

# Borough of River Edge Municipal Stormwater Management Plan

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Date of Plan: May 19, 2005  
Revised Date: February 16, 2007  
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## Sources :

Borough of River Edge Master Plan, 1984.  
Borough of River Edge Master Plan Revisions, 1990,  
1996, 2003  
Natural Resources Inventory, Borough of River Edge,  
2004 Passaic River Coalition

## **Introduction**

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of River Edge ("the Borough") to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-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 baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for future stormwater facilities.

A "build-out" analysis has not been included in this plan based upon existing zoning and land available for development. The Borough qualifies for the exemption. See the Land Use/Build-Out Analysis section of the plan for more information. (Figure C-9 and C-12) The plan also addresses the review and update of existing ordinances, the Borough 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 standards 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. 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. (**References:** Borough of River Edge; Stormwater Management Ordinance #1542 and New Jersey Stormwater Best Management Practices Manual: [www.njstormwater.org](http://www.njstormwater.org).)

## **Stormwater Discussion**

Land development can dramatically alter the hydrologic cycle (See Figure C-1) of a site and, ultimately, an entire watershed. Also see C-2 for the groundwater recharge of River Edge. 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.

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**

### **Description:**

The Borough encompasses a 1.9 square mile area in Bergen County, New Jersey. In recent years, the Borough has been under significant re-development pressure. The population of the Borough has changed from 11,111 in 1980, to 10,603 in 1990, to 10,946 in 2000. The gradual change in population has led to an increase in the number of housing units in the borough. In 1970 the numbers of housing units were 4,112 and in the year 2000 the numbers of housing units are 4,210. Anticipated changes in the landscape will most likely increase stormwater runoff volumes and pollutant loads to the waterways of the municipality. Figure C-3 illustrates the waterways in the Borough. Figure C-4 depicts the Borough boundary on the USGS quadrangle maps.

### **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 two major rivers that border the Borough to the east and west, the Hackensack River and the Van Saun Mill Brook, respectively, have not been investigated by the Borough to determine whether or not they are impaired. If the Borough, the County, State or other governmental entity determines these rivers are impaired waterways the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for each waterway.

The State of New Jersey assigns a surface water classification to the Hackensack River of FW2-NT(C1) as water located in the Hackensack Basin. This label means that it is general surface water that does not support trout production or maintenance.

**Waterway Health:**

As per New Jersey Integrated Water Quality Monitoring and Assessment Report, Hackensack River is impaired above Old Tappan gage, Oradell to Old Tappan gage, Fort Lee road to Oradell gage, Bellmans creek to Fort Lee road, above Paterson avenue, below Paterson avenue, Route 3 to Bellmans creek, Amtrak bridge to Route 3 and below Amtrak bridge. Van Saun Mill Brook is not impaired as per New Jersey Integrated Water Quality Monitoring and Assessment Report. (To see New Jersey Integrated Water Quality Monitoring and Assessment Report and List of Impaired Waters: Go to <http://www.state.nj.us/dep/wms/bwqsa/generalinfo.html>)

The New Jersey Integrated Water Quality Monitoring and Assessment Reports are intended to provide effective tools for maintaining high quality waters and improving the quality of waters that do not attain their designated uses. The Integrated Reports describe attainment of the designated uses specified in New Jersey's Surface Water Quality Standards (N.J.A.C. 7:9B), which include: aquatic life, recreation, drinking water, fish consumption, shellfish consumption, industrial and agricultural.

**Existing Stormwater Features:**

Borough of River Edge has one (1) Detention Pond which is located on block 1201, lot 1 at the intersection of State Route 4 and Davis Drive, owned and maintained by Borough of River Edge. The Borough does not an existing groundwater assessment.

**Storm/Sanitary Sewer System:**

The Borough of River Edge Sanitary and Storm System are not a combined system. Sewers were planned for the northern sections of the town in 1915. Thereafter, sewer extension projects were undertaken on as needed basis until the entire town was serviced. The Borough had three pumping stations located at Eastbrook, Wayne and Woodland Avenue. Two of the stations at Eastbrook and Woodland were eliminated when the Borough entered into an Interlocal agreement with the Borough of Paramus to process the sewerage for the 200 homes previously serviced by the pumping stations. The Borough also entered into an Interlocal agreement with the Borough of Paramus to service 90 homes when the Kimberly Way development was constructed.

One other Interlocal agreement exists with the City of Hackensack to service one commercial property.

In September 1989 a study on infiltration and inflow was performed by the engineering firm of Clinton Bogert on several sewer mini-systems. Other study or T.V. work is performed on an as needed basis as recommended by the Sewer Subcommittee of the Mayor and Council. A Sewer Subcommittee of the Mayor and Council meets on an almost monthly basis to investigate, discuss and issue recommendations on sewer, storm, drainage and water related issues. Staff is represented by the Borough Engineer, Superintendent of Public Works and the Borough Administrator/CFO. Two elected officials presently serve on the subcommittee, citizens have served and minutes are kept. Several major repair and/or reconstruction projects have resulted from the subcommittee's recommendations and emergency repairs have also been performed.

Town wide the Borough's sewerage is processed by the Bergen County Utilities Authority (BCUA) either through a direct link or via its Interlocal agreements. All sections of the town are hooked up through mini-systems to the BCUA lines. A complete map of the Borough's sewer and storm system was compiled in December, 2002 by Costa Engineering.

**Master Plan:**

The Borough of River Edge Master Plan was developed by Barry M. Barovick, a professional planner and was reviewed and accepted by the Planning Board on April 1, 1984. The Master Plan has been reviewed as per the statute (N.J.S.A.40:550-89) and has included recommendations for a housing plan element and a fair share plan and a recycling plan for source separation on May 23, 1990. On November 21, 1996, a subsequent review indicated that no changes were recommended. The most recent review was accomplished on August 21, 2003. It cited a disrepair and neglect in certain commercial areas located south of Main Street and on Kinderkamack Road. It recommended a revitalization and/or redevelopment plan for these areas.

**ORDINANCES:**

The Stormwater Management Regulations require that municipalities adopt and enforce ordinances in several areas to eliminate or limit the impact of non-point

pollution. The Borough of River Edge has complied in the following manner:

Pet Waste: Section 122-14 of the Borough Codification of Ordinances requires that pet owners properly dispose of their pet's solid waste.

Litter: Section 272 of the Borough of River Edge Codification of Ordinances regulates the placement of litter and provides for violations and penalties.

Wildlife Feeding: Section 122-19 of the Borough of River Edge Codification of Ordinances was adopted via Ordinance #1437, dated 9/2/03, which prohibits the feeding of any wildlife in a public park or on any property owned or operated by the municipality.

Yard Waste/Collection: Section 358 Article IV and Article VI of the Borough of River Edge Codification of Ordinances provides for the disposal of grass and foliage. The section was amended via ordinance #1440, 9/15/03 to restrict the placement in the road to not more than three feet and not within ten feet of any storm sewer inlet.

Waste Disposal: Section 343 of the Borough of River Edge Codification of Ordinances prohibits the improper spilling, dumping or disposal of materials other than what would be appropriate for a storm or a sanitary sewer.

## **Water Resources in River Edge**

### ***C-1 Rivers:***

Streams in River Edge include Van Saun Mill Brook, its tributaries, and Coles Brook. These streams flow into the Hackensack River, which forms the eastern boundary of River Edge. The land areas that supply water to these streams, their subwatersheds or drainage areas are depicted in Figure C-3. "The DEP is designating a special level of protection for a number of waterways in New Jersey. This protection, known as Category One, targets water bodies that provide drinking water, habitat for Endangered and Threatened species, and popular recreational and/or commercial species, such as trout or shellfish. Waterways can be designated Category One because of exceptional ecological significance, exceptional shellfish resource, or exceptional fisheries resource. The Category One designation provides additional protections to waterbodies that help prevent water quality degradation and discourage development where it would impair or destroy natural resources and environmental quality. The Borough of River Edge does not have any C-1 waterways. See Figure C-7 which

depicts on a map of River Edge whether any C-1 waterways exist. The watershed of the Hackensack River covers a much larger area, and extends into New York State. A portion of the Hackensack River is designated C-1 and that is where it starts at the New York/New Jersey State line to the Oradell Dam.

**Watershed:**

The Borough of River Edge is located in Watershed Management Area 5; this is illustrated on Figure C-8. The watershed area is broken down into smaller components called (HUC 14's) because they have a 14 digit code. The Hackensack River, which runs north to south through River Edge, has a HUC 14 Code of (0203010318005P) and is part of a subwatershed described as "Hackensack R (Bellmans Creek to Fort Lee Road)".

\* Additional information from NJDEP web-site:  
[www.nj.gov/dep/watershedmgt/](http://www.nj.gov/dep/watershedmgt/)

**Recharge:**

In order to sustain the fish and other life in these streams and the Hackensack River, it is essential that the recharge capabilities of the land in River Edge be retained so that water seeps slowly into these streams in dry weather.

The New Jersey Geological Survey has developed a method for evaluating ground water recharge in New Jersey. The method relies on estimating a soil-water budget, where the following equation applies:

recharge = precipitation - surface runoff -  
evapotranspiration

The report on this method recognizes the many interactions that control ground water recharge. Many climate, soil, and vegetation factors strongly influence the principal processes that control ground water recharge. The most important climatic factors are the amount, intensity, and form of precipitation. Climate also influences recharge through its effects on evapotranspiration, mainly solar radiation, wind humidity, and air temperatures. Soil properties are decisive factors in the recharge process. These properties exert strong control on the permeability, water-holding capacity, water content prior to a precipitation event, and the depth of plant roots. In addition, land use and land cover affect the surface

conditions of the soil, which can enhance or reduce infiltration. The type of vegetation also influences recharge through controls on evapotranspiration, interception of precipitation and surface runoff.

The method developed uses available data to estimate average annual ground water recharge rates based on the soil-water budget equation given above. Wooded areas have the highest recharge rates because the vegetation detains storm water and facilitates its percolation into the ground. The recharge capabilities of the land in River Edge have been mapped, and are shown in Figure C-2.

***Flooding:***

In areas where storm water is allowed to percolate into the ground, stream flow is maintained by the gradual discharge of water stored in the ground. Disturbing the soils or removing vegetation in those areas would diminish stream flow, especially during drought. Inappropriate development that increases impervious cover increases flooding, because storm water runs off rapidly instead of percolating into the ground and seeping out slowly. There should be concern in all areas of River Edge to assure that more storm water seeps into the ground and that less runs off rapidly to cause floods.

Flood plains are areas located along rivers and streams that were formed by the action of seasonal floodwaters over time. Flooding is exacerbated by increases in impervious cover and compacted soils, which change surface conditions and thereby increase the velocity and volume of surface runoff. Preserving flood plains in a natural state is essential to reducing flooding problems. In New Jersey, the flood plain is regulated by the New Jersey Department of Environmental Protection (NJDEP) under the Flood Hazard Area Control Act of 1979. Flood Hazard Areas can be expected to flood at least once in a hundred years. Flood Hazard Areas are divided into the stream channel, the floodway, and flood fringe areas. Floodways flood frequently, at least once in ten years. Flood Hazard Areas in River Edge are shown on Figure C-5. Also shown in Figure C-5 are areas beyond the Flood Hazard Areas, where flooding may be expected to occur at least once in 500 years. These areas would grow in size and flooding problems would increase, if less water could soak into the ground in these areas in the future.

The NJDEP also regulates land use along some tidal waterways in River Edge in compliance with the Waterfront Development Law, which was adopted in 1914. The regulated waterfront area includes tidal waterways "and all lands lying thereunder, up to and including the mean high water line, and adjacent upland land areas extending landward of the mean high water line to the first paved public road, railroad or surveyable property line existing on September 26, 1980 generally parallel to the waterway, provided that the landward boundary of the upland area shall be no less than 100 feet and no more than 500 feet landward of the mean high water line." The location of the head of tide on the Coles Brook is shown in Figure C-5. The entire waterfront along the Hackensack River in River Edge, as well as the lower portion of Coles Brook, is tidal, and is regulated under the Waterfront Development Law. Within the regulated zones any development or changes in land use must be reviewed and permitted by NJDEP. To mitigate problems associated with flooding, the Borough has had a documented interest in creating a buffer along the Hackensack River. From 1990 to 1994, the County of Bergen represented by Chester P. Mattson, the Director of Planning & Economic Development, discussed with the Borough the construction of the "Hackensack River Pathway". In 2002 and 2003, an application was made to the State of New Jersey, Department of Environmental Protection, Division of Parks & Forestry, Office of Natural Lands Management. In 2003, a Recreation Trails Program Grant was made for the Kenneth B. George Park. These grants were not funded.

Recently, the Mayor of the Borough of River Edge has called for a meeting of towns along the Hackensack River to discuss its dredging/desilting and desnagging. Charlotte Vandervalk, Assemblywoman for the 29<sup>th</sup> District has made a similar effort and the Borough is monitoring those efforts as well. Figure C-10 or the Zoning Map of the Borough does indicate that the Borough has obtained title to the vast majority of land that abuts the Hackensack River, which is subject to flooding.

It is the intention of the Borough that where the opportunity presents itself and funding is available, the Borough would continue its past practice of acquiring land for recreational and conservation purposes.

**Wetlands:**

Ground water also seeps into wetlands and keeps them healthy. The protection of the natural functioning of wetlands is important for many reasons. Wetlands slow and absorb storm water runoff before it reaches a stream. Wetlands help to reduce flooding. Wetlands allow sediments, including phosphorus in particulate form, to settle in the wetland instead of filling up the stream. Wetlands provide time for the vegetation in the wetland to absorb the nutrients in the runoff water, such as nitrogen compounds. Wetland areas in River Edge are mapped in Figure C-6. Wetlands are regulated in New Jersey under the Freshwater Wetlands Protection Act. Under the regulations developed pursuant to this act a fifty foot transition or buffer area is required around freshwater wetlands in River Edge. Nevertheless, wherever a larger buffer that is naturally vegetated can be maintained or restored, the natural functions of a wetland will be better protected.

**Drinking Water:**

The Borough's water supply is provided by the United Water Company. There are no public wells that might be used as a drinking water supply. The water that comes from wells is ground water which is replenished by recharge. In River Edge there are no "public community" wells. There may be "public non-community" wells, which serve 25 or more people but are not used every day like "public community" wells. The Borough has researched the availability at the locations of well head protection areas around any public non-community wells. No information has been found, therefore no mapping is presented.

**Design and Performance Standards**

The Borough 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, Borough inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. (Reference: Borough of River Edge; Stormwater Management Ordinance # 1542: Section 6)

### **Plan Consistency**

The Borough is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Borough; 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 Borough's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Borough inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the Bergen County Soil Conservation District and co-ordinate any corrective measures with their office's.

### **Nonstructural Stormwater Management Strategies**

The Borough will review the master plan and ordinances, and will provide a list of the sections in the Borough land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. 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.

Chapter 49 of the Borough Code, entitled Land Use Procedures, will be reviewed with regard to incorporating nonstructural stormwater management strategies. Recommendations for changes will be considered to this Chapter to incorporate these strategies.

The Borough will consider changing its design and performance standards to incorporate nonstructural Stormwater Management strategies.

These strategies fall into five major categories: Vegetation and Landscaping, Minimize Land Disturbance, Impervious Area Management, Time of Concentration Modifications and Preventative Source Controls. Examples of strategies that might be used in these categories are listed below:

- Inventory existing site vegetation.
- Inventory existing soils and slopes.
- Specify % of site to be cleared.
- Specify % of multi-level parking deck and parking beneath buildings.
- A listing of the number and location of trash receptacles, pet waste stations and inlets.
- Acquisition of land along any waterway for the purpose of pathways and buffers.
- Planting of 25' buffer on waterways.
- Shade Tree Commission regulations such as: restriction or removal of shade trees without the Borough's permission and regulations on the replanting and number of trees in other locations based on the clearance of others.

### **Land Use/Build-Out Analysis**

If a municipality can document that it has a combined total of less than one square mile of vacant or agricultural lands, the municipality is not required to complete a build-out analysis.

A detailed land use analysis for the Borough was conducted. Figure C-12 illustrates the existing vacant land use in the Borough based on the 2004 extended Tax Duplicate.

One square mile is equal to 640 acres of land. Figure C-9 illustrates that the Borough of River Edge has only 5.57 acres of vacant or agricultural lands. It is therefore exempt from the Master Plan Review and build out analysis.

Figure C-11 depicts the land usage in terms of land use and cover. Figure C-10 depicts the zoning classifications based on the ordinances of the Borough.

## **Mitigation Plans**

A mitigation plan is required to grant a variance or exemption from the design and performance standards of a municipal stormwater management plan. The mitigation requirements should offer a hierarchy of options that clearly offset the effect on groundwater recharge, stormwater quantity control, and/or stormwater quality control that was created by granting the variance or exemption.

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.

### **Mitigation Project Criteria**

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 Borough Engineer.

## Stormwater Quantity Considerations

Increased stormwater runoff volume from new development can cause damages to property and habitat due to increased flood elevations and/or flood velocities. Mitigation project areas can include locations that will provide for additional storage and slower release of excess stormwater. Mitigation of stormwater quantity can be accomplished by increasing (BMPs) to control previously uncontrolled runoff or by retrofitting existing stormwater structures to decrease the volume and peak of runoff.

In areas adjacent to the stream, a hydrologic and hydraulic analysis can be performed to determine if increasing storage capacity would offset the additional volume of runoff and associated peak increase from sites upstream of the storage area. Increase in the storage capacity of an existing structure, such as upstream of a bridge or culvert, can also be considered provided that it is demonstrated that such an increase does not exacerbate flooding at other areas.

Note that work in regulated areas, such as floodplains and wetlands must be performed in accordance with applicable regulations such as the Flood Hazard Area Control Act Rules and the Freshwater Wetland Act Rules. Also, many areas of open space in New Jersey have received funding by the Department's Green Acres Program and many of those encumbered placed on these lands must be investigated by the Borough of River Edge before these areas can be utilized for mitigation to ensure that there are no conflicts.

Some examples of areas or features sensitive to changes with regard to flooding include:

- Culverts and bridges-these features may constrict flow and cause flooding or may provide storage that, if lost, would cause downstream flooding problems
- Property subject to flooding-areas of concern include those where there is historical evidence of recurrent problems, particularly if exacerbated over time because of increasing impervious surface in the contributing watershed
- Eroding/widening stream banks or channels-particularly

if due to changes in hydrology due to effects of development

- Category One waters-flooding affects could alter habitat that was the basis for the designation
- Wetlands-changes in hydrology can affect viability of wetlands, either by increasing or decreasing volumes and velocities of water discharging to the wetlands

Listed below is specific project that can be used to address the mitigation requirement.

Redirect Stormwater flow from Valley Road to the retention pond at Davis Drive instead of the present outlet to Van Saun Mill Brook.

One method to accomplish ground water recharge mitigation is to discharge runoff as sheet flow across a vegetated area to allow for the infiltration of runoff. It should be noted that, if this measure is used, calculating compliance with the recharge standard is limited to the 2-year storm standard, given existing methods.

Some examples of areas or features sensitive to ground water recharge changes include:

- Springs, seeps, wetlands, white cedar swamps-sensitive to changes in ground water level/hydrology
- Threatened and endangered species or their habitats-some are sensitive to changes in ambient ground water levels
- Streams with low base flow or passing flow requirements-would be particularly sensitive to changes in hydrology
- Aquifer recharge zones-loss of recharge in these areas can adversely affect ground water supply
- Category One waters-loss of base flow can affect many of the bases for designation

Listed below is specific project that can be used to address the mitigation requirement.

Replace the existing impervious parking lots at the Borough's Tenney Avenue Municipal and Police, and Library locations with permeable paving to provide groundwater recharge. An infiltration chamber system may be used and due to site constraints, the retrofit BMP must be installed underground and cannot reduce the existing number of parking spaces. The BMP (NJ Stormwater Best Management Practices Manual, Chapter 4, Page 4-2, Table 4-1) are subject to the approval of the Borough.

3. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in paragraph 1 or 2, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. For example, if a variance is given because the 80 percent TSS requirement is not met, the selected project may address water quality impacts due to a fecal impairment. Listed below are specific projects that can be used to address the mitigation option.

#### Water Quality

- Establish a vegetative buffer along 2,850 linear feet of the shoreline at Kenneth B. George Park as a goose control measure and to filter stormwater runoff from the high goose traffic areas.
- Provide goose management measures, including public education at Kenneth B. George Park.

#### Identification of Specific Mitigation Projects

As discussed above, mitigation projects should be selected after examining existing problems related to stormwater quality, quantity and recharge in the affected drainage area. Municipal mitigation plans can be a very effective means to address existing problems resulting from stormwater management while ensuring that existing problems are not made worse and new problems are avoided.

Where a list of mitigation projects is identified, the plan must also identify the type of design and performance standard the individual projects may mitigate. Whenever possible, quantification of the mitigation provided by each

project relative to the applicable standard should also be included.

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.

#### Stormwater Quality Considerations

Stormwater quality is regulated for the purpose of minimizing/preventing nonpoint source pollution from reaching the waterway. Mitigation for stormwater quality can be achieved either by directing the runoff from the water quality design storm into a natural area where it can be filtered and/or infiltrated into the ground, by constructing a new BMP to intercept previously untreated runoff or by retrofitting existing stormwater systems that previously did not provide sufficiently for water quality.

Existing forested and other vegetated non-wetland areas also be used as a water quality mitigation area if runoff is discharged as sheet flow through the area in a non-erosive manner, and the vegetated area is restricted from future development. A discussion of the appropriate widths for these vegetative filters is provided in Chapter 9 of the New Jersey Best Management Practices Manual (BMP Manual)

If a mitigation project cannot be identified that would compensate for a waiver related to water quality, and provided the project requiring a waiver would not result in a measurable change in water quality relative to TSS and nutrients, the mitigation project could be designed to address another parameter of concern in the watershed (as indicated by an impairment listing and/or an adopted TMDL) for which stormwater is a source, such as fecal coliform.

Some examples of areas or features sensitive to water quality changes include:

- Trout associated waters-chemical pollutants and temperature effects can diminish viability of

populations

- Lakes, ponds or other impoundments—these waterways are sensitive to addition of nutrients
- Threatened and endangered species or their habitats—sensitive to both quality and quantity changes
- Drinking water supplies—adverse affects on quality can increase the cost of treatment or threaten the use
- Category One waters—an issue where quality was the basis of the designation Waterways with a water quality or use impairment—deterioration of quality in an impaired waterways will increase the cost and challenge of restoration

Listed below is specific project that can be used to address the mitigation requirement.

Best retrofit the existing parking area at the western side of River Dell Middle School to provide the removal of 80 percent of total suspended solids. Due to site constraints, the retrofit BMP must be installed underground and cannot reduce the existing number of parking spaces. The BMP (NJ Stormwater Management Practices Manual, Chapter 4, Page 4-2, Table 4-1) are subject to the approval of the Borough.

#### Ground Water Recharge Considerations

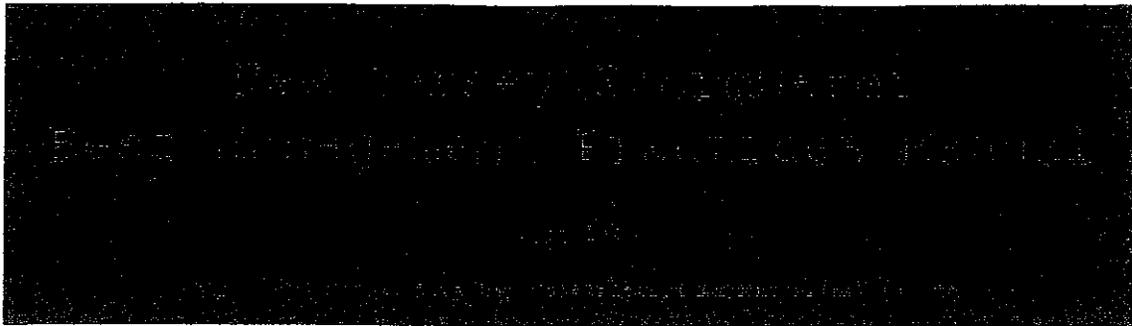
Recharge is regulated to maintain the availability of ground water as a water supply source as well as to provide a stable source of base flow in streams.

There are two requirements associated with the recharge standard. The first is that 100 percent of the site's average annual pre-developed ground water recharge volume be maintained after development and the second is that 100 percent of the difference between the site's pre- and post-development 2-year runoff volumes be infiltrated. To mitigate for groundwater recharge design requirements, either computational method can be utilized to determine

the volume lost that needs to be provided by the mitigation project.

## **Penalties**

Any person who erects, constructs, alters, repairs, converts, or maintains, or uses any building, structure or land in violation of this ordinance, shall be subject to the penalties: [To be determined by Borough of River Edge Mayor and Council].



# Model Stormwater Control Ordinance for Municipalities

**Important note:** *This sample ordinance is provided to assist municipalities in the development of municipal stormwater control ordinances and the incorporation of design and performance standards into municipal stormwater management plans. It is provided for information purposes only. It is important that current regulations are carefully reviewed before any portion of this draft ordinance is adopted.*

*Notes are provided in italics throughout this model stormwater control ordinance, and are not intended to be adopted as part of the ordinance.*

*This model ordinance does not include a section on fees. The Department expects that the review of development applications under this ordinance would be an integral part of the municipal review of subdivisions and site plans. As a result, the costs to municipalities of reviewing development applications under this ordinance can be defrayed by fees charged for review of subdivisions and site plans under N.J.S.A. 40:55D-8.b.*

## Section 1: Scope and Purpose

## A. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural BMPs. Structural BMPs should be integrated with nonstructural stormwater management strategies and proper maintenance plans. 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. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

*Note: Municipalities are encouraged to participate in the development of regional stormwater management plans, and to adopt and implement ordinances for specific drainage area performance standards that address local stormwater management and environmental characteristics.*

## B. Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for "major development," as defined in Section 2.

## C. Applicability

1. This ordinance shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:

- a. Non-residential major developments; and
- b. Aspects of residential major developments that are not preempted by the Residential Site Improvement Standards, N.J.A.C. 5:21.

2. This ordinance shall also be applicable to all major developments undertaken by [insert name of municipality].

D. Compatibility with Other Permit and Ordinance Requirements  
Development approvals issued for subdivisions and site

plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and 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.

## Section 2: 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 the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C.7:8-1.2.

"CAFRA Planning Map" means the geographic depiction of the boundaries for Coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

"CAFRA Centers, Cores or Nodes" means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

"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.

"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; and well head protection and groundwater recharge areas. 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.

"Empowerment Neighborhood" means a neighborhood designated by the Urban Coordinating Council "in consultation and conjunction with" the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

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

"Impervious surface" means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

"Infiltration" is the process by which water seeps into the soil from precipitation.

"Major development" means any "development" that provides for ultimately disturbing one or more acres of land. 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.

"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.

"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, [insert name of municipality], 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. .

"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.

"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, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most 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.

"Tidal Flood Hazard Area" means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

"Urban Coordinating Council Empowerment Neighborhood" means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

"Urban Enterprise Zones" means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et.seq.

"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.

### **Section 3: General Standards**

#### **A. Design and Performance Standards for Stormwater Management Measures**

1. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Section 4. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.
2. The standards in this ordinance apply only to new major development 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 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.

*Note: Alternative standards shall provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity and water quality impacts of major development projects as would be provided under the standards in N.J.A.C. 7:8-5.*

## Section 4: Stormwater Management Requirements for Major Development

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 10.
- B. 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).
- C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G:
1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
  2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
  3. The construction of a public pedestrian access, such as a side walk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.
- D. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G 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:
1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
  2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management

strategies and measures, the option selected complies with the requirements of Sections 4.F and 4.G to the maximum extent practicable;

3. The applicant demonstrates that, in order to meet the requirements of Sections 4.F and 4.G, existing structures currently in use, such as homes and buildings, would need to be condemned; and
4. 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 D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 4.F and 4.G that were not achievable on-site.

#### E. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in Sections 4.F and 4.G shall be met by incorporating nonstructural stormwater management strategies set forth at Section 4.E into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Paragraph 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.
2. Nonstructural stormwater management strategies incorporated into site design shall:
  - a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
  - b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
  - c. Maximize the protection of natural drainage features and vegetation;
  - d. 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;

e. Minimize land disturbance including clearing and grading;

f. Minimize soil compaction;

g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;

h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;

i. 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:

(1) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 4.E.3. below;

(2) Site design features that help to prevent discharge of trash and debris from drainage systems;

(3) Site design features that help to prevent and/or contains pills or other harmful accumulations of pollutants at industrial or commercial developments; and

(4) 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.

3. Site design features identified under Section 4.E.2.i.(2) 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 Section 4.E.3.c below.

a. 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:

- (1) 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
- (2) 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.

b. 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.

c. This standard does not apply:

- (1) 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;
- (2) Where flows from the water quality design storm as specified in Section 4.G.1 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:

(a) 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

(b) A bar screen having a bar spacing of 0.5 inches.

(3) 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 Section 4.G.1; or

(4) 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 Sections 4.F and 4.G shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.

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 7, or found on the Department's website at [www.njstormwater.org](http://www.njstormwater.org).

#### F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

1. 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.

- a. 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.
- b. The minimum design and performance standards for groundwater recharge are as follows:
  - (1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, either:
    - (a) 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
    - (b) 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.
  - (2) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to (3) below.
  - (3) The following types of stormwater shall not be recharged:
    - (a) 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

(b) 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.

(4) 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.

c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 5, complete one of the following:

(1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;

(2) 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 two, 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;

(3) 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

(4) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (1), (2) and (3) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

2. Any application for a new agricultural development that meets the definition of major development at Section 2 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.

#### G. Stormwater Runoff Quality Standards

1. Stormwater management 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. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being

proposed on a development site. 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. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at [www.njstormwater.org](http://www.njstormwater.org). The BMP Manual and other sources of technical guidance are listed in Section 7. TSS reduction shall be calculated based on the removal rates

for the BMPs in Table 2 below. Alternative 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 the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.

3. If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (AXB)/100$$

Where

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

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

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

Table 2: TSS Removal Rates for BMPs	
Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Section 6.C
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4. If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the sub areas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.
5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. 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 Sections 4.F and 4.G.
6. 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 7.
7. 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.

8. 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:

a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

(1) 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. (2) Encroachment within the designated special water resource protection area under Subsection (1) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. 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. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.

b. 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.

c. 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:

- (1) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
- (2) Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;
- (3) Temperature shall be addressed to ensure no impact on the receiving waterway;
- (4) 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;
- (5) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
- (6) All encroachments proposed under this section shall be subject to review and approval by the Department.

d. 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. If a stream corridor protection plan for a waterway subject to Section 4.G(8) 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. A stream corridor protection plan for a waterway subject to G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in G.8.a.(1) above. 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.
- e. This paragraph G.8 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.

## **Section 5: Calculation of Stormwater Runoff and Groundwater Recharge**

A. Stormwater runoff shall be calculated in accordance with the following:

1. The design engineer shall calculate runoff using one of the following methods:

a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 - Hydrology and Technical Release 55 - Urban Hydrology for Small Watersheds; or

b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology at Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5.A.1.b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption

that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts that may reduce pre-construction stormwater runoff rates and volumes.
  4. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 Urban Hydrology for Small Watersheds and other methods may be employed.
  5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tail water in the design of structural stormwater management measures.
- B. Groundwater recharge may be calculated in accordance with the following:
1. The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

## Section 6: Standards for Structural Stormwater Management Measures

A. Standards for structural stormwater management measures are as follows:

1. 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).
2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. 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. 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. In addition, the design of trash racks must comply with the requirements of Section 8.D.
3. 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.
4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 8.

B. 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 Section 4 of this ordinance.

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

## Section 7: Sources for Technical Guidance

- A. Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 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.

1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. 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.

2. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.

- B. Additional technical guidance for stormwater management measures can be obtained from the following:

1. 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 maybe obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;

2. The Rutgers Cooperative Extension Service, 732-932-9306; and
3. 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.

## **Section 8: Safety Standards for Stormwater Management Basins**

- A. 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.

*Note: The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in Sections 8.B.1, 8.B.2, and 8.B.3 for trash racks, overflow grates, and escape provisions at outlet structures.*

- B. Requirements for Trash Racks, Overflow Grates and Escape Provisions

1. 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:

a. The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.

b. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the

outlet pipe or structure.

c. 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.

d. 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.

2. 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:

a. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.

b. The overflow grate spacing shall be no less than two inches across the smallest dimension.

c. 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.

3. For purposes of this paragraph 3, 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:

a. 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 Section 8.C a free-standing outlet structure may be exempted from this requirement.

b. 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 feet. Such safety ledges shall be comprised of two

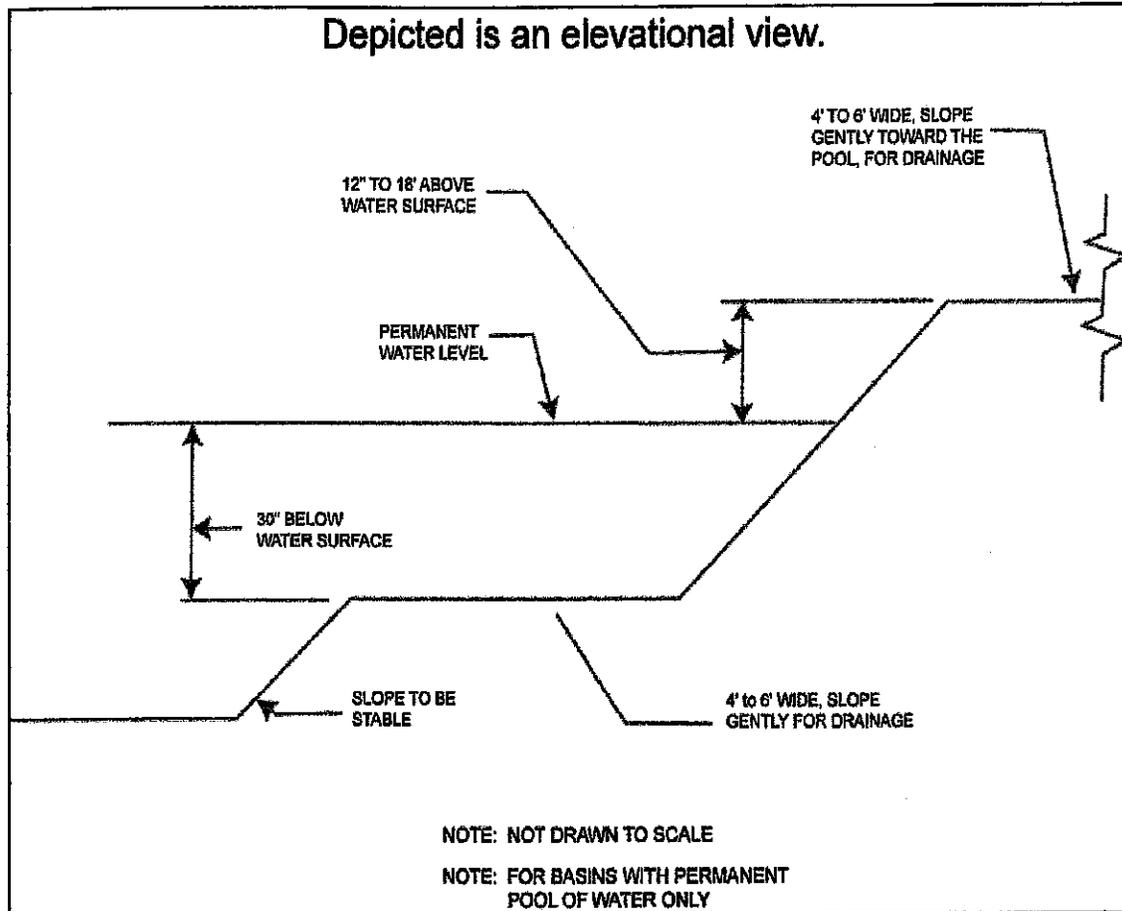
steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 8.D for an illustration of safety ledges in a stormwater management basin.

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

### C. Variance or Exemption from Safety Standards

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

D. Illustration of safety ledges in a New stormwater Management Basin.



## Section 9: Requirements for a Site Development Stormwater Plan

### A. Submission of Site Development Stormwater Plan

1. 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 Section 9.C below as part of the submission of the applicant's application for subdivision or site plan approval.

2. The applicant shall demonstrate that the project

meets the standards set forth in this ordinance.

3. The applicant shall submit [specify number] copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 9.C of this ordinance.

#### B. 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 which 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.

#### C. Checklist Requirements

The following information shall be required:

##### 1. 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 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.

##### 2. Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or

environmentally sensitive features and to those that provide particular opportunities or constraints for development.

### 3. 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.

### 4. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of Sections 3 through 6 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 problems at the source by land management and source controls whenever possible.

### 5. Stormwater Management Facilities Map

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

a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.

b. 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.

### 6. Calculations

a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 4 of this ordinance.

b. When the proposed stormwater management control measures (e.g., infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

#### 7. Maintenance and Repair Plan

The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 10.

#### 8. 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 Sections 9.C.1 through 9.C.6 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.

### **Section 10: Maintenance and Repair**

#### A. Applicability

1. Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Sections 10.B and 10.C.

#### B. General Maintenance

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

2. The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
3. 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.
4. If the person responsible for maintenance identified under Section 10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
5. 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.
6. The person responsible for maintenance identified under Section 10.B.2 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.

7. The person responsible for maintenance identified under Section 10.B.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
8. The person responsible for maintenance identified under Section 10.B.2 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 Sections 10.B.6 and 10.B.7 above.
9. The requirements of Sections 10.B.3 and 10.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.

*(Note: It may be appropriate to delete requirements in the maintenance and repair plan that are not applicable if the ordinance requires the facility to be dedicated to the municipality. If the municipality does not want to take this responsibility, the ordinance should require the posting of a two year maintenance guarantee in accordance with N.J.S.A. 40:55D-53. Guidelines for developing a maintenance and inspection program are provided in the New Jersey Stormwater Best Management Practices Manual and the NJDEP Ocean County Demonstration Study, Stormwater Management Facilities Maintenance Manual, dated June 1989 available from the NJDEP, Watershed Management Program.)*

10. 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. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails

or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

B. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

### **Section 11: Penalties**

Any person who erects, constructs, alters, repairs, onverts, or maintains, or uses any building, structure or land in violation of this ordinance, shall be subject to the following penalties:[Municipality to specify].

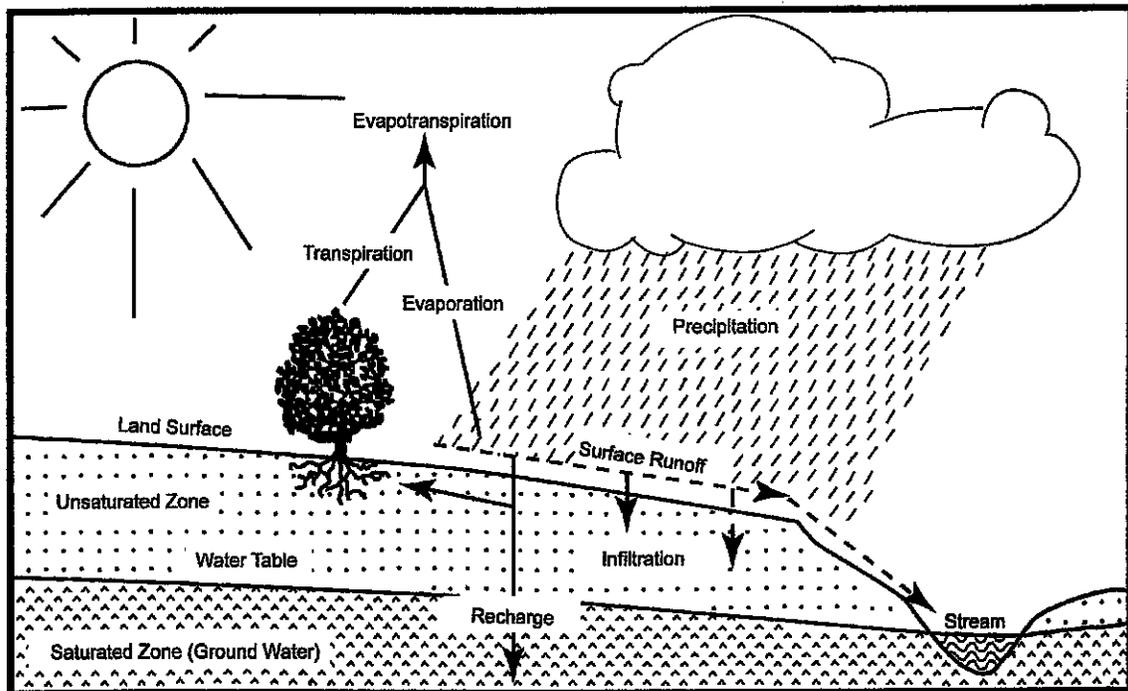
### **Section 12: Effective Date**

This ordinance shall take effect immediately upon the approval by the county review agency, or sixty (60) days from the receipt of the ordinance by the county review agency if the county review agency should fail to act.

### **Section 13: Severability**

If the provisions of any section, subsection, paragraph, subdivision, or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision, or clause of this ordinance.

Figure C-1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

Figure C-2: Groundwater Recharge in River Edge

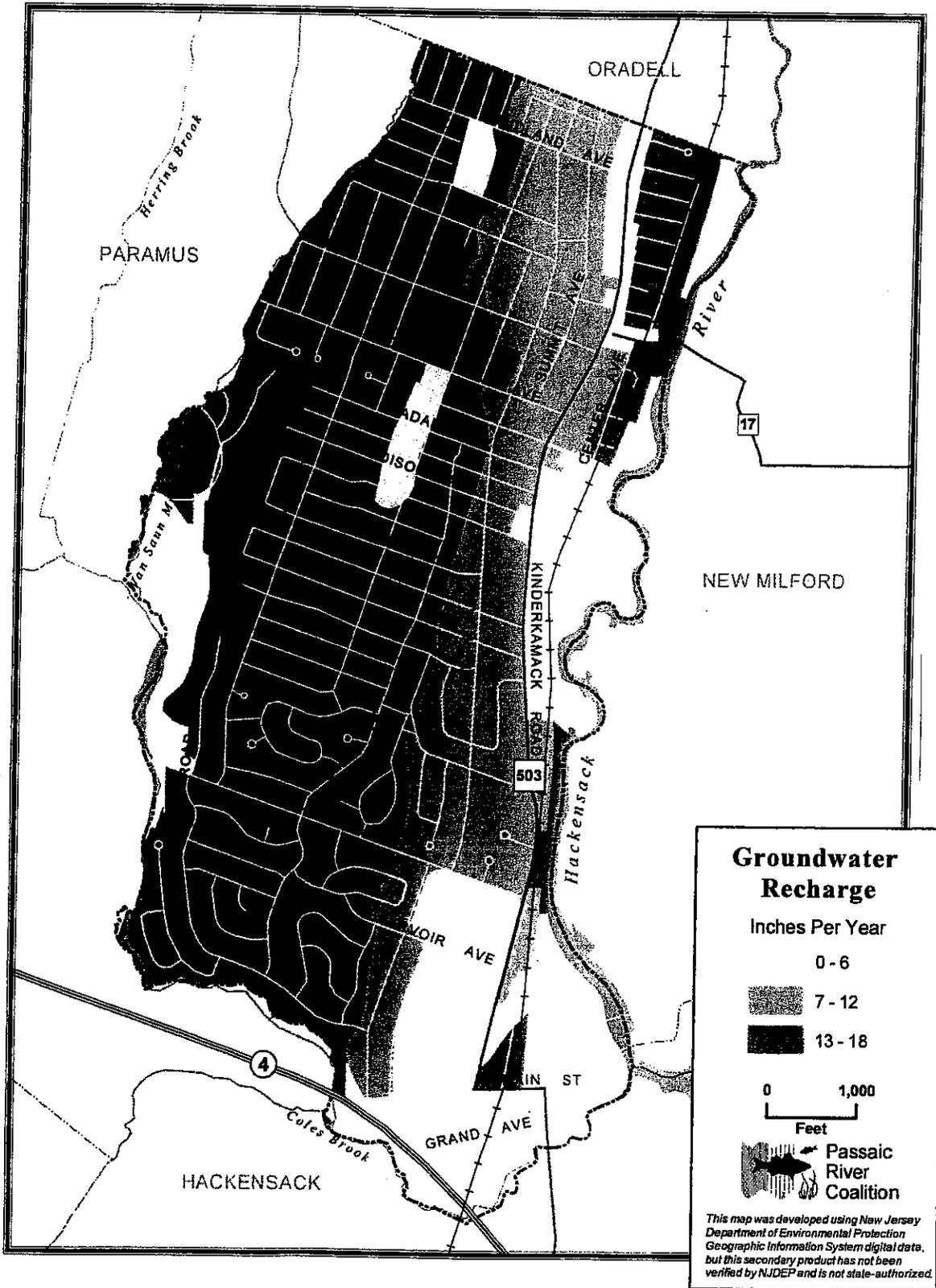


Figure C-3: Borough and Its Waterways

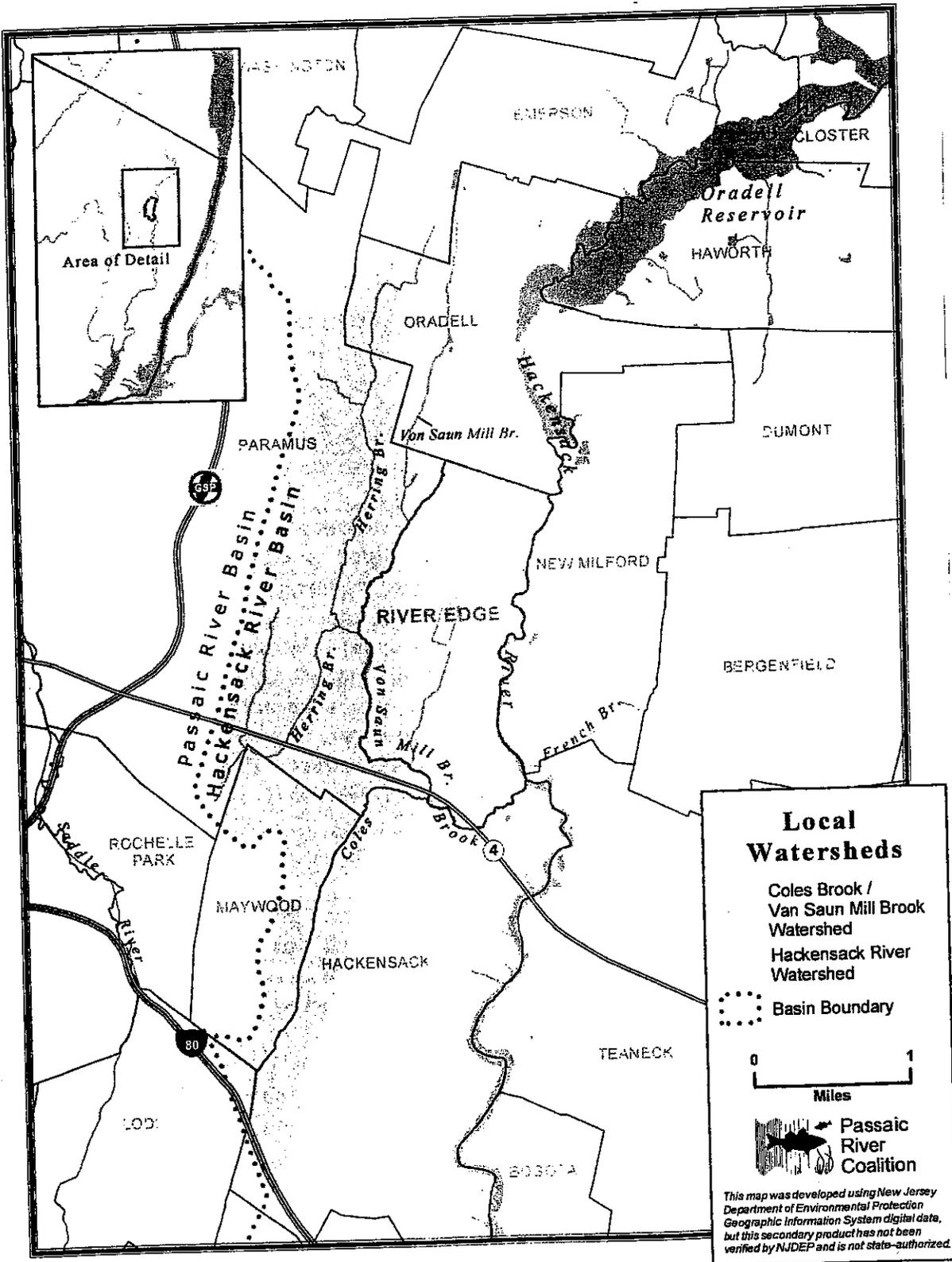


Figure C-4: Borough Boundary on USGS Quadrangles



Figure C-5: Flood Zones and Tidal Waterways

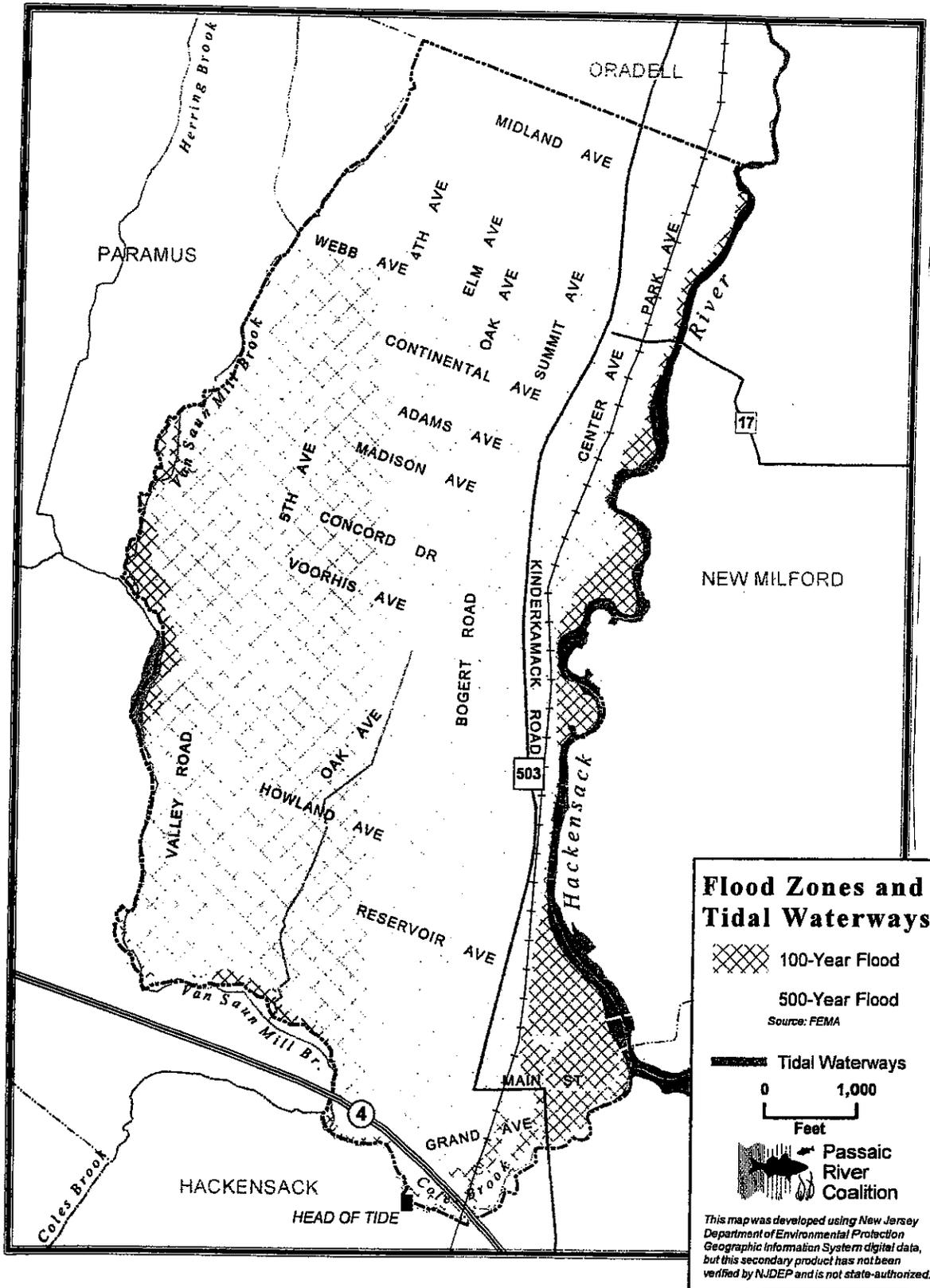


Figure C-6: Wetlands

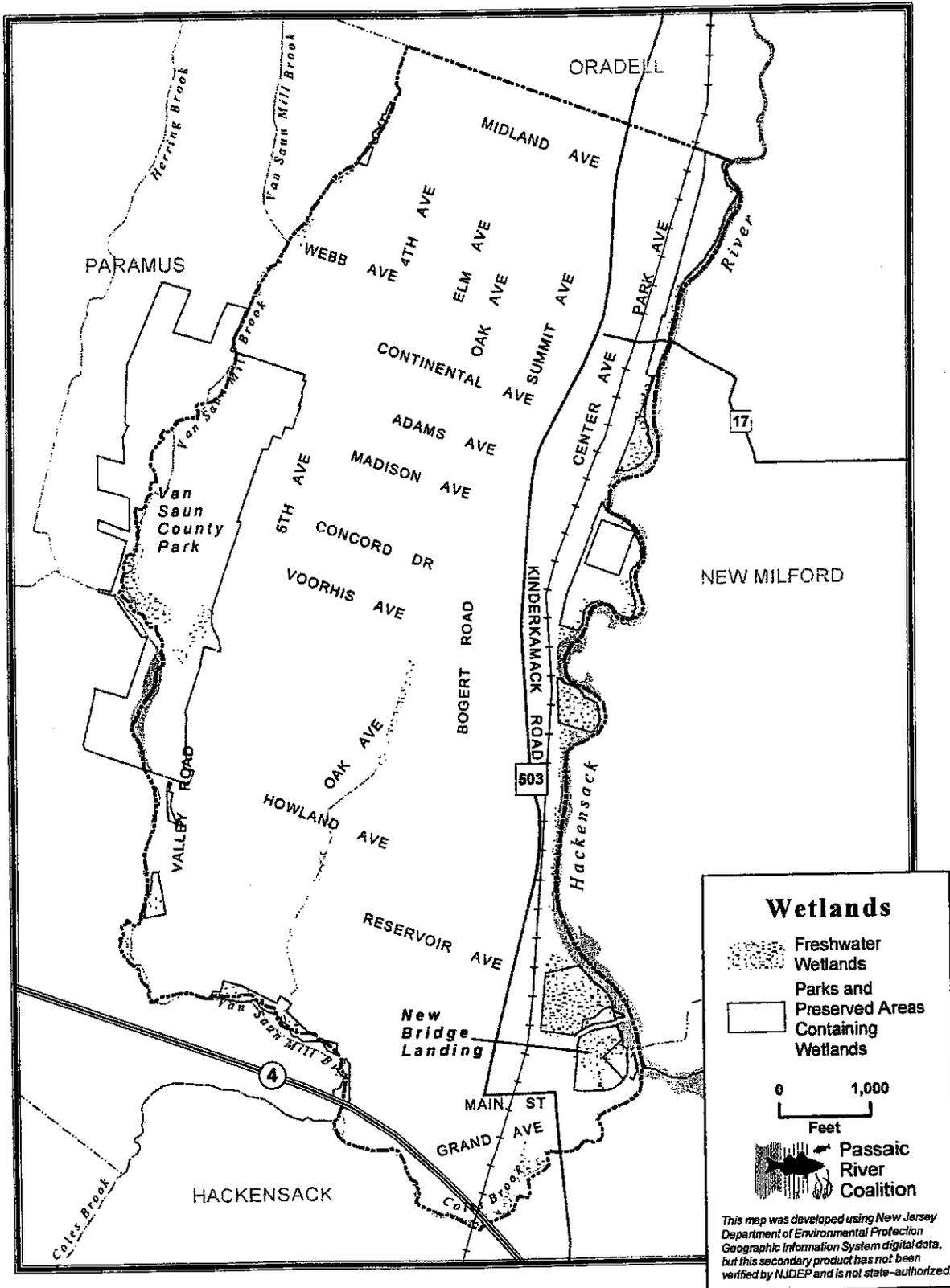


Figure C-7: C-1 Waterways & HUC-14 in River Edge

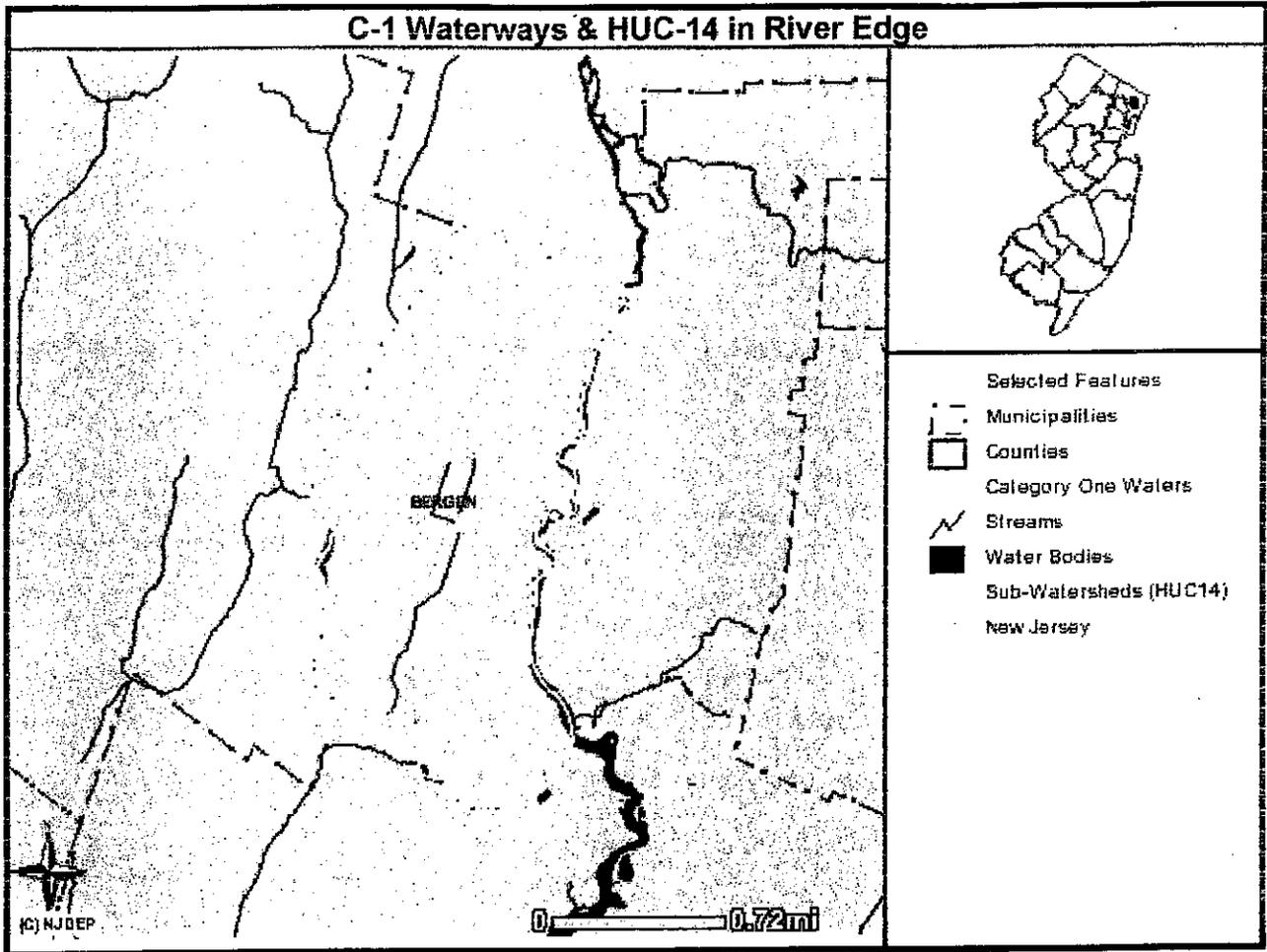


Figure C-8: Water Shed Management Areas of Northeastern New Jersey

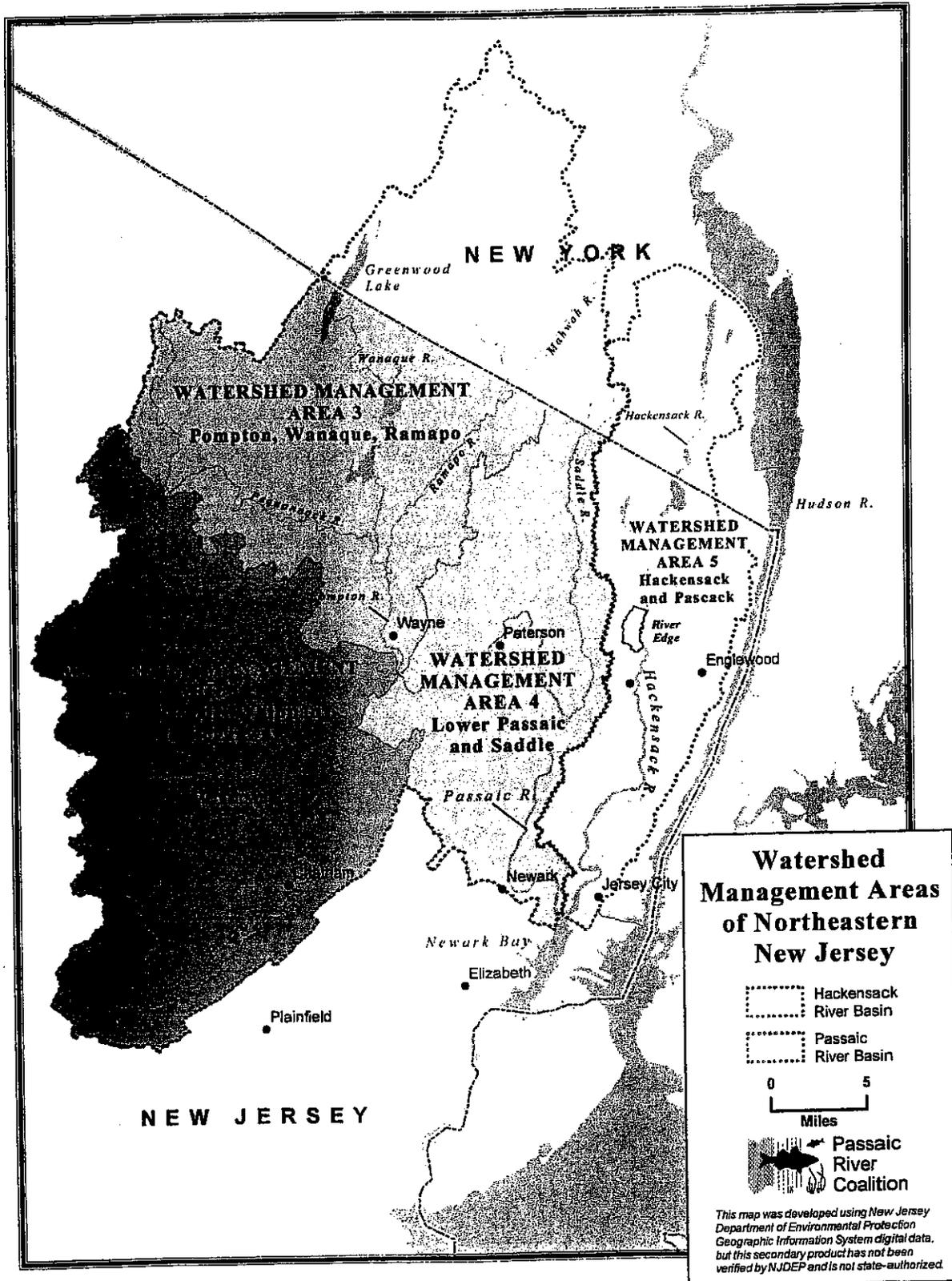
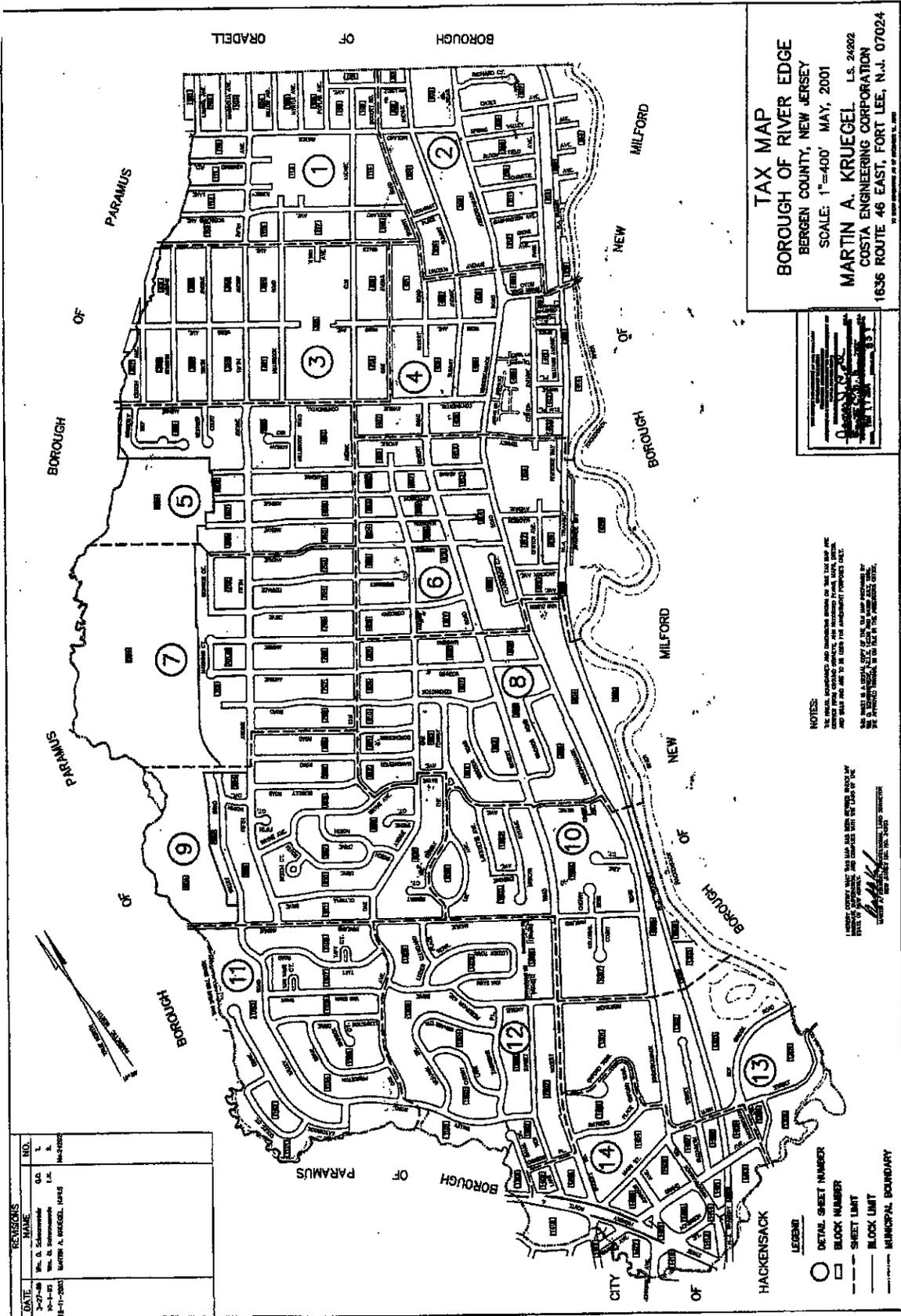


Figure C-9: Well Head Map



DATE	REVISIONS	NO.
12-11-2001	WATSON A. KRUEGEL, RARE	1
08-1-2001	WATSON A. KRUEGEL, RARE	2
07-1-2001	WATSON A. KRUEGEL, RARE	3
06-1-2001	WATSON A. KRUEGEL, RARE	4
05-1-2001	WATSON A. KRUEGEL, RARE	5
04-1-2001	WATSON A. KRUEGEL, RARE	6
03-1-2001	WATSON A. KRUEGEL, RARE	7
02-1-2001	WATSON A. KRUEGEL, RARE	8
01-1-2001	WATSON A. KRUEGEL, RARE	9
12-1-2000	WATSON A. KRUEGEL, RARE	10
11-1-2000	WATSON A. KRUEGEL, RARE	11
10-1-2000	WATSON A. KRUEGEL, RARE	12
09-1-2000	WATSON A. KRUEGEL, RARE	13
08-1-2000	WATSON A. KRUEGEL, RARE	14

Figure C-10: Zoning Map

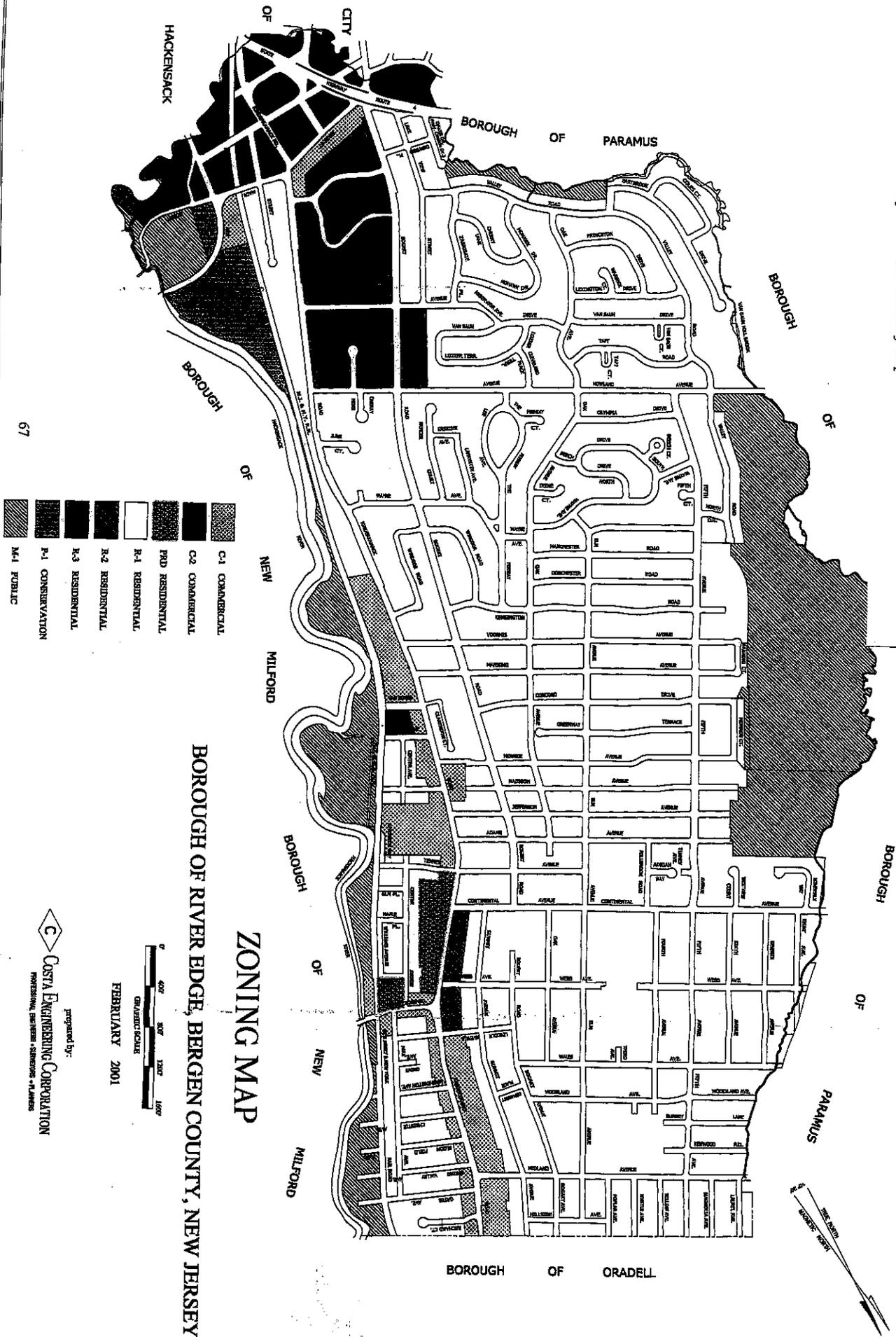


Figure C-11: Land Use and Land Cover

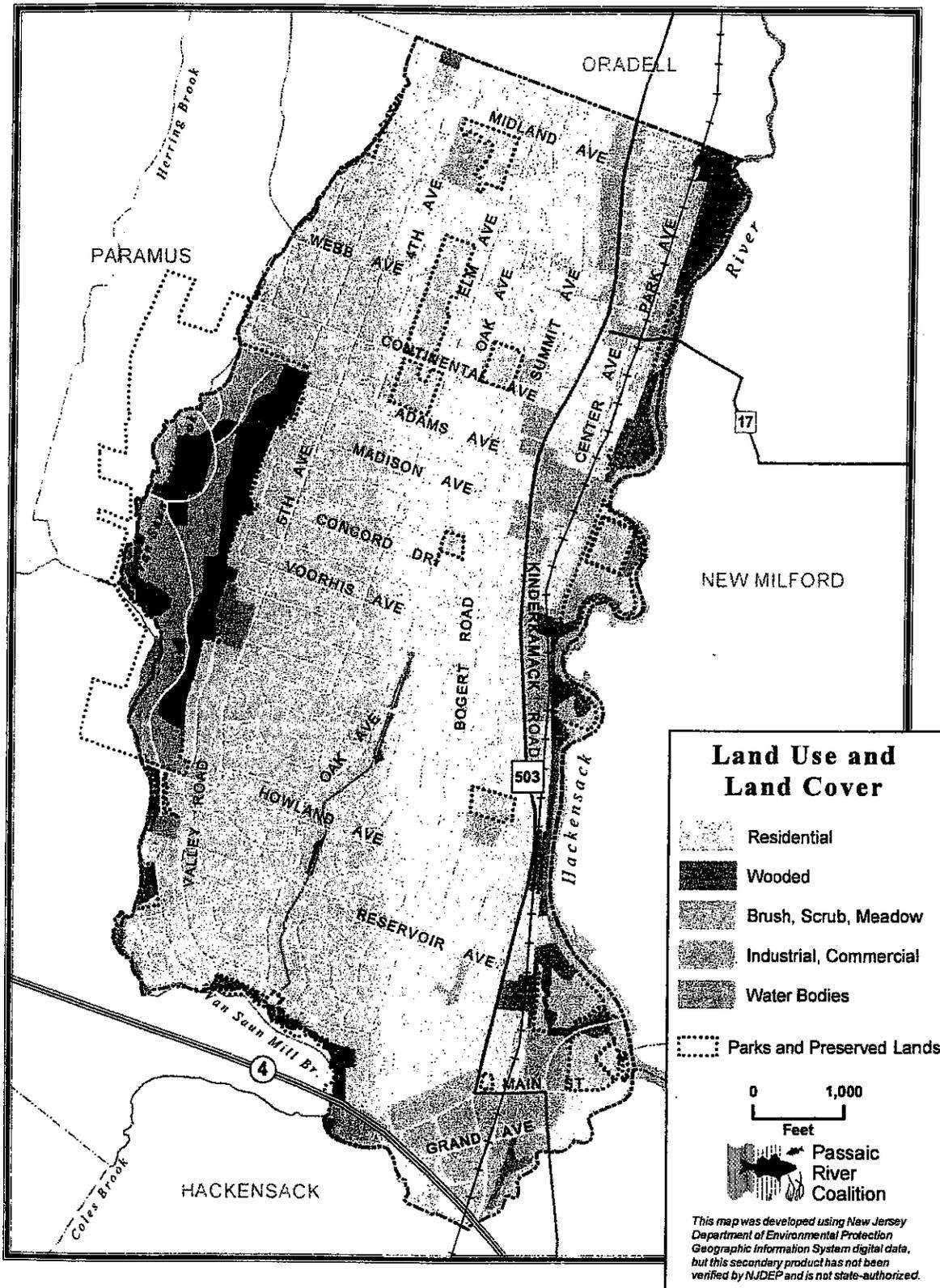


Figure C-12: Analysis of Vacant Land  
Source: 2004 Extended Tax Duplicate

<u>Block/Lot</u>	<u>Land Dim.</u>	<u>Acreage</u>	<u>Address</u>
114/18	44x102	.1030	188 Woodland
204/22	50x130	.1492	872 Bogert
207/12.01	50x100	.1148	52 Gates
207/12.02	50x100	.1148	50 Gates
212/19.02	25x86	.1067	46 Lincoln
213/3	75x110	.1894	830 Park
213/15	75.110	.1894	822 Park
301/13	50 Irr.	.0000	8 <sup>th</sup> Avenue
301/14	50 Irr.	.0000	8 <sup>th</sup> Avenue
301/15	125 Irr.	.0000	8 <sup>th</sup> Avenue
307/1	.21 AC	.2100	745 8 <sup>th</sup> Avenue
311/24	50x150	.1722	734 5 <sup>th</sup> Avenue
402/4	60x137	.1887	781 Summit
412/3	75.150	.0000	Elm Place
620/3.01	97x81	.1804	Hackensack River
620/3.02	96x21	.0463	River Front
805/2	138x58	.1837	Hackensack River
805/5	170x43	.1678	Hackensack River
809/13.01	.184 AC	.1840	425 Kinderkamack
809/14.01	.196 AC	.1960	20 Wayne
1004/8.02	50x159	.1825	381 Kinderkamack
1005/3	340x57	.4449	360 Kinderkamack
1103/5	.210 AC	.2100	Howland
1103/6	.281 AC	.2810	Howland
1103/7	.418 AC	.4180	Howland
1207/42	29 Irr.	.0000	Bogert
1302/3	300 Irr.	.0000	230 Kinderkamack
1306/4.01	.15 AC	.1500	Commerce
1306/4.02	.50 AC	.5000	Commerce
1404/2.01		.0000	Rutgers Place

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Figure C-12: Analysis of Vacant Land (continued)

<u>Block/Lot</u>	<u>Land Dim.</u>	<u>Acreage</u>	<u>Address</u>
1404/3	.0436	.0436	2 Bogert
1412/3	100x168	.3857	134 Grand
1413/1	119 Irr.	.0000	2 Route 4, West
1417/2	53x233	.2835	281 Johnson
1418/2	50x150	.1722	278 Johnson
1418/3	100 Irr.	.0000	11 Route 4, East
1418/4		<u>.0000</u>	62 Madison
		5.57 Acre's	

Figure C-13: River Edge Soil Survey



Figure C-14: River Edge USGS Water bodies map

