

# **Watershed Based Municipal Stormwater Management Plan**

## **Franklin Township**

*prepared for*

**Gloucester County Improvement Authority**

*on behalf of*

**Gloucester County Board of Chosen Freeholders  
and  
Franklin Township**

**February 2006**

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# Acknowledgements

## ***Gloucester County Freeholders***

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Joseph A. Brigandi, Jr.  
Frank J. DiMarco  
William (Bill) Krebs  
Helene M. Reed  
Warren S. Wallace

## ***Gloucester County Improvement Authority Board Members***

Joseph A. Brigandi, Sr., Chairman  
Charles Fentress, Vice Chairman  
Sam Ferraino, Jr., Secretary/Treasurer  
Chad M. Bruner, Commissioner  
Jeanette Moyer, Commissioner

## ***Gloucester County Planning Division***

Charles Romick, Director

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David Shields, Executive Director  
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## ***Parker McCay***

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Suzanne McCarthy  
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## ***Gloucester and Camden County Soil Conservation Districts***

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## ***Rowan University***

Joseph Orlins, PhD., PE, D WRE

## ***Franklin Township***

## ***Franklin Township Planning Board***

## ***Franklin Township Stormwater Program Coordinator***

Tier A Municipal Stormwater Regulation Program

# Stormwater Pollution Prevention Team Members

Number of team members may vary.

Completed by: **Charles Bosco**  
Title: **Stormwater Program Coordinator**  
Date: **June 12, 2017**  
Municipality: **Franklin Township**  
County: **Gloucester**  
NJPDES #: **NJG 0151025**  
PI ID #: **197781**

Stormwater Program Coordinator: **Charles Bosco**

Title: **Franklin Township Public Works Director**

Office Phone #: **(856) 694-3155**

Emergency Phone #: **(856)535-6379**

Public Notice Coordinator: **Barbara Freijomil**

Title: **Franklin Township Municipal Clerk**

Office Phone #: **(856) 694-1234 ext. 114**

Emergency Phone #: **(856) 694-1234 ext. 114**

Post-Construction Stormwater Management Coordinator: **Robert Burducci**

Title: **Franklin Township Code Enforcement Officer**

Office Phone #: **(856) 694-1234 ext. 144**

Emergency Phone #: **(856) 694-1234 ext. 144**

Local Public Education Coordinator: **Barbara Freijomil**

Title: **Franklin Township Municipal Clerk**

Office Phone #: **(856) 694-1234 ext. 114**

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Ordinance Coordinator: **Robert Berducci**

Title: **Franklin Township Code Enforcement Officer**

Office Phone #: **(856) 694-1234 ext. 144**

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Public Works Coordinator: **Charles Bosco**

Title: **Franklin Township Public Works Director**

Office Phone #: **(856) 694-3155**

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Employee Training Coordinator: **Charles Bosco**

Title: **Franklin Township Stormwater Program Coordinator**

Office Phone #: **(856) 694-3155**

Emergency Phone #: **(856)535-6379**

Other: **CME Engineering Associates**

Title: **Township Engineer**

Office Phone #: **(732)462-7400**

Emergency Phone #: **(732)887-9528**

## SPPP Form 2 - Public Notice

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG0151025

PI ID #: 197781

Team Member/Title: Barbara Freijomil, Municipal Clerk

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update: Feb 1, 2015

Briefly outline the principal ways in which you comply with applicable State and local public notice requirements when providing for public participation in the development and implementation of your stormwater program.

For meetings where public notice is required under the Open Public Meetings Act ("Sunshine Law," N.J.S.A. 10:4-6 et seq.), Franklin Township provides public notice in a manner that complies with the requirements of that Act. Also, in regard to the passage of ordinances, Franklin Township provides public notice in a manner that complies with the requirements of N.J.S.A. 40:49-1 et seq. In addition, for municipal actions (e.g., adoption of the municipal stormwater management plan) subject to public notice requirements in the Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.), Franklin Township complies with those requirements.

# Stormwater Pollution Prevention Plan

Tier A Municipal Stormwater General Permit

Municipality: **Franklin Township**

County: «County»

NJPDES # : **NJG 0151025**

PI ID #:197781

Team Member: **Charles Bosco, Stormwater Program Coordinator**

Date: **July 1, 2005**

Effective Date of Permit Authorization (EDPA): **April 1, 2004**

Signature \_\_\_\_\_ Date **July 1, 2005**

Print or Type Name and Title **Charles Bosco, Stormwater Program Coordinator**



# SPPP Form 3 – New Development and Redevelopment Program

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **CME Associates**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

Describe in general terms your post-construction stormwater management in new development and redevelopment program (post-construction program), and how it complies with the Tier A Permit minimum standard. This description must address compliance with the Residential Site Improvement Standards for stormwater management; ensuring adequate long-term operation and maintenance of BMPs (including BMPs on property that you own or operate); design of storm drain inlets (including inlets that you install); and preparation, adoption, approval, and implementation of a municipal stormwater management plan and municipal stormwater control ordinance(s). Attach additional pages as necessary. Some additional specific information (mainly about that plan and ordinance(s)) will be provided in your annual reports.

To control stormwater from new development and redevelopment projects throughout Franklin Township (including projects we operate) we will do the following:

We are already ensuring that all new residential development and redevelopment projects that are subject to the Residential Site Improvement Standards for stormwater management (including the NJDEP Stormwater Management rules, N.J.A.C. 7:8, referenced in those standards) are in compliance with those standards. Our planning and zoning boards ensure such compliance before issuing preliminary or final subdivision or site plan approvals under the Municipal Land Use Law.

Since the EDPA, Franklin Township has not constructed any new development or redevelopment projects on Township property. If we decide to construct such a project before our municipal stormwater control ordinance takes effect, we will ensure adequate long-term operation and maintenance of BMPs for that project by requiring a project maintenance plan similar to the maintenance plan described in our draft of that ordinance, and by requiring and funding the implementation of that plan. We will also require any storm drain inlets that we install to comply with the design standard in Attachment C of our permit. Once that ordinance takes effect, we will ensure such operation and maintenance for any new development or redevelopment projects on our property by complying with the maintenance requirements in that ordinance. In addition, any storm drain inlets we install for such projects will comply with that ordinance's standard for such inlets.

Gloucester County, through the Gloucester County Improvement Authority, is undertaking a countywide stormwater management program, to assist the municipalities in the county with their stormwater permit responsibilities. As part of that countywide program, Gloucester County is preparing the Franklin Township Municipal Stormwater Management Plan.

Our planning board and municipal attorney will review the Municipal Stormwater Management Plan, and the Model Stormwater Control Ordinance in the NJ Stormwater BMP Manual, and will prepare a municipal stormwater control ordinance similar to that model. We will also meet with county planning agency staff to discuss the plan and the ordinance. The plan will be adopted by our planning board and the ordinance will be adopted by our governing body on or before April 1, 2006, and will then be submitted to the county planning agency for approval.

Once approved, the ordinance, which will be administered by our planning and zoning boards and code enforcement officer, will control stormwater from non-residential development and redevelopment projects. Where it is necessary to implement the municipal stormwater management plan, the approved ordinance will also control aspects of residential development and redevelopment projects that are not subject to the Residential Site Improvement Standards.

For any BMP that is installed in order to comply with the requirements of our post-construction program, Franklin Township will ensure adequate long-term operation as well as preventative and corrective maintenance (including replacement) of BMPs. For BMPs on private property that we do not own or operate, Franklin Township intends to do this by adopting and enforcing a provision in the municipal stormwater control ordinance that requires the private entity to perform the operation and maintenance, with penalties if the private entity does not comply. If, for example, the private entity does not perform the required maintenance, the Township can perform the maintenance and charge the private entity.

Franklin Township will also enforce, through the municipal stormwater control ordinance, compliance with the design standard in Attachment C of our permit to control passage of solid and floatable materials through storm drain inlets. Franklin Township expects that for most projects, such compliance will be achieved either by installation of the NJDOT bicycle safe grate and (if needed) a curb opening with a clear space no bigger than two inches across the smallest dimension, or (for flows not passing through compliant storm drain inlets) by conveying flows through a trash rack as described in the "Alternative Device Exemptions."

# SPPP Form 4 - Local Public Education Program

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: Barbara Freijomil, Municipal Clerk

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update: 2/1/15

## Local Public Education Program

Describe your Local Public Education Program. Be specific on how you will distribute your educational information, and how you will conduct your annual event. Attach additional pages with the date(s) of your annual mailing and the date and location of your annual event.

Gloucester County, through the Gloucester County Improvement Authority, is undertaking a countywide stormwater management program, to assist the municipalities in the county with their stormwater permit responsibilities. As part of that countywide program, Gloucester County is undertaking portions of the activities required for the Local Public Education Program. Specifically, the County will be:

1. distributing the NJDEP educational brochure annually; and
2. conducting the annual education event in conjunction with Franklin Township.

The County will mail the DEP brochure to our residents and businesses in September of each year. Extra copies will be available at the county library and at our municipal building.

The annual event will be held each year on the first Saturday after Labor Day in coordination with our Community Day celebration. The County will provide a display booth with copies of the NJDEP educational brochure, other NJDEP supplemental education brochures and information, and appropriate materials related to the BMPs required under our NJPDES Stormwater Permit. The booth will be staffed by a county employee with an understanding of municipal stormwater issues and appropriate representatives of Franklin Township, who will be present to answer questions regarding local stormwater issues. In addition, we will invite our Environmental Commission to set up their own booths during this event.

## SPPP Form 5 – Storm Drain Inlet Labeling

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update: 2/1/15

### Storm Drain Inlet Labeling

Describe your storm drain inlet labeling program, including your labeling schedule, the details of your long-term maintenance plan, and plans on coordinating with watershed groups or other volunteer organizations.

Under the NJPDES Stormwater Permit, storm drain inlet labeling is required in certain areas of the municipality:

1. along municipal streets with sidewalks; and
2. within plazas, parking areas and maintenance yards.

Gloucester County, through the Gloucester County Improvement Authority, is undertaking a countywide stormwater management program, to assist the municipalities in the county with their stormwater permit responsibilities. As part of that countywide program, Gloucester County is working with Franklin Township and interested volunteer groups to develop a program for inlet labeling. The County is working with our Municipal Stormwater Program Coordinator and public works officials to identify the areas within Franklin Township where labeling is required.

The County will purchase the labels and assist with organizing the labeling in Franklin Township. Our Public Works Department will be doing the labeling, using plastic labels that will be applied with adhesive. All storm drain inlets that are along municipal streets with sidewalks, and all storm drain inlets within plazas, parking areas, or maintenance yards that are operated by Franklin Township, will be labeled.

The County will also provide door hangers and coordinate and organize volunteer groups for distribution of the hangers. The County plans on coordinating with our local girl scout and boy scout groups and the high school environmental club.

The attached map divides Franklin Township into two sectors. Labeling of Sector A will be completed by April 2007, and Sector B will be completed by April 2009.

During our annual catch basin cleaning program, we will be checking these labels to ensure that they are still visible, and if they are not, the labels will be replaced as soon as practicable.

## SPPP Form 6 – MS4 Outfall Pipe Mapping

Municipality: Franklin Township

County: Gloucester

NJPDES #: NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

Explain how you will prepare your map (include its type and scale, and the schedule for the mapping process). Who will prepare your map (e.g., municipal employees, a consultant, etc.)?

Gloucester County, through the Gloucester County Improvement Authority, is undertaking a countywide stormwater management program, to assist the municipalities in the county with their stormwater permit responsibilities. As part of that countywide program, Gloucester County is preparing the Stormwater outfall mapping required as part of the NJPDES Stormwater Permit.

Regional stormwater management planning efforts currently being conducted by the SCS and Rowan University are mapping stormwater outfalls in portions of the upper Maurice River, upper Mantua Creek and upper Raccoon Creek watersheds. The outfall information is being obtained using a datalogger and GPS, and will be available for use in the municipal stormwater program. In addition, the DVRPC developed a protocol for outfall data collection and mapping that can be used throughout the tri-county region.

The County, in consultation with Franklin Township's Stormwater Program Coordinator and Department of Public Works personnel, will obtain the stormwater outfall data for Franklin Township and will utilize the County GIS and recent (2002) aerial photographic coverage of the county to prepare the required outfall maps. A field crew will log the outfalls using a datalogger with GPS, following the DVRPC outfall logging protocol. The data will generally include: surface water body; outfall location, size, type, structural condition, and headwall arrangements; stream conditions (e.g. bank scour); and other hydraulic information (i.e. dry weather flow conditions including flow rates, staining, odors, colors, turbidity, floatable material, temperature, deposits, vegetation, and algae). Digital photograph(s) will also be acquired and logged.

Once all outfall pipe locations are identified, map(s) will be developed displaying the outfall pipe locations, with alphanumeric identifiers, at a scale of 1 inch = 100 feet. All water bodies receiving outfall pipe discharges will be identified on the map(s). The attached map divides Franklin Township into two sectors. Sector A will be mapped by April 2007, and Sector B will be mapped by April 2009.

The outfall mapping GIS will also be used for implementation of the illicit connection elimination program and for the outfall pipe scour detection, remediation and maintenance program.

# SPPP Form 7 – Illicit Connection Elimination Program

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

Describe your Illicit Connection Elimination Program, and explain how you plan on responding to complaints and/or reports of illicit connections (e.g., hotlines, etc.). Attach additional pages as necessary.

Gloucester County, through the Gloucester County Improvement Authority, is undertaking a countywide stormwater management program, to assist the municipalities in the county with their stormwater permit responsibilities. As part of that countywide program, Gloucester County is preparing the stormwater outfall mapping required under the NJPDES Stormwater Permit. During the course of mapping the outfall pipe locations, the County will conduct an initial physical inspection of all of Franklin Township's outfall pipes.

The County will use the DEP Illicit Connection Inspection Report Form to conduct these inspections, and these forms will be kept with Franklin Township's SPPP records. Field personnel will be trained to calibrate, maintain, and take field samples. If dry weather flow is evident during field logging, the field crew will test outfalls for surfactants; if positive, the field crew will test for ammonia and potassium to determine if the source is potentially sanitary sewage. If surfactants are negative, the field crew will test for fluoride to determine if the source is potentially potable water.

The County's field crew will investigate non-stormwater discharges, investigating potential sanitary sewage discharges first, notifying the NJDEP of immediate threats, and proceeding upstream in the system, documenting the results. If possible, the field crew will identify the responsible party and provide notice to Franklin Township for issuance of a citation requiring elimination of the illicit connection, if the illicit connection is within Franklin Township.

If, after the appropriate amount of investigation, the County is unable to locate the source of the illicit connection, a Closeout Investigation Form will be submitted with Franklin Township's Annual Inspection and Recertification. If an illicit connection is found to originate from within another public entity, Franklin Township will report the illicit connection to the Department.

Franklin Township has a hotline ((856) 694-3155) that is currently used for reporting spills and illegal dumping. This hotline ((856) 694-3155) is also available for reporting illicit connections.

# SPPP Form 8 – Illicit Connection Records

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

Prior to May 2, 2006

*Note: Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? **Inspections will begin between Apr 05 and Mar 06**

Number of outfalls found to have a dry weather flow?

Number of outfalls found to have an illicit connection?

How many illicit connections were eliminated?

Of the illicit connections found, how many remain?

May 2, 2006 – May 1, 2007

*Note: Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year?

Number of outfalls found to have a dry weather flow?

Number of outfalls found to have an illicit connection?

How many illicit connections were eliminated?

Of the illicit connections found, how many remain?

May 2, 2007 – May 1, 2008

*Note: Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year?

Number of outfalls found to have a dry weather flow?

Number of outfalls found to have an illicit connection?

How many illicit connections were eliminated?

Of the illicit connections found, how many remain?

May 2, 2008 – May 1, 2009

*Note: Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year?

Number of outfalls found to have a dry weather flow?

Number of outfalls found to have an illicit connection?

How many illicit connections were eliminated?

Of the illicit connections found, how many remain?

Of the illicit connections found, how many remain?

## SPPP Form 9 – Yard Waste Ordinance/Collection Program

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

Please describe your yard waste ordinance/collection program. Be sure to include the collection schedule and how you will notify the residents and businesses of this schedule. Attach additional pages as necessary.

Franklin Township has considered the two options available, and has decided to developed a yard waste collection and disposal program instead of just adopting and enforcing an ordinance that prohibits placing non-containerized yard wastes in the street.

We will be conducting collections of leaves and brush on a weekly basis during the months of October, November, and December, plus April and May in the spring. During the remainder of the year, we may hold additional yard waste collections, but no schedule has been determined for these. Franklin Township does not collect grass at any time. During the months when we are having collections, we will post our collection schedule and our ordinance requirements in our yearly calendar, which is mailed to all residents and businesses the beginning of each year, on our municipal web site, and on the bulletin board in our municipal building.

Attached is a copy of Franklin Township's Calendar containing the Guidelines for Trash Collection and Recycling Information which is mailed to every Franklin Township resident in January to notify the residents of collection schedules.

Franklin Township will also be adopting and enforcing a yard waste ordinance (see SPPP Form 10) that will prohibit all yard wastes from being placed at the curb or along the street more than seven days prior to our scheduled collections, unless they are bagged or otherwise containerized. The ordinance will also prohibit the placing of yard waste closer than 10 feet from any storm sewer inlet along the street, unless they are bagged or otherwise containerized.

## SPPP Form 10 - Ordinances

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: Robert Berducci, Code Enforcement Officer

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

For each ordinance, give the date of adoption. If not yet adopted, explain the development status:

Pet Waste: Pending attorney review of the NJDEP model ordinance

Are information sheets regarding pet waste distributed with pet licenses? Y (  ) N (  )

Litter: Pending attorney review of the NJDEP model ordinance

Improper Waste Disposal: Pending attorney review of the NJDEP model ordinance

Wildlife Feeding: Pending attorney review of the NJDEP model ordinance

Yard Waste: Pending attorney review of the NJDEP model ordinance

Illicit Connections: Pending attorney review of the NJDEP model ordinance

How will these ordinances be enforced?

Our code enforcement officers and local police officers will enforce these ordinances. If someone is found to be in violation of an ordinance, they will be issued a written warning for first time offenses, and penalties will be issued for subsequent offenses.

# SPPP Form 11 – Storm Drain Inlet Retrofitting

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

What type of storm drain inlet design will generally be used for retrofitting?

For most projects Franklin Township will use the NJDOT bicycle safe grate style and (if needed) a curb opening with a clear space no bigger than two inches across the smallest dimension.

| Repaving, repairing, reconstruction or alteration project name | Projected start date | Start date | Date of completion | # of storm drain inlets | # of storm drains w/ hydraulic exemptions |
|--|----------------------|------------|--------------------|-------------------------|---|
|  |                      |            |                    |                         |   |
|  |                      |            |                    |                         |   |
|  |                      |            |                    |                         |   |
|  |                      |            |                    |                         |   |
|  |                      |            |                    |                         |   |
|  |                      |            |                    |                         |   |

Are you claiming any alternative device exemptions or historic place exemptions for any of the above projects? Please explain:

Franklin Township does not operate any alternative devices within the municipality. At this time we do not plan on installing any such devices for repaving, repairing, reconstruction or alteration projects. We also do not plan on claiming any historic place exemptions.

# SPPP Form 12 – Street Sweeping and Road Erosion Control Maintenance

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

## Street Sweeping

Please describe the street sweeping schedule that you will maintain.

(NOTE: Attach a street sweeping log containing the following information: date and area swept, no. of miles swept and the total amount of materials collected.)

Franklin Township has evaluated all of its streets, and determined that there are no areas which need to be swept under the NJPDES Stormwater Permit criteria.

Because no street sweeping is required under the permit, there is no log attached.

## Road Erosion Control Maintenance

Describe your Road Erosion Control Maintenance Program, including inspection schedules. A list of all sites of roadside erosion and the repair technique(s) you will be using for each site should be attached to this form.

(NOTE: Attach a road erosion control maintenance log containing the following information: location, repairs, date)

Franklin Township will use the Public Works Department to monitor all its roads and streets for erosion problems during normal patrols. All identified road erosion problems will be reported to the Public Works Director. Identified areas of erosion will be prioritized for repairs. Maintenance personnel will then be assigned to the areas of concern, and the areas identified to have road erosion problems will be repaired in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. Maintenance personnel will maintain an inspection log, and the Public Works Director will maintain a list of all repairs and the dates completed. The status of the Road Erosion Control Maintenance Program will be included in the Annual Report and Recertification.

# SPPP Form 13 – Stormwater Facility Maintenance

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID # : 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

Please describe your annual catch basin cleaning program and schedule. Attach a map/diagram or additional pages as necessary.

Franklin Township will implement an annual catch basin cleaning program to maintain catch basin function and efficiency. All catch basins will be inspected once each year. If, at the time of inspection, no sediment, trash or debris is observed in the catch basin, then that catch basin will not be cleaned. All catch basins will be inspected yearly, even if they were found to be "clean" the previous year. At the time of cleaning, the catch basins will also be inspected for proper function. Maintenance will be scheduled for those catch basins that are in disrepair. The annual catch basin cleaning program will begin in April of 2005.

Please describe your stormwater facility maintenance program for cleaning and maintenance of all stormwater facilities operated by the municipality. Attach additional pages as necessary.

(NOTE: Attach a maintenance log containing information on any repairs/maintenance performed on stormwater facilities to ensure their proper function and operation.)

Franklin Township will implement a stormwater facility maintenance program to ensure that all stormwater facilities operated by the Township function properly. Franklin Township operates the following:

- catch basins
- storm drains
- infiltration basins

These stormwater facilities will be inspected annually to insure that they are functioning properly. In high risk areas, preventative maintenance will be performed on all stormwater facilities to ensure that they do not begin to fail.

# SPPP Form 14 - Outfall Pipe Stream Scouring Remediation

Municipality: Franklin Township

County: Gloucester

NJPDES #: NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

Describe your stormwater outfall pipe scouring detection, remediation and maintenance program to detect and control active, localized stream and stream bank scouring. Attach additional pages as necessary.

(NOTE: Attach a prioritized list of sites observed to have outfall pipe stream and stream bank scouring, date of anticipated repair, method of repair and date of completion.)

Gloucester County, through the Gloucester County Improvement Authority, is undertaking a countywide stormwater management program, to assist the municipalities in the county with their stormwater permit responsibilities. As part of that countywide program, Gloucester County is mapping the MS4 outfall pipes in Franklin Township (see SPPP Form 6). At the same time, the County will be inspecting the outfalls as part of our illicit connection elimination program (see SPPP Form 7).

Concurrently with the outfall mapping and illicit connection inspections, the County will be checking all of our outfall pipes for signs of scouring. The data that will be collected under the DVRPC outfall logging protocol will include information on bank scour, which will be reported to our Stormwater Program Coordinator. Sites with stream scour will be placed on a prioritized list and repairs will be made in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. In addition, repairs that do not need NJDEP permits for those repairs may be done first.

We will follow each repair up with an annual inspection of the site to ensure that scouring has not resumed. Attached is a list of all sites with outfall pipe stream scouring, the date we plan on repairing the scouring, and the method of repair we will use. When repairs are completed we will note the date of that repair on this form.

# SPPP Form 15 – De-icing Material and Sand Storage

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

## De-icing Material and Sand Storage

Describe how you currently store your municipality's de-icing materials, and describe your inspection schedule for the storage area. If your current storage practices do not meet the de-icing material storage SBR describe your construction schedule and your seasonal tarping interim measures. If you plan on sharing a storage structure, please include its location, as well as a complete list of all concerned public entities. If you store sand outdoors, describe how it meets the minimum standard.

Franklin Township currently stores its de-icing salt & sand highway mix in a three-sided pole barn located at 234 Broad Street in Franklin Township. Franklin Township will implement the interim seasonal tarping procedures at this site until a permanent structure is built. From October 15th through April 30th we will inspect each tarp weekly to ensure that it is covering the salt pile. In addition, at the completion of loading and unloading activities we will inspect for spilled salt.

Gloucester County, through the Gloucester County Improvement Authority, is undertaking a countywide stormwater management program, to assist the municipalities in the county with their stormwater permit responsibilities. As part of that countywide program, Gloucester County is undertaking a study to determine the most feasible locations for regional de-icing materials storage facilities. Once those studies have been completed, the County will construct permanent de-icing materials storage facilities for the shared use of the municipalities in the County. These facilities will be completed and available for the use of Franklin Township by April 1, 2007.

# SPPP Form 16 – Standard Operating Procedures

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

| BMP  | Date SOP went into effect  | Describe your inspection schedule  |
|--|----------------------------|--|
| <p><b>Fueling Operations</b><br/>(including the required practices listed in Attachment D of the permit)</p>   | <p><u>July 1, 2005</u></p> | <p>We have one (1) fueling location within our municipal maintenance yards located at 234 Broad Street in Franklin Township which will be inspected once a month.</p> <p>We will also perform visual inspections before discharging stormwater that has accumulated in the secondary containment area of all aboveground fuel storage tanks.</p> |
| <p><b>Vehicle Maintenance</b><br/>(including the required practices listed in Attachment D of the permit)</p>  | <p><u>July 1, 2005</u></p> | <p>Monthly inspections will be held to ensure that the SOP is being met.</p>   |
| <p><b>Good Housekeeping Practices</b><br/>(including the required practices listed in Attachment D of the permit)</p> <p>Attach inventory list required by Attachment D of the permit.</p> | <p><u>July 1, 2005</u></p> | <p>Monthly inspections of all municipal maintenance yards and ancillary operations will be held.</p>   |

## Franklin Township DPW Outside Inventory

|   |                               |
|---|-------------------------------|
| 1 | 550 gallon waste oil tank     |
| 1 | 1,000 gallon waste oil tank   |
| 1 | 5,200 gallon diesel fuel tank |
| 1 | 2,000 gallon gasoline tank    |
| 7 | 31 cubic yard trash trucks    |
| 6 | five cubic yard dump trucks   |
| 4 | three cubic yard dump trucks  |
| 2 | stake body trucks             |
| 2 | service utility trucks        |
| 3 | ¾ ton pick-ups                |
| 1 | jeep cherokee                 |
| 2 | roadside mowing tractors      |
| 1 | 621 case loader               |
| 2 | backhoe tractors              |
| 1 | brush bandit chipper          |
| 1 | Haybuster tub grinder         |
| 2 | American roads leaf vac's     |
| 1 | Gallion road grader           |
| 1 | Kumotsu Dozer                 |
| 4 | low-bed equipment trailers    |
| 1 | enclosed equipment trailer    |

## SPPP Form 17 – Employee Training

Municipality: Franklin Township

County: Gloucester

NJPDES # : NJG 0151025

PI ID #: 197781

Team Member/Title: **Charles Bosco, Stormwater Program Coordinator**

Effective Date of Permit Authorization (EDPA): April 1, 2004

Date of Completion: July 1, 2005 Date of most recent update:

Describe your employee training program. For each required topic, list the employees that will receive training on that topic, and the date the training will be held. Attach additional pages as necessary.

Gloucester County, through the Gloucester County Improvement Authority, is undertaking a countywide stormwater management program, to assist the municipalities in the county with their stormwater permit responsibilities. As part of that countywide program, Gloucester County will be providing annual employee training for Tier A municipalities throughout the County.

The training programs will include:

- Waste disposal
- Yard waste
- Illicit connection elimination
- Stormwater facility maintenance
- Road erosion control
- Maintenance yard operations
- Construction activity
- Post construction stormwater management in new development

The training programs will be conducted at various locations and times throughout the County on an annual basis. Dates for the training program are yet to be determined.





State of New Jersey

THE PINELANDS COMMISSION

PO Box 7

NEW LISBON NJ 08064

(609) 894-7300

August 16, 2007

JON S. CORZINE  
Governor

JOHN C. STOKES  
Executive Director

William H. Fleming, Jr.  
Churchill Consulting Engineers  
344 North Route 73  
Suite A  
Berlin, NJ 08009

Dear Mr. Fleming:

I am writing in response to your August 10, 2007 letter to Christine Graziano of our staff concerning Franklin Township's Municipal Stormwater Management Plan. We appreciate your providing the Commission with a revised version of the Stormwater Management Plan.

Our review indicates that all of the revisions we previously requested to the Stormwater Plan have now been incorporated, with one exception. Figure 7, which is described on page 4-1 of the Stormwater Plan as reflective of existing zoning, does not accurately depict the zoning plan currently in pace for the Pinelands Area portion of Franklin Township. Rather, Figure 7 depicts a zoning plan which was recommended in the Township's 2004 Master Plan but recently rescinded by the Planning Board. Please ensure that an appropriately revised version of Figure 7 is inserted into the Stormwater Plan upon adoption. In the meantime, if you would keep us informed as to the Township's anticipated schedule for adopting the revised Stormwater Plan, we would greatly appreciate it.

Please feel free to call me if you have any questions or concerns.

Sincerely,

Susan R. Grogan, P.P., AICP  
Chief Planner

/CFR

c: Patricia Knobloch, Community Development Director, Franklin Township

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CHURCHILL, P.C.



<http://www.nj.gov/pinelands/>  
E-mail: [info@njpines.state.nj.us](mailto:info@njpines.state.nj.us)

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## Section 1. Introduction

All New Jersey municipalities were required in early 2004 to obtain a NJPDES Municipal Stormwater General Permit for control of their stormwater discharges. The Gloucester County Board of Chosen Freeholders, through the Gloucester County Improvement Authority (GCIA), is committed to working with all of the municipalities in Gloucester County to cost-effectively accomplish the new stormwater management permit program's goals.

To that end, the GCIA has undertaken watershed-based municipal stormwater management planning throughout the County, and has prepared a Watershed Based Municipal Stormwater Management Plan (MSWMP) for Franklin Township that includes both municipal and watershed stormwater management information and evaluations. The location of Franklin Township, in relationship to the eight major watersheds in Gloucester County, is shown on Figure 1.

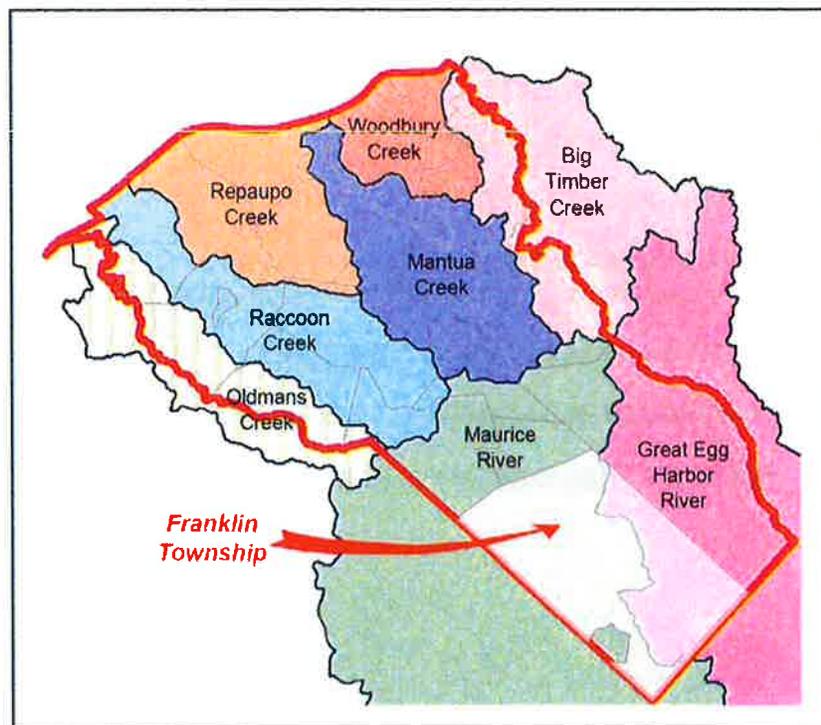
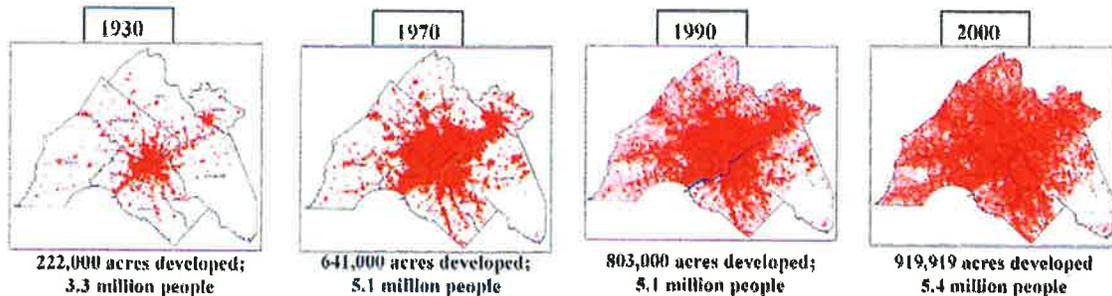


Figure 1. Franklin Township and Gloucester County Watersheds

The NJDEP's new Stormwater Management Rules in N.J.A.C. 7:8 have been developed to address the adverse impacts that unmanaged land development can have on groundwater recharge and stormwater runoff quality and quantity. Figure 2 shows the expansion of development within the Delaware Valley during the 70 year period from

1930 through 2000. Along with this development has come a corresponding increase in stormwater runoff, and increased impacts associated with non-point source pollution.



Source: DVRPC

**Figure 2. Delaware Valley Development Patterns (1930 – 2000)**

The Franklin Township MSWMP was prepared as part of Gloucester County's Stormwater Management Program. The Sample Municipal Stormwater Management Plan included in Appendix C of the New Jersey Stormwater Best Management Practices Manual, dated February 2004, was utilized as a template for preparation of the plan.

The MSWMP provides strategies for Franklin Township to follow in addressing stormwater management. The plan is required by N.J.A.C. 7:14A-25, the Municipal Stormwater Regulations, and contains the elements required by N.J.A.C. 7:8, the Stormwater Management Rules.

The MSWMP addresses groundwater recharge and stormwater quantity and quality, by incorporating the stormwater design and performance standards for new major development (defined as projects that disturb one or more acres of land or increase the amount of impervious surface by one-quarter acre or more). These standards are intended to minimize the adverse impact of stormwater runoff on water quality, and to address water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies.

The MSWMP also includes:

- Long-term operation and maintenance measures for stormwater facilities associated with new major development projects.
- A "build-out" analysis that is based upon existing zoning and the land available for development.
- Changes that should be made to existing ordinances, the Master Plan, and other municipal land use planning documents, in order to allow various low impact development techniques.
- Mitigation strategies for variances or exemptions from the design and performance standards, including the implementation of specific mitigation projects to offset the effects of such variances or exemptions.

## Section 2. Goals

The Franklin Township MSWMP goals are:

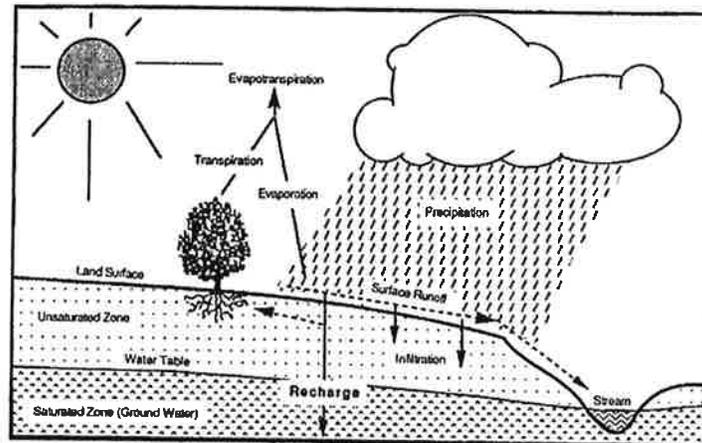
1. The reduction of flood damage, including damage to life and property.
2. The minimization, to the extent practical, of increases in stormwater runoff from new development.
3. The reduction of soil erosion from construction activities.
4. The insurance of adequate stormwater facilities, including culverts, bridges, and other in-stream structures.
5. The maintenance of groundwater recharge.
6. The prevention, to the extent feasible, of non-point stormwater pollution.
7. The maintenance of surface waters to ensure their biological and stormwater management functions, including the restoration, enhancement, and maintenance of their chemical, physical, and biological integrity, in order to protect public health and safeguard aquatic life; the preservation of their scenic and ecological values; and the enhancement of their domestic, municipal, recreational, industrial, and other uses.
8. The protection of public health and welfare, through the planning, engineering, operation and maintenance of stormwater systems.

The MSWMP outlines specific stormwater standards for new development and proposes stormwater management controls that address impacts from existing development. Preventative and corrective maintenance strategies are included to ensure the long-term effectiveness of stormwater management facilities. The MSWMP provides recommendations for stormwater systems to protect the public health and welfare.

This watershed-based MSWMP includes a discussion of both Franklin Township and its watershed(s). Land use, zoning, impervious surfaces, and pollutant loadings were evaluated using a Geographic Information System. These efforts provide an initial understanding of surface water quality in the County's watersheds, and establish a basis for evaluating the impacts of future land use and zoning decisions.

## Section 3. Stormwater and Development

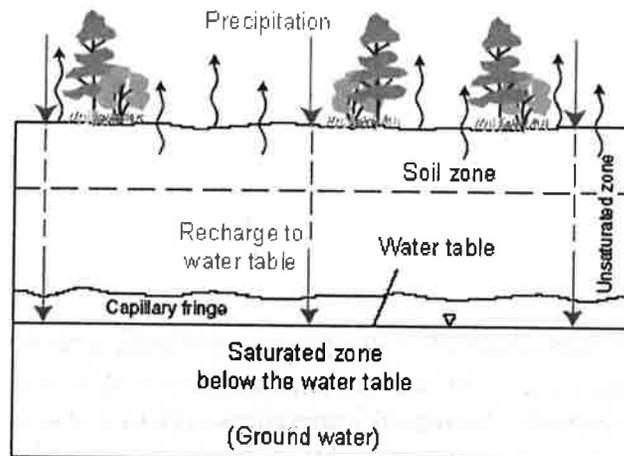
Water moves continuously through the hydrologic or water cycle (see Figure 3). Water evaporates from water bodies and the earth's surface and transpires from vegetation into the atmosphere (these components of the water cycle are jointly referred to as



Source: New Jersey Geological Survey Report GSR-32.

**Figure 3. Groundwater Recharge in the Hydrologic Cycle**

evapotranspiration). Water vapor in the atmosphere condenses to form clouds which produce precipitation that falls to the earth's surface. A small percentage of this precipitation falls over the land and runs off into streams and lakes flowing to the oceans.

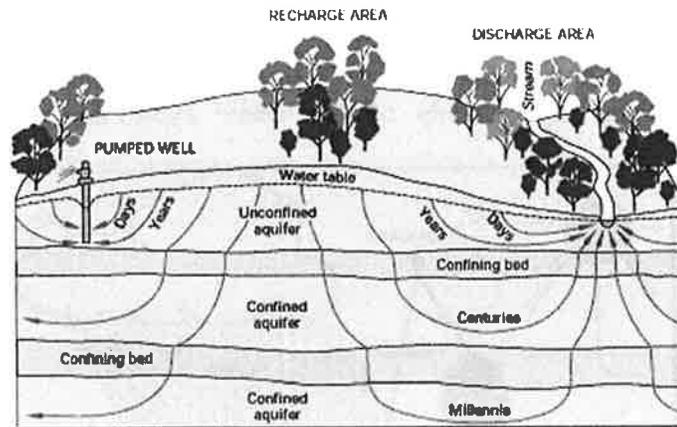


Source: US Geological Survey

**Figure 4. Subsurface Water**

However, most of the precipitation that falls on land surfaces infiltrates into the ground (see Figure 4), where it either recharges shallow groundwater table aquifers and discharges to streams and springs, sustaining their base flow, or seeps into deeper

confined aquifers, where it is stored for long periods and discharges regionally (see Figure 5). Human activities and development of the land can interfere with the natural water cycle, and in doing so, impact a watershed in many ways.



Source: US Geological Survey

**Figure 5. Groundwater Flow Paths**

Development can remove beneficial vegetation; replacing it with lawns or impervious cover, thus reducing evapotranspiration and infiltration. Clearing and grading removes depressions that store rainfall and encourage infiltration. Construction activities can also compact the soil and diminish infiltration, resulting in increased volumes and rates of stormwater runoff.

Conversely, increased impervious areas that are connected to each other through gutters, channels, and storm sewers transport runoff more quickly than natural areas. Shortening runoff travel time increases the rainfall-runoff response in the watershed, causing flow in downstream waterways to reach peak rates faster and water levels to increase above natural conditions. These conditions aggravate downstream flooding and erosion and increase the quantity of sediment in stream flow and deposited in stream channels. Impervious areas and storm sewers reduce the potential for surface vegetation to filter and remove pollutants from runoff.

Increased impervious area from land development can also decrease infiltration, and in turn, reduce stream base flow and groundwater recharge. Reductions in stream base flow can dry up habitat in stream channels and adjacent wetlands, and in so doing, adversely impact the health of important biological communities that reside in or depend upon these stream channels and wetlands. Increased impervious area can also increase peak stream flow, channel erosion, and sedimentation and thus can destroy aquatic habitat.

Land development can result in the addition and accumulation of pollutants on the land surface. Runoff and infiltration can mobilize and transport these pollutants to groundwater and streams. Surfaces and cleared areas within a development can receive a variety of pollutants from the atmosphere and from runoff over land surfaces that mobilizes fertilizers, animal wastes, and leakage and corrosion from vehicles. The

pollutants may include suspended and dissolved solids containing metals, nutrients and other inorganic compounds; hydrocarbons, pesticides, herbicides and other organic compounds; and pathogens--all of which can become mobilized by precipitation falling on the land.

Land development can also adversely affect water quality and stream biota in subtle ways. Runoff stored in detention or retention basins can become heated, raising the temperature of the downstream waterway and adversely affecting cold water aquatic species, such as trout, and by providing conditions that support unwanted aquatic species. Additionally, development may remove trees along streams or cause stream bank instability that undermines nearby trees. These trees are valuable because they provide shade that maintains cooler water temperatures and increased dissolved oxygen levels during critical summer periods. Trees also help stabilize stream banks, preventing bank erosion, and their leaf litter provides habitat and food for aquatic communities.

## Section 4. Background

### FRANKLIN TOWNSHIP

Franklin Township is located in southeastern Gloucester County (see Figure 1). The Township's characteristics, as they relate to the stormwater management planning goals described in Section 2, are discussed in this background section of the M/WSWMP.

### **Zoning and Existing Land Use**

Franklin Township is unique among the 24 municipalities in Gloucester County, for several reasons. In terms of both total area and land area (see Table 1), it has the largest land area in Gloucester County.

**Table 1. Franklin Township Area**

|            | <u>Area</u><br>(sq. mi.) |
|------------|--------------------------|
| Total Area | 56.43                    |
| Land Area  | 56.01                    |
| Water Area | 0.42                     |

With so much land area, its location between Philadelphia and the New Jersey Shore, and its major highway access (in particular, Routes 47 and 55), Franklin Township will someday experience significant development pressures. However, as shown on Figure 6, approximately 35% of the Township is located within the New Jersey Pinelands, and as such; it is one of only two municipalities in Gloucester County with a portion of its area in the Pinelands. Development within some of the Township is constrained by the Pinelands Comprehensive Management Plan (CMP).

The existing zoning within both the Pinelands and non-Pinelands portions of the Township is shown on Figure 7, and the existing land use, based on the NJDEP GIS Land Cover analysis is shown on Figure 8. The zoning map also shows the designated Pinelands Management Areas within the Pinelands portion of the Township. The most densely populated non-Pinelands portion of the Township is commonly referred to as Franklinville, and encompasses much of the more densely developed commercial and residential area in the Township.

In addition to the constraints on development imposed by the Pinelands CMP, development in Franklin Township continues to be constrained by circumstances related to the availability of sewers and wastewater treatment in both the Pinelands and non-Pinelands portions of the Township. Neither area has sewers, nor are they designated as sewer service areas under the Tri-County Water Quality Management Plan (WQMP).

**Figure 6. Pinelands Area**

**Figure 7. Zoning**

**Figure 8. Land Cover**

Franklin Township is not currently served by the Gloucester County Utilities Authority regional system and its treatment plant located in West Deptford. Franklin Township relies entirely upon onsite disposal systems and groundwater discharge for wastewater treatment and disposal.

The current rate of development in Franklin Township is slow, and the projected build-out development in the Township is many years away, given its geographic location, its size, and the amount of undeveloped land in the Township.

## Population and Housing

The population of Franklin Township (see Table 2) is the 6th largest total population in Gloucester County. Table 2 provides the urban population and rural population (if any) breakdown. With respect to housing, the Township also has the 6th largest number of total housing units in Gloucester County and the number of urban and rural housing units (if any) are shown (see Table 2).

Franklin Township is one of only 13 municipalities in the County with housing units classified as rural.

**Table 2. Franklin Township Population and Housing (Year 2000)**

|       | <u>Population</u> | <u>Housing Units</u> |
|-------|-------------------|----------------------|
| Total | 15,466            | 5,461                |
| Urban | 6,623             | 2,409                |
| Rural | 8,843             | 3,052                |

Source: U.S. Census Bureau

Franklin Township is 20th of 24 municipalities in Gloucester County in terms of population density.

**Table 3. Franklin Township Population Density (1990 – 2003)**

|      | <u>Population</u> | <u>Population Density</u><br>(persons/sq. mi.) |
|------|-------------------|--|
| 1990 | 14,349            | 256  |
| 2000 | 15,466            | 276  |
| 2003 | 5,001             | 286  |

Franklin Township has been one of the more moderately growing municipalities in Gloucester County in recent years. Between 1990 and 2000, Franklin Township experienced an 8 percent growth, and the estimated growth from 2000 to 2003 is 547 or 4 percent (see Table 4).

**Table 4. Franklin Township Population Growth (1990 – 2003)**

|      | <u>Population</u> | <u>Population Change</u> | <u>Percent Growth</u> |
|------|-------------------|--------------------------|-----------------------|
| 1990 | 14,349            |                          |                       |
| 2000 | 15,466            | 1,117                    | 8                     |
| 2003 | 5,001             | 547                      | 4                     |

Source: U.S. Census Bureau and N.J. Department of Labor

The Delaware Valley Regional Planning Commission (DVRPC) projects Franklin Township to grow by 5,234 people over the 30-year period from 2000 to 2030 (see Table 5), with an overall growth of 33.8 percent during those three decades.

**Table 5. Franklin Township Projected Population Growth (2000 – 2030)**

|      | <u>Population</u> | <u>Population Change</u> | <u>Percent Growth</u> |
|------|-------------------|--------------------------|-----------------------|
| 2000 | 15,466            |                          |                       |
| 2010 | 16,820            | 1,354                    | 8.8                   |
| 2020 | 18,780            | 1,960                    | 11.7                  |
| 2030 | 20,700            | 1,920                    | 10.2                  |

Source: DVRPC

## Surface Water

### (a) Watersheds and Hydrologic Unit Codes (HUCs)

There are eight major Watersheds within Gloucester County. Each of these Watersheds and their land areas within the County are shown in Table 6. Also shown in Table 6 is a two character identification code used in this report to identify data tables and figures related to the individual watersheds.

**Table 6. Watersheds Within Gloucester County**

| <u>ID</u> | <u>Watershed</u>       | <u>Area</u><br>(acres) |
|-----------|------------------------|------------------------|
| BT        | Big Timber Creek       | 12,925                 |
| GE        | Great Egg Harbor River | 36,997                 |
| MC        | Mantua Creek           | 32,099                 |
| MR        | Maurice River          | 47,177                 |
| OC        | Oldman's Creek         | 14,558                 |
| RA        | Raccoon Creek          | 31,822                 |
| RE        | Repaupo Creek          | 26,222                 |
| WC        | Woodbury Creek         | <u>13,787</u>          |
|           |                        | 215,587                |

Franklin Township is partially within two of these major watersheds, as shown in Table 7.

**Table 7. Franklin Township Watersheds**

| <u>ID</u> | <u>Watershed</u>       | <u>Area</u><br>(acres) |
|-----------|------------------------|------------------------|
| GE        | Great Egg Harbor River | 13,069                 |
| MR        | Maurice River          | <u>23,069</u>          |
|           |                        | 36,138                 |

The NJDEP requires that municipalities evaluate the impacts of their small municipal separate storm sewer systems (small MS4s) on surface waters at the HUC14 sub-watershed level (these watershed and sub-watershed divisions were developed by the United States Geological Survey (USGS) using a coding system called Hydrological Unit Codes, or HUCs).

Figure 9 shows the HUC14s located partially or entirely within the municipal boundaries of Franklin Township. The names of the HUC14s are shown in Table 8.

#### **(b) New Jersey Surface Water Quality Standards**

The Federal Clean Water Act requires that states maintain surface water quality in high quality waters and restore water quality in impaired waters. Surface Water Quality Standards (SWQS) have been developed by the NJDEP (and Delaware River Basin Commission (DRBC) for the Delaware River) to accomplish this goal. These standards establish "designated uses" to be achieved for surface water bodies and specify the water quality criteria necessary to achieve these uses.

**Figure 9. HUC14s**

**Table 8. Franklin Township Watersheds and HUC14s**

| Watershed              | HUC14 Sub-Watershed                         |  |
|------------------------|---|--|
|                        | <u>No.</u>                                  | <u>Name</u>  |
| Great Egg Harbor River | 02040302040010                              | Hospitality Branch (above Whitehouse Rd)                         |
|                        | 02040302040020                              | Hospitality Branch (Rt 538 to Whitehouse Rd)                     |
|                        | 02040302040030                              | Hospitality Branch (Piney Hollow Rd to Rt 538)                   |
|                        | 02040302040040                              | White Oak Branch (Hospitality Branch)                            |
|                        | 02040302040050                              | Collings Lakes tributary (Hospitality Branch)                    |
| Maurice River          | 02040206120020                              | Little Ease Run (below Academy Rd)                               |
|                        | 02040206120040                              | Reed Branch (Still Run)  |
|                        | 02040206120050                              | Still Run (Willow Grove Lake - Silver Lake Rd)                   |
|                        | 02040206130010                              | Scotland Run (above Fries Mill)                                  |
|                        | 02040206130020                              | Scotland Run (Delsea Drive to Fries Mill)                        |
|                        | 02040206130030                              | Indian Branch (Scotland Run)                                     |
|                        | 02040206130040                              | Scotland Run (below Delsea Drive)                                |
|                        | 02040206140010                              | Maurice River (Blackwater Branch to/including Willow Grove Lake) |
|                        | 02040206140020                              | Burnt Mill Branch/Hudson Branch                                  |
| 02040206140040         | Blackwater Branch (above/including Pine Br) |  |

Designated uses established by the NJDEP for New Jersey water bodies include potable water supply (drinking water use), propagation of fish and wildlife (aquatic life use), recreation in and on the water (primary and secondary contact), agricultural and industrial supplies, and navigation. The NJDEP has established stream classifications and antidegradation designations for all of the state's surface water bodies. New Jersey's Water Quality and Monitoring Standards homepage can be found at the following link:

<http://www.state.nj.us/dep/wmm/>

The Surface Water Quality Standards can be found in N.J.A.C. 7:9B at these links:

<http://www.state.nj.us/dep/wmm/sgwqt/swqsdocs.html>

<http://www.state.nj.us/dep/wmm/sgwqt/sgwqt.html>.

In addition, because the Delaware River is an interstate water body, the Delaware River Basin Commission (DRBC) has established interstate zones, designated uses for each zone, and water quality standards to achieve the designated uses along the entire length of the river. Gloucester County adjoins the very lowest end of Zone 3, Zone 4 and the upper most portion of Zone 5. The DRBC's 2004 Delaware River and Bay Integrated List Water Quality Assessment Report, which contains the water quality standards for each zone (see Section 2.2), and the results of their 2004 Delaware River and Bay Water Quality Assessment, can be found at the following link:

<http://www.state.nj.us/drbc/04IntegratedList/index.htm>.

The Surface Water Quality Criteria for all classified waterways in the State depend on their designated uses and reflected Surface Water Classification. The Surface Water Quality Criteria are detailed in N.J.A.C. 7:9B-1.14 and are too voluminous to include in this report.

### **(c) Impaired Waters**

States are required to prepare and submit to the USEPA a report that identifies waters that do not meet or are not expected to meet surface water quality standards (SWQS). This report is commonly referred to as the 303(d) list. In accordance with Section 305(b) of the CWA, the States are also required biennially to prepare and submit to the USEPA a report addressing the overall water quality of the State's waters. This report is commonly referred to as the 305(b) Report or the Water Quality Inventory Report. Those water bodies, which are listed on the 303(d) list, are referred to as "water quality limited" water bodies and a total maximum daily load (TMDL) must be developed for each individual pollutant in these impaired water bodies.

In November 2001, the USEPA issued guidance that encouraged states to integrate 305(b) Report and the 303(d) List into one report. The New Jersey Department of Environmental Protection (NJDEP) chose to develop an Integrated Report for New Jersey starting in 2002. The 2004 Integrated List of Waterbodies combines these two

assessments and assigns water bodies to one of five sublists. Sublists 1 through 4 include water bodies that are generally unimpaired. Sublist 5 of the 2004 Report supersedes Sublist 5 of the 2002 Integrated List and the new sublist presents all water quality limited waters and includes waters for which TMDL development is occurring or will occur within two years. The Sublists of water bodies in New Jersey are categorized as follows.

- Sublist 1** - water bodies that are attaining the water quality standards and no use is threatened.
- Sublist 2** - water bodies that are attaining some of the designated uses; no use is threatened; and insufficient or no data and information is available to determine if the remaining uses are attained or threatened.
- Sublist 3** - water bodies where there is insufficient or no data and information to determine if any designated use is attained.
- Sublist 4** - water bodies that are impaired or threatened for one or more designated uses but do not require the development of a TMDL [for the reasons described in Sublists 4A, 4B and 4C below].
- Sublist 4A.** - TMDL has been completed.
- Sublist 4B** - other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.
- Sublist 4C** - impairment is not caused by a pollutant.
- Sublist 5** - the water quality standard is not attained. The waterway is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL.

The link to the most recent 2004 NJDEP Integrated Water Quality and Assessment Report is:

<http://www.state.nj.us/dep/wmm/sgwqt/wat/integratedlist/integratedlist2004.html>

For the purposes of evaluating surface water quality in Gloucester County, the Integrated Lists (Sublists 1-5) were abridged and sorted to include only those locations within the County. (See Watershed Surface Water Quality discussion(s) that follow)

#### **(d) Total Maximum Daily Loads (TMDLs)**

TMDLs are required, under Section 303(d) of the federal Clean Water Act, for water bodies that cannot meet surface water quality standards after the implementation of “technology-based” effluent limitations. TMDLs may also be established to help maintain or improve water quality in waters that are not impaired. Based on the 2002 and 2004 integrated list, the NJDEP entered into a Memorandum of Agreement with USEPA that sets out a schedule for completion of TMDLs.

A TMDL allocates the load capacity to point sources in the form of waste load allocations (WLAs) and to nonpoint sources in the form of load allocations (LAs), and may also identify reserve capacity and a margin of safety. WLAs result in Water Quality Based Effluent Limits for point source Wastewater Treatment Plants and requirements based on Best Management Practices (BMPs) for regulated stormwater point sources, such as Combined Sewer Overflows (CSOs). Because nonpoint source pollution does not come from discrete sources, LAs generally identify broad categories of nonpoint sources that contribute to the parameters of concern. The LA then includes specific load reduction measures, through Best Management Practices (BMPs), that may include local ordinances for stormwater management and nonpoint source pollution control, headwaters protection practices, or other mechanisms for addressing the parameters of concern.

A separate TMDL calculation must be prepared for each pollutant listed for each impaired stream segment or lake. A TMDL is considered "proposed" when the NJDEP publishes the TMDL Report as a proposed Water Quality Management Plan Amendment in the New Jersey Register (NJR) for public review and comment. A TMDL is considered "established" when the NJDEP finalizes the TMDL Report and formally submits it to EPA Region 2 for a thirty (30)-day review and approval. The TMDL is considered "approved" when the NJDEP-established TMDL is approved by EPA Region 2. The TMDL is considered "adopted" when the EPA-approved TMDL is adopted by the NJDEP as a water quality management plan amendment and the adoption notice is published in the NJR. The link to New Jersey's TMDLs and their status is:

<http://www.nj.gov/dep/watershedmgt/tmdl.htm#intro>

In the process of establishing a TMDL, an implementation plan is developed to identify how the various sources will be reduced to their designated allocations. Implementation strategies for non-point sources may include: improved stormwater management, the adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other Best Management Practices to control stormwater runoff loadings.

#### **(e) Gloucester County's Impaired Waters**

There are about 27 different water bodies within Gloucester County that are considered impaired for their designated use, because they do not meet their respective water quality standards for one or more pollutant parameters. The impaired parameters include phosphorus, mercury, copper, silver, PCBs, dioxin, benthic macroinvertebrates, pH, fecal coliform, total coliform, and total suspended solids. The NJDEP has prepared or will prepare TMDLs for each water body and impaired parameter. . (See Watershed Surface Water Quality discussion(s) that follow)

### **(f) Gloucester County's TMDLs**

At this time, the NJDEP has proposed five sets of TMDLs that address impaired water bodies in Gloucester County. The full text of these proposals can be found and downloaded at the following link:

<http://www.nj.gov/dep/watershedmgt/tmdl.htm#intro> .

Three of the five sets of TMDLS were proposed by the NJDEP in April 2003 and were based on the 2002 Integrated Report. These TMDLs were approved in September 2003 but have not yet been adopted. Two of the five sets of TMDLs were proposed by the NJDEP in May and July 2005 and are not yet established.

### **Ground Water**

Gloucester County is located in the Atlantic Coastal Plain Physiographic Province. Beneath Gloucester County are a series of geologic units that form aquifers or aquifer systems and confining units (aquitards). The geologic units consist largely of layers of unconsolidated sediments of clays, silts, sands and gravels, deposited over many millions of years, and extending from the land surface, hundreds or thousands of feet to bedrock. These sand and gravel layers and units when grouped together form the aquifers or aquifer systems and the layers and units containing higher amounts of silts and clays when grouped together form the confining units.

The geologic units in the County dip gently to the south-east, and they outcrop (and are exposed) in broad, irregular, northeast-southwest trending bands on the land surface. The oldest formations outcrop along and under the Delaware River, and progressively younger units outcrop in sequence, moving southeasterly towards the Atlantic Coast.

There are several major coastal plain aquifers or aquifer systems which outcrop and are exposed in Gloucester County. Starting with the oldest and most westerly, they are: the Potomac-Raritan-Magothy (PRM) aquifer system, which outcrops along and under the Delaware River; the Englishtown aquifer system; the Wenonah-Mount Laurel aquifer; and the Kirkwood-Cohansey aquifer system.

The Wenonah-Mount Laurel, Englishtown, and PRM aquifers are exposed in their respective outcrops, but dip into the subsurface, becoming semi-confined or confined at depth in a southeasterly direction. The Kirkwood-Cohansey aquifer system remains exposed throughout its outcrop and is exposed and unconfined within Gloucester County.

There are a few other minor geologic units outcropping in the County that may yield very small amounts of water, including the Merchantville, Marshalltown and Vincentown Formations. However, because of their low permeability's, these formations are more often regarded as confining units. In addition to these minor geologic units, small, shallow, deposits of more recent sands with gravel from the Bridgeton, Pennsauken and Cape May Formations can be found on the surface in the County, particularly capping

hills and along stream banks.

The aquifers or aquifer systems in Gloucester County are separated by relatively impermeable geologic confining units that vary in thickness and in their confining ability, ranging from semi-confining to confining. These confining units also outcrop in broad, highly irregular, northeast-southwest trending bands on the land surface and are located between the aquifers' outcrops.

Confining geologic units in the County, starting with the oldest and most westerly outcropping, are: the Woodbury-Merchantville (between the PRM and the Englishtown); the Marshalltown (between the Englishtown and the Wenonah-Mount Laurel); and the Hornerstown-Navesink-Vincentown (between the Wenonah-Mount Laurel and the Kirkwood-Cohansey). Water in the subsurface tends to move very slowly, if at all from one aquifer to another, because of these confining units between the aquifers.

Minimizing the impacts of stormwater runoff on the ground water of Franklin Township is a primary goal of this MSWMP, as is protecting Franklin Township's surface waters.

#### **(a) Stormwater Runoff and Ground Water Recharge**

In New Jersey's Atlantic Coastal Plain, precipitation averages about 43.75 inches per year. On average, about 45 percent of the annual precipitation results in runoff (or about 19.75 inches per year), and about 55 percent of the precipitation is lost into the atmosphere as evapotranspiration. The infiltration, or groundwater recharge, component of runoff provides the base stream flow in the Atlantic Coastal Plain. At an average runoff rate of 19.75 inches per year, the maximum recharge rate of 15 inches per year indicates that as much as 75 percent of the runoff will recharge the ground water.

In Franklin Township, the water table aquifer receiving recharge is the Kirkwood-Cohansey aquifer. This is a major source of water supply for the residents and businesses in Franklin Township that are to a great extent, relying on individual private wells. Water table aquifers are susceptible to ground water contamination, and protection of the Franklin Township's ground water is important.

Because the upper geologic unit in Franklin Township has the ability to transmit large quantities of water downward, store the precipitation from individual storm events, and discharge the stored water as base flow to streams in a more uniform manner than would result from direct runoff, the streams in Franklin Township can benefit from groundwater recharge and stream base flow maintenance. For this reason, groundwater recharge in Franklin Township is a significant and necessary stormwater management strategy. Stormwater management in new major development and redevelopment within Franklin Township should incorporate measures that address and maximize potential groundwater recharge, to the greatest extent possible.

**(b) Well head Protection Areas (WHPAs)**

Water supply wells in exposed unconfined aquifers depend on surface recharge to maintain groundwater levels and groundwater quality, thereby directly linking stormwater management and recharge with water supply. Largely because of this linkage, unconfined public community water supply (PCWS) wells and public non-community water supply (PNCWS) wells have designated “wellhead protection areas” (WHPAs). Water supply wells in the confined portions of aquifers, away from the exposed outcrop area, are not directly linked to surface recharge, and have no WHPAs.

WHPAs establish the approximate area within which contamination, released on the surface, will travel to the well head, over the prescribed period of time. WHPAs include three tiers; the inner boundary, Tier 1, includes an area with a 2 year travel time, the middle boundary, Tier 2, includes an area with a 5 year travel time and the outer boundary, Tier 3, includes an area with a 12 year travel time. WHPAs serve as warning zones, within which high risk activities should be avoided, and further provide a prioritization for clean-up of surface and groundwater contamination that occurs within a WHPA.

Franklin Township is located entirely on the outcrop of the Kirkwood-Cohansey aquifer system, which is exposed at the surface and unconfined. Figure 10 shows the aquifer outcrop and the WHPAs in Franklin Township. In this municipality, the exposed outcrop of the aquifer is susceptible to contamination from development, stormwater runoff and the quality of groundwater recharge.

There are eight unconfined PCWS wells in Franklin Township. Four of these are grouped together near Iona and form one large composite WHPA. Two wells are further south on Delsea Drive, near the crossing of Malaga Run, and the remaining two wells are at the intersection of Delsea Drive and Route 40. There is also a WHPA east of Newfield, resulting from some Newfield water supply wells.

There are 21 unconfined PNCWS wells in Franklin Township and although these PNCWS wells have smaller WHPAs than the PCWS wells, they are abundant in Franklin Township. The PNCWS wells are:

1. The vicinity of Hill Street in Malaga (8 wells)
2. Franklinville (7 wells)
3. Victoria Avenue Girl Scout Camp and vicinity (2 wells)
4. Tuckahoe Road just north of Blue Bell
5. East of Newfield on Route 40 (3 wells)
6. Intersection of Lake and Main Roads
7. Dutch Mill Road across from Pine Grove Camp
8. Route 40 and West Boulevard
9. West Boulevard near Delaware Avenue

**Figure 10. Geology and Well Head Protection Areas**

10. Delsea Drive west of Malaga Lake (2 wells)
11. Delsea Drive and Pennsylvania Avenue
12. Pennsylvania Avenue west of Delsea Drive
13. Porchtown
14. Porchtown Road at Route 40
15. Janvier vicinity (3 wells)
16. Iona vicinity (4 wells)
17. Star Cross (2 wells)
18. Grant Avenue (2 wells)
19. Fries Mill
20. Monroeville Road west of Franklinville
21. Delsea Drive north of Franklinville (2 wells).

The locations of WHPAs for PCWS and PNCWS wells in Franklin Township should be considered in future zoning, land use and stormwater management decisions.

### **(c) New Jersey Groundwater Quality Standards**

The NJDEP's has established Ground Water Quality Standards (GWQSs) for all of the ground waters in the State of New Jersey (N.J.A.C. 7:9-6). Like the SWQSs, the GWQSs establish the designated uses for the State's ground water, and specify the ground water quality criteria for specific constituents, including toxic pollutants, consistent with those designated uses.

The GWQSs establish classification areas according to the geographic extent (both vertical and horizontal) of geologic formations, or units, within which ground water is classified for the designated uses. Designated uses may include any human withdrawal of ground water (for example, for potable, agricultural or industrial water), the discharge of ground water to surface waters of the State which support human use or ecological systems, or the direct support of ecological systems.

The GWQSs include three major classes of ground water:

|           |  |
|-----------|--|
| Class I   | Ground Water of Special Ecological Significance        |
| Class II  | Ground Water for Potable Water Supply                  |
| Class III | Ground Water With Uses Other Than Potable Water Supply |

Under the NJDEP GWQSs, the primary designated use for Class I ground waters is the maintenance of special ecological resources supported by the ground water within the classification area; secondary designated uses of Class I waters is use for potable water, agricultural water and industrial water, if these uses are viable using water of natural quality and do not impair the primary use (for example, by altering ground water quality).

Class I ground water is further designated as either Class I-A (Exceptional Ecological Areas) or Class I-PL (Pinelands). Ground water within watersheds of FW-1 surface waters (a Category One surface water classification), and certain "Natural Areas"

designated by the NJDEP in the GWQSSs, are designated as Class I-A ground waters.

The classification area for Class I-PL consists of all ground water in the Cohansey and Kirkwood Formations located within the New Jersey Pinelands, other than those designated as Class I-A. As noted above, the Kirkwood-Cohansey aquifer is the water table aquifer throughout the Pinelands areas within Gloucester County, and these ground waters (to the depth below ground surface of the aquifer) are thus classified as Class I-PL.

Class I-PL waters are further classified as either Class I-PL (Preservation Area) or Class I-PL (Protection Area), (see Figure 6 Franklin and Monroe Townships only). The ground waters in the Kirkwood-Cohansey aquifer within the Preservation Area are Class I-PL (Preservation Area) ground waters, while the ground waters in the Kirkwood-Cohansey aquifer in the Protection Area are classified as Class I-PL (Protection Area) waters.

The designated uses for Class I-PL (Preservation Area) and Class I-PL (Protection Area) vary somewhat:

Class I-PL(Preservation Area): the primary designated use is the support and preservation of unique and significant ecological resources of the Pinelands, through the restoration, maintenance and preservation of ground water quality in its natural state; secondary designated uses include compatible agricultural uses in accordance with the Pinelands Comprehensive Management Plan (N.J.A.C. 7:50-6 et seq.) and potable water uses.

Class I-PL(Protection Area): the primary designated use is the preservation of Pinelands plant and animal species and their habitats through the protection and maintenance of the essential characteristics of Pinelands ground water quality; secondary designated uses include potable and agricultural water uses.

Class III ground waters are ground waters that are not suitable for potable use due to their natural hydrogeologic characteristics, such as aquitards - Class III-A ground water, or due to their natural water quality that is unsuitable for conversion to potable water, such as saline ground water (Class III-B).

All ground waters in New Jersey not designated as Class I or Class III are designated as Class II ground waters. Class II ground waters are further classified as either Class II-A or Class II-B. The designated uses of Class II-B waters are any reasonable use other than potable use; however, the NJDEP has not designated any ground waters as Class II-B.

The Kirkwood-Cohansey aquifer (the water table aquifer) in the non-Pinelands portion of the County is a Class II-A ground water. The primary designated use for Class II-A ground water is potable water and conversion (through conventional water supply

treatment, mixing or other similar technique) to potable water; secondary designated uses include agricultural water and industrial water.

The ground water quality criteria for the Class I-PL (Preservation Area), Class I-PL (Protection Area), and Class II-A ground waters in the water table aquifer in Winslow Township vary, and thus the stormwater management measures that are protective of these ground waters may vary.

Class I-PL (Preservation Area): the ground water quality criteria are the natural quality for each constituent. This is a nondegradation classification in which natural quality shall be maintained or restored. Under the GWQSSs, the NJDEP may not approve any discharge or any other activity which would result in the degradation of natural quality within the Class I-PL(Preservation Area) classification area (although this provision does not apply to activities that are in conformance with N.J.A.C. 7:50-6 et seq.).

Class I-PL (Protection Area): the ground water quality criteria are the background water quality for each constituent. Under the GWQSSs, the NJDEP may not approve any discharge or any other activity which would result in the degradation of background water quality in a Class I-PL(Protection Area) classification area (although, once again, this provision does not apply to activities that are in conformance with N.J.A.C. 7:50-6 et seq.).

Class II-A: specific criteria for various constituents are listed in an appendix to the GWQSSs; if a specific criterion is not listed for a particular constituent, the NJDEP may establish interim specific criteria based on available data regarding the constituent's carcinogenicity, toxicity, public welfare or organoleptic effects, as appropriate for the protection of the potable water use.

Because of the different ground water quality criteria in the three ground water classification areas, the necessary stormwater management measures may vary among these areas. The nondegradation standard based on natural ground water quality in the Class I-PL (Preservation Area) will require the most stringent consideration of stormwater impacts from any proposed major development projects.

On the other hand, major development projects have been designed in the Pinelands areas covered by the Class I-PL (Protection Area) ground water classification, and approved. It is anticipated that ground water quality issues will not be a significant concern for new major development projects that comply with the new design and performance standards in N.J.A.C. 7:8.

Within the non-Pinelands portions of the County, with a Class II-A ground water designation, the specific ground water quality criteria included in the GWQSSs will

continue to apply. However, the three contaminants for which the NJDEP has required a projection of build-out stormwater pollutant loading are nitrogen, phosphorus and total suspended solids (see Section 5). These three pollutants are of particular significance with regard to surface water quality, but are not included in the list of constituent criteria for Class II-A ground water. Once again, it is anticipated that ground water quality issues will not be a significant concern for new major development projects in the non-Pinelands portions of the County if the projects comply with the new design and performance standards in N.J.A.C. 7:8.

## Soils

One of the main objectives of the new NJDEP Stormwater Management Rules is to promote ground water recharge in order to replenish aquifers, maintain base flow in streams and assist in maintaining the groundwater supply. Ground water recharge is significantly affected by land use (e.g., commercial vs. agricultural uses), as well by the type of natural soil present on the ground surface. The National Resource Conservation Service (NRCS) has grouped soil types throughout the United States into four different Hydrologic Soil Groups (HSGs): A, B, C and D, depending on their infiltration ability and the potential rate of ground water recharge.

Group A soils have high infiltration rates and recharge potential and provide little direct runoff. They generally include well-drained and sorted sands and gravels. Group B soils have moderately high recharge potential, while Group C soils have lower infiltration rates and generally include more silt and clay particles with higher direct runoff potential. Group D soils have very low recharge rates and a high direct runoff potential. Some soils may have two classifications depending on whether or not they contain soil layers with different infiltration characteristics. For example, a soil classified as A/D has both a Group A soil layer that is well-drained and a Group D soil layer that is poorly drained.

The NJDEP's new stormwater regulations encourage new development in areas with soils that do not recharge significant amounts of water to aquifers; that is, in Group C and D soil areas. The regulations encourage the protection of the natural condition, infiltration and recharge rates in Group A or B soil areas. However, many Group D soil areas are located in wetlands or adjacent to wetlands and water bodies and these areas are not developable. It may not be possible to completely avoid disturbance and new development in Group A and B soil areas. But, the NJDEP's new stormwater regulations require equal amounts of ground water recharge before and after new development.

Figure 11 depicts the hydrologic soil groupings in Franklin Township. Franklin Township's soils are primarily moderately well draining Group B soils. There are some poorly-draining Group C and D soils associated with waterways and wetlands.

**Figure 11. Soils**

## **MAURICE RIVER WATERSHED**

### **Topography**

Figure MR-1 (see Appendix A) provides an aerial photograph (2000) of the Maurice River Watershed and depicts general land use and other planimetric relationships within the watershed. It is a “birds-eye” view of the watershed that allows a quick assessment of watershed conditions as they existed at that time. This watershed appears generally to be a rural watershed.

Figure MR-2 (see Appendix A) provides the USGS Quadrangle (topographic map) for this watershed. Relief (elevation difference) within the Maurice River Watershed is about 160 feet, with elevations ranging from a low of 3.3 to a high of 164 feet above mean sea level. Lower elevations occur along the waterways and wetlands and higher elevations occur along the watershed’s boundaries. The land surface elevations and relief in this watershed have been sculpted by surface runoff and erosion of the unconsolidated coastal plain sediments at the land surface. But, the relief in this watershed is generally small, although there are a few localized land areas with steeper slopes. Hills with steeper slopes, often capped by more erosion resistant sediments (gravels), can generally be found within the watershed, providing some structural control and forming drainage boundaries.

The river is about 10 miles long as it traverses Gloucester County, and the average stream gradient (slope) along the length of the watershed’s stream channel (the long profile) is 0.0006 (excluding any estuarine portions). In general, stream slopes within the watershed are extremely flat.

In this watershed, surface drainage has eroded the land surface in dendritic drainage patterns that exhibit little structural control because of the relatively uniform resistance to erosion from the underlying sediments. Generally, the streams in the watershed consist of short straight sections connected by bends and kinks. For the most part, there is little or no stream braiding or meandering and stream channels are not heavily incised. The streams in the watershed appear to be “graded.” Stream base level, gradient, channel section, sediment load and flow are in relative dynamic equilibrium. Uncontrolled development within the watershed could, however, upset this equilibrium.

### **Hydrology**

The Maurice River Watershed encompasses portions of both Gloucester County and neighboring Salem and Cumberland Counties to the south. Much of the Watershed is outside of the County and so, the neighboring municipalities in Salem County impact water quality in some of the streams and HUC-14s.

The Maurice River has a total drainage area of 386 square miles (including approximately 74 square miles in Gloucester County) and flows south for 50 miles

through Cumberland County to the Delaware Bay. The only major tributary of this river within Gloucester County is Scotland Run, but other tributaries include Little Ease Run and Still Run. The River and its tributaries are shown on Figure MR-3 (see appendix A). In Gloucester County, this watershed contains 12 HUC14 sub-watersheds and these are listed in Table MR-1.

## Surface Water Quality

### (a) Surface Water Classifications

The surface waters in the Maurice River Watershed are classified FW1-NT, PL, FW2-NT, or FW2-NTC1.

The designated uses for surface water classification FW1-NT (non-trout fresh surface waters that are to be maintained in their natural state of quality and not subject to any man-made wastewater discharges or increases in runoff from anthropogenic activities) as described by the N.J.A.C. 7:9B-1.12(a) are:

1. Set aside for posterity to represent the natural aquatic environment and its associated biota;
2. Primary and secondary contact recreation;
3. Maintenance, migration and propagation of the natural and established biota; and
4. Any other reasonable uses.

The designated uses for PL, Pinelands waters as described by the N.J.A.C. 7:9B-1.12(b) are:

1. Cranberry bog water supply and other agricultural uses;
2. Maintenance, migration, and propagation of the natural and established biota indigenous to this unique ecological system;
3. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection;
4. Primary and secondary contact recreation; and
5. Any other reasonable uses.

The designated uses for surface water classification FW2-NT (non-trout fresh surface waters not designated as FW1 or PL) as described by the N.J.A.C. 7:9B-1.12(c) are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary and secondary contact recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and

**Table MR-1. Maurice River Watershed HUC14s**

| <b>Municipality</b> | <b>HUC14 Sub-Watershed</b> |  |
|---------------------|----------------------------|--|
|                     | <b><u>No.</u></b>          | <b><u>Name</u></b>   |
| Franklin Township   | 02040206120020             | Little Ease Run (below Academy Rd)                               |
|                     | 02040206120040             | Reed Branch (Still Run)  |
|                     | 02040206120050             | Still Run (Willow Grove Lake - Silver Lake Rd)                   |
|                     | 02040206130010             | Scotland Run (above Fries Mill)                                  |
|                     | 02040206130020             | Scotland Run (Delsea Drive to Fries Mill)                        |
|                     | 02040206130030             | Indian Branch (Scotland Run)                                     |
|                     | 02040206130040             | Scotland Run (below Delsea Drive)                                |
|                     | 02040206140010             | Maurice River (Blackwater Branch to/including Willow Grove Lake) |
|                     | 02040206140020             | Burnt Mill Branch/Hudson Branch                                  |
|                     | 02040206140040             | Blackwater Branch (above/including Pine Br)                      |
| Elk Township        | 02040206120010             | Little Ease Run (above Academy Rd)                               |
|                     | 02040206120030             | Still Run (above Silver Lake Road)                               |
|                     | 02040206120040             | Reed Branch (Still Run)  |
|                     | 02040206120050             | Still Run (Willow Grove Lake - Silver Lake Rd)                   |
| Monroe Township     | 02040206120010             | Little Ease Run (above Academy Rd)                               |
|                     | 02040206130010             | Scotland Run (above Fries Mill)                                  |
|                     | 02040206130020             | Scotland Run (Delsea Drive to Fries Mill)                        |
| Clayton Borough     | 02040206120010             | Little Ease Run (above Academy Rd)                               |
|                     | 02040206120020             | Little Ease Run (below Academy Rd)                               |
|                     | 02040206120030             | Still Run (above Silver Lake Road)                               |
|                     | 02040206120050             | Still Run (Willow Grove Lake - Silver Lake Rd)                   |
|                     | 02040206130010             | Scotland Run (above Fries Mill)                                  |
|                     | 02040206130020             | Scotland Run (Delsea Dr to Fries Mill)                           |
| Glassboro Borough   | 02040206120010             | Little Ease Run (above Academy Rd)                               |
|                     | 02040206120030             | Still Run (above Silver Lake Road)                               |
| Washington Township | 02040206120010             | Little Ease Run (above Academy Rd)                               |
|                     | 02040206130010             | Scotland Run (above Fries Mill)                                  |
| Newfield Borough    | 02040206140020             | Burnt Mill Branch/Hudson Branch                                  |

## 5. Any other reasonable uses.

The designated uses for surface water classification FW2-NTC1 (non-trout Category One fresh surface waters not designated as FW1 or PL) have the same designated uses as FW2-NT but the water way is considered a Category One water. There are special antidegradation policies applied to Category One waters in order to protect against “measurable changes in water quality characteristics because of their clarity, color, scenic setting, other characteristics of aesthetic value, exceptional ecological significance, or exceptional fisheries resources.” (N.J.A.C. 7:B, June 2005)

### **(b) Surface Water Quality Data**

**Ambient Biomonitoring Network** - The NJDEP has established an Ambient Biomonitoring Network (AMNET) to document the health of the state’s waterways. There are over 800 AMNET sampling sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by the NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired, based on this 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 AMNET sites within this watershed are shown in Figure MR-4 (see Appendix A) and the most recent AMNET scores for Impaired Waters within this watershed are included in the data in Appendix B.

**Conventional Water Quality Data** – The NJDEP utilizes conventional surface water quality data from a number of sources to bi-annually evaluate the impairment of surface water bodies. These water quality data include the federal Storage and Retrieval repository (STORET) data and other Existing Sources. The STORET and Existing Sources sampling locations within this watershed are shown in Figure MR-4 and the most recent data for Impaired Waters within this watershed are included in the data in Appendix B

### **(c) Impaired Waters**

For the purpose of evaluating surface water quality in this watershed, the NJDEP Integrated List (Sublists 1-5) were abridged and sorted to provide the locations of impaired waters within this watershed and these are listed in Table MR-2. A map showing the locations of impaired water is included as Figure MR-4 (Appendix A). There are fifteen (15) different sites within this watershed that are considered impaired for their designated uses, because they do not meet their respective water quality standards for one or more pollutant parameters. The impaired parameters include: mercury, benthic macroinvertebrates, pH, and fecal coliform.

**Table MR-2. Maurice River Impaired Waters List**

| <u>No.</u> | <u>Location</u>                                  | <u>Parameter</u>           | <u>Priority</u> |
|------------|--|----------------------------|-----------------|
| 1.         | Blackwater Branch at Main Rd in Franklin         | Benthic Macroinvertebrates | Low             |
| 2.         | Burnt Mill Branch at Forest Grove Rd in Newfield | Benthic Macroinvertebrates | Low             |
| 3.         | Franklinville Lake-17                            | Fecal Coliform             | High            |
| 4.         | Holly Green Campground Pond-17                   | Fecal Coliform             | High            |
| 5.         | Indian Branch at Rt 47 in Franklin               | Benthic Macroinvertebrates | Low             |
| 6.         | Indian Branch at Sta Rd in Janvier (Franklin.)   | Benthic Macroinvertebrates | Low             |
| 7(a).      | Indian Branch near Malaga                        | Fecal Coliform             | High            |
| 7.         | Indian Branch near Malaga                        | pH                         | Medium          |
| 8.         | Iona Lake-17                                     | Fecal Coliform             | High            |
| 9.         | Little Ease Run at Grant Ave in Franklin         | Benthic Macroinvertebrates | Low             |
| 10.        | Little Ease Run at Leonard Cake Rd in Franklin   | Benthic Macroinvertebrates | Low             |
| 11(a).     | Little Ease Run at Porchtown                     | Fecal Coliform             | High            |
| 11(b).     | Little Ease Run at Porchtown                     | pH                         | Medium          |
| 12(a).     | Malaga Lake-17                                   | Fecal Coliform             | High            |
| 12(b).     | Malaga Lake-17                                   | Mercury                    | High            |
| 13.        | Still Run at Little Mill Rd in Franklin          | Benthic Macroinvertebrates | Low             |
| 14.        | Still Run near Malaga                            | pH                         | Medium          |
| 15(a).     | Wilson Lake                                      | Fecal Coliform             | High            |
| 15(b).     | Wilson Lake                                      | Mercury                    | High            |

**(d) TMDL Proposals**

The NJDEP has proposed two sets of TMDLs that address impaired water bodies in this watershed. The full text of these proposals can be found and downloaded at the following link:

<http://www.nj.gov/dep/watershedmgt/tmdl.htm#intro> .

Both of the sets of TMDLS were proposed by the NJDEP in April 2003 and were based on the 2002 Integrated Report. These TMDLs were approved in September 2003, but have not yet been adopted.

A list of this watershed's TMDL proposals is included in Table MR-3. The locations of TMDLs in this watershed are shown on Figure MR-4 Water Quality (Appendix A).

### Table MR-3. Maurice River TMDL Proposals

| <u>Location</u>              | <u>Parameter</u> | <u>Status</u>           |
|------------------------------|------------------|-------------------------|
| Little Ease Run at Porchtown | Fecal Coliform   | Approved September 2003 |
| Indian Branch near Malaga    | Fecal Coliform   | Approved September 2003 |

The TMDL proposals are for fecal coliform for Little Ease Run at Porchtown and for Indian Branch near Malaga. Waste load allocation reductions have been proposed for the affected waterways. The TMDL proposals discuss possible sources of fecal coliform as well as the method used to develop the TMDLs and remediation plan. (See Section 8 Water Quality-TMDL Stormwater Management Strategies).

#### Category One Waters

Category One Waters are designated in New Jersey's rules for Surface Water Quality Standards (SWQSs) (N.J.A.C. 7:9B-1.4) "for protection from measurable changes in water quality characteristics because of their clarity, color, scenic setting, other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance or exceptional fisheries resources". The new Stormwater Management Rules require establishment of a Special Water Resource Protection Area (SWRPA) along these waters to buffer them from new major development and redevelopment. In accordance with N.J.A.C. 7:8, development within or around these areas may be subject to special stormwater management measures,

The Category One Waters in the Maurice River Watershed are:

1. Beaverdam Branch FW2-NT(C1)\* Within the boundaries of Glassboro Wildlife Management Area
2. Little Ease Run FW2-NT(C1) Run and tributaries within the Glassboro Wildlife Management Area, except FW1 tributaries

Category One waterways within the Maurice River Watershed include the segments of Beaverdam Branch and Little Ease Run and its tributaries within the Glassboro Wildlife Management Area.

#### Hydrogeology

The Maurice River Watershed is underlain by the Kirkwood-Cohansey aquifer system, which is unconfined at the surface and provides the water table aquifer in this portion of Gloucester County.

#### Soils

The Maurice River Watershed is characterized primarily by moderately well-draining

Group B soils. The C/D soils are located, as expected, along the river itself and its major tributaries in the wetlands areas. Figure MR-5 (see Appendix A) shows the potential amounts of infiltration and ground water recharge throughout the watershed.

## Critical Habitats

The NJDEP Division of Fish and Wildlife Endangered Nongame Species Program developed a Geographic Information System (GIS) called the *Landscape Project*, which is described as a “pro-active, ecosystem-level approach to the long-term protection of imperiled and priority species and their important habitats in New Jersey.” Version 2 of the Landscape project is now available interactively on the web and for download. According to the NJDEP’s Metadata, “Version 2 was created by intersecting imperiled and priority species data with NJDEP 1995/97 Land Use/Land Cover update. The resulting data layer identifies, delineates and ranks (based on the conservation status of species present) habitat statewide. Each patch is coded for the number of sightings of priority, state threatened, state endangered and federally listed species present. The data is designed to be used for state and local planning, open space acquisition and land-use regulation.”

The NJDEP Division of Fish and Wildlife describes the *Landscape Project* and the importance of preserving natural habitat as follows:

New Jersey is the most densely populated state in the nation. One of the consequences of this distinction is the extreme pressure that is placed on our natural resources. As the population grows, we continue to lose or impact the remaining natural areas of the state. As more and more habitat is lost, people are beginning to appreciate the benefits and necessity of maintaining land in its natural state.

For example, we know that wetlands are critical for recharging aquifers, lessening the damage from flooding and naturally breaking down contaminants in the environment. Forests and grasslands protect the quality of our drinking water, help purify the air we breathe and provide important areas for outdoor recreation. Collectively, these habitats are of critical importance to the diverse assemblage of wildlife found in New Jersey, including more than 70 species classified as threatened or endangered.

Many imperiled species require large contiguous tracts of habitat for survival. The consequence of the rapid spread of suburban sprawl is the loss and fragmentation of important wildlife habitat and the isolation and degradation of the smaller habitat patches that remain. Small patches of fields, forests and wetlands interspersed with development provide habitat for common species that do well living near humans, but do not provide the necessary habitat for most of our imperiled wildlife. We need to

protect large, contiguous blocks of forest, grassland and wetlands to assure the survival of imperiled species over the long-term.

In addition to providing habitat for the conservation of imperiled species, protecting critical wildlife areas will result in more open space for outdoor recreation. Recent surveys by the U.S. Fish and Wildlife Service show that more than 60% of Americans participate in some form of wildlife-related recreation. Open spaces provide places where people can escape the confines of urban and suburban living.

Most critical habitats are supported in part or in total by the surrounding surface and ground water resources, and they are consequently impacted by development, non-point source pollution and stormwater runoff. Critical Habitats mapped by the NJDEP's Landscape Project within this watershed are shown on Figure MR-6 (see Appendix A). The Critical Habitats within this watershed may include Grassland, Forest, Forested Wetland, Emerging Wetland, Beach, Bald Eagle Foraging, Urban Peregrine Falcon Nesting, and Wood Turtle habitats that should, to the extent practical, be conserved and protected from the adverse impacts caused by uncontrolled development and stormwater runoff.

## **GREAT EGG HARBOR RIVER WATERSHED**

### **Topography**

Figure GE-1 provides an aerial photograph (2000) of the Great Egg Harbor River Watershed and depicts general land use and other planimetric relationships within the watershed. It is a “birds-eye” view of the watershed that allows a quick assessment of watershed conditions as they existed at that time. This watershed appears generally to be a rural watershed.

Figure GE-2 provides the USGS Quadrangle (topographic map) for this watershed. Relief (elevation difference) within the portion of the Great Egg Harbor River Watershed inside of Gloucester County is about 195 feet, with elevations ranging from a low of 16 to a high of 213 feet above mean sea level. Lower elevations occur along the waterways and wetlands and higher elevations occur along the watershed’s boundaries. The land surface elevations and relief in this watershed have been sculpted by surface runoff and erosion of the unconsolidated coastal plain sediments at the land surface. But, the relief in this watershed is generally small, although there are a few localized land areas with steeper slopes. Hills with steeper slopes, often capped by more erosion resistant sediments (gravels), can generally be found within the watershed, providing some structural control and forming drainage boundaries.

The River is about 9 miles long as it traverses Gloucester County, and the average stream gradient (slope) along the length of the watershed’s stream channel (the long profile) is 0.001. In general, stream slopes within the watershed are extremely flat.

In this watershed, surface drainage has eroded the land surface in dendritic drainage patterns that exhibit little structural control because of the relatively uniform resistance to erosion from the underlying sediments. Generally, the streams in the watershed consist of short straight sections connected by bends and kinks. For the most part, there is little or no stream braiding or meandering and stream channels are not heavily incised. The streams in the watershed appear to be “graded.” Stream base level, gradient, channel section, sediment load and flow are in relative dynamic equilibrium. Uncontrolled development within the watershed could, however, upset this equilibrium.

### **Hydrology**

The Great Egg Harbor River is 49 miles long from head to mouth and drains a total area of 304 square miles, 58 square miles of which is in Gloucester County. This portion of the Great Egg Harbor River Watershed contains the headwaters of the River, which eventually drains into Great Egg Harbor Bay before emptying into the Atlantic Ocean (NJDEP WMA Summary). The River and its tributaries are shown on Figure GE-3. In Gloucester County, this watershed contains 11 HUC14 sub-watersheds and these are listed in Table GE-1.

**Table GE-1. Great Egg Harbor River Watershed HUC14s**

| <b>Municipality</b> | <b>HUC14 Sub-Watershed</b> |  |  |
|---------------------|----------------------------|--|--|
|                     | <b><u>No.</u></b>          | <b><u>Name</u></b>   |  |
| Monroe Township     | 02040302030030             | Four Mile Branch (Great Egg Harbor River)                      |  |
|                     | 02040302030040             | Great Egg Harbor River (Broad Lane Road to AC Expressway)      |  |
|                     | 02040302030050             | Squankum Branch (Great Egg Harbor River)                       |  |
|                     | 02040302030060             | Great Egg Harbor River (Piney Hollow Rd to Broad Lane Rd)      |  |
|                     | 02040302030080             | Great Egg Harbor River (Hospitality Branch to Piney Hollow Rd) |  |
|                     | 02040302040010             | Hospitality Branch (above Whitehouse Rd)                       |  |
|                     | 02040302040020             | Hospitality Branch (Rt 538 to Whitehouse Rd)                   |  |
|                     | 02040302040030             | Hospitality Branch (Piney Hollow Rd to Rt 538)                 |  |
|                     | 02040302040040             | White Oak Branch (Hospitality Branch)                          |  |
|                     | 02040302040050             | Collings Lakes tributary (Hospitality Branch)                  |  |
|                     | 02040302040070             | Hospitality Branch (below Piney Hollow Rd)                     |  |
|                     | Franklin Township          | 02040302040010   | Hospitality Branch (above Whitehouse Rd)     |
|                     |                            | 02040302040020   | Hospitality Branch (Rt 538 to Whitehouse Rd) |
| 02040302040030      |                            | Hospitality Branch (Piney Hollow Rd to Rt 538)                 |  |

## Surface Water Quality

### (a) Surface Water Classifications

The surface waters in the Great Egg Harbor River Watershed are classified PL or FW2-NT.

The designated uses for PL, Pinelands waters as described by the N.J.A.C. 7:9B-1.12(b) are:

1. Cranberry bog water supply and other agricultural uses;
2. Maintenance, migration, and propagation of the natural and established biota indigenous to this unique ecological system;
3. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection;
4. Primary and secondary contact recreation; and
5. Any other reasonable uses.

The designated uses for surface water classification FW2-NT (non-trout fresh surface waters not designated as FW1 or PL) as described by the N.J.A.C. 7:9B-1.12(c) are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary and secondary contact recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and
5. Any other reasonable uses.

### (b) Surface Water Quality Data

**Ambient Biomonitoring Network** - The NJDEP has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sampling sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by the NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired, based on this 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 AMNET sites within this watershed are shown in Figure GE-4 (see Appendix A) and the most recent AMNET scores for Impaired Waters within this watershed are included in the data in Appendix B.

**Conventional Water Quality Data** – The NJDEP utilizes conventional surface water quality data from a number of sources to bi-annually evaluate the impairment of surface water bodies. These water quality data include the federal Storage and Retrieval repository (STORET) data and other Existing Sources. The STORET and Existing Sources sampling locations within this watershed are shown in Figure GE-4 (Appendix A) and the most recent data for Impaired Waters within this watershed are included in the data in Appendix B.

### (c) Impaired Waters

For the purpose of evaluating surface water quality in this watershed, the NJDEP Integrated List (Sublists 1-5) were abridged and sorted to provide the locations of impaired waters within this watershed and these are listed in Table GE-2. A map showing the locations of impaired water is included as Figure GE-4 (Appendix A). There are six (6) different sites within this watershed that are considered impaired for their designated uses, because they do not meet their respective water quality standards for one or more pollutant parameters. The impaired parameters include: mercury, pH, fecal coliform and total coliform.

**Table GE-2. Great Egg Harbor River Impaired Waters List**

| <u>No.</u> | <u>Location</u>                                | <u>Parameter</u> | <u>Priority</u> |
|------------|--|------------------|-----------------|
| 1.         | Hospitality Branch headwater                   | Fecal Coliform   | High            |
| 2.         | Cranes Lake                                    | Fecal Coliform   | Low             |
| 3.         | Great Egg Harbor -1, 4 thru 11, and 13 thru 14 | Total Coliform   | High            |
| 4a.        | Great Egg Harbor River near Sicklerville       | pH               | Medium          |
| 4b.        | Great Egg Harbor River near Sicklerville       | Mercury          | High            |
| 5.         | Hospitality Branch at Blue Bell Rd. near Cecil | pH               | Medium          |
| 6.         | Hospitality Branch near Cecil                  | pH               | Medium          |

### (d) TMDL Proposals

The NJDEP has proposed one set of TMDLs that address impaired water bodies in this watershed. The full text of these proposals can be found and downloaded at the following link:

<http://www.nj.gov/dep/watershedmgt/tmdl.htm#intro> .

The TMDL was proposed by the NJDEP in April 2003 and was based on the 2002 Integrated Report. This TMDL was approved in September 2003, but has not yet been adopted.

A list of this watershed's TMDL proposals is included in Table GE-3. The locations of TMDL in this watershed is shown on Figure GE-4 Water Quality (Appendix A).

**Table GE-3. Great Egg Harbor River TMDL Proposals**

| <u>Location</u>              | <u>Parameter</u> | <u>Status</u>           |
|------------------------------|------------------|-------------------------|
| Hospitality Branch headwater | Fecal Coliform   | Approved September 2003 |

There is a TMDL proposal for fecal coliform for Hospitality Branch headwater. Waste load allocation reductions have been proposed for the affected waterways. The TMDL proposals discuss possible sources of fecal coliform as well as the method use to develop the TMDLs and remediation plan. (See Section 8 Water Quality-TMDL Stormwater Management Strategies).

### **Category One Waters**

The Great Egg Harbor River Watershed does not have Category One waters within Gloucester County.

### **Hydrogeology**

The Great Egg Harbor River Watershed is in the outcrop of the Kirkwood-Cohansey aquifer system, which is unconfined at the surface and provides the water table aquifer in this portion of Gloucester County.

### **Soils**

The portion of the Great Egg Harbor River Watershed within Gloucester County is predominantly Group B or moderately well-drained soils. Soils of lesser quality (primarily Group C/D) are concentrated along the River and its tributaries in wetlands areas, as well as along the Route 42/322 corridor. Figure GE-5 shows the potential amounts of infiltration and ground water recharge throughout the watershed.

### **Critical Habitats**

The NJDEP Division of Fish and Wildlife Endangered Nongame Species Program developed a Geographic Information System (GIS) called the *Landscape Project*, which is described as a "pro-active, ecosystem-level approach to the long-term protection of imperiled and priority species and their important habitats in New Jersey." Version 2 of the Landscape project is now available interactively on the web and for download. According to the NJDEP's Metadata, "Version 2 was created by intersecting imperiled

and priority species data with NJDEP 1995/97 Land Use/Land Cover update. The resulting data layer identifies, delineates and ranks (based on the conservation status of species present) habitat statewide. Each patch is coded for the number of sightings of priority, state threatened, state endangered and federally listed species present. The data is designed to be used for state and local planning, open space acquisition and land-use regulation.”

The NJDEP Division of Fish and Wildlife describes the *Landscape Project* and the importance of preserving natural habitat as follows:

New Jersey is the most densely populated state in the nation. One of the consequences of this distinction is the extreme pressure that is placed on our natural resources. As the population grows, we continue to lose or impact the remaining natural areas of the state. As more and more habitat is lost, people are beginning to appreciate the benefits and necessity of maintaining land in its natural state.

For example, we know that wetlands are critical for recharging aquifers, lessening the damage from flooding and naturally breaking down contaminants in the environment. Forests and grasslands protect the quality of our drinking water, help purify the air we breathe and provide important areas for outdoor recreation. Collectively, these habitats are of critical importance to the diverse assemblage of wildlife found in New Jersey, including more than 70 species classified as threatened or endangered.

Many imperiled species require large contiguous tracts of habitat for survival. The consequence of the rapid spread of suburban sprawl is the loss and fragmentation of important wildlife habitat and the isolation and degradation of the smaller habitat patches that remain. Small patches of fields, forests and wetlands interspersed with development provide habitat for common species that do well living near humans, but do not provide the necessary habitat for most of our imperiled wildlife. We need to protect large, contiguous blocks of forest, grassland and wetlands to assure the survival of imperiled species over the long-term.

In addition to providing habitat for the conservation of imperiled species, protecting critical wildlife areas will result in more open space for outdoor recreation. Recent surveys by the U.S. Fish and Wildlife Service show that more than 60% of Americans participate in some form of wildlife-related recreation. Open spaces provide places where people can escape the confines of urban and suburban living.

Most critical habitats are supported in part or in total by the surrounding surface and groundwater water resources, and they are consequently impacted by development, non-

point source pollution and stormwater runoff. Critical Habitats mapped by the NJDEP's Landscape Project within this watershed are shown on Figure GE-6. These Critical Habitats within this watershed may include Grassland, Forest, Forested Wetland, Emerging Wetland, Beach, Bald Eagle Foraging, Urban Peregrine Falcon Nesting, and Wood Turtle habitats that should, to the extent practical, be conserved and protected from the adverse impacts caused by uncontrolled development and stormwater runoff.

## **Section 5. Build-Out Analysis and Pollutant Loading Projections**

Build-out analyses and pollutant loading projections have been prepared for each municipality, HUC14 and watershed within Gloucester County, generally in accordance with the NJDEP's methodology described by their guidance and regulations. The build-out analyses and pollutant loading projections are tools to assess the potential impacts from development and stormwater runoff within each of the County's municipalities and watersheds.

Some municipalities in Gloucester County are essentially fully developed ("built-out"); little new development can or will occur in these municipalities. However, the potential for significant redevelopment exists in these highly developed municipalities, and the existing development in built-out municipalities contributes pollutants to the watershed. Thus, all of the municipalities in the County, regardless of their remaining developable land areas were evaluated in the County's build-out analyses and pollutant loading projections.

Furthermore, in order to add more meaning to the pollutant loading projections, the County has compared present land use and future (build-out) land use by projecting the pollutant loadings under both conditions. The County utilized powerful GIS data management and mapping software to perform these analyses for each municipality, HUC14 and watershed.

The build-out analyses and pollutant loading projections allow municipalities, the County and others to quantifiably project the impacts from development on surface waters. Using this tool, municipalities and the County are in a better position to develop strategies to minimize, manage and/or mitigate these impacts through improved stormwater management and construction practices and potentially through modifications to the land use and zoning, before build-out occurs.

Build-out analyses and pollutant loading projections are a tool and an initial step for assessing and quantifying adverse impacts from development and stormwater runoff. There are, however, a number of reservations associated with the NJDEP's Build-out methodology, and with build-out and pollutant loading analyses in general.

1. The methodology over-simplifies the complex hydrologic and pollutant transport mechanisms associated with these processes and development.
2. The methodology does not account for the transient nature of development within a given municipality and watershed. It ignores the differences in time over which build-out will occur. For example, one municipality or portion of a watershed

might take 10 years to essentially build-out, while another might take 100 years or more.

3. The impervious surface coverage analyses presume that all development within a zone occur at the maximum impervious coverage permitted within the zone. Although it would be reasonable to assume an average impervious coverage, the maximum permitted impervious coverage is the extreme. Furthermore, many municipal land use zones do not specify a maximum impervious coverage and an assumption must be used that may not be optimal (similar zones in other municipalities within the County were used to estimate impervious coverage).
4. The NJDEP presented very little information about the origin and conditions that apply to their land cover pollutant loading coefficients for total phosphorus, total nitrogen and total suspended solids. For example, what are the climatic, soils, hydrologic, geologic, topographic, and vegetative conditions that these coefficients represent, and even more importantly, what stormwater runoff controls were employed that generated these coefficients? Without this information, it is not possible to fully understand the implications of pollutant loadings using these coefficients. The methodology is highly sensitive to these coefficients.
5. Because the NJDEP's methodology projects pollutant loadings for only three parameters, total phosphorus, total nitrogen and total suspended solids, the pollutant loading projections are biased against agricultural land uses. For example, changes in land use from agriculture to low density rural development occurs throughout much of Gloucester County. The NJDEP's pollutant loading coefficients for agriculture are two to three times greater than those for low density residential development. The resulting annual pollutant loadings will then be two to three times lower for land transitioning from agriculture to residential development.

This might be misconstrued to imply that the loss of agricultural lands to residential development is somehow desirable. Furthermore, because of the significant amount of agricultural land in some municipalities and watersheds in Gloucester County, the method makes residentially and commercially developed municipalities and watersheds appear less prone to the impacts of nonpoint source pollution, which is not the case.

In Gloucester County and other similar areas in New Jersey, agriculture is recognized as being fundamentally important and vital to society, and as such the County does not advocate transitioning from agricultural land uses to residential or other more intense forms of development.

6. The NJDEP's land cover coefficients do not appear to consider or incorporate the new stormwater management techniques now required by the new New Jersey stormwater regulations and the new LID BMP strategies. Furthermore, most

municipalities have required some form of stormwater runoff control in new development for 20 years or more. The NJDEP land cover coefficients may, therefore, be very conservative with respect to present development conditions and greatly overestimate the adverse impacts at build-out.

7. In addition to nitrogen, phosphorous and suspended solids there are a number of other pollutants associated with non-point source pollution and stormwater runoff from development. These include among other parameters, petroleum hydrocarbons, metals and pathogenic organisms which are not currently accounted for by the NJDEP's methodology.
8. Malfunctioning and/or inadequate onsite wastewater disposal systems are believed to be a major source of non-point pollution. The NJDEP's method does not account for pollution resulting from onsite systems.

Despite these reservations, the build-out analyses and pollutant loading projections are valuable tools for assessing the potential impacts from development and stormwater runoff. The build out analyses and pollutant loading projections in Gloucester County have been developed with the flexibility to easily adjust the pollutant loading coefficients, zoning and other elements of the analyses and projections. The County utilized powerful GIS data management and mapping software to perform these analyses and create this flexibility for each municipality, HUC14 and Watershed. In the future, municipalities and the County may choose to make adjustments that will better project the impacts of stormwater runoff and development.

The following GIS-based method was used for the build-out analyses and pollutant loading projections and to prepare the figures presented in this report.

1. Using GIS digital coverages from the NJDEP and DVRPC (existing land use), the eight Watersheds, 54 HUC14 areas and the 24 municipalities within the County were identified, their boundaries delineated and the results saved as a GIS feature layers. ESRI's ArcGIS mapping software was then used to provide the land areas of existing land uses within each of the HUC14s, watersheds and municipalities.
2. Using the Gloucester County Planning Department's GIS data, municipal zoning areas were integrated with the HUC14 drainage areas to establish the zoning within each municipality and HUC14 drainage area. Municipal zoning is highly variable throughout the County. A "crosswalk" was used to associate all municipal zones with the zones provided by the NJDEP for pollutant loading projections.
3. Existing (present) impervious land coverage was determined for each HUC14 and municipality using aerial mapping techniques.
4. Constrained areas were determined from the NJDEP's and the County's GIS coverages, including surficial water bodies, wetland areas, Category One resource

protection areas and their associated 300 foot buffers, designated open space and protected park areas. These were saved as GIS feature layers and integrated with the existing land use, HUC14 and municipal zoning feature layers. The build-out amount of impervious land coverage within each HUC14 and municipality was then calculated from the zoning layer.

Build-out land areas available for new development and redevelopment were calculated by subtracting the constrained areas from the developable areas based on zoning for each HUC14, Watershed and municipality. In essence, the land available for new development is agricultural, forest and/or barren lands and the land available for redevelopment consists of the existing residential, commercial and industrially zoned areas.

5. The build-out (future) impervious surface coverage was calculated by multiplying build-out land areas available for new development and redevelopment by the maximum impervious surface coverage, using (whenever available) the maximum impervious surface coverage percentages specified within each municipal zoning ordinance for that area.
6. Pollutant loading projections were calculated for each municipality and HUC14, using the pollutant loading coefficients provided by the NJDEP Stormwater BMP Manual and shown in Table 9. Pollutant loading projections were made for all 24 municipalities, 54 HUC14s and the eight Watersheds for both the existing land use (present) and build-out (future) conditions.

**Table 9. Pollutant Loads For Various Land Cover Types**

| <u>Land Cover</u>                | <u>Total Phosphorus Load</u><br>(lbs/acre/year) | <u>Total Nitrogen Load</u><br>(lbs/acre/year) | <u>Total Suspended Solids Load</u><br>(lbs/acre/yr) |
|----------------------------------|---|---|---|
| High, Medium Density Residential | 1.4   | 15  | 140   |
| Low Density, Rural Residential   | 0.6   | 5   | 100   |
| Commercial                       | 2.1   | 22  | 200   |
| Industrial                       | 1.5   | 16  | 200   |
| Urban, Mixed Urban, Other Urban  | 1.0   | 10  | 120   |
| Agricultural                     | 1.3   | 10  | 300   |
| Forest, Water, Wetlands          | 0.1   | 3   | 40  |
| Barrenland/Transitional Area     | 0.5   | 5   | 60  |

Source: NJDEP Stormwater BMP Manual 2004.

## **FRANKLIN TOWNSHIP**

### **Build-Out, Impervious Cover and Pollutant Loading Projections**

The results of the Franklin Township Build-out analysis, including the existing and build-out (future) conditions, are presented in Table 10. This table provides the total area, constrained area, and developable area in acres for each HUC14 within Franklin Township.

Table 10 also provides the impervious areas in acres and percent for both existing and build-out conditions, in order to allow comparison of the results for these conditions. In general, impervious percentages greater than about 10 to 15 percent may indicate potential watershed impairment from stormwater and development. The total pollutant loadings for phosphorous, nitrogen and total suspended solids are projected in pounds per year for both the existing and build-out conditions, in order to allow comparison of the pollutant loadings.

Included in this plan and in the New Jersey Stormwater Management Regulations and guidance are strategies to minimize, manage and/or mitigate build-out impacts, through improved stormwater management and construction practices. In addition, modifications to current land use and zoning will change the build-out impacts and the County's GIS can be used to evaluate the results of such changes.

# Table 10. Franklin Township Pollutant Loading Projections

| HUC14 Sub-Watershed | Name   | Area (Acres)     |                  |                  | Impervious Area |                 |              | Total Pol     |               |               |              |
|---------------------|--|------------------|------------------|------------------|-----------------|-----------------|--------------|---------------|---------------|---------------|--------------|
|                     |  | Total            | Developable      |                  | Acres           | Percent         |              |               |               |               |              |
|                     |  |                  | Constrained      | Existing         |                 | Build-Out       | Existing     |               | Build-Out     | Phosphorus    |              |
|                     |  |                  | Existing         | Build-Out        | Existing        | Build-Out       | Existing     | Build-Out     | Existing      | Build-Out     |              |
| :040010             | Hospitality Branch (above Whitehouse Rd)                         | 302.48           | 8.47             | 294.01           | 22.43           | 66.90           | 7.42%        | 22.12%        | 156           | 284           | 1.5          |
| :040020             | Hospitality Branch (Rt 538 to Whitehouse Rd)                     | 1,668.29         | 162.96           | 1,505.33         | 73.17           | 233.36          | 4.39%        | 13.99%        | 831           | 957           | 8.2          |
| :040030             | Hospitality Branch (Piney Hollow Rd to Rt 538)                   | 1,427.35         | 560.66           | 866.69           | 22.21           | 55.25           | 1.56%        | 3.87%         | 278           | 271           | 3.6          |
| :040040             | White Oak Branch (Hospitality Branch)                            | 2,557.89         | 1,167.90         | 1,389.99         | 47.35           | 200.15          | 1.85%        | 7.82%         | 633           | 852           | 6.9          |
| :040050             | Collings Lakes tributary (Hospitality Branch)                    | <u>7,138.54</u>  | <u>2,748.45</u>  | <u>4,390.08</u>  | <u>168.09</u>   | <u>704.29</u>   | <u>2.35%</u> | <u>9.87%</u>  | <u>3,193</u>  | <u>2,856</u>  | <u>29.2</u>  |
|                     | <b>Sub-Total</b>   | <b>13,094.55</b> | <b>4,648.44</b>  | <b>8,446.10</b>  | <b>333.25</b>   | <b>1,259.95</b> | <b>2.54%</b> | <b>9.62%</b>  | <b>5,091</b>  | <b>5,220</b>  | <b>49.7</b>  |
| :120020             | Little Ease Run (below Academy Rd)                               | 2,298.46         | 627.08           | 1,671.36         | 141.51          | 444.84          | 6.16%        | 19.35%        | 1,231         | 1,835         | 11.3         |
| :120040             | Reed Branch (Still Run)  | 1,396.13         | 274.95           | 1,121.18         | 32.09           | 168.18          | 2.30%        | 12.05%        | 1,078         | 673           | 9.0          |
| :120050             | Still Run (Willow Grove Lake - Silver Lake Rd)                   | 2,924.91         | 743.52           | 2,181.39         | 162.49          | 405.15          | 5.56%        | 13.85%        | 1,550         | 1,577         | 14.4         |
| :130010             | Scotland Run (above Fries Mill)                                  | 77.62            | 0.94             | 76.69            | 4.89            | 11.50           | 6.30%        | 14.82%        | 80            | 46            | 6            |
| :130020             | Scotland Run (Delsea Drive to Fries Mill)                        | 4,524.13         | 1,175.50         | 3,348.63         | 195.10          | 534.52          | 4.31%        | 11.81%        | 1,500         | 2,147         | 16.3         |
| :130030             | Indian Branch (Scotland Run)                                     | 4,234.54         | 1,287.92         | 2,946.62         | 113.82          | 441.99          | 2.69%        | 10.44%        | 1,244         | 1,768         | 13.9         |
| :130040             | Scotland Run (below Delsea Drive)                                | 3,927.97         | 650.60           | 3,277.38         | 201.73          | 619.86          | 5.14%        | 15.78%        | 2,174         | 2,525         | 20.9         |
| :140010             | Maurice River (Blackwater Branch to/including Willow Grove Lake) | 109.21           | 0.00             | 109.21           | 4.29            | 16.59           | 3.93%        | 15.19%        | 30            | 66            | 4            |
| :140020             | Burnt Mill Branch/Hudson Branch                                  | 1,928.35         | 228.86           | 1,699.48         | 92.94           | 327.32          | 4.82%        | 16.97%        | 1,376         | 1,247         | 12.5         |
| :140040             | Blackwater Branch (above/including Pine Br)                      | <u>1,652.33</u>  | <u>370.46</u>    | <u>1,281.86</u>  | <u>68.74</u>    | <u>223.53</u>   | <u>4.16%</u> | <u>13.53%</u> | <u>1,119</u>  | <u>862</u>    | <u>9.8</u>   |
|                     | <b>Sub-Total</b>   | <b>23,073.65</b> | <b>5,359.83</b>  | <b>17,713.80</b> | <b>1,017.60</b> | <b>3,193.48</b> | <b>4.41%</b> | <b>13.84%</b> | <b>11,382</b> | <b>12,746</b> | <b>109.5</b> |
|                     | <b>Total</b>   | <b>36,168.20</b> | <b>10,008.27</b> | <b>26,159.90</b> | <b>1,350.85</b> | <b>4,453.43</b> | <b>3.73%</b> | <b>12.31%</b> | <b>16,473</b> | <b>17,967</b> | <b>159.2</b> |

## **MAURICE RIVER WATERSHED**

### **Build-out, Impervious Cover and Pollutant Loading Projections**

The Maurice River watershed is located in the southeastern portion of Gloucester County and includes municipalities in Gloucester, Cumberland and Salem Counties. Gloucester County occupies less than 20 percent of the watershed. These build-out projections include Gloucester County municipalities and their relative contribution (area) to the watershed: Franklin Township (49%), Elk Township (18%), Monroe Township (13%), Clayton Borough (10%), Glassboro Borough (6%), Washington Township (3%) and Newfield Borough (2%). Figure MR-7 (see Appendix A) shows the existing land use, based on DVRPC 2000 land use data. Figure MR-8 (see Appendix A) shows the constrained areas in the watershed.

The watershed is largely undeveloped; approximately 50 percent is wooded land and approximately 25 percent is agriculture. The results of the Maurice River Watershed build-out analysis, including both existing and build-out (future) conditions, are presented in Table MR-4. This table provides the total area, constrained area, and developable area in acres for each HUC14 within the watershed and County.

Table MR-4 also provides the impervious areas in both acres and percent for existing and build-out conditions, in order to allow comparison of the results. In general, impervious percentages greater than about 10 to 15 percent may indicate potential watershed impairment from stormwater and development. The total pollutant loadings for phosphorous, nitrogen and total suspended solids are projected in pounds per year for both the existing and build-out conditions, in order to allow comparison of the pollutant loadings.

HUC14 Subwatershed

Area (Acres)

Impervious Area

Total Poll

| Name   | Total           |                 |                  | Developable      |                 |                  | Acres           |                 |                 | Percent      |               |               | Phosphorus    |               |               |
|--|-----------------|-----------------|------------------|------------------|-----------------|------------------|-----------------|-----------------|-----------------|--------------|---------------|---------------|---------------|---------------|---------------|
|  | Existing        | Build-Out       | Total            | Existing         | Build-Out       | Total            | Existing        | Build-Out       | Total           | Existing     | Build-Out     | Total         | Existing      | Build-Out     | Total         |
| Little Ease Run (above Academy Rd)           | 114.64          | 457.14          | 2,071.26         | 796.98           | 1,274.24        | 1,274.24         | 114.64          | 457.14          | 571.78          | 5.53%        | 22.07%        | 27.60%        | 715           | 1,129         | 1,844         |
| Little Ease Run (below Academy Rd)           | 85.99           | 259.41          | 827.25           | 681.15           | 146.09          | 827.25           | 85.99           | 259.41          | 345.40          | 10.39%       | 31.36%        | 36.75%        | 490           | 912           | 1,402         |
| Still Run (above Silver Lake Rd)             | 6.77            | 82.50           | 316.85           | 169.84           | 147.01          | 316.85           | 6.77            | 82.50           | 89.27           | 2.14%        | 26.04%        | 28.18%        | 164           | 181           | 345           |
| Still Run (Willow Grove Lake-Silver Lake Rd) | 148.67          | 332.94          | 829.32           | 665.59           | 163.72          | 829.32           | 148.67          | 332.94          | 501.61          | 17.93%       | 40.15%        | 58.08%        | 557           | 959           | 1,516         |
| Little Ease Run (above Academy Rd)           | 24.75           | 84.90           | 573.54           | 192.00           | 381.55          | 573.54           | 24.75           | 84.90           | 109.65          | 4.32%        | 14.80%        | 19.12%        | 104           | 168           | 272           |
| Little Ease Run (below Academy Rd)           | 2.60            | 4.69            | 30.93            | 12.85            | 18.08           | 30.93            | 2.60            | 4.69            | 7.29            | 8.41%        | 15.16%        | 22.57%        | 15            | 9             | 24            |
| <b>Sub-Total</b>                             | <b>383.42</b>   | <b>1,221.58</b> | <b>4,649.15</b>  | <b>2,518.41</b>  | <b>2,130.69</b> | <b>4,649.15</b>  | <b>383.42</b>   | <b>1,221.58</b> | <b>2,605.00</b> | <b>8.25%</b> | <b>26.28%</b> | <b>34.53%</b> | <b>2,045</b>  | <b>3,358</b>  | <b>5,403</b>  |
| Little Ease Run (above Academy Rd)           | 1.08            | 2.37            | 8.00             | 7.91             | 0.09            | 8.00             | 1.08            | 2.37            | 3.45            | 13.50%       | 29.63%        | 43.13%        | 2             | 11            | 13            |
| Still Run (above Silver Lake Rd)             | 149.36          | 694.23          | 3,250.69         | 2,360.57         | 890.11          | 3,250.69         | 149.36          | 694.23          | 843.59          | 4.59%        | 21.36%        | 25.95%        | 2,190         | 2,652         | 4,842         |
| Reed Branch (Still Run)                      | 100.01          | 1,191.42        | 3,426.98         | 1,948.64         | 1,478.34        | 3,426.98         | 100.01          | 1,191.42        | 1,291.43        | 2.92%        | 34.77%        | 37.69%        | 1,899         | 3,464         | 5,363         |
| Still Run (Willow Grove Lake-Silver Lake Rd) | 83.74           | 304.36          | 1,543.87         | 1,128.65         | 415.22          | 1,543.87         | 83.74           | 304.36          | 388.10          | 5.42%        | 19.71%        | 25.13%        | 983           | 1,166         | 2,149         |
| <b>Sub-Total</b>                             | <b>334.19</b>   | <b>2,192.38</b> | <b>8,229.54</b>  | <b>5,445.77</b>  | <b>2,783.76</b> | <b>8,229.54</b>  | <b>334.19</b>   | <b>2,192.38</b> | <b>2,928.15</b> | <b>4.06%</b> | <b>26.64%</b> | <b>30.70%</b> | <b>5,074</b>  | <b>7,294</b>  | <b>12,368</b> |
| Little Ease Run (below Academy Rd)           | 141.51          | 444.84          | 2,298.46         | 1,671.36         | 627.08          | 2,298.46         | 141.51          | 444.84          | 586.35          | 6.16%        | 19.35%        | 25.51%        | 1,231         | 1,835         | 3,066         |
| Reed Branch (Still Run)                      | 32.09           | 168.18          | 1,396.13         | 1,121.18         | 274.95          | 1,396.13         | 32.09           | 168.18          | 200.27          | 2.30%        | 12.05%        | 14.35%        | 1,078         | 673           | 1,751         |
| Still Run (Willow Grove Lake-Silver Lake Rd) | 162.49          | 405.15          | 2,924.91         | 2,181.39         | 743.52          | 2,924.91         | 162.49          | 405.15          | 564.91          | 5.56%        | 13.85%        | 19.41%        | 1,550         | 1,577         | 3,127         |
| Little Ease Run (above Academy Rd)           | 4.89            | 11.50           | 77.62            | 76.69            | 0.94            | 77.62            | 4.89            | 11.50           | 16.39           | 6.30%        | 14.82%        | 21.12%        | 80            | 46            | 126           |
| Little Ease Run (below Academy Rd)           | 195.10          | 534.52          | 4,524.13         | 3,348.63         | 1,175.50        | 4,524.13         | 195.10          | 534.52          | 729.62          | 4.31%        | 11.81%        | 16.12%        | 1,500         | 2,147         | 3,647         |
| Still Run (above Silver Lake Rd)             | 113.82          | 441.99          | 4,234.54         | 2,946.62         | 1,287.92        | 4,234.54         | 113.82          | 441.99          | 555.81          | 2.69%        | 10.44%        | 13.13%        | 1,244         | 1,768         | 3,012         |
| Reed Branch (Still Run)                      | 201.73          | 619.86          | 3,927.97         | 3,277.38         | 650.60          | 3,927.97         | 201.73          | 619.86          | 821.59          | 5.14%        | 15.78%        | 21.92%        | 2,174         | 2,525         | 4,699         |
| Little Ease Run (above Academy Rd)           | 4.29            | 16.59           | 109.21           | 109.21           | 0.00            | 109.21           | 4.29            | 16.59           | 20.88           | 3.93%        | 15.19%        | 19.12%        | 30            | 66            | 96            |
| Little Ease Run (below Academy Rd)           | 92.94           | 327.32          | 1,928.35         | 1,699.48         | 228.86          | 1,928.35         | 92.94           | 327.32          | 426.26          | 4.82%        | 16.97%        | 21.79%        | 1,376         | 1,247         | 2,623         |
| Reed Branch (Still Run)                      | 68.74           | 223.53          | 1,652.33         | 1,281.86         | 370.46          | 1,652.33         | 68.74           | 223.53          | 292.27          | 4.16%        | 13.53%        | 17.69%        | 1,119         | 862           | 1,981         |
| <b>Sub-Total</b>                             | <b>1,017.60</b> | <b>3,193.48</b> | <b>23,073.65</b> | <b>17,713.80</b> | <b>5,359.83</b> | <b>23,073.65</b> | <b>1,017.60</b> | <b>3,193.48</b> | <b>8,173.63</b> | <b>4.41%</b> | <b>13.84%</b> | <b>18.25%</b> | <b>11,382</b> | <b>12,746</b> | <b>24,128</b> |
| Little Ease Run (above Academy Rd)           | 170.37          | 311.90          | 2,159.52         | 692.65           | 1,466.88        | 2,159.52         | 170.37          | 311.90          | 482.27          | 7.89%        | 14.44%        | 22.33%        | 529           | 1,060         | 1,589         |
| Still Run (above Silver Lake Rd)             | 108.59          | 237.66          | 649.29           | 497.73           | 151.57          | 649.29           | 108.59          | 237.66          | 346.25          | 16.72%       | 36.60%        | 53.32%        | 333           | 726           | 1,059         |
| <b>Sub-Total</b>                             | <b>278.96</b>   | <b>549.56</b>   | <b>2,808.81</b>  | <b>1,190.38</b>  | <b>1,618.45</b> | <b>2,808.81</b>  | <b>278.96</b>   | <b>549.56</b>   | <b>832.52</b>   | <b>9.93%</b> | <b>19.57%</b> | <b>28.65%</b> | <b>862</b>    | <b>1,786</b>  | <b>2,648</b>  |
| Little Ease Run (above Academy Rd)           | 93.50           | 595.96          | 1,765.74         | 1,373.59         | 392.15          | 1,765.74         | 93.50           | 595.96          | 788.69          | 5.30%        | 33.75%        | 39.05%        | 1,139         | 2,277         | 3,416         |
| Little Ease Run (above Academy Rd)           | 353.56          | 1,284.73        | 4,218.97         | 3,070.72         | 1,148.24        | 4,218.97         | 353.56          | 1,284.73        | 1,638.29        | 8.38%        | 30.45%        | 38.83%        | 1,952         | 4,958         | 6,910         |
| Little Ease Run (below Academy Rd)           | 0.02            | 0.26            | 1.05             | 1.05             | 0.00            | 1.05             | 0.02            | 0.26            | 0.28            | 1.90%        | 24.76%        | 26.66%        | 1             | 1             | 2             |
| <b>Sub-Total</b>                             | <b>447.08</b>   | <b>1,880.95</b> | <b>5,985.76</b>  | <b>4,445.36</b>  | <b>1,540.39</b> | <b>5,985.76</b>  | <b>447.08</b>   | <b>1,880.95</b> | <b>2,427.25</b> | <b>7.47%</b> | <b>31.42%</b> | <b>38.89%</b> | <b>3,092</b>  | <b>7,236</b>  | <b>10,328</b> |
| Little Ease Run (below Academy Rd)           | 132.45          | 200.68          | 1,118.40         | 987.02           | 131.40          | 1,118.40         | 132.45          | 200.68          | 333.13          | 11.84%       | 17.94%        | 24.78%        | 669           | 898           | 1,567         |
| Little Ease Run (above Academy Rd)           | 42.04           | 52.91           | 257.61           | 235.27           | 22.34           | 257.61           | 42.04           | 52.91           | 94.95           | 16.32%       | 20.54%        | 26.86%        | 151           | 281           | 432           |
| Little Ease Run (above Academy Rd)           | 710.57          | 284.77          | 1,095.38         | 655.77           | 439.61          | 1,095.38         | 710.57          | 284.77          | 995.34          | 10.98%       | 26.07%        | 37.05%        | 900           | 1,000         | 1,900         |

## **GREAT EGG HARBOR RIVERWATERSHED**

### **Build-out, Impervious Cover and Pollutant Loading Projections**

The Great Egg Harbor River watershed is located in the northeastern portion of Gloucester County and includes municipalities in Gloucester and Atlantic Counties. Gloucester County occupies less than 20 percent of the watershed. These build-out projections include Gloucester County municipalities and their relative contribution (area) to the watershed: Monroe Township (65%) and Franklin Township (35%). Figure GE-7 (see Appendix A) shows the existing land use, based on DVRPC 2000 land use data. Figure GE-8 (see Appendix A) shows the constrained areas in the watershed.

The Gloucester County portion of the watershed is largely rural and is comprised of undeveloped lands (wood lands and agriculture), although the northern portion of Monroe Township has been experiencing development. The results of the Great Egg Harbor River Watershed build-out analysis, including both existing and build-out (future) conditions, are presented in Table GE-4. This table provides the total area, constrained area, and developable area in acres for each HUC14 within the watershed and County.

Table GE-4 also provides the impervious areas in both acres and percent for existing and build-out conditions, in order to allow comparison of the results. In general, impervious percentages greater than about 10 to 15 percent may indicate potential watershed impairment from stormwater and development. The total pollutant loadings for phosphorous, nitrogen and total suspended solids are projected in pounds per year for both the existing and build-out conditions, in order to allow comparison of the pollutant loadings.

# TABLE 4. GREAT EGG HARBOR RIVER WATERSHED NONPOINT LOADING PROJECTIONS

| HUC14 Sub-Watershed |  | Area (Acres)     |                  |                  |                 | Impervious Area |              |               |               | Total Pollut  |                |    |
|---------------------|--|------------------|------------------|------------------|-----------------|-----------------|--------------|---------------|---------------|---------------|----------------|----|
|                     | Name   | Total            | Constrained      | Developable      | Acres           |                 | Percent      |               | Phosphorus    |               |                |    |
|                     |  |                  |                  |                  | Existing        | Build-Out       | Existing     | Build-Out     | Existing      | Build-Out     | Existing       | Ni |
|                     |  |                  |                  |                  |                 |                 |              |               |               |               |                |    |
| 10                  | Hospitality Branch (above Whitehouse Rd)                       | 302.48           | 8.47             | 294.01           | 22.43           | 66.90           | 7.42%        | 22.12%        | 156           | 284           | 1,572          |    |
| 20                  | Hospitality Branch (Rt 538 to Whitehouse Rd)                   | 1,668.29         | 162.96           | 1,505.33         | 73.17           | 233.36          | 4.39%        | 13.99%        | 831           | 957           | 8,262          |    |
| 30                  | Hospitality Branch (Piney Hollow Rd to Rt 538)                 | 1,427.35         | 560.66           | 866.69           | 22.21           | 55.25           | 1.56%        | 3.87%         | 278           | 271           | 3,681          |    |
| 40                  | White Oak Branch (Hospitality Branch)                          | 2,557.89         | 1,167.90         | 1,389.99         | 47.35           | 200.15          | 1.85%        | 7.82%         | 633           | 852           | 6,905          |    |
| 50                  | Collings Lakes tributary (Hospitality Branch)                  | <u>7,138.54</u>  | <u>2,748.45</u>  | <u>4,390.08</u>  | <u>168.09</u>   | <u>704.29</u>   | <u>2.35%</u> | <u>9.87%</u>  | <u>3,193</u>  | <u>2,856</u>  | <u>29,296</u>  |    |
|                     | <b>Sub-Total</b>   | <b>13,094.55</b> | <b>4,648.44</b>  | <b>8,446.10</b>  | <b>333.25</b>   | <b>1,259.95</b> | <b>2.54%</b> | <b>9.62%</b>  | <b>5,091</b>  | <b>5,220</b>  | <b>49,716</b>  |    |
| 30                  | Four Mile Branch (Great Egg Harbor River)                      | 3,003.75         | 813.13           | 2,190.62         | 380.72          | 736.14          | 12.67%       | 24.51%        | 1,388         | 3,342         | 13,917         |    |
| 40                  | Great Egg Harbor River (Broad Lane Road to AC Expressway)      | 1,598.22         | 479.31           | 1,118.91         | 45.02           | 116.60          | 2.82%        | 7.30%         | 563           | 763           | 6,141          |    |
| 50                  | Squankum Branch (Great Egg Harbor River)                       | 4,785.34         | 1,072.47         | 3,712.88         | 474.85          | 795.97          | 9.92%        | 16.63%        | 2,364         | 4,097         | 24,224         |    |
| 50                  | Great Egg Harbor River (Piney Hollow Rd to Broad Lane Rd)      | 1,098.76         | 930.58           | 168.18           | 8.76            | 8.35            | 0.80%        | 0.76%         | 69            | 17            | 763            |    |
| 80                  | Great Egg Harbor River (Hospitality Branch to Piney Hollow Rd) | 1,871.85         | 1,409.31         | 462.54           | 48.38           | 57.53           | 2.58%        | 3.07%         | 388           | 521           | 4,038          |    |
| 10                  | Hospitality Branch (above Whitehouse Rd)                       | 4,889.56         | 1,200.68         | 3,688.90         | 279.33          | 616.28          | 5.71%        | 12.60%        | 2,662         | 4,400         | 24,797         |    |
| 20                  | Hospitality Branch (Rt 538 to Whitehouse Rd)                   | 2,281.78         | 540.06           | 1,741.72         | 129.45          | 171.36          | 5.67%        | 7.51%         | 1,024         | 1,528         | 10,577         |    |
| 30                  | Hospitality Branch (Piney Hollow Rd to Rt 538)                 | 2,295.89         | 1,037.99         | 1,257.89         | 54.65           | 40.43           | 2.38%        | 1.76%         | 478           | 841           | 5,784          |    |
| 40                  | White Oak Branch (Hospitality Branch)                          | 1,115.19         | 599.31           | 515.87           | 6.94            | 15.48           | 0.62%        | 1.39%         | 192           | 310           | 2,677          |    |
| 50                  | Collings Lakes tributary (Hospitality Branch)                  | 570.03           | 376.85           | 193.17           | 1.82            | 5.80            | 0.32%        | 1.02%         | 62            | 116           | 867            |    |
| 70                  | Hospitality Branch (below Piney Hollow Rd)                     | <u>392.26</u>    | <u>215.52</u>    | <u>176.73</u>    | <u>16.98</u>    | <u>6.56</u>     | <u>4.33%</u> | <u>1.67%</u>  | <u>80</u>     | <u>150</u>    | <u>926</u>     |    |
|                     | <b>Sub-Total</b>   | <b>23,902.63</b> | <b>8,675.21</b>  | <b>15,227.41</b> | <b>1,446.90</b> | <b>2,570.50</b> | <b>6.05%</b> | <b>10.75%</b> | <b>9,269</b>  | <b>16,086</b> | <b>94,711</b>  |    |
|                     | <b>Total</b>   | <b>36,997.18</b> | <b>13,323.65</b> | <b>23,673.51</b> | <b>1,780.15</b> | <b>3,830.45</b> | <b>4.81%</b> | <b>10.35%</b> | <b>14,361</b> | <b>21,306</b> | <b>144,427</b> |    |

## **Section 6. Design and Performance Standards**

Franklin Township must amend its land use ordinances to incorporate 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. This requirement will be met by adopting a Municipal Stormwater Control Ordinance that meets these requirements or by amending an existing stormwater control ordinance to meet these requirements.

The design and performance standards in the adopted or amended ordinance must 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.

After adoption or amendment of the ordinance, it must be submitted to the County, along with this MSWMP, for approval.

Furthermore, during construction of major development within Franklin Township, municipal inspectors must observe the construction of stormwater management measures to ensure that they are constructed and function as designed.

The New Jersey stormwater design and performance standards represent an initial effort to control non-point sources of pollution and to improve groundwater recharge. The effective control of point sources of pollution took many years. The USEPA and the NJDEP believe that further water quality improvements can now best be achieved by controlling non-point sources of pollution and stormwater runoff.

New stormwater management measures and design and performance standards will emerge over the ensuing years. The stormwater rules, NJPDES stormwater permits, and municipal stormwater plans and ordinances will similarly evolve and require amendments. Municipalities will be expected to control stormwater runoff, to improve or maintain surface water quality and groundwater recharge and to continue to utilize appropriate stormwater design and performance standards to achieve this goal.

With the increasing emphasis on non-point source pollution and concerns over the adverse impacts of uncontrolled land development, effective alternatives to the centralized stormwater conveyance and treatment strategies have been developed that are the basis for many of the new stormwater management standards in the State. New strategies have been developed to minimize and even prevent adverse stormwater runoff impacts from occurring.

Such strategies, known collectively as Low Impact Development techniques or LIDs, reduce and/or prevent adverse runoff impacts through sound site planning and both nonstructural and structural techniques that preserve or closely mimic a site's natural or pre-developed hydrologic response to precipitation. These new stormwater management strategies are explained in more detail in Section 8 of this MSWMP.

## Section 7. Plan Consistency

There are no approved Regional Stormwater Management Plans (RSWMPs) in Gloucester County at this time. However, Regional Stormwater Management Planning is being conducted by the County Planning Department, NJ Soil Conservation Districts/Program and Rowan University in portions of a number of the County's watersheds. These include portions of the Maurice River (upper portions, including Scotland Run, Little Ease Run and Still Run), Raccoon Creek (upper portions) and Mantua Creek (Chestnut Branch).

The Gloucester County Stormwater Management Program is working closely with these regional efforts. When these or any future RSWMPs are approved by the appropriate regional water quality management planning agency and NJDEP, and adopted as part of the regional water quality management plan, the new New Jersey stormwater management regulations require that municipal stormwater management plans be revised to provide consistency.

Presently, TMDLs have been proposed for certain surface water bodies in Gloucester County. Section 4 of this MSWMP addresses impaired surface waters, TMDLs and supporting surface water quality data. When these ongoing TMDL proposals or any future TMDLs proposals are finally approved, the new New Jersey stormwater management regulations require that municipal stormwater management plans be revised to provide consistency.

The Franklin Township MSWMP is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. Franklin Township 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.

Furthermore, Franklin Township's stormwater management ordinance(s) will require all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, municipal inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the Gloucester County Soil Conservation District.

## Section 8. Stormwater Management Strategies

### Low Impact Development Techniques

The NJDEP's new Stormwater Management Rules include the specific provisions that must be addressed in a municipal stormwater management plan (N.J.A.C. 7:8-4.2(c)). One of these requirements is that the plan include an evaluation of the extent to which the master plan (including the land use element), official map, and development regulations (including zoning ordinances) implement the principles of the Stormwater Management Rules relating to nonstructural stormwater management strategies (N.J.A.C. 7:8-5.3(b)).

New stormwater management techniques have been developed that minimize and prevent adverse stormwater effects from land disturbance. These techniques are referred to by the NJDEP as Low Impact Development techniques (LIDs) and include both nonstructural and structural Best Management Practices (BMPs). LID-BMPs first minimize quantitative and qualitative changes to a site's pre-developed hydrology (i.e., employ nonstructural techniques first) and then provide stormwater management through smaller sized structural techniques distributed throughout the site. The link to the NJDEP website to download the BMP Manual is:

[http://www.njstormwater.org/bmp\\_manual2.htm](http://www.njstormwater.org/bmp_manual2.htm)

Nonstructural LID-BMPs include such practices as minimizing site disturbance, preserving important site features, reducing and disconnecting impervious cover, flattening slopes, utilizing native vegetation, minimizing turf grass lawns and maintaining natural drainage features. It may be possible at some sites to satisfy all stormwater management requirements through nonstructural LID-BMPs. Structural BMPs are considered LIDs if they are located close to the source of runoff. Structural LID-BMPs include various types of basins, filters, devices and permeable surfaces located within residential lots and otherwise throughout residential, commercial, industrial or institutional development.

Because LIDs rely on nonstructural or relatively small structural BMPs distributed throughout a land development site, ownership and maintenance may be similarly distributed to an array of property owners. The new Stormwater Management rule requires the use of deed restrictions for LID-BMPs to ensure that property owners fully recognize, understand and support the continuing use of LID-BMPs for stormwater management.

The NJDEP believes that effective, state-wide use of such practices can best be achieved through modifications to municipal master plans and land use ordinances to include LID goals and to provide for the use of specific LID-BMPs. The Stormwater Management Rules require municipalities to review their master plans and ordinances in order to incorporate LID techniques to the maximum extent practicable.

The NJDEP Stormwater Management Rules (N.J.A.C. 7:8) require, in Section 5.2(a) that Major Development (disturbing one acre or more or increasing impervious surface by 1/4 acre) incorporate nonstructural stormwater management strategies “to the maximum extent practicable.” Nonstructural LID-BMPs are to be given preference over structural BMPs. Where it is not possible to fully comply with the Stormwater Management Rules through nonstructural LIDs, structural LID-BMPs are to be used in conjunction with standard structural BMPs to meet the Rules’ requirements.

N.J.A.C. 7:8-5 further requires that an applicant seeking approval for major development or redevelopment specifically identify which and how these nine nonstructural strategies are incorporated or provide an engineering, environmental, or safety reason for their non-incorporation.

The NJ BMP manual contains a LID checklist which planning boards and development applicants can use to ensure LID techniques are being applied. This checklist is available in Appendix D.

#### **(a) Nonstructural LID-BMPs**

The NJDEP’s new Stormwater rule’s design and performance standards require the maximum possible use of nine nonstructural strategies.

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.
3. Maximize the protection of natural drainage features and vegetation.
4. Minimize the decrease in the pre-construction time of concentration.
5. Minimize land disturbance including clearing and grading.
6. Minimize soil compaction.
7. Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.
8. Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.
9. Provide preventative source controls.

The nonstructural LID-BMPs have been grouped by the NJDEP into four general categories:

- I. Vegetation and Landscaping** – reduces runoff volumes and peaks through infiltration, surface storage, and evapotranspiration, provides pervious surface for groundwater recharge and removes pollutants from stormwater. Key techniques include:

- A. **Preservation of Natural Areas** – preserve areas with significant hydrologic functions including forested areas, riparian corridors and soils/geology with high recharge potential.
- B. **Native Ground Cover** – reduce the use of turf grass and preserve areas that naturally minimize runoff.
- C. **Vegetative Filters and Buffers** – provide native ground cover and grass areas to filter stormwater runoff from pervious areas and to provide locations for runoff to infiltrate.

**II. Minimizing Land Disturbance** – reduces runoff volume and pollutant loads and maintains existing recharge rates and other hydrologic functions. Key techniques include:

- A. Planning and design to fit the development to the terrain, limiting clearing and grading.
- B. Evaluating site conditions and constraints including soil types, geology, topography, slopes, drainage areas, wetlands, and floodplains to maintain high recharge areas and provide runoff storage areas.
- C. Utilizing construction techniques that limit disturbance and soil compaction.
- D. Restricting the future expansion of buildings and other improvements that will adversely affect runoff volumes and rates or recharge rates.

**III. Impervious Area Management** – reduces water quality impacts, runoff volume and peak rates, runoff velocity, erosion and flooding. Key techniques include:

- A. **Streets** – use minimum acceptable pavement widths and incorporate pervious vegetated medians and islands with curb cuts for runoff access.
- B. **Sidewalks** – use pervious pavement with infiltration storage beneath and disconnect from the street drainage system.
- C. **Parking and Driveways** – use pervious pavement wherever practical and reduce parking space requirements by sharing requirements in mixed uses and by reducing parking space lengths by allowing for overhang into pervious areas.
- D. **Pervious Paving Materials** – Use pervious materials in parking spaces, driveways, access roadways and sidewalks, including pavers, porous pavement and gravel.
- E. **Unconnected Impervious Areas** – Disconnect impervious areas and runoff from the site's drainage system allowing the sheet flow to cross pervious areas through curb cuts or by eliminating curbing and using shoulders and swales.
- F. **Vegetated Roofs** – install lightweight vegetative planting beds on new or existing roofs.

**IV. Time of Concentration Modification** – minimize reductions to the time of concentration caused by changes in hydrologic characteristics in order to minimize the peak runoff rate. Key techniques include:

- A. **Surface Roughness Changes** – increase surface roughness through the use of land cover and decrease the amount of connected smooth surfaces in order to increase runoff travel time throughout the drainage area.
- B. **Slope Reduction** – reduce slopes in graded areas and/or provide terraces and reduced slope channels to increase runoff travel length and time.
- C. **Vegetated Conveyance** – use vegetated channels and swales to increase roughness and runoff travel time and to provide opportunities for runoff treatment and infiltration.

In order to assure to the maximum extent possible the use of Nonstructural LIDs in new major development, the NJDEP prepared a Nonstructural Strategies Evaluation Worksheet, and this worksheet is included in Appendix D.

**(b) Structural LID-BMPs**

In addition to these nonstructural LID-BMPs, structural stormwater management measures can be LID-BMPs. These structural BMPs become LID-BMPs by storing, infiltrating, and/or treating runoff close to the source of the stormwater. Unlike standard structural BMPs that are located along a site's drainage system, structural LID-BMPs are normally dispersed throughout a development and more closely mimic the hydrology. LID-BMPs are typically standard structural BMPs, but their location, closer to the runoff source, allows them to be smaller in size. Standard structural BMPs that can be implemented at a LID scale include: drywells, infiltration systems, bioretention basins, and both surface and subsurface detention basins; downsized, to address stormwater close to its source as LIDs.

There are a number of structural stormwater BMPs that may be used to address the groundwater recharge and stormwater quality and quantity requirements of the NJDEP Stormwater Management Rules in N.J.A.C. 7:8. The structural BMPs include the following techniques (see also *New Jersey Stormwater Best Management Practices Manual*, February 2004, which includes the planning, design, construction, and maintenance guidelines for these structural BMPs):

1. Bioretention Systems
2. Constructed Stormwater Wetlands
3. Dry Wells
4. Extended Detention Basins
5. Infiltration Basins
6. Manufactured Treatment Devices
7. Pervious Paving Systems
8. Rooftop Vegetated Cover
9. Sand Filters

10. Vegetative Filters
11. Wet Ponds

Other BMPs that possess similar levels of effectiveness, efficiency, and endurance may also be utilized, provided that such levels can be demonstrated.

Franklin Township will review the Master Plan and local land use ordinances and incorporate structural stormwater management strategies (LID and standard structural stormwater BMPs) to the extent practicable and in accordance with sound planning, science, engineering and construction principles, as they apply to its unique environment.

## **Other Stormwater Management Strategies**

### **MAURICE RIVER WATERSHED**

#### **(a) Gloucester County Stormwater Management Program's Watershed Workshop**

The Gloucester County Stormwater Management Program held a Maurice River Watershed workshop, inviting representatives from each municipality in the watershed to an evening discussion of stormwater management issues and strategies. The resulting issues and recommended strategies are presented below.

- **Geese Management:** Increasing geese populations have become a problem throughout both the suburban and rural portions of southern New Jersey. Stormwater detention ponds, grass and lawn areas and farm fields provide habitat for geese. Although the populations sometimes add to the areas aesthetics, there are adverse impacts to water quality and the land that result, especially with over population.

The new New Jersey Stormwater regulations require municipalities to pass ordinances prohibiting the feeding of waterfowl. In addition, municipalities should encourage land cover types and practices in new development that discourage geese from resting, nesting and feeding in areas that would otherwise provide attractive habitat, such as stormwater management facilities. Changes to State and federal laws regarding hunting were discussed and recommended at the workshop.

See also the Upper Maurice River Watershed Regional Stormwater Management Plan, which contains a thorough description of geese management strategies in the Appendix.

- **Localized Roadway Flooding:** Localized roadway flooding occurs at a number of locations in the watershed, including Gorgo Lane in Newfield, Burnt Mill Branch near the railroad, Malaga Lake in Franklin and along Route 55. Particularly at locations where state, county and municipal roadways intersect, runoff from state and county roadways sometimes becomes a burden to local roads and stormwater

systems, and ownership and responsibility for its management is sometimes unclear and neglected.

The new New Jersey stormwater regulations and the design and performance standards, address this issue for all new major development (defined as projects that disturb one or more acres of land or increase the amount of impervious surface by one-quarter acre or more), including new roadway construction and reconstruction. State, County and local roadway agencies must comply with these new regulations and control their stormwater runoff accordingly. Unfortunately, the new regulations can not resolve already existing, localized roadway flooding

Most municipalities and the County Highway Division do not have plans or maps of their stormwater system, nor is there a method in place for State, County or local agencies to share stormwater system information, even though these systems must frequently work together. Furthermore, there are typically few if any systems for inspecting and recording the stormwater system's condition or maintenance activities.

The Gloucester County Stormwater Program includes an extensive outfall mapping component for Gloucester County's municipalities and the County Highway Division. The program is using GPS dataloggers to map and record data in a digital format for stormwater outfalls throughout the County. The County program will produce outfall maps for each municipality and the County Highway Division and store the digital data in a GIS for easy sharing, updates and retrieval.

The outfall maps are a first step in defining the County's stormwater systems. In order to assist municipalities with stormwater system management, the County will purchase dataloggers for use by municipalities in mapping the other components of their stormwater systems (inlets, pipes, ditches, culverts, basins etc.). An understanding of the stormwater systems and drainage may help resolve existing localized roadway flooding, and it will assist the municipalities and County in providing the maintenance assurances required by their new stormwater NJPDES permits.

- **Silver Lake:** Silver Lake, in Clayton Borough on its western border with Elk Township, may be impaired and unable to meet water quality standards. Water quality analysis is required to determine its status and further evaluation by the appropriate state and county agencies is recommended. Additional stormwater management strategies, if any, would be based on the results of this evaluation.
- **Scotland Run Golf Course:** Scotland Run Golf Course is requesting permission to divert stormwater for irrigation purposes from the headwaters of Scotland Run. The net loss in stream flow, if any, should be considered in order to prevent adverse impacts to downstream water quality and aquatic habitat.

**(b) Upper Maurice River Regional Stormwater Management Plan**

The Gloucester Soil Conservation District (GSCD) with the New Jersey Department of Agriculture, State Soil Conservation Committee (SSCC) and the Burlington, Camden and Cape-Atlantic Soil Conservation Districts prepared an Upper Maurice River Regional Stormwater Management Plan dated October 2004 that includes the upper portions of the Maurice River Watershed, eighty-five percent of which is in Gloucester County (there is a small portion in Salem and Cumberland Counties too). This regional stormwater plan concluded that:

The Upper Maurice River Watershed is in overall good condition. The streams and rivers are not significantly impacted by development and do not exhibit significantly degraded areas in regards to stream erosion, water quality, riparian buffer width, floodplain management and wetlands quality. However, it must be noted that Gloucester County is one of the fastest growing counties in the Delaware Valley and as a result is experiencing rapid development...

The watershed is not significantly impacted by stormwater at this time. However, to prevent degradation of the Upper Maurice River and to assure that it remains in its existing condition, steps to minimize the impacts of urbanization on this watershed are vital. To address these and other issues a variety of management strategies are proposed. New development must continue to adequately address stormwater management issues appropriately. To do so, all new development must comply with the regulations set forth in the new NJDEP Stormwater Management Rule N.J.A.C. 7:8 and the Residential Site Improvement Standards.

The stormwater management strategies proposed in the Upper Maurice River Watershed Regional Stormwater Management Plan are stated below:

- **Stormwater Recharge and Zoning-Based Recharge:** Changes in land use from rural agricultural to emerging suburban/urban development invariably and irrevocably alter natural runoff retention/infiltration capabilities of the soil. Because of this, the enhancement of stormwater facilities to provide for recharge of runoff to groundwater should be considered as part of the regional stormwater management plan for the Upper Maurice River. As the landscape is altered in the construction process, the natural soil horizons are disturbed and the forested areas are removed, the capacities of the soils in the post-development condition to mimic pre-development water retention and infiltration is severely impaired and reduced. This reduction results in increased overland flow, decrease of retained moisture, and ultimately reduction in stream baseflow. The use of infiltration as a sole method, or in combination with detention where conditions are conducive for success, should be examined and put to use as possible methods of stormwater management. In this manner, the recharge capabilities of the existing watershed could be maintained, thus assuring overall watershed health.

- **Low Impact Development:** Low Impact Development (LID) provides a variety of techniques to maintain or restore the pre-developed hydrologic characteristics of the site. We recommend that all municipalities adopt and require, when acceptable, Low Impact Development techniques as part of their land development and stormwater management ordinances. These techniques control stormwater runoff and pollutants at the sources, by promoting a reduction of impervious cover, maintaining the natural features, flattening grades and by constructing and/or maintaining grass swales, streets without curbs, depression storage, etc. LID also provides a means to retrofit highly urbanized areas to reduce stormwater runoff and pollutant loadings.
- **Pre-Development Site Analysis:** Accurately assessing the true hydrologic condition of a development site or drainage area is critical to designing effective stormwater management facilities. A variety of techniques, tools and models are available for the engineer or hydrologist to simplify and quantify the complex interaction between rainfall, watershed storage and runoff. However, the accurate measurement or calculation of the input parameters of these techniques is complicated by the unique hydrology of the Upper Maurice River Watershed. Carefully delineating the effective drainage area and calculating reasonable time parameters can help to ensure the accuracy of the pre-development site analysis. The critical step is a comparison of the calculated runoff to observed conditions at the “outlet” of the drainage area. The result of these efforts will be better stormwater design, decreased management costs and positive environmental benefits.
- **Adoption of DelMarVa Peak Rate Factor:** As part of more accurately modeling existing conditions in the Upper Maurice River, utilizing regionalized factors in the calculation of stormwater runoff is critical. The DelMarVa peak rate factor (PRF) replaces the national average PRF in the dimensionless unit hydrograph used by the NRCS stormwater runoff prediction methodologies. The DelMarVa hydrograph has been formally recommended for use in the coastal plain of New Jersey and should be required for all hydrologic analyses in this watershed.
- **Forest and Forest Buffers:** The hydrology of the Upper Maurice River Watershed is significantly influenced by the vast forests and forested wetlands. In upland forests, the combination of soils, slope and vegetation provide an ideal mechanism for recharging precipitation. This recharged rainfall in turn supports the stream base flows. Development in these sub-basin watersheds will most likely reduce not only the forest cover, but also the recharge capacity of the site. To the greatest extent possible, forest areas should be retained and forest buffers utilized to infiltrate rainfall and excess runoff. Forested land is widely regarded as providing the greatest positive impact in all watersheds, producing very little surface water runoff and supporting the natural hydrology of the watershed.

- **Culvert Maintenance:** Numerous rural and secondary roads cross the Upper Maurice River Watershed. The culverts that drain the streams under these roads often appear undersized or at least partially obstructed with debris or sediment. These restrictions tend to pond runoff on the upstream side of the roads within the wetland riparian corridors. The culverts are in effect acting as the outlet of a natural detention basin. Despite this natural detention, roadway flooding does not appear to be a serious concern. The current configurations provide significant benefits to the watershed, including attenuation of stormwater runoff, reducing downstream peak flows and increasing the potential for infiltration. To maintain this condition it is recommended that existing culverts and cross-drains be maintained at their current size and geometry unless flooding is evident.
- **Canada Goose Management:** Suburban development has become an attractive home for resident and migratory Canada Geese. Ponds, lakes and stormwater basins, with their combination of open water and managed turf, provide suitable habitat for Canada Geese to rest, nest and feed. While many people enjoy seeing Canada Geese, they do not necessarily enjoy the assorted negative impacts associated with the Canada goose population that inhabit the area. These impacts include goose feces, aggressive behavior, turf and property damage and natural resource degradation. To help prevent the degradation caused by Canada geese, we recommend that all local and county governments adopt policies and ordinances to reduce or eliminate the current practices that create this attractive habitat for geese. These preventive measures include ordinances prohibiting the feeding of waterfowl and practices to discourage geese from populating desirable areas.
- **Lake and Pond Management and Maintenance:** The many ponds and lakes of the Upper Maurice River Watershed provide significant regional benefits. Beyond the aesthetic benefit to the community, these waterbodies help to reduce the slope of the stream network, provide regional stormwater attenuation and serve as sediment basins, trapping much of the excess sediment carried by the streams. In order to maintain these positive benefits, all lakes and ponds within the watershed must be actively managed to ensure the stability and continued functionality of these important features. Therefore, we recommend a comprehensive management plan and maintenance schedule for all of the publicly and privately held lakes and ponds in the Upper Maurice River Watershed. These plans should focus on dam maintenance, siltation and dredging and vegetation management.

Because the Upper Maurice River Watershed in Gloucester County is not yet significantly degraded by development, the principle goal of these stormwater management strategies is maintaining existing water quality and stream channel conditions, as development occurs in the future. In order to meet this goal, the municipalities in the watershed (Franklin Township, Elk Township, Monroe Township, Clayton Borough, Glassboro Borough, Washington Township and Newfield Borough in Gloucester County and Upper Pittsgrove and Pittsgrove Townships in Salem County and

Vineland City in Cumberland County) must work together to accomplish these stormwater management strategies.

One way to assure this cooperation is through the formation of a Regional Stormwater Management Committee, comprised of stakeholders, working with a Lead Planning Agency, to finalize the Regional Stormwater Management Plan for the Upper Maurice River Watershed, in accordance with the most recent NJDEP requirements. Once this final plan is approved by the appropriate regional water quality management planning agency and the NJDEP, and adopted as part of the regional water quality management plan, the new stormwater management regulations require that municipal stormwater management plans be revised to provide consistency.

### **(c) Water Quality-TMDL Stormwater Management Strategies**

The NJDEP has proposed two sets of TMDLs that address impaired water bodies in this watershed. The TMDL proposals are for fecal coliform for Little Ease Run at Porchtown and for Indian Branch near Malaga. Waste load allocation reductions have been proposed for the affected waterways. The TMDL proposals discuss possible sources of fecal coliform as well as the method use to develop the TMDLs and remediation plan. The full text of these proposals can be found and downloaded at the following link:

<http://www.nj.gov/dep/watershedmgt/tmdl.htm#intro> .

The TMDL remediation plans and stormwater strategies are summarized below.

**Fecal Coliform:** Fecal Coliform contamination may have either point or non-point sources or both. Point sources generally involve sewage discharges. Because sewage treatment plants have permits that require disinfection to levels well below water quality standards, the proposed TMDLs address non-point sources, involving stormwater runoff. These non-point stormwater sources include runoff from various land uses that transport fecal coliform from geese and other wildfowl, farms, and domestic pets to the receiving water. Non-point sources also include “illicit” sources, such as failing onsite disposal systems and the illegal connections of sanitary drains from buildings to storm sewers.

A number of stormwater management strategies were included in the TMDL Fecal Coliform proposals to remediate the affected waterways.

- **Phase II NJPDES Permits and the Municipal Stormwater Regulation Program:** Fecal Coliform loadings may be reduced by the new requirements to enforce a pet waste ordinance and an ordinance prohibiting the feeding of wildfowl on public property. The NJPDES permit requirements also require the annual inspection and cleaning (if necessary) of catch basins, the performance of good housekeeping practices at maintenance yards and public education and employee training aimed at reducing non-point sources of pollution, including fecal coliform. Additional reductions in fecal coliform levels may result from the elimination of illicit connections and failing on-site sewage disposal systems. Fecal coliform

contributions from agricultural activities can be controlled by the implementation of agricultural conservation management plans and best management practices.

- **Little Ease Run:** The TMDL proposal for Little Ease Run at Porchtown found that Franklinville Lake attracts populations of Canadian Geese. Additionally, many older homes located along the stream corridor, as well as around Franklinville Lake may have failing septic systems. A cattle farm and sheep farm located along Franklinville Lake was suggested as another possible source. Additional monitoring is required to identify the source(s) of the impairment. Possible remediation methods suggested include the use of agricultural BMPs, as well as community based geese management programs.
- **Indian Branch:** The TMDL proposal for Indian Branch near Malaga found that the majority of land cover along the stream corridor is forest. Some small horse farms and cattle farms were observed near the NJDEP's monitoring site. Additionally, some homes along the stream corridor use onsite systems or possibly cesspools. It was suggested that additional monitoring is needed to determine if onsite systems are a source. Possible remedial methods include the use of agricultural BMPs.

## **GREAT EGG HARBOR RIVER WATERSHED**

### **(a) Gloucester County Stormwater Management Program's Watershed Workshop**

The Gloucester County Stormwater Management Program held a Great Egg Harbor River Watershed workshop, inviting representatives from each municipality in the watershed to an evening discussion of stormwater management issues and strategies. No issues and recommended strategies were presented at that time.

### **(b) Regional Stormwater Management Planning**

There is no Regional Stormwater Management Plan (RSWMP) for the Great Egg Harbor River Watershed. The Gloucester Soil Conservation District (GSCD) with the New Jersey Department of Agriculture, State Soil Conservation Committee (SSCC) and the Burlington, Camden and Cape-Atlantic Soil Conservation Districts prepared an Upper Maurice River Regional Stormwater Management Plan dated October 2004. The Upper Maurice River is adjacent to the Great Egg Harbor River Watershed. Conditions in the Great Egg Harbor River Watershed are sufficiently similar to those in the Upper Maurice River Watershed to permit some extrapolation of applicable stormwater management strategies.

The stormwater management strategies proposed for the Great Egg Harbor River Watershed are stated below:

- **Stormwater Recharge and Zoning-Based Recharge:** Changes in land use from rural agricultural to emerging suburban/urban development invariably and

irrevocably alter natural runoff retention and infiltration capabilities of the soil. Because of this, the enhancement of stormwater facilities to provide for recharge of runoff to ground water should be considered as part of the regional stormwater management strategies for the Great Egg Harbor River Watershed.

- **Low Impact Development:** Low Impact Development (LID) provides a variety of techniques to maintain or restore the pre-developed hydrologic characteristics of the site. All municipalities should adopt and require, when acceptable, Low Impact Development techniques as part of their land development and stormwater management ordinances.
- **Pre-Development Site Analysis:** Accurately assessing the true hydrologic condition of a development site or drainage area is critical to designing effective stormwater management facilities. A variety of techniques, tools and models are available for the engineer or hydrologist to simplify and quantify the complex interaction between rainfall, watershed storage and runoff. However, the accurate measurement or calculation of the input parameters of these techniques is complicated by the unique hydrology of the Great Egg Harbor River Watershed. Carefully delineating the effective drainage area and calculating reasonable time parameters can help to ensure the accuracy of the pre-development site analysis. The critical step is a comparison of the calculated runoff to observed conditions at the “outlet” of the drainage area.
- **Adoption of DelMarVa Peak Rate Factor:** As part of more accurately modeling existing conditions in the Great Egg Harbor River Watershed, utilizing regionalized factors in the calculation of stormwater runoff is critical. The DelMarVa peak rate factor (PRF) replaces the national average PRF in the dimensionless unit hydrograph used by the NRCS stormwater runoff prediction methodologies. The DelMarVa hydrograph has been formally recommended for use in the coastal plain of New Jersey and should be required for all hydrologic analyses in this watershed.
- **Forest and Forest Buffers:** The hydrology of the Great Egg Harbor River Watershed is significantly influenced by the vast forests and forested wetlands. In upland forests, the combination of soils, slope and vegetation provide an ideal mechanism for recharging precipitation. This recharged rainfall in turn supports the stream base flows. Development in these sub-basin watersheds will most likely reduce not only the forest cover, but also the recharge capacity of the site. To the greatest extent possible, forest areas should be retained and forest buffers utilized to infiltrate rainfall and excess runoff.
- **Culvert Maintenance:** Numerous rural and secondary roads cross the Great Egg Harbor River Watershed. The culverts that drain the streams under these roads often appear undersized or at least partially obstructed with debris or sediment. These restrictions tend to pond runoff on the upstream side of the roads within the wetland riparian corridors. The culverts are in effect acting as the outlet of a

natural detention basin. The current configurations provide significant benefits to the watershed, including attenuation of stormwater runoff, reducing downstream peak flows and increasing the potential for infiltration. To maintain this condition it is recommended that existing culverts and cross-drains be maintained at their current size and geometry unless flooding is evident.

- **Geese Management:** Increasing goose populations have become a problem throughout both the suburban and rural portions of southern New Jersey. Stormwater detention ponds, grass and lawn areas and farm fields provide habitat for geese. Although the populations sometimes add to the areas aesthetics, there are adverse impacts to water quality and the land that result, especially with over population.

The New Jersey Stormwater regulations require municipalities to pass ordinances prohibiting the feeding of waterfowl. In addition, municipalities should encourage land cover types and practices in new development that discourage geese from resting, nesting and feeding in areas that would otherwise provide attractive habitat, such as stormwater management facilities. Changes to state and federal laws regarding hunting were discussed and recommended at the workshop.

- **Lake and Pond Management and Maintenance** – Ponds and lakes in the Great Egg Harbor River Watershed provide significant aesthetic benefit, and these waterbodies reduce stream slopes, provide storage and attenuate peak runoff rates and serve as sediment basins, trapping sediment carried by the streams. They also provide a diverse aquatic habitat for certain species not found in streams. Programmatic management and maintenance of public and privately held lakes and ponds, including dam maintenance, dredging and vegetation management, is needed to sustain these benefits.
- **Well Head Protection Areas and Aquifer Outcrops:** Additional stormwater treatment may be needed for recharge in Well Head Protection Areas and/or aquifer outcrop areas, in order to prevent drinking water and ground water contamination. Further evaluation of stormwater recharge quality and the natural attenuation of contaminants are needed. State and federal assistance may be required for these evaluations.
- **Stream and Streambank Stabilization** – Erosion is significantly accelerated by human activities and development in the watershed. Streambank erosion introduces excess sediment loads to the stream and in turn chokes lakes and ponds with sediment. Watershed-wide stream and stream bank restoration and stabilization priorities and guidelines should be adopted by all involved municipalities and agencies working in the watershed in order to improve water quality, upgrade in-stream and riparian habitat and reduce sedimentation in receiving waterbodies.

### (c) Water Quality-TMDL Stormwater Management Strategies

The NJDEP has proposed one TMDL to address impaired water bodies in this watershed. The full text of the proposal can be found and downloaded at the following link:

<http://www.nj.gov/dep/watershedmgt/tmdl.htm#intro> .

The TMDL was proposed by the NJDEP in April 2003 and was based on the 2002 Integrated Report. This TMDL was approved in September 2003, but has not yet been adopted. The TMDL proposal is for fecal coliform for Hospitality Branch headwater. Waste load allocation reductions have been proposed for the affected waterways. The TMDL proposals discuss possible sources of fecal coliform as well as the method use to develop the TMDLs and remediation plan

**Fecal Coliform:** Fecal Coliform contamination may be derived from either point or non-point sources or both. Point sources generally involve sewage discharges. However, because sewage treatment plants have permits that require disinfection to levels well below water quality standards, the proposed TMDLs address non-point sources, involving stormwater runoff. These non-point stormwater sources include runoff from various land uses that transport fecal coliform from geese and other wildfowl, farms, and domestic pets to the receiving water. Non-point sources also include “illicit” sources, such as failing onsite disposal systems and the illegal connections of sanitary drains from buildings to storm sewers.

The NJDEP TMDL indicates that this watershed area is mixed forest, urban and agriculture and that it is actively being developed. Horses and geese were noted as possible sources of fecal coliform contamination. The NJDEP’s TMDL percent reduction in Fecal Coliform required to meet water quality standards is 86 percent for Hospitality Branch headwaters. The NJDEP indicates that it “will address the sources of impairment through systematic source track down, matching strategies with sources, selecting responsible entities and aligning available resources to effect implementation.”

Typical stormwater management strategies that may be employed to remediate the affected waterways include:

- **Phase II NJPDES Permits and the Municipal Stormwater Regulation Program:** Fecal Coliform loadings may be reduced by the new requirements to enforce a pet waste ordinance and an ordinance prohibiting the feeding of wildfowl on public property. The NJPDES permit requirements also require the annual inspection and cleaning (if necessary) of catch basins, the performance of good housekeeping practices at maintenance yards and public education and employee training aimed at reducing non-point sources of pollution, including fecal coliform. Additional reductions in fecal coliform levels may result from the elimination of illicit connections and failing on-site sewage disposal systems.

- **Agricultural BMPs:** Fecal coliform contributions from agricultural activities can be controlled by the implementation of agricultural conservation management plans and Best Management Practices.
- **Further Source Identification:** Additional monitoring is recommended to locate and identify significant sources of fecal coliform.

## Section 9. Mitigation Plans

Section 6 of this MSWMP addresses the design and performance standards for stormwater management measures applicable to major development projects. In some instances, however, site specific conditions may prevent strict compliance with these standards. In accordance with N.J.A.C. 7:8-4.2(c)11, such projects may be granted a variance or exemption from these standards by the Municipal Zoning Board or Planning Board, if a mitigation plan is approved by the Board and mitigation plan implementation is a condition of the major development project approval.

To the extent possible, a mitigation plan should offset the impacts on groundwater recharge, stormwater quantity control, and/or stormwater quality control that would be created by granting the variance or exemption to the development project. In addition, to the extent possible, the proposed mitigation project(s) should be located within the same HUC14 sub-drainage basin(s) as the major development project, and if not, within the same Watershed Management Area.

A mitigation plan may include more than one mitigation project, in order to achieve the objectives of location and/or impact offsets. The Municipal Stormwater Coordinator Public Works Director (if different), and Engineer (if different) will develop and maintain a list of mitigation projects that can be implemented in order to comply with the mitigation plan provisions of this MSWMP. Included as part of the list of projects will be quantitative estimates of the offsets to groundwater recharge, stormwater quantity control, and/or stormwater quality control for each of the mitigation projects.

The mitigation plan must include a detailed plan and schedule for implementation of the mitigation project(s). Implementation may be accomplished as a part of the major development project, or the Municipality may accept funding for the project(s), at the discretion of the Municipality. If the Municipality chooses to accept funding in lieu of implementation, such funding shall include any costs that must be incurred by the Municipality in implementing the mitigation project(s), including design, permitting, land and/or easement acquisition, construction, and provisions for the long-term operation and maintenance of the mitigation project(s).

A mitigation plan must clearly demonstrate that strict compliance with the design and performance standards for stormwater management measures cannot be achieved. Before submitting a mitigation plan that does not meet the objectives of the MSWMP with regard to mitigation project location and/or impact offsets, the developer shall request that the Municipality determine whether it can identify other projects, consistent with those objectives, that the Municipality can add to its list.

A mitigation plan that includes a mitigation project or projects not taken from the Municipality's list may be submitted for review by the Municipality. Such projects must be reviewed and accepted by the Municipality, before a mitigation plan including such projects can be submitted to the Zoning Board or Planning Board for review. A mitigation plan including projects not already listed by the Municipality must include quantitative estimates of the offsets to groundwater recharge, stormwater quantity control, and/or stormwater quality control for each of those unlisted mitigation projects.

The mitigation plan must include provisions for ensuring the long-term operation and maintenance of the mitigation project(s), by clearly identifying the party responsible for the operation and maintenance of each mitigation project. If the Municipality accepts a mitigation plan that designates the Municipality as the responsible party for mitigation project operation and maintenance, provisions for funding the associated costs by the developer shall be included in the mitigation plan.

If implementation of a mitigation plan is a condition of approval for a major development project by the Municipal Zoning Board or Planning Board, such approval shall also include the requirement that the developer execute a funding agreement with the Municipality for mitigation plan implementation, as a further condition of approval. The funding agreement, in form acceptable to the Municipality, shall provide for funding by the developer of all costs to implement the plan that will be incurred by the Municipality, including the cost of long-term operation and maintenance of any mitigation projects.

## Section 10. Gloucester County Stormwater Management Program

The Gloucester County Board of Freeholders, in an effort to help municipalities address non-point source pollution and stormwater management, has established a Gloucester County Stormwater Management Program that provides assistance with many of the NJPDES permit requirements. The Gloucester County Stormwater website at <http://www.gcstormwater.com> provides a web link to learn more about the new NJDEP stormwater management rules, the NJPDES stormwater management permit requirements and the ongoing Gloucester County Stormwater Management Program.

The purpose of the program is to help municipalities meet the NJDEP's permit requirements through a regional effort in a fiscally responsible manner.

The County is addressing a number of each town's permit requirements to help alleviate the financial burden, while providing coordinated efforts that will better manage our environment. By utilizing a countywide watershed based approach; the end product will be a plan for each municipality tailored to the specific needs of the watershed.

The Gloucester County Freeholder Board's watershed-based approach to stormwater management is unique in the state of New Jersey. Through economies of scale and the use of technology, not necessarily available at the local level, the regional plan saves local taxpayers more, by coordinating preparation of the NJDEP required MSWMP for each of the 24 municipalities. The County not only saves time and money, but is better prepared to control non-point source pollution and to encourage improvements in water quality throughout Gloucester County.

The overall long term goal of stormwater management is to have all waters in New Jersey meet water quality standards for their designated uses. That is, ensure that our rivers, lakes and coastal waters are fishable, swimmable, and support healthy ecosystems. The *New Jersey Nonpoint Source and Stormwater Management Program Plan*, (NJDEP, December, 2000) indicates that "Nonpoint sources of pollution from stormwater runoff have long been thought to be major contributors to the degradation of water quality in New Jersey." It further states:

The task ahead will not be easy. Controlling point sources of pollution took many years, many new governmental and private partners and billions of federal and private dollars. Successfully managing nonpoint sources of pollution and stormwater runoff can be expected to require a similar if not greater commitment.

**APPENDIX A. WATERSHED FIGURES**

|      |      |
|------|------|
| MR-1 | GE-1 |
| MR-2 | GE-2 |
| MR-3 | GE-3 |
| MR-4 | GE-4 |
| MR-5 | GE-5 |
| MR-6 | GE-6 |
| MR-7 | GE-7 |
| MR-8 | GE-8 |

Figure 9 from Appendix A

**APPENDIX B. WATER QUALITY DATA**

Maurice River Watershed  
AMNET Scores

| Watershed     | Site Name         | Site Number | Location                           | Municipality   | Impairment Score 1995/1996 | Impairment Score 2000/2001 | Habitat Score 2000/2001 | Impairment Rating 1995/1996 | Impairment Rating 2000/2001 | Chironomid Larvae Abnormalities | Site Activity |
|---------------|-------------------|-------------|------------------------------------|----------------|----------------------------|----------------------------|-------------------------|-----------------------------|-----------------------------|---------------------------------|---------------|
| Maurice River | Blackwater Br     | AN0738      | Main Rd                            | Franklin Twp   | 6                          | 6                          | 143                     | Severe                      | Severe                      | False                           | True          |
| Maurice River | Burnt Mill Br     | AN0734      | W Blvd                             | Newfield Boro  | 12                         | 24                         | 154                     | Moderate                    | None                        | False                           | True          |
| Maurice River | Indian Br         | AN0724      | Rt 47                              | Franklin Twp   | 12                         | 21                         | 163                     | Moderate                    | Moderate                    | True                            | True          |
| Maurice River | Little Ease Run   | AN0726A     | Carpenter Rd                       | Glassboro Boro | 99                         | 9                          | 151                     | No Sample                   | Moderate                    | False                           | True          |
| Maurice River | LJ Ease Run       | AN0727      | Grant Ave                          | Franklin Twp   | 21                         | 21                         | 162                     | Moderate                    | Moderate                    | False                           | True          |
| Maurice River | LJ Ease Run       | AN0728      | Leonard Cake Rd                    | Franklin Twp   | 21                         | 18                         | 154                     | Moderate                    | Moderate                    | False                           | True          |
| Maurice River | Reed Br           | AN0731      | Royal Ave                          | Franklin Twp   | 15                         | 15                         | 174                     | Moderate                    | Moderate                    | False                           | True          |
| Maurice River | Scotland Run      | AN0721      | Rt 322                             | Monroe Twp     | 24                         | 15                         | 155                     | None                        | Moderate                    | False                           | True          |
| Maurice River | Scotland Run      | AN0722      | Clayton - Williamsdown Rd (Rt 610) | Clayton Boro   | 24                         | 18                         | 166                     | None                        | Moderate                    | False                           | True          |
| Maurice River | Scotland Run      | AN0723      | Rt 538                             | Franklin Twp   | 27                         | 21                         | 166                     | None                        | Moderate                    | False                           | True          |
| Maurice River | Scotland Run      | AN0725      | Rt 40                              | Franklin Twp   | 18                         | 24                         | 173                     | Moderate                    | None                        | True                            | True          |
| Maurice River | Still Run         | AN0729      | Aura Rd                            | Elk Twp        | 24                         | 30                         | 172                     | None                        | None                        | True                            | True          |
| Maurice River | Still Run         | AN0730      | LJ Mill Rd                         | Franklin Twp   | 18                         | 18                         | 169                     | Moderate                    | Moderate                    | False                           | True          |
| Maurice River | Still Run         | AN0732      | Rt 40                              | Franklin Twp   | 24                         | 21                         | 162                     | None                        | Moderate                    | False                           | True          |
| Maurice River | UNT to LJ Ease Ru | AN0726      | Carpenter Rd                       | Glassboro Boro | 9                          | 99                         | 999                     | Moderate                    | No Sample                   | False                           | False         |

Impairment Score      Impairment Rating

24 - 30      Non-Impaired

9 - 21      Moderately Impaired

0 - 6      Severely Impaired

Non-Impaired

Sublist 5

Maurice River Watershed  
Fecal Coliform Data

| Watershed     | Site Name                 | Site ID  | HUC      | Sampling Agency | Sample Date | Result Value (CFU/100mL) | Standard (CFU/100mL) |
|---------------|---------------------------|----------|----------|-----------------|-------------|--------------------------|----------------------|
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/04/98    | 20                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/17/98    | 140                      | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/27/98    | 20                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 09/03/98    | 24000                    | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 09/17/98    | 130                      | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 1998 AVG    | 436                      | 200                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/11/00    | 20                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/18/00    | 20                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/25/00    | 20                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/01/00    | 790                      | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/08/00    | 80                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 2000 AVG    | 186                      | 200                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/10/01    | 50                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/17/01    | 20                       | 400                  |

Maurice River Watershed  
Fecal Coliform Data

| Watershed     | Site Name                 | Site ID  | HUC      | Sampling Agency | Sample Date     | Result Value (CFU/100mL) | Standard (CFU/100mL) |
|---------------|---------------------------|----------|----------|-----------------|-----------------|--------------------------|----------------------|
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/24/01        | 20                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/31/01        | 50                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/07/01        | 70                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | <b>2001 AVG</b> | <b>42</b>                | <b>200</b>           |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/29/02        | 40                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/05/02        | 90                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/12/02        | 40                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/19/02        | 40                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/26/02        | 80                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | <b>2002 AVG</b> | <b>58</b>                | <b>200</b>           |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/09/03        | 40                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/16/03        | 20                       | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/23/03        | 113                      | 400                  |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 07/30/03        | 40                       | 400                  |

**Maurice River Watershed  
Fecal Coliform Data**

| Watershed     | Site Name                    | Site ID  | HUC      | Sampling Agency | Sample Date     | Result Value (CFU/100mL) | Standard (CFU/100mL) |
|---------------|------------------------------|----------|----------|-----------------|-----------------|--------------------------|----------------------|
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | 08/06/03        | 230                      | 400                  |
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | <b>2003 AVG</b> | 286                      | 200                  |
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | 06/02/04        | 130                      | 400                  |
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | 06/09/04        | 60                       | 400                  |
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | 06/16/04        | 170                      | 400                  |
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | 06/23/04        | 130                      | 400                  |
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | 06/30/04        | 40                       | 400                  |
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | <b>2004 AVG</b> | 106                      | 200                  |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 06/17/98        | 483                      | 400                  |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 08/13/98        | 80                       | 400                  |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 09/03/98        | 1,300                    | 400                  |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 09/17/98        | 170                      | 400                  |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | <b>1998 AVG</b> | 496                      | 200                  |

Non-Impaired

Impaired

Maurice River Watershed  
pH Data

| Watershed     | Site Name                 | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|---------------|---------------------------|----------|----------|-----------------|-------------|-----|
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/24/97    | 4.5 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/24/97    | 4.3 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 03/11/98    | 4.2 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 03/11/98    | 4.2 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/04/98    | 4.6 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/04/98    | 5.4 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/27/98    | 5.3 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/27/98    | 5.3 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 12/08/98    | 5.4 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/10/99    | 4.2 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/10/99    | 4.1 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/25/99    | 4.3 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/25/99    | 4.2 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/11/99    | 5.6 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/11/99    | 6.1 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/16/99    | 4.6 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/16/99    | 4.6 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/07/00    | 4.4 |

Maurice River Watershed  
pH Data

| Watershed     | Site Name                 | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|---------------|---------------------------|----------|----------|-----------------|-------------|-----|
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/07/00    | 4.4 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/10/00    | 4.5 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/10/00    | 4.6 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/14/00    | 4.6 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/14/00    | 4.7 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/15/00    | 4.7 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/15/00    | 4.8 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/20/01    | 4.8 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/20/01    | 4.8 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/09/01    | 4.9 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/09/01    | 4.9 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/22/01    | 5.5 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/22/01    | 6.6 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 12/11/01    | 5.5 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 12/11/01    | 5.7 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/19/02    | 4.7 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/19/02    | 4.2 |

**Maurice River Watershed  
pH Data**

| Watershed     | Site Name                 | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|---------------|---------------------------|----------|----------|-----------------|-------------|-----|
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/18/02    | 4.1 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 06/18/02    | 4.2 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/20/02    | 5.2 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/20/02    | 5.9 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/25/02    | 3.7 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/25/02    | 4.0 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 03/05/03    | 3.3 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/13/03    | 3.7 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/13/03    | 4.2 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/12/03    | 4.1 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 08/12/03    | 4.3 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/24/03    | 4.1 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 11/24/03    | 4.3 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/09/04    | 3.9 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 02/09/04    | 4.2 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/19/04    | 4.0 |
| Maurice River | Indian Branch near Malaga | 01411466 | 02040206 | USGS            | 05/19/04    | 4.5 |

Maurice River Watershed  
pH Data

| Watershed     | Site Name                    | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|---------------|------------------------------|----------|----------|-----------------|-------------|-----|
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | 09/09/04    | 4.2 |
| Maurice River | Indian Branch near Malaga    | 01411466 | 02040206 | USGS            | 09/09/04    | 4.7 |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 11/25/97    | 6.4 |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 11/25/97    | 5.0 |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 03/25/98    | 5.6 |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 03/25/98    | 5.8 |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 05/20/98    | 5.6 |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 05/20/98    | 6.8 |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 09/03/98    | 6.1 |
| Maurice River | Little Ease Run at Porchtown | 01411458 | 02040206 | USGS            | 09/03/98    | 6.8 |
| Maurice River | Still Run near Malaga        | 01411453 | 02040206 | USGS            | 11/24/98    | 6.6 |
| Maurice River | Still Run near Malaga        | 01411453 | 02040206 | USGS            | 11/24/98    | 6.6 |
| Maurice River | Still Run near Malaga        | 01411453 | 02040206 | USGS            | 02/25/99    | 6.0 |
| Maurice River | Still Run near Malaga        | 01411453 | 02040206 | USGS            | 02/25/99    | 6.7 |
| Maurice River | Still Run near Malaga        | 01411453 | 02040206 | USGS            | 05/17/99    | 6.6 |
| Maurice River | Still Run near Malaga        | 01411453 | 02040206 | USGS            | 05/17/99    | 6.8 |
| Maurice River | Still Run near Malaga        | 01411453 | 02040206 | USGS            | 09/20/99    | 5.9 |

Maurice River Watershed  
pH Data

| Watershed     | Site Name             | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|---------------|-----------------------|----------|----------|-----------------|-------------|-----|
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | USGS            | 09/20/99    | 5.3 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 12/03/02    | 6.0 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 03/13/03    | 5.4 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 06/12/03    | 6.1 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 09/09/03    | 6.1 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 12/10/03    | 6.3 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 12/10/03    | 6.3 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 03/09/04    | 6.3 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 06/01/04    | 6.5 |
| Maurice River | Still Run near Malaga | 01411453 | 02040206 | NJDEP           | 09/02/04    | 6.4 |

Impaired

Non-Impaired

Maurice River Watershed  
Mercury Data

| Watershed     | Site Name   | Species               | Date       | N | Total Weight (g) | Total Length (cm) |             |       | Age (years) | Sex | Hg Concentration (mg/kg wet weight) |
|---------------|-------------|-----------------------|------------|---|------------------|-------------------|-------------|-------|-------------|-----|-------------------------------------|
|               |             |                       |            |   |                  | Avg.              | Range       | Range |             |     |                                     |
| Maurice River | Malaga Lake | Esox niger            | 1996       | 1 |                  | 29.3              | 29.3        |       |             |     | 0.85                                |
| Maurice River | Malaga Lake | Esox niger            | 1996       | 1 |                  | 31                | 31          |       |             |     | 0.99                                |
| Maurice River | Malaga Lake | Esox niger            | 1996       | 1 |                  | 32                | 32          |       |             |     | 0.73                                |
| Maurice River | Malaga Lake | Esox niger            | 1996       | 1 |                  | 34                | 34          |       |             |     | 1.48                                |
| Maurice River | Malaga Lake | Esox niger            | 1996       | 1 |                  | 36.2              | 36.2        |       |             |     | 0.97                                |
| Maurice River | Malaga Lake | Micropterus salmoides | 1996       | 1 |                  | 32.4              | 32.4        |       |             |     | 0.95                                |
| Maurice River | Wilson Lake | Esox niger            | 1992       | 1 |                  | 39.78             | 34.4 - 50.6 | 2.5   | 1 - 4       |     | 0.80                                |
| Maurice River | Wilson Lake | Chain Pickerel        | 10/28/1992 |   | 1056.1           | 50.6              |             |       |             | M   | 1.06                                |
| Maurice River | Wilson Lake | Chain Pickerel        | 10/29/1992 |   | 339.4            | 37.8              |             |       |             | M   | 0.24                                |
| Maurice River | Wilson Lake | Chain Pickerel        | 10/30/1992 |   | 287.9            | 36.3              |             |       |             | M   | 0.38                                |
| Maurice River | Wilson Lake | Chain Pickerel        | 10/31/1992 |   | 245.3            | 34.4              |             |       |             | F   | 1.54                                |
| Maurice River | Wilson Lake | Largemouth Bass       | 1992       |   | 574              | 355               |             |       |             |     | 0.77                                |
| Maurice River | Wilson Lake | Largemouth Bass       | 1992       |   | 830              | 470               |             |       |             |     | 1.75                                |
| Maurice River | Wilson Lake | Largemouth Bass       | 1992       |   | 781              | 400               |             |       |             |     | 0.88                                |
| Maurice River | Wilson Lake | Largemouth Bass       | 1992       |   | 509              | 345               |             |       |             |     | 0.99                                |
| Maurice River | Wilson Lake | Largemouth Bass       | 1992       |   | 199              | 256               |             |       |             |     | 0.90                                |
| Maurice River | Wilson Lake | Largemouth Bass       | 1992       |   | 628              | 470               |             |       |             |     | 1.44                                |
| Maurice River | Wilson Lake | Chain Pickerel        | 1992       |   | 135              | 305               |             |       |             |     | 0.88                                |
| Maurice River | Wilson Lake | Chain Pickerel        | 1992       |   | 620              | 470               |             |       |             |     | 1.60                                |
| Maurice River | Wilson Lake | Chain Pickerel        | 1992       |   | 172              | 295               |             |       |             |     | 0.66                                |
| Maurice River | Wilson Lake | Chain Pickerel        | 1992       |   | 94               | 257               |             |       |             |     | 0.91                                |
| Maurice River | Wilson Lake | Yellow Perch          | 1992       |   | 270              | 261               |             |       |             |     | 0.72                                |
| Maurice River | Wilson Lake | Yellow Perch          | 1992       |   | 180              | 245               |             |       |             |     | 0.65                                |
| Maurice River | Wilson Lake | Yellow Perch          | 1992       |   | 294              | 295               |             |       |             |     | 1.24                                |
| Maurice River | Wilson Lake | Yellow Perch          | 1992       |   | 350              | 300               |             |       |             |     | 1.08                                |
| Maurice River | Wilson Lake | Yellow Perch          | 1992       |   | 129              | 220               |             |       |             |     | 0.48                                |
| Maurice River | Wilson Lake | Pumpkinseed Sunfish   | 1992       |   | 140              | 182               |             |       |             |     | 1.62                                |
| Maurice River | Wilson Lake | Pumpkinseed Sunfish   | 1992       |   | 210              | 204               |             |       |             |     | 0.26                                |

Maurice River Watershed  
Mercury Data

| Watershed     | Site Name   | Species                | Date | N   | Total Weight (g) | Total Length (cm) |       | Age (years) |       | Sex | Hg Concentration (mg/kg wet weight) |
|---------------|-------------|------------------------|------|-----|------------------|-------------------|-------|-------------|-------|-----|-------------------------------------|
|               |             |                        |      |     |                  | Avg.              | Range | Avg.        | Range |     |                                     |
| Maurice River | Wilson Lake | Pumpkinseed Sunfish    | 1992 | 152 | 185              |                   |       |             |       |     | 0.50                                |
| Maurice River | Wilson Lake | Golden Shiner (forage) | 1992 | 0   | 0                |                   |       |             |       |     | 0.47                                |
| Maurice River | Wilson Lake | Golden Shiner (forage) | 1992 | 0   | 0                |                   |       |             |       |     | 0.29                                |
| Maurice River | Wilson Lake | Golden Shiner (forage) | 1992 | 0   | 0                |                   |       |             |       |     | 0.29                                |
| Maurice River | Wilson Lake | Golden Shiner (forage) | 1992 | 0   | 0                |                   |       |             |       |     | 0.46                                |
| Maurice River | Wilson Lake | Golden Shiner (forage) | 1992 | 0   | 0                |                   |       |             |       |     | 0.31                                |

Women of reproductive age and children:  
< 0.08 ppm  
No Advisories

0.08 - 0.18 ppm

0.19 - 0.54 ppm

> 0.54 ppm

Others:

< 0.35 ppm

0.35 - 0.93 ppm

0.947 - 2.81 ppm

> 2.81 ppm

No Advisories

Limited Consumption (Less than one meal per week)

Limited Consumption (Less than one meal per month)

No consumption advised

Non-Impaired

Impaired

**Great Egg Harbor River Watershed  
AMNET Scores**

| Watershed             | Site Name       | Site Number | Location                  | Municipality | Impairment Score 1996/1996 | Impairment Score 2000/2001 | Habitat Score 2000/2001 | Impairment Rating 1995/1996 | Impairment Rating 2000/2001 | Chironomid Larvae Abnormalities | Site Activity |
|-----------------------|-----------------|-------------|---------------------------|--------------|----------------------------|----------------------------|-------------------------|-----------------------------|-----------------------------|---------------------------------|---------------|
| Great Egg Harbor Rive | Faraway Br      | AN0629      | Jackson Rd                | Monroe Twp   | 12                         | 12                         | 180                     | Moderate                    | Moderate                    | False                           | True          |
| Great Egg Harbor Rive | Four Mile Br    | AN0622      | Malaga Rd (Rt 536)        | Monroe Twp   | 21                         | 27                         | 129                     | Moderate                    | None                        | False                           | True          |
| Great Egg Harbor Rive | Gr Egg Harbor R | AN0623      | Williamstown - Winslow Rd | Monroe Twp   | 30                         | 21                         | 183                     | None                        | Moderate                    | False                           | True          |
| Great Egg Harbor Rive | Hospitality Br  | AN0627      | Blue Bell Rd              | Monroe Twp   | 9                          | 12                         | 176                     | Moderate                    | Moderate                    | False                           | True          |
| Great Egg Harbor Rive | Hospitality Br  | AN0628      | Rt 538                    | Monroe Twp   | 9                          | 21                         | 150                     | Moderate                    | Moderate                    | False                           | True          |
| Great Egg Harbor Rive | Squankum Br     | AN0624      | Malaga Rd                 | Monroe Twp   | 9                          | 9                          | 158                     | Moderate                    | Moderate                    | False                           | True          |
| Great Egg Harbor Rive | White Oak Br    | AN0630      | Jackson Rd                | Monroe Twp   | 9                          | 6                          | 176                     | Moderate                    | Severe                      | False                           | True          |

**Impairment Score**      **Impairment Rating**  
**24 - 30**                      **Non-Impaired**  
**9 - 21**                        **Moderately Impaired**  
**0 - 6**                            **Severely Impaired**

**Great Egg Harbor River Watershed  
Phosphorous Data**

| Watershed              | Site Name                                       | Site ID  | HUC      | Sampling Agency | Sample Date | Sample Type | Result Value (mg/l) | Standard (mg/l) |
|------------------------|---|----------|----------|-----------------|-------------|-------------|---------------------|-----------------|
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/03/97    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/03/97    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 03/19/98    | Unfiltered  | 0.03                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 03/19/98    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 06/04/98    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 06/04/98    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 09/02/98    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 09/02/98    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/08/98    | Unfiltered  | 0.05                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/08/98    | Filtered    | 0.05                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/10/99    | Unfiltered  | 0.05                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/10/99    | Filtered    | 0.05                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/24/99    | Unfiltered  | 0.04                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/24/99    | Filtered    | 0.05                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/23/99    | Unfiltered  | 0.05                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/23/99    | Filtered    | 0.05                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/16/99    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/16/99    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/07/00    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/07/00    | Filtered    | 0.00                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/10/00    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/10/00    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/15/00    | Unfiltered  | 0.02                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/15/00    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/15/00    | Unfiltered  | 0.01                | 0.1             |

**Great Egg Harbor River Watershed  
Phosphorous Data**

| Watershed              | Site Name                                       | Site ID  | HUC      | Sampling Agency | Sample Date | Sample Type | Result Value (mg/l) | Standard (mg/l) |
|------------------------|---|----------|----------|-----------------|-------------|-------------|---------------------|-----------------|
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/15/00    | Filtered    | 0.00                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/20/01    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/20/01    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/09/01    | Unfiltered  | 0.02                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/09/01    | Filtered    | 0.00                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/22/01    | Unfiltered  | 0.02                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/22/01    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/11/01    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/11/01    | Filtered    | 0.00                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/19/02    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/19/02    | Filtered    | 0.00                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 06/03/02    | Unfiltered  | 0.03                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 06/03/02    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/20/02    | Unfiltered  | 0.02                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/20/02    | Filtered    | 0.00                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/25/02    | Unfiltered  | 0.02                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/25/02    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 03/05/03    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 03/05/03    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/13/03    | Unfiltered  | 0.03                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/13/03    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/12/03    | Unfiltered  | 0.04                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/12/03    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/24/03    | Unfiltered  | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/24/03    | Filtered    | 0.01                | 0.1             |

**Great Egg Harbor River Watershed  
Phosphorous Data**

| Watershed              | Site Name                                       | Site ID  | HUC      | Sampling Agency | Sample Date | Sample Type | Result Value (mg/l) | Standard (mg/l) |
|------------------------|---|----------|----------|-----------------|-------------|-------------|---------------------|-----------------|
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/09/04    | Unfiltered  | 0.02                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/09/04    | Filtered    | 0.01                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/19/04    | Unfiltered  | 0.03                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/19/04    | Filtered    | 0.02                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 09/09/04    | Unfiltered  | 0.02                | 0.1             |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 09/09/04    | Filtered    | 0.01                | 0.1             |

Non-Impaired

Impaired

**Great Egg Harbor River Watershed  
pH Data**

| Watershed              | Site Name                                       | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|------------------------|---|----------|----------|-----------------|-------------|-----|
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 03/04/04    | 5.8 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 06/07/02    | 6.0 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 05/25/04    | 6.5 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 08/26/04    | 6.4 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 09/11/03    | 5.8 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 06/03/03    | 5.2 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 04/24/01    | 6.0 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 11/25/02    | 4.7 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 04/26/01    | 6.5 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 04/25/01    | 6.1 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 03/18/03    | 5.2 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 12/08/03    | 5.6 |
| Great Egg Harbor River | Great Egg Harbor River near Sicklerville        | 01410784 | 02040302 | NJDEP           | 12/08/03    | 5.6 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/03/97    | 6.1 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/03/97    | 6.1 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 03/19/98    | 5.5 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 03/19/98    | 5.7 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 06/04/98    | 6.5 |

**Great Egg Harbor River Watershed  
pH Data**

| Watershed              | Site Name                                       | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|------------------------|---|----------|----------|-----------------|-------------|-----|
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 06/04/98    | 6.6 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 09/02/98    | 6.4 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 09/02/98    | 6.4 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/08/98    | 6.0 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/10/99    | 5.8 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/10/99    | 5.5 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/24/99    | 6.3 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/24/99    | 7.0 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/23/99    | 6.1 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/23/99    | 6.6 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/16/99    | 5.7 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/16/99    | 6.7 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/07/00    | 6.1 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/10/00    | 6.3 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/10/00    | 6.2 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/15/00    | 6.0 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/15/00    | 6.1 |

**Great Egg Harbor River Watershed  
pH Data**

| Watershed              | Site Name                                       | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|------------------------|---|----------|----------|-----------------|-------------|-----|
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/15/00    | 6.0 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/15/00    | 5.9 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/20/01    | 6.0 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/20/01    | 5.8 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/09/01    | 6.2 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/09/01    | 6.5 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/22/01    | 6.4 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/22/01    | 7.1 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/11/01    | 5.6 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 12/11/01    | 6.3 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/19/02    | 5.5 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/19/02    | 6.5 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 06/03/02    | 5.5 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 06/03/02    | 6.3 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/20/02    | 5.6 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/20/02    | 6.4 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/25/02    | 6.0 |

**Great Egg Harbor River Watershed  
pH Data**

| Watershed              | Site Name                                       | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|------------------------|---|----------|----------|-----------------|-------------|-----|
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/25/02    | 6.3 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 03/05/03    | 6.2 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 03/05/03    | 6.4 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/13/03    | 5.6 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/13/03    | 6.2 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/12/03    | 5.8 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 08/12/03    | 6.3 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/24/03    | 5.5 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 11/24/03    | 6.0 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/09/04    | 5.2 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 02/09/04    | 5.8 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/19/04    | 5.8 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 05/19/04    | 6.6 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 09/09/04    | 6.1 |
| Great Egg Harbor River | Hospitality Branch at Blue Bell Road near Cecil | 01411035 | 02040302 | USGS            | 09/09/04    | 6.2 |
| Great Egg Harbor River | Hospitality Branch near Cecil                   | 01411050 | 02040302 | USGS            | 12/15/99    | 6.0 |
| Great Egg Harbor River | Hospitality Branch near Cecil                   | 01411050 | 02040302 | USGS            | 12/15/99    | 6.5 |

**Great Egg Harbor River Watershed  
pH Data**

| Watershed              | Site Name                     | Site ID  | HUC      | Sampling Agency | Sample Date | pH  |
|------------------------|-------------------------------|----------|----------|-----------------|-------------|-----|
| Great Egg Harbor River | Hospitality Branch near Cecil | 01411050 | 02040302 | USGS            | 02/16/00    | 6.2 |
| Great Egg Harbor River | Hospitality Branch near Cecil | 01411050 | 02040302 | USGS            | 02/16/00    | 6.8 |
| Great Egg Harbor River | Hospitality Branch near Cecil | 01411050 | 02040302 | USGS            | 05/24/00    | 6.7 |
| Great Egg Harbor River | Hospitality Branch near Cecil | 01411050 | 02040302 | USGS            | 05/24/00    | 7.0 |
| Great Egg Harbor River | Hospitality Branch near Cecil | 01411050 | 02040302 | USGS            | 09/13/00    | 6.9 |
| Great Egg Harbor River | Hospitality Branch near Cecil | 01411050 | 02040302 | USGS            | 09/13/00    | 6.9 |

 Impaired

 Non-Impaired

**APPENDIX C. MUNICIPAL REGULATION CHECKLIST**

# New Jersey Stormwater Best Management Practices Manual

February 2004

<http://www.state.nj.us/dep/watershedmgt/bmpmanualfeb2004.htm>

## A P P E N D I X B

# Municipal Regulations Checklist

### A checklist for incorporating nonstructural stormwater management strategies into local regulations

As part of the requirements for municipal stormwater management plans in the Stormwater Management Rules at N.J.A.C. 7:8-4, municipalities are required to evaluate the municipal master plan, and land use and zoning ordinances to determine what adjustments need to be made to allow the implementation of nonstructural stormwater management techniques, also called low impact development techniques, which are presented in *Chapter 2: Low Impact Development Techniques*. *Chapter 3: Regional and Municipal Stormwater Management Plans* provides information on the development of municipal stormwater management plans, including the evaluation of the master plan, and land use and zoning ordinances. This checklist was prepared to assist municipalities in identifying the specific ordinances that should be evaluated, and the types of changes to be incorporated to address the requirements of the Stormwater Management Rules.

## Part 1: Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharge and stormwater runoff quality and quantity.

### A. Preservation of Natural Areas

Municipal regulations should include requirements to preserve existing vegetated areas, minimize turf grass lawn areas, and use native vegetation.

- Yes  No Are applicants required to provide a layout of the existing vegetated areas, and a description of the conditions in those areas?
- Yes  No Does the municipality have maximum as well as minimum yard sizing ordinances?
- Yes  No Are residents restricted from enlarging existing turf lawn areas?
- Yes  No Do the ordinances provide incentives for the use of vegetation as filters for stormwater runoff?
- Yes  No Do the ordinances require a specific percentage of permanently preserved open space as part of the evaluation of cluster development?

## **B. Tree Protection Ordinances**

Municipalities often have a tree ordinance to minimize the removal of trees and to replace trees that are removed. However, while tree ordinances protect the number of trees, they do not typically address the associated leaf litter or smaller vegetation that provides additional water quality and quantity benefits. Municipalities should consider enhancing tree ordinances to a forest ordinance that would also maintain the benefits of a forested area.

- Yes  No Does the municipality have a tree protection ordinance?
- Yes  No Can the municipality include a forest protection ordinance?
- Yes  No If forested areas are present at development sites, is there a required percentage of the stand to be preserved?

## **C. Landscaping Island and Screening Ordinances**

Municipalities often have ordinances that require landscaping islands for parking areas. The landscaping islands can provide ideal opportunities for the filtration and disconnection of runoff, or the placement of small LID-BMPs. Screening ordinances limit the view of adjoining properties, parking areas, or loading areas. Low maintenance vegetation can be required in islands and areas used for screening to provide stormwater quality, groundwater recharge, or stormwater quantity benefits.

- Yes  No Do the ordinances require landscaping islands in parking lots, or between the roadway and the sidewalk? Can the ordinance be adjusted to require vegetation that is more beneficial for stormwater quality, groundwater recharge, or stormwater quantity, but that does not interfere with driver vision at the intersections?
- Yes  No Is the use of bioretention islands and other stormwater practices within landscaped areas or setbacks allowed?
- Yes  No Do the ordinances require screening from adjoining properties? Can the screening criteria require the use of vegetation to the maximum extent practicable before the use of walls or berms?

## **D. Riparian Buffers**

Municipalities may have existing buffer and/or floodplain ordinances that require the protection of vegetation adjacent to streams. Municipalities should consult existing regulations adopted by the Department to ensure that riparian buffer or floodplain ordinances reflect the requirements of the Department within these areas. The municipality should consider conservation restrictions and allowable maintenance to ensure the preservation of these areas.

- Yes  No Is there a stream buffer or floodplain ordinance in the community?
- Yes  No Is the ordinance consistent with existing state regulatory requirements?
- Yes  No Does the ordinance require a conservation easement, or other permanent restrictions on buffer areas?
- Yes  No Does the ordinance identify or limit when stormwater outfall structures can cross the buffer?
- Yes  No Does the ordinance give detailed information on the type of maintenance and/or activities that is allowed in the buffer?

## Part 2: Minimizing Land Disturbance

The minimization of disturbance can be used at different phases of a development project. The goal is to limit clearing, grading, and other disturbance associated with development to protect existing features that provide stormwater benefits. Zoning ordinances typically limit the amount of impervious surfaces on building lots, but do not limit the amount of area that can be disturbed during construction. This strategy helps preserve the site's existing hydrologic character, as well as limiting the occurrence of soil compaction.

### A. Limits of Disturbance

Designing with the terrain, or site fingerprinting, requires an assessment of the characteristics of the site and the selection of areas for development that would minimize the impact. This can be incorporated into the requirements for existing site conditions and the environmental impact statement. Limits of disturbance should be incorporated into construction plans reviewed and approved by the municipality. Setbacks should be evaluated to determine whether they can be reduced. The following maximum setbacks are recommended for low impact development designs:

- front yard – 20 feet;
- rear yard – 25 feet; and
- side yard – 8 feet.

- Yes  No As part of the depiction of existing conditions, are environmentally critical and environmentally constrained areas identified? (Environmentally critical areas are areas or features with significant environmental value, such as steep slopes, stream corridors, natural heritage priority sites, and habitats of threatened and endangered species. Environmentally constrained areas are those with development restrictions, such as wetlands, floodplains, and sites of endangered species.)
- Yes  No Can any of the existing setbacks be reduced?
- Yes  No Are there maximum turf grass or impervious cover limits in any of the setbacks?
- Yes  No Do the ordinances inhibit or prohibit the clearcutting of the project site as part of the construction?
- Yes  No Is the traffic of heavy construction vehicles limited to specific areas, such as areas of proposed roadway? Are these areas required to be identified on the plans and marked in the field?
- Yes  No Do the ordinances require the identification of specific areas that provide significant hydrologic functions, such as existing surface storage areas, forested areas, riparian corridors, and areas with high groundwater recharge capabilities?
- Yes  No Does the municipality require an as-built inspection before issuing a certificate of occupancy? If so, does the inspection include identification of compacted areas, if they exist within the site?
- Yes  No Does the municipality require the restoration to compacted areas in accordance with the Soil Erosion and Sediment Control Standards?

## B. Open Space and Cluster Development

Open space areas are restricted land that may be set aside for conservation, recreation, or agricultural use, and are often associated with cluster development requirements. Since open space can have a variety of uses, the municipality should evaluate its open space ordinances to determine whether amendments are necessary to provide improved stormwater benefits.

- Yes  No Are open space or cluster development designs allowed in the municipality?
- Yes  No Are flexible site design incentives available for developers that utilize open space or cluster design options?
- Yes  No Are there limitations on the allowable disturbance of existing vegetated areas in open space?
- Yes  No Are the requirements to re-establish vegetation in disturbed areas dedicated for open space?
- Yes  No Is there a maximum allowable impervious cover in open space areas?

## Part 3: Impervious Area Management

The amount of impervious area, and its relationship to adjacent vegetated areas, can significantly change the amount of runoff that needs to be addressed by BMPs. Most of a site's impervious surfaces are typically located in the streets, sidewalks, driveway, and parking areas. These areas are further hampered by requirements for continuous curbing that prevent discharge from impervious surfaces into adjacent vegetated areas.

### A. Streets and Driveways

Street widths of 18 to 22 feet are recommended for low impact development designs in low density residential developments. Minimum driveway widths of 9 and 18 feet for one lane and two lanes, respectively, are also recommended. The minimum widths of all streets and driveways should be evaluated to demonstrate that the proposed width is the narrowest possible consistent with safety and traffic concerns and requirements. Municipalities should evaluate which traffic calming features, such as circles, rotaries, medians, and islands, can be vegetated or landscaped. Cul-de-sacs can also be evaluated to reduce the radius area, or to provide a landscape island in the center.

- Yes  No Are the street widths the minimum necessary for traffic density, emergency vehicle movement, and roadside parking?
- Yes  No Are street features, such as circles, rotaries, or landscaped islands allowed to or required to receive runoff?
- Yes  No Are curb cuts or flush curbs with curb stops an allowable alternative to raised curbs?
- Yes  No Can the minimum cul-de-sac radius be reduced or is a landscaped island required in the center of the cul-de-sac?
- Yes  No Are alternative turn-arounds such as "hammerheads" allowed on short streets in low density residential developments?
- Yes  No Can the minimum driveway width be reduced?
- Yes  No Are shared driveways permitted in residential developments?

## B. Parking Areas and Sidewalks

A mix of uses at a development site can allow for shared parking areas, reducing the total parking area. Municipalities require minimum parking areas, but seldom limit the total number of parking spaces. Table 1 shows recommendations for minimum parking space ratios for low impact design:

**Table 1: Low Impact Development Parking Space Ratios**

| Use                          | Parking Ratio per 1000 sq. ft. of Gross Floor Area |
|------------------------------|--|
| Professional office building | Less than 3.0                                      |
| Shopping centers             | Less than 4.5                                      |

- Yes  No Can the parking ratios be reduced?
- Yes  No Are the parking requirements set as maximum or median rather than minimum requirements?
- Yes  No Is the use of shared parking arrangements allowed to reduce the parking area?
- Yes  No Are model shared parking agreements provided?
- Yes  No Does the presence of mass transit allow for reduced parking ratios?
- Yes  No Is a minimum stall width of 9 feet allowed?
- Yes  No Is a minimum stall length of 18 feet allowed?
- Yes  No Can the stall lengths be reduced to allow vehicle overhang into a vegetated area?
- Yes  No Do ordinances allow for permeable material to be used in overflow parking areas?
- Yes  No Do ordinances allow for multi-level parking?
- Yes  No Are there incentives to provide parking that reduces impervious cover, rather than providing only surface parking lots?

*Sidewalks can be made of pervious material or disconnected from the drainage system to allow runoff to re-infiltrate into the adjacent pervious areas.*

- Yes  No Do ordinances allow for sidewalks constructed with pervious material?
- Yes  No Can alternate pedestrian networks be substituted for sidewalks (e.g., trails through common areas)?

### **C. Unconnected Impervious Areas**

Disconnection of impervious areas can occur in both low density development and high density commercial development, provided sufficient vegetated area is available to accept dispersed stormwater flows. Areas for disconnection include parking lot or cul-de-sac islands, lawn areas, and other vegetated areas.

- Yes  No Are developers required to disconnect impervious surfaces to promote pollutant removal and groundwater recharge?
- Yes  No Do ordinances allow the reduction of the runoff volume when runoff from impervious areas are re-infiltrated into vegetated areas?
- Yes  No Do ordinances allow flush curb and/or curb cuts to allow for runoff to discharge into adjacent vegetated areas as sheet flow?

## **Part 4: Vegetated Open Channels**

The use of vegetated channels, rather than the standard concrete curb and gutter configuration, can decrease flow velocity, and allow for stormwater filtration and re-infiltration. One design option is for vegetated channels that convey smaller storm events, such as the water quality design storm, and provide an overflow into a storm sewer system for larger storm events.

- Yes  No Do ordinances allow or require vegetated open channel conveyance instead of the standard curb and gutter designs?
- Yes  No Are there established design criteria for vegetated channels?

**APPENDIX D. LOW IMPACT DEVELOPEMNT CHECKLIST**

# New Jersey Stormwater Best Management Practices Manual

February 2004

<http://www.state.nj.us/dep/watershedmgt/bmpmanualfeb2004.htm>

## A P P E N D I X A

# Low Impact Development Checklist

### **A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development**

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

# Low Impact Development Checklist

**A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development**

Municipality: \_\_\_\_\_

County: \_\_\_\_\_ Date: \_\_\_\_\_

Review board or agency: \_\_\_\_\_

Proposed land development name: \_\_\_\_\_

Lot(s): \_\_\_\_\_ Block(s): \_\_\_\_\_

Project or application number: \_\_\_\_\_

Applicant's name: \_\_\_\_\_

Applicant's address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email address: \_\_\_\_\_

Designer's name: \_\_\_\_\_

Designer's address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email address: \_\_\_\_\_



## Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

\_\_\_\_\_

Do regulations include nonstructural requirements? Yes: \_\_\_\_\_ No: \_\_\_\_\_

If yes, briefly describe: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

List LID-BMPs prohibited by local regulations: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Pre-design meeting held? Yes: \_\_\_\_\_ Date: \_\_\_\_\_ No: \_\_\_\_\_

Meeting held with: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Pre-design site walk held? Yes: \_\_\_\_\_ Date: \_\_\_\_\_ No: \_\_\_\_\_

Site walk held with: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Other agencies with stormwater review jurisdiction:

Name: \_\_\_\_\_

Required approval: \_\_\_\_\_

Name: \_\_\_\_\_

Required approval: \_\_\_\_\_

Name: \_\_\_\_\_

Required approval: \_\_\_\_\_

## Part 3: Nonstructural Strategies and LID-BMPs in Design

### 3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed? Yes: \_\_\_\_\_ No: \_\_\_\_\_

If yes, was this inventory a factor in the site's layout and design? Yes: \_\_\_\_\_ No: \_\_\_\_\_

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: \_\_\_\_\_ No: \_\_\_\_\_ If yes, specify % of site: \_\_\_\_\_

Native ground cover? Yes: \_\_\_\_\_ No: \_\_\_\_\_ If yes, specify % of site: \_\_\_\_\_

Vegetated buffers? Yes: \_\_\_\_\_ No: \_\_\_\_\_ If yes, specify % of site: \_\_\_\_\_

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: \_\_\_\_\_ No: \_\_\_\_\_ If yes, specify % of site: \_\_\_\_\_

Native ground cover? Yes: \_\_\_\_\_ No: \_\_\_\_\_ If yes, specify % of site: \_\_\_\_\_

Vegetated buffers? Yes: \_\_\_\_\_ No: \_\_\_\_\_ If yes, specify % of site: \_\_\_\_\_

D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: \_\_\_\_\_ No: \_\_\_\_\_

Reduce runoff pollutant loads through runoff treatment: Yes: \_\_\_\_\_ No: \_\_\_\_\_

Maintain groundwater recharge by preserving natural areas: Yes: \_\_\_\_\_ No: \_\_\_\_\_

### 3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

A. Have inventories of existing site soils and slopes been performed? Yes: \_\_\_\_\_ No: \_\_\_\_\_

If yes, were these inventories factors in the site's layout and design? Yes: \_\_\_\_\_ No: \_\_\_\_\_

B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners? Yes: \_\_\_\_\_ No: \_\_\_\_\_

If yes, how: \_\_\_\_\_

\_\_\_\_\_

Restrict temporary site disturbance during construction? Yes: \_\_\_\_\_ No: \_\_\_\_\_

If yes, how: \_\_\_\_\_

\_\_\_\_\_

Consider soils and slopes in selecting disturbance limits? Yes: \_\_\_\_\_ No: \_\_\_\_\_

If yes, how: \_\_\_\_\_

\_\_\_\_\_

C. Specify percentage of site to be cleared: \_\_\_\_\_ Regraded: \_\_\_\_\_

D. Specify percentage of cleared areas done so for buildings: \_\_\_\_\_

For driveways and parking: \_\_\_\_\_ For roadways: \_\_\_\_\_

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

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F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: \_\_\_\_\_ HSG B: \_\_\_\_\_ HSG C: \_\_\_\_\_ HSG D: \_\_\_\_\_

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: \_\_\_\_\_ HSG B: \_\_\_\_\_ HSG C: \_\_\_\_\_ HSG D: \_\_\_\_\_

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

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I. Does the site include Karst topography? Yes: \_\_\_\_\_ No: \_\_\_\_\_

If yes, discuss measures taken to limit Karst impacts:

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### 3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: \_\_\_\_\_ Proposed: \_\_\_\_\_

B. Specify maximum site impervious coverage allowed by regulations: \_\_\_\_\_

C. Compare proposed street cartway widths with those required by regulations:

| Type of Street                                      | Proposed Cartway Width (feet) | Required Cartway Width (feet) |
|---|-------------------------------|-------------------------------|
| Residential access – low intensity                  |                               |                               |
| Residential access – medium intensity               |                               |                               |
| Residential access – high intensity with parking    |                               |                               |
| Residential access – high intensity without parking |                               |                               |
| Neighborhood  |                               |                               |
| Minor collector – low intensity without parking     |                               |                               |
| Minor collector – with one parking lane             |                               |                               |
| Minor collector – with two parking lanes            |                               |                               |
| Minor collector – without parking                   |                               |                               |
| Major collector                                     |                               |                               |

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

F. Specify percentage of total site impervious cover created by buildings:

By driveways and parking: \_\_\_\_\_ By roadways: \_\_\_\_\_

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

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H. Specify percentage of total impervious area that will be unconnected:

Total site: \_\_\_\_\_ Buildings: \_\_\_\_\_ Driveways and parking: \_\_\_\_\_ Roads: \_\_\_\_\_

I. Specify percentage of total impervious area that will be porous:

Total site: \_\_\_\_\_ Buildings: \_\_\_\_\_ Driveways and parking: \_\_\_\_\_ Roads: \_\_\_\_\_

J. Specify percentage of total building roof area that will be vegetated: \_\_\_\_\_

K. Specify percentage of total parking area located beneath buildings: \_\_\_\_\_

L. Specify percentage of total parking located within multi-level parking deck: \_\_\_\_\_

### 3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: \_\_\_\_\_ Vegetated swale: \_\_\_\_\_ Natural channel: \_\_\_\_\_

Stormwater management facility: \_\_\_\_\_ Other: \_\_\_\_\_

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

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C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: \_\_\_\_\_

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Increase overland flow roughness: \_\_\_\_\_

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### 3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

#### A. Trash Receptacles

Specify the number of trash receptacles provided: \_\_\_\_\_

Specify the spacing between the trash receptacles: \_\_\_\_\_

Compare trash receptacles proposed with those required by regulations:

Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

#### B. Pet Waste Stations

Specify the number of pet waste stations provided: \_\_\_\_\_

Specify the spacing between the pet waste stations: \_\_\_\_\_

Compare pet waste stations proposed with those required by regulations:

Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

#### C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: \_\_\_\_\_

#### D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

Litter collection: Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

\_\_\_\_\_

\_\_\_\_\_

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

## Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

| No. | Nonstructural Strategy   | Yes | No |
|-----|--|-----|----|
| 1.  | Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.  |     |    |
| 2.  | Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.   |     |    |
| 3.  | Maximize the protection of natural drainage features and vegetation.   |     |    |
| 4.  | Minimize the decrease in the pre-construction time of concentration.   |     |    |
| 5.  | Minimize land disturbance including clearing and grading.  |     |    |
| 6.  | Minimize soil compaction.  |     |    |
| 7.  | Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides. |     |    |
| 8.  | Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.   |     |    |
| 9.  | Provide preventative source controls.  |     |    |

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

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**APPENDIX E. FRANKLIN TOWNSHIP MITIGATION PROJECTS**

# Illicit Connection Inspection Report Form

Municipality  
Information

Municipality: Franklin County Gloucester

NJPDES # : NJG0151025 PI ID #: 197781

Team Member: Sean Fleming, Zac Papa

Date 04-Dec-06 Effective Date of Permit Authorization (EDPA): 01-Apr-04

Outfall #: E009 Location: Swedesboro Road

Receiving Waterbody: Maurice River

1. Is there a dry weather flow? Y (  ) N (  )
2. If "YES", what is the outfall flow estimate? 0.3 gpm  
(flow sample should be kept for further testing, and this form will need to be submitted with the Annual Report and Certification)
3. Are there any indications of an intermittent flow? Y (  ) N (  )
4. If you answered "NO" to BOTH questions #1 and #3, there is probably not an illicit connection and you can skip to question #7.  
(NOTE: This form **does not** need to be submitted to the Department, but should be kept with your SPPP.)  
  
If you answered "YES" to either question, please continue on to question #5.  
(NOTE: This form will need to be submitted to the Department with the Annual Report and Certification.)

## 5. PHYSICAL OBSERVATIONS:

- (a) ODOR: sulfide \_\_\_\_\_
- (b) COLOR: none \_\_\_\_\_
- (c) TURBIDITY: cloudy
- (d) FLOATABLES: none \_\_\_\_\_
- (e) DEPOSITS/STAINS: none \_\_\_\_\_
- (f) VEGETATION CONDITIONS: normal
- (g) DAMAGE TO OUTFALL STRUCTURES:  
IDENTIFY STRUCTURE: Circular Concrete, No Headwall  
DAMAGE: none \_\_\_\_\_

## 6. ANALYSES OF OUTFALL FLOW SAMPLE:

\* field calibrate instruments in accordance with manufacturer's instructions prior to testing.

- (a) DETERGENTS: \_\_\_\_\_ mg/L

(if sample is greater than 0.06 mg/L, the sample is contaminated with detergents [which may be from sanitary wastewater or other sources]. Further testing is required and this outfall should be given the highest priority.)

(if the sample is not greater than 0.06 mg/L and it does not show physical characteristics of sanitary wastewater [e.g., odor, floatables, and/or color] it is unlikely that it is from sanitary wastewater sources, yet there may still be an illicit connection of industrial wastewater, rinse water, backwash or cooling water. Skip to question #6c.)

(b) **AMMONIA (as N) TO POTASSIUM RATIO:** \_\_\_\_\_

(if the Ammonia to Potassium Ratio is greater than 0.6:1, then it is likely that the pollutant is sanitary sewage)

(if the Ammonia to Potassium Ratio is less than or equal to 0.6:1, then the pollutant is from another washwater source.)

(c) **FLUORIDE:** \_\_\_\_\_mg/L

(if the fluoride levels are between 1.0 and 2.5 mg/L, then the flow is most likely from fluoride treated potable water.)

(if the sample tests below a detection limit of 0.1 mg/L for fluoride, it is likely to be from groundwater infiltration, springs or streams. In some cases, however, it is possible that the discharge could originate from an onsite well used for industrial cooling water, which will test non-detect for both detergents and fluoride. To differentiate between these cooling water discharges and groundwater infiltration, you will have to rely on temperature.)

(d) **TEMPERATURE:** \_\_\_\_\_°F

(if the temperature of the sample is over 70°F, it is most likely cooling water)

(if the temperature of the sample is under 70°F, it is most likely from ground water infiltration)

7. Is there a suspected illicit connection? Y (  ) N (  )

If "YES", what is the suspected source? \_\_\_\_\_

If "NO", skip to signature block on the bottom of this form.

8. Has the investigation of the suspected illicit connection been completed?

Y (  ) N (  )

If "YES", proceed to question #9.

If "NO", skip to signature block on the bottom of this form.

9. Was the source of the illicit connection found? Y (  ) N (  )

If "YES", identify the source. \_\_\_\_\_

What plan of action will follow to eliminate the illicit connection?

Resolution:

If "NO", complete the Closeout Investigation Form and attach it to this Illicit Connection Inspection Report Form.

Inspector's Name: Sean Fleming

Title: Environmental Scientist

Signature:  Sean Fleming

Digitally signed by Sean Fleming  
DN: cn=Sean Fleming, c=US  
Date: 2007.03.08 13:04:09 -0500

Date: 12/29/06

If there is a dry weather flow or evidence of an intermittent flow, be sure to include this form with your Annual Report and Certification.

If there is not a dry weather flow or evidence of an intermittent flow, this form should be retained with your SPPP.

# Illicit Connection Inspection Report Form

Municipality  
Information

Municipality: Franklin County Gloucester

NJPDES # : NJG0151025 PI ID #: 197781

Team Member: Sean Fleming, Zac Papa

Date 04-Dec-06 Effective Date of Permit Authorization (EDPA): 01-Apr-04

Outfall #: E018 Location: Malaga Park Drive

Receiving Waterbody: Malaga Branch

1. Is there a dry weather flow? Y (  ) N (  )
2. If "YES", what is the outfall flow estimate? \_\_\_\_\_ gpm  
(flow sample should be kept for further testing, and this form will need to be submitted with the Annual Report and Certification)
3. Are there any indications of an intermittent flow? Y (  ) N (  )
4. If you answered "NO" to BOTH questions #1 and #3, there is probably not an illicit connection and you can skip to question #7.  
(NOTE: This form **does not** need to be submitted to the Department, but should be kept with your SPPP.)  
  
If you answered "YES" to either question, please continue on to question #5.  
(NOTE: This form will need to be submitted to the Department with the Annual Report and Certification.)

## 5. PHYSICAL OBSERVATIONS:

- (a) ODOR: none \_\_\_\_\_
- (b) COLOR: none \_\_\_\_\_
- (c) TURBIDITY: none \_\_\_\_\_
- (d) FLOATABLES: none \_\_\_\_\_
- (e) DEPOSITS/STAINS: none \_\_\_\_\_
- (f) VEGETATION CONDITIONS: normal
- (g) DAMAGE TO OUTFALL STRUCTURES:  
IDENTIFY STRUCTURE: \_\_\_\_\_  
DAMAGE: none \_\_\_\_\_

## 6. ANALYSES OF OUTFALL FLOW SAMPLE:

\* field calibrate instruments in accordance with manufacturer's instructions prior to testing.

- (a) DETERGENTS: \_\_\_\_\_ mg/L

(if sample is greater than 0.06 mg/L, the sample is contaminated with detergents [which may be from sanitary wastewater or other sources]. Further testing is required and this outfall should be given the highest priority.)

(if the sample is not greater than 0.06 mg/L and it does not show physical characteristics of sanitary wastewater [e.g., odor, floatables, and/or color] it is unlikely that it is from sanitary wastewater sources, yet there may still be an illicit connection of industrial wastewater, rinse water, backwash or cooling water. Skip to question #6c.)

(b) **AMMONIA (as N) TO POTASSIUM RATIO:** \_\_\_\_\_

(if the Ammonia to Potassium Ratio is greater than 0.6:1, then it is likely that the pollutant is sanitary sewage)

(if the Ammonia to Potassium Ratio is less than or equal to 0.6:1, then the pollutant is from another washwater source.)

(c) **FLUORIDE:** \_\_\_\_\_ mg/L

(if the fluoride levels are between 1.0 and 2.5 mg/L, then the flow is most likely from fluoride treated potable water.)

(if the sample tests below a detection limit of 0.1 mg/L for fluoride, it is likely to be from groundwater infiltration, springs or streams. In some cases, however, it is possible that the discharge could originate from an onsite well used for industrial cooling water, which will test non-detect for both detergents and fluoride. To differentiate between these cooling water discharges and groundwater infiltration, you will have to rely on temperature.)

(d) **TEMPERATURE:** \_\_\_\_\_ °F

(if the temperature of the sample is over 70°F, it is most likely cooling water)

(if the temperature of the sample is under 70°F, it is most likely from ground water infiltration)

7. Is there a suspected illicit connection? Y (  ) N (  )

If "YES", what is the suspected source? \_\_\_\_\_

If "NO", skip to signature block on the bottom of this form.

8. Has the investigation of the suspected illicit connection been completed?

Y (  ) N (  )

If "YES", proceed to question #9.

If "NO", skip to signature block on the bottom of this form.

9. Was the source of the illicit connection found? Y (  ) N (  )

If "YES", identify the source. \_\_\_\_\_

What plan of action will follow to eliminate the illicit connection?

Resolution:

If "NO", complete the Closeout Investigation Form and attach it to this Illicit Connection Inspection Report Form.

Inspector's Name: Sean Fleming

Title: Environmental Scientist

Signature:  Sean Fleming

Digitally signed by Sean Fleming  
DN: cn=Sean Fleming, c=US  
Date: 2007.03.06 13:04:40 -05'00'

Date: 12/29/06

If there is a dry weather flow or evidence of an intermittent flow, be sure to include this form with your Annual Report and Certification.

If there is not a dry weather flow or evidence of an intermittent flow, this form should be retained with your SPPP.

# Illicit Connection Inspection Report Form

Municipality  
Information

Municipality: Franklin County Gloucester

NJPDES # : NJG0151025 PI ID #: 197781

Team Member: Sean Fleming, Zac Papa

Date 04-Dec-06 Effective Date of Permit Authorization (EDPA): 01-Apr-04

Outfall #: E022 Location: Central Ave

Receiving Waterbody: Malaga Branch

1. Is there a dry weather flow? Y (  ) N (  )
2. If "YES", what is the outfall flow estimate? \_\_\_\_\_ gpm  
(flow sample should be kept for further testing, and this form will need to be submitted with the Annual Report and Certification)
3. Are there any indications of an intermittent flow? Y (  ) N (  )
4. If you answered "NO" to BOTH questions #1 and #3, there is probably not an illicit connection and you can skip to question #7.  
(NOTE: This form **does not** need to be submitted to the Department, but should be kept with your SPPP.)  
  
If you answered "YES" to either question, please continue on to question #5.  
(NOTE: This form will need to be submitted to the Department with the Annual Report and Certification.)

## 5. PHYSICAL OBSERVATIONS:

- (a) ODOR: none \_\_\_\_\_
- (b) COLOR: none \_\_\_\_\_
- (c) TURBIDITY: none \_\_\_\_\_
- (d) FLOATABLES: none \_\_\_\_\_
- (e) DEPOSITS/STAINS: none \_\_\_\_\_
- (f) VEGETATION CONDITIONS: normal \_\_\_\_\_
- (g) DAMAGE TO OUTFALL STRUCTURES:  
IDENTIFY STRUCTURE: \_\_\_\_\_  
DAMAGE: none \_\_\_\_\_

## 6. ANALYSES OF OUTFALL FLOW SAMPLE:

\* field calibrate instruments in accordance with manufacturer's instructions prior to testing.

- (a) DETERGENTS: \_\_\_\_\_ mg/L

(if sample is greater than 0.06 mg/L, the sample is contaminated with detergents [which may be from sanitary wastewater or other sources]. Further testing is required and this outfall should be given the highest priority.)

(if the sample is not greater than 0.06 mg/L and it does not show physical characteristics of sanitary wastewater [e.g., odor, floatables, and/or color] it is unlikely that it is from sanitary wastewater sources, yet there may still be an illicit connection of industrial wastewater, rinse water, backwash or cooling water. Skip to question #6c.)

(b) **AMMONIA (as N) TO POTASSIUM RATIO:** \_\_\_\_\_

(if the Ammonia to Potassium Ratio is greater than 0.6:1, then it is likely that the pollutant is sanitary sewage)

(if the Ammonia to Potassium Ratio is less than or equal to 0.6:1, then the pollutant is from another washwater source.)

(c) **FLUORIDE:** \_\_\_\_\_ mg/L

(if the fluoride levels are between 1.0 and 2.5 mg/L, then the flow is most likely from fluoride treated potable water.)

(if the sample tests below a detection limit of 0.1 mg/L for fluoride, it is likely to be from groundwater infiltration, springs or streams. In some cases, however, it is possible that the discharge could originate from an onsite well used for industrial cooling water, which will test non-detect for both detergents and fluoride. To differentiate between these cooling water discharges and groundwater infiltration, you will have to rely on temperature.)

(d) **TEMPERATURE:** \_\_\_\_\_ °F

(if the temperature of the sample is over 70°F, it is most likely cooling water)

(if the temperature of the sample is under 70°F, it is most likely from ground water infiltration)

7. Is there a suspected illicit connection? Y (  ) N (  )

If "YES", what is the suspected source? \_\_\_\_\_

If "NO", skip to signature block on the bottom of this form.

8. Has the investigation of the suspected illicit connection been completed?

Y (  ) N (  )

If "YES", proceed to question #9.

If "NO", skip to signature block on the bottom of this form.

9. Was the source of the illicit connection found? Y (  ) N (  )

If "YES", identify the source. \_\_\_\_\_

What plan of action will follow to eliminate the illicit connection?

Resolution:

If "NO", complete the Closeout Investigation Form and attach it to this Illicit Connection Inspection Report Form.

Inspector's Name: Sean Fleming

Title: Environmental Scientist

Signature:  Sean Fleming

Digitally signed by Sean Fleming  
DN: cn=Sean Fleming, c=US  
Date: 2007.03.08 13:05:07 -0500

Date: 12/29/06

If there is a dry weather flow or evidence of an intermittent flow, be sure to include this form with your Annual Report and Certification.

If there is not a dry weather flow or evidence of an intermittent flow, this form should be retained with your SPPP.

# Illicit Connection Inspection Report Form

Municipality  
Information

Municipality: Franklin County Gloucester

NJPDES # : NJG0151025 PI ID #: 197781

Team Member: Sean Fleming, Zac Papa

Date 04-Dec-06 Effective Date of Permit Authorization (EDPA): 01-Apr-04

Outfall #: E035 Location: MacCarthur Ave.

Receiving Waterbody: Little Ease Run

1. Is there a dry weather flow? Y (  ) N (  )
2. If "YES", what is the outfall flow estimate? 0.5 gpm  
(flow sample should be kept for further testing, and this form will need to be submitted with the Annual Report and Certification)
3. Are there any indications of an intermittent flow? Y (  ) N (  )
4. If you answered "NO" to BOTH questions #1 and #3, there is probably not an illicit connection and you can skip to question #7.  
(NOTE: This form **does not** need to be submitted to the Department, but should be kept with your SPPP.)  
  
If you answered "YES" to either question, please continue on to question #5.  
(NOTE: This form will need to be submitted to the Department with the Annual Report and Certification.)

## 5. PHYSICAL OBSERVATIONS:

- (a) ODOR: none \_\_\_\_\_
- (b) COLOR: none \_\_\_\_\_
- (c) TURBIDITY: none \_\_\_\_\_
- (d) FLOATABLES: none \_\_\_\_\_
- (e) DEPOSITS/STAINS: none \_\_\_\_\_
- (f) VEGETATION CONDITIONS: normal
- (g) DAMAGE TO OUTFALL STRUCTURES:  
IDENTIFY STRUCTURE: Circular Corrugated Plastic  
DAMAGE: none \_\_\_\_\_

## 6. ANALYSES OF OUTFALL FLOW SAMPLE:

\* field calibrate instruments in accordance with manufacturer's instructions prior to testing.

- (a) DETERGENTS: \_\_\_\_\_ mg/L

(if sample is greater than 0.06 mg/L, the sample is contaminated with detergents [which may be from sanitary wastewater or other sources]. Further testing is required and this outfall should be given the highest priority.)

(if the sample is not greater than 0.06 mg/L and it does not show physical characteristics of sanitary wastewater [e.g., odor, floatables, and/or color] it is unlikely that it is from sanitary wastewater sources, yet there may still be an illicit connection of industrial wastewater, rinse water, backwash or cooling water. Skip to question #6c.)

(b) **AMMONIA (as N) TO POTASSIUM RATIO:** \_\_\_\_\_  
 (if the Ammonia to Potassium Ratio is greater than 0.6:1, then it is likely that the pollutant is sanitary sewage)  
 (if the Ammonia to Potassium Ratio is less than or equal to 0.6:1, then the pollutant is from another washwater source.)

(c) **FLUORIDE:** \_\_\_\_\_ mg/L  
 (if the fluoride levels are between 1.0 and 2.5 mg/L, then the flow is most likely from fluoride treated potable water.)  
 (if the sample tests below a detection limit of 0.1 mg/L for fluoride, it is likely to be from groundwater infiltration, springs or streams. In some cases, however, it is possible that the discharge could originate from an onsite well used for industrial cooling water, which will test non-detect for both detergents and fluoride. To differentiate between these cooling water discharges and groundwater infiltration, you will have to rely on temperature.)

(d) **TEMPERATURE:** \_\_\_\_\_ °F  
 (if the temperature of the sample is over 70°F, it is most likely cooling water)  
 (if the temperature of the sample is under 70°F, it is most likely from ground water infiltration)

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7. Is there a suspected illicit connection? Y (  ) N (  )  
 If "YES", what is the suspected source? \_\_\_\_\_  
 If "NO", skip to signature block on the bottom of this form.

8. Has the investigation of the suspected illicit connection been completed?  
 Y (  ) N (  )  
 If "YES", proceed to question #9.  
 If "NO", skip to signature block on the bottom of this form.

9. Was the source of the illicit connection found? Y (  ) N (  )  
 If "YES", identify the source. \_\_\_\_\_  
 What plan of action will follow to eliminate the illicit connection?  
 Resolution:  
 If "NO", complete the Closeout Investigation Form and attach it to this Illicit Connection Inspection Report Form.

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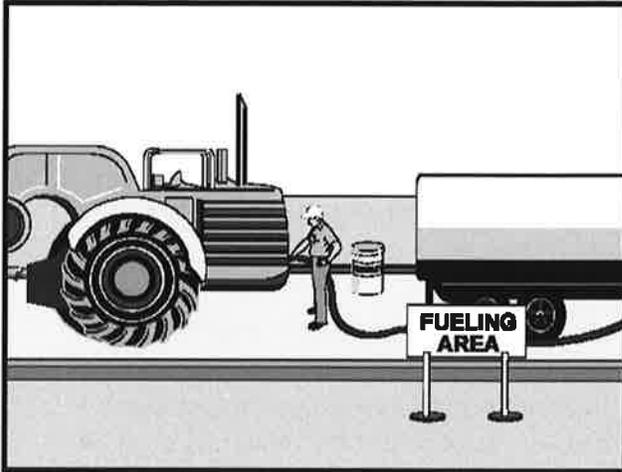
Inspector's Name: Sean Fleming  
 Title: Environmental Scientist  
 Signature:  Sean Fleming  
Validity unknown  
 Date: 12/29/06

Digitally signed by Sean Fleming  
 DN: cn=Sean Fleming, c=US  
 Date: 2007.03.08 13:05:25 -0500

If there is a dry weather flow or evidence of an intermittent flow, be sure to include this form with your Annual Report and Certification.

If there is not a dry weather flow or evidence of an intermittent flow, this form should be retained with your SPPP.

# Franklin Township Standard Operating Procedures Vehicle and Equipment Fueling



## Franklin Township Maintenance Yards With Fueling Operations

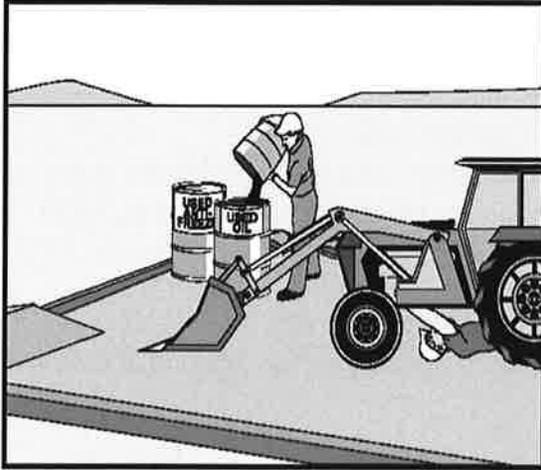
**Introduction and Purpose** Vehicle and equipment fueling procedures and practices are designed to minimize surface or ground waters. Understanding the procedures for delivering fuel into vehicles, mobile fuel tanks, and storage tanks is critical for this purpose. Safety is always the priority.

**Scope** These procedures are to be implemented at all maintenance yards with fueling. Including mobile fueling operations.

- Standards and Specifications (for vehicle and equipment fueling)**
- Shut the engine off
  - Ensure that the fuel is the proper type of fuel.
  - Absorbent spill clean-up materials and spill kits shall be available in fueling areas and on mobile fueling vehicles and shall be disposed of properly after use.
  - Nozzles used in vehicle and equipment fueling shall be equipped with an automatic shut-off to prevent overfill.
  - Fuel tanks shall not be "topped off".
  - Mobile fueling shall be minimized. Whenever practical, vehicles and equipment shall be transported to the designated fueling area in the maintenance yard.
  - Clearly post, in a prominent area of the facility, instructions for safe operation of fueling equipment, and appropriate contact information for the person(s) responsible for spill response.

- Standards and Specifications (for bulk fueling)
- Drip pans or absorbent pads shall be used under all hose and pipe connections and other leak-prone areas during bulk fueling.
  - Block storm sewer inlets, or contain tank trucks used for bulk transfer, with temporary berms or temporary absorbent booms during the transfer process. If temporary berms are being used instead of blocking the storm sewer inlets, all hose connection points associated with the transfer of fuel must be within the temporary berms during the loading/unloading of bulk fuels.
  - Protect fueling areas with berms and/or dikes to prevent run-on, runoff, and to contain spills.
  - A trained employee must always be present to supervise during bulk transfer.
- Spill Response
- Conduct cleanups of any fuel spills immediately after discovery.
  - Uncontained spills are to be cleaned using dry cleaning methods only. Spills shall be cleaned up with a dry, absorbent material (e.g., kitty litter, sawdust, etc.) and absorbent materials shall be swept up.
  - Collected waste is to be disposed of properly.
  - Contact the Franklin Township Spill Response Team at 856-694-3155.
- Maintenance and Inspection
- Fueling areas and storage tanks shall be inspected monthly.
  - Keep an ample supply of spill cleanup material on the site.
  - Any equipment, tanks, pumps, piping and fuel dispensing equipment found to be leaking or in disrepair must be repaired or replaced immediately.

# Franklin Township Standard Operating Procedure Vehicle Maintenance



## Franklin Township Maintenance Yards BMP Objectives

- Waste Management
- Spill Prevention, Containment and Countermeasures
- Pollution Control

**Introduction and Purpose** This SOP contains the basic practices of vehicle maintenance to be implemented at all maintenance yards including maintenance activities at ancillary operations in Franklin Township. The purpose of this SOP is to provide a set of guidelines for the Franklin Township vehicle maintenance yards including maintenance activities at ancillary operations.

**Scope** This SOP applies to all maintenance yards including maintenance activities at ancillary operations within the Township of Franklin.

**Standards and Specifications**

- Conduct vehicle maintenance operation only in designated areas.
- When possible, perform all vehicle and equipment maintenance at an indoor location with a paved floor.
- Always use drip pans.
- Absorbent spill clean-up materials shall be available in maintenance areas and shall be disposed of properly after use.
- Maintenance areas shall be protected from stormwater run-on and runoff, and shall be located at least 50 feet downstream drainage facilities and watercourses.
- Use portable tents or construct a roofing-device over long-term maintenance areas and for projects that must be performed outdoors.

- Do not dump or dispose oils, grease, fluids, and lubricants onto the ground.
- Do not dump or dispose batteries, used oils, antifreeze and other toxic fluids into a storm drain or watercourse.
- Do not bury tires.
- Collect waste fluids in properly labeled containers and dispose properly.

**Spill Response  
and Reporting**

- Provide spill containment dikes or secondary containment around stored oils and other fluid storage drum(s).
- Conduct cleanups of any fuel spills immediately after discovery.
- Spills are to be cleaned using dry cleaning methods only. Spills shall be cleaned up with a dry, absorbent material (e.g., kitty litter, sawdust, etc.) and the rest of the area is to be swept.
- Collected waste is to be disposed of properly.
- Contact the Franklin Township Spill Response Team at 856-694-3155.

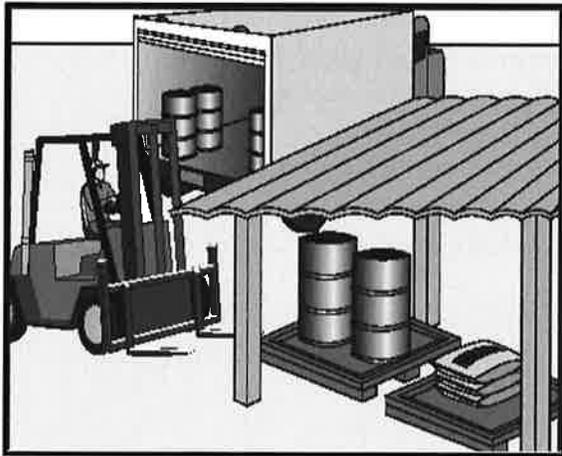
**Maintenance  
and Inspection**

- Periodically check for leaks and damaged equipment and make repairs as necessary.

# Franklin Township

## Standard Operating Procedure

### Good Housekeeping



#### Franklin Township Good Housekeeping Goals

- Proper Recycling
- Proper Waste Disposal
- Pollution Prevention

**Introduction and Purpose** This SOP contains the basic practices of good housekeeping to be implemented at maintenance yards including maintenance activities at ancillary operations in Franklin Township. The purpose of this SOP is to provide a set of guidelines for the employees of Franklin Township for Good Housekeeping Practices at their maintenance yards including maintenance yards at ancillary operations.

**Scope** This SOP applies to all maintenance yards including maintenance activities at ancillary operations in Franklin Township.

- Standards and Specifications (General)**
- All containers should be properly labeled and marked, and the labels must remain clean and visible.
  - All containers must be kept in good condition and tightly closed when not in use.
  - When practical, chemicals, fluids and supplies should be kept indoors.
  - If containers are stored outside, they must be covered and placed on spill platforms.
  - Keep storage areas clean and well organized.
  - Spill kits and drip pans must be kept near any liquid transfer areas, protected from rainfall.
  - Absorbent spill clean-up materials must be available in maintenance areas and shall be disposed of properly after use.
  - Place trash, dirt and other debris in the dumpster.
  - Collect waste fluids in properly labeled containers and dispose of them properly.
  - Establish and maintain a recycling program by disposing, papers, cans, bottles and trash in designated bins.

Standards and Specifications (Salt and De-icing Material Handling)

- During loading and unloading of salt and de-icing materials, prevent and/or minimize spills. If salt or de-icing materials are spilled, remove the materials using dry cleaning methods. All collected materials shall be either reused or properly discarded.
- Sweeping should be conducted once a week to get rid of dirt and other debris. Sweeping should also be conducted immediately following loading/unloading activities, when practical.
- Minimize the tracking of materials from storage and loading/unloading areas.
- Minimize the distance that salt and de-icing materials are transported during loading/unloading activities.
- Any materials that are stored outside must be tarped when not actively being used.
- If interim seasonal tarping is being implemented, de-icing materials may be stored outdoors only between October 15<sup>th</sup> through April 30<sup>th</sup>.

Spill Response and Reporting

- Conduct clean up of any spill(s) immediately after discovery.
- Spills are to be cleaned using dry cleaning methods only.
- Contact the Franklin Township Spill Response Team at 856-694-3155.

Maintenance and Inspection

- Periodically check for leaks and damaged equipment and make repairs as necessary.
- Perform monthly inspections of all (indoor and outdoor if applicable) storage locations.



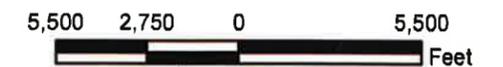
# Stormwater Management Plan

## Figure 6

### PINELANDS AREA

#### Legend

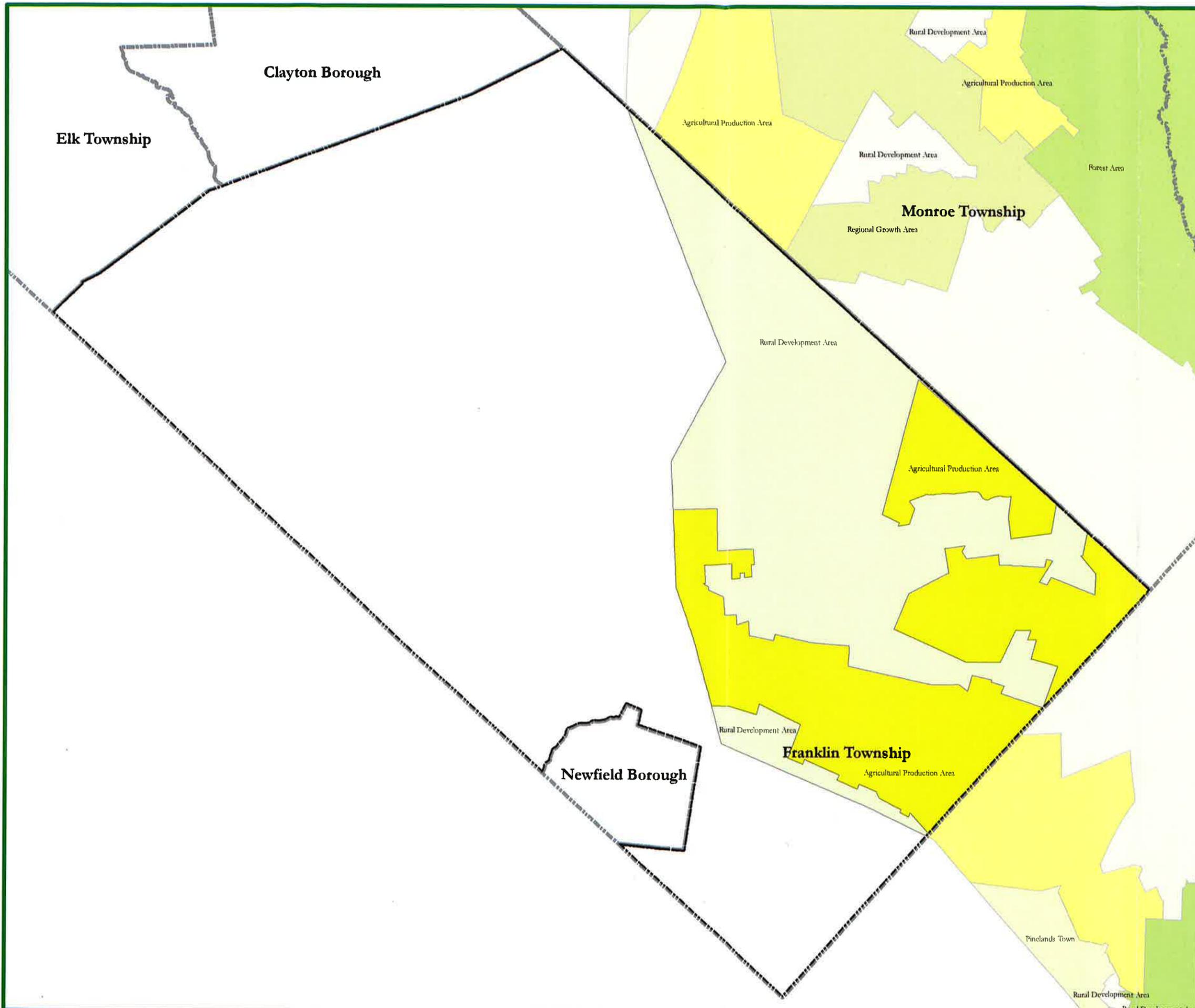
-  Municipal Boundary
- Pinelands Management Areas**
- NAME**
-  Agricultural Production Area
-  Federal or Military Facility
-  Forest Area
-  Pinelands Town
-  Pinelands Village
-  Preservation Area
-  Regional Growth Area
-  Rural Development Area
-  Special AG Production Area



County - Gloucester      Dated: 02/23/06  
Township - Franklin      Drawn by: SEB

Quadrangles      Newfield, NJ #141  
Pitman East, NJ #128      Buena, NJ #142

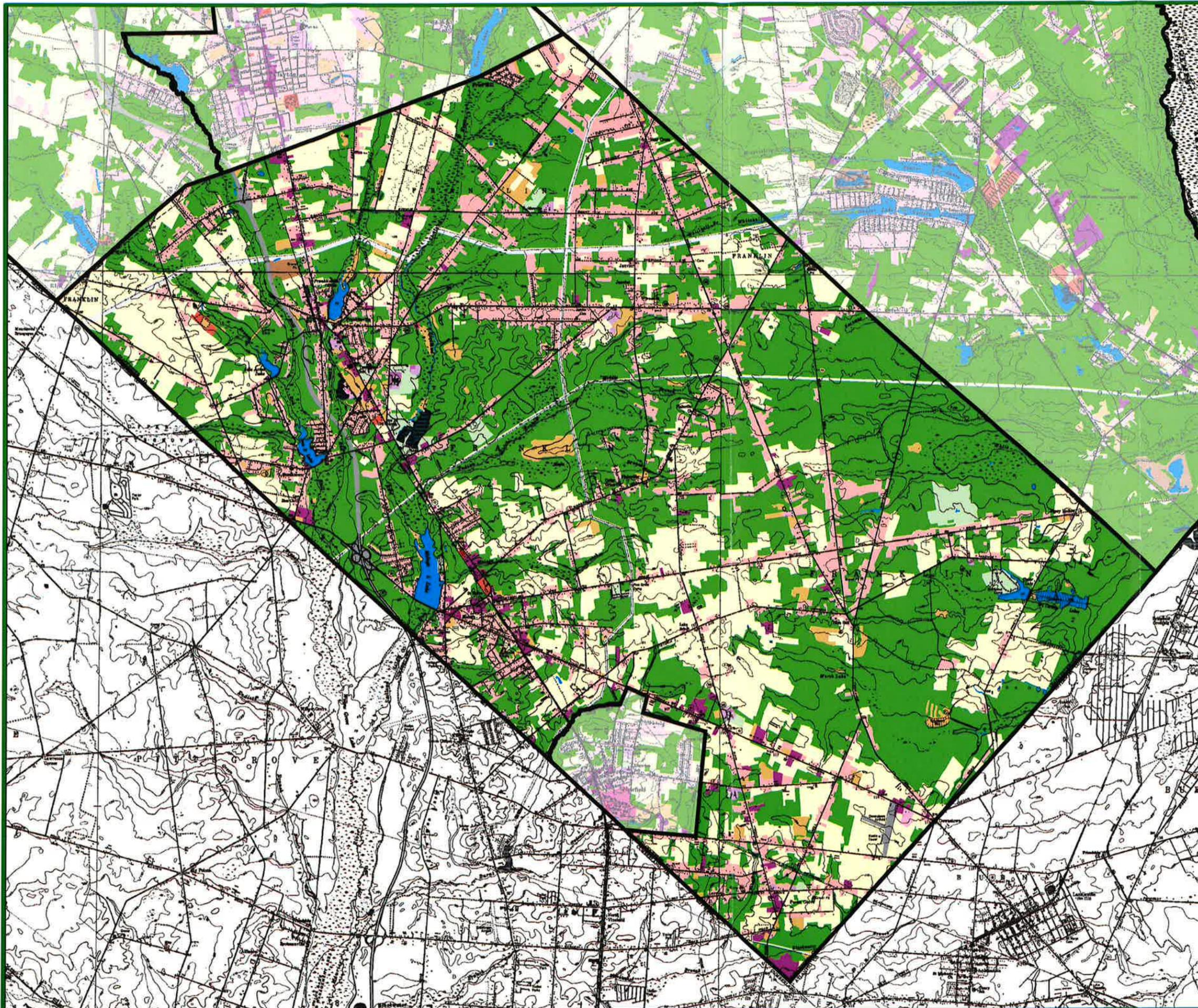
Note:  
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.  
Additional Information for Pinelands data:  
Originator: New Jersey Pinelands Commission,  
Comprehensive Management Plan, Date: July, 2003











# Stormwater Management Plan

## Figure 8

### EXISTING LAND USES

**Legend**

Municipal Boundary

**Gloucester County Land Use (as mapped by DVRPC)**

| DESCRIPTION                    |                           |
|--------------------------------|---------------------------|
| Agriculture                    | Recreation                |
| Agriculture:Agricultural Bog   | Parking:Recreation        |
| Community Services             | Residential:Single-Family |
| Parking:Community Services     | Residential:Row Home      |
| Commercial                     | Residential:Mobile Home   |
| Parking:Commercial             | Residential:Multi-Family  |
| Manufacturing:Light Industrial | Parking:Multi-Family      |
| Parking:Light Manufacturing    | Utility                   |
| Manufacturing:Heavy Industrial | Parking:Utility           |
| Parking:Heavy Manufacturing    | Transportation            |
| Military                       | Parking:Transportation    |
| Parking:Military               | Vacant                    |
| Mining                         | Water                     |
| Parking:Mining                 | Wooded                    |



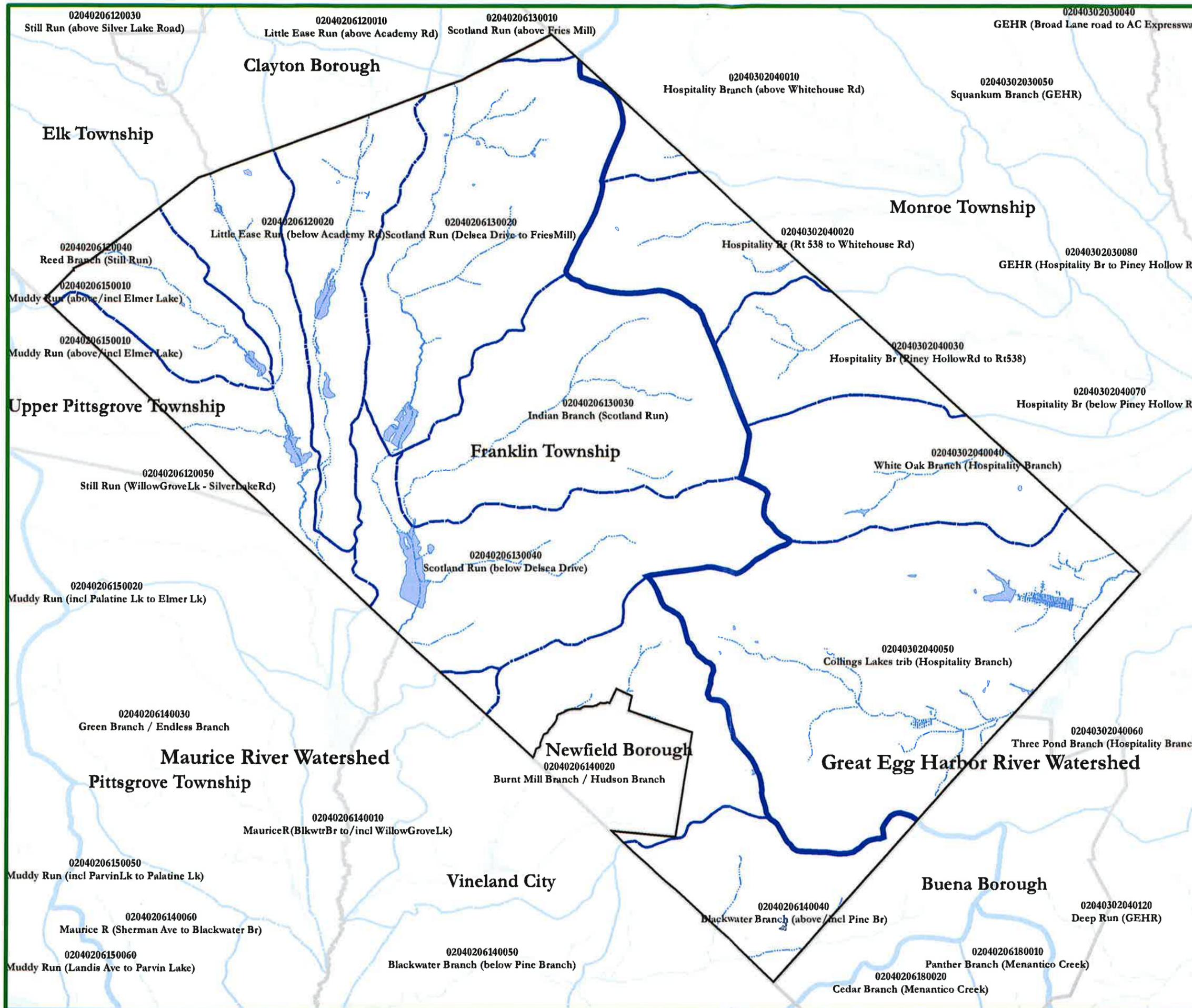
County - Gloucester  
Township - Franklin

Dated: 03/21/06  
Drawn by: SEB

Quadrangles  
Pitman East, NJ #128

Newfield, NJ #141  
Buena, NJ #142

**Note:**  
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



# Stormwater Management Plan

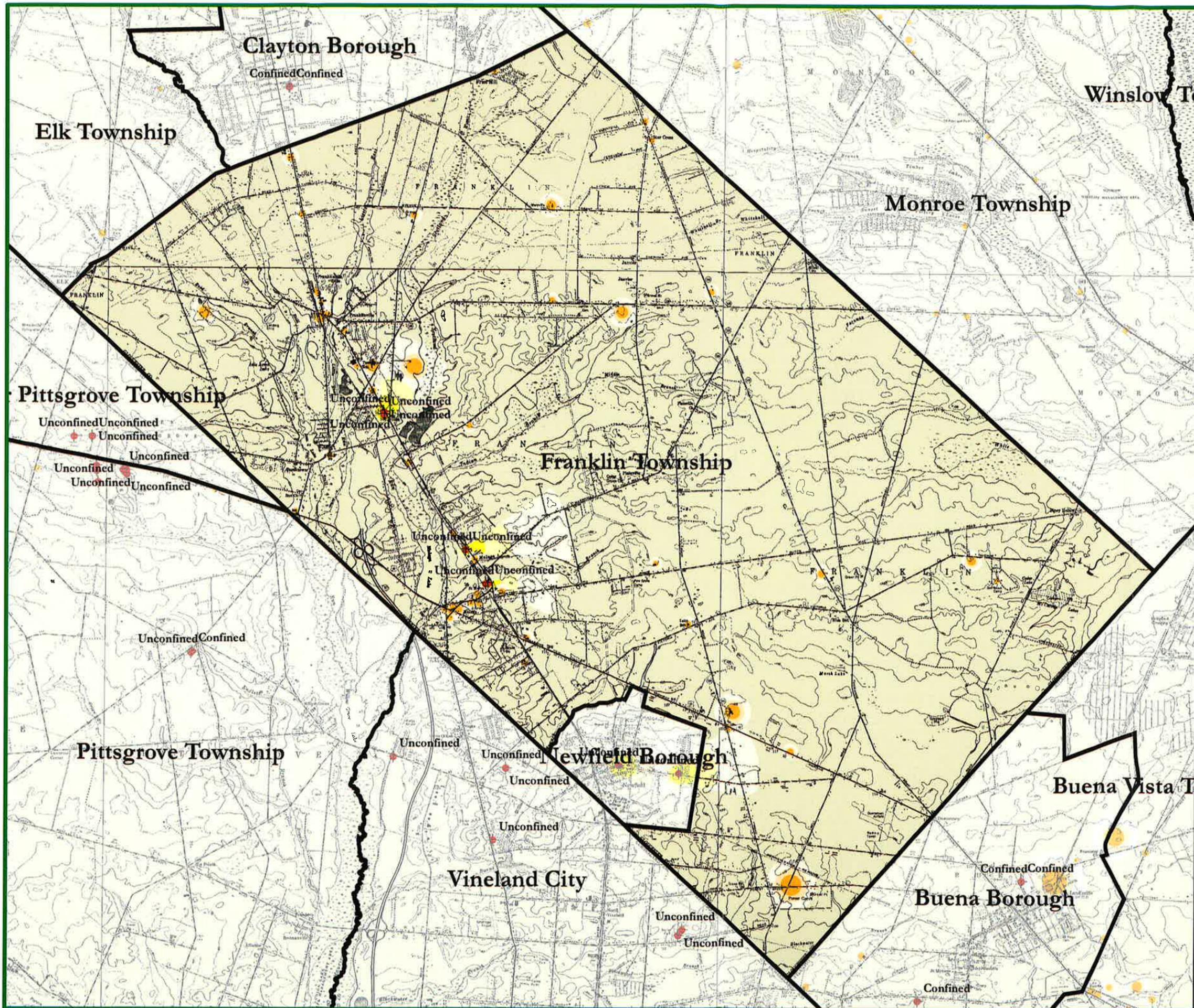
## Figure 9 HUC14s

- Legend**
- Municipal Boundary
  - Watershed Boundary
  - HUC14 Boundary (as mapped by NJDEP)
  - Streams (as mapped by NJDEP)
  - Lakes (as mapped by NJDEP)



County - Gloucester  
 Township - Franklin  
 Dated: 02/23/06  
 Drawn by: SEB  
 Quadrangles: Pitman East, NJ #128; Newfield, NJ #141; Buena, NJ #142

**Note:**  
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized. Additional information for HUC14 data: Originator: Department of Environmental Protection (NJDEP), New Jersey Geological Survey (NJGS), Publication Date: April 4th, 2000.



# Stormwater Management Plan

## Figure 10

### GEOLOGY & WELLHEAD PROTECTION AREAS

- Legend**
- Municipal Boundary
  - Public Community Water Supply Wells
  - Public Community Wellhead Protection Areas**
  - TIER**
  - Tier 1 (2 years)
  - Tier 2 (5 years)
  - Tier 3 (12 years)
  - Public Non-Community Wellhead Protection Areas**
  - TIER**
  - Tier 1 (2 years)
  - Tier 2 (5 years)
  - Tier 3 (12 years)
  - Gloucester County Geology**
  - GEONAME**
  - Cohansy Formation



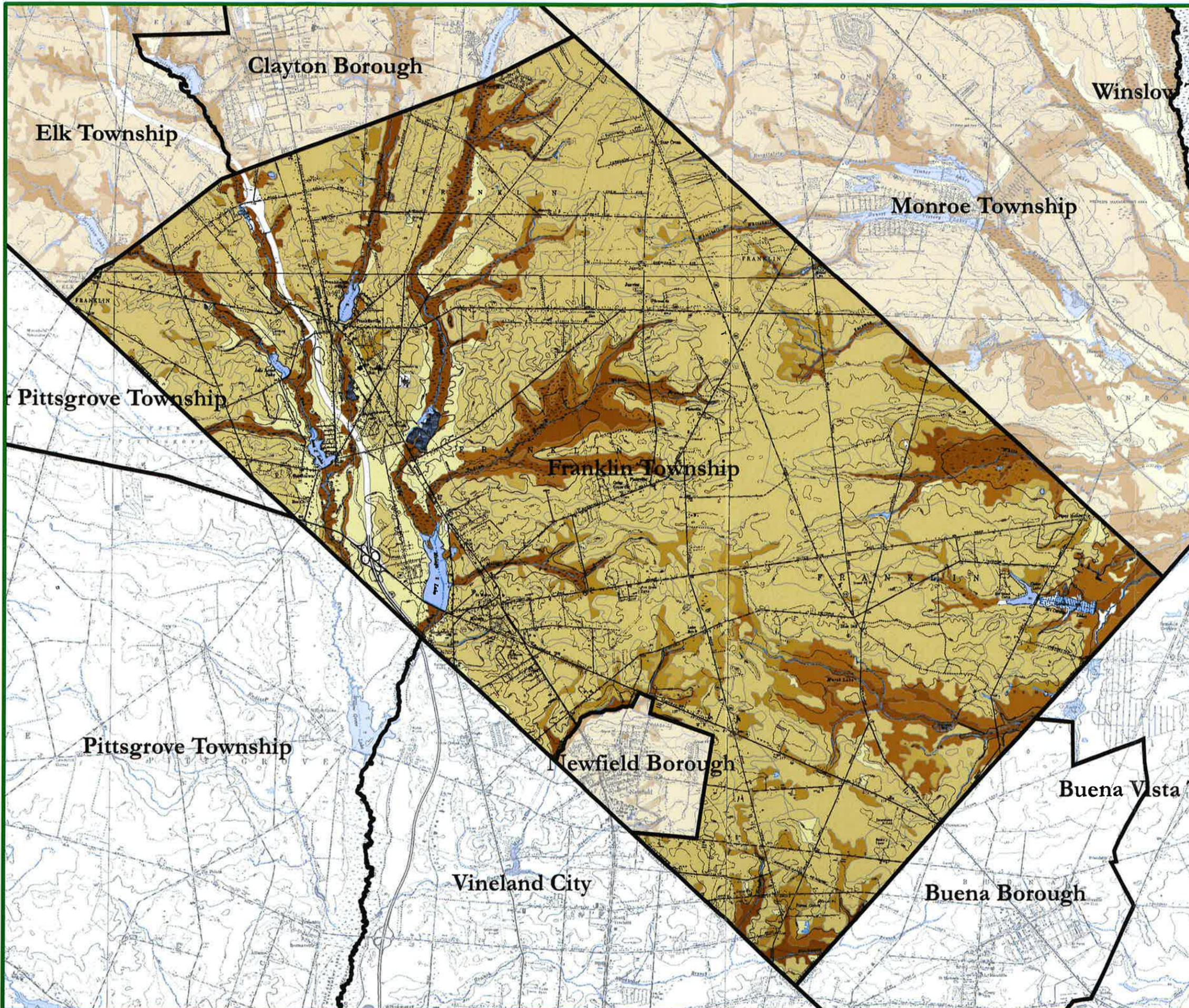
County - Gloucester  
Township - Franklin

Dated: 02/23/06  
Drawn by: SEB

Quadrangles  
Pitman East, NJ #128

Newfield, NJ #141  
Buena, NJ #142

**Note:**  
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized. Additional Information for Wells data: New Jersey Department of Environmental Protection NJDEP, New Jersey Geological Survey NJGS, Publication Date: April 5th, 2004. Additional Information for Geologic data: Originator: New Jersey Department of Environmental Protection (NJDEP), New Jersey Geological Survey (NJGS), Publication Date: June 30th, 1999.



# Stormwater Management Plan

## Figure 11 SOILS

### Legend

- Municipal Boundary
- Streams (as mapped by NJDEP)
- Lakes (as mapped by NJDEP)

### Gloucester County Soils

#### Hydrology

- No Data
- A
- B
- B/D
- C
- C/D
- D



County - Gloucester                      Dated: 02/23/06  
 Township - Franklin                      Drawn by: SEB

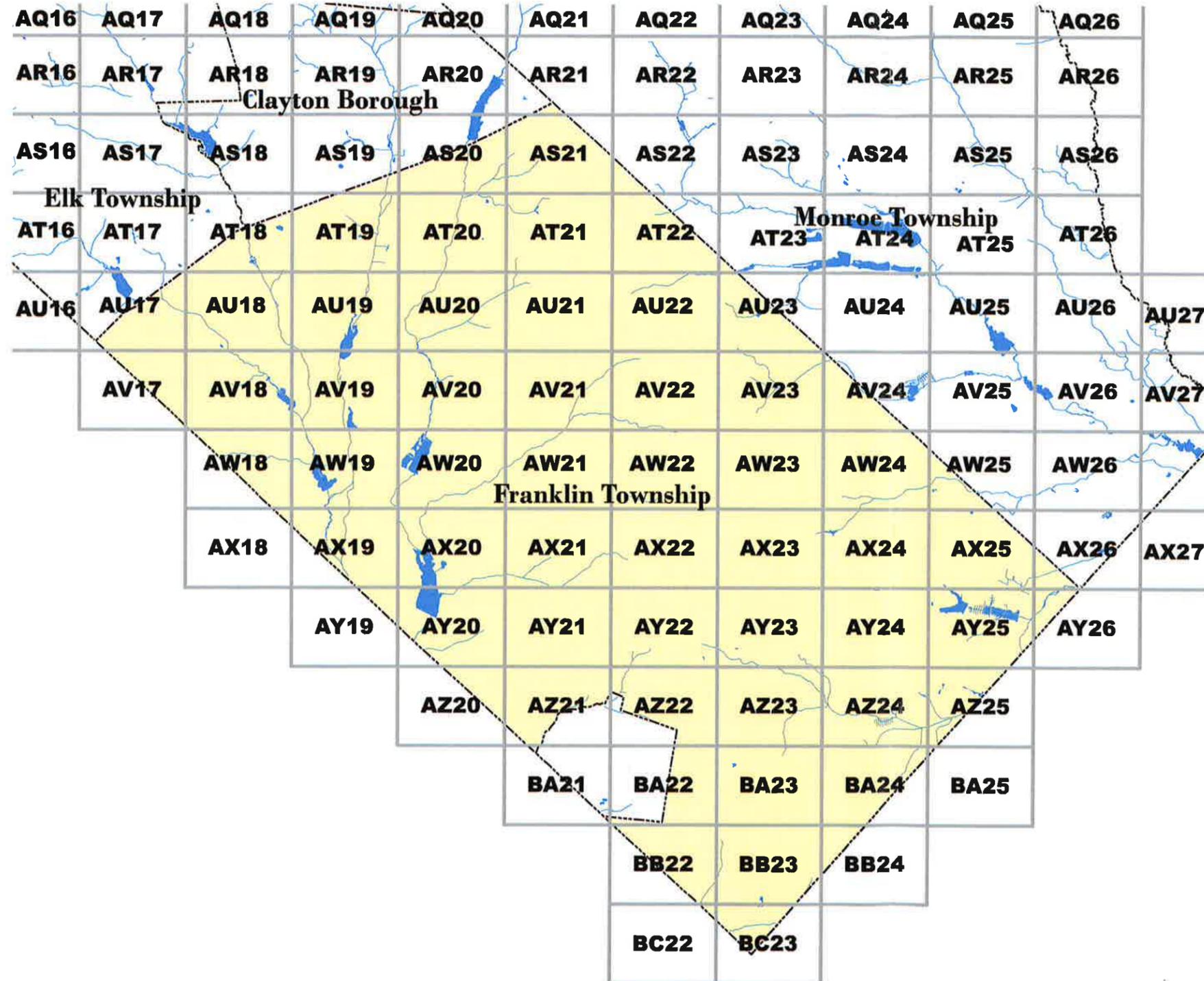
Quadrangles                                      Newfield, NJ #141  
 Pitman East, NJ #128                              Buena, NJ #142

**Note:**  
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized. Additional Information for Soils data: U.S. Department of Agriculture, Natural Resources Conservation Service. Photographic or digital enlargement of these maps to scales greater than at which they were originally mapped can cause misinterpretation of the data. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale. The depicted soil boundaries, interpretations, and analysis derived from them do not eliminate the need for onsite sampling, testing, and detailed study of specific sites for intensive uses. Thus, these data and their interpretations are intended for planning purposes only. Digital data files are periodically updated. Files are dated, and users are responsible for obtaining the latest version of the data.  
 Publication Date: April 7th, 2005.



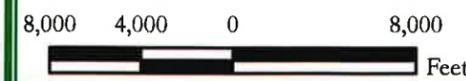
# OUTFALL LOCATIONS

## Gloucester County, New Jersey



### Legend

- Municipal Boundary
  - Watershed Boundary
  - HUC 14
  - Stream
  - Lake
  - NJDOT Roadways
- | Municipal Outfalls | County Outfalls |
|--------------------|-----------------|
| Detention Basin    | Ditch           |
| Ditch              | Field           |
| Field              | Lake or Pond    |
| Lake or Pond       | Woods           |
| Woods              | Stream or River |
| Stream or River    | Wetland         |
| Wetland            |                 |



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 Freeholder Director  
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# OUTFALL LOCATIONS

## Gloucester County, New Jersey

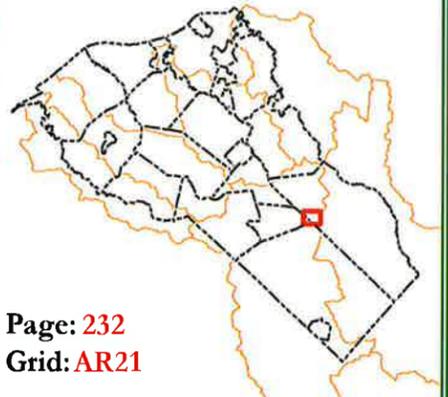
Date: April 9th, 2007

### Legend

- Municipal Boundary
- Watershed Boundary
- HUC 14
- Stream
- Lake
- NJDOT Roadways



- | Municipal Outfalls | County Outfalls |
|--------------------|-----------------|
| Detention Basin    | Ditch           |
| Ditch              | Field           |
| Field              | Lake or Pond    |
| Lake or Pond       | Woods           |
| Woods              | Stream or River |
| Stream or River    | Wetland         |
| Wetland            |                 |



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Grid: AR21

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Freeholder Director  
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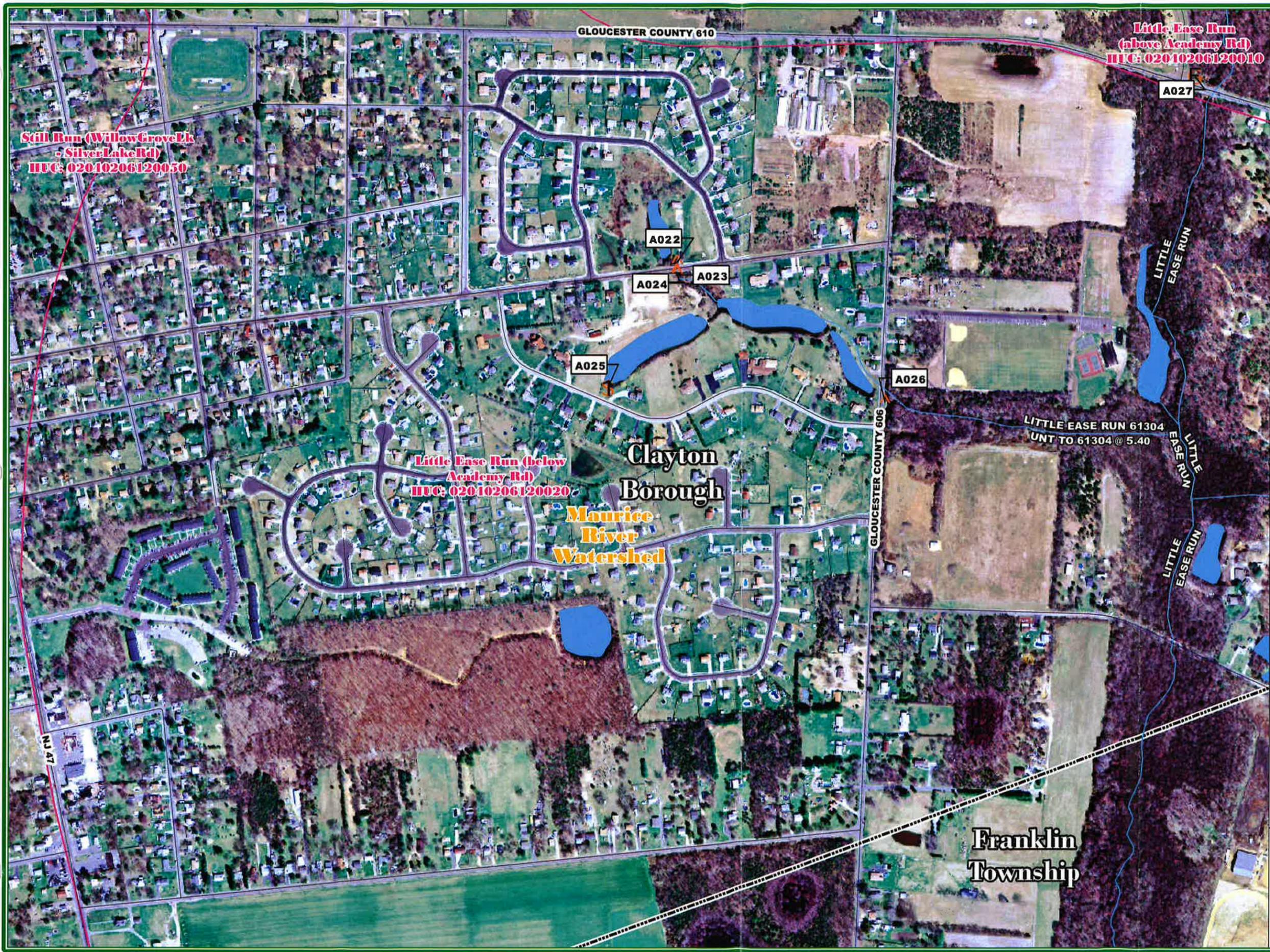
**Maurice River Watershed**  
Monroe Township

Scotland Run (above Fries Mill)  
HUC: 02040206130010

Clayton Borough

Franklin Township

**Great Egg Harbor River Watershed**



# OUTFALL LOCATIONS

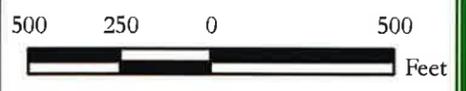
Gloucester County, New Jersey

Date: April 9th, 2007

**Legend**

- Municipal Boundary
- Watershed Boundary
- HUC 14
- Stream
- Lake
- NJDOT Roadways

| Municipal Outfalls | County Outfalls |
|--------------------|-----------------|
| Detention Basin    | Ditch           |
| Ditch              | Field           |
| Field              | Lake or Pond    |
| Lake or Pond       | Woods           |
| Woods              | Stream or River |
| Stream or River    | Wetland         |
| Wetland            |                 |



Page: 243  
Grid: AS19

# OUTFALL LOCATIONS

Gloucester County, New Jersey

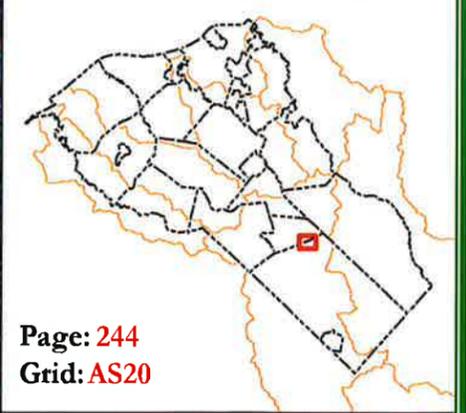
Date: April 9th, 2007

## Legend

- Municipal Boundary
- Watershed Boundary
- HUC 14
- Stream
- Lake
- NJDOT Roadways



- | Municipal Outfalls | County Outfalls |
|--------------------|-----------------|
| Detention Basin    | Ditch           |
| Ditch              | Field           |
| Field              | Lake or Pond    |
| Lake or Pond       | Woods           |
| Woods              | Stream or River |
| Stream or River    | Wetland         |
| Wetland            |                 |



Page: 244  
Grid: AS20

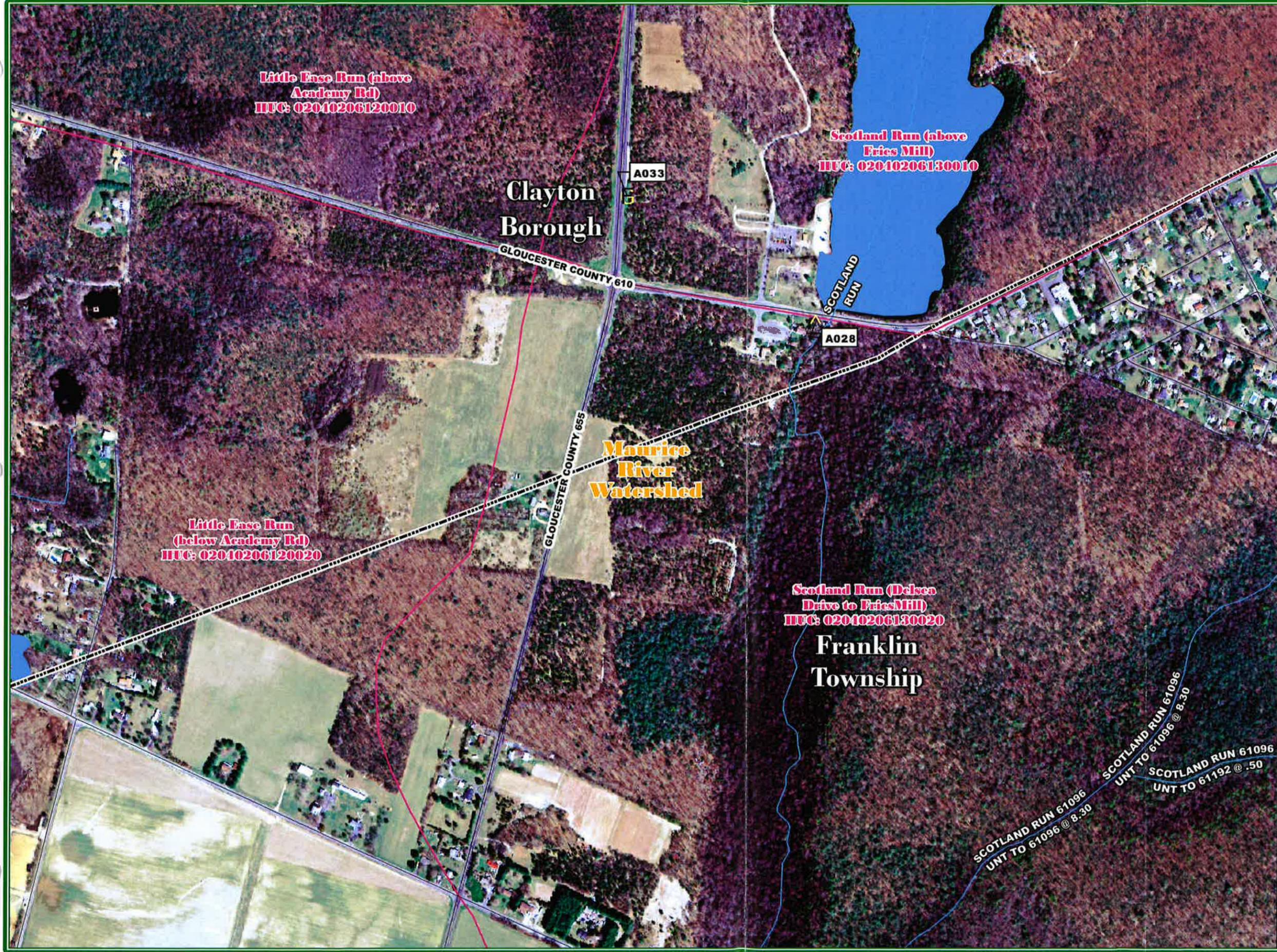
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CONSULTANTS

Little Ease Run (above Academy Rd)  
HUC: 02040206120010

Scotland Run (above Fries Mill)  
HUC: 02040206130010

Clayton  
Borough

Maurice  
River  
Watershed

Little Ease Run (below Academy Rd)  
HUC: 02040206120020

Scotland Run (Delsea Drive to Fries Mill)  
HUC: 02040206130020

Franklin  
Township

SCOTLAND RUN 61096  
UNT TO 61096 @ 8.30

SCOTLAND RUN 61096  
UNT TO 61096 @ 8.30

SCOTLAND RUN 61096  
UNT TO 61192 @ .50

**Clayton  
Borough**

**OUTFALL  
LOCATIONS**  
Gloucester County, New Jersey

Date: April 9th, 2007

**Legend**

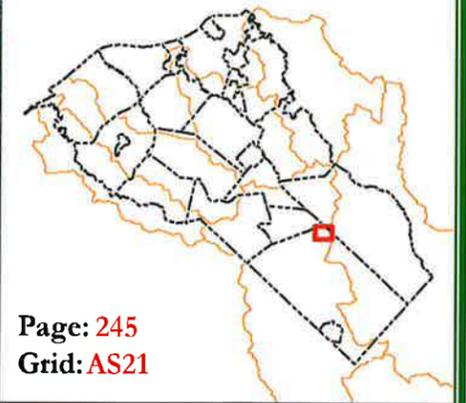
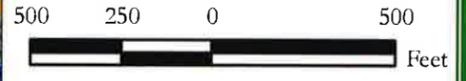
- Municipal Boundary
- Watershed Boundary
- HUC 14
- Stream
- Lake
- NJDOT Roadways

**Municipal Outfalls**

- Detention Basin
- Ditch
- Field
- Lake or Pond
- Woods
- Stream or River
- Wetland

**County Outfalls**

- Ditch
- Field
- Lake or Pond
- Woods
- Stream or River
- Wetland



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# OUTFALL LOCATIONS

Gloucester County, New Jersey

Date: April 9th, 2007

### Legend

- Municipal Boundary
- Watershed Boundary
- HUC 14
- Stream
- Lake
- NJDOT Roadways



- | Municipal Outfalls | County Outfalls |
|--------------------|-----------------|
| Detention Basin    | Ditch           |
| Ditch              | Field           |
| Field              | Lake or Pond    |
| Lake or Pond       | Woods           |
| Woods              | Stream or River |
| Stream or River    | Wetland         |
| Wetland            |                 |



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Grid: AS22

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# OUTFALL LOCATIONS

Gloucester County, New Jersey

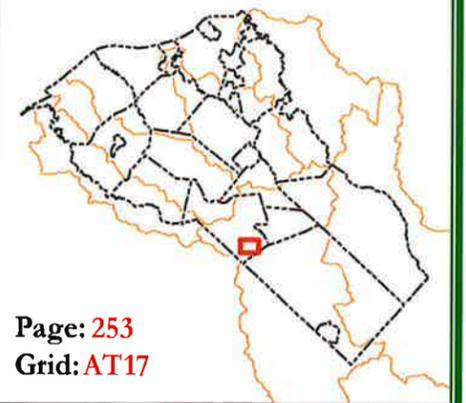
Date: April 9th, 2007

### Legend

-  Municipal Boundary
-  Watershed Boundary
-  HUC 14
-  Stream
-  Lake
-  NJDOT Roadways



- | Municipal Outfalls  | County Outfalls   |
|---|---|
|  Detention Basin |  Ditch           |
|  Ditch           |  Field           |
|  Field           |  Lake or Pond    |
|  Lake or Pond    |  Woods           |
|  Woods           |  Stream or River |
|  Stream or River |  Wetland         |
|  Wetland         |   |



Page: 253  
Grid: AT17



# OUTFALL LOCATIONS

Gloucester County, New Jersey

Date: April 9th, 2007

**Legend**

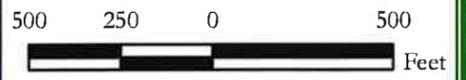
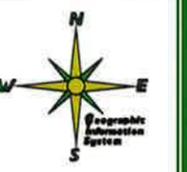
- Municipal Boundary
- Watershed Boundary
- HUC 14
- Stream
- Lake
- NJDOT Roadways

**Municipal Outfalls**

- Detention Basin
- Ditch
- Field
- Lake or Pond
- Woods
- Stream or River
- Wetland

**County Outfalls**

- Ditch
- Field
- Lake or Pond
- Woods
- Stream or River
- Wetland



Page: 254  
Grid: AT18

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**Clayton  
Borough**

**Franklin  
Township**

**Maurice  
River  
Watershed**

**Little Ease Run (below  
Academy Rd)  
HUC: 02010206120020**

**Still Run (Willow Grove Lk  
- Silver Lake Rd)  
HUC: 02010206120050**

# OUTFALL LOCATIONS

Gloucester County, New Jersey

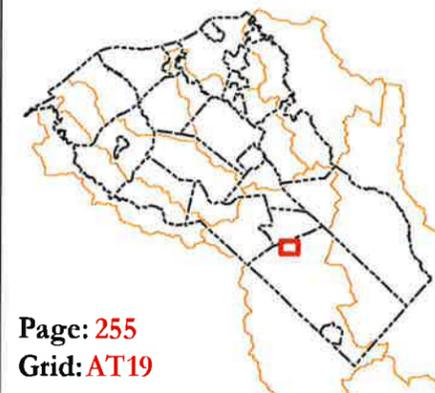
Date: April 9th, 2007

**Legend**

- Municipal Boundary
- Watershed Boundary
- HUC 14
- Stream
- Lake
- NJDOT Roadways



- | Municipal Outfalls | County Outfalls |
|--------------------|-----------------|
| Detention Basin    | Ditch           |
| Ditch              | Field           |
| Field              | Lake or Pond    |
| Lake or Pond       | Woods           |
| Woods              | Stream or River |
| Stream or River    | Wetland         |
| Wetland            |                 |



Page: 255  
Grid: AT19

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# OUTFALL LOCATIONS

Gloucester County, New Jersey

Date: April 9th, 2007

**Legend**

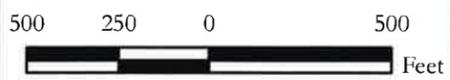
- Municipal Boundary
- Watershed Boundary
- HUC 14
- Stream
- Lake
- NJDOT Roadways

**Municipal Outfalls**

- Detention Basin
- Ditch
- Field
- Field
- Lake or Pond
- Woods
- Stream or River
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**County Outfalls**

- Ditch
- Field
- Lake or Pond
- Woods
- Stream or River
- Wetland



Page: 256  
Grid: AT20

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