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Borough of Oradell

Municipal Stormwater Management Plan

Borough of Oradell
355 Kinderkamack Road
Oradell, NJ 07649

Borough of Oradell
Municipal Stormwater
Management Plan

Tier A Municipal Stormwater General Permit – NJ0141852
Borough of Oradell
Bergen County
New Jersey
NJPDES # NJG0150525
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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Oradell ("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 Regulations. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major developments.

Major Developments are defined as:

- Projects that disturb one (1) or more acres of land
- OR which increase impervious coverage by one quarter acre
- OR major subdivisions as defined in the Borough land use ordinance (cite here).
- OR any combination thereof.

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 existing and future stormwater facilities. A "build-out" analysis has not been included in this plan based upon existing zoning and a lack of land available for development. Oradell is not required to perform a build out analysis because Oradell has less than one square mile of developable land. 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 Borough of Oradell is currently performing its Periodic Reexamination of the Master Plan.

The final component of this plan is a mitigation planning strategy for when a variance or exemption from 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 greatest 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 and increase groundwater recharge where possible;
- Prevent, to the greatest extent feasible, an increase in nonpoint source pollution;
- Maintain the integrity of stream channels for their biological functions, natural resource values and aesthetic beauty 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 and other uses of water; and
- Protect public safety through the proper design and operation of stormwater catch basins and stormwater facilities.
- Enhance the general environment of Oradell, the Hackensack River, the Van Saun Mill Brook, the Behnke Brook and other waters;

Enhance the health, safety and general wellbeing of the residents of Oradell and the State of New Jersey by protecting and enhancing the ecosystems, wildlife habitat, the food web and biodiversity.

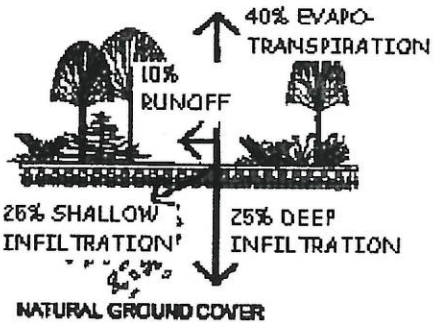
To achieve these goals, this plan outlines specific stormwater design and performance standards for new development and re-development.

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

Stormwater Discussion

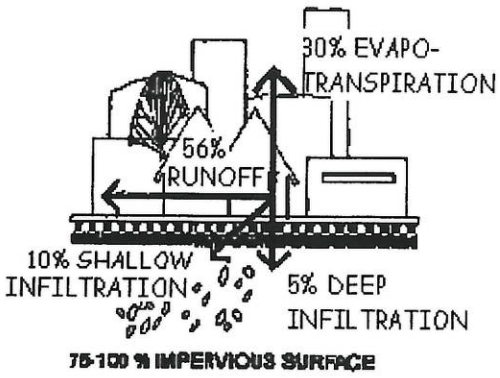
Land development can dramatically alter the hydrologic cycle (See Figure C-3) of a site and, ultimately, an entire watershed. The Hackensack River Watershed has been dramatically altered by land development.

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.

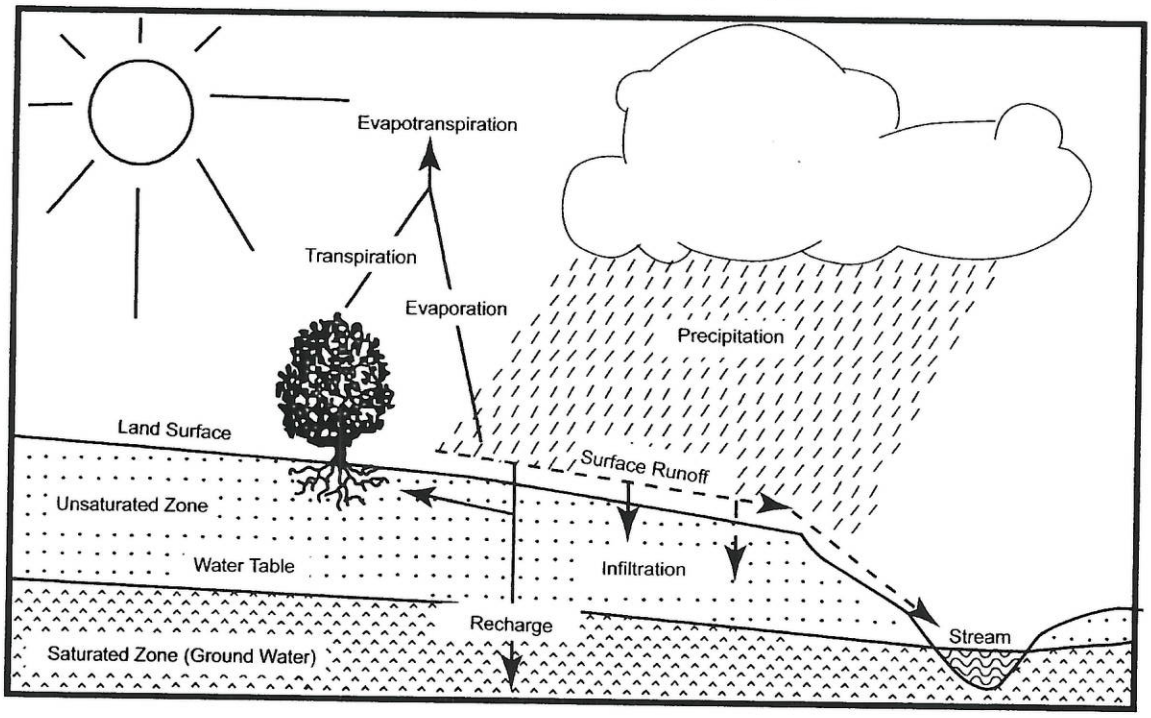


Impervious areas that are connected to each other through gutters, channels and storm sewers can transport runoff more quickly than natural areas. (Gutters for roof runoff that are piped directly to a catch basin, or gutters that are attached by underground pipes to a hole cut in the curb that carries water to the

street are two examples of the connection of impervious surfaces that speed transport time.) This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel.

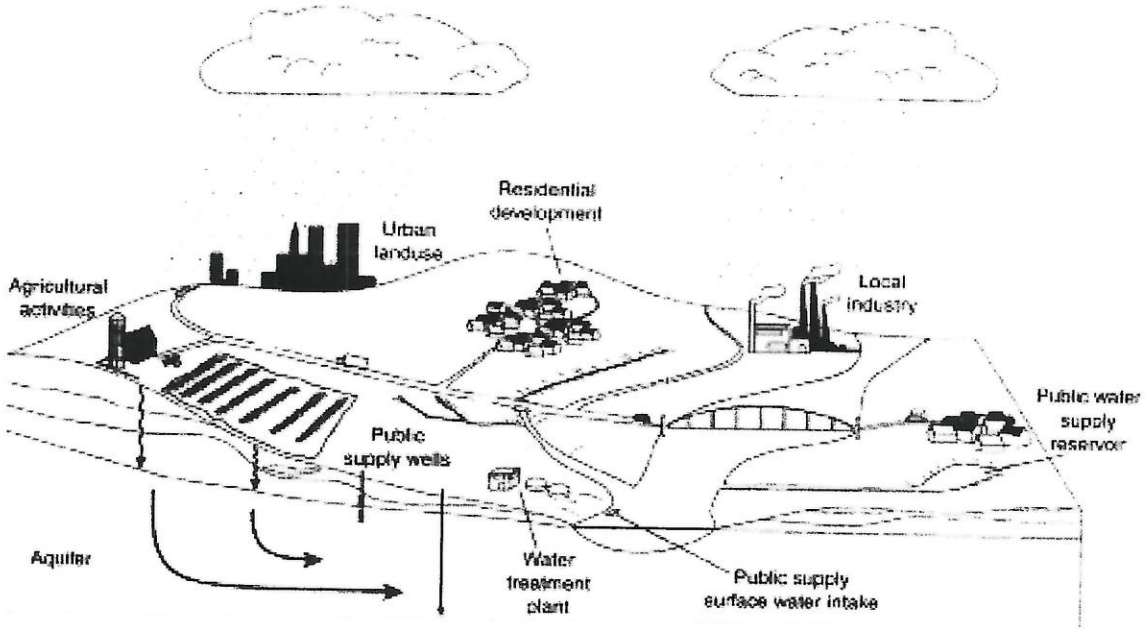
Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

Figure B-3: Groundwater Recharge in the Hydrologic Cycle



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, intercept rainwater in their canopy, provide bank stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

Figure B-4: Stormwater Runoff in the Hydrologic Cycle



Stream Corridors Serve Critical Functions

New Jersey's streams and rivers provide scenic beauty and recreational opportunities, wildlife habitat and drinking water. Streams extend beyond the water flowing within the banks, to include

the stream banks, adjacent wetlands and floodplain. The stream corridor is an extensive ecosystem of important biological diversity. Undisturbed stream corridors protect streams and furnish flood control at no cost, store water during dry periods, maintain water quality by filtering pollutant-laden runoff and support a large diversity of plants and animals.

Streams receive water from precipitation, runoff from land surfaces, wetlands or ground water from springs and seeps. The woodlands and wetlands in the stream's watershed absorb precipitation and gradually release it into the stream. This is the stream's "baseflow." The baseflow keeps the stream running in periods of light or no rainfall. The link between ground and surface water can flow both ways; in wet seasons, streams may contribute to the ground water of adjacent aquifers.

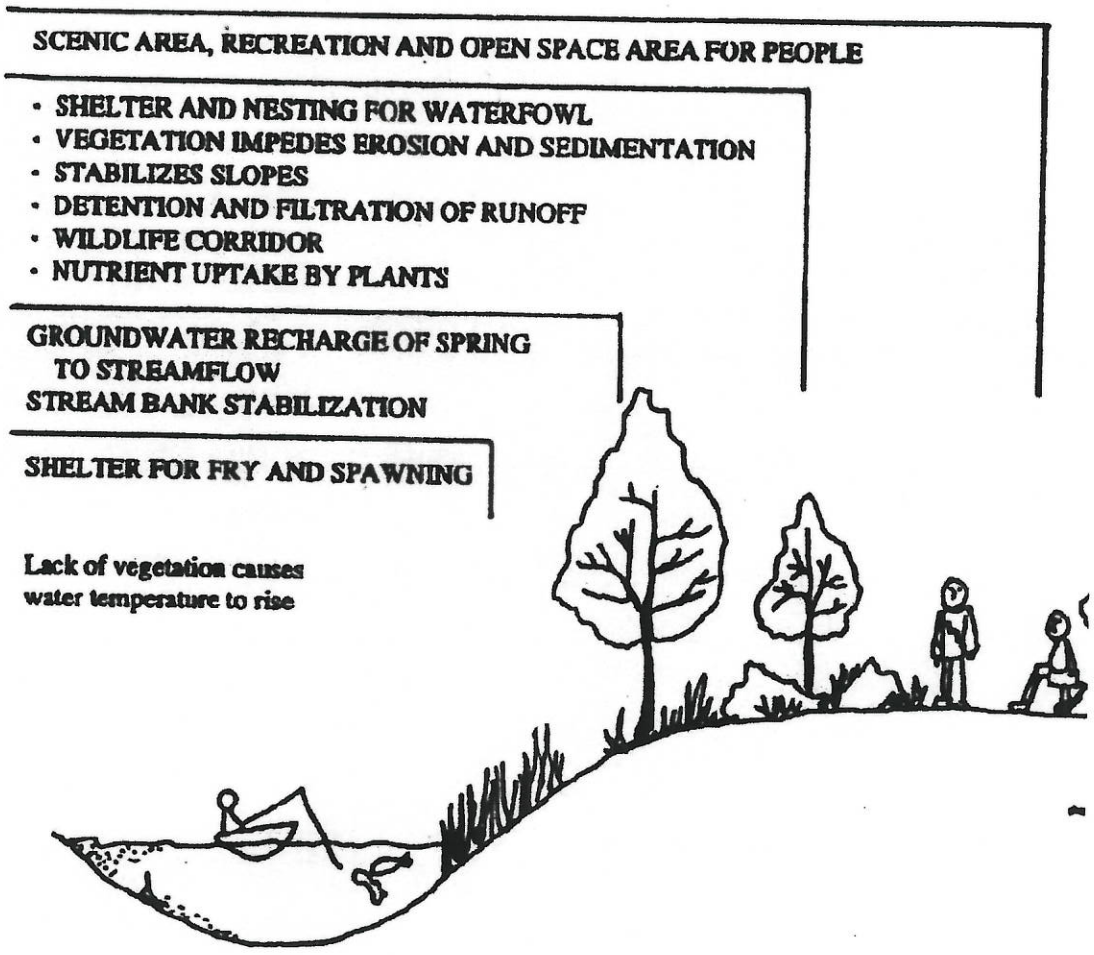
In addition to slowly releasing stored precipitation, vegetated stream banks, nearby woodlands, wetlands and floodplains help maintain water quality. Stream- side vegetation takes up nutrients, and soil and organic material on the banks can help filter pollutants and sediments from parking lots, streets and land. Slowing the flow into the stream also gives organic material a chance to decompose instead of overloading the waters.

Stream corridors are major habitats for plants and animals. The streams and adjacent areas support a wide variety of species. The headwaters of streams are the seeps and springs where leaf litter constitutes the base of the food chain for the entire stream system. Downstream, larger animals and other plants make up an intricate self-supporting community.

Stream buffers help nature to keep streams and reservoirs clean, a function that expensive engineering efforts can't begin to emulate. They are a crucial component of the "green infrastructure". Providing vegetated stream buffers contributes to cleaner drinking water for New Jersey residents. If pollution impairs these waters, drinking water supply purveyors would have to resort to more extensive and expensive treatment to bring them back to previous water quality.

Effective stream corridor management requires addressing the entire stream -- its hydrological and ecological systems -- to solve problems of surface water pollution, loss of groundwater recharge and decline in animal and plant habitats.

Figure B-5: Critical Functions of Stream Corridors

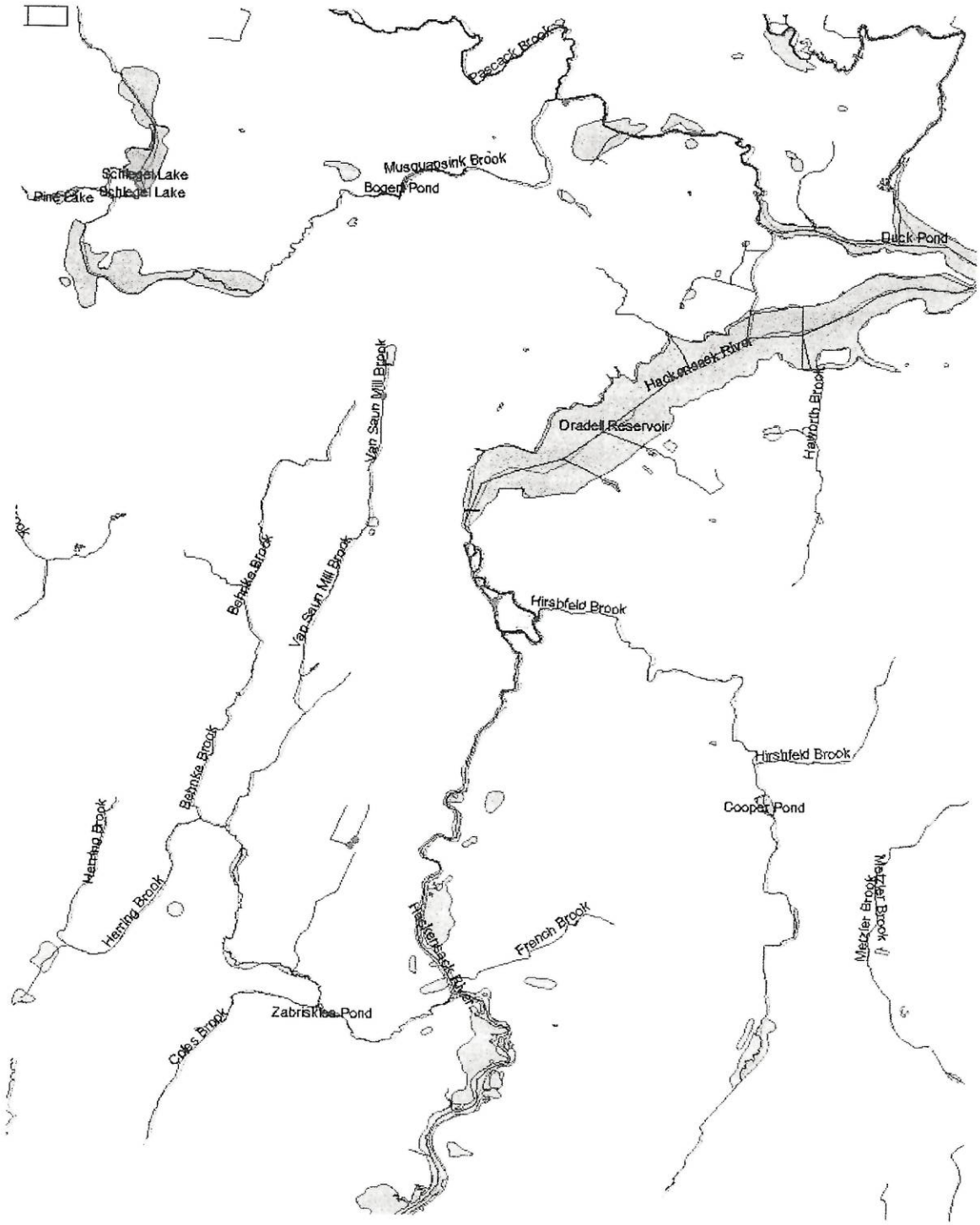


Background and Characteristics of the Borough of Oradell

The Borough of Oradell encompasses 2.5 square mile area in Bergen County, New Jersey. In recent years, the Borough and the surrounding area has been under significant development pressure. The population of the Borough has remained flat from 8,658 in 1980, to 8,024 in 1990, to 8,047 in 2000. Despite the lack of population increase there has been considerable demand for larger single family homes, larger driveways to accommodate more cars and development; changes in the landscape that have almost certainly have already dramatically increased stormwater runoff volumes and pollutant loads to the waterways of the municipality.

Figure B-6 illustrates the waterways in the vicinity of Oradell.

Figure B-6 Named Waterbodies in and Around Oradell



Listing of Color Maps Showing Oradell's Characteristics

Oradell's Waterways

The principal waterways of the Borough are The Hackensack River and its tributaries:

- Hackensack River – including the Oradell Reservoir
- Van Saun Mill Brook
- Behnke Brook
- Other Hackensack River tributaries including unnamed streams

Oradell is located in Watershed Management Area 5. (WMA5). WMA5 is called the Hackensack Hudson Pascack watershed management area. The Pascack Brook is a tributary of the Hackensack, its sub watershed flows into the Hackensack watershed. To the east of the Hackensack watershed is the Hudson River. To the west is WMA 4 the Lower Passaic/Saddle which covers the Saddle River and areas west.

Figure C-1 depicts the Borough boundary on the USGS quadrangle maps in color.

Hackensack River and Oradell Reservoir

The Hackensack River runs through the center of the Borough from north to south. The Oradell Reservoir is a part of the Hackensack River and is a drinking water supply source for more than 750,000 people in New Jersey. The Reservoir was artificially created by damming the Hackensack River in 1922. The Oradell Reservoir and all waters that flow into the Reservoir are listed as Category One waters and are subject to the highest protections afforded by law.

On July 12, 2004 the Governor of New Jersey designated Oradell Reservoir with the Category One antidegradation designation based upon its "exceptional water supply significance". All waterways which flow into the Reservoir have also been by designated as Category One waters. These areas are to be protected by a 300 foot buffer.

In Oradell, there are unnamed streams that flow into the Reservoir on the shoreline area east of Kinderkamack Road and also along the area bordered by the Emerson Golf Club. (Much of the Emerson Golf Club is located in Oradell.) These streams have a high concentration of both frogs and tadpoles, perhaps the highest in town.

One such stream originates at the lake at the Emerson Golf Club runs through a forested wetland near the railroad tracks and curves back to the reservoir. This was the area where NJ Transit proposed to put in their "Golf Siding" before the Borough sued NJT to stop it. It was feared that Norfolk Southern or others would begin to run freight trains carrying toxic chemicals along the Reservoir shoreline if such as siding was built. This would have make the public drinking supply vulnerable to contamination and nine towns joined together in a lawsuit to stop the railroad project.

The 2,000 acre Oradell Reservoir is a primary drinking water source and is part of Water System # 0238001. The surface water intake is located in the adjacent Borough of Haworth. The Oradell Dam is owned and operated by United Water, the successor to the original Hackensack Water Company. The dam, which is approximately 25 feet high,

has moved the historic head of the tide northward. The Hackensack River in Oradell is divided into two separate and distinct ecological regimes- freshwater above the dam and brackish tidal estuary to the south. The freshwater portion is classified as C1, FW2, NT The tidal portion is classified as SE1.

The Hackensack River above the dam is classified as C1, FW2, NT .The C1 indicates the Category One Antidegradation designation for Special Water Resource Protection Areas (SWRPA), The FW 2 indicates Fresh Water, the NT indicates Non-Trout as trout maintenance and spawning does not take place in the waterway. The HUC14 code number for the Hackensack River freshwater portion is **02030103170060**.

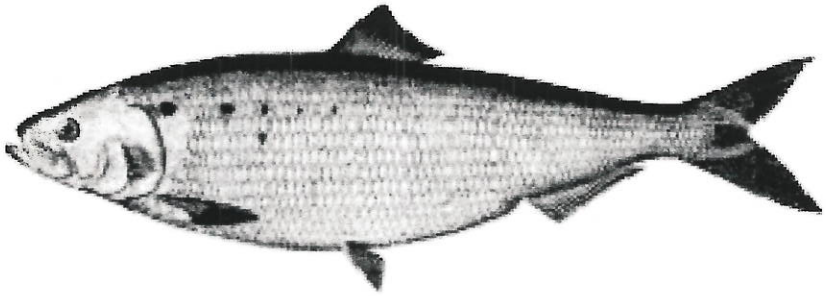
The Oradell Dam is the main impediment to fish passage on the Hackensack River. A report by NJDEP entitled "Locations Of Anadromous American Shad And River Herring During Their Spawning Period In New Jersey's Freshwaters Including Known Migratory Impediments And Fish Ladders" dated November 2000 documents the situation. "Surveys confirmed a spawning run of American Shad and both river herring species (alewife and blueback) at the base of the Oradell Dam." Anadromous fish spend most of their lives in the ocean but return to freshwater streams to spawn. (e.g. salmon and sturgeon).

The Hackensack Riverkeeper, Inc., obtained an American Rivers-NOAA Community-Based Restoration Program Partnership Grant to conduct a preliminary analysis of the feasibility of restoring fish passage at the Oradell Dam. In the September 21, 2004 meeting of the Mayor and Council, United Water representatives acknowledged the plans for the fish ladder and said that their dam safety improvements would not adversely impact the fish ladder project.

The DEP states, "Category One, targets waterbodies that provide drinking water, (or)…habitat for… popular recreational and/or commercial species... Waterways can be designated Category One because of exceptional ecological significance, exceptional water supply significance… 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 island chain south of the Dam could be eligible for Category One protections in the future. Development or Re-development of the Hackensack River Riparian corridor must minimize environmental impacts to the resource.

Figure B-7: Anadromous Fish Found in the Hackensack River In Oradell



American shad *Alosa sapidissima*

The tidal estuarine portion of the Hackensack River below the dam is classified as SE1 as it is a part of the Hudson Raritan Estuary. The tidal intrusion of salt water from the Atlantic Ocean finds its way from Newark Bay, through the Meadowlands and up to Oradell. Thus the Hackensack River below the dam is tidally influenced brackish water with a lower concentration of salt than the ocean but with different ecological characteristics than fresh water. The SE1 indicates Saline Estuary, the NT indicates Non-Trout as trout maintenance and spawning does not take place in the waterway. The HUC14 code number for the Hackensack River brackish water portion is **02030103180030.**

Van Saun Mill Brook and Behnke Brook

To the west of the Hackensack River there are two important streams. Both are tributaries of the Hackensack River. These streams are the Van Saun Mill Brook and the Behnke

Brook (which is often more correctly referred to as part of the Herring Brook. For simplicity it is referred to herein as the Behnke Brook). Both Van Saun Mill Brook and the Behnke Brook have their headwaters on the Oradell border with Emerson to the west of the Reservoir. The Van Saun Mill Brook flows through Van Saun Park. Both brooks flow into the Coles Brook and then into the Hackensack River south of the Borough. The Van Saun Mill Brook and the Behnke Brook are both classified as **FW2 -NT**. The FW 2 indicates Fresh Water, the NT indicates that No Trout production or maintenance takes places in the waterway.

The HUC14 code number for the Van Saun Mill Brook and the Behnke Brook is **02030103180010**. Both brooks are a part of the Coles Brook/Van Saun Mill Brook HUC14 drainage basin.

Other

Further west of the Behnke Brook, the western corner of the Borough is in the HUC14 drainage basin of the Pascack Brook code number 02030103170020. The Pascack Brook is C1, FW2-NT No part of the Pascack Brook is located in Oradell but its water flows into the Reservoir.

In addition, further east, the Hirshfeld Brook has its confluence in Oradell south of the dam at the New Milford border. The Hirshfeld Brook is subject to frequent flooding and has been channelized in spots especially around the border with Oradell.
Channelized streams significantly alter natural functions and can cause serous downstream impacts. It is preferable to discourage development near streams and in floodplains, to reduce impervious surfaces, to maintain vegetated stream buffers and follow other best management practices to reduce runoff and enhance groundwater recharge.

The mouth of the Hirshfeld Brook from New Milford empties into the Hackensack River on the eastern side of Van Buskirk Island. This confluence is obstructed from view by the

massive buildings of the defunct water treatment plant. The section of the Hirshfeld Brook near Oradell is categorized as FW2-NT. A small portion of Oradell on the southwestern border with New Milford is in the drainage basin of the Hirshfeld Brook whose HUC14 code number is 02030103180020.

Oradell Land Use and Development

The number of dwelling units has increased only slightly over the past twenty five years as almost all of the vacant land in the Borough has been developed. The number of dwelling units in 1980 was 2,808, in 1990 it was 2,836 in 2000 it was 2,833. In 2002, the Borough sold off a parcel of land to a developer who built a new house. In 2005, the first major subdivision in ten years was granted on an oversized 2.5 acre corner lot that gave approval to add 3 new homes. (These homes have not been built yet.)

Figure C-1 depicts the Borough boundary on the USGS quadrangle maps in color.

The 1990 Borough Land Use Plan documents only 31.5 acres of vacant developable land in the Borough. Today that figure is considerably less. There are 218.2 acres that are zoned for housing that are currently used as golf courses. In addition there are 136.8 acres surrounding the Oradell reservoir and 45.9 acres of riparian land along the Hackensack River south of the dam. The Borough has no agricultural lands. If all of the aforementioned lands were totaled they would equal 432.4 acres or 0.68 square miles. Since the Borough has less than one square mile of vacant or agricultural lands, the Borough is not required to perform a build-out analysis to project future stormwater impacts.

Condition of Oradell's Water Resources

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. There are no AMNET monitoring sites in Oradell.

The the NJDEP and other regulatory agencies also collect water quality chemical data on the streams in the state., the Van Saun Mill Brook and the Behnke Brook, respectively, are both moderately.. These data also show that the instream total phosphorus concentrations and fecal coliform concentrations of the Hackensack River frequently exceed the state's criteria. This means that the river is considered moderately impaired and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for each waterway. A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require a NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs. The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d))

(Integrated List) is required by the Federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

Non Attainment for Phosphorous

Figure B-8: Hackensack River TMDL's Under Consideration

State of New Jersey's
2004 Integrated Water Quality monitoring and Assessment Report
June 22, 2004

TMDLs or other responses to be completed by 2006

CONVENTIONAL POLLUTANTS:

Northeast Region:

WMA 4

Site ID	Station Name	Non-Attainment Parameter(s)	Response(s) by 2006:
01391500, 01391200, 01391490, 01391550, 4-SITE-12, Passaic-7, 4-site-13, 4-sad-1	Saddle River at Lodi	Phosphorus	TP TMDL

WMA 5

Site ID	Station Name	Non-Attainment Parameter(s)	Response(s) by 2006:
1378560	Coles Brook at Hackensack	Phosphorus	TP TMDL
1378500	Hackensack River at New Milford	Phosphorus	TP TMDL
1377499	Musquapsink Brook at River Vale	Phosphorus	TP TMDL
1377500, 5-PAS-1	Pascack Brook at Westwood	Phosphorus	TP TMDL

A TMDL for Phosphorous or other response is required for the Hackensack River in Oradell by 2006. The primary sources of Phosphorus in the Hackensack River are the fertilizers used on the lawns of residential homes, and on Ballfields and Golf Courses. Phosphorus acts as a nutrient that fertilizes aquatic plants and algae. Promoting the growth of algae can rob the water of dissolved oxygen. The decomposition of dead algae consumes oxygen and can result in fish kills, especially in hotter dryer weather.

The NJDEP states: "Total Maximum Daily Loads (TMDLs) represent the assimilative or carrying capacity of the receiving water taking into consideration point and nonpoint sources of pollution, natural background, and surface water withdrawals. A TMDL is developed as a mechanism for identifying all the contributors to surface water quality impacts and setting goals for load reductions for specific pollutants as necessary to meet

surface water quality standards. TMDLs are required, under Section 303(d) of the federal Clean Water Act, to be developed for waterbodies that cannot meet surface water quality standards after the implementation of technology-based effluent limitations. TMDLs may also be established to help maintain or improve water quality in waters that are not impaired. A TMDL establishes Waste Load Allocations and Load Allocations for point and nonpoint sources, respectively. Regulations concerning TMDLs are contained in EPA's Water Quality Planning and Management Regulations (40 CFR 130). "A TMDL is established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." (40 CRF 130.7(c)).

Where TMDLs are required to address documented surface water quality impairment, allocations are made to the varying sources contributing to the water quality problem in order to reduce the total pollutant load received by the waterbody. Load reduction goals established through TMDLs are achieved through the issuance of wasteload allocations for points source discharges and load allocations for nonpoint source discharges. Since nonpoint source pollution, by definition, does not come from discrete, identifiable sources, load allocations would consist of the identification of categories of nonpoint sources that contribute to the parameters of concern. The load allocation would also include specific load reduction measures for those categories of sources, to be implemented through best management practices (BMPs) including local ordinances for stormwater management and nonpoint source pollution control, headwaters protection practices, or other mechanisms for addressing the priority issues of concern."

Water Quantity

In addition to water quality problems, the Borough has exhibited some water quantity problems including flooding, stream bank erosion, and diminished base flow in its streams. Water quantity is linked with population quantity. As the quantity of people has increased in the watershed, more land was developed, impervious surfaces multiplied and

wetlands were often filled, disrupting the natural systems that mitigate flooding and regulate baseflow.

The Hackensack River south of the dam floods at frequent intervals. The US Geological Survey measures stream conditions in Oradell. The USGS New Milford Stream Gage Station # **01378500** is actually located in Oradell on Van Buskirk Island.
Over 113 square miles of land in the Hackensack River watershed, upstream of the dam drain to the Oradell Reservoir. Land development in the 113 square mile area has added imperviousness, and reduced infiltration. The result is an increased the level of "flashiness" after storm events, faster transport time and water velocity and increased peak flow rates which contribute to flood frequency.
The following readings were taken at Van Buskirk Island:

Figure B-9: Oradell's Flooding History

Hackensack River Flooding

Peak Flood Flows

Date	**Elevation** (NGVD29)*
3/31/1951	12.39
5/30/1968	12.85
6/19/1972	12.59
9/27/1975	13.79
11/9/1977	14.20
4/5/1984	14.21
4/5/1987	13.01
5/17/1989	14.28
5/17/1990	12.26
9/16/1999	17.70

Tropical Storm Floyd

In addition there is photographic and written documentation of a serious flood in 1903.

The chart above shows that the 100-year flood happens much more frequently than once every 100 years.

A flood could happen again in Oradell during any year. Recent floods in Oakland in western Bergen County were reported as worse than Tropical Storm Floyd. The storm system's heaviest rainfalls were concentrated to the northwest of Oradell. As it was, recent Hackensack River readings were less than one foot below flood stage.

The USGS says: "Rivers across the nation seem to be rising to record flood levels almost every year… The term 100-year flood is misleading because it leads people to believe that it happens only once every 100 years. The truth is that an uncommonly big flood can happen any year. The term 100-year flood is really a statistical designation, and there is a 1-in-100 chance that a flood this size will happen during any year. Perhaps a better term would be the "1-in-100 chance flood."

The Hirshfeld Brook in New Milford on the Oradell border is also subject to frequent flooding and has been channelized. A flood map for Oradell is shown in figure C-4.

As the imperviousness increased in the Borough of Oradell, the peak and volumes of stream flows also increased. The increased amount of water resulted in stream bank erosion, which resulted in unstable areas along streambanks and degraded stream habitats. The high imperviousness of the Borough has significantly decreased groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on instream habitat during the summer months. A map of the groundwater recharge areas are shown in Figure C-4.

Wellhead Protection

Wellhead protection areas are a required element of the MSWMP and are shown in Figure C-5.

There are no Public Community Wells or Public Non-Community Wells located in the Borough of Oradell. A small portion of the Emerson Golf Club located on the northern border of Oradell with Emerson is in the 12 year recharge zone of an well located in Emerson according to NJDEP data. The Borough may want to adopt specific ordinances to protect wellhead protection areas to minimize the infiltration of pollutants into aquifers.

Surface Water

Virtually all potable water in the Borough of Oradell is supplied by United Water, New Jersey. United Water's hydrants and supply mains reach every street in town. If any individual residences exist that choose to rely on private groundwater wells rather than United Water, that number of residences is likely to be negligible.

According to the United Water NJ Consumer Confidence Report for 2003 dated May 2004, the quality of the water supplied to Oradell meet or exceeds all state and federal standards for safe drinking water. United Water's Treatment plant in Haworth uses ozone and other methods to treat the water that they obtain from the Oradell Reservoir. United Water Resources is a subsidiary of ONDEO, the world's largest water services group. ONDEO is a subsidiary of Suez (Suez Lyonnaise des Eaux).

From time to time, during dry weather, the water supply in Oradell Reservoir is augmented by other water sources in order to satisfy demand. Approximately 25% of our drinking water supply on average is obtained from the Highlands. There is a 17 mile long, 60 inch pipeline that brings water from the Wanaque Reservoir to the Oradell Reservoir This pipeline called the Wanaque South Interconnection Project was completed

in 1987. Water from the Ramapo, Pompton and Passaic Rivers is pumped into the Wanaque Reservoir and then into the pipe. More than half of the people in New Jersey get all or part of their drinking water from the Highlands. The Highlands Water Protection and Planning Act was signed on August 10, 2004 at the Wanaque Reservoir with the goal of protecting the State's water supply, natural resources and wildlife. We must take additional steps to protect the water supply, natural resources and wildlife in the Piedmont Physiographic Province as well.

Wastewater

Stormwater comes from precipitation. Potable water comes out of the faucet. Wastewater is the term for potable water after it is used in the bathroom and kitchen. The Borough is located in the wastewater sewer service area of the Bergen County Utilities Authority. There are very few septic systems in Oradell. The sanitary sewer wastewater lines are connected to the BCUA treatment facility at Little Ferry. The wastewater receives only secondary treatment; the BCUA has not implemented tertiary treatment as yet, Tertiary treatment would remove more nutrients from the wastewater than current methods. The nearest municipality using tertiary treatment is Secaucus.

The sanitary sewer pipes are separate from the stormwater pipes. (The term "storm sewers" for stormwater facilities is now frowned upon for non technical users because it can be somewhat confusing to the public. The preferred term MS4 stands for municipal separate storm sewer system.) The Borough of Oradell does not have any known Combined Sewer Systems (CSS). The nearest CSS in the area is the City of Hackensack.

Recreational Values of Oradell's Water Resources

Oradell is a waterfront town with virtually no waterfront access to the public. Oradell's waterways can be better utilized used for recreational purposes. Oradell's water bodies are not considered swimmable, however, bird watching along the Hackensack River in Oradell or canoeing, kayaking or fishing could be enjoyed on waterways in Oradell if

there was better public access. The preservation of the natural resources of lands that have high water resource values is especially important in Oradell, because without their protection flooding will increase, the Van Saun Mill Brook, Behnke Brook and the Hackensack River will become more impaired, and the health of the people, pets and wildlife in Oradell may be threatened.

Improvement of degraded floodplains and stream corridors to a more natural condition will improve water quality and the health of the ecosystems. With more sensible land use policies, proper stormwater management, and minor behavioral changes like using less fertilizer, it may even make it possible to allow swimming and improve fishing in some of the waters of Oradell in the future.

A recent article in the Secaucus Reporter states:
"In the past, because of unwise land use practices, fish species diversity had declined in the Meadowlands. With the passage of the Clean Water Act in 1972, air, water and land quality have improved dramatically. The recent NJMC survey shows a change for the better in fish populations. While the number of fish was larger in the earlier study, the size of the fish almost tripled. Plus, the range of species increased. For the health of the wetlands, this is a good thing.
In 1987-1988, the mummichog, a small minnow-like fish, was dominant at 85 percent of fish taken. In 2001-2003, it had reduced to 40 percent. More desirable game species such as striped bass, white perch, Atlantic silverside and gizzard shad have appeared on the scene.
An increased amount of species is a sign of fish community stability".

The ecosystem of the Hackensack River in the Meadowlands continues to improve because of the new emphasis on land use polices and ecosystem health and viability. These same policies adopted throughout the watershed could lead to even more dramatic improvements in the future.

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 will function to designed specifications.

Plan Consistency

This Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) N.J.A.C. 5:21. The Borough of Oradell 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 and other ordinances require 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 local Soil Conservation District.

The MSWMP must be coordinated with the appropriate Soil Conservation District and any other stormwater management plan, such as an adopted regional stormwater

management plan. A short paragraph as given below is sufficient to comply with this requirement unless there is a TMDL for any of the waterways within the municipality. If a TMDL is in place and requires reductions in nonpoint sources within the municipalities, the TMDL requirements should be incorporated into this municipal stormwater management plan. For example, if a TMDL completed for fecal coliform identified the need for a goose management plan to control the impact from the resident geese at a local park, the goose management plan should be incorporated into this municipal stormwater management plan. Another example is that a TMDL may have identified over-fertilization of residential lawns as a source of nutrients to the impaired waterway and recommended development of a no-phosphorus ordinance for a particular section of the Borough unless soil testing indicates a lack of sufficient phosphorus in the soil. This ordinance should be incorporated into this municipal stormwater management plan.

The Borough is not within a Regional Stormwater Management Planning Area. A TMDL for nickel exists in the lower Hackensack River and is associated with the operation of sewage treatment plants. A TMDL for fecal coliform is under consideration and a TMDL is in development for phosphorous by 2006 for waters within the Borough; therefore this plan needs to be consistent with TMDLs developed in 2006. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

If a TMDL is in place and requires reductions in nonpoint sources within the municipalities, the TMDL requirements should be incorporated into this municipal stormwater management plan. For example, if a TMDL completed for fecal coliform identified the need for a goose management plan to control the impact from the resident geese. A goose management plan should be incorporated into this municipal stormwater management plan. Another example is that a TMDL may have identified over-fertilization of residential lawns as a source of nutrients to the impaired waterway and recommended development of a no-phosphorus ordinance for the Borough unless soil testing indicates a lack of sufficient phosphorus in the soil.

Where TMDLs are required to address documented surface water quality impairment, allocations are made to the varying sources contributing to the water quality problem in order to reduce the total pollutant load received by the waterbody. Load reduction goals established through TMDLs are achieved through the issuance of wasteload allocations for point source discharges and load allocations for nonpoint source discharges. Since nonpoint source pollution, by definition, does not come from discrete, identifiable sources, load allocations would consist of the identification of categories of nonpoint sources that contribute to the parameters of concern. The load allocation would also include specific load reduction measures for those categories of sources, to be implemented through best management practices (BMPs) including local ordinances for stormwater management and nonpoint source pollution control, headwaters protection practices, or other mechanisms for addressing the priority issues of concern.

Nonstructural Stormwater Management Strategies and Ordinance Discussion

The Borough of Oradell is required to adopt and enforce the following ordinances by October 1, 2005 to conform with NJDEP regulations:

Illicit Connection Ordinance
Improper Waste Disposal Ordinance
Litter Ordinance
Wildlife Feeding Ordinance
Pet Waste Ordinance
Yard Waste Ordinance
Stormwater Control Ordinance

The adoption of the mandatory ordinances and the actual changes to existing ordinances are not required at this time. The required action to identify ordinances that are likely to need modification has been fulfilled and is found in the Appendix below:

In addition to the design and performance standards for nonstructural strategies discussed above, the municipal stormwater management plan must be evaluated to determine how the municipal plan and ordinances should be amended to implement the principles of nonstructural stormwater management.

Municipalities are required to evaluate the municipal master plan, and land use and zoning ordinances to determine what adjustments need to be made to allow the implementation of nonstructural stormwater management techniques, also called Low Impact Development (LID) techniques. To address this requirement, municipal ordinances and plans must be reviewed to determine where changes can be made to incorporate nonstructural stormwater management strategies. When submitting the plan and ordinances to the county for review and a copy to the Department, all revised ordinances, master plans, and maps must be attached, along with an adoption schedule. The Borough has reviewed the master plan and ordinances, and has provided a list of the sections in the Borough Land Use and Zoning Ordinances that may **be modified** to incorporate nonstructural stormwater management strategies.

Land Use/Build-Out Analysis Discussion

Oradell is not required to do a build out analysis because it has less than one square mile of vacant land and virtually no agricultural land. 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. Otherwise, a build-out analysis must be conducted assuming full development under existing zoning for each HUC14 drainage area in the municipality. To satisfy the minimum requirements, the result of the build-out analysis is acreage of impervious surfaces by HUC14 and associated nonpoint loadings attributed to the build-out of the municipality

Although a build out analysis is not required 218 acres of land is in use as Golf Courses. It is important to note that, although the pollutant loads of golf courses are higher than those for vacant lands because of pesticides and phosphorous and nutrients from fertilizers; converting golf course lands to residential or high density residential as

currently zoned in the Borough of Oradell typically results in an increase in pollutant loads for metals and petroleum hydrocarbons.. Also the percentage of impervious surfaces increases dramatically. If as a result of increases of impervious surfaces, the increases in stormwater runoff flows are not managed properly then these high flows will increase stream bank erosion, thereby increasing sediment loads and Total Suspended Solids to the receiving waters.

Mitigation Planning

A mitigation plan is required to grant a variance or exemptions from the design and performance standards of a municipal stormwater management plan. Mitigation should be a last resort; projects should conform to Borough Ordinances. As real world experience with mitigation has shown mixed results from attempts to mitigate sensitive ecological impacts, e.g. constructed wetlands that failed to meet expectations and representations, the mitigation requirements should offer a hierarchy of options that more than clearly offset the effect on groundwater recharge, stormwater quantity control, and/or stormwater quality control that was created by granting the variance or exemption. The detrimental impacts of a proposed variance should be offset by a factor of two to allow for uncertainty and differences in interpretation especially given the impaired nature of the Borough's waterways. This mitigation plan is provided for a proposed development that is granted a variance or exception from the stormwater management design and performance standards. Presented is a hierarchy of options

Mitigation Project Criteria

Option 1. if possible, the mitigation project should be implemented in the same drainage area as the proposed development with the following exceptions due to existing water quality and quantity conditions and the limited land area of the Borough of Oradell as follows:

- Variances granted in the Pascack Brook HUC14 area shall mitigate impacts in the Coles Brook/Van Saun Brook HUC14.

- Variances granted in the Hirshfeld Brook HUC14 area shall mitigate impacts south of the Oradell dam.
- Variances granted in either Hackensack River HUC14 area shall mitigate impacts south of the Oradell dam.

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. The developer will be responsible for all costs of maintenance for the mitigation project for the life of the building, facility, structure and any replacements thereto for which a variance is received. The developer will pay the estimated costs for two years in advance and thereafter shall be billed annually based on the Borough's experience and actual expenses. The developer shall also post a bond with the Borough of Oradell for the projected cost of maintenance over a 20 years span. The developer will also reimburse the Borough for the cost of any experts that the Borough chooses to hire to evaluate the mitigation project proposal prior to Board approval and to monitor and report on the project implementation, maintenance and results to both the Borough and Developer on an ongoing basis. 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. Listed below are specific projects that can be used to address the mitigation requirement.

- **Groundwater Recharge** • Replace the existing Borough owned, impervious parking lot the Ridgewood Woods/Ballfields/Swim Club complex approximate 80,000 sf with permeable paving to provide approximately 600,000 cf of additional average annual groundwater recharge.

- **Water Quality** • Retrofit the existing stormwater management drain inlets in the Borough on Oradell Avenue, Kinderkamack Road, Elm Street New Milford Avenue and Marginal Road to provide the removal of 80 percent of total suspended solids and removal of 95% hydrocarbons and petrochemicals from runoff by installing and utilizing .Ultra Urban Filter storm drain inserts, part # CO1414N from AbTech Industries or equivalent and replacing said units on an annual basis and paying an annual stipend to the Oradell DPW to reimburse the costs incurred in man hours including benefits, taxes and supervision and equipment costs including estimated depreciation in vacuuming said units on an as needed basis. Each unit is estimated to approximately 10 minutes of vacuuming by a skilled operator. .

Option 2. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option 1, 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 and maintain a vegetative buffer with suitable native plantings (minimum 50 foot wide) along all Borough owned and County owned sections along the length of the Hackensack River below the dam and along the Behnke Brook in the vicinity of Ridgewood Field, as a goose control measure and to filter stormwater runoff from the high goose traffic areas. and provide goose management measures, including public education at all Ballfields and open lawn parkland in the Borough .
- Options 1 and 2 would be available only if the MSWMP includes a list of environmental enhancement projects that provide groundwater recharge, control flooding, or control nonpoint source pollution. Although only a brief description of each project is presented here, it is important for the municipality to have

sufficient information on each project, including size of the project, permit requirements, land ownership, and estimated project costs (i.e., permitting fees, engineering costs, construction costs, and maintenance costs).. In addition, the developer and owners of the developed properties will agree to be jointly and severally liable In the event of default, and responsible for 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.

Summary

The Borough of Oradell and all New Jersey municipalities must incorporate new ideas and employ new strategies to address the environmental impacts of development.

Acknowledgements

The writer is indebted to the following people and organizations for their assistance, encouragement and source material utilized in the preparation of this plan:

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Councilman Andy Marulis, Borough of Oradell

Terry McCue, Borough Administrator, Borough of Oradell

Mark DiGennaro, P.E. Superintendent Public Works, Borough of Oradell

Stephen Depken, Construction Official, Borough of Oradell

Marisa Tiberi, Engineer, Boswell McClave Engineering

Robert Reynolds, P.E.

Peter L. Kallin, Ph.D., PWS TRC Omni Environmental Corp.

Hackensack Riverkeeper Inc.

Passaic River Coalition

Watershed Management Area 5

NJDEP

ANJEC

USGS

FEMA

United Water NJ

American Rivers

Burgis Associates Inc.

Meadowlands Conservation Trust

Oradell Environmental Committee

-Michael Herson

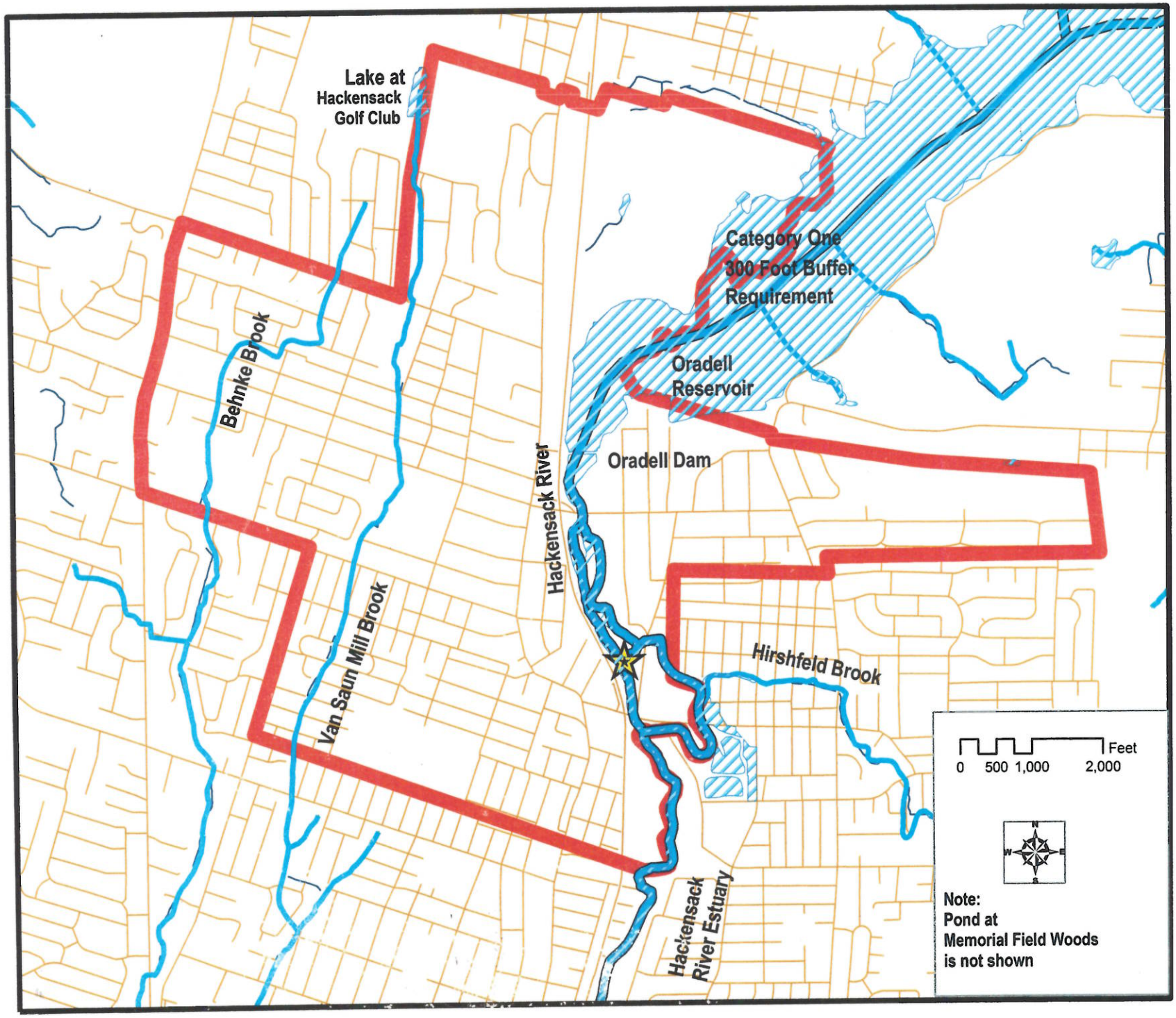
Stormwater Coordinator, Borough of Oradell

Borough of Oradell

Municipal Stormwater Management Plan Maps

Listing of Color Maps Showing Oradell's Characteristics

ORADELL
Waterways



Legend

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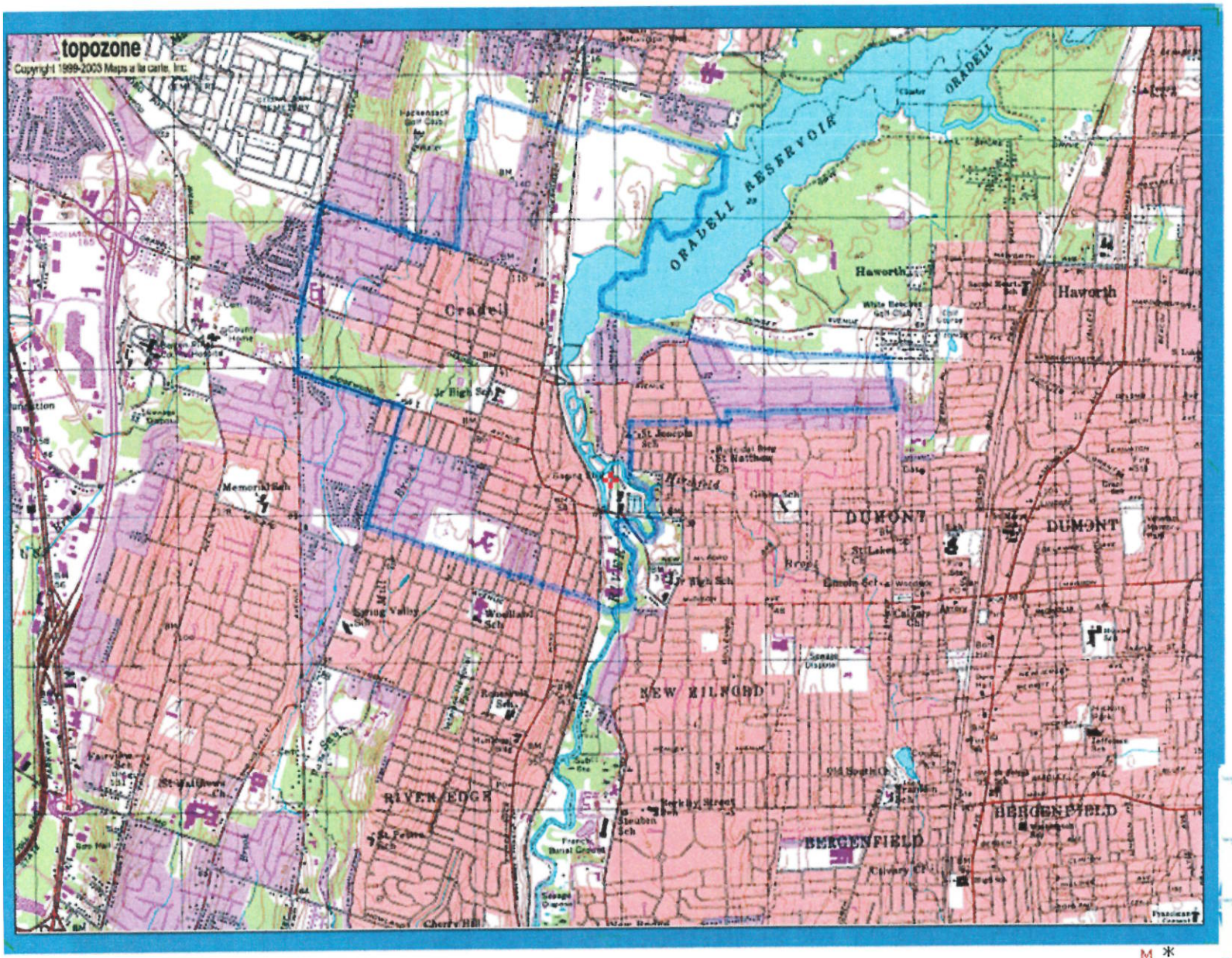
- streamgage_sp
- Rivers_(stateriv)
- Streams_(swqs)
- OradellOutline
- berline
- berstrm
- Oradell_Streets

Oradell

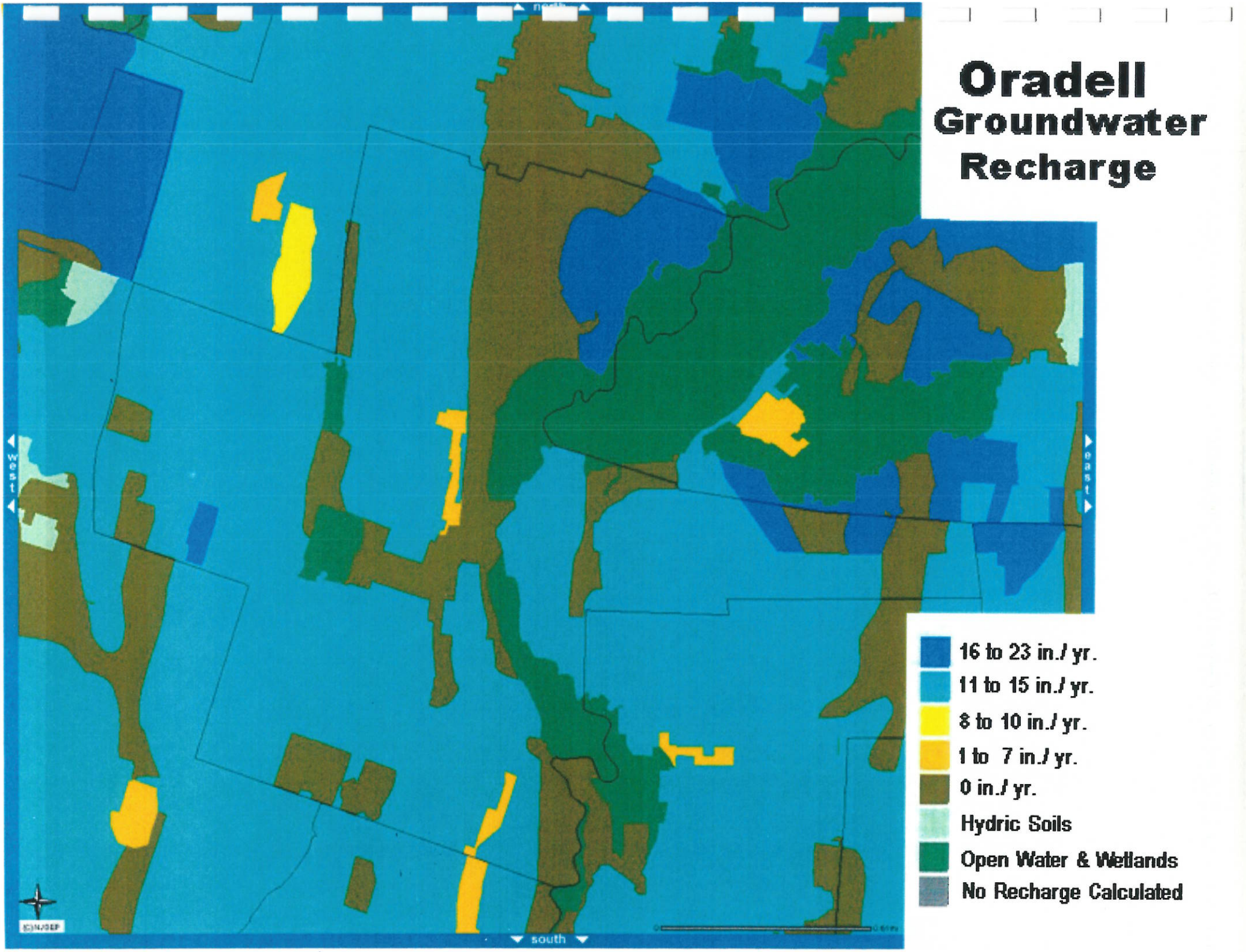
USGS Hackensack Quad

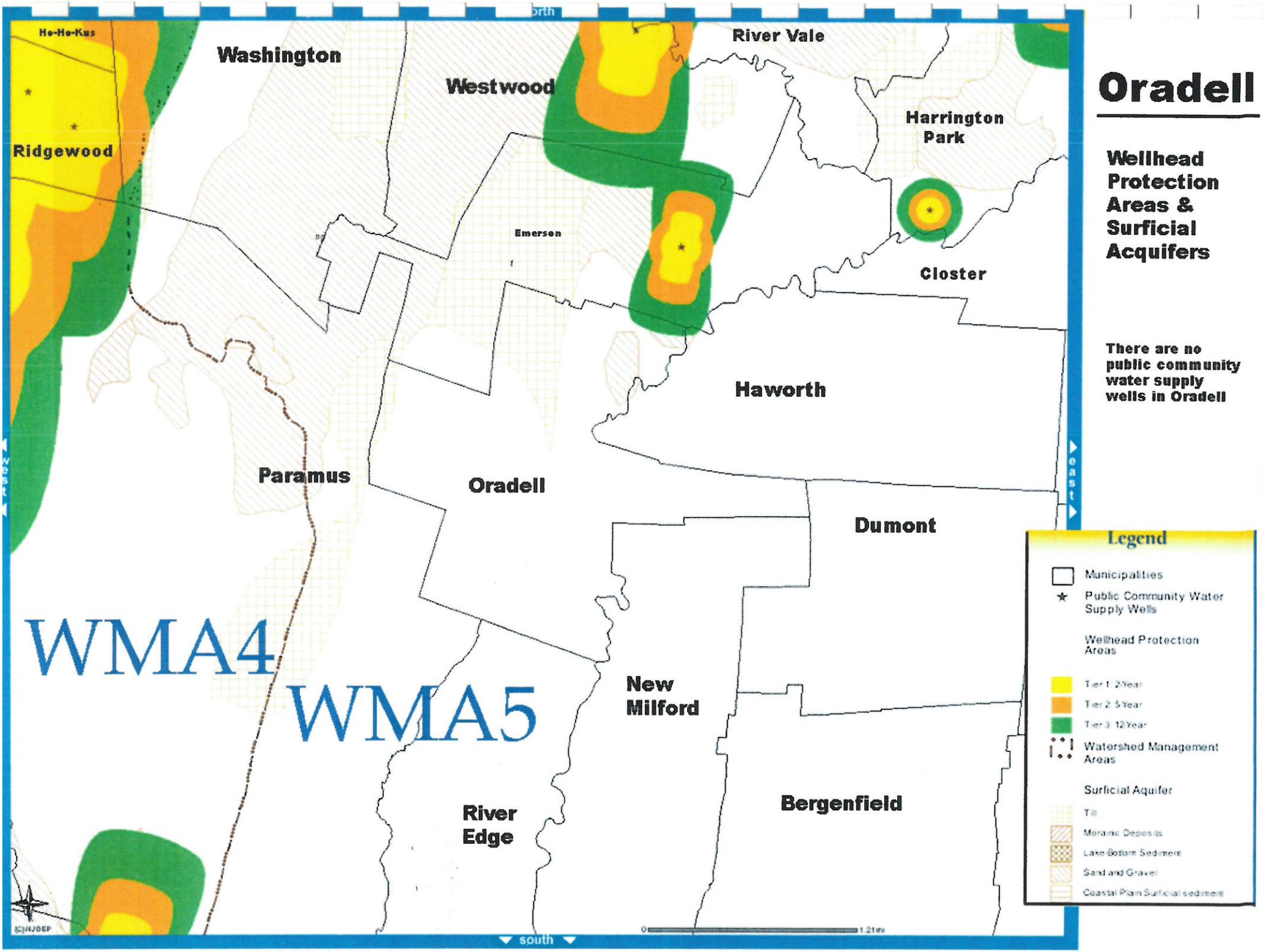
With Highlighted Boundary Added



BASE INFORMATION WAS OBTAINED FROM MAPS PREPARED BY MALCOM KASLER & ASSOCIATES, INC. DATED 3/91 & WILLIAM G. SCHWARZWER DATED 10/96 AND BURGIS ASSOCIATES INC. (3/00)

Drawing Name: ZONING MAP	2000 Zoning Map with Color Highlighting Added (2005)	Project No. 799.01	Drawing Date 3/1/2000
BURGIS ASSOCIATES, INC. PROFESSIONAL PLANNERS / LANDSCAPE ARCHITECTS 25 WOODED AVENUE MENDHAM, N.J. 07945	BOROUGH OF ORADELL	Drawing Scale 1" = 600'+/-	Drawing No. 799 ZONING


Oradell
Groundwater
Recharge
north
west
east
south
16 to 23 in./ yr.
11 to 15 in./ yr.
8 to 10 in./ yr.
1 to 7 in./ yr.
0 in./ yr.
Hydric Soils
Open Water & Wetlands
No Recharge Calculated


Oradell
Wellhead Protection Areas & Surficial Acquifers
There are no public community water supply wells in Oradell
He-He-Kus
Washington
Westwood
River Vale
Harrington Park
Ridgewood
Emerson
Closter
Haworth
Paramus
Oradell
Dumont
WMA4
WMA5
New Milford
River Edge
Bergenfield
Legend
Municipalities
Public Community Water Supply Wells
Wellhead Protection Areas
Tier 1 2Year
Tier 2 5Year
Tier 3 12Year
Watershed Management Areas
Surficial Aquifer
Till
Moraine Deposits
Lake Bottom Sediment
Sand and Gravel
Coastal Plain Surficial sediment
north
west
east
south
(C)NJDEP

Oradell Bedrock Geology

north

JTrpcq

JTrpsc

JTrpsc - Passaic Formation
Conglomerate and Sandstone facies

Oradell

JTrps

JTrps - Passaic Formation
Sandstone and Siltstone facies

Jd

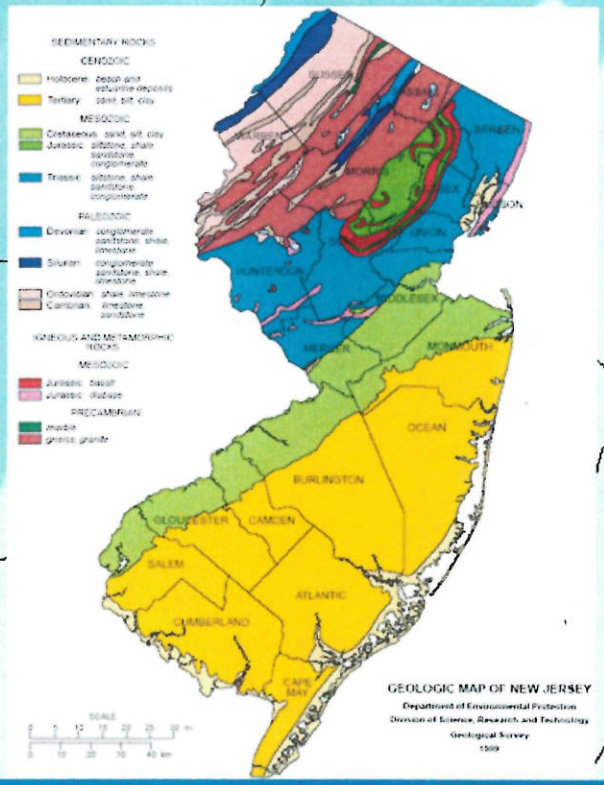
Trla

Trl

JTrpms

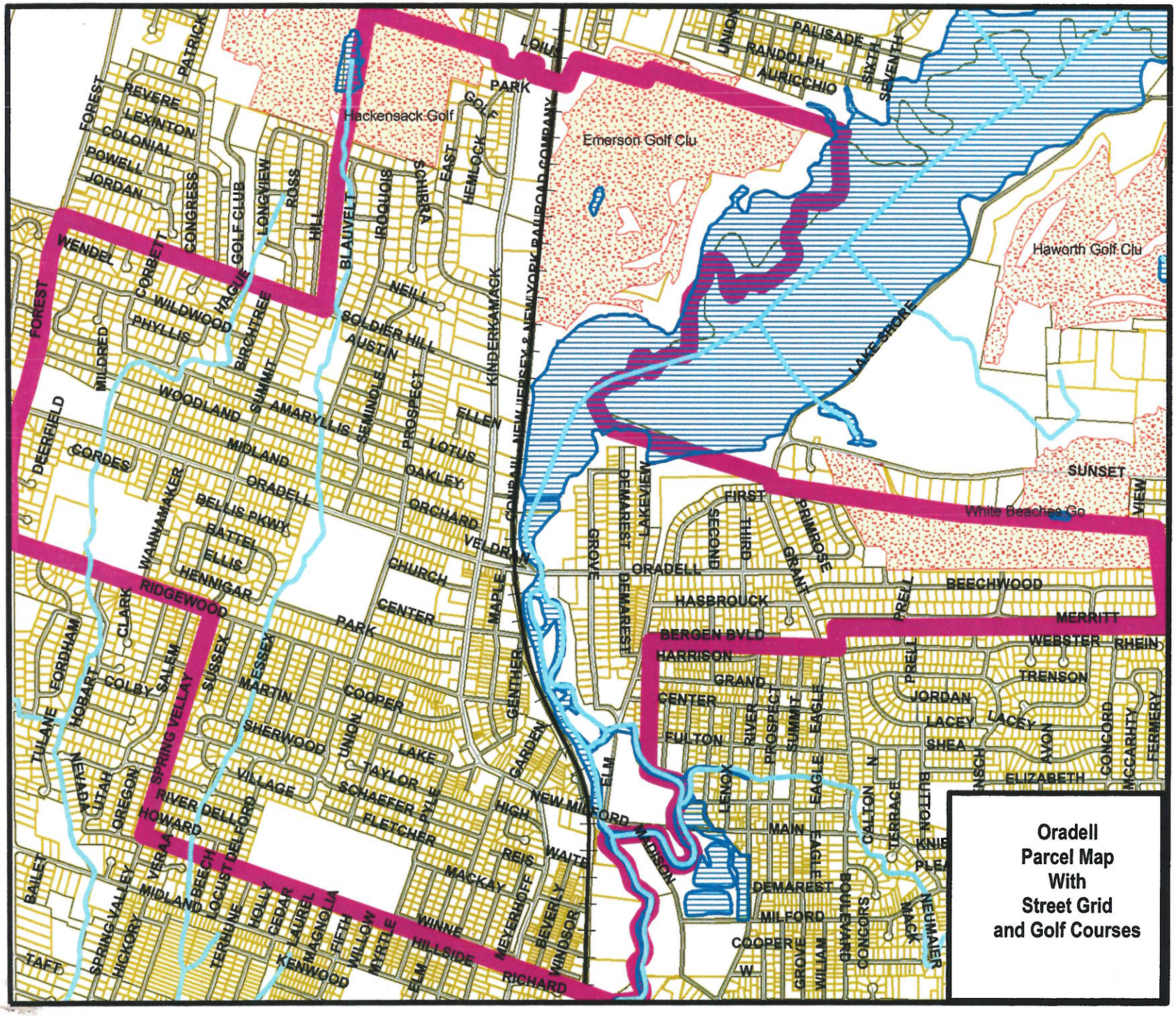
0 2mi

south



Legend

- Jd Jurassic Diabase
- Jg Granophyre
- JTrp Passaic Formation
- Trpg Passaic Formation Gray bed
- JTrpcq Passaic Formation Quartzite-clast Conglomerate facies
- JTrpcl Passaic Formation Limestone-clast Conglomerate facies
- JTrpsc Passaic Formation Conglomerate and Sandstone facies
- JTrps Passaic Formation Sandstone and Siltstone facies
- JTrpms Passaic Formation Mudstone facies
- Trl Lockatong Formation
- TRlr Lockatong Formation Red bed
- Trla Lockatong Formation Arkosic Sandstone facies
- Trls Lockatong Formation Sandstone and Conglomerate Sandstone facies



ORADELL

0 412.5 825 1,650 Feet

Existing Land Use Development Pattern

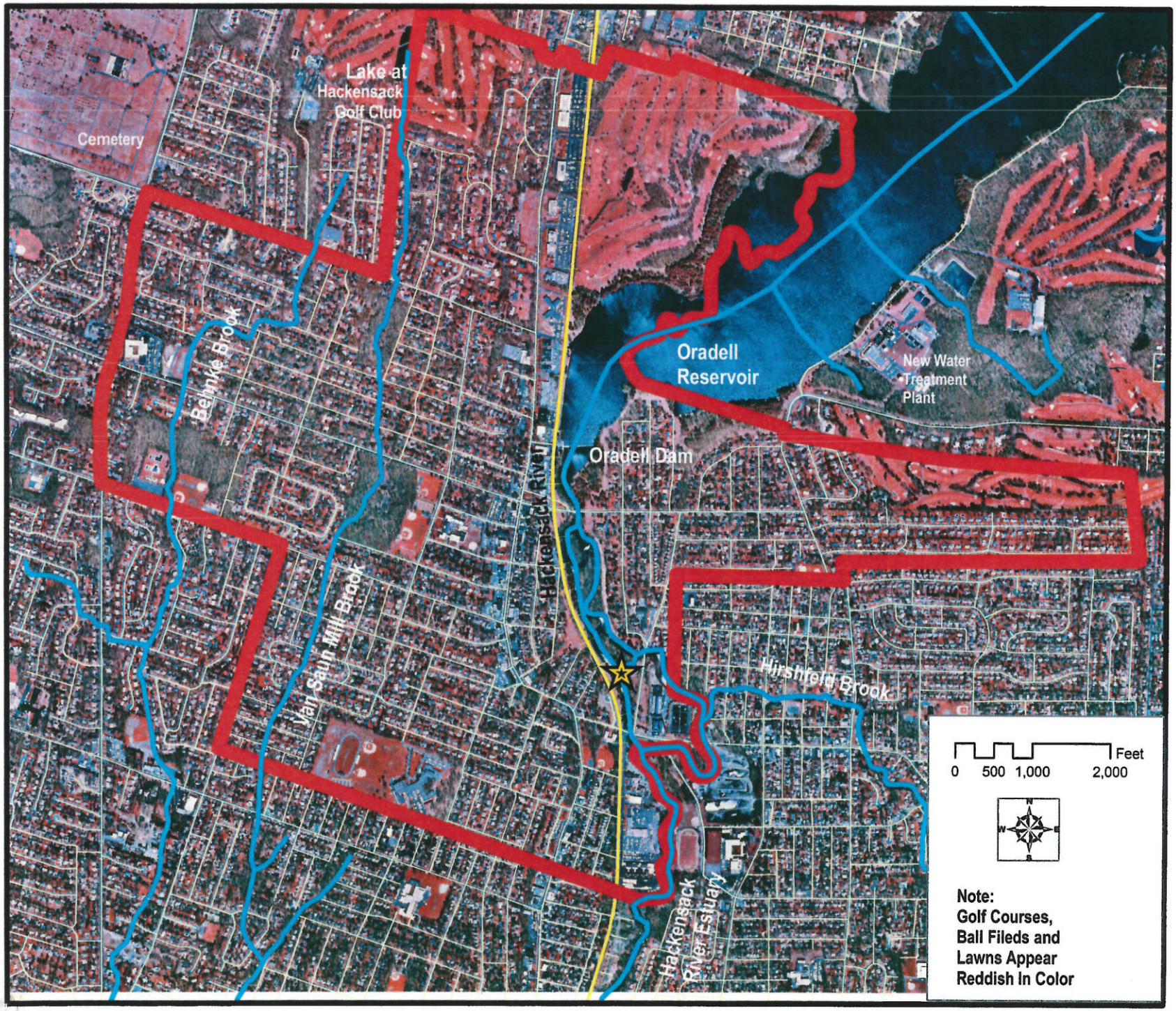
Legend

- Streams_&_ Rivers_(svvqs)
- water_ca
- Oradell_Outline
- Rail_Lines
- Oradell _Roads
- Golf_Courses
- Oradell_Blocks
- Oradell_Parcels

Oradell Parcel Map With Street Grid and Golf Courses

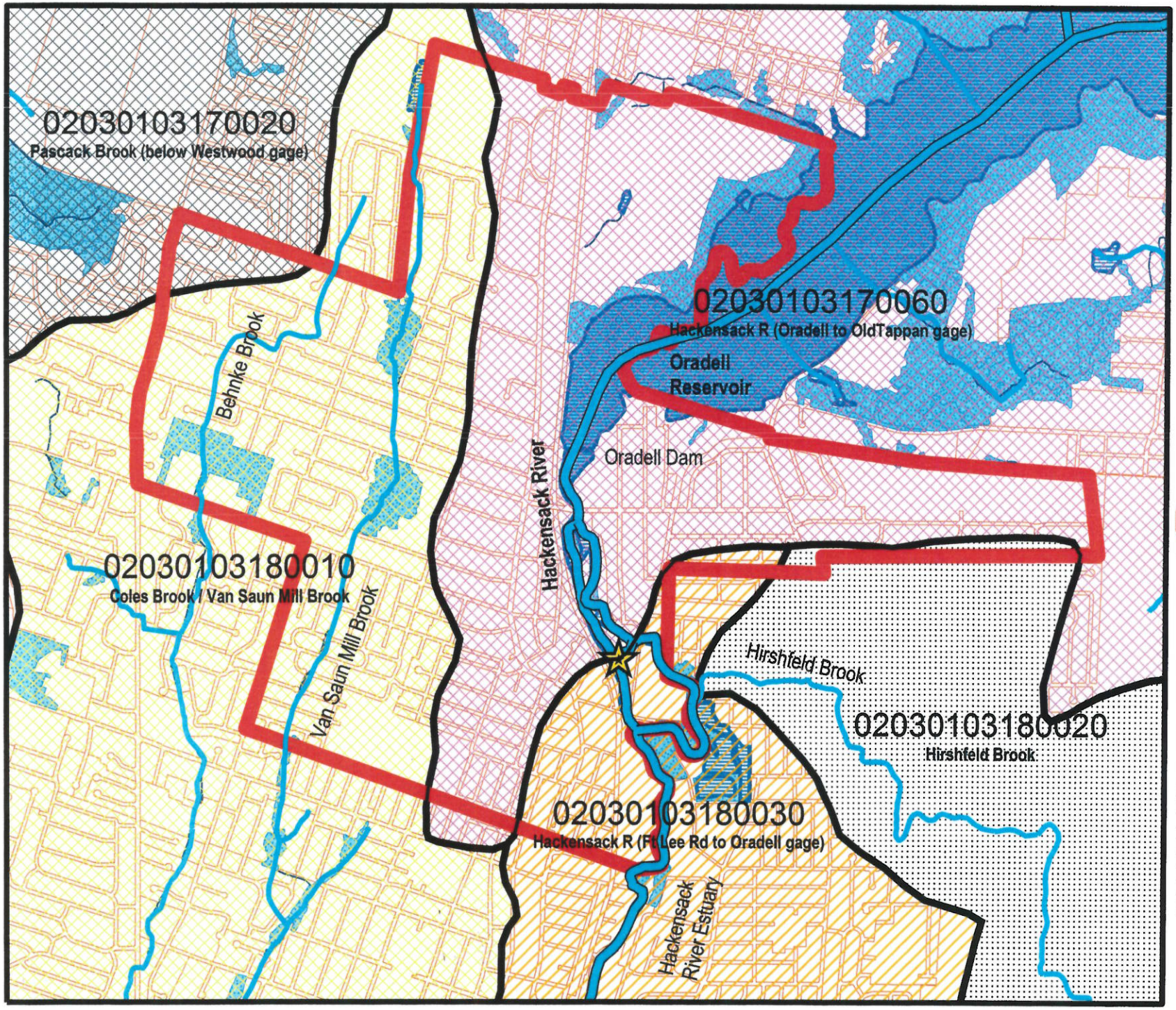
ORADELL Existing Land Use

Aerial Photo Map



Legend

- streamgage_sp
- Streams_&_Rivers_(sw qs)
- Oradell_Outline
- Rail_Lines
- Oradell_Streets



ORADELL HUC14s

Hydrologic Unit Codes for Sub Watersheds in WMA5

N W E S

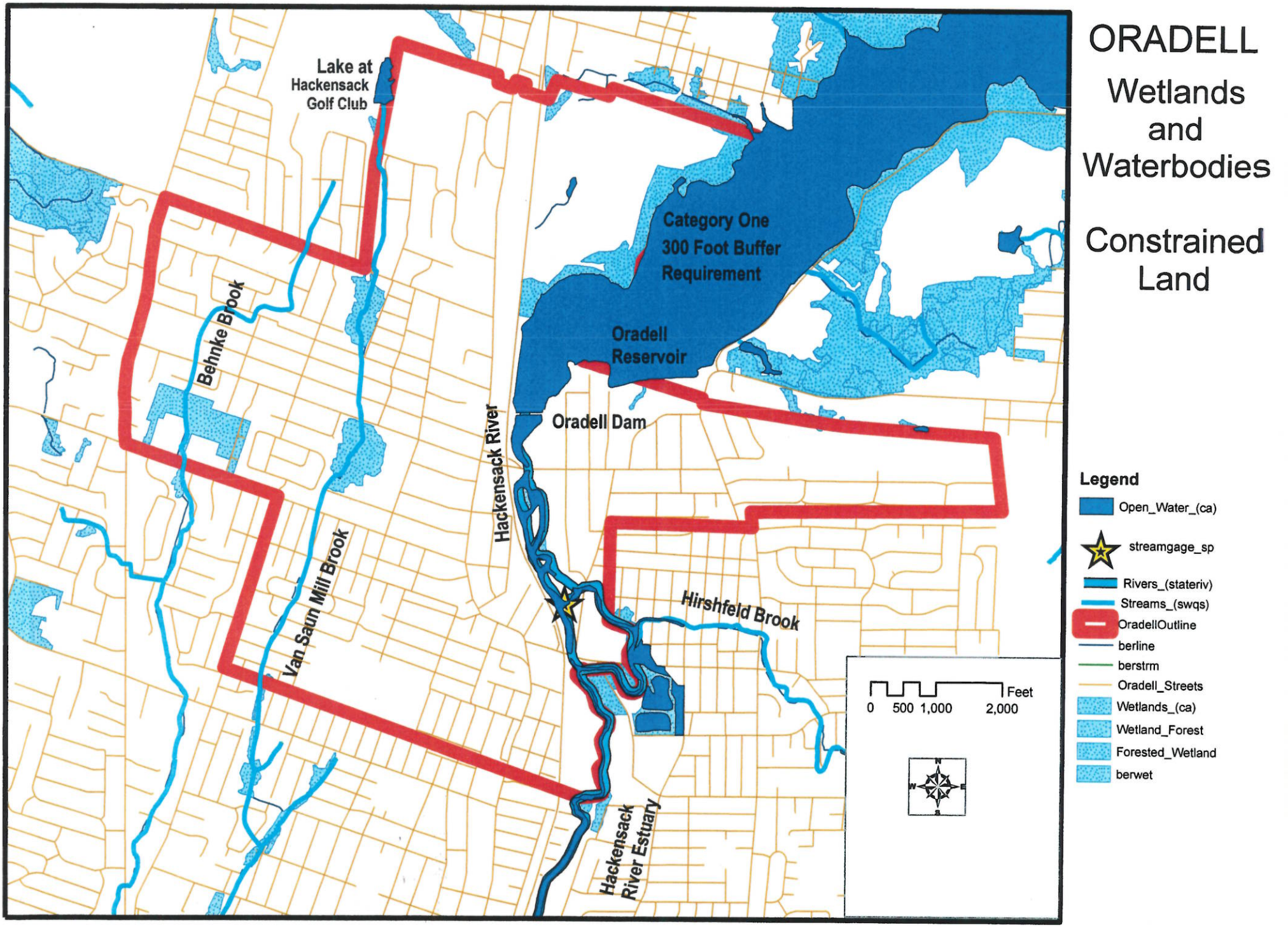
0 500 1,000 2,000 Feet

Legend

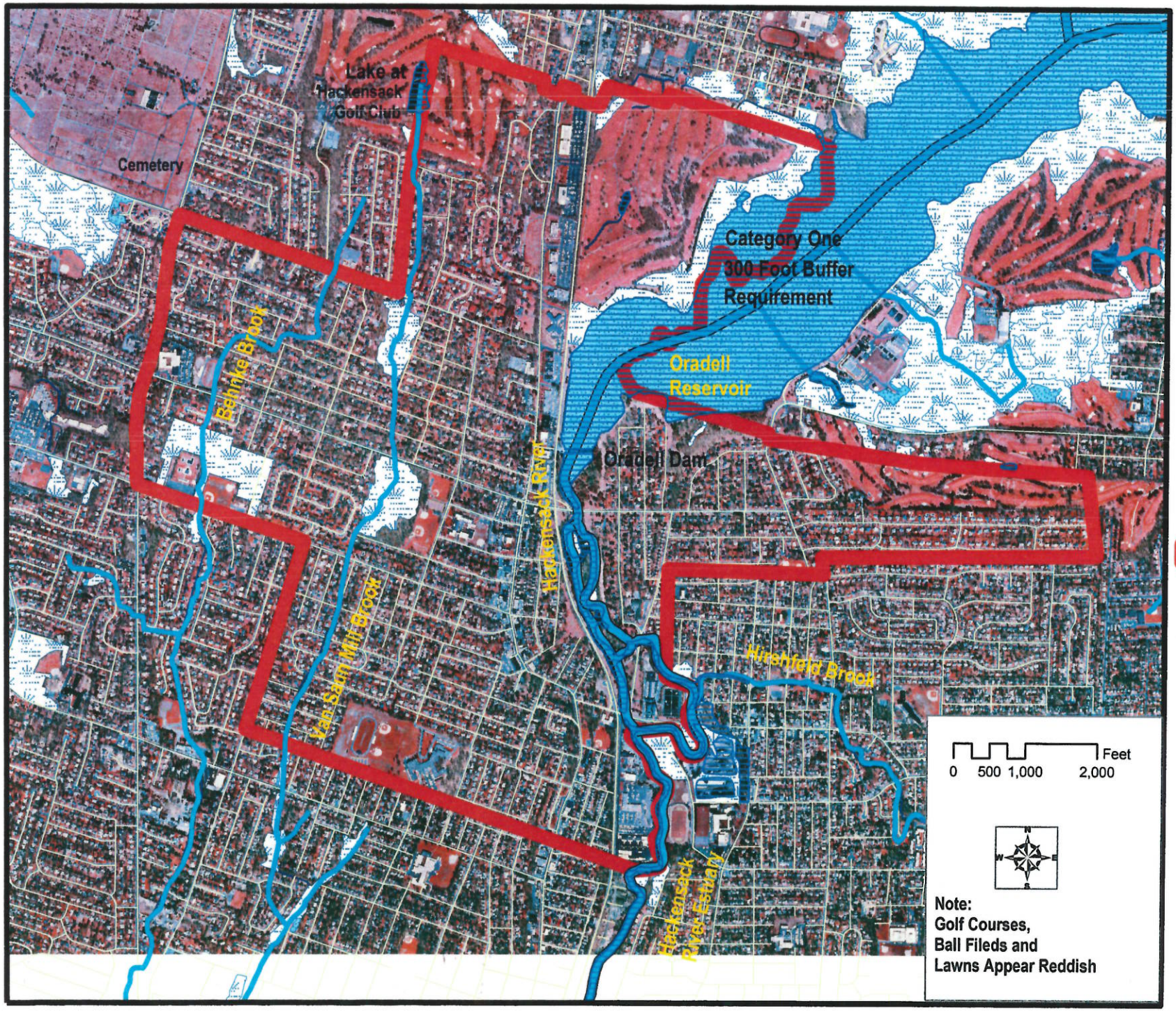
- Stream_Gage_sp
- Rivers_(stateriv)
- Streams_(swqs)
- Oradell_Outline
- HUC14s _(dephuc14)

Names_&_Codes

- Open_Water_(ca)
- berline
- berstrm
- Wetlands_(ca)
- Wetland_Forests
- Forested_Wetland
- Oradell_Blocks
- berwet
- Hirshfeld
- HackBelowGage
- ColesVanSaunMill
- PascakBrook
- HackAboveGage

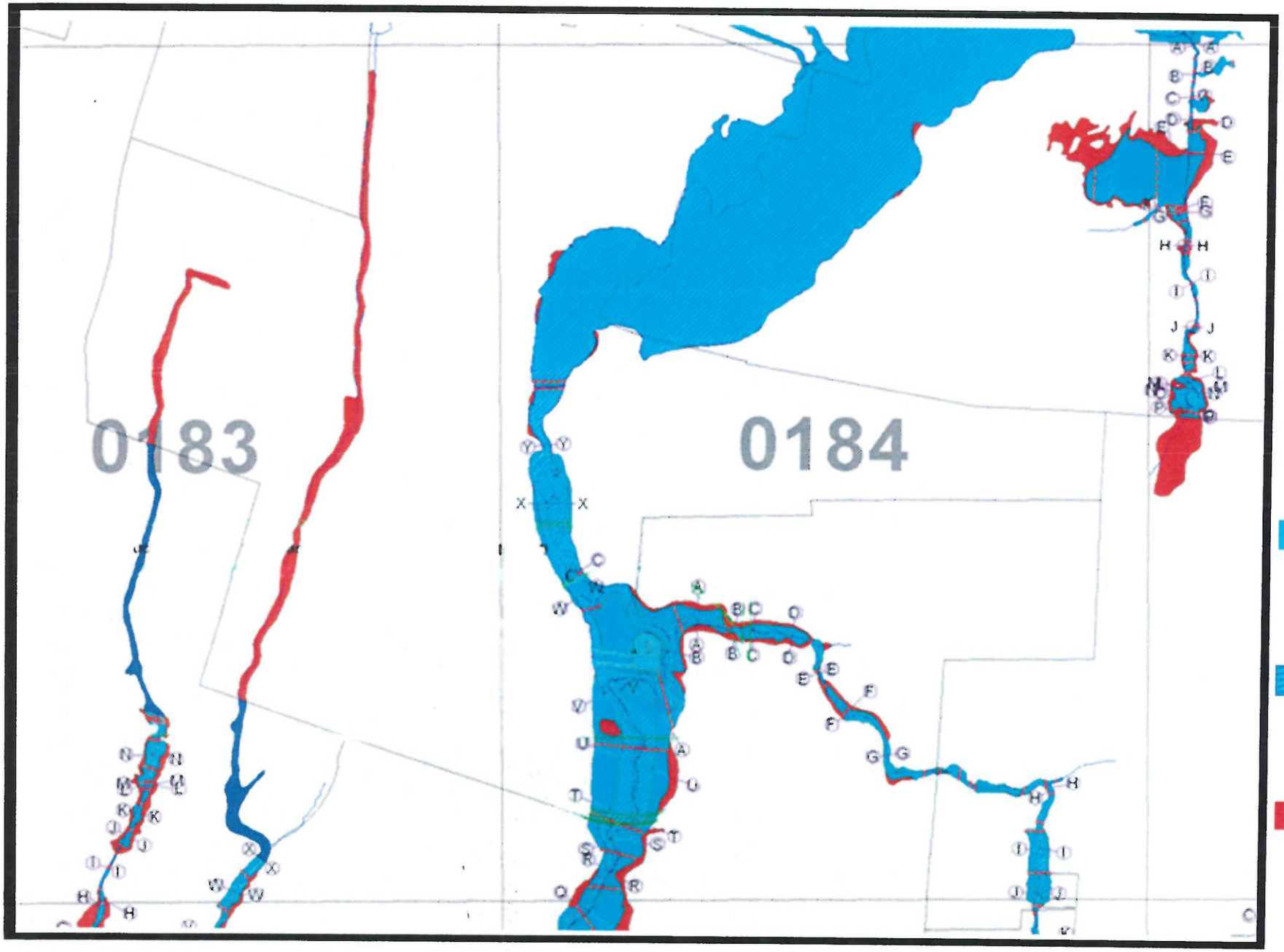

ORADELL
Wetlands and Waterbodies
Constrained Land
Lake at Hackensack Golf Club
Category One 300 Foot Buffer Requirement
Oradell Reservoir
Oradell Dam
Behnke Brook
Van Saun Mill Brook
Hackensack River
Hirshfeld Brook
Hackensack River Estuary
Legend
Open_Water_(ca)
streamgage_sp
Rivers_(stateriv)
Streams_(swqs)
OradellOutline
berline
berstrm
Oradell_Streets
Wetlands_(ca)
Wetland_Forest
Forested_Wetland
berwet
0 500 1,000 2,000
Feet

ORADELL Wetlands, Water Bodies and Land Use



Special Flood Hazard Areas

Oradell Flood Zones



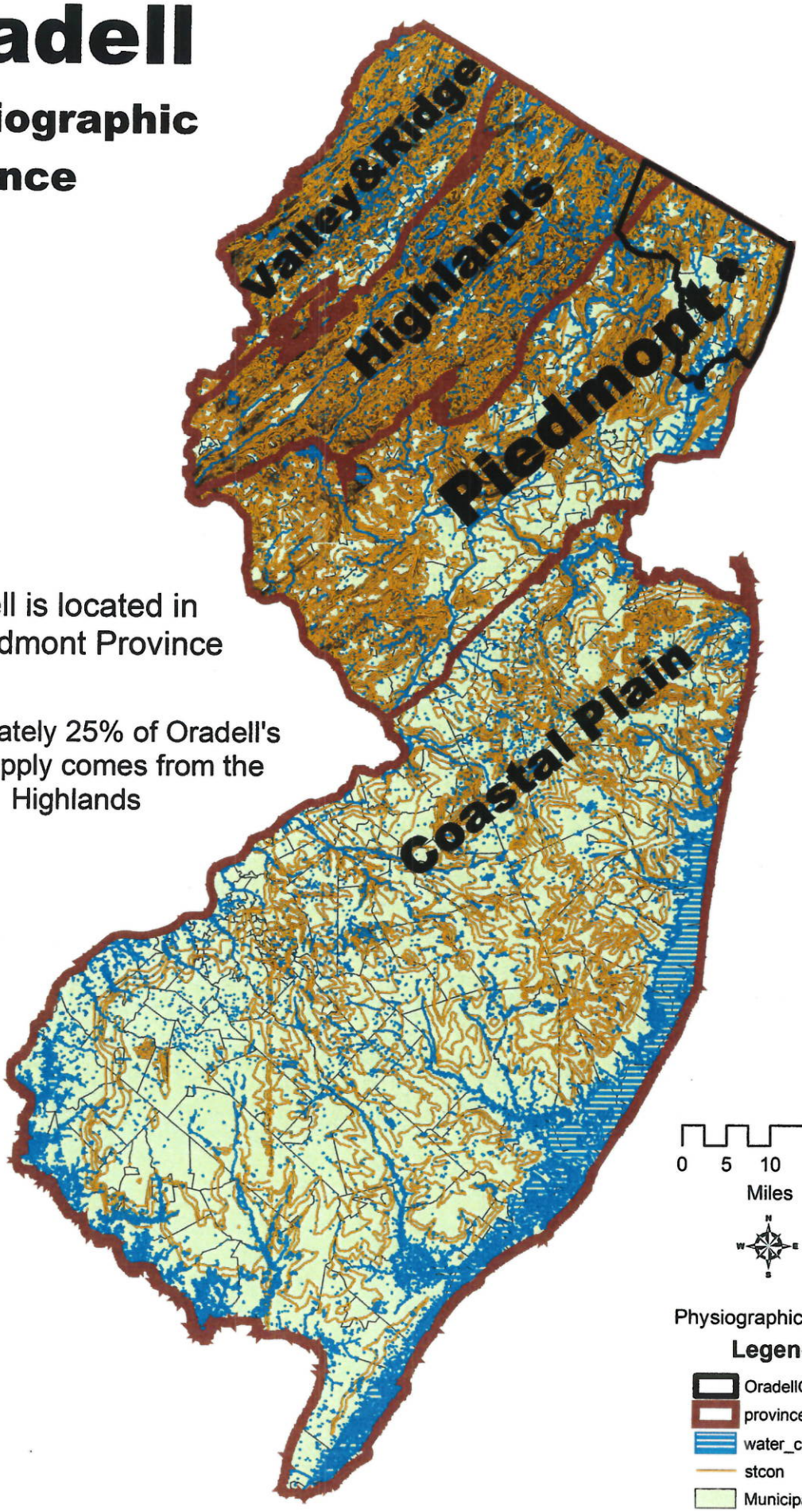
"100 Year"

Floodway

"500 Year"

Oradell

Physiographic Province Map



Oradell is located in the Piedmont Province

Approximately 25% of Oradell's water supply comes from the Highlands

APPENDIX I

Municipal Stormwater Management Plan

Borough of Oradell
355 Kinderkamack Road
Oradell, NJ 07649

Nonstructural Stormwater Management Strategies and Ordinances

The Borough of Oradell is required to adopt and enforce the following ordinances by October 1, 2005 to conform with NJDEP regulations:

Illicit Connection Ordinance
Improper Waste Disposal Ordinance
Litter Ordinance
Wildlife Feeding Ordinance
Pet Waste Ordinance
Yard Waste Ordinance
Stormwater Control Ordinance

The adoption of the mandatory ordinances and the actual changes to existing ordinances are not required at this time. The required action to identify ordinances that are likely to need modification has been fulfilled below:

In addition to the design and performance standards for nonstructural strategies discussed above, the municipal stormwater management plan must be evaluated to determine how the municipal plan and ordinances should be amended to implement the principles of nonstructural stormwater management.

Municipalities are required to evaluate the municipal master plan, and land use and zoning ordinances to determine what adjustments need to be made to allow the implementation of nonstructural stormwater management techniques, also called Low Impact Development (LID) techniques. To address this requirement, municipal ordinances and plans must be reviewed to determine where changes can be made to incorporate nonstructural stormwater management strategies. When submitting the plan and ordinances to the county for review and a copy to the Department, all revised ordinances, master plans, and maps must be attached, along with an adoption schedule. The Borough has reviewed the master plan and ordinances, and has provided a list of the

sections in the Borough Land Use and Zoning Ordinances that may **be modified** to incorporate nonstructural stormwater management strategies.

New Ordinances Required To Comply With NJDEP Regulations

Oradell Stormwater Plan
Mandatory Requirement
The Borough of Oradell must adopt and enforce an ordinance based on the following NJDEP model by October 1, 2005.

NJDEP Model Ordinance - Illicit Connection
Ordinance # [ ] - Illicit Connection Ordinance

SECTION I. Purpose:
An ordinance to prohibit illicit connections to the municipal separate storm sewer system(s) operated by the [insert name of municipality], so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

SECTION II. Definitions:
For the purpose of this ordinance, the following terms, phrases, words, and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory. The definitions below are the same as or based on corresponding definitions in the New Jersey Pollutant Discharge Elimination System (NJPDES) rules at N.J.A.C. 7:14A-1.2.

a. Domestic sewage - waste and wastewater from humans or household operations.

b. Illicit connection – any physical or non-physical connection that discharges domestic sewage, non-contact cooling water, process wastewater, or other industrial waste (other than stormwater) to the municipal separate storm sewer system operated by the [insert name of municipality], unless that discharge is authorized under a NJPDES permit other than the Tier A Municipal Stormwater General Permit (NJPDES Permit Number NJ0141852). Non-physical connections may include, but are not limited to, leaks, flows, or overflows into the municipal separate storm sewer system.

c. Industrial waste - non-domestic waste, including, but not limited to, those pollutants regulated under Section 307(a), (b), or (c) of the Federal Clean Water Act (33 U.S.C. §1317(a), (b), or (c)).

d. Municipal separate storm sewer system (MS4)– a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins,

curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by [insert name of municipality] or other public body, and is designed and used for collecting and conveying stormwater. NOTE: In municipalities with combined sewer systems, add the following: "MS4s do not include combined sewer systems, which are sewer systems that are designed to carry sanitary sewage at all times and to collect and transport stormwater from streets and other sources."

e. NJPDES permit – a permit issued by the New Jersey Department of Environmental Protection to implement the New Jersey Pollutant Discharge Elimination System (NJPDES) rules at N.J.A.C. 7:14A

f. Non-contact cooling water - water used to reduce temperature for the purpose of cooling. Such waters do not come into direct contact with any raw material, intermediate product (other than heat) or finished product. Non-contact cooling water may however contain algaecides, or biocides to control fouling of equipment such as heat exchangers, and/or corrosion inhibitors.

g. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

h. Process wastewater - any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. Process wastewater includes, but is not limited to, leachate and cooling water other than non-contact cooling water.

i. Stormwater – water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, is captured by separate storm sewers or other sewerage or drainage facilities, or is conveyed by snow removal equipment.

SECTION III. Prohibited Conduct:
No person shall discharge or cause to be discharged through an illicit connection to the municipal separate storm sewer system operated by the [insert name of municipality] any domestic sewage, non-contact cooling water, process wastewater, or other industrial waste (other than stormwater).

SECTION IV. Enforcement:
This ordinance shall be enforced by the [Police Department and/or other Municipal Officials] of [insert name of municipality].

SECTION V. Penalties:
Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed [insert amount].

SECTION VI. Severability:
Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or

holding of any such portion of this Ordinance to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION VII. Effective date:
This Ordinance shall be in full force and effect from and after its adoption and any publication as may be required by law.

ALL OF WHICH IS ADOPTED this ___day of _____, 200_, by

Oradell Stormwater Plan
Mandatory Requirement
The Borough of Oradell must adopt and enforce an ordinance based on the following NJDEP model by October 1, 2005.

NJDEP Model Ordinance - Improper Disposal of Waste
Ordinance # [ ] - Improper Disposal of Waste Ordinance

SECTION I. Purpose:
An ordinance to prohibit the spilling, dumping, or disposal of materials other than stormwater to the municipal separate storm sewer system (MS4) operated by the [insert name of municipality], so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

SECTION II. Definitions:
For the purpose of this ordinance, the following terms, phrases, words, and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

a. Municipal separate storm sewer system (MS4)– a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by [insert name of municipality] or other public body, and is designed and used for collecting and conveying stormwater. NOTE: In municipalities with combined sewer systems, add the following: "MS4s do not include combined sewer systems, which are sewer systems that are designed to carry sanitary sewage at all times and to collect and transport stormwater from streets and other sources."
b. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
c. Stormwater – water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, is captured by separate storm sewers or other sewerage or drainage facilities, or is conveyed by snow removal equipment.

SECTION III. Prohibited Conduct:
The spilling, dumping, or disposal of materials other than stormwater to the municipal separate storm sewer system operated by [insert name of municipality] is prohibited. The spilling, dumping, or disposal of materials other than stormwater in such a manner as to cause the discharge of pollutants to the municipal separate storm sewer system is also prohibited.

SECTION IV. Exceptions to Prohibition:
a. Water line flushing and discharges from potable water sources
b. Uncontaminated ground water (e.g., infiltration, crawl space or basement sump pumps, foundation or footing drains, rising ground waters)
c. Air conditioning condensate (excluding contact and non-contact cooling water)
d. Irrigation water (including landscape and lawn watering runoff)
e. Flows from springs, riparian habitats and wetlands, water reservoir discharges and diverted stream flows
f. Residential car washing water, and residential swimming pool discharges
g. Sidewalk, driveway and street wash water
h. Flows from fire fighting activities
i. Flows from rinsing of the following equipment with clean water:
- Beach maintenance equipment immediately following their use for their intended purposes; and
- Equipment used in the application of salt and de-icing materials immediately following salt and de-icing material applications. Prior to rinsing with clean water, all residual salt and de-icing materials must be removed from equipment and vehicles to the maximum extent practicable using dry cleaning methods (e.g., shoveling and sweeping). Recovered materials are to be returned to storage for reuse or properly discarded.
Rinsing of equipment, as noted in the above situation is limited to exterior, undercarriage, and exposed parts and does not apply to engines or other enclosed machinery.

SECTION V. Enforcement:
This ordinance shall be enforced by the [Police Department and/or other Municipal Officials] of [insert name of municipality].

SECTION VI. Penalties:
Any person(s) who continues to be in violation of the provisions of this ordinance, after being duly notified, shall be subject to a fine not to exceed [insert amount].

SECTION VII. Severability:
Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or holding of any such portion of this Ordinance to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION VIII. Effective date:

This Ordinance shall be in full force and effect from and after its adoption and any publication as may be required by law.

ALL OF WHICH IS ADOPTED this ___day of _____, 200_, by the _____.

Oradell Stormwater Plan
Mandatory Requirement
The Borough of Oradell must adopt and enforce an ordinance based on the following NJDEP model by October 1, 2005.

NJDEP Model Ordinance - Litter Control
Ordinance #[ ] - Litter Control

SECTION I. Purpose:
An ordinance to establish requirements to control littering in [insert name of municipality], so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

SECTION II. Definitions:
For the purpose of this ordinance, the following terms, phrases, words and their derivations
shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.
a. Litter - any used or unconsumed substance or waste material which has been discarded, whether made of aluminum, glass, plastic, rubber, paper, or other natural or synthetic material, or any combination thereof, including, but not limited to, any bottle, jar or can, or any top, cap or detachable tab of any bottle, jar or can, any unlighted cigarette, cigar, match or any flaming or glowing material or any garbage, trash, refuse, debris, rubbish, grass clippings or other lawn or garden waste, newspapers, magazines, glass, metal, plastic or paper containers or other packaging or construction material, but does not include the waste of the primary processes of mining or other extraction processes, logging, sawmilling, farming or manufacturing.
b. Litter Receptacle – a container suitable for the depositing of litter.
c. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

SECTION III. Prohibited acts and regulated activities:
1. It shall be unlawful for any person to throw, drop, discard or otherwise place any litter of any nature upon public or private property other than in a litter receptacle, or having done so, to allow such litter to remain.

2. Whenever any litter is thrown or discarded or allowed to fall from a vehicle or boat in violation of this ordinance, the operator or owner, or both, of the motor vehicle or boat shall also be deemed to have violated this ordinance.

SECTION IV. Enforcement:
This ordinance shall be enforced by the [Police Department and/or other Municipal Officials] of [insert name of municipality].

SECTION V. Penalties:
Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed [insert amount].

SECTION VI. Severability:
Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or holding of any such portion of this Ordinance to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION VII. Effective date:
This Ordinance shall be in full force and effect from and after its adoption and any publication as may be required by law.
ALL OF WHICH IS ADOPTED this _____ day of ____, 200_, by the _____.

Oradell Stormwater Plan
Mandatory Requirement
The Borough of Oradell must adopt and enforce an ordinance based on the following NJDEP model by October 1, 2005.

NJDEP Model Ordinance - Wildlife Feeding
Ordinance # [ ] - Wildlife Feeding Ordinance

SECTION I. Purpose:
An ordinance to prohibit the feeding of unconfined wildlife in any public park or on any other property owned or operated by [insert name of municipality], so as to protect public health, safety and welfare, and to prescribe penalties for failure to comply.

SECTION II. Definitions:
For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

a. Feed – to give, place, expose, deposit, distribute or scatter any edible material with the intention of feeding, attracting or enticing wildlife. Feeding does not include baiting in the legal taking of fish and/or game.
b. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
c. Wildlife – all animals that are neither human nor domesticated.

SECTION III. Prohibited Conduct:
a. No person shall feed, in any public park or on any other property owned or operated by [insert name of municipality], any wildlife, excluding confined wildlife (for example, wildlife confined in zoos, parks or rehabilitation centers, or unconfined wildlife at environmental education centers).

SECTION IV. Enforcement:
a. This ordinance shall be enforced by the [Police Department and/or other Municipal Officials] of [insert name of municipality].
b. Any person found to be in violation of this ordinance shall be ordered to cease the feeding immediately.

SECTION V. Violations and Penalties:
Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed [insert amount].

SECTION VI. Severability:
Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or holding of any such portion of this Ordinance to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION VII. Effective date:
This Ordinance shall be in full force and effect from and after its adoption and any publication as may be required by law.

ALL OF WHICH IS ADOPTED this _____ day of ____, 200_, by the _____.

Oradell Stormwater Plan
Mandatory Requirement
The Borough of Oradell must adopt and enforce an ordinance based on the following NJDEP model by October 1, 2005.

NJDEP Model Ordinance - Pet Waste
Ordinance # [ ] - Pet Waste

SECTION I. Purpose:

An ordinance to establish requirements for the proper disposal of pet solid waste in [insert name of municipality], so as to protect public health, safety and welfare, and to prescribe penalties for failure to comply.

SECTION II. Definitions:
For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.
a. Immediate – shall mean that the pet solid waste is removed at once, without delay.
b. Owner/Keeper – any person who shall possess, maintain, house or harbor any pet or otherwise have custody of any pet, whether or not the owner of such pet.
c. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
d. Pet - a domesticated animal (other than a disability assistance animal) kept for amusement or companionship.
e. Pet solid waste – waste matter expelled from the bowels of the pet; excrement
f. Proper disposal – placement in a designated waste receptacle, or other suitable container, and discarded in a refuse container which is regularly emptied by the municipality or some other refuse collector; or disposal into a system designed to convey domestic sewage for proper treatment and disposal.

SECTION III. Requirement for Disposal:
All pet owners and keepers are required to immediately and properly dispose of their pet's solid waste deposited on any property, public or private, not owned or possessed by that person.

SECTION IV. Exemptions:
Any owner or keeper who requires the use of a disability assistance animal shall be exempt from the provisions of this section while such animal is being used for that purpose.

SECTION V. Enforcement:
The provisions of this Article shall be enforced by the [Police Department and the Local Board of Health] of [insert name of municipality].

SECTION VI. Violations and Penalty:
Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed [insert amount].

SECTION VII. Severability:
Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or

holding of any such portion of this Ordinance to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION VIII. Effective date:
This Ordinance shall be in full force and effect from and after its adoption and any publication as may be required by law.

ALL OF WHICH IS ADOPTED this _____ day of ____, 200_, by the _____.

Oradell Stormwater Plan
Mandatory Requirement
The Borough of Oradell must adopt and enforce an ordinance based on the following NJDEP models by October 1, 2005. ***The Borough of Oradell has developed an innovative Leaf Collection plan that is based on a flexible schedule system successfully used during leaf collection season. The model ordinances for Yard Waste Collection and Containerized Yard Waste could be modified and combined to make a distinction between leaf pickup season in the fall and grass and garden debris pickup at other times of the year. Combining the ordinances is necessary to accommodate the flexible collection schedule system outlines in the enclosed Stormwater Pollution Prevention Plan. (SPPP). A Suggested Hybrid Leaf Pickup and Containerized Yard Waste Collection Ordinance as well as the model ordinances (included for reference) follow below:***

Suggested Hybrid Leaf Pickup and Containerized Yard Waste Collection Ordinance

SECTION I. Purpose:
An ordinance to establish requirements for the proper handling of yard waste and autumn leaf waste in the Borough of Oradell, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

SECTION II. Definitions:
For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.
a. Containerized – means the placement of yard waste in a trash can, bucket, bag or other vessel, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.
b. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

c. Street - means any street, avenue, boulevard, road, parkway, viaduct, drive, or other way, which is an existing State, county, or municipal roadway, and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas within the street lines.
d. Yard Waste – means grass clippings and vegetative garden debris including leaves sticks and small branches.
e. Autumn Leaf Waste – means leaves from deciduous trees and needles from coniferous species that fall to the ground during Autumn.
e. Gardening Season – means that period of time running from roughly April 6 through November 2nd as specified in the Borough Calendar.
f. Autumn Leaf Collection Season - means that period of time running from roughly October 17th through December 16th as specified in the Borough Calendar.

SECTION III. Prohibited Conduct:
(A) Yard Waste
The owner or occupant of any property, or any employee or contractor of such owner or occupant engaged to provide lawn care or landscaping services, shall not sweep, rake, blow or otherwise place yard waste, unless the yard waste is containerized, in the street. If yard waste that is not containerized is placed in the street, the party responsible for placement of yard waste must remove the yard waste from the street or said party shall be deemed in violation of this ordinance.

Sweeping, raking, blowing or otherwise placing Autumn Leaf Waste that is not containerized at the curb or along the street is only allowed during Autumn Leaf Collection Season and shall not be placed closer than 10 feet from any storm drain inlet.

(B) Autumn Leaf Waste
The owner or occupant of any property, or any employee or contractor of such owner or occupant engaged to provide lawn care or landscaping services, shall not sweep, rake, blow or otherwise place Autumn Leaf Waste in the street more than 4 times during a given Leaf Collection Season, unless the Autumn Leaf Waste is containerized.

Placement of such Autumn Leaf Waste at the curb or along the street at any other time or in any other manner is a violation of this ordinance. If such placement of Autumn Leaf Waste occurs, the party responsible for placement of the yard waste must remove the yard waste from the street or said party shall be deemed in violation of this ordinance. Autumn leaves that fall naturally into the street or blow into the street without human intervention are exempted.

SECTION IV. Enforcement:
The provisions of this ordinance shall be enforced by [insert appropriate department].

SECTION V. Violations and Penalties:
Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed [insert amount].

SECTION VI. Severability:
Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or holding of any such portion of this Ordinance to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION VII. Effective date:
This Ordinance shall be in full force and effect from and after its adoption and any publication as may be required by law.

ALL OF WHICH IS ADOPTED this _____ day of ____, 200_, by the _____.

NJDEP Model Ordinance - Yard Waste Collection Program
Ordinance #[ ] - Yard Waste Collection Program

SECTION I. Purpose:
An ordinance to establish a yard waste collection and disposal program in [insert name of municipality], so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

SECTION II Definitions:
For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.
a. Containerized – means the placement of yard waste in a trash can, bucket, bag or other vessel, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.
b. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
c. Street – means any street, avenue, boulevard, road, parkway, viaduct, drive, or other way, which is an existing State, county, or municipal roadway, and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas within the street lines.
d. Yard Waste – means leaves and grass clippings.

SECTION III. Yard Waste Collection
Sweeping, raking, blowing or otherwise placing yard waste that is not containerized at the curb or along the street is only allowed during the seven (7) days prior to a scheduled and announced collection, and shall not be placed closer than 10 feet from any storm drain inlet.

Placement of such yard waste at the curb or along the street at any other time or in any other manner is a violation of this ordinance. If such placement of yard waste occurs, the party responsible for placement of the yard waste must remove the yard waste from the street or said party shall be deemed in violation of this ordinance.

SECTION IV. Enforcement:
The provisions of this ordinance shall be enforced by [insert appropriate department].

SECTION V. Violations and Penalties:
Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed [insert amount].

SECTION VI. Severability:
Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be independent section, subsection, sentence, clause and phrase, and the finding or holding of any such portion of this Ordinance to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION VII. Effective date:
This Ordinance shall be in full force and effect from and after its adoption and any publication as may be required by law.

ALL OF WHICH IS ADOPTED this _____ day of ____, 200_, by the _____.

NJDEP Model Ordinance - Containerized Yard Waste
Ordinance #[ ] - Containerized Yard Waste

SECTION I. Purpose:
An ordinance to establish requirements for the proper handling of yard waste in [insert name of municipality], so as to protect public health, safety and welfare, and to prescribe penalties
for the failure to comply.

SECTION II. Definitions:
For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall"
is always mandatory and not merely directory.
a. Containerized – means the placement of yard waste in a trash can, bucket, bag or other vessel, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.

b. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
c. Street - means any street, avenue, boulevard, road, parkway, viaduct, drive, or other way, which is an existing State, county, or municipal roadway, and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas within the street lines.
d. Yard Waste – means leaves and grass clippings.

SECTION III. Prohibited Conduct:
The owner or occupant of any property, or any employee or contractor of such owner or occupant engaged to provide lawn care or landscaping services, shall not sweep, rake, blow or otherwise place yard waste, unless the yard waste is containerized, in the street. If yard waste that is not containerized is placed in the street, the party responsible for placement of yard waste must remove the yard waste from the street or said party shall be deemed in violation of this ordinance.

SECTION IV. Enforcement:
The provisions of this ordinance shall be enforced by [insert appropriate department].

SECTION V. Violations and Penalties:
Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed [insert amount].

SECTION VI. Severability:
Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or holding of any such portion of this Ordinance to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION VII. Effective date:
This Ordinance shall be in full force and effect from and after its adoption and any publication as may be required by law.

ALL OF WHICH IS ADOPTED this _____ day of ____, 200_, by the _____.

Oradell Stormwater Plan

Mandatory Requirement

The Borough of Oradell must adopt and enforce an ordinance based on the following NJDEP model by October 1, 2005.

NJDEP Model

Stormwater Control

Ordinance for NJ 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.

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.

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

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 pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.

2. This ordinance shall also be applicable to all major developments undertaken by [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 sidewalk 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 contain spills 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.

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

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. 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

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 subareas 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. 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 tailwater 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 may be 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.

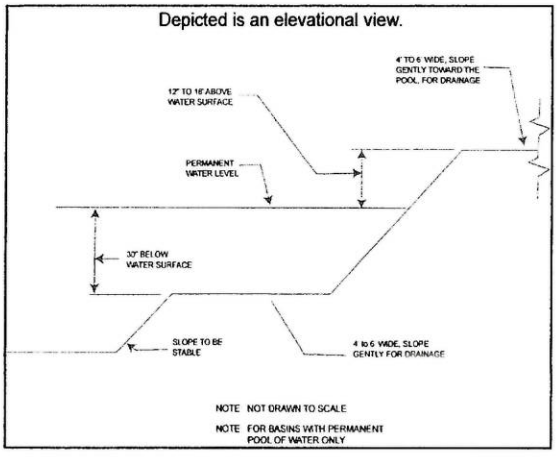
b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two 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 3 horizontal 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.

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, converts, 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.

Existing Ordinances Suggested For Revision

These are the ordinances identified for revision with suggestions for changes. Many of the suggestions were adapted from the saple MSWP provided by NJDEP. The Borough Planner, Construction Official, the Borough Engineer should be consulted for their expertise on these items.. 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 240 of the Oradell Borough Code, entitled Oradell Land Development Ordinance, and other parts of the Borough Code were reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes are recommended for consideration to incorporate these Low Impact Development strategies:

§Chapter 150-1 Prohibited Acts

This chapter prohibits interference with wild fowl.

Suggestion

An amendment could be added, "This provision shall not apply to Borough approved geese management programs that use non lethal means such as noise and trained dogs to discourage fecal contamination by resident geese populations".

§175-1 (6) Prohibited Acts

. "Throw or discard any refuse of any kind whatsoever into the waters of any spring, pond, stream, lake, river or any other body of water or upon any public street or public place or discharge any sewage or waste into said waters or places or any of them or pollute the said waters in any manner."

Suggestion:

This ordinance could be superseded by the new Litter Ordinance and Improper Waste Disposal Ordinance mandated by NJDEP or the Borough may wish to combine the features of the existing ordinance and the new ordinances.

This chapter's language could be made broader.

Throw or discard any refuse of any kind whatsoever or discharge any sewage or waste or any chemical that could be deemed toxic or hazardous into the waters of any spring, pond, stream, lake, river or any other body of water or upon any public street, storm drain or public place that drains into said waters or places to pollute the said waters in any manner."

In addition other provisions could be added to prevent dumping and provide pollution source control. Storage of materials or wastes that are deposited upon a lot in such form or manner that they can be transferred off the lot, directly or indirectly, by natural forces such as precipitation, evaporation or wind should be prohibited. Requirements should als be put into place to ensure that all materials and wastes that might create a pollutant or a hazard be enclosed in appropriate containers.

§253-5 Spillage during transport of loads.

It shall be unlawful for any person transporting loads within the limits of the borough to drop or spill the contents of the vehicle in any manner that may injure or damage the surface of the roadways."

Suggestion:

The phrase "or the waterbodies of the Borough" could be added to protect against oil, chemical and hazardous material spills.

§ 235-44. Residential or apartment house zones.

"Sidewalks constructed in residential or apartment house zones, as defined and set forth in the Zoning Ordinance of the borough, shall be constructed of either concrete or bituminous asphalt."

Suggestion:

Language could be appended

Sidewalks constructed in residential or apartment house zones, as defined and set forth in the Zoning Ordinance of the borough, shall be constructed of either concrete or bituminous asphalt. or of permeable paving materials where appropriate.

§235-45 B 2 (e) "Height above curb; slope.

All sidewalks shall be at least one inch above the finished curb and shall have a slope of ¼ inch per foot of width towards the curb."

Suggestion:

This section requires developers to design sidewalks to toward the curb to accelerate stormwater discharge. The ordinance could be amended as NJDEP recommends to allow sidewalks to slope away from the curb to discharge stormwater to neighboring lawns where feasible .

§235-45 E Drains under sidewalks.

" No leader pipe or other drain shall discharge over the sidewalk, but shall be carried under the sidewalk to the gutter in a cast-iron pipe or bituminized fiber pipe. The hole in the curb shall be round, neatly cut, leaving at least one inch of solid stone or concrete over the hole, doing no other damage to the curbing and shall be of no larger diameter than necessary."

Suggestion:

The effect of this practice is to take stormwater from roof drains and send it out into the streets, through storm drains without provision for groundwater recharge and storm water quantity impacts. The Borough should be discouraging this practice in favor of other BMP alternatives in as part of its stormwater management strategy.

Likewise the practice of tying roof leaders directlt into storm drains or catch basins also has detrimental effects on ground water recharge, transport time and stormwater quantities The Borough should be discouraging this practice in favor of other BMP alternatives in as part of its stormwater management strategy.

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§ 240-7.4. Buffer area.

"When a nonresidential use abuts a residential zone on the side or rear, a space not less than ten feet in width on the nonresidential property shall be designated as a buffer area and so indicated on the plat. Buffer areas will be contiguous with residential property lines and shall be of uniform width. If the buffer is less than 20 feet wide, the applicant may be required to erect and landscape a six-foot-high double-sided "sight-proof" fence within the buffer area parallel to the lot line of the abutting residential lot and set back a distance appropriate for the landscaping treatment in the buffer area. No chain-link or cyclone fences shall be permitted. Buffer areas on the nonresidential property between parking areas, loading areas and /or streets shall be at least 10 feet wide. When two or more commercial properties abut on the side or rear, an area of not less than three feet in width shall be designated on each property as a buffer area, and so indicated on the plat.

A. Buffer areas shall be maintained and kept clean of all debris, rubbish, weeds and tall grass. Any screen planting shall be maintained permanently, and any plant material which does not live shall be replaced within one year or one growing season.

B. No structure, activity, storage of materials or parking of vehicles shall be permitted in the buffer area, except access drives from public streets, one unlighted directional sign per each direction of traffic per access drive, and permitted signs as specified in this Code.

C. Requirements for planting in the buffer area.

(1) A solid and continuous landscaped screen shall be planted and maintained to conceal the parking and loading areas, eliminate the glare of vehicle lights throughout the year and camouflage the building from the abutting residential areas. The landscape screen shall consist of evergreen trees, such as hemlock, Douglas fir and Norway spruce. Trees shall be planted in an area five to 20 feet from the residential line in a zigzag pattern and not more than six feet apart, except where otherwise authorized by the approving board. Evergreen trees shall not be less than six feet high above the top of the root ball when planted, and the lowest branches shall be not more than one foot above the ground. In the event that existing evergreens do not provide an adequate buffer, supplemental plantings may be required. (2) In addition to the landscaped screen, other trees which are on the currently approved list of the Shade Tree Committee shall be planted by the applicant at a distance of not more than 30 feet from each other.

(3) A landscape plan prepared by a New Jersey licensed landscape architect/professional shall be submitted for review and approval.

Suggestion:

Language could be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces. This section could also requires the preservation of natural wood tracts and limit land disturbance for new construction.•

§ 240-7.6. (3) Off-street Parking.

"(3) "All parking areas shall be adequately drained. Curbing shall be provided so that vehicles cannot drive onto unpaved areas."

Suggestion:

A provision could be added to allow breaks in the curbing to allow stormwater to flow from the parking lot to sunken island style vegetated beds to provide for filtration and groundwater recharge.

Also, language could be added to allow for use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm drains.

§ 240-8.12. H Swimming pools and ponds.

H. "No swimming pool or pond shall be permitted to drain into a public street. A swimming pool drain shall be connected to the sanitary sewer according to New Jersey regulations. However, any overflow water from rain may be dispersed onto the owner's property."

Suggestion:

The first sentence could be amended to say "No swimming pool or pond shall be permitted to drain into a public street or storm drain." In order to clarify the regulations and correct the all too common practice of running a hose to the storm drain catch basin after a pool is "shocked" with chlorine.

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§ 240-13.13. Easements; natural features.

A. Easements.

(1) In large-scale development, easements along rear property lines or elsewhere for utility installation may be required. Such easements shall be at least 15 feet wide and located in consultation with the companies or municipal departments concerned.

(2) Where a subdivision is traversed by a watercourse, drainageway channel or street, there shall be provided a stormwater easement or drainage right-of-way conforming substantially to the lines of such watercourse of such further width or construction, or both, as will be adequate for the purpose.

B. Natural features, such as streams, brooks, hilltops and views, shall be preserved whenever possible in designing any subdivision containing such features.

Suggestion

Natural Features should require that streams and brooks be preserved.

Other natural features, such as trees, forted areas, swamps, hilltops, and views, shall be preserved whenever possible, and that care be taken to preserve selected trees to enhance soil stability and landscaped treatment of the area. The smended to expand trees to forested areas is to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

§ 107-18. Control of dogs off premises.

A. Dogs shall be controlled as follows.

(1) No dog kept in a kennel, pet shop, shelter or pound shall be permitted off the premises, except on leash, in a crate or under other safe control.

(2) No person owning or in charge of any dog shall cause or allow such dog to soil, defile, defecate on or commit any nuisance on any common thoroughfare, sidewalk, passageway, play area, park or any place where people congregate or walk or upon any public property whatsoever or upon any private property without the permission of the owner of said property. [Added 10-21-1980 by Ord. No. 707]

(3) Any person owning or in charge of any dog which soils, defiles, defecates on or commits any nuisance on any common thoroughfare, sidewalk, passageway, play area, park or any place where people congregate or walk or upon any public property whatsoever or upon any private property, without the permission of the owner of said property shall immediately remove all feces deposited by any such dog in a sanitary manner approved by the Board of Health. [Added 10-21-1980 by Ord. No. 707]

B. The provisions of this section shall not apply to blind persons who may use dogs as guides. [Added 10-21-1980 by Ord. No. 707]

C. Any person who violates any provision of the foregoing Subsection A(2), A(3) or B of this section shall, upon conviction thereof, be liable to a penalty of not less than $5 nor more than $500 for each violation. Each day a particular violation continues shall constitute a separate offense. [Added 10-21-1980 by Ord. No. 707]

This ordinance could be superseded by the new Pet Waste Ordinance mandated by NJDEP or the Borough may wish to combine the features of the existing ordinance and the new ordinances in consultation with the Board of Health.

OTHER ORDINANCES

In addition to the above, the following ordinances would have a beneficial effect on managing Stormwater.

- Steep Slope Ordinance
- Useable Area to Protect Wetlands, Floodplains & Steep Slopes

- Stream Corridor Protection Ordinance
- Wellhead Protection Ordinance
- Tree Preservation and Replacement Ordinance

The following are actual ordinances that are in use in the listed municipalities. The Borough Planner, Engineer or Attorney may be able to provide us with suggestions to better tailor these ordinances to the Borough of Oradell or may be able to provide other model ordinances.

Steep Slope Ordinance

Source: ANJEC

Disclaimer: This ordinance is an example of an approach that has worked in one municipality. It should be modified to reflect local environmental conditions, current regulations, and state-of-the-art knowledge in the environmental field.

Washington Township (MO) Steep Slopes

§ 217?38. Steep slopes and ridge protection. [Amended 11?21?1994 by Ord. No. 23?94; 8?21?1995 by Ord. No. 29?95; 10?16?1995 by Ord. No. 37?95; 9?21?1998 by Ord. No. 30?98]

A. Statement of purpose.

(1) It is the express purpose of this section to provide special qualitative and quantitative development controls for all lands located within the township that have present within their boundaries topographical conditions, hereinafter defined as "steep slopes" and "ridgelines."

(2) These special development controls are provided in recognition of the potentially negative impacts of construction in steep slope areas in the form of erosion, siltation, excessive removal of vegetation and soil, flooding, soil slippage, water runoff and destruction of unique land forms and scenic vistas. It is further the purpose of this section to encourage good land use planning and design, maximize optimal use of the natural terrain and maintain ridgelines and scenic vistas intact.

(3) Effective and reasonable application of these regulations will protect the health, safety and welfare of the citizens of the township.

(4) This section is further promulgated to provide a functional land use design and control mechanism that will augment the basic land use controls of this chapter and the administrative implementation devices contained within Chapter 159, Site Plan Review, and Chapter 175, Subdivision of Land, respectively.

B. Applicability. The requirements, guidelines and controls promulgated under this section shall be applicable to all properties within all zone districts situated in the township in their existing physical state or condition as of the date of the passage of this section. The requirements of Subsections C, D and E of this 217?38 shall apply where said properties have a slope area of 15% or greater, and the requirements of Subsection F shall apply where said properties are within 100 feet of a ridgeline.

C. Construction control limitations. Disturbance of steep slopes shall be limited to the following based on the indicated slopes:

Slope Permitted Activity

Less than 15% All activities

15% to less than 25% All activities subject to review and approval of individual grading plans per Subsection E below

25% to less than 30% Only transitional grading

30% or greater No disturbance permitted

D. Exception. The above construction control limitations are not applicable for isolated steep slopes with an area of 400 square feet or less.

E. Lot grading/driveway/drainage plans. For all lots with proposed disturbance of a steep slope area, a lot grading/driveway/drainage plan shall be approved by the Township Engineer prior to the issuance of a building permit. Said plan shall include, but not be limited to, existing and proposed contours, limits of soil disturbance, construction details, soil erosion, sedimentation control measures and drainage calculations and, where required by the Township Engineer, stormwater control measures. A fee of $400 shall be payable to the township for review of the lot grading/driveway/drainage plan. The design standards for lot grading plans shall be pursuant to the following standards:

(1) No soil shall be excavated, removed, deposited or disturbed except as a result of and in accordance with a lot grading plan approved under the terms of this chapter.

(2) Proposed disturbance of soil shall be, for purposes consistent with the intent of this

chapter, and it shall be executed in a manner that will not cause erosion or other unstable conditions.

(3) Provision shall be made for the proper disposition of surface water runoff so that it will not increase unstable conditions. Appropriate storm drainage facilities shall be provided for downstream properties.

(4) Provision shall be made for any structure or protective measures that proposed slopes may require for the protection of the public safety, including but not limited to retaining walls, guide rails, headwalls and fences.

(5) Provision shall be made for a safe water supply and for the disposal of sanitary sewage as approved by the Board of Health.

(6) Any proposed building or structure or attendant protective measures will not impede the flow of surface water through any watercourse: Only a nominal increase in water surface elevation and velocities will be allowed due to construction.

(7) Any proposed vehicular facilities including roads, drives or parking areas, shall be so designed that any land disturbances shall not cause excessive erosion. Both the vertical and horizontal alignment of vehicular facilities shall be so designed that hazardous circulation conditions will not be created.

(8) Final grades of the proposed driveway shall be in conformance with Chapter 172, Streets and Sidewalks, Article 117, Driveway Construction.

(9) Any fill placed on the lot shall be properly stabilized and, when found necessary depending upon existing slopes and soil types, supported by retaining walls or other appropriate structures as approved by the Township Engineer.

(10) All cuts shall be supported by retaining walls or other appropriate retaining structures when, depending upon the nature of the soil characteristics, such structures are found necessary by the Township Engineer in order to prevent erosion.

(11) There shall be no alteration of site elevations in excess of one foot within five feet of an adjoining property.

(12) Changes in grade shall not exceed a slope of 2 to 1 unless supported by retaining walls.

(13) No retaining wall on a residential site shall exceed six feet in height, and there shall be at least 10 feet between stepped retaining walls. All retaining walls greater than four

feet in height require a certification by a professional engineer that the wall was constructed in accordance with approved plans.

F. Scenic vista and ridgeline protection requirements.

(1) Applicability; review of plans; compliance. The requirements, guidelines and controls promulgated under this section shall be applicable to site plan and subdivision applications and building permits for new buildings. The Planning Board or Zoning Board of Adjustment, as the case may be, shall review all plans submitted under this section as part of any application for site plan or subdivision approval. The Construction Official shall refer applications for building permits for new buildings to the Township Engineer for review to assure compliance with this section.

(2) Applicants shall determine whether the ridgeline depicted on a map entitled "Washington Township Ridgeline," dated May 7, 1996, adopted by this section is within 100 feet of the property which is the subject of the application. Said map is intended as a guideline and is subject to further clarification by the Township Engineer for each property which may be affected. The map is intended to depict the ridgelines occurring in the township where a slope of 25 % or greater changes to less than 25%, at the top of the mountain at an elevation of 700 feet or greater. The determination of the presence of the ridgeline shall be done on a map provided by the applicant with topography depicted at two foot contour intervals.

(3) Applicants for construction on properties to which this section applies shall demonstrate to the reviewing board or Township Engineer, as the case may be, that the proposed buildings or structures will not extend above the predominant treeline. No structure that is the subject of this section shall be located closer than 60 feet to the ridgeline, as determined by the Township Engineer, unless, in the Township Engineer's opinion, such requirements would render an existing lot unusable. In such a case, the Township Engineer may recommend the issuance and the Construction Official may issue a construction permit for an existing lot of record which does not meet the requirements of this section upon his determination that no suitable conforming location is available. There shall be no disturbance within this sixty foot area except for access. Snow fencing or other similar method of tree protection approved by the Township Engineer shall be placed at the edge of this sixty foot protection area during construction.

(4) Development should be sited behind and below visual barriers such as trees, ridgelines and other topographic features. The height and location of development shall not alter the views of, and from, the natural ridgeline.
(5) Development shall be located and designed to preserve views of cultural/historic landmarks and of unique geographic and topographic features identified in the Conservation Plan Element and Historic Preservation Plan Element of the Washington Township Master Plan.
(6) There shall be a review fee of $400 per lot, in addition to any other applicable fees, for any application for development of a property subject to this § 217?38F. [Added 11?16?1998 by Ord. No. 36-98]

Useable Area to Protect Wetlands, Floodplains & Steep Slopes
Source: ANJEC

Disclaimer. This ordinance is an example of an approach that has worked in one municipality. It should be modified to reflect local environmental conditions, current regulations, and state-of-the-art knowledge in the environmental field.

Chatham Township (1997)
ORDINANCE 97-010

AN ORDINANCE OF THE TOWNSHIP OF CHATHAM, COUNTY OF MORRIS, STATE OF NEW JERSEY, AMENDING THE LOCAL DEVELOPMENT REGULATIONS OF THE TOWNSHIP OF CHATHAM TO ADD USEABLE LOT AREA REQUIREMENTS

BE IT ORDAINED by the Township Committee of the Township of Chatham, County of Morris, State of New'Jersey that Chapter XXX of the "Revised General Ordinance of the Township, 1995" be amended and supplemented as follows:

1. Section 30-6 is amended to add the following definition:

"Useable Lot Area" shall mean a contiguous area within the boundaries of a lot, but outside of required lot setbacks, that is free of wetlands, wetland transition areas, flood hazard areas, or easements that restrict development. Not more than 40% of the useable lot area shall have a slope of between 15% and 20%; no more than 20% shall have a slope of between 20% and 25% and no slope over 25% shall be within the useable lot area.

2. Section 30-64.1d is amended to add subparagraph 6 as follows:

All single family residential lots within the R-1, R-1A, R1B, R-2, R-2A, R-2B and R-3 zones that are created in a subdivision shall have a minimum Useable Lot Area of 7,000 square feet in which the dwelling and other permitted structures shall be constructed.

3. Statement of Purpose.

It is the purpose of this Ordinance to establish criteria by which residential building lots can be established that will provide a suitable and adequate area in which to construct a dwelling and other improvements. This Ordinance is intended to ensure the development of lots that will allow the construction of dwellings and necessary uses while minimizing the disturbance of environmentally sensitive features.

4. This Ordinance shall take effect in accordance with law.
Introduced: February 13, 1997 TOWNSHIP OF CHATHAM IN
Adopted: April 10, 1997 THE COUNTY OF MORRIS

Stream Corridor Protection Ordinance
Source: ANJEC
Disclaimer: This ordinance is an example of an approach that has worked in one municipality. It should be modified to reflect local environmental conditions, current regulations, and state-of-the-art knowledge in the environmental field.

Holmdel Township (1994)

§30-116.7 Stream Corridors.

a The purpose of this subsection is to protect property from flooding, to reduce land development impacts on stream water quality and flows, to protect existing natural drainage features, to protect other's rights within the same watershed from adverse effects of improper stream corridor development ; and, to provide recreation and wildlife migration corridors.

b Stream corridors shall mean the stream channel and the land on either side of the stream channel which is within the one hundred (100) year floodplain, or is a sloping area of fifteen (15%) percent or greater that is contiguous to the stream channel or one hundred (100) year floodplain. Stream channels shall mean permanent or intermittent watercourses shown on U S. G. S. quadrangle maps, the Monmouth County Soil Survey or such other source as the Planning Board may deem appropriate.

c Stream corridor buffers with a width of fifty (50) feet shall be required around all stream channels, one hundred (100) year floodplains, and contiguous slopes of fifteen (15%) percent or greater, except for the Hop Brook/Ramanessin Brook and its tributaries, where the buffer shall have a width of one hundred fifty (150) feet around all stream channels, one hundred (100) year floodplains, and contiguous slopes of fifteen (15%) percent or greater No septic system shall be located within any stream corridor, or within one hundred (100) feet of a stream bank.

d The following information shall be supplied for any development within a stream corridor and buffer. Such information shall be in addition to information required for site plan or subdivision review.

1. Delineation of stream corridors and buffers as defined above.

2 Detailed hydrologic engineering studies indicating the effects on drainage, streams, and adjacent properties as well as the property in question including the necessary data to determine whether the boundaries of the stream corridor and buffer would be affected if the application were granted.

3. A plan indicating the disposition of any fill materials proposed to be deposited by the grading or regrading of land.

4. A demonstration of how suitable techniques, including erosion and soil stabilization measures, sediment traps and nutrient control by vegetation filters or other mechanisms, will be incorporated to protect the stream.

e An approved application for development on a lot which contains a stream corridor or buffer or portion of a stream corridor or buffer shall provide a conservation easement for the continued protection of the stream corridor and buffer. The conservation easement shall encompass the entire stream corridor and buffer. Conservation easements shall be perpetual, shall name the Township of Holmdel as beneficiary, shall prohibit erection of any structures, shall be in conformance with Section 30-58, and shall be confirmed by deed and by plat filed with the County Recording Officer in compliance with the Map Filing Law The Township Committee shall notify the Environmental Commission before vacating or modifying a conservation easement established on a stream corridor. Where the lands proposed for development include a portion of the stream corridor, a condition of any major subdivision or major site plan approval shall be the revegetation of any portions of the required stream corridor buffer which were disturbed by prior land uses, such as agriculture. The vegetation plan shall utilize native tree and plant species and shall be approved by the Township Engineer (1976 Code §78-71 4, Ord. No 3-82 ; Ord. No.94-22).

Wellhead Protection Ordinance

Source: ANJEC

Disclaimer. This ordinance is an example of an approach that has worked in one municipality. It should be modified to reflect local environmental conditions, current regulations, and state-of-the-art knowledge in the environmental field.

STAFFORD TOWNSHIP (1996)

A. The WPO Zone is an overlay zone whereby, in addition to the requirements of the underlying zoning district, the following requirements shall apply. In the event of a conflict with the requirements of the underlying zone, the provisions of the WPO Zone shall supersede.

B. The following uses and activities shall be prohibited in the WPO Zone:

(1) Permanent storage or disposal of hazardous wastes, industrial or municipal sludge or radioactive materials, including solid waste landfills.

(2) Collection and transfer facilities for hazardous wastes, solid wastes that contain hazardous materials, and radioactive materials.

(3) Any use or activity requiring the underground storage of hazardous material or waste in excess of an aggregate total of 300 gallons.

C. The following activities involved or conducted as part of an otherwise permitted or accessory use in the underlying zone shall be permitted only upon the finding of the Planning Board, as part of any required site plan or subdivision approval, that best management practices, or other procedures or measures, set forth in § 211-25.1E below, are in place such that a minimal threat posed by the activity to groundwater quality in the wellhead protection area in which the activity is to be conducted:

(1) On-site storage (above or below ground), use or disposal of hazardous materials or wastes in excess of an aggregate total of 50 gallons or 100 pounds.

(2) Individual ground disposal systems.

(3) Auto body and auto repair activities.

(4) New and used truck and auto sales activities.

(5) Contractor yards.

(6) Commercial car washes.

D. The following activities or uses are exempted from the requirements of § 211?25.1E and C:

(1) Retail sales establishments that store and handle hazardous materials for resale in their original unopened containers.

(2) Police, fire and emergency medical service facilities.

(3) Municipal, county and state government facilities.

(4) The use of any hazardous material solely as fuel in a vehicle fuel tank or as a lubricant in a Vehicle.

(5) The transportation of a hazardous material through the WPO Zone, provided that the transporting vehicle is in transit and meets all state and federal requirements for the transportation of such hazardous material.

E. All activities regulated pursuant to § 211?25.1B and all site plan and major subdivision applications shall submit an environmental impact assessment addressing the requirements of § 130?94b and demonstrating to the satisfaction of the approving authority that the proposed use and/or activity employs, to the maximum extent practicable, best management practices, as set forth in § 130?83, to protect groundwater quality in the WPO Zone and minimize the potential groundwater contamination. Nothing in this subsection shall relieve an applicant from the requirements of § 130?94A, B and C where applicable. Any waiver that may be granted by the approving authority from the requirements of § 130?94A, B and C shall not include waiver of the requirements of § 130?94D.

Tree Preservation and Replacement Ordinance

Minimizing land disturbance is a nonstructural stormwater management strategy. The Borough of Oradell may wish to consult with its Shade Tree Commission and Borough Professionals on an appropriate tree preservation ordinance.

The preservation of mature trees and forested areas is a key strategy in the management of environmental resources, particularly watershed management, air quality, and ambient heating and cooling.

Additional Existing Ordinances

FAR & Impervious

The Borough of Oradell has been having ongoing discussions about making changes in Floor Area Ratios for different zones. The Board of Adjustment has made recommendations to the Planning Board and the Planning Board is considering the issue. A recent subdivision application that was granted by the Planning Board may illustrate one of the considerations. The existing FAR on an oversize lot would have allowed for a home that was out of scale of surrounding homes. The FAR, setbacks and impervious surface limits can all be part of a sound stormwater management strategy.

Although each zone has a maximum allowable percent impervious surface, the Borough Code could be amended to remind developers that satisfying the percent impervious requirements does not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures .The Borough could also evaluate the maximum allowable impervious cover for each zone to determine whether a reduction in impervious cover is appropriate. The Borough should also evaluate a maximum percent of disturbance for each zone, for those areas identified as natural features and to prevent clear cutting and excessive soil movement. Also, if a developer is given a variance to exceed the maximum allowable percent imperviousness, the developer must mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge as described in The Stormwater Control Ordinance. A detailed description of an approach on how to develop a mitigation plan is included in this Municipal Stormwater Management Plan.