



Stormwater Pollution Prevention Plan

Borough of Rumson

Monmouth County

NJPDES#: NJG0149071

January 2021



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SPPP Form 1 – SPPP Team Members

All records must be available upon request by NJDEP.

Stormwater Program Coordinator (SPC)	
Print/Type Name and Title	David M. Marks, P.E., C.M.E., CFM Borough Engineer
Office Phone # and eMail	Tel: (732) 842-3300 Email: dmarks@rumsonnj.gov
Signature/Date	January 2021
Individual(s) Responsible for Major Development Project Stormwater Management Review	
Print/Type Name and Title	David M. Marks, P.E., C.M.E., CFM Borough Engineer
Print/Type Name and Title	Thomas P. Neff, P.E., P.P., C.M.E. T&M Associates, Planning & Zoning Board Engineer
Print/Type Name and Title	
Print/Type Name and Title	
Print/Type Name and Title	
Other SPPP Team Members	
Print/Type Name and Title	Mark T. Wellner, CPWM Superintendent Rumson Public Works
Print/Type Name and Title	Ronald J. Sickler Foreman/Wastewater Management Rumson Public Works
Print/Type Name and Title	
Print/Type Name and Title	



SPPP Form 2 – Revision History

All records must be available upon request by NJDEP.

	Revision Date	SPC Initials	SPPP Form Changed	Reason for Revision
1.				
2.				
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SPPP Form 3 – Public Involvement and Participation Including Public Notice

All records must be available upon request by NJDEP.

1. Website URL where the Stormwater Pollution Prevention Plan (SPPP) is posted online:	http://www.rumsonnj.gov/engineering.html
2. Date of most current SPPP:	January 2021
3. Website URL where the Municipal Stormwater Management Plan (MSWMP) is posted online:	http://www.rumsonnj.gov/engineering.html
4. Date of most current MSWMP:	February 7, 2005, Amended August 7, 2005 (Appendix A) Master Plan Re-Examination April 13, 2015 (Appendix A1)
5. Physical location and/or website URL where associated municipal records of public notices, meeting dates, minutes, etc. are kept:	Municipal Clerk's Office www.rumsonnj.gov
6. Describe how the permittee complies with applicable state and local public notice requirements when providing for public participation in the development and implementation of a MS4 stormwater program:	
<p>The Borough posts all notices in the Two River Times, Asbury Park Press, on the Borough's Website, constant contact emails, or on the informational signs in the Borough. Additional information is distributed to property owners via mailed newsletters.</p>	



SPPP Form 4 – Public Education and Outreach

All records must be available upon request by NJDEP.

<p>1. Describe how public education and outreach events are advertised. Include specific websites and/or physical locations where materials are available.</p>
<p>Public education and outreach events are advertised in the Two River Times, Asbury Park Press, on the Borough's Website, constant contact emails, or on the informational signs in the Borough.</p> <p>www.rumsonnj.gov</p>
<p>2. Describe how businesses and the general public within the municipality are educated about the hazards associated with illicit connections and improper disposal of waste.</p>
<p>Businesses and the general public are educated about the hazards associated with illicit connections and improper disposal of waste via the Borough's Website, constant contact emails, or physical mailings sent via newsletter.</p> <p>www.rumsonnj.gov</p>
<p>3. Indicate where public education and outreach records are maintained.</p>
<p>Public Education and Outreach records are maintained at the locations identified below (please note, not all records are stored in each location):</p> <ul style="list-style-type: none">• Municipal Clerk's Office• Department of Public Works• Engineering Department• www.rumsonnj.gov



SPPP Form 5 – Post-Construction Stormwater Management in New Development and Redevelopment Program

All records must be available upon request by NJDEP.

<p>1. How does the municipality define ‘major development’?</p>
<p>Major Development as defined in Borough Ordinance Chapter 16, Section 2.3:</p> <p>“Major development” means an individual “development,” as well as multiple developments that individually or collectively result in:</p> <ol style="list-style-type: none">1. The disturbance of one or more acres of land since February 2, 2004;2. The creation of one-quarter acre or more of “regulated impervious surface” since February 2, 2004;3. The creation of one-quarter acre or more of “regulated motor vehicle surface” since March 2, 2021 {or the effective date of this ordinance, whichever is earlier}; or4. A combination of 2 and 3 above that totals an area of one-quarter acre or more. The same surface shall not be counted twice when determining if the combination area equals one-quarter acre or more. <p>Major development includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually meet any one or more of paragraphs 1, 2, 3, or 4 above. Projects undertaken by any government agency that otherwise meet the definition of “major development” but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered “major development.”</p>
<p>2. Does the municipality approach residential projects differently than it does for non-residential projects? If so, how?</p>
<p>The Borough Ordinance regulates residential and nonresidential development differently through its Zoning Schedules. Borough Ordinance Chapter 22, Section 5.1.a.2 and associated Schedules regulate building and lot coverage for residential and non-residential development. Development projects which do not meet the thresholds of a Major Development, but exceed the Borough’s Stormwater Management Thresholds identified in Chapter 16, Section 2, must comply with the applicable Stormwater Management requirements for residential and nonresidential development.</p> <p>There is no differentiation between residential and nonresidential for Major Developments.</p>
<p>3. What process is in place to ensure that municipal projects meet the Stormwater Control Ordinance?</p> <p>Development Permits are required for all development in the Borough in accordance with Chapter 22. Stormwater Management is required on all projects which exceed the thresholds</p>



<p>defined in Chapter 16, Section 2.C.2 or for Major Developments as defined in Chapter 16, Section 2.3.</p> <p>Development projects require Zoning Approval, Building Permit, and/or Soil Removal or Fill Approval prior to the issuance of building permits. Prior to the issuance of those approvals, the Borough Engineer reviews the development application for Stormwater Management applicability and compliance. Development projects which require Planning or Zoning Board approval are also reviewed by the Board Engineer and compliance with the Stormwater Management Ordinance is a condition of approval, when applicable.</p>	
<p>4. Describe the process for reviewing major development project applications for compliance with the Stormwater Control Ordinance (SCO) and Residential Site Improvement Standards (RSIS). Attach a flow chart if available.</p>	
<p>Development Permits are required for all development in the Borough in accordance with Chapter 22. Stormwater Management compliance is required on all projects which exceed the thresholds defined in Chapter 16, Section 2.C.2 or for Major Developments as defined in Chapter 16, Section 2.3.</p> <p>Development projects require Zoning Approval, Building Permit, and/or Soil Removal or Fill Approval prior to the issuance of building permits. Prior to the issuance of those approvals, the Borough Engineer reviews the development application for Stormwater Management applicability and compliance. Development projects which require Planning or Zoning Board approval are also reviewed by the Board Engineer and compliance with the Stormwater Management Ordinance is a condition of approval, when applicable.</p>	
<p>5. Does the Municipal Stormwater Management Plan include a mitigation plan?</p>	<p>There is not a formal Stormwater Mitigation Plan, however development projects must comply with the stormwater quantity reductions defined in the ordinance.</p>
<p>6. What is the physical location of approved applications for major development projects, Major Development Summary Sheets (permit att. D), and mitigation plans?</p>	<p>Approved applications are kept with the Planning and Zoning Board, Zoning Officer, Engineer, and/or Building Department.</p>



SPPP Form 6 – Ordinances

All records must be available upon request by NJDEP.

Ordinance permit cite IV.B.1.b.iii	Date of Adoption	Website URL	Was the DEP model ordinance adopted without change?	Entity responsible for enforcement
1. Pet Waste permit cite IV.B.5.a.i	12/1/2005	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement
2. Wildlife Feeding permit cite IV.B.5.a.ii	12/1/2005	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement
3. Litter Control permit cite IV.B.5.a.iii	12/1/2005	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement
4. Improper Disposal of Waste permit cite IV.B.5.a.iv	12/1/2005	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement
5. Containerized Yard Waste/ Yard Waste Collection Program permit cite IV.B.5.a.v	12/1/2005	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement
6. Private Storm Drain Inlet Retrofitting permit cite IV.B.5.a.vi	5/11/2010	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement
7. Stormwater Control Ordinance permit cite IV.B.4.g and IV.B.5.a.vii	12/15/2005	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement
8. Illicit Connection Ordinance permit cite IV.B.5.a.viii and IV.B.6.d	12/1/2005	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement
9. Optional: Refuse Container/ Dumpster Ordinance permit cite IV.E.2	5/11/2010	http://www.rumsonnj.gov/engineering.html	Yes	Police Department & Code Enforcement

Indicate the location of records associated with ordinances and related enforcement actions:

The above ordinances can be found in Appendices B thru J, on file with the Municipal Clerk & at <http://www.rumsonnj.gov/engineering.html>. Borough Ordinance Chapter 16 Environmental Protection, Section 2 Stormwater Management and Control can be found in Appendix K. The entire Borough Ordinance can be found at <https://ecode360.com/RU4115>. Enforcement related documents are kept with Police Department & Code Enforcement.



SPPP Form 7 – Street Sweeping

All records must be available upon request by NJDEP.

1. Provide a written description or attach a map indicating which streets are swept as required by the NJPDES permit. Describe the sweeping schedule and indicate if any of the streets are swept by another entity through a shared service arrangement.

The Borough's commercial district along E. & W. River Road from Third Street to Ridge Road is swept on a monthly basis in accordance with the NJPDES permit. A map of the area is included in Appendix L.

2. Provide a written description or attach a map indicating which streets are swept that are NOT required to be swept by the NJPDES permit. Describe the sweeping schedule and indicate if any of the streets are swept by another entity through a shared service arrangement.

The Borough's Department of Public works sweeps all streets within the municipality once per year. As personnel and equipment resources permit, street sweeping is completed throughout the year at an increased interval.

3. Does the municipality provide street sweeping services for other municipalities? If so, please describe the arrangements.

There are no shared service arrangements currently in effect.

4. Indicate the location of records, including sweeping dates, areas swept, number of miles swept and total amount of wet tons collected each month. Note which records correspond to sweeping activities beyond what is required by the NJPDES permit, i.e., sweepings of streets within the municipality that are not required by permit to be swept or sweepings of streets outside of the municipality.

All street sweeping records are maintained with the Department of Public Works.



SPPP Form 8 – Catch Basins and Storm Drain Inlets

All records must be available upon request by NJDEP.

1. Describe the schedule for catch basin and storm drain inlet inspection, cleaning, and maintenance.
The Department of Public Works inspects and cleans every catch basin and storm drain inlet within the Borough's jurisdiction on a yearly basis. If repairs or maintenance of structure is required, it is logged and addressed as personnel and equipment resources permit. As needed, contracted services for major stormwater structure repairs are included in the Borough's annual Capital Improvement Program.
2. List the locations of catch basins and storm drain inlets with recurring problems, i.e., flooding, accumulated debris, etc.
The Department of Public Works does not have list of catch basins and storm drain inlets with recurring problems.
3. Describe what measures are taken to address issues for catch basins and storm drain inlets with recurring problems and how they are prioritized.
Not applicable
4. Describe the inspection schedule and maintenance plan for storm drain inlet labels on storm drains that do not have permanent wording cast into the design.
On the storm drains that do not have permanent wording cast into the design, the attached label is inspected and replaced as necessary on an annual basis when the catch basin and/or storm drain inlet is cleaned and inspected.
5. Indicate the location of records of catch basin and storm drain inlet inspections and the wet tons of materials collected during catch basin and storm drain inlet cleanings.
Records are maintained with the Department of Public Works.



SPPP Form 9 – Storm Drain Inlet Retrofitting

All records must be available upon request by NJDEP.

1. Describe the procedure for ensuring that municipally owned storm drain inlets are retrofitted.
All municipally owned storm drains are retrofitted when the roadway is resurfaced.
2. Describe the inspection process to verify that appropriate retrofits are completed on municipally owned storm drain inlets.
Field inspections are conducted to confirm storm drains are appropriately retrofitted when the Borough resurfaces a street. Those inspections are conducted by the Superintendent of Public Works, Borough Engineer, and/or Consulting Engineer.
3. Describe the procedure for ensuring that privately owned storm drain inlets are retrofitted.
When a property owner applies for development approvals, the plan review and approval require the retrofitting of private storm drain inlets. Field inspections are conducted to confirm storm drains are appropriately retrofitted prior to the issuance of a certificate of occupancy, certificate of compliance, and/or release of performance bonds. Those inspections are conducted by the Superintendent of Public Works, Borough Engineer, and/or Consulting Engineer.
4. Describe the inspection process to verify that appropriate retrofits are completed on privately owned storm drain inlets.
Prior to the issuance of a certificate of occupancy, issuance of a certificate of compliance, or the release of performance bonds, Field inspections are conducted to confirm storm drains are appropriately retrofitted. Those inspections are conducted by the Superintendent of Public Works, Borough Engineer, and/or Consulting Engineer.



SPPP Form 10 – Municipal Maintenance Yards and Other Ancillary Operations

All records must be available upon request by NJDEP.

Complete separate forms for each municipal yard or ancillary operation location.

Address of municipal yard or ancillary operation:

80 E. River Road, Rumson, NJ 07760

List all materials and machinery located at this location that are exposed to stormwater which could be a source of pollutant in a stormwater discharge:

Raw materials – Recycled concrete, stone, and topsoil on as needed basis contained in bins which do not have direct runoff to stormwater discharges

Intermediate products – None

Final products – None

Waste materials – Street sweepings contained in bins which do not have direct runoff to stormwater discharges. All street sweepings are disposed on a regular basis at Monmouth County Reclamation Center located in Tinton Falls.

By-products – None

Machinery – 1 - 31CY Refuse Truck, 1 - Hook Lift Truck

Fuel – 10,000 gallon (5,000 gasoline, 5,000 diesel) above ground double walled fuel tank and dispenser.

Lubricants – None

Solvents – None

Detergents related to municipal maintenance yard or ancillary operations – None

Other – None



For each category below, describe the best management practices in place to ensure compliance with all requirements in permit Attachment E. If the activity in the category is not applicable for this location, indicate where it occurs.

Indicate the location of inspection logs and tracking forms associated with this municipal yard or ancillary operation, including documentation of conditions requiring attention and remedial actions that have been taken or have been planned.

1. Fueling Operations

Fueling operations are conducted on site. Fuel is stored in a 10,000 gallon (5,000 gasoline, 5,000 diesel) double walled above ground storage tank. Fuel dispensers and associative piping are attached to the tank system, all of which is above ground. Access is restricted to select Borough personnel. Spill containment and leak protection systems are functioning and inspected regularly.

All inspection logs are kept with the Department of Public Works.

2. Vehicle Maintenance

All vehicle and equipment maintenance is completed in the Public Works garages.

3. On-Site Equipment and Vehicle Washing

See permit attachment E for certification and log forms for Underground Storage Tanks.

No vehicle washing is completed on-site. The Borough participates in a shared service Contract with Monmouth County, which has a vehicle wash system located at the Monmouth County Reclamation Center located in Tinton Falls.

4. Discharge of Stormwater from Secondary Containment

None



<p>5. Salt and De-Icing Material Storage and Handling</p>
<p>Salt for de-icing is stored in a covered building dedicated to salt storage.</p>
<p>6. Aggregate Material and Construction Debris Storage</p>
<p>As needed, aggregate material and construction debris is temporarily stored in a bin with no direct runoff to stormwater discharges. Construction debris is disposed on a regular basis to Mazza Recycling located in Tinton Falls.</p>
<p>7. Street Sweepings, Catch Basin Clean Out and Other Material Storage</p>
<p>As needed, street sweepings and catch basin cleanout debris is temporarily stored in a bin with no direct runoff to stormwater discharges. The debris is disposed on a regular basis to Monmouth County Reclamation Center located in Tinton Falls.</p>
<p>8. Yard Trimmings and Wood Waste Management Sites</p>
<p>All yard trimmings and wood waste is disposed directly to Mazza Recycling located in Tinton Falls.</p>
<p>9. Roadside Vegetation Management</p>
<p>Most roadside vegetation is maintained by the property owner. The Borough only maintains limited areas of road ends or along Borough Open Space. The resulting vegetative debris is disposed directly to Mazza Recycling located in Tinton Falls.</p>



SPPP Form 11 – Employee Training

All records must be available upon request by NJDEP.

<p>A. Municipal Employee Training: Stormwater Program Coordinator (SPC) must ensure appropriate staff receive training on topics in the chart below as required due to job duties assigned within three months of commencement of duties and again on the frequency below. Indicate the location of associated training sign in sheets, dates, and agendas or description for each topic.</p>		
Topic	Frequency	Title of trainer or office to conduct training
1. Maintenance Yard Operations (including Ancillary Operations)	Every year	Superintendent of Public Works and/or Borough Engineer
2. Stormwater Facility Maintenance	Every year	Superintendent of Public Works and/or Borough Engineer
3. SPPP Training & Recordkeeping	Every year	Superintendent of Public Works and/or Borough Engineer
4. Yard Waste Collection Program	Every 2 years	Superintendent of Public Works and/or Borough Engineer
5. Street Sweeping	Every 2 years	Superintendent of Public Works and/or Borough Engineer
6. Illicit Connection Elimination and Outfall Pipe Mapping	Every 2 years	Superintendent of Public Works and/or Borough Engineer
7. Outfall Pipe Stream Scouring Detection and Control	Every 2 years	Superintendent of Public Works and/or Borough Engineer
8. Waste Disposal Education	Every 2 years	Superintendent of Public Works and/or Borough Engineer
9. Municipal Ordinances	Every 2 years	Superintendent of Public Works and/or Borough Engineer
10. Construction Activity/Post-Construction Stormwater Management in New Development and Redevelopment	Every 2 years	Superintendent of Public Works and/or Borough Engineer
<p>B. Municipal Board and Governing Body Members Training: Required for individuals who review and approve applications for development and redevelopment projects in the municipality. This includes members of the planning and zoning boards, town council, and anyone else who votes on such projects. Training is in the form of online videos, posted at www.nj.gov/dep/stormwater/training.htm.</p> <p style="margin-top: 20px;">Within 6 months of commencing duties, watch <i>Asking the Right Questions in Stormwater Review Training Tool</i>. Once per term thereafter, watch at least one of the online DEP videos in the series available under Post-Construction Stormwater Management. Indicate the location of records documenting the names, video titles, and dates completed for each board and governing body member.</p>		



C. **Stormwater Management Design Reviewer Training:** All design engineers, municipal engineers, and others who review the stormwater management design for development and redevelopment projects on behalf of the municipality must attend the first available class upon assignment as a reviewer and every five years thereafter. The course is a free, two-day training conducted by DEP staff. Training dates and locations are posted at www.nj.gov/dep/stormwater/training.htm. Indicate the location of the DEP certificate of completion for each reviewer.



SPPP Form 12 – Outfall Pipes

All records must be available upon request by NJDEP.

1. **Mapping:** Attach an image or provide a link to the most current outfall pipe map. Maps shall be updated at the end of each calendar year.

The Borough's outfall mapping is made part of this report in Appendix M and available for viewing and download from the Borough's website at:

<http://www.rumsonnj.gov/engineering.html>

As of December 21, 2020, the Borough has had the mapping available online and made the necessary submissions to NJDEP.

Note that ALL maps must be electronic by 21 Dec 2020 via the DEP's designated electronic submission service. For details, see http://www.nj.gov/dep/dwq/msrp_map_aid.htm.

2. **Inspections:** Describe the outfall pipe inspection schedule and indicate the location of records of dates, locations, and findings.

Outfall pipes are inspected every five years. To manage resources, a minimum of 20% of The total outfall pipes are inspected annually. All records are maintained with the Department of Public Works.

3. **Stream Scouring:** Describe the program in place to detect, investigate and control localized stream scouring from stormwater outfall pipes. Indicate the location of records related to cases of localized stream scouring. Such records must include the contributing source(s) of stormwater, recommended corrective action, and a prioritized list and schedule to remediate scouring cases.

As outfalls are inspected, the immediately downstream area is inspected for stream scour. It must be noted that most, if not all identified outfalls discharge into tidally influenced waters surrounding the Borough.



4. **Illicit Discharges:** Describe the program in place for conducting visual dry weather inspections of municipally owned or operated outfall pipes. Record cases of illicit discharges using the DEP's Illicit Connection Inspection Report Form (www.nj.gov/dep/dwq/tier_a_forms.htm) and indicate the location of these forms and related illicit discharge records.

Note that Illicit Connection Inspection Report Forms shall be included in the SPPP and submitted to DEP with the annual report.

With many, if not all, identified outfalls discharging into tidally influenced waters the ability to conduct dry weather inspections is nearly impossible. With that in mind, the Borough is proactively coordinating and monitoring efforts with William Heddendorf with the New Jersey Department of Environmental Protection, Bureau of Marine Water Monitoring, Navesink River Coalition, and Clean Ocean Action. To date, the group has not identified any illicit connections.

Records associated with illicit connections will be kept with the Department of Public Works, Borough Engineer, and Code Enforcement Officer.

The DEP's Illicit Connection Inspection Report Form has been included in Appendix N.



SPPP Form 13 – Stormwater Facilities Maintenance

All records must be available upon request by NJDEP.

1. Detail the program in place for the long-term cleaning, operation and maintenance of each stormwater facility owned or operated by the municipality.
The Department of Public Works, cleans and inspects all municipally owned stormwater Facilities. As needed, maintenance and repairs are conducted with Public Works resources or contracted services. Records are maintained with the Department of Public Works and/or the Borough Engineer.
2. Detail the program in place for ensuring the long-term cleaning, operation and maintenance of each stormwater facility NOT owned or operated by the municipality.
When a development project requires stormwater management facilities, the applicant must submit an operation and maintenance manual as a condition of approval. The property owner (or owner's agent responsible for maintenance) is responsible to keep maintenance logs available at the request of the Borough. A representative of the Borough may conduct visual inspections of the stormwater management facilities and review the maintenance documents on a semi-annual basis.
3. Indicate the location(s) of the Stormwater Facilities Inspection and Maintenance Logs listing the type of stormwater facilities inspected, location information, inspection dates, inspector name(s), findings, preventative and corrective maintenance performed.
Inspection log sheets can be found in Appendix O made part of this report.
Note that maintenance activities must be reported in the annual report and records must be available upon request. DEP maintenance log templates are available at http://www.nj.gov/dep/stormwater/maintenance_guidance.htm (select specific logs from choices listed in the Field Manuals section).
<i>Additional Resources: The NJ Hydrologic Modeling Database contains information and maps of stormwater management basins. To view the database map, see https://hydro.rutgers.edu. To download data in an Excel format, see https://hydro.rutgers.edu/public_data/.</i>



SPPP Form 14 – Total Maximum Daily Load Information

All records must be available upon request by NJDEP.

1. Using the Total Maximum Daily Load (TMDL) reports provided on www.nj.gov/dep/dwq/msrp-tmdl-rh.htm, list adopted TMDLs for the municipality, parameters addressed, and the affected water bodies that impact the municipality's MS4 program.

Capital improvement projects within drainage areas tributary to TMDL affected water bodies include investigation of sanitary and stormwater infrastructure and necessary improvements.

The Borough has partnered with NJDEP Bureau of Marine Water Monitoring, Navesink River Coalition, and Clean Ocean Action to promote public education, outreach, and best practices within the Navesink and Shrewsbury watersheds.

The NJDEP's TMDL Report for Watershed Management Area 12 is made part of this report as Appendix P.

2. Describe how the permittee uses TMDL information to prioritize stormwater facilities maintenance projects and to address specific sources of stormwater pollutants.

The Borough uses TMDL information to understand where potential infrastructure improvement funds need to be allocated towards sanitary sewer and stormwater sewer infrastructure investigation and possible improvements.



SPPP Form 15 – Optional Measures

All records must be available upon request by NJDEP.

1. Describe any Best Management Practice(s) the permittee has developed that extend beyond the requirements of the Tier A MS4 NJPDES permit that prevents or reduces water pollution.

The Borough of Rumson has implemented additional stormwater management measures for developments that do not meet the requirements of a Major Development, yet exceed the thresholds identified in Chapter 16, Section 2.2.C.2. Since its adoption in 2005, a significant number of new residential homes were constructed with recharge systems capturing 90% of roof areas and porous driveway systems. These measures have reduced runoff quantity leaving a development site, improved groundwater recharge, and improved water quality throughout the community. Without the higher standards implemented by the Governing Body, many of the development projects in the Borough would not meet the Major Development definition, and would not require any stormwater management measures.

2. Has the permittee adopted a Refuse Container/Dumpster Ordinance?

Yes, the Borough adopted the Refuse Container/Dumpster Ordinance December 12, 2010. The ordinance can be found on the Borough website here: <http://www.rumsonnj.gov/engineering.html>. The entire Borough Ordinance can be found at <https://ecode360.com/RU4115>.



Appendix A
Stormwater Management Plan, Master Plan Element

STORMWATER MANAGEMENT PLAN
MASTER PLAN ELEMENT

BOROUGH OF RUMSON
MONMOUTH COUNTY, NEW JERSEY

PREPARED FOR
RUMSON BOROUGH PLANNING BOARD

February 7, 2005
Amended August 7, 2006

PREPARED BY
C. BERNARD BLUM, JR., P.E., P.P.
RUMSON BOROUGH ENGINEER

OF THE FIRM OF



11 TINDALL ROAD
MIDDLETOWN, NJ 07748



C. BERNARD BLUM, JR. P.E., P.P.
LICENSED PROFESSIONAL ENGINEER - NO. GE14227
LICENSED PROFESSIONAL PLANNER - NO. LI00887

The original of this document has been signed and sealed in accordance with New Jersey Law

RUMSON BOROUGH PLANNING BOARD

GERTRUDE PARTON, CHAIRMAN

JOHN R. EMERY, VICE CHAIRMAN

MAYOR JOHN E. EKDAHL

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C. BERNARD BLUM, JR., P.E., P.P, BOROUGH ENGINEER

MICHAEL B. STEIB, PLANNING BOARD ATTORNEY

FREDERICK ANDRE, SECRETARY

BOROUGH OF RUMSON PLANNING BOARD

**RESOLUTION ADOPTING STORMWATER MANAGEMENT PLAN
MASTER PLAN ELEMENT**

WHEREAS, the Planning Board is a duly constituted approving Authority created pursuant to the Provisions of N.J.S.A. 40:55D-23 of the Municipal Land Use Law; and

WHEREAS, pursuant to N.J.S.A. 40:55D-28, the Planning Board may prepare and after public hearing may amend a Master Plan or component parts thereof to guide the use of lands within the Municipality in a manner which protects public health, safety and promotes the general welfare; and

WHEREAS, pursuant to N.J.A.C. 7:8-4.3(a), a Municipality shall adopt a Municipal Stormwater Management Plan as an integral part of its Master Plan; and

WHEREAS, pursuant to N.J.A.C. 7:8-1.1 et. seq., the Planning Board has prepared a Stormwater Management Plan Master Plan Element in order to comply with the requirements set forth in the New Jersey Administrative Code for Municipal Stormwater Management Planning; and

Aug 09 06 12:08p

Michael B. Steib P. R.

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WHEREAS, pursuant to the requirements of the Municipal Land Use Law N.J.S.A. 40:55D-1 et. seq. and specifically N.J.S.A. 40:55D-28 and N.J.S.A. 40:55D-13, the Planning Board conducted a public hearing on the 7th day of August, 2006, due Notice of said meeting having been given in accordance with New Jersey Statutes, the Open Public Meetings Act and the Municipal Land Use Law and a quorum of the Planning Board being present, the Planning Board reviewed and considered the proposed Stormwater Management Plan Master Plan Element along with any public comment thereon and the Planning Board having determined that the Stormwater Management Plan Master Plan Element is in compliance with the requirements of the Municipal Land Use Law and the requirements for stormwater management pursuant to the applicable Sections of the New Jersey Administrative Code.

NOW, THEREFORE, BE IT RESOLVED, by the Planning Board of the Borough of Rumson on this 11th day of September, 2006 that the Stormwater Management Plan Master Plan Element prepared by C. Bernard Blum, Jr., P.E., P.P., Rumson Borough Engineer dated February 7, 2005, amended August 7, 2006, be and is hereby adopted.

OFFERED BY: *COUNCILMAN RUBIN*

SECONDED BY: MR. ANDERSON

ROLL CALL:

YES: PARTON, RUBIN, EMERY, ANDERSON, SHANLEY, HEWITT, CASAZZA,
VAUGHAN

NO: NONE

ABSTAIN: WHITE

ABSENT: EKORHL, LOSPINUSO

Michael B. Steib
Chairperson, Planning
Board - Borough of Rumson

I CERTIFY, that the above is a true and exact copy of
the Resolution adopted by the Borough of Rumson at its
meeting held on September 11, 2006.

Janet J. Piro
Secretary, Planning
Board - Borough of Rumson

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ATTACHMENT A – VACANT LAND INVENTORY AND ANALYSIS REPORT

INTRODUCTION

A Stormwater Management Plan provides a strategy for municipalities to plan for and manage increased runoff associated with future development and land use changes. This municipal Stormwater Management Plan is designed to provide a municipal-wide approach to stormwater management planning. This Plan makes recommendations to better regulate stormwater management. This Plan is not designed to resolve existing flooding or runoff problems, but to identify them for future correction. This Plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by including stormwater design and performance standards for new development and redevelopment. This Plan also addresses the Borough's suggested policy regarding the long-term operation and maintenance of existing and future stormwater management facilities.

This Stormwater Management Plan complies with N.J.A.C. 7:14A-25 Municipal Stormwater Regulations, which requires each community in New Jersey to prepare and adopt a stormwater management plan.

GOALS AND OBJECTIVES

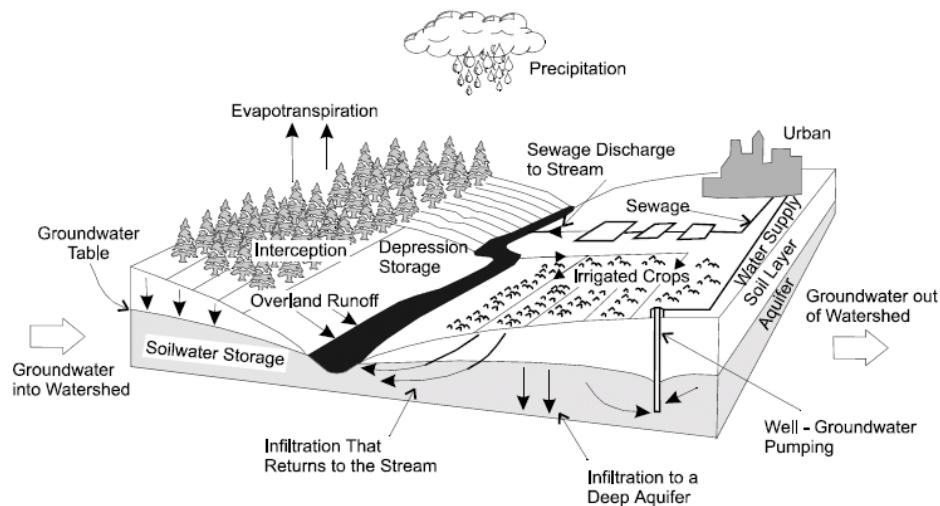
The goals of this Stormwater Management Plan are:

1. Reduce flood damage, including damage to life, property and the environment;
2. Minimize, to the extent practical, any increase in stormwater runoff from any new development;
3. Reduce soil erosion from development, redevelopment and construction projects;
4. Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
5. Maintain groundwater recharge;
6. Prevent, to the greatest extent feasible, an increase in non-point pollution;
7. Maintain the integrity of stream channels for their biological function, as well as for drainage;
8. Minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the State, to protect the public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, commercial, and other uses of water;
9. Protect public safety through the proper design and operation of stormwater basins;
10. Properly manage and maintain existing natural ponds and waterways on private property;
11. Retain community character while addressing Council on Affordable Housing (COAH) housing issues;
12. Regulate the stormwater impacts from properties within 300 feet of a C-1 waterway that are unregulated by the Municipal Land Use Law (MLUL) and the Residential Site Improvement Standards (RSIS); and
13. To encourage the use of indigenous vegetation in landscape design.

HYDROLOGIC CYCLE

The hydrologic cycle describes the continuous circulation of water between the oceans, atmosphere and land. Water is supplied to the atmosphere by evapotranspiration. This includes evaporation from water, vegetation, snow, and transpiration from plants. Water is returned to the land through precipitation. Within the hydrologic cycle, water may be stored by vegetation, snowpacks, land surfaces, water bodies, saturated subsurface zones, and unsaturated subsurface zones/soils. Water may be transported between these storage areas

Figure 1



Source : After, M. L. Davis, D. A. Cornwell. **Introduction to Environmental Engineering**, 1991.

via overland runoff, stream flow, infiltration, groundwater recharge, and groundwater flow, among other processes (Figure 1).

Definitions:

Overland runoff – water that travels over the ground surface to a channel

Streamflow – movement of water via channels

Groundwater flow – movement of water through the subsurface

Infiltration – penetration of water through the ground surface

Groundwater recharge – water that reaches saturated zone

People interact with the hydrologic cycle by removing water for agricultural, domestic, and non-residential uses, and returning it as wastewater discharges. Urban development may also interfere with the natural transfers of water between storage components of the hydrologic cycle.

Within a watershed, a water balance may be used to describe the hydrological cycle. A water balance provides for an accounting of water transfers across a watershed's boundaries over a

period of time. Any difference between inflows to the system and outflows from the system during this time period must be balanced by a change of storage within the system.

Changes to the Hydrologic Cycle/Water Balance

An increase in impervious area associated with urbanization increases runoff while it decreases infiltration of water into surrounding soils. Urbanization also results in decreased evapotranspiration. Conventional development practices in an urban watershed stream dramatically change the hydrologic condition of a stream.

Impacts include:

- An increase in the magnitude and frequency of runoff events;
- An increase in the stream’s annual flow as surface storm runoff rather than base flow; and
- Increases in velocity of flow during storms.

The National Oceanographic and Atmospheric Administration (NOAA), the agency that develops statistical estimates of rainfall amounts has increased its estimates for the majority of storm events, particularly the larger events. The following table indicates the old and new twenty-four hour rainfall amounts in inches for Monmouth County.

NRCS 24 Hour Design Storm Rainfall Depth (inches) – September 2004

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

Source: NOAA

The decrease in infiltration that occurs with urbanization reduces soil moisture replenishment and groundwater recharge that is the source of stream baseflow, which is important for sustaining aquatic life.

The preservation of the natural hydrologic cycle, to the greatest extent practicable, will maintain groundwater recharge and reduce baseflow impacts. It will also reduce the potential for flooding and erosion, and possibly, the size and cost of stormwater infrastructure.

Lack of proper stormwater management, reduced baseflow, degradation of water quality, and increased flooding and erosion can lead to reduced diversity of aquatic life, fewer opportunities for human uses of water resources, and loss of property and human life.

DEMOGRAPHICS

Population Trends

Table 1 shows the Borough’s historic population trend in comparison to Monmouth County and the State of New Jersey. From 1910 through 2000, the population of Rumson increased every decade until 1970. Since 1980, population has decreased slightly. The largest increases in population occurred prior to 1970 when the Borough had enough remaining vacant land to sustain additional growth. The Master Plan attributes the construction of the Garden State Parkway and other regional highway improvements as having a dramatic effect on the Borough’s growth between 1950 and 1960 resulting in a 60% increase in the population. By the 1970’s, Rumson had all but reached its residential build-out potential.

Year	Rumson		Monmouth		New Jersey	
	Population	% Change	Population	% Change	Population	% Change
1910	1,449		64,734		2,537,167	
1920	1,658	14.4	104,925	62.1	3,155,900	24.4
1930	2,073	25.0	147,209	40.3	4,041,334	28.1
1940	2,926	41.1	161,238	9.5	4,160,165	2.9
1950	4,004	36.8	225,327	39.7	4,835,329	16.2
1960	6,405	60.0	334,401	48.4	6,066,782	25.5
1970	7,421	15.9	461,849	38.1	7,168,164	18.2
1980	7,623	2.7	503,173	8.9	7,364,158	2.7
1990	6,701	-12.1	553,124	9.9	7,730,118	5.0
2000	7,137	6.5	615,305	11.2	8,414,350	8.9

Source: U.S. Census

Housing

Table 2 shows that while there are eleven (11) fewer housing units in the Borough in 2000 as compared to 1990, the number of occupied housing units increased by 58. Thus, the vacancy rate has decreased over the last decade as new homeowners reinvested in existing vacant or abandoned properties. Rental units have been changing ownership and are being purchased by those who intend to use them as owner-occupied units. The number of owner-occupied housing units in 2000 increased by 89 units from 1990. According to the 2000 census, there are 69 fewer vacant units than in 1990. The increase in occupied housing units has almost entirely been family households. Both the number of single-person households and family households increased marginally from 1990.

TABLE 2 – GENERAL HOUSING CHARACTERISTICS

	1990		2000		Change
	Number	Percent	Number	Percent	
OCCUPANCY STATUS					
Total housing units	2621	100	2,610	100	-11
Occupied housing units	2394	91.3	2,452	93.9	58
Vacant housing units	227	8.7	158	6.1	-69
TENURE					
Occupied housing units	2394	100	2,452	100	58
Owner-occupied housing units	2120	88.6	2,209	90.1	89
Renter-occupied housing units	274	11.4	243	9.9	-31
VACANCY STATUS					
Vacant housing units	227	100	158	100	-69
POPULATION					
	6701	100	7137	100	436
HOUSEHOLDS					
Family Households	1932	80	1989	81	57
1 Person Households	462	20	463	19	1
Persons/Household	2.80		2.91		0.11
Persons/Family Household	3.23		3.36		0.13
Persons/Housing Unit	2.56		2.73		0.17

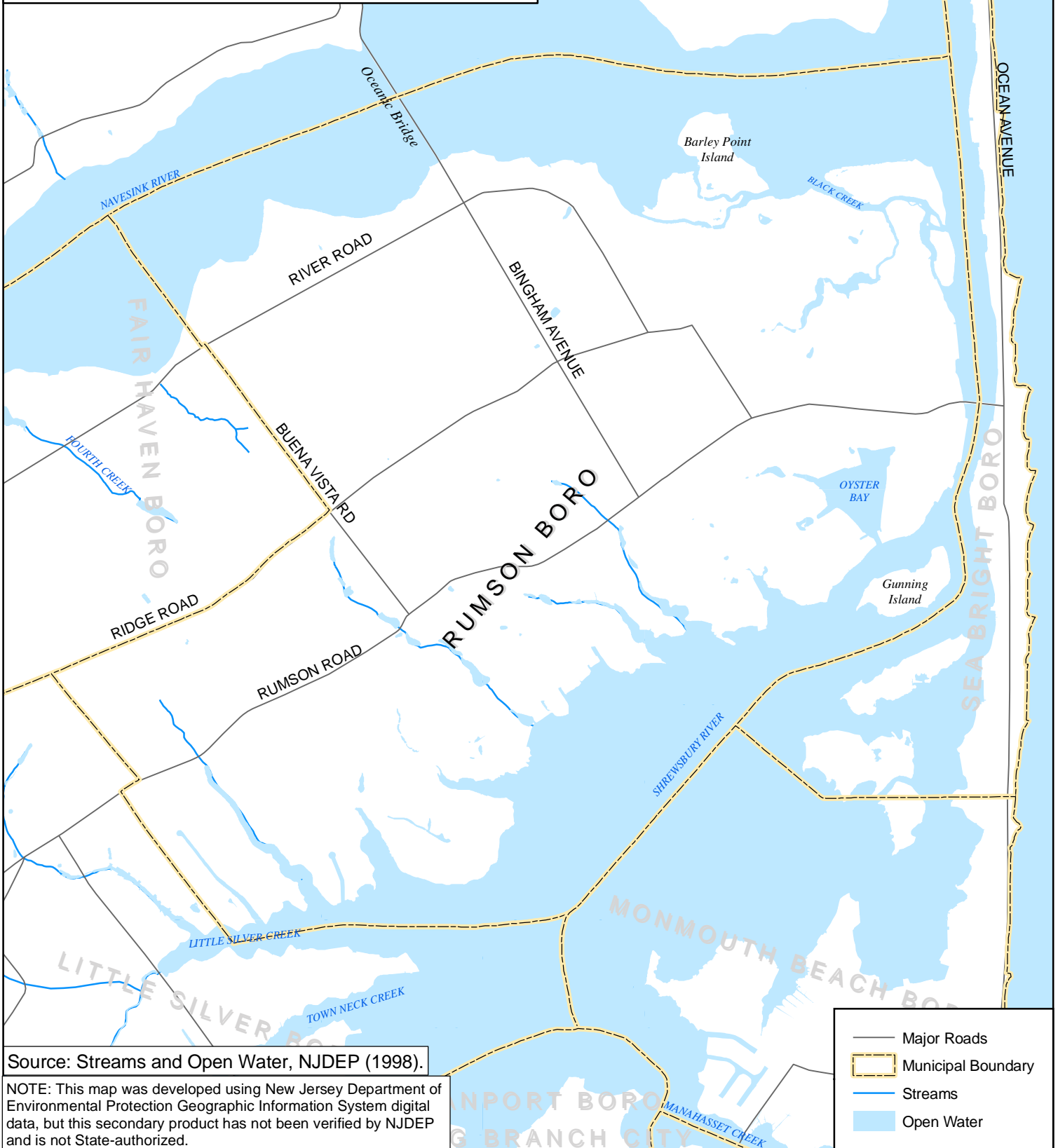
Source: US Census

When compared to Monmouth County and the State, Rumson Borough has a slightly lower percentage of vacant housing. However, where Rumson has a 90.1% owner-occupancy rate, the County has a rate of 74.6% and the State a rate of only 65.6%. Rumson's higher than average ownership rate can be attributed to the limited number of rental units and high majority of single-family housing stock.

Figure 2: Waterways
Borough of Rumson
Monmouth County, New Jersey

3

0 1,250 2,500 5,000 7,500 Feet



Source: Streams and Open Water, NJDEP (1998).

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.

BACKGROUND OF THE BOROUGH

General Characteristics

The Borough of Rumson has a land area of 5.2 square miles. It is located between the Shrewsbury and Navesink Rivers in eastern Monmouth County. In addition to the primary and secondary watercourses in the Borough, there are a number of unnamed tributaries and ponds that are identified in Figure 2.

Rumson is a mature community that has established harmonious patterns of land use and satisfactory public facilities and services. The challenge for Rumson is to manage further growth and changes within the Borough to assure that its quality of life is maintained. Rumson is a fully developed community that has developed in a manner consistent with County and State Plans.

The Borough has historically maintained low-density zoning in environmentally sensitive areas of the Borough, particularly along the Shrewsbury River and, in general, along the Navesink, both listed by NJDEP as Category-1 streams. In accordance with the recently adopted NJDEP Stormwater Regulations, a 300-foot buffer is required from a Category-1 stream, as part of any Major Development (i.e., any site plan or subdivision resulting in more than 1 acre of disturbance or more than 1/4 acre of additional impervious coverage). As a result of local market forces, revitalization of existing commercial and residential structures has occurred, and is occurring, in the Borough in a manner consistent with the master plan and existing development. However, size and scale of the majority of this development does not meet the “Major Development” threshold and therefore, the Category -1 buffer requirement will not have a significant impact on future development.

The Borough’s established development pattern, the preservation of which is the Borough’s primary goal, creates and supports a well designed mixed-use community. In addition, the Borough has adopted a mixed-use overlay option in the General Business, Neighborhood Business and Professional Office districts.

The Borough Council adopted a Tree Protection Ordinance and has designated a Tree Ordinance Officer to administer the newly enacted Tree Protection Program. The purpose of the ordinance is to prevent the clear cutting of trees and to restrict the removal of other trees, thereby maintaining the beauty and character, preventing erosion, controlling actions that will substantially change drainage patterns and restricting any action that could create a hazard to persons or property.

NJDEP – Integrated List of Water Bodies

The Navesink River is identified on New Jersey’s 2004 Integrated List of Water Bodies as being impaired or threatened (Sublist 5). Along the Navesink River, NJ Department of Environmental Protection (NJDEP) is monitoring fish tissue for fish-PCB and fish-dioxin. According to NJDEP, impairments for total coliform, dissolved oxygen and fecal coliform have been identified along the Shrewsbury River/Navesink River Estuary.

Both the Navesink River and the Shrewsbury River estuary exceed the state's criteria for the above mentioned pollutants and are classified as impaired waterways upstream of Rumson. NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for each waterway. A TMDL is the amount of a pollutant that can be accepted by a water body without causing an exceedance of water quality standards or interfering with the ability for a water body to be used for one or more of its designated uses. Where more than one pollutant is associated with the impairment of a single waterway, the waterway will remain on Sublist 5 until TMDLs for all pollutants have been completed and approved by USEPA. However, while a TMDL has not currently been established for the portions of the Shrewsbury and Navesink Rivers adjacent to Rumson's political boundary, future testing may lead to the creation of a TMDL, which would require a revision to this Plan.

General Characteristics of the Navesink and Shrewsbury Rivers

The Navesink River drains an area of 95 square miles and includes the following tributaries: Swimming River, Yellow Brook, Big Brook, Mine Brook, and Willow Brook. The Swimming River Reservoir, a major potable water impoundment, is located in this watershed, as are many small ponds. The Navesink estuary supports substantial hard clam (*Mercentaria mercenaria*), soft clam (*Mya arenaria*), and blue crab (*Callinectes sapidus Rathbun*) populations.

The Shrewsbury River drains an area of 27 square miles. Tributaries to the river include Manhasset Creek, Troutman's Creek, Branchport Creek, Turtle Mill Brook, Parkers Creek, Oceanport Creek, Town Neck Creek, Wardell's Creek and Little Silver Creek. The Shrewsbury and Navesink Rivers produce the majority of soft clams in the state. The Oceanic Bridge serves as the boundary line where shell-fishing beds are open/closed to shell fish harvesting.

Impacts from agriculture, horse farms, development and urban runoff are believed to have contributed to non-point sources of pollution in the Shrewsbury and Navesink rivers. These impacts include siltation of rivers, streams and ponds, increased nutrient levels in water bodies and increased bacterial levels. Urban runoff and bacteria specific to wildlife have contaminated many shellfish-harvesting beds in the downstream reaches of the Shrewsbury and Navesink Rivers.

Within the shellfish-harvesting portions of the Navesink River, the major pollution problem is high bacterial loadings from non-point sources, with the highest concentration occurring in the segment of the river near Red Bank. According to NJDEP, water quality improves as one proceeds downstream along the Shrewsbury and Navesink rivers. Significant improvements in water quality in the Navesink River have occurred from reducing non-point source loading into the river that led to the reopening of shellfish harvesting in the late 1990's, which was previously closed for over twenty-five years.

Monmouth County Health Department

Monmouth County Health Department monitors the Navesink and Shrewsbury Rivers at four (4) locations within the Borough of Rumson on a quarterly basis. These approximate locations are located near Lafayette Street, at the north end of Bingham Avenue, at the point of confluence of the two rivers near the Route 520 bridge pier, and near Avenue of Two Rivers South. Each location is monitored for fecal coliform bacteria; total phosphorous, total suspended solids and pH. The

County results show levels of fecal coliform bacteria, total phosphorous, total suspended solids and pH that are slightly above recommended standards. This Plan also recognizes the future need to develop specific strategies to improve water quality for each tributary that flows into the Shrewsbury and Navesink rivers.

Groundwater Recharge

Figure 3 indicates groundwater recharge rates for the Borough. The groundwater recharge GIS layer created by NJDEP utilizes soil characteristics and existing land use information to determine the likely rate of groundwater recharge. Areas with lower groundwater recharge, i.e., impervious areas and soils with poor infiltration, may require additional engineering measures to encourage groundwater recharge.

Existing Stormwater Facilities

Rumson contains seven municipally owned structural stormwater facilities, which are maintained by the Borough of Rumson Department of Public Works and/or the Board of Education staff. Four of the facilities consist of grass swales within the Willowbrook subdivision. They are located at Block 93, Lots 16.06, 16.09, 16.10 and 16.11. All of the swales terminate into a collection system within Willowbrook Drive. Existing ponds at the Deane-Porter and Forestdale School (Block 44, Lot 15) and across from Borough Hall (Block 39, Lot 13) serve as retention basins for the schools and Lakeview Avenue Neighborhoods respectively. Outfall structures from the pond terminate into the stormwater system at Black Point Road and Narumson Street. Lastly, a detention basin exists in Meadow Ridge Park, which accepts runoff from the park and a County maintained storm sewer system.

In addition to these stormwater facilities, the Borough has approximately five (5) miles of municipally owned and maintained storm sewer pipe ranging in size from 8” to 30”, approximately 600 storm drain inlets and approximately 200 outfall structures. More than half of the existing roadways are curbed. Additional information can be found in the Borough’s Stormwater Pollution Prevention Plan (SPPP).

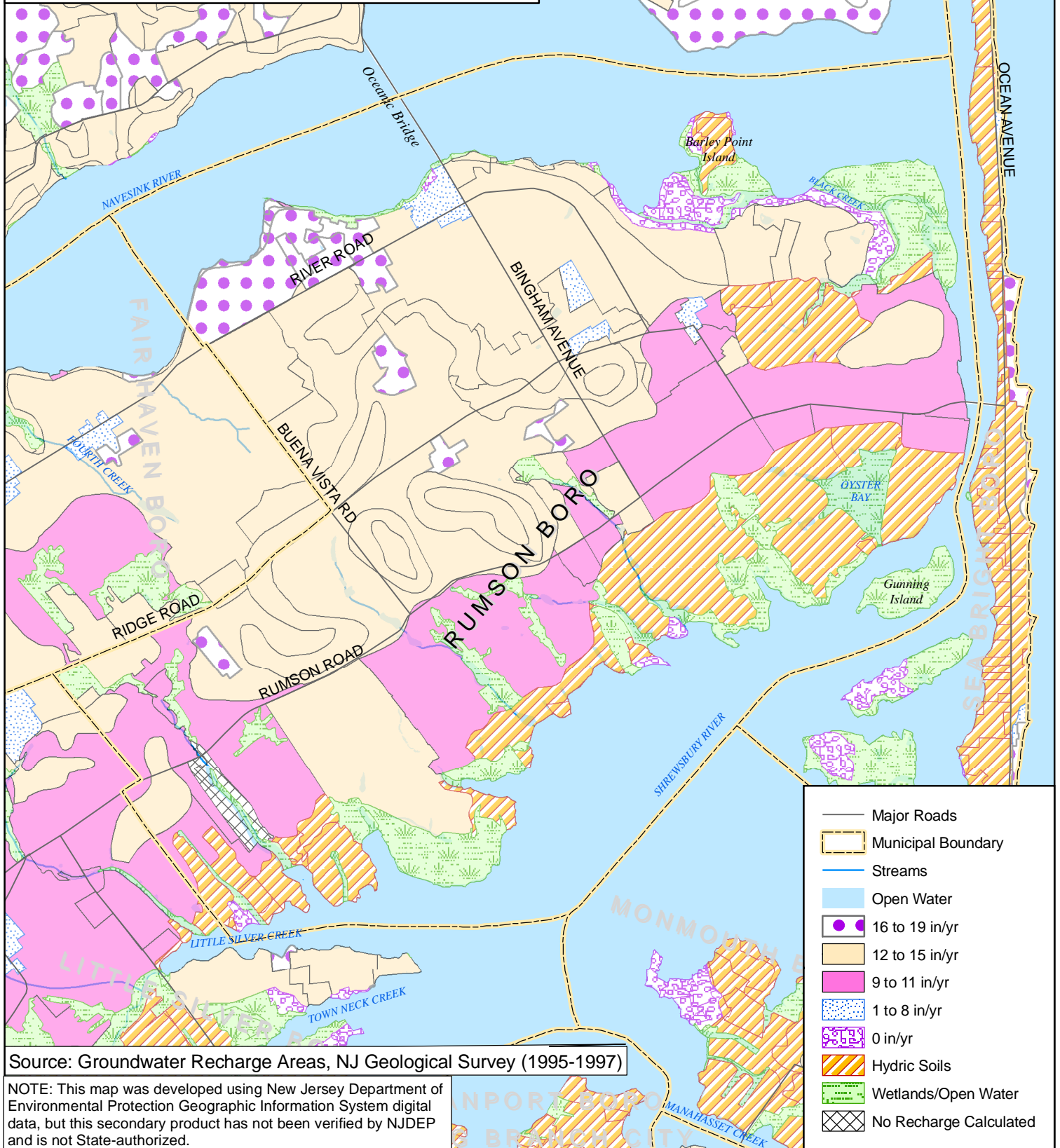
Public Well Heads

There are no public well-heads in Rumson and, therefore, no wellhead protection areas. Although there are no public-well heads there are several private wells, including a high yield well at the golf course.

Figure 3: Groundwater Recharge Areas Borough of Rumson Monmouth County, New Jersey

3

0 1,250 2,500 5,000 7,500 Feet



Source: Groundwater Recharge Areas, NJ Geological Survey (1995-1997)

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.

Land Use Issues Addressed in this Stormwater Management Plan

There are several land-use issues, which are identified in this Plan as follows:

1. The long-term maintenance of ponds and waterways on private property;
2. Investigate revising the Borough's regulations to require major development unregulated by RSIS to comply with stormwater rules and regulations, i.e., building permit applications not typically regulated by site plan/subdivision approval;
3. Investigate regulating expansions of residential structures and new development in commercial areas;
4. Minimizing mitigation for commercial areas on small lots less than 10,000 square feet in size by balancing policies within points 2 and 3 above;
5. Mitigation techniques for areas of the Borough with a seasonal high water table;
6. Encouraging the use of low phosphorus fertilizers on residential and non-residential properties; and
7. The need for stream protection ordinances and other non-structural stormwater management best management practices (BMP's).

Several of these issues will be addressed in the Borough's Stormwater Ordinance and several of these issues will be addressed long range.

DESIGN AND PERFORMANCE STANDARDS

The Borough should adopt applicable design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to reduce the negative impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The following table indicates actions appropriate for various types of development in Rumson. Ultimately, design and performance standards will be created that contain the necessary language to maintain stormwater management measures consistent with applicable stormwater management rules at N.J.A.C. 7:8-5.8 - Maintenance Requirements. This includes language for safety standards consistent with N.J.A.C. 7:8-6 - Safety Standards for Stormwater Management Basins. The ordinances will be submitted to the county for review and approval by April 2006. During construction, borough inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

A number of structural and nonstructural strategies are complicated systems that may increase the promulgation of mosquito breeding habitats. New development and redevelopment should be coordinated with the Monmouth County Mosquito Extermination Commission so these facilities can be designed, constructed and properly maintained to minimize mosquito breeding.

This Plan recommends further study and evaluation of the maintenance of natural stormwater management structures, i.e., ponds, drainage ways, etc. on private property. The current Borough policy of requiring private owners to maintain their portion of a system of interconnected ponds, with outlets discharging to streams and streams crossing numerous lots presents constant conflicts and an unworkable enforcement challenge. This Plan recognizes the need to identify a workable plan with practical implementation for which maintenance can be financed on a long-term basis.

Proper maintenance is critical to the successful performance of a stormwater management system. The Borough has prepared a Stormwater Pollution Prevention Plan (SPPP) that establishes a maintenance schedule for all existing stormwater related maintenance requirements. The Borough will also initiate a local education program to educate property owners on the control of household waste, fertilizers, solids, floatable controls, pesticides and other methods to reduce stormwater pollutants that may adversely affect the Borough's waterways.

For regulated new development and redevelopment projects meeting the NJDEP stormwater management threshold for a Major Development, the Borough will require an operation and maintenance plan in accordance with the DEP BMP manual. Copies of each maintenance plan will be filed with the Borough.

Borough personnel will perform inspections of all stormwater facilities on Borough property or within Borough drainage easement after significant storms to document the functioning of the system and to identify maintenance needs. After this, annual checks should be done to identify maintenance needs. As part of these inspections, blockages may need to be cleared from inlets and outlets. Invasive vegetation may need to be tended or replaced. The design of stormwater management practices for water quality improvement is based primarily on settling of sediment. Therefore, at some point, accumulated material will need to be removed. Borough ordinances should indicate that the inspection of systems is permissible on private property provided the necessary easements are in place upon giving reasonable notice. Ordinances should also indicate a time frame for maintenance procedures to occur upon receiving notice from the Borough that maintenance is required.

TABLE 3 - DESIGN AND PERFORMANCE STANDARDS – POLICY IMPLEMENTATION TABLE

	RESIDENTIAL DEVELOPMENT SUBJECT TO RSIS				Residential Development Not Subject to RSIS				Non-residential Development			
	Major Development		Other		Above Residential Stormwater Management Threshold ¹		Under Residential Stormwater Management Threshold ¹		Above Non-residential Stormwater Management Threshold ¹		Under Non-residential Stormwater Management Threshold ¹	
	Well Drained Soils ²	Poorly Drained Soils ³	Well Drained Soils ²	Poorly Drained Soils ³	Well Drained Soils ²	Poorly Drained Soils ³	Well Drained Soils ²	Poorly Drained Soils ³	Well Drained Soils ²	Poorly Drained Soils ³	Well Drained Soils ²	Poorly Drained Soils ³
Non-structural Strategies⁴												
Protect critical / sensitive areas	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒
Minimize Impervious surfaces	☐	☐	☒	☒	☐	☐	☒	☒	☒	☒	☒	☒
Protect Natural Features	☐	☐	☒	☒	☐	☐	☒	☒	☒	☒	☒	☒
Decrease “reduction in time of concentration”	☐	☐	☒	☒	☐	☐	☒	☒	☒	☒	☒	☒
Minimize land disturbance	☐	☐	☒	☒	☐	☐	☒	☒	☒	☒	☒	☒
Open channel conveyance systems	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Structural Strategies												
Bioretention systems	☐	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Constructed wetlands	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Dry wells	☐	☒	☒	☒	☐	☒	☐	☒	☒	☒	☒	☒
Extended detention Basins	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Infiltration basins	☐	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Manufactured treatment devices	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Pervious paving systems	☐	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☒
Sand filters	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Vegetative filters	☐	☒	☒	☒	☐	☒	☒	☒	☐	☒	☒	☒
Wet ponds	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

Key: Non-structural Strategies

- ☐ - Appropriate in most cases
- ☒ - May be appropriate, further study necessary
- ☒ - Inappropriate in most cases

Key: Structural Strategies

- ☐ - Usually preferred
- ☒ - Considered on-site specific basis
- ☒ - Not preferred

¹ Residential Stormwater Management Threshold – See Table 3A

Non-Residential Stormwater Management Threshold – See Table 3A

² Well-drained soils – The Borough’s stormwater implementation ordinances will define well-drained soils. However, well-drained soils will generally have groundwater recharge rates of at least 12 inches per year in accordance with Figure 3.

³ Poorly drained soils – The Borough’s stormwater implementation ordinances will define poorly drained soils. However, poorly drained soils will generally have groundwater recharge rates less than 12 inches per year in accordance with Figure 3.

⁴ Additional strategies will apply within 300 feet of a C-1 waterway.

TABLE 3A - STORMWATER MANAGEMENT THRESHOLDS

A. Residential Development

1. Total lot disturbance, including new building and lot coverage, soil disturbance and/or re-grading, exceeds 40,000 square feet in the R-1, R-2 or R-3 Zone District or 7,000 square feet in other zone districts; and/or
2. New impervious surface exceeds 10,000 square feet; and/or
3. A building permit is required and:
 - a. Building coverage or lot coverage exceeds or will exceed 75% of the maximum permitted in the R-1, R-2 or R-3 Zone District or 85% of the maximum permitted in the other zone districts; and
 - b. Building coverage added as a result of the development exceeds 1,200 square feet in the R-1, R-2, or R-3 Zone District or 400 square feet in other zone districts.

B. Non-residential Development

1. The Development is a major development as defined by N.J.A.C. 7:8-1.2 et seq.; and/or
2. Lot coverage exceeds or will exceed 85% of the maximum permitted; and
 - a. Lot coverage added as a result of the development exceeds the greater of 4,000 square feet or 60% of the maximum lot coverage permitted; or
 - b. Lot disturbance exceeds 10,000 square feet.

PLAN CONSISTENCY

Currently there are no adopted Regional Stormwater Management Plans that include all or portions of Rumson and no TMDL's have been developed for waters within the Borough to date. If a Regional Stormwater Management Plan or a TMDL is developed in the future, this Plan will be updated to be consistent.

According to the North Coast – Environmental Planning Region Ecological Resource Inventory (EPRERI) prepared by the Monmouth County Planning Board and the Monmouth County Environmental Council in 1999, coordinated watershed management planning is conducted throughout Monmouth County. It is promoted and implemented by the County Planning Board, the County Environmental Council and the nine Regional Environmental Planning Councils that were established to focus on watershed planning and management.

Past efforts included the collection of the water resource baseline on County property to access county water resources. Recent initiatives include the creation of watershed modeling and characterization studies that were designed to review potential future impacts of existing zoning. A study by EPRERI approximately 10 to 15 years ago recommended that the North Coast REPC work with the Monmouth County Planning Board to develop a regional stormwater management plan to provide base information that municipalities can use regarding the scale and location of any Best Management Practices that might need to be installed in the Shrewsbury and Navesink River watersheds. As indicated in Figure 4, two of these regions lie within Rumson Borough. The EPRERI regional master plan was not completed nor has it been recognized by the NJDEP. If necessary, this plan will be updated to be consistent with a future Regional Master Plan, which may result from the ongoing study.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS, N.J.A.C. 5:21). Rumson will utilize the current update of the RSIS for stormwater management review of residential areas. This Plan incorporates the statute of RSIS and acknowledges that RSIS is periodically updated.

The Borough's Stormwater Management Ordinance will require all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards.

The Municipal Stormwater Management Plan is also consistent with the County Growth Management Guide and the State Development and Redevelopment Plan. The State Planning Commission adopted the State Development and Redevelopment Plan (SDRP) in June of 1992 and adopted a revised SDRP on March 1, 2001. A new SDRP was released for cross acceptance in 2004. The SDRP contains a number of goals and objectives regarding the future development and redevelopment of New Jersey. The primary objective of the SDRP is to guide development to areas where infrastructure is available or can be readily extended such as along existing transportation corridors, in developed or developing suburbs, and in urban areas. New growth and development should be located in "centers", which are "compact" forms of development, rather than in 'sprawl' development. The

overall goal of the SDRP is to promote development and redevelopment that will consume less land, deplete fewer natural resources and use the State's infrastructure more efficiently. Among these is the redevelopment and revitalization of New Jersey's cities and urban areas.

With the exception of environmentally constrained lands, i.e., wetlands, Rumson is located within Planning Area 1 (PA-1). As documented in the SDRP, the following intent has been documented for PA-1:

- Provide for much of the state's future redevelopment;
- Revitalize cities and towns;
- Promote growth in compact forms;
- Stabilize older suburbs;
- Redesign areas of sprawl; and
- Protect the character of existing stable communities.

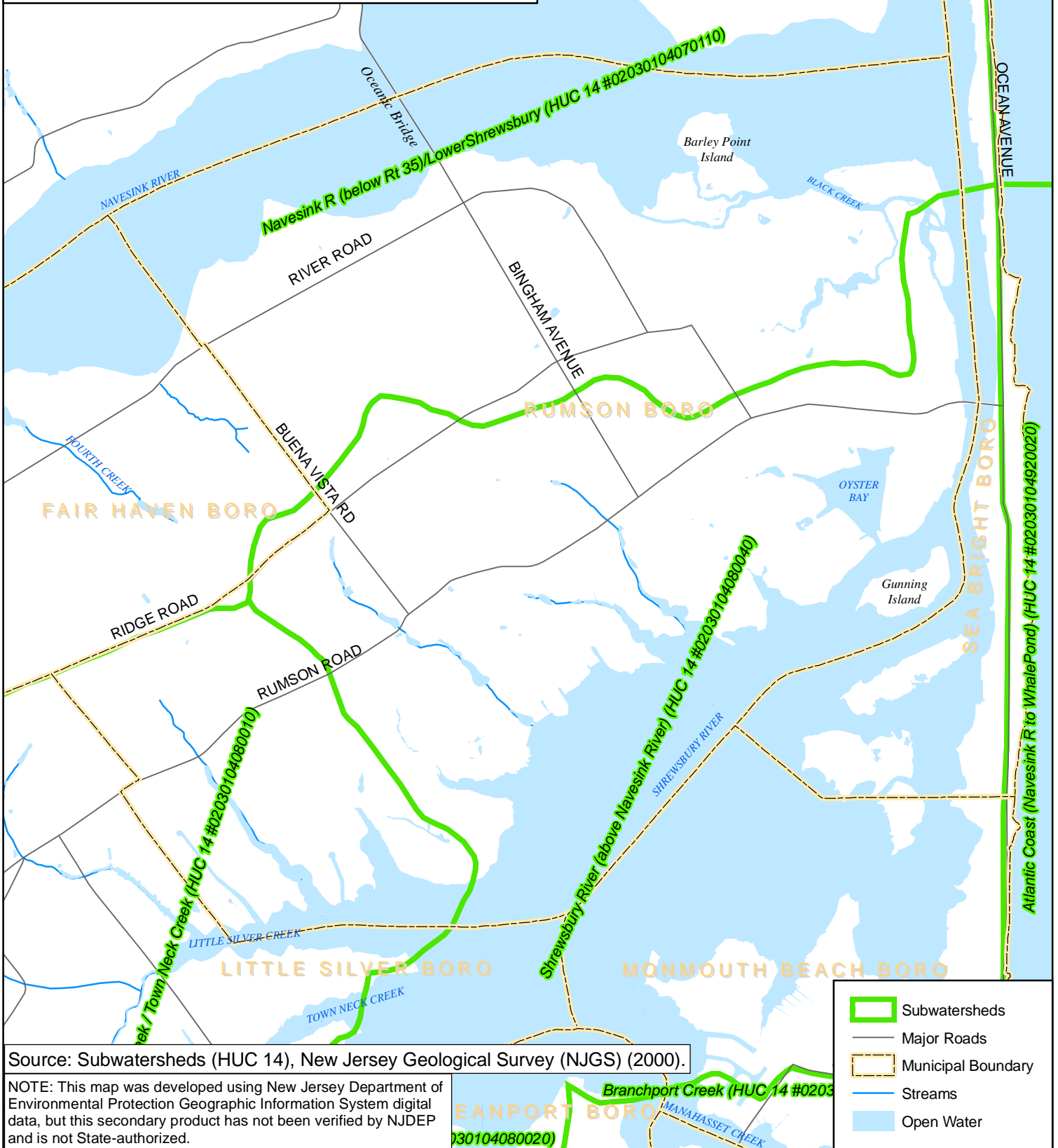
According to the SDRP in the Environmentally Sensitive Planning Area, PA 5, the intention is to:

- Protect environmental resources through the protection of large contiguous areas of land;
- Accommodate growth in Centers;
- Protect the character of existing stable communities;
- Confine programmed sewers and public water services to Centers; and
- Revitalize cities and towns.

Figure 4: Subwatersheds (HUC14) within the Borough of Rumson Monmouth County, New Jersey

3

0 1,250 2,500 5,000 7,500 Feet



Source: Subwatersheds (HUC 14), New Jersey Geological Survey (NJGS) (2000).

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.

- Subwatersheds
- Major Roads
- Municipal Boundary
- Streams
- Open Water

NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The Borough reviewed the 1988 Master Plan, the 1997 Master Plan Reexamination Report and the 2002 Master Plan Reexamination Report and Borough ordinances pertinent to stormwater management planning. The following narrative indicates recommended revisions for the existing ordinance and new strategies that the Borough should consider if needed. Since the Borough is a fully developed community, minimal new development is anticipated.

Strategies

This Plan specifically recommends the maximum practical use of the following nonstructural strategies for all major developments in accordance with Subchapter 5 of the DEP Best Management Practices manual:

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 vegetated open-channel conveyance systems discharge into and through stable vegetated areas.
8. Provide preventative source controls.

For certain development not subject to RSIS (i.e., commercial development or development not meeting the major development threshold, but meeting the stormwater management thresholds tailored to the Borough), this Plan also recommends the use of the above nonstructural strategies to the maximum extent feasible. In addition, Subchapter 5 further requires an applicant seeking approval for a major development⁵ to specifically identify which and how these nonstructural strategies have been incorporated into the development’s design. Finally, for each of those nonstructural strategies that could not be incorporated into the development’s design due to engineering, environmental, or safety reasons, the applicant must provide an acceptable rationale for this contention.

Recommended Measures

Recommendations in the BMP manual may be implemented through the use of the following:

⁵ Major Development – means any ‘development’ that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Projects undertaken by any government agency which otherwise meet the definition of ‘major development’ but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered “major development”.

Vegetated Filter Strips

Vegetated filter strips are engineered stormwater conveyance systems that treat small drainage areas. Generally, a vegetated filter strip consists of a level spreader and planted vegetation. The level spreader ensures uniform flow over the vegetation that filters out pollutants, and promotes infiltration of the stormwater.

Vegetated filter strips are best utilized adjacent to a buffer strip, watercourse or drainage swale since the discharge will be in the form of sheet flow, making it difficult to convey the stormwater downstream in a normal conveyance system (swale or pipe).

Stream and Valley Corridor Buffer Strips

Buffer strips are undisturbed areas between development and the receiving waters. There are two management objectives associated with stream and valley corridor buffer strips:

- To provide buffer protection along a stream and valley corridor to protect existing ecological form and functions; and
- To minimize the impact of development on the stream itself (filter pollutants, provide shade and bank stability, reduce the velocity of overland flow).

Buffers only provide limited benefits in terms of stormwater management; however, they are an integral part of a system of best management practices.

The Stabilization of Banks, Shoreline and Slopes

The root systems of trees, shrubs and plants effectively bind soils to resist erosion. Increasing the amount of required plant material for new and redeveloped residential and non-residential sites should be encouraged throughout the Borough. Planting schemes should be designed by a certified landscape architect to combine plant species that have complementary rooting characteristics to provide long-term stability.

Pond Configuration

In Rumson, many estate homes create ponds for aesthetic purposes. In some cases, these ponds are part of interconnected systems. Many of these ponds are shallow and suffer from eutrophic conditions. This leads to a large amount of weed and algae growth that depletes the amount of dissolved oxygen in the water. Through proper design, increases in water temperature during summer months can be minimized.

The configuration of a pond will affect its temperature. The length-to-width ratio should be maximized to prevent the occurrence of large open areas of water that cannot be shaded by vegetation. The positioning of deciduous and coniferous trees along the edges of a pond, channel, or wetland can assist in mitigating undesirable increases in water temperature and contribute to the maintenance of dissolved oxygen levels by inhibiting the growth of algae. It is desirable that ponds should have at least one deep area over 4 to 6 feet in depth to keep the pond waters cool and to maintain an area to sustain a fish population.

Pond Maintenance

In the Design and Performance Standards Section of this Plan, the narrative indicates that the maintenance of stormwater management systems, including ponds, with outfalls discharging to Borough streams and waterways, is the responsibility of private property owners. To date, this has not been an effective way of maintaining ponds. The Borough is exploring new options to determine whether there are viable alternatives to manage this resource. The Borough anticipates including educational materials regarding the impacts of poor pond maintenance in a direct mailing to all residents. The continuing exploration of this issue may change the Borough's policy regarding pond maintenance in the future. The requirement for any new or rehabilitated pond should be consistent with the Category -1 stream requirements.

Deterrence of Geese

Maintaining or planting dense woody vegetation around the perimeter of a pond or wetland is the most effective means of deterring geese from taking over and contaminating local lakes and ponds. Minimizing the amount of land that is mowed will limit the preferred habitat for geese. However, if these actions are not sufficient, the Borough will investigate other actions.

Fertilizers

The use of fertilizers to create the “perfect lawn” is an increasingly common problem in many residential areas. Fertilizer run-off increases the level of nutrients in water bodies and can accelerate eutrophication⁶ in the lakes and rivers and continue on to the coastal areas. The excessive use of fertilizer causes nitrate contamination of groundwater. Good fertilizer maintenance practices can help in reducing the amount of nitrates in the soil and thereby lower its content in the water. Initially, the Borough should work with the NJDEP to educate homeowners of the impacts of the overuse of fertilizers. This discussion should include other techniques to create a “green lawn” without over fertilizing. Almost as important as the use of fertilizer is the combination of over fertilizing and over watering lawns. In many cases, this leads to nutrient rich runoff, which ultimately may discharge into a nearby stream, lake or other water body. If fertilizer is applied correctly, the natural characteristics of the underlying soils will absorb or filter out the nutrients in the fertilizer.

Unpaved Roads

While there are no unpaved public roads in the Borough, there are a few privately maintained unpaved roads or lands serving more than one lot. There is a need to manage the runoff from these roadways. Poorly maintained unpaved roads may contribute to water quality problems and erosion from unpaved roads may increase nonpoint source pollution. This Plan recommends utilizing best management practices (BMP's) to properly manage existing unpaved roads.

⁶ Eutrophication – The normally slow aging process by which a lake evolves into a bog or marsh and ultimately assumes a completely terrestrial state and disappears.

Other Ordinance Recommendations Include:

1. To improve stormwater management and to improve water quality, investigate:
 - a. Reducing the permitted amount of building and impervious coverage limits throughout the Borough; and
 - b. Imposing greater reductions on development exceeding the stormwater management threshold in addition to or as an alternative to structural management strategies.
2. Investigate the creation of a stream buffer ordinance which is consistent with the NJDEP Stormwater Regulations as related to protection of a Category -1 stream.
3. Require conservation easements within environmentally constrained lands, i.e., wetlands and buffer areas.
4. The stormwater implementation ordinance should incorporate requirements to promote groundwater recharge.
5. Ordinances should be updated to indicate when stormwater outfall structures are permitted to cross a buffer area.
6. Ordinances should indicate what types of maintenance activities are permitted within Category-1 stream corridor buffer areas and conservation easements, i.e., removal of fallen trees, lawn cutting, etc.
7. The Borough should consider placing restrictions that limit the allowable disturbance of existing vegetated areas.
8. The Borough should review its wildlife ordinance to include additional species other than geese.
9. Ordinances should be prepared which allow impervious areas to be disconnected by:
 - Allowing the reduction of the runoff volume when runoff from impervious areas are re-infiltrated into vegetated areas;
 - Allowing flush curb and/or curb cuts to allow for runoff to discharge into adjacent vegetated areas as sheet flow; and
 - Permitting an open filter area adjoining a catch basin.

The above ordinances will be based on the NJDEP Model Stormwater Ordinances. The above ordinances will also include a reduced stormwater management threshold for the Borough, in accordance with Tables 3 and 3A, and will include requirements for developments not meeting the Major Development threshold but meeting the stormwater management threshold tailored to the Borough. Upon completion of the ordinance revisions, the adopted ordinances will be submitted to the Monmouth County Planning Board through the Stormwater Technical Advisory Committee (STAC) for review and approval. A copy will also be sent to the Department of Environmental Protection at the time of submission.

INFILL DEVELOPMENT

Applying stormwater management practices in developed areas of Rumson may be a challenge. Limited available vacant land and its cost may limit stormwater management options in infill situations. Stormwater controls are likely to be implemented on private property where owners are responsible for their maintenance. Rumson can generally require

owners to maintain these controls; however, the proliferation of numerous small, scattered facilities may become an enforcement problem from a management and operations perspective.

In Rumson, the most common form of infill development is the demolition of a home and replacement with a home containing a larger building footprint. This Plan does not contemplate the replacement of single-family homes with higher density land uses, i.e., multi-family housing, which would have greater stormwater management impact as a result of increased impervious coverage.

In most instances, infill development creates a more intensive use than previous uses and has higher levels of impervious cover, runoff, and contaminant loading per unit of area. In Rumson, the impacts of expanding large estates on properties greater than two acres in size are significant. In accordance with the Municipal Land Use Law, typically only a building permit is required rather than minor site plan approval, which is granted by the Construction Official rather than the Planning Board.

In many cases, areas surrounding the new infill development were built before the need for stormwater controls was recognized and may be experiencing stormwater management problems. While the development of single, individual infill sites may not have significant stormwater impacts, the development of many individual sites can have cumulative effects and exacerbate existing problems or create new stormwater problems by increasing flooding, erosion, or water quality degradation.

On residential properties, infill development is often limited by lot-level controls. In most cases, having residential roof leaders that discharge to ponding areas is the prevalent practice, e.g., lawn. However, there are additional opportunities to increase groundwater recharge and reducing runoff by using structural stormwater systems, such as a drywell or pervious pavement. Other options to improve stormwater quality and to reduce stormwater quantity include:

- Creating of shrubby rain gardens;
- Promoting awareness of problems associated with soil compaction; and
- Promoting resident awareness of stormwater impacts through public education.

To properly regulate infill development, this Plan specifically recommends the creation of regulations that require stormwater improvements for construction that substantially increase the building footprint. Revising the Borough's grading and disturbance requirements can regulate this.

Commercial Infill Development

There are fewer opportunities to improve stormwater management on small-scale commercial infill development sites than on surrounding residential properties in the Borough. Many commercial properties are located on smaller parcels than surrounding residential properties with greater percentages of permitted building coverage as well as increased ordinance requirements, e.g., number of parking spaces, etc. This Plan recognizes

this and recommends increasing requirements on residential properties rather than commercial properties in the Borough. This will help to encourage local businesses in a manner that will retain community character.

Surface stormwater facilities, such as wet ponds, constructed wetlands and infiltration basins, are not viable options because of the relatively large amount of surface area required. However, the following low impact options should be encouraged:

- Redirecting roof gutters to lawns or dry wells;
- Requiring additional tree plantings; and
- Disconnecting impervious surfaces.
- Encouraging the use of pervious pavement surfaces.

Marinas⁷

Marinas and recreational boating are increasingly popular uses along the New Jersey shore. The growth of recreational boating, along with coastal development, has led to the need to protect waterways. While Marinas are not permitted uses in the Borough, there are two active marinas located on Washington and First Streets.

Of the two marinas, one could be better classified as a restaurant with accessory boat slips, while the other marina offers services typically associated with a marinas, i.e., fueling, repair, sales, etc. Despite having a full-service marina in the Borough, this Plan does not anticipate substantial impacts associated with its use.

State and federal regulations require permits for stormwater discharge for certain types of marinas. Under the NJDEP Pollution Discharge Elimination System (NJDPES) Storm Water Program, discharge permits are required for point source discharges of storm water from certain types of marinas. A point source discharge of storm water is a flow of rainfall runoff in some kind of discrete conveyance (a pipe, ditch, channel, swale, etc.).

According to the above referenced EPA web site, “if a marina is primarily in the business of renting boat slips, storing boats, cleaning boats, and repairing boats, and generally performs a range of other marine services, it is classified under the storm water program (using the Standard Industrial Classification (SIC) system developed by the Office of Management and Budget) as a SIC 4493. Marinas classified as SIC 4493 are the type that may be regulated under the storm water program and may be required to obtain a storm water discharge permit.

A marina that is classified as a SIC 4493 is required to obtain an NJDPES stormwater discharge permit if vehicle maintenance activities such as vehicle (boat) rehabilitation, mechanical repairs, painting, fueling, and lubrication or equipment cleaning operations are conducted at the marina. The stormwater permit will apply only to the point source discharges of storm water from the maintenance areas at the marinas. Operators of these types of marinas should consult the water pollution control agency of the State in which the marina is located to determine how to obtain a stormwater discharge permit.”

⁷ Information obtained from <http://www.epa.gov/owow/nps/MMGI/Chapter5/ch5-1.html#Practices>

The Borough should continue to monitor state and federal requirements for marinas and encourage marinas within the Borough to become a part of the New Jersey Clean Marina Program.

The Clean Marina Program is a voluntary program, which encourages marina owners, yacht clubs, boatyards and boaters to voluntarily adopt practices that help prevent adverse impacts to water quality, sensitive habitats, and living resources in proximity to marinas and to protect the critical habitat areas that are home to a variety of species including algae, plankton, shellfish and finfish.

The program helps to prevent harmful environmental practices through education and outreach to boaters and marina owners. It provides assistance and guidance to enable marinas and other recreational boating facilities to reduce the sources and impacts of non-point source pollution. Some examples include sewage facility management, fueling operations, fish and solid waste management and boat cleaning

STRUCTURAL STORMWATER MANAGEMENT⁸

The Department of Environmental Protection in Chapter 9 of its Stormwater Management Best Management Practices (BMP) manual identifies several structural stormwater management options. The Borough recommends utilizing the following structural devices in accordance with the Borough's Design and Performance Standards – Policy Implementation Table located on Page 12 of this Plan. Specifically, the Borough encourages the use of structural stormwater management systems in a manner that maximizes the preservation of community character.

Bioretention Systems

A bioretention system consists of a soil bed planted with native vegetation located above an underdrained sand layer. It can be configured as either a bioretention basin or a bioretention swale. Stormwater runoff entering the bioretention system is filtered first through the vegetation and then the sand/soil mixture before being conveyed downstream by the underdrain system. Runoff storage depths above the planting bed surface are typically shallow. The adopted Total Suspended Solid (TSS) removal rate for bioretention systems is 90 percent.

Constructed Stormwater Wetlands

Constructed stormwater wetlands are wetland systems designed to maximize the removal of pollutants from stormwater runoff through settling and both uptake and filtering by vegetation. Constructed stormwater wetlands temporarily store runoff in relatively shallow pools that support conditions suitable for the growth of wetland plants. The adopted removal rate for constructed stormwater wetlands is 90 percent.

⁸ Definitions provided in the NJDEP – Stormwater Best Management Practices Manual at: http://www.njstormwater.org/tier_A/bmp_manual.htm

Dry Wells

A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff from roofs of structures. Discharge of this stored runoff from a dry well occurs through infiltration into the surrounding soils. A dry well may be either a structural chamber and/or an excavated pit filled with aggregate. Due to the relatively low level of expected pollutants in roof runoff, a dry well cannot be used to directly comply with the suspended solids and nutrient removal requirements contained in the NJDEP Stormwater Management Rules at N.J.A.C. 7:8. However, due to its storage capacity, a dry well may be used to reduce the total stormwater quality design storm runoff volume that a roof would ordinarily discharge to downstream stormwater management facilities.

Extended Detention Basins

An extended detention basin is a facility constructed through filling and/or excavation that provides temporary storage of stormwater runoff. It has an outlet structure that detains and attenuates runoff inflows and promotes the settlement of pollutants. An extended detention basin is normally designed as a multistage facility that provides runoff storage and attenuation for both stormwater quality and quantity management. The adopted TSS removal rate for extended detention basins is 40 to 60 percent, depending on the duration of detention time provided in the basin.

Infiltration Basins

An infiltration basin is a facility constructed within highly permeable soils that provides temporary storage of stormwater runoff. An infiltration basin does not normally have a structural outlet to discharge runoff from the stormwater quality design storm. Instead, outflow from an infiltration basin is through the surrounding soil. An infiltration basin may also be combined with an extended detention basin to provide additional runoff storage for both stormwater quality and quantity management. The adopted TSS removal rate for infiltration basins is 80 percent. It should be noted that a dry well is a specialized infiltration facility intended only for roof runoff.

Manufactured Treatment Devices

A manufactured treatment device is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff. The TSS removal rate for manufactured treatment devices is based on the NJDEP certification of the pollutant removal rates on a case-by-case basis. Other pollutants, such as nutrients, metals, hydrocarbons, and bacteria can be included in the verification/certification process if the data supports their removal efficiencies.

Pervious Paving Systems

Pervious paving systems are paved areas that produce less stormwater runoff than areas paved with conventional paving. This reduction is achieved primarily through the infiltration of a greater portion of the rain falling on the area than would occur with conventional paving. This increased infiltration occurs either through the paving material itself or through void spaces between individual paving blocks known as pavers. Pervious

paving systems are divided into three general types. Each type depends primarily upon the nature of the pervious paving surface course and the presence or absence of a runoff storage bed beneath the surface course. Porous paving and permeable pavers with storage bed systems treat the stormwater quality design storm runoff through storage and infiltration. Therefore, these systems have adopted TSS removal rates similar to infiltration structures. The use of pervious paving systems should be required for any developments, which does not meet the Major Development threshold but meets the reduced Borough stormwater management threshold noted in Table 3A.

Sand Filters

A sand filter consists of a forebay and underdrained sand bed. It can be configured as either a surface or subsurface facility. Runoff entering the sand filter is conveyed first through the forebay, which removes trash, debris, and coarse sediment, and then through the sand bed to an outlet pipe. Sand filters use solids settling, filtering, and adsorption processes to reduce pollutant concentrations in stormwater. The adopted TSS removal rate for sand filters is 80 percent.

Vegetative Filters

A vegetative filter is an area designed to remove suspended solids and other pollutants from stormwater runoff flowing through a length of vegetation called a vegetated filter strip. The vegetation in a filter strip can range from turf and native grasses to herbaceous and woody vegetation, all of which can either be planted or indigenous. It is important to note that all runoff to a vegetated filter strip must both enter and flow through the strip as sheet flow. Failure to do so can severely reduce and even eliminate the filter strip's pollutant removal capabilities. The TSS removal rate for vegetative filters will depend upon the vegetated cover in the filter strip.

Wet Ponds

A wet pond is a stormwater facility constructed through filling and/or excavation that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows and promotes the settlement of pollutants. A wet pond, also known as a retention basin, can also be designed as a multi-stage facility that also provides extended detention for enhanced stormwater quality design storm treatment and runoff storage and attenuation for stormwater quantity management. The adopted TSS removal rate for wet ponds is 50 to 90 percent, depending on the permanent pool storage volume in the pond and, where extended detention is also provided, the duration of detention time provided in the pond.

Each of these structures has advantages and disadvantages to manage stormwater. As previously noted Rumson is a fully developed community and anticipates the majority of new construction as residential infill development. The Design and Performance Standards – Policy Implementation Table indicates the appropriateness of these structural stormwater management structures in Rumson.

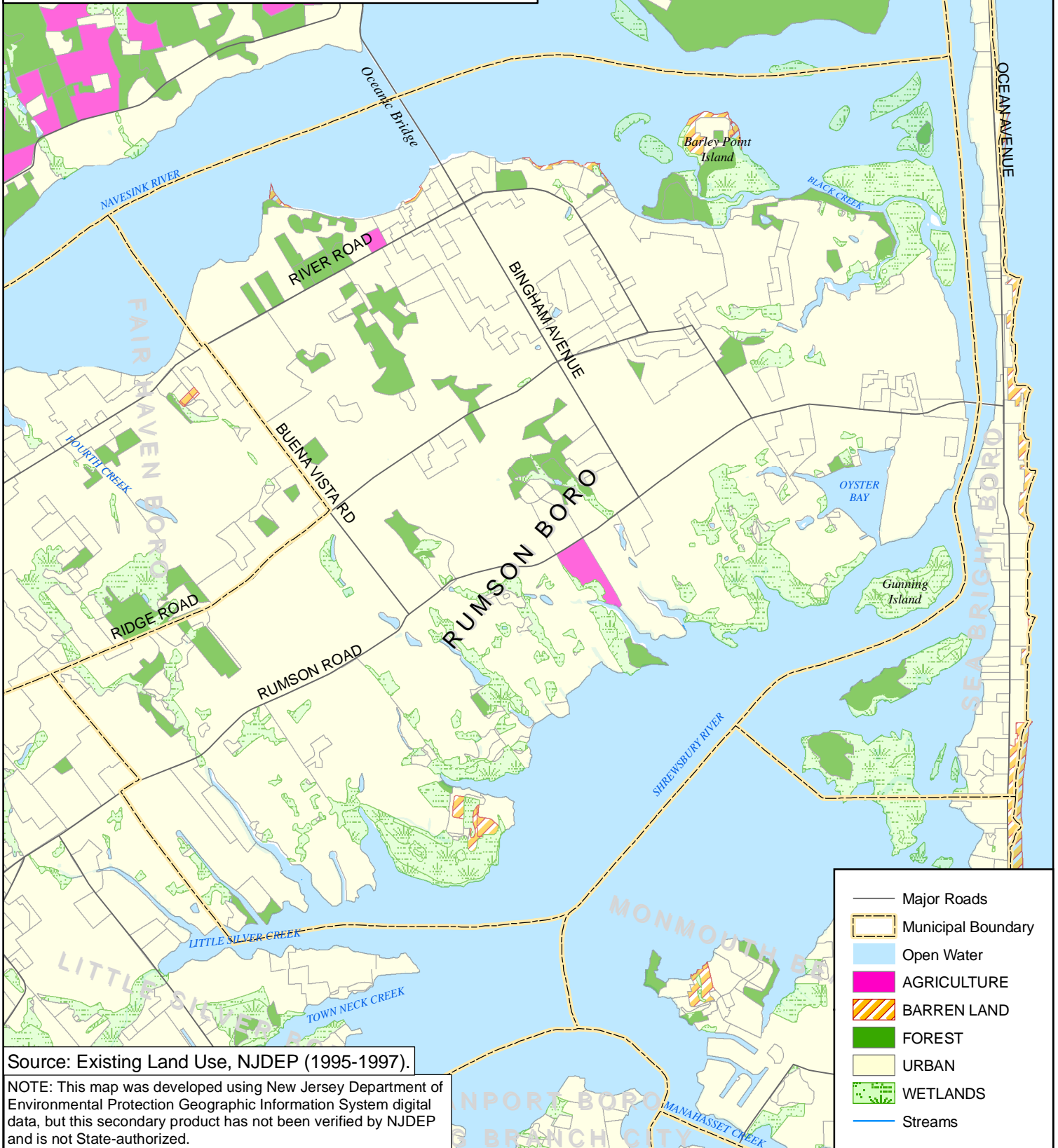
LAND USE/BUILDOUT ANALYSIS

In August 2003, the Borough prepared a Vacant Land Inventory and Analysis Report in accordance with the Council on Affordable Housing (COAH) Standards that indicated that the Borough contains virtually no privately owned vacant land. A copy of the Vacant Land Analysis is located within Attachment A. Figures 4, 5, 6 and 7 complement the Vacant Land Inventory by identifying existing land use, subwatersheds, zoning and environmental constraints in the Borough.

Figure 5: Existing Land Use
Borough of Rumson
Monmouth County, New Jersey

3

0 1,250 2,500 5,000 7,500 Feet



Source: Existing Land Use, NJDEP (1995-1997).

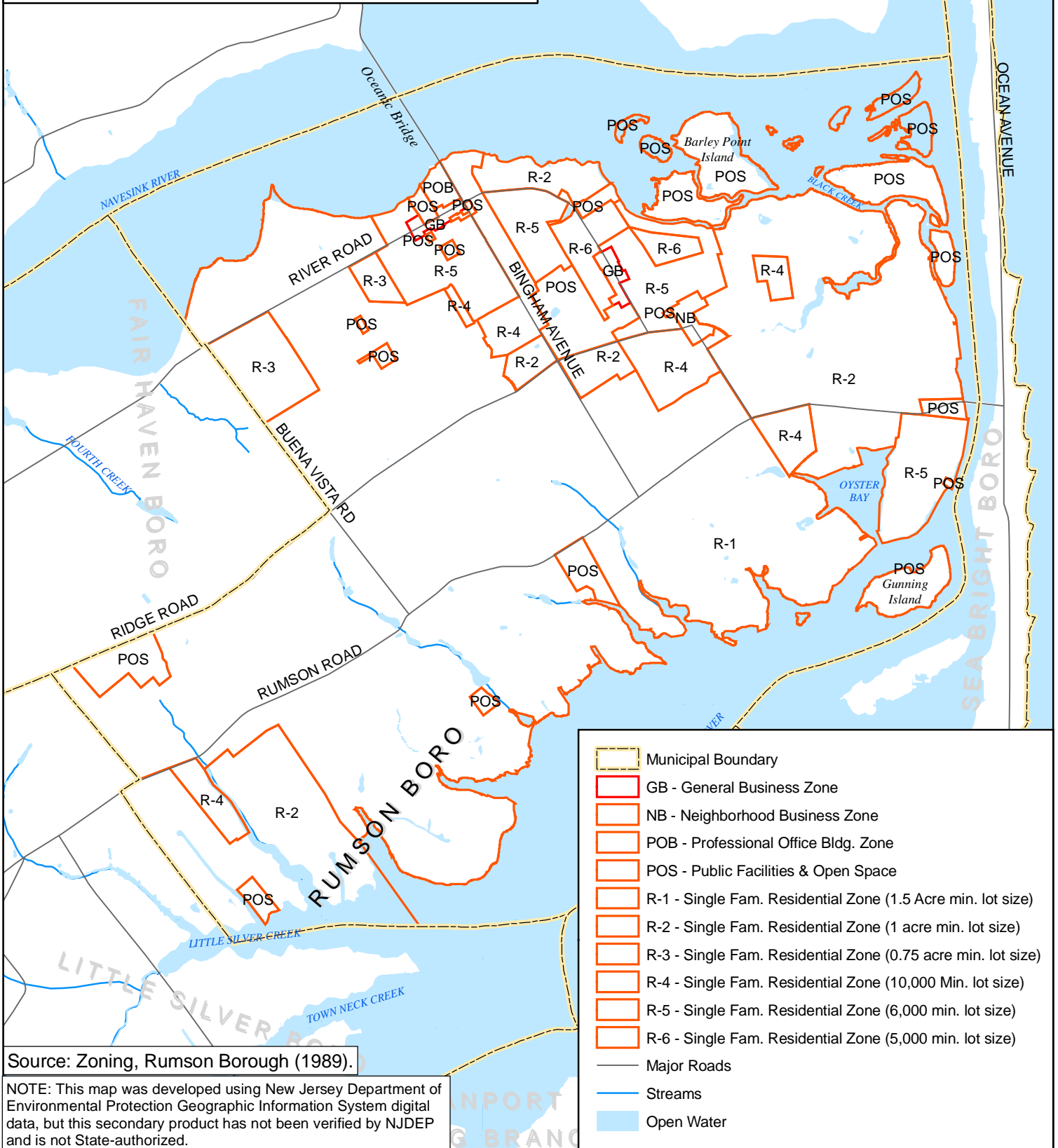
NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

- Major Roads
- Municipal Boundary
- Open Water
- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WETLANDS
- Streams

Figure 6: Zoning Districts
Borough of Rumson
Monmouth County, New Jersey

3

0 1,250 2,500 5,000 7,500 Feet



Source: Zoning, Rumson Borough (1989).

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.

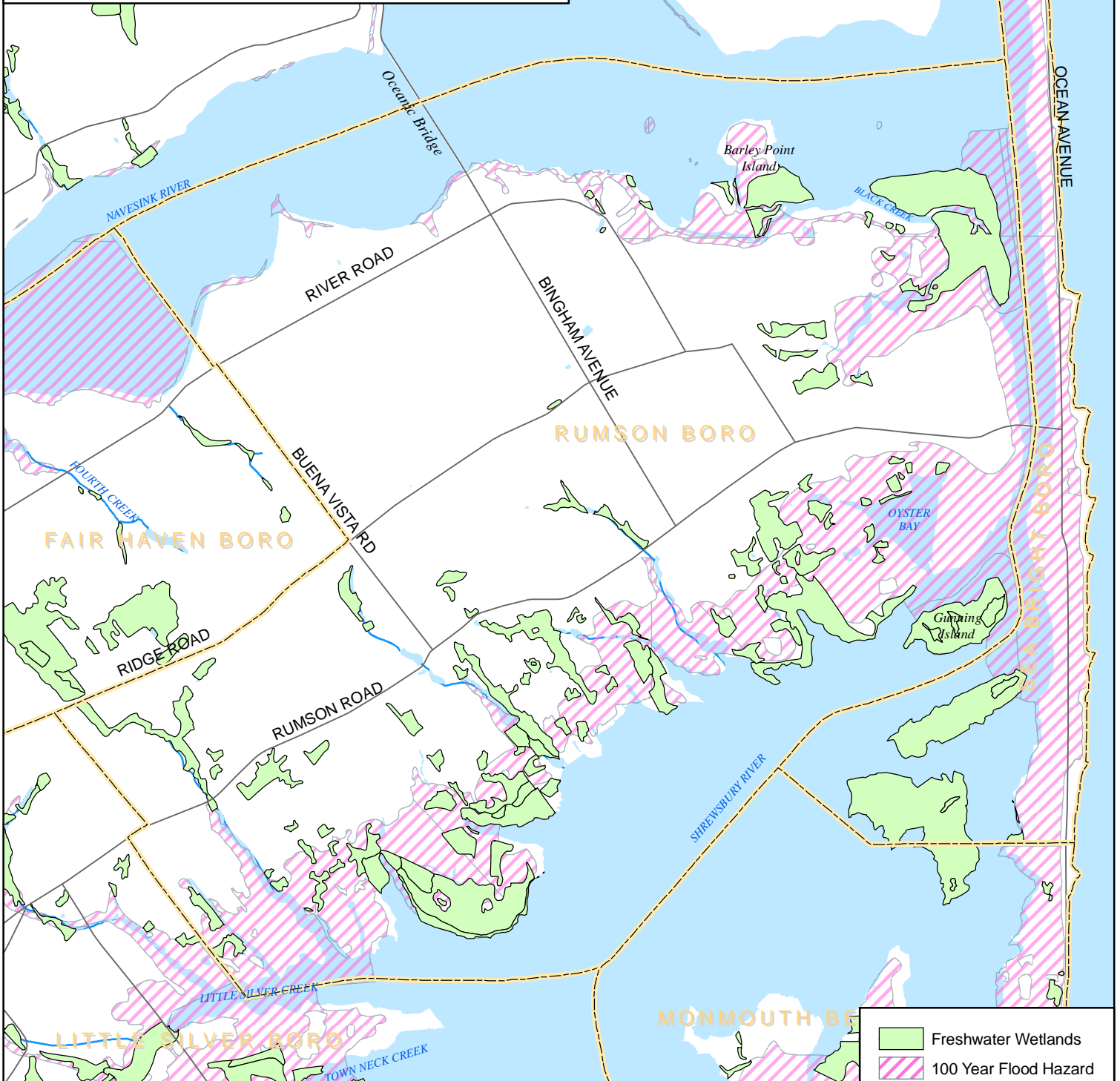
Figure 7: Environmental Constraints

Borough of Rumson

Monmouth County, New Jersey

3

0 1,250 2,500 5,000 7,500 Feet



Source: Freshwater Wetlands, NJDEP (1999).
 Flood Hazard, Federal Emergency Management Agency (1996).

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.

- Freshwater Wetlands
- 100 Year Flood Hazard
- Major Roads
- Municipal Boundary
- Streams
- Open Water

MITIGATION PLANS

Mitigation is intended to provide potential solutions to offset stormwater related impacts on groundwater recharge, stormwater quantity control, and/or stormwater quality control for proposed development and establishes the criteria to grant a variance or exemption from the stormwater management design and performance standards.

Mitigation for major development as defined by N.J.A.C. 7:8 – 1.2 et seq. must be implemented in the same drainage area as the proposed development and must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property. Performance standards must ensure the long-term maintenance of the project, which include the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual. The Borough does not anticipate granting variances or exemptions for “major development” until a detailed mitigation plan is developed and approved. This Plan recommends a local stormwater management threshold substantially less than the “major development” threshold in the NJDEP Stormwater Regulations. A greater number of small development projects will be subject to some degree of regulation. When strict compliance cannot be achieved, the commensurate mitigation will consist of a large number of small contributions and will have to be aggregated to form a technically and economically practical mitigation project. The Borough will investigate granting variances or exemptions for development subject to the local stormwater management threshold subject to:

1. Demonstrating that alternate measures proposed by the developer achieve substantially similar benefits to the required measures, or
2. Showing that literal compliance is technically impractical or presents a substantial economic hardship; and
3. Providing mitigation by implementing stormwater management improvements identified by the Borough elsewhere in the basin, which achieve substantially similar stormwater management benefits (i.e. quality for quality and quantity for quantity), or
4. If no specific improvements are identified by the Borough or applicable in the basin and/or the equivalent mitigation obligation is too small to support a mitigation project, a fair-share contribution shall be required to a mitigation bank.

The Borough is investigate using the mitigation bank concept in connection with developing a plan to improve stormwater quality in the sub-basins, which contain privately owned ponds and water courses (see pages 19 & 20).

Due to the lack of vacant land and development potential in the Borough, it is anticipated that the majority of stormwater mitigation will result in retrofitting existing stormwater facilities and natural infrastructure or improving the layout and designing of nonstructural stormwater management techniques. However, this Plan recognizes that other projects may be identified in the future that are subject to the approval of the Planning Board or Borough Engineer.

The following two strategies were identified by the Borough as possible structural mitigation strategies:

1. Install new inlet castings and heads on existing Borough streets, in roadways not proposed for resurfacing, for solids and floatable control;
2. Investigate improving of any of the seven (7) existing stormwater management facilities in the Borough

According to NJDEP Best Management Practices Manual⁹, the following are structural and non-structural strategies that can be utilized to retrofit existing stormwater management deficiencies or structures.

1. Roofs are a large source of concentrated runoff from development. Clean roof runoff can be directed by downspouts to a dry well, disconnecting a portion of the runoff from the storm sewer system and both reducing runoff volume and restoring groundwater recharge.
2. Vegetative filters can be incorporated into existing developments where runoff from paved or intensely managed turf areas can be discharged across the filters. This may require the removal or slotting of existing curbs along the edge of parking lots or roads. Parking lots with vegetated aisle dividers may be particularly amendable to this type of filter strip application.

The Borough will continue to evaluate possible mitigation projects and will develop a more specific concept that will be submitted to Monmouth County and the NJDEP as part of future stormwater control ordinances as concepts are developed. Additionally, as future concepts are developed, the Borough will update and finalize mitigation section of this plan.

⁹ New Jersey Stormwater Best Management Practices Manual, February 2004, Chapter 8 - Maintenance and Retrofit of Stormwater Management Measures

ATTACHMENT A

VACANT LAND INVENTORY AND ANALYSIS
REPORT

Vacant Land Inventory and Analysis Report

Prepared for

Borough of Rumson
Monmouth County, New Jersey

August 7, 2003

Prepared by:



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VACANT LAND INVENTORY

COAH regulations permit municipalities to request an adjustment from their housing need due to a lack of available vacant and developable land. Pursuant to N.J.A.C. 5:93-4.2, municipalities requesting an adjustment of their fair share obligation due to lack of available land must submit an inventory of vacant and undeveloped parcels by lot and block, with property ownership and acreage. All privately-owned parcels identified as vacant in the Borough's tax assessment records are listed in the accompanying Vacant Land Inventory Table in Appendix A. Where two or more contiguous vacant lots are in common ownership, the parcels have been combined into a single tract on the inventory. Property owned by the Borough is listed in the Municipal Lands Table in Appendix B. Vacant and municipally owned sites have been mapped in the accompanying Vacant Land Inventory Map in Appendix C.

PERMITTED EXCLUSIONS

COAH regulations also establish the criteria by which sites or portions of sites in a municipal vacant land inventory may be excluded from the calculation of the municipality's RDP. Environmentally sensitive areas may be excluded from consideration, including flood hazard areas, wetlands, and areas characterized by steep slopes (defined in COAH's regulations as slopes with a grade of greater than fifteen percent) that render a site or portion of a site unsuitable for low and moderate income housing. In addition, small isolated lots having an insufficient acreage to generate an affordable housing setaside as part of an inclusionary development may be excluded. Vacant lots under development as part of an approved subdivision or that received site plan approval for development may also be excluded. Landlocked parcels or sites with limited or no access may also be excluded from the calculation of the RDP.

The Vacant Land Inventory Table in Appendix A provides a parcel by parcel description of the exclusions that have been made pursuant to COAH's guidelines. The general categories of exclusions are summarized as follows:

1. **Small and Isolated Sites.** Several sites listed in the vacant land inventory consist of small and isolated vacant lots that are too small to be realistically developed with an inclusionary development and have been eliminated pursuant to N.J.A.C. 5:93-4.2(c)2. In a number of cases, these lots are associated with an adjacent residential use and are in common ownership. They are used as yards for these dwellings.

COAH's minimum presumptive density in calculating the RDP is six units per acre with a twenty percent setback. At six units per acre, at least 0.8 acres must be present to yield one affordable unit at a 20 percent setback. Consequently, properties with less than 0.8 acres have been excluded. A field investigation was undertaken to confirm that the larger of these small isolated lots (0.5 to 0.8 acres) are not in areas where the application of a higher presumptive density would be appropriate. As a result of this investigation, these lots also were eliminated.

2. **Environmental Constraints.** Environmentally constrained lands may be eliminated pursuant to N.J.A.C. 5:93-4.2(e)2. Environmental constraints fall into the following three categories:

- a) **Wetlands.** A number of lots have been eliminated in part due to the presence of wetlands. Wetlands areas and their relationship to the vacant land inventory sites are mapped in the accompanying Environmental Constraints Map, which also includes floodplain data. In many cases these wetland areas are located within or are coterminous with the flood hazard areas on the site.

- b) **Flood Hazard Areas.** COAH regulations permit flood hazard areas as defined in N.J.A.C. 7:13 and mapped by the NJDEP to be eliminated from the developable land acreage of properties included in the vacant land inventory. If there is no state study of the flood hazard area and the flood drainage is fully developed, then the municipality may use the most recent flood insurance maps to determine the flood hazard area. Consequently, Rumson has used FEMA Flood Insurance Rate Map data to map the flood hazard areas within the Borough. These areas are shown in the accompanying Environmental Constraints Map. Where more detailed data is available, this information is shown. Many sites within the southern portion of the Borough near the Shrewsbury River are impacted by flood hazard areas and have been eliminated in whole or in part due to this constraint. In addition, several "sedge" islands have been eliminated from the inventory.

- c) **Steep Slopes.** COAH regulations allow slopes of greater than 15 percent to be excluded from the calculation of the RDP. However, if a municipality has a steep slope ordinance that allows development within steep slopes, these areas can only be excluded to the extent that they are regulated in the steep slope ordinance. The Borough has taken no exclusions for steep slopes but will consider steep slopes in analyzing particular sites.
3. **Access.** Sites with inadequate access have been eliminated. Typically, these are land-locked lots or lots where access is constrained due to limited lot frontage or other constraints, including environmental constraints.
 4. **Association Owned Properties and Dedicated Open Space.** Parcels owned by property associations as common areas, dedicated open space, or used for drainage basins and similar drainage facilities have been eliminated.
 5. **Approved Site Plans.** Consistent with COAH practice, properties that have an approved subdivision or site plan have been eliminated.
 6. **Incompatible Land Uses.** Sites that are adjacent to or located in areas with incompatible land uses have been determined to be not suitable for low and moderate income housing in accordance with the provisions of N.J.A.C. 5:93-4.2(e)6 and the definition of suitable site as set forth in N.J.A.C. 5:93-1.3, and may be eliminated. No sites on the vacant land inventory were eliminated due to incompatible land uses.
 7. **Municipal Sites.** Municipally owned sites are listed in the Municipal Sites Table in Appendix B and shown in the Municipal Sites Map in Appendix C. No municipally owned sites are included in the calculation of the Borough's RDP. Existing municipally owned parcels include Borough offices, public safety facilities, as well as public parks, playgrounds recreation and conservation areas listed in the Borough's Green Acres Recreation and Open Space Inventory (ROSI). Lands on the ROSI account for approximately 90 acres of parks and open space areas. (Parcel information shown in the vacant land inventory tables was provided by the Borough Tax Assessor.)

- a) **Active Recreation Sites.** Municipalities may reserve up to three (3) percent of their total "developed and developable acreage" for active municipal recreation and exclude this acreage from consideration as potential sites for low and moderate income housing and the calculation of the RDP. Developable acreage is the total vacant and undeveloped lands in the municipality minus historic and architecturally important sites, agricultural lands, and environmentally sensitive lands excluded from the vacant land inventory by COAH's rules. Also excluded from the calculation of total vacant and undeveloped lands are those owned by nonprofit organizations, counties and the State or Federal government that are precluded from development. Existing active municipal recreation areas are then subtracted from the three percent calculation of total developed and developable acreage to determine additional land that may be reserved for active municipal recreation.

Rumson has a total of 3,029.2 acres of developed and developable lands in the Borough. Based on the calculation of developed and developable acreage, the Borough may reserve up to 90.9 acres of active recreation lands. Currently, the Borough has approximately 44.2 acres of property used for active recreation. (See Municipal Lands Inventory Table in Appendix B.) The Borough may reserve up to 46.7 additional acres for active recreation.

- b) **Future Conservation/Passive Recreation/Open Space.** A municipality may reserve up to three (3) percent of its total land area for conservation, parklands, or open space. Based on a total land area of 3,252.2 acres, Rumson may reserve up to 97.6 acres for conservation, parklands or open space. Currently, the Borough has 45.79 acres of municipally owned land reserved for "conservation, parklands and open space." (See Appendix B.) The Borough may reserve up to 51.8 additional acres for open space purposes.

REPEAL OF OBLIGATION

Based on analysis of the Borough's vacant land inventory, all of the sites listed in the inventory may be excluded from the calculation of the Borough's RDP. The reasons for the exclusions are listed in the table in Appendix A. Consequently, the Borough of Rumson's RDP is zero. In the event that it is determined that the Borough has an RDP, the Borough shall—consistent with N.J.A.C. 5:93-4.2(g)—select a method that it deems appropriate to address this RDP.

SUMMARY AND CONCLUSION

The vacant land analysis reveals that the Borough of Rumson does not have sufficient acreage to accommodate its 268-unit new construction obligation. After following the procedures for undertaking a vacant land adjustment analysis described in COAH's regulations, it has been determined that, the Borough of Rumson has an RDP of zero units.

APPENDIX A

Vacant Land Inventory Table

APPENDIX A: VACANT LAND INVENTORY 2003: PRIVATE LANDS

BOROUGH OF RUMSON, NEW JERSEY

Site ID No.	Site Identification				Area Exclusions as per N.J.A.C. 5:93-4.2(e)				Developable Acres		
	Block	Lot	Location	Owner	Site Area (acres)	Environmentally Sensitive				Net Area Remaining	Exclusion Codes & Remarks
						Wetlands	Floodplain	Steep Slopes			
1	93	16.06	1 Willowbrook Road	Crested Butte, LLC	2.39	0.22	0.00	0.00	2.17	Developed with single-family dwelling	0.00
2	93	16.10	5 Willowbrook Road	Dimisa, Doris	3.46	0.46	0.00	0.00	3.00	Part of previously approved residential subdivision. Pond in rear of property. Undersized parcel.	0.00
3	113	11	Conover Lane	Somerset Capital, LLC	4.66	1.86	2.80	0.00	0.00	In flood plain. Wetlands. Subdivision [?]	0.00
4	121	2	End of Broadmoor	Broadmoor Properties, Inc.	7.59	0.00	7.59	0.00	0.00	In flood plain. Subdivision application under review by Planning Board.	0.00
5	121	1	End of Broadmoor	Broadmoor Properties, Inc.	8.02	4.49	3.54	0.00	0.00	In flood plain. Wetlands. Subdivision application under review by Planning Board.	0.00
6	123	2.02	105 Rumson Road	Duff, Thomas & Susan	1.58	0.41	0.21	0.00	0.95	Pond. Wetlands. Part of adjacent residential property.	0.00
7	124	18	172 Bingham Avenue	Gehlhaus, Henry F., II & Allison	1.98	1.44	0.54	0.00	0.00	Flood plain & wetlands.	0.00
8	126	14	87 Rumson Road	Greenleaf, Wayne & Jamie	3.02	1.96	0.58	0.00	0.48	Part of adjacent residential property. Wetlands in rear of site.	0.00
9	128	10.1	Oyster Bay Drive	Bloom, Henry c/o GB Ltd.	0.45	0.00	0.45	0.00	0.00	In flood plain. Undersized parcel.	0.00
10	135	7	S. Shrewsbury Drive	Sorensen, Arthur	0.53	0.35	0.18	0.00	0.00	In flood plain. Wetlands. Undersized parcel.	0.00
11	138	3	Warren Street	Desmond, Francis J. & Joan H.	0.10	0.00	0.10	0.00	0.00	In flood plain. Part of adjacent residential property. Undersized parcel.	0.00
12	142	4	15 Rumson Road/ CR WA	Borneman, Steven W. & Linda S.	0.17	0.00	0.12	0.00	0.05	Undersized parcel. Part of adjacent residential property.	0.00
13	144	13	Waterman Avenue	Perkins, Audrey W.	0.26	0.00	0.26	0.00	0.00	In flood plain. Undersized parcel. Part of adjacent residential property.	0.00
14	144	27.01	River Place	Johnson, Edward & Leona	0.26	0.00	0.26	0.00	0.00	In flood plain. Undersized parcel. Part of adjacent residential property.	0.00
15	150	1	Gunning Island	Bloom Island Inc. c/o GB Ltd. Oper. Co.	15.37	1.83	13.55	0.00	0.00	Sedge island	0.00
16	163	1	Island W. of Barley Point	Dubouchet Holding Co. c/o D. Dorn	3.24	0.00	3.24	0.00	0.00	Sedge island	0.00
17	164	1	Islands W. of Barley Point	Dubouchet Holding Co. c/o D. Dorn	11.32	0.00	11.32	0.00	0.00	Sedge island	0.00
18	164	2	Island	Unknown Owner	5.32	0.00	5.32	0.00	0.00	Sedge island	0.00
19	168	1	Island	Unknown Owner	1.01	0.00	1.01	0.00	0.00	Sedge island	0.00
20	11	21	East River Road	Gallagher, Marie O.	0.79	0.13	0.65	0.00	0.02	Wetlands. Part of adjacent residential property. Narrow, irregularly shaped lot.	0.00
21	33	35.01	31 Allen Street	Kondrup, Adolph	0.11	0.00	0.00	0.00	0.11	Undersized parcel. Part of adjacent residential property.	0.00
22	38	10	16 Forrest Avenue	Caruso, Janet	0.20	0.00	0.00	0.00	0.20	Undersized parcel. Part of adjacent residential property.	0.00
23	55	9	76 Blackpoint Road	Haywood, Robert & Lisa	0.12	0.00	0.00	0.00	0.12	Undersized parcel. Part of adjacent residential property.	0.00
24	61	25	166 E. River Road	Hurdtown Builders, Inc.	0.19	0.00	0.00	0.00	0.19	Developed with single-family dwelling	0.00
25	69	6	28 Holly Street	Josselyn, Barbara R.	0.12	0.00	0.00	0.00	0.12	Undersized parcel. Part of adjacent residential property.	0.00
26	70	5.01	Ridge Road	Parent, Arthur F. & Leslie H.	2.03	0.93	0.15	0.00	0.95	Part of adjacent residential property. Wetlands.	0.00
27	76	6	6 North Ward Avenue	Moretti, Albert V. & Christina M.	1.93	0.00	1.93	0.00	0.00	Flood plain.	0.00
28	85	13	162 Rumson Road	Moros, Zack J. & Roula	1.84	0.00	0.00	0.00	1.84	Single family dwelling under construction	0.00
29	45	15.01	49 Forrest Avenue	Rumson Builders, LLC	0.11	0.00	0.00	0.00	0.11	Developed with single-family dwelling	0.00
30	45	15.02	51 Forrest Avenue	Rumson Builders, LLC	0.16	0.00	0.00	0.00	0.16	Developed with single-family dwelling	0.00
31	100	9.01	15 Ridge Road	Dougherty, Robert & Kathleen	2.53	0.00	0.14	0.00	2.40	Residential subdivision.	0.00
32	100	9.03	129 Avenue of Two Rivers	Turso, Peter & Kathleen	1.22	0.00	0.00	0.00	1.22	Residential subdivision.	0.00
33	100	9.02	127 Avenue of Two Rivers	McCarthy, Peter J. & Pia	1.50	0.00	0.00	0.00	1.50	Residential subdivision.	0.00
34	88	7	Ridge Rd. & Bellevue Ave.	Fareholm c/o Chapman, Bird, & Grey	1.29	0.00	0.00	0.00	1.29	Part of adjacent residential property.	0.00
					TOTAL ACREAGE	14.07	53.93	0.00	16.87		0.00

APPENDIX B

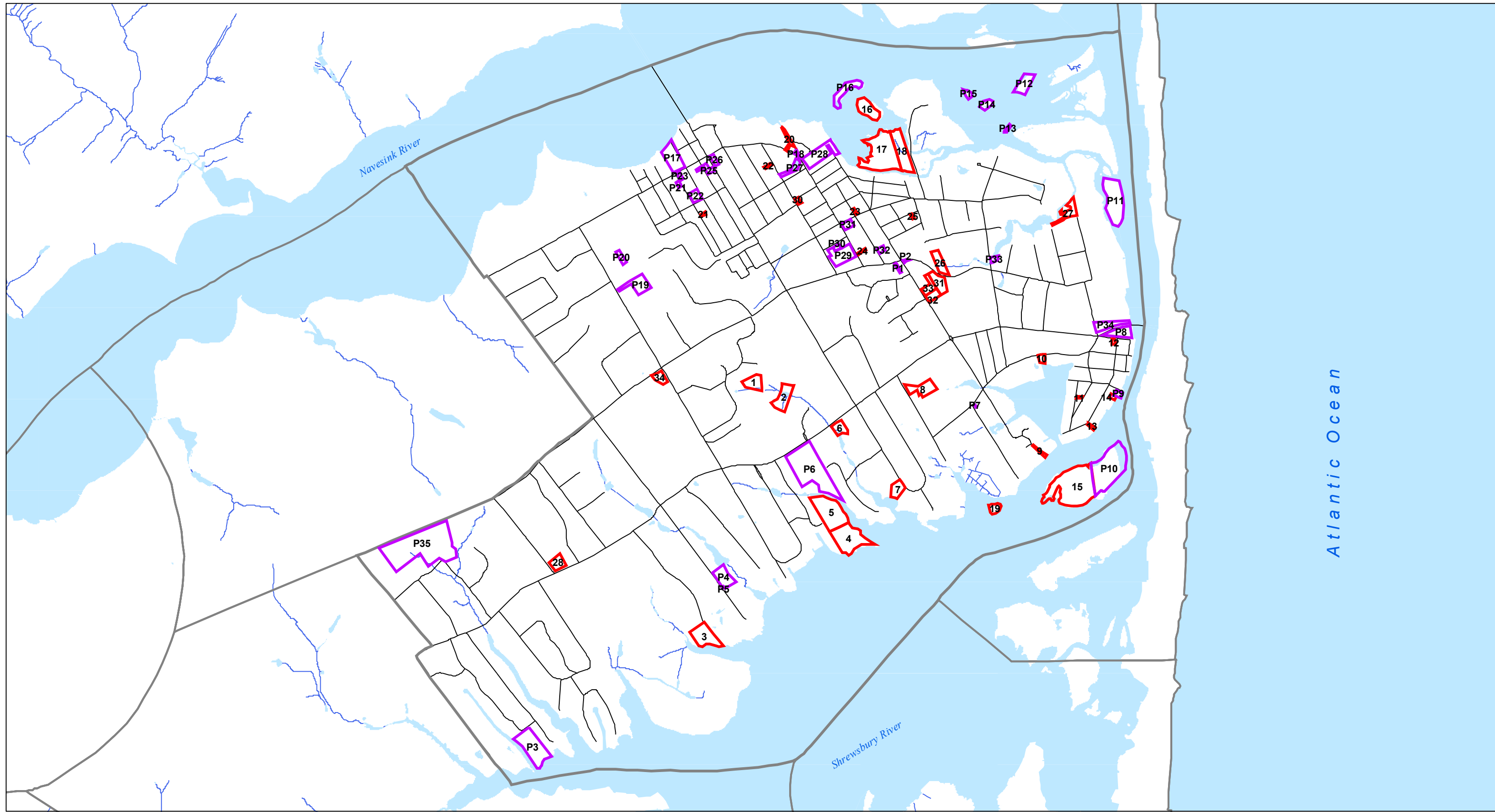
Municipal Lands Table

APPENDIX B: MUNICIPAL LANDS TABLE
BOROUGH OF RUMSON, NEW JERSEY

Site ID No.	Block	Lot	Location	Area Name (if known)	Site Area (acres)	Area Exclusions as per N.J.A.C. 5:93-4.2(e)			Comments
						Environmentally Sensitive		Net Area Remaining	
						Wetlands	Floodprone		
P-1	99	13	Ridge Road	Parking Lot	0.17	0.00	0.00	0.17	Other
P-2	100	13	Ave. of Two Rivers & Ridge	Oceanic Public Library Trust	0.13	0.00	0.00	0.13	Other
P-3	105	28	Riverside Drive	Riverside Park	7.09	0.00	7.09	0.00	Active
P-4	115	23.01	Buena Vista Avenue	Disposal Area	3.00	1.41	1.59	0.00	Other
P-5	115	23.02	Buena Vista Avenue	Pumping Station	0.05	0.00	0.05	0.00	Other
P-6	122	1	Rumson Road	Open Space	14.47	2.33	8.50	3.64	Passive
P-7	128	2	Shrewsbury Drive	Sewage Pumping Station	0.05	0.03	0.02	0.00	Other
P-8	143	1	Rumson Road & Ward Ave.	Pocket Park	2.26	0.00	0.84	1.42	Active
P-9	144	30	Grant Avenue	Main Pumping Station	0.48	0.00	0.48	0.00	Other
P-10	150	2	Gunning Island	Sedge Island	12.15	2.54	9.61	0.00	Passive
P-11	151	1	Island-Ward Avenue	Sedge Island	7.71	0.00	7.71	0.00	Passive
P-12	155	1	Island E of Barley Point	Sedge Island	2.54	0.00	2.54	0.00	Passive
P-13	156	1	Island E of Barley Point	Sedge Island	0.27	0.00	0.27	0.00	Passive
P-14	157	1	Island	Sedge Island	0.99	0.00	0.99	0.00	Passive
P-15	158	1	Islands E of Barley Point	Sedge Island	0.55	0.00	0.55	0.00	Passive
P-16	162	1	West of Barley Point	Sedge Island	2.73	0.00	2.73	0.00	Passive
P-17	5	4	West River Road	Victory Park	4.17	0.00	0.97	3.20	Active
P-18	11	25	East River Road	Pocket Park	0.18	0.09	0.08	0.01	Active
P-19	18	15	Bellevue Avenue	Bird Sanctuary	3.26	0.00	0.00	3.26	Passive
P-20	18	18	Bellevue Avenue	Pocket Park	0.68	0.00	0.00	0.68	Active
P-21	27	5	Allen Street	Borough of Rumson	0.23	0.00	0.00	0.23	Active
P-22	28	11	Church & Lafayette	Rogers Park	1.18	0.00	0.00	1.18	Active
P-23	28	1	25 W. River Road & Allen St.	Oceanic Hook & Ladder	0.26	0.00	0.00	0.26	Other
P-24	29	6	Washington Street	Parking Lot	0.16	0.00	0.00	0.16	Other
P-25	30	5	40 Bingham Avenue	Community Center & Parking Lot	0.62	0.00	0.00	0.62	Other
P-26	36	1	River Road	Parking Lot	0.56	0.00	0.00	0.56	Other
P-27	39	13	East River Road	Pond	1.12	0.40	0.00	0.72	Passive
P-28	49	9	East River Road	Borough Hall shed & First Aid	4.49	0.31	4.10	0.09	Other
P-29	60	5	East River Road	Piping Rock Park	3.84	0.00	0.00	3.84	Active
P-30	60	2	Carlton Street	Garage	0.35	0.00	0.00	0.35	Other
P-31	61	1	East River Road	Rumson Fire Co.	0.89	0.00	0.00	0.89	Other
P-32	62	30	Center Street	Police Headquarters	0.37	0.00	0.00	0.37	Other
P-33	73	17	Navesink Avenue	Sewage Pumping Station	0.40	0.00	0.40	0.00	Other
P-34	80	1	Rumson Road	Pocket Park	2.26	0.00	0.22	2.04	Active
P-35	81	7.00	Ridge Road	Park	22.34	2.21	0.00	20.13	Active
TOTAL ACREAGE					101.99	9.32	48.73	43.95	

APPENDIX C

Vacant Land Inventory Maps

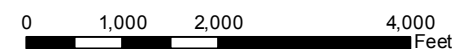


Vacant Land Inventory Map

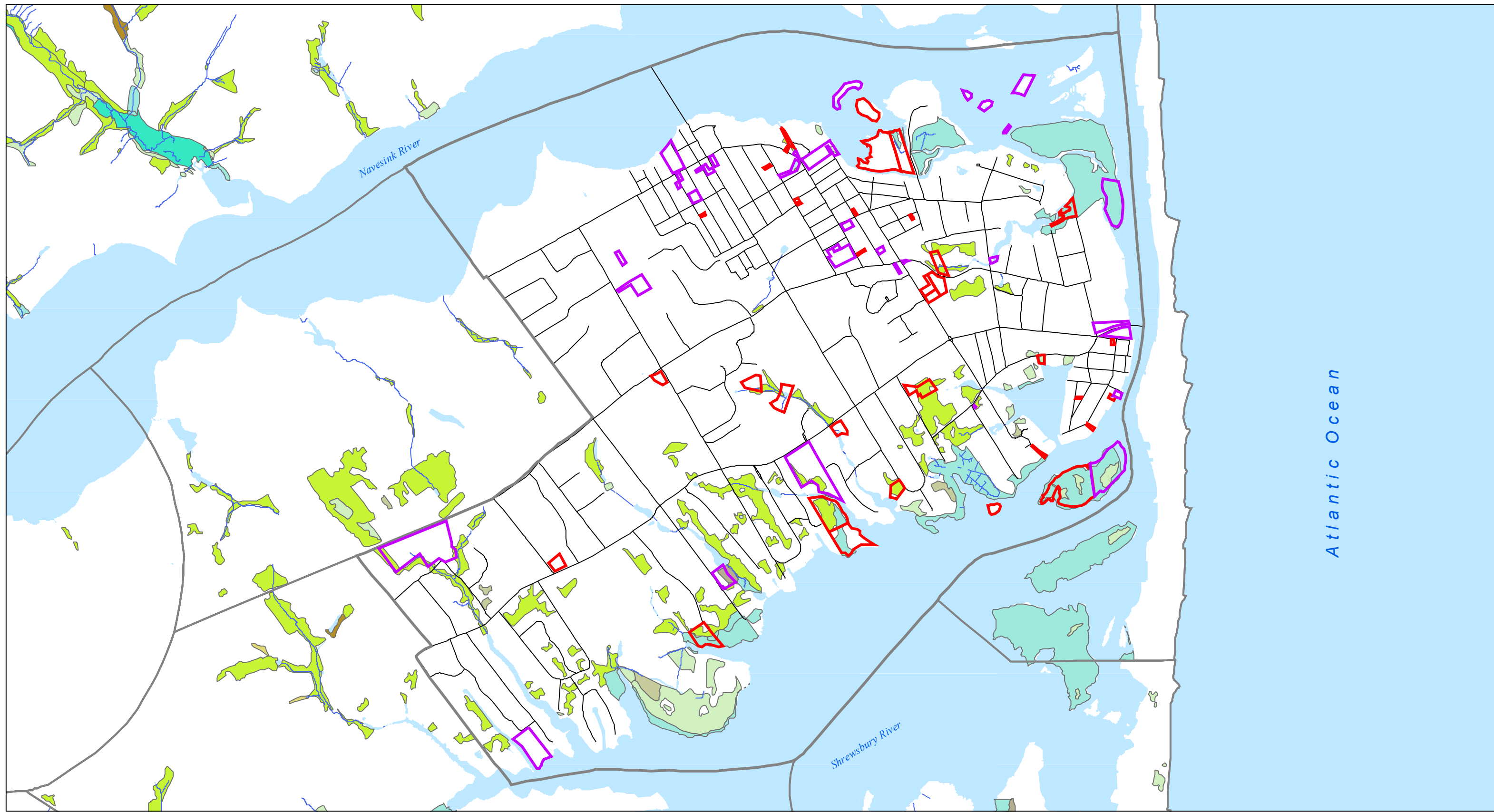
Borough of Rumson

Monmouth County, NJ

- Municipal Property
- Vacant, Private
- Municipal Boundaries
- Roadways
- Streams
- Water Bodies

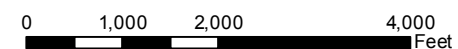


NOTE: This map was developed, in part, using Monmouth County Geographic Information System digital data, but this secondary product has not been verified by MCGIS and is not warranted by the County.

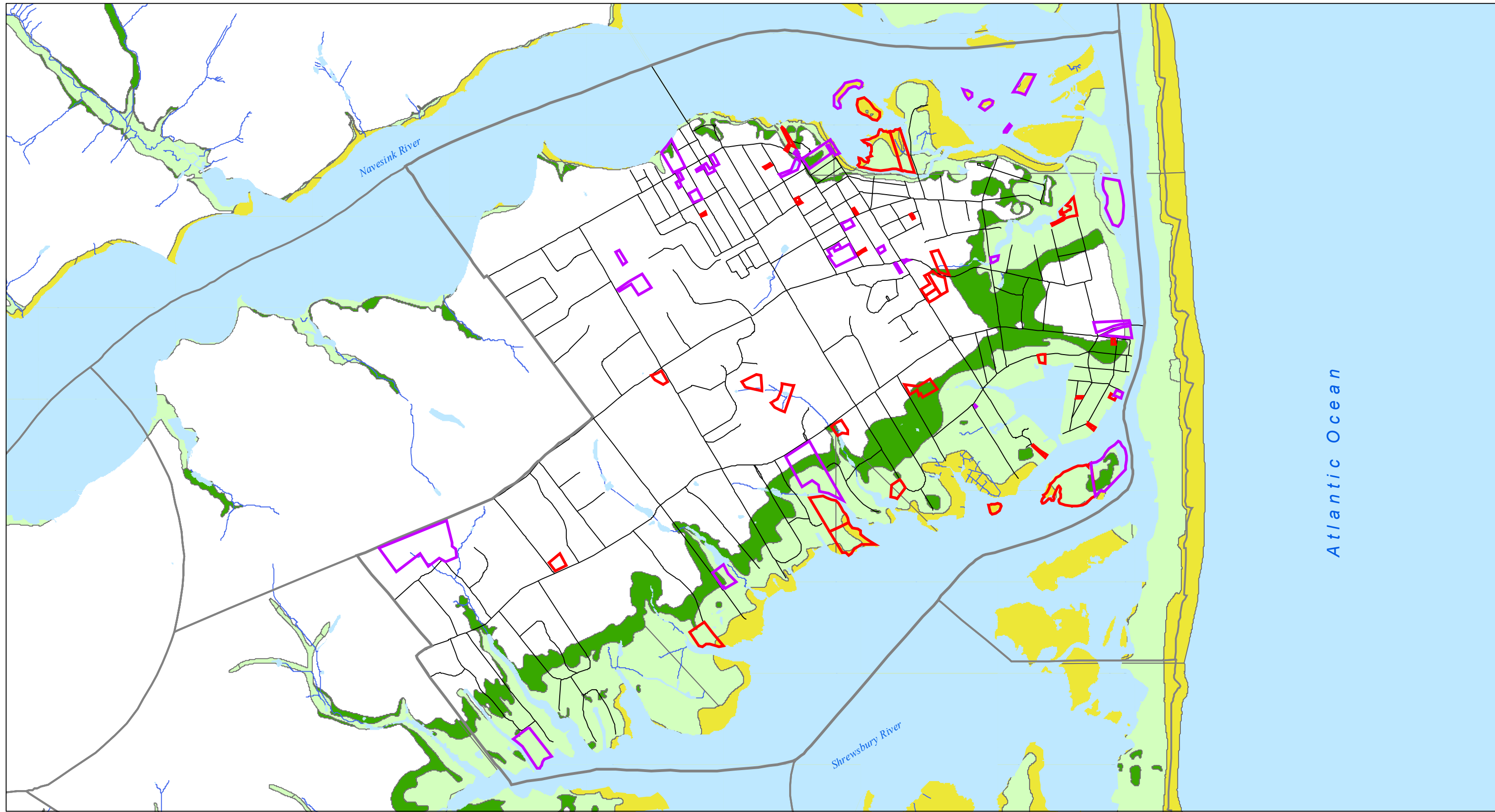


Environmental Constraints: Wetlands Borough of Rumson Monmouth County, NJ

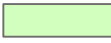







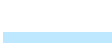
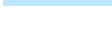
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|----------------------------------|--|----------------------|
| AGRICULTURAL WETLANDS (MODIFIED) | MANAGED WETLANDS (MODIFIED) | Municipal Property |
| ATLANTIC WHITE CEDAR WETLANDS | MIXED FORESTED WETLANDS (CONIFEROUS DOM.) | Vacant, Private |
| CONIFEROUS SCRUB/SHRUB WETLANDS | MIXED FORESTED WETLANDS (DECIDUOUS DOM.) | Municipal Boundaries |
| CONIFEROUS WOODED WETLANDS | MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.) | Roadways |
| DECIDUOUS SCRUB/SHRUB WETLANDS | MIXED SCRUB/SHRUB WETLANDS (CONIFEROUS DOM.) | Streams |
| DECIDUOUS WOODED WETLANDS | SALINE MARSHES | Water Bodies |
| DISTURBED WETLANDS (MODIFIED) | VEGETATED DUNE COMMUNITIES | |
| FRESHWATER TIDAL MARSHES | WETLAND RIGHTS-OF-WAY (MODIFIED) | |
| HERBACEOUS WETLANDS | | |



NOTE: This map was developed, in part, using Monmouth County Geographic Information System digital data, but this secondary product has not been verified by MCGIS and is not warranted by the County.



**Environmental Constraints:
Flood Prone Areas
Borough of Rumson
Monmouth County, NJ**

- | | | | |
|--|-----------------|---|----------------------|
|  | 100-Year Flood |  | Municipal Property |
|  | 500-Year Flood |  | Vacant, Private |
|  | Velocity Hazard |  | Municipal Boundaries |
|  | Undetermined |  | Roadways |
| | |  | Streams |
| | |  | Water Bodies |



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Appendix A1
2015 Master Plan Reexamination Report & Amendments



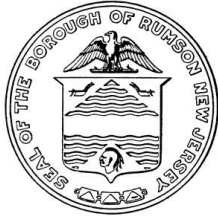
2015 Master Plan Reexamination Report & Amendments

Borough of Rumson
Monmouth County, New Jersey

2015 Master Plan Reexamination Report & Amendments

Adopted April 13, 2015

Prepared for:



The Borough of Rumson
Monmouth County, New Jersey

Prepared by:



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*The original of this document was signed
and sealed in accordance with New Jersey Law*

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Borough of Rumson, Monmouth County, New Jersey**

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I. Introduction

The New Jersey Municipal Land Use Law (MLUL) requires that each municipality in New Jersey undertake a periodic review and reexamination of its local Master Plan. The purpose of the Reexamination Report is to review and evaluate the master plan and municipal development regulations on a regular basis in order to determine the need for updates and revisions. In addition, the preparation of a statutorily compliant Reexamination Report provides a presumption of validity of the municipal zoning ordinance under the law. This report constitutes the Master Plan Reexamination Report for the Borough of Rumson as required by the Municipal Land Use Law at N.J.S.A. (40:55D-89).

The Borough of Rumson adopted its last comprehensive Master Plan in 1988. The Borough has subsequently adopted Reexamination Reports in 1994, 1997, 2002, and 2012. The current document (hereinafter referred to as the 2015 Master Plan Reexamination Report) serves as a reexamination of the 1988 Master Plan, as supplemented by the 2012 Master Plan Reexamination Report.

While the 2015 Master Plan Reexamination Report is broad in scope, it has been prepared in light of the experience of Hurricane Sandy. It, therefore, places special emphasis on facilitating recovery from Hurricane Sandy's impacts, as well as promoting resiliency to future storm impacts and other potential natural hazards. To achieve this, the 2015 Master Plan Reexamination Report recommends a number of updates and revisions to the 1988 Master Plan. These changes have been compiled into a master plan amendment, which is appended to this document.



II. Requirements of the Periodic Reexamination Report

The Municipal Land Use Law requires that the Borough of Rumson provide for the reexamination of the municipal master plan and development regulations at least once every ten years. The purpose of the reexamination is to review the progress of the Borough in achieving its planning objectives, and to consider the need for changes in order to ensure that the municipal plan is current and meets the needs of the Borough. The Planning Board of the Borough of Rumson is responsible for completing the reexamination, and preparing and adopting by resolution a report on the findings of the reexamination.

The Municipal Land Use Law requires that the reexamination report describe the following:

- The major problems and objectives relating to land development in the municipality at the time of the adoption of the last reexamination report.
- The extent to which such problems and objectives have been reduced or have increased subsequent to such date.
- The extent to which there have been significant changes in assumptions, policies, and objectives forming the basis for the master plan or development regulations as last revised, with particular regard to the density and distribution of population and land uses, housing conditions, circulation, conservation of natural resources, energy conservation, collection, disposition, and recycling of designated recyclable materials, and changes in state, county and municipal policies and objectives.
- The specific changes recommended for the master plan or development regulations, if any, including underlying objectives, policies and standards, or whether a new plan or regulation should be prepared.
- The recommendations of the planning board concerning the incorporation of redevelopment plans adopted pursuant to the "Local Redevelopment and Housing Law," P.L.1992, c. 79 (C.40A:12A-1 et seq.) into the land use plan element of the municipal master plan, and recommended changes, if any, in the local development regulations necessary to effectuate the redevelopment plans of the municipality.

The 2015 Master Plan Reexamination Report addresses each of these statutory requirements.



III. The Major Problems and Objectives Relating to Land Development in the Borough of Rumson at the Time of the Adoption of the Last Reexamination Report

Master Plan Objectives

The 1988 Master Plan included the following general objectives:

1. Maintain Rumson's character as a residential community and the quality of life that it offers.
2. Encourage the most appropriate use of land consistent with neighborhood character and its suitability for development.
3. Establish appropriate population densities and limit the intensity of development to both preserve the natural environment and to ensure neighborhood, community, and regional well-being.
4. Maintain a satisfactory level of public facilities and services.
5. Secure the public's safety from fire, flood, panic, and other natural and man-made disasters.
6. Maintain fiscal stability.
7. Ensure that Rumson's development does not conflict with the development and general welfare of neighboring municipalities, the county, and the state as a whole.
8. Coordinate development with land use policies to encourage the appropriate and efficient expenditure of public funds.
9. Provide sufficient space in appropriate locations for residential, recreational, commercial, and open space use.
10. Locate and design transportation routes to promote the free flow of traffic while discouraging congestion or blight.
11. Promote a desirable visual environment.
12. Conserve historic sites and districts.
13. Prevent urban sprawl and degradation of the environment through improper land use.
14. Expand housing opportunities within the Borough compatible with neighborhood character and the needs of present and future residents.
15. Promote the recovery of recyclable materials from municipal solid waste and encourage the conservation of energy.
16. Protect the natural resources and qualities of the Borough including freshwater and saltwater wetlands, floodplains, stream corridors, open space, steep slopes, and areas with scenic, cultural, and recreational values.



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The last Reexamination Report (adopted in 2012) indicated that the November 2002, June 2002, and 1997 Reexamination Reports supported the goals and objectives of the 1988 Master Plan. The 2012 Reexamination Report did not modify the prior endorsements.

Problems Articulated in the 1988 Master Plan

1. The disposal of solid waste and implementation of recycling to meet state recycling goals.
2. Addressing the Borough need for low and moderate income housing.
3. Controlling the intensity of development within the existing residential neighborhoods in order to ensure that infill development, redevelopment, or expansions are compatible with neighborhood character.
4. Conserving scenic waterfront views along the Navesink River and the Shrewsbury River.
5. Managing further development within the business and commercial districts to be compatible in scale and intensity with surrounding residential areas and with the character of the business area.
6. Discouraging piecemeal conversions of residential uses in commercial areas into substandard commercial properties.
7. Improving pedestrian and vehicular circulation in the business districts.
8. Protecting Borough landmarks.
9. Protecting sensitive natural features including wetlands and flood hazard areas.

Assumptions that Underpin Borough Planning

The 1994 and 2002 Reexamination Reports both outline three assumptions that underpin planning issues in Rumson. They are listed below:

1. The continued economic viability of Rumson as a single family residential community with supporting public, commercial, and institutional facilities and services.
2. No natural or man-made disasters will require redevelopment of the Borough.
3. Given a stable population level, there will be minimal need to expand municipal facilities and services.

Issues in 2012

Section 3 of the 2012 Master Plan Reexamination Report summarized the status of the primary planning concerns at that time as follows:

“The Planning Board continues to have a concern that changes in the R-1 and R-2 zone districts are required to address potential adverse impacts of infill



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development. In the Board's opinion, recent new construction, during the economic downturn of the past several years, has not been as oversized as that in the past, however, modifications to the municipal regulation[s] are necessary to address potential detrimental effects and are still appropriate. The Planning Board believes that the Borough officials should implement the Board's recommendations prior to an increase in development activity.

While new housing construction has dropped substantially on a county-wide basis, the pace of new residential construction in Rumson Borough has only slowed moderately."



IV. Extent to Which Such Problems and Objectives Have Been Reduced or Increased

Status of Existing Objectives, Problems, and Assumptions

This section reiterates the objectives, problems, and assumptions of the 1988 Master Plan, with the following exceptions and commentary concerning the extent that the objective, problem, or assumption has been reduced or increased. The commentary is in italic text:

- General Objective #5: Secure the public's safety from fire, flood, panic, and other natural and man-made disasters.

Revised as follows: Secure the public's safety from fire, flood, panic, and other natural and man-made disasters. Adapt efforts accordingly to reflect updated flood levels and data from FEMA and NOAA.

- Assumption #2 that underpins Borough planning: No natural or man-made disasters will require redevelopment of the Borough.

This assumption has been removed.

- Assumption #3 that underpins Borough planning: Given a stable population level, there will be minimal need to expand municipal facilities and services.

Revised as follows: Given a stable population level, there will be minimal need to expand municipal facilities and services. However, an expansion of recreational facilities will be required to address resident and Borough needs.

In addition, the primary planning concerns of the 2012 Master Plan Reexamination Report are also reiterated, with commentary concerning the extent that the planning concern has been reduced or increased. The commentary is in italic text.

- "The Planning Board continues to have a concern that changes in the R-1 and R-2 zone districts are required to address potential adverse impacts of infill development. In the Board's opinion, recent new construction, during the economic downturn of the past several years, has not been as oversized as that in the past, however, modifications to the municipal regulation[s] are necessary to address potential detrimental effects and are still appropriate. The Planning Board believes that the Borough officials should implement the Board's recommendations prior to an increase in development activity."



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This recommendation still has not been implemented in the development ordinance, and has been deleted.

- “While new housing construction has dropped substantially on a county-wide basis, the pace of new residential construction in Rumson Borough has only slowed moderately.”

Table #1 in the 2012 Reexamination Report depicted Housing Units Authorized by Building Permits For New Construction in the Borough of Rumson from 2004 to 2011. The updated data has been supplemented below. The Board finds that new construction permits in 2012 and 2013 have not dropped in Rumson.

Table 1: Housing Units Authorized by Building Permits for New Construction

Rumson Borough, 2004-2013

<i>Year</i>	<i>1 & 2 Family</i>	<i>Mixed Use</i>	<i>Total</i>
2004	38	2	40
2005	34	0	34
2006	41	0	41
2007	36	0	36
2008	27	0	27
2009	17	0	17
2010	23	0	23
2011	27	0	27
2012	30	0	30
2013	44	2	46
<i>Total</i>	317	4	321
<i>Average</i>	31.7	0.4	32.1

Source: NJ Department of Community Affairs, Construction Reporter



Recommendations of the 2012 Reexamination Report

The 2012 Reexamination Report recommended a number of changes to the Zoning Map and the Land Development Ordinance Provisions. An updated Summary of Recommendations of the 2012 Reexamination Report with the 2015 Planning Board's recommendations to bring those recommendations up to date is provided below:

1. Increase the minimum lot requirements for portions of the R-1 and R-2 zones.
This is no longer relevant.
2. Specific properties were recommended to be rezoned from R-5 to General Business.
Completed. This was amended via Ordinance 14-007 D.
3. Building Height: New residential construction must comply with municipal flood hazard rules that require the lowest habitable floor to be above the base flood elevation.
This has been completed. The Borough adopted zoning amendments 13-002 G and 13-003 D in January 2013 to reflect FEMA's Advisory Base Flood Elevations and map dated December 2012.
4. Circulation Plan/Bicycle Circulation: The Borough should revise the Master Plan to update the circulation element to include a sub-plan element for bicycle circulation to specify locations for bicycle lanes on roadways within the Borough, as well as to address pedestrian improvements and needed sidewalks.
This is on-going, as it has not yet been completed.
5. Solar and Small Wind Energy Facilities in Residential Zones: The Borough Council should consider zoning requirements for solar and wind energy facilities in future amendments to the Zoning Ordinance to promote a desirable visual environment.
Completed. This has been amended via Ordinance 12-013 D.
6. Regulations of House Size: The Borough should monitor the building sizes of new or expanded homes and develop a database of pertinent information to better evaluate this issue. Annual reports to the Planning Board may be one mechanism to monitor this issue.
This is on-going.
7. Economic Development: Borough officials should monitor the demand of the use of satellite offices in the downtown business district, which lies in close proximity to the



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houses of CEOs. The Borough should subsequently determine if the General Business zone should be expanded or modified for additional office use.

No changes have been made yet to the General Business zone. This recommendation requires additional review and research.

8. Master Plan Documents: The Borough should compile the 1988 Master Plan and all subsequent master plan element amendments and reexamination reports into one reference document easily made available by Borough staff to the general public.

This is an on-going recommendation and part of the update.



V. Extent to Which There Have Been Significant Changes in the Assumptions, Policies, and Objectives

The Planning Board continues to find that, with the exceptions that have been outlined in the previous section of this reexamination report, the overall assumptions, policies, and objectives of the 1988 Master Plan are consistent with and reflect the current assumptions, policies, and objectives of the Planning Board in terms of future development to the Borough.

The following significant changes in the assumptions, policies, and objectives relating to land development in the Borough of Rumson have taken place since 2012:

Changes at the Local Level

As indicated in the following subsections, there have been considerable changes at the local level since the adoption of the 2012 Master Plan Reexamination Report.

Impacts of Hurricane Sandy

Hurricane Sandy struck the coast of New Jersey on October 29, 2012, and caused extensive damage to the Borough of Rumson from both storm surge and wind damage. 284 properties within the Borough's jurisdiction experienced substantial damage. All of the Borough's sewage pump stations went offline due to floodwater inundation and/or power system failure. Trees and power lines throughout the Borough fell, in many cases damaging buildings and homes. The Borough also faced power outages for 14 days.

Despite the extent of damages the Borough of Rumson sustained from Hurricane Sandy, existing land use patterns and prevailing land uses are not anticipated to substantially change. The long-term impacts of Hurricane Sandy have yet to be seen, but will be affected by a variety of



Figure 1: Displaced Boats from Hurricane Sandy
Source: Rumson-Fair Haven Patch

factors including insurance payouts, flood insurance regulations, as well as the ability of residents, businesses, and the Borough to rebuild.

With the impacts of Hurricane Sandy so great, the Borough of Rumson has significant concern and reason for promoting not only recovery from Sandy, but also building resiliency to future storm impacts and other potential natural hazards. This offers new opportunities for redevelopment, but care must be taken to ensure all new development keeps with the character of the community.



Figure 2: Wind Damage from Hurricane Sandy
Source: Rumson-Fair Haven Patch

Additionally, many residents

require assistance in rebuilding and returning to their homes. The impact of the storm also offers an opportunity to increase the resiliency of the Borough's infrastructure.

In addition, new FEMA Flood insurance maps are in the process of being adopted. These maps increase the flood zone and base flood elevations for some coastal areas of the Borough. Property owners will need to take preventative measures to ensure they are in compliance with the new regulations.

While the current 2015 Master Plan Reexamination Report is broad in scope, the experience of Hurricane Sandy and the need to build resiliency has influenced and informed its development.

Strategic Recovery Planning Report

As a response to Hurricane Sandy, the Borough of Rumson adopted a Strategic Recovery Planning Report in 2014. The purpose of the Strategic Recovery Planning Report is to outline a recommended set of actions to guide the Borough in promoting recovery from the impacts of Hurricane Sandy and resiliency to future storms.

The actions recommended by the Strategic Recovery Planning Report are as follows:

- Installing a town-wide SCADA system;
- Automating and upgrading the zoning and construction permit program;
- Updating the Borough's hazards mitigation plan;
- Revising and updating Rumson's Emergency Operations Procedure Manual;
- Developing a GIS database/inventory of Borough-owned infrastructure;
- Compiling low-elevation aerial mapping of identified special flood hazard areas;
- Entering FEMA's CRS program;
- Preparing a more comprehensive Borough Master Plan, and updating its goals and objectives to address post-Sandy strategies;
- Adding a floodplain management plan to the Master Plan;
- Installing an emergency standby generator at Oceanic Hook and Ladder fire house;
- Replacing under-sized drainage piping at Club Way, and at Holly Tree Lane and Navesink Avenue;
- Removing of silt along minor waterway parallel to Brookside Drive;
- Developing Bingham Hall as a comfort station during emergencies; and
- Installing waterfront bulkheading at Rumson Boat Launch facility.

Implementation of the recommendations that have been listed above will promote recovery from Hurricane Sandy and increased resiliency to future storms. Where relevant, individual actions are discussed elsewhere in this report.

Building Height and Base Flood Elevations

Also as a response to Hurricane Sandy, the Borough of Rumson adopted zoning amendments 13-002 G and 13-003 D in January 2013 to reflect FEMA's Advisory Base Flood Elevations and map dated December 2012. This required new residential construction and substantially damaged homes to comply with municipal flood hazard rules in which the lowest habitable floor must be above the base flood elevation.



Demographic Changes

The Borough of Rumson adopted its last Master Plan Reexamination Report in 2012, which already incorporated the latest US Census Bureau population estimates. The overall density and distribution of population and the land use pattern within the Borough has not changed substantially since the last reexamination in 2012. Nonetheless, the total population of the Borough as of the US Census in 2010 was 7,122 and decreased to 7,098 in 2012 (according to the 2012 American Community Survey estimates).

Zoning Board of Adjustment Annual Report

The Borough of Rumson Zoning Board of Adjustment releases an annual report that covers the Board's actions in each calendar year. The Board works with applicants to develop improved designs and reduce the intensity and quantity of variances, often reducing the number requested. A summary of the Board's actions for 2013 is included in this section.

In 2013, the Board of Adjustment held 12 regular Board meetings and heard a total of 46 applications, of which 26 were for Hurricane Sandy damage. Of the 46 applications:

- 21 were for the construction of new single-family residences;
- 16 were for expansion and renovation to existing single-family residences;
- One was for driveway relocation;
- Four were for in-ground pools;
- One was for the renovation of an existing secondary residential cottage;
- One was for relocation of an existing carriage house; and
- Two were site plans (a school security entrance and a multi-family residence).

In 2013, 43 applications were approved, three were withdrawn, and none were denied. In addition, 11 of the applications that would have been denied were allowed to continue to a subsequent meeting to incorporate Board recommended modifications. The following table shows a breakdown of the type of variances granted in 2013.



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Table 2: Zoning Board of Adjustment Variance Approvals, 2013

<i>Variance</i>	<i>Number of Approvals</i>
<i>Lot Area</i>	4
<i>Lot Width & Frontage</i>	15
<i>Front Setback Building</i>	12
<i>Building Coverage</i>	9
<i>Rear Setback</i>	7
<i>Accessory Setback</i>	4
<i>Accessory Structure without Principal</i>	2
<i>Lot Shape</i>	17
<i>Side Setback</i>	12
<i>Front Setback Porch</i>	2
<i>Building Height</i>	0
<i>Lot Coverage</i>	0
<i>Floor Area</i>	4
<i>Accessory Front Yard</i>	5
<i>Accessory Building Ground Floor</i>	0

Variations were also granted for one garage door visible from street or river, four for driveway width within front yard setback, one for renovation of an existing secondary residential cottage, one reconstruction of a multi-family residence and number of garage spaces to the Ordinance maximum of five spaces.

Changes at the County/Regional Level

Since the adoption of the 2012 Master Plan Reexamination Report, there have been several changes at the county and regional level, including the adoption of the Monmouth County Water Quality Management Plan. In addition, the county is undergoing the process of updating both its Master Plan and the Monmouth County Multi-Jurisdictional Natural Hazards Mitigation Plan.

Monmouth County Water Quality Management Plan

In accordance with the Statewide Water Quality Management Planning rules (N.J.A.C. 7:15-3.4), a public notice for a Proposed Amendment to the Monmouth County Water



Quality Management (WQM) Plan was published on January 7, 2013 in the New Jersey Register and the Asbury Park Press. This amendment proposal would provide for a Future Wastewater Service Area (FWSA) for Monmouth County.

Almost all of the Borough of Rumson is located in the proposed sewer service area, so the adoption of the WQM Plan will have no impact on the development of the Borough. Borough officials participated alongside the Monmouth County Planning Board with regard to the sewer service area proposed for Rumson, and the Monmouth County accepted input provided by the Borough.

Monmouth County Multi-Jurisdictional Natural Hazard Mitigation Plan

Monmouth County adopted its Multi-Jurisdictional Natural Hazard Mitigation Plan (HMP) in 2009 to meet the requirements of the Disaster Mitigation Act of 2000. Monmouth County employed a multi-jurisdictional approach to develop the plan, and every municipality in the county was invited to participate as an equal partner with the county. The Plan identifies natural hazards that could affect the county's jurisdictions, evaluates the risks associated with these hazards, identifies the mitigation actions to lessen the impacts of a disaster on Monmouth County communities, and prioritizes them based on the municipal master plans and other planning documents. The county is in the process of updating the HMP to incorporate elements of mitigation planning post Hurricane Sandy. A draft plan was released for review in October 2014.

As part of its participation in the HMP outreach process, the Borough of Rumson has updated and supplemented its list of recovery actions to include the following:

1. Elevating 32 homes to reflect new FEMA FIRM maps.
2. Installing a new elevated bulkhead and a new tide valve at the western terminus of Washington Avenue; replacing an existing tide valve at the western terminus of Grant Avenue and Waterman Avenue; and constructing an earthen berm and associated grading above the existing bulkhead at the western and eastern terminus of Grant Avenue, and western terminus of Waterman Avenue.
3. Installing emergency backup generators and/or flood proofing measures at pump stations at the following locations: Riverside Drive, Club Way, Thorton Way, Navesink Avenue, Buena Vista Avenue, and Shrewsbury Drive. Also recommended is reinforced steel, rubber gasket lined storm doors at the pump stations located at Marina and at Grant Avenue.
4. Installing reinforced steel and rubber gasket-lined storm doors at the Borough's Department of Public Works garage.



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5. Installing 150 linear feet of new elevated bulkhead, rehabilitation and replacement of existing drainage pipes, and installing a new tide valve at the intersection of Shrewsbury Drive and Avenue of Two Rivers.
6. Removing two existing underground fuel storage tanks (one diesel and one regular unleaded) and installing two new above-ground tanks at the Borough's Department of Public Works yard.
7. Upgrading the shelter facility located at Rumson-Fair Haven Regional High School, including emergency power facility.
8. Implementing stream and pond clearing to speed draining of flood prone areas and following up with regular maintenance.
9. Tree maintenance of shade trees along streets in the community; increasing the effectiveness of Public Works to clear trees in the event of a storm.
10. Continuing to maintain current warning systems that are already operational including the Borough website, AM radio, the Reverse 911 calling system, and the emergency siren alerting system.
11. Enacting new FEMA flood maps as part of planning and zoning regulations.
12. Installing a quick connection for a portable generator at Borough Hall.
13. Developing Bingham Hall as a comfort station during emergencies.
14. Installing a Borough-wide SCADA system.
15. Installing an emergency standby generator at Oceanic Hook & Ladder Fire House.
16. Replacing under-sized drainage piping at the south end of Club Way, and at the intersection of Holly Tree lane and Navesink Avenue.
17. Installing 225 linear feet of new bulkheading at the Rumson Boat Launch facility.
18. Automating and upgrading the zoning and construction permit program.
19. Revising and updating the Borough's Emergency Operations Procedure Manual.
20. Entering FEMA's Community Rating System (CRS) program.
21. Developing a GIS database/inventory of Borough-owned infrastructure.

Changes at the State Level

As indicated in the following subsections, there have been considerable changes at the state level since the adoption of the 2012 Master Plan Reexamination Report.

Green Buildings and Environmental Sustainability Element

Many New Jersey municipalities have made efforts to reduce their carbon footprint, decrease greenhouse gas emissions, encourage the use of renewable energy sources, conserve energy, and minimize the use of natural resources. Federal and state programs



have been established to assist municipalities to address these goals. In the private sector, the US Green Building Council, a private organization, has established the Leadership for Energy and Environmental Design (LEED) certification programs to encourage and standardize the certification of buildings which are energy efficient and incorporate sustainable environmental design concepts.

Recognizing the importance of green building and sustainability, the Legislature amended the Municipal Land Use Law (MLUL) in 2008 to add the “Green Building and Environmental Sustainability Plan Element” to the list of optional elements of municipal master plans. The scope of the new element is as follows: “A green buildings and environmental sustainability plan element, which shall provide for, encourage and promote the efficient use of natural resources and the installation and usage of renewable energy systems, consider the impact of buildings on the local, regional, and global environment; allow ecosystems to function naturally; conserve and reuse water; treat storm water on site; and optimize climatic conditions through site orientation and design.”

State Strategic Plan

The NJ State Planning Commission is now staffed by the Office of Planning Advocacy (OPA) which is within the Department of State. The OPA has released a draft State Strategic Plan to supersede the current State Development and Redevelopment Plan. Public Hearings were held in February, March, and September of 2012. The draft State Strategic Plan is based upon a criteria-based system rather than a geographic planning area. The draft State Strategic Plan has not been adopted by the State Planning Commission at this time and was put on hold following Hurricane Sandy.

The Borough of Rumson should continue to monitor the progress of the new plan and its implication for future planning in the Borough.

Redevelopment Case Law

There have been a number of recent court decisions concerning the use of criteria for determining an area “in need of redevelopment” pursuant to the Local Redevelopment and Housing Law (LRHL). The most significant of these decisions is the NJ Supreme Court’s decision in Gallenthin vs. Paulsboro, which reevaluated and set guidelines for the use of the statutory criteria for determining an area in need of redevelopment. The New Jersey Legislature also held hearings in 2010 on legislation to update the NJ Redevelopment and Housing Law. In 2013 Assembly Bill 3615 became law and is intended to protect property owners by limiting the redevelopment powers of



municipalities under the LRHL. This amendment raises the standard for a blight finding to one in which the property must be unproductive.

New Jersey Council on Affordable Housing (COAH)

COAH originally adopted affordable housing rules for the third round period in 2004. However, an Appellate Division decision in 2007 stayed COAH from reviewing any plans as part of a petition for substantive certification, and resulted in a remand of the 2004 rules back to COAH to revise them consistent with the Appellate Division decision. COAH subsequently adopted revised third round rules in 2008.

In 2010, the Appellate Division invalidated COAH's 2008 third round rules, and the "growth share" methodology upon which they were based. In 2013, the New Jersey Supreme Court upheld and modified the Appellate Division's 2010 decision that invalidated COAH's third round rules. As a result, COAH was then charged with the task of adopting new affordable housing rules.

COAH has since failed twice to adopt new affordable housing rules for the third round period. Due to COAH's failure to adopt such rules, the New Jersey Supreme Court concluded on March 10, 2015 that there no longer exists a legitimate basis to block access to the courts, which was the original intent of the COAH process. The New Jersey Supreme Court's March 10 decision notes that: "parties concerned about municipal compliance with constitutional affordable housing obligations are [now] entitled to such access, and municipalities that believe they are constitutionally compliant[,] or that are ready and willing to demonstrate ... compliance [with such obligations,] should be able to secure declarations that their housing plans and implementing ordinances are presumptively valid in the event they ... must defend [themselves] against exclusionary zoning litigation."

In its March 10 decision, the New Jersey Supreme Court established a transitional process to not immediately allow exclusionary zoning actions to proceed in court. The decision notes that: "[d]uring the first thirty days following [June 8, 2015] ..., the only actions that will be entertained by the courts will be declaratory judgment actions filed by any [municipality] ... that either (1) had achieved substantive certification from COAH under prior iterations of Third Round Rules before they were invalidated, or (2) had "participating" status before COAH. Assuming [that] any such [municipality] ... waits and does not file a declaratory judgment action during [the] ... thirty-day period, an action may thereafter be brought by a party against [the municipality] ..., provided the action's sole focus is on whether the [municipality's] ... housing plan meets its Mount Laurel obligations (a constitutional compliance challenge). The court's evaluation of a



[municipality's] ... plan that had received substantive certification, or that will be submitted to the court as proof of constitutional compliance, may result in the [municipality's] ... receipt of the judicial equivalent of substantive certification and accompanying protection as provided under the [Fair Housing Act]”

The Borough of Rumson has filed a plan with COAH, but the plan has not been certified. Therefore, the Borough fulfills Criterion 2 as outlined in the transitional process that has been described above. The Borough will, as a result, be able to file a declaratory judgment action immediately upon the March 10 decision becoming effective on June 8, 2015.

Changes at the Federal Level

Executive Order Establishing a Federal Flood Risk Management Standard

In 2013, the President’s Hurricane Sandy Rebuilding Task Force adopted a higher flood standard for the Sandy-affected region to ensure that federally funded buildings, roads and other projects were rebuilt stronger to withstand future storms. The Sandy Task Force also recommended that the Federal Government create a national flood risk standard for federally funded projects beyond the Sandy-affected region. The new standard gives agencies the flexibility to select one of three approaches for establishing the flood elevation and hazard area they use in siting, design, and construction. They can:

- Use data and methods informed by best-available, actionable climate science;
- Build two-feet above the 100-year (1%-annual-chance) flood elevation for standard projects, and three feet above for critical buildings like hospitals and evacuation centers; or
- Build to the 500-year (0.2%-annual-chance) flood elevation.

On January 30, 2015, the President released proposed guidelines for these standards that are available for 60 days of public comment. Once public input has been considered, including from a series of public listening sessions that will be held across the country, and the guidelines are finalized, agencies will implement the Standard through their own rulemaking or other procedures, which also will incorporate input from the public and stakeholders.

The new flood standard will apply when Federal funds are used to build, or significantly retrofit or repair, structures and facilities in and around floodplains to ensure that those structures are resilient, safer, and long-lasting. It will not affect the standards or rates of the National Flood Insurance Program. Each agency will carefully consider how to appropriately apply this standard, and consider robust public input before deciding how to implement it.



VI. Specific Changes Recommended for the Master Plan and Development Regulations

Given the extent to which there have been significant changes in assumptions, policies, and objectives at the local, county, and state levels, the 2015 Master Plan Reexamination Report recommends a number of changes to the Borough's municipal master plan and development regulations. These are discussed in the following subsections.

Changes to the Master Plan

- **Master Plan Elements**

The Borough should compile the 1988 Master Plan and all subsequent master plan element amendments and reexamination reports into one reference document to facilitate easy access by Borough staff and the general public.

- **Green Buildings and Environmental Sustainability Element**

The Borough should prepare a green buildings and environmental sustainability element, which, concurrent with Municipal Land Use Law, can provide for, encourage, and promote the efficient use of natural resources and the installation and usage of renewable energy systems, consider the impact of buildings on the local, regional, and global environment; allow ecosystems to function naturally; conserve and reuse water; treat storm water on site; and optimize climatic conditions through site orientation and design.

- **Circulation Plan/Bicycle Circulation**

The Borough should revise the Master Plan to update the circulation element to include a sub-plan element for bicycle circulation to specify locations for bicycle lanes on roadways within the Borough, as well as to improve pedestrian access.

- **Capital Improvement Plan**

The Borough should prepare a Capital Improvement Plan that identifies needed capital improvements to improve local resiliency.

- **Floodplain Management Plan Element**

The Borough should prepare a Floodplain Management Plan (FMP). This will identify and assess flood hazards within the Borough, establish the goals and objectives for floodplain management in Rumson, and present a series of actions designed to minimize flooding and mitigate the impacts from flooding in the future. The FMP will also evaluate the need and potential options for wetland restoration and maintenance and/or other engineering control measures to mitigate potential storm surge in those areas of the Borough that may be vulnerable. The FMP will include recommendations



to the Borough's current Floodplain Development Protection Ordinance. This project is being prepared concurrent to this Master Plan Reexamination Report, and funding is provided through the Post Sandy Planning Assistant Grant Program (PSPAGP).

- **Stormwater Management Plan**

The Borough Stormwater Management Plan and Stormwater Management Ordinance were amended in 2006 to be consistent with the New Jersey Stormwater Best Management Practices Manual prepared by the New Jersey Department of Environmental Protection. The ordinance sets specific standards for flood control, groundwater recharge and pollutant reduction. The Borough should continue to enforce these requirements for all applicable development, including the elevation of single family dwellings, to reduce the impacts of stormwater runoff to neighboring properties and Borough infrastructure. The Borough should also consider amending the Stormwater Management Plan to address green infrastructure techniques to promote resiliency in the Borough, while keeping in mind hazard mitigation, community resiliency, and sea level rise.

- **Open Space Inventory**

The opportunity for additional open space preservation in Rumson is small, due to the fact that it is largely built-out and the high value of land within the community. However, there are numerous existing parks and areas of preserved open space scattered throughout the community. Many of the islands located in the Shrewsbury and Navesink Rivers are also owned by the State or Borough for conservation. While the opportunity for future open space preservation within the Borough is low, if the opportunity arises it should be further explored to aid in storm resiliency and to mitigate possible storm impacts.

- **Housing Element and Fair Share Plan**

The Borough of Rumson already filed a plan with the Council on Affordable Housing (COAH), but the plan has not been certified, therefore the Borough of Rumson is classified as having a "participating" status before COAH. A decision by the New Jersey Supreme Court on March 10, 2015 established a transitional process in which the Borough will be able to file a declaratory judgment action immediately upon the March 10 decision becoming effective on June 8, 2015. The Borough should undertake a review of the implications of the Supreme Court decision and make a determination of the appropriate course of action to address compliance with the affordable housing obligation.

Regardless of the transitional status of COAH rules, this Master Plan Reexamination Report recommends amending the Housing Plan Element to address the following:



- The Borough encourages homeowners of single-family structures to elevate their homes to make them more resilient to future Sandy-type storms.
- It is the Borough's policy that affordable housing should not be located within the flood hazard areas.

Development Regulations

- **Flood Zones**

Some areas in Rumson Borough along the Navesink and Shrewsbury Rivers lie within a flood zone. Zoning regulations should be evaluated to make sure that losses due to flooding are minimized through appropriate area and use requirements and proper flood hazard regulations.

- **Building Elevation**

The Borough's Flood Damage Prevention Ordinance currently requires that new, substantially damaged or substantially improved buildings located in a special flood hazard area be elevated to or above the Advisory Base Flood Elevation (ABFE). The Ordinance should be revised to indicate that buildings shall be elevated at least one foot above the 2009 Effective FIRM, the 2012



Figure 3: Rumson Home Elevation on Warren Street
Source: RedBankGreen.com

ABFE, or the 2014 Preliminary FIRM elevation, whichever is greatest. The Borough should also require and maintain elevation certificates for all elevated buildings in a special flood hazard area.

- **Maximum Permissible Lot and Building Coverages**

The Borough should continue to monitor the maximum permissible lot and building coverages for residential uses as they relate to parking issues, schools, and school children.

- **Regulations of House Size**

The Borough should continue to monitor the building sizes of new or expanded homes and develop a database of pertinent information to better evaluate this issue. Annual reports to the Planning Board may be one mechanism to monitor this issue. Another mechanism may be the automation and updating of the zoning and construction permit process that is currently underway as part of the PSPAGP.

- **Economic Development**

Borough officials should monitor the demand for the use of satellite offices for Borough residents in the downtown business district. The Borough should subsequently determine if the General Business zone should be expanded or modified for additional office use.

- **Permitted and Conditional Uses**

The Borough should monitor and maintain the list of permitted and conditional uses in the non-residential zones.

- **Erosion Setbacks**

The Borough of Rumson should consider adopting an erosion setback ordinance based on erosion rates along the Navesink and Shrewsbury Rivers. An erosion setback ordinance would reduce the need for erosion control structures along the shoreline, minimize property damage due to erosion, and maintain the natural shoreline dynamics. In order to maintain effective setback requirements, reliable scientific data must be used. Additionally, erosion rates change over time and would require a periodic reevaluation of the setback lines along the riverfronts.

- **Stream Dumping**

The Borough Ordinance currently prohibits the disposal of waste and refuse upon any parking place, street, road, avenue, park, or other public place upon any lot or other premises, except in receptacles or containers provided for such purposes. The ordinance should be revised to clearly prohibit the dumping of any waste or refuse in any stream or waterway.

- **Side and Rear Setbacks**

It is recommended that the Schedule of Zoning District Regulations be revised to allow unroofed porches, landings, stoops, and stairs to extend up to five feet beyond the side and rear setback lines in a residential zone.

- **Grading and Stormwater Runoff**

In order to minimize the effect of grading and stormwater runoff associated with new development, changes are recommended to Section 22-7.27, Soil Removal and Fill,



and Section 22-7.25, Fences and Walls of the Development Regulations. Additional oversight and approvals will be required to ensure that there will be no negative impacts to neighboring properties as a result of new construction. Additional regulations are proposed for Section 22-7.25 to limit the impacts of large retaining walls that are sometimes constructed when a house is elevated.

Other Recommendations/Capital Recommendations

- **Zoning and Construction Permit Process Automation and Updates**

The Borough should automate and update its system for processing zoning and construction permits. In 2013 Rumson processed double the amount of permits seen in the years preceding Hurricane Sandy. An upgraded permit program in which inspectors receive and manage permits on laptops and electronic tablets using state of the art technology will significantly increase the Borough's efficiency in this task and in recovering from future storm events. This project is being prepared concurrent to this Master Plan Reexamination Report, and funding is provided through the PSPAGP.

- **Update the Borough's Hazard Mitigation Plan (HMP)**

The Hazard Mitigation Plan should identify and assess the various flooding hazards within the Borough as well as the associated vulnerabilities to those hazards. The HMP should also identify alternative mitigation actions that can be implemented to reduce the Borough's risk resulting from hazard exposure. This project is being prepared concurrent to this Master Plan Reexamination Report, and funding is provided through the PSPAGP.

- **Revise and update the Borough's Emergency Operations Procedure Manual**

The Borough should prepare an update to its Emergency Operations Procedure Manual, which includes creating a flood hazard-specific annex to accompany the existing Plan. This new annex should focus on any special planning needs generated by a hurricane or severe flooding scenario and will contain unique and regulatory response associated with extreme flooding. This project is being prepared concurrent to this Master Plan Reexamination Report, and funding is provided through the PSPAGP.

- **Develop a Geographic Information System (GIS) to Increase Resiliency**

The Borough should develop a GIS database and inventory of Borough-owned infrastructure to support future planning efforts. The components of the GIS would support facilities and public works infrastructure, land information, and floodplain management-related data layers and applications. This project is being prepared



concurrent to this Master Plan Reexamination Report, and funding is provided through the PSPAGP.

In addition, these aspects of the GIS program should be made available to the public through the Borough website or by visiting Borough Hall where staff members can help explain the various maps and hazards.

- **Participation in FEMA’s Community Rating System (CRS)**

The Borough should consider participating in the CRS. The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum National Flood Insurance Program (NFIP) requirements. The NFIP administers the CRS which scores towns on their effectiveness in dealing with the mitigation of flood hazard events. As a result of earning CRS points, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS:

- Reduce flood damage to insurable property;
- Strengthen and support the insurance aspects of the NFIP; and
- Encourage a comprehensive approach to floodplain management.

- **Install a Borough-wide Supervisory Control and Data Acquisition (SCADA)**

The Borough should install a SCADA system. The SCADA system would communicate critical alarms to a centralized location or operational personnel within the Borough. This would be in conjunction with the Borough’s owned and operated facilities (including at pump stations, Borough Hall, the Police Department, firehouses, etc.). Use of a SCADA system can provide the Borough with accurate information on water and wastewater collection, pump control, pump station performance, as well as provide alarm notifications of system failure, emergency levels, and any other events as they occur. This would help protect the environmental quality of the Borough by preventing sewer spills into local waterways. The SCADA also would monitor fire, security, power failures, and generator operations for the Borough.

- **Drainage System Maintenance**

The Borough Department of Public Works checks for fallen trees and blocked storm drains routinely. It also regularly inspects and reports debris in streams and ditches. The Borough should remove debris and sediment accumulation in streams and ponds to speed draining of flood prone areas. The maintenance of these waterways is important to ensure proper drainage and to protect the health and safety of Borough



residents. The Borough should continue to support this maintenance program in an effort to decrease blockages and backups during storms.

- **Cleanup Minor Waterway**

The Borough plans to remove silt along the minor waterway parallel to Brookside Drive, just north of Rumson Road. During heavy rains, the stream backs up onto residential properties and occasionally floods Rumson Road. Any efforts to clean up the minor waterway should also include the installation of more drainage south and south east of Rumson Road. The downstream drainage system should also be further investigated for potential rehabilitation.

- **Comfort Station at Bingham Hall**

The Borough would like to develop Bingham Hall as a comfort station during emergencies. Any efforts to develop Bingham Hall as a comfort station should include the installation of an emergency standby generator, installation of a high-speed wireless network, acquisition of comfort supplies (emergency cots, food and water supplies), installation of electronic device charging stations, preparation of computer terminals, and installation of a television with a cable feed for news updates.

- **Rumson Boat Launch Bulkhead**

There is currently no bulkhead along the Borough's property to the northwest of the municipal boat ramp. The Borough should install approximately 225 linear feet of waterfront bulkheading at this site. The existing timber bulkhead on the northwest side of the ramp should also be replaced due to severe rot and inadequate length. Over the years, upland area has been lost due to storm surges and erosion. The installation of bulkheading will reclaim that property, prevent further erosion of the shoreline soils, and reduce flooding and impacts associated with small storm surges and nuisance tidal flooding. Due to the close proximity of critical facilities such as the DPW yard, Borough Hall, and Police Station, it is imperative that these facilities are protected and stay operation during a storm event.

- **Debris Management Plan**

The Borough should prepare a municipal Debris Management Plan including such components as allocating debris removal sites, collection strategies, and debris reduction methods.

- **Flood Warning Systems**

The Borough should consider implementing early flood warning systems for the Shrewsbury and Navesink Rivers as a shared service with other towns along the rivers.



- **Install Emergency Power**

The Borough should upgrade the shelter facility located at Rumson Fair Haven Regional High School, including the emergency power facility. The Borough should also install an emergency standby generator at the Oceanic Hook and Ladder Firehouse.

- **Portable Generator**

The Borough should install a quick connection system for a portable generator with a manual switch gear at Borough Hall.



Figure 4: Emergency Generator at the DPW Yard

- **Maintain Warning Systems**

The Borough alerts its residents to floods, storms, and other hazards through a Reverse 911 calling system, the Borough website, AM radio, and an emergency siren alerting system. The Borough should continue to maintain these current warning systems. Early warnings give residents time to prepare for the hazard and evacuate if necessary, resulting in reductions to the loss of life and property from an event. It is also recommended that the Borough provide additional information to the public, perhaps through the Borough website, on emergency sirens to ensure that all members of the public are aware of the various sirens and their meanings. For a relatively low cost, maintaining current warning systems will help protect the health and safety of the Borough's residents and ensure they are properly notified of incoming threats.

- **Upgrade Drainage System**

The south end of Club Way and the intersection of Holly Tree Lane and Navesink Avenue both experience regular nuisance flooding due to heavy rainfall and high tides. This often causes the areas to become impassable and can delay emergency response times. It is recommended that the Borough rehabilitate and upgrade the existing drainage system to increase capacity and decrease flooding at the south end of Club Way and at the intersection of Holly Tree Lane and Navesink Avenue. The

roads should also be reconstructed, possibly to a higher elevation, to provide proper slope and drainage.

- **Tree Maintenance**

It is recommended that the Borough perform tree maintenance. This recommendation involves tree trimming and pruning of shade trees along the streets in the community to prevent downed power lines. This should also involve increasing effectiveness of the Public Works Department to clear trees in the aftermath of a storm event, as well as coordination with utility companies.

- **Construct or Install Improvements to Eight Sanitary Sewer Pump Stations within the Borough**

The Borough should install emergency backup generators and/or flood proofing measures at pump stations at the following locations: Riverside Drive, Club Way, Thorton Way, Navesink Avenue, Buena Vista Avenue, and Shrewsbury Drive. Also recommended is reinforced steel, rubber gasket lined storm doors at the pump stations located at Marina and at Grant Avenue.

- **Department of Public Works Garage**

The Borough should install reinforced steel, rubber gasket-lined storm doors to the building's service bays to provide greater protection from wave action and flooding to the building's structure and contents.

- **Construct New Elevated Bulkhead**

The Borough should complete the installation of 150 linear feet of new, elevated bulkhead, the rehabilitation and replacement of existing drainage pipes, and the installation of a new tide valve at the intersection of Shrewsbury Drive and Avenue of Two Rivers.

- **Remove and Replace Existing Underground Fuel Storage Tanks**

The Borough should remove two existing underground fuel storage tanks (one diesel and one regular unleaded) and install two new above-ground tanks at the Department of Public Works Yard.

- **Oceanic Village, Waterfront Lands, and Commercial District**

The Borough is concerned with the future development of the area north of River Road, south of the Navesink River, west of Bingham Avenue, and east of Third Street. This area includes portions of the historic Oceanic Village, waterfront lands, and the commercial district. Additional study of this area and production of a more detailed plan for its future use and improvement is recommended.

- **Bridge Improvements**



The Borough Planning Board encourages the Borough to coordinate with Monmouth County to expedite the maintenance of the two drawbridges into Middletown and Sea Bright in order to allow more successful improvements and evacuation during emergencies.

- **Flood Hazard Mitigation in the West Park Section of the Borough, South of Rumson Road**

This area is subject to periodic flooding associated with fluctuations in the tidal cycle. To address this problem, the Borough is reviewing the possibility of reconstructing and raising the streets in this neighborhood prone to periodic inundation. The Borough should review the development regulations applicable to this area to determine if minimum elevations for finished lot grade or buildings should be required. For existing lots and improvements, additions or changes which would trigger a requirement to elevate a lot and existing improvements should also be reviewed. A requirement should also be considered that non-habitable floor space and lot grading be elevated to be compatible with the increased elevation of the street.

In addition, there are numerous stormwater outfall pipes located throughout the West Park neighborhood. If these outfalls do not have functioning tide valves, the river water can enter the outfalls and surcharge through the catch basins into the streets. This is a regular occurrence during full moon high tide events and results in flooded, impassable roads. The Borough should install tide valves on all outfalls in this area where none exist. This project is currently underway to install seven new tide valves, funded through Borough funds.

The Borough should also complete the installation of new

elevated bulkheads at the western terminus of Washington Avenue; the replacement of an existing tide valve at the western terminus of Grant Avenue and Waterman Avenue; and construction of an earthen berm and associated grading above the



Figure 5: Waterman Avenue Stormwater Outfall

existing bulkhead at the western and eastern terminus of Grant Avenue and the southwestern terminus of Waterman Avenue.

- **Living Shorelines**

The Borough should consider living shorelines as an approach to shoreline stabilization.

- **Community Vulnerability Analysis**

The Borough should undertake a Community Vulnerability Analysis to evaluate the number of structures that may be exposed to potential flood and storm surge risks.

Floodplain Management Plan Action Items

The following are a list of action items recommended in the Floodplain Management Plan, which is being prepared concurrent with this Master Plan Reexamination Report.

- **Floodproofing Non-Residential Buildings**

The Borough should encourage the floodproofing of non-residential buildings within the flood zone that do not meet the base flood elevation requirements. Information regarding the different floodproofing techniques should be made available to the public.

- **Road Elevation and Improvements**

As part of the Shrewsbury Drive road improvements in 2010, the road was elevated and a series of low flood walls were constructed adjacent to low-lying properties to prevent flood waters from entering the properties. This practice has proven successful and should be further evaluated for other future road improvements.

- **Wetlands Protection**

State regulations through the NJDEP freshwater and coastal wetland permit programs are currently in place to limit development in the Borough's wetland areas. The Borough should continue to support and enforce these programs. Additionally, the Borough should consider further investigation of living shorelines to augment these areas and provide additional shoreline stabilization.

- **Erosion and Sediment Control**

The Standards for Soil Erosion and Sediment Control in New Jersey are regulated by the New Jersey Department of Agriculture and locally enforced through the Freehold Soil Conservation District. The Borough should continue to support and enforce these standards for all applicable development.

- **Water Quality Improvement**



The Borough of Rumson currently enforces the NJDEP Best Management Practices for stormwater runoff quality and reduction of total suspended solids. Green infrastructure techniques should also be used to promote resiliency in the Borough and improve the water quality entering the Navesink and Shrewsbury Rivers. Green infrastructure uses permeable surfaces, landscape formations, and plant material to intercept stormwater runoff before it enters storm drains by promoting infiltration and filtration. Their use can promote resiliency by mitigating flooding and helping the Borough to quickly recover from storms. Additionally, green infrastructure captures runoff pollution and prevents it from entering waterways.

- **Coastal Barrier Protection**

Rumson is protected from the Atlantic Ocean by the Borough of Sea Bright. Additionally, there are a number of uninhabited islands located throughout the rivers that act as natural buffers. A number of these islands are identified on the Preliminary FIRM map as Coastal Barrier Resource System Areas. The Borough should continue to maintain these islands as undeveloped open space.

- **Health and Safety Maintenance**

After flooding and other severe storms, the Police Department is responsible for patrolling evacuated areas to prevent break-ins and looting. Clearing streets and removing debris is performed through the Borough Department of Public Works and outside contractors when necessary. The Borough should continue to make the health and safety of its residents and business owners a priority after storms.

- **Building Inspections**

Many buildings were severely damaged during Hurricane Sandy. The process of inspecting each house for structural damage and possible condemnation can be lengthy and result in homeowners being kept out of their houses for extended periods of time. As part of the Emergency Operations Plan, the Borough should prepare a written procedure for inspecting damaged properties before they can be reoccupied. The Borough should consider hiring outside consultants to aid in the process if necessary.

- **Mitigation Funding**

After severe storm events, Borough officials are in regular contact with County and State OEM offices, as well as FEMA representatives, to identify various mitigation opportunities and funding sources. The Borough should continue this process to ensure both the Borough and its residents have access to all appropriate grants and that proper procedures are followed prior to repairs.



- **Outreach Projects**

The Floodplain Management Plan Committee should consider participation at local events through setting up a booth at local events. Additionally, information on flood hazards and mitigation activities can be mailed out annually as newsletters or with tax bills. The Borough could also consider including a section on its website devoted to floodplain management and hazard mitigation.

- **Library**

The Monmouth County Library System contains current FEMA publications on flooding. The Borough should encourage the Oceanic Library to do the same so that Borough residents have access to this information.

- **Technical Assistance**

The Borough building and construction department can make available pamphlets and booklets concerning flood preparation, NFIP, elevation requirements, flood venting, etc.

- **Environmental Education**

To increase environmental awareness and knowledge of flood risks within the community, the Borough should coordinate with the Rumson Fair Haven Environmental Awareness Club and other local organizations.



VII. Recommendations Concerning the Incorporation of Redevelopment Plans

The Planning Board finds that there are no areas within the Borough of Rumson that require investigation as possible “areas in need of redevelopment” in accordance with N.J.S.A. 40A:12A et seq., the Local Redevelopment and Housing Law. Therefore, changes in the local development regulations are not necessary at this time.



Master Plan Amendment

Introduction

The purpose of this Master Plan amendment is to incorporate the recommendations and changes that have been outlined in the 2015 Reexamination Report into the Borough's Master Plan, or to establish the basis for future actions through the definition of new goals and objectives. This Master Plan amendment: updates and adds to the Master Plan objectives, problems, and assumptions; updates the Land Use Plan Element with updated existing land use mapping and a discussion on building resiliency; and includes an update to the community facilities plan element to promote resiliency and include updated mapping of community facilities and critical infrastructure.

Hurricane Sandy struck the coast of New Jersey on October 29, 2012, and its storm surge and winds caused extensive damage to the Borough of Rumson's roadways, critical infrastructure, utility services, and to buildings and homes. This document is the Borough's response to Hurricane Sandy's impacts, and offers new opportunities for examining community resiliency and ensuring that recovery efforts address the Borough's needs for the future.



Master Plan Objectives, Problems, and Assumptions

Given the experience of Hurricane Sandy, it is important that the Master Plan objectives promote sustainability and resiliency, as well as the local-level implementation of the Monmouth County Multi-Jurisdictional Hazard Mitigation Plan Draft Update and the recommendations of the 2014 Strategic Recovery Planning Report. The Master Plan is, therefore, amended to include new resiliency objectives, provided below. In addition, the existing objectives, problems, and assumptions that underpin Borough planning are: reproduced to promote clarity and centrality of information; and, updated to the extent necessary in order to adequately reflect conditions as of 2015.

Planning Objectives

1. Maintain Rumson's character as a residential community and the quality of life that it offers.
2. Encourage the most appropriate use of land consistent with neighborhood character and its suitability for development.
3. Establish appropriate population densities and limit the intensity of development to both preserve the natural environment and to ensure neighborhood, community, and regional well-being.
4. Maintain a satisfactory level of public facilities and services.
5. Secure the public's safety from fire, flood, panic, and other natural and man-made disasters. Adapt efforts accordingly to reflect updated flood levels and data from the Federal Emergency Management Agency (FEMA) and the National Oceanic and Atmospheric Administration (NOAA).
6. Maintain fiscal stability.
7. Ensure that Rumson's development does not conflict with the development and general welfare of neighboring municipalities, the county, and the state as a whole.
8. Coordinate development with land use policies to encourage the appropriate and efficient expenditure of public funds.
9. Provide sufficient space in appropriate locations for residential, recreational, commercial, and open space use.
10. Locate and design transportation routes to promote the free flow of traffic while discouraging congestion or blight.
11. Promote a desirable visual environment.
12. Conserve historic sites and districts.
13. Prevent urban sprawl and degradation of the environment through improper land use.



14. Expand housing opportunities within the Borough compatible with neighborhood character and the needs of present and future residents.
15. Promote the recovery of recyclable materials from municipal solid waste and encourage the conservation of energy.
16. Protect the natural resources and qualities of the Borough including freshwater and saltwater wetlands, floodplains, stream corridors, open space, steep slopes, and areas with scenic, cultural, and recreational values.

Resiliency Objectives

1. Plan for new development to minimize risk from natural hazards.
2. Promote public awareness of hazard mitigation and resiliency issues.
3. Focus public agencies on community vulnerabilities to hazards such as flooding.
4. Encourage future capital projects to be located outside flood hazard areas.
5. Encourage renovations and modifications that are resilient to flood- and storm-related impacts.
6. Encourage municipal efforts and initiatives in FEMA's Community Rating System (CRS).

Problems Articulated in the 1988 Master Plan

1. The disposal of solid waste and implementation of recycling to meet state recycling goals.
2. Addressing the Borough need for low and moderate income housing.
3. Controlling the intensity of development within the existing residential neighborhoods in order to ensure that infill development, redevelopment, or expansions are compatible with neighborhood character.
4. Conserving scenic waterfront views along the Navesink River and the Shrewsbury River.
5. Managing further development within the business and commercial districts to be compatible in scale and intensity with surrounding residential areas and with the character of the business area.
6. Discouraging piecemeal conversions of residential uses in commercial areas into substandard commercial properties.
7. Improving pedestrian and vehicular circulation in the business districts.
8. Protecting Borough landmarks.
9. Protecting sensitive natural features including wetlands and flood hazard areas.





Figure 6: Coastal Area of Rumson

Assumptions that Underpin Borough Planning

1. The continued economic viability of Rumson as a single family residential community with supporting public, commercial, and institutional facilities and services.
2. Given a stable population level, there will be minimal need to expand municipal facilities and services. However, an expansion of recreational facilities will be required to address resident and Borough needs.

Land Use Plan Element

As has been previously noted, the 2015 Master Plan Reexamination Report recommends that the Land Use Plan Element be amended to facilitate increased sustainability and promote resiliency through the use of green building and infrastructure techniques. The 2015 Master Plan Reexamination Report also recommends that the Land Use Element be amended to include current existing land use mapping. This is achieved below.

Current Land Use Mapping

The Land Use Plan Element is updated to incorporate the following mapping presented in Appendices A through C of this document:

- Current land use mapping that is presented in Appendix A;
- Critical environmental areas that are presented in Appendix B; and
- The Existing Zoning and Flood Hazard Areas Overlay that is presented in Appendix C. No zoning changes are warranted in this Amendment, as the Borough is nearly fully developed and there are limited, if any, areas to be modified that would reflect lessons learned by Hurricane Sandy.

R-5 Zone, West Park Neighborhood

The West Park area is a densely developed neighborhood of the Borough and is wholly located in a flood hazard area. A significant number of the single family residences in West Park were substantially damaged by Hurricane Sandy.

The Planning Board is concerned about the potential for additional intensification of this residential area and the resultant potential increase in the number of homes which would be subject to the impact of future storm events. Approximately one-fifth of the residential lots in West Park are double the required minimum lot area (6,000 square feet) for the R-5 zone. Therefore, the Planning Board encourages the Borough to monitor development activity in West Park and evaluate appropriate zoning requirements to limit possible infill development through re-subdivision of existing residential properties and thereby minimize potential future damages.

Building Resiliency through Development Regulations

Given the experience of Hurricane Sandy and the potential for future storms, there is a compelling need to build resiliency in the Borough of Rumson. The Land Use Plan Element, therefore, recommends that the Borough's development regulations be designed to build resiliency throughout the Borough. This should be done through the promotion of green building and infrastructure techniques. This section of the Land Use



Plan Element overviews green building and infrastructure techniques, and is meant to inform the future development of municipal development regulations.

Green Building and Infrastructure Techniques

Green building and infrastructure techniques are an important tool for promoting resiliency in the Borough of Rumson. They use permeable surfaces (e.g., porous concrete, gravel, mulch, etc.), landscape formations (e.g., channels, depressions), plant material, or other technologies to reduce stormwater runoff by promoting natural infiltration. Their use can promote resiliency by mitigating flooding (i.e., reducing the risk and impacts of flooding) and helping the Borough to quickly recover from storms. In addition, they provide numerous co-benefits, not the least of which are: reducing long-term maintenance and operation costs of stormwater infrastructure; and, capturing runoff pollution (e.g., particular matter, heavy metals) and preventing their entry into sensitive terrestrial waterways.

The Land Use Plan Element recommends the incorporation of green building and infrastructure techniques in the Borough's development regulations. Recommended green building and infrastructure techniques are described in the following subsections.

Downspout Disconnection

Downspout disconnection refers to the rerouting of rooftop drainage pipes to specialized containment devices (e.g., rain barrels, cisterns) and permeable areas, instead of traditional stormwater drainage systems. This allows stormwater runoff from building roofs not only to infiltrate soil, but also to be collected for later use (e.g., watering lawns and gardens), which reduces demand on public water supplies.



Figure 7: Downspout Disconnection (Source: EPA)

Rain Gardens

Rain gardens are shallow, vegetated basins that absorb stormwater runoff from impervious surfaces (e.g., rooftops, sidewalks, and streets). Runoff is channeled into rain gardens, and is then used by plants, infiltrated into the ground, and evaporated. They may be installed in a variety of locations, and can be an attractive element of site design. In addition, it is important to note that rain gardens can be installed in a variety of locations. Indeed, they may be installed in any properly graded unpaved space, and in parking lots and paved areas through the construction of specialized planter boxes that collect and absorb runoff.



Figure 8: Rain Gardens (Source: EPA)

Bioswales

Bioswales are open, linear channels with vegetation, mulching, or xeriscaping that slow stormwater runoff and attenuate flooding potential while conveying stormwater runoff away from critical infrastructure. While they convey stormwater runoff away from critical infrastructure, their permeable surface permits the natural infiltration of stormwater. They are often used as an alternative to, or enhancement of, traditional stormwater drainage systems.



Figure 9: Bioswales (Source: EPA)

Permeable Pavements

Permeable pavements help to reduce stormwater runoff, which helps to improve the quality of terrestrial waters and mitigate flooding. With traditional (i.e., impervious) pavement, stormwater runs into drains and inlets, which places a burden on such infrastructure, and may result in the discharge of pollutants (e.g., sediment, oil residue, etc.) into terrestrial waters. Permeable pavements, however, infiltrate, treat, or store rainwater where it falls. Key examples of permeable pavements include pervious concrete, porous asphalt, and permeable interlocking pavers.



Figure 10: Permeable Pavements (Source: EPA)

Green Roofs

Green roofs are roofs that are covered with substrate and vegetation that enable the infiltration of rainwater. This not only minimizes stormwater runoff, but leads to reduced building operating costs and energy consumption by providing improved insulation of the roof surface, and absorbing less heat on the roof surface (i.e., increasing the roof surface albedo over traditional roof surfaces). Flat and low-pitched roofs are most suited to green roof development and retrofitting therewith.



Figure 11: Green Roofs (Source: EPA)

Tree Cover

Increased tree cover in developed areas is an important example of green infrastructure. Trees reduce and slow stormwater by intercepting precipitation in their leaves and branches. In addition, their root systems help to aerate soil, which facilitates natural infiltration of stormwater and reduces runoff. Trees also purify the air, and can help to cool developed areas by providing shade, and through evaporative cooling and increased latent heat flux (i.e., the dissipation of sensible heat).

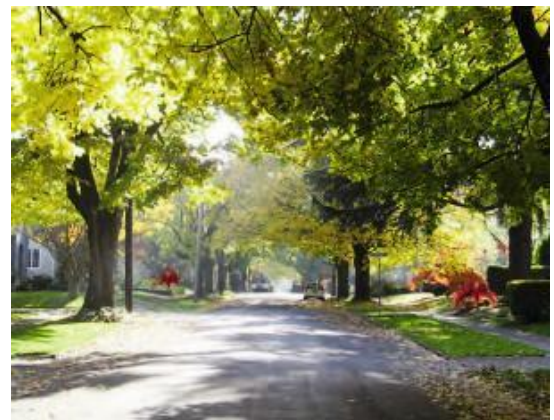


Figure 12: Tree Cover (Source: EPA)

Living Shorelines

Living shorelines are an approach to shoreline stabilization that uses wetland plants, submerged aquatic plants, oyster reefs, coir fiber logs, sand fill, and stone to provide shoreline protection and maintain important habitat areas. They offer numerous benefits over hardened structures (e.g., bulkheads and concrete walls), including protection of the riparian and intertidal environments, improvement of water quality via filtration of upland runoff; and creation of habitat for aquatic and terrestrial species.

Open Space Preservation

Preservation of open space areas within and adjacent to developed areas can help to mitigate the water quality and flooding impacts of stormwater. Indeed, natural open space areas promote increased groundwater recharge, lower stormwater runoff, and reduced levels of nutrients and sediment in terrestrial waters. They also help to cool developed areas through evaporative cooling and increased latent heat flux. The use of building coverage and impervious surface limits, tree-save requirements, and noncontiguous clustering are key ways to promote open space preservation through development regulation.



Figure 13: Open Space Preservation (Source: EPA)

Changes to Development Regulations

The zoning ordinance should be amended to require as-built surveys for new construction and additions to mitigate the problems resulting from the increase in new impervious coverage and changes in grading. Construction and reconstruction as part of the recovery from Hurricane Sandy has increased residential building activity. The construction has increased concerns regarding stormwater runoff on to adjoining properties.

Community Facilities and Resiliency Plan Element

The 2015 Master Plan Reexamination Report recommends that the Community Facilities Plan Element be updated to include updated mapping of community facilities and critical infrastructure, and to promote resiliency at community facility and critical infrastructure sites. This is achieved in the following subsections.

Promoting Resiliency

The following section on promoting resiliency should be added to the Community Facilities and Resiliency Plan Element:

Hurricane Sandy caused extensive damage to community facilities and other critical infrastructure in the Borough of Rumson. All of the Borough's sewage pump stations went offline due to floodwater inundation and/or power system failure. Trees and power lines throughout the Borough fell, in many cases damaging buildings and homes. The Borough also faced power outages for 14 days.

Given the experience of Hurricane Sandy and the potential for similar storms in the future, it is important that the Borough promote the resiliency of its community facilities and critical infrastructure. This can be done through the application of green building and infrastructure techniques, which are discussed in the Land Use Element of this Master Plan. It can also be achieved through physical flood control and related devices, elevation of facilities above the advisory base flood elevation, careful site selection for new facilities, or other means. In addition, resiliency can be promoted by providing new and upgraded emergency power generation facilities at important sites, such as municipal buildings, police station, schools, and pump stations, which will help the Borough to function in times of crisis. By promoting the resiliency of community facilities and critical infrastructure, the Borough is not only protecting its investment, but may also set an important example for others to follow and thereby increase the overall sustainability and resiliency of the Borough.

Historic Properties

The Borough of Rumson's Historic Preservation Commission has prepared a preliminary list of the Borough's historic properties inventory. This list includes 416 homes that were built in or before 1918, remain standing, and have not undergone significant renovations to facades. These properties are part of the community's assets, and may be threatened by flood hazard areas. The mapping presented in Appendix D depicts the Borough's historic preservation properties in relation to flood hazard areas. Of the 416 properties included in the inventory, 99 are located in the AE zone (with a one percent chance of



annual flooding), and 17 are located within the VE velocity flood zone (also with a one percent chance of annual flooding). The Community Facilities and Resiliency Plan Element should be updated to include the mapping presented in Appendix D: Historic Properties. This inventory and relevant mapping also serve as an amendment to the Historic Preservation Element which was prepared as a part of the 1988 Master Plan. This is also in accordance with the Borough's general planning objective to "conserve historic sites and districts."

Public Facilities and Other Critical Infrastructure Mapping

The Community Facilities and Resiliency Plan Element should be updated to include the following list of resiliency improvements to public facilities and critical infrastructure. This list of improvements is included and described in the "Other Recommendations/Capital Recommendations" section of the 2015 Master Plan Reexamination Report.

- Zoning and Construction Permit Process Automation and Updates
- Update the Borough's Hazard Mitigation Plan (HMP)
- Revise and update the Borough's Emergency Operations Procedure Manual
- Develop a Geographic Information System (GIS) to Increase Resiliency
- Participation in FEMA's Community Rating System (CRS)
- Install a Borough-wide Supervisory Control and Data Acquisition (SCADA)
- Drainage System Maintenance
- Cleanup Minor Waterway
- Comfort Station at Bingham Hall
- Rumson Boat Launch Bulkhead
- Debris Management Plan
- Flood Warning Systems
- Install Emergency Power
- Portable Generator
- Maintain Warning Systems
- Upgrade Drainage System
- Tree Maintenance
- Construct or Install Improvements to Eight Sanitary Sewer Pump Stations within the Borough
- Department of Public Works Garage
- Construct New Elevated Bulkhead
- Remove and Replace Existing Underground Fuel Storage Tanks
- Oceanic Village, Waterfront Lands, and Commercial District



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- Coordinate with Monmouth County on Bridge Improvements and Maintenance
- Flood Hazard Mitigation in the West Park Section of the Borough, South of Rumson Road
- Living Shorelines
- Community Vulnerability Analysis

Additionally, the Community Facilities and Resiliency Plan Element should also be updated to include the following list of action items identified in the 2015 Floodplain Management Plan, which is being prepared concurrent with this document:

- Floodproofing Non-Residential Buildings
- Road Elevation and Improvements
- Wetlands Protection
- Erosion and Sediment Control
- Water Quality Improvement
- Coastal Barrier Protection
- Health and Safety Maintenance
- Building Inspections
- Mitigation Funding
- Outreach Projects
- Library
- Technical Assistance
- Environmental Education

Furthermore, this Community Facilities and Resiliency Plan Element is updated to include public facilities and critical infrastructure mapping that is presented in Appendix E of this document. Note that this mapping shows the relation of these features to mapped flood hazard areas.



Circulation Plan Element

As has been previously mentioned in the 2015 Master Plan Reexamination Report, the Circulation Plan Element should be prepared in order to: include recommendations for the development of emergency evacuation routes; and promote the development of bicycle and pedestrian connections. This is achieved in the following subsections.

Emergency Evacuation Routes

Rumson Borough's location on waterways and the potential for additional hurricanes and storms in the future make it necessary to plan for emergency evacuation routes to move people and equipment in times of emergency, and provide safe, efficient routes to emergency shelters and similar facilities within the region. This is particularly important for flood-prone areas of the Borough.

Key aspects of emergency evacuation route planning include identification of potential routes, completing necessary modernization and upgrading, ensuring that routes are properly maintained and marked through signage, and informing the public about the presence of such routes. To elaborate, it is noted that potential routes should provide regional connections. Modernizing and upgrading roadways to be used as emergency evacuation routes will improve mobility and facilitate the evacuation of the Borough in times of crisis.

In addition to the above, it is noted that the planning of emergency evacuation routes should be coordinated with the New Jersey Department of Transportation, Monmouth County, and neighboring municipalities. This is important not only because evacuation routes would provide connections to the broader region, but also because roadways used as potential evacuation routes may fall under state, county, or municipal jurisdictions.

Bicycle and Pedestrian Connections

Bicycle and pedestrian connections are encouraged and should be provided to the maximum extent possible in all areas of the Borough, and particularly between parks, recreation, and open space areas, and important population centers. Providing such connections will not only help to make the Borough of Rumson more sustainable by promoting non-motorized transportation, but also greatly improve the quality of life for Borough residents. While sidewalks are an important pedestrian facility, the focus of this Circulation Plan Element is on dedicated and shared bicycle lanes, greenways, and multipurpose trails.

To maximize the provision of bicycle and pedestrian linkages, this Circulation Plan Element does not specify the exact locations where they should be provided, but rather



establishes a vision, discusses key principles of the design and maintenance of bicycle and pedestrian facilities, and outlines important goals and objectives for their provision.

Vision for Bicycle and Pedestrian Linkages

The Circulation Plan Element's vision is to develop the Borough's network of bicycle and pedestrian linkages and secure the recreation and transportation benefits of bicycling and walking for Borough residents. The Circulation Plan Element envisions a network of bicycle and pedestrian linkages that connects the Borough's population centers with: open space and recreation areas; schools; commercial nodes; and other key destinations in the Borough of Rumson and neighboring municipalities.

The Circulation Plan Element also envisions that linkages will be provided in the form of: on-road bicycle lanes, lanes shared between bicycles and vehicles, where appropriate; greenways; and protected multipurpose trails. In all variations, bicyclists and pedestrians will be able to travel in a safe and efficient manner throughout the network, which will boost bicycling and walking for recreation, and increase their use as a means of transport.

Additionally, in July 2014 the Borough of Rumson adopted Resolution 2014-0722-106 in support of the Monmouth County Complete Streets Policy. In this resolution the Borough requested that Monmouth County act as the lead agency in support of a bicycle lane initiative that would increase the connectivity of Monmouth County municipalities using both local and county roads.

Facility Design and Maintenance

When planning bicycle and pedestrian linkages, it is important to pay attention to the needs and expectations of users, the facility's visual appeal and design, and its upkeep. The following subsections provide an overview of basic concepts to guide the planning and development of bicycle and pedestrian facilities within the Borough of Rumson.

High Quality Experience

As a starting point, it is important to consider the elements that lead to a high quality experience. Examples of such elements include: visual appeal; pleasantness and convenience of location; presence of interconnections, residential areas, and community facilities; sufficient length, accessibility for users with limited mobility; and the availability of special features, such as educational opportunities, benches, shelters, and similar amenities. When planning bicycle and pedestrian facilities, it is important to maximize the availability of these elements in order to provide a high quality experience.



User Needs

It is also important to consider the needs and physical ability of the user. For example, the elderly and disabled will typically have different levels of ability than the remainder of the population. By giving consideration to the needs and physical ability of all users, use and success of the network will be maximized. Accommodating a broad cross section of users of all ages and abilities will help to maximize the use and success of the network.

Connectivity

Connectivity refers to the linkages a network provides from a given point to another. When planning bicycle and pedestrian facilities, it is important to consider possible connections between neighborhoods, business districts, parks, community facilities, and natural environments. By providing such connections, bicycle and pedestrian facilities can provide a viable route to a destination.

Facility Type

Facility type will affect its design. The basic types of bicycle and pedestrian facilities are: on-road bicycle lanes; shared lanes; greenways; and multipurpose trails.

- **Dedicated, On-Road Bicycle Lanes:** On-road bicycle lanes provide dedicated space for cyclists where motorists are not allowed to park, stand, or drive. They are designated with striping, signage, and pavement markings, and make the movements of motorists and cyclists more predictable, thereby increasing safety. They are generally unidirectional, and travel in the same direction as the adjacent vehicle travel lanes. They are located on the right side of the roadway (i.e., along the curb), and when on-street parking is available they are generally situated between vehicle travel and parking lanes. According to guidelines of the American Association of State Highway and Transportation Officials, the minimum recommended width of an on-road bicycle lane is four feet. However, six feet is the preferred width recommended by this Circulation Plan Element. The additional width provides a greater degree of separation between bicycles and motor vehicles. Standards of the American Association of State Highway and Transportation Officials indicate that striping to separate on-road bicycle lanes from vehicle travel lanes should be six inches in width. Striping to separate on-road bicycle lanes from parking lanes should be four inches.
- **Shared Lanes:** Bicycle facilities may be provided in lanes shared between bicycles and motor vehicles. Shared lanes may be suitable on roadways with low traffic volumes or wide roadway shoulders, and are generally a low-cost solution because they can be provided without the requirement for physical changes to the



roadway. Indeed, shared lanes only require bikeway network signage; they can, however, be supplemented with pavement markings. The width of a shared lane should ideally be 15 feet to allow for enough clearance between bicycles and large vehicles.

- **Greenways:** Greenways are long, linear open spaces that provide a setting for nature conservation and recreation. They often contain trails and link parks. The corridors of streams and rivers, and utility easements lend themselves to greenway development. Greenways are often the location of bicycle and pedestrian facilities.
- **Multipurpose Trails:** Multipurpose trails facilitate connections within the community. They provide for safe, non-motorized passage between residential and commercial areas, parks and open space areas, and other community features. A width of eight to ten feet is appropriate for multipurpose trails. In certain high-traffic areas, however, a width of ten to twelve feet may be appropriate. In all cases, the width should be enough to accommodate bidirectional passage. Multipurpose trails may be provided in roadway rights-of-way, but when they are provide in such areas, they are physically separated from motor vehicle traffic by open space or some other type of physical barrier (e.g., guard rail, curbing, etc.).
- **Signage:** Signage serves a number of important functions. Most importantly, it helps a user to identify his or her location and conveys information about facility characteristics. As such, proper signage is an important part of bicycle and pedestrian facility design.

Signage at the trailhead should include: the name of the facility; a large-format map; length; permitted activities; and information on connections. Signage should contain a minimal amount of text by making extensive use of icons and pictograms. Locational markers placed at regular intervals along the route should supplement this information. Additionally, interpretative signage should be provided where significant natural or cultural features are present. All signage should be made of durable materials that resist fading, water damage, and vandalism.

With regard to traffic signage, it is noted that the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) provides standards for all traffic control devices nationwide, including signs for bicycle facilities. All traffic control devices nationwide must conform to its standards. It is, therefore, the recommendation of the Circulation Plan Element that the current MUTCD be consulted when planning traffic control signage.



- **Amenities:** When planning bicycle and pedestrian facilities, it is important to provide appropriate amenities. The appropriateness of a particular amenity will be determined by the function, type, and anticipated users of the facility. Amenities have a significant impact on a user's overall experience, and may include: bicycle racks; resting areas; benches; picnic areas; drinking fountains; animal-proof refuse containers; observation areas; and shelters, among others.
- **Maintenance:** The proper maintenance and upkeep of the Borough of Rumson's bicycle and pedestrian facilities will ensure the public's continued use, safety, and enjoyment. As such, maintenance is an integral part of the bicycle and pedestrian facility planning process.

The maintenance required for a specific facility will be determined by type, surface, and amenities. Consequently, it is the recommendation of this Circulation Plan Element that a maintenance plan be written for the bicycle and pedestrian network in the Borough of Rumson.

A facility's future maintenance needs must also be considered during the design process. For instance, off-road facilities should be designed to be accessible to maintenance vehicles. Additionally, benches and other amenities should be designed to be low maintenance. By giving forethought to maintenance in the design process, a facility's future maintenance requirements can be simplified.

Goals for Bicycle and Pedestrian Linkages

The Borough's goals for bicycle and pedestrian linkages are as follows:

- Provide bicycle and pedestrian linkages between neighborhoods and key destinations within the Borough, and to neighboring municipalities.
- Establish a permanent advisory committee for bicycle and pedestrian facilities.
- To the greatest extent possible, develop bicycle and pedestrian linkages between dead-end streets and cul-de-sacs.
- Provide identification and guide signs for bicyclists and pedestrians.
- Provide safe and adequate bicycle parking options at key destinations, and in all public parks.
- Work with Monmouth County to provide signage that alerts motorists of the presence of bicyclists along county roadways.
- Provide only bicycle-safe sewer grates in all areas of the Borough.
- Provide adequate lighting to ensure safety for bicyclists and pedestrians.



2015 Master Plan Reexamination Report & Amendment Borough of Rumson, Monmouth County, New Jersey

- Ensure that all bicycle projects comply with recognized design standards, such as the *Guide for the Development of Bicycling Facilities* prepared by the American Association of State Highway and Transportation Officials.
- Investigate potential funding mechanisms for bicycle and pedestrian facilities, including grants and open space trust funds.
- Coordinate bicycle planning with adjoining municipalities, Monmouth County, and the State of New Jersey.
- Develop a borough-wide bicycle and pedestrian facility map that is displayed at parks and other major destinations.
- Provide traffic calming at key locations to improve bicycle and pedestrian safety and encourage use of facilities.

Furthermore, this Circulation Plan Element is updated to include the public facilities and critical infrastructure mapping that is discussed in the Community Facilities and Resiliency Plan Element, as shown in Appendix E of this document. Note that this mapping shows the relation of these features to mapped flood hazard areas.



Stormwater Management Plan Element

As recommended in the 2015 Master Plan Reexamination Report, the Stormwater Management Plan Element is hereby amended to incorporate both the Borough's Hazard Mitigation Plan action items identified in the 2015 Master Plan Reexamination Report and also the green building and infrastructure techniques outlined in the 2015 Land Use Plan Amendment.



Housing Plan Element

The Borough of Rumson already filed a plan with the Council on Affordable Housing (COAH), but the plan has not been certified, therefore the Borough of Rumson is classified as having a “participating” status before COAH. A decision by the New Jersey Supreme Court on March 10, 2015 established a transitional process in which the Borough will be able to file a declaratory judgment action immediately upon the March 10 decision becoming effective on June 8, 2015. The Borough should undertake a review of the implications of the Supreme Court decision and make a determination of the appropriate course of action to address compliance with the affordable housing obligation.

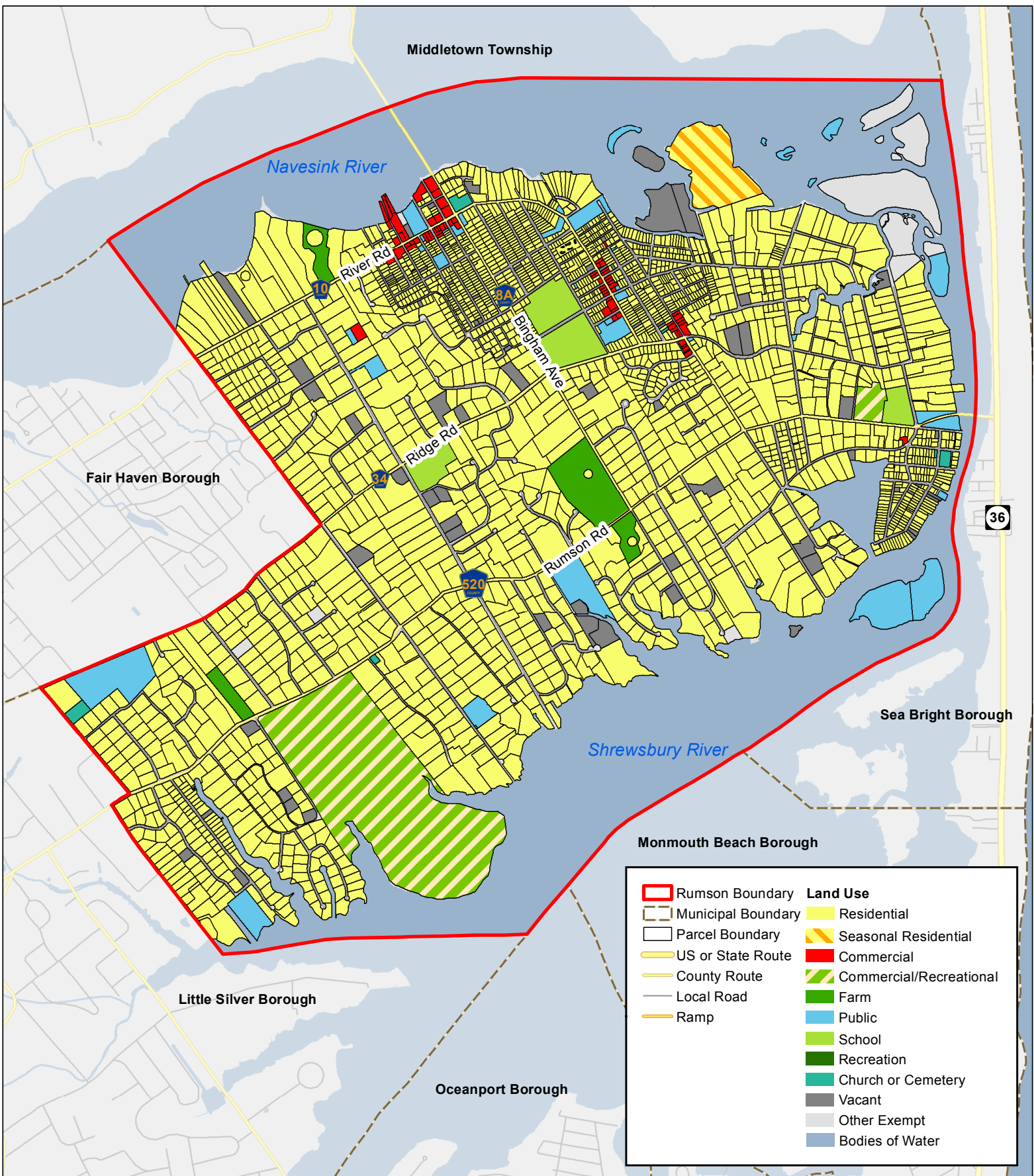
While it is not the intent for this Housing Plan Element to make any changes to the Borough’s Housing Element and Fair Share Plan at this time, the Housing Plan Element is hereby amended to address the following:

- The Borough encourages homeowners of single-family structures to elevate their homes to make them more resilient to future Sandy-type storms.
- It is the Borough’s policy that affordable housing should not be located within the flood hazard areas.



Appendix A: Existing Land Use Map

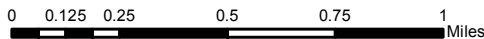




Rumson Boundary	Land Use
Municipal Boundary	Residential
Parcel Boundary	Seasonal Residential
US or State Route	Commercial
County Route	Commercial/Recreational
Local Road	Farm
Ramp	Public
	School
	Recreation
	Church or Cemetery
	Vacant
	Other Exempt
	Bodies of Water



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Prepared by: JAC, 2/19/2015
 Source: NJDEP; NJDOT; NJGIN; Monmouth County; Borough of Rumson
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2014 Master Plan Reexamination Report

Existing Land Use

Borough of Rumson

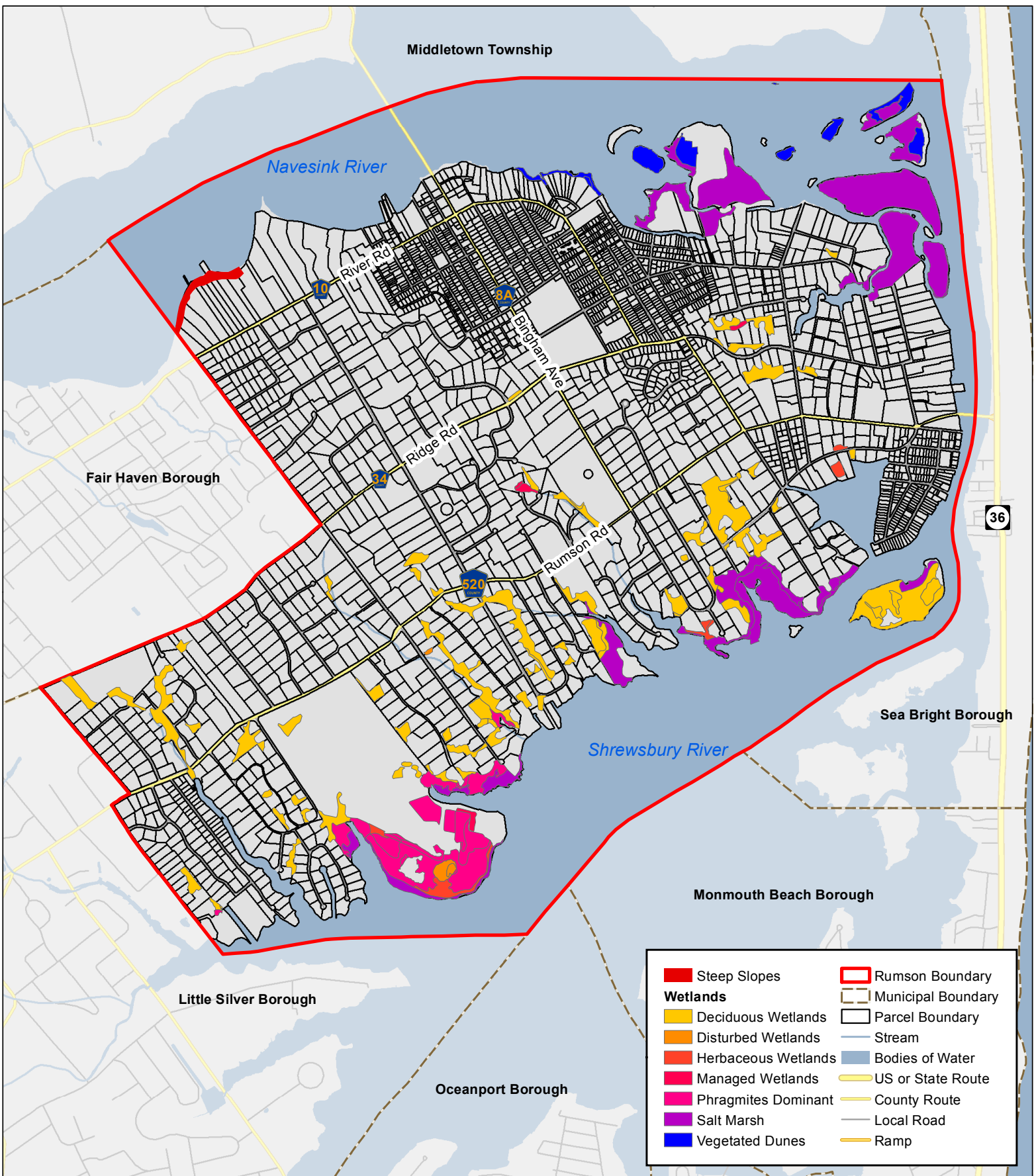
Monmouth County, New Jersey



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.

Appendix B: Critical Environmental Areas





Steep Slopes	Rumson Boundary
Wetlands	Municipal Boundary
Deciduous Wetlands	Parcel Boundary
Disturbed Wetlands	Stream
Herbaceous Wetlands	Bodies of Water
Managed Wetlands	US or State Route
Phragmites Dominant	County Route
Salt Marsh	Local Road
Vegetated Dunes	Ramp



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0 0.125 0.25 0.5 0.75 1 Miles

Prepared by: JAC, 10/17/2014
 Source: NJDEP; NJDOT; NJGIN; Monmouth County; Borough of Rumson
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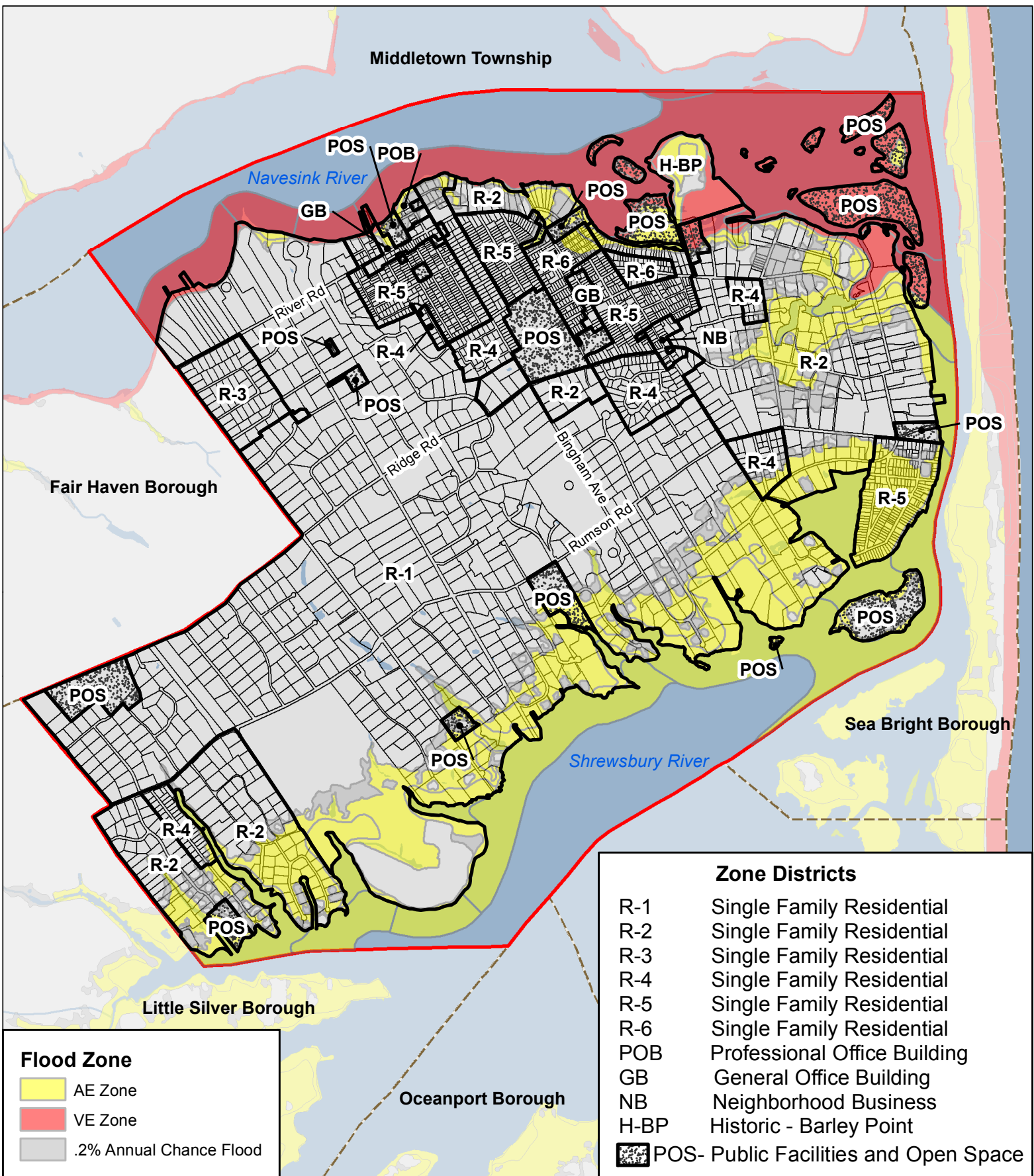
Critical Environmental Areas Borough of Rumson Monmouth County, New Jersey



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.

Appendix C: Existing Zoning & Flood Hazard Areas Overlay





Flood Zone

- AE Zone
- VE Zone
- .2% Annual Chance Flood

Zone Districts

- R-1 Single Family Residential
- R-2 Single Family Residential
- R-3 Single Family Residential
- R-4 Single Family Residential
- R-5 Single Family Residential
- R-6 Single Family Residential
- POB Professional Office Building
- GB General Office Building
- NB Neighborhood Business
- H-BP Historic - Barley Point
- POS- Public Facilities and Open Space



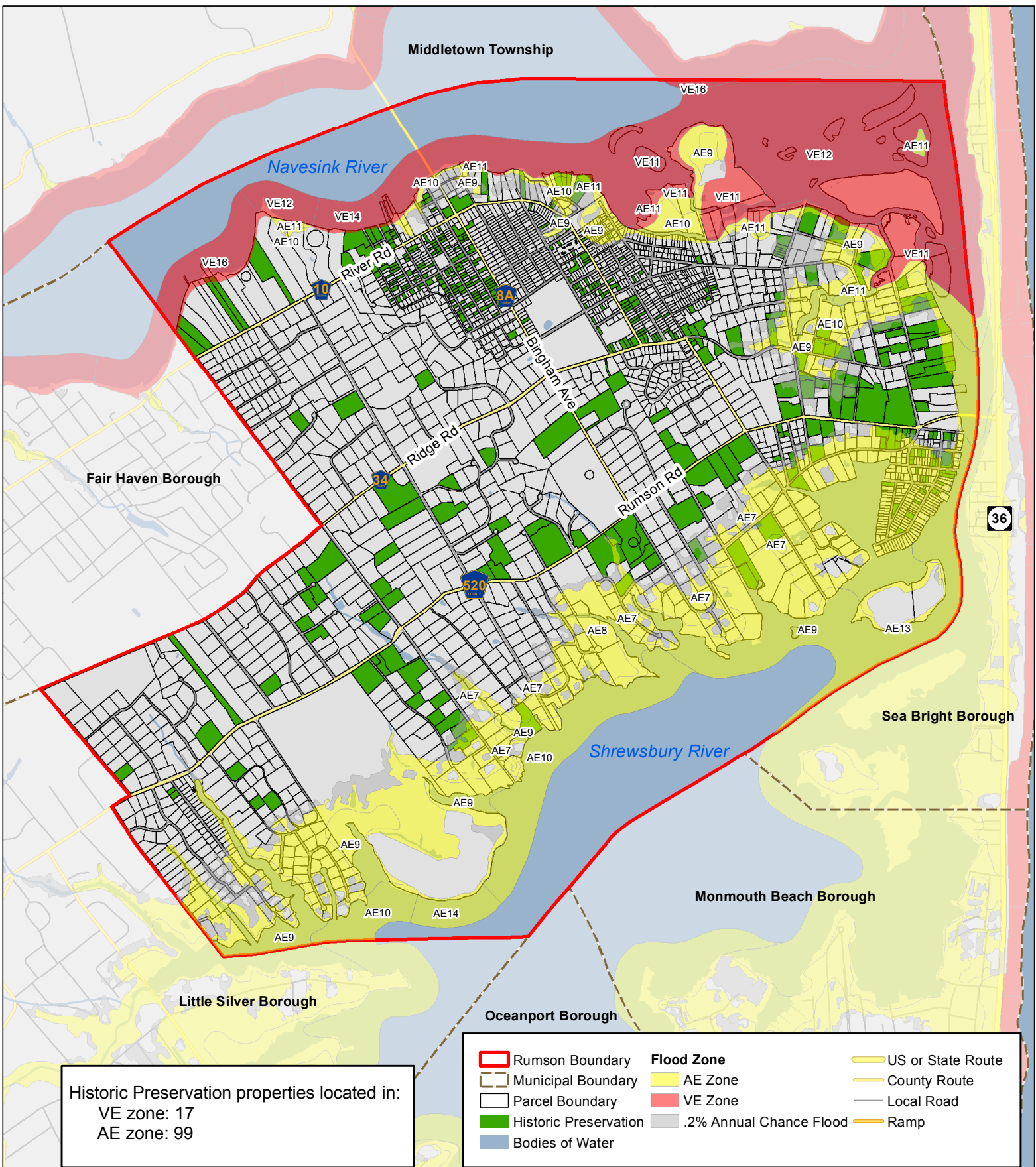
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**2014 Master Plan Reexamination Report
 Zoning Map
 Borough of Rumson
 Monmouth County, New Jersey**



Appendix D: Historic Properties





Historic Preservation properties located in:
 VE zone: 17
 AE zone: 99

Rumson Boundary	Flood Zone	US or State Route
Municipal Boundary	AE Zone	County Route
Parcel Boundary	VE Zone	Local Road
Historic Preservation	.2% Annual Chance Flood	Ramp
Bodies of Water		



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0 0.125 0.25 0.5 0.75 1 Miles

Prepared by: JAC, 2/19/2015
 Source: NJDEP; NJDOT; NJGIN; Monmouth County; Borough of Rumson
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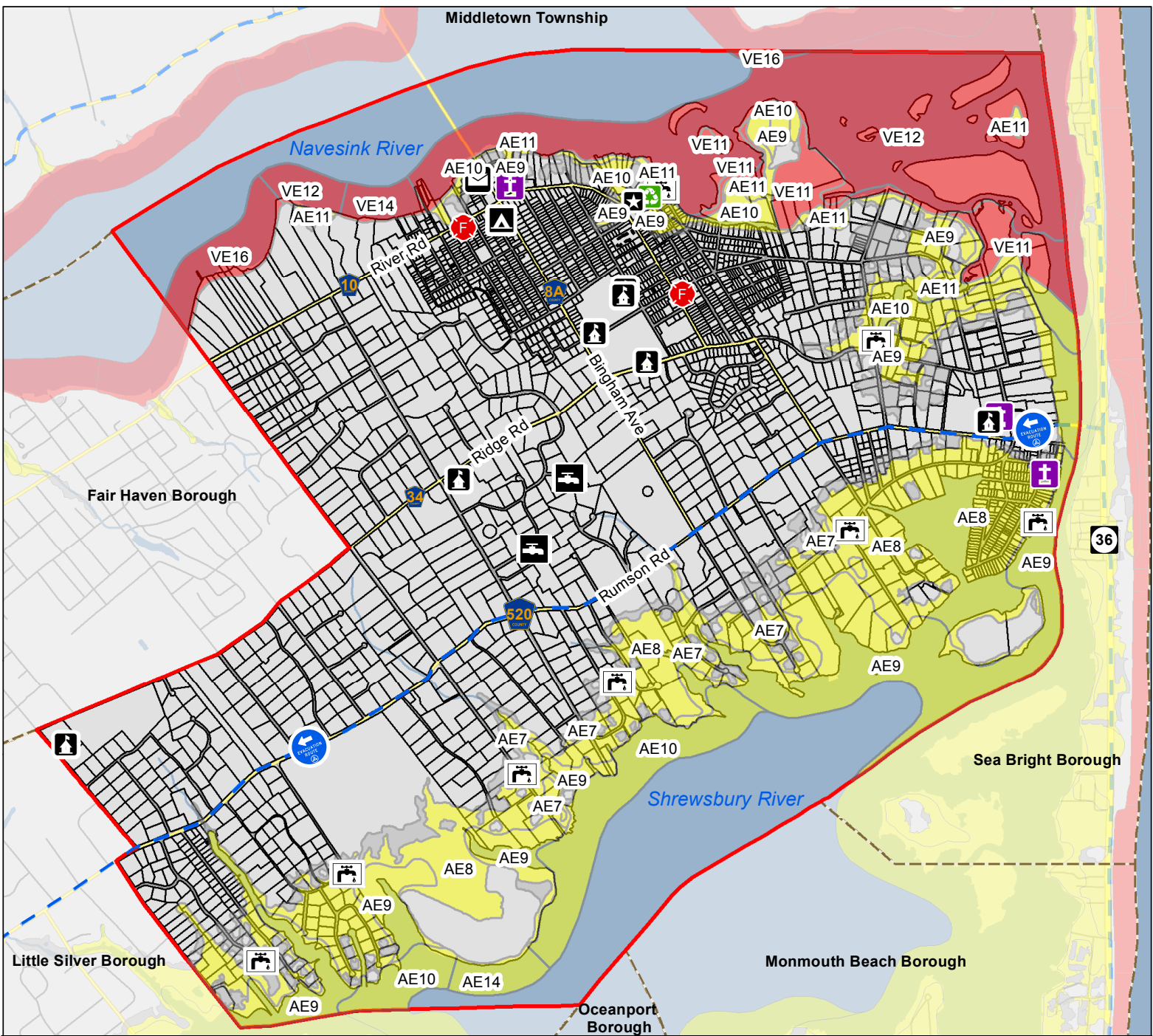
2014 Master Plan Reexamination Report Historic Preservation Properties Borough of Rumson Monmouth County, New Jersey



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.

Appendix E: Community Facilities and Flood Hazard Areas





Post Office	Schools	Flood Zone	Rumson Boundary	Designated Evacuation Route
Borough Hall & Police Department	Church	AE Zone	Municipal Boundary	US or State Route
Fire Station	Pump Station Undamaged During Hurricane Sandy	VE Zone	Parcel Boundary	County Route
DPW Garage / Recycling Center	Pump Station Damaged During Hurricane Sandy	.2% Annual Chance Flood	Bodies of Water	Local Road
Bingham Hall Comfort Station				Ramp


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0 0.125 0.25 0.5 0.75 1 Miles

Community Facilities & Flood Hazard Areas Borough of Rumson Monmouth County, New Jersey

Prepared by: JAC, 2/25/2015
 Source: NJDEP; NJDOT; NJGIN; Borough of Rumson; FEMA
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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.



Appendix B

Pet Waste Ordinance

**AN ORDINANCE TO AMEND THE CODE
OF THE BOROUGH OF RUMSON BY
ADDING CHAPTER XVI, PET WASTE**

BE IT ORDAINED by the Mayor and Council of the Borough of Rumson, in the County of Monmouth and State of New Jersey.

SECTION 1. That Chapter XVI, Section 5, Pet Waste, be added to read as follows:

§ 16-5.1. Purpose:

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

§ 16-5.2. Definitions:

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

- a. Immediate – shall mean that the pet solid waste is removed at once, without delay.
- b. Owner/Keeper – any person who shall possess, maintain, house or harbor any pet or otherwise have custody of any pet, whether or not the owner of such pet.
- c. Person – any individual, corporation,

company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

- d. Pet – a domesticated animal (other than a disability assistance animal) kept for amusement or companionship.
- e. Pet solid waste – waste matter expelled from the bowels of the pet; excrement.
- f. Proper disposal – placement in a designated waste receptacle, or other suitable container, and discarded in a refuse container which is regularly emptied by the municipality or some other refuse collector; or disposal into a system designed to convey domestic sewage for proper treatment and disposal.

§ 16-5.3. Requirement for Disposal:

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

§ 16-5.4. Exemptions:

Any owners and keeper who requires the use of a disability assistance animal shall be exempt from the provisions of this section while such animal is being used for that purpose.

§ 16-5.5. Enforcement:

The provisions of this Article shall be enforced by the Police Department of the Borough of Rumson.

§ 16-5.6. Violations and Penalty:

Any person(s) who is found to be in violation of

the provisions of this ordinance shall be subject to a fine not to exceed \$100 for each separate offense.

SECTION 2. This ordinance shall take effect upon final passage and publication according to law.

Introduced: November 10, 2005.

Passed and Approved: December 1, 2005.

I hereby approve of the passing of this ordinance.

John E. Ekdahl
Mayor

Attest:

Thomas S. Rogers
Borough Clerk/Administrator



Appendix C

Wildlife Feeding Ordinance

**AN ORDINANCE TO AMEND THE CODE
OF THE BOROUGH OF RUMSON BY
ADDING CHAPTER XVI, WILDLIFE FEEDING**

BE IT ORDAINED by the Mayor and Council of the Borough of Rumson, in the County of Monmouth and State of New Jersey.

SECTION 1. That Chapter XVI, Section 6, Wildlife Feeding, be added to read as follows:

§ 16-6.1. Purpose:

An ordinance to prohibit the feeding of unconfined wildlife in any public park or on any other property owned or operated by the Borough of Rumson, so as to protect public health, safety and welfare, and to prescribe penalties for failure to comply.

§ 16-6.2. Definitions:

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

- a. Feed – to give, place, expose, deposit, deposit, distribute or scatter any edible material with the intention of feeding, attracting or enticing wildlife. Feeding does not include baiting in the legal taking of fish and/or game.
- b. Person – any individual, corporation, company,

partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

- c. Wildlife – all animals that are neither human nor domesticated.

§ 16-6.3. Prohibited Conduct:

- a. No person shall feed, in any public park or on any other property owned or operated by the Borough of Rumson, any wildlife, excluding confined wildlife (for example, wildlife confined in zoos, parks or rehabilitation centers, or unconfined wildlife at environmental education centers).

§ 16-6.4. Enforcement:

- a. This ordinance shall be enforced by the Police Department of the Borough of Rumson.
- b. Any person found to be in violation of this ordinance shall be ordered to cease the feeding immediately.

§ 16-6.5. Violations and Penalties:

Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed \$100 for each separate offense.

SECTION 2. This ordinance shall take effect upon the final passage and publication according to law.

Introduced: November 10, 2005.

Passed and Approved: December 1, 2005.

I hereby approve of the
passing of this ordinance.

John E. Ekdahl
Mayor

Attest:

Thomas S. Rogers
Borough Clerk/Administrator



Appendix D

Litter Control Ordinance

**AN ORDINANCE TO AMEND THE CODE
OF THE BOROUGH OF RUMSON BY
ADDING CHAPTER XVI, LITTER CONTROL**

BE IT ORDAINED by the Mayor and Council of the Borough of Rumson, in the County of Monmouth and State of New Jersey.

SECTION 1. That Chapter XVI, Section 7, Litter Control, be added to read as follows:

§ 16-7.1. Purpose:

An ordinance to establish requirements to control littering in the Borough of Rumson, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

§ 16-7.2. Definitions:

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

- a. Litter – any used or unconsumed substance or waste material which has been discarded, whether made of aluminum, glass, plastic, rubber, paper, or other natural or synthetic material, or any combination thereof, including, but not limited to, any bottle, jar or can, or any top, cap or detachable tab of any bottle, jar or can, any unlighted cigarette, cigar, match or any flaming or glowing material

or any garbage, trash, refuse, debris, rubbish, grass clippings or other lawn or garden waste, newspapers, magazines, glass, metal, plastic or paper containers or other packaging or construction material, but does not include the waste of the primary processes of mining or other extraction processes, logging, saw-milling, farming or manufacturing.

- b. Litter Receptacle – a container suitable for the depositing of litter.
- c. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

§ 16-7.3. Prohibited acts and regulated activities:

- 1. It shall be unlawful for any person to throw, drop, discard or otherwise place any litter of any nature upon public or private property other than in a litter receptacle, or having done so, to allow such litter to remain.
- 2. Whenever any litter is thrown or discarded or allowed to fall from a vehicle or boat in violation of this ordinance, the operator or owner, or both, of the motor vehicle or boat shall also be deemed to have violated this ordinance.

§ 16-7.4. Enforcement:

This ordinance shall be enforced by the Police Department of the Borough of Rumson.

§ 16-7.5. Penalties:

Any person(s) who is found to be in violation of

the provisions of this ordinance shall be subject to a fine not to exceed \$100 for each separate offense.

SECTION 2. This ordinance shall take effect upon the final passage and publication according to law.

Introduced: November 10, 2005.

Passed and Approved: December 1, 2005.

I hereby approve of the passing of this ordinance.

John E. Ekdahl
Mayor

Attest:

Thomas S. Rogers
Borough Clerk/Administrator



Appendix E

Improper Disposal of Waste Ordinance

**AN ORDINANCE TO AMEND THE CODE
OF THE BOROUGH OF RUMSON BY
ADDING CHAPTER XVI, IMPROPER
DISPOSAL OF WASTE**

BE IT ORDAINED by the Mayor and Council of the Borough of Rumson, in the County of Monmouth and State of New Jersey.

SECTION 1. That Chapter XVI, Section 8, Improper Disposal of Waste, be added to read as follows:

§ 16-8.1. Purpose:

An ordinance to prohibit the spilling, dumping, or disposal of materials other than stormwater to the municipal separate storm sewer system (MS4) operated by the Borough of Rumson, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

§ 16-8.2. Definitions:

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

- a. Municipal separate storm sewer system (MS4) – a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by the Borough

of Rumson or other public body, and is designed and used for collecting and conveying stormwater. MS4s do not include combined sewer systems, which are sewer systems that are designed to carry sanitary sewage at all times and to collect and transport stormwater from streets and other sources.

- b. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
- c. Stormwater – water resulting from precipitation (including rain and snow) that runs off the land’s surface, is transmitted to the subsurface, is captured by separate storm sewers or other sewerage or drainage facilities, or is conveyed by snow removal equipment.

§ 16-8.3. Prohibited Conduct:

The spilling, dumping, or disposal of materials other than stormwater to the municipal separate storm sewer system operated by the Borough of Rumson is prohibited. The spilling, dumping, or disposal of materials other than stormwater in such manner as to cause the discharge of pollutants to the municipal separate storm water system is also prohibited.

§ 16-8.4. Exceptions to Prohibition:

- a. Water line flushing and discharges from potable water sources.
- b. Uncontaminated ground water (e.g., infiltration, crawl space or basement sump pumps, foundation or footing drains, rising ground waters).

- c. Air conditioning condensate (excluding contact and non-contact cooling water).
- d. Irrigation water (including landscape and lawn watering runoff).
- e. Flows from springs, riparian habitats and wetlands, water reservoir discharges and diverted stream flows.
- f. Residential car washing water, and residential swimming pool discharges.
- g. Sidewalk, driveway and street wash water.
- h. Flows from fire fighting activities.
- i. Flows from rinsing of the following equipment with clean water:
 - Beach maintenance equipment immediately following their use for their intended purposes; and
 - Equipment used in the application of salt and de-icing materials immediately following salt and de-icing material applications. Prior to rinsing with clean water, all residual salt and de-icing materials must be removed from equipment and vehicles to the maximum extent practicable using dry cleaning methods (e.g., shoveling and sweeping). Recovered materials are to be returned to storage for reuse or properly discarded.

Rinsing of equipment, as noted in the above situation is limited to exterior, undercarriage, and exposed parts and does not apply to engines or other enclosed machinery.

§ 16-8.5. Enforcement:

This ordinance shall be enforced by the Police

Department of the Borough of Rumson.

§ 16-8.6. Penalties:

Any person(s) who continues to be in violation of the provisions of this ordinance, after being duly notified, shall be subject to a fine not to exceed \$100 for each separate offense.

SECTION 2. This ordinance shall take effect upon the final passage and publication according to law.

Introduced: November 10, 2005.

Passed and Approved: December 1, 2005.

I hereby approve of the
passing of this ordinance.

John E. Ekdahl
Mayor

Attest:

Thomas S. Rogers
Borough Clerk/Administrator



Appendices F & F1
Containerized Yard Waste/ Yard Waste Collection Ordinance

**AN ORDINANCE TO AMEND THE CODE
OF THE BOROUGH OF RUMSON BY
ADDING CHAPTER XVI, CONTAINERIZED
YARD WASTE**

BE IT ORDAINED by the Mayor and Council of the Borough of Rumson, in the County of Monmouth and State of New Jersey.

SECTION 1. That Chapter XVI, Section 4, Containerized Yard Waste, be added to read as follows:

§ 16-4.1 Purpose:

An ordinance to establish requirements for the proper handling of yard waste in the Borough of Rumson, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

§ 16-4.2. Definitions:

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

- a. Containerized – means the placement of yard waste in bio degradable bags only, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.
- b. Person – any individual, corporation, company,

partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

- c. Street – means any street, avenue, boulevard, road, parkway, viaduct, drive or other way, which is an existing State, county, or municipal roadway, and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas in which the street lines.
- d. Yard Waste – means leaves, brush, and thatch, but does not include grass clippings.

§ 16-4.3. Prohibited Conduct:

The owner or occupant of any property, or any employee or contractor of such owner or occupant engaged to provide lawn care or landscaping services, shall not sweep, rake, blow or otherwise place yard waste, unless the yard waste is containerized, at the curb or along the street, which shall be is only allowed during the seven (7) days prior to a Borough scheduled and announced collection, and shall not be placed closer than 10 feet from any storm drain inlet. If yard waste that is not containerized is placed in the street, the party responsible for placement of yard waste must remove the yard waste from the street or said party shall be deemed in violation of this ordinance.

§ 16-4.4. Enforcement:

The provisions of this ordinance shall be enforced by the Police Department of the Borough of Rumson.

§ 16-4.5. Violations and Penalties:

Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed \$100 for each separate offense.

SECTION 2. This ordinance shall take effect upon final passage and publication according to law.

Introduced: November 10, 2005.

Passed and Approved: December 1, 2005.

I hereby approve of the passing of this ordinance.

John E. Ekdahl
Mayor

Attest:

Thomas S. Rogers
Borough Clerk/Administrator

**AN ORDINANCE TO AMEND THE CODE
OF THE BOROUGH OF RUMSON
BY ADDING CHAPTER XVI, YARD WASTE
COLLECTION PROGRAM**

BE IT ORDAINED by the Mayor and Council of the Borough of Rumson, in the County of Monmouth and State of New Jersey.

SECTION 1. That Chapter XVI, Section 3, Yard Waste Collection Program, be added to read as follows:

§ 16-3.1. Purpose:

An ordinance to establish a yard waste collection and disposal program in the Borough of Rumson, so as to protect public health, safety, and welfare, and to prescribe penalties for the failure to comply.

§ 16-3.-2. Definitions:

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

- a. Containerized – means the placement of yard waste in bio degradable bags only, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.

- b. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
- c. Street – means any street, avenue, boulevard, road, parkway, viaduct, drive, or other way, which is an existing State, county, or municipal roadway, and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas within the street lines.
- d. Yard Waste – means leaves, brush, and thatch, but does not include grass clippings.

§ 16-3.3. Yard Waste Collection.

Sweeping, raking, blowing or otherwise placing yard waste that is not containerized at the curb or along the street is only allowed during the seven (7) days prior to a Borough scheduled and announced collection, and shall not be placed closer than 10 feet from any storm drain inlet. Placement of such a yard waste at the curb or along the street at any other time or in any other manner is a violation of this ordinance. If such placement of the yard waste occurs, the party responsible for placement of the yard waste must remove the yard waste from the street or said party must remove the yard waste from the street or said party shall be deemed in violation of this ordinance.

§ 16-3.4. Container Required.

The owner or occupant of any residential property shall provide bio degradable bags for contractors of such owner or occupant engaged to provide lawn care or landscaping services should the schedule of work on the property preclude compliance with “seven day rule” for placement of yard waste

along the street.

§ 16-3.5. Prohibited Acts.

- a. Placement of grass clippings at the curb or along the street at any time.
- b. Placement of yard waste at curb or along the street prior to Borough scheduled periods as specified in this Ordinance.
- c. Placement of brush at the curb or along the street from November through March of the following year.
- d. Placement of leaves at the curb or along the street in the months of January, February, March, July and August.
- e. Placement of yard waste within 10 feet from any storm drain.
- f. Containers shall not be placed at street curb at any time except on the Borough scheduled pick-up date.

§ 16-3.6. Enforcement.

The provisions of the ordinance shall be enforced by the Police Department of the Borough of Rumson.

§ 16-3.7. Violations and Penalties.

Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed \$100 for each separate offense.

SECTION 2. This ordinance shall take effect upon final passage and publication according to law.

Introduced: November 10, 2005.

Passed and Approved: December 1, 2006.

I hereby approve of the
passing of this ordinance.

John E. Ekdahl
Mayor

Attest:

Thomas S. Rogers
Borough Clerk/Administrator



Appendix G

Private Storm Drain Inlet Retrofitting Ordinance

§ 16-11. PRIVATE STORM DRAIN INLET RETROFITTING.

§ 16-11.1. Purpose. [Ord. No. 10-007G, § 2]

The purpose of this section is to establish requirements for the retrofitting of existing storm drain inlets which are in direct contact with repaving, repairing, reconstruction, or resurfacing or alterations of facilities on private property, to prevent the discharge of solids and floatables (such as plastic bottles, cans, food wrappers and other litter) to the municipal separate storm sewer system(s) operated by the Borough of Rumson so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

§ 16-11.2. Definitions. [Ord. No. 10-007G, § 2]

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

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) — Shall mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by the Borough of Rumson or other public body, and is designed and used for collecting and conveying stormwater. "MS4s do not include combined sewer systems, which are sewer systems that are designed to carry sanitary sewage at all times and to collect and transport stormwater from streets and other sources."

PERSON — Shall mean any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

STORM DRAIN INLET — Shall mean an opening in a storm drain used to collect stormwater runoff and includes, but is not limited to, a grate inlet, curb-opening inlet, slotted inlet, and combination inlet.

WATERS OF THE STATE — Shall mean the ocean and its estuaries, all springs, streams and bodies of surface or groundwater, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

§ 16-11.3. Prohibited Conduct. [Ord. No. 10-007G, § 2]

No person in control of private property (except a residential lot with one single-family house) shall authorize the repaving, repairing (excluding the repair of individual potholes), resurfacing (including top coating or chip sealing with asphalt emulsion of a thin base of hot bitumen), reconstructing or altering any surface that is in direct contact with an existing storm drain inlet on that property unless the storm drain inlet either:

- a. Already meets the design standard below to control passage of solid and floatable materials; or
- b. Is retrofitted or replaced to meet the standard in subsection 16-11.4 below prior to the completion of the project.

§ 16-11.4. Design Standards. [Ord. No. 10-007G, § 2]

Storm drain inlets identified in subsection 16-11.3 above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash and other floating, suspended, or settleable solids. For exemptions to this standard see subsection 16-11.4d below.

- a. Design engineers shall use either of the following grades whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
 1. The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or
 2. A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than one-half (0.5) inch across the smallest dimension.
- b. Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channel, and stormwater basin floors.

- c. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two (2.0) or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.
- d. This standard shall not apply:
 - 1. Where the Municipal Engineer agrees that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;
 - 2. Where flows are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
 - (a) A rectangular space four and five-eighths (4 5/8) inches long and one and one-half (1.5) inches wide (this option does not apply for outfall netting facilities); or
 - (b) A bar screen having a bar spacing of one-half (0.5) inch.
 - 3. Where flows are conveyed through a trash rack that has parallel bars with one (1.0) inch spacing between the bars; or
 - 4. Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

§ 16-11.5. Enforcement. [Ord. No. 10-007G, § 2]

This section shall be enforced by the Police Department or Code Enforcement of the Borough of Rumson.

§ 16-11.6. Violations and Penalties. [Ord. No. 10-007G, § 2]

Any person(s), firm(s) or corporation(s) who violates or neglects to comply with any provision of this section or any rule or regulation pursuant thereto, shall be subject to the penalties as stated in Chapter 3, Section 3-1.



Appendix H
Stormwater Control Ordinance
(Adopted December 2005)

**BOROUGH OF RUMSON
COUNTY OF MONMOUTH**

**AN ORDINANCE TO AMEND THE CODE OF THE BOROUGH OF RUMSON
BY ADDING CHAPTER XVI, ENVIRONMENTAL PROTECTION,
SECTION 2, STORMWATER MANAGEMENT AND CONTROL**

BE IT ORDAINED by the Mayor and Council of the borough of Rumson, in the County of Monmouth and State of New Jersey, as follows:

SECTION 1

That Chapter XVI, Environmental Protection, Section 2, Stormwater Management and Control, is added as follows:

16-2.1 Title

This section shall be known as and may be cited as the “Stormwater Management Ordinance of the Borough of Rumson”

16-2.2 Scope and Purpose

a. **Policy Statement**

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural Best Management Practices (BMPs). Structural BMPs should be integrated with nonstructural stormwater management measures and proper maintenance plans. Nonstructural measures include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated loading of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

b. **Purpose**

It is the purpose of this section to establish minimum stormwater management requirements and controls for development.

c. Applicability

This section shall be applicable to all development which:

1. Requires a development permit as defined in Chapter 22 of the Code of the Borough of Rumson; and
2. Meets or exceeds the following Stormwater Management Thresholds:

STORMWATER MANAGEMENT THRESHOLDS	
A. Residential Development	
1. Total lot disturbance, including new building and lot coverage, soil disturbance and/or re-grading, exceeds 40,000 square feet in the R-1, R-2 or R-3 Zone District or 7,000 square feet in other zone districts; and/or	
2. New impervious surface exceeds 10,000 square feet; and/or	
3. A building permit is required and:	
a. Building coverage or lot coverage exceeds or will exceed 75% of the maximum permitted in the R-1, R-2 or R-3 Zone District or 85% of the maximum permitted in the other zone districts; and	
b. Building coverage added as a result of the development exceeds 1,200 square feet in the R-1, R-2, or R-3 Zone District or 400 square feet in other zone districts.	
B. Non-residential Development	
1. The Development is a major development as defined by N.J.A.C. 7:8-1.2 et seq.; and/or	
2. Lot coverage exceeds or will exceed 85% of the maximum permitted; and	
a. Lot coverage added as a result of the development exceeds the greater of 4,000 square feet or 60% of the maximum lot coverage permitted; or	
b. Lot disturbance exceeds 10,000 square feet.	

d. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued pursuant to this section are to be considered an integral part of development approvals under the development permit, subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this section shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This section is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this section imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

16-2.3 Definitions and Word Usage

For the purpose of this section, the following terms, phrases, words and their derivations shall have the meaning given herein. When not inconsistent with the context, words used in the present tense include the future, words in the plural number include the singular and words in the singular number include the plural number. The word “shall” is always mandatory and not merely directory.

Unless specifically defined below, words or phrases used in this section shall be interpreted so as to give them the meaning they have in common usage and to give this section its most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

CAFRA Planning Map means the geographic depiction of the boundaries for coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

CAFRA Centers, Cores or Nodes means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

Compaction means the increase in soil bulk density.

Core means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

County review agency means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A county planning agency; or

A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

Department means the New Jersey Department of Environmental Protection.

Designated Center means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

Design engineer means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

Development means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use

of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act , N.J.S.A 4:1C-1 et seq.

Drainage area means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving water body or to a particular point along a receiving water body.

Environmentally critical areas means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Non-game Species Program.

Empowerment Neighborhood means a neighborhood designated by the Urban Coordinating Council "in consultation and conjunction with" the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

Erosion means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Impervious surface means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

Infiltration is the process by which water seeps into the soil from precipitation.

Major development means any development that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

Municipality means any City, Borough, Town, Township, or Village.

Node means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

Nutrient means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

Person means any individual, corporation, company, partnership, firm, association, Borough of Rumson, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.

Pollutant means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and non-hazardous pollutants.

Recharge means the amount of water from precipitation that infiltrates into the ground and is not evapo-transpired.

Sediment means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

Site means the lot or lots upon which a development is to occur or has occurred.

Soil means all unconsolidated mineral and organic material of any origin.

State Development and Redevelopment Plan Metropolitan Planning Area (PA1) means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

State Plan Policy Map is defined as the geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

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

Stormwater runoff means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

Stormwater management basin means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

Stormwater management measure means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

Tidal Flood Hazard Area means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

Urban Coordinating Council Empowerment Neighborhood means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

Urban Enterprise Zones means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

Urban Redevelopment Area is defined as previously developed portions of areas: (1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes; (2) Designated as CAFRA Centers, Cores or Nodes; (3) Designated as Urban Enterprise Zones; and (4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

Waters of the State means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

Wetlands or **wetland** means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

16-2.4 General Standards

a. Design and Performance Standards for Stormwater Management Measures

1. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Subsection 16-2.5. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.
2. The standards in this Section apply only to development exceeding the Stormwater Management Threshold outlined in Subsection 16-2.2., c, 2, and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.
3. The standards in Subsection 16-2.11 apply to development which exceeds the Stormwater Management Threshold in Subsection 16-2.2, c, 2, but does not meet the definition of “Major Development.”

16-2.5 General Stormwater Management Requirements for Major Development

- a. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Subsection 16-2.12.
- b. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department' Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).
- c. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections 16-2.5.f and 16-2.5.g:
 1. The construction of an underground utility line provided that the disturbed areas are re-vegetated upon completion;
 2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
 3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.
- d. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections 16-2.5.f and 16-2.5.g may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:
 1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
 2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Subsections 16-2.5.f and 16-2.5.g to the maximum extent practicable;
 3. The applicant demonstrates that, in order to meet the requirements of Subsections 16-2.5.f and 16-2.5.g, existing structures currently in use, such as homes and buildings, would need to be condemned; and
 4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under 16-2.5.d.3 above within the upstream drainage area of the receiving stream, that

would provide additional opportunities to mitigate the requirements of Subsections 16-2.5.f and 16-2.5.g that were not achievable on-site.

e. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in Subsections 16-2.5.f and 16-2.5.g shall be met by incorporating nonstructural stormwater management strategies set forth at Subsection 16-2.5.e into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Paragraph 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.
2. Nonstructural stormwater management strategies incorporated into site design shall:
 - (a) Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
 - (b) Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
 - (c) Maximize the protection of natural drainage features and vegetation;
 - (d) Minimize the decrease in the "time of concentration" from pre-construction to post construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;
 - (e) Minimize land disturbance including clearing and grading;
 - (f) Minimize soil compaction;
 - (g) Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
 - (h) Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;
 - (i) Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:

- (i) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Subsection 16.2.5.e.3 below;
 - (ii) Site design features that help to prevent discharge of trash and debris from drainage systems;
 - (iii) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
 - (iv) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24- 39 et seq., and implementing rules.
3. Site design features identified under Subsection 16-2.5.e.2(i)(ii) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, “solid and floatable materials” means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Subsection 16-2.5.e.3(c) below.
- (a) Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
 - (i.) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or
 - (ii) A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

- (b) Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.
- (c) This standard does not apply:

(i) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;

(ii) Where flows from the water quality design storm as specified in Subsection 16-2.5-g.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

- A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or
- A bar screen having a bar spacing of 0.5 inches.

(iii) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in Subsection 16-2.5.g.1; or

(iv) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

4 Any land area used as a nonstructural stormwater management measure to meet the performance standards in Subsections 16-2.5.f and 16-2.5.g shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.

5 Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices (BMP) Manual. The BMP Manual may be obtained from the address identified in Subsection 16-2.8, or found on the Department's website at www.njstormwater.org.

f Erosion Control, Groundwater Recharge and Runoff Quantity Standards

1 This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.

(a) The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.

(b) The minimum design and performance standards for groundwater recharge are as follows:

(i) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Subsection 16-2.6, either:

(1) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or

(2) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated

(ii) This groundwater recharge requirement does not apply to projects within the “urban redevelopment area,” or to projects subject to Subsection 16-2.5.f.1(b)(iii) below.

(iii) The following types of stormwater shall not be recharged:

(1) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than “reportable quantities” as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

(2) Industrial stormwater exposed to “source material.” “Source material” means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

(iv) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal

systems and other subsurface structures in the vicinity or down gradient of the groundwater recharge area.

- (c) In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Subsection 16-2.6, complete one of the following:
- (i) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
 - (ii) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
 - (iii) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the preconstruction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-construction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or
 - (iv) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (i), (ii) and (iii) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

2 Any application for a new agricultural development that meets the definition of major development in Subsection 16-2.3 shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of this Subsection and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For the purposes of this Subsection, “agricultural development” means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of

land for the processing or sale of food and the manufacturing of agriculturally related products.

g Stormwater Runoff Quality Standards

1 Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2 For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Subsection 16-2.8, or found on the Department’s website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Subsection 16-2.8. Total Suspended Solids (TSS) reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New

Jersey Department of Environmental Protection, P.O. Box 418 Trenton, New Jersey, 08625-0418.

- If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (A \times B)/100$$

Where: R = total TSS percent load removal from application of both BMPs
 A = the TSS percent removal rate applicable to the first BMP
 B = the TSS percent removal rate applicable to the second BMP

Table 2: TSS Removal Rates for BMPs	
Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Subsection 16-2.7.c
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

- If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the sub-areas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.
- Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Subsections 16-2.5.f and 16-2.5.g.
- Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Subsection 16-2.8.
- In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
- Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle

Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

- (a) The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
 - (i) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.
 - (ii) Encroachment within the designated special water resource protection area under Subsection 16-2.5.g.8(a)(i) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.
- (b) All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the “Standards For Soil Erosion and Sediment Control in New Jersey,” established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq.
- (c) If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the “Standards for Soil Erosion and Sediment Control in New Jersey,” established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:
 - (i) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
 - (ii) Stormwater associated with discharges allowed by this Subsection shall achieve a 95 percent TSS post-construction removal rate;

- (iii) Temperature shall be addressed to ensure no impact on the receiving waterway;
 - (iv) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;
 - (v) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
 - (vi) All encroachments proposed under this Subsection shall be subject to review and approval by the Department.
- (d) A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Subsection 16-2.5.g.8 has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to Subsection 16-2.5.g.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in 16-2.5.g.8.(a)(i) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.
- (e) Paragraph 16-2.5.g.8 does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

16-2.6 Calculation of Stormwater Runoff and Groundwater Recharge

- a Stormwater runoff shall be calculated in accordance with the following:
 - 1 The design engineer shall calculate runoff using one of the following methods:
 - (a) The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or
 - (b) The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

- 2 For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term “runoff coefficient” applies to both the NRCS methodology at Subsection 16-2.6.a.1(a) and the Rational and Modified Rational Methods at Subsection 16-2.6.a.1(b). A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).
 - 3 In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts that may reduce pre-construction stormwater runoff rates and volumes.
 - 4 In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 – Urban Hydrology for Small Watersheds and other methods may be employed.
 - 5 If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.
- b Groundwater recharge may be calculated in accordance with the following:
- 1 The New Jersey Geological Survey Report GSR-32 *A Method for Evaluating Ground-Water Recharge Areas in New Jersey*, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

16-2.7 Standards for Structural Stormwater Management Measures

- a Standards for structural stormwater management measures are as follows:
- 1 Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas,

wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).

- 2 Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1”) spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Subsection 16-2.9.d.
 - 3 Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
 - 4 At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
 - 5 Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Subsection 16-2.9.
- b Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Subsection 16-2.5 of this Chapter.
- c Manufactured treatment devices may be used to meet the requirements of Subsection 16-2.5 of this Chapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

16-2.8 Sources for Technical Guidance

- a Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; Telephone (609) 777-1038.
 - 1 Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bio-retention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration

structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.

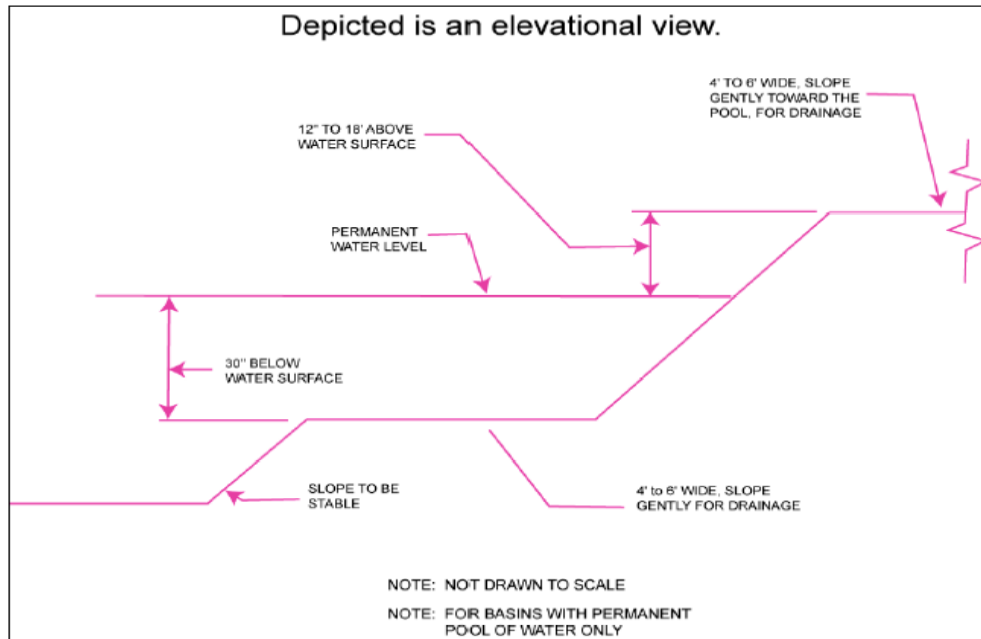
- 2 The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.
- b Additional technical guidance for stormwater management measures can be obtained from the following:
- 1 The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;
 - 2 The Rutgers Cooperative Extension Service, 732-932-9306; and
 - 3 The Freehold Soil Conservation Districts, 4000 Kozlowski Road, Freehold New Jersey, 07728, (732)683-8500.

16-2.9 Safety Standards for Stormwater Management Basins

- a This Subsection sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This Subsection applies to any new stormwater management basin.
- b Requirements for Trash Racks, Overflow Grates and Escape Provisions
 - 1 A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:
 - (a) The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.
 - (b) The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.
 - (c) The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
 - (d) The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.

- 2 An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
 - (a) The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
 - (b) The overflow grate spacing shall be no less than two inches across the smallest dimension.
 - (c) The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.
 - 3 For purposes of this paragraph, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
 - (a) If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Subsection 16-2.9.c a freestanding outlet structure may be exempted from this requirement.
 - (b) Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Subsection 16-2.9.d for an illustration of safety ledges in a stormwater management basin.
 - (c) In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.
- c Variance or Exemption from Safety Standards
- 1 A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

d Illustration of Safety Ledges in a New Stormwater Management Basin



16-2.10 Requirements for a Site Development Stormwater Plan

a Submission of Site Development Stormwater Plan

- 1 Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Subsection 16-2.10.c below as part of the submission of the applicant's application for subdivision or site plan approval.
- 2 The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
- 3 The applicant shall submit 15 copies of the materials listed in the checklist for site development stormwater plans in accordance with Subsection 16-2.10.c of this ordinance.

b Site Development Stormwater Plan Approval

The applicant's Site Development project shall be reviewed as a part of the subdivision, site plan, or development application review process by the Planning Board, Zoning Board of Adjustment or official from which municipal approval is sought. The Board and/or Zoning Officer shall consult the Borough Engineer or other such engineer (as appropriate) to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

c Checklist Requirements

The following information shall be required:

1 Topographic Base Map

- (a) The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2- foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2 Environmental Site Analysis

- (a) A written and graphic description of the natural and man-made features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.

3 Project Description and Site Plan(s)

- (a) A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4 Land Use Planning and Source Control Plan

- (a) This plan shall provide a demonstration of how the goals and standards of Subsections 16-2.4 through 16-2.7 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5 Stormwater Management Facilities Map

- (a) The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

- (i) Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
- (ii) Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6 Calculations

- (a) Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Subsection 16-2.5 of this ordinance.
- (b) When the proposed stormwater management control measures (e.g., infiltration basins) depend on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

7 Maintenance and Repair Plan

- (a) The design and planning of the stormwater management facility shall meet the maintenance requirements of Subsection 16-2.12.

8 Waiver from Submission Requirements

- (a) The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Subsections 16-2.10.c.1 through 116-2.10.c.6 of this Section when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

16-2.11 Stormwater Management Requirements for Other than Major Development

- a The requirements of this subsection shall apply to development which exceeds the Stormwater Management Threshold described in Subsection 16-2.2, c, 2, but does not meet the definition of major development.
- b In lieu of complying with the general requirements of this subsection, the applicant may:
 - 1 Demonstrate compliance with the requirements for major development set forth in Subsection 16-2.5 and succeeding Subsections (except Subsection 16-2.5.q.8 which is superseded by Subsection 16-2.11.c.3); or

- 2 Demonstrate that there will be no increase in either the peak rate of runoff or the total volume of runoff from the site after development when compared to pre-development conditions.

c General Requirements

- 1 If the development requires major site plan or major subdivision approval, the applicant must demonstrate that:
 - (a) Neither the peak rate of runoff nor the total volume of runoff after development will be more than 115% of the pre-development rate and volume; and
 - (b) That a TSS reduction of 50% is obtained for residential development and a TSS reduction of 70% is obtained for non-residential or mixed use development.
- 2 If the development does not require major site plan or major subdivision approval, the applicant must demonstrate that:
 - (a) All runoff from at least 90% of the roof area of all principal and accessory building is recharged; and
 - (b) Parking areas, drives, access aisles or other areas used by motor vehicles are provided with a pervious paving system meeting the standards of the New Jersey Stormwater Best Management Practices Manual as follows:
 - (1) At least ninety percent (90%) of the total area must be provided with the effective equivalent of a paving system described as “permeable pavers without storage”.
 - (2) If paving systems described as “porous paving” or “permeable pavers with storage bed” are provided, they will be considered twice as effective as “permeable pavers without storage” and must be provided for at least forty-five percent (45%) of the total area.
 - (3) In sites which combine more than one system, twice the area of “porous paving” and/or “permeable pavers with storage bed” plus the area of “permeable pavers without storage” must be at least ninety percent (90%) of the total area.
 - (c) As an alternative to (a) and (b) above, the applicant may demonstrate compliance with Subsection 16-2.11.c.1.
- 3 The applicant shall preserve and maintain a special water resource protection area along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water

quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

- (a) The applicant shall preserve and maintain an undisturbed minimum special water resource protection area equal to the minimum required Rear Yard Setback required by Chapter 22 of the Borough Code. The special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.
- (b) Encroachment within the designated special water resource protection area under Subsection 16-2.11.c.3(a) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable.
- (c) All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the “Standards For Soil Erosion and Sediment Control in New Jersey,” established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq.

d Waiver from General Requirements

- 1 The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in this subsection when it can be demonstrated that:
 - (a) Alternate measures proposed by the developer achieve substantially similar benefits to the required measures; or
 - (b) Literal compliance is technically impractical or presents a substantial economic hardship.
- 2 As part of the waiver application the applicant shall submit documentation to demonstrate that the proposed development incorporates the Non-Structural Stormwater Management Strategies set forth in Subsection 16-2.5.e.2 to the maximum extent practicable.

16-2.12 Maintenance and Repair

a Applicability

- 1 Projects subject to review as in Subsection 16-2.2.c of this ordinance shall comply with the requirements of Subsections 16-2.12.b and 16-2.12.c.

b General Maintenance

- 1 The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
- 2 The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
- 3 Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
- 4 If the person responsible for maintenance identified under Subsection 16-2.12.b above is not a public agency, the maintenance plan and any future revisions based on Subsection 16-2.12.b.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
- 5 Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.
- 6 The person responsible for maintenance identified under Subsection 16-2.12.b .2 above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.
- 7 The person responsible for maintenance identified under Subsection 16-2.12.b 2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
- 8 The person responsible for maintenance identified under Subsection 16-2.12.b. 2 above shall retain and make available, upon request by any public entity with

administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Subsections 16-2.12.b.6 and 16-2.12.b.7 above.

- 9 The requirements of Subsections 16-2.12.b.3 and 16-2.12.b.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
 - 10 In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the Borough may immediately proceed to do so and shall bill the cost thereof to the responsible person.
- c Nothing in this Subsection shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

16-2.13 Violations and Penalties

- a Any person who violates any provision of this subsection shall, upon conviction thereof in municipal Court, be punishable by imposition of the penalties set forth in Chapter 3, Subsection 3-1.1.
- b Each instance of engaging in a separate regulated activity, in violation of this Subsection shall be deemed a separate offense.
- c In addition, the Borough may institute civil action for injunctive or other relief to enforce the provision of this subsection.



Appendix I

Illicit Connection Ordinance

**AN ORDINANCE TO AMEND THE CODE
OF THE BOROUGH OF RUMSON BY
ADDING CHAPTER XVI, ILLICIT
CONNECTION**

BE IT ORDAINED by the Mayor and Council of the Borough of Rumson, in the County of Monmouth and State of New Jersey.

SECTION 1. That Chapter XVI, Section 9, Illicit Connection, be added to read as follows:

§ 16-9.1. Purpose:

An ordinance to prohibit illicit connections to the municipal separate storm sewer system(s) operated by the Borough of Rumson, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

§ 16-9.2. Definitions:

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

- a. Domestic sewage – waste and wastewater from humans or household operations.
- b. Illicit connection – any physical or non-physical connection that discharges domestic sewage,

non-contact cooling water, process wastewater, or other industrial waste (other than stormwater) to the municipal separate storm sewer system operated by the Borough of Rumson, unless that discharge is authorized under a NJPDES permit other than the Tier A Municipal Stormwater General Permit (NJPDES Permit Number NJ0141852). Non-physical connections may include, but are not limited to, leaks, flows, or overflows into the municipal separate storm sewer system.

- c. Industrial waste – non-domestic waste, including, but limited to, those pollutants regulated under Section 307(a), (b), or (c) of the Federal Clean Water Act (33 U.S.C. § 1317(a), (b), or (c)).
- d. Municipal separate storm sewer system (MS4) – a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by the Borough of Rumson or other public body, and is designed and used for collecting and conveying stormwater. MS4s do not include combined sewer systems, which are sewer systems that are designed to carry sanitary sewage at all times and to collect and transport stormwater from streets and other sources.
- e. NJPDES permit – a permit issued by the New Jersey Department of Environmental Protection to implement the New Jersey Pollutant Discharge Elimination System (NJPDES) rules at N.J.A.C. 7:14A.
- f. Non-contact cooling water – water used to

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

- g. Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
- h. Process wastewater – any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. Process wastewater includes, but is not limited to, leachate and cooling water other than non-contact cooling water.
- i. Stormwater – water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, is captured by separate storm sewers or other sewerage or drainage facilities, or is conveyed by snow removal equipment.

§ 16-9.3. Prohibited Conduct:

No person shall discharge or cause to be discharged through an illicit connection to the municipal separate storm sewer system operated by the Borough of Rumson any domestic sewage, non-contact cooling water, process wastewater, or other industrial waste (other than stormwater).

§ 16-9.4. Enforcement:

This ordinance shall be enforced by the Police Department of the Borough of Rumson.

§ 16-9.5. Penalties:

Any person(s) who is found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed \$100.00 for each separate offense.

SECTION 2. This ordinance shall take effect upon the final passage and publication according to law.

Introduced: November 10, 2005.

Passed and Approved: December 1, 2005.

I hereby approve of the
passing of this ordinance.

John E. Ekdahl
Mayor

Attest:

Thomas S. Rogers
Borough Clerk/Administrator



Appendix J
Refuse Container/Dumpster Ordinance

§ 16-10. REFUSE CONTAINERS/DUMPSTERS.

§ 16-10.1. Purpose. [Ord. No. 10-007G, § 1]

The purpose of this section is to establish requirements for dumpsters and other refuse containers that are outdoors or exposed to stormwater, requiring dumpsters and refuse containers to be covered at all times and prohibits the spilling, dumping, leaking, or otherwise discharge of liquids, semi-liquids or solids from the containers to the municipal separate storm sewer system(s) operated by the Borough of Rumson and/or the waters of the State so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

§ 16-10.2. Definitions. [Ord. No. 10-007G, § 1]

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

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) — Shall mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by the Borough of Rumson or other public body, and is designed and used for collecting and conveying stormwater. "MS4s do not include combined sewer systems, which are sewer systems that are designed to carry sanitary sewage at all times and to collect and transport stormwater from streets and other sources."

PERSON — Shall mean any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

REFUSE CONTAINER — Shall mean any waste container that a person controls whether owned, leased, or operated, including dumpsters, trash cans, garbage pails, and plastic trash bags.

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

WATERS OF THE STATE — Shall mean the ocean and its estuaries, all springs, streams and bodies of surface or groundwater, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

§ 16-10.3. Prohibited Conduct. [Ord. No. 10-007G, § 1]

Any person who controls, whether owned, leased, or operated, a refuse container or dumpster must ensure that such container or dumpster is covered at all times and shall prevent refuse from spilling out or overflowing. Any person who owns, leases or otherwise uses a refuse container or dumpster must ensure that such container or dumpster does not leak or otherwise discharge liquids, semi-liquids or solids to the municipal separate storm water sewer system(s) operated by the Borough of Rumson.

§ 16-10.4. Exceptions to Prohibition. [Ord. No. 10-007G, § 1]

- a. Permitted temporary demolition containers.
- b. Litter receptacles (other than dumpsters or other bulk containers).
- c. Individual homeowner trash and recycling containers.
- d. Refuse containers at facilities authorized to discharge stormwater under a valid NJPDES permit.
- e. Large bulky items (e.g., furniture, bound carpet and padding, white goods placed curbside for pickup).

§ 16-10.5. Enforcement.

This section shall be enforced by the Police Department or Code Enforcement of the Borough of Rumson. (Ord. No. 10-007G, § 1]

§ 16-10.6. Violations and Penalties. [Ord. No. 10-007G, § 1]

Any person(s), firm(s) or corporation(s) who violates or neglects to comply with any provision of this section or any rule or regulation pursuant thereto, shall be subject to the penalties as stated in Chapter 3, Section 3-1.



Appendix K
Stormwater Management and Control Ordinance
(Adoption Date February 2021)

21-001 G**AN ORDINANCE TO AMEND THE CODE OF THE BOROUGH OF RUMSON BY AMENDING CHAPTER XVI ENVIRONMENTAL PROTECTION ORDINANCES**

BE IT ORDAINED by the Mayor and Council of the Borough of Rumson, in the County of Monmouth and State of New Jersey that Chapter XVI (Environmental Protection) of the General Ordinances of the Borough of Rumson is hereby amended or supplemented as follows:

PURPOSE

The purpose of this Ordinance is to Amend Chapter XVI (Environmental Protection) by replacing Section 2 *Stormwater Management and Control* in its entirety.

Chapter XVI (Environmental Protection) of the General Ordinances of the Borough of Rumson is hereby amended or supplemented as follows (new text is double underlined, text to be deleted is struck through and notations to the reader and changes in subparagraph designations either with or without changes to content are italicized):

SECTION 1.

That Chapter XVI (Environmental Protection) Section 2 *Stormwater Management and Control* shall be replaced in its entirety as follows:

16-2 STORMWATER MANAGEMENT AND CONTROL**16-2.1 Title**

This section shall be known as and may be cited as the “Stormwater Management Ordinance of the Borough of Rumson.”

16-2.2 Scope and Purpose:**A. Policy Statement**

Flood control, groundwater recharge, and pollutant reduction shall be achieved through the use of stormwater management measures, including green infrastructure Best Management Practices (GI BMPs) and nonstructural stormwater management strategies. GI BMPs and low impact development (LID) should be utilized to meet the goal of maintaining natural hydrology to reduce stormwater runoff volume, reduce erosion, encourage infiltration and groundwater recharge, and reduce pollution. GI BMPs and LID should be developed based upon physical site conditions and the origin, nature and the anticipated quantity, or amount, of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

B. Purpose

The purpose of this ordinance is to establish minimum stormwater management requirements and controls for “major development,” as defined below in subsection 16-2.3.

C. Applicability. This ordinance shall be applicable to all developments which:

1. Requires a development permit as defined in Chapter 22 of the Code of the Borough of Rumson, and
2. Meets or exceeds the following Stormwater Management Thresholds:

STORMWATER MANAGEMENT THRESHOLDS**A. Residential Development**

1. <u>Total lot disturbance, including new building and lot coverage, soil disturbance and/or re-grading, exceeds 40,000 square feet in the R-1, R-2, or R-3 Zone Districts, or 7,000 square feet in other zone districts; and/or</u>
2. <u>New impervious surface exceeds 10,000 square feet; and/or</u>
3. <u>A building permit is required and;</u>
a. <u>Building coverage exceeds 75% of the maximum permitted in the R-1, R-2, or R-3 Zone Districts or 85% of the maximum permitted in the other zone districts; and</u>
b. <u>Building coverage added as a result of the development exceeds 1,200 square feet in the R-1, R-2, and R-3 Zone Districts or 400 square feet in other zone districts.</u>
4. <u>Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C 5:21.</u>
B. <u>Nonresidential Development</u>
1. <u>The development is a major development as defined in subsection 16-2.3; and/or</u>
2. <u>Lot coverage exceeds or will exceed 85% of the maximum permitted; and</u>
c. <u>Lot coverage added as a results of the development exceeds the greater of 4,000 square feet or 60% of the maximum lot coverage permitted; or</u>
d. <u>Lot disturbance exceeds 10,000 square feet.</u>
C. <u>This ordinance shall also be applicable to all major developments undertaken by The Borough of Rumson.</u>

D. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued pursuant to this ordinance are to be considered an integral part of development approvals and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare.

This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

16-2.3 Definitions:

For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

“CAFRA Centers, Cores or Nodes” means those areas with boundaries incorporated by reference or revised by the Department in accordance with N.J.A.C. 7:7-13.16.

“CAFRA Planning Map” means the map used by the Department to identify the location of Coastal Planning Areas, CAFRA centers, CAFRA cores, and CAFRA nodes. The CAFRA Planning Map is available on the Department's Geographic Information System (GIS).

“Community basin” means an infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond, established in accordance with N.J.A.C. 7:8-4.2(c)14, that is designed and constructed in accordance with the New Jersey Stormwater Best Management Practices Manual, or an alternate design, approved in accordance with N.J.A.C. 7:8-5.2(g), for an infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond and that complies with the requirements of this chapter.

“Compaction” means the increase in soil bulk density.

“Contributory drainage area” means the area from which stormwater runoff drains to a stormwater management measure, not including the area of the stormwater management measure itself.

“Core” means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

“County review agency” means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

1. A county planning agency or
2. A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

“Department” means the Department of Environmental Protection.

“Designated Center” means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

“Design engineer” means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

“Development” means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlarge-enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 *et seq.*

In the case of development of agricultural land, development means: any activity that requires a State permit, any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act, N.J.S.A 4:1C-1 *et seq.*

“Disturbance” means the placement or reconstruction of impervious surface or motor vehicle surface, or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Milling and repaving is not considered disturbance for the purposes of this definition.

“Drainage area” means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

“Environmentally constrained area” means the following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

“Environmentally critical area” means an area or feature which is of significant environmental value, including but not limited to: stream corridors, natural heritage priority sites, habitats of endangered or threatened species, large areas of contiguous open space or upland forest, steep slopes, and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department’s Landscape Project as approved by the Department’s Endangered and Nongame Species Program.

“Empowerment Neighborhoods” means neighborhoods designated by the Urban Coordinating Council “in consultation and conjunction with” the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

“Erosion” means the detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

“Green infrastructure” means a stormwater management measure that manages stormwater close to its source by:

1. Treating stormwater runoff through infiltration into subsoil;
2. Treating stormwater runoff through filtration by vegetation or soil; or
3. Storing stormwater runoff for reuse.

"HUC 14" or "hydrologic unit code 14" means an area within which water drains to a particular receiving surface water body, also known as a subwatershed, which is identified by a 14-digit hydrologic unit boundary designation, delineated within New Jersey by the United States Geological Survey.

“Impervious surface” means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

“Infiltration” is the process by which water seeps into the soil from precipitation.

“Lead planning agency” means one or more public entities having stormwater management planning authority designated by the regional stormwater management planning committee pursuant to N.J.A.C. 7:8-3.2, that serves as the primary representative of the committee.

“Major development” means an individual “development,” as well as multiple developments that individually or collectively result in:

1. The disturbance of one or more acres of land since February 2, 2004;
2. The creation of one-quarter acre or more of “regulated impervious surface” since February 2, 2004;
3. The creation of one-quarter acre or more of “regulated motor vehicle surface” since March 2, 2021 *{or the effective date of this ordinance, whichever is earlier}*; or
4. A combination of 2 and 3 above that totals an area of one-quarter acre or more. The same surface shall not be counted twice when determining if the combination area equals one-quarter acre or more.

Major development includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually meet any one or more of paragraphs 1, 2, 3, or 4 above. Projects undertaken by any government agency that otherwise meet the definition of “major development” but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered “major development.”

“Motor vehicle” means land vehicles propelled other than by muscular power, such as automobiles, motorcycles, autocycles, and low speed vehicles. For the purposes of this definition, motor vehicle does not include farm equipment, snowmobiles, all-terrain vehicles, motorized wheelchairs, go-carts, gas buggies, golf carts, ski-slope grooming machines, or vehicles that run only on rails or tracks.

“Motor vehicle surface” means any pervious or impervious surface that is intended to be used by “motor vehicles” and/or aircraft, and is directly exposed to precipitation including, but not limited to, driveways, parking areas, parking garages, roads, racetracks, and runways.

“Municipality” means any city, borough, town, township, or village.

“New Jersey Stormwater Best Management Practices (BMP) Manual” or “BMP Manual” means the manual maintained by the Department providing, in part, design specifications, removal rates, calculation methods, and soil testing procedures approved by the Department as being capable of contributing to the achievement of the stormwater management standards specified in this chapter. The BMP Manual is periodically amended by the Department as necessary to provide design specifications on additional best management practices and new information on already included practices reflecting the best available current information regarding the particular practice and the Department’s determination as to the ability of that best management practice to contribute to compliance with the standards contained in this chapter. Alternative stormwater management measures, removal rates, or calculation methods may be utilized, subject to any limitations specified in this chapter, provided the design engineer demonstrates to the municipality, in accordance with Section IV.F. of this ordinance and N.J.A.C. 7:8-5.2(g), that the proposed measure and its design will contribute to achievement of the design and performance standards established by this chapter.

“Node” means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

“Nutrient” means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

“Person” means any individual, corporation, company, partnership, firm, association, political subdivision of this State and any state, interstate or Federal agency.

“Pollutant” means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§ 2011 *et seq.*)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. “Pollutant” includes both hazardous and nonhazardous pollutants.

“Recharge” means the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

“Regulated impervious surface” means any of the following, alone or in combination:

1. A net increase of impervious surface;
2. The total area of impervious surface collected by a new stormwater conveyance system (for the purpose of this definition, a “new stormwater conveyance system” is a stormwater conveyance system that is constructed where one did not exist immediately prior to its construction or an existing system for which a new discharge location is created);
3. The total area of impervious surface proposed to be newly collected by an existing stormwater conveyance system; and/or
4. The total area of impervious surface collected by an existing stormwater conveyance system where the capacity of that conveyance system is increased.

“Regulated motor vehicle surface” means any of the following, alone or in combination:

1. The total area of motor vehicle surface that is currently receiving water;
2. A net increase in motor vehicle surface; and/or
quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant, where the water quality treatment will be modified or removed.

“Sediment” means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

“Site” means the lot or lots upon which a major development is to occur or has occurred.

“Soil” means all unconsolidated mineral and organic material of any origin.

“State Development and Redevelopment Plan Metropolitan Planning Area (PA1)” means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the State’s future redevelopment and revitalization efforts.

“State Plan Policy Map” is defined as the geographic application of the State Development and Redevelopment Plan’s goals and statewide policies, and the official map of these goals and policies.

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

“Stormwater management BMP” means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management BMP may either be normally dry (that is, a detention basin or infiltration system), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

“Stormwater management measure” means any practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

“Stormwater runoff” means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

“Stormwater management planning agency” means a public body authorized by legislation to prepare stormwater management plans.

“Stormwater management planning area” means the geographic area for which a stormwater management planning agency is authorized to prepare stormwater management plans, or a specific portion of that area identified in a stormwater management plan prepared by that agency.

“Tidal Flood Hazard Area” means a flood hazard area in which the flood elevation resulting from the two-, 10-, or 100-year storm, as applicable, is governed by tidal flooding from the Atlantic Ocean. Flooding in a tidal flood hazard area may be contributed to, or influenced by, stormwater runoff from inland areas, but the depth of flooding generated by the tidal rise and fall of the Atlantic Ocean is greater than flooding from any fluvial sources. In some situations, depending upon the extent of the storm surge from a particular storm event, a flood hazard area may be tidal in the 100-year storm, but fluvial in more frequent storm events.

“Urban Coordinating Council Empowerment Neighborhood” means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

“Urban Enterprise Zones” means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

“Urban Redevelopment Area” is defined as previously developed portions of areas:

1. Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
2. Designated as CAFRA Centers, Cores or Nodes;
3. Designated as Urban Enterprise Zones; and
4. Designated as Urban Coordinating Council Empowerment Neighborhoods.

“Water control structure” means a structure within, or adjacent to, a water, which intentionally or coincidentally alters the hydraulic capacity, the flood elevation resulting from the two-, 10-, or 100-year storm, flood hazard area limit, and/or floodway limit of the water. Examples of a water control structure may include a bridge, culvert, dam, embankment, ford (if above grade), retaining wall, and weir.

“Waters of the State” means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or groundwater, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

“Wetlands” or “wetland” means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

16-2.4 Design and Performance Standards for Stormwater Management Measures

- A. Stormwater management measures for major development shall be designed to provide erosion control, groundwater recharge, stormwater runoff quantity control, and stormwater runoff quality treatment as follows:

1. The minimum standards for erosion control are those established under the Soil and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules at N.J.A.C. 2:90.
 2. The minimum standards for groundwater recharge, stormwater quality, and stormwater runoff quantity shall be met by incorporating green infrastructure.
- B. The standards in this ordinance apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

16-2.5 Stormwater Management Requirements for Major Development

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with subsection 16-2.12.
- B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department's Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlenbergi* (bog turtle).
- C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity requirements of subsection 16-2.5.P, Q and R:
1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
 2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
 3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.
- D. A waiver from strict compliance from the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity requirements of subsection 16-2.5.O, P, Q and R may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:
1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
 2. The applicant demonstrates through an alternatives analysis, that through the use of stormwater management measures, the option selected complies with the requirements of subsection 16-2.5.O, P, Q and R to the maximum extent practicable;
 3. The applicant demonstrates that, in order to meet the requirements of subsection 16-2.5.O, P, Q and R, existing structures currently in use, such as homes and buildings, would need to be condemned; and
 4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under subsection 16-2.5.D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of subsection 16-2.5.O, P, Q and R that were not achievable onsite.
- E. Tables 1 through 3 below summarize the ability of stormwater best management practices identified and described in the New Jersey Stormwater Best

Management Practices Manual to satisfy the green infrastructure, groundwater recharge, stormwater runoff quality and stormwater runoff quantity standards specified in subsection 16-2.5.O, P, Q and R. When designed in accordance with the most current version of the New Jersey Stormwater Best Management Practices Manual, the stormwater management measures found at N.J.A.C. 7:8-5.2 (f) Tables 5-1, 5-2 and 5-3 and listed below in Tables 1, 2 and 3 are presumed to be capable of providing stormwater controls for the design and performance standards as outlined in the tables below. Upon amendments of the New Jersey Stormwater Best Management Practices to reflect additions or deletions of BMPs meeting these standards, or changes in the presumed performance of BMPs designed in accordance with the New Jersey Stormwater BMP Manual, the Department shall publish in the New Jersey Registers a notice of administrative change revising the applicable table. The most current version of the BMP Manual can be found on the Department’s website at:

https://njstormwater.org/bmp_manual2.htm.

- F. Where the BMP tables in the NJ Stormwater Management Rule are different due to updates or amendments with the tables in this ordinance the BMP Tables in the Stormwater Management rule at N.J.A.C. 7:8-5.2(f) shall take precedence.

<u>Table 1</u> <u>Green Infrastructure BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity</u>				
<u>Best Management Practice</u>	<u>Stormwater Runoff Quality TSS Removal Rate (percent)</u>	<u>Stormwater Runoff Quantity</u>	<u>Groundwater Recharge</u>	<u>Minimum Separation from Seasonal High Water Table (feet)</u>
<u>Cistern</u>	<u>0</u>	<u>Yes</u>	<u>No</u>	<u>--</u>
<u>Dry Well^(a)</u>	<u>0</u>	<u>No</u>	<u>Yes</u>	<u>2</u>
<u>Grass Swale</u>	<u>50 or less</u>	<u>No</u>	<u>No</u>	<u>2^(e)</u> <u>1^(f)</u>
<u>Green Roof</u>	<u>0</u>	<u>Yes</u>	<u>No</u>	<u>--</u>
<u>Manufactured Treatment Device^{(a) (g)}</u>	<u>50 or 80</u>	<u>No</u>	<u>No</u>	<u>Dependent upon the device</u>
<u>Pervious Paving System^(a)</u>	<u>80</u>	<u>Yes</u>	<u>Yes^(b)</u> <u>No^(c)</u>	<u>2^(b)</u> <u>1^(c)</u>
<u>Small-Scale Bioretention Basin^(a)</u>	<u>80 or 90</u>	<u>Yes</u>	<u>Yes^(b)</u> <u>No^(c)</u>	<u>2^(b)</u> <u>1^(c)</u>
<u>Small-Scale Infiltration Basin^(a)</u>	<u>80</u>	<u>Yes</u>	<u>Yes</u>	<u>2</u>

<u>Small-Scale Sand Filter</u>	<u>80</u>	<u>Yes</u>	<u>Yes</u>	<u>2</u>
<u>Vegetative Filter Strip</u>	<u>60-80</u>	<u>No</u>	<u>No</u>	<u>--</u>

(Notes corresponding to annotations ^(a) through ^(g) are found on Table 3)

Table 2 <u>Green Infrastructure BMPs for Stormwater Runoff Quantity</u> <u>(or for Groundwater Recharge and/or Stormwater Runoff Quantity</u> <u>with a Waiver or Variance from N.J.A.C. 7:8-5.3)</u>				
<u>Best Management Practice</u>	<u>Stormwater Runoff Quality TSS Removal Rate (percent)</u>	<u>Stormwater Runoff Quantity</u>	<u>Groundwater Recharge</u>	<u>Minimum Separation from Seasonal High Water Table (feet)</u>
<u>Bioretention System</u>	<u>80 or 90</u>	<u>Yes</u>	<u>Yes^(b)</u> <u>No^(c)</u>	<u>2^(b)</u> <u>1^(c)</u>
<u>Infiltration Basin</u>	<u>80</u>	<u>Yes</u>	<u>Yes</u>	<u>2</u>
<u>Sand Filter^(b)</u>	<u>80</u>	<u>Yes</u>	<u>Yes</u>	<u>2</u>
<u>Standard Constructed Wetland</u>	<u>90</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>
<u>Wet Pond^(d)</u>	<u>50-90</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>

(Notes corresponding to annotations ^(b) through ^(d) are found on Table 3)

Table 3 <u>BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or</u> <u>Stormwater Runoff Quantity</u> <u>only with a Waiver or Variance from N.J.A.C. 7:8-5.3</u>				
<u>Best Management Practice</u>	<u>Stormwater Runoff Quality TSS Removal Rate (percent)</u>	<u>Stormwater Runoff Quantity</u>	<u>Groundwater Recharge</u>	<u>Minimum Separation from Seasonal High Water Table (feet)</u>
<u>Blue Roof</u>	<u>0</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>
<u>Extended Detention Basin</u>	<u>40-60</u>	<u>Yes</u>	<u>No</u>	<u>1</u>
<u>Manufactured Treatment Device^(h)</u>	<u>50 or 80</u>	<u>No</u>	<u>No</u>	<u>Dependent upon the device</u>

<u>Sand Filter</u> ^(c)	<u>80</u>	<u>Yes</u>	<u>No</u>	<u>1</u>
<u>Subsurface Gravel Wetland</u>	<u>90</u>	<u>No</u>	<u>No</u>	<u>1</u>
<u>Wet Pond</u>	<u>50-90</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>

Notes to Tables 1, 2, and 3:

- (a) subject to the applicable contributory drainage area limitation specified at subsection 16-2.5.O.2;
- (b) designed to infiltrate into the subsoil;
- (c) designed with underdrains;
- (d) designed to maintain at least a 10-foot wide area of native vegetation along at least 50 percent of the shoreline and to include a stormwater runoff retention component designed to capture stormwater runoff for beneficial reuse, such as irrigation;
- (e) designed with a slope of less than two percent;
- (f) designed with a slope of equal to or greater than two percent;
- (g) manufactured treatment devices that meet the definition of green infrastructure at subsection 16-2.3;
- (h) manufactured treatment devices that do not meet the definition of green infrastructure at subsection 16-2.3.

G. An alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate may be used if the design engineer demonstrates the capability of the proposed alternative stormwater management measure and/or the validity of the alternative rate or method to the municipality. A copy of any approved alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate shall be provided to the Department in accordance with subsection 16-2.7.B. Alternative stormwater management measures may be used to satisfy the requirements at subsection 16-2.5.O only if the measures meet the definition of green infrastructure at Section II. Alternative stormwater management measures that function in a similar manner to a BMP listed at subsection 16-2.5.O.2 are subject to the contributory drainage area limitation specified at subsection 16-2.5.O.2 for that similarly functioning BMP. Alternative stormwater management measures approved in accordance with this subsection that do not function in a similar manner to any BMP listed at subsection 16-2.5.O.2 shall have a contributory drainage area less than or equal to 2.5 acres, except for alternative stormwater management measures that function similarly to cisterns, grass swales, green roofs, standard constructed wetlands, vegetative filter strips, and wet ponds, which are not subject to a contributory drainage area limitation. Alternative measures that function similarly to standard constructed wetlands or wet ponds shall not be used for compliance with the stormwater runoff quality standard unless a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with subsection 16-2.5.D is granted from subsection 16-2.5.O.

H. Whenever the stormwater management design includes one or more BMPs that will infiltrate stormwater into subsoil, the design engineer shall assess the hydraulic impact on the groundwater table and design the site, so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table, so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems or other subsurface structures within the zone of influence of the groundwater mound, or interference with the proper functioning of the stormwater management measure itself.

I. Design standards for stormwater management measures are as follows:

1. Stormwater management measures shall be designed to take into account the existing site conditions, including, but not limited to, environmentally critical areas; wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability, and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone);
 2. Stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure, as appropriate, and shall have parallel bars with one-inch spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third the width of the diameter of the orifice or one-third the width of the weir, with a minimum spacing between bars of one inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of subsection 16-2.9.C;
 3. Stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement;
 4. Stormwater management BMPs shall be designed to meet the minimum safety standards for stormwater management BMPs at subsection 16-2.9; and
 5. The size of the orifice at the intake to the outlet from the stormwater management BMP shall be a minimum of two and one-half inches in diameter.
- J. Manufactured treatment devices may be used to meet the requirements of this subchapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department. Manufactured treatment devices that do not meet the definition of green infrastructure at Section II may be used only under the circumstances described at subsection 16-2.5.O.4.
- K. Any application for a new agricultural development that meets the definition of major development at Section II shall be submitted to the Soil Conservation District for review and approval in accordance with the requirements at subsections 16-2.5.O, P, Q and R and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For purposes of this subsection, "agricultural development" means land uses normally associated with the production of food, fiber, and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacture of agriculturally related products.
- L. If there is more than one drainage area, the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at subsection 16-2.5.P, Q and R shall be met in each drainage area, unless the runoff from the drainage areas converge onsite and no adverse environmental impact would occur as a result of compliance with any one or more of the individual standards being determined utilizing a weighted average of the results achieved for that individual standard across the affected drainage areas.
- M. Any stormwater management measure authorized under the municipal stormwater management plan or ordinance shall be reflected in a deed notice recorded in the Monmouth County Clerk's Office. A form of deed notice shall be submitted to the municipality for approval prior to filing. The deed notice shall contain a description of the stormwater management measure(s) used to meet the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at subsections 16-2.5.O, P, Q and R and shall identify the location of the stormwater management measure(s) in NAD 1983 State Plane New Jersey FIPS 2900 US Feet or Latitude and Longitude in decimal degrees. The deed notice shall also reference the maintenance plan

required to be recorded upon the deed pursuant to subsection 16-2.12.B.5. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the municipality. Proof that the required information has been recorded on the deed shall be in the form of either a copy of the complete recorded document or a receipt from the clerk or other proof of recordation provided by the recording office. However, if the initial proof provided to the municipality is not a copy of the complete recorded document, a copy of the complete recorded document shall be provided to the municipality within 180 calendar days of the authorization granted by the municipality.

N. A stormwater management measure approved under the municipal stormwater management plan or ordinance may be altered or replaced with the approval of the municipality, if the municipality determines that the proposed alteration or replacement meets the design and performance standards pursuant to subsection 16-2.5 of this ordinance and provides the same level of stormwater management as the previously approved stormwater management measure that is being altered or replaced. If an alteration or replacement is approved, a revised deed notice shall be submitted to the municipality for approval and subsequently recorded with the Monmouth County Clerk’s Office and shall contain a description and location of the stormwater management measure, as well as reference to the maintenance plan, in accordance with M above. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the municipality in accordance with M above.

O. Green Infrastructure Standards

1. This subsection specifies the types of green infrastructure BMPs that may be used to satisfy the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards.
2. To satisfy the groundwater recharge and stormwater runoff quality standards at subsection 16-2.5.P and Q, the design engineer shall utilize green infrastructure BMPs identified in Table 1 at subsection 16-2.5.F. and/or an alternative stormwater management measure approved in accordance with subsection 16-2.5.G. The following green infrastructure BMPs are subject to the following maximum contributory drainage area limitations:

<u>Best Management Practice</u>	<u>Maximum Contributory Drainage Area</u>
<u>Dry Well</u>	<u>1 acre</u>
<u>Manufactured Treatment Device</u>	<u>2.5 acres</u>
<u>Pervious Pavement Systems</u>	<u>Area of additional inflow cannot exceed three times the area occupied by the BMP</u>
<u>Small-scale Bioretention Systems</u>	<u>2.5 acres</u>
<u>Small-scale Infiltration Basin</u>	<u>2.5 acres</u>
<u>Small-scale Sand Filter</u>	<u>2.5 acres</u>

3. To satisfy the stormwater runoff quantity standards at subsection 16-2.5.R, the design engineer shall utilize BMPs from Table 1 or from Table 2 and/or an alternative stormwater management measure approved in accordance with subsection 16-2.5.G.
4. If a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with subsection 16-2.5.D is granted from the requirements of this subsection, then BMPs from Table 1, 2, or 3, and/or an alternative stormwater management measure approved in accordance with subsection 16-2.5.G may be used to meet the groundwater recharge,

stormwater runoff quality, and stormwater runoff quantity standards at subsection 16-2.5.P, Q and R.

5. For separate or combined storm sewer improvement projects, such as sewer separation, undertaken by a government agency or public utility (for example, a sewerage company), the requirements of this subsection shall only apply to areas owned in fee simple by the government agency or utility, and areas within a right-of-way or easement held or controlled by the government agency or utility; the entity shall not be required to obtain additional property or property rights to fully satisfy the requirements of this subsection. Regardless of the amount of area of a separate or combined storm sewer improvement project subject to the green infrastructure requirements of this subsection, each project shall fully comply with the applicable groundwater recharge, stormwater runoff quality control, and stormwater runoff quantity standards at subsection 16-2.5.P, Q and R, unless the project is granted a waiver from strict compliance in accordance with subsection 16-2.5.D.

P. Groundwater Recharge Standards

1. This subsection contains the minimum design and performance standards for groundwater recharge as follows:
2. The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at subsection 16-2.6, either:
 - i. Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or
 - ii. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.
3. This groundwater recharge requirement does not apply to projects within the “urban redevelopment area,” or to projects subject to 4 below.
4. The following types of stormwater shall not be recharged:
 - i. Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than “reportable quantities” as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and
 - ii. Industrial stormwater exposed to “source material.” “Source material” means any material(s) or machinery, located at an industrial facility, that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

Q. Stormwater Runoff Quality Standards

1. This subsection contains the minimum design and performance standards to control stormwater runoff quality impacts of major development. Stormwater runoff quality standards are applicable when the major development results in an increase of one-quarter acre or more of regulated motor vehicle surface.

2. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm as follows:
 - i. Eighty percent TSS removal of the anticipated load, expressed as an annual average shall be achieved for the stormwater runoff from the net increase of motor vehicle surface.
 - ii. If the surface is considered regulated motor vehicle surface because the water quality treatment for an area of motor vehicle surface that is currently receiving water quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant is to be modified or removed, the project shall maintain or increase the existing TSS removal of the anticipated load expressed as an annual average.
3. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. Every major development, including any that discharge into a combined sewer system, shall comply with 2 above, unless the major development is itself subject to a NJPDES permit with a numeric effluent limitation for TSS or the NJPDES permit to which the major development is subject exempts the development from a numeric effluent limitation for TSS.
4. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 4, below. The calculation of the volume of runoff may take into account the implementation of stormwater management measures.

Table 4 - Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
1	0.00166	41	0.1728	81	1.0906
2	0.00332	42	0.1796	82	1.0972
3	0.00498	43	0.1864	83	1.1038
4	0.00664	44	0.1932	84	1.1104
5	0.00830	45	0.2000	85	1.1170
6	0.00996	46	0.2117	86	1.1236
7	0.01162	47	0.2233	87	1.1302
8	0.01328	48	0.2350	88	1.1368
9	0.01494	49	0.2466	89	1.1434
10	0.01660	50	0.2583	90	1.1500
11	0.01828	51	0.2783	91	1.1550
12	0.01996	52	0.2983	92	1.1600
13	0.02164	53	0.3183	93	1.1650
14	0.02332	54	0.3383	94	1.1700
15	0.02500	55	0.3583	95	1.1750
16	0.03000	56	0.4116	96	1.1800
17	0.03500	57	0.4650	97	1.1850
18	0.04000	58	0.5183	98	1.1900
19	0.04500	59	0.5717	99	1.1950
20	0.05000	60	0.6250	100	1.2000
21	0.05500	61	0.6783	101	1.2050
22	0.06000	62	0.7317	102	1.2100
23	0.06500	63	0.7850	103	1.2150
24	0.07000	64	0.8384	104	1.2200
25	0.07500	65	0.8917	105	1.2250
26	0.08000	66	0.9117	106	1.2267
27	0.08500	67	0.9317	107	1.2284
28	0.09000	68	0.9517	108	1.2300
29	0.09500	69	0.9717	109	1.2317
30	0.10000	70	0.9917	110	1.2334
31	0.10660	71	1.0034	111	1.2351
32	0.11320	72	1.0150	112	1.2367
33	0.11980	73	1.0267	113	1.2384
34	0.12640	74	1.0383	114	1.2400
35	0.13300	75	1.0500	115	1.2417
36	0.13960	76	1.0568	116	1.2434
37	0.14620	77	1.0636	117	1.2450
38	0.15280	78	1.0704	118	1.2467
39	0.15940	79	1.0772	119	1.2483
40	0.16600	80	1.0840	120	1.2500

5. If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (A \times B) / 100,$$

Where

R = total TSS Percent Load Removal from application of both BMPs, and
A = the TSS Percent Removal Rate applicable to the first BMP
B = the TSS Percent Removal Rate applicable to the second BMP.

6. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include green infrastructure BMPs that optimize nutrient removal while still achieving the performance standards in subsections 16-2.5.P, Q and R.

7. In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
8. The Flood Hazard Area Control Act Rules at N.J.A.C. 7:13-4.1(c)1 establish 300-foot riparian zones along Category One waters, as designated in the Surface Water Quality Standards at N.J.A.C. 7:9B, and certain upstream tributaries to Category One waters. A person shall not undertake a major development that is located within or discharges into a 300-foot riparian zone without prior authorization from the Department under N.J.A.C. 7:13.
9. Pursuant to the Flood Hazard Area Control Act Rules at N.J.A.C. 7:13-11.2(j)3.i, runoff from the water quality design storm that is discharged within a 300-foot riparian zone shall be treated in accordance with this subsection to reduce the post-construction load of total suspended solids by 95 percent of the anticipated load from the developed site, expressed as an annual average.
10. This stormwater runoff quality standards do not apply to the construction of one individual single-family dwelling, provided that it is not part of a larger development or subdivision that has received preliminary or final site plan approval prior to December 3, 2018, and that the motor vehicle surfaces are made of permeable material(s) such as gravel, dirt, and/or shells.

R. Stormwater Runoff Quantity Standards

1. This subsection contains the minimum design and performance standards to control stormwater runoff quantity impacts of major development.
2. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at subsection 16-2.6, complete one of the following:
 - i. Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2-, 10-, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
 - ii. Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the 2-, 10- and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
 - iii. Design stormwater management measures so that the post-construction peak runoff rates for the 2-, 10- and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed; or
 - iv. In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with 2.i, ii and iii above is required unless the design engineer demonstrates through hydrologic and hydraulic analysis that the increased volume, change in timing, or increased rate of the stormwater runoff, or any combination of the three will not result in additional flood damage below the point of discharge of the major development. No analysis is required if the stormwater is discharged directly into any ocean, bay, inlet, or the reach of any watercourse between its confluence with an ocean, bay, or inlet and downstream of the first water control structure.
3. The stormwater runoff quantity standards shall be applied at the site's boundary to each abutting lot, roadway, watercourse, or receiving storm sewer system.

16-2.6 Calculation of Stormwater Runoff and Groundwater Recharge:

A. Stormwater runoff shall be calculated in accordance with the following:

1. The design engineer shall calculate runoff using one of the following methods:

- i. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in Chapters 7, 9, 10, 15 and 16 Part 630, Hydrology National Engineering Handbook, incorporated herein by reference as amended and supplemented. This methodology is additionally described in *Technical Release 55 - Urban Hydrology for Small Watersheds* (TR-55), dated June 1986, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the Natural Resources Conservation Service website at:

https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf

or at United States Department of Agriculture Natural Resources Conservation Service, 220 Davison Avenue, Somerset, New Jersey 08873; or

- ii. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations. The rational and modified rational methods are described in "Appendix A-9 Modified Rational Method" in the Standards for Soil Erosion and Sediment Control in New Jersey, January 2014. This document is available from the State Soil Conservation Committee or any of the Soil Conservation Districts listed at N.J.A.C. 2:90-1.3(a)3. The location, address, and telephone number for each Soil Conservation District is available from the State Soil Conservation Committee, PO Box 330, Trenton, New Jersey 08625. The document is also available at:

<http://www.nj.gov/agriculture/divisions/anr/pdf/2014NJSoilErosionControlStandardsComplete.pdf>.

2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology above at subsection 16-2.6.A.1.i and the Rational and Modified Rational Methods at subsection 16-2.6.A.1.ii. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).
3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, that may reduce pre-construction stormwater runoff rates and volumes.
4. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from

unconnected impervious cover, urban impervious area modifications as described in the NRCS *Technical Release 55 – Urban Hydrology for Small Watersheds* or other methods may be employed.

5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

- B. Groundwater recharge may be calculated in accordance with the following:

The New Jersey Geological Survey Report GSR-32, A Method for Evaluating Groundwater-Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at the New Jersey Geological Survey website at:

<https://www.nj.gov/dep/njgs/pricelst/gsreport/gsr32.pdf>

or at New Jersey Geological and Water Survey, 29 Arctic Parkway, PO Box 420
Mail Code 29-01, Trenton, New Jersey 08625-0420.

16-2.7 Sources for Technical Guidance:

- A. Technical guidance for stormwater management measures can be found in the documents listed below, which are available to download from the Department's website at:

http://www.nj.gov/dep/stormwater/bmp_manual2.htm.

1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended and supplemented. Information is provided on stormwater management measures such as, but not limited to, those listed in Tables 1, 2, and 3.
2. Additional maintenance guidance is available on the Department's website at:

https://www.njstormwater.org/maintenance_guidance.htm.

- B. Submissions required for review by the Department should be mailed to:

The Division of Water Quality, New Jersey Department of Environmental Protection, Mail Code 401-02B, PO Box 420, Trenton, New Jersey 08625-0420.

16-2.8 Solids and Floatable Materials Control Standards:

- A. Site design features identified under subsection 16-2.5.F above, or alternative designs in accordance with subsection 16-2.5.G above, to prevent discharge of trash and debris from drainage systems shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see subsection 16-2.8.A.2 below.

1. Design engineers shall use one of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
 - i. The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines; or

- ii. A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater system floors used to collect stormwater from the surface into a storm drain or surface water body.

- iii. For curb-opening inlets, including curb-opening inlets in combination inlets, the clear space in that curb opening, or each individual clear space if the curb opening has two or more clear spaces, shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.

2. The standard in A.1. above does not apply:

- i. Where each individual clear space in the curb opening in existing curb-opening inlet does not have an area of more than nine (9.0) square inches;
- ii. Where the municipality agrees that the standards would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets;
- iii. Where flows from the water quality design storm as specified in N.J.A.C. 7:8 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
 - a. A rectangular space four and five-eighths (4.625) inches long and one and one-half (1.5) inches wide (this option does not apply for outfall netting facilities); or
 - b. A bar screen having a bar spacing of 0.5 inches.

Note that these exemptions do not authorize any infringement of requirements in the Residential Site Improvement Standards for bicycle safe grates in new residential development (N.J.A.C. 5:21-4.18(b)2 and 7.4(b)1).

- iv. Where flows are conveyed through a trash rack that has parallel bars with one-inch (1 inch) spacing between the bars, to the elevation of the Water Quality Design Storm as specified in N.J.A.C. 7:8; or
- v. Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

16-2.9 Safety Standards for Stormwater Management Basins:

- A. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management BMPs. This section applies to any new stormwater management BMP.
- B. The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management BMPs. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater

management BMPs to be retrofitted to meet one or more of the safety standards in subsections 16-2.9.C.1, C.2, and C.3 for trash racks, overflow grates, and escape provisions at outlet structures.

C. Requirements for Trash Racks, Overflow Grates and Escape Provisions

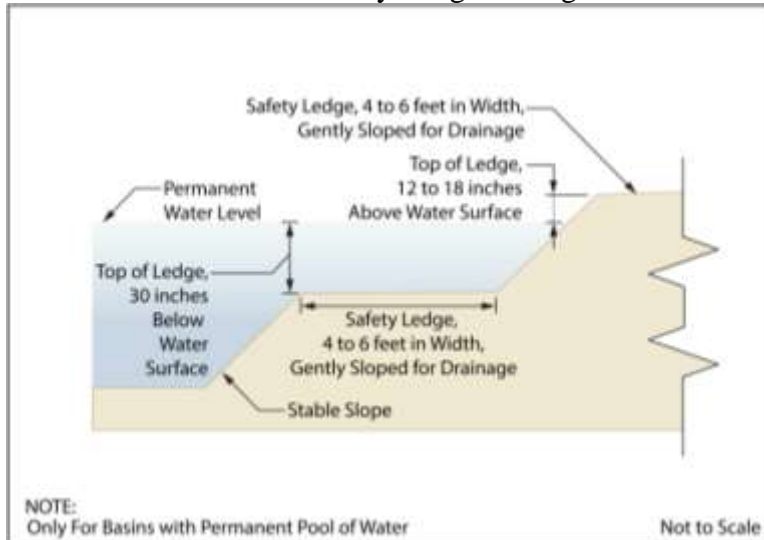
1. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the Stormwater management BMP to ensure proper functioning of the BMP outlets in accordance with the following:
 - i. The trash rack shall have parallel bars, with no greater than six-inch spacing between the bars;
 - ii. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure;
 - iii. The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack; and
 - iv. The trash rack shall be constructed of rigid, durable, and corrosion resistant material and designed to withstand a perpendicular live loading of 300 pounds per square foot.
2. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
 - i. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
 - ii. The overflow grate spacing shall be no less than two inches across the smallest dimension
 - iii. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 pounds per square foot.
3. Stormwater management BMPs shall include escape provisions as follows:
 - i. If a stormwater management BMP has an outlet structure, escape provisions shall be incorporated in or on the structure. Escape provisions include the installation of permanent ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management BMPs. With the prior approval of the municipality pursuant to subsection 16-2.9.C, a free-standing outlet structure may be exempted from this requirement;
 - ii. Safety ledges shall be constructed on the slopes of all new stormwater management BMPs having a permanent pool of water deeper than two and one-half feet. Safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See VIII.E for an illustration of safety ledges in a stormwater management BMP; and
 - iii. In new stormwater management BMPs, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than three horizontal to one vertical.

D. Variance or Exemption from Safety Standard

A variance or exemption from the safety standards for stormwater management BMPs may be granted only upon a written finding by the municipality that the variance or exemption will not constitute a threat to public safety.

E. Safety Ledge Illustration

Elevation View –Basin Safety Ledge Configuration



16-2.10 Requirements for a Site Development Stormwater Plan:

A. Submission of Site Development Stormwater Plan

1. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at subsection 16-2.10.C below as part of the submission of the application for approval.
2. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
3. The applicant shall submit three (3) copies of the materials listed in the checklist for site development stormwater plans in accordance with subsection 16-2.10.C of this ordinance.

B. Site Development Stormwater Plan Approval

The applicant's Site Development project shall be reviewed as a part of the review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the municipality's review engineer to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

C. Submission of Site Development Stormwater Plan

The following information shall be required:

1. Topographic Base Map

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces,

existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2. Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its surroundings should be submitted. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.

3. Project Description and Site Plans

A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations will occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high groundwater elevations. A written description of the site plan and justification for proposed changes in natural conditions shall also be provided.

4. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of subsections 16-2.4 through 16-2.6 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5. Stormwater Management Facilities Map

The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

- i. Total area to be disturbed, paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
- ii. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6. Calculations

- i. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in subsection 16-2.5 of this ordinance.
- ii. When the proposed stormwater management control measures depend on the hydrologic properties of soils or require certain separation from the seasonal high water table, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

7. Maintenance and Repair Plan

The design and planning of the stormwater management facility shall meet the maintenance requirements of subsection 16-2.12.

8. Waiver from Submission Requirements

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipality's review engineer, waive submission of any of the requirements in subsections 16-2.10.C.1 through C.6 of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

16-2.11 Stormwater Management Requirements for Other Than Major Development.

a. The requirements of this subsection shall apply to development which exceeds the Stormwater Management Threshold described in subsection 16-2.2c,2, but does not meet the definition of major development.

b. In lieu of complying with the general requirements of this subsection, the applicant may:

1. Demonstrate compliance with the requirements for major development set forth in subsection 16-2.5; or

2. Demonstrate that there will be no increase in either the peak rate of runoff or the total volume of runoff from the site after development when compared to predevelopment conditions through an engineered analysis of the development.

c. General Requirements.

1. If the development requires major site plan or major subdivision approval, the applicant must demonstrate that:

(a) Neither the peak rate of runoff nor the total volume of runoff after development will be more than 115% of the predevelopment rate and volume; and

(b) That a TSS reduction of 50% is obtained for residential development and a TSS reduction of 70% is obtained for nonresidential or mixed-use development.

2. If the development does not require major site plan or major subdivision approval, the applicant must demonstrate that:

(a) All runoff from at least 90% of the roof area of all principal and accessory building is recharged; and

(b) Parking areas, drives, access aisles or other areas used by motor vehicles are provided with a pervious paving system meeting the standards of the New Jersey Stormwater Best Management Practices Manual as follows:

(1) At least 90% of the total area must be provided with the effective equivalent of a paving system described as "permeable pavers without storage."

(2) If paving systems described as "porous paving" or "permeable pavers with storage bed" are provided, they will be considered twice as effective as "permeable pavers without storage" and must be provided for at least 45% of the total area.

(3) In sites which combine more than one system, twice the area of "porous paving" and/or "permeable pavers with storage bed" plus the area of "permeable pavers without storage" must be at least 90% of the total area.

(c) As an alternative to paragraphs (a) and (b) above, the applicant may demonstrate compliance with subsection 16-2.11c,1.

(d) The recharge systems identified within paragraph (a) above shall be designed, at a minimum, to store the Water Quality Storm (as defined in subsection 16-2.5.Q.4) without accounting for exfiltration during the storm event. This requirement does not replace a more restrictive or conservative design criteria based on existing conditions, proposed development, unique, unusual, and/or extraordinary circumstances.

3. The applicant shall preserve and maintain a special water resource protection area along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

(a) The applicant shall preserve and maintain an undisturbed minimum special water resource protection area equal to the minimum required rear yard setback required by Chapter 22 of the Revised General Ordinances of the Borough. The special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.

(b) Encroachment within the designated special water resource protection area under subsection 16-2.11c,3(a) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable.

(c) All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.

d. Waiver from General Requirements.

1. The municipal official or board reviewing an application under this section may, in consultation with the municipal engineer, waive submission of any of the requirements in this subsection when it can be demonstrated that:

(a) Alternate measures proposed by the developer achieve substantially similar benefits to the required measures; or

(b) Literal compliance is technically impractical or presents a substantial economic hardship.

2. As part of the waiver application the applicant shall submit documentation to demonstrate that the proposed development incorporates the Green Infrastructure Standards set forth in subsection 16-2.5.O to the maximum extent practicable.

16-2.12 Maintenance and Repair:

A. Applicability

Projects subject to review as in subsection 16-2.2.C of this ordinance shall comply with the requirements of subsections 16-2.12.B and C.

B. General Maintenance

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
2. The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). The plan shall contain information on BMP location, design, ownership, maintenance tasks and frequencies, and other details as specified in Chapter 8 of the NJ BMP Manual, as well as the tasks specific to the type of BMP, as described in the applicable chapter containing design specifics.
3. If the maintenance plan identifies a person other than the property owner (for example, a developer, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's or entity's agreement to assume this responsibility, or of the owner's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
4. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project. The individual property owner may be assigned incidental tasks, such as weeding of a green infrastructure BMP, provided the individual agrees to assume these tasks; however, the individual cannot be legally responsible for all of the maintenance required.
5. If the party responsible for maintenance identified under subsection 16-2.12.B.3 above is not a public agency, the maintenance plan and any future revisions based on subsection 16-2.12.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
6. Preventative and corrective maintenance shall be performed to maintain the functional parameters (storage volume, infiltration rates, inflow/outflow capacity, etc.) of the stormwater management measure, including, but not limited to, repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.

7. The party responsible for maintenance identified under subsection 16-2.12.B.3 above shall perform all of the following requirements:
 - i. maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders;
 - ii. evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed; and
 - iii. retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by subsections 16-2.12.B.6 and B.7 above.
 8. The requirements of subsection 16-2.12.B.3 and B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency, subject to all applicable municipal stormwater general permit conditions, as issued by the Department.
 9. In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person. Nonpayment of such bill may result in a lien on the property.
 10. The posting of a two-year maintenance bond will be required for all stormwater management control measures installed as part of a major development.
- C. Nothing in this subsection shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53

16-2.13 Penalties:

Any person(s) who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this ordinance shall be subject to the following penalties:

{Municipality to specify}

16-2.14 Severability:

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

16-2.15 Effective Date:

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

SECTION 2.

If any section, subsection, clause, or phrase of this ordinance is held to be unconstitutional or invalid for any reason, such decision shall not affect the remaining portions of this ordinance. All ordinances or parts of ordinances inconsistent with this ordinance are hereby repealed to the extent of such inconsistency.

SECTION 3.

This ordinance shall take effect upon final passage and publication according to law.

Introduced:

Passed and Approved:

I hereby approve of the
Passing of this ordinance.

Joseph K. Hemphill
Mayor

Attest:

Thomas S. Rogers
Municipal Clerk/Administrator

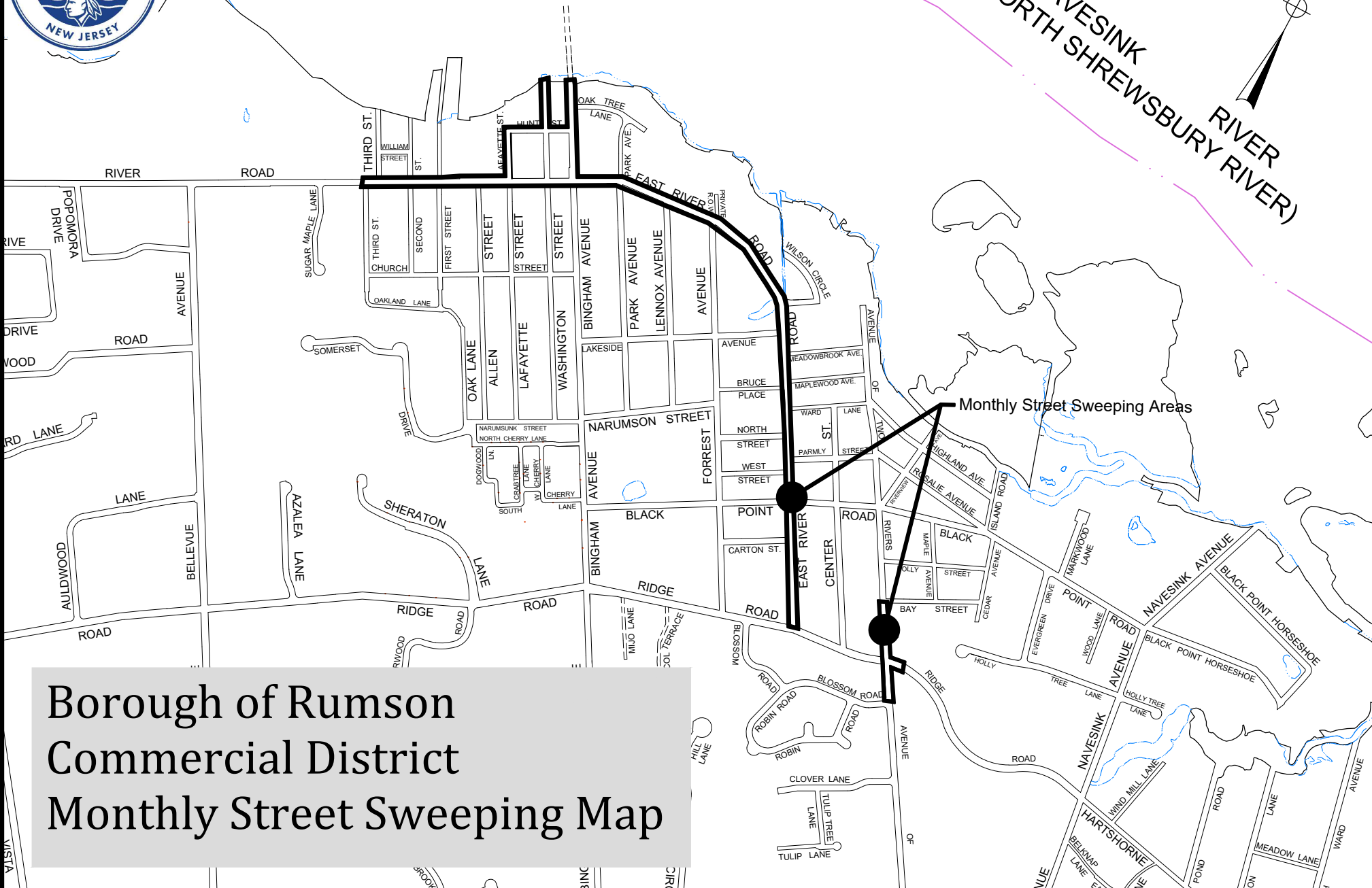
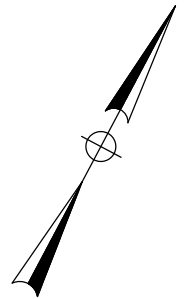


Appendix L

Street Sweeping Map



NAVESINK RIVER
(NORTH SHREWSBURY RIVER)



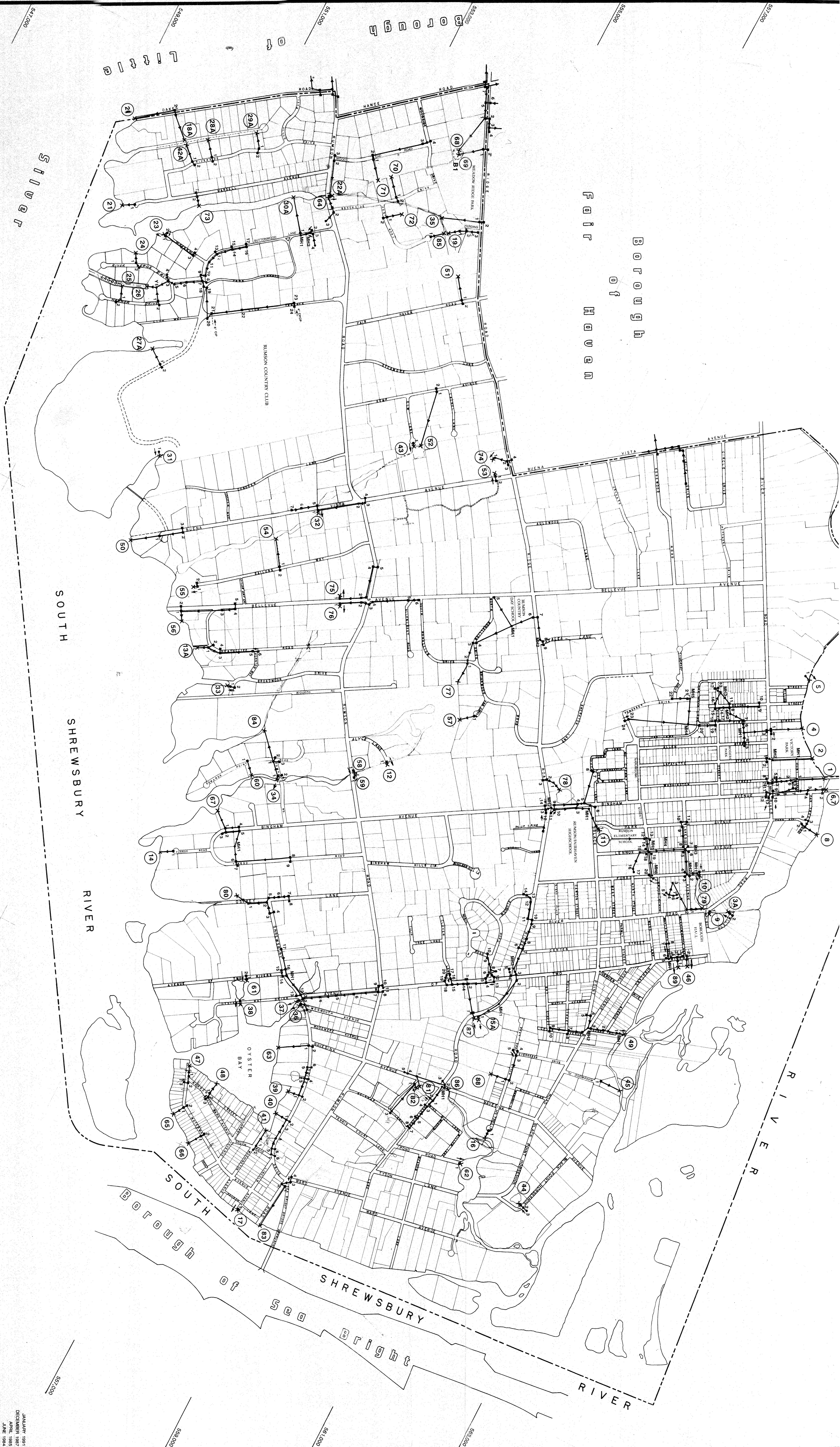
Monthly Street Sweeping Areas

**Borough of Rumson
Commercial District
Monthly Street Sweeping Map**



Appendix M

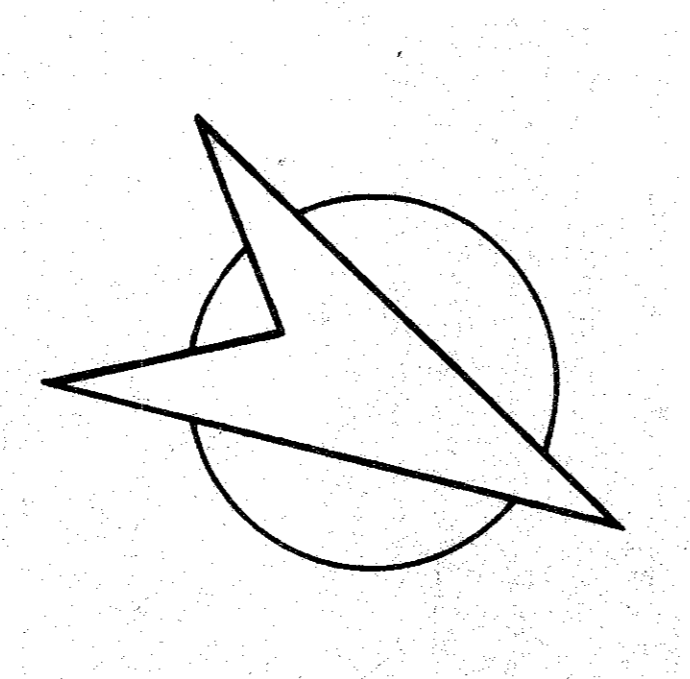
Borough Outfall Map



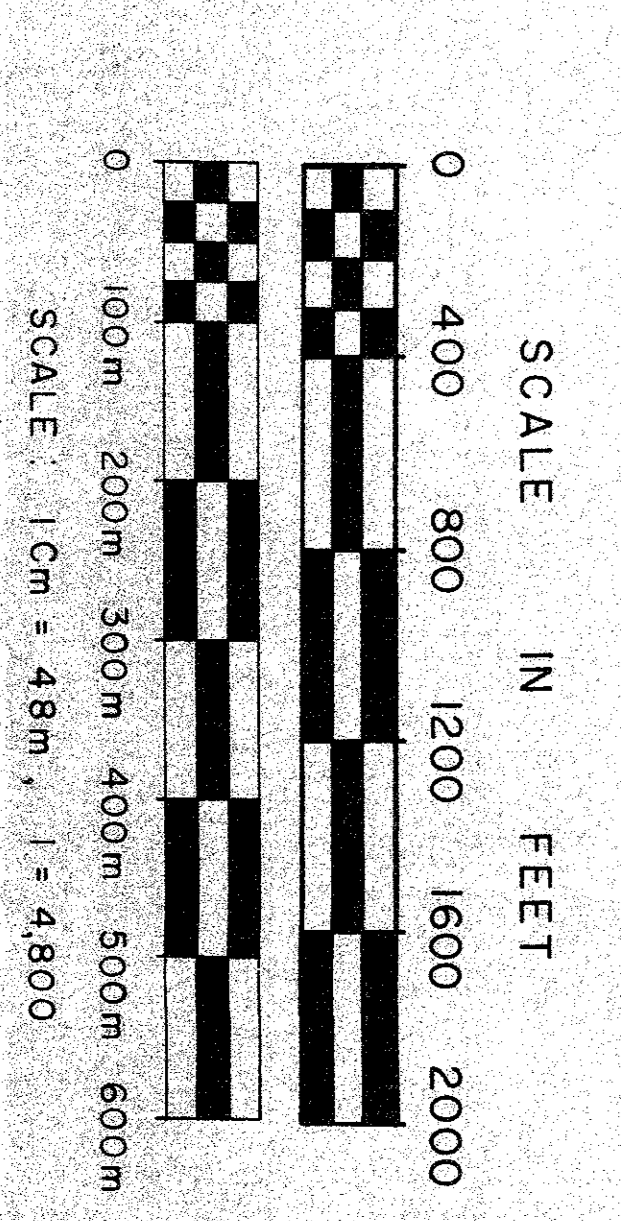
**OF
R U M S O N
MONMOUTH COUNTY
NEW JERSEY**

**STORMWATER
INFRASTRUCTURE
DRAINAGE SYSTEM**

- ⊗ 43 Outfall
- Pipe
- Inlet
- Manhole
- Direction of Flow
- State Plane Coordinates



Prepared by:
T & M ASSOCIATES
ELEVEN TINDALL ROAD
MIDDLETOWN, NEW JERSEY 07748
(908) 671-6400
February 14, 1992



Revised by: MONMOUTH COUNTY DEPARTMENT OF PLANNING AUGUST 1985
Base Map Prepared by: COMMUNITY PLANNING ASSOCIATES, INC.
JANUARY 1991
DECEMBER 1987
APRIL 1984
JUNE 1984
MAY 1983
JULY 1982
SEPTEMBER 1979
JUNE 1978
MAY 1977



Appendix N
Illicit Connection Inspection Report Form

Illicit Connection Inspection Report Form

Municipality
Information

Municipality: _____ County _____

NJPDES # : _____ PI ID #: _____

Team Member: _____

Date _____ Effective Date of Permit Authorization (EDPA): _____

Outfall #: _____ Location: _____

Receiving Waterbody: _____

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:

(b) COLOR:

(c) TURBIDITY:

(d) FLOATABLES:

(e) DEPOSITS/STAINS:

(f) VEGETATION CONDITIONS:

(g) DAMAGE TO OUTFALL STRUCTURES:

IDENTIFY STRUCTURE: _____

DAMAGE: _____

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: _____

Title: _____

Signature: _____

Date: _____

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.



Appendix O
Stormwater Facilities Inspection & Maintenance Form

Stormwater Management Measures Maintenance Plan

Maintenance Logs and Inspection Records

NOTE

This Maintenance Logs and Inspection Records are intended to be editable and adjustable in accordance with the design of stormwater management measures, the site conditions, and the special needs of responsible party. The Engineer should supplement information and best management practice to assist the responsible party to perform maintenance.

Blue text indicates information may be deleted and or replaced as necessary.

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Inspection Checklist Log

1. The responsible party shall report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.
2. The maintenance crew should fill out the checklist in the field manual when performing each inspection/maintenance task.
3. After the maintenance task is performed, the checklist should be filed in the Maintenance Plan and recorded in the log below.

Cycle of Inspection	Stormwater Management Measure No.	Checklist No.	Date(s) of Inspection
(1st Quarter) MM/DD/YYYY	(Basin #1, GS #1, GS#2)		
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1" rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1" rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter)			

Cycle of Inspection	Stormwater Management Measure No.	Checklist No.	Date(s) of Inspection
MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1" rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1" rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1" rain) MM/DD/YYYY			

Continue the table when necessary.

Attach the Inspection Checklist after each inspection

Preventative Maintenance Log

Maintenance Schedule	Stormwater Management Measure No.	Preventative Maintenance Record No.	Date(s) of Maintenance
(1st Quarter) MM/DD/YYYY	(Basin #1, GS #1, GS#2)		
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Maintenance work; e.g., after 1" rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1" rain) MM/DD/YYYY			

Continue the table when necessary.

**Attach the Preventative Maintenance Record after
each maintenance task performed**

Corrective Maintenance Log

Maintenance Schedule	Stormwater Management Measure No.	Corrective Maintenance Record No.	Date(s) of Maintenance
(1st Quarter) MM/DD/YYYY	(Basin #1, GS #1, GS#2)		
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Maintenance work; e.g., after 1" rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1" rain) MM/DD/YYYY			

Continue the table when necessary

Attach the Corrective Maintenance Record after each maintenance task performed



Appendix P

NJDEP TMDL Report for Watershed Management Area 12

**Amendment to the
Monmouth and Ocean Counties Water Quality
Management Plans**

**Five Total Maximum Daily Loads for
Total Coliform to Address
Shellfish-Impaired Waters in
Watershed Management Area 12
Atlantic Coastal Water Region**

**Proposed: February 21, 2006
Established: September 7, 2006
Approved: September 27, 2006
Adopted: October 13, 2011**

**Prepared by:
New Jersey Department of Environmental Protection
and**



**With assistance provided by:
United States Environmental Protection Agency, Region 2**

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EXECUTIVE SUMMARY

In accordance with Section 305(b) and 303(d) of the Federal Clean Water Act (CWA), the State of New Jersey, Department of Environmental Protection (NJDEP) developed the *2004 Integrated List of Waterbodies* addressing the overall water quality of the State's waters and, in Sublist 5, identifying impaired waterbodies for which Total Maximum Daily Loads (TMDLs) may be necessary. The *2004 Integrated List of Waterbodies* was adopted by the Department on October 4, 2004, (36 NJR 4543(a)) as an amendment to the Statewide Water Quality Management Plan, as part of the Department's continuing planning process pursuant to the Water Quality Planning Act at N.J.S.A. 58:11A-7 and the Statewide Water Quality Management Planning rules at N.J.A.C. 7:15-6.4(a). The *2004 Integrated List of Waterbodies* Sublist 5 identified twelve waterbodies that are impaired with respect to total coliform in Watershed Management Area (WMA) 12. In that list, a waterbody was determined to be impaired if it does not fully support shellfish harvest in accordance with National Shellfish Sanitation Program (NSSP) criteria. Portions of some waterbodies that were initially listed as impaired on the *2004 Integrated List of Waterbodies* Sublist 5 were subsequently determined through this study to be ineligible for development of a TMDL for one of several reasons. For some, there was insufficient or no data to develop a TMDL for some waterbodies. Where data was insufficient to develop a TMDL, the waterbodies have remained on Sublist 5 until additional data is available to develop a TMDL. Where there was no data, the waterbody was incorrectly listed as impaired and was placed on Sublist 3 in the 2006 Integrated List. In addition, based on a spatial analysis of monitoring station locations and best available data, some of these waterbodies were found to be closed according to administrative requirements and not because of water quality data. Closures of waters as the result of administrative precautions were removed from Sublist 5 and placed on the appropriate Sublist in the 2006 Integrated List of Waterbodies, as the impairment is due to pollution and not pollutants. TMDLs were developed for the shellfish impaired waterbodies that were impaired because of water quality, as listed in Table 1. During the TMDL assessment process, the sampling sites encompassed within each impaired waterbody spatial extent were reevaluated and data from all sites within the spatial extent were considered for TMDL development. The more inclusive sampling site information for the waterbodies is included under "Site IDs Addressed" in Table 1. Some of the waterbodies were divided into smaller sub-groups that reflect more consistent local water quality conditions, watershed characteristics, and local pollution sources for the purpose of establishing more localized load reduction targets.

Table 1. Waterbodies in WMA 12 identified on the *2004 Integrated List of Waterbodies* as impaired for shellfishing

2004 303(d) Listing	Listing Site ID #	Action
Atlantic Ocean	Asbury Park Offshore-93,95,97,98,102,104; Atlantic Ocean-12	TMDL Assessment - No Reduction
Atlantic Ocean	Asbury Park Offshore-100	Unable to assess for TMDL
Atlantic Ocean	Atlantic Ocean-6; Cape May Channel-7	TMDL Assessment - Reduction in WMA 16; Grouped with Jarvis Sound

Atlantic Ocean	Atlantic Ocean Sea Isle-16	Unable to assess for TMDL
Atlantic Ocean	NJ Atlantic Ocean-53, 59	Unable to assess for TMDL
Matawan Creek Estuary	8, R62	To be Addressed in the NY-NJ Harbor TMDLs
Manasquan River Estuary ⁽¹⁾	Manasquan River Estuary-1 thru 3	TMDL Assessment - Reduction
Navesink River Estuary ⁽²⁾	Shrewsbury/Navesink River Estuary-4 thru 7	TMDL Assessment - Reduction
Shark River Estuary ⁽³⁾	Shark River Estuary-1	TMDL Assessment - Reduction
Shrewsbury River Estuary ⁽⁴⁾	Shrewsbury/Navesink River Estuary-4 thru 8	TMDL Assessment - Reduction
Waackaack Creek-Tidal ⁽⁵⁾	35, R65	TMDL Assessment - Reduction
Ware Creek-Estuary	Ware Creek-Estuary	To be Addressed in the NY-NJ Harbor TMDLs

Footnote: (#) WMA 12 TMDL count.

Nonpoint and stormwater point sources are the primary sources of total coliform/fecal coliform loads in these waterbodies. Source loads were estimated for land uses in each watershed and for local marinas that may be causing water quality impacts in these waterbodies. Traditional point sources, i.e., treatment facilities that have a sanitary waste component, were considered de minimus, due to the use of effective disinfection practices by these facilities. TMDLs were developed based on an analysis of the existing pathogen indicator data compared to NSSP and NJDEP pathogen indicator criteria, and the loading capacity has been allocated among the point and nonpoint sources. This TMDL report includes implementation strategies that will bring the subject waterbodies into compliance with the NSSP criteria for unrestricted shellfish harvest.

This TMDL Report is consistent with US EPA's May 20, 2002 guidance document entitled, *Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992* (Sutfin, 2002), which describes the statutory and regulatory requirements for approvable TMDLs. This TMDL Report was proposed as an amendment to the Monmouth and Ocean Counties Water Quality Management Plans (WQMP). Following the proposal, public comments were summarized and responses prepared. This report adopts five TMDLs as amendments to the Monmouth and Ocean Counties Water Quality Management Plans (WQMP) in accordance with N.J.A.C. 7:15-3.4 (g).

1.0 INTRODUCTION

In accordance with Section 303(d) of the Federal Clean Water Act (CWA) (33 U.S.C. 1315(B)), the State of New Jersey is required biennially to prepare and submit to the USEPA a report that identifies waters that do not meet or are not expected to meet water quality standards

after implementation of technology-based effluent limitations or other required controls. This report is commonly referred to as the 303(d) List. In accordance with Section 305(b) of the CWA, the State of New Jersey is 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. The *Integrated List of Waterbodies* combines these two assessments and assigns waterbodies to one of five sublists. Sublists 1 through 4 include waterbodies that are generally unimpaired (Sublist 1 and 2), have limited assessment or data availability (Sublist 3), are impaired due to pollution rather than pollutants or have had a TMDL or other enforceable management measure approved by EPA (Sublist 4). Sublist 5 constitutes the traditional 303(d) list for waters impaired or threatened by one or more pollutants, for which a TMDL may be required. In WMA 12, the *2004 Integrated List of Waterbodies* identified twelve waterbodies as impaired because they do not fully support shellfish use. In the course of developing TMDLs for the listed impairments, it was determined that portions of the waterbodies that were initially listed as impaired on the *2004 Integrated List of Waterbodies* Sublist 5 were subsequently determined to be ineligible for development of a TMDL for one of several reasons. For some waterbodies, there was insufficient or no data to develop a TMDL. Where data was insufficient to develop a TMDL, the waterbodies remained on Sublist 5. Where there was no data, the waterbody was placed on Sublist 3 in the 2006 Integrated List until additional data can be obtained to develop a TMDL. In addition, based on a spatial analysis of monitoring station locations and best available data, some of the site identifications were found to be closed as the result of considering administrative requirements and not because of water quality data. Proximity to potential sources such as marinas, development served by septic systems and concentrated stormwater outfall locations warrants precautionary closures of shellfish waters on a seasonal or full time basis. Closures of waters for shellfishing as the result of administrative precautions were removed from Sublist 5 and placed on Sublist 4C in the 2006 Integrated List of Waterbodies because the impairment is due to pollution and not pollutants. TMDLs were developed for the shellfish impaired waterbodies that were impaired because of water quality.

A TMDL represents the assimilative or carrying capacity of a waterbody, taking into consideration point and nonpoint sources of pollutants of concern, natural background and surface water withdrawals. A TMDL quantifies the amount of a pollutant a waterbody can assimilate and still conform to applicable water quality standards and support designated uses. The TMDL or loading capacity is allocated to known point and nonpoint sources in the form of waste load allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Recent EPA guidance (Sutfin, 2002) describes the statutory and regulatory requirements for approvable TMDLs, as well as additional information generally needed for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations. These TMDLs address the following required items in the May 20, 2002 guideline document:

1. Identification of waterbody(ies), pollutant of concern, pollutant sources and priority ranking.
2. Description of applicable water quality standards and numeric water quality target(s).
3. Loading capacity – linking water quality and pollutant sources.
4. Load allocations.
5. Wasteload allocations.
6. Margin of safety.
7. Seasonal variation.
8. Reasonable assurances.
9. Monitoring plan to track TMDL effectiveness.
10. Implementation (USEPA is not required to and does not approve TMDL implementation plans).
11. Public Participation.

This report adopts five TMDLs for total coliform to address the impaired shellfish waters in WMA 12. All of the impaired waterbodies were assigned a High priority ranking in the 2004 *Integrated List of Waterbodies* Sublist 5. These TMDLs include management approaches to reduce pathogen contributions from various sources in order to attain applicable surface water quality standards and fully support the designated shellfish use. These TMDLs cover more area than is actually listed as being impaired due to the fact that the implementation plans, as described in detail later in this document, cover entire watersheds, not just the impaired waterbodies. These waterbodies were moved to Sublist 4 following approval of the TMDLs by USEPA. In addition to the shellfish impairments, the Atlantic Ocean and Shark River Estuary were also listed as impaired for low dissolved oxygen on the 2004 *Integrated List*. These waterbodies will remain on Sublist 5 for dissolved oxygen, which will be addressed in future TMDL efforts.

2.0 POLLUTANT OF CONCERN AND AREA OF INTEREST

The pollutant of concern for the adopted TMDLs is total coliform, which is measured as an indicator for the presence of pathogens. The National Shellfish Sanitation Program (NSSP) has established criteria for indicator organisms that are used to determine support of the shellfishing use. The NSSP sets forth other requirements for restricting shellfish harvest based on shoreline surveys. Where potential sources, such as wastewater or stormwater outfalls, septic systems or marinas, are present, precautionary restrictions are applied. These shellfish restrictions are referred to as administrative closures and are not appropriate for TMDL development. As discussed, where portions of listed impaired waterbodies were found to be administratively closed, they were properly placed on Sublists 1, 3 or 4 on the 2006 *Integrated List*. TMDLs were developed for the waterbodies listed in Table 2 and shown in Figure 1. As an aid to analysis and to help focus implementation efforts, some waterbodies were divided into smaller sub-groups to reflect local water quality conditions, watershed characteristics, and local pollution sources. Sub-groups were delineated based on several criteria including the location of monitoring stations and data availability, the size and spatial extent of each waterbody, the location of possible pathogen sources, and other

waterbody/watershed characteristics. A TMDL calculation was made for each waterbody sub-group or the entire waterbody if there were no sub-groups delineated. Waterbody sub-groups are listed in Table 2 and shown in Figure 1. The 2004 New Jersey 303(d) impairment listing for each waterbody (Sublist 5) is also provided in Table 2 for reference.

Table 2. Waterbodies listed for shellfish use impairment in WMA 12

2004 303(d) Listing	2004 303(d) Listing Site IDs	TMDL Site ID	Sub-group	Percent reduction
Atlantic Ocean	Asbury Park Offshore-93,95,97,98,100,102,104; Atlantic Ocean-12	Atlantic Ocean-93, 95, 97, 98, 102, 104	-	0%
Manasquan River Estuary	Manasquan River Estuary-1 thru 3	Manasquan River Estuary-1, 2, 3	-	77%
Navesink River Estuary	Shrewsbury/ Navesink Estuary-4 thru 7	Navesink River Estuary - 4, 5, 6	A	0%
		Navesink River Estuary-7	B	92%
Shark River Estuary	Shark River Estuary-1	Shark River Estuary-1	-	81%
Shrewsbury River Estuary	Shrewsbury/ Navesink Estuary-4 thru 8 (Correction = Shrewsbury River Estuary-1-3, 8)	Shrewsbury River Estuary-2	A	0%
		Shrewsbury River Estuary-1, eastern portion of 3	B	0%
		Shrewsbury River Estuary-8, western portion of 3	C	74%
Waackaack Creek-Tidal	35, R65	35, R65, SRB4	-	34%

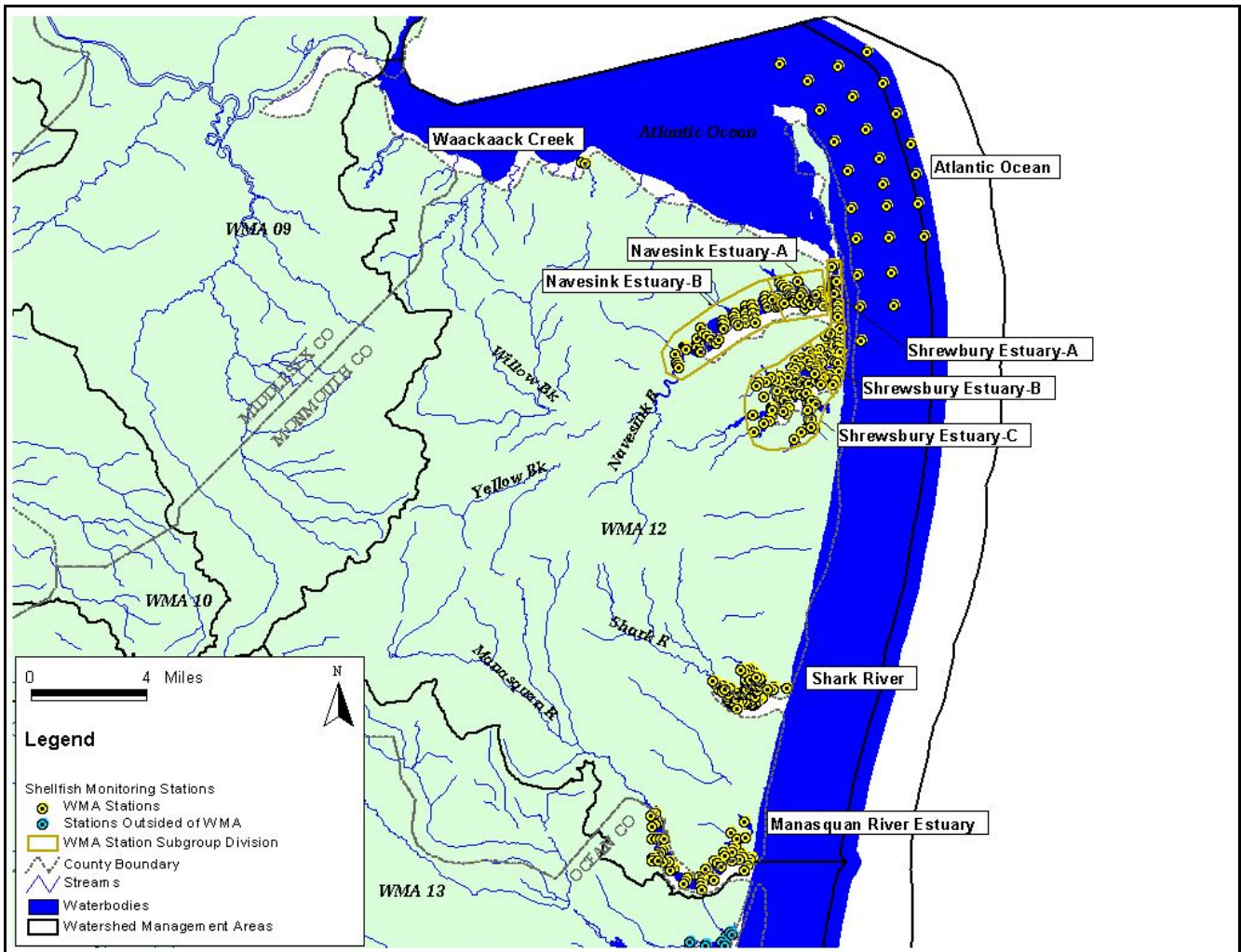


Figure 1. Shellfish impaired waterbodies in WMA 12

2.1 Applicable Water Quality Standards

New Jersey Surface Water Quality Standards (SWQS) include pathogen indicator criteria for the assessment of the recreational use (primary and secondary contact recreation) for all waterbodies (Table 3). New Jersey SWQS also specify that shellfish waters shall meet the guidelines of the NSSP. The NSSP guidelines include stringent criteria, expressed in terms of indicator organisms, to protect against the harvest of shellfish in waters where the sanitary quality could have health risks for consumers. Total coliform data are used to assess the shellfish designated use for the waterbodies in all waters, except for the listed Atlantic Ocean waterbody, according to the New Jersey 2004 *Integrated Water Quality Monitoring and Assessment Report*. Fecal coliform data are used to assess the Atlantic Ocean waterbody. With the exception of ocean waters, samples were collected using the Systematic Random Sampling (SRS) protocol. Ocean waters were collected using the Adverse Pollution Condition (APC) protocol. The analytical methods used were 3-tube dilution analysis for total coliform and 5-tube analysis for fecal coliform. Atlantic Ocean water quality analyses were performed using the NSSP fecal coliform 90th percentile (43 cfu/100ml) and geometric mean (14

cfu/100ml) criteria (for the 5-tube analysis – note the 90th percentile shown in Table 3 is for the 3-tube analysis for comparison). Because the Atlantic Ocean was listed based on an administrative closure determination and not based on water quality a TMDL is not appropriate; therefore, the TMDLs in this report were developed to meet the NSSP 90th percentile (330 cfu/100ml) and geometric mean (70 cfu/100ml) criteria for total coliform (in colony forming units, or cfu) because this is the basis for impairment in the waters for which TMDLs were required.

Table 3. Water quality criteria expressed in CFU/100 ml

Bacterial Indicator	NJ Surface Water Quality Standards (SWQS)		National Shellfish Sanitation Program (NSSP)
	Within 1500 ft. of shoreline	1500 ft. to 3 mi. from shoreline	
Total Coliform	N/A	N/A	<ul style="list-style-type: none"> • Geometric Mean (Geomean) shall not exceed 70 • No more than 10% of samples shall exceed 330 for APC monitoring • Estimated 90th percentile shall not exceed 330 for SRS monitoring
Fecal Coliform	<ul style="list-style-type: none"> • Geomean shall not exceed 50 	<ul style="list-style-type: none"> • Geomean shall not exceed 200 • No more than 10% in any 30-day period to exceed 400 	<ul style="list-style-type: none"> • Median or geomean shall not exceed 14 • No more than 10% shall exceed 49 for APC monitoring • Estimated 90th percentile shall not exceed 49 for SRS monitoring
Enterococcus	<ul style="list-style-type: none"> • Geomean shall not exceed 35 • Single sample shall not exceed 104 	N/A	N/A

Source: NJDEP SWQS, 2005 and USFDA NSSP Guide for the Control of Molluscan Fish, 2003.

Notes:

- Samples shall be obtained at sufficient frequencies and at locations during periods which will permit valid interpretation of laboratory analyses. A minimum of five samples as equally spaced over a 30-day period, as feasible, should be collected; however, the number of samples, frequencies and locations will be determined by NJDEP or other appropriate agency in any particular case.
- NSSP standards shown are based on a 3-tube decimal dilution test. Additional standards for 5- and 12-tube decimal dilution tests apply.
- For NSSP sampling, sample collection requirements vary based on attributes of the waters where samples are collected (e.g., whether the area is affected by point sources, etc.).
- Standards shown are those that apply to waters approved for shellfish growing. Additional requirements and exceptions may apply and can be found in NJDEP's SWQS and NSSP's guidelines documents.
- APC = Adverse Pollution Conditions. APC sampling occurs in areas with known point sources, including around some marinas.
- SRS = Systematic Random Sampling. SRS sampling methods are used in the majority of shellfish waters and is based on a random statistical sampling approach.

Each year, the Department updates the classification of New Jersey's coastal waters for shellfish harvesting based on analysis of extensive sampling (over 15,000 samples per year) and pollution source surveys. The classifications indicate sanitary coastal water quality. New Jersey has had a long history of improving the sanitary quality of its coastal waters.

In accordance with the NSSP, the Department must also perform a sanitary survey/Local Area Report (LAR) that collects and evaluates information concerning actual and potential pollution sources that may adversely affect the water quality in each growing area. Based on the sanitary survey information, the Department assigns the growing area to one of five classifications. These classifications are summarized below.

Classification	Description
Approved	No restrictions on licensed harvesters
Seasonal (November - April)	Water open for harvest seasonally from Nov - April
Seasonal (January - April)	Water open for harvest seasonally from January - April
Special Restricted	Harvest only by Special Permit. Shellfish harvested must be further purified by relay to Approved waters or processing in a depuration plant prior to being sold.
Prohibited	No harvest under any conditions.

The impaired waterbodies addressed in this document are classified as Saline Estuary 1 (SE1), except for small portions in the upper reaches of tidal streams that are classified as Fresh Water 2 (FW2).

In all SE1 waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;
2. Maintenance, migration and propagation of the natural and established biota;
3. Primary and secondary contact recreation; and
4. Any other reasonable uses.

In all FW2 waters, the designated uses are (from NJAC 7:9B-1.12):

1. Maintenance, migration and propagation of the natural and established aquatic 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.

2.2 Description of Land Use in the Watershed Management Area

Watershed Management Area 12 includes watersheds that primarily drain the eastern portions of Middlesex, Monmouth, and Ocean Counties and flow in one of two directions: northeast to Sandy Hook/Raritan Bay or southeast to the Atlantic Ocean. WMA 12 is 503 square miles in size and lies within the Coastal Plain physiographic province, which is

characterized by a low-lying topography. Sandy soils and coastal scrub/pine vegetation dominate WMA 12. Table 4 shows the land use distribution among the waterbody subgroup watersheds. Land use data for each watershed were derived from the 1995/1997 land use/land cover dataset developed for New Jersey.

Table 4. Land use area distribution in WMA 12 subgroup watersheds

Waterbody	Subgroup	Agriculture		Barren Land		Forest		Urban		Water		Wetlands		Total Area km ²
		km ²	%	km ²	%	km ²	%	km ²	%	km ²	%	km ²	%	
Atlantic Ocean	-	0.00	0.0%	0.58	13.8%	0.87	20.5%	0.62	14.7%	0.21	5.0%	1.94	46.0%	4.23
Manasquan River Estuary	-	21.83	10.2%	4.31	2.0%	39.69	18.6%	73.31	34.4%	9.64	4.5%	64.64	30.3%	213.42
Navesink River Estuary	A	36.91	15.3%	1.79	0.7%	45.87	19.0%	94.19	39.1%	12.81	5.3%	49.43	20.5%	241.00
Navesink River Estuary	B	36.47	16.1%	1.75	0.8%	40.42	17.9%	88.97	39.3%	10.09	4.5%	48.66	21.5%	226.37
Shark River Estuary	-	1.03	1.7%	2.27	3.6%	13.54	21.7%	28.20	45.2%	3.85	6.2%	13.52	21.7%	62.41
Shrewsbury River Estuary	A	37.33	11.7%	2.02	0.6%	49.91	15.7%	147.52	46.3%	24.40	7.7%	57.35	18.0%	318.53
Shrewsbury River Estuary	B	0.42	0.6%	0.21	0.3%	3.35	4.6%	51.36	70.6%	9.80	13.5%	7.56	10.4%	72.71
Shrewsbury River Estuary	C	0.42	0.6%	0.21	0.3%	3.24	4.8%	48.77	72.5%	7.74	11.5%	6.89	10.2%	67.28
Waackaack Creek-Tidal	-	1.05	4.5%	0.39	1.7%	3.70	16.0%	14.40	62.4%	0.06	0.3%	3.46	15.0%	23.05

Notes: - The land area values for Shrewsbury River Estuary A include contributions from Navesink River Estuary A and B, and Shrewsbury River Estuary B and C.
 - The land area values for Shrewsbury River Estuary B include contributions from Shrewsbury River Estuary C.
 - The land area values for Navesink River Estuary A include contributions from Navesink River Estuary B.

3.0 SOURCE ASSESSMENT

A source assessment was conducted to identify and characterize potential pathogen sources that may be impacting water quality and shellfish growing areas in the listed waters. Point and nonpoint sources were considered in TMDL development. Source assessment also included the determination of the relative contribution of the primary bacteria sources to facilitate proper management responses through TMDL implementation. A variety of information was used to characterize possible pathogen sources including shoreline surveys conducted by the Department, land use information gathered for each watershed, point source information, literature sources, and other available data.

3.1 Shoreline Surveys

WMA 12 includes seven shoreline survey areas: Raritan Bay and Sandy Hook Bay (NE-1), Atlantic Ocean North (AONO), Navesink River (NE-2), Shrewsbury River (NE-3), Shark River (NE-4), Atlantic Ocean North-Central (AONC), and Manasquan River (NE-5). Shellfish TMDLs were developed for waterbodies within each of these areas, except for Atlantic Ocean North-Central (AONC), in which no shellfish impaired waterbodies are located. Local Area Reports (LARs) were completed for each shoreline survey area by the NJDEP Bureau of Marine Water Monitoring to characterize shellfish growing areas, surrounding land uses, and potential pollution sources in the watershed. These reports satisfy the requirements of the NSSP program by providing information on local shellfish growing areas. This information is also used by NJDEP in the assessment process and for determining impairment status. The data contained in these reports were used to help identify and characterize the potential pathogen sources that may be impacting the shellfish harvest areas located within each TMDL waterbody sub-group. Note that these reports may be outdated and, therefore, recent data collected by NJDEP regarding shellfish classifications and pollution sources may not be reflected in these reports. Updated information on the point and nonpoint sources identified and the respective loading estimates are provided in the following source assessment sections.

The 2004 shellfish classification GIS coverage was provided by NJDEP and used to cross-reference with TMDL waterbody sub-groups. A summary of the information presented in the most recent LAR for each shoreline survey area is presented below.

- **NE-1: Raritan Bay and Sandy Hook Bay**
A sanitary survey report was published in September 2004 and represents the data collection period: 1997-2000. This growing area encompasses the shellfish waters of Sandy Hook Bay and Raritan Bay. The area, located in northern Monmouth County, New Jersey, extends from the Highlands Bridge northward to Sandy Hook and westward to the Raritan River. A TMDL was developed for Waackaack Creek-Tidal, which flows into this survey area. The Bayshore Floodgate is located at the junction of Thorns Creek and Waackaack Creek, which helps alleviate street flooding in the communities of Keansburg, Union Beach, Middletown, and Hazlet during high tides. The Waackaack Marina is also located along this waterbody.
- **AONO: Atlantic Ocean North**
This area includes the ocean waters from Monmouth Beach to Sandy Hook.
- **NE-2: Navesink River**
A reappraisal report for NE-2 was published in December 1993 and represents the data collection period: 1988-1992, later revised to include data collected from 1992-1995. The Navesink River is an estuary of the Raritan-Sandy Hook Bay complex, which joins the Shrewsbury River before entering the Atlantic Ocean through Sandy Hook Bay. The Navesink estuary contains 2,290 acres of shellfish growing waters, which support hard clam and soft clam populations. The Navesink watershed drains 95 square miles of

urban/suburban residential development and agricultural lands. Land use in the Navesink watershed includes significant agricultural uses, primarily in the headwaters areas, and urban/suburban development, primarily in the areas bordering the estuary. The Navesink and Shrewsbury Rivers provide for almost the entire soft clam fishery in New Jersey. Permitted discharges for fecal coliform from treatment facilities are generally located in upstream areas. Wastewater generated in the downstream area is treated and discharged to the Atlantic Ocean. Stormwater discharges are concentrated in the areas adjacent to the estuary, reflecting the urban/suburban land use and the related impervious surfaces found in developed areas. Marinas are located in the upper portion of the waterbody. The Navesink River was previously sampled under the Adverse Pollution Condition strategy (according to this shoreline survey). Since 1981, a major inter-agency initiative involving federal, state, county and private institutions, and costing several million dollars, has been underway to reduce nonpoint source bacterial pollution of the Navesink estuary. The shoreline survey discusses water quality improvements and proposed shellfish classification changes to recognize these improvements.

- NE-3: Shrewsbury River

A reappraisal report for NE-3 was published in December 2004 and represents the data collection period: 1998-2003. The Shrewsbury River is located in northern Monmouth County. Tidal waters enter the Navesink River via Sandy Hook Bay. A narrow channel then connects these water bodies to the Shrewsbury River. Seven municipalities surround the Shrewsbury River; they are Rumson Borough, Little Silver Borough, Shrewsbury Borough, Oceanport Borough, Long Branch City, Monmouth Beach Borough, and Sea Bright Borough. There are 23 marinas located along different areas of the estuary. According to this report, water samples from the Shrewsbury River were collected (using the Systematic Random Sampling strategy) and analyzed from 43 sampling stations for total coliform during this time period. All sampling stations complied with their respective criteria for Seasonal or Special Restricted classification. No changes in classification were recommended for this area. There are no direct discharges into the Shrewsbury River, although there are numerous storm water outfalls and some other indirect discharges. Stormwater outfalls are one of the most significant nonpoint sources of pollution. Animal waste and horse farms were also discussed in the shoreline survey.

- NE-4: Shark River

A reappraisal report for NE-4 was published in November 2004 and represents the data collection period: 1994-2000. The Shark River is located in the east central part of New Jersey, northwest of the city of Belmar and south of Neptune City, in Monmouth County. This river is bordered on the east by Avon-by-the-Sea, to the north by Neptune City, to the west by Neptune Township and Wall Township, and to the south by Wall Township and Belmar Borough. The waters in this shellfish growing area are classified as Special Restricted. The Shark River Shellfish Growing Area is approximately 791.8 acres in area. The Shark River area has historically been an area with a large abundance of hard clams. Prior to 1998, this shellfish growing area was sampled using the Adverse Pollution Condition (APC) sampling strategy (the condition was rainfall). In 1998, the sampling

strategy was changed to Systematic Random Sampling (SRS) strategy. The land use patterns of this area are mainly urban, with significant human activities impacting the shellfish growing area. There were 19 marinas located in the area, according to this shoreline survey. The water quality of this shellfish growing area is typically impacted by the nonpoint pollution sources associated with these activities, along with the many storm water outfalls located in this shellfish growing area. Forests and wetlands border the southwest (upstream) side of the Shark River. There is little or no livestock farming in this area.

- **NE-5: Manasquan River**

A reappraisal report for NE-5 was published in October 1996 and represents the data collection period: 1990-1995. The Manasquan River is located on the border between Ocean and Monmouth Counties. The Manasquan River estuary is hydrologically connected to the Atlantic Ocean through the Manasquan Inlet and to Barnegat Bay through the Point Pleasant Canal. The Manasquan Inlet is the northernmost entry point to the Intracoastal Waterway. The estuary has a semi-diurnal tidal exchange with the Atlantic Ocean. The data collected in this area showed a slight improvement in water quality from the last survey. However, the improvement was not sufficient to warrant a change in classification. According to the 2004 classification, the upper portion is listed as Prohibited and the lower portion as Special Restricted. The Manasquan River is more than 23 miles in length and drains a total area of 81 square miles. The lower 6.5 miles comprise the estuary. The drainage area includes extensive urban/suburban development, as well as forested and agricultural areas. The estuary is bordered by a resort area that is used extensively for recreation, especially during the summer months. Two large bathing beaches are located on the northern and southern margins of the estuary at the Manasquan Inlet. An additional bathing beach is located upstream of the Point Pleasant Canal. Numerous marinas and waterfront restaurants are located in the boroughs of Manasquan, Brielle, Point Pleasant, and Point Pleasant Beach. This survey listed 26 marinas in the area serving 1,940 vessels. There are no direct discharges of treated effluent to the Manasquan Estuary. However, there are numerous stormwater discharges and identified contaminated sites. The primary potential sources of pollutants to the Manasquan Estuary include: nonpoint sources such as those discharging into stormwater sewers, discharges associated with marinas, and agricultural inputs from upstream areas. There is also a significant migratory bird population during certain times of the year at the Manasquan River Wildlife Refuge, which is located just upstream of the estuary.

3.2 Assessment of Point Sources

For TMDL development purposes, point sources include domestic and industrial wastewater treatment plants that discharge to surface waters, as well as surface water discharges of stormwater subject to regulation under the National Pollutant Discharge Elimination System (NPDES). This includes facilities with individual or general industrial stormwater permits, Tier A municipalities, and federal, interstate agency, state, and county facilities regulated under the New Jersey Pollutant Discharge Elimination System (NJPDES) municipal

stormwater permitting program. Tier A municipalities are generally located within the more densely populated regions of the state or along the coast. These municipalities meet the population size requirements of EPA's Municipal Separate Storm Sewer System (MS4) program for regulating urban stormwater discharges. Stormwater point sources, like stormwater nonpoint sources, derive their pollutant loads from runoff from land surfaces and load reduction is accomplished through the use of best management practices (BMPs). The distinction is that stormwater point sources are regulated under the Clean Water Act (under the MS4 program). Stormwater point sources are or will be addressed through the management practices required through the discharge permits.

Wastewater treatment facilities and Tier A municipalities that directly discharge to the shellfish waters in WMA 12 or tributaries that eventually flow into these waters are identified in Appendices B and C. Per Department NJPDES Regulation, N.J.A.C. 7:14A-12.5(a), "All wastewater that could contain pathogenic organisms such as fecal coliform and/or enterococci organisms shall be subject to continuous year round disinfection prior to discharge into surface waters." Therefore, loads from wastewater treatment facilities were considered de minimus, consistent with previous pathogen TMDLs developed by the Department. The NJPDES permit limits for these point sources will not be changed as a result of these TMDLs and will remain a 200 cfu/100 ml monthly geometric mean and a 400 cfu/100 ml weekly geometric mean. Stormwater loads from Tier A MS4 systems are point sources that can be significant. These loads were estimated using the watershed loading methods described in the nonpoint source section, as they will be addressed through BMPs.

3.3 Assessment of Nonpoint Sources

Nonpoint sources that may affect shellfish waters include stormwater discharges that are not subject to regulation under the Clean Water Act, including Tier B municipalities, direct stormwater runoff from land surfaces, as well as malfunctioning sewage conveyance systems, failing or inappropriately located septic systems, and direct contributions from wildlife, livestock and pets. Tier B municipalities are generally located in more rural, non-coastal regions of the state. There are no Tier B municipalities located in the affected drainage areas.

Alternative methods were considered to determine the best approach for estimating land-based loads contributed by each watershed, including the Watershed Treatment Model (WTM) a study of nonpoint source loadings generated in a study of the Toms River watershed, and simpler bacteria load estimation equations. The WTM model was selected because it encompasses local rainfall data and stream length information to better tailor load estimates. In addition, it has been successfully applied in previous coastal TMDL studies (Oyster Bay-New York, U.S. Virgin Islands TMDLs). The goal of applying WTM is to characterize all the point and nonpoint sources, as available data allows, in the existing system and to determine their relative contributions to the waterbody of interest. The loading values thus derived, along with the loads contributed by marinas as discussed below, serve as the reference point from which reductions are made to meet TMDL targets.

The WTM model is a series of spreadsheets that quantifies the loading of pathogen indicators based on land use distribution, stream network length in the watershed, and annual rainfall. The model is designed as a planning level tool for watersheds that do not have sufficient data for complex modeling applications. Although the WTM model has several tiers of data specificity, loading estimates can be calculated with simple land use data, as they were for these shellfish TMDLs. Land use loads are calculated on an annual basis by using a series of coefficients for runoff volume and pathogen loading derived from scientific literature. General land use categories are assigned either a coefficient that is then multiplied by an annual runoff volume to calculate an annual load (e.g., urban land uses), or an annual unit area load that is applied as a function of land use (e.g., rural land uses). These coefficients, presented in Table 5, were chosen based upon the best available research and are summarized in WTM's user manual (Caraco, 2001).

Table 5. Default WTM land use categories and loading variables

WTM Land Use	Corresponding New Jersey Land Uses	Average % Impervious Cover	Fecal Coliform Conc. (MPN/100 ml) or Annual Load (billion/acre)
Low Density Residential	Low Density Residential, Rural Residential, Recreational Land, Athletic Fields	19	20,000
Medium Density Residential	Medium Density Residential, Mixed Residential, Mixed Urban or Built-Up, Other Urban or Built-Up, Military Reservations, No Longer Military	35	20,000
High Density Residential	High Density Residential	56	20,000
Commercial	Commercial Services	71	20,000
Roadway	Transportation/Communication/Utilities	39	20,000
Industrial	Industrial, Industrial/Commercial	78	20,000
Forest	Forest	0	Load: 12 billion/acre
Rural	Agriculture	0	Load: 39 billion/acre
Barren (replaced "Vacant Lots" category in WTM)	Barren	2	Load: 12 billion/acre (estimated)

The default fecal coliform loading rates in the WTM model were converted to total coliform values based on a regression equation developed to examine the relationship between fecal coliform and total coliform concentrations using New Jersey shellfish monitoring data collected from 1991 through 2004. Fecal coliform is a component of total coliform, therefore, the loading values were increased based on this equation.

The potential to accurately convert observed fecal coliform values to equivalent total coliform values is supported by a November 1996 study by Espy, Huston, and Associates, Inc. This study investigated public health issues related to recreational and commercial fisheries use of Corpus Christi Bay, Texas produced for the Corpus Christi Bay National Estuary Program (Jensen et al., 1996). A significant correlation ($R^2=85.7\%$) was found between total and fecal coliform concentrations reported for water samples collected in shared sampling quadrants when plotted on a logarithmic scale. The regression equation derived from the Texas data,

converted into an exponential expression ($TC=1.69*FC^{1.013}$) is very similar to the equation derived from water quality data analyzed as part of these TMDLs ($TC=1.22*FC^{1.061}$).

The watershed for each TMDL waterbody sub-group was delineated using the Hydrologic Unit Coverage (HUC-14 digit) developed by NJDEP, digital elevation model (DEM) data, and the National Hydrography Dataset (NHD) stream coverage for New Jersey. Land use data for each watershed was obtained from the 1995/1997 land use coverage developed for New Jersey's WMAs. Land use categories were consolidated into broader groups for use in estimating land-based loads using the WTM model and for presenting the loading results. The percent impervious information for each land use category was derived from the percent impervious information in the Department's GIS land use coverage, averaged across similar land uses. The bacterial loads for urban areas in each watershed were calculated based on the default fecal coliform concentration literature value for urban land uses, the average percent impervious cover, and the annual runoff volume calculated by the WTM model. Agricultural, forest, and barren land use loads were calculated based on the specific loading rate for each category. Wetland areas and waterways were not included in loading calculations based on WTM model assumptions.

In addition to land-based sources, pathogens can also be associated with direct discharges from boats at marinas. This potential source can be a primary cause of high bacteria concentrations in and around marinas. The bacteria load from inappropriate and illicit wastewater discharges in marinas and mooring locations was estimated based on the marina GIS coverage provided by NJDEP. This dataset includes information on the number of boat slips and boat sizes typical of each marina. The marina formula presented in the Department's shoreline surveys (LARs) was used to calculate the bacteria load for each marina. Marina loads were calculated for the summer months (May - September). In addition, marina loads were multiplied by a factor of 0.25 to recognize a lower contribution during other months (October through April) based on best professional judgment. The marina formula was updated to calculate total coliform loads based on the total coliform-fecal coliform regression equation developed for this TMDL study, as described in the WTM model discussion above. Marinas associated with each waterbody (or sub-group) and the calculated total coliform/fecal coliform loads are presented in Appendix D.

The equation used to estimate fecal coliform loads from marina buffers is:

$$FC / day = 2 \times 10^9 (FC / person / day) \times 2 (person / boat) \times [(0.25 \times slips \geq 24') + (0.065 \times slips < 24')]$$

Explanation of terms in equation:

Fecal coliform per person per day:	2×10^9
Number of people per boat:	2
For slips able to accommodate boats > 24 feet (combination of factors yields multiplier of 0.25):	
Number of slips occupied:	50%
Number of boats occupied:	50%
For boats < 24':	6.5% discharge waste

Direct contributions from illicit discharges, livestock, pets, and wildlife (e.g. seagulls, geese, and other waterfowl in particular) were not estimated based on the lack of site-specific information needed to represent these sources. Note that waterfowl direct deposition in some shellfish areas was mentioned as a likely source according to several published shoreline survey reports for New Jersey. Population estimates, bacteria production rates, and other information would be needed to estimate these sources. Bacteria may also be present in the sediment in some areas, as a result of contamination from stormwater, failing septic systems, malfunctioning sewer systems, agricultural runoff, and other sources. For these TMDLs, the loads contributed by wildlife, sediment, and the other sources were assumed to be included in the land use loading coefficients.

Pathogen indicator source data used in TMDL development are shown in Figures 2 and 3. Land uses, NJPDES-permitted wastewater treatment facilities, marinas, stormwater outfalls, and water quality stations are shown in these maps.

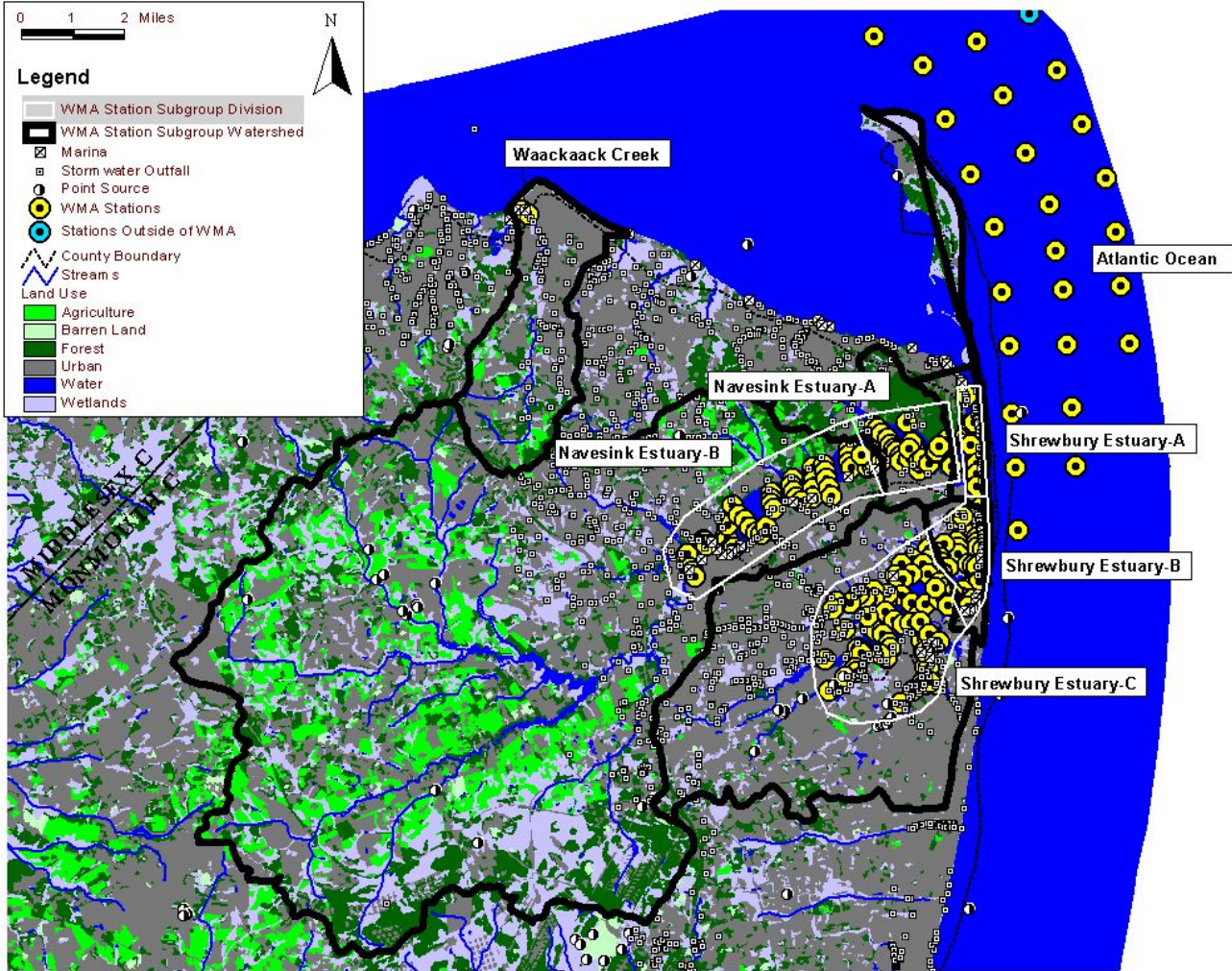


Figure 2. Primary pathogen indicator source data used in TMDL development for northern portions of WMA 12

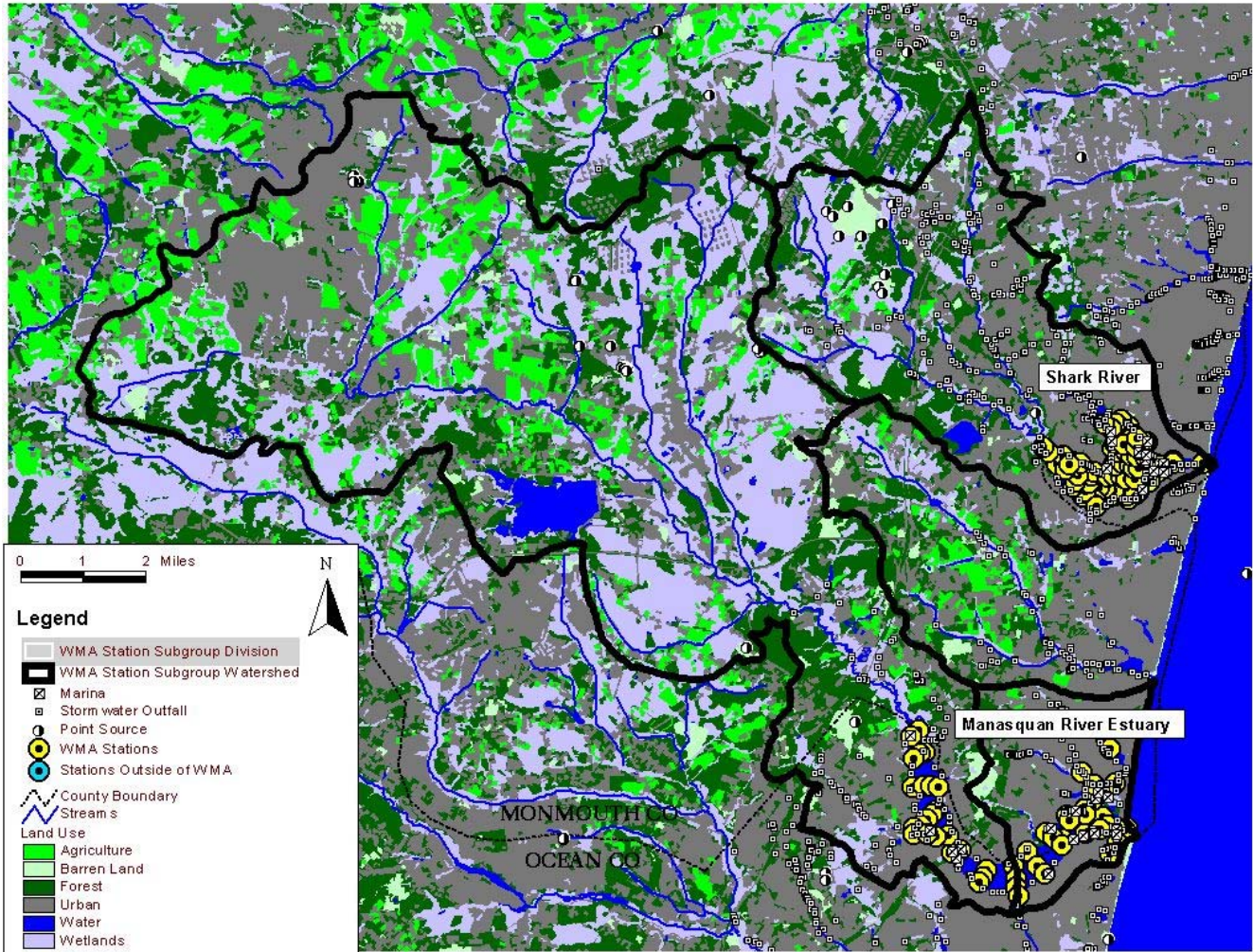


Figure 3. Primary pathogen indicator source data used in TMDL development for southern portions of WMA 12

4.0 WATER QUALITY ANALYSIS

Relating pathogen sources to concentrations of indicator organisms in the impaired waters is distinguished from quantifying that relationship for other pollutants given the inherent variability in population size and dependence not only on physical factors such as temperature and soil characteristics, but also on less predictable factors such as re-growth media. Since bacteria loads and concentrations can vary many orders of magnitude over short distances and over time at a single location, dynamic water quality models can be very difficult to calibrate. Options available to control nonpoint sources of bacteria typically include measures such as sewage infrastructure improvements, goose management strategies, pet waste ordinances, agricultural conservation management plans, and septic system replacement and maintenance. The effectiveness of these control measures is not easily measured relative to observed ambient concentrations. Given these considerations,

detailed water quality modeling was not selected for determining the load reductions needed to attain standards and support the designated shellfish use.

Shellfish monitoring data collected by the Department, in accordance with NSSP guidelines, were used as the basis for TMDL development for the listed shellfish waters. Total coliform data were used to assess the shellfish designated use for all but the ocean portion of the listed waterbodies in WMA 12 according to the New Jersey 2004 *Integrated Water Quality Monitoring and Assessment Report*, and the ocean was found not to be impaired based on water quality, but rather as an administrative precaution. Therefore, total coliform data were used in TMDL development. As described in Section 3.0, each waterbody was divided into smaller sub-groups (as necessary) in order to better represent local water quality conditions, watershed characteristics, and local pollution sources and, thereby inform implementation efforts. The data collected for each waterbody sub-group (or the entire waterbody if not subdivided) were compared to the NSSP criteria for total coliform. In order to account for the spatial distribution in pathogen sources, critical conditions, and other TMDL considerations, the "worst case" station within each waterbody (or sub-group) was identified and used in TMDL development. Monitoring data collected at stations located within marina buffer areas were not included in the analysis because these areas will remain restricted for shellfish harvest as a precautionary measure. Seasonal trends and other factors were evaluated to determine the critical condition period for TMDL development, as described in the next section. Critical condition analyses indicate that bacteria concentrations were typically higher during summer months, therefore, summer data (collected during May-September) were exclusively used in the analysis.

"Worst case" stations were identified based on the calculated 90th percentile (arithmetic), median, data period (emphasis on recent data), and sample size (priority given to stations with sample sizes >20). The "worst case" station identified for each waterbody (or sub-group) is shown in Table 6, along with summary data statistics. The data collected at each "worst case" station were then used to develop TMDLs for each respective waterbody (or sub-group). The percent reduction required was based on the difference between the calculated 90th percentile (using the FDA method specified in NSSP guidelines) and the NSSP 90th percentile criteria or the calculated geometric mean and the NSSP geometric mean criteria, whichever was greater. Source loads were then reduced for each waterbody (or sub-group) to meet the overall percent reduction required.

As a result of this analysis, several waterbodies (or sub-groups) were found to meet the NSSP criteria. The listing of these waterbodies reflects application of the shoreline survey information in making water classifications. Critical to the shoreline survey is the identification of potential pollution sources that may intermittently impact water quality and not be detected by water samples collected 5-12 times a year. According to the NSSP *Guide for the Control of Molluscan Shellfish*, if in the judgment of the state authority, pollution sources present an actual or potential public health hazard, those waters cannot be classified as "Approved". Shellfish harvest restrictions that are imposed because of the shoreline surveys will remain restricted, regardless of water quality. Therefore, development of a TMDL for these areas is not generally appropriate. These areas will be reassigned on the 2006

Integrated List. In areas subject to administrative closure where water quality conforms to criteria, the areas will be placed on Sublist 1; where there is insufficient data to determine conformance with the criteria, the areas will be placed on Sublist 3; where the water quality does not conform to the criteria, but the areas would not be open even if water quality improved, the areas will be placed on Sublist 4, as the impairment is due to pollution, not pollutants.

Table 6. Worst case stations in WMA 12

Waterbody	Subgroup	Worst Case Station	Parameter	Count*	Start Date	End Date	90th Percentile* (arithmetic)	Geometric Mean*	Median*
Atlantic Ocean	-	A2C	Fecal Coliform (5 tube test)	35	7/7/93	6/29/04	3	3	3
Manasquan River Estuary	A	1303D	Total Coliform	49	6/13/85	9/9/04	2400	150	93
Navesink River Estuary	A	1014	Total Coliform	85	2/21/84	9/14/04	1084	53	43
Navesink River Estuary	B	1000C	Total Coliform	71	2/21/84	9/20/04	2400	489	460
Shark River Estuary	-	1206A	Total Coliform	75	10/12/84	7/15/04	2400	135	93
Shrewsbury River Estuary	A	1022A	Total Coliform	83	2/21/84	9/10/03	422	26	21
Shrewsbury River Estuary	B	1101	Total Coliform	90	2/14/84	9/13/04	230	23	23
Shrewsbury River Estuary	C	1128A	Total Coliform	44	2/27/84	5/4/04	2010	71	43
Waackaack Creek-Tidal	A	SRB4	Total Coliform	43	6/6/84	2/28/92	830	34	30

* Concentration expressed in cfu/100 ml

Green highlighted, worst case stations meet NSSP standards.

4.1 Seasonal Variation/Critical Conditions

The technical approach used to develop these TMDLs includes conservative assumptions that take into account seasonal variability and critical conditions. Tidal waterbodies are difficult to assess given the dynamic flow regime, flushing characteristics, spatial and temporal variability in pathogen sources and contributions, watershed characteristics, and other factors. Seasonal trends were evaluated to determine the critical condition period for TMDL development. The results of this analysis indicated that bacteria concentrations were typically higher during summer months. The influx of summer vacationers and the resulting increase in septic and potential leaking sewer volumes, increased marina and boat use, and other factors contribute to this seasonal trend. Rainfall and flow impacts were also evaluated, but correlation results did not show a clear relationship between bacteria concentrations and these factors. As a result, TMDLs were developed based on summer data collected at the

“worst case” station identified for each waterbody (or sub-group). Figure 4 shows the seasonal trend in total coliform shellfish monitoring data for all “worst case” stations located in WMA 12. This conservative approach takes into account seasonal variation and critical conditions because only the data collected during summer months were used to identify “worst case” stations and for determining the TMDL percent reduction required and load allocations. These assumptions are consistent with previous freshwater TMDLs developed in New Jersey and recent shellfish TMDLs developed in New York.

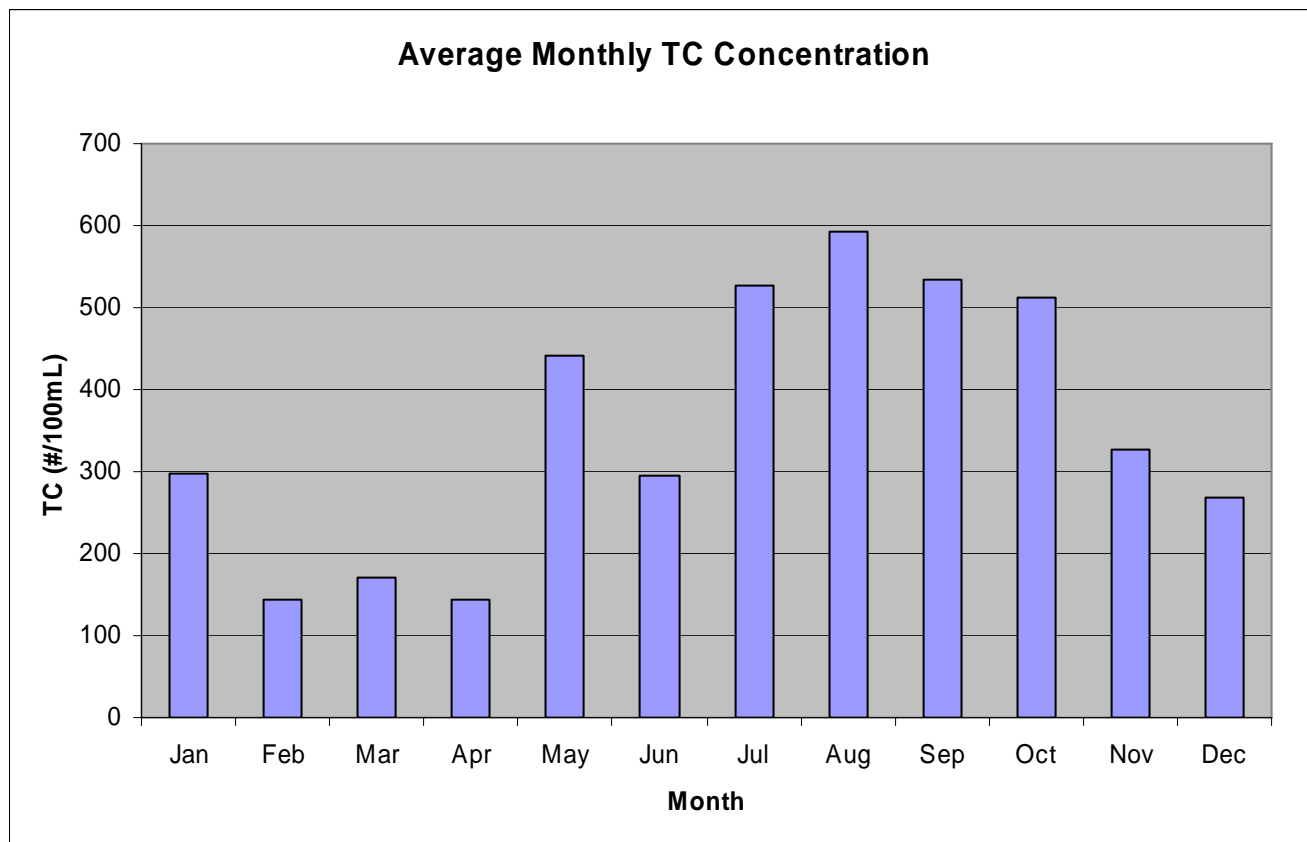


Figure 4. Seasonal trend in TC data for all worst case stations in WMA 12

4.2 Margin of Safety

A Margin of Safety (MOS) is provided to account for “lack of knowledge concerning the relationship between effluent limitations and water quality” (40 CFR 130.7(c)). For these TMDLs, both an implicit and explicit Margin of Safety (MOS) were incorporated. An implicit MOS was incorporated by using conservative assumptions, including the use of “worst case” stations to determine the percent reduction required, using data collected during the summer critical condition period to develop TMDLs, treating total coliform and fecal coliform as a conservative substance (source loads were estimated without including die-off rates, soil incorporation, etc.), using conservative methods to estimate land-based loads, and other factors. In addition, a 5% explicit MOS was calculated for each TMDL eligible waterbody.

5.0 TMDL CALCULATIONS

TMDLs were developed based on the percent reduction calculated by comparing the data collected at each “worst case” station to the NSSP 90th percentile criteria for total coliform. The overall percent reduction (including a minimum explicit 5% MOS) was calculated and load reductions for point and nonpoint sources were estimated. The percent reduction specified for each waterbody (or sub-group) was applied equally to pathogen sources in each watershed for which source reduction measures can reasonably be applied. The loads contributed by forest lands and barren lands were not reduced in the TMDL allocation because these loads represent natural background levels (e.g. wildlife contributions) and/or sources that cannot be reasonably reduced. As a result, existing loads from these sources are equal to the future loads. Therefore, the load reduction from land uses and marinas for which reduction measures can reasonably be applied must be increased proportionally, as presented in Table 9.

The TMDL was allocated among point and nonpoint sources. Wastewater treatment plants typically have a negligible discharge due to required disinfection practices designed to reduce and/or eliminate the bacteria concentration in wastewater. These point source loads were, therefore, considered de minimus and were not included in the overall WLA presented in Tables 8 and 9. An individual WLA was calculated, as presented in Appendix B, assuming discharge at full permitted capacity at the effluent limit. Stormwater from Tier A municipalities was assigned a WLA, while Tier B municipalities, non-urban land uses and marinas were assigned LAs.

In the TMDL analysis, some of the waterbodies were divided into smaller subgroups. In several situations, one subgroup was determined to flow/contribute loads to another subgroup. This is referred to as a “nested” watershed situation. Because the load reductions were calculated on progressively larger, overlapping drainage areas, this led to some waterbodies initially receiving more than one load reduction percentage. To eliminate multiple reductions, a revision was made in how the TMDLs are presented. Load contributions from impaired up-stream drainage areas were adjusted to TMDL (reduced) quantities; then added to downstream loads and the percent reductions recalculated. The revised values are presented in Table 1, Table 2, Table 8, and Table 9 for the affected subgroups. The nested subgroups located in WMA 12 are shown in “Appendix E: Maps of Nested Watersheds”. This exercise resulted in Navesink-A no longer requiring a 52% reduction. By meeting the up-stream, Navesink-B reduction of 92%, Navesink-A would require no further reduction in order to support designated uses. Thus the Navesink-A subgroup was assigned a 0 percent reduction. There were no changes in the number of 2004 303(d) Listings receiving TMDLs.

5.1 Wasteload Allocations and Load Allocations

WLAs were established for point source discharges within each watershed and for municipal stormwater discharges subject to regulation under the CWA. LAs were established for all

stormwater sources that are not subject to regulation under the CWA and for all other nonpoint sources. Stormwater point sources that received a WLA were distinguished from stormwater sources receiving a LA on the basis of land use type and municipal tier designation (Tier A/Tier B).

This distribution of loading capacity between WLAs and LAs is consistent with recent EPA guidance that clarifies existing regulatory requirements for establishing WLAs for stormwater discharges (Wayland, November 2002). Stormwater discharges are captured within the runoff sources quantified according to land use, as described previously. Distinguishing between regulated and unregulated stormwater is necessary in order to express WLAs and LAs numerically; however, “EPA recognizes that these allocations might be fairly rudimentary because of data limitations and variability within the system” (Wayland, November 2002, p.1). Therefore, allocations are established according to source categories as shown in Table 7. This demarcation between WLAs and LAs based on land use source categories is not perfect, but it represents the best estimate defined as narrowly as data allow. The Department acknowledges that there may be stormwater sources in the residential, commercial, industrial, and mixed urban runoff source categories that are not NJPDES-regulated. Nothing in these TMDLs shall be construed to require the Department to regulate a stormwater source under NJPDES that would not already be regulated as such, nor shall anything in these TMDLs be construed to prevent the Department from regulating a stormwater source under NJPDES.

Table 7. Assignment of WLAs and LAs for stormwater point sources and nonpoint sources

Land Use Source Category	Municipal Tier	TMDL Allocation Type
High density residential	A	WLA
Medium density residential (incl. mixed residential, mixed urban, other urban, military reservations, and no longer military)	A	WLA
Low density residential (incl. rural residential, recreational land, and athletic fields)	A	WLA
Commercial	A	WLA
Industrial	A	WLA
Roadways	A	WLA
High density residential	B	LA
Medium density residential (incl. mixed residential, mixed urban, other urban, military reservations, and no longer military)	B	LA
Low density residential (incl. rural residential, recreational land, and athletic fields)	B	LA
Commercial	B	LA
Industrial	B	LA
Roadways	B	LA
Agricultural	N/A	LA
Forest	N/A	LA
Barren land	N/A	LA

Notes: - Wetland areas were not included in load estimates based on model assumptions.
 - There are no Tier B municipalities located in the affected drainage areas.

A summary of the WLAs, LAs, and MOS is provided for each subject waterbody (or subgroup) in Table 8 and source loads and allocations are presented in Table 9. The loads contributed by forest lands and barren lands were not reduced in the TMDL allocation table, as described above. The load reduction for controllable sources (i.e. urban lands, agricultural lands, and marinas) was increased proportionally to meet the overall percent reduction required for each waterbody (or subgroup).

Table 8. TMDL calculations for shellfishing impaired waters in WMA 12

Waterbody	Sub-group	WLA			LA			MOS		TMDL (cfu/yr)	TMDL (cfu/day)
		Load (cfu/yr)	Load (cfu/day)	% of TMDL	Load (cfu/yr)	Load (cfu/day)	% of TMDL	Load (cfu/yr)	Load (cfu/day)		
Manasquan River Estuary	-	2.62E+15	7.18E+12	73%	8.00E+14	2.19E+12	22%	1.80E+14	4.93E+11	3.60E+15	9.86E+12
Navesink River Estuary	B	8.34E+14	2.28E+12	66%	3.68E+14	1.01E+12	29%	6.32E+13	1.73E+11	1.26E+15	3.45E+12
Shark River Estuary	-	9.33E+14	2.56E+12	78%	2.07E+14	5.67E+11	17%	6.00E+13	1.64E+11	1.20E+15	3.29E+12
Shrewsbury River Estuary	C	2.20E+15	6.03E+12	91%	1.05E+14	2.88E+11	4%	1.21E+14	3.32E+11	2.42E+15	6.63E+12
Waackaack Creek-Tidal	-	1.66E+15	4.55E+12	91%	6.59E+13	1.81E+11	4%	9.06E+13	2.48E+11	1.81E+15	4.96E+12

Footnote: Daily TMDLs were calculated by dividing the annual load values by 365 days/year. The daily loads are based on the TMDL not exceeding the calculated annual load. MOS is 5% of the TMDL.

Table 9. WMA 12 Land-based Load Allocations

Waterbody	Subgroup	Overall % Reduction	Agriculture			Barren Land			Forest			Urban Total (WLA)			Marinas (LA)			MOS (cfu/yr)	TMDL (cfu/yr)
			Existing Load (cfu/yr)	Percent Reduction	Allocated Load (cfu/yr)	Existing Load (cfu/yr)	Percent Reduction	Allocated Load (cfu/yr)	Existing Load (cfu/yr)	Percent Reduction	Allocated Load (cfu/yr)	Existing Load (cfu/yr)	Percent Reduction	Allocated Load (cfu/yr)	Existing Load (cfu/yr)	Percent Reduction	Allocated Load (cfu/yr)		
Manasquan River Estuary	-	77%	4.69E+14	79%	9.92E+13	2.85E+13	0%	2.85E+13	2.63E+14	0%	2.63E+14	1.24E+16	79%	2.62E+15	1.94E+15	79%	4.10E+14	1.80E+14	3.60E+15
Navesink River Estuary	B	92%	7.84E+14	93%	5.20E+13	1.16E+13	0%	1.16E+13	2.67E+14	0%	2.67E+14	1.26E+16	93%	8.34E+14	5.52E+14	93%	3.66E+13	6.32E+13	1.26E+15
Shark River Estuary	-	81%	2.22E+13	82%	3.97E+12	1.50E+13	0%	1.50E+13	8.96E+13	0%	8.96E+13	5.22E+15	82%	9.33E+14	5.51E+14	82%	9.85E+13	6.00E+13	1.20E+15
Shrewsbury River Estuary	C	74%	9.09E+12	74%	2.37E+12	1.41E+12	0%	1.41E+12	2.15E+13	0%	2.15E+13	8.42E+15	74%	2.20E+15	3.07E+14	74%	8.01E+13	1.21E+14	2.42E+15
Waackaack Creek-Tidal	-	34%	2.25E+13	35%	1.47E+13	2.61E+12	0%	2.61E+12	2.44E+13	0%	2.44E+13	2.54E+15	35%	1.66E+15	3.71E+13	35%	2.42E+13	9.06E+13	1.81E+15

Footnote: Daily TMDLs can be calculated by dividing the load values by 365 days/year.

5.2 Reserve Capacity

Reserve capacity is an optional means of reserving a portion of the loading capacity to allow for future growth. Reserve capacities are not included for the subject waters. Wastewater treatment facilities will continue to be required to achieve disinfection. Nonpoint source reduction strategies applied to land uses will be equally effective with respect to existing and future use of the land.

6.0 FOLLOW - UP MONITORING

The Department maintains a large network of monitoring stations throughout the State's coastal region. The Department's Bureau of Marine Water Monitoring collects water quality data to determine compliance with the National Shellfish Sanitation Program, for the evaluation of the ecological health of coastal waters, and to monitor, identify and track pollution sources impacting the State's coastal waters. Shellfish monitoring data collected the Bureau and information on pollution sources within each watershed and waterbody were used to identify the shellfish-impaired waters that are the subject of these TMDLs. Pathogen indicator data will continue to be collected by the Bureau on a routine basis to assess changes in water quality over time and to determine compliance with the NSSP criteria for shellfish growing areas.

7.0 IMPLEMENTATION

Management measures are "economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint and stormwater sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint and stormwater source pollution control practices, technologies, processes, citing criteria, operating methods, or other alternatives" (USEPA, 1993).

Development of effective management measures depends on accurate source assessment. Coliform bacteria are contributed to the environment from a number of categories of sources including human, domestic or captive animals, agricultural practices, and wildlife. Coliform bacteria from these sources can reach waterbodies directly, through overland runoff, or through sewage or stormwater conveyance facilities. Each potential source will respond to one or more management strategies designed to eliminate or reduce that source of coliform bacteria. Each management strategy has one or more entities that can take lead responsibility to effect the strategy. Various funding sources are available to assist in accomplishing the management strategies. The Department will address the sources of impairment through systematic source trackdown, matching strategies with sources, selecting responsible entities and aligning available resources to effect implementation.

For example, the stormwater discharged to the impaired waterbodies through "municipal separate storm sewer systems" (MS4s) are regulated under the Department's Municipal Stormwater Regulation Program. Under these rules and associated general permits, many

municipalities (and various county, State, and other agencies) will be required to implement various control measures that should substantially reduce bacteria loadings, including measures to eliminate “illicit connections” of domestic sewage and other waste to the MS4s, adopt and enforce a pet waste ordinance, prohibit feeding of unconfined wildlife on public property, clean catch basins, perform good housekeeping at maintenance yards, and provide related public education and employee training. These measures are to be phased in over a timeframe specified in the Department’s Municipal Stormwater permitting program. The Department will use its Water Quality Management Planning program to expedite implementation of these measures where amendments to areawide Water Quality Management Plans are proposed. The Department has provided State funds as well as a portion of its Clean Water Act 319(h) pass through grant funds to assist municipalities in meeting these requirements.

Sewage conveyance facilities are potential sources of fecal coliform in that equipment failure or operational problems may result in the release of untreated sewage. These sources, once identified, can be eliminated through appropriate corrective measures that can be affected through the Department’s enforcement authority. Inadequate on-site sewage disposal can also be a source of fecal coliform. Systems that were improperly designed, located or maintained may result in surfacing of effluent; illicit remedies such as connections to storm sewers or streams add human waste directly to waterbodies. Once these problems have been identified through local health departments, sanitary surveys or other means, alternatives to address the problems can be evaluated and the best solution implemented. The New Jersey Environmental Infrastructure Financing Program, which includes New Jersey’s State Revolving Fund, provides low interest loans to assist in correction of water quality problems related to stormwater and wastewater management.

Geese are migratory birds that are protected by the Migratory Bird Treaty Act of 1918 and other Federal and State Laws. Resident Canada geese do not migrate, but are nevertheless protected by this and other legislation. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS)-Wildlife Services program reports that the 1999 estimated population of non-migratory geese in New Jersey was 83,000. Geese may produce up to 1½ pounds of fecal matter a day and when they congregate in large numbers they can represent a locally significant source of coliform bacteria. This may warrant taking steps to reduce populations in these areas.

Because geese are free to move about and commonly graze and rest on large grassy areas associated with schools, parks, golf courses, corporate lawns and cemeteries, measures to reduce populations, where necessary, are best developed and conducted at the community level through a community-based goose damage management program. USDA’s Wildlife Services program recommends that a community prepare a written Canada Goose Damage Management Plan that may include the following actions:

- Initiate a fact-finding and communication plan
- Enact and enforce a “no feeding” ordinance
- Conduct goose damage control activities such as habitat modification
- Review and update land use policies

- Reduce or eliminate goose reproduction (permit required)
- Hunt geese to reinforce nonlethal actions (permit required)

Procedures such as handling nests and eggs, capturing and relocating birds, and the hunting of birds require a depredation permit from either the USDA APHIS Wildlife Services or U.S. Fish and Wildlife Services. Procedures requiring permits should be a last resort after a community has exhausted the other listed measures. The Department's draft guide *Management of Canada Geese in Suburban Areas, March 2001*, which may be found at www.state.nj.us/dep/watershedmgt under publications, provides extensive guidance on how to modify habitat to serve as a deterrent to geese as well as other prevention techniques such as education through signage and ordinances.

In coastal areas, other waterfowl are naturally present in significant numbers and vary seasonally with migratory patterns. Other wildlife contributions may include deer populations, which have been identified as a potential fecal coliform source in the impaired watersheds. The forested and low-density residential areas that provide deer habitat can be found in close proximity to the impaired stream segments. Deer have been evaluated in fecal coliform TMDLs by other States (e.g. Alabama and South Carolina) and could be a fecal coliform source in New Jersey. Management measures to reduce coliform bacteria contributed by wildlife are not generally practicable.

Agricultural activities are another example of potential sources of coliform bacteria. Possible contributors are direct contributions from livestock permitted to traverse streams and stream corridors, manure management from feeding operations, or use of manure as a soil fertilizer/amendment. Implementation of conservation management plans and best management practices are the best means of controlling agricultural sources of coliform bacteria. Several programs are available to assist farmers in the development and implementation of conservation management plans and best management practices. The Natural Resource Conservation Service is the primary source of assistance for landowners in the development of resource management pertaining to soil conservation, water quality improvement, wildlife habitat enhancement, and irrigation water management. The USDA Farm Services Agency performs most of the funding assistance. All agricultural technical assistance is coordinated through the locally led Soil Conservation Districts. The funding programs include:

- **The Environmental Quality Incentive Program (EQIP)** is designed to provide technical, financial, and educational assistance to farmers/producers for conservation practices that address natural resource concerns, such as water quality. Practices under this program include integrated crop management, grazing land management, well sealing, erosion control systems, agri-chemical handling facilities, vegetative filter strips/riparian buffers, animal waste management facilities and irrigation systems.
- **The Conservation Reserve Program (CRP)** is designed to provide technical and financial assistance to farmers/producers to address the agricultural impacts on water quality and to maintain and improve wildlife habitat. CRP practices include the

establishment of filter strips, riparian buffers and permanent wildlife habitats. This program provides the basis for the Conservation Reserve Enhancement Program (CREP).

- **The Conservation Reserve Enhancement Program** The New Jersey Departments of Environmental Protection and Agriculture, in partnership with the Farm Service Agency and Natural Resources Conservation Service, have established a \$100 million dollar CREP agreement. The program matches \$23 million of State money with \$77 million from the Commodity Credit Corporation within USDA. Through CREP, financial incentives are offered for agricultural landowners to voluntarily implement conservation practices on agricultural lands. NJ CREP will be part of the USDA's Conservation Reserve Program (CRP). There will be a ten-year enrollment period, with CREP leases ranging between 10-15 years. The State intends to augment this program thereby making these leases permanent easements. The enrollment of farmland into CREP in New Jersey is expected to improve stream health through the installation of water quality conservation practices on New Jersey farmland.

Uses of the marine environment as a recreational area and receiving water have the potential to contribute pathogen loads. As part of the Governor's Coast 2005 initiative, the Department has taken many steps toward stronger protection for water quality and habitat, including:

- The Department has worked to strengthen standards for ocean dischargers to avoid impacts to water quality. The Department requires implementation of measures that will prevent catastrophic sewage spills through the maintenance and upgrading of aging infrastructure.
- The Department targets \$30 million in grants to accelerate projects that improve coastal water quality.
- Following public input and adequate data collection, the Department will begin restoration of Wreck Pond (a major source of beach closings) no later than September 2005.
- The Department will begin reconstruction of the Deal Lake flume no later than September 2005.
- The Department partners with other state agencies, non-profit groups, trade organizations, and marina owners to activate the "New Jersey Clean Marina" program.
- New Jersey will work with anglers, environmentalists, and the New Jersey congressional delegation to establish a "Clean Ocean Zone" to protect water quality in the NY/NJ Bight by eliminating and preventing pollution.

In March 2005, the New Jersey Clean Marina Program was established. It is a voluntary education program that provides information, guidance, and technical assistance to marina operators, local government, and recreational boaters regarding the most effective practices to protect water quality and coastal resources. Marina and boat operational and maintenance activities can contribute to nonpoint source pollution by discharging substances such as oil, grease, paint and cleaning chemicals, and fish waste. This Program gives marina managers

the information they need to reduce these incidental effects of their activities. Facilities that meet the requirements of the Program are recognized as "Clean Marinas." By adopting pollution prevention measures, marina owners and managers can engage in environmentally responsible operations and management of their facility. The New Jersey Clean Marina Program is a partnership among state and federal government agencies, trade associations, marine businesses and other interested parties. The Department website (www.njcleanmarina.org) contains more information and a complete list of participating agencies and organizations.

Another program designed for coastal water quality improvement is New Jersey's Clean Vessel Act (CVA) Committee. Passed by the Congress in 1992, the CVA helps reduce pollution from vessel sewage discharges. Federal grants are available to states on a competitive basis for the construction and/or renovation, operation and maintenance of pumpout and portable toilet dump stations. Currently, states submit grant proposals, by May 1st of each year, to one of seven Fish and Wildlife Service regional offices for review. The service's Division of Federal Aid then convenes a panel including representatives from the Service's Washington Office of the Division of Federal Aid, the National Oceanic and Atmospheric Administration (NOAA), the USEPA, and the U.S. Coast Guard. The panel reviews, ranks and makes funding recommendations to the Director of the Fish and Wildlife Service. The Director gives priority consideration to grant proposals which provide installation and/or operation of pumpout and dump stations under federally approved state plans.

All recreational vessels must have access to pumpouts funded under the Clean Vessel Act. NOAA will mark pumpout and dump station locations on its nautical charts. Halfway through the program, grants have been awarded to install 1,200 pumpout stations and 630 dump stations. A maximum fee of \$5.00 may be charged for the use of pumpout facilities constructed or maintained with grant funds.

As part of this program, four CVA funded pumpout boats are in service in New Jersey. They are operated by the Borough of Seaside Park, by Monmouth County, and by Ocean County. Pumpout boats can pull up along side a recreational boat and pump out its sewage holding device with a suction hose. Once a pumpout boat is full of waste, it discharges the waste into a sewage treatment facility for proper disposal.

No Discharge Areas

The Manasquan River and the Shark River were given some help on May 28, 1998, as they were designated as New Jersey's first "no discharge zone" for boat sewage. Later the Navesink River, Shrewsbury River and Barnegat Bay/Manahawkin Bay/Little Egg Harbor Region were also designated "no discharge zones" by the Department and the USEPA. A "no discharge zone" means that the discharge of any boat sewage, treated or untreated, is forbidden in these areas. These waterways have sufficient boat sewage pumpout facilities to accommodate all boaters using the areas. Current law for the Manasquan, Shark, Navesink, and Shrewsbury Rivers now makes it illegal to dump boat sewage within 3 miles of the shorelines of these areas. Fines for illegal dumping may reach \$2,000 or more. In order for a body of water to become designated as a no discharge zone, there should be one pumpout station per 200 to 300 slips. Once this number is established and the pumpout station is

operational, the body of water may be designated a “no discharge zone” by the EPA and the NJDEP.

The Department has approved the Hudson River for “no discharge zone” designation. The State of New York has also approved the Hudson River for such a designation. If approval of the body of water is given by the USEPA, the waterway will also become “no discharge zones”. The information above is located on the Department’s website (<http://www.njfishandwildlife.com/cvahome.htm>).

Management strategies are summarized below in Table 10.

Table 10. Implementation management strategies

Source Category	Responses	Potential Responsible Entity	Funding options
Human Sources			
Inadequate (per design, operation, maintenance, location, density) on-site disposal systems	Sanitary surveys, septic management programs/ordinances	Municipality	CWA 604(b) for confirmation of inadequate condition; Environmental Infrastructure Financing Program for construction of selected option
Inadequate or improperly maintained stormwater facilities; illicit connections	Measures required under Municipal Stormwater permitting program including any additional measures determined in the future to be needed through TMDL process	Municipality, State and County regulated entities, stormwater utilities	CWA 319(h); Environmental Infrastructure Financing Program for construction of selected option
Malfunctioning sewage conveyance facilities	Identify through source trackdown and repair	Owner of malfunctioning facility-compliance issue	User fees
Marinas	Clean Marina Program; No Discharge Zones; Marina BMPs including: Marine pump-out facilities; Marina flushing design; Fish waste management including fish-cleaning restrictions, public education, and fish waste disposal; Proper sewage handling including: installing a sanitary pump-out system, providing on-shore restrooms, provide accommodations for emptying potable Marine Sanitation Devices (MSDs),	Marina property owner; Municipalities for ordinance adoption and compliance	State sources and CWA 319(h)

Source Category	Responses	Potential Responsible Entity	Funding options
	safeguarding and maintaining septic systems, providing live aboard facilities, offering MSD inspections, encouraging compliance, and educating boaters.		
Domestic/captive animal sources			
Pets	Pet waste ordinances	Municipalities for ordinance adoption and compliance	State source and CWA 319(h) assistance to municipalities to implement municipal stormwater regulations
Horses, livestock, zoos	Confirm through source trackdown: SCD/NRCS develop conservation management plans	Property owner	EQIP, CRP, CREP
Agricultural practices	Confirm through source trackdown; SCD/NRCS develop conservation management plans, exercise CAFO/AFO authority if applicable	Property owner	EQIP, CRP, CREP
Wildlife			
Locally excessive populations of resident Canada geese or other waterfowl	Feeding ordinances; Goose Management BMPs	Municipality for ordinance; local community groups for BMPs	State source; CWA 319(h)
Indigenous wildlife	Confirm through trackdown; riparian buffer restoration; consider revising designated uses	State	State source

7.1 Source Trackdown

Sewage Infrastructure Improvement Act (SIIA)

N.J.A.C. 7:22A was originally adopted by the Department on December 29, 1989 (see 22 N.J.R. 368(a)) to implement the Sewage Infrastructure Improvement Act (SIIA), N.J.S.A. 58:25-23 et seq. The SIIA has two main components: (1) to address discharges from combined sanitary and stormwater sewer systems (CSO) throughout the State (planning and design grants for CSOs) and (2) to map and investigate stormwater sewer systems in Atlantic, Cape May, Monmouth and Ocean counties (stormwater mapping grants). The SIIA,

which became effective on August 3, 1988, was designed to address nonpoint and point sources of pollution from stormwater sewer systems and combined sewer overflow points. The New Jersey Legislature has declared that these sources of pollution contribute greatly to the biological and chemical degradation of coastal and surface waters of the state. The SIIA recognized that nonpoint sources of pollution create public health dangers and mandate beach and shellfish bed closings by contributing high levels of bacteria to surface waters through stormwater sewer systems. The SIIA also recognized that overflows of raw sewage from combined sewer systems are another major source of water pollution and established various requirements for municipalities and public entities to address these pollution problems.

The SIIA required all municipalities with stormwater sewer systems discharging into the salt waters of Monmouth, Ocean, Atlantic or Cape May counties to prepare and submit a map of their sanitary and stormwater sewer systems and to conduct periodic stormwater monitoring of outfalls discharging to saltwater. Grant funding was provided for mapping, sampling and identification of cross connections and interconnections between the stormwater and sanitary sewers. This work is essentially complete and will inform implementation efforts.

While there are no CSOs in the waterbodies addressed in this TMDL report, it should be noted that significant source reduction strategies have been and continue to be put in place to address this source of pathogens in other waterbodies, such as the New York/New Jersey Harbor, which will be addressed in future TMDL efforts.

Pathogen Indicators and Microbial Source Tracking:

Advances in microbiology and molecular biology have produced several methodologies that discriminate among sources of fecal coliform and thus more accurately identify pathogen sources. The numbers of pathogenic microbes present in polluted waters are few and not readily isolated nor enumerated. Therefore, analyses related to the control of these pathogens must rely upon indicator microorganisms. The commonly used pathogen indicator organisms are the coliform groups of bacteria, which are characterized as gram-negative, rod-shaped bacteria. Coliform bacteria are suitable indicator organism because they are generally not found in unpolluted water, are easily identified and quantified, and are generally more numerous and more resistant than pathogenic bacteria (Thomann and Mueller, 1987).

Tests for fecal organisms are conducted at an elevated temperature (44.5°C), where the growth of bacteria of non-fecal origin is suppressed. While correlation between indicator organisms and diseases can vary greatly, as seen in several studies performed by the EPA and others, two indicator organisms *Esherichia coli* (*E. coli*) and enterococci species showed stronger correlation with incidence of disease in bathers than fecal coliform (USEPA, 2001). Similar epidemiological studies for shellfish consumption have not been performed for *E. coli* or enterococci. Recent advances have allowed for more accurate identification of pathogen sources. A few of these methods, including, molecular, biochemical, and chemical are briefly described in the following paragraph.

Molecular (genotype) methods are based on the unique genetic makeup of different strains, or subspecies, of fecal bacteria (Bowman et al, 2000). An example of this method includes "DNA fingerprinting" (i.e., a ribotype analysis which involves analyzing genomic DNA from fecal *E. coli* to distinguish human and non-human specific strains of *E. coli*). Biochemical (phenotype) methods include those based on the effect of an organism's genes actively producing a biochemical substance (Graves et al., 2002; Goya et al 1987). An example of this method is multiple antibiotic resistance (MAR) testing of fecal *E. coli*. In MAR testing, *E. coli* are isolated from fecal samples and exposed to 10-23 different antibiotics. In theory, *E. coli* originating from wild animals should show resistance to a smaller number of antibiotics than *E. coli* originating from humans or pets. Given this general trend, MAR patterns or "signatures" can be defined for each class of *E. coli* species. Chemical methods are based on finding chemical compounds associated with human wastewater, and useful in determining if the sources are human or non-human. Such methods measure the presence of optical brighteners, which are contained in all laundry detergents, and soap surfactants in the water column. Unlike the optical brightener method, the measurement of surfactants may allow for some quantification of the source.

MST methods have already been successfully employed at the Department in the past decade. Since 1988, the Department has worked cooperatively with the University of North Carolina in developing and determining the application of RNA coliphage as a pathogen indicator. This research was funded through USEPA and Hudson River Foundation grants. These studies showed that the RNA coliphages are useful as an indicator of fecal contamination; particularly in chlorinated effluents and that they can be serotyped to distinguish human and animal fecal contamination. Through these studies, the Department has developed an extensive database of the presence of coliphages in defined contaminated areas (point human, non-point human, point animal, and non-point animal).

More recently, the Department has established a MST methodology that utilizes both genotype (genotyping of F+RNA coliphages) and phenotype (MAR testing) tests. The results of these tests are collectively evaluated to best determine sources of fecal contamination. The methodology includes evaluation of long-term microbial results as well as data (GIS Land use coverage, aerial photographs, and visual assessments) of actual and potential sources, stormwater monitoring to delineate the location of major sources and the use of MAR and F+ coliphage in conjunction with conventional microbial indicators. This methodology has been successfully applied in several areas including Seaside Park, Long Swamp, Atlantic City, and Parvin State Park. This methodology may be utilized for select TMDL waterbodies.

7.2 Specific Projects

In addition to generic strategies described previously, a number of projects have been undertaken which are expected to aid in achieving the load reductions assigned to the impaired waterbodies. Ongoing activities to develop and implement watershed restoration plans are expected to result in additional specific projects to reduce pollutant loads.

Table 11. WMA 12 Outreach and Restoration Projects

WMA	FY	FUNDING SOURCE	RECIPIENT	PROJECT TITLE	GRANT AMOUNT
12	1999	319	Rutgers Cooperative Ext. Solid Waste Management	Best Management Practices for Horse Manure on Small Farms	\$110,000.00
12	2001	319	Middletown Township Environmental Commission	To perform an assessment of McClees Brook for a wetland restoration project.	\$34,000 base
12	2001	319	Sylvan Lake Commission	Proposes to construct a concrete containment area to capture sediment & debris from the stormwater trunk line serving portions of Neptune City & Neptune Twp.	\$40,000.00
12	2002	319	Friends of Monmouth County Parks System	Riparian Restoration in the Manasquan Watershed	\$100,000.00
12	2003	319	Borough of Avon by the Sea	Removing Siltation and Debris in Sylvan Lake	\$230,000.00
12	2003	319	Monmouth County Planning Board	Ramenessin Brook NPS Pollution Source Assessment and Stormwater Impact Study	\$177,500.00
12	2003	319	Township of Neptune	The Implementation of Stormwater BMPs at Lake Alberta	\$195,400.00
12	2003	319	Monmouth University School of Science, Technology and Engineering	Innovative Assessment of Sources of Fecal E Coli in Pathogen Impaired Waterbodies of the Monmouth Coastal Watersheds Region	\$124,762.00
12	2004	319	The Deal Lake Commission c/o Borough of Allenhurst	The Development of A Regional Stormwater Management Plan for the Deal Lake Watershed For the Purpose of the Managing Existing and future Stormwater Impact	\$99,400.00
12	2004	319	Atlantic Highlands Environmental Commission	Many Mind Creek Regional Stormwater Management Plan	\$87,833.00
	1998	319	Rutgers Department of Environmental Services	BMPs for the use of Non-traditional Organic Wastes in Agriculture	\$79,000.00

8.0 REASONABLE ASSURANCE

With the implementation of follow-up monitoring, source identification and source reduction as described in general and for each segment, the Department has reasonable assurance that a significant increase in the shellfish designated use will be attained. The results of trackdown and follow up ambient monitoring will be evaluated to determine effectiveness of the identified measures and if additional measures are needed.

9.0 PUBLIC PARTICIPATION

The Water Quality Management Planning Rules N.J.A.C. 7:15-7.2 requires the Department to initiate a public process prior to the development of each TMDL and to allow public input to the Department on policy issues affecting the development of the TMDL. Further, the Department proposed each TMDL as an amendment to the appropriate areawide water quality management plan in accordance with procedures at N.J.A.C. 7:15-3.4(g). As part of the public participation process for the development and implementation of the subject TMDLs, the Department worked collaboratively with a series of stakeholder groups as part of the Department's ongoing watershed management efforts.

The Department conducted three outreach sessions: November 17, 2005 for WMAs 12 and 13 with the Barnegat Bay Advisory Committee at Ocean County College; December 15, 2005 for WMAs 14, 15, and 16 at the Galloway Township Library in Galloway, New Jersey; and January 3, 2006 for WMAs 16 and 17 at the Commercial Township Municipal Building in Port Norris. During the sessions, presentations of the Department TMDL process, the locations of impaired shellfish waterbodies, and potential methods to achieve bacteria source reductions were shared. GIS maps aided in soliciting information regarding potential sources within each watershed.

10.0 AMENDMENT PROCESS

Notice proposing these TMDLs was published February 21, 2006 in the New Jersey Register and in newspapers of general circulation in order to provide the public an opportunity to review the TMDL document and submit formal comments. In addition, a public hearing was held on March 23, 2006 at the Ocean County Community College - Toms River Campus in the Technology Building Lecture Hall. There was an informal presentation from 7:00 p.m. to 7:30 p.m., which was followed by the public hearing from 7:30 p.m. until the end of testimony. Notice of the proposal and hearing was provided to affected municipalities in the watershed.

All comments received during the public notice period and at the public hearing have become part of the record for this TMDL and were considered in the Department's decision to establish this TMDL through submittal to EPA Region 2. This TMDL has been adopted as an amendment to the Monmouth and Ocean Counties Water Quality Management Plans in accordance with New Jersey's Water Quality Management Planning Rules at N.J.A.C. 7:15-3.4 (g). The outcome of the public participation process is described in Appendix F.

APPENDIX A: REFERENCES

Bacteria Load Estimation methods used to estimate land-based bacteria load contributions: (1) Toms River studies – USGS (May 2005); (2) Loading Coefficient Analysis and Selection Tool (LCAST). Developed by NJDEP and Tetra Tech, December 2001.; (3) Watershed Treatment Model (WTM). Developed by the Center for Watershed Protection in July 2001; (4) Simple Method for calculating bacteria loads (Schueler, T. 1987).

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Cooperative Coastal Monitoring Program (CCMP) bacteria data, county-year spreadsheets provided by NJDEP on 6/8/2005 and 10/25/2005.

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APPENDIX B: NJPDES WASTEWATER TREATMENT FACILITIES

WMA 12 Wastewater Treatment Facilities

Waterbody	Subgroup	NJPDES ID	Facility Name	Pipe	Design Flow** (MGD)	FC Limit (cfu/100ml)	WLA*** (cfu/day)	Permit Category*	Receiving Waters
Navesink River Estuary	B	NJ0022586	Marlboro Psychiatric Hospital	001A	1	200 MoGeoAvg	7.57E+09	A	Big Brook
		NJ0023540	Naval Weapons Station Earle STP	001A	0.37	200 MoGeoAvg	2.80E+09	A	Hockhockson Brook
		NJ0027031	Holmdel BOE - Village School	001A	0.01	200 MoGeoAvg	7.57E+07	A	Ramanessin (Hop) Brook
		NJ0027529	Holmdel Nursing/Convalescent	001A	0.025	200 MoGeoAvg	1.89E+08	A	Willow Brook via unnamed trib
		NJ0031674	Remington's CafT	001A	0.028	200 MoGeoAvg	2.12E+08	A	Willow Brook via unnamed trib
		NJ0031771	Colts Neck Inn	001A	0.006	200 MoGeoAvg	4.54E+07	A	Yellow Brook
		NJ0035718	Prudential Insurance	001A	0.04	200 MoGeoAvg	3.03E+08	A	Willow Brook via unnamed trib
Shark River Estuary	-	NJ0024872	Neptune Twp SA STP	002A	8.5	200 MoGeoAvg	6.44E+10	A	Jumping Brook

*Permit Categories: A = Sanitary Surface Water Discharge; A8 = Discharge to Reg. Outfall Auth.; B = Industrial/Commercial Surface Water; RF = Stormwater; 05 = Stormwater Runoff

** Design Flow reflects the design capacity of the entire treatment facility, and does not indicate individual pipe/outfall capacity.

*** Because sanitary discharges require disinfection that achieves nearly complete removal, they are considered a de minimus contribution. The "WLA" was calculated using:

"WLA" (cfu/day) = Design Flow (MGD) × 3785411.78 liters/1 million gallons × FC Limit (cfu/100ml) × 100ml/0.1 liters

APPENDIX C: MUNICIPALITIES

WMA 12 Tier A Municipalities

Tier	Waterbody	Subgroup	Municipality	NJPDES Number		
A	Atlantic Ocean	-	GATEWAY NAT'L REC AREA			
			MONMOUTH BEACH BORO	NJG0154261		
			SEA BRIGHT BORO	NJG0151513		
	Manasquan River Estuary	-	BRICK TWP	NJG0151394		
			BRIELLE BORO	NJG0152030		
			COLTS NECK TWP	NJG0151564		
			FARMINGDALE BORO	NJG0153486		
			FREEHOLD BORO	NJG0150479		
			FREEHOLD TWP	NJG0150797		
			HOWELL TWP	NJG0153940		
			MANALAPAN TWP			
			MANASQUAN BORO	NJG0147818		
			POINT PLEASANT BEACH BORO	NJG0150657		
			POINT PLEASANT BORO	NJG0154555		
			SEA GIRT BORO	NJG0153583		
			WALL TWP	NJG0153214		
	Navesink River Estuary	A	ATLANTIC HIGHLANDS BORO	NJG0149853		
			HIGHLANDS BORO	NJG0147885		
			MIDDLETOWN TWP	NJG0148873		
			RUMSON BORO	NJG0149071		
		B	ABERDEEN TWP	NJG0152676		
			COLTS NECK TWP	NJG0151564		
			FAIR HAVEN BORO	NJG0153991		
			FREEHOLD TWP	NJG0150797		
			HOLMDEL TWP	NJG0148458		
			HOWELL TWP	NJG0153940		
			LITTLE SILVER BORO	NJG0153508		
			MARLBORO TWP	NJG0154784		
			MIDDLETOWN TWP	NJG0148873		
			RED BANK BORO	NJG0150983		
			RUMSON BORO	NJG0149071		
			TINTON FALLS BORO	NJG0150070		
			Shark River Estuary	-	AVON BY THE SEA BORO	NJG0154431
					BELMAR BORO	NJG0150771
					COLTS NECK TWP	NJG0151564
	HOWELL TWP	NJG0153940				
	NEPTUNE CITY BORO	NJG0153567				
	NEPTUNE TWP	NJG0150631				
	OCEAN TWP	NJG0150860				
	SOUTH BELMAR BORO					
	TINTON FALLS BORO	NJG0150070				
	WALL TWP	NJG0153214				
	Shrewsbury River Estuary	A	GATEWAY NAT'L REC AREA			
HIGHLANDS BORO			NJG0147885			
MIDDLETOWN TWP			NJG0148873			
RUMSON BORO			NJG0149071			
SEA BRIGHT BORO			NJG0151513			

	B	MONMOUTH BEACH BORO	NJG0154261
		RUMSON BORO	NJG0149071
		SEA BRIGHT BORO	NJG0151513
	C	EATONTOWN BORO	NJG0148008
		FAIR HAVEN BORO	NJG0153991
		LITTLE SILVER BORO	NJG0153508
		LONG BRANCH CITY	NJG0150410
		MONMOUTH BEACH BORO	NJG0154261
		OCEANPORT BORO	NJG0152315
		RED BANK BORO	NJG0150983
		RUMSON BORO	NJG0149071
		SEA BRIGHT BORO	NJG0151513
		SHREWSBURY BORO	NJG0149268
		SHREWSBURY TWP	NJG0152421
		TINTON FALLS BORO	NJG0150070
WEST LONG BRANCH BORO	NJG0153257		
Waackaack Creek	-	HAZLET TWP	NJG0150649
		HOLMDEL TWP	NJG0148458
		KEANSBURG BORO	NJG0149101
		MIDDLETOWN TWP	NJG0148873
		UNION BEACH BORO	NJG0148466

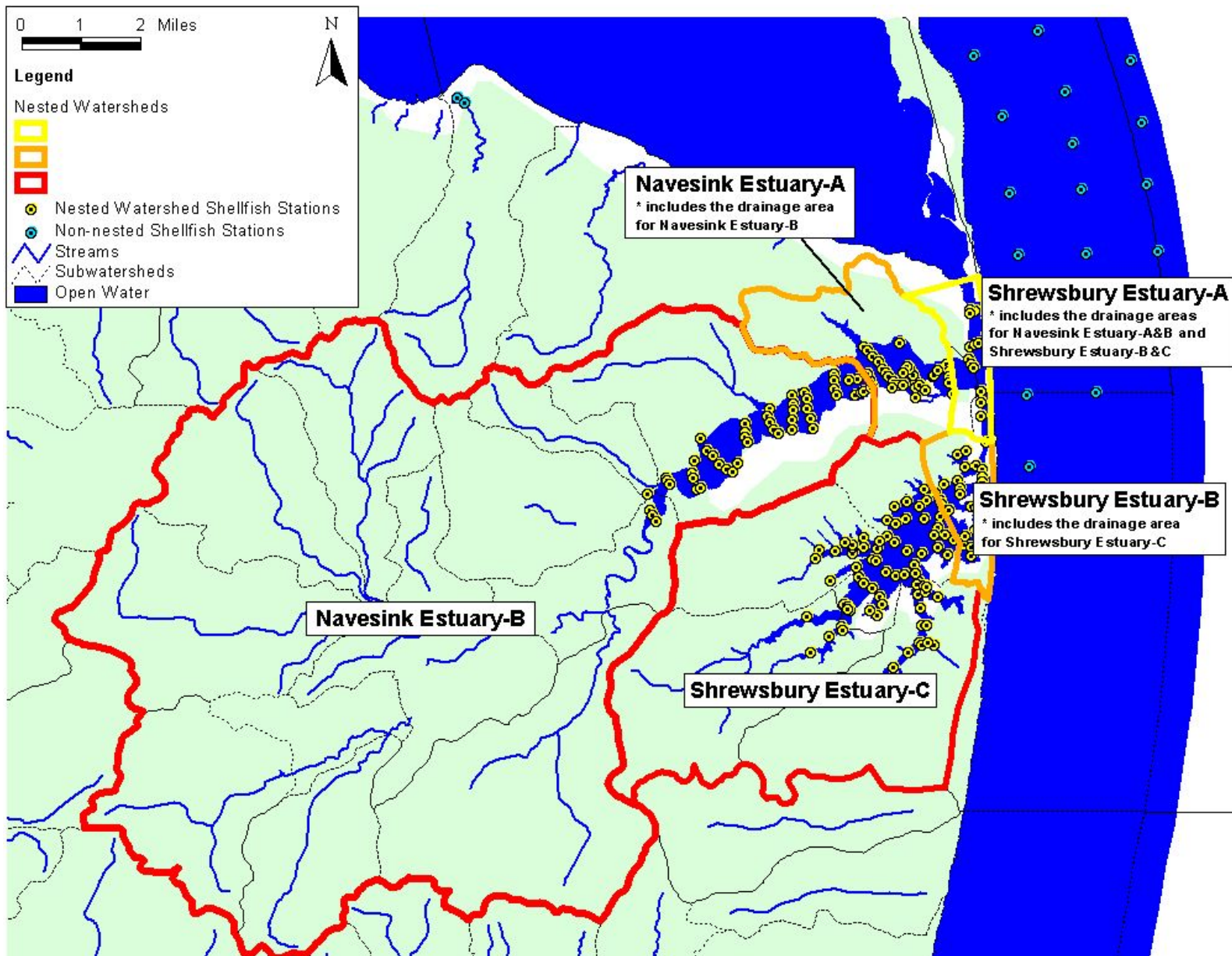
APPENDIX D: MARINA LOADING ESTIMATES

WMA12 Marina Loading Estimates

Waterbody	Subgroup	Marina Name	Load (cfu/year)
Manasquan River Estuary	-	BRIELLE ANCHORAGE	1.489E+13
		BRIELLE MARINE BASIN	6.981E+13
		BRIELLE YACHT CLUB	1.210E+14
		CLARK'S LANDING	2.560E+14
		Cove Haven	1.862E+14
		Crystal Point	1.758E+14
		DRAWBRIDGE M	3.351E+13
		DYNA-MARINE	3.351E+13
		Garden State Marina	6.516E+13
		HOFFMAN'S ANCHORGE I	3.817E+13
		INLET BASIN	5.585E+12
		KEN'S LANDING	4.003E+13
		Manasquan River Club	1.862E+14
		Manasquan Yacht Club	2.886E+13
		McCARTHY'S MARINE SA	1.164E+14
		NJ YACHT CORP	5.585E+13
		NORTHEAST SPORTFISHI	1.396E+13
		PETERSON'S RIVIERA M	6.051E+13
		POINT ANCHORAGE BOAT	3.444E+13
		POINT PLEASANT MARIN	5.306E+13
		ROBINSON'S ANCHORAGE	1.676E+13
		Southside Marina	4.003E+13
		Strictley Marina	9.848E+12
Suburban Boat Works	2.048E+14		
VELOCE BARCA M	7.819E+13		
Navesink River Estuary	B	Barnacle Bill's	5.380E+13
		Chris' River Plaza	1.972E+13
		Fair Haven Yacht Wor	9.031E+13
		Irwin's Yacht Works	2.176E+13
		Irwin's Yacht Works	7.339E+13
		Molly Pitcher	6.981E+13
		Monmouth Boat Club	3.910E+13
		North Shrewsbury Ice	0.000E+00
		Oceanic	5.864E+13
		Oyster Point	3.723E+13
		Red Bank Municipal B	9.774E+12
		River Rats Sail Club	1.070E+13
		Riverview Towers Con	1.480E+13
		Sea Land	3.314E+12
Shrewsbury River Yac	4.988E+13		
Shark River Estuary	-	Ap's Marina	1.218E+13
		Avon Fishing Basin	1.396E+13
		Belmar Mun. Marina	2.164E+14
		Bry's Marina	6.944E+12
		Campbells Boat Yard	4.245E+12
		Cashman's Dock	7.261E+11
		Kelly's Yacht Club	4.245E+12
Main One Marina	1.445E+13		

		Olivers Com.Pier	3.965E+12	
		Remmington's Marina	2.139E+13	
		S.R. Hills Marina	8.797E+13	
		S.R.Boat Rental & W.	0.000E+00	
		S.R.Hills Beach&Yach	0.000E+00	
		Shark River Yacht Cl	8.990E+13	
		Shore Watercraft	2.420E+12	
		Southport Condo's	3.072E+12	
		Sunset Water Sports	2.420E+12	
		Total Marine at Seav	6.509E+13	
		Ziegler's Dock	2.104E+12	
Shrewsbury River Estuary	A	BAHR'S LANDING	1.759E+13	
		Fairbanks Hotel / Ma	2.793E+13	
		GATEWAY MARINA	1.056E+13	
		Ocean View Marina	2.346E+13	
		Quay Rest. and Marin	2.793E+13	
		Schupps Landing	1.333E+13	
		Sea Bridge Condos	2.327E+13	
	B	Anglers Marina	1.720E+13	
		Atlantis Yacht Club	5.120E+13	
		Carriage House Marin	2.962E+13	
		Channel Club Marina	1.194E+14	
		Chris Landing Condos	4.654E+13	
		Cove Sail Marina	5.876E+13	
		Fountains Condos	1.210E+13	
		Monmouth Sailing Cen	4.645E+13	
		Navesink Marina	3.415E+14	
		Surfside Marina	2.709E+13	
		Trade Winds Condos	1.862E+13	
		unknown condos	6.051E+12	
		West End Marina	2.055E+13	
		Wharfside Condos	7.354E+13	
	C	Long Branch Ice Boat	3.519E+13	
		Marina Bay Condos &	4.222E+13	
		Mariners Emporium	5.157E+13	
		Pattern Point Yacht	6.981E+13	
Pleasure Bay Marina		4.245E+13		
Rumson Country Club		1.901E+13		
Sea Winds Condo		4.654E+13		
Waackaack Creek-Tidal	-	ABANDONED	0.000E+00	
Waackaack Creek-Tidal	-	WAACKAACK MARINA	3.707E+13	

APPENDIX E: MAPS OF NESTED WATERSHEDS



E-1. Navesink Estuary and Shrewsbury Estuary Nested Watersheds (WMA 12)

APPENDIX F: RESPONSE TO PUBLIC COMMENTS

This constitutes the New Jersey Department of Environmental Protection's (Department) response to comments raised during the comment period for the document entitled "Five Total Maximum Daily Loads for Total Coliform to Address Shellfish Impaired Waters in Watershed Management Area 12 Atlantic Coastal Water Region", which was proposed on February 21, 2006. These TMDLs were proposed as an amendment to the Monmouth County and Ocean County Water Quality Management Plans and include management approaches to reduce loadings of total coliform from various sources in order to support the shellfish harvesting use.

The notice proposing the TMDLs was published on February 21, 2006 in the New Jersey Register and in newspapers of general circulation in order to provide the public an opportunity to review the TMDL document and submit formal comments. The TMDL documents were made available at the Department, upon request by mail, and on the Department's website. The Department conducted a non-adversarial public hearing on March 23, 2006 at the Ocean County Community College - Toms River Campus in the Technology Building Lecture Hall. The public comment period ended on April 7, 2006.

No comments were received during the public hearing. However, four comment letters were received on the proposed TMDLs during the open public comment period. The letters were received from:

1. Mid-Atlantic Environmental Law Center, c/o Widener University School of Law, 4601 Concord Pike, PO Box 7474, Wilmington, Delaware 19803
2. Clean Ocean Action, 18 Hartshorne Drive, PO Box 505, Sandy Hook, Highlands, NJ 07732-0505
3. American Littoral Society, Building 18, Sandy Hook, Highlands, NJ 07732
4. Monmouth County Health Department, 3435 US Route 9, Freehold, NJ 07728

Department initiated changes to the document include the following:

1. In several TMDLs, situations arose where one impaired subgroup flows into another impaired subgroup. This was referred to as a "nested" watershed situation. To compensate for the overlapping subgroups' drainage contribution areas, the proposed TMDL document was revised. Load contributions from impaired up-stream drainages were adjusted to TMDL (reduced) quantities; then added to downstream loads. The result in WMA 12 was that Navesink-A no longer requires a 52% reduction. By meeting the up-stream, Navesink-B reduction of 92%, Navesink-A would support the designated use, requiring no further reduction for the Navesink-A subgroup. Values were revised in Table 1, Table 2, Table 8, and Table 9 for the affected watersheds.
2. Table 8 was revised to present Daily TMDLs. The daily loads were calculated by dividing the annual load values by 365 days/year, and are based on the TMDL not exceeding the calculated annual load.
3. "Appendix E: Maps of Nested Watersheds" has been added to show more detail in these drainages.
4. Several references in Appendix A have been added or revised.

5. Appendix B, C, and D were revised to eliminate duplicate facility, municipality, and/or marina listings. A column was added in Appendix B to present the potential WLA for each wastewater treatment facility.

A summary of comments to the proposal and the Department's responses to those comments follow. The number(s) in brackets at the end of each comment corresponds to the commenter(s) listed above.

Comment 1.

The Department has a duty to develop TMDLs for impaired waters in all shellfish harvest restriction areas, including those restricted based on shoreline surveys or where insufficient data or no data for a waterbody exists. The Department cannot move a waterbody from one Sublist to another without the approval of the USEPA. (1)

Response 1.

The Department acknowledges that EPA must approve any change in status of a waterbody with respect to Sublist 5 of the Integrated List. The EPA has been involved in the development of these TMDLs and concurs with the approach for each waterbody. In the course of developing the TMDLs, all available data was gathered and analyzed and the spatial extent of each listing was assessed. For some waterbodies, it was determined that, while there was sufficient data to declare the waterbody as impaired, there was insufficient data to calculate a TMDL. These waterbodies will remain on Sublist 5 until enough data is gathered to permit calculation of a TMDL. In some cases it was determined that a waterbody was listed as impaired in the absence of water quality data applicable to the waterbody. For example, the spatial extent used for initial assessment may have been revised as the result of more detailed assessment during TMDL development. This was the case when some waterbodies were divided into smaller sub-groups to reflect local water quality conditions, watershed characteristics and local pollution sources. Sub-groups were delineated based on several criteria including the location of monitoring stations and data availability, the size and spatial extent of each waterbody, the location of possible pathogen sources, and other waterbody/watershed characteristics. In these cases, the resultant waterbody with no water quality data will be moved to Sublist 3 until a determination as to impairment status based on data can be made. Where there was sufficient data, TMDLs were calculated for each waterbody in WMA 12 that was impaired based on the water quality data, provided an improvement in water quality would result in lifting the harvesting restriction. Where the presence of actual or potential sources (such as marinas or stormwater outfalls), rather than water quality, was the basis for non-support of the shellfish designated use, the waterbody does not qualify for a TMDL because water quality improvement would not result in full support of the shellfish use. Such closures of shellfish waters are considered administrative closures. In areas where the water quality does not conform to the criteria, but the areas would not be open even if water quality improved, the areas will be placed on Sublist 4, as the impairment is due to pollution, not pollutants. Beyond requiring compliance with the numeric water quality standards, the NSSP requires the State authority to impose precautionary restrictions based on the presence of sources that could deliver loads of pathogens unexpectedly, for example as the result of a malfunction of a sewer or septic system, or behaviors that are difficult to regulate, such as the handling of waste generated on watercraft. In order to protect human health, precautionary harvesting restrictions are required, even if ambient monitoring data conform to the standards,

because ambient monitoring may not capture random, unpredictable excursions due to such sources. Waterbodies that are restricted based on such administrative precautions were not considered for TMDLs because no improvement in water quality would result in full support of the designated use. As these waterbodies are closed due to the potential for contamination, regardless of actual water quality data, closures of waters for shellfishing as the result of administrative precautions were removed from Sublist 5 and placed on Sublist 4C in the 2006 and 2008 Integrated Lists of Waterbodies. As explained in both the 2006 and the 2008 Integrated Reports Sublist 4C states that development of a TMDL is not required because non-attainment is caused by something other than a pollutant (e.g. "pollution" such as overland flow of stormwater, stream flow alterations, or habitat degradation).

Comment 2.

The Department does not indicate that it developed the TMDLs with the USEPA's guidance document, "Protocol for Developing Pathogen TMDLs", First Edition, January 2001, USEPA Document Number EPA 841-R-00-002, ("Pathogen Protocol"). The Pathogen Protocol is the more specific guidance document, and should have been utilized in the development of the TMDL. (1)

Response 2.

The USEPA guidance document "Protocol for Developing Pathogen TMDLs" establishes an organizational framework for states to utilize in the development of pathogen TMDLs. These TMDLs have been developed consistent with the protocol, even though this was not specifically stated in the document.

Comment 3.

There is a blank page in the document, yet there is no explanation for whether this was intentional. (1)

Response 3.

The Department has removed the unintentional, blank page from the document.

Comment 4.

The commenter appreciates the effort put into the source assessment. (1)

Response 4.

The Department acknowledges the commenter's support .

Comment 5.

The Department does not state when the waterbodies included in the local area report were first listed as impaired, yet in some cases it relies on data from 1992. If the water bodies were not impaired when this data was gathered then it would not reflect the impairment which this TMDL is to address. To ensure that accurate data is being used to develop this TMDL, the Department must use recent data. (1)

Response 5.

Local area report summaries were included to provide background information on water quality conditions, pollution sources, and watershed characteristics. Recent shellfish monitoring data

collected by the Department (data period: 1980-2004) and updated source information (marina locations, land use data, and other geographic information) were used to develop these TMDLs. These TMDLs, therefore, reflect the most current data available.

Comment 6.

Although the Department, in Table 8, provides the sum of the Waste Load Allocations (WLA) for each waterbody, it has failed to list the WLA for each individual point source, including New Jersey Pollutant Discharge Elimination System (NJPDES) permit holders and Tier A municipality point sources, as required by the Regulations. (1)

Response 6.

As stated in the TMDL document, wastewater discharges in the affected waterbodies (listed individually in Appendix B of the TMDL document) are considered *de minimus* sources and have each been assigned a WLA of zero, with no change in the effluent limit of 200 cfu/ml. Tier A municipalities (identified individually in Appendix C of the TMDL document) have each been assigned the percent reduction assigned to all reducible sources. This method of assigning WLAs to Municipal Separate Stormwater Sewer System (MS4) sources is accepted by EPA, as described in the document. The distinction is that the point sources receive the reduction as a WLA, while nonpoint sources receive the reduction as a LA.

Comment 7.

Although each individual permit holder may meet the Surface Water Quality Standard (SWQS), the cumulative effect may be causing the impairment of the water. The permit holders are consistently below the permit limits. The permit limitations should be reduced so that the permit holders are held to a lower standard on a regular basis. (1)

Response 7.

In TMDL development, the worst case condition was considered for wastewater discharges, that is, the load is assumed to equal the effluent limit at the permitted flow. The calculated contribution from these sources was compared to the TMDL load calculated for each waterbody. Wastewater facilities were found to have negligible fecal coliform contributions even at their maximum potential discharge.

Comment 8.

The Department must provide assurances that NJPDES permitted facilities will comply with their permits in the future. (1)

Response 8.

The Department maintains an effective compliance and enforcement program. Both the Department and the entities maintaining the wastewater treatment and collection systems routinely respond to unauthorized discharges as they are identified, including remedial measures and fines.

Comment 9.

The NJPDES permits provide limitations for fecal coliform; however, they do not specify limitations for total coliform. While fecal coliform is addressed in a total coliform limit, total

coliform is not addressed in a fecal coliform limit. Because the impairment is for total coliform, NJPDES limitations on total coliform should be established. (1)

Response 9.

The commenter is correct that fecal coliform is a subset of total coliform. Fecal coliform are bacteria that live in the digestive tract of warm-blooded animals (humans, pets, farm animals, and wildlife) and are excreted in the feces. Total coliform includes both fecal coliform and bacteria that live in the soil and are not necessarily associated with fecal material. Both total and fecal coliform bacteria are used as indicators of the potential presence of disease-causing organisms, which are generally present in such minute amounts they are not easily monitored for directly. Because the source in question (wastewater treatment facilities) derives from human waste, fecal coliform is the more appropriate indicator when establishing effluent limits.

Comment 10.

The commenter assumes that by “malfunctioning sewage conveyance systems” the Department is referring to combined sewer overflows, which should be a point source, not a nonpoint source. (1)

Response 10.

The term refers to broken pipes and pumping facilities, which are episodic, unplanned events that are immediately corrected and do not figure into either load or wasteload allocations.

Comment 11.

The Department fails to state where the runoff volume figures were derived. (1)

Response 11.

The Watershed Treatment Model is a series of spreadsheets that quantifies the loading of pathogen indicators based on land use distribution, stream network length in the watershed and annual rainfall. The model calculates the annual runoff volume for each watershed based on annual average (or median) rainfall data (inches/year). Annual median rainfall estimates were derived from the rainfall data collected at National Oceanic and Atmospheric Administration weather stations (for the period of record) within or proximate to these watersheds.

Comment 12.

After examination of the WTM’s User Manual, the commenter was unable to reconcile the figures and land uses listed in Table 5 of the TMDL Document. (1)

Response 12.

The bacteria loading coefficients presented in Table 5 are the default values used in the WTM model. The online WTM user’s manual references the WTM model spreadsheet in the introductory statement and also provides a download link to the spreadsheet. A loading coefficient for barren lands was not included in the WTM model; therefore, an estimated value was used for this land use category.

Comment 13.

The Department does not state what the load capacity is or how such a figure was calculated. There is no way to verify the accuracy of the TMDLs. (1)

Response 13.

The TMDL that was calculated for each waterbody defines the loading capacity, which is the amount of pollutant loading that a waterbody can receive without violating water quality standards. TMDLs were developed based on comparing current bacteria levels to National Shellfish Sanitation Program (NSSP) criteria for total coliform. Source load reductions necessary to meet these TMDLs (i.e. loading capacity) were calculated and are presented in Table 8 and Table 9 of these reports.

Comment 14.

The Department does not offer a timeframe for implementing the proposed implementation management strategies, including a timeframe for when the control measures are to be phased in under the Municipal Stormwater permitting program. The Department should fast-track the MS4 program for these waterbodies to implement the reductions through MS4 permits. (1)

Comment 15.

The commenter commends the Department for setting over 48 TMDLs in 6 watershed management areas, but achievement of the needed reductions is not ensured because of the lack of detailed information on monitoring, implementation, and enforcement strategies. Because several different “potentially responsible entities” will need to implement management strategies to meet the TMDL for each waterbody, it is imperative that NJDEP elaborate as to the specific actions in TMDL implementation to be taken for success, including the Division of the NJDEP that will be taking on these responsibilities. It is also essential that this program be adequately funded with a dedicated staff person. (2)

Comment 16.

It appears that the TMDLs will be implemented primarily through the Municipal Stormwater Regulation Program. The rules for this program provide for “additional measures” which can be required by, among other things, a TMDL approved or established by EPA. The TMDLs must be included in each municipal permit as an additional measure and must, therefore, include BMPs that are required to be implemented with measurable goals for each BMP, and a specific timeframe in which to complete the implementation of the BMPs. (2)

Comment 17.

There are neither timelines when required reductions must be achieved, nor any enforcement provisions when a waterbody fails to achieve the required reduction. These deficiencies make it impossible for the NJDEP to effectively manage the responsible entities and enforce these mandated fecal coliform concentration reductions. If the NJDEP finds that enforcement is not appropriate, they must identify specific follow-up action that will be required to successfully achieve the imposed TMDLs. (2)

Response to Comments 14 through 17.

New Jersey has a long history of improvement for coastal waters. Between 1978 and 2003, the total area of waters available for shellfish harvest in New Jersey’s has increased 16%, from 74% to 90%. More recently, the rate of improvement over the past 10 years has been, roughly, a 0.4% per year increase in “approved” waters. The commenter is correct that, going forward, the primary means to implement the TMDLs is through the municipal stormwater regulation program. As described

in the section of the TMDL entitled 7.0 Implementation, the statewide basic requirements (New Jersey Pollutant Discharge Elimination System N.J.A.C. 7:14A-25.6(b)) implement various control measures that should substantially reduce bacteria loadings, including measures to eliminate “illicit connections” of domestic sewage and other waste to the MS4s, adopt and enforce a pet waste ordinance, prohibit feeding of unconfined wildlife on public property, clean catch basins, perform good housekeeping at maintenance yards, and provide related public education and employee training. Upon implementation, these requirements are expected to be highly effective in controlling inputs of total coliform load into the waterbodies. The implementation schedule for the municipal stormwater regulation program has already been set forth in rules and can be found at www.njstormwater.org. The Department believes that this schedule is sufficiently aggressive and notes that the statewide basic requirements are currently operative. “Additional measures” as provided for in the rules are those that are identified to be needed, beyond the basic requirements, to address water quality problems. No “additional measures” have been identified at this time. Effectiveness monitoring will determine whether the objectives of the TMDLs are being met. If this monitoring determines that objectives are not being met, adaptive management prescribes the consideration of additional measures.

The remaining elements of the plan for attaining the designated use will proceed over time and may be adjusted, as needed, through adaptive management, to respond to results of the shellfish waters classification monitoring program. Data is collected and assessed continually throughout the year, and will inform further development and/or refinement of management measures to implement the TMDLs. The Department is continually working through its watershed management initiative to implement nonpoint source reduction strategies within the 20 watershed management areas, consistent with established TMDLs, using available resources. The TMDL documents provide the basis upon which regulatory action can be taken to implement management strategies and to prioritize funding for water quality improvement. The Department has been and continues to target available resources, like the 319(h) nonpoint source grant program, Corporate Business Tax (CBT) revenues, and allied grant programs for agricultural areas (EQIP, CRP and CREP) to address sources in the impaired areas for which TMDLs were completed. Follow up monitoring will determine where efforts need to be stepped up or redirected to attain the designated use. Finally, the TMDL process and adoption of the TMDLs as amendments to the applicable areawide Water Quality Management Plans (WQMPs) is significant because it assures that plan amendments and permitting throughout the Department are consistent with the TMDLs. For example, implementation of septic management districts may be required through wastewater management plan updates where septic system sources are identified.

The overall implementation plan, while relying on monitoring, permitting and enforcement programs as well as funding sources available within and outside of the Department, is coordinated through the Division of Land Use Planning, which has dedicated resources to this purpose.

Comment 18.

The proposed amendments fail to incorporate management strategies to systematically monitor and improve TMDL compliance. Adequate and continual assessment of the implemented TMDLs must happen to ensure that loadings are reduced. Sections 6.0 and 7.0, addressing follow-up monitoring and implementation, do not explicitly require regular monitoring in all listed waterbodies or a schedule to assess the effectiveness of the TMDLs through monitoring. It is

strongly urged that the Department include in the proposed amendments the requirement to perform regular monitoring on all listed waterbodies and a timeline for using these data in trend analyses to assess the effectiveness of the TMDL implementation. (2)

Response 18.

The Department's Bureau of Marine Water Monitoring conducts extensive sampling in the shellfishing waterbodies addressed in this TMDL report. Trend analysis of water quality for shellfish classification is performed throughout the year and will also be used to assess effectiveness of TMDL implementation, as explained in the Reasonable Assurance section of the TMDL document (Section 8).

Comment 19.

In general, the commenter strongly supports the Department's efforts to document declining water quality throughout the coastal zone, estuaries, and shellfish areas. Providing scientific evidence of water quality degradation and developing management and implementation strategies to improve the situation are needed for estuarine recovery. The data show that, over time, resources like harvestable shellfish waters can recover and the Department is applauded for this proposal which could, if forcefully implemented, lead to continued estuarine recovery. Numerical thresholds for resolving impairments are supported and integration of these standards into the Water Quality Management Planning and Stormwater Management programs is the right step toward implementation.

However, the TMDLs lack specific requirements for coordinated regulatory, regional and municipal implementation, without which land use decisions will continue to undermine plans for water quality improvement.

Studies show development and increasing impervious cover is directly linked to diminishing water quality in our bays and estuaries. Natural resource capacity is currently not reflected in permitting and planning in the coastal zone, including in establishing Coastal Centers and in the cross-acceptance/endorsed plan process. The Department must require that these TMDLs are integrated into the policies and permitting decisions made by other agencies and by all sections of the Department as scientifically verified and appropriate limits on how much growth is sustainable and where growth should go. In particular, the Land Use Regulation Program (LURP), the Division of Watershed Management, the Office of Policy and Planning and the Coastal Management Program must work collaboratively to ensure that decisions affecting coastal watersheds are consistent with capacity limits that will achieve water quality objectives. No permits should be issued for land uses that threaten shellfish waters and there should be no further extension of sewer service area to support center-based development in sensitive coastal watersheds.

Also needed is a fully funded watershed area management plan in which State-sponsored stakeholders in every coastal county are charged with integrating TMDLs into regional and local stormwater management plans and local ordinances. Additional funding for stormwater plans is needed as well. Monitoring and implementation of TMDLs at the local level could assist the Department to increase the frequency of monitoring for those waterbodies. In this way, problems could be more quickly identified, and Sublist 5 could be more quickly updated and the risks to the public health could be reduced. Regulatory requirements in both the Stormwater Management and Surface Water Quality Protection programs must also be strengthened so that counties and municipalities can be held accountable for land use decisions that undermine the specific TMDL

standards and/or the intent and purpose of this proposed shellfish water quality recovery program. Recognizing 2006 budget constraints, alternatively, funding benefits in other programs should be linked to completion of updated Plans and in so doing direct that municipalities take steps in both land use planning and stormwater management to implement these proposed TMDLs. (3)

Response 19.

The Department acknowledges the commenter's support of its efforts to protect and improve water quality throughout the State. These efforts have led to improved water quality in many areas, such as in shellfish classification where New Jersey waters available to harvest have increased 16%, from 74% to 90% between 1978 and 2003. More recently, the rate of improvement over the past 10 years has been, roughly, a 0.4% per year increase in "approved" waters. TMDLs are just one of the methods utilized to improve water quality in the state. In general, TMDLs have certain regulatory authority that is applied to advance implementation strategies. For example, NJPDES permits may have requirements added as specified in a TMDL to achieve load reductions. In addition, once adopted as an amendment to the applicable Water Quality Management Plan, State permits must be consistent with the findings of a TMDL. These TMDLs do not establish any capacity limitations, as it is expected that the measures identified will control new sources as well as existing sources. The suggestion that there be no further sewer service provided in coastal areas may be counter-productive, as some closure areas are so designated because of high density development served by septic systems. If these systems are failing, sewer installation may be an appropriate solution to address the problem and should not be discounted out of hand. As discussed in further detail in the TMDL document in the Implementation section (section 7), other implementation measures require voluntary participation, encouraged and assisted by the Department's Division of Land Use Planning and funding programs managed by the Department (CBT, 319(h), 604(b) and the Environmental Infrastructure Financing Program) and other agencies (Farm Bill programs). As stated by the commenter, the Department's 2006 budget and subsequent budgets did not allow for funding beyond that which has already been provided to assist municipalities that may be used to implement the stormwater regulation requirements. However, shellfish beds continue to be opened due to such Department initiatives as the Clean Marinas Program which is now up to 40 facilities certified as using best management practices to protect New Jersey's marine resources. The Division of Land Use Planning's Office of Policy Implementation and Watershed Restoration has resources dedicated to coordinating the Department's and other agencies' activities aimed at implementing the TMDLs, which is discussed in further detail in the TMDL implementation section.

The Department welcomes assistance provided by watershed partners, such as monitoring, and uses quality data provided by partners in assessing water quality throughout the State. Every 2 years, the Department solicits data from within the Department as well as from public entities (e.g., counties, Delaware River Basin Commission, Interstate Environmental Commission, and neighboring states), academia and volunteers. The Department provides notice of the request for data in the New Jersey Register and the Department's website prior to developing each Integrated Report. As previously stated, if the implementation of identified measures is found to be inadequate to achieve support of designated uses, additional measures, which would become enforceable requirements of stormwater permits, will be considered. The TMDL is not the vehicle for coordination among agencies; rather the objective of the TMDL is attainment of the established water quality criteria for each water body identified in Table 2 of the TMDL document.

Assessment of successful implementation of the TMDL will require an adequate monitoring program, as described in the TMDL under Section 6.0 Follow-up Monitoring. In New Jersey, TMDLs are administered under The Water Quality Management Planning Rules N.J.A.C. 7:15, wherein Subchapter 3 requires that all projects and activities affecting water quality shall be conducted in a manner that does not conflict with a Water Quality Management Plans (WQMP). TMDLs are adopted as an amendment to the appropriate WQMP; thus no permit may be issued by the Department that is inconsistent with an adopted TMDL.

Comment 20.

To enhance implementation, TMDL segments should be designated as Category 1 (C1) waters, thereby receiving larger buffer protection and more aggressive anti-degradation thresholds. Category 1 waterbody thresholds should be revised to include Cedar Creek (portions of which are already FW1 and SE1), the Mullica River (portions of which are already C1 and SE1), and the Cohansey River (portions of which are already SE1). C1 designation would allow greater control over uplands and feeder streams, development of which harms downstream and estuarine water quality. (3)

Response 20.

The Department concurs that riparian buffers are important for water quality protection/restoration and riparian restoration is identified as one of the measures needed to implement the TMDLs. None of the above listed waters were officially petitioned for upgrade to C1. The Department periodically evaluates waters and designates C1 antidegradation designation for those that qualify through a rulemaking process. Waters designated as C1 and the mapped tributaries within the C1 subwatershed have 300-foot Special Water Resource Protection Areas within which future development is regulated. However, designation as C1 will not effect restoration of currently developed/disturbed buffers. This will be accomplished through voluntary projects undertaken with State and other resources. Furthermore, antidegradation policies apply to C2 waters as well. A lowering of water quality is only allowed if alternatives that avoid a lowering are infeasible and a socio-economic justification warrants a lowering, but not below the Surface Water Quality Criteria. In any case, the Surface Water Quality Standards rules provide for changing a stream designation at N.J.A.C. 7:9B, which includes a petition option that the commenter may choose to exercise.

Comment 21.

Regarding marina sources, the commenter urges the Department to not just encourage, but require, more marinas to engage in the Clean Marina Program. This strategy requires no additional funding by using more aggressive, perhaps mandatory, participation or compliance requirements. (3)

Response 21.

The Department will explore options to increase funding to further encourage participation in the Clean Marina Program. Section 310 of the NJ Coastal Zone Management Act grant (NOAA) currently funds the Clean Marina Program. At this time there are 40 facilities enrolled in the Program. Additional funding for the Program comes from a New Jersey Department of Transportation, Office of Maritime Resources I BOAT NJ Program grant awarded to the New Jersey Marine Sciences Consortium/ New Jersey SeaGrant Program. The NJMSC/NJSG also

contributes funding for administration of the Program. Requiring individual marina enrollment could be used, on a case by case basis, when impairment is directly linked to marina operation. However, there are many Clean Marina Programs nation-wide and none of them are mandatory. The cost of comprehensive state-wide marina enrollment may be prohibitively high for marina owners. Additional info about the Clean Marina Program can be found at www.njcleanmarina.org.

Comment 22.

Several studies have shown that bacteria can survive and reproduce in sediment, under the right conditions, as discussed in the comment submitted by Monmouth County. Sediment should be added to the list of non-human sources (4)

Response 22.

These TMDLs were developed based on recent shellfish monitoring data collected by the Department. These data reflect the ambient bacteria levels and contributing sources in each waterbody. Accordingly, these TMDLs take into account all sources of bacteria that may be present. Enteric bacteria in the environment originate from humans and other warm-blooded animals. Bacteria levels in sediment are the result of contamination from stormwater, failing septic systems, malfunctioning sewer systems, agricultural runoff, and other contributing sources. Bacteria loads from these sources were quantified using best available data to help facilitate implementation activities designed to reduce bacteria levels and shellfish contamination. Sediment re-suspension and other potential sources, such as waterfowl direct deposition, could not be quantified due to lack of available data. Nevertheless, language has been added stating that sediment may be a source of bacteria in shellfish waters to section "3.3 Assessment of Nonpoint Sources" of the document. Bacteria may be present in the sediment in some areas, as a result of contamination from stormwater, failing septic systems, malfunctioning sewer systems, agricultural runoff, and other sources. For these TMDLs, the loads contributed by wildlife, sediment, and the other sources were assumed to be included in the land use loading coefficients.

Comment 23.

Because public participation plays a key role in TMDL development, TMDLs should be geared towards laypeople by providing a more user friendly approach in regard to data analysis and explanations. (1)

Response 23.

The Department endeavors to make each TMDL report understandable to the lay person, by providing multiple opportunities for public participation, through presentations of methodology and results, in order to aid public understanding and to obtain feedback on the TMDL. However, a TMDL is also by necessity, to some extent, a technical document. The TMDL must contain the necessary technical information to assure that it will function as designed when it is implemented. The Department would welcome any specific recommendations that would enhance understanding of the TMDL information.

Comment 24.

The commenter is disappointed that multiple water body segments are addressed in a single TMDL and that the language within all of the proposed TMDLs is verbatim. (1)

Response 24.

The Department aims to maximize efficiency in conveying the outcomes of TMDL studies. Where information and methodologies are the same to deal with similar problems in numerous waterbodies, it is logical to consolidate those aspects, rather than generate a large number of repetitious written materials. Wherever information is unique, it is conveyed, through means, such as separate maps, calculations, local area report information and site-specific implementation projects tailored to the applicable area. The TMDL documents are only similar where the information to be conveyed is the same, such as the introductory remarks and the description of the TMDL process, which does not vary from TMDL to TMDL.