

**TOWNSHIP OF BOONTON  
MORRIS COUNTY, NEW JERSEY**

**MUNICIPAL STORMWATER  
MANAGEMENT PLAN**



April 2005

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## **Introduction**

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Boonton Township (“the Township”) to address stormwater-related impacts. N.J.A.C. 7 requires the creation of this plan: 14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A “build-out” analysis has been included in this plan based upon existing zoning and land available for development. The plan also addresses the review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standard is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

## **Goals**

The goals of this MSWMP are to:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project;
- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;
- Minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- Protect public safety through the proper design and operation of stormwater basins.

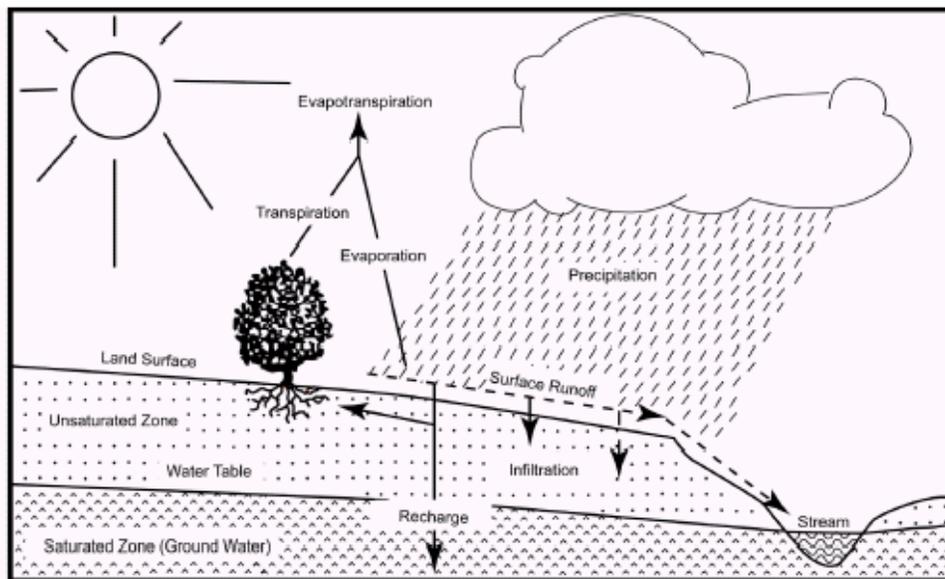
To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

## **Stormwater Discussion**

Land development can dramatically alter the hydrologic cycle (See Figure C-1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly

intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration, which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

**Figure C-1: Groundwater Recharge in the Hydrologic Cycle**



Source: New Jersey Geological Survey Report GSR-32.

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In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

## **Background**

The Township encompasses 8.6 square mile area in Morris County, New Jersey. In recent years, the Township has been under moderate development pressure. The population of the Township has increased from 3273 in 1980, to 3566 in 1990, to 4287 in 2000. This population increase has resulted in moderate demand for new development; changes in the landscape have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. Figure 1 illustrates the waterways in the Township. Figure 2 depicts the Township boundary on the USGS quadrangle maps. Figure 3 depicts the groundwater recharge areas for the Township.

The major river that traverses the Township is the Rockaway River. There are minor tributaries within the Township, the most significant of which is the Beaver Brook, as identified in Figure 1. The Rockaway River and the Beaver Brook are both classified as moderately impaired according to AMNET data. Monitoring indicates that the headwaters and portions of the mainstream are not impaired, but impairment does tend to occur at the outlets of lakes and at the downstream ends of tributaries.

## **Water Quality**

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

The Township of Boonton Environmental Resource Inventory dated 2001 provides an extensive discussion on the waterways of the Township including reports of ground water studies and water quality.

### **Water Quantity**

The Township has exhibited minor water quantity problems including flooding, and stream bank erosion. Recent projects within the Township to address these problems have been the purchase of four homes, which periodically experienced severe flooding along the Rockaway River under a FEMA grant made available as a result of damage from Hurricane Flood in 1999. In that same area the Township implemented a riverbank-planting project in conjunction with the Rockaway River Watershed Cabinet.

Boonton Township is located within Watershed Management Area (WMA) 6. Within the Township two HUC-14s are designated, they are the Rockaway River Watershed and Whippany River Watershed as shown in Figure 4 Wellhead protection areas, also required as part of the MSWMP, are shown in Figure 5.

## **Design and Performance Standards**

The Township will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. The ordinances will be submitted to the county for review and approval within [24 months of the effective date of the Stormwater Management Rules.]

During construction, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

## **Plan Consistency**

The Township is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Township; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDLs. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Township's Stormwater Management Ordinance will require all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Township inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

## **Nonstructural Stormwater Management Strategies**

The Township has reviewed the master plan and ordinances, and has provided a list of the sections in the Township land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 24 months of the effective date of the Stormwater Management Rules. A copy will be sent to the Department of Environmental Protection at the time of submission.

**A.** Chapter 102, Land Use of the Code of the Township of Boonton was reviewed with regard to incorporating nonstructural stormwater management strategies.

Several recommended amendments were identified to Part 3, Development Review, Article IX, On-Tract Improvements; Construction and Design Standards, to incorporate these strategies.

**Section 102-48B, General standards**, requires the development to conform to design standards that will encourage good development patterns in the Township. This section will be amended to encourage low impact development and to require compliance with this Plan and the Stormwater Control Ordinance, when adopted.

### **Section 102-49, On-tract improvements for subdivisions:**

**Section 102-49A, Streets, curbs and sidewalks, Paragraph (6) Pavement and Curbs**, provides that concrete or granite block curbs shall be installed along all streets, except private roads or roads in the R-130 District when it is demonstrated that surface water runoff can be adequately handled in drainage swales. This section will be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

**Section 102-49A, Streets, curbs and sidewalks, Paragraph (7) Drainage swales**, currently permits drainage swales only in connection with private streets and, at the discretion of the Planning Board, on longer stretches of roads in sensitive areas. This section will be amended, as will the specifications for drainage swales in Appendix 1, to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

**Section 102-49A, Streets, curbs and sidewalks, Paragraph (8), Drainage**, provides for adequate provisions for culverts, storm sewers and detention and/or retention basins as needed. This section will also be amended to allow for the use of vegetated swales.

**Section 102-49A, Streets, curbs and sidewalks, Paragraph (19), Dead-end streets**, provides for a turn around or cul-de-sac having an outside radius of not less than 40 feet and a right-of-way radius of 50 feet, and provides an alternative to the paved forty-foot right-of-way of a twenty-five-foot wide pavement around a vegetation island having a diameter of 50 feet with a right-of-way radius of 50 feet.

**Section 102-49A, Streets, curbs and sidewalks, Paragraph (29), Shade Trees**, requires that developers plant nursery grown shade trees not less than 9 feet from the curb line and not more than 50 feet apart. In addition, Part 5 of Chapter 102, the Tree Protection and Removal Ordinance, restricts the removal of mature trees in the Township. A tree protection and removal plan as well as a soil erosion and sediment control plan must be approved as part of any application to the Planning Board for site plan or subdivision approval or for any clearing of any land or land disturbance in the Township. The purpose of the ordinance is to minimize land disturbance and to provide for surface water retention and drainage, a nonstructural stormwater management strategy. These sections will be amended to require the identification of forested areas and for the protection of a portion of such areas from disturbance.

**Section 102-49C, Lots**, will be amended to require limits of disturbance.

**Section 102-49F, Utilities, easements and natural features**, requires that a stormwater or drainage easement be conveyed to the municipality where a subdivision is traversed by a watercourse, drainage way, channel or stream. This section also requires a conservation easements to protect scenic vistas, open space, historical areas, soil types, steep slopes, rock outcroppings, preservation of trees, watercourses, animal life and to eliminate excessive noise. All easements require that no vegetation be removed or destroyed in the easement area, except in accordance with approved forest management practices. Amendments will be considered to this section to include forested areas to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to trees and the other protected features.

**Section 102-49G, Critical areas**, is designed to protect steep slopes and wetlands. Steep slopes easements are required for any area having a slope of 25% or greater. Within the easement no disturbance of soil and healthy vegetation may take place.

**Section 102-49H, Lot grading plans**, requires a lot-grading plan before there may be any disturbance of a lot. The lot-grading plan must provide for the proper disposition of surface water runoff and for appropriate storm drainage facilities for downstream properties. This section will be amended to require that applicants provide a layout of the existing vegetated areas and a description of the conditions in those areas.

**Paragraph (13)** provides limits of disturbance for different slope categories.

**Section 102-51, On-site installation for site plans:**

**Section 102-51C, Parking, subparagraph (2), Drainage**, requires that all parking and loading areas shall be graded and equipped with adequate drainage facilities in accordance with Schedule B as approved by the Township Engineer. Schedule B will be amended to conform to the Stormwater Regulations.

**Section 102-51C, Parking subparagraph (5), Curbing**, provides that parking areas and driveways shall be enclosed by concrete or granite block curbing six inches above the paved surface when required by the Planning Board. This section will be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

**Section 102-51C, Parking subparagraph (6), Screening**, provides that non-residential parking and loading areas be screened from residential zones by a fence but also allows for a hedge or other natural landscaping if approved by the Planning Board as well as landscaped berms.

**Section 102-51C, Parking subparagraph (9), Size of parking spaces**, provides for a minimum width of 10 feet and a maximum length of 20 feet. This section will be amended to provide for a stall length of 18 feet to allow for vehicle overhang into a vegetated area.

**Section 102-51C, Parking subparagraph (10), Parking aisle width and parking location**, provides that the width of services aisles and the location of parking shall be as provided in Schedule C.

**Section 102-51D, Sidewalks**, provides for the construction of sidewalks in appropriate locations between buildings and parking lots. This section will be amended to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces, or use permeable paving materials where appropriate.

**Section 102-51F, Landscaping**, requires all portions of a property not used for off-street parking to be landscaped with grass lawns, trees and shrubs. One tree is required for each 10,000 square feet of parking area or part thereof. This section will be amended to encourage the use of low maintenance vegetation in place of turf grass and berms.

**Section 102-51H, Stormwater management**, requires compliance with the Township Stormwater Management Ordinance. The Stormwater Management Ordinance will be revised to comply with the new regulations and “Best Management Practices” (BMP) as promulgated by the State.

**Section 102-51J, Trash, garbage and recyclable materials**, requires that provision be made on-site for the orderly deposit, storage and collection of trash, garbage and recyclable materials. Such materials must be stored in suitable containers in fenced or walled enclosures adjoining a sidewall of a building and not facing a street or residential area. Such materials must further be protected from the elements to eliminate the potential for accumulation or scattering of debris. Garbage must be stored in airtight and/or leak proof covered metal containers. The Board of Health and the Fire Prevention Bureau must approve the garbage disposal program for the site.

**Section 102-51K, Requirements for multifamily housing developments, subparagraph (1), Off-street parking and internal roadways**, requires that off-street parking areas and roadways be paved, bounded by permanent curbing and constructed

in accordance with Township of Boonton road specifications. This section will be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

**Section 102-51K, Requirements for multifamily housing developments, subparagraph (2), Landscaping and open space**, provides that a minimum of 40% of the entire tract shall be used as common open space and facilities. The common open space must be attractively landscaped with grass lawns, trees and shrubs. Existing trees and natural features are to be preserved. Sidewalks are to be constructed in accordance with Township sidewalk requirements. Fences, hedges or other natural landscaping may be used as buffers between common facilities and residential units. The Board of Health must approve trash disposal methods.

**B. Part 6. Flood Damage Prevention.** Among the stated purposes of this portion of the Land Use Ordinance, is the protection of natural features, erosion control, flood control, control of defoliation and protection of aquifer-recharge areas. The ordinance also identifies water resource conservation areas containing valuable environmental qualities that are best retained in substantially an undeveloped state. In addition to major bodies of water, these water resource conservation areas include all unnamed streams and bodies of water shown on the flood maps or that may exist or come to exist in the Township. Section 102-123 regulates the activities permitted in these water resource conservation areas and generally prohibits all construction or alteration of the land. The Township is investigating implementing a stream corridor protection ordinance to require buffer areas along watercourses. The ordinance will regulate activities within the buffer zones.

**C. Part 8, Zoning**, of the Township Code, describes the 11 zoning districts in the Township. Eight of the districts are residential including an assisted senior housing district. There is a small Office Building District consisting of only three separate properties and a small Retail Business District, consisting of a single property all of which are located on the southeast portion of the municipality. There is also a Business Park District located in the middle of the Township, which is more extensive than either of the other non-residential districts. The majority of the remaining undeveloped property in the Township is located in the R-130 zone, which has a maximum density of one detached single-family dwelling for every three and one-half acres. The Township does not have a cluster ordinance but instead addresses open space through large lot zoning and open space acquisitions.

The maximum impervious coverage limitation in the BP Zone is 15%. The Township currently provides for maximum building coverage in residential districts. The Township is evaluating an ordinance to establish maximum impervious coverage requirements for each residential zone. If a developer is granted a variance to exceed the maximum percent impervious surface requirements, he will be required to mitigate the impact of the additional impervious surfaces. The mitigation effort must address water quality, flooding, and groundwater recharge. A detailed description of how to develop a mitigation plan is included in this Municipal Stormwater Management Plan.

**Schedule A** sets forth the Road Widths and Specifications. This Section will be revised to comply with Subchapter 4, Street & Parking, as set forth in the "Residential

Site Improvement Standards” (R.S.I.S.) New Jersey Administrative Code, Title 5, Chapter 21, as revised January 20, 2004.

The “Pavement Section” for all municipal roads shall be comprised of a 2” thick top course of bituminous concrete, Mix I-5, an intermediate course of bituminous stabilized base, Mix I-2, 3” thick and a base course of dense graded aggregate (D.G.A.), 4” thick. All thickness are compacted thickness. All materials and methods of construction shall comply with the current specifications of the N.J.D.O.T.

The curbs and sidewalks regulations for subdivisions along private roads will be revised to state that curbing may be required for drainage control and to recommend curb cuts or flush curbs to dissipate street drainage into vegetated swales or infiltration trenches and to allow for the disconnection of impervious surfaces as set forth in the BMP manual. Sidewalks are not required.

The road specifications for subdivisions along private roads shall be amended to provide for a minimum right-of-way width of 40 feet for a private road with the pavement width to be in accordance with R.S.I.S. standards. The pavement composition and thickness shall be the same as for all other roads in the Township.

The specific regulations for subdivisions in the R-130 zone will be deleted since all lots are covered by the R.S.I.S., the Stormwater Regulations and BMPs.

**Schedule B** sets forth the Storm Drainage Design Standards, which will be amended to reference the Stormwater Regulations.

**Schedule C** establishes Parking Aisle Widths and Location of Parking and Loading Areas.

**D. Chapter 127, Streets, Article III, Driveways**, describes the procedure for construction of a new driveway or access to any street. Driveways are required to have a minimum width of nine feet to a point of fifty feet from the road right-of-way. §127-21B. Driveways are also required to be constructed and maintained in such a manner as to prevent erosion of the soil and its deposition upon the streets, gutters, catch basins, inlets, drains or culverts. §127-21C. §127-21D provides that driveways must be constructed in a manner as not to interfere with the drainage along the existing pavement or traveled way. Water may not be discharged more than two feet beyond the curb, where curbs are installed and no ditch or gutter exists. This Article will be amended to allow the use of pervious paving material to minimize stormwater runoff and promote groundwater recharge.

## Land Use/Build-Out Analysis

Currently within Boonton Township there is approximately 2,158 acres of vacant land. Of this vacant land, 718 acres are preserved as Open Space and 185 acres are preserved farmland, as shown on Figure 6 Existing Land Use Plan and Figure 8 Zoning Districts. It is anticipated that an additional 1,318 acres will be preserved as part of the Township's Open Space program and 185 additional acres will be preserved as Farmland.

Most remaining undeveloped areas of Boonton Township are replete with environmental constraints or otherwise include conditions which are discouraging to development or which demand a very low-density approach to development. See Figure 7 Land Use Land Cover. Among these conditions are the following:

- Geology (Pre-Cambrian bedrock and Stratified Drift deposits)
- Steep slopes and rock outcrop
- Wetlands
- Flood hazard areas
- Aquifer recharge areas
- Stream quality
- Wildlife habitats and endangered plant and animal species

Significant changes to the 3 1/2-Acre Residential designation are recommended. One such change involves enlargement of the area classified by the addition of lands currently included in the 2-Acre Residential classification.

## Mitigation Plans

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. Presented is a hierarchy of options.

1. The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.
2. The applicant can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information on the projects can be obtained from the Township Engineer. Listed below are specific projects that can be used to address the mitigation requirement.
3. The municipality may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.