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July 8, 2005

TO: Honorable Mayor Gary Passanante
Council President James Perry
Councilman David Alexander
Councilwoman Jacquelin Coston
Councilman Edward J. Kain
Councilman William O'Donnell
Councilman Nick Tolomeo
Mr. Victor Cantillo, C.F.O./Treasurer/Administrator
Mr. Donald Wharton, C.P.W.M., Superintendent of Sewer Department/Public Works
Ms. Regina White, R.M.C., C.M.C., Deputy Borough Clerk/Deputy Treasurer

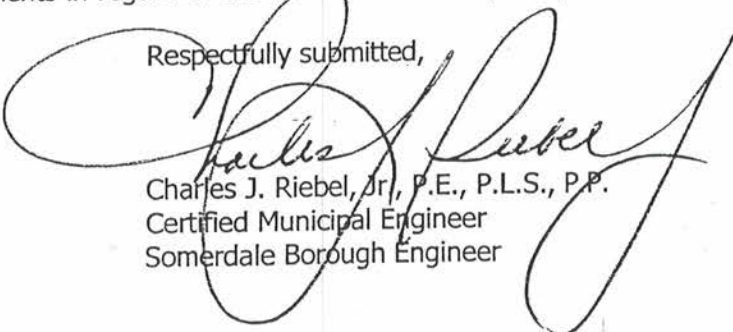
RE: **MUNICIPAL STORMWATER MANAGEMENT PLAN**
Borough of Somerdale, Camden County,
New Jersey (MEI #7-406SM0304)

Dear Members of the Governing Body:

We are herewith enclosing a copy of the Municipal Stormwater Management Plan for your review, prior to the public hearing, scheduled for the Council Meeting on July 14, 2005.

If you have any questions or comments in regard to the contents of this report, please contact me at this office.

Respectfully submitted,


Charles J. Riebel, Jr., P.E., P.L.S., P.P.
Certified Municipal Engineer
Somerdale Borough Engineer

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Enclosures

projects/7/406/Docs/Submittal-GB

Borough of Somerdale

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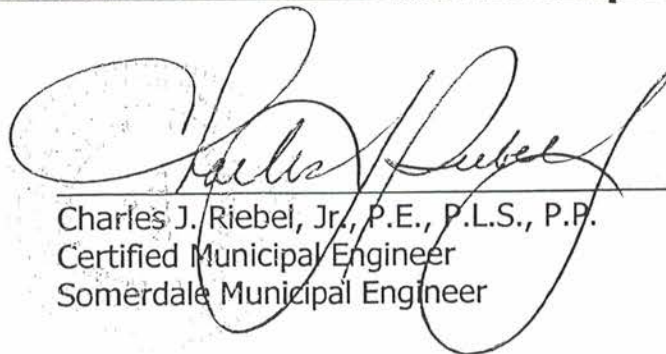
MUNICIPAL STORMWATER MANAGEMENT PLAN

For The

BOROUGH OF SOMERDALE
Camden County, New Jersey

(MEI #406SM0304)

March 8, 2005
Revised March 24, 2005
Revised April 27, 2005



Charles J. Riebel, Jr., P.E., P.L.S., P.P.
Certified Municipal Engineer
Somerdale Municipal Engineer

4/27/05

Date

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Introduction

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

A "build-out" analysis has not been included since there is less than one square mile of vacant or agricultural land remaining in the Borough. The plan also addresses the review and update of existing ordinances, the Borough Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

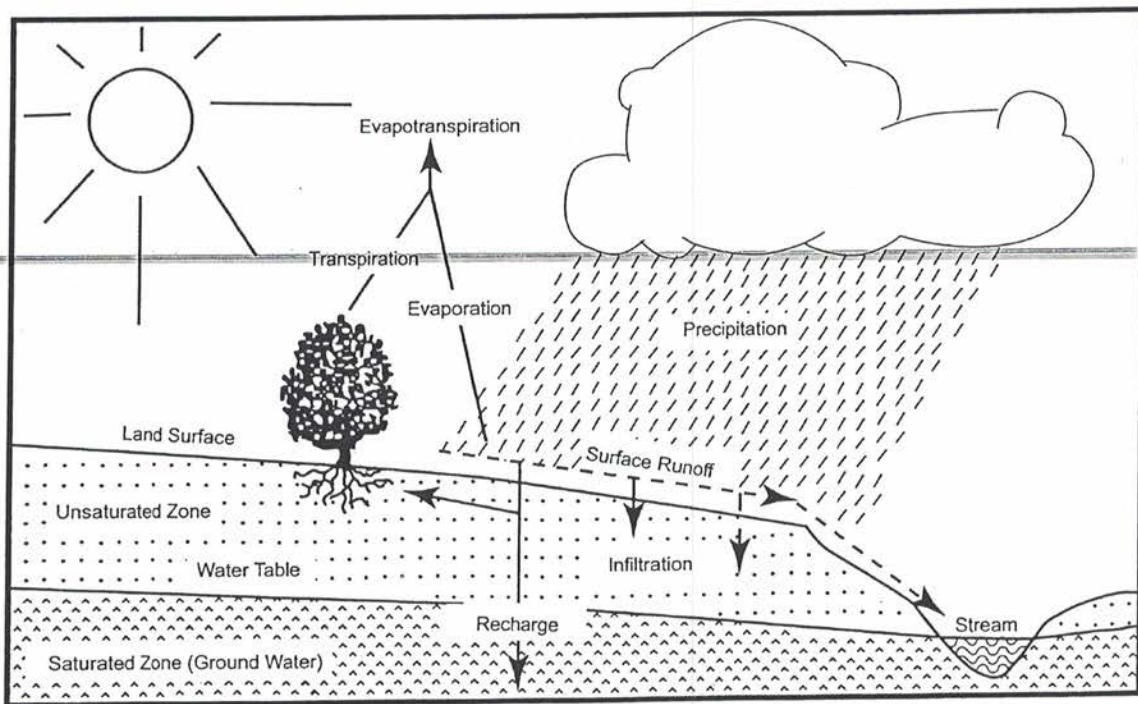
- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other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

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

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See Figure C-1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

Figure C-1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

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

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

Background

The Borough encompasses a 1.36 square mile area in Camden County, New Jersey. The population of the Borough has been, steadily decreasing from 5,900 in 1980, to 5,440 in 1990, to 5,192 in 2000. There have not been any substantial changes in the stormwater runoff volumes and pollutant loads to the waterways of the municipality. Figure C-2 illustrates the waterways in the Borough. Figure C-3 depicts the Borough boundary on the USGS quadrangle maps.

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

No testing has been performed on Gravelly Run. The nearest test site for Cooper Creek appears to be in Lindenwold (Site ID #01467191) where the impairment is phosphorus. It does not appear that there are no priority rankings for these streams.

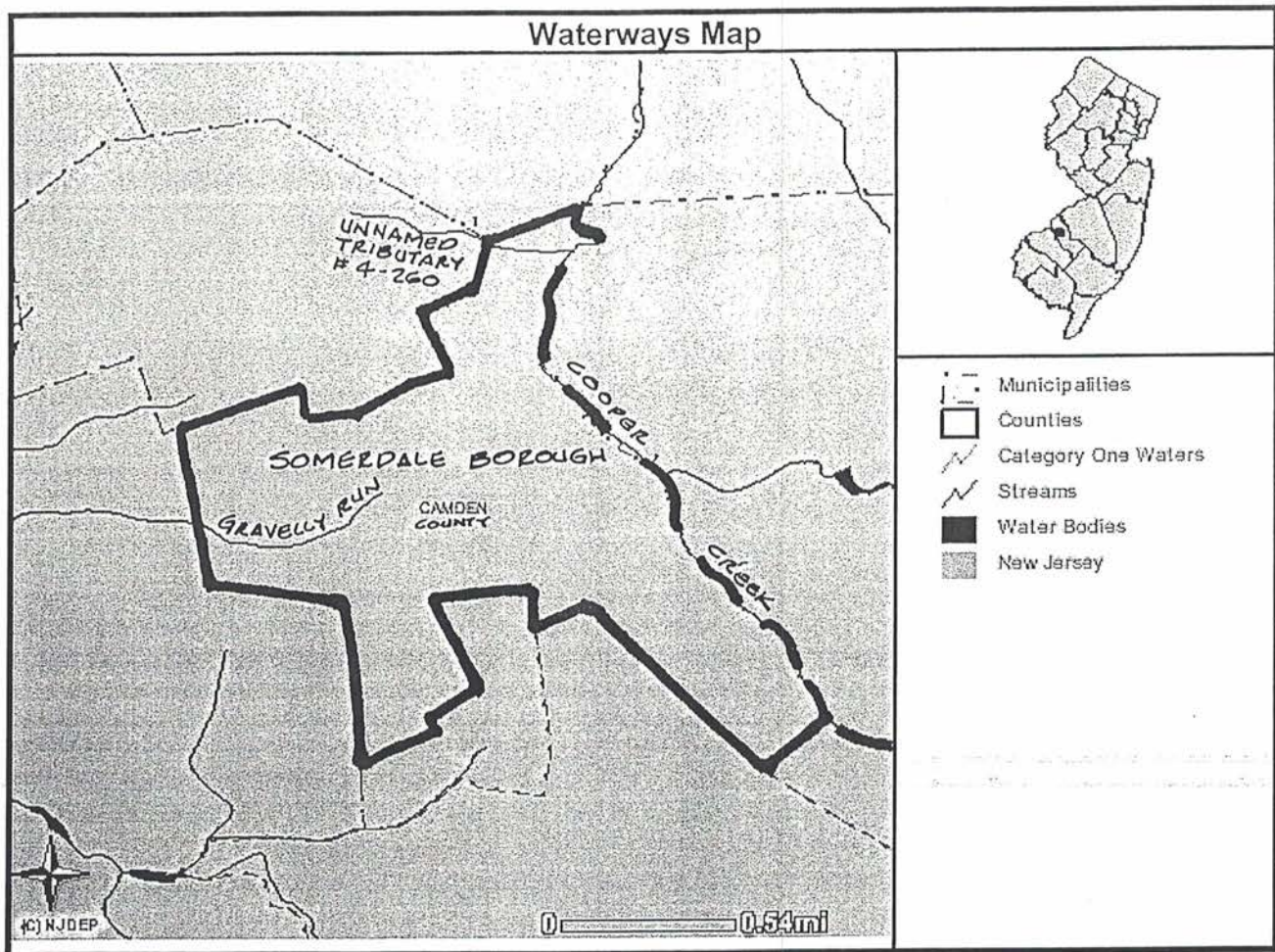


FIGURE C-2
WATERWAYS MAP
Borough of Somerdale
Camden County, New Jersey

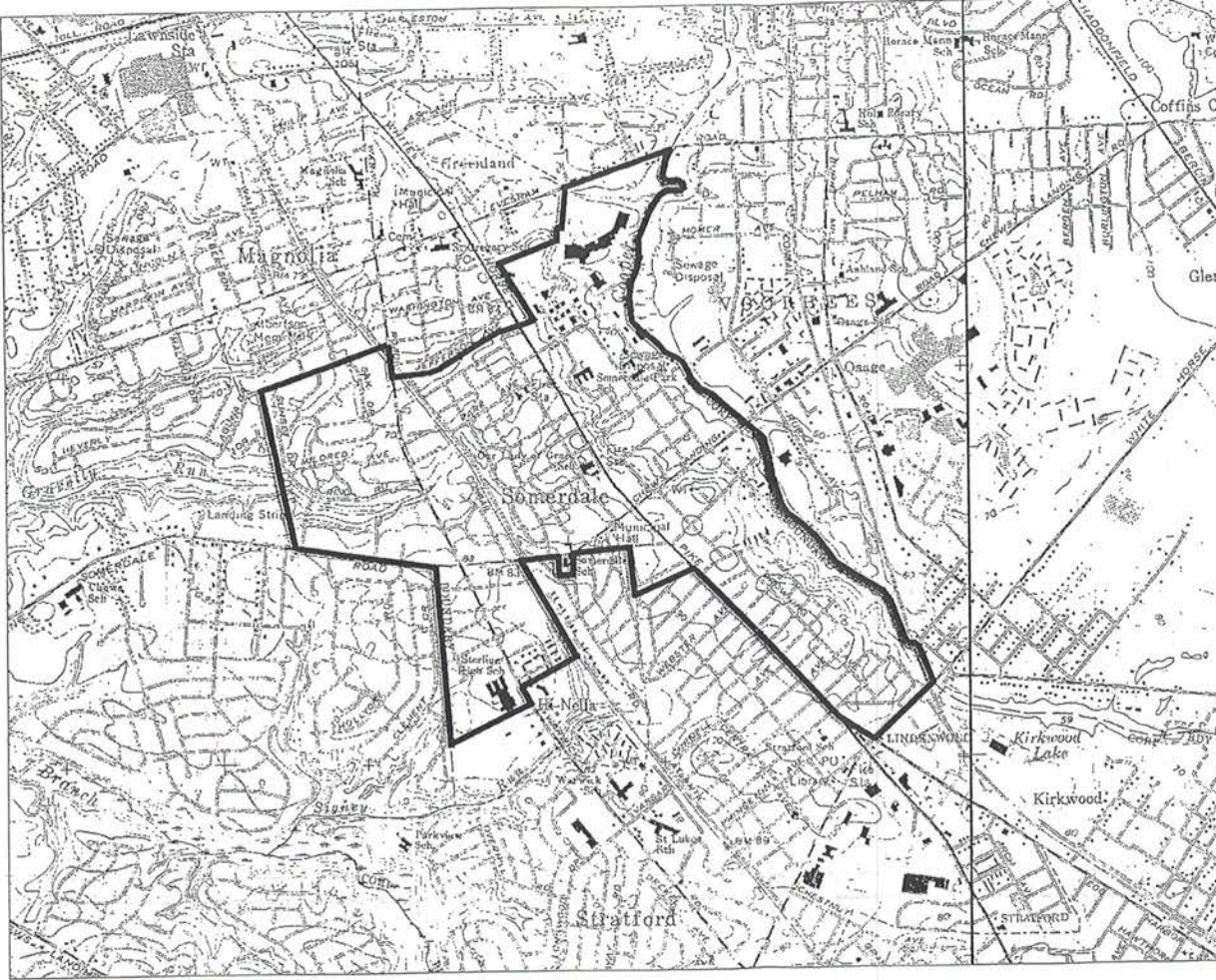


FIGURE C-3
U.S.G.S. QUADRANGLE MAP
RUNNEME QUADRANGLE
BOROUGH OF SOMERDALE
CAMDEN COUNTY, NEW JERSEY
DATE: 03-07-05 SCALE: 1"=1500'

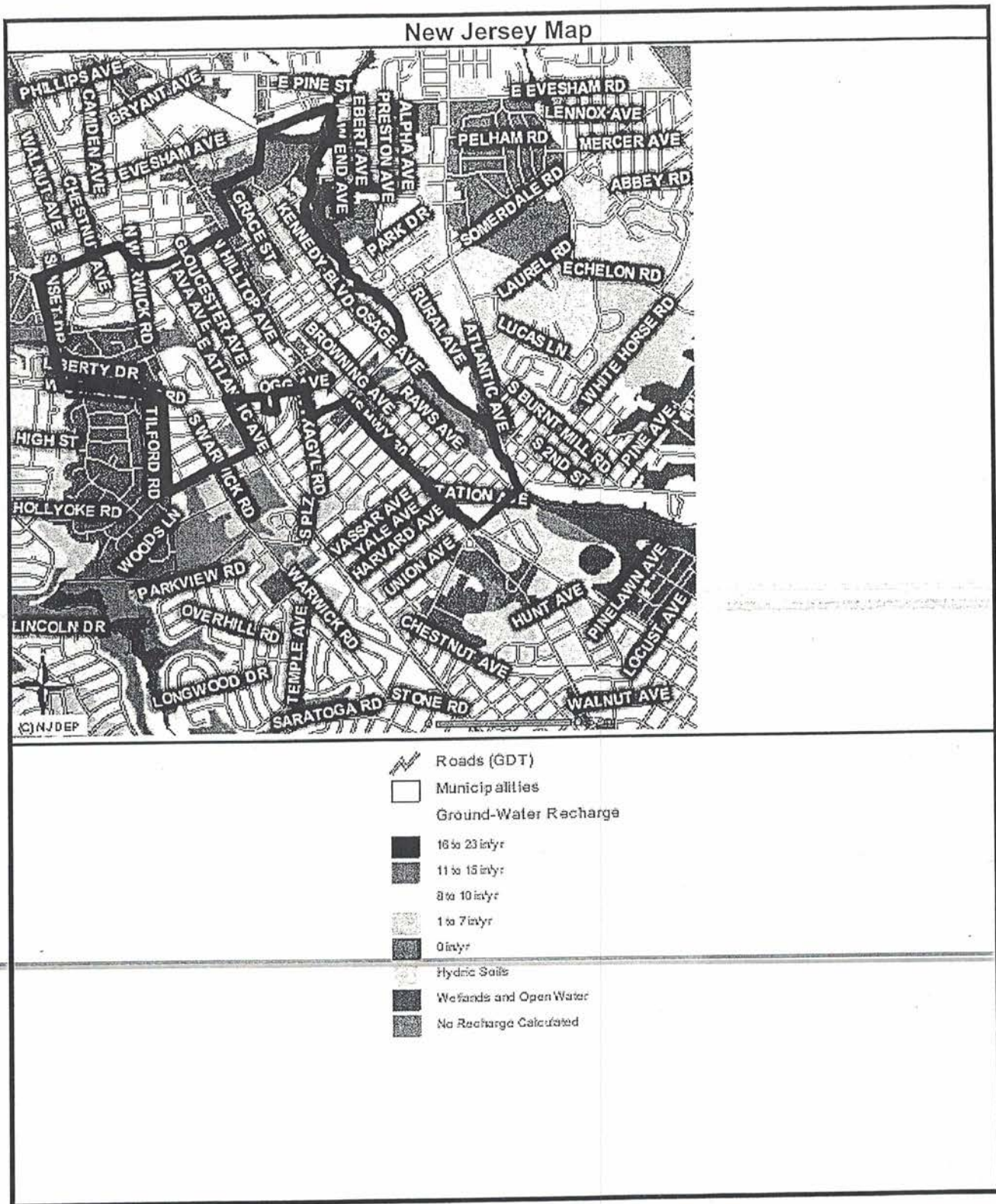
Therefore, it is believed that the N.J.D.E.P. has not developed a Total Maximum Daily Load (TMDL) for pollution for these waterways.

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, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

In addition to water quality problems, the Borough has exhibited severe water quantity problems including flooding and stream bank erosion, and diminished base flow in its waterways.

The stormwater flows to the waterways were less (i.e., less impervious area), prior to development, than presently exist in the Borough. As the imperviousness increased in the Borough, the peak and volumes of stream flows also increased. The increased amount of water resulted in stream bank erosion, which resulted in unstable areas, and degraded stream habitats. The soils within the Borough are mostly impermeable, as they are clayey (marl). The imperviousness of the Borough has somewhat decreased groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on instream habitat during the summer months. A map of the groundwater recharge areas are shown in Figure C-4. Wellhead protection areas, also required as part of the MSWMP. Figure C-5 depicts no wellhead protection areas within the Borough.

**FIGURE C-4**

GROUNDWATER RECHARGE AREAS
 Borough of Somerdale
 Camden County, New Jersey

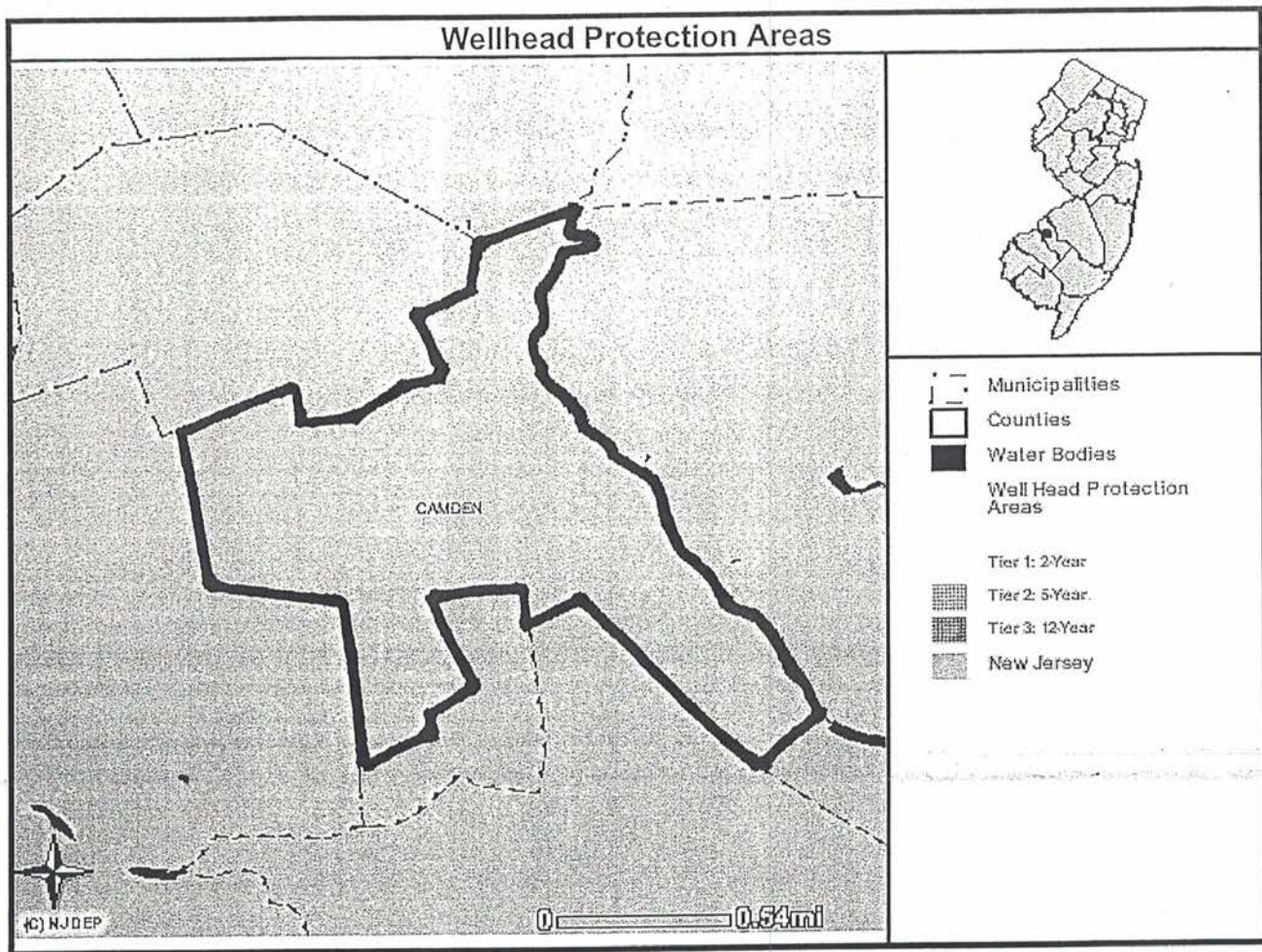


FIGURE C-5
WELLHEAD PROTECTION AREAS
Borough of Somerdale
Camden County, New Jersey

No Wellhead Protection areas exist
in the Borough

Design and Performance Standards

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

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

Plan Consistency

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

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

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

Nonstructural Stormwater Management Strategies

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

Chapter 162 of the Borough Code, entitled Land Use and Development, was reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes were made to Article XII of this Chapter, entitled "Design Standards and Requirements" to incorporate these strategies.

Section 162-128 was amended to include Buffers: Buffers requires buffer areas along all lot and street lines separating residential uses from arterial and collector streets, separating a nonresidential use from either a residential use or residential zoning district line, and along all street lines where loading and storage areas can be seen from the street. The landscape requirements for these buffer areas in the existing section do not recommend the use of native vegetation. The language of this section was amended to require the use of native vegetation, which requires less fertilization and watering than non-native species. Additionally, language was included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces. This section currently requires the preservation of natural wood tracts and limits land disturbance for new construction.

Article XXV

Section ____: Cluster Development provides for a cluster development option to preserve land for public and agricultural purposes, to prevent development on environmentally sensitive areas, and to aid in reducing the cost of providing streets, utilities and services in residential developments. This cluster option is an excellent tool for reducing impervious roads and driveways. The option allows for smaller lots with smaller front and side yard setbacks than traditional development options. It also minimizes the disturbance of large tracts of land, which is a key nonstructural stormwater management strategy. The cluster option is being amended to require that 40% of the total tract be preserved as common open space for residential area. The cluster option does require that 25 percent of the green or common area be landscaped with trees and/or shrubs. This language was amended to promote the use of native vegetation, which requires less fertilization and watering than non-native ornamental plants. Although the cluster option requires public concrete sidewalks to be installed along all streets, the option requires paths in open space to be mulched or stone to decrease the impervious area.

Section 162-75: Curbing requires that concrete curb and gutter, concrete curb, or Belgian block curb be installed along every street within and fronting on a development. This section was amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

Section 162-28: Drainage, Watercourses and Flood Hazard Areas requires that all streets be provided with inlets and pipes where the same are necessary for proper drainage. This section ~~was amended to encourage the used of natural vegetated swales in lieu of inlets and pipes.~~

Section 162-70: Driveways and Accessways describes the procedure for construction of any new driveway or accessway to any street. This section was amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

Section ____ added to note: Natural Features requires that natural features, such as trees, brooks, swamps, hilltops, and views, be preserved whenever possible, and that care be taken to preserve selected trees to enhance soil stability and landscaped treatment of the area. This section was amended to expand trees to forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

Article XXII: Nonconforming Uses, Buildings and Structures require a variance for existing single family homes proposing additions that exceed the maximum percent impervious. The homeowner must mitigate the impact of the additional impervious surfaces unless the stormwater management plan for the development provided for these increases in impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge as described in Chapter 135. A detailed description of how to develop a mitigation plan is present in the Borough Code.

Section 162-67.01 amended to include: Off-site and Off-tract Improvements describes essential off-site and off-tract improvements. Language was added to this section to require that any off-site and off-tract stormwater management and drainage improvements must conform to the "Design and Performance Standards" described in this plan and provided in Chapter 135 of the Borough Code.

Section 162-68: Off-street Parking and Loading details off-street parking and loading requirements. All parking lots with more than 10 spaces and all loading areas are required to have concrete or Belgian block curbing around the perimeter of the parking and loading areas. This section also requires that concrete or Belgian block curbing be installed around all landscaped areas within the parking lot or loading areas. This section was 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. Also, language was 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. The section allows a developer to demonstrate that fewer spaces would be required, provided area is set aside for additional spaces if necessary. This section was amended to allow pervious paving to be used in areas to provide overflow parking, vertical parking structures, smaller parking stalls, and shared parking.

Sections 162-___ amended to include: Performance Standards provide pollution source control. It prohibits materials or wastes to be deposited upon a lot in such form or manner that they can be transferred off the lot, directly or indirectly, by natural forces such as precipitation, evaporation or wind. It also requires that all materials and wastes that might create a pollutant or a hazard be enclosed in appropriate containers.

Section 162-128 amended to add: Shade Trees requires a minimum of three shade trees per lot to be planted in the front yard. The ordinance also restricts and otherwise controls the removal of mature trees. This ordinance recognizes that the preservation of mature trees and forested areas is a key strategy in the management of environmental resources, particularly watershed management, air quality, and ambient heating and cooling. These sections set out a "critical footprint area" that extends 20 feet beyond the driveway and building footprint where clearing of trees cannot occur. This complies with minimizing land disturbance, which is a nonstructural stormwater management strategy.

Section 162-59: Sidewalks describe sidewalk requirements for the Borough. Although sidewalks are not required along all streets, the Borough can require them in areas where the probable volume of pedestrian traffic, the development's location in relation to other populated areas and high vehicular traffic, pedestrian access to bus stops, schools, parks, and other public places, and the general type of improvement intended indicate the advisability of providing a pedestrian way.

Sidewalks are to be a minimum of four feet wide and constructed of concrete. Language was added to this section to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces, or use permeable paving materials where appropriate.

Section 162-_____ amended to add: Soil Erosion and Sediment Control addresses soil erosion and sediment control by referencing 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.

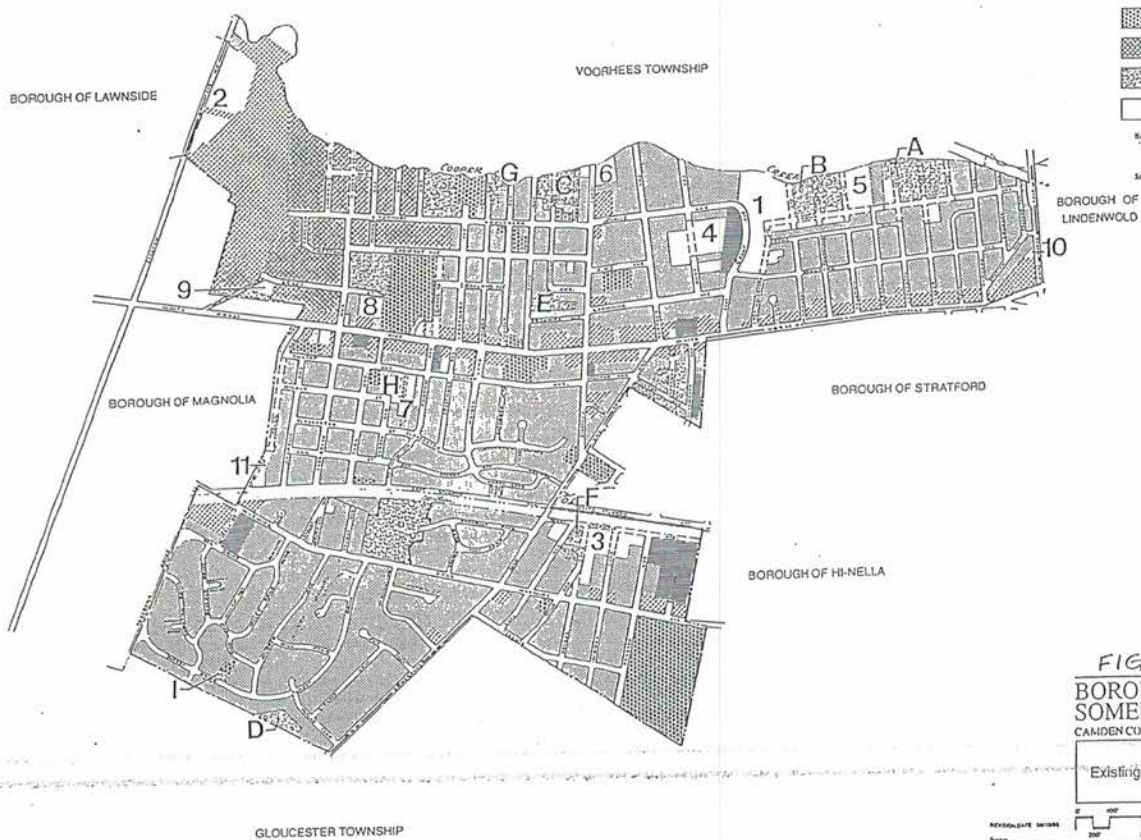
Section 162-28: Drainage addresses stormwater runoff by referencing new Chapter _____, the Borough's Surface Water Management Ordinance, which was updated to include all requirements outlined in N.J.A.C. 7:8-5. These changes were presented earlier in this document.

Section 162-94: Streets describes the requirements for streets in the Borough. The Borough has several street classifications, ranging from "Arterial," which has a minimum right-of-way of 80 feet, to "Secondary Local," which has a minimum right-of-way of 50 feet. Street paving widths are a function of the number of units served, whether a street is curbed, whether on-street parking is permitted, whether the interior streets serve lots of two acres or larger, and whether on-site topographical constraints allow design flexibility. Depending on these factors, paving width for secondary local streets has a range from 20 to 32 feet. This section was amended to encourage developers to limit on-street parking to allow for narrower paved widths. This section also required that cul-de-sacs have a minimum radius of 50 feet. Language was added to this section to reduce the minimum radius of cul-de-sac designs. Cul-de-sacs with landscaped islands have a minimum radius of 50 feet, cul-de-sacs with flush curbs, with a reinforced shoulder to accommodate larger equipment and emergency vehicles.

Several changes were made to Part of Chapter 162 of the Borough Code entitled "Zoning Standards." The Borough has 3 types of residential districts. Each district has a maximum percent impervious surface allocation of 45%, which has a minimum lot size of 7,500 square feet for detached single-family homes and 30,000 square feet for multi-family buildings. The Borough has 3 types of non-residential districts. Each of these districts has a maximum percent impervious surface allocation of 75%. Although each zone has a maximum allowable percent impervious surface, the Borough Code was amended to remind developers that satisfying the percent impervious requirements does not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures contained in Chapter _____ – Surface Water Runoff. The Borough is evaluating the maximum allowable impervious cover for each zone to determine whether a reduction in impervious cover is appropriate. The Borough is also evaluating a maximum percent of disturbance for each zone, for those areas identified as natural features in Section 162-_____. Also, if a developer is given a variance to exceed the maximum allowable percent imperviousness, the developer must mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge as described in Chapter _____. A detailed description of how to develop a mitigation plan is included in this Municipal Stormwater Management Plan.

Land Use/Build-Out Analysis

Since there is less than one square mile of vacant land, a buildout analysis is not required.



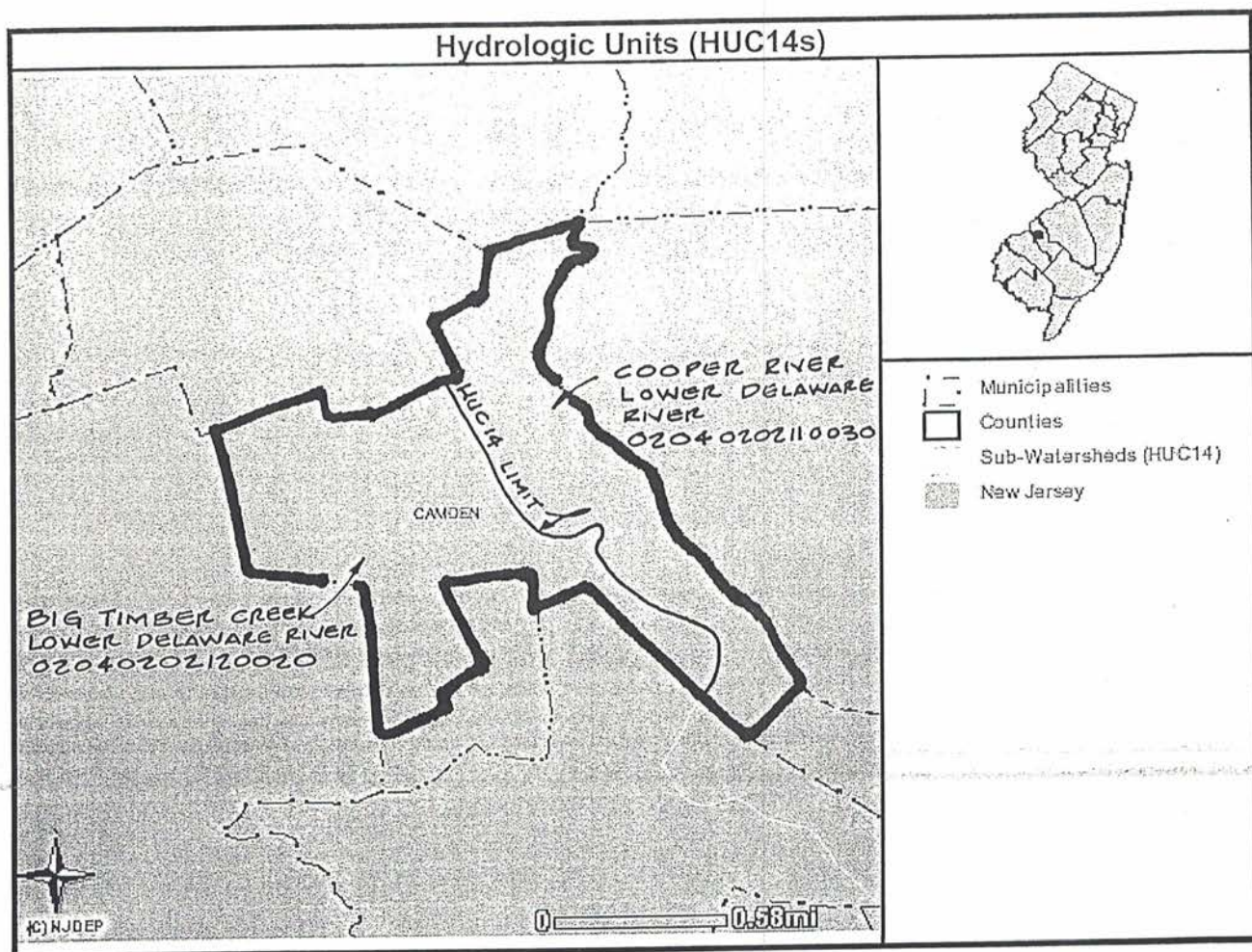


FIGURE C-7
HYDROLOGIC UNITS (HUC14s)
Borough of Somerdale
Camden County, New Jersey

Mitigation Plans

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

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 can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information on the projects can be obtained from the Borough Engineer. Listed below are specific projects that can be used to address the mitigation requirement.

Groundwater Recharge – Due to the impermeable soils that exist throughout the Borough, groundwater recharge cannot be achieved.

Water Quality

- Retrofit the existing stormwater management facility at Park Elementary School to provide the removal of 80 percent of total suspended solids from the parking lot runoff.
- Retrofit the existing parking area at the Municipal Building to provide the removal of 80 percent of total suspended solids. Due to site constraints, the retrofit BMP must be installed underground and cannot reduce the existing number of parking spaces.

Water Quantity

- Install stormwater management measures in the open space in the Park Elementary School and recreation facilities to reduce the peak flow from the upstream development on the receiving stream to the rate of flows, determined by the Borough Engineer, for the 2, 10, and 100-year storms respectively.

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

Water Quality

- Re-establish a vegetative buffer (minimum 50 foot wide) along the down gradient edge of the lands of the Kennedy Park and Public Works Complex of the banks of Cooper Creek as a goose control measure and to filter stormwater runoff from the high goose traffic areas.
- Provide goose management measures, including public education at the recreation facilities.

Legend
 Wetlands
 Floodplain

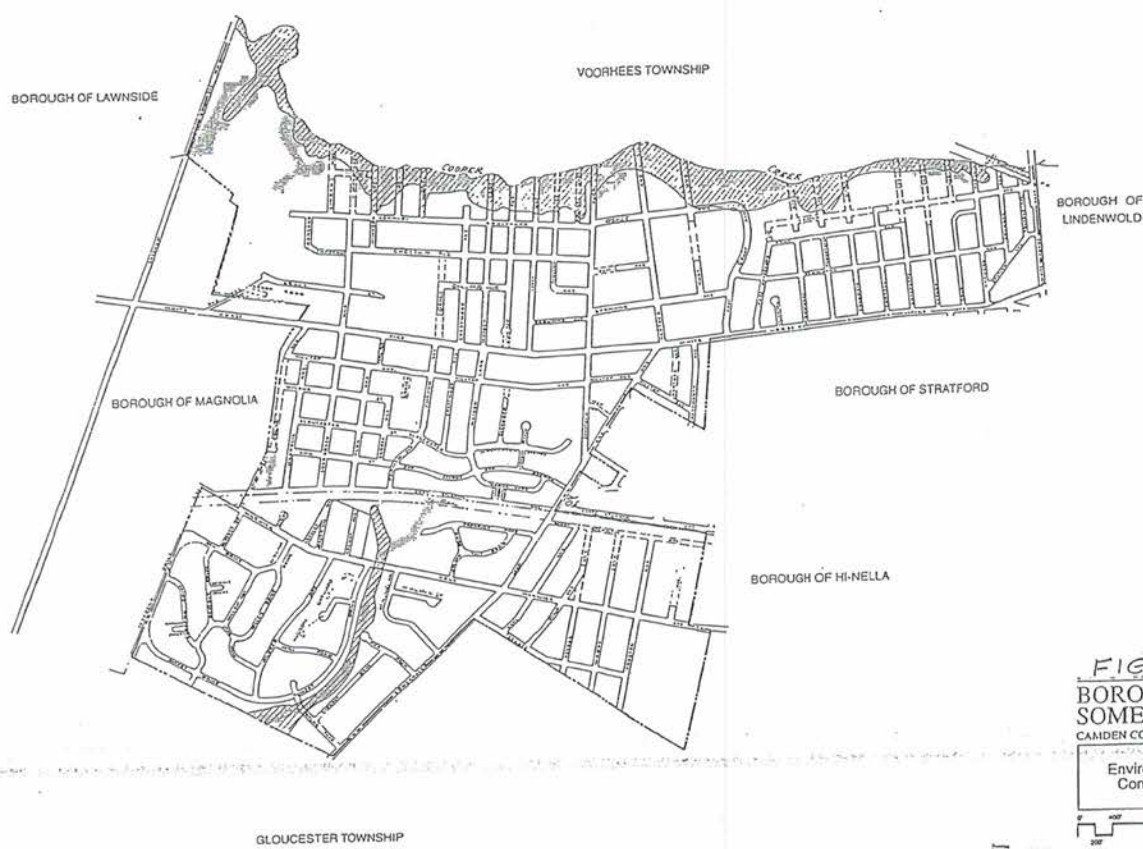


FIGURE C-9a.
BOROUGH OF SOMERDALE
 CAMDEN COUNTY, NEW JERSEY

Environmental Constraints

2

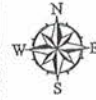
DATE: May 12, 1998
 SCALE: 1" = 400'

THE WALTZMAN PLANNING GROUP
 22 Euclid Street • Woodbury, NJ 08968 • 609 853-2400

FIGURE C-9b

Environmental Constraints Map
Somerdale Borough
Camden County, New Jersey

March 2005^D



Legend

- Municipal Boundary
- Wetlands

