BIRDSALL SERVICES GROUP
ENGINEERS & CONSULTANTS

Job No. 2-00002-400011

MUNICIPAL STORMWATER MANAGEMENT PLAN UPDATE

BOROUGH OF BELMAR
MONMOUTH COUNTY, NEW JERSEY

BELMAR PLANNING BOARD

MARCH 2009

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STORMWATER MANAGEMENT PLAN UPDATE
BOROUGH OF BELMAR

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I. INTRODUCTION

Pursuant to the requirements of N.J.A.C. 7:14A-25 *Municipal Stormwater Regulations* the Borough of Belmar, Monmouth County, New Jersey is required to adopt a Municipal Stormwater Management Plan (MSWMP), which outlines the strategy for the Borough of Belmar ("Borough") to address stormwater-related impacts. This plan contains the required elements described in N.JA.C.

7:8 Stormwater Management Rules, and addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new development and major redevelopment.

The standards incorporated herein are intended to minimize the adverse impacts of stormwater runoff related to water quality and flood control, along with the loss of groundwater recharge, which provides base flow ill receiving water bodies. The plan also describes long-term operation and maintenance measures for existing and future stormwater management infrastructure.

The key elements incorporated into the Borough of Belmar MSWMP include a "build-out" analysis based upon existing zoning and rand available for development. Also included in the Borough's MSWMP is a review and update of existing stormwater control ordinances, the Borough Master Plan, and other planning documents to allow for project designs that include low impact and sustainable development techniques.

The final element of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the Stormwater Management Plan is specific stormwater management measures are identified to mitigate the impacts of development.

II. KEY GOALS

The Borough of Belmar MSWMP has been prepared to meet the following key goals:

A. Minimize the potential for flood damage to life and property.

B. Minimize and effectively mitigate any increase in stormwater runoff from any new development or redevelopment proposals.

C. Minimize or prevent the erosion of soil from any land development or construction activity.

D. Assure the adequacy and hydraulic function of existing and proposed culverts and bridges, and other ill stream flow control or flood control appurtenances.

E. Encourage, through planning and design guidelines, the recharge of stormwater runoff to groundwater's to the extent as may be practical based upon soil and groundwater conditions:

F. Prevent, to the greatest extent feasible, any increase in non-point source pollution, and where possible identify and minimize sources

G. Minimize the presence of pollutants in stormwater runoff from new and existing development in an effort to restore; enhance, and maintain the chemical, physical, and biological integrity of the waters of the State. To protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water.

H. Protect the public through the proper design and performance of stormwater management facilities.

I. Promote the conservation of open space and natural resources, and prevent degradation of the environment through improper uses and/or intensities of land.

J. The coordination of municipal regulations and requirements with those of Monmouth County, the State of New Jersey and Federal Agencies which plan and/or regulate environmentally sensitive lands within the Borough, such as flood hazard areas, wetlands, and other environmentally sensitive areas.

K. The regulation of stormwater management activities to ensure compliance with current and future Total Maximum Daily Loads of Pollutants (TMDL's) as determined by the NJDEP for receiving waterbodies.

L. Promote the use of low impact and sustainable development and redevelopment techniques to preserve environmental features.

M. Protection of natural and environmental resources including floodplains, wetlands, and areas suitable for public and quasi-public recreational activities.

N. To reduce the risk of saltwater intrusion into existing potable wells.

To achieve these goals and objectives, this document outlines specific stormwater design and performance standards for development and re-development proposals within the Borough of Belmar. Additionally, the MSWMP mandates certain stormwater management mitigation strategies to address impacts from existing development.

Preventative maintenance and corrective strategies are included in the MSWMP 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.

III. STORMWATER DISCUSSION

Belmar is a one-square mile coastal community located in the County of Monmouth and surrounded by several waterbodies, including, but not limited to; the Atlantic Ocean to the east, Shark River Bay to the west, Lake Como to the south and the Shark River Inlet. In addition, Silver Lake is located entirely within the Borough's borders. Based on review of the NJDEP aerial data, it appears there are no large vacant parcels for future development. The Borough of Belmar has been predominantly built out for decades.

HYDROLOGIC CYCLE

It is recognized that the grading, altering or development of land can dramatically affect the hydrologic cycle of a site, and ultimately an entire watershed as depicted in Figure 1 (Source-NJGS Report GSR-32). 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.

In the Borough of Belmar the DELMARVA unit hydrograph must be utilized in modeling surface water runoff and stormwater management design for pre-and post developed conditions. DELMARVA hydrograph usage is primarily restricted to areas that have slopes less than 5%, permeable soils and are characterized by "ponded" topography capable of capturing and holding some degree of precipitation prior to runoff occurring. It should not be utilized for design in areas where the predeveloped conditions are heavily urbanized and the drainage area is characterized by significant areas of impervious cover. The Standard hydrograph should continue to be used in these areas. (See http://www.njstormwater.org/rainfalldata.htm)

Development or alteration of a property's geophysical characteristics may replace this vegetation with lawn or impervious cover, thereby reducing the site's evapotranspiration and infiltration characteristics. The clearing and re-grading of a site may also remove natural depressions that temporarily store rainfall and reduce the amount of stormwater runoff to receiving water bodies.

For Construction activities typically compact underlying soil layers and diminish a property's infiltration capacity, resulting in increased volumes and rates of stormwater runoff from the site to surface waters.

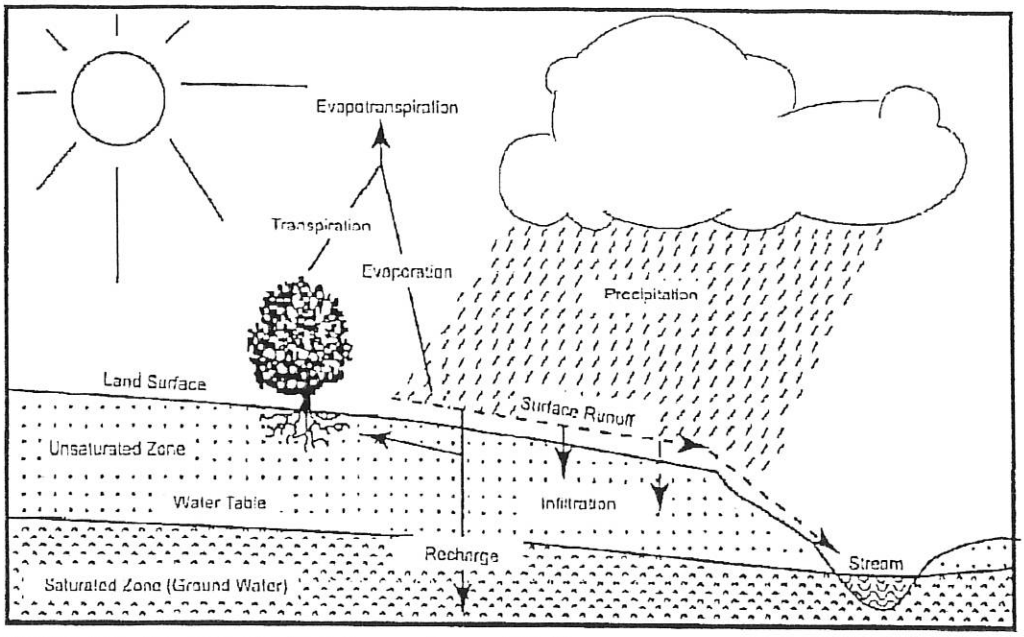
Impervious areas, which are connected to each other through gutters, channels, and storm sewers, convey runoff more rapidly than natural areas. This shortening of the transport, or travel time, increases the rainfall-runoff response of the drainage area, causing the floodwaters in downstream waterways to reach a rate of flow more rapidly and higher in magnitude than natural or predevelopment conditions.

These increases typically create new, and aggravate existing downstream flooding and soil erosion issues and ultimately result in sedimentation of stream channels. The filtration of runoff and removal of pollutants, typically provided by surface and channel vegetation is eliminated by the installation of storm sewers that discharge runoff directly into a stream corridor.

Increases in impervious area also decrease opportunities for infiltration, which reduces the stream base flow and groundwater recharge levels. Reduced base flows and increased peak flows result in greater fluctuations between normal and peak: flow rates, which may result in stream 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 and some species cannot adapt.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface, which is subsequently mobilized and transported to streams by storm sewers. 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.

FIGURE 1 Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

In addition to increased pollutant loading, land development or re-development may adversely impact water quality and stream biota in more subtle ways, such as 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 activities may also remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

Given the complexity and magnitude of hydrologic impacts associated with a development or redevelopment of land, or other alteration of physical characteristics of the topography of the lands of the Borough, this MSWMP outlines specific measures required to minimize such impacts.

IV. BACKGROUND

Historical Background

The early history of Belmar is closely entwined with the history of Monmouth County. The earliest residents of Belmar were members of the Unami Tribe of the Lenni Lenape

Indians who established summer fishing villages along the banks of the Shark River. The first recorded history of Belmar occurred when the explorer Henry Hudson, made reference in his journal to the Shark River by noting an inlet with high hills in the distance as he traveled up the New Jersey Coast towards what is now New York City.

In 1687, the land south of the Shark River was sold to Galvin Drummond by Chief Wanamasso. During the Revolutionary War, a salt works operation was established on the southern bank of the Shark River to provide salt for the Continental Army. During the mid-1800's, the Shark River area including the area now known as the Borough of Belmar, contained several farms and homesteads.

Ocean Beach Association

In 1872, the Ocean Beach Association was formed for the purpose of purchasing land south of the Shark River with the intent of developing a seaside community. The Association purchased: 375 acres including one (1) mile of ocean Frontage and 1 1/2 miles of frontage on the Shark River. This tract was planned in a grid pattern providing twelve (12) 80-foot wide avenues extending from the Ocean to the River, which were crossed by a series of 60-foot wide streets.

The Shark River was known to New York and Philadelphia sportsmen for its fishing and oyster beds. The combination of river and ocean front beach encouraged summer tourism and year-round development. In 1875 railroad service was begun, linking Ocean Beach with northern New Jersey. During that same year, a Post Office was established and the first school opened. In the 1880 "Seaside Directory of New Jersey", Belmar was noted as having a year-round population of 300, which would swell to 3,000 during the summer months.

Land Area

The Borough of Belmar has a land area of 1.0 mile and is situated on the mid-coast portion of Monmouth County. See the aerial overview of the Borough of Belmar (Source, NJDEP 2002 Aerial Photos GIS data) illustrated on the Figures that have been included within this MSWMP. The current land uses in Belmar have been illustrated on Figure 1- Land Use Map.

Population

Belmar's year round population is about 6,000, but during the summer months it swells to 60,000 because of its desirability as a vacation destination. While population growth as a whole has been increasing in Monmouth County, Belmar's population has been decreasing. (See Housing Element and Fair Share Plan, Belmar Borough, Monmouth County.) CAFRA

The Borough of Belmar is located in the CAFRA Coastal Metropolitan Planning Area, which represents the most urbanized portions within the CAFRA designated jurisdiction. The amended rules specify that a maximum of 80% percent lot coverage is permitted within the Metropolitan Planning Area.

Seaport Redevelopment Plan

Belmar's Seaport Redevelopment Plan has been under discussion since the early 1990s as a way to revitalize the northern portion of Belmar's commercial district with a mix of residential, office and retail uses.

The redevelopment plan is an ambitious plan, which would call for the renovation and expansion of the marina, the design and construction of a waterfront promenade that will connect the marina to the downtown. It should be noted that the marina has its own storm water management plan and permits with the NJDEP. Any redevelopment proposed at the marina must comply with all rules and regulations imposed by the NJDEP. The goal of the "Seaport Redevelopment Plan is to build on Belmar's assets by seamlessly merging new developments into the existing infrastructure, while preserving and enhancing the character and charm of the town. (Detailed information about the Seaport Redevelopment Plan is available at www.belmar.com).

Topography

Topography in the Borough is relatively level, gently sloping toward either the Ocean or the Shark River. Elevations range from sea level at the beach to a high point of approximately 22 feet near the water tower on Sixteenth Avenue. See the USGS quadrangle (Source USGS 1989Asbury Park Quadrangle), included as Figure 2, for details of the general topography.

Soils

The U.S. Soil Conservation Service lists four (4) distinct soil types found in the Borough of Belmar:

1. Hooksan Sand (HwB) can generally found between the ocean and Ocean Avenue.
2. Udorthents - Urban Land Complex (UD) can be found from Ocean Avenue to approximately halfway between Ocean Avenue and A Street, extending from Shark River Inlet to Sixteenth Avenue where it extends from Ocean Avenue to approximately halfway between A Street and B Street.
3. Evesboro Sand - Urban land Complex (EWB) can be found from approximately halfway between Ocean Avenue and A Street to the edge of Shark River, west of N.J.S. H. Route 35. It extends from Shark River Inlet to approximately Thirteenth Avenue between D Street and Main Street. It extends from around Fifteenth Avenue in a northerly direction to Shark River at the juncture of the L Street Beach and Maclsearie Park.

4. Klej Loamy Sand - Urban land Complex (KUA) can be found west of the Udorthents between Ocean Avenue and A Street and south of the Evesboro Sand - Urban Land Complex, extending to approximately Lake Como. It extends from approximately halfway between D Street and Main Street from Fifteenth Avenue in a northerly direction to Shark River at the juncture of the L Street Beach and Maclearie Park, westward to include the portion of Belmar between the railroad to the intersection of Sixteenth Avenue and N.J.S.H. Route 35.

See a detail of the Monmouth County Soil Survey, (source USDA Soil Conservation Service) included as Figure 3, for details of existing soil types.

Hooksan Sand consists of excessively drained soils of coastal dunes. Slope ranges from 0 to 5%. This is a nearly level to gently sloping soil adjacent to coastal beaches. Almost all of the acreage of this soil is used for recreation or wildlife habitat.

Udorthents - Urban land Complex is well drained to somewhat poorly drained soil. These soils formed instratified or graded, sandy or loamy fill material. These soils have been altered in some way; in some areas the altering was filling over or excavating excessively drained to poorly drained areas. The composition of this soil series is made up of 50% of Udorthents soils and 50% Urban land soils. Typically, in filled or excavated areas, Udorthents consist of loamy materials. The filled areas are on flood plains, tidal marshes, and on areas moderately well drained to poorly drained. Urban land consists of areas covered by impermeable surfaces, such as dwellings, roads and streets, shopping centers, parking lots, and buildings.

Evesboro Sand - Urban Land Complex consists of excessively drained soils and can be found within upland areas. These soils formed within acid, sandy, and coastal plain sediments. This complex can be found in the Borough and contains soils that are level with gentle slopes

Klej Loamy Sand - Urban Land Complex consists of nearly level, moderately well drained and somewhat poorly drained soils. Klej is a loamy sand with permeability that is rapid in the subsoil and moderate in the substratum. Seasonably high water tables are very common for this type of soil.

The Belmar beach is located east of Ocean Avenue. New Jersey beaches are comprised primarily of sand with only small amounts of shells and pebbles. The historic source of New Jersey beach sand is the Appalachian Mountains along with some marine sedimentation.

The sand on Belmar beaches is for the most part quartz with less than ten percent (10%) glauconite. Iron stains on many grains give the sand a yellow hue. The sand is a mix of coarse sand found on beaches from Belmar to Bay Head and medium sand deposited from Belmar to Sandy Hook.

Groundwater Recharge Area

See a detail of the Groundwater Recharge Areas, (source NJDEP GIS download) included as Figure 5, for details of existing groundwater recharge in inches per year. Due to the high permeability rates of the sandy soils listed above there is significant groundwater recharge through out the Borough of Belmar, The majority of the Borough's recharge to groundwater is in excess of 11 inches per year.

V. BOROUGH WATERWAYS AND RESOURCES

The South Coast Region

The South Coast Region is part of the Atlantic Coastal Watershed and within Watershed Management Area 12. There are seven (7) major sub-watersheds. Three (3) sub-watersheds comprise the South Coast Region, while the northern four (4) comprise the Mid-Coast Region.

The South Coast sub-watersheds are: Shark River Sub-watershed, Wreck Pond Sub-watershed and the Silver, Como, and Belmar Sub-watershed assemblage. The boundaries of these subwatersheds have been delineated by the Monmouth County Planning Board and include all lands that drain to each waterbody that is located within each watershed. In some coastal subwatersheds, the land drains directly to the Atlantic Ocean in narrow bands that follow the coast and were included in the adjacent sub-watershed. For example, the assemblage of the Silver, Como and Belmar Sub-watersheds drain directly to the ocean through the beach.

Shark River Subwatershed

The Shark River Sub-watershed is the largest in the Region and includes land within the municipalities of Tinton Falls, Colts Neck, Howell, Wall, Neptune, Neptune City, Avon-by-the-Sea, Belmar-and Lake Como. This sub-watershed is dominated by medium to high-density residential areas, but still has some remaining natural lands. All lands within the delineated sub-watershed drains directly to Shark River. The Shark River forms a northerly border of Belmar.

The Shark River is fed by a multitude of smaller tributaries, the most significant of which are the Jumping Brook and Shark River Brook. Jumping Brook is fed by smaller streams including Wells Brook and Hankins Brook. Shark River Brook is fed by Webleys Brook, South Brook, Robin's Swamp Brook, Sarah Green Brook, and Laurel Gully Brook. Shark River is also fed directly by Quaker and Musquash Brooks.

The Shark River is a tidally influenced bay, which consists of the confluence of four (4) freshwater streams, the adjacent mudflats/salt marshes, and the inlet connecting the bay to the Atlantic Ocean. The river is home to an assortment of shorebirds and waterfowl including herons, egrets, gulls, swans, geese, ducks, coots, cormorants and osprey.

Marine life in the river includes mollusk varieties of snails, mussels and clams and crustaceans including crabs and starfish and, of course, a variety of fish. The River also provides important wintering habitat for many species of waterfowl including American Wigeons, Buffleheads, Common Mergansers, Greater Scaup, Brant and American Black Ducks.

The high intensity development that characterizes this region contributes significant amounts of nonpoint source pollution from residential and agricultural runoff and boats. Additional protection and restoration of undeveloped sites should be achieved through conservation easements, acquisition, purchase of development rights, enforcement of existing regulations and by encouraging landowners to participate in restoration through State and Federal incentive programs. A portion of Shark River is permanently protected as open space by Monmouth County's Shark River Park.

The estuarine waters of Shark River are brackish. The level of salinity is lower to the western end of this 'D' shaped water body. Water quality is generally good; however, only one (1) river beach in this area is currently open for bathing and is located at the L Street Beach in Belmar. An agreement between the Borough of Belmar and the Monmouth County Health Department closes this beach mandatorily for 24 hours following a rainfall event of 0.1 inches to avoid the high bacterial levels that occur when the storm sewers are flushed. The number of closures is therefore directly linked to the weather.

Also in this sub-watershed is Glendola-Reservoir, located off Belmar Boulevard in Wall Township. The reservoir is linked to Shark River via Sarah Green Brook. It is managed by New Jersey American Water Company, which supplies potable water to part of the Region.

Silver, Como, and Spring Lakes Subwatersheds

These sub-watersheds were grouped together due to their similarities, even though the lands drain separately to the three (3) lakes. This sub-watershed delineation also includes lands that drained directly to the ocean. All three (3) of these lakes are coastal lakes and most likely once outlet directly to the Ocean. All three (3) have been stabilized through the installation of riprap or bulkheading, and receive significant quantities of stormwater through storm sewers that drain the surrounding residential communities.

Silver Lake is situated in the Borough of Belmar near Fifth Avenue. It is surrounded by a park and contains an island, near the western end and provides shelter for waterfowl. Medium to high density residential and commercial lands dominate the uses in this area. The stormwater run-off for this area drains into Silver Lake. Silver Lake is connected to the Atlantic Ocean via a gated out fall.

Lake Como, the largest of the three (3) lakes, forms part of the borders between Lake Como, Belmar and Spring Lake. Lake Como is fed by Polly Pod Brook and extends into Wall Township. Polly Pod Brook remains primarily a surface water system in a highly developed area and has not been significantly piped. Medium to high-density residential and commercial lands dominate the area. The stormwater run-off for this area drains to Lake Como. Recreational lands are also a significant part of the drainage basin. Lake Como is also connected to the Atlantic Ocean via a gated out fall.

Data indicates that water quality is generally good, however siltation has long been an issue in the two (2) lakes of this highly developed region. As a result, future lake dredging programs may be necessary. There are no streams located within the Borough of Belmar. Therefore, there is no convergence or interface-with Borough's storm sewers. See a detail of the waterways and water bodies located within the Borough of Belmar (Source: NJDEP GIS Download and Belmar Infrastructure Mapping (09-14-2004) prepared by Birdsall Engineering, Inc.) included as Figure 9-Waterways Map.

Wetlands

Because the composition of the soils found in Belmar, wetlands areas are not prevalent in the area. As illustrated in Figure 4-Wetlands Map, three (3) different wetlands classifications exist in the Borough. The wetland complexes are in close proximity to Silver Lake, Lake Como, and Shark River. A large area of tidal wetlands exists within and proximate to the Shark River in the northwestern portion of the Borough. A small area of managed wetlands can be found along Lake Como. The perimeter of a natural lake wetland complex is located at Lake Como.

Wellhead Protection Areas

Wellhead protection areas, which are also required to be included in a MSWMP, are illustrated in Figure 6-Wellhead Protection Map. The NJDEP mapping depicts a total of six (6) wellhead protection areas within the Borough.

According to the NJDEP, "A Well Head Protection Area (WHPA) in New Jersey is a map area calculated around a Public Community Water Supply (PCWS) well that delineates the horizontal extent of ground water captured by a well pumping at a specific rate over a two, five, and twelve-year period of time for unconfined wells. The confined wells have a fifty foot (50') radius delineated around each well serving as the well head protection area to be controlled by the water purveyor in accordance with Safe Drinking Water Regulations" (see NJAC 7:10-11.7(b) 1). Well Head Protection Area delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as subsequent phases of the NJDEP SWAP program are completed.

BEI contacted the director of Public Works to confirm the total amount of well protection areas that are located within the Borough. The Director indicated that there are only four (4) wellhead protection areas within the Borough. Two (2) wellhead protection areas that are shown on the map and located west of highway route 35 had been abandoned.

As part of Belmar's Municipal Stormwater Management Plan, the Borough will be requiring future development projects to utilize ground water recharge best management practices where it is feasible. The recharge of the existing ground water supply should provide protection from saltwater intrusion into the freshwater wells. Salt-water intrusion is typically caused by the over pumping of ground water supplies. Currently, there are no ordinances in place to protect existing wellhead protection areas. The Borough has considered preparing additional ordinance amendments to protect wellhead protection areas that are located within the Borough of Belmar.

Hydrologic Units (HUC-14's)

The hydrologic units (HUC-14's) that are present in the Borough of Belmar have been illustrated on Figure 9-Waterways Map. There are two (2) hydrologic units (HUC-14's) located within the Borough of Belmar. They are, 02030104090060 (Shark River (Below Remson Mill Gage) which drains to the Shark River and 02030104090080 (Wreck Pond-Below Rt. 35) which drains to the Atlantic Ocean.

Watershed Planning Initiatives

Coordinated watershed management is promoted and implemented by the County Planning Board and the County Environmental Council, in conjunction with the County Health Department, which work to reduce regional impacts that can result from landscape shifts.

In addition, other regional efforts have developed within the county, which focus on specific resources. Within the South Coast Region, the municipalities that surround Shark River joined together in the early 1990's to protect that resource and formed a group called the Shark River Roundtable. This group worked to achieve a federal" No Discharge Zone" designation for Shark River, which prohibits the discharge of waste from all vessels while they are within the waters of the Shark River. Belmar was one (1) of the first municipalities in the state to receive the designation.

Monmouth Coastal Watersheds Partnership

The Monmouth' Coastal 'Watersheds Partnership has established and issued a prioritized subwatershed issues list for all of the subwatersheds within the Monmouth coastal watershed. Below is a list in descending order of the South Coast's prioritized issues:

1. Water Quality
2. Stormwater Infrastructure
3. Sedimentation
4. Erosion
5. Natural Resources Management (Habitat)
6. Natural Resources Management (Wetlands)
7. Public Access
8. Public Awareness

Relationship Between Landscape Shifts and Watershed Resources

Protection of water quality is necessary as changes in the physical characteristics of the landscape occur. Protection of water resources begins. with management of the activities in the watershed which surrounds it. Human activities can affect the quality and quantity of the water by altering the natural processes that shape this resource. One (1) process that is often altered is the flow of storm water. Impervious surfaces, such as paved roads and buildings, can interrupt the natural flow of water into streams or into the groundwater. Increasing impervious cover decreases the amount of water that is typically recharged into the ground, thus increasing the amount of surface water runoff. These conditions can lead to flooding and degradation of water quality, absent adequate watershed management programs.

Best management practices used in a watershed, such as re-vegetation of a bulkheaded lake or retrofitting storm drains to remove sediment from storm water, can be key components of watershed management programs.

Nonpoint source pollution is the main cause of nutrient enrichment in the Borough's water bodies. Due to the increase in nutrients, algae and weeds become abundant reducing oxygen, harming aquatic life and causing the accelerated aging of the water bodies. Sediment laden runoff exacerbates this condition by facilitating the siltation of streambeds resulting in poor hydraulic conveyance characteristics. The available data indicates that water quality is generally good within all of the Borough's water bodies. According to the "Report on Nine (9) Coastal Lakes in Monmouth County", issued by the Monmouth County Health Department in April 1990, Lake Como had low nitrate and ammonia levels and low bacterial counts. The low nitrate and ammonia levels all are indicative of excessive phytoplankton uptake of nearly all the nutrients present. Blue-green algae proliferate during the summer months and Lake Como. This is consistent with algae proliferation in most coastal lakes. It was concluded by the Monmouth County Health Department that eutrophication of the lake, is primarily caused by nonpoint sources such as runoff from well-maintained lawns, both residential and commercial, in the watershed. They also concluded that waterfowl present on the lake were adding new treatments that promote algae proliferation. The Borough of

Belmar has undertaken other preventative measures such as providing "Mutt Mitts" and installing "Don't feed the geese" signs that were proximate to Borough waterways.
With regard to Silver Lake, the Health Department found low nutrient levels and bacterial counts indicative of fair water quality. The low nutrient levels all are indicative of excessive phytoplankton uptake of nearly all the nutrients present. Increases in bacterial counts at Silver Lake were noted to coincide with rain events, which resulted in nonpoint runoff into the lake. It was also noted that an enormous numbers of birds were congregating at either end of the lake. Large numbers of feeding ducks and geese were observed. The Health Department indicated that Silver Lake is treated annually with algaecide in order to inhibit-the growth of algae at the lake. It was concluded by the Monmouth County Health Department that while the algaecide program is limiting excessive plant growth, the perimeter of the lakes routinely used for dog walking and picnicking. The organic element pf both food and feces can only add to the acceleration of eutrophication by adding nutrients to the lake for bacterial and algal growth. These issues along with the impacts from storm drains and nonpoint sources must be addressed if Silver Lake is to continue to be a source of recreation and enjoyment. In 1993, Coastal Environmental Services, Inc. studied Silver Lake and came up with essentially the same conclusions. Coastal Environmental Services, Inc., also prepared a Lake Restoration and Management Plan for the Borough of Belmar, July 1994, elements of which have been implemented. These include, but are not limited to, the introduction of vegetated biofilter strips along the edges of Silver Lake, landscape enhancements and catch basin filters.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the State's waterways. These sites are sampled for benthic macroinvertebrates by NJDEP on a five (5) year cycle. 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. In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. The MSWMP will be updated as this information becomes available.

A TMDL is the amount of a pollutant that can be accepted by a water body without causing an exceedance of water quality standards or interfering with the ability to use a water body for one (1) 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 BMP's.

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 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 TMDL's are needed.

The following waterway(s) of the Borough appear on Sublist5:

Appendix I B Sublist 5 of the 2004 Integrated List (By Waterbody/Parameter) With Priority Ranking

Region	WMA	Station Name/Waterbody	Site ID #	Impairment	Priority	Data Source
Atlantic Coast	12	L Street Beach (Belmar)	L Street Beach (Belmar)	Fecal Coliform	High	Cooperative Coastal Monitoring Program
Atlantic Coast	12	Shark River	Shark River	Dioxin	High	NJDEP Fish Tissue Monitoring
Atlantic Coast	12	Shark River	Shark River	PCB	High	NJDEP Fish Tissue Monitoring
Atlantic Coast	12	Shark River Estuary	Shark River Estuary-1	Dissolved Oxygen	Medium	NJDEP Coastal Monitoring, Direction Monitoring
Atlantic Coast	12	Shark River Estuary	Shark River Estuary-1	Total Coliform	High	NJDEP Coastal Monitoring, Direction Monitoring

This is identified on Appendix I-B of Sublist 5, with numerous impairments noted for dissolved oxygen, fecal coliform, dioxin levels, and PCB levels indicates that a TMDL shall be required to enhance water quality requirements at the direction of NJDEP. The Shark River appears on this list, therefore, a TMDL for the Shark River watershed has been prepared by NJDEP. The TMDL can be accessed at the following web address: http://oaspub.epa.gov/tmdl/enviro.control?p_list_id=NJ_0104&p_cycle=2004

VI. DESIGN AND PERFORMANCE STANDARDS

The Borough of Belmar has adopted 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.* Chapter XL of the Belmar Administrative Code, entitled *Zoning and Land Development,* was reviewed with regard to incorporating nonstructural stormwater management strategies. Changes were made to the following articles of Chapter XL to incorporate these challenges:

Development Regulations 40-9

f. *Stormwater Management*

1. Purpose.

(a) It is hereby determined that the waterways within the Borough of Belmar are at times subjected to flooding; that such flooding is danger to the lives and property of the public; that such flooding is also a danger to the natural resources of the Borough of Belmar, the County and the State; that development tends to accentuate flooding by increasing storm water runoff, due to alteration of the hydrologic response of the watershed in changing from the undeveloped to the developed condition; that such increase flooding produced by the development of real property contributes increased quantities of waterborne pollutants, and tends to increase channel erosion; that such increase flooding, increased erosion, and increased pollution constitutes deterioration of the water resources of the Borough of Belmar, the County arid the State; and that such increased flooding, increased erosion and increased pollution can be controlled to some extent by the regulation of storm water runoff from such development. It is therefore determined that it is in the public's interest to regulate the development of real property and to establish standards to regulate the additional discharge of storm water runoff from such developments as provided in this chapter.

(b) The stormwater management plans submitted shall demonstrate careful consideration of the general and specific concerns, values and standards of the municipal Master Plan and applicable County, regional and State storm drainage control program, any County mosquito commission control standards, and shall be based on environmentally sound site planning, engineering and architectural techniques.

(c) Development shall use the best available technology to minimize off-site storm water runoff, increase on site infiltration, simulate natural drainage systems, and minimize off-site discharge of pollutants to ground and surface water and encourage natural filtration functions. Best available technology may include measures such as retention basins, recharge trenches, porous paving and piping, contour terraces and swales.

2. System Strategy and Design

(a) Stormwater management systems strategy and design shall comply with the specifications forth in the construction specifications.

3. Detention When Required

(a) Detention will be provided for all major subdivisions and all major site plans of previously undeveloped parcels, resulting in more than five thousand (5,000) square feet of impervious surface such that after development the peak rate of flow from the site will not exceed the corresponding flow, which would have been created by similar storms prior to development. (Ord. No. 1992-329.2)

In addition to the development regulations above, the Borough has adopted specific measures to proactively address stormwater management:

1. As part of the Borough's Seaport Redevelopment Plan (see www.belmar.com), all stormwater infrastructures in that area is being upgraded. There will be perforated piping as well as the redirection of a significant amount" of stormwater run-off away from Silver Lake, an area of flooding concern.

2. All development in the Borough's Seaport Redevelopment (see www.belmar.com) must comply with a demanding LEED's-type sustainability checklist, which, among other things, requires them to tie all their building run-off-directly into the underground stormwater infrastructure, thereby reducing road-side run-off and the pick-up of non-source point pollutants during storm events. Stormwater from the Seaport Redevelopment flows into Shark River, where plans call for filtration devices to be installed at the outflows.

3. Developers in the Seaport Redevelopment area also must reduce stormwater run-off levels by 5%, a significant decrease in an area that currently is essentially 100% impervious.

4. The Borough adopted a Construction Site Maintenance ordinance (accessible through www.belmar.com) that requires best management practices in all development/redevelopment sites throughout the Borough.

5. Belmar is methodically replacing old infrastructure throughout the Borough, replacing it with perforated piping, and also trying mitigation techniques, such as dry wells, in residential municipal roadways.

6. The municipal land use boards now require a landscape plan on all applications, with the goal of ensuring appropriate pervious landscaping, and several residential builders are voluntarily installing mitigation measures such as dry wells.

7. The Borough has adopted new ordinances, including a Floor-Area-Ratio ordinance, and clarified existing ordinances that impact impervious surface, such as the elimination of pools and pavers in the calculation of pervious surface.

8. The Borough is aggressive in its public outreach and education about stormwater issues. For example, the Belmar Environmental Commission is proactive in educating residents about stormwater management (see attached copy of the Fall 2006 *Eco-Watch).* Belmar's Emergency Management team also is proactive in alerting and educating residents about potential flood issues.

9. The Borough has participated in a multi-municipality program through Geese Police to reduce its resident geese population, resulting in a significant decrease in fecal droppings found around the lakes.

VII. PLAN CONSISTENCY

The Borough of Belmar is in a Watershed Management Planning Area (WMA-12) (Monmouth Watersheds). If necessary, at a point in the future, the MSWMP will be updated to be consistent with any regional stormwater management plans. Currently, no land within Belmar is contained within the bounds of an adopted Regional Stormwater Management Plan (RSWMP).

Belmar's Stormwater Management Ordinances require all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Borough inspectors shall observe on-site soil erosion and sediment control measures and report any inconsistencies to the Freehold Soil Conservation District. In addition, Belmar has adopted a Construction Maintenance Ordinance that outlines best management practices. As it reinforces the principles and design standards that have already been adopted in the State of New Jersey's Residential Site Improvement Standards (RSIS), this MSWMP is consistent with the RSIS (N.J.A.C. 5:21) and the Borough will utilize the most current update of the RSIS in the stormwater management review of residential areas. Further, major development must meet the established design and performance standards set forth in the Soil Erosions and Sediment Control Act as all new development and redevelopment plans must comply with New Jersey's Soil Erosion and Sediment Control standards. Also, during construction activities, municipal inspectors will observe land disturbance as well as on-site soil erosion and sediment control measures and will report any inconsistency to the Freehold Soil Conservation District.

The ecologically sensitive measures that are being pursued through this plan and other Borough initiatives are consistent with the State Plan. The entire Borough of Spring Lake has been designated as a (PA1) Metropolitan Planning Area, the goals and objectives outlined within this plan will serve to encourage compact redevelopment where land is suited for development. Environmentally sensitive stormwater management techniques will be incorporated into the site design for future land development projects. These techniques will protect environmentally sensitive lands from any development impact.

Further, the stormwater management methods that are discussed within this Municipal Stormwater Management Plan are consistent with and incorporate the objectives and polices of the Monmouth County Growth Management Guide that was adopted by the Monmouth County Planning Board in December 1995.

Belmar's Stormwater Management Plan shall remain consistent with the Borough of Belmar Master Plan, CAFRA and the Residential Site Improvement Standards (RSIS),

N.J.A.C. 5:21. The Borough shall utilize the most current update RSIS-during the stormwater review of residential projects.

The Borough has implemented certain planning strategies as part of its ongoing master plan process, including the following:

- Planning in the Borough. of Belmar will include a variety-of residential and nonresidential uses, which will be compatible with existing development patterns and in accordance with constraints of environmental features, which are a major physiographic aspect of the Borough.
- The Borough shall consider innovative development proposals, which would enhance and protect environmental features, minimize energy uses and encourage development densities consistent with existing patterns of development.
- The Planning Board in conjunction with other boards and agencies will continue to review development proposals in terms of natural and environmental resources including floodplains, wetlands, wetland buffer areas, intermittent streams and surface drainage areas, and areas suitable for public and quasi-public recreation activities.
- The Borough shall encourage the establishment of restrictive lot coverage for building, parking lots and other impervious surfaces and ensure open space and buffers on all development sites. Development proposals shall be evaluated to ensure the use of low impact and sustainable development strategies.
- The Borough shall encourage wooded, landscaped and grass buffers along Route 35, Route 71 and Main Street during land use board review of development applications.

The Borough of Belmar is situated within the CAFRA zone, along coastal New Jersey. The Coastal Area Facilities Review Act (CAFRA) policy on wetlands, which are defined as lands inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation adapted for life in saturated soil conditions, applies to Belmar Borough. In general, development is prohibited in the wetlands areas unless the proposed development can meet certain criteria. These include developments which require water access, or are water oriented, have no prudent or feasible alternative on a non-wetland site, will result in minimum feasible alterations or impairment of the wetland, and will result in minimum feasible alterations or impairment of the natural contour or the natural vegetation of the wetlands. Related to the wetlands area are the CAFRA definition and policies concerning wetlands buffers, which are all lands within the buffer of coastal wetlands as defined by CAFRA. Development is prohibited in a wetlands buffer area unless it can be demonstrated that the proposed development will not have a significant adverse

impact on the wetlands and on the natural relationship between the wetlands and the surrounding upland.

VIII. NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The implementation of non-structural Best Management Practices are strongly encouraged to be added to the Borough's existing development regulations and applied to all new site design proposals. Whenever possible, the following nine (9) strategies should be incorporated into site design:

- Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
- Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
- Maximize the protection of natural drainage features and vegetation;
- 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 drainage area to the point of interest within a watershed;
- Minimize land disturbance including clearing and grading;
- Minimize soil compaction;
- Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
- Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas; and
- 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. These source controls include, but are not limited to:

  i. Site design features that help to prevent accumulation of trash and debris in drainage systems;

  ii. Site design features that help to prevent discharge of trash and debris from drainage systems;

  iii. Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

iv. 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.

The accepted practice for development within the Borough includes low impact and sustainable design techniques, preservation of natural features, and protection of environmentally sensitive lands. Specific techniques to be employed during the design of development or redevelopment proposals include, but are not limited to the following:

a. Use of vegetative swales to provide biofiltration.
b. Disconnecting of impervious surfaces.
c. Recharge of "clean" runoff where feasible (e.g. roof leaders).
d. Use of pervious surfaces to the extent feasible.
e. Provide pretreatment of stormwater prior to provide water quality due to the excessively permeable soils present in the Borough.

Based on review of ordinances that were adopted from January 1, 2007 to date, there are no specific ordinances for the implementation of non-structural stormwater management strategies. However, Ordinance 2008-07 created a Multi-Family Cluster Development, MF-75 as a conditional use in the R-75 zone in the Borough of Belmar and incorporates a non-structural stormwater strategy. Section 40-6.13(i)14 (landscaping) states that all land area not covered by pavement materials, buildings, decorative landscaping or shrubbery must be provided with a permanent green grassed lawn. Grassed lawn areas can be used as a non-structural stormwater strategy and in accordance with the NJDEP Stormwater Regulations.

IX. STRUCTURAL STORMWATER MANAGEMENT STRATEGIES

As mentioned earlier, the NJDEP has implemented more rigid regulations regarding the volume, rate, and quality of stormwater originating on a new development site. Some sites may be able to achieve these standards through vegetative swales, and buffers, and landscaping to control non-point source pollution. Other sites may require the building of a stormwater basin. In these cases, where the development of structural stormwater facilities is necessary, the New Jersey Department of Environmental Protection's BMP guidelines should be utilized. The structural BMP's utilized in low impact development concentrate on the following practices to be utilized in site development in conjunction with the non-structural methods described above:

- Bio-retention Systems – A bioretention system consists of a soil bed planted with native vegetation located above an under drained sand layer. It can be configured either as a basin or a swale.

- Constructed Stormwater Wetlands – Constructed wetlands are wetlands systems designed to maximize the removal of pollutants from stormwater runoff through settling and both uptake and filtering by the vegetation.
- Dry Wells - A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff from roofs and structures. Discharge of the accumulated stormwater from a dry well occurs through infiltration into the surrounding soils.
- Extended Detention Basins - An extended detention basin is a facility constructed through excavation or embankments that provides temporary storage of stormwater runoff. It has an outlet structure that detains runoff inflow and allows for controlled outflow to aid in mitigating stormwater flows from development. Usually this type of structure is utilized to provide both water quantity and water quality mitigation.
- Infiltrative Basins – Infiltration Basins are similar to detention basins in that they both temporarily store stormwater runoff generated from development project. The principal outlet to this type of basin is not a constructed outlet structure. Highly permeable soils are used for infiltration into the surrounding subsoil.
- Manufactured Treatment Devices – A manufactured treatment device is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff.
- Pervious Paving Systems – Pervious pavement utilizes void areas within the paving material to provide for this permeable surface.
- Sand Filters – A sand filter consists of a forebay and an under drained sand bed. Runoff entering the sand filter is conveyed first through the forebay. The forebay removes trash, debris and coarse sediments, and then perculates through the sand bed to an outlet pipe at the bottom of the sand filter.
- Vegetative Filters – A vegetative filter is an area designed to remove suspended solids and other pollutants from stormwater runoff that flows through the vegetation. This is called a vegetative filter strip. The vegetation in a filter strip that can range from turf grass to woody vegetation.
- Wet Ponds - A wet pond is a facility constructed through excavation or embankments that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows that promote the settlement of pollutants.

Further, all structural stormwater management measures (structural BMP's) shall be designed according to the following conditions:

- They should to take into account the existing site conditions, including, but not limited to, 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).

- They should be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake of the outlet structure as appropriate, and shall contain 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 (1") and a maximum spacing between bars of six inches (6"). In addition, the design of trash racks must comply with the requirements of N.J.A.C. 7:8-7.D.

- They should be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvements Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.

- At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches (2½") in diameter.

- Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section N.J.A.C. 7:8-7.

- 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 this subchapter.

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

- In order to ensure adequate long term operation as well as preventative and corrective maintenance of stormwater management measures and structural BMP's, the designers of such facilities should submit a Maintenance Plan to the municipality that indicates the specific maintenance tasks and schedules as indicated in N.J.A.C. 7:8-5.8 "Maintenance Requirements". This maintenance plan will require the ultimate user of said structural BMP's to provide an annual certification that the stormwater management measures approved are functioning as designed and that the proper maintenance and inspection of said measures have been performed. Random spot inspections by the municipality will be conducted to ensure compliance along with appropriate enforcement actions such as fines to be levied should non-compliance result.

By adhering to the State's newly adopted design standards, the BMP's engineered for each proposed development project will serve to improve stormwater quality, enhance groundwater recharge, and reduce stormwater runoff. These methods when combined will serve to improve the environment and protect the public

interest by minimizing the risk of flooding and maintain the Borough's water supply through the future.

X. LAND USE/BUILD-OUT ANALYSIS

The Borough has endorsed the Monmouth County Planning Board Projections of March 2005 for the Borough of Belmar of Developable Land by Composite Zone, Potential Development, and Population & Employment Projections 2025. The Borough has also incorporated the Monmouth County Planning Board detailed land use and potential development analysis for the years 2005 and 2025 in the Belmar 2004 Cross Acceptance Report.

As evidenced by Figure lOA (source-Monmouth County Planning Board), shown on page 31, the Borough of Belmar has less than one (1) square mile of vacant or developable land, thus a Build Out analysis is not required pursuant to the requirements of N.J.A.C. 7:14A-25 *Municipal Stormwater Regulations.*

In addition, a chart, Figure 1OB (source-Monmouth-County Planning Board), has been provided below which shows additional impervious cover by composite zone, municipal development projection factors and-employment projections factors.

Also provided is a plan, Figure l-Land Use Map, which depicts the existing land use within the Borough of Belmar.

FIGURE 10 A

Monmouth County Planning Board Projections
Belmar

Date: Mar. 02, 2005

Developable Land By Composite Zone

	Conservation Recreation	Single Family Residential	Multi-family Residential	Mixed-Use	Commercial	Office Business	Research Office Warehouse Laboratory	Industrial	Total
1995 Acres of Developable Land	34.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	35.0

Potential Development

	Conservation Recreation Residential Units	Conservation Recreation Comm. Square Feet	Single Family Residential Units	Multi-family Residential Units	Mixed-Use Multi-family Residential Units	Mixed-Use Comm. Square Feet	Commercial Square Feet	Office Business Square Feet	Research Office Warehouse Laboratory Square Feet	Industrial Square Feet
Entire Municipality at Build-out	0	0	2	0	0	0	600	0	0	0
Entire Municipality at Horizon	0	0	2	0	0	0	600	0	0	0

Horizon Year: 2025
Horizon Period: 30
Person Per Household Ratio: 2.05

Population & Employment Projections

	1995 CA Estimate	2000 Census	Model Additional	2025 Projection
Population	-	6045	3	6048
95 Cross Accepted Employment	800	-	1	801
Households	-	2946	2	2948

Projections	
2025 Population Projection =	6048
2025 Employment Projection =	801
2000 Employment Projection =	800
2025 Household Projection =	2948

FIGURE 10 B

Monmouth County Planning Board Projections
Belmar

Additional Impervious Cover by Composite Zone

Municipality	Composite Zone Categories (In Acres)								Total Area (Acres)
	Conser-vation Recreation	Single Family Residential	Multi-family Residential	Mixed-Use	Commer-cial	Office Business	Research Office Warehouse Laboratory	Industrial	
Belmar	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2

Data: Mar. 02, 2005

Municipal Development Projection Factors

dwelling units		square feet			
Sing. Fam.	Multi-fam.	Commerc.	Office	Industrial	Cons/Com
6	1	2469	803	14	10

Data: Mar. 02, 2005

Source: 7 year annual average trend for the time period 1997-2003 was calculated for each municipality based on the MCPB database of subdivision and site plan approvals.

Employment Projections Factors

	Cnsv/Cm	MxCM	Comm	Off/Bus	ROW/Lab	Ind
emp/1000sf	1	1	1	3	3	2
use group	*	M	M	B	B	F

Source: Chapter 94, Substantive Rules of the New Jersey Council on Affordable Housing for the Period Beginning Dec. 20, 2004

**Note: Neither the COAH Use Groups nor the ITE Trip Generation Handbook had an employment factor for a use similar to Conservation/Recreation Commercial. After a cursory review of ConRec applications in Monmouth County, a factor of 1 emp./1000 sf was determined to be acceptable.*

XI. MITIGATION PLAN

OVERVIEW

A municipal mitigation plan is an element of the Municipal Stormwater Management Plan that allows municipalities to grant variances or exemptions to the design and performance standards for stormwater runoff quality and groundwater recharge that is established in N.J.A.C. 7:8-5, and adopted into the municipal stormwater control ordinance. The existence of a mitigation plan does not preclude the requirement of an applicant to meet the design and performance standards for any one (1) of the three (3) key stormwater requirements, namely maintaining pre-development recharge, stormwater runoff quantity reduction and stormwater runoff quality. Instead, the mitigation plan allows the Borough of Belmar, in limited circumstances to waive the strict compliance of one (1) or more of the performance standards, where full compliance cannot be reasonably accommodated on site, provided that a mitigation plan has been approved by the County review agency under the requirements of N.J.A.C. 7:8-4. In addition, approval of a waiver or exemption from one (1) of the three (3) criteria outlined above provides no guarantee that, if requested, an exemption or waiver will be granted for either or both of the remaining criteria. Under no circumstances shall the Borough of Belmar waive the Special Resources Protection Area (SRPA) established under the stormwater management rules at N.J.A.C. 7:8-5.5 (h).

Supporting evidence for an exemption or waiver shall be prepared in the form of a "stormwater management report" which will be signed and sealed by a New Jersey licensed professional engineer. The report shall include at a minimum:

- Detailed hydrologic and hydraulic calculations identifying the sizing criteria for each BMP and the stormwater collection system based upon the anticipated peak flow and/or volume.

- A map of the planned project showing existing conditions with drainage boundaries and land features, including delineated wetlands, proposed improvements, including all BMPs, grading, utilities, impervious features, and landscaping.

- Construction details for each BMP with appropriate contact information.

When applying for a waiver, the applicants professional engineer must first demonstrate that on-site compliance is either a) not possible, or b) possible but would result in tangible negative environmental or structural impacts. Such impacts may include:

- If the strict application of the regulations would result in a reduction of open space and/or undisturbed buffer areas. It is important to note that in this

situation, the applicant must demonstrate that such reductions are caused by compliance with State and local regulations and is not an attempt to maximize buildable area.

- The degradation of groundwater quality due to the infiltration of poor quality runoff.

- The modification to the elevation of the groundwater table due to rapid infiltration of stormwater will have demonstrable negative impacts on local structures and/or local groundwater quality.

- Flooding due to changes in the time of peak for a storm attenuated in compliance with N.J.A.C. 7:8 and the New Jersey Stormwater Best Management Practices Manual. Despite the requirement for peak reductions to be applied to the 2-year, 10-year and 100-year events, peak runoff from a sub-basin of a HUC-14 may actually experience increases due to changes to peak timing.

An applicant may also propose a mitigation project on a site that has not been identified in this mitigation plan. However, in each circumstance the selection of a mitigation project must incorporate the following requirements:

- The project must be within the same area that would contribute to the receptor impacted by that project. If there is no specific sensitive receptor impacted, then the location of the mitigation project may be located anywhere within the municipality, preferably at a location that would provide the greatest benefit.

- Legal authorization must be obtained to construct the project at the location selected. This includes the maintenance and any access needs for the project throughout its operation.

- The mitigation project should be located close to the original development project. If possible, the mitigation project should be located at a similar distance from the identified sensitive receptor. This distance should not be based on actual location, but on a similar hydraulic distance to the sensitive receptor.

- It is preferable to have one (1) location that addresses any or all of the performance standards waived, rather than one (1) location for each performance standard.

- The project location must demonstrate no adverse impacts to other properties.

- For projects addressing the groundwater recharge performance standard, a mitigation project site upstream of the location of the actual project site is preferable to a downstream location.

- Mitigation projects that address stormwater runoff quantity can choose to provide storage for proposed increases in runoff volume, as opposed to a direct peak flow reduction.

- Mitigation projects that address stormwater runoff quality can choose to address another pollutant other than TSS, which has been demonstrated to be of particular concern, such as streams that have been listed as an impaired waterbody for other pollutants. However, care must be taken to ensure that waivers that are granted for the TSS requirements do not result in the impairment of an existing unimpaired area.

All mitigation plans and reviews should consider the location of the mitigation project in relation to the property where the projected damage will occur. For example, if a project were unable to achieve the stormwater quantity performance standards upstream of an inadequate culvert, a mitigation project downstream of that culvert would not offer similar protection. Or, if the groundwater recharge is the major contributor to a wetlands area, the new project should continue to provide recharge to the wetlands area.

Also, in environmentally critical areas, the quality of stormwater that is being directed to infiltration facilities should be assessed. If the quality of stormwater that would be infiltrated following development poses a threat to groundwater supplies, off-site mitigation should be considered. Off-site mitigation should also be undertaken when on-site recharge is precluded by site conditions, or when stormwater quality assessments indicate that on-site stormwater infiltration will degrade ambient groundwater quality in environmentally sensitive areas. Environmentally critical areas include locations where groundwater is classified by the State as holding either special ecological significance, wellhead protection areas, areas of known groundwater contamination, or areas of on-going groundwater remediation. Groundwater recharge is of particular concern in areas discharging to Category 1 (C1) groundwater or in wellhead protection areas. Options for off-site groundwater recharge include:

- Retrofitting or refurbishing an existing stormwater basin
- Reducing the amount of impervious cover on site by adding vegetation or incorporating pervious paving materials

SENSITIVE RECEPTORS

Within Figure 8, entitled Sensitive Receptor Map, Belmar has taken care to indicate the sensitive receptor areas within the Borough that are especially susceptible to stormwater changes. As many of the mitigation measures that will be employed to these sensitive receptor areas are in the planning and preliminary design stage, when appropriate, Belmar will allow developers to fund studies to plan and engineer the most

suitable mitigation measure for each project site, and each performance standard. An applicant may also provide compensatory mitigation through the contribution of funds when, due to the small amount of the waiver given for the performance standard, it is not practical to provide a full mitigation project. In these circumstances, the receipt of financial contributions shall be considered the completion of mandatory mitigation for that project. However, in these instances, the Borough will be responsible to ensure that mitigation occurs based on the collection of the funds. If such a situation were to arise, a detailed description of the circumstances, funding amount and performance standard that was mitigated will be provided in Belmar's annual NJPDES report.

MITIGATION CRITERIA

The mitigation requirements listed below offer a hierarchy of options that are intended to offset the effect on groundwater recharge, stormwater quantity control, and/or stormwater quality control to an equal or greater extent than was created by the granting of a waiver or exemption from the stormwater management requirements.

The mitigation criteria are listed below in order of preference:

1) **Identify, design, and implement a compensating measure to mitigate impacts-** The preferred option is to identify and develop a compensating mitigation project in the same drainage area as the proposed development. In these cases, the applicant will address the same issue within the design and performance standards for which the variance or exemption is being sought, and demonstrate that the proposed mitigating measures provide equal or greater compensation to offset the non-complying aspect of the stormwater management system on site. The developer must also ensure the long-term maintenance of the project as outlined in Chapters 8 and 9 of the NJDEP Stormwater BMP Manual. If the Borough agrees to control a new stormwater management facility, arrangement in the form of an escrow account will be made to stipulate the payment amount, schedule, and long term responsibilities of the facility to ensure that it functions to capacity.

    a. The applicant can select one (1) 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 form the Borough Engineer. Listed below are specific projects that can be used to address the mitigation requirement.

        Water Quality

        1) Desilting of existing storm sewers
        2) Dredging of Borough lakes
        3) Redirection of stormwater to tidal body.
        4) Any recommendations contained in the Regional Stormwater Management Plan for the Shark River Watershed.

5) Algae control programs within the Borough's lakes.
6) Retrofitting of existing municipal stormwater catch basins with filters and/or special heads to prevent inflow of floatables.

Water Quantity

1) Correction of the flooding problem at Route 35 and L Street.
2) Repair or replacement of substandard or deteriorated storm pipes.
3) Any recommendations contained in the Regional Stormwater Management Plan for the Shark River Watershed.

2) **Complete a project identified by the municipality as equivalent to the environmental impact created by the exemption or variance-** 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 measures that are not directly equivalent to the impacts for which the variance or exemption is being sought. However, the project must address the same issue to an equal or greater extent.

3) **Provide funding for municipal projects that would address existing stormwater impacts-** The third and least preferable stormwater mitigation option is for the applicant to provide funding or partial funding for an environmental enhancement project that has been identified in this Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan. The contributed funds must be equal or greater than the cost to implement the required on-site stormwater measure for which relief is requested including the cost of land, easements, engineering design, and long-term maintenance. However, with this option, Belmar Borough, not the applicant is ultimately responsible for the design, property acquisition, construction, construction management, maintenance (short-term and long-term) and follow-up study, unless that project and its prospective costs have been outlined within this Mitigation Plan.

REQUIREMENTS FOR MITIGATION PROJECTS

Whether the applicant is proposing the mitigation project, or Belmar has identified the project within this Mitigation Plan, the following requirements for mitigation must be included in the project submission.

- **Impact from noncompliance-** The applicant must provide a table to show the required values, and the values provided in the project, and include an alternative analysis that demonstrates that on-site compliance was maximized to the greatest extent practicable.

- **Narrative and Supporting Information Regarding the Need for the Waiver-** The waiver cannot be granted for a condition that was created by the applicant. If the applicant can provide compliance with the stormwater rules through a reduction in the scope of the project, the applicant has created the condition and a waiver cannot be issued. The applicant must provide a discussion and supporting information of the site conditions that would not allow the construction of a stormwater management facility to provide compliance with these requirements, and/or if the denial of the application would impose an extraordinary hardship on the applicant brought about by circumstances peculiar to the subject property. The site conditions to be considered are soil type, the presence of karst geology, acid soils, a high groundwater table, unique conditions that would create an unsafe design, as well as conditions that may provide a detrimental impact to public health, welfare, and safety.

- **Sensitive Receptor-** Identify the sensitive receptor related to the performance standard for which a waiver is sought. Demonstrate that the mitigation site contributes to the same sensitive receptor.

- **Design of the Mitigation Project-** Provide the design details of the mitigation project. This includes, but is not limited to, drawings, calculations, and other information needed to evaluate the mitigation project.

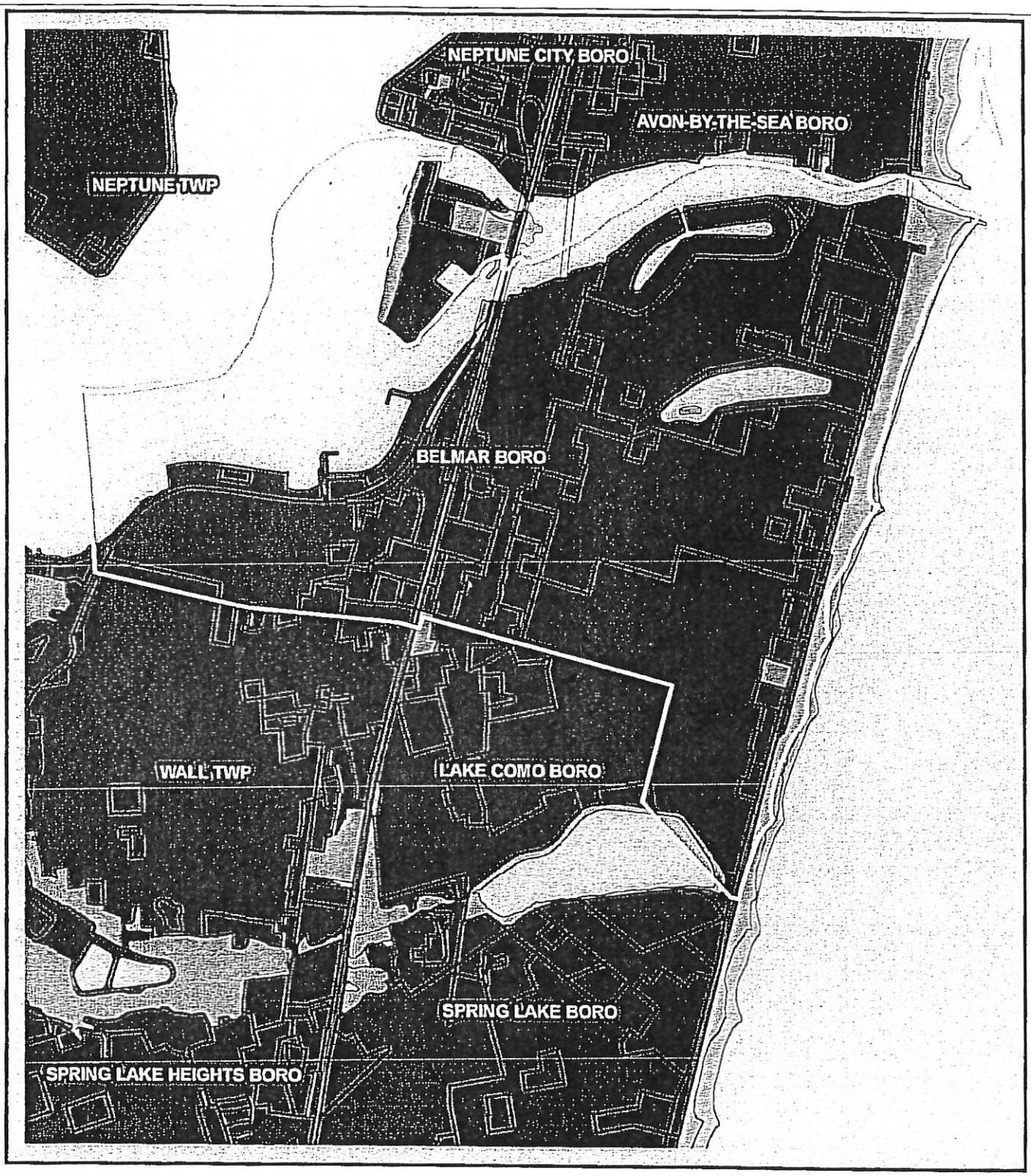
- **Responsible Party-** The mitigation project submission must list the party or parties responsible for the construction or maintenance of the mitigation project. Documentation must be provided to demonstrate that the responsible party is aware of, has authority to perform, and accepts the responsibility for the construction and the maintenance of the mitigation project. Under no circumstances shall the responsible party be an individual single-family homeowner.

- **Maintenance-** The applicant must include a maintenance plan that addresses the maintenance criteria at N.J.A.C. 7:8-5 as part of a mitigation plan. In addition, if the maintenance responsibility is being transferred to Belmar, or another entity, the entity responsible for the cost of the maintenance must be identified. Belmar provides applicants with the option of conveying the mitigation project to the Borough, provided that the applicant funds the cost of maintenance of the facility in perpetuity.

- **Permits-** The applicant is solely responsible to obtain any and all necessary local, State, or other applicable permits for the identified mitigation project or measure. The applicable permits must be obtained prior to the municipal approval of the project for which the mitigation is being sought.

- **Construction-** The applicant must demonstrate that the construction of the mitigation project coincides with the construction of the proposed project. A certificate of occupancy or final approval by the municipality for the application

permit cannot be issued until the mitigation project or measure receives final approval. Any mitigation projects proposed by the municipality to offset the stormwater impacts of the Borough's own projects must be completed within six (6) months of the completion of the municipal project, in order to remain in compliance with Belmar's NJPDES General Permit.



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Legend

- BELMAR BORO
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS

N

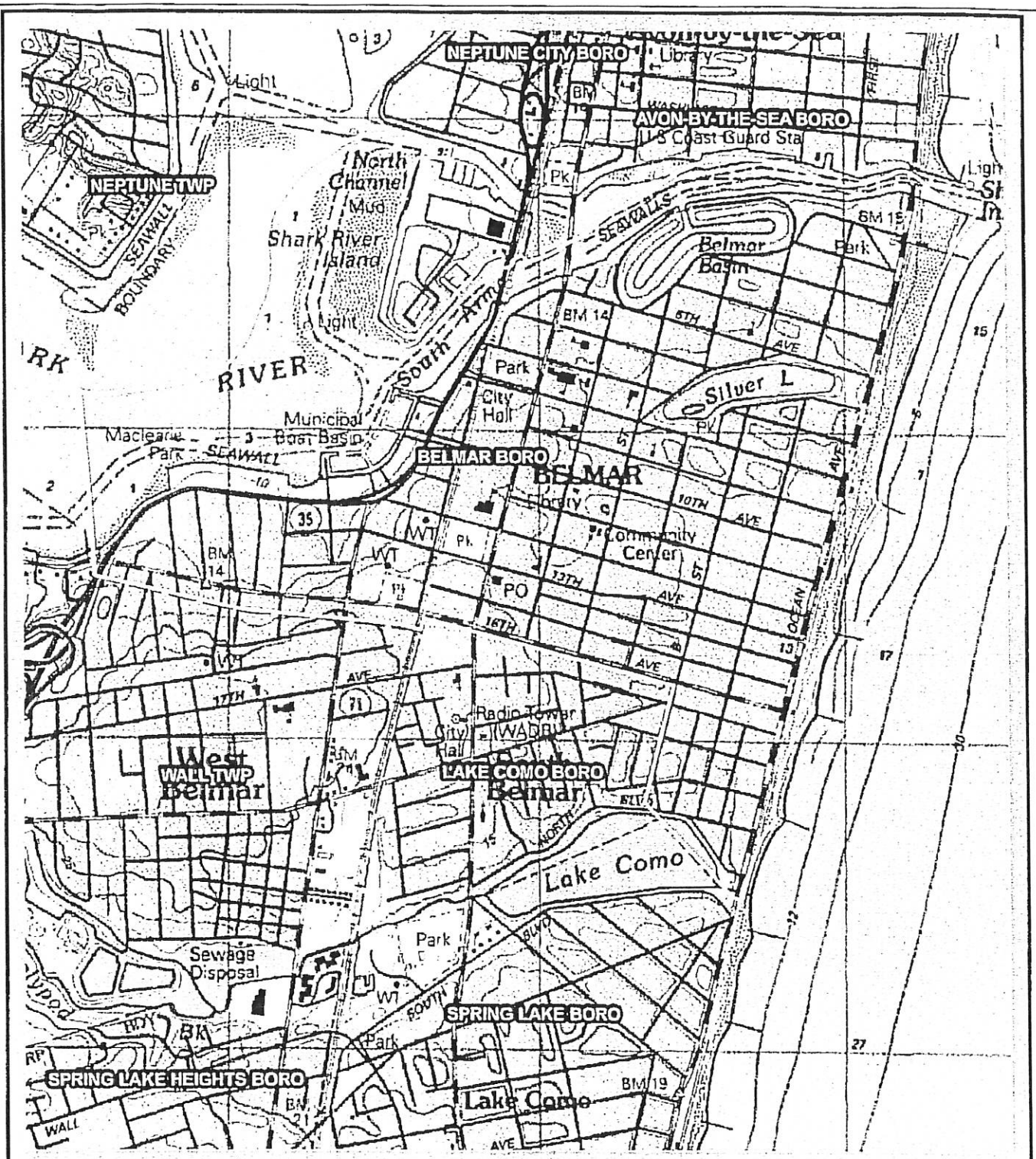
FIGURE 1-LAND USE MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

M:\Eatontown-BE\field-jobs\200002400011\GIS

Job No: 200002400011



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Legend

BELMAR BORO

N

FIGURE 2-USGS QUAD MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

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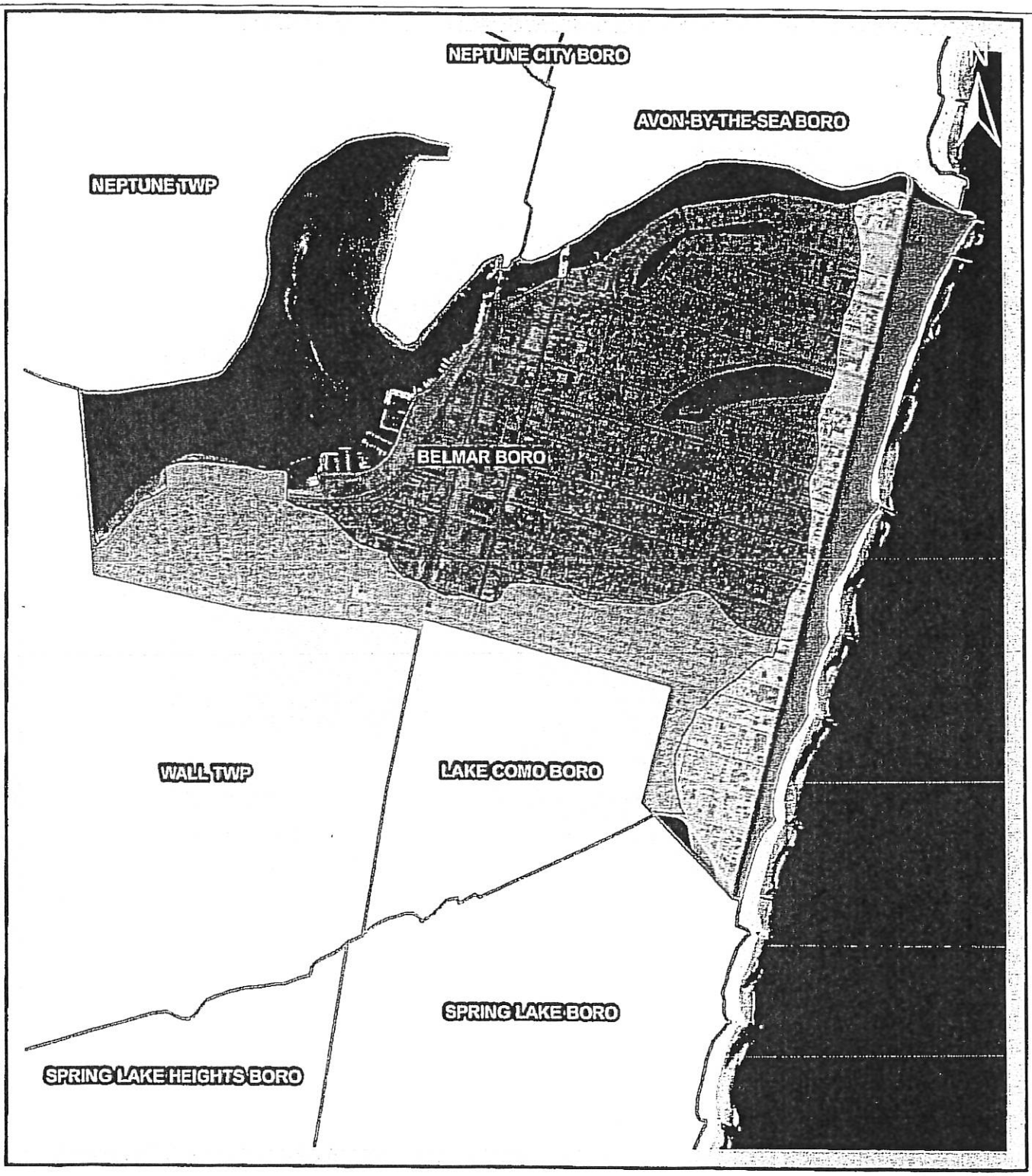
Job No: 200002400011



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Legend

Soil Label

- EWB
- HwB
- KUA
- UD

N

FIGURE 3-SOILS MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

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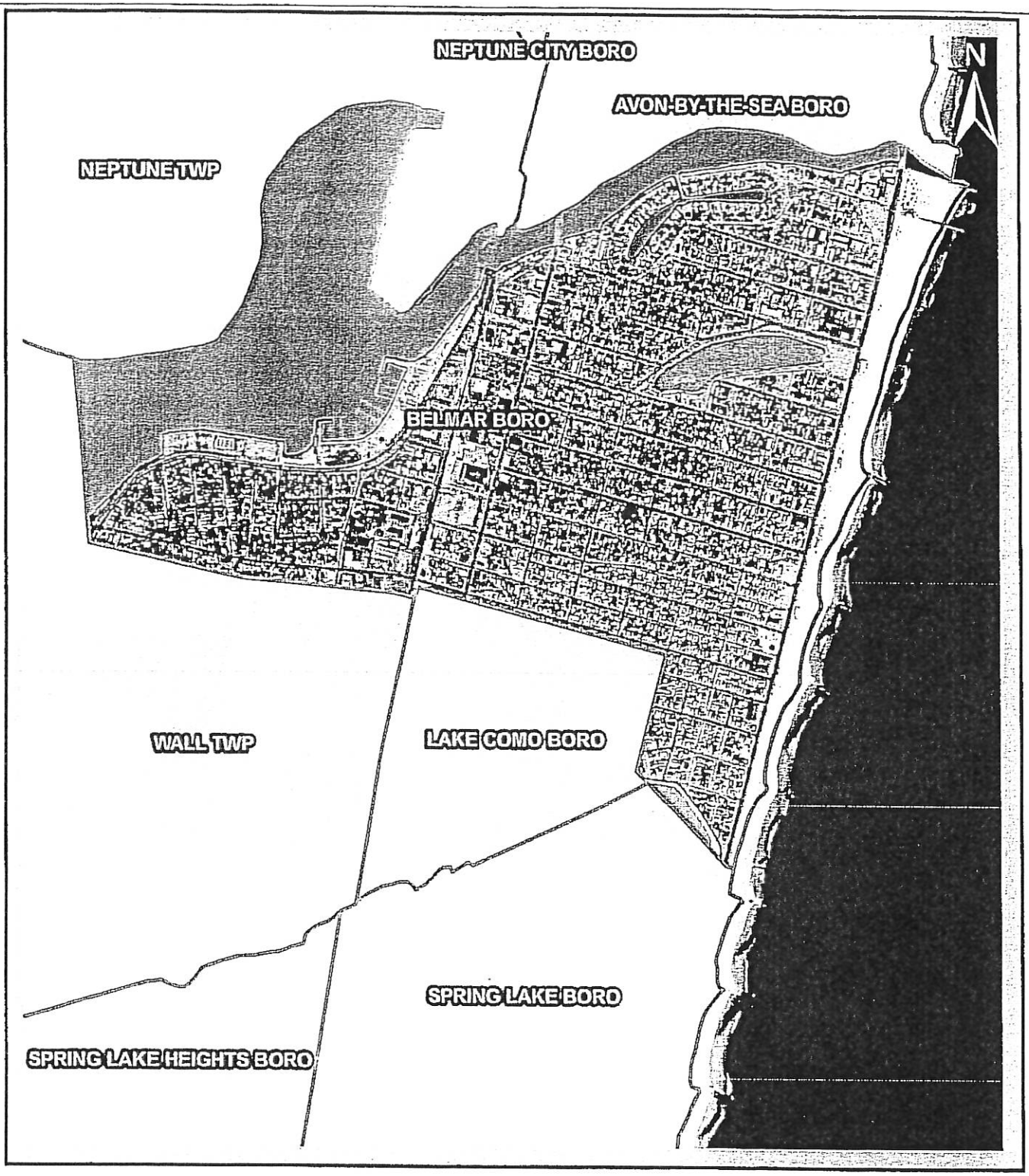
Job No: 200002400011



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Legend

- MANAGED WETLANDS (MODIFIED)
- NATURAL LAKES
- TIDAL WATER

N

FIGURE 4-WETLANDS MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

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Job No: 200002400011

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Legend

Groundwater Recharge Rate

Inches Per Year

- 0 - 5
- 6 - 11
- 12 - 14
- 15 - 19

FIGURE 5-GROUNDWATER RECHARGE MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

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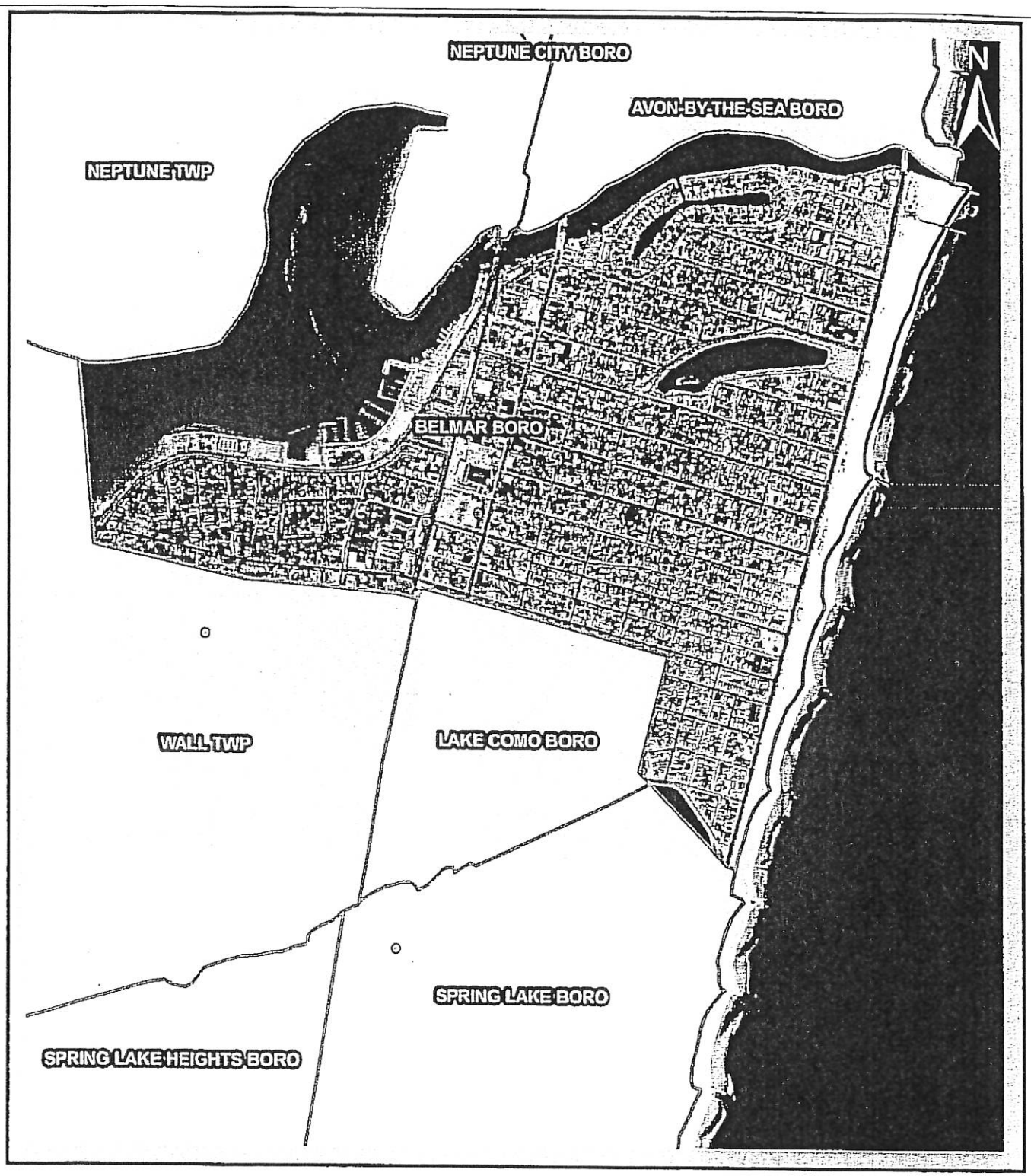
Job No: 200002400011



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08/27/08	1"=450'	AML	AML

Legend

Wellhead Protection Areas

TIER

1

2

3

N

FIGURE 6-WELLHEAD PROTECTION MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

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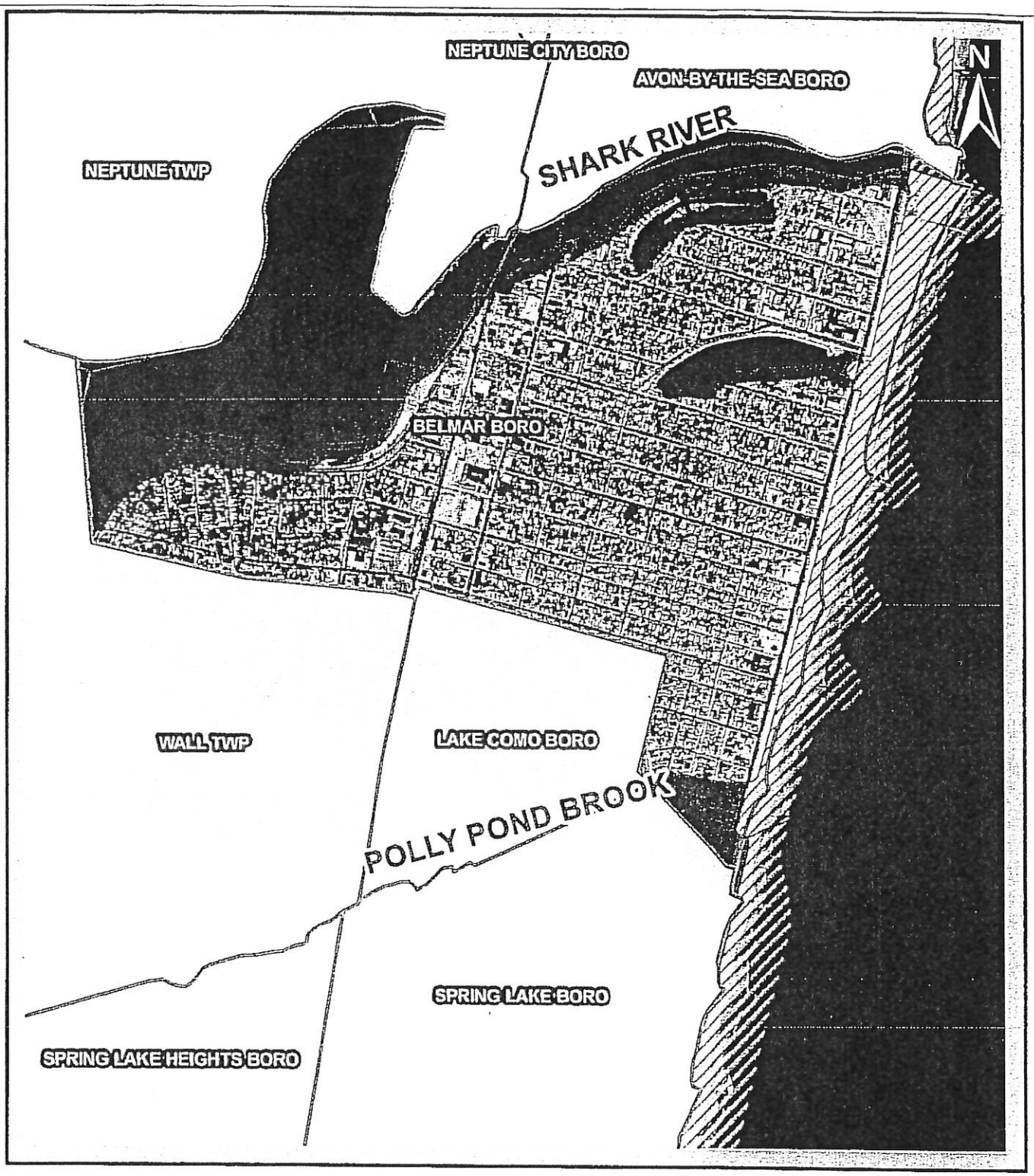
Job No: 200002400011



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Legend

Waterways

FEMA FLOOD ZONE

AE

VE

N

FIGURE 7-FEMA FLOOD MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

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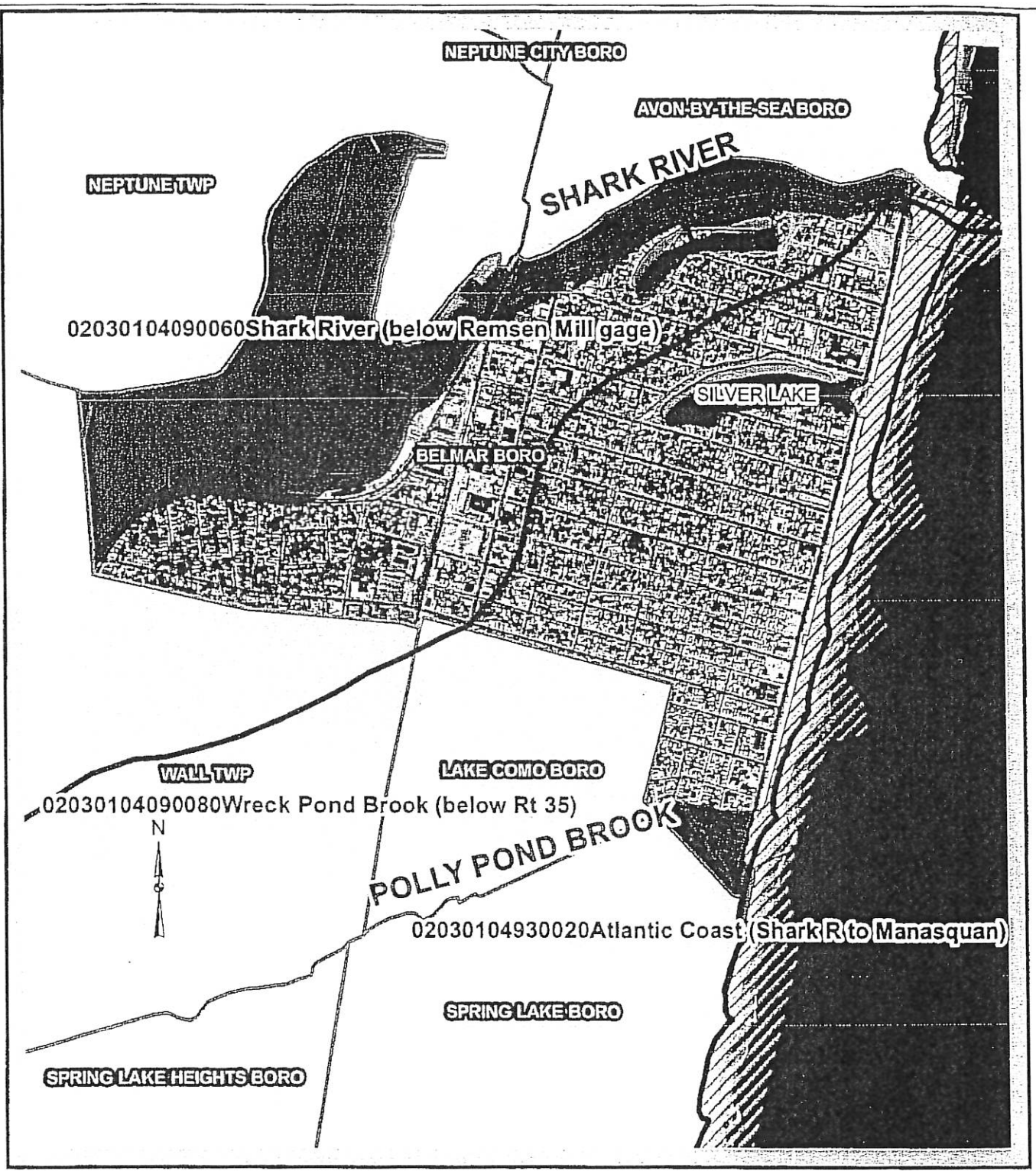

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DATE	SCALE	DRAWN BY:	RELEASED BY:
06/27/08	1"=450'	AML	AML

Legend
- HUC 14 Subwatersheds
- Waterways
- AE
- VE
- MANAGED WETLANDS (MODIFIED)
- NATURAL LAKES
- TIDAL WATER

N

FIGURE 8-SENSITIVE RECEPTORS MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

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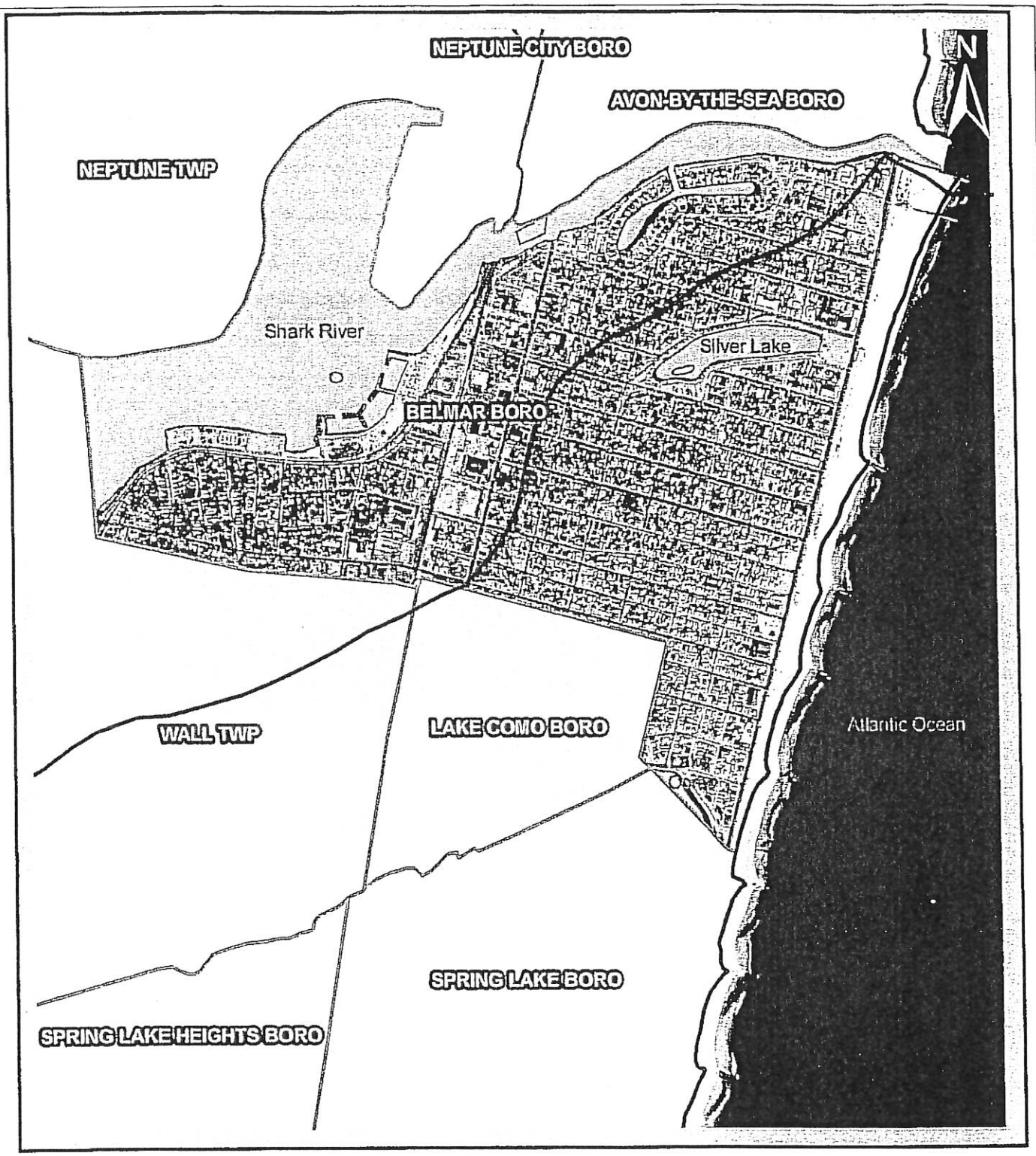
Job No: 200002400011



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DATE	SCALE	DRAWN BY:	RELEASED BY:
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Legend

- HUC14 Boundary
- Waterways and Lakes
- Streams

N

FIGURE 9-WATERWAYS MAP

BELMAR MSWMP
BELMAR BOROUGH
MONMOUTH COUNTY, NEW JERSEY

Sources: NJDEP GIS DATA

M:\Eatontown-BE\old-jobs\200002400011\GIS

Job No: 200002400011