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Stormwater Management Plan

For

**Township of Ocean
Monmouth County, New Jersey**

Prepared by:

Maser Consulting, PA

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Introduction

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

This plan also addresses the review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques. In addition, the plan includes a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

MSWMP Goals

The goals of this MSWMP are to:

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

- Particular attention shall be given to the water quality and control of flood damage of special target areas including the Whale Pond Brook and Poplar Brook.
- Guide development and establish stormwater management strategies consistent with the General Goals and Objectives of the Township Master Plan and specifically the following items:

Conservation Plan

- To identify, map and preserve environmentally sensitive land in the Township, including wetlands, flood plains and other flood prone areas, steep slopes, areas of significant vegetation and areas of archeological significance.

Land Use Plan

- To insure that land development in the Township provides a balance of land uses, which will help, maintain the quality of life within the Township for all of its current and future citizens.
- To insure that future development in the Township does not conflict with existing land uses.
- To ensure that future development in the Township provides for the protection of environmentally sensitive land as identified in the Conservation Element

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventive 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 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than under 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 the habitat of some species.

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

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

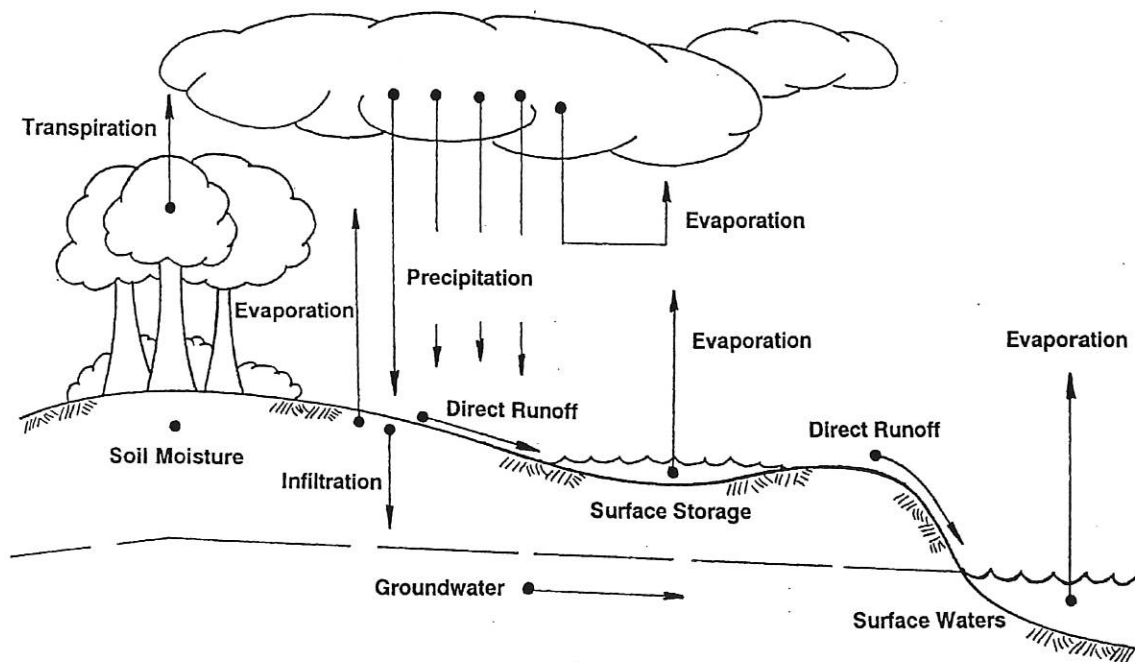


Figure 1 – Hydrologic Cycle

Background

The Township encompasses 11.2 square miles in the eastern portion of Monmouth County, New Jersey. The Township is generally a residential community, but does have a mix of commercial, professional and industrial uses. The Township has few large areas of undeveloped land remaining. There are a number of streams located within the municipality including Whale Pond Brook, Poplar Brook, Hog Swamp Brook and a number of tributaries of Deal Lake. The streams and water bodies within the Township are shown in Figure 2 and the topography of the Township is shown in Figure 3.

According to the 2000 census, the Township has 26,959 residents. The population rose approximately 9 percent since the 1990 census. This population increase is on par with the overall state and county increases of approximately 9 percent respectively over the same period.

The Township falls in Watershed Management Area 12 which extends from Perth Amboy to Point Pleasant Beach. WMA 12 is comprised of an assemblage of coastal subwatersheds, all or a portion of which fall into 56 municipalities in the Raritan Bay and Atlantic Coastal drainage basins. The Township contains portions of Hydrologic Unit Code (HUC-14) areas for four (4) areas. These HUC14 areas are shown in Figure 4.

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 New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics. The closest AMNET site is located on the Whale Pond Brook at Larchwood Avenue in Ocean.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. These data show that the instream total phosphorus and total fecal coliform concentrations for Deal Lake frequently exceed the state's criteria. This means the waterway is impaired and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants. It is important to protect the tributaries that lead to the Deal Lake, since any development in the municipality will have an impact on its TMDLs.

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 an NJPDES permit to discharge, and nonpoint source pollution, 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 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 TMDL's are needed.

The following waters are listed on Sublist 5 (August 9, 2004):

- Whale Pond Brook at Larchwood Avenue in Ocean, Benthic Macroinvertebrates (AN0477- NJDEP AMNET) Low Priority for TMDL.
- Whale Pond Brook at Route #35 in Eatontown, fecal coliform & PH, Monmouth County Health Department (01407617, 31) Medium Priority for TMDL.
- Poplar Brook at Deal, Phosphorus, Monmouth County Health Department (01407640, 59) Medium Priority for TMDL.
- Takanassee Lake, although located outside of the municipal boundaries is the receiving water body for Whale Pond Brook, fecal coliform and phosphorus, High Priority for TMDL
- Although the specific tributaries of Deal Lake do not appear on the list, the Lake itself does. Deal Lake is somewhat impaired by fecal coliform and phosphorus, and has a high priority for a TMDL. Despite this high priority ranking the Lake does not appear on "Appendix 1C for TMDL or other Responses to be completed by 2006".

The Township has exhibited water quantity problems including flooding and stream bank erosion at various locations. While flooding does occur on the Deal Lake Tributary II in the southern portion of the Township, the Poplar and Whale Pond brooks have experienced major flooding issues. The 100-year floodplain of these streams has been indicated in Figure 5.

Poplar Brook originates at the western border of the Township passes through Deal on it way to the Atlantic Ocean. Recurring flood has been experienced along the brook with major events that have impacted Poplar Village, a senior citizen housing project, as well as Brookside Avenue. In addition a sanitary sewer pump station was inundated which

may have attributed to the release of raw sewerage. A reconnaissance study by the Army Corps of Engineers was completed in 1994 and attributed the flood to insufficient channel cross sections and inadequately sized culverts. The report preliminarily recommended installation of a levee to protect Poplar Village, clearing and desnagging of the stream and associated culverts, and the raising of Whale Pond Road to create a natural detention basin. The feasibility study commenced in 1997, but completion was delayed until funding was available in 2003. Preparation of a draft "Detailed Project Report is currently scheduled for January 2008.

Whale Pond Brook is located at the border of Eatontown and Ocean Township. The depth flooding is not as significant to that of Poplar Brook and therefore it was not included in the ACOE study. However the frequency is similar to Poplar Brook. Flooding does occur at Brooke Road, Branch Road, and Peachtree Road. Upstream erosion appears to be the main contributing factor, stabilization of the stream banks is much needed.

The Township is almost fully developed. The existing Land Use/ Land Cover Map, based on 1995/1997 aerial photography, is shown in Figure 6. The existing zoning is shown in Figure 7. A current aerial photo with parcel lot lines overlain on it is shown in Figure 8. The vast majority of land is urban land with little chance for groundwater recharge. The Township has 22 Zoning Districts and 4 overlays: Low Density Single Family Residential (R-1), Low Density Single Family Residential Transition (R-1T), Low Density Single Family Residential (R-2), Medium Density Single Family Residential (R-3), Medium Density Single Family Residential (R-4), Medium Density Single Family Residential (R-5), High Density Single Family Residential (R-6), Garden Apartment (R-7), Planned Residential Development (R-3/PRD), Affordable Housing (AR-3-PRD), Transitional Office/Residential (T-1), Neighborhood Commercial (C-1), Highway Commercial (C-2), General Commercial (C-3), Regional Commercial (C-4), Light Industrial (L-1), Office/Limited Commercial (O-1/20), Office-Research (O-1/40), Office-Research-Limited Commercial (O-1/80), Regional Office (O-2), Limited Commercial (C-5), Planned Adult Overlay (PAC), Shrewsbury River Islands Recreation Activity (SRI), Regional Commercial Zone Shopping Service Facility Option Overlay (C-4/RSSF), Senior Citizen Apartment Overlay (SCA), and Commercial Development Overlay (CDO).

The Township is entirely within the State Plan Designation PA1 Metropolitan Planning Area with the exception of two areas in the northwest portion of the Township, which are classified as county parkland (Weltz Park) and state owned land. However, groundwater recharge rates for native soils in this area are generally between 1 and 19 inches annually. The average annual groundwater recharge rates are shown graphically in Figure 9.

According to the NJDEP, a "Well Head Protection Area" (WHPA) is a map area calculated around a Public Community Water Supply (PCWS) well in New Jersey 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 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).”

WHPA 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.

As shown in Figure 10, the Township is not in a Tier 3 Well Head protection area, thus poses a minimal risk of contamination to the public water supply.

In addition to the rivers and streams that run through and along the Township, there are a number of wetland areas. The Township Master Plan specifically identifies the preservation of wetlands and environmentally sensitive areas in the Conservation Plan Goals and Objectives. These wetland areas, shown in Figure 11, provide flood storage, nonpoint source pollutant removal and habitat for flora and fauna.

Design and Performance Standards

The Township will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5-8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. The ordinances will be submitted to the County for review and approval within 12 month of adoption of the Municipal Stormwater Management Plan.

The municipality, through its public works group, will be inspecting outfalls, performing street erosion edge inspections, and catch basin inspections. These inspections cover the entire town with no exceptions. If a violation is found or an area of need is located, the responsible party will be notified and the situation will be rectified. If the party does not respond, a summons will be and the situation corrected.

Plan Consistency

The Township is not within a Regional Stormwater Management Planning Area and no TMDL's have been developed for waters within the Township at this time. However there is a Regional Stormwater Management Plan being prepared for Deal Lake. The Deal Lake Regional Stormwater Management Plan has not been completed nor have any TMDL's been approved. When the RSWMPs is developed and approved, this Municipal Stormwater Management Plan will be updated to be consistent. The Municipal Stormwater Management Plan will also be updated to address approved TMDL's from

the Deal Lake RSWMPs, Poplar Brook or any other impaired waterway directly affected by the municipality.

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

The Township’s Stormwater Management Plan requires all new development and redevelopment plans to comply with New Jersey’s Soil Erosion and Sediment Control Standards. During construction, Township inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District. All pertinent design calculations for stormwater management facilities should adhere to the new design rainfall depths for Monmouth County as revised by the Natural Resources Conservation Service as of September 2004 accordingly:

NRCS 24 Hour Design Storm Rainfall Depths

as Revised September 2004

Storm Period	1 Year		2 Year		5 Year		10 Year		25 Year		50 Year		100 Year	
	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New
Monmouth County	2.8	2.9	3.4	3.4	4.4	4.4	5.3	5.2	6.0	6.6	6.5	7.7	7.5	8.9

The Stormwater Management Plan is consistent with and requires all new development and redevelopment plans to comply with the Monmouth County Growth Management Guide’s objective to Water Resources as follows:

1. Encourage the protection and conservation of all water resources.
2. Encourage the protection of potable water resources.
3. Encourage the preservation and improvement of coastal water resources.
4. Promote preservation and improvement of surface water quality.
5. Encourage the preservation and improvement of groundwater quality and quantity.
6. Promote and protection of water-oriented wildlife habitat.
7. Promote the preservation, restoration and enhancement of wetlands and stream corridors in order to protect the adjacent water bodies, such as streams, rivers, lakes, bays and oceans.

This Plan is consistent with the County Growth Management Guide by encouraging the protection of stream corridors, encouraging flood control and groundwater recharge, and through the implementation of the non-structural and structural strategies . This Plan is also consistent with the Monmouth County Growth Management Guide by preserving and protecting valuable natural feature within the Township.

The Township's Plan is consistent with the plans and policies of the State Redevelopment or Development Plan (SDRP), which was adopted in 2001. The SDRP places the entire Township in the Metropolitan Planning Area (PA1). According to the State Plan, most of the communities within the PA1 planning area are fully developed or almost fully developed with little vacant land available for new development. This plan is consistent with the State Plan by preserving and protecting the established residential character, preserving and upgrading the existing utility infrastructure, providing adequate open space facilities, and preserving and protecting valuable natural features within the Township.

Nonstructural Stormwater Management Strategies

The Township has reviewed the master plan and ordinances, and has provided a list of the sections in the Township land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 12 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.

The Township Code, was reviewed in regard to incorporating non-structural stormwater management strategies. Several changes are recommended to **Article IV** of this chapter, entitled "**Design and Performance Standards**" to incorporate the following strategies

- The protection of 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 pre-construction "time of concentration."
- 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 discharge into and through stable vegetated areas.

- Provide preventative source controls.

9-1 Soil Removal

This addresses soil erosion and sediment control by referencing Chapter 128, the Township's Soil Erosion and Sediment Control Ordinance. This ordinance requires developers to comply with the New Jersey Soil Erosion and Sediment Control Standards and outlines some general design principles, including: whenever possible, retain and protect natural vegetation; minimize and retain water runoff to facilitate groundwater recharge; and, install diversions, sediment basins, and similar required structures prior to any on-site grading or disturbance.

9-1.14 Retention of Top Soil

The owner of the premises or the person in charge of the soil removal or mining operation where permission has been duly granted shall not take away the top layer of arable soil for a depth of six inches but such top layer or arable sod to the depth of six inches shall be set aside for retention on the premises and shall be replaced over the premises when the last of the soil has been removed pursuant to levels and contour lines as approved by the township engineer.

9-2 Tree Removal - This section of the ordinance details the standards and requirements for the removal of trees within the municipality. The Township recognizes that the destruction and removal of trees has the potential to impair the growth and development of the other trees on properties considered for development as well as adjacent properties. Furthermore unnecessary tree removal could cause soil erosion or increase dust; could impair existing drainage patterns; could lessen property values in the neighborhood and could substantially impair the aesthetic values of the area.

Section 9-2.8 (Standards) indicates that consideration should be given to the preservation of trees outside of areas where buildings or other structures, patios, driveways, loading areas, recreation areas, parking areas, roadways, drainage right-of-ways, or sewer easements are proposed, along with areas located within 20 feet of the same. Consideration shall also be given to the historic and landmark value of trees requested to be removed. This section complies with minimizing land disturbance, which is a nonstructural stormwater management strategy. These sections should be amended to require the identification of forested areas, and require a percentage of the area to be protected from disturbance in order to limit the amount of land disturbance, discourage unnecessary tree removal and reduce the possibilities of clear cutting.

Section 9-2.9 (Protection of Trees) indicates that no soil or materials shall be placed within three feet of any tree and where it is necessary by reason of topography to grade around such trees, the township engineer may require that trees be appropriately welled. Trees, which are to be retained, shall be protected at all times during the period of construction with appropriate fencing to the satisfaction of the township engineer or tree expert certified by the State of New Jersey duly appointed by the township manager. This section should be amended to extend the area of protection to the drip line of the

trees to be preserved, thus minimizing soil compaction and not compromising the health of the trees.

Section 9-2.10 (Replacement of Trees) addresses tree replacement by referencing Section 21-55.2 (Provision and Protection of Trees and Shrubs) for the number and types of trees that shall be replaced. This ordinance requires developers to provide a Tree Location and Preservation Plan indicating the size and type of existing trees to be preserved. The plan further indicates that a minimum of 15 trees shall be provided for each acre of development. The section should be amended to require replacement trees to be native species, which requires less fertilization and watering than non-native ornamental plants.

Section 21-45 (Off Street Parking Requirements) details off-street parking requirements.

Section 21-45.5 (Parking Area Site Layout) indicates that driveways and internal roads shall be separated from parking areas by curbed landscaped islands where possible. This section should be amended to allow for flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. Additional language should be added to allow for use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm sewers. This section also provides guidance on minimum parking space requirements. These requirements are based on the number of dwelling units and/or gross floor area. This section should be amended to allow a developer to demonstrate that fewer spaces would be required, provided area is set aside for additional spaces if necessary. This section should be amended further to allow pervious paving to be used in areas to provide overflow parking, vertical parking structures, smaller parking stalls, and shared parking.

Section 21-55.1 (Landscaping Design Criteria) Indicates that considerations of natural site features such as: existing trees, streams, rock outcropping, etc. shall be preserved wherever possible.

Item “e” of this section suggests the protection of landscape areas by curbs or bumpers. All buffers and landscaped areas shall be protected from adjacent parking areas by minimum 6" high curbs. This section should be amended to allow for flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management.

Item “h” of this section lists the requirements for buffer plantings. The language of this section should be amended to require the use of native vegetation, which requires less fertilization and watering than non-native species.

This section currently indicates that considerations of natural site features such as: existing trees, streams, rock outcropping, etc. shall be preserved wherever possible.

Section 21-55.11 (Drainage System) lists the Township’s stormwater management requirements. This section should be revised to include all requirements outlined in N.J.A.C. 7:8-5. These changes were presented earlier in this document.

Section 21-55.13 (Off-Site and Off-Tract Improvements) describes essential off-site and off-tract improvements. Language should be added to this section to require that any off-site and off-tract stormwater management and drainage improvements must conform to the “Drainage Requirements” described in this plan and provided in Section 21-55.11 of the Township Code.

Land Use/Build-Out Analysis

The Township of Ocean has a combined total of less than one square mile of vacant lands; the Township is not required to do a build-out analysis, based on the 1995 Land Use Land Cover data provided by the NJDEP and the Monmouth County’s 2003 Vacant Land inventory. This information represents land use/land cover (LU/LC) as it existed in New Jersey as of 1995. The LU/LC categories were interpreted from 1995 color infrared aerial photography, and mapped in parcels as small as one acre for the entire state. This information was created as part of the 1995/97 Land Use/Land Cover Update Project.

Mitigation Plans

This mitigation plan is provided for proposed developments or redevelopment projects that seek a variance or exemption from the stormwater management design and performance standards set forth in this Municipal Stormwater Management Plan and N.J.A.C. 7:8-5. Applicants for development shall mitigate the impacts of development on stormwater at their own site or other sites within the subject watershed.

There are several larger tracts of publicly (Township, County, and State) owned land within the Poplar Brook and Whale Pond Brook watersheds that provide for the opportunity to implement BMPs since a majority of the privately owned parcels are already developed. The larger publicly owned tracts maybe the only available areas to provide significant flood control projects. The Township owns or has control over several of the smaller stream corridors that may be good candidates for water quality mitigation.

Mitigation Project Criteria

1. The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.

- a. The applicant may select one of the following example projects listed to compensate for the deficit from the performance standards resulting from the proposed project or identify other possible projects. More detailed information on the projects can be obtained from the Township Engineer. Listed below are example projects that can be used to address the mitigation requirement and are shown on Figure 12. The list may be expanded as the Township maps its stormwater systems and assesses the functionality of the existing stormwater management facilities. In addition potential projects may also be identified by the Deal Lake Regional Stormwater Management Plan or by the applicant themselves with approval from the Township.

1. Whalepond Brook Bank Stabilization (Water Quality);
2. Poplar Brook Bank Stabilization (Water Quality);
3. Retrofit Top of the Hill Detention Basin (Volume & Water Quality);
4. Retrofit Park/Larchwood Detention Basin (Volume & Water Quality);
5. Retrofit Norwood Detention Basin (Volume & Water Quality);
6. Roller Road Drainage Area (Volume & Water Quality);
7. Lambert Johnson Drive Drainage Area (Volume & Water Quality).;
8. Deal Lake and its tributaries Bank Stabilization, one area in particular is the south side of the Township's Colonial Golf Course (Water Quality);
9. Green Grove Road (Longview at Wayside) Detention Basin (Volume & Water Quality).
10. Additional areas of mitigation that are identified by the Deal Lake Regional Stormwater Management Plan.

Volume control project can include channel improvements such as sediment removal, desnaging, culvert upgrades and raising of roadways to increase the upstream natural storage capacity.

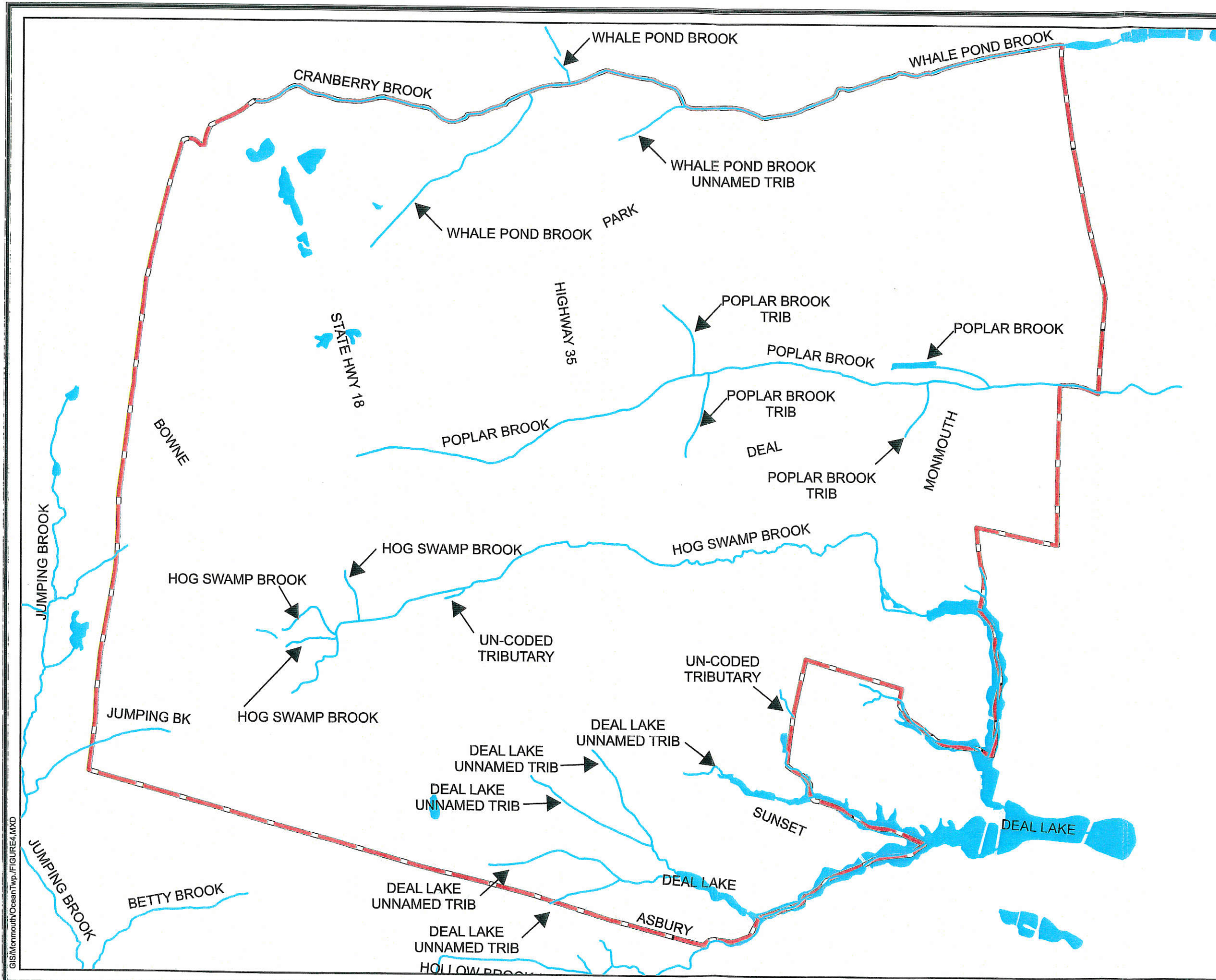
Upon completion of the Deal Lake Regional Stormwater Management Plan, additional areas of mitigation and compliance with approved TMDL's will be addressed for mitigation purposes. The Township may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

It is the developer's responsibility to provide a detailed study of any proposed mitigation project, and provide the Township with a proposed mitigation plan for review and approval. Mitigation projects shall meet all applicable safety, design and performance standards.

Recommended Implementing Stormwater Control Ordinances

The Township will implement or revise the following ordinances:

- Illicit Connection Ordinance
- Improper Waste Disposal Ordinance
- Litter Ordinance
- Pet Waste Ordinance
- Wildlife Feeding Ordinance
- Yard Waste Ordinance
- The Stormwater Control Ordinance will be implemented in accordance with NJAC 7:8-4.



**OCEAN TOWNSHIP
WATERWAYS MAP**

FIGURE 2
OCTOBER 2007

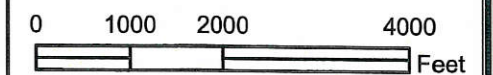


Legend

- NJDEP STREAMS
- NJDEP LAKES

THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

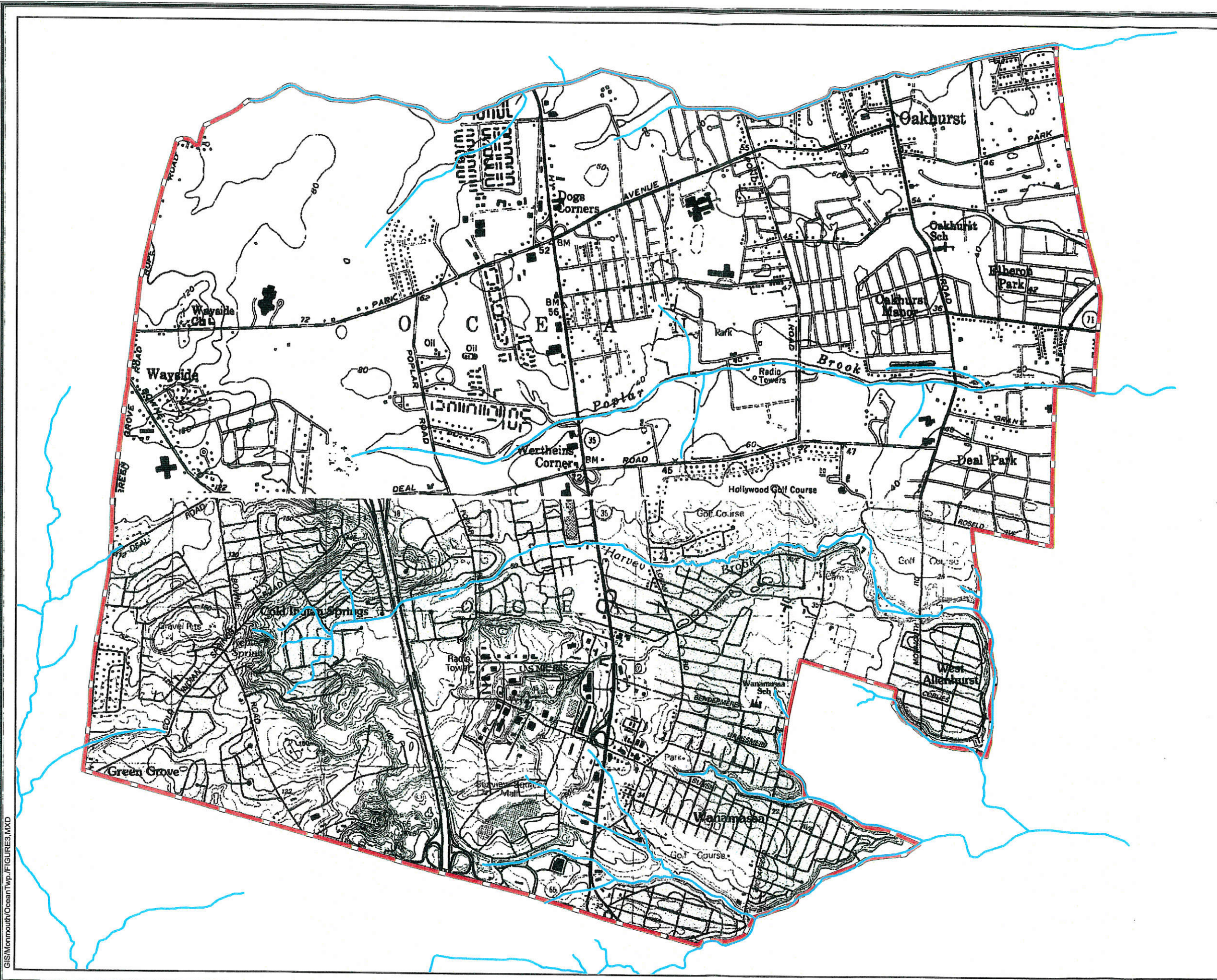
1 INCH EQUALS 2000 FEET



NJDEP STREAMS DATA WAS PUBLISHED 11-01-1998
NJDEP OPEN WATER AREAS PUBLISHED 11-01-1998



GIS/Monmouth/OceanTwp.FIGURE4.MXD



**OCEAN TOWNSHIP
USGS QUADRANGLE MAP**

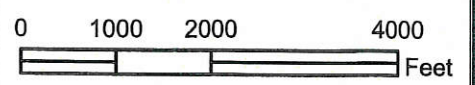
FIGURE 3

OCTOBER 2007



THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA AND USGS QUADRANGLE MAPS. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

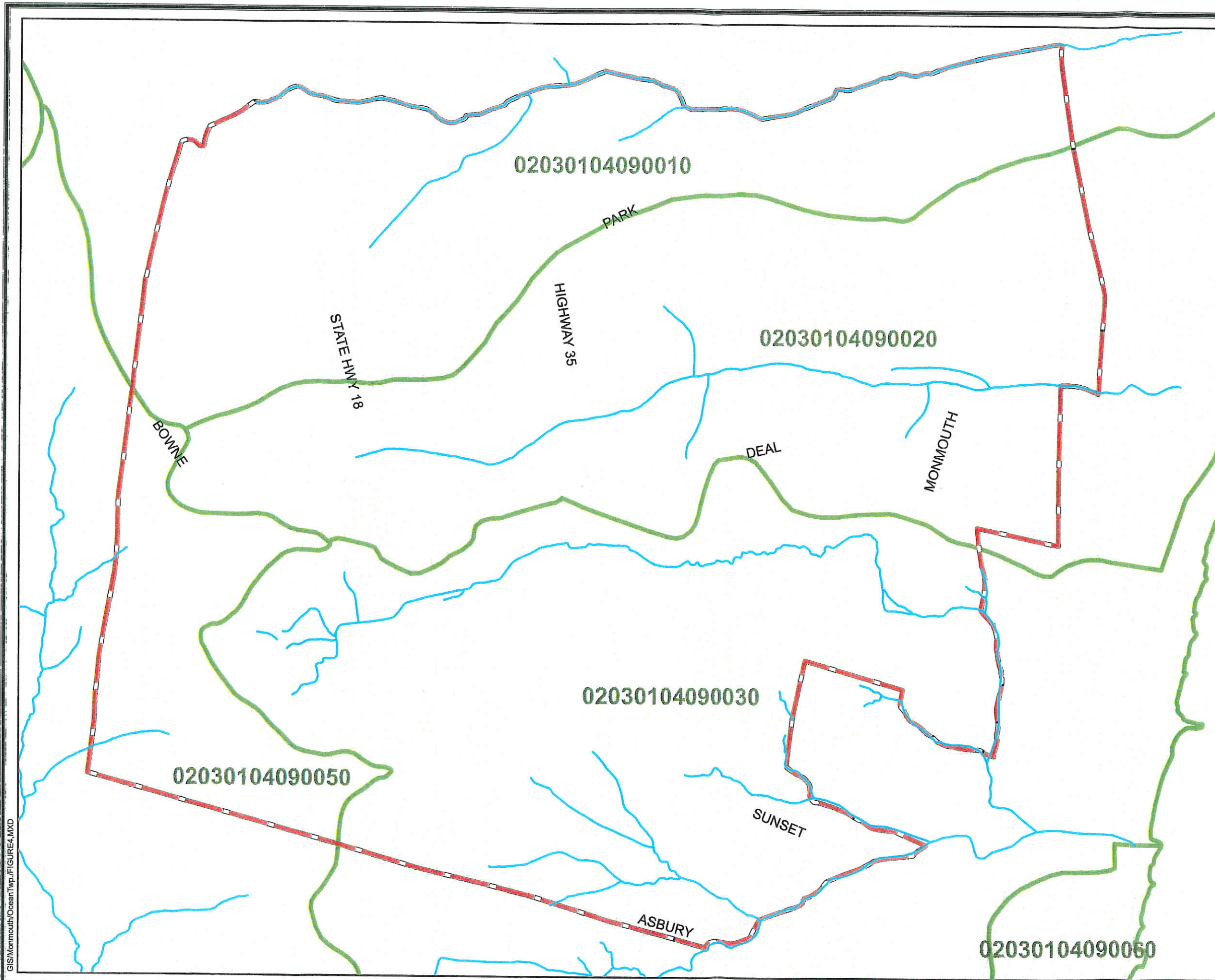
1 INCH EQUALS 2000 FEET



THE USGS MAP SOURCE: NEW JERSEY GEOLOGICAL SURVEY CD-SERIES CD 00-1 TOPOGRAPHIC BASE MAPS 1:24,000 OF NEW JERSEY 6-30-2000



GIS/Monmouth/OceanTwp.FIGURE3.MXD



OCEAN TOWNSHIP
HUC 14 DRAINAGE AREA MAP

FIGURE 4
 OCTOBER 2007



Legend
 NJDEP HUC 14 BOUNDARY

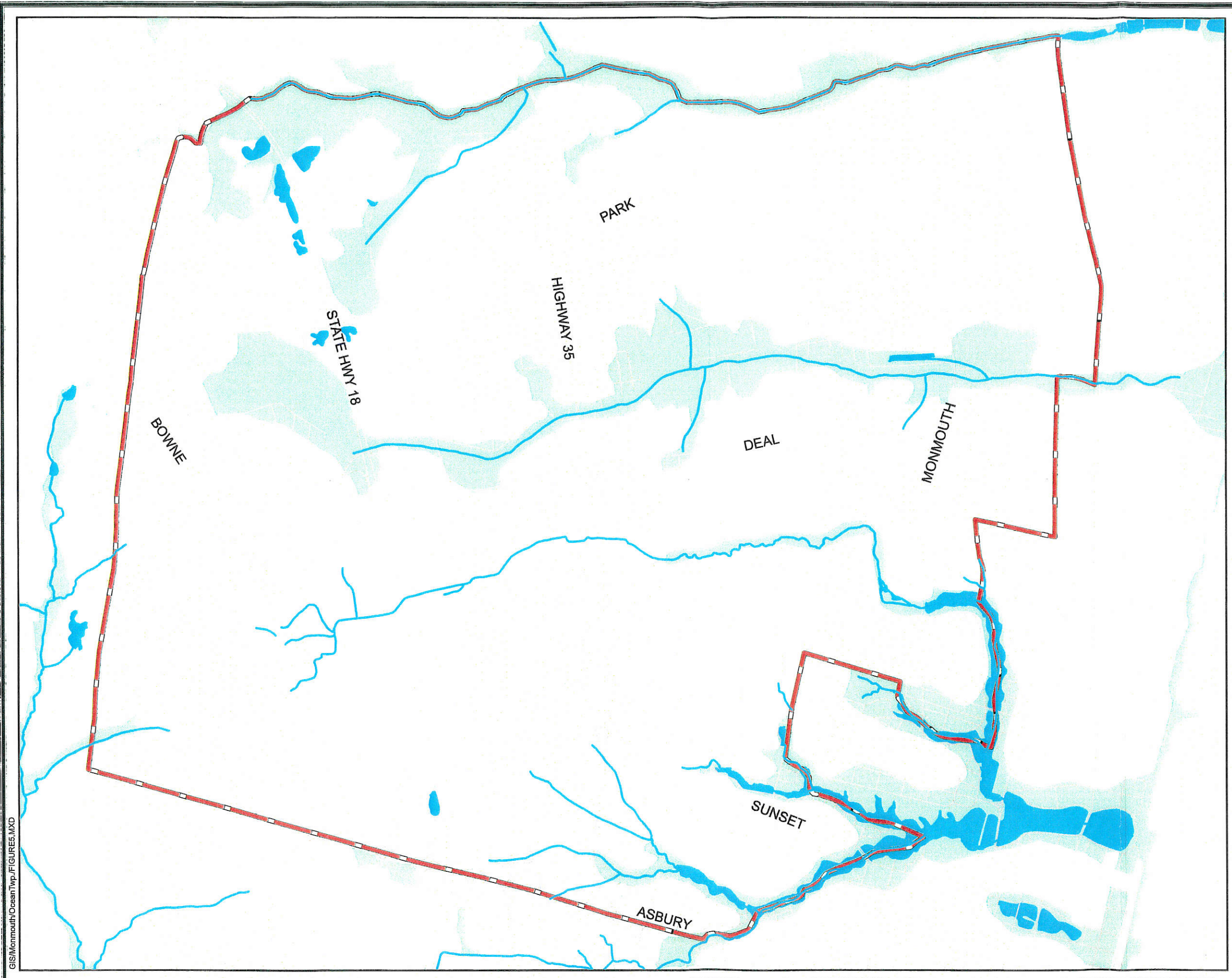
THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

1 INCH EQUALS 2000 FEET
 0 1000 2000 4000 Feet

NJDEP 14 DIGIT HYDROLOGIC UNIT CODE DELINEATIONS FOR NEW JERSEY PUBLISHED 1/20/2006.



GIS/Monmouth/OceanTwp.FIGURE4.MXD



OCEAN TOWNSHIP
100-YEAR FREQUENCY
FLOODPLAIN MAP

FIGURE 5

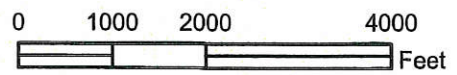
OCTOBER 2007



Legend
 100 - YEAR FREQUENCY FLOOD PLAIN

THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

1 INCH EQUALS 2000 FEET



NJDEP FLOOD PRONE AREAS WERE CREATED AS PART OF THE INTEGRATED TERRAIN MAPPING PROGRAM (PHASE 4 1991-1992)



GIS/Monmouth/OceanTwp.FIGURES.MXD

OCEAN TOWNSHIP

LAND USE MAP

FIGURE 6

OCTOBER 2007



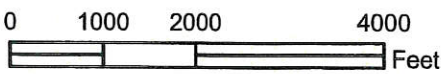
Legend

NJDEP 2002 LAND USE
(BY TYPE)

-  AGRICULTURE
-  BARREN LAND
-  FOREST
-  URBAN
-  WATER
-  WETLANDS

THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

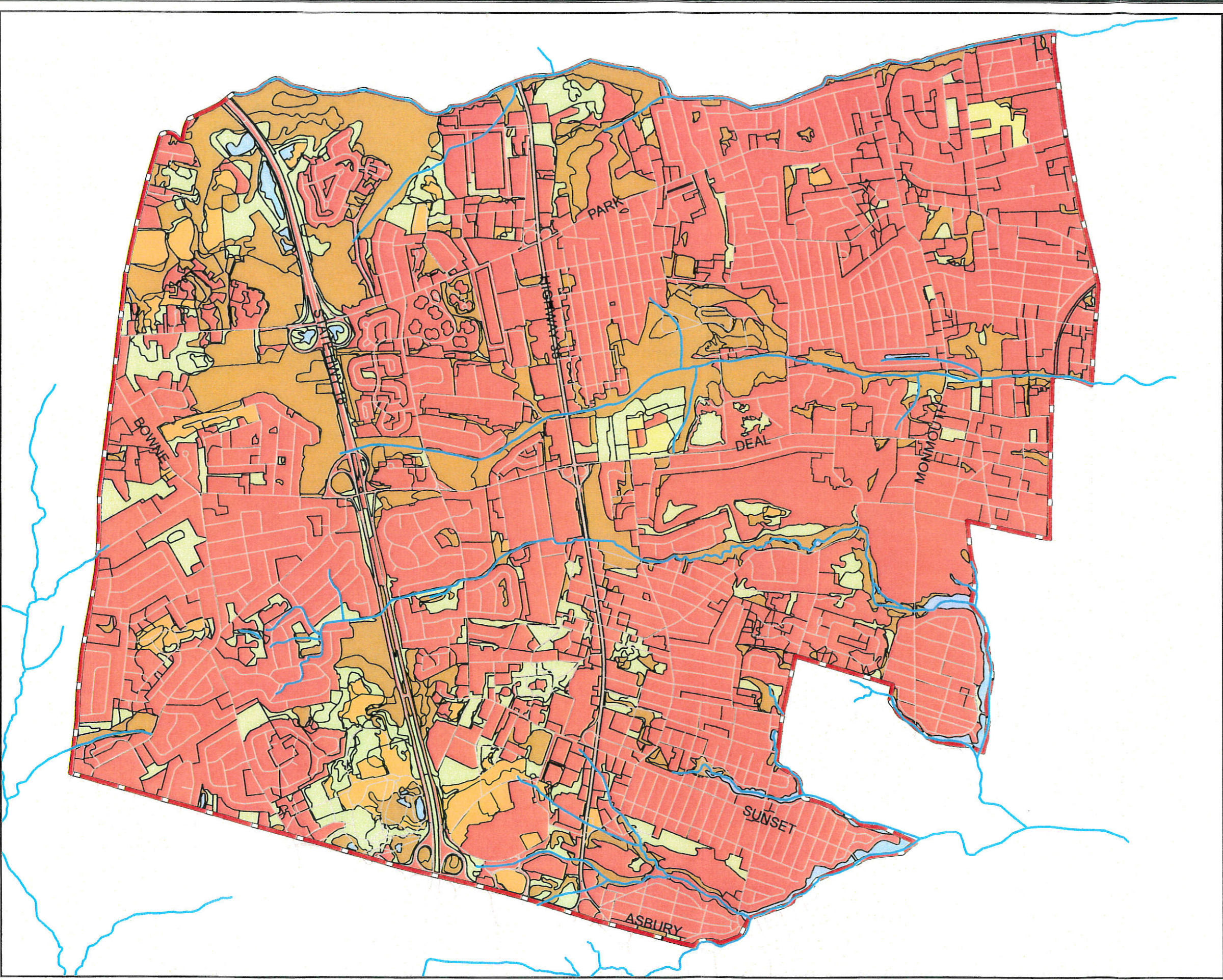
1 INCH EQUALS 2000 FEET



THE NJDEP LANDUSE DATA IS DATED 2002.



GIS/Monmouth/OceanTyp/FIGURE6.MXD



OCEAN TOWNSHIP ZONING MAP FIGURE 7

OCTOBER 2007

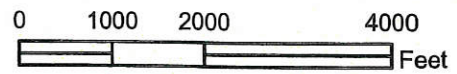


KEY

- R-1 LOW DENSITY SINGLE FAMILY RESIDENTIAL ZONE
- R-1T LOW DENSITY SINGLE FAMILY RESIDENTIAL TRANSITIONAL ZONE
- R-2 LOW DENSITY SINGLE FAMILY RESIDENTIAL ZONE
- R-3 MEDIUM DENSITY SINGLE FAMILY RESIDENTIAL ZONE
- R-4 MEDIUM DENSITY SINGLE FAMILY RESIDENTIAL ZONE
- R-5 MEDIUM DENSITY SINGLE FAMILY RESIDENTIAL ZONE
- R-6 HIGH DENSITY SINGLE FAMILY RESIDENTIAL ZONE
- R-7 GARDEN APARTMENT RESIDENTIAL ZONE
- R-3PRD PLANNED RESIDENTIAL DEVELOPMENT ZONE
- AR3-PRD AFFORDABLE HOUSING ZONE
- T-1 TRANSITIONAL OFFICE/RESIDENTIAL ZONE
- C-1 NEIGHBORHOOD COMMERCIAL ZONE
- C-2 HIGHWAY COMMERCIAL ZONE
- C-3 GENERAL COMMERCIAL ZONE
- C-4 REGIONAL COMMERCIAL ZONE
- I-1 LIGHT INDUSTRY ZONE
- O-1/20 OFFICE/LIMITED COMMERCIAL ZONE
- O-1/40 OFFICE-RESEARCH ZONE
- O-1/80 OFFICE-RESEARCH-LIMITED COMMERCIAL ZONE
- O-2 REGIONAL OFFICE RESEARCH ZONE
- C-5 LIMITED COMMERCIAL ZONE
- PAC PLANNED ADULT COMMUNITY OVERLAY
- SRI SHREWSBURY RIVER ISLANDS RECREATION ACTIVITY ZONE (NOT ON MAP)
- C-4/RSSF REGIONAL COMMERCIAL ZONE SHOPPING SERVICE FACILITY OPTION OVERLAY
- SCA SENIOR CITIZEN APARTMENT OVERLAY
- CDD COMMERCIAL DEVELOPMENT OVERLAY

THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

1 INCH EQUALS 2000 FEET



ZONING INFORMATION SOURCE: MAP PREPARED BY JAMES W. HIGGINS ASSOCIATES UPDATED 11/27/2002.



GIS/Monmouth/OceanTwp.FIGURE7.MXD





OCEAN TOWNSHIP AERIAL PHOTO MAP

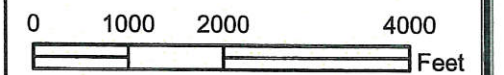
FIGURE 8

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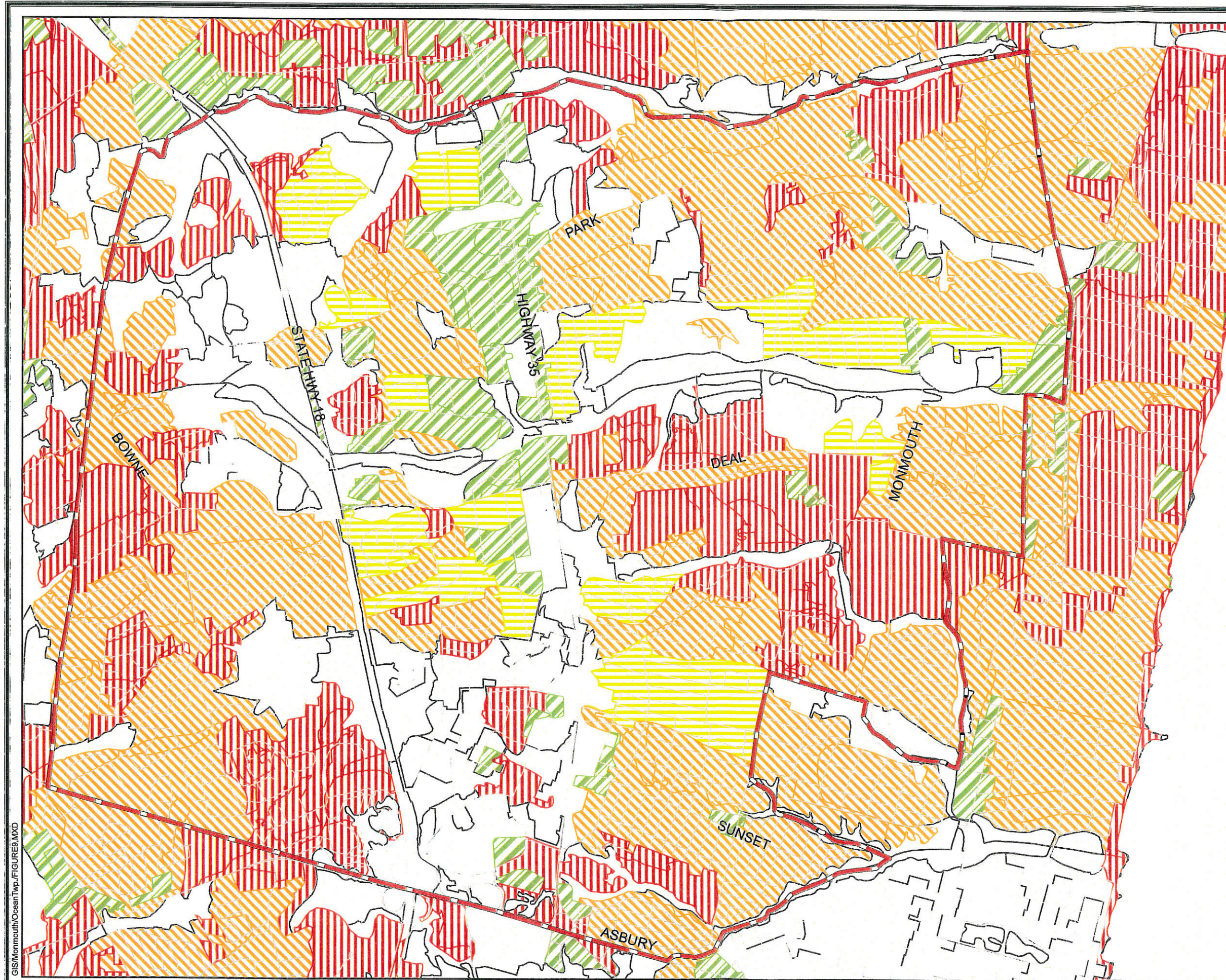
THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

1 INCH EQUALS 2000 FEET



THIS AERIAL PHOTO IS DATED 2003 AND IS FROM MONMOUTH COUNTY'S GIS LAND BASE 2003 GIS UPDATE PROJECT.





**OCEAN TOWNSHIP
GROUNDWATER RECHARGE
MAP**

FIGURE 9

OCTOBER 2007



**AVERAGE ANNUAL GROUNDWATER
RECHARGE (INCHES)**

	0.00
	0.01 - 5.99
	6.00 - 10.99
	11.00 - 13.99
	14.00 - 18.99

THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

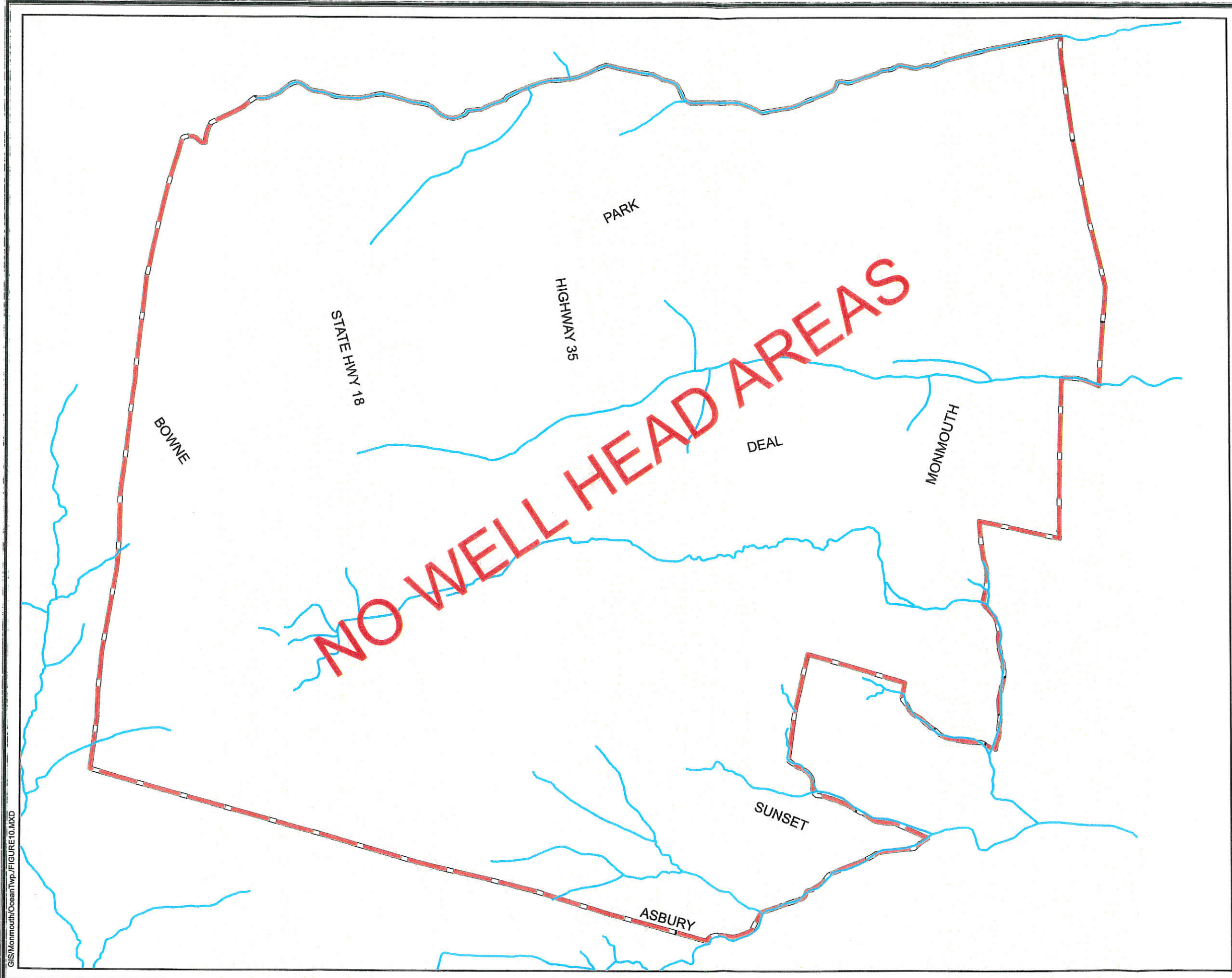
1 INCH EQUALS 2000 FEET



THE GROUNDWATER LAYER IS FROM THE NJ GEOLOGICAL SURVEY BURUEA OF GROUNDWATER RESOURCES EVALUATION. THE DATA IS DATED 4-1997.



GIS/Monmouth/OceanTwp/FIGURE9.MXD



**OCEAN TOWNSHIP
WELL HEAD
PROTECTION AREAS MAP**

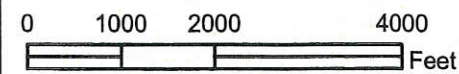
FIGURE 10

OCTOBER 2007



THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

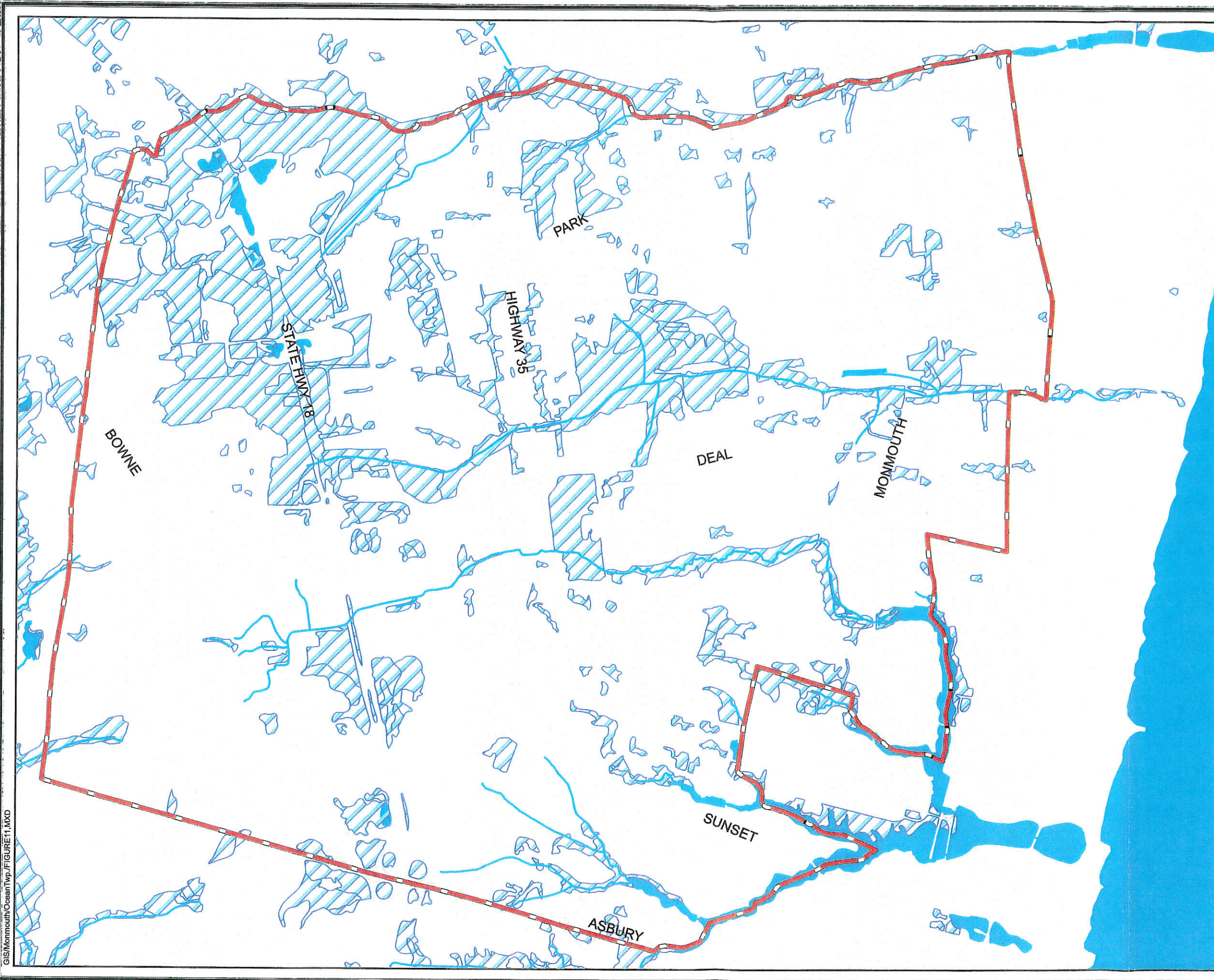
1 INCH EQUALS 2000 FEET



SOURCE: PUBLIC COMMUNITY SUPPLY WELLS NJGS 1997



GIS/Monmouth/OceanTwp./FIGURE10.MXD



**OCEAN TOWNSHIP
WETLANDS MAP**
FIGURE 11
OCTOBER 2007



Legend
 NJDEP WETLANDS

THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

1 INCH EQUALS 2000 FEET
 0 1000 2000 4000
 Feet

NJDEP WETLANDS DATA DATED 11-1999.



GIS\Monmouth\OceanTwp\Figure11.MXD

**OCEAN TOWNSHIP
MITIGATION AREA MAP**



FIGURE 12
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LEGEND

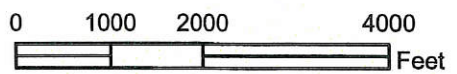
- 02030104090010**
1. WHALEPOND BROOK BANK STABILIZATION
- 02030104090020**
2. POPLAR BROOK BANK STABILIZATION
3. TOP OF THE HILL DETENTION BASIN
4. PARK/LARCHWOOD DETENTION BASIN
5. NORWOOD DETENTION BASIN
- 02030104090030**
6. ROLLER ROAD DRAINAGE AREA
7. LAMBERT JOHNSON DRIVE
8. DEAL LAKE BANK STABILIZATION
- 02030104090050**
9. GREEN GROVE ROAD (LONGVIEW AT WAYSIDE) DETENTION BASIN

Legend

-  NJDEP HUC 14
-  MITIGATION AREAS

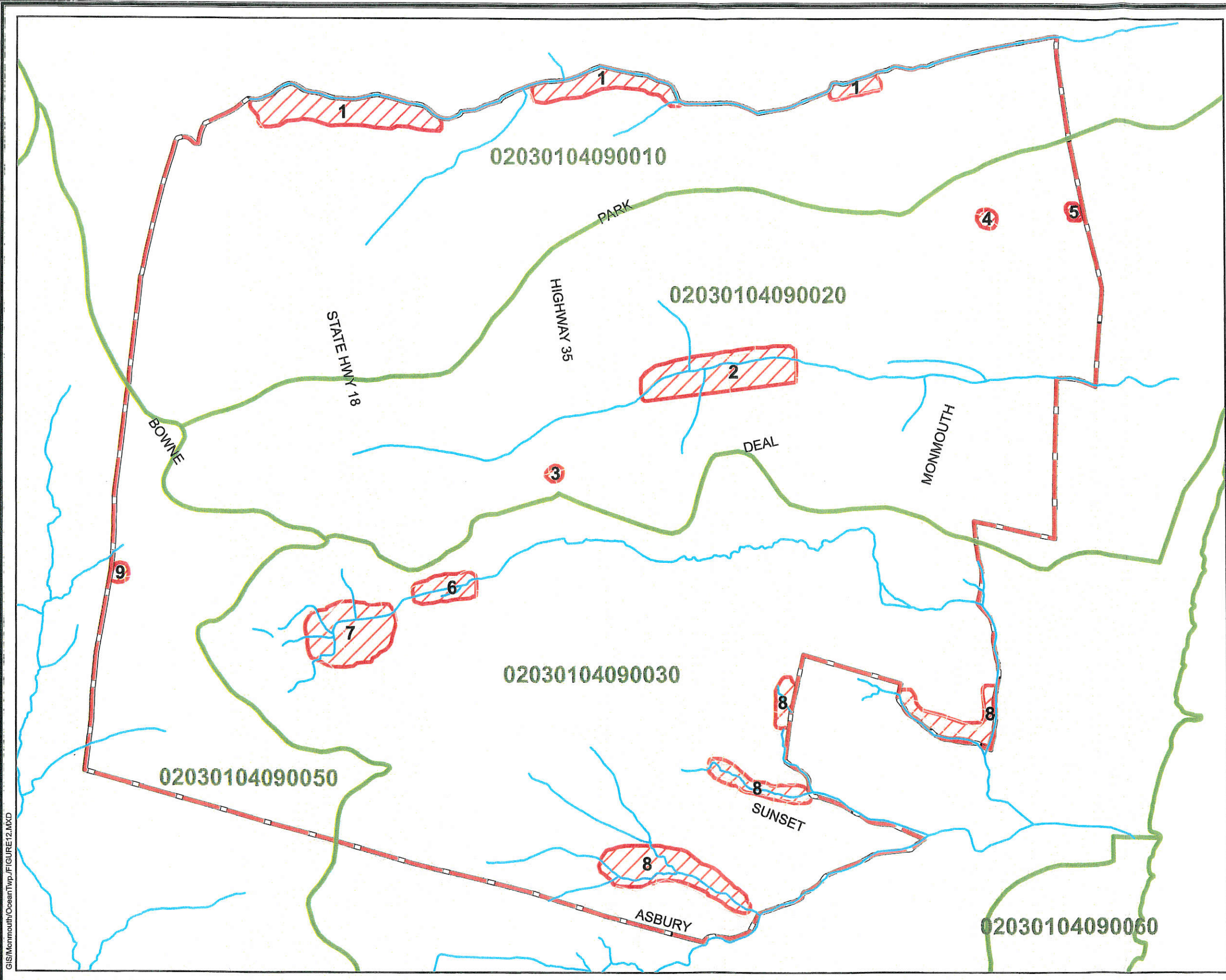
THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT COUNTY OR STATE AUTHORIZED.

1 INCH EQUALS 2000 FEET



NJDEP 14 DIGIT HYDROLOGIC UNIT CODE DELINEATIONS FOR NEW JERSEY PUBLISHED 1-2006.

MITIGATION AREAS CREATED BY MASER CONSULTING 5-2005.



GIS/Monmouth/OceanTwp/FIGURE12.MXD