Stormwater Pollution Prevention Plan

Borough of Westwood

Bergen County

NJPDES Permit No. NJG0149462

May 8, 2020

NJDEP Program Interest I.D. No. 131613

BOSWELL ENGINEERING
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Job No. WW-740

To Whom it May Concern:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for purposely, knowingly, recklessly, or negligently submitting false information.

Sincerely,

Ben Kezmarsky
Borough Administrator
Borough of Westwood

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SPPP Form 1 – SPPP Team Members

Stormwater Program Coordinator (SPC)	
Print/Type Name and Title	Ben Kezmarsky, Borough Administrator
Office Phone # and eMail	(201) 664-7100 ext. 150, bkezmarsky@westwoodnj.gov
Signature/Date	6/17/2020

Individual(s) Responsible for Major Development Project Stormwater Management Review	
Print/Type Name and Title	Edward Senkevich Jr., P.E., Boswell Engineering Borough Engineer Representative
Print/Type Name and Title	Selwyn Joy, P.E., Boswell Engineering Hydraulic Engineer
Print/Type Name and Title	John Mayo, P.E., Boswell Engineering Hydraulic Engineer
Print/Type Name and Title	
Print/Type Name and Title	

Other SPPP Team Members	
Print/Type Name and Title	Karen Hughes, Borough Clerk Public Notice Coordinator/Local Public Education Coordinator
Print/Type Name and Title	Armand Marini, Construction Code Official Post-Construction Stormwater Management Coordinator
Print/Type Name and Title	Russel R. Huntington, Esq., Borough Attorney Ordinance Coordinator
Print/Type Name and Title	Richard Woods, Superintendent of Public Works Public Works Coordinator/Employee Training Coordinator
Print/Type Name and Title	

SPPP Form 2 – Revision History

Please record changes to the signature page and updates to the approach taken to comply with the permit, e.g., new street sweeping frequency, change to shared services, etc.

	Revision Date	SPC Initials	SPPP Form Changed	Reason for Revision
1.	5/8/2020	BK	1-15	2019 Annual Update
2.				
3.				
4.				
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20.				

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:	https://www.westwoodnj.gov/173/Stormwater-Information
2. Date of most current SPPP:	May 8, 2020
3. Website URL where the Municipal Stormwater Management Plan (MSWMP) is posted online:	https://www.westwoodnj.gov/173/Stormwater-Information
4. Date of most current MSWMP:	August 2007
5. Physical location and/or website URL where associated municipal records of public notices, meeting dates, minutes, etc. are kept:	235 Harrington Avenue, Westwood, NJ 07675

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:

The Borough of Westwood provides adequate public notice for public participation in the development and implementation of the MS4 stormwater program as per the Open Public Meetings Act ("Sunshine Law," N.J.S.A. 10:4-6 et seq.); statutory procedures for the enactment of ordinances (N.J.S.A. 40:49-2), including the municipal stormwater control ordinance; and the Municipal Land Use Law concerning the adoption or amendment of the MSWMP (N.J.S.A. 40:55D-13, 28 and 94) and the review of applications for development (N.J.S.A. 40:55D-12).

The Borough of Westwood also makes elements of its MS4 stormwater program available to the public by providing the current SPPP upon request as required by Part IV.F.1.g (SPPP) and posting the current SPPP on its website to the extent required by Part IV.F.1.f (SPPP); and posting the current MSWMP and all ordinances required by this permit on its website or otherwise comply with the notification requirements of N.J.A.C. 7:8-4.4(e) (https://www.westwoodnj.gov/173/Stormwater-Information).

The Borough of Westwood maintain records of compliance with public participation requirements at the Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675.

SPPP Form 4 – Public Education and Outreach

All records must be available upon request by NJDEP.

1. Describe how public education and outreach events are advertised. Include specific websites and/or physical locations where materials are available.

The Borough of Westwood conducts a diverse range of public education and outreach events that total 12 points annually from a minimum of three of the five categories based on Attachment B. These events are advertised on the Borough website (https://www.westwoodnj.gov/) and within the Borough calendar which is distributed in January with extra copies available at the Borough library, Borough hall and DPW building. Additionally, the Borough will coordinate local watershed groups and the AmeriCorps NJ Watershed Ambassador Program to organize volunteer events.

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.

The Borough of Westwood mails a brochure to our residents and businesses outlining the hazards of illicit connections and improper waste disposal. The brochure is distributed in January with our Borough calendar. Extra copies are available at our Town library, Borough hall and DPW building.

3. Indicate where public education and outreach records are maintained.

Records of all public education and outreach are kept at the Westwood Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675.

QUICK REFERENCE ILLICIT GUIDE

ILLICIT DISCHARGE - Any liquid, not composed entirely of stormwater, that is introduced into a stormwater system. Examples include solvents, vehicle fluids, fuels, paints, household products and chlorinated swimming pool water.

ILLICIT DUMPING - Unloading or disposal of solid, semi-solid or liquid substances near or into a stormwater system. Examples include motors, containers, grass clippings and leaves.

ILLICIT SPILLS - Any intentional or accidental spill of solid, semi-solid or liquid substances into or adjacent to a stormwater system. Examples include fluids from vehicles, chemicals from drums or storage tanks, used oil, paint containers and fertilizer.

ILLICIT CONNECTIONS - Any constructed conveyance that connects non-stormwater discharges directly to a stormwater system. These illicit conveyances are located either above or below the ground and may include drains, pipes or ditches.

Stormwater system refers to storm drains, pipes, ditches, channels and ponds that convey, store, release or treat stormwater runoff.

WAYS TO REDUCE ILLICIT ACTIVITIES

HOMEOWNERS

- Dispose of household chemicals properly at designated collection sites.
- Follow label directions on pesticide and fertilizer containers and dispose of properly.
- Use yard waste as mulch or dispose of properly by bagging or composting leaves and grass clippings.
- Recycle approved containers.
- Maintain septic systems.
- De-chlorinate swimming pool water before discharging.

BUSINESSES

- Properly store and dispose of substances used in commercial processes.
- Landscape to prevent excessive runoff and erosion.
- Maintain privately owned stormwater ponds.
- Learn and comply with local environmental ordinances.

Should you have any questions on how to implement these tips, call (201) 664-2349.

WWW.WESTWOODNJ.COM

PROTECT WATER QUALITY

PREVENT ILLICIT ACTIVITIES

BOROUGH OF **WESTWOOD**

CITIZENS - TOGETHER WE CAN PROTECT OUR WATER

SOME CAUSES MAY SEEM INSIGNIFICANT, BUT THE EFFECTS CAN BE DRAMATIC

The Borough of Westwood is a beautiful place to live, work and play. We have an abundance of gorgeous streams and l akes. The Borough is working together with citizens and businesses to protect these valuable natural resources.

One of the greatest threats to our lakes, rivers and streams is pollutants in stormwater runoff. Simply stated, stormwater runoff is the water that flows over the land during and immediately after a rainstorm. As this water flows, it collects pollutants such as sediment, leaves, pesticides and automobile fluids. These contaminants can impact wildlife, fish, plants and surface water quality.

The Borough has a New Jersey Pollutant Discharge Elimination System (NJPDES) Tier A Municipal Stormwater General Permit. Part of the NJPDES Permit requires a Stormwater Management Program that prohibits harmful pollutants from entering our stormwater systems. You can help in this effort by eliminating illicit activities.

ILLICIT ACTIVITIES

Illicit activities are those that intentionally or accidentally introduce pollutants into our stormwater systems. Illicit discharge, dumping, spills and connections pose a great risk to our water resources. Fortunately, most of these actions can be prevented in both residential and commercial areas.

With your help, we can protect and preserve the vital waterways of Westwood.

Please prevent or report any illicit activities you may see by calling (201) 664-2349.

WATER POLLUTION SOURCES

1. Illicit discharge into a stormwater system
2. Illicit dumping into a stormwater system or near a body of water
3. Illicit spills on a parking lot, road, or ground surface can flow into the nearest storm drain of a stormwater system
4. Illicit connections from a residence or business connected to a stormwater system that convey an illicit discharge

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

All records must be available upon request by NJDEP.

1. How does the municipality define 'major development'?
As per Ord. 06:01 -- Stormwater Control, the Borough of Westwood defines a "major development" as: "Any development that provides for ultimately disturbing one or more acres of land. "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."
2. Does the municipality approach residential projects differently than it does for non-residential projects? If so, how?
As per Ord. 06:01 -- Stormwater Control, the Borough of Westwood does not approach residential projects differently than non-residential projects. Stormwater ordinances and regulations are implemented as applicable.
3. What process is in place to ensure that municipal projects meet the Stormwater Control Ordinance?
All municipal projects are reviewed and regularly inspected by the Borough Engineer and designees to ensure compliance with the Stormwater Control Ordinance. A maintenance plan for BMPs and structural stormwater management measures as described in the Stormwater Control Ordinance is established to ensure adequate long-term operation and maintenance of required BMPs and structural stormwater management measures for any Borough projects or development.

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

All records must be available upon request by NJDEP.

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.	
The process for reviewing major development project applications for compliance is as follows: 1. Examination of the existing and proposed site conditions to verify whether the development is subject to the Stormwater Control Ordinance(s). 2. Examination of the hydraulic, hydrologic, and geographic conditions of the development site, such as land use cover, topography, flooding history, and discharge point(s). 3. Examination of proposed stormwater management measures: - A determination is made as to whether the proposed stormwater management measures first incorporate nonstructural strategies to meet the design and performance standards to the maximum extent practicable. The nine nonstructural strategies must be adopted in the municipality's Stormwater Control Ordinance(s). They can be also found in N.J.A.C. 7:8-5.3. The Department has prepared a Low Impact Development Checklist that provides information to assist reviewers and designers in demonstrating that nonstructural stormwater management Tier A Municipal Stormwater Guidance Document October 2018 Chapter 3.4 Post Construction Stormwater Management in New Development and Redevelopment Page 12 measures have been implemented in a project. The checklist is available online from the Department at http://www.nj.gov/dep/stormwater/bmp_manual/NJ_SWBMP_A.pdf; and - After incorporating the nonstructural strategies, a determination is made to ascertain whether the proposed development still requires structural measures in order to meet the design and performance standards for water quality, quantity and groundwater recharge. 4. Examination of whether the proposed structural measures follow the design and performance standards as well as the best management practices required in the Municipal Stormwater Control Ordinance(s), the Residential Site Improvement Standards and the Stormwater Management rules. The Department provides the New Jersey Stormwater BMP manual to guide the detailed designs of stormwater management measures. The municipality's review engineers must be familiar with the design guidelines in order to perform an effective review. The New Jersey Stormwater BMP Manual is available at http://www.nj.gov/dep/stormwater/bmp_manual2.htm. 5. Examination of whether a maintenance plan is proposed and meets the requirements in the Municipal Stormwater Control Ordinance(s). There are specific requirements to prepare a maintenance plan, provide the information of the party responsible for the maintenance and the legal step to record the maintenance plan on the deed.	
5. Does the Municipal Stormwater Management Plan include a mitigation plan?	No.
6. What is the physical location of approved applications for major development projects, Major Development Summary Sheets (permit att. D), and mitigation plans?	Records of all approved applications for major development are kept at the Westwood Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675 and the Westwood Borough Hall at: 101 Washington Ave, Westwood, NJ 07675.

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	10/04/05	https://ecode360.com/13846812	YES	Police Department & Board of Health
2. Wildlife Feeding permit cite IV.B5.a.ii	10/04/05	https://ecode360.com/13846825	YES	Police Department & Board of Health
3. Litter Control permit cite IV.B5.a.iii	10/04/05	https://ecode360.com/13850838	YES	Police Department & Board of Health
4. Improper Disposal of Waste permit cite IV.B.5.a.iv	10/04/05	https://ecode360.com/13851456	YES	Police Department & Board of Health
5. Containerized Yard Waste/ Yard Waste Collection Program permit cite IV.B.5.a.v	10/04/2005	https://ecode360.com/13851732	YES	Police Department & Superintendent of Public Works
6. Private Storm Drain Inlet Retrofitting permit cite IV.B.5.a.vi	05/04/2010	https://ecode360.com/14567034	YES	Police Department, Recycling Coordinator, Department of Health, Property Maintenance Official, Code Enforcement Officer, & Housing Officer
7. Stormwater Control Ordinance permit cite IV.B.4.g and IV.B.5.a.vii	03/22/2006	https://ecode360.com/13851951#13851951	YES	Borough Engineer
8. Illicit Connection Ordinance permit cite IV.B.5.a.vii and IV.B.6.d	10/04/2005	https://ecode360.com/13851479	YES	Police Department
9. Optional: Refuse Container/ Dumpster Ordinance permit cite IV.E.2	05/04/2010	https://ecode360.com/14567015	YES	Police Department, Recycling Coordinator, Department of Health, Property Maintenance Official, Code Enforcement Officer, & Housing Officer

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

Records of all ordinances and related enforcement actions are kept at the Westwood Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675.

ARTICLE V
Disposal of Pet Waste
[Adopted 10-4-2005 by Ord. No. 05-28]

§ 99-37. Purpose.

This purpose of this article is to establish requirements for the proper disposal of pet solid waste in the Borough of Westwood so as to protect public health, safety and welfare and to prescribe penalties for failure to comply.

§ 99-38. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

   IMMEDIATE — The pet solid waste is removed at once, without delay.

   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.

   PERSON — Any individual, corporation, company, partnership, firm, association or political subdivision of this state subject to municipal jurisdiction.

   PET — A domesticated animal (other than a disability assistance animal) kept for amusement or companionship.

   PET SOLID WASTE — Waste matter expelled from the bowels of the pet; excrement.

   PROPER DISPOSAL — Placement in the designated waste receptacle, or other suitable container, and discarding in a refuse container which is regularly emptied by the municipality or some other refuse collector; or disposal into a system designated to convey domestic sewage for proper treatment and disposal.

B. 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.

§ 99-39. Disposal required.

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

§ 99-40. Exemptions.

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

§ 99-41. Enforcement.

The provisions of this article shall be enforced by the Police Department and the local Board of Health of the Borough of Westwood.

§ 99-42. Violations and penalties.

Any person(s) who is found to be in violation of the provisions of this article shall be subject to a fine not to exceed $500.

ARTICLE VI
Feeding of Wildlife
[Adopted 10-4-2005 by Ord. No. 05-31]

§ 99-43. Purpose.

The purpose of this article is to prohibit the feeding of unconfined wildlife in any public park or on any other property owned or operated by the Borough of Westwood so as to protect public health, safety and welfare and to prescribe penalties for failure to comply.

§ 99-44. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

   FEED — To give, place, expose, 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.

   PERSON — Any individual, corporation, company, partnership, firm, association or political subdivision of this state subject to municipal jurisdiction.

   WILDLIFE — All animals that are neither human nor domesticated.

B. 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.

§ 99-45. Prohibited conduct; exceptions.

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

§ 99-46. Enforcement.

A. This article shall be enforced by the Police Department and the local Board of Health of the Borough of Westwood.

B. Any persons found to be in violation of this article shall be ordered to cease the feeding immediately.

§ 99-47. Violations and penalties.

Any person(s) who is found to be in violation of the provisions of this article shall be subject to a fine not to exceed $500.

ARTICLE II
Litter Control
[Adopted 10-4-2005 by Ord. No. 05-29]

§ 204-15. Purpose.

The purpose of this article is to establish requirements to control littering in the Borough of Westwood so as to protect public health, safety and welfare and to prescribe penalties for failure to comply.

§ 204-16. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

   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, sawmilling, farming or manufacturing.

   LITTER RECEPTACLE — A container suitable for the depositing of litter.

   PERSON — Any individual, corporation, company, partnership, firm, association, or political subdivision of this state subject to municipal jurisdiction.

B. 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.

§ 204-17. Prohibited acts; litter from vehicles and boats.

A. 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.

B. Whenever any litter is thrown or discarded or allowed to fall from a vehicle or boat in violation of this article, the operator or owner, or both, of the motor vehicle or boat shall also be deemed to have violated this article.

§ 204-18. Enforcement.

The provisions of this article shall be enforced by the Police Department and the local Board of Health of the Borough of Westwood.

§ 204-19. Violations and penalties.[1]

Any person(s) who is found to be in violation of the provisions of this article shall be punishable as provided in Chapter 1, General Provisions, Article III, General Penalty, of the Code of the Borough of Westwood.

1. **Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I).**

ARTICLE III

Improper Disposal of Waste to Storm Sewers

[Adopted 10-4-2005 by Ord. No. 05-30]

§ 288-12. Purpose.

The purpose of this article is 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 Westwood, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

§ 288-13. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words, and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

   MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) — A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by the Borough of Westwood or other public body and is designed and used for collecting and conveying stormwater.

   PERSON — Any individual, corporation, company, partnership, firm, association, or political subdivision of the state subject to municipal jurisdiction.

   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 sewage or drainage facilities or is conveyed by snow-removal equipment.

B. 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.

§ 288-14. Prohibited conduct.

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

discharge of pollutants to the municipal separate storm sewer system is also prohibited.

§ 288-15. Exceptions.

Exceptions are as follows:

A. Waterline flushing and discharges from potable water sources.

B. Uncontaminated groundwater (e.g., infiltration, crawl space or basement sump pumps, foundation or footing drains, rising groundwaters).

C. Air-conditioning condensate (excluding contact and noncontact 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:

(1) Beach maintenance equipment immediately following its use for its intended purposes; and

(2) Equipment used in the application of salt and deicing materials immediately following salt and deicing material applications. Prior to rinsing with clean water, all residual salt and deicing 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.

(3) 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.

§ 288-16. Enforcement.

This article shall be enforced by the Police Department and the local Board of Health of the Borough of Westwood.

§ 288-17. Violations and penalties.

Any person(s) who continues to be in violation of the provisions of this article, after being duly notified, shall be subject to a fine not to exceed $500.

ARTICLE V
Containerization of Yard Waste
[Adopted 10-4-2005 by Ord. No. 05-32]

§ 318-42. Purpose.

The purpose of this article is to establish requirements for the proper handling of yard waste in the Borough of Westwood so as to protect public health, safety and welfare and to prescribe penalties for failure to comply.

§ 318-43. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

   CONTAINERIZED — The placement of yard waste in a trash can, bucket, bag or other vessel, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.

   PERSON — Any individual, corporation, company, partnership, firm, association, or political subdivision of this state subject to municipal jurisdiction.

   STREET — Any street, avenue, boulevard, road, parkway, viaduct, drive, or other way which is an existing state, county, or municipal roadway, including 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.

   YARD WASTE — Leaves and grass clippings.

B. 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.

§ 318-44. 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, in the street. 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 article.

§ 318-45. Enforcement.

This article shall be enforced by the Police Department of the Borough of Westwood.

§ 318-46. Violations and penalties.

Any person(s) who is found to be in violation of the provisions of this article shall be subject to a fine not to exceed $500.

ARTICLE VI
Collection of Yard Waste
[Adopted 10-4-2005 by Ord. No. 05-33]

§ 318-47. Purpose.

The purpose of this article is to establish a yard waste collection and disposal program in the Borough of Westwood so as to protect public health, safety and welfare and to prescribe penalties for failure to comply.

§ 318-48. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

   CONTAINERIZED — The placement of yard waste in a trash can, bucket, bag or other vessel, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.

   PERSON — Any individual, corporation, company, partnership, firm, association, or political subdivision of this state subject to municipal jurisdiction.

   STREET — Any street, avenue, boulevard, road, parkway, viaduct, drive, or other way which is an existing state, county, or municipal roadway, including 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.

   YARD WASTE — Leaves and grass clippings, and branches less than three inches in diameter. [1]

B. 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.

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1. Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I).

§ 318-49. Prohibited conduct.

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 days prior to the scheduled and announced collection, and it shall not be placed closer than 10 feet to any storm drain inlet. Placement of such yard waste at the curb or along the street at any other time or in any other manner is a violation of this article. If such placement of yard waste occurs, the party responsible for placement of the yard waste must remove the yard waste from the street or said party shall be deemed in violation of this article.

§ 318-50. Enforcement.

This article shall be enforced by the Police Department of the Borough of Westwood.

§ 318-51. Violations and penalties.

Any person(s) who is found to be in violation of the provisions of this article shall be subject to a fine not to exceed $500.

ARTICLE VI

Retrofitting of Private Storm Drain Inlets

[Adopted 5-4-2010 by Ord. No. 10-08]

§ 288-29. Purpose.

This article requires 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 in order to prevent the discharge of solids and floatables (such as plastic bottles, cans, food wrappers and other litter) to the municipal storm sewer system(s) operated by the Borough of Westwood so as to protect public health, safety and welfare, and it prescribes penalties for the failure to comply.

§ 288-30. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words, and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

   MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) — A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by the Borough of Westwood or other public body and is designed and used for collecting and conveying stormwater.

   PERSON — Any individual, corporation, company, partnership, firm, association, or political subdivision of this state subject to municipal jurisdiction.

   STORM DRAIN INLET — 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 — The ocean and its estuaries, all springs, streams and bodies of surface water or groundwater, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

B. 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.

§ 288-31. Prohibited conduct.

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 or a thin base of hot bitumen), reconstructing or altering of 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 § 288-32 below prior to the completion of the project.

§ 288-32. Design standard.

Storm drain inlets identified in § 288-31 above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this section, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard, see Subsection C below.

A. Grates.

(1) 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:

(a) 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.

(b) A different grate, if each individual clear space in that grate has an area of no more than seven square inches or is no greater than 0.5 inch across the smallest dimension.

(2) 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 square inches or be no greater than two inches across the smallest dimension.

C. This standard does 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 4 5/8 inches long and 1 1/2 inches wide (this option does not apply for outfall netting facilities); or

(b) A bar screen having a bar spacing of 0.5 inch.

(3) Where flows are conveyed through a trash rack that has parallel bars with one-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 historic property listed on the New Jersey Register.

§ 288-33. Enforcement.

The Westwood Police Department, Recycling Coordinator, Department of Health, Property Maintenance Official, Code Enforcement Officer, and Housing Officer are hereby individually and severally empowered to enforce the provisions of this article.

§ 288-34. Violations and penalties.

Any person(s) who is found to be in violation of the provisions of this article shall be punishable as provided in Chapter 1, General Provisions, Article III, General Penalty, of the Code of the Borough of Westwood for each storm drain inlet that is not retrofitted to meet the design standard.

Chapter 325

STORMWATER CONTROL

GENERAL REFERENCES

Uniform construction codes — See Ch. 129.

Flood damage prevention — See Ch. 175.

Land use and development — See Ch. 195.

Property maintenance — See Ch. 260.

Sewers — See Ch. 288.

Sewer use — See Ch. 293.

Soil movement — See Ch. 312.

Solid waste — See Ch. 318.

Sidewalk construction — See Ch. 330, Art. I.

Trees — See Ch. 367.

Individual sewage disposal systems — See Ch. 409.

§ 325-1. Policy; purpose; applicability; effect on other provisions.

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 strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans 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. It is the purpose of this chapter to establish minimum stormwater management requirements and controls for major development, as defined in § 325-2.

C. Applicability.

(1) This chapter shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:

(a) Nonresidential major developments; and

(b) Aspects of residential major developments that are not preempted by the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21.

(2) This chapter shall also be applicable to all major developments undertaken by the Borough of Westwood.

(3) This chapter shall also be applicable to all existing commercial and multifamily developments within the Borough of Westwood unless preempted by the RSIS standards set forth in N.J.A.C. 5:21 or as herein provided for. **[Added 10-30-2007 by Ord. No. 07-22]**

D. Compatibility with other permit and ordinance requirements.

(1) Development approvals issued for subdivisions and site plans pursuant to this chapter are to be considered an integral part of development approvals under the 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 chapter shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare.

(2) This chapter is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or other provision of law, except that, where any provision of this chapter 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.

§ 325-2. Definitions.

Unless specifically defined below, words or phrases used in this chapter shall be interpreted so as to give them the meaning they have in common usage and to give this chapter 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 CENTERS, CORES OR NODES — Those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

CAFRA PLANNING MAP — 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.

COMPACTION — The increase in soil bulk density.

CORE — A pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

COUNTY REVIEW AGENCY — 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. A county planning agency; or

B. 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 — The New Jersey Department of Environmental Protection.

DESIGNATED CENTER — A state development and redevelopment plan center, as designated by the State Planning Commission, such as urban, regional, town, village, or hamlet.

DESIGN ENGINEER — 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 — 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 — 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.

EMPOWERMENT NEIGHBORHOOD — 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.

ENVIRONMENTALLY CRITICAL AREAS — 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 wellhead 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.

EROSION — The detachment and movement of soil or rock fragments by water, wind, ice or gravity.

IMPERVIOUS SURFACE — A surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

INFILTRATION — The process by which water seeps into the soil from precipitation.

MAJOR DEVELOPMENT — Any development that provides for ultimately disturbing one or more acres of land. "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 — Any city, borough, town, township, or village.

NODE — An area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

NUTRIENT — A chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

PERSON — Any individual, corporation, company, partnership, firm, association, the Borough of Westwood, 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 — 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, groundwaters or surface waters of the state or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

RECHARGE — The amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

SEDIMENT — 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 — The lot or lots upon which a major development is to occur or has occurred.

SOIL — All unconsolidated mineral and organic material of any origin.

STATE DEVELOPMENT AND REDEVELOPMENT PLAN METROPOLITAN PLANNING AREA (PA1) — 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 — 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 — 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 BASIN — 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 — 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 nonstormwater discharges into stormwater conveyances.

STORMWATER RUNOFF — Water flow on the surface of the ground or in storm sewers resulting from precipitation.

TIDAL FLOOD HAZARD AREA — 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 — A neighborhood given priority access to state resources through the New Jersey Redevelopment Authority.

URBAN ENTERPRISE ZONES — 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 — Previously developed portions of areas:

A. Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;

B. Designated as CAFRA Centers, Cores or Nodes;

C. Designated as Urban Enterprise Zones; and

D. Designated as Urban Coordinating Council Empowerment Neighborhoods.

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

WETLANDS or WETLAND — An area that is inundated or saturated by surface water or groundwater 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."

§ 325-3. Design and performance standards for stormwater management measures.

A. 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 § 325-4. 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.

B. The standards in this chapter 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.

§ 325-4. 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 § 325-11.

B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitats 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 13:1B-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 quantity, and stormwater runoff quality requirements of Subsections F and G:

(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 with the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections F and 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 F and G to the maximum extent practicable;

(3) The applicant demonstrates that, in order to meet the requirements of Subsections F and 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 Subsection D(3) above, within the upstream drainage area of the receiving stream that would provide additional opportunities to mitigate the requirements of Subsections F and G that were not achievable on site.

E. Nonstructural stormwater management strategies.

(1) To the maximum extent practicable, the standards in Subsections F and G shall be met by incorporating the nonstructural stormwater management strategies set forth in this subsection 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 Subsection E(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 preconstruction 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; and

(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:

[1] Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Subsection E(3) below;

[2] Site design features that help to prevent discharge of trash and debris from drainage systems;

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

[4] 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 E(2)(i)[2] above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this subsection, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard, see Subsection E(3)(c) below.

(a) Grates.

[1] 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:

[a] 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

[b] A different grate, if each individual clear space in that grate has an area of no more than seven square inches

or is no greater than 0.5 inch across the smallest dimension.

[2] 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 7.0 square inches or be no greater than two inches across the smallest dimension.

(c) This standard does not apply:

[1] 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;

[2] Where flows from the water quality design storm as specified in Subsection 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] A rectangular space 4 5/8 inches long and 1 1/2 inches wide (this option does not apply for outfall netting facilities); or

[b] A bar screen having a bar spacing of 0.5 inch.

[3] Where flows are conveyed through a trash rack that has parallel bars with one-inch spacing between the bars, to the elevation of the water quality design storm as specified in Subsection G(1); 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 historic property listed on the New Jersey Register.

(4) Any land area used as a nonstructural stormwater management measure to meet the performance standards in Subsections F and G shall meet one of the following requirements:

(a) Be dedicated to a government agency as approved by the appropriate reviewing agency;

(b) Be subjected to a conservation restriction filed with the appropriate county clerk's office; or

(c) Be subjected 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 Manual. The BMP Manual may be obtained from the address identified in § 325-8 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:

[1] The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at § 325-5, either:

[a] Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual preconstruction groundwater recharge volume for the site; or

[b] Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from preconstruction to post construction for the two-year storm is infiltrated.

[2] This groundwater recharge requirement does not apply to projects within the urban redevelopment area or to projects subject to Subsection F(1)(b)[3] below.

[3] The following types of stormwater shall not be recharged:

[a] 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 a 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

[b] 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.

[4] 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 downgradient 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 § 325-5, complete one of the following:

[1] Demonstrate through hydrologic and hydraulic analysis that, for stormwater leaving the site, post-construction runoff hydrographs for the two-, ten-, and one-hundred-year storm events do not exceed, at any point in time, the preconstruction runoff hydrographs for the same storm events;

[2] Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the preconstruction condition, in the peak runoff rates of stormwater leaving the site for the two-, ten-, and one-hundred-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;

[3] Design stormwater management measures so that the post-construction peak runoff rates for the two-, ten-, and one-hundred-year storm events are 50%, 75% and 80%, 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

[4] In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with Subsection F(1)(c)[1], [2] and [3] 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" at § 325-2 shall be submitted to the appropriate soil conservation district for review and approval in accordance with the requirements of this section and any applicable soil conservation district guidelines for stormwater runoff quantity and erosion control. For the purposes of this section, "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% 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-1.1 et seq., 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 nonstructural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution

Time (minutes)	Cumulative Rainfall (inches)
0	0.0000
5	0.0083
10	0.0166
15	0.0250
20	0.0500
25	0.0750
30	0.1000
35	0.1330
40	0.1660
45	0.2000
50	0.2583
55	0.3583
60	0.6250
65	0.8917
70	0.9917
75	1.0500
80	1.0840
85	1.1170
90	1.1500
95	1.1750

Table 1: Water Quality Design Storm Distribution

Time (minutes)	Cumulative Rainfall (inches)
100	1.2000
105	1.2250
110	1.2334
115	1.2417
120	1.2500

(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 § 325-8 or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in § 325-8. 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.

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% to 60%
Infiltration structure	80%
Manufactured treatment device	See § 325-6C
Sand filter	80%
Vegetative filter strip	60% to 80%
Wet pond	50% to 90%

(3) If more than one BMP in series is necessary to achieve the required TSS reduction of 80% 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.

(4) If there is more than one on-site drainage area, the TSS removal rate of 80% shall apply to each drainage area unless the runoff from the subareas converge on site, in which case the removal rate can be demonstrated through a calculation using a weighted average.

(5) 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 F and G.

(6) Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in § 325-8.

(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) 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 the 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:

[1] A three-hundred-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 center line of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession.

[2] Encroachment within the designated special water resource protection area under Subsection G(8)(a)[1] 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 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. 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 the bank of the waterway or center line of the waterway where the bank is undefined. All encroachments proposed under this subsection 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,[1] 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,[2] 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:

[1] Stabilization measures shall not be placed within 150 feet of the Category One waterway;

[2] Stormwater associated with discharges allowed by this section shall achieve a TSS post-construction removal rate of 95%;

[3] Temperature shall be addressed to ensure no impact on the receiving waterway;

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1. **Editor's Note: See N.J.A.C. 2:90-1.3.**
2. **Editor's Note: See N.J.A.C. 2:90-1.3.**

[4] 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;

[5] A conceptual project design meeting shall be held with the appropriate Department staff and soil conservation district staff to identify necessary stabilization measures; and

[6] All encroachments proposed under this section 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 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 G(8) shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in Subsection G(8)(a)[1] 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) Subsection 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.

§ 325-5. 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 preconstruction 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 A(1)(a) and the Rational and Modified Rational Methods at Subsection 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 has 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 preconstruction 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 preconstruction 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 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 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.

§ 325-6. 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 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 1/3 the width of the diameter of the orifice or 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 § 325-9D.

(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, 5:21-7.4, and 5:21-7.5 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 2 1/2 inches in diameter.

(5) Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at § 325-9.

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 § 325-4 of this chapter.

C. Manufactured treatment devices may be used to meet the requirements of § 325-4 of this chapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

§ 325-7. Nonstructural stormwater strategies.

A. Strategies.

(1) Buffers. Buffer areas are required along all lot and street lines separating residential uses from arterial and collector streets, separating a nonresidential use from either a residential use or residential zoning district line, and along all street lines where loading and storage areas can be seen from the street. The buffer area shall use native vegetation, which requires less fertilization and watering than nonnative species. Buffer areas may be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces. Preservation of natural wood tracts and limiting land disturbance for new construction must be incorporated where practical.

(2) Curbs and gutters. Curb cuts or flush curbs with curb stops are encouraged where practical to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas where practical.

(3) Drainage systems. An existing ordinance may require that all streets be provided with inlets and pipes where the same are necessary for proper drainage. The use of natural vegetated swales in lieu of inlets and pipes is encouraged where practical.

(4) Driveways and accessways. The use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge should be considered for driveways and accessways where practical. Consideration should be given for subsurface soil conditions. The use of crowned driveways is also encouraged to promote disconnectivity between impervious surfaces and grass areas to promote groundwater recharge.

(5) Natural features. Natural features, such as trees, brooks, swamps, hilltops, and views, are to be preserved whenever possible, and care shall be taken to preserve selected trees to enhance soil stability and landscaped treatment of the area. In addition, forested areas shall be maintained to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

(6) Nonconforming uses, structures or lots. The existing ordinance may allow an applicant/owner of an existing use to propose additions or alterations that exceed the permitted building and/or lot coverage percentages. The applicant should mitigate the impact of the additional impervious surfaces unless the stormwater management plan for the development provided for these increases in impervious surfaces. This mitigation effort must address water quality, flooding and groundwater recharge.

(7) Off-site and off-tract improvements. Any off-site and off-tract stormwater management and drainage improvements must conform to the design and performance standards described.[3]

(8) Off-street parking and loading. Parking lots with more than 10 spaces and all loading areas should allow for flush curb with curb stop or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. The use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm sewers, should be utilized where practical. A developer may demonstrate that fewer spaces would be required, provided that area is set aside for additional spaces if necessary. Pervious paving could be provided for overflow parking areas.

(9) Performance standards. Pollution source control must be evaluated in order to prohibit materials or wastes from being deposited upon a lot in such form or manner that they can be transferred off the lot, directly or indirectly, by natural forces such as precipitation, evaporation or wind. Materials and wastes that might create a pollutant or a hazard shall be enclosed in appropriate containers.

(10) Shade trees. The existing ordinance may require a minimum of shade trees per lot to be planted in the front yard. In addition to this section, the Borough may have a tree preservation ordinance[4] that restricts and otherwise controls the removal of mature trees throughout the Borough. This chapter should recognize that the preservation of mature trees and forested areas must be considered in the management of environmental resources, particularly watershed management, air quality, and ambient heating and cooling. A critical disturbance area that extends beyond the driveway and building footprint where clearing of trees cannot occur shall be depicted on the plan minimizing land disturbance. Identification of forested areas and the percentage of wooded areas to be protected from disturbance shall also be provided.

(11) Sidewalks. Sidewalks should be designed to discharge stormwater to neighboring lawns, where feasible, to disconnect these impervious surfaces or use permeable paving materials where appropriate.

(12) Soil erosion and sediment control. The applicant shall comply with the Standards for Soil Erosion and Sediment Control in New Jersey[5] and should incorporate signs to retain and protect natural vegetation, minimize and retain water runoff to facilitate groundwater recharge, and install diversions, sediment basins, and

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3. Editor's Note: See § 325-3 of this chapter.

4. Editor's Note: See Ch. 367, Trees.

5. Editor's Note: See N.J.A.C. 2:90-1.3.

similar required structures prior to any on-site grading or disturbance.

B. Further guidance on the implementation of these strategies can be found in the NJDEP Stormwater Best Management Practices Manual, April 2004, as amended.

§ 325-8. Sources for technical guidance.

A. Technical guidance for stormwater management measures can be found in the documents listed at Subsection A(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 bioretention 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)3. 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 soil conservation districts listed in N.J.A.C. 2:90-1.3(a)3. 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.

§ 325-9. 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 basins.

This section applies to any new stormwater management basin. The provisions of this section do not preempt more stringent municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in Subsection B for trash racks, overflow grates, and escape provisions at outlet structures.

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/sq. ft.

(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/sq. ft.

(3) For purposes of this Subsection B(3), "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:

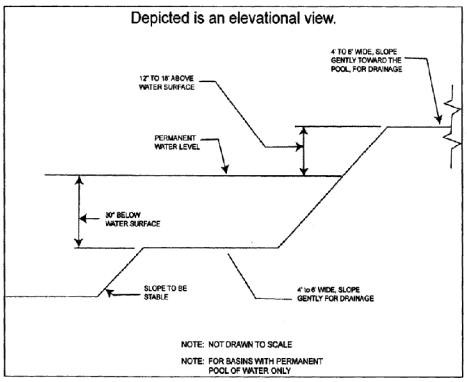
(a) If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Subsection C, a freestanding outlet structure may be exempted from this requirement.

(b) Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than 2 1/2 feet. Such safety ledges shall be comprised of two steps. Each step shall be four feet to six feet in width. One step shall be located approximately 2 1/2 feet below the permanent water surface, and the second step shall be located one to 1 1/2 feet above the permanent water surface. See Subsection 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 three horizontal to one vertical.

C. Variance or exemption from safety standards. 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.



§ 325-10. Requirements for site development stormwater plan.

A. Submission of site development stormwater plan.

(1) Whenever an applicant seeks municipal approval of a development subject to this chapter, the applicant shall submit all of the required components of the checklist for the site development stormwater plan at Subsection 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 chapter.

(3) The applicant shall submit 16 copies of the materials listed in the checklist for site development stormwater plans in accordance with Subsection C of this section.

B. Site development stormwater plan approval. The applicant's site development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (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 chapter.

C. Checklist requirements. 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 a 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 one inch equals 200 feet or greater, showing two-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 floodplains, 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 man-made 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 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 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 groundwater 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. This plan shall provide a demonstration of how the goals and standards of §§ 325-3 through 325-7 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. The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

(a) 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.

(b) 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 predevelopment and post-development conditions for the design storms specified in § 325-4 of this chapter.

(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 on-site 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.

D. Maintenance and repair plan. The design and planning of the stormwater management facility shall meet the maintenance requirements of § 325-11.

E. Waiver from submission requirements. The municipal official or board reviewing an application under this chapter may, in consultation with the Municipal Engineer, waive submission of any of the requirements in Subsection C(1) through (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.

§ 325-11. Maintenance and repair.

A. Applicability.

(1) Projects subject to review as in § 325-1C of this chapter shall comply with the requirements of Subsections B and C.

(2) The maintenance and repair provisions of this section shall be applicable to existing projects, as herein described in § 325-1C(3), except as follows: **[Added 10-30-2007 by Ord. No. 07-22]**

(a) Existing projects shall not be subject to the provisions of Subsection B(1), (2), (3) and (4). The purpose and intent of this section is to require the owner of any facility covered by this chapter, as amended, to maintain, clean and repair, as needed, all aspects of the stormwater management facilities existing on each such project's site. As to existing sites, this chapter shall not be construed as to require new or updated drainage facilities unless jurisdiction is triggered by further development or in instances where the existing facilities have deteriorated or failed to function as intended and are, as a consequence, contributing to flooding, pollution, erosion or other environmental degradation.

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 include the following:

(a) Contain specific preventative maintenance tasks and schedules, and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement).

(b) 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 B(2) above, is not a public agency, the maintenance plan and any future revisions based on Subsection 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 nonvegetated linings.

(6) The person responsible for maintenance, identified under Subsection 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 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 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 Subsection B(6) and (7) above.

(9) The requirements of Subsection B(3) and (4) do not apply to stormwater management facilities that are dedicated to and accepted by the Borough of Westwood 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 Borough of Westwood shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to effect maintenance and repair of the facility in a manner that is approved by the Municipal Engineer or his designee. The Borough of Westwood, 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 of Westwood or County of Bergen may immediately proceed to do so and shall bill the cost thereof to the responsible person.

C. Nothing in this section 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.

§ 325-12. Violations and penalties.

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this chapter shall be subject to the following penalties: a fine not to exceed $500 per day for the first offense; and a fine not to exceed $1,000 per day, with the possibility of imprisonment, for the second and subsequent offenses.

§ 325-13. When effective.

This chapter shall take effect immediately upon the approval by the county review agency or 60 days from the receipt of the ordinance by the county review agency if the county review agency should fail to act.

ARTICLE IV
Illicit Connections to Storm Sewers
[Adopted 10-4-2005 by Ord. No. 05-34]

§ 288-18. Purpose.

The purpose of this article is to prohibit illicit connections to the municipal separate storm sewer system(s) operated by the Borough of Westwood, so as to protect public health, safety and welfare, and to prescribe penalties for failure to comply.

§ 288-19. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

DOMESTIC SEWAGE — Waste and wastewater from humans or household operations.

ILLICIT CONNECTION — Any physical or nonphysical connection that discharges domestic sewage, noncontact cooling water, process wastewater, or other industrial waste (other than stormwater) to the municipal separate storm sewer system operated by the Borough of Westwood, unless that discharge is authorized under a NJPDES permit other than the Tier A Municipal Stormwater General Permit (NJPDES Permit No. NJ0141852). Nonphysical connections may include, but are not limited to, leaks, flows, or overflows into the municipal separate storm sewer system.

INDUSTRIAL WASTE — Nondomestic waste, including, but not 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)].

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) — A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by the Borough of Westwood or other public body, designed and used for collecting and conveying stormwater.

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.

NONCONTACT 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. Noncontact cooling water may, however, contain algaecides, or biocides to control fouling of equipment, such as heat exchangers and/or corrosion inhibitors.

PERSON — Any individual, corporation, company, partnership, firm, association, or political subdivision of this state subject to municipal jurisdiction.

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, by-product, or waste product. Process wastewater includes, but is not limited to, leachate and cooling water other than noncontact cooling water.

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.

B. 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 above 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.

§ 288-20. 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 Westwood any domestic sewage, noncontact cooling water, process wastewater, or other industrial waste (other than stormwater).

§ 288-21. Enforcement.

This article shall be enforced by the Police Department of the Borough of Westwood.

§ 288-22. Violations and penalties.

Any person(s) who is found to be in violation of the provisions of this article shall be subject to a fine not to exceed $2,000.

ARTICLE V
Refuse Containers and Dumpsters
[Adopted 5-4-2010 by Ord. No. 10-07]

§ 288-23. Purpose.

This article requires dumpsters and other refuse containers that are outdoors or exposed to stormwater to be covered at all times and prohibits the spilling, dumping, leaking, or otherwise discharging of liquids, semiliquids or solids from the containers to the municipal separate storm sewer system(s) operated by the Borough of Westwood and/or the waters of the state, so as to protect public health, safety and welfare, and it prescribes penalties for the failure to comply.

§ 288-24. Definitions; word usage.

A. For the purpose of this article, the following terms, phrases, words, and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning:

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) — A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by the Borough of Westwood or other public body and is designed and used for collecting and conveying stormwater. NOTE: In municipalities with combined sewer systems, add the following: "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 — Any individual, corporation, company, partnership, firm, association, or political subdivision of the state subject to municipal jurisdiction.

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

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.

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

B. 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.

§ 288-25. Covering of containers; prevention of leaks and discharges.

A. 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.

B. 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, semiliquids or solids to the municipal separate storm sewer system(s) operated by the Borough of Westwood.

§ 288-26. Exceptions.

Exceptions are as follows:

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).

§ 288-27. Enforcement.

The Westwood Police Department, Recycling Coordinator, Department of Health, Property Maintenance Official, Code Enforcement Officer, and Housing Officer are hereby individually and severally empowered to enforce the provisions of this article.

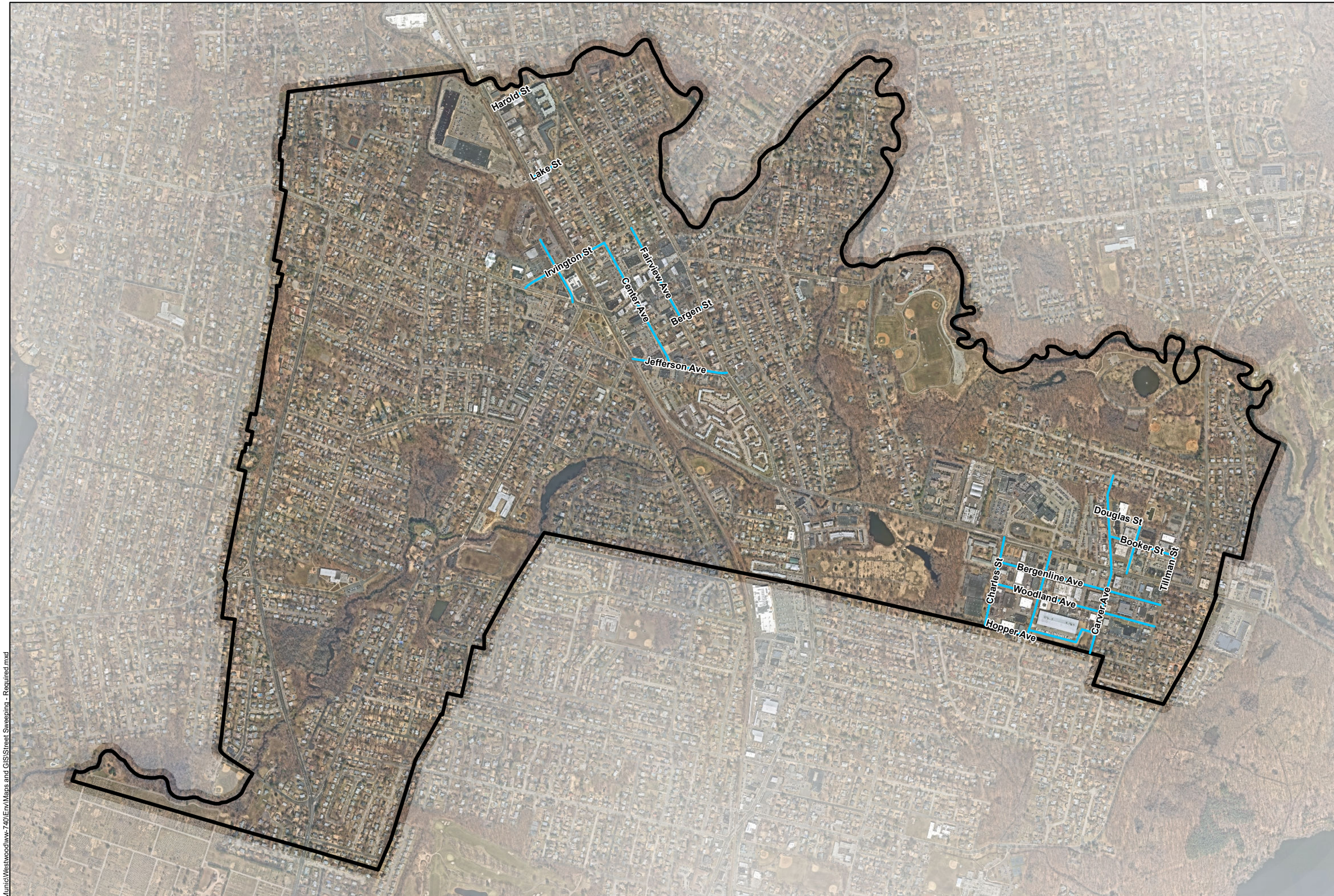
§ 288-28. Violations and penalties.

Any person(s) who is found to be in violation of the provisions of this article shall be punishable as provided in Chapter 1, General Provisions, Article III, General Penalty, of the Code of the Borough of Westwood.

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 of Westwood has approximately 3.46 miles (18,261.19 LF) of required street sweeping within the town, as seen on the attached map. The Borough of Westwood has evaluated these streets to determine which areas will need to be swept bi-weekly.
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 of Westwood intends on maintaining its existing street sweeping program for all other streets (that are not required by the permit), which includes the sweeping of all streets bi-monthly. The total length of all additional street sweeping is 31.12 miles (164,329.77 LF).
3. Does the municipality provide street sweeping services for other municipalities? If so, please describe the arrangements.
The Borough of Westwood does not provide street sweeping services for other municipalities. However, the Borough does share a street sweeper with the Township of River Vale.
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.
Records of all street sweeping are kept at the Westwood Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675.



Notes:
NearMap Image Date: March 28, 2019

Required Roadways

Tier A Municipal Stormwater Permitting

Street Sweeping - Required

Borough of Westwood
Bergen County New Jersey

BOSWELL ENGINEERING
ENGINEERS ... SURVEYORS ... PLANNERS ... SCIENTISTS
330 Phillips Avenue ● South Hackensack, NJ 07606
Tel: 201-641-0770 ● Fax: 201-641-1757

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Scale
1 in = 1,000 ft

Job No. WW-740

March 2020

Last Edit: 3/3/2020

Drawn By: JMW

Check By: FJR

Sheet 1 of 1

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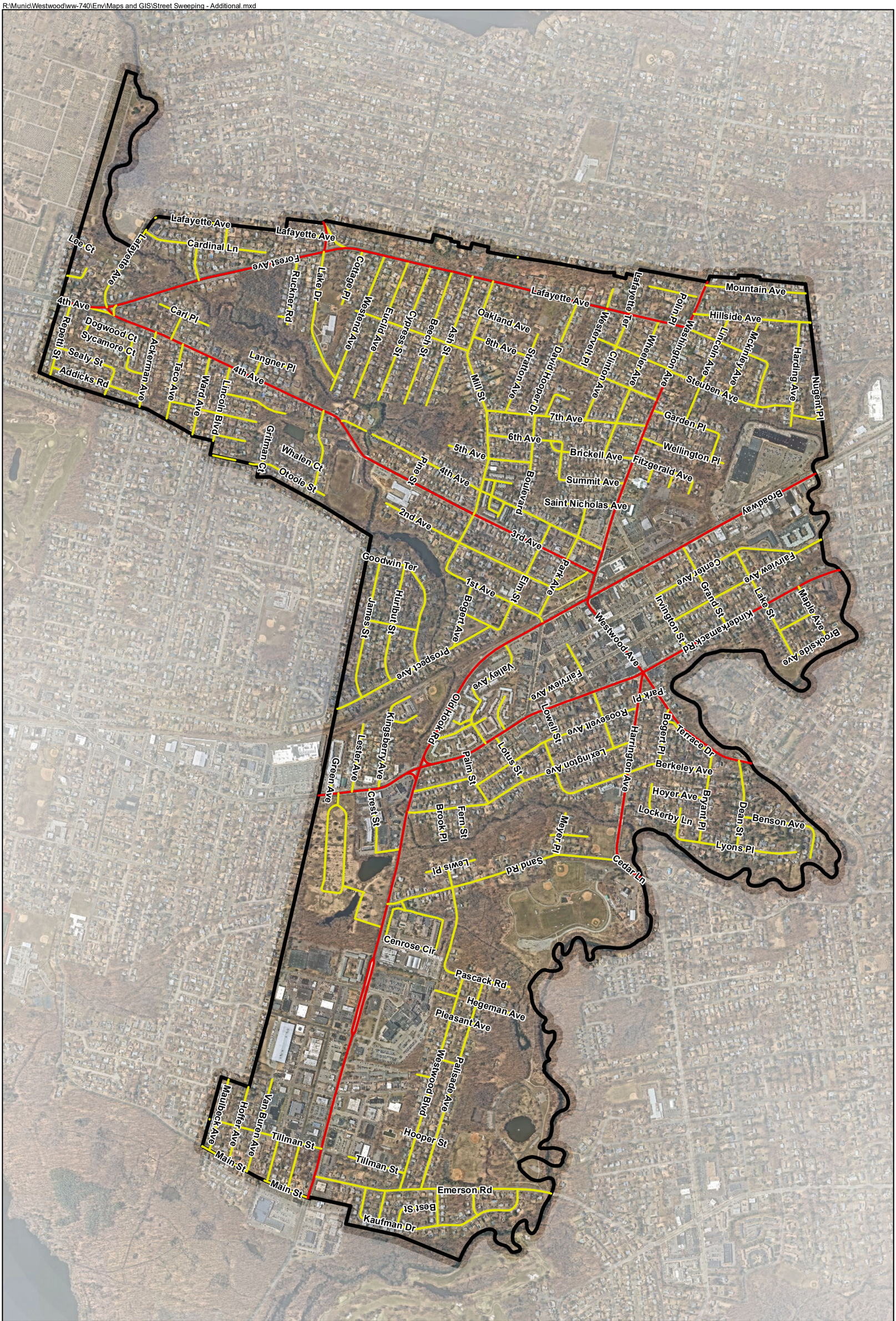

Sheet 1 of 1

Check By: FJR

Drawn By: JMW

Last Edit: 3/3/2020

March 2020

Job No. WW-740

Scale

1 in = 1,000 ft

W S N E

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ENGINEERS - SURVEYORS - PLANNERS - SCIENTISTS
330 Phillips Avenue South Hackensack, NJ 07606
Tel: 201-641-0770 ●Fax: 201-641-1757

Tier A Municipal Stormwater Permitting

Street Sweeping - Additional

Borough of Westwood

Bergen County New Jersey

Notes:
NearMap Image Date: March 28, 2019

Additional Roads — County Road

Street Sweeping -- Required Roads

Date	Area Swept	Number of Miles Swept	Total Amount of Wet Tons/Month

Street Sweeping -- Additional Roads

Date	Area Swept	Number of Miles Swept	Total Amount of Wet Tons/Month

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.
Visual inspections are performed once yearly. Grates are removed when necessary to remove accumulated material.
2. List the locations of catch basins and storm drain inlets with recurring problems, i.e., flooding, accumulated debris, etc.
No reoccurring problems have been reported or observed during routine inspection.
3. Describe what measures are taken to address issues for catch basins and storm drain inlets with recurring problems and how they are prioritized.
As previously stated, there are no reoccurring problems have been noted.
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.
All inlets within the Borough are labeled and labels are replaced as necessary during inspections.
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 of all catch basin and storm drain inlet inspections and wet tons of material collected during catch basin and storm drain inlet cleaning are kept at the Westwood Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675.

Inlet Cleaning Log

Catch Basin #	Inspector	Date	Inspected	Cleaned	Repaired	Labeled	Comments

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.
Inlets are retrofitted as needed during paving projects.
2. Describe the inspection process to verify that appropriate retrofits are completed on municipally owned storm drain inlets.
Retrofitting inlets are included with road paving projects. The municipal engineer inspectors ensure that the proper inlet head is installed.
3. Describe the procedure for ensuring that privately owned storm drain inlets are retrofitted.
All existing storm drain inlets which are in direct contact with repaving, repairing (excluding repair of individual potholes), reconstruction, resurfacing (including topcoating or chip sealing with asphalt emulsion or a thin base of hot bitumen), or alterations of facilities on property not owned or operated by the municipality (except individual single-family homes) shall be retrofitted to meet current NJDEP guidelines for the size of inlet casting and curb piece openings as required by the New Jersey Pollutant Discharge Elimination System permit (NJDES permit, rules at N.J.A.C. 7:14A). These projects shall be inspected to ensure that privately owned storm drain inlets are retrofitted. This shall be enforced by the Police Department, Superintendent of the Department of Public Works, and the Code Enforcement Officer of the Borough of Westwood.
4. Describe the inspection process to verify that appropriate retrofits are completed on privately owned storm drain inlets.
Inlets will be inspected by the building inspector to verify that they are in compliance with the "Design Standards for Storm Drain Inlets" set forth in the "Tier A Municipal Stormwater General Permit -- Attachement C".

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:
Westwood Department of Public Works at: 235 Harrington Avenue, Westwood, NJ 07675

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 – Sand

Intermediate products –

Final products –

Waste materials –

By-products –

Machinery – 5 Garbage Trucks / 3 Roll Offs / 1 Lifting Truck

Fuel – Gasoline/Diesel

Lubricants –

Solvents –

Detergents related to municipal maintenance yard or ancillary operations –

Other –

SPPP Form 10 – Municipal Maintenance Yards and Other Ancillary Operations

All records must be available upon request by NJDEP.

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

The Westwood DPW utilizes four (4) aboveground storage tanks (AST) utilized for the storage of waste oil (one 275 gallon tank), gasoline (one 2,000 gallon tank and one 1,000 gallon tank), and diesel (one 2,000 gallon tank). These ASTs are located at the DPW yard. Gasoline, diesel fuel and motor oil/hydraulic oil deliveries to the DPW are by common carrier or via tank truck. All fueling operations are performed in accordance with the Best Management Practices in Attachment E. Drip pans are placed under hoses and pipe connections, inlets are blocked, and safety operations are posted during bulk fuel transfer. Equipment is immediately replaced or repaired when leaking or disrepair is discovered.

2. Vehicle Maintenance

All vehicle maintenance is performed in accordance with the Best Management Practices in Attachment E. Equipment is operated and maintained to prevent exposure of pollutants to stormwater. Whenever possible, all vehicle maintenance is performed inside of the garage located on-site. For projects that must be conducted outdoors, and last more than one day, portable tents or covers shall be placed over the equipment being serviced when not being worked on and drip pans shall be used at all times. Work will be performed in areas away from storm drains or inlets will be blocked when maintenance is being conducted outdoors.

3. On-Site Equipment and Vehicle Washing

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

Excluding the rinsing of salt trucks with clean water within the DPW yard, all equipment and vehicle washing at an off-site facility. Therefore, equipment and vehicle washing is performed in accordance with the Best Management Practices in Attachment E by eliminating the unpermitted discharge of waste wastewater to storm sewer inlets or waters of the State.

Associated records and logs are kept at the Westwood Department of Public Works at: 235 Harrington Avenue, Westwood, NJ 07675.

4. Discharge of Stormwater from Secondary Containment

Non-applicable. The on-site fuel tanks are stored within a convault that does not expose the storage tanks to or require the discharge of stormwater. No material stored outside of the on-site garage is held within secondary containment and does not require stormwater discharge.

SPPP Form 10 – Municipal Maintenance Yards and Other Ancillary Operations

All records must be available upon request by NJDEP.

5. Salt and De-Icing Material Storage and Handling
All salt and de-icing material is stored and handled in accordance with the Best Management Practices in Attachment E. All salt and deicing material is stored inside of the salt shed located on-site. Inspections and maintenance of the salt shed and surrounding area are performed regularly; tracking of material from loading and unloading operations is minimized; and the area is swept regularly, in the event of tracked material and after loading and unloading is complete all loose material is collected placed back into the salt shed for reuse.
6. Aggregate Material and Construction Debris Storage
All aggregate material and construction debris are stored outside and uncovered with more than a 50-foot setback from any stormwater inlet and outside of any regulated area (including but not limited to coastal areas, wetlands, and floodplains) in accordance with the Best Management Practices in Attachment E.
7. Street Sweepings, Catch Basin Clean Out and Other Material Storage
All storage of street sweeping, catch basin clean out and other material is performed in accordance with the Best Management Practices in Attachment E. These materials are placed in a pile for the removal of trash before being moved to a covered container. Material is removed for disposal within six months of placement into storage. All material from street sweeping, catch basin clean out, etc. is stored inside of the salt shed located on-site.
8. Yard Trimmings and Wood Waste Management Sites
All yard trimmings and wood waste are temporarily stored in a covered container and is hauled off by Nature's Choice for proper disposal in accordance with the Best Management Practices in Attachment E.
9. Roadside Vegetation Management
The Borough of Westwood maintains all roadside vegetation by trimming. All areas of uncurbed roadside vegetation are monitored for erosion problems from vehicular traffic. The Borough of Westwood does not utilize herbicides for roadside vegetation management so as to prevent it from being washed by stormwater into the waters of the State and to prevent erosion caused by devegetation. Monthly inspections are performed to ensure that the Best Management Practices in Attachment E of the Permit are being executed for Roadside Vegetation Management. Associated records and inspection logs are kept at the Westwood Department of Public Works at: 235 Harrington Avenue, Westwood, NJ 07675.

SPPP Form 11 – Employee Training

All records must be available upon request by NJDEP.

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.

Topic	Frequency	Title of trainer or office to conduct training
1. Maintenance Yard Operations (including Ancillary Operations)	Every year	Superintendent of Department of Public Works
2. Stormwater Facility Maintenance	Every year	Superintendent of Department of Public Works
3. SPPP Training & Recordkeeping	Every year	Environmental Department Head, Boswell Eng.
4. Yard Waste Collection Program	Every 2 years	Superintendent of Department of Public Works
5. Street Sweeping	Every 2 years	Superintendent of Department of Public Works
6. Illicit Connection Elimination and Outfall Pipe Mapping	Every 2 years	Superintendent of Department of Public Works
7. Outfall Pipe Stream Scouring Detection and Control	Every 2 years	Superintendent of Department of Public Works
8. Waste Disposal Education	Every 2 years	Superintendent of Department of Public Works
9. Municipal Ordinances	Every 2 years	Superintendent of Department of Public Works
10. Construction Activity/Post-Construction Stormwater Management in New Development and Redevelopment	Every 2 years	Superintendent of Department of Public Works

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.

Within 6 months of commencing duties, watch *Asking the Right Questions in Stormwater Review Training Tool*. 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.

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.

Tier A Stormwater Training

Trainer:		
Location:		
Class Name:		
Trainer:		
Name	**Date Completed**	**Signature**

Additional Notes/Topics Covered:

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ENGINEERS ■ SURVEYORS ■ PLANNERS ■ SCIENTISTS
330 Phillips Avenue • P.O. Box 3152 • South Hackensack, N.J. 07606-1722 • (201) 641-0770 • Fax (201) 641-1831

SPPP Training & Recordkeeping
Training Log

Trainer: Frank J. Rossi, Environmental Science Department Head, Boswell Engineering

Name	Date Completed	Signature

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.

   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.

The Borough conducted an initial physical inspection of all outfall pipes during the mapping process. All outfalls are inspected at least once a year during dry weather conditions as defined within "Chapter 3.6: MS4 Outfall Pipe Mapping and Illicit Discharge and Scour Detection and Control" of the "Tier A Municipal Stormwater Guidance Document". All sites will be placed on a prioritized list and repairs will be made in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. In addition, repairs that do not require NJDEP permits will be performed first.

Records of inspections including dates, locations, and findings are kept at the Westwood Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675.

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.

When the Borough is performing the outfall condition assessment all outfall pipes are inspected for signs of scouring. All sites will be placed on a prioritized list and repairs will be made in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. In addition, repairs that do not require NJDEP permits will be performed first.

The Borough will follow each repair up with an annual inspection of the site to ensure that scouring has not resumed.

Records of localized stream scour including contributing source(s) of stormwater, recommended corrective action, and prioritized list and schedule to remediate scouring cases are kept at the Westwood Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675.

SPPP Form 12 – Outfall Pipes

All records must be available upon request by NJDEP.

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.

The Borough conducted an initial physical inspection of all outfall pipes during the mapping process. During this process and as a part of the continued inspection of outfalls the Borough implemented and enforces an ongoing Illicit Discharge Detection and Elimination Program as follows:

- Conducting visual dry weather inspection of all outfall pipes owned and operated by the municipality;

- Investigating the source if evidence of illicit discharge is found;

- Eliminating non-stormwater discharges that are traced to their source and found to result from illicit connections;

- Documenting investigations and actions taken;

- Inspecting any newly identified outfall pipes for illicit discharges;

- Investigating dry weather flows discovered during routine inspection and maintenance; and

- Investigating all complaints and reports of illicit discharges within three months of receipt.

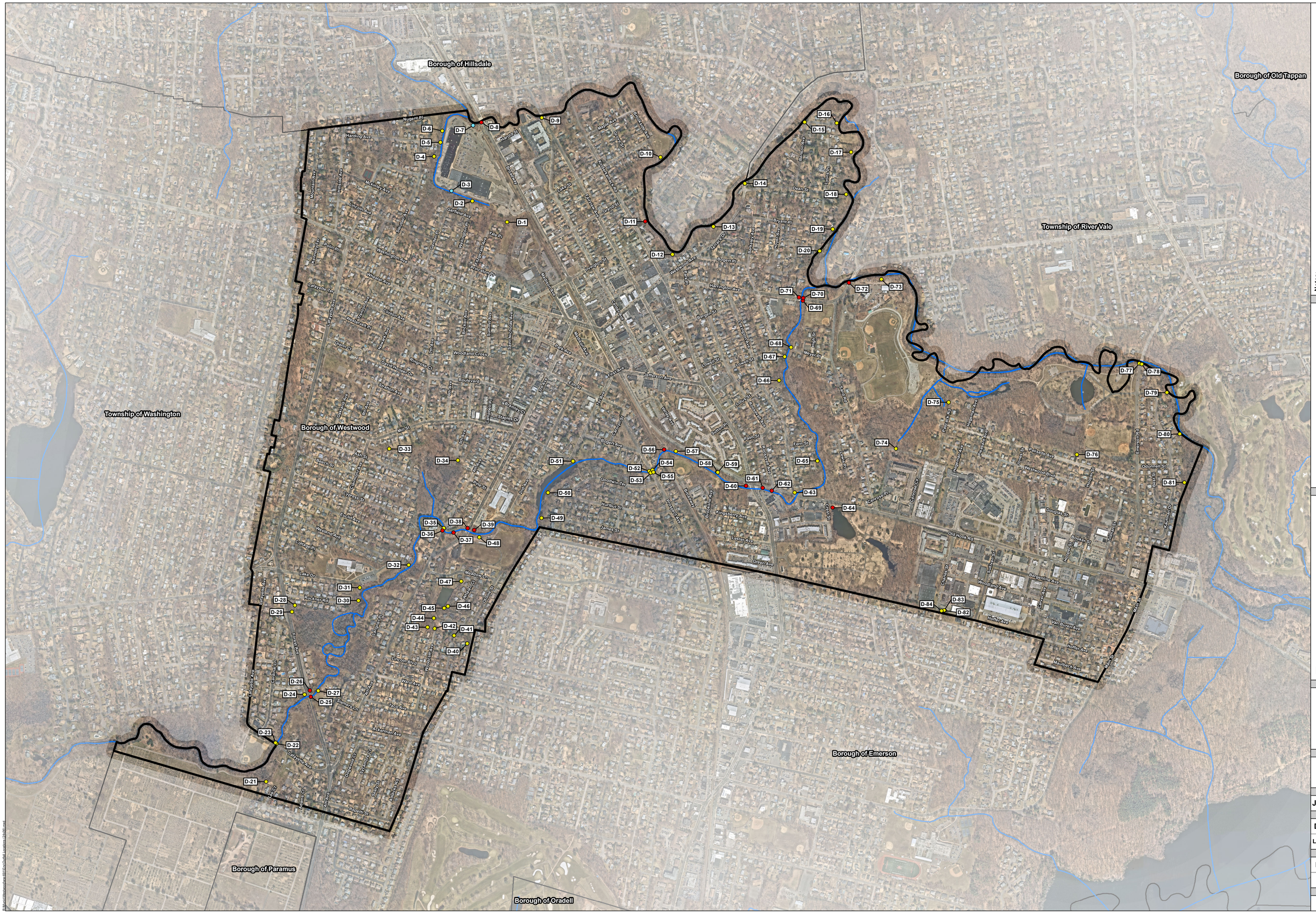
Outfall pipes that are found to have a dry weather flow or evidence of an intermittent non-stormwater flow will be rechecked to locate the illicit connection. If the Borough is able to locate the illicit connection and the connection is within the Borough of Westwood, we will cite the responsible party for being in violation of our Illicit Connection Ordinance and we will have the connection eliminated immediately. If, after the appropriate amount of investigation, the Borough is unable to locate the source of the illicit connection, we will submit the Closeout Investigation Form with our Annual Inspection and Recertification. If an illicit connection is found to originate from another public entity, the Borough of Westwood will report the illicit connection to the Department.

The Borough of Westwood has a hotline that is currently used for reporting spills and illegal dumping. This hotline will also be made available for reporting illicit connections.

Records of illicit connection cases are kept at the Westwood Department of Public Works located at: 235 Harrington Avenue, Westwood, NJ 07675.

Outfall Inspection Log

Outfall ID	Inspector	Date	Inspected		Repair		Scour		Comments
			Yes	No	Yes	No	Yes	No	



Notes:
NearMap Image Date: March 28, 2019

Private Owned Outfall
County Owned Outfall
Municipal Owned Outfall

Stormwater Outfall Locations

Borough of Westwood
Bergen County
New Jersey

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330 Phillips Avenue South Hackensack, NJ 07606
Tel.: 201-641-0770 ● Fax: 201-641-1757

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Scale
1 in = 500 ft

Job No. WW-691

December 2019

Last Edit: 12/20/2019

Drawn By: JMW

Check By: FJR

Sheet 1 of 1

BOSWELL ENGINEERING

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SITE PHOTOGRAPHS

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
Borough of Westwood	Westwood, New Jersey	Stormwater Outfall Survey	WW-691

Photo No. 1.

Description:

Discharge ID:
D-1

Location:
140 Washington Ave

Watercourse:
Pascack Brook Tributary

Size:
48" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 2.

Description:

Discharge ID:
D-2

Location:
72 Wellington Place

Watercourse:
Pascack Brook Tributary

Size:
15" CMP – Flared End

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
Borough of Westwood	Westwood, New Jersey	Stormwater Outfall Survey	WW-691

Photo No. 3.

Description:

Discharge ID:
D-3

Location:
22 Garfield Ave

Watercourse:
Pascack Brook Tributary

Size:
15" CMP – Flared End

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *Private*

Photo No. 4.

Description:

Discharge ID:
D-4

Location:
91 Steuben Ave

Watercourse:
Pascack Brook Tributary

Size:
50"x31" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
Borough of Westwood	Westwood, New Jersey	Stormwater Outfall Survey	WW-691

Photo No. 5.

Description:

Discharge ID:
D-5

Location:
Harding Ave

Watercourse:
Pascack Brook Tributary

Size:
15" CMP – Flared End

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 6.

Description:

Discharge ID:
D-6

Location:
23 Nugget Pl

Watercourse:
Pascack Brook Tributary

Size:
18" CMP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 7.

Description:

Discharge ID:
D-7

Location:
Along Railroad

Watercourse:
Pascack Brook

Size:
15" CMP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Private*

Photo No. 8.

Description:

Discharge ID:
D-8

Location:
Along Railroad

Watercourse:
Pascack Brook

Size:
24" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 9.

Description:

Discharge ID:
D-9

Location:
550 Fairview Ave

Watercourse:
Pascack Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 10.

Description:

Discharge ID:
D-10

Location:
135 Lake St

Watercourse:
Pascack Brook

Size:
18" RCP

Condition:
Poor

Scour:
Yes

Illicit Connection:
No

Repair:
Stabilize Bank, Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 11.

Description:

Discharge ID:
D-11

Location:
397 Kinderkamack Rd

Watercourse:
Pascack Brook

Size:
18" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 12.

Description:

Discharge ID:
D-12

Location:
338 Westwood Ave

Watercourse:
Pascack Brook

Size:
30" RCP

Condition:
Fair

Scour:
Yes

Illicit Connection:
No

Repair:
Repair Concrete Apron
NJDEP Permit Required

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
Borough of Westwood	Westwood, New Jersey	Stormwater Outfall Survey	WW-691

Photo No. 13.

Description:

Discharge ID:
D-13

Location:
Westwood Ave

Watercourse:
Pascack Brook

Size:
15" RCP

Condition:
Good

Scour:
Yes

Illicit Connection:
No

Repair:
Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 14.

Description:

Discharge ID:
D-14

Location:
430 Westwood Ave

Watercourse:
Pascack Brook

Size:
18" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 15.

Description:

Discharge ID:
D-15

Location:
66 Benson Ave

Watercourse:
Pascack Brook

Size:
12" CMP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
Reset Headwall and Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 16.

Description:

Discharge ID:
D-16

Location:
90 Benson Ave

Watercourse:
Pascack Brook

Size:
12" CMP

Condition:
Poor

Scour:
Yes

Illicit Connection:
No

Repair:
Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 17.

Description:

Discharge ID:
D-17

Location:
73 Lyons Pl

Watercourse:
Pascack Brook

Size:
18" RCP

Condition:
Good

Scour:
Yes

Illicit Connection:
No

Repair:
Install Headwall and
Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 18.

Description:

Discharge ID:
D-18

Location:
23 Lyons Pl

Watercourse:
Pascack Brook

Size:
15" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
Install Headwall and
Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 19.

Description:

Discharge ID:
D-19

Location:
Bryant Pl

Watercourse:
Pascack Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 20.

Description:

Discharge ID:
D-20

Location:
87 Lockerby Ln

Watercourse:
Pascack Brook

Size:
15" RCP

Condition:
Poor

Scour:
No

Illicit Connection:
No

Repair:
Install Headwall and
Expose Pipe Opening
NJDEP Permit Required

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
Borough of Westwood	Westwood, New Jersey	Stormwater Outfall Survey	WW-691

Photo No. 21.

Description:

Discharge ID:
D-21

Location:
20 Lee Ct

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 22.

Description:

Discharge ID:
D-22

Location:
51 Lafayette Ave

Watercourse:
Musquapsink Brook

Size:
24" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
Borough of Westwood	Westwood, New Jersey	Stormwater Outfall Survey	WW-691

Photo No. 23.

Description:

Discharge ID:
D-23

Location:
85 Lafayette Ave

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 24.

Description:

Discharge ID:
D-24

Location:
5 Steinbach Pl

Watercourse:
Musquapsink Brook

Size:
24" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 25.

Description:

Discharge ID:
D-25

Location:
108 Carl Pl

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 26.

Description:

Discharge ID:
D-26

Location:
127 Forest Ave

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 27.

Description:

Discharge ID:
D-27

Location:
114 Carl Pl

Watercourse:
Musquapsink Brook

Size:
36" RCP

Condition:
Poor

Scour:
No

Illicit Connection:
No

Repair:
Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 28.

Description:

Discharge ID:
D-28

Location:
1 Ruckner Rd

Watercourse:
Musquapsink Brook

Size:
48" CMP

Condition:
Poor

Scour:
No

Illicit Connection:
No

Repair:
Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
Borough of Westwood	Westwood, New Jersey	Stormwater Outfall Survey	WW-691

Photo No. 29.

Description:

Discharge ID:
D-29

Location:
215 Forest Ave

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 30.

Description:

Discharge ID:
D-30

Location:
62 Ruckner Rd

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 31.

Description:

Discharge ID:
D-31

Location:
29 Lake Dr

Watercourse:
Musquapsink Brook

Size:
12" RCP

Condition:
Poor

Scour:
No

Illicit Connection:
No

Repair:
Expose Pipe Opening and Reevaluate

Owner: *Municipal*

Photo No. 32.

Description:

Discharge ID:
D-32

Location:
6 Westend Ave

Watercourse:
Musquapsink Brook

Size:
6" PVC

Condition:
Good

Scour:
Yes

Illicit Connection:
Investigate

Repair:
Investigate

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
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Photo No. 33.

Description:

Discharge ID:
D-33

Location:
205 Mill St

Watercourse:
Musquapsink Brook Trib.

Size:
15" RCP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 34.

Description:

Discharge ID:
D-34

Location:
109 Fifth Ave

Watercourse:
Musquapsink Brook Trib.

Size:
24" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Photo No. 35.

Description:

Discharge ID:
D-35

Location:
352 Fourth Ave

Watercourse:
Musquapsink Brook

Size:
Unknown

Condition:
Unknown

Scour:
Unknown

Illicit Connection:
Unknown

Repair:
Locate Pipe and Reevaluate

Owner: *Municipal*

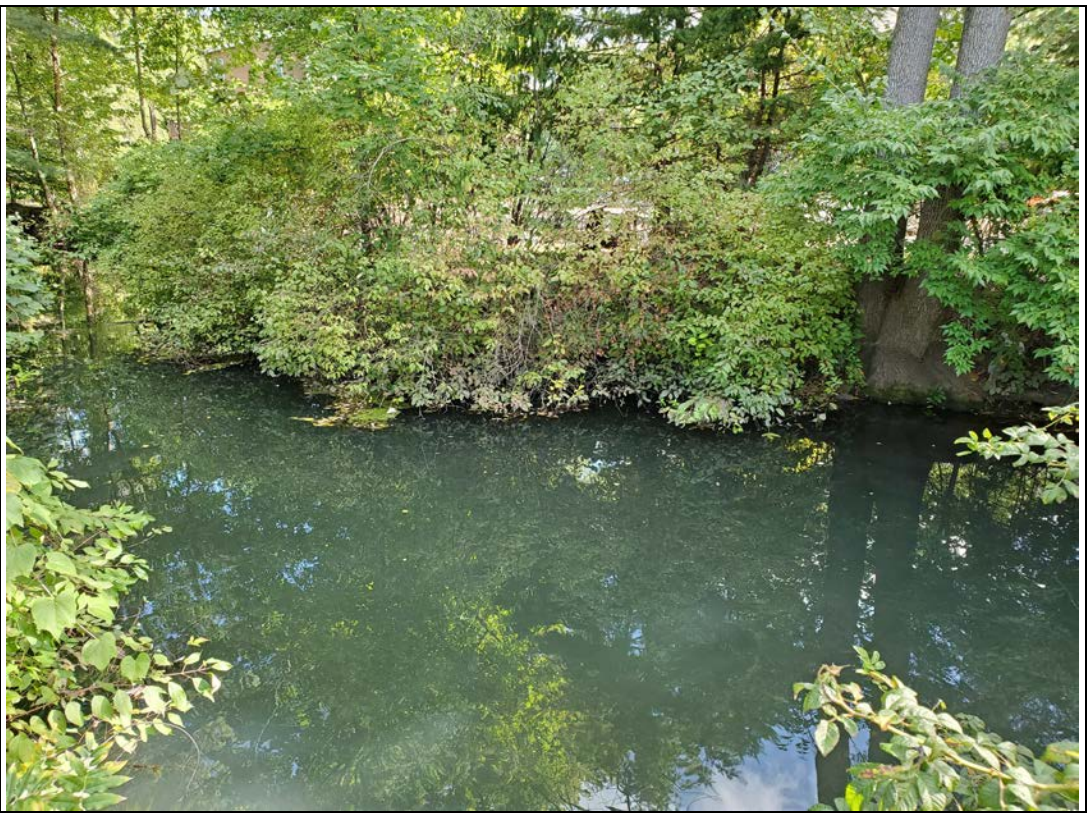

Photo No. 36.

Description:

Discharge ID:
D-36

Location:
308 Fourth Ave

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
Investigate Pipe, Repair Headwall and Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *County*

Photo No. 37.

Description:

Discharge ID:
D-37

Location:
Fourth Ave

Watercourse:
Musquapsink Brook

Size:
48" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 38.

Description:

Discharge ID:
D-38

Location:
26 Third Ave

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 39.

Description:

Discharge ID:
D-39

Location:
23 Third Ave

Watercourse:
Musquapsink Brook

Size:
12" RCP

Condition:
Unknown

Scour:
Unknown

Illicit Connection:
Unknown

Repair:
Locate Pipe and Reevaluate

Owner: *County*

Photo No. 40.

Description:

Discharge ID:
D-40

Location:
1 Gritman Ct

Watercourse:
Musquapsink Brook Trib.

Size:
24" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 41.

Description:

Discharge ID:
D-41

Location:
33 William St

Watercourse:
Musquapsink Brook Trib.

Size:
18" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
Reset Pipe, Install Headwall
NJDEP Permit Required

Owner: *Municipal*

Photo No. 42.

Description:

Discharge ID:
D-42

Location:
17 Gritman Ct

Watercourse:
Musquapsink Brook Trib.

Size:
15" RCP

Condition:
Poor

Scour:
Yes

Illicit Connection:
No

Repair:
Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 43.

Description:

Discharge ID:
D-43

Location:
62 Woodcliff Ave

Watercourse:
Musquapsink Brook Trib.

Size:
15" RCP

Condition:
Poor

Scour:
No

Illicit Connection:
No

Repair:
Remove Sediment to Expose Pipe and Reevaluate

Owner: *Municipal*

Photo No. 44.

Description:

Discharge ID:
D-44

Location:
14 Gritman Ct

Watercourse:
Musquapsink Brook Trib.

Size:
24" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 45.

Description:

Discharge ID:
D-45

Location:
50 Whalen Ct

Watercourse:
Musquapsink Brook Trib.

Size:
30" RCP – Flared End

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 46.

Description:

Discharge ID:
D-46

Location:
54 Whalen Ct.

Watercourse:
Musquapsink Brook Trib.

Size:
15" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
Remove tree to expose pipe opening

Owner: *Municipal*

Photo No. 47.

Description:

Discharge ID:
D-47

Location:
37 Meadow Rd

Watercourse:
Musquapsink Brook Trib.

Size:
36" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 48.

Description:

Discharge ID:
D-48

Location:
23 Third Ave

Watercourse:
Musquapsink Brook

Size:
36" RCP

Condition:
Fair

Scour:
Yes

Illicit Connection:
No

Repair:
Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 49.

Description:

Discharge ID:
D-49

Location:
128 Goodwin Terr

Watercourse:
Musquapsink Brook

Size:
10" Iron

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
Repair Pipe and Conduit
Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 50.

Description:

Discharge ID:
D-50

Location:
98 Goodwin Terr

Watercourse:
Musquapsink Brook

Size:
12" PVC

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 51.

Description:

Discharge ID:
D-51

Location:
25 First Ave

Watercourse:
Musquapsink Brook

Size:
30" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 52.

Description:

Discharge ID:
D-52

Location:
112 Prospect Ave

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Unknown

Scour:
Unknown

Illicit Connection:
Unknown

Repair:
Photograph Pipe and Reevaluate

Owner: *Municipal*

Photo No. 53.

Description:

Discharge ID:
D-53

Location:
4 Godwin Terr

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Unknown

Scour:
Unknown

Illicit Connection:
Unknown

Repair:
Photograph Pipe and Reevaluate

Owner: *Municipal*

Photo No. 54.

Description:

Discharge ID:
D-54

Location:
109 Prospect Ave

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Unknown

Scour:
Unknown

Illicit Connection:
Unknown

Repair:
Photograph Pipe and Reevaluate

Owner: *Municipal*

Photo No. 55.

Description:

Discharge ID:
D-55

Location:
99 Prospect Ave

Watercourse:
Musquapsink Brook

Size:
36" RCP

Condition:
Unknown

Scour:
Unknown

Illicit Connection:
Unknown

Repair:
Photograph Pipe and Reevaluate

Owner: *Municipal*

Photo No. 56.

Description:

Discharge ID:
D-56

Location:
Old Hook Rd

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
Remove debris to expose pipe opening

Owner: *County*

Photo No. 57.

Description:

Discharge ID:
D-57

Location:
Old Hook Rd

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 58.

Description:

Discharge ID:
D-58

Location:
Old Hook Rd

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 59.

Description:

Discharge ID:
D-59

Location:
Old Hook Rd

Watercourse:
Musquapsink Brook

Size:
30" RCP

Condition:
Poor

Scour:
No

Illicit Connection:
No

Repair:
Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 60.

Description:

Discharge ID:
D-60

Location:
Old Hook Rd

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *County*

Photo No. 61.

Description:

Discharge ID:
D-61

Location:
99 Kinderkamack Rd

Watercourse:
Musquapsink Brook

Size:
18" CMP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 62.

Description:

Discharge ID:
D-62

Location:
99 Kinderkamack Rd

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 63.

Description:

Discharge ID:
D-63

Location:
7 Lexington Ave

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 64.

Description:

Discharge ID:
D-64

Location:
23 Kinderkamack Rd

Watercourse:
Musquapsink Brook Trib.

Size:
18" RCP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
Clean Pipe Opening

Owner: *County*

Photo No. 65.

Description:

Discharge ID:
D-65

Location:
2 Brook Pl

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Fair

Scour:
Yes

Illicit Connection:
No

Repair:
Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 66.

Description:

Discharge ID:
D-66

Location:
123 Lexington Ave

Watercourse:
Musquapsink Brook

Size:
18" Clay Pipe

Condition:
Good

Scour:
Yes

Illicit Connection:
No

Repair:
Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
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Photo No. 67.

Description:

Discharge ID:
D-67

Location:
1 Berkeley Ave

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 68.

Description:

Discharge ID:
D-68

Location:
Meyer Pl

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 69.

Description:

Discharge ID:
D-69

Location:
Harrington Ave

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 70.

Description:

Discharge ID:
D-70

Location:
Harrington Ave

Watercourse:
Musquapsink Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 71.

Description:

Discharge ID:
D-71

Location:
Harrington Ave

Watercourse:
Musquapsink Brook

Size:
18" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 72.

Description:

Discharge ID:
D-72

Location:
Harrington Ave

Watercourse:
Pascack Brook

Size:
18" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *County*

Photo No. 73.

Description:

Discharge ID:
D-73

Location:
235 Harington Ave

Watercourse:
Pascack Brook

Size:
30" CMP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 74.

Description:

Discharge ID:
D-74

Location:
Pascack Rd

Watercourse:
Pascack Brook Tributary

Size:
15" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 75.

Description:

Discharge ID:
D-75

Location:
Pascack Rd

Watercourse:
Pascack Brook Tributary

Size:
24" RCP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 76.

Description:

Discharge ID:
D-76

Location:
56 Palisade Ave

Watercourse:
Pascack Brook Tributary

Size:
36" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
Remove debris to expose pipe opening

Owner: *Municipal*

Photo No. 77.

Description:

Discharge ID:
D-77

Location:
Emerson Rd

Watercourse:
Pascack Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 78.

Description:

Discharge ID:
D-78

Location:
Emerson Rd

Watercourse:
Pascack Brook

Size:
15" RCP

Condition:
Good

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 79.

Description:

Discharge ID:
D-79

Location:
13 Kaufman Dr

Watercourse:
Pascack Brook

Size:
18" RCP

Condition:
Good

Scour:
Yes

Illicit Connection:
No

Repair:
Install Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 80.

Description:

Discharge ID:
D-80

Location:
33 Kaufman Dr

Watercourse:
Pascack Brook

Size:
18" RCP

Condition:
Poor

Scour:
Yes

Illicit Connection:
No

Repair:
Replace Pipe, Install Headwall and Conduit Outlet Protection
NJDEP Permit Required

Owner: *Municipal*

Photo No. 81.

Description:

Discharge ID:
D-81

Location:
71 Kaufman Dr

Watercourse:
Pascack Brook

Size:
15" RCP

Condition:
Excellent

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 82.

Description:

Discharge ID:
D-82

Location:
Hopper Ave

Watercourse:
Emerson Brook

Size:
12" CMP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

CLIENT NAME:	SITE LOCATION:	PROJECT NAME:	PROJECT NO.:
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Photo No. 83.

Description:

Discharge ID:
D-83

Location:
Hopper Ave

Watercourse:
Emerson Brook

Size:
30" CMP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
No

Owner: *Municipal*

Photo No. 84.

Description:

Discharge ID:
D-84

Location:
Hopper Ave

Watercourse:
Emerson Brook

Size:
12" CMP

Condition:
Fair

Scour:
No

Illicit Connection:
No

Repair:
Investigate and clear pipe opening

Owner: *Municipal*

Illicit Connection Inspection Log

Outfall ID	Inspector	Date	Inspected		Investigated		Documented		Comments
			Yes	No	Yes	No	Yes	No	

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**: Oil

(b) **COLOR**: Yellow

(c) **TURBIDITY**: Cloudy

(d) **FLOATABLES**: Petroleum

(e) **DEPOSITS/STAINS**: Sediment

(f) **VEGETATION CONDITIONS**: Excessive Gr

(g) **DAMAGE TO OUTFALL STRUCTURES**:

IDENTIFY STRUCTURE: _____

DAMAGE: Metal Corrosion

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**: 112

(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**: 123 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? 12

   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. asdfasdfasdf

   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.

Closeout Investigation Form

Municipality Information	Municipality:____ County ____ NJPDES # : **NJG**____PI ID #: ____ Team Member / Title: ____

Outfall #: ____Location: ____

Receiving Waterbody: ____

Basis for Submittal:

(☐) A non-stormwater discharge was found, but no source was located within six months.

(☐) An intermittent non-stormwater discharge was observed, and three unsuccessful investigations were conducted to investigate the discharge while it was flowing.

Describe each phase of your investigation, including dates. Attach additional pages as necessary:

Inspector's Name: ____

Title: ____

Signature: _____

Date: ____

Complete and attach this form to the appropriate Illicit Connection Inspection Report Form and submit with the Annual Report and Certification.

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 Borough of Westwood will implement a stormwater facility maintenance program to ensure that the stormwater facility operated by the Borough function properly. The Borough operates the following:

1 (one) Rain Garden

This stormwater facility will be inspected annually to ensure that it is functioning properly. In high risk areas, preventative maintenance will be performed on the stormwater facility to ensure that it does not begin to fail.

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.

The Borough is creating an inventory of all privately owned stormwater facilities. Letters will be sent requesting a description of the facility's stormwater structures and site specific maintenance plans, logs and any past or present issues or concerns. Once the inventory is complete the Borough will inspect the facilities on an 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.

Records of all stormwater facilities inspections and maintenance logs are kept at the Westwood Department of Public Works at: 235 Harrington Avenue, Westwood, NJ 07675.

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).

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/.

Municipal Stormwater Facility Inspection Log

Address	Coordinates	Inspector	Inspection		Repair		Date	Preventative/Corrective Maintenance	Findings
			Yes	No	Yes	No			

Private Stormwater Facility Inspection Log

Address	Coordinates	Inspector	Inspected		Repairs Needed		Date	Preventative/Corrective Maintenance	Findings
			Yes	No	Yes	No			

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.

The Borough of Westwood has reviewed the TMDLs as follows:

Applicable Stream TMDL(s)
- Total Maximum Daily Loads for Fecal Coliform to Address 32 Streams in the Northeast Water Region

  Fecal Coliform - 2003 : Pascack Brook/Musquapsink Brook

- Total Maximum Daily Loads for Phosphorus to Address Three (3) Stream Segments in the Northeast Water Region

  Total Phosphorus - 2005 : Pascack Brook/Musquapsink Brook

Applicable Lake TMDL(s)
- None

Applicable Shellfish TMDL(s)
- None

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

The Borough of Westwood utilizes TMDL information to prevent the specific stormwater pollutants from entering the Pascack Brook and Musquapsink Brook. Management strategies implemented for restricting pollutants are as follows:

- Wildlife Feeding Ordinance No. 05-31 is enacted and enforced
- Geese deterrents on public fields to reduce waste
- Pet Waste Ordinance No. 05-28 is enacted and enforced
- Pet Waste signage and plastic bag dispensaries in public areas
- Municipal properties are treated with phosphorus free fertilizers

Bureau of Nonpoint Pollution Control

Water Pollution Management Element

Bureau of Nonpoint Pollution ControL

Industrial Stormwater Permitting Program

Municipal Stormwater Regulation Program

- Tier A Municipalities
- Tier B Municipalities
- Public Complex
- Highway Agency
- Case Manager List
- Emergency Snow Removal and Disposal Policy
- De-Icing Storage Policy
- Cleanwater Multimedia
- Stormwater Training
- TMDL Lookup

Companion Links
- www.cleanwaternj.org
- www.njstormwater.org

Onsite Wastewater Management Program

Discharge to Ground Water Permitting Program

Stormwater Management

Green Infrastructure in New Jersey

General Permits

Individual Permits

Municipality and County
Westwood Borough
Bergen County

Total Maximum Daily Load(TMDL) Information for Selected Municipality:

Applicable Stream TMDL(s)

- Total Maximum Daily Loads for Fecal Coliform to Address 32 Streams in the Northeast Water Region

  Fecal Coliform - 2003 : Pascack Brook/Musquapsink Brook : View the TMDL Document

- Total Maximum Daily Loads for Phosphorus to Address Three (3) Stream Segments in the Northeast Water Region

  Total Phosphorus - 2005 : Pascack Brook/Musquapsink Brook : View the TMDL Document

Applicable Lake TMDL(s)

None

Applicable Shellfish TMDL(s)

None

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Last Updated: March 27, 2019

Amendment to the Northeast Water Quality Management Plan

Total Maximum Daily Loads for Fecal Coliform to Address 32 Streams in the Northeast Water Region

Watershed Management Area 3
(Pompton, Pequannock, Wanaque, and Ramapo Rivers)
Watershed Management Area 4
(Lower Passaic and Saddle Rivers)
Watershed Management Area 5
(Hackensack River, Hudson River, and Pascack Brook)
Watershed Management Area 6
(Upper & Middle Passaic, Whippany, and Rockaway Rivers)

Proposed:	January 21, 2003
Established:	March 28, 2003
Approved (by EPA Region 2):	July 29, 2003
Adopted:	June 6, 2013

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

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1.0 Executive Summary

In accordance with Section 305(b) of the Federal Clean Water Act (CWA), the State of New Jersey developed the *2002 Integrated List of Waterbodies*, addressing the overall water quality of the State's waters and identifying impaired waterbodies for which Total Maximum Daily Loads (TMDLs) may be necessary. The *2002 Integrated List of Waterbodies* identified several waterbodies in the Northeast Water Region as being impaired by pathogens, as indicated by the presence of fecal coliform concentrations in excess of standards. This report, developed by the New Jersey Department of Environmental Protection (NJDEP), establishes 32 TMDLs addressing fecal coliform loads to the waterbodies identified in Table 1.

Table 1 Fecal coliform-impaired stream segments in the Northeast Water Region, identified in Sublist 5 of the 2002 Integrated List of Waterbodies, for which fecal coliform TMDLs are being established.

TMDL Number	WMA	Station Name/Waterbody	Site ID	County(s)	River Miles
1	3	Macopin River at Macopin Reservoir	01382450	Passaic	1.8
2	3	Wanaque River at Highland Avenue	01387010	Passaic	1.5
3	3	Ramapo River Near Mahwah	01387500	Passaic and Bergen	17.7
4	4	Passaic R. below Pompton R. at Two Bridges	01389005	Passaic	1.83
5	4	Preakness Brook Near Little Falls	01389080	Passaic	8.9
6	4	Deepavaal Brook at Fairfield	01389138	Essex	6.3
7	4	Passaic River at Little Falls	01389500	Passaic and Essex	15.0
8	4	Peckman River at West Paterson	01389600	Passaic and Essex	7.7
9	4	Goffle Brook at Hawthorne	01389850	Passaic and Bergen	10.5
10	4	Diamond Brook at Fair Lawn	01389860	Passaic and Essex	2.5
11	4	WB Saddle River at Upper Saddle River	01390445	Bergen	2.4
12	4	Saddle River at Ridgewood	01390500	Bergen	24.0
13	4	Ramsey Brook at Allendale	01390900	Bergen	6.4
14	4	HoHoKus Brook at Mouth at Paramus	01391100	Bergen	6.2
15	4	Saddle River at Fairlawn	01391200	Bergen	5.0
16	4	Saddle River at Lodi	01391500	Bergen	3.8
17	5	Hackensack River at River Vale	01377000	Bergen	10.0
18	5	Musquapsink Brook at River Vale	01377499	Bergen	7.3
19	5	Pascack Brook at Westwood	01377500	Bergen	6.6
20	5	Tenakill Brook at Cedar Lane at Closter	01378387	Bergen	10.2
21	5	Coles Brook at Hackensack	01378560	Bergen	11.1
22	6	Black Brook at Madison	01378855	Morris	2.4
23	6	Passaic River near Millington	01379000	Morris and Somerset	5.2
24	6	Dead River near Millington	01379200	Somerset	21.9
25	6	Passaic River near Chatham	01379500	Somerset, Union, Essex, and Morris	25.2
26	6	Canoe Brook near Summit	01379530	Essex	17.6
27	6	Rockaway River at Longwood Valley	01379680	Sussex and Morris	11.6
28	6	Rockaway River at Blackwell Street	01379853	Morris	3.5
29	6	Beaver Brook at Rockaway	01380100	Morris	17.0
30	6	Stony Brook at Boonton	01380320	Morris	13.1
31	6	Rockaway River at Pine Brook	01381200	Morris	6.8

TMDL Number	WMA	Station Name/Waterbody	Site ID	County(s)	River Miles
32	6	Passaic River at Two Bridges	01382000	Morris and Essex	14.1
Total River Miles:					305.0

These thirty-two TMDLs will serve as management approaches or restoration plans aimed at identifying the sources of fecal coliform and for setting goals for fecal coliform load reductions in order to attain applicable surface water quality standards (SWQS).

As stated in N.J.A.C. 7:9B-1.14(c) of the New Jersey Surface Water Quality Standards, "Fecal coliform levels shall not exceed a geometric average of 200 CFU/100 ml nor should more than 10 percent of the total sample taken during any 30-day period exceed 400 CFU/100 ml in FW2 waters." Nonpoint and stormwater point sources are the primary contributor to FC loads in these streams and can include storm-driven loads transporting fecal coliform from sources such as geese, farms, and domestic pets to the receiving water. Nonpoint sources also include steady-inputs from sources such as failing sewage conveyance systems and failing or inappropriately located septic systems. Because the total point source contribution other than stormwater (i.e. Publicly-Owned Treatment Works, POTWs) is an insignificant fraction of a percent of the total load, these fecal coliform TMDLs will not impose any change in current practices for POTWs and will not result in changes to existing effluent limits.

Using ambient water quality data monitoring conducted during the water years 1994-2000, summer and all season geometric means were determined for each Category 5 listed segment. Given the two surface water quality criteria of 200 CFU/100 ml and 400 CFU/100 ml in FW2 waters, computations were necessary for both criteria and resulted in two values for percent reduction for each stream segment. The higher (more stringent) percent reduction value was selected as the TMDL and will be applied to nonpoint and stormwater sources as a whole or apportioned to categories of nonpoint and stormwater sources within the study area. The extent to which nonpoint and stormwater sources have been identified and the process by which they will become identified will vary by study area based on data availability, watershed size and complexity, and pollutant sources. Implementation plans for activities to be established in these watersheds are addressed in this report.

Each TMDL shall be proposed and adopted by the Department as an amendment to the appropriate area wide water quality management plan(s) in accordance with N.J.A.C. 7:15-3.4(g).

This TMDL Report is consistent with EPA's May 20, 2002 guidance document entitled: "Guidelines for Reviewing TMDLs under Existing Regulations issued in 1992," (Suftin, 2002) which describes the statutory and regulatory requirements for approvable TMDLs.

2.0 Introduction

Sublist 5 (also known as List 5 or, traditionally, the 303(d) List) of the State of New Jersey's proposed *2002 Integrated List of Waterbodies* identified several waterbodies in the Northeast Water Region as being impaired by pathogens, as evidenced by the presence of high fecal coliform concentrations. This report establishes 32 TMDLs, which address fecal coliform loads to the identified waterbodies. These TMDLs serve as management approaches or restoration plans aimed toward reducing loadings of fecal coliform from various sources in order to attain applicable surface water quality standards for the pathogen indication. Several of these waterbodies are listed in Sublist 5 for impairment cause by other pollutants. These TMDLs address only fecal coliform impairments. Separate TMDL evaluations will be developed to address the other pollutants of concern. The waterbodies will remain on Sublist 5 until such time as TMDL evaluations for all pollutants have been completed and approved by the United States Environmental Protection Agency (USEPA).

3.0 Background

3.1. 305(b) Report and 303(d) List

In accordance with Section 305(b) of the Federal Clean Water Act (CWA) (33 U.S.C. 1315(B)), the State of New Jersey is required to biennially prepare and submit to the United States Environmental Protection Agency (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.

In accordance with Section 303(d) of the CWA, the State is also required to biennially prepare and submit to USEPA a report that identifies waters that do not meet or are not expected to meet surface water quality standards (SWQS) after implementation of technology-based effluent limitations or other required controls. This report is commonly referred to as the 303(d) List. The listed waterbodies are considered water quality-limited and require total maximum daily load (TMDLs) evaluations. For waterbodies identified on the 303(d) List, there are three possible scenarios that may result in a waterbody being removed from the 303(d) List:

> **Scenario 1:** A TMDL is established for the pollutant of concern;
> **Scenario 2:** A determination is made that the waterbody is meeting water quality standards (no TMDL is required); or
> **Scenario 3:** A determination is made that a TMDL is not the appropriate mechanism for achieving water quality standards and that other control actions will result in meeting standards

Where a TMDL is required (Scenario 1), it will: 1) specify the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards; and 2) allocate pollutant loadings among point and nonpoint pollutant sources.

Recent EPA guidance (Suftin, 2002) describes the statutory and regulatory requirements for approvable TMDLs, as well as additional information generally needed for USEPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations. The Department believes that this TMDL report, which includes thirty-two TMDLs, addresses the following 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.
12. Submittal letter.

3.2. Integrated List of Waterbodies

In November 2001, USEPA issued guidance that encouraged states to integrate the 305(b) Report and the 303(d) List into one report. This integrated report assigns waterbodies to one of five categories. In general, Sublists 1 through 4 include waterbodies that are unimpaired, have limited assessment or data availability or have a range of designated use impairments, whereas Sublist 5 constitutes the traditional 303(d) List for waters impaired or threatened by a pollutant for which one or more TMDL evaluations are needed. Where more than one pollutant is associated with the impairment for a given waterbody, that waterbody will remain in Sublist 5 until one of the three possible delisting scenarios are completed. In the case of an Integrated List, however, the waterbody is not delisted but moved to one of the other categories.

Following USEPA's guidance, the Department chose to develop an Integrated Report for New Jersey. New Jersey's proposed *2002 Integrated List of Waterbodies* is based upon these five categories and identifies water quality limited surface waters in accordance with N.J.A.C. 7:15-6 and Section 303(d) of the CWA. These TMDLs address fecal coliform impairments, as listed on Sublist 5 of the State of New Jersey's proposed *2002 Integrated List of Waterbodies.*

3.3. Total Maximum Daily Loads (TMDLs)

A Total Maximum Daily Load (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 water body can assimilate without violating a state's water quality standards and allocates that load capacity to known point and nonpoint sources in the form of wasteload allocations (WLAs), load allocations (LAs), and a margin of safety. A TMDL is developed as a mechanism for identifying all the contributors to surface water quality impacts and setting goals for load reductions for pollutants of concern as necessary to meet the SWQS.

Once one of the three possible delisting scenarios, noted above, is completed, states have the option to remove the waterbody and specific pollutant of concern from Sublist 5 of the *2002 Integrated List of Waterbodies* or maintain the waterbody in Sublist 5 until SWQS are achieved. The State of New Jersey will be removing the waterbodies for fecal impairment from Sublist 5 once these TMDLs are approved by USEPA.

4.0 Pollutant of Concern and Area of Interest

The pollutant of concern for these TMDLs is pathogens, the presence of which is indicated by the elevated concentration of fecal coliform bacterial. Fecal coliform concentrations have been found to exceed New Jersey's Surface Water Quality Standards (SWQS) published at N.J.A.C. 7-9B et seq. As reported in the proposed *2002 Integrated List of Waterbodies*, the New Jersey Department of Environmental Protection (NJDEP) identified waterbodies as being impaired by fecal coliform. The Northeast Water Region listings for fecal coliform impairment are identified in Table 2. Also identified in Table 2 are the river miles and management response associated with each listed segment. All of these waterbodies have a high priority ranking, as described in the *2002 Integrated List of Waterbodies*.

Table 2 Abridged Sublist 5 of the 2002 Integrated List of Waterbodies, listed for fecal coliform impairment in the Northeast Water Region.

TMDL No.	WMA	Station Name/Waterbody	Site ID	River Miles	Management Response
1	3	Macopin River at Macopin Reservoir	1382450	**1.8**	establish TMDL
	3	Pequannock River at Macopin Intake Dam	1382500	**19.1**	none; Re-assessment shows non-impairment
	3	Wanaque River at Wanaque	1387000	**0.6**	water quality monitoring needed to identify if an impairment exists
2	3	Wanaque River at Highland Ave.	1387010	**1.5**	establish TMDL
3	3	Ramapo River near Mahwah	1387500	**17.7**	establish TMDL
4	4	Passaic River below Pompton River at Two Bridges	1389005	**1.8**	establish TMDL
5	4	Preakness Brook Near Little Falls	1389080	**8.9**	establish TMDL
6	4	Deepavaal Brook at Fairfield	1389138	**6.3**	establish TMDL
7	4	Passaic River at Little Falls	1389500	**15.0**	establish TMDL
8	4	Peckman River at West Paterson	1389600	**7.7**	establish TMDL
9	4	Goffle Brook at Hawthorne	1389850	**10.5**	establish TMDL
10	4	Diamond Brook at Fair Lawn	1389860	**2.5**	establish TMDL

TMDL No.	WMA	Station Name/Waterbody	Site ID	River Miles	Management Response
	4	Passaic River at Elmwood Park	1389880	**13.8**	CSO influence
11	4	WB Saddle River at Upper Saddle River	1390445	**2.4**	establish TMDL
12	4	Saddle River at Ridgewood	1390500	**24.0**	establish TMDL
13	4	Ramsey Brook at Allendale	1390900	**6.4**	establish TMDL
14	4	HoHoKus Brook at Mouth at Paramus	1391100	**6.2**	establish TMDL
15	4	Saddle River at Fairlawn	1391200	**5.0**	establish TMDL
16	4	Saddle River at Lodi	1391500	**3.8**	establish TMDL
17	5	Hackensack River at River Vale	1377000	**10.0**	establish TMDL
18	5	Musquapsink Brook at River Vale	1377499	**7.3**	establish TMDL
19	5	Pascack Brook at Westwood	1377500	**6.6**	establish TMDL
20	5	Tenakill Brook at Cedar Lane at Closter	1378387	**10.2**	establish TMDL
	5	Hackensack River at New Milford	1378500	**1.1**	water quality monitoring needed to identify if an impairment exists
21	5	Coles Brook at Hackensack	1378560	**11.1**	establish TMDL
22	6	Black Brook at Madison	1378855	**2.4**	establish TMDL
23	6	Passaic River near Millington	1379000	**5.2**	establish TMDL
24	6	Dead River Near Millington	1379200	**21.1**	establish TMDL
25	6	Passaic River near Chatham	1379500	**25.2**	establish TMDL
26	6	Canoe Brook near Summit	1379530	**17.6**	establish TMDL
27	6	Rockaway River at Longwood Valley	1379680	**11.6**	establish TMDL
28	6	Rockaway River at Blackwell Street	1379853	**3.5**	establish TMDL
29	6	Beaver Brook at Rockaway	1380100	**17.0**	establish TMDL
30	6	Stony Brook at Boonton	1380320	**13.1**	establish TMDL
31	6	Rockaway River at Pine Brook	1381200	**6.8**	establish TMDL
	6	Whippany River at Morristown	1381500	**6.6**	TMDL completed in 1999
	6	Whippany River near Pine Brook	1381800	**6.6**	TMDL completed in 1999
32	6	Passaic River at Two Bridges	1382000	**14.1**	establish TMDL

These thirty-two TMDLs will address 305 river miles or approximately 87% of the total river miles impaired by fecal coliform (352 total FC impaired river miles) in the northeast watershed region. Based on the detailed county hydrography stream coverage, 847 stream miles, or 47% of the stream segments in the northeast region (1800 total miles) are directly affected by the 32 TMDLs due to the fact that the implementation plans cover entire watersheds; not just impaired waterbody segments.

Table 2 identifies six segments for which TMDLs will not be developed at this time based on investigations following the *2002 Integrated List of Waterbodies* proposal. These segments, which are identified as requiring a management response other than "establish TMDL," are discussed in Appendix A along with the listing Sublist to which they will be moved.

These include: #01382500, Pequannock River at Macopin Intake Dam, #01387000, Wanaque River at Wanaque, #01378500, Hackensack River at New Milford, #01381500, Whippany

River at Morristown, #01381800, Whippany River near Pine Brook, and #01389880, Passaic River at Elmwood Park. For each of these segments an explanation of the management response is provided in Appendix A.

4.1. Description of the Northeast Water Region and Sublist 5 Waterbodies

4.1.1. Watershed Management Area 3

Watershed Management Area 3 (WMA 3) includes watersheds that receive water from the Highlands portion of New Jersey. The Pequannock, Wanaque and Ramapo Rivers all flow into the Pompton River. The Pompton River is, in turn, a major tributary to the Upper Passaic River. WMA 3 contains some of the State's major water supply reservoir systems including the Wanaque Reservoir, the largest surface water reservoir in New Jersey. There are four watersheds in WMA 3: Pompton, Ramapo, Pequannock and Wanaque River Watersheds. WMA 3 lies mostly in Passaic County but also includes parts of Bergen, Morris, and Sussex Counties.

The **Pequannock River Watershed** is 30 miles long and has a drainage area of 90 square miles. The headwaters are in Sussex County and the Pequannock River flows east, delineating the Morris/Passaic County boundary line. The Pequannock River joins the Wanaque River and flows to the Pompton River in Wayne Township. Some of the major impoundments within this watershed are Kikeout Reservoir, Lake Kinnelon Reservoir, Clinton Reservoir, Canistear Reservoir, Oak Ridge Reservoir, and Echo Lake Reservoir. The great majority of the land within this watershed is forested and protected for water supply purposes and parklands.

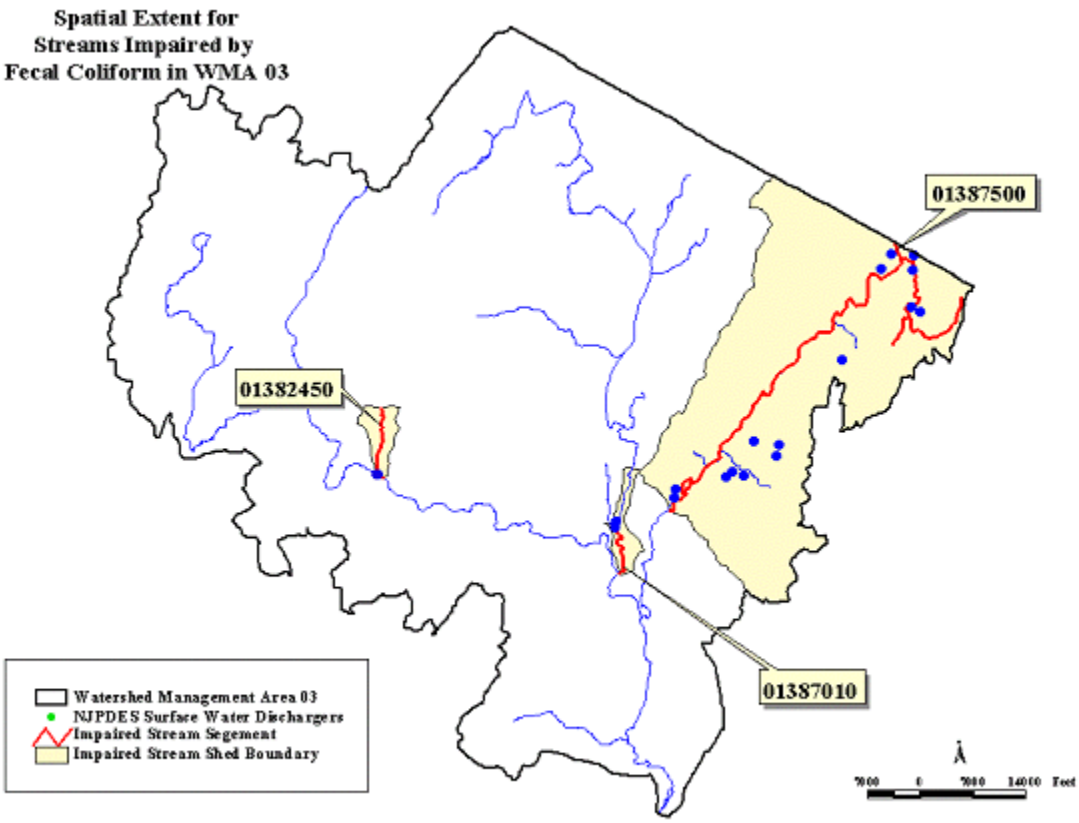
The **Ramapo River and Pompton River Watersheds** comprise a drainage area of about 160 square miles; 110 square miles of which are in New York State. The Ramapo River flows from New York into Bergen County and enters the Pequannock River to form the Pompton River in Wayne Township. The Ramapo River is 15 miles long on the New Jersey side. The Pompton River, a tributary to the Passaic River, is 7 miles long. Some of the major impoundments within this watershed include Point View Reservoir #1, Pompton Lakes, and Pines Lake. Over one-half of this watershed is undeveloped; however, new development is extensive in many areas.

The **Wanaque River Watershed** has a total drainage area of 108 square miles. The headwaters of the river lie within New York State as a minor tributary to Greenwood Lake (located half in New Jersey and half in New York). The New Jersey portion lies in West Milford, Passaic County. The Wanaque River joins up with the Pequannock River in Riverdale Township. The Wanaque River is 27 miles in length. Some of the major impoundments and lakes with this watershed are the Wanaque Reservoir, Greenwood Lake, Arcadia Lake and Lake Inez. Most of the land in this watershed is undeveloped, consisting of vacant lands, reservoirs, parks and farms.

Sublist 5 Waterbodies in WMA 3

Three river segments of the thirty-two impaired segments addressed in this report, the Macopin River (#01382450), Wanaque River (#01387010), and Ramapo River (#01387500) are located in WMA 3. The spatial extent of each segment is identified in Figure 1. River miles, watershed sizes and land use\land cover by percent area associated with each segment are listed in Table 3.

Figure 1 Spatial extent of Sublist 5 segments for which TMDLs are being developed in WMA 3



Segment #01382450, the Macopin River at Macopin Reservoir, has a watershed area of approximately 1.1 mi^2. Water quality from stations #01382410 and #01382450 were used in assessing the status and spatial extent of bacterial contamination. The length of the impaired stream segment is approximately 1.8 miles and is located on the Macopin River upstream of the confluence of the Macopin and the Pequannock Rivers. A total of 1.9 stream miles (based on county hydrologic stream coverage) are located within its watershed and will be included in the implementation plan.

Table 3 River miles, Watershed size, and Anderson Landuse classification for three Sublist 5 segments, listed for fecal coliform, in WMA 3.

	Segment ID		
	1382450	**1387010**	**1387500**
Sublist 5 impaired river miles (miles)	1.8	1.5	17.7
Total river miles within watershed and included in the implementation plan (miles)	1.9	4.0	87.8
Watershed size (acres)	711	708	26084
Landuse/Landcover			
Agriculture	0.00%	0.00%	0.43%
Barren Land	0.15%	0.17%	0.78%
Forest	89.74%	29.65%	51.20%
Urban	4.11%	55.19%	37.64%
Water	1.97%	4.71%	3.05%
Wetlands	4.04%	10.29%	6.89%

Segment #01387010, the Wanaque River at Highland Avenue at Wanaque, is located on the Wanaque River from the inlet of the Wanaque River at Inez Lake to the confluence of the Wanaque and Pequannock Rivers. Water quality from stations #01387014 and #01387041 were used in assessing the spatial extent of bacterial contamination. The stream segment length is approximately 1.5 miles with a watershed area of approximately 708 acres or 1.1 mi^2.

Segment #01387500, the Ramapo River near Mahwah, is located on the Ramapo River between the NJ-NY borders to the inlet at Pompton Lake. Water quality from station #01387500 was used to assess the spatial extent of bacterial contamination. The impaired stream segment length is approximately 17.7 miles. A total of 87.8 stream miles are located within its watershed and will be included in the implementation plan. The total drainage area for this segment is approximately 26084 acres or 40.8 mi^2.

4.1.2. Watershed Management Area 4

Watershed Management Area 4 (WMA 4) includes the Lower Passaic River (from the Pompton River confluence downstream to the Newark Bay) and its tributaries, including the Saddle River. The WMA 4 drainage area is approximately 180 square miles and lies within portions of Passaic, Essex, Hudson, Morris and Bergen Counties.

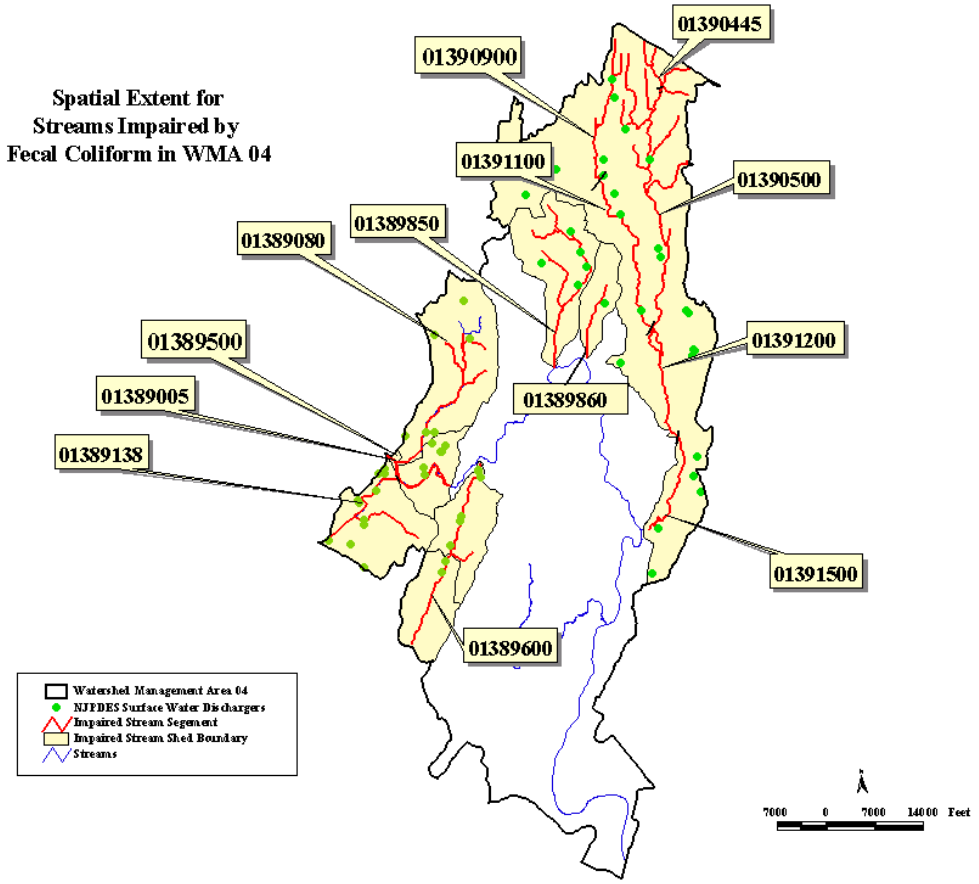
Two watersheds comprise WMA 4: the Lower Passaic River Watershed and Saddle River River Watershed. The **Lower Passaic River Watershed** originates from the confluence of the Pompton River downstream to the Newark Bay. This 33-mile section meanders through Bergen, Hudson, Passaic, and Essex Counties and includes a number of falls, culminating with the Great Falls at Paterson. This watershed has a drainage area of approximately 129 square miles. The major tributaries to this section of the Passaic River are the Saddle River,

Preakness Brook, Second River, and Third River. The Saddle River is one of the larger tributaries to the Lower Passaic River. The **Saddle River Watershed** has a drainage area of approximately 51 square miles. Land in this watershed is extensively developed and contains many older cities and industrial centers including Newark, Paterson, Clifton, and East Orange.

Sublist 5 Waterbodies inWMA 4

Thirteen of the thirty-two TMDLs in the Northeast region are located in WMA 4. Included are several segments of the Saddle River (#01390500, #01391200 and #01391500), West Branch of the Saddle River (#01390445), Ramsey Brook (#01390900), Hohokus Brook (#01391100), the Passaic River (#01389005 and #01389500), Preakness Brook (#01389080), Deepavaal Brook (#01389138), Diamond Brook (#01389860), Goffle Brook (#01389850), and the Peckman River (#01389600). Several of these stream segments are geographically located in close proximity, thus, when these segments were found to contain similar levels of bacteria contamination (geometric means value), water quality data from these segments were grouped when calculating the TMDL. The spatial extent of each segment is identified in Figure 2. River miles, watershed sizes and land use\land cover by percent area associated with each segment are listed in Table 4.

Figure 2 Spatial extent of Sublist 5 segments for which TMDLs are being developed in WMA 4



Given the proximity and similarity in impairment of several stations in the Saddle River watershed, six segments were grouped for the purposes of this report. These segments include: the West Branch Saddle River at Upper Saddle River (#01390445), Saddle River at Ridgewood (#01390500), Ramsey Brook at Allendale (#01390900), Hohokus Brook at Paramus (#01391100), Saddle River at Fairlawn (#01391200), and the Saddle River at Lodi (#01391500). These stream segments extend from the New York-New Jersey border to the confluence of the Saddle and Passaic Rivers and is contained within a 32933 acres, or 51.5 mi^2, watershed. The combined six stream segments total a length of 45.7 miles. The implementation plan will address all of streams located in this watershed (97.3 miles). Stations #01390445, #01390470, #01390510, #01390518, #01390900, #01391100, #01391490, and #01391500 were used to assess the status and spatial extent of bacterial contamination.

Table 4 River miles, Watershed size, and Anderson Landuse classification for thirteen Sublist 5 segments, listed for fecal coliform, in WMA 4.

	Segment ID		
	1390445, 1390500, 1390900, 1391100, 1391200, 1391500	**1389005,1389500, 1389080, 1389138,1389600**	**1389850,1389860**
Sublist 5 impaired river miles (miles)	45.7	29.8	10.5
Total river miles within watershed and included in the implementation plan (miles)	97.3	56.1	13.3
Watershed size (acres)	32933	14450	7590
Landuse/Landcover			
Agriculture	0.51%	0.12%	0.07%
Barren Land	0.20%	0.79%	0.27%
Forest	10.59%	20.81%	7.96%
Urban	81.89%	69.81%	88.51%
Water	1.06%	1.59%	0.46%
Wetlands	5.75%	6.88%	2.74%

Five Sublist 5 segments, the Passaic River below Pompton River at Two Bridges (#01389005), Passaic River at Little Falls (#1389500), Preakness Brook near Little Falls (#1389080), Deepavaal Brook at Fairfield (#01389138) and Peckman River at West Paterson (#01389600) were grouped based on similarities in geography and bacterial concentrations. Water quality from stations #01389500, #01389080, #01389138, #01382000, and #01389600 were used to assess the status and spatial extent of bacterial contamination. The combined length of the impaired stream segments is approximately 29.8 miles. A total of 56.1 stream miles are located within its watershed and will be included in the implementation plan. The total drainage area for this segment is approximately 14450 acres, or 22.6 mi^2.

Stream segments #01389850 and #01389860 were also grouped in calculating the TMDL percent reduction. Segment #01389850, Goffle Brook at Hawthorne, consists of the entire length of Goffle Brook to the confluence of Goffle Brook with the Passaic River. Segment #01389860, Diamond Brook at Fair Lawn, consists of the entire length of Diamond Brook to the confluence of Diamond Brook with the Passaic River. Water quality from stations #01389850 and #01389860 were used in assessing the status and spatial extent of bacterial contamination for these segments. The length of the impaired #01389850 stream segment is approximately 10.5 miles in a watershed area of approximately 5658 acres or 8.8 mi^2. A total of 13.3 river miles are in the watershed and will be included in the implementation plan. The length of the impaired #01389860 stream segment is approximately 2.5 miles in a watershed area of approximately 1932 acres or 3.0 mi^2.

4.1.3. Watershed Management Area 5

Watershed Management Area 5 (WMA 5) includes parts of Hudson and Bergen Counties and has a watershed area of approximately 165 square miles. WMA 5 is comprised of three watersheds: Hackensack River Watershed, Hudson River Watershed and Pascack Brook Watershed. The Hackensack River originates in New York State and flows south to the Newark Bay. New Jersey's portion of the river is 31 miles long. The Hackensack River Watershed is approximately 85 square miles. Major tributaries include the Pascack Brook, Berry's Creek, Overpeck Creek, and Wolf Creek. The **Pascack Brook Watershed** has a drainage area of approximately 51 square miles.

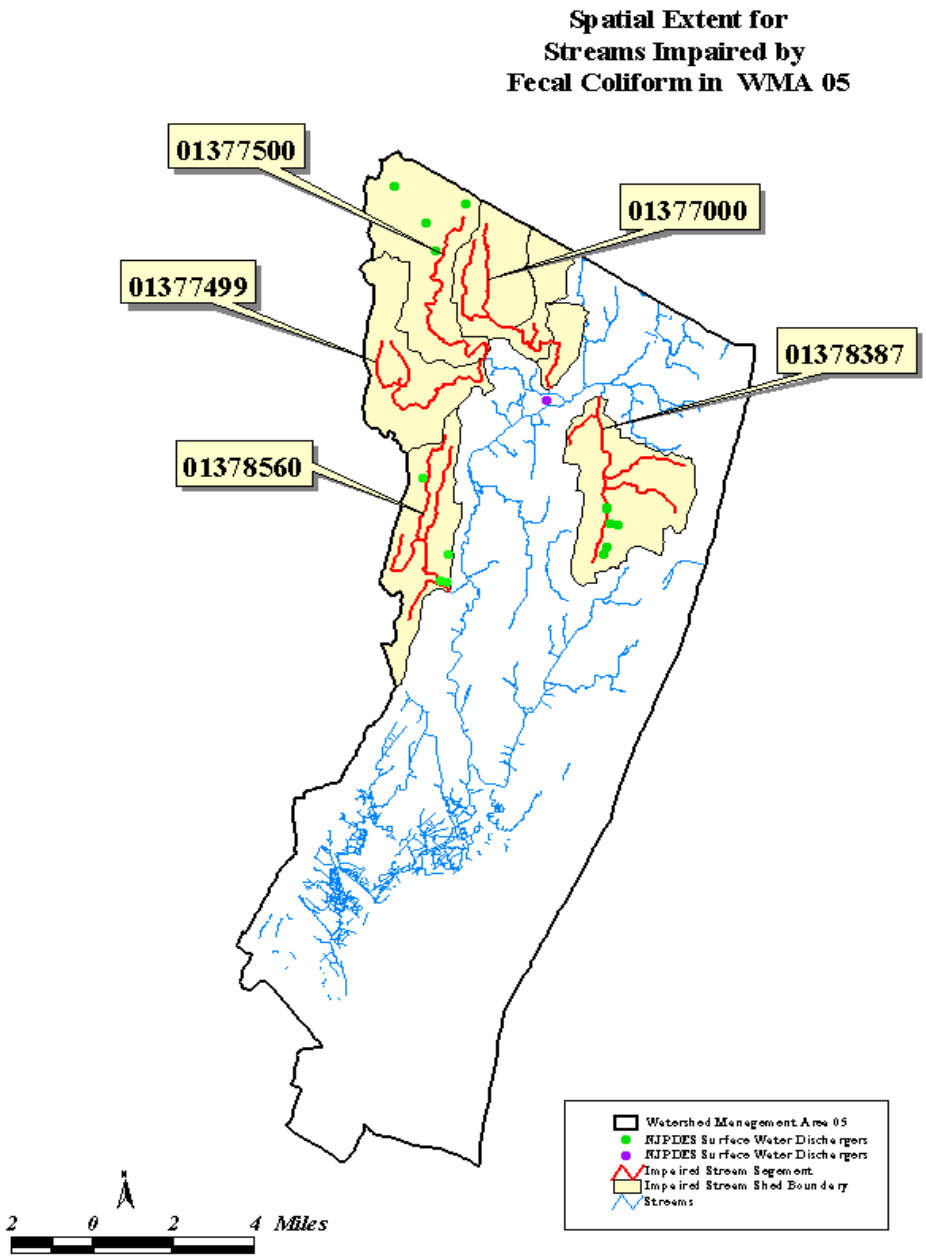
The New Jersey portion of the Hudson River is 315 miles long and begins in New York State at Lake Tear of the Clouds on the southwest side of Mount Marcy, New York's highest peak. The New Jersey portion of the **Hudson River Watershed** is approximately 29 square miles. The Hudson River forms the boundary between New Jersey and New York States.

Although WMA 5 is the most populated of all the WMAs, approximately 50% of the land is still undeveloped, with more than 30% residential development. The remaining developed land is commercial/industrial use. Much of the lower **Hackensack River Watershed** is tidal marsh known as the Hackensack Meadowlands. The Meadowlands are home to more than 700 plant and animal species including several rare and threatened species

Sublist 5 Waterbodies in WMA 5

Five of the thirty-two TMDLs in this report are located in WMA 5. Included are segments in the Hackensack River (#01377000), Pascack Brook (#01377500), Musquapsink Brook (#01377499), Tenakill Brook (#01378387), and Coles Brook (#01378560). The spatial extent of each segment is identified in Figure 3. River miles, watershed size and land use\land cover by percent area associated with each segment are listed in Table 5.

Figure 3 Spatial extent of Sublist 5 segments for which TMDLs are being developed in WMA 5



Hackensack River at River Vale, (segment #01377000) flows across the New Jersey/New York State line in River Vale/Old Tappan and extends to the inlet of the Oradell Reservoir. Water quality from stations #01377000 and #01376970 (Hackensack River at Old Tappan) were used in assessing the status and spatial extent of bacterial contamination for this segment. The length of the impaired stream segment is approximately 10.0 miles in a

watershed area of approximately 5912 acres or 9.2 mi^2, however a total of 20.3 river miles are located in the watershed and will be included in the implementation plan.

Table 5 River miles, Watershed size, and Anderson Landuse classification for five Sublist 5 segments, listed for fecal coliform, in WMA 5.

	Segment ID			
	1377000	**1377499, 1377500**	**1378387**	**1378560**
Sublist 5 impaired river miles (miles)	10.0	13.8	10.2	11.1
Total river miles within watershed and included in the implementation plan (miles)	20.3	33.3	10.8	14.8
Watershed size (acres)	5902	10430	5626	4241
Landuse/Landcover				
Agriculture	0.07%	0.95%	0.17%	0.00%
Barren Land	0.42%	0.30%	0.13%	0.18%
Forest	13.85%	11.53%	11.32%	4.98%
Urban	65.52%	79.72%	84.43%	91.80%
Water	12.09%	2.31%	0.44%	0.19%
Wetlands	8.05%	5.18%	3.51%	2.84%

Pascack Brook at Westwood, segment #01377500, and Musquapsink Brook at River Vale segment #01377500, were also grouped based on similarities in geography and extent of bacterial contamination. Water quality from stations #01377499 and #01377500 were used in assessing the status and spatial extent of bacterial contamination for these segments. The combined length of the impaired stream segments is approximately 13.8 miles in a watershed area of approximately 10429 acres or 16.3 mi^2, however a total of 33.3 river miles are located within the watershed and will be included in the implementation plan.

Tenakill Brook at Cedar Lane at Closter, segment #01378387, consists of the entire length of Tenakill Brook upstream of USGS station #01378387. Water quality from this station #01378387 was used in assessing the status and spatial extent of bacterial contamination for this segment. The length of the impaired stream segment is approximately 10.2 miles in a watershed area of approximately 5625 acres or 8.8 mi^2. A total of 10.8 river miles are included in this watershed and will be included in the implementation plan

Coles Brook at Hackensack, segment #01378560, consists of the entire length of Coles Brook upstream of USGS station #01378560. Water quality from station #01378560 was used in assessing the status and spatial extent of bacterial contamination for this segment. The length of the impaired stream segment is approximately 11.1 miles in a watershed area of approximately 4240 acres or 6.6 mi^2. A total of 14.8 river miles are included in this watershed and will be included in the implementation plan.

4.1.4. Watershed Management Area 6

Watershed Management Area 6 (WMA 6) represents the area drained by waters from the upper reaches of the Passaic River Basin including the Passaic River from its headwaters in Morris County to the confluence of the Pompton River. Extensive suburban development and reliance upon ground water sources for water supply characterize WMA 6. WMA 6 lies in portions of Morris, Somerset, Sussex and Essex counties and includes the Upper & Middle Passaic River, Whippany River and Rockaway River Watersheds.

The **Upper Passaic River Watershed** is approximately 50 miles long and consists of a drainage area approximately 200 square miles in portions of Somerset, Morris, and Essex Counties. This section of the Passaic River is a significant source of drinking water for a much of northeastern New Jersey. Major tributaries to the Upper Passaic River include the Dead River, Rockaway River, Whippany River, and Black Brook. The Great Swamp National Wildlife Refuge is located within the Upper Passaic River Watershed. Approximately one-half of this watershed is undeveloped or vacant, with the remainder primarily residential and commercial; however, this watershed is facing significant development in the vacant areas. This watershed is subject to frequent flooding.

The **Middle Passaic River Watershed** includes Great Piece Meadows and Deepavaal Brook. The Great Piece Meadows is a freshwater wetland with a drainage area of approximately 12 square miles and is prone to flooding. Various owners privately own the Great Piece Meadows.

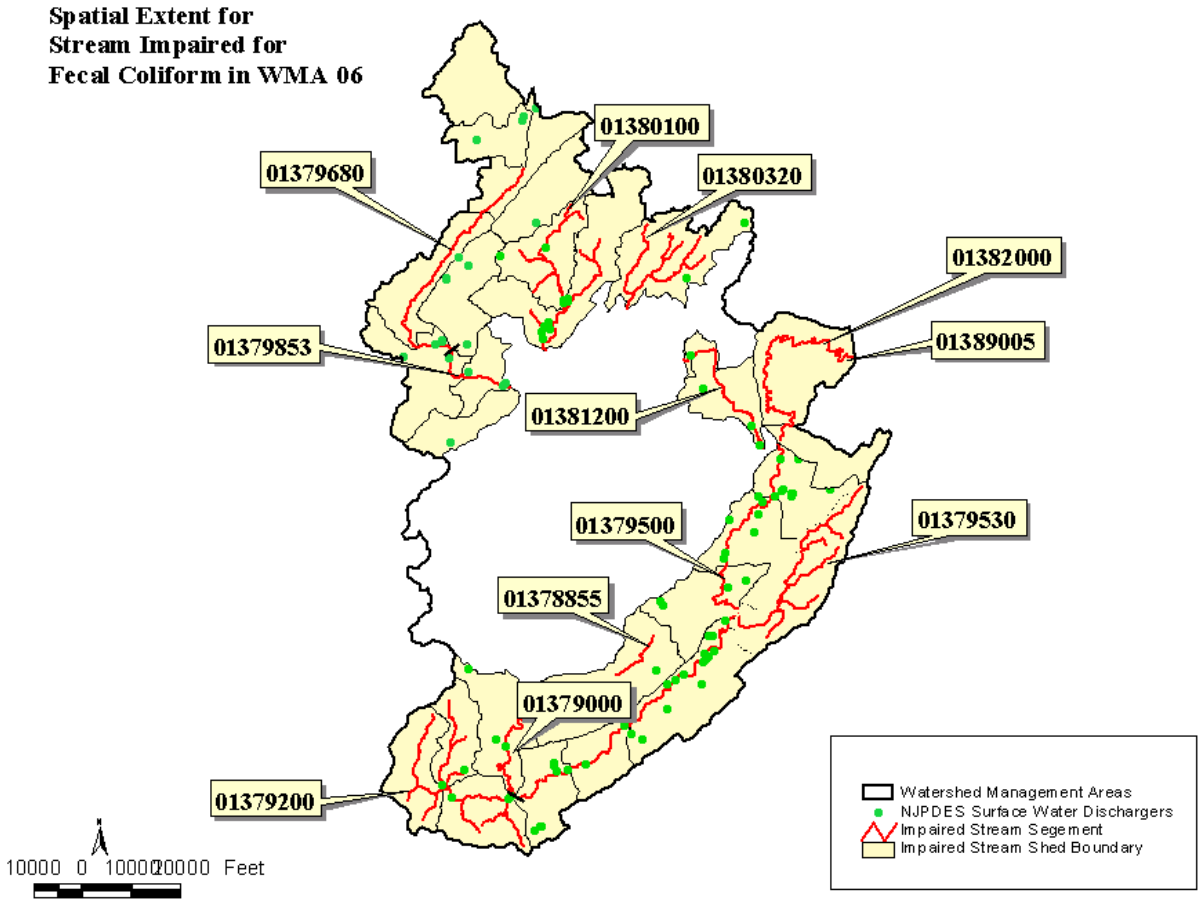
The **Rockaway River Watershed** has a drainage area of approximately 133 square miles and is approximately 37 miles long. The Rockaway River flows east to its confluence with the Whippany River at Pine Brook. Major tributaries include Stone Brook, Mill Brook, Beaver Brook, and Den Brook. The land use patterns in this area are complex and include vacant areas, parklands, residential development and industrial/commercial uses.

The **Whippany River Watershed** drains approximately 69 square miles and is located entirely within Morris County. The river is approximately 18 miles long and flows to the Passaic River. Two major tributaries are Black Brook and Troy Brook. The population is centered in Morristown, Parsippany-Troy Hills, Hanover Township and East Hanover Township.

Sublist 5 Waterbodies WMA 6

Eleven of the thirty-two TMDLs in this report are located in WMA 6. Included are segments in the Black Brook (#01378855), Dead River (#01379200), Passaic River (#01379000, #01379500, and #01382000), Rockaway River (#01379680, #01379853, and #01381200), Canoe Brook (#01379530), Beaver Brook (#01380100), and Stony Brook (#01380320). The spatial extent of each segment is identified in Figure 4. River miles, watershed size and land use\land cover by percent area associated with each segment are listed in Table 6.

Figure 4 Spatial extent of Sublist 5 segments for which TMDLs are being developed in WMA 6



Five segments, the Black Brook at Madison (#01378855), Passaic River near Millington (#01379000), Dead River near Millington (#01379200), the Passaic River near Catham (#01379500), and Canoe Brook near Summit (#01379530), comprise a large portion of the Passaic River headwater region and were grouped based on geographical similarities and bacterial geometric mean concentrations. Water quality from stations #01378855, #01379000, #01379200, #001379500, and #01379530 were used to assess the status and spatial extent of bacterial contamination. The combined length of the impaired stream segments is approximately 71.0 miles. A total of 204.8 stream miles are located within its watershed and will be included in the implementation plan. The total drainage area for this segment is approximately 66,759 acres, or 104.3 mi^2.

Table 6 River miles, Watershed size, and Anderson Landuse classification for eleven Sublist 5 segments, listed for fecal coliform, in WMA 6.

	Segment ID					
	1378855,1379000, 1379200,1379500, 1379530	**1379680 1379853**	**1380100**	**1380320**	**1381200**	**1382000**
Sublist 5 impaired river miles (miles)	71.0	15.1	16.9	13.1	6.8	14.9
Total river miles within watershed and included in the implementation plan (miles)	204.8	105.8	43.0	25.0	18.4	53.0
Watershed size (acres)	66759	39246	14528	7864	4861	11019
Landuse/Landcover						
Agriculture	2.23%	0.36%	0.16%	2.00%	1.44%	0.52%
Barren Land	0.90%	1.23%	2.66%	0.36%	1.62%	0.51%
Forest	19.21%	55.51%	63.14%	62.92%	13.07%	11.83%
Urban	51.57%	27.70%	17.22%	21.24%	66.79%	42.42%
Water	1.45%	3.75%	7.08%	4.03%	2.14%	3.00%
Wetlands	24.65%	11.44%	9.74%	9.46%	14.94%	41.72%

Rockaway River at Longwood Valley, (#01379680), and Rockaway River at Blackwell St. (#01379853) were grouped based on similarities in geography and bacterial contamination. Water quality from stations #01379680, #01379700 and #01379853 were used in assessing the spatial extent of bacterial contamination for these segments. The combined length of the impaired stream segments is approximately 15.1 miles in a watershed area of approximately 39246 acres or 61.3 mi^2. A total of 105.8 river miles are located within the watershed and will be included in the implementation plan.

Beaver Brook at Rockaway, segment #01380100, consists of the entire Beaver Brook to the confluence of Beaver Brook and the Rockaway River. Water quality from station #01380100 was used to assess the status and spatial extent of bacterial contamination. The impaired stream segment length is approximately 16.9 miles. A total of 43.0 stream miles are located within its watershed and will be included in the implementation plan. The total drainage area for this segment is approximately 14528 acres or 22.7 mi^2.

Segment #01380320, Stony Brook at Boonton, consists of the entire Stony Brook to the confluence of Stony Brook and the Rockaway River. Water quality from station #01380100 was used to assess the status and spatial extent of bacterial contamination. The impaired stream segment length is approximately 13.1 miles. A total of 25.0 stream miles are located within its watershed and will be included in the implementation plan. The total drainage area for this segment is approximately 7864 acres or 12.3 mi^2.

Segment #01381200, Rockaway River at Pine Brook, is located on the downstream portion of the Rockaway River between the outlet of the Boonton Reservoir and the confluence of the

Rockaway and the Whippany Rivers. Water quality from station #01381200 was used to assess the status and spatial extent of bacterial contamination. The impaired stream segment length is approximately 6.8 miles. A total of 18.4 stream miles are located within its watershed and will be included in the implementation plan. The total drainage area for this segment is approximately 4861 acres or 7.6 mi^2.

Segment #01382000, Passaic River at Two Bridges, is located on the Passaic River between the confluence of the Whippany and Passaic Rivers to the confluence of the Passaic and Pompton Rivers. Water quality from station #01382000 was used to assess the status and spatial extent of bacterial contamination. This segment was not grouped with other segments based on its relatively lower bacterial concentrations compared with those found in up and downstream on the Passaic River. The impaired stream segment length is approximately 14.9 miles in a drainage area of approximately 11019 acres or 17.2 mi^2. A total of 53.0 stream miles are located within its watershed and will be included in the implementation plan.

4.2. Data Sources

The Department's Geographic Information System (GIS) was used extensively to describe northeast watershed characteristics. In concert with USEPA's November 2001 listing guidance, the Department is using Reach File 3 (RF3) in the 2002 Integrated Report to represent rivers and streams. The following is general information regarding the data used to describe the watershed management area:

- Land use/Land cover information was taken from the 1995/1997 Land Use/Land cover Updated for New Jersey DEP, published 12/01/2000 by Office of Information Resources Management (OIRM), Bureau of Geographic Information and Analysis (BGIA), delineated by watershed management area.
- 2002 Assessed Rivers coverage, NJDEP, Watershed Assessment Group, unpublished coverage.
- County Boundaries: Published 11/01/1998 by the NJDEP, Office of Information Resources Management (OIRM), Bureau of Geographic Information and Analysis (BGIA), "NJDEP County Boundaries for the State of New Jersey." Online at: http://www.state.nj.us/dep/gis/digidownload/zips/statewide/stco.zip
- Detailed stream coverage (RF3) by County: Published 11/01/1998 by the NJDEP, Office of Information Resources Management (OIRM), Bureau of Geographic Information and Analysis (BGIA). "Hydrography of XXX County, New Jersey (1:24000)." Online at: http://www.state.nj.us/dep/gis/digidownload/zips/strm/
- NJDEP 14 Digit Hydrologic Unit Code delineations (DEPHUC14), published 4/5/2000 by Department of Environmental Protection (NJDEP), New Jersey Geological Survey (NJGS) Online at: http://www.state.nj.us/dep/gis/digidownload/zips/statewide/dephuc14.zip
- NJPDES Surface Water Discharges in New Jersey, (1:12,000), published 02/02/2002 by Division of Water Quality (DWQ), Bureau of Point Source Permitting - Region 1 (PSP-R1).

5.0 Applicable Water Quality Standards

5.1. New Jersey Surface Water Quality Standards for Fecal Coliform

As stated in N.J.A.C. 7:9B-1.14(c) of the New Jersey SWQS, the following are the criteria for freshwater fecal coliform:

> "Fecal coliform levels shall not exceed a geometric average of 200 CFU/100 ml nor should more than 10 percent of the total sample taken during any 30-day period exceed 400 CFU/100 ml in FW2 waters".

All of the waterbodies covered under these TMDLs have a FW1 or FW2 classification (NJAC 7:9B-1.12). The designated use, i.e. surface water uses, both existing and potential, that have been established by the Department for waters of the State, for all of the waterbodies in the Northeast Water Region is as stated below:

In all FW1 waters, the designated uses are:
1. Set aside for posterity to represent the natural aquatic environment and its associated biota;
2. Primary and secondary contact recreation;
3. Maintenance, migration and propagation of the natural and established aquatic biota; and
4. Any other reasonable uses.

In all FW2 waters, the designated uses are:
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.

5.2. Pathogen Indicators in New Jersey's Surface Water Quality Standards (SWQS)

A subset of total coliform, fecal coliform, originates from the intestines of warm-blooded animals. Therefore, because they do not include organisms found naturally in soils, fecal coliform is preferred over total coliform as a pathogen indicator. In 1986, USEPA published a document entitled *"Implementation Guidance for Ambient Water Quality Criteria for Bacteria – 1986"* that contained their recommendations for water quality criteria for bacteria to protect bathers from gastrointestinal illness in recreational waters. The water quality criteria established levels of indicator bacteria *Escherichia coli* (*E. coli*) for fresh recreational water and enterococci for fresh and marine recreational waters in lieu of fecal coliforms. Historically, the New Jersey has listed water bodies for exceedances of the fecal coliform criteria.

Therefore, the Department is obligated to develop TMDLs for Sublist 5 water bodies based upon fecal coliform, at least until New Jersey has the transition to *E. coli* and enterococci in the Department's SWQS and until sufficient data have been collected to either develop a TMDL or to support a proposal to move the waterbodies to one of the other four categories.

6.0 Source Assessment

In order to evaluate and characterize fecal coliform loadings in the waterbodies of interest in these TMDLs, and thus propose proper management responses, source assessments are warranted. Source assessments include identifying the types of sources and their relative contributions to fecal coliform loadings, in both time and space variables.

6.1. Assessment of Point Sources other than Stormwater

All point sources of fecal coliform other than stormwater for these TMDLs are listed in Appendix B. These point sources include all municipal wastewater treatment plants (Major and Minor Industrial discharges) as will as industrial treatment plants that also treat domestic wastewater (Major and Minor Industrial discharges that have limits for bacterial quality indicators in their permits). Municipal treatment plants and industrial treatment plants that may include domestic wastewater in their effluent are required to disinfect effluent prior to discharge and to meet surface water quality criteria for fecal coliform in their effluent. In addition, New Jersey's urface Water Quality Standards at N.J.A.C. 7:9B-1.(c)4 reads "No mixing zones shall be permitted for indicators of bacterial quality including, but not limited to, fecal coliforms and enterococci". This mixing zone policy is applicable to both municipal and industrial treatment plants.

Since POTWs and industrial treatment plants routinely achieve essentially complete disinfection (less than 20 CFU/100ml), the requirement to disinfect is, in effect, more stringent than the fecal coliform effluent criteria. The percent of the total point source contribution is an insignificant fraction of the total load. Consequently, these fecal coliform TMDLs will not impose any change in current practices for POTWs and industrial treatment plants and will not result in changes to existing effluent limits. The methodology used in this report is inappropriate for use in areas affected by combined sewer overflows (CSOs) or in areas influenced by tidal action. Therefore, stream segments falling into these two categories will be excluded from the discussion of TMDLs in this report.

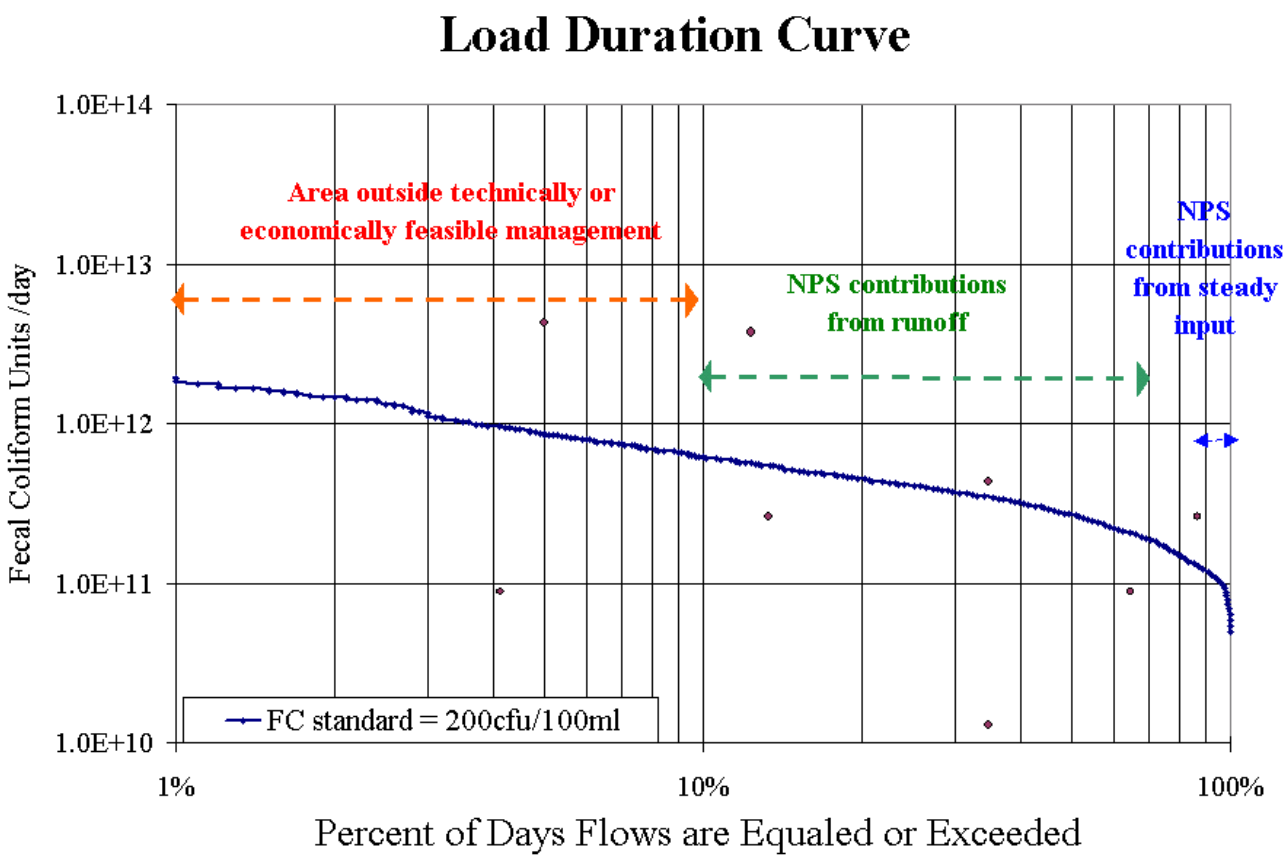
6.2. Assessment of Nonpoint and Stormwater Sources

Nonpoint and stormwater sources include storm-driven loads such as runoff from various land uses that transport fecal coliform from sources such as geese, farms, and domestic pets to the receiving water. Domestic pet waste, geese waste, as well as loading from storm water detention basins will be addressed by the Phase II MS4 program. Nonpoint sources also include steady-inputs from "illicit" sources such as failing sewage conveyance systems, sanitary sewer overflows (SSOs), and failing or inappropriately located septic systems. When

"illicit" sources are identified, appropriate enforcement measures will be taken to eliminate them.

When streamflow gauge information is available, a load duration curve (LDC) is useful in identifying and differentiating between storm-driven and steady-input sources. As an example, Figure 5 represents a LDC using the 200 CFU/100 ml criterion.

Figure 5 Example Load Duration Curve (LDC)



The load duration curve method is based on comparison of the frequency of a given flow event with its associated water quality load. A LDC can be developed using the following steps:

1. Plot the Flow Duration Curve, Flow vs. % of days flow exceeded.
2. Translate the flow-duration curve into a LDC by multiplying the water quality standard, the flow and a conversion factor, the result of this multiplication is the maximum allowable load associated with each flow
3. Graph the LDC, maximum allowable load vs. percent of time flow is equaled or exceeded
4. Water quality samples are converted to loads (sample water quality data multiplied by daily flow on the date of sample).
5. Plot the measured loads on the LDC.

Values that plot below the LDC represent samples below the concentration threshold whereas values that plot above represent samples that exceed the concentration threshold. Loads that plot above the curve and in the region between 85 and 100 percent of days in which flow is exceeded indicate a steady-input source contribution. Loads that plot in the region between 10 and 70 percent suggest the presence of storm-driven source contributions. A combination of both storm-driven and steady-input sources occurs in the transition zone between 70 and 85 percent. Loads that plot above 99 percent or below 10 percent represent values occurring during either extreme low or high flows conditions and are thus considered to be outside the region of technically and economically feasible management. In this report, LDCs are used only for TMDL implementation and not in calculating TMDLs.

7.0 Water Quality Analysis

Relating pathogen sources to in-stream concentrations 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 fecal coliform loads and concentrations can vary many orders of magnitude over short distances and over time at a single location, dynamic model calibrations can be very difficult to calibrate. Options available to control non-point sources of fecal coliform typically include measures such as goose management strategies, pooper-scooper ordinances, and septic system maintenance. However, the effectiveness of these control measures is not easily measured. Given these considerations, detailed water quality modeling may not provide adequate insight or guidance toward the development of implementation plans for fecal coliform reductions.

As described in EPA guidance, a TMDL identifies the loading capacity of a waterbody for a particular pollutant. EPA regulations define loading capacity as the greatest amount of loading that a waterbody can receive without violating water quality standards (40 C.F.R. 130.2). The loadings are required to be expressed as either mass-per-time, toxicity, or other appropriate measures (40 C.F.R. 130.2(i)). For these TMDLs, the load capacity is expressed as a concentration set to meet the state water quality standard. For bacteria, it is appropriate and justifiable to express the components of a TMDL as percent reduction based on concentration. The rationale for this approach is that:

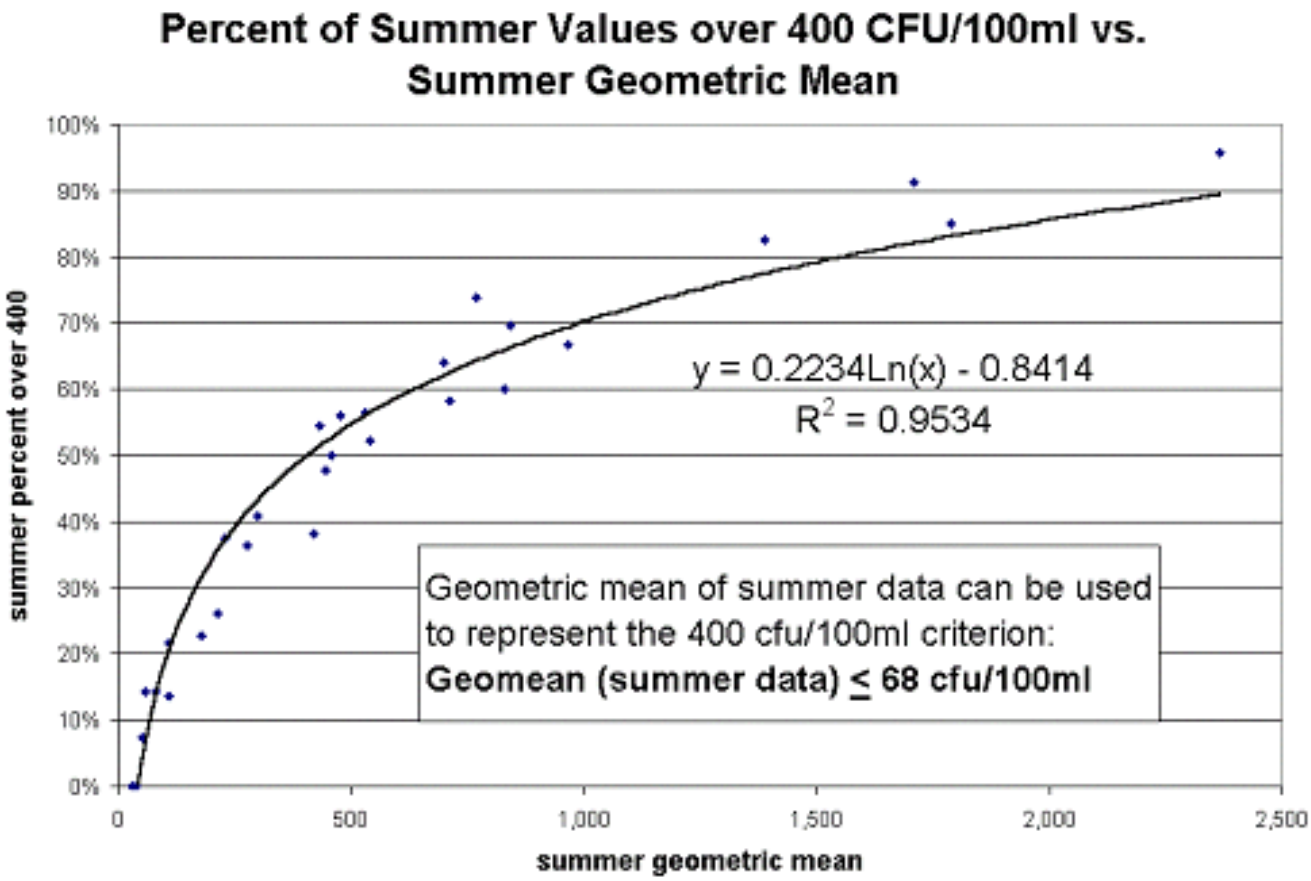
- expressing a bacteria TMDL in terms of concentration provides a direct link between existing water quality and the numeric target;
- using concentration in a bacteria TMDL is more relevant and consistent with the water quality standards, which apply for a range of flow and environmental conditions; and
- follow-up monitoring will compare concentrations to water quality standards.

Given the two criteria of 200 CFU/100 ml and 400 CFU/100 ml in FW2 waters, computations were necessary for both criteria and resulted in two percent reduction values. The higher

percent reduction value was applied in the TMDL so that both the 200 CFU/100 ml and 400 CFU/100 ml criteria were satisfied.

To satisfy the 200 CFU/100ml criteria, the geometric mean of all available data between water years 1994-2000 was compared to an adjusted target concentration. The adjusted target accounts for an explicit margin of safety and is equal to 200 minus the margin of safety. A calculation incorporating all available data is generally conservative since most samples are taken during the summer when fecal coliform is generally higher. A geometric mean of summer data was used to develop a percent reduction to satisfy the 400 CFU/100 ml criteria. A summer geometric mean can be used to represent the 400 criteria by regressing the percent over 400 CFU/100 ml against the geometric mean (Figure 6). Thus, each datapoint on Figure 6 represents all the data from one individual monitoring station. Sites with 20 or more summer data points were used to develop this regression, in order to make use of more significant values for percent exceedance. The resulting regression has an r-squared value of 0.9534. Solving for X when Y is equal to 10% yields a geometric mean threshold of 68 CFU/100ml. This means that, using summer data, a geometric mean of 68 can be used to represent the 400 CFU/100ml criterion. Since the geometric mean is a more reliable statistic than percentile when limited data are available, 68 CFU/100ml was used to represent the 400 CFU/100ml criterion for all sites. The inclusion of all data from summer months (May through September) to compare with the 30-day criterion is justified because summer represents the critical period when primary and secondary contact with water bodies is most prevalent. A more detailed justification for using summer data can be found in Section 7.1,"Seasonal Variation and Critical Conditions."

Figure 6 **Percent of summer values over 400 CFU/100ml as a function of summer geometric mean values**



$y = 0.2234\text{Ln}(x) - 0.8414$ Equation 1

$R^2 = 0.9534$

Geometric mean, and summer geometric mean, and percent reductions were determined at each location for both criteria using Equations 2 through 4. To satisfy the 200 CFU/100ml criteria, equations 2 and 3 were applied. Equations 2 and 4 were used in satisfying the 400 CFU/100ml criteria.

$$Geometric\,Mean\ for\ 200\,CFU\ criteria = \sqrt[n]{y_1 y_2 y_3 y_4 \ldots y_n}$$ Equation 2

where:
y = sample measurement
n = total number of samples

$$200\,CFU\ criteria\,Percent\,\text{Re}duction = \frac{(Geometric\,mean - (200 - e))}{Geometric\,mean} \times 100\%$$ Equation 3

$$400\,CFU\ criteria\,Percent\,\text{Re}duction = \frac{(Summer\,Geometric\,mean - (68 - e))}{Summer\,Geometric\,mean} \times 100\%$$ Equation 4

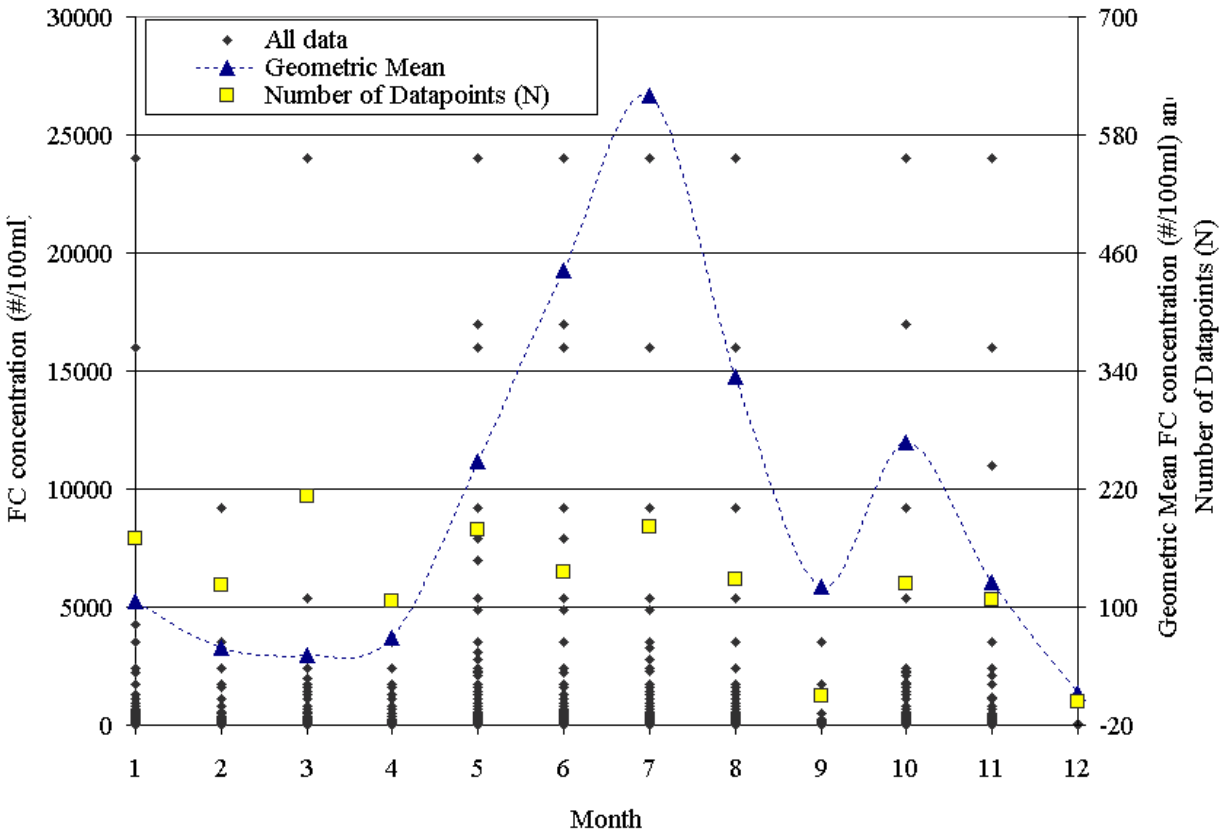
where:
e = (margin of safety)

This percent reduction can be applied to nonpoint and stormwater sources as a whole or be apportioned to categories of nonpoint and stormwater sources within the study area. The extent to which nonpoint and stormwater sources have been identified and the process by which they will become identified will vary by study area based on data availability, watershed size and complexity, and pollutant sources.

7.1. Seasonal Variation/Critical Conditions

These TMDLs will attain applicable surface water quality standards year round. The approach outlined in this paper is conservative given that in most cases fecal coliform data were collected during the summer months, a time when in-stream concentrations are typically the highest. This relationship is evidenced when calculating, on a monthly basis, the geometric mean of fecal coliform data collected statewide. Statewide fecal coliform geometric means during water years 1994-1997 were compared on a monthly basis and are shown in Figure 7. The 1994-1997 period was chosen for this analysis so that the significance of the number of individual datapoints for any given month was minimized. During the 1994-1997 period year-round sampling for fecal coliform was conducted by sampling four times throughout the year. Following 1997, the fecal coliform sampling protocol was changed to five samples during a 30-day period in the summer months. As evident in Figure 7, higher monthly geometric means are observed between May and September with the highest values occurring during mid-summer. This relationship is also evident when using the entire 1994-2002 dataset or datasets from individual water years. Given this relationship, summer is considered the critical period for violating fecal coliform SWQS and, as such, sampling during this period is considered adequate for meeting year round protections and designated uses.

Figure 7 Statewide monthly fecal coliform geometric means during water years 1994-1997 using USGS/NJDEP data.



7.2. 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 calculations, both an implicit and explicit Margin of Safety (MOS) are incorporated. Implicitly, a MOS is inherent in the estimates of current pollutant loadings, the targeted water quality goals (New Jersey's SWQS) and the allocations of loading. This was accomplished by taking conservative assumptions throughout the TMDL evaluation and development. Examples of some of the conservative assumptions include treating fecal coliform as a conservative substance, applying the fecal coliform criteria to stormwater sources, and applying the fecal coliform criteria to the stream during all weather conditions. Fecal coliforms decay in the environment (i.e. outside the fecal tract) relatively rapidly, yet this analysis assumes a linear relationship between fecal load and instream concentration. Furthermore, it is generally recognized that fecal contamination from stormwater poses much less risk of illness than fecal contamination from sewage or septic system effluent (Cabelli, 1989). Finally, much of the fecal coliform is flushed into the system during rainfall events and passes through the system in a short time. Primary and secondary recreation generally occur during dry periods.

An explicit MOS is provided by incorporating a confidence level multiplier associated with log-normal distributions in the calculation of the load reduction for both the 200 and 400 standards. Using this method, the 200 and 400 targets are reduced based on the number of data points and the variability within each data set. For these TMDLs, a confidence level of 90% was used in calculating the MOS. As a result, and as identified in Appendix C, the target value will be different for each stream segment or grouped segments. The explicit margin of safety is calculated using the following steps:

1- FC data (x) will transformed to Log form data (y),
2- the mean of the Log- transformed data (y) is determined, $\bar{y}$
3- Determine the standard deviation of the Log-transformed data, S_y using the following equation:

$$S_y = \sqrt{\frac{\sum_i (y_i - \bar{y})^2}{N-1}}$$

4- Determine the Geometric mean of the FC data (GM)
5- Determine the standard deviation of the mean (standard error of the mean), $s_{\bar{y}}$, using the following equation:

$$s_{\bar{y}} = \frac{s_y}{\sqrt{N}}$$

6- For the 200 standard ($x_{standard}$), $y_{standard}$ = Log(200)= 2.301, thus for a confidence level of 90%, the target value will be the lower confidence limit (n= -1.64), $y_{target} = y_{std} - n \cdot s_{\bar{y}}$, for example, the 200 criteria: $y_{target} = 2.301 - n^* s_{\bar{y}}$
7- The target value for x, $x_{target} = 10^{y\ target}$
8- The margin of safety (e) therefore will be $e = x_{standard} - x_{target}$
9- Finally, the load reduction = $\frac{GM - x_{target}}{GM} \cdot 100\%$, for example the 200 criteria will be defined as: $\frac{(GM - (200 - e))}{GM} \cdot 100\%$

   The 400 criteria would be defined as: $\frac{(GM - (68 - e))}{GM} \cdot 100\%$

8.0 TMDL Calculations

Because these TMDLs are calculated based on ambient water quality data, the allocations are provided in terms of percent reductions. In the same way, the loading capacity of each stream is expressed as a function of the current load:

$LC = (1 - PR) \times L_o$, where

LC = loading capacity for a particular stream;
PR = percent reduction as specified in Tables 7-10;

L_o = current load.

8.1. Wasteload Allocations and Load Allocations

For the reasons discussed previously, these TMDLs do not include WLAs for traditional point sources (POTWs, industrial, etc.). WLAs are hereby established for all NJPDES-regulated point sources (including NJPDES-regulated stormwater), while LAs are established for all stormwater sources that are not subject to NJPDES regulation, and for all nonpoint sources. Both WLAs and LAs are expressed as percentage reductions for particular stream segments.

Table 7 identifies the required percent reduction necessary for each stream segment or group of segments to meet the fecal coliform SWQS. The reductions reported in these tables include a margin of safety factor and represent the higher percent reduction (more stringent) required of the two criteria. Reductions that are required under each criteria are located in Appendix C. In all cases, the 400 CFU/100ml criteria was the more stringent of the two criteria, thus values reported in Table 7 were equal to the percent required to meet the 400 CFU/100ml criteria.

Table 7 TMDLs for fecal coliform-impaired stream segments in the Northeast Water Region as identified in Sublist 5 of the 2002 Integrated List of Waterbodies. The reductions reported in this table represent the higher, or more stringent, percent reduction required of the two fecal colifom criteria.

TMDL No.	WMA	Station Name/Waterbody	Sublist 5 Segment	Summer Geometric Mean CFU/100ml	MOS as a percent of the target conc.[1]	Percent Reduction (LA) without MOS	Percent Reduction (LA) with MOS	Wasteload Allocation (WLA) as a Percent Reduction, with MOS
1	3	Macopin River at Macopin Reservoir	01382450	59	46%	-16%	**37%**	**37%**
2	3	Wanaque River at Highland Avenue	01387010	208	53%	67%	**85%**	**85%**
3	3	Ramapo River near Mahwah	01387500	431	44%	84%	**91%**	**91%**

TMDL No.	WMA	Station Name/Waterbody	Sublist 5 Segment	Summer Geometric Mean CFU/100ml	MOS as a percent of the target conc.[1]	Percent Reduction (LA) without MOS	Percent Reduction (LA) with MOS	Wasteload Allocation (WLA) as a Percent Reduction, with MOS
4	4	West Branch Saddle River at Upper Saddle R.	01390445	1,144	30%	94%	**96%**	**96%**
5	4	Saddle River at Saddle River	01390500					
6	4	Saddle River at Ridgewood Ave at Ridgewood	01390900					
7	4	Hohokus Brook at Mouth at Paramus	01391100					
8	4	Saddle River at Rochelle Park	01391200					
9	4	Saddle River at Lodi	01391500					
10	4	Passaic R. below Pompton R. at Two Bridges	01389005	652	30%	90%	**93%**	**93%**
11	4	Passaic River at Little Falls	01389500					
12	4	Preakness Brook near Little Falls	01389080					
13	4	Peckman River at West Paterson	01389600					
14	4	Deepavaal Brook at Fairfield	01389138					
15	4	Diamond Brook at Fair Lawn	01389860	1,544	47%	96%	**98%**	**98%**
16	4	Goffle Brook at Hawthorne	01389850					
17	5	Hackensack River at River Vale	01377000	294	34%	77%	**85%**	**85%**
18	5	Musquapsink Brook at River Vale	01377499	709	54%	90%	**96%**	**96%**
19	5	Pascack Brook at Westwood	01377500					
20	5	Tenakill Brook at Cedar Lane at Closter	01378387	159	91%	57%	**96%**	**96%**
21	5	Coles Brook at Hackensack	01378560	1,093	68%	94%	**98%**	**98%**
22	6	Black Brook at Madison	01378855	1,370	29%	95%	**96%**	**96%**
23	6	Passaic River near Millington	01379000					
24	6	Dead River Near Millington	01379200					
25	6	Passaic River near Chatham	01379500					
26	6	Canoe Brook near Summit	01379530					
27	6	Rockaway River at Longwood Valley	01379680	373	54%	82%	**92%**	**92%**
28	6	Rockaway River at Blackwell Street	01379853					
29	6	Beaver Brook at Rockaway	01380100	362	43%	81%	**89%**	**89%**
30	6	Stony Brook at Boonton	01380320	214	32%	68%	**78%**	**78%**
31	6	Rockaway River at Pine Brook	01381200	571	28%	88%	**91%**	**91%**
32	6	Passaic River at Two Bridges	01382000	276	33%	75%	**83%**	**83%**

[1] MOS as a percent of target is equal to: $\frac{e}{200\,CFU/100ml}$ or $\frac{e}{68\,CFU/100ml}$ where "e" is defined as the MOS in Section 7.2

8.2. 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 at this time. The loading capacity of each stream is expressed as a function of the current load (Section 8.0), and both WLAs and LAs are expressed as percentage reductions for particular stream segments (Section 8.1). Therefore, the percent reductions from current levels must be attained in consideration of any new sources that may accompany future development.

9.0 Follow - up Monitoring

The NJDEP's primary surface water quality monitoring unit is the Office of Water Monitoring Management. In association with the Water Resources Division of the U.S. Geological Survey, the NJDEP have cooperatively operated the Ambient Stream Monitoring Network (ASMN) in New Jersey since the 1970s. The ASMN currently includes approximately 115 stations that are routinely monitored on a quarterly basis. Bacteria monitoring, as part of the ASMN network, are conducted five times during a consecutive 30-day summer period each year. The data from this network has been used to assess the quality of freshwater streams and percent load reductions. Although other units also perform monitoring functions, the ASMN will remain a principal source of FC monitoring.

10.0 Implementation

When bacterial sources are easily identifiable, measures outlined in section 10.2, Source Categories and Best Management Practices (BMPs), will be applied to reduce bacterial loading to meet SWQ standards. When bacterial sources are not easily identifiable, load duration curves will be used in conjunction with bacterial source tracking, if necessary, to identify pathogen sources.

Much of the stormwater discharged to the surface waters in question is discharged through "small municipal separate storm sewer systems" (small MS4s) that are proposed to be regulated under the Department's proposed Phase II NJPDES stormwater rules for the Municipal Stormwater Regulation Program. Under those proposed rules and associated draft general permits, nearly all municipalities (and various county, State, and other agencies) in the Northeast Region 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 small MS4, 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. The WLAs and LAs in Table 7 are not themselves "Additional Measures" under proposed N.J.A.C. 7:14A-25.6 or 25.8.

Sections 10.2 and 10.4 identify BMPs and monitoring measures that in some respects are in addition to the control measures required in these general permits. These BMPs and monitoring measures are also not "Additional Measures" under proposed N.J.A.C. 7:14A-25.6 or 25.8. However, the Department will seek to have these BMPs and monitoring measures implemented through means other than requirements in these general permits. Also, in the future, the Department may propose and adopt WQM plan amendments that identify one or more of these BMPs (or other BMPs) and monitoring measures as "Additional Measures" for some or all of the permittees under these general permits.

10.1. Load Duration Curve (LDC)

As explained in Section 6.2, a LDC can be a beneficial tool as a first step in identifying potential pathogen sources. LDCs for listed segments in the Northeast region are located in Appendix D. In each case, thirty (30) years of USGS gage flow data (water years 1970-2000), from the listed station, were used in generating the curve. When a recent 30-year period was not available at the listed station, an adjacent station was selected based on station correlation information in US Geological Survey Open File Report 81-1110 (USGS, 1982). When an adjacent station was used in the manner, flows were adjusted to the station of interest based on a ratio of watershed size. LDCs were not developed for stations in which a satisfactory correlation could not be found.

10.2. Source Categories and Best Management Practices

The TMDLs developed in this report were developed with the assistance of stakeholders in WMAs 3, 4, 5 and 6 as part of the Department's ongoing watershed management efforts. Through the creation of the watershed management planning process over the past several years, Public Advisory Committees (PACs) and Technical Advisory Committees (TACs) were created in all 20 WMAs. Whereas the PACs serve in an advisory capacity to the New Jersey Department of Environmental Protection, and examined and commented on a myriad of issues in the watersheds, the TACs were focused on the scientific, ecological, and engineering issues relevant to the mission of the PAC. The Department in collaboration with the Northeast TACs narrowed the scope of the primary sources of fecal contamination to the following:

Non-Human Sources of Fecal Coliform

- Canada geese
- Pet Waste
- Stormwater basins
- Direct stormwater discharges to waterbodies
- Farms, zoos and livestock

Human Sources of Fecal Coliform

- Malfunctioning or older improperly sized septic systems

- Failing sewage conveyance systems
- Improper garbage storage and disposal

10.3. Management Strategies

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, siting criteria, operating methods, or other alternatives" (USEPA, 1993). A combination of best management practices and direct remedies of illicit sources that are found through track-down monitoring will be used to implement these TMDLs.

10.3.1. Short-Term Management Strategies

Short-term management strategies include existing projects dubbed "Action Now" that are on the ground projects funded by the Department to address fecal and other NPS impairments to an impaired waterbody. These projects include stream bank restoration projects, ordinance development and catchbasin cleanouts. Funding sources include Clean Water Act 319(h) funds and State sources. Since 1998, 319(h) funds have provided approximately $3 million annually.Priority is given to funding projects that address TMDL implementation, development of stormwater management plans and projects that address impairment based on Sublist 5 listed waterbodies.

An example of such a project is a two-year project evaluating stormwater quality in a low-density residential area located in Hanover Township, Morris County. As part of the study, catch basin cleaning and public education and outreach were conducted. The outreach program targeted homeowners, landscapers and pet owners and was based on enhancing awareness and effecting behaviors that would reduce specific potential sources of NPS contaminants.

10.3.2. Long–Term Management Strategies

While short-term management measures will begin to reduce sources of fecal coliform in the Northeast Water Region, additional measures will be needed to verify and further reduce or eliminate these sources. Some of these measures may be implemented now, where resources are available and sources have already been identified as causing the fecal impairment. Both short-term and long-term management strategies that address fecal reduction related to these identified sources may be eligible for future Departmental funding.

Source Categories for Long-Term Management Strategies

1) Canada Geese

Geese are migratory birds that are protected by the Migratory Bird Treaty Act of 1918 and other Federal and State Laws. Resident Canada geese are those birds that do not migrate, but are 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 and other pest waterfowl have been identified as one of several primary sources of pathogen loading to impaired water bodies in the Northeast Region. Geese may produce up to 1½ pounds of fecal matter a day.

Canada Goose Damage Management Plan

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, solutions 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 exhaustedthe 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.

2) Stormwater Detention Basins and Impoundments

Stormwater detention basins may act as sources of fecal coliform due to the accumulation of geese and pet waste in basins. Under certain conditions, coliform will increase in numbers in basins. As a result, significant quantities of fecal coliform can be discharged during storm events.

Impoundments created by small dams across streams have been a measure commonly used for flood control by municipalities in New Jersey. In addition to flood control, the impoundments were often incorporated into public parks in order to provide recreational opportunities for residents. Many of the impoundments are surrounded by mowed turf areas, which in combination with open water serve as an ideal habitat for geese and an

attraction for pet walking. Specific management measures to reduce fecal coliform inputs to these waterbodies include:

- Development of Stormwater Management Plan
- Establishment of Riparian Buffers and "no mow" zones
- No feed ordinances for all waterfowl and wildlife and signage
- Retrofit of detention/retention basins to achieve water quality control
- Conduct regularly scheduled stormwater basin cleanout and maintenance, storm sewer inlet cleanouts and street sweeping programs

3) Pet Waste

Specific management measures to reduce pet waste include:

- Adoption of pet waste disposal i.e. pooper scooper ordinances
- Signage in parks and other public recreation areas
- Provide plastic bags dispensers in public recreation areas

4) Agricultural

Agricultural activities are potential sources of fecal coliform. Possible contributors are direct contributions from livestock permitted to traverse streams and stream corridors, manure management from feeding operations, 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 fecal coliform. Several programs are available to assist farmers in the development and implementation of conservation management plans and best management practices.

Agricultural Conservation Programs

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. There are a number of USDA farm programs currently addressing NPS pollution. A few of these 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 Wetland Reserve Program (WRP)** is designed to address the restoration of previously farmed wetlands. Easements are purchased for a 10-year, 30-year, or permanent duration.

- **Integrated Crop Management** is a best management practice designed to reduce the application of fertilizers and herbicides using soil samples and education to control nutrient and pesticide application to cropland.

- **The Farmland Preservation Program (FPP)** is designed to strengthen the agricultural industry and preserve important farmlands to enhance the economy and quality of life in the Garden State. Four different programs are available: The eight-year Program, where landowners voluntarily restrict non-agricultural development on their land for 8 years. In exchange, participants are eligible for cost-sharing grants for soil and water conservation projects, as well as other statutory benefits and protections. The Easement Purchase Program, where landowners sell the development rights on their land to the County Agriculture Development Board (CADB), non-profit organizations or directly to the State. Compensation for this sale is based upon the appraised value of the development rights on the land. The landowner retains ownership of the land and is eligible for cost-sharing grants for soil and water conservation projects and other benefits. The Fee Simple Program, where farms are acquired by the State Agriculture Development Committee (SADC, which is in but not of, the NJDA) based upon their fair market value and auction them off to private owners, after agricultural deed restrictions have been placed on the land. Lastly, there is the Easement Donation Program, where landowners donate their development easements to the SADC or the CADB. All of these programs have been in place since 1983.

- **The Soil & Water Conservation Cost-Sharing Program** is available to participants in a Farmland Preservation Program pursuant to the Agriculture Retention and Development Act. A Farmland Preservation Program (FPP) means any voluntary FPP or municipally approved FPP, the duration of which is at least 8 years, which has as its principal purpose as long term preservation of significant masses of reasonably contiguous agricultural land within agricultural development areas. The maintenance and support of increased agricultural production must be the first priority use of the land. Eligible practices include erosion control, animal waste control facilities, and water management practices. Cost sharing is provided for up to 50% of the cost to establish eligible practices.

- **The State Conservation Cost Share Program (CCSP)** is administered by the State Soil Conservation Committee and is integrated with the federal Environmental Quality Incentives Program (EQIP). It provides technical and financial assistance to producers for prevention and control of nonpoint sources of pollution. Cost sharing is provided for up to 75%, and in some cases 90% of the cost of installing approved conservation practices. Applications are approved based upon their environmental benefits and water quality enhancements.

- **Conservation Reserve Enhancement Program (CREP).** The New Jersey Departments of Environmental Protection and Agriculture, in partnership with the Farm Service Agency and Natural Resources Conservation Service, has recently submitted a proposal to the USDA to offer financial incentives for agricultural landowners to voluntarily implement conservation practices on agricultural lands. The NJ Conservation Reserve Enhancement Program (NJ CREP) will be part of the USDA's Conservation Reserve Program (CRP). 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. Following are some highlights of the New Jersey CREP proposal:

    - 30,000 acres of agricultural land are targeted for conservation, with 4,000 acres of agricultural land targeted for permanent conservation easement. Farmland enrolled but not permanently preserved will be under rental contract for 10-15 years
    - Conservation practices under the program are riparian buffers, filter strips, contour buffer strips, and grass waterways.
    - Water quality benefits of the program are expected to assist in achieving biologically healthy streams.
    - Permanent preservation of 4,000 acres of CREP lands will aid in reaching open space preservation goals.
    - The proposal is for a $100 million program representing a 3:1 Federal/State match, with New Jersey providing $23 million and USDA – Commodity Credit Corporation committing $77 million.

5) Stormwater Management

The Department has recently proposed Stormwater Management Rules and NJPDES Phase II Municipal Stormwater Regulation Rules that will establish standards and a regulatory program for stormwater management. Stormwater general permits issued by the Municipal Stormwater Regulation Program will address stormwater pollution

6) Malfunctioning and Older Improperly Sized Septic Systems; Illicit Connections of Domestic Sewage

Malfunctioning and older improperly sized septic systems contribute to fecal coliform loading in two ways: the system may fail hydraulically, where there is surface break out; or

hydrogeologically, under conditions when soils are inadequate to filter pathogens. Specific management measures include the implementation of the NJPDES Municipal Stormwater Regulation Program, Sanitary Surveys, Septic System Management Programs and future sewer service area designations for service to domestic treatment works.

Sanitary surveys are conducted in an effort to evaluate the water quality of natural surface waters and identify those components that affect water quality, including geographic factors and pollution sources. The focus of the sanitary survey is to identify nonpoint and stormwater source contribution of fecal coliform within the watershed. It is accomplished by sampling for various types of fecal indicators (fecal coliform, enterococcus, fecal streptococcus, *E. coli* and coliphage) during wet and dry weather conditions. Where potential problems with septic systems are identified, as described below, a trackdown study may be warranted. This could lead to an analysis of alternatives to address any identified inadequacies, such as rehabilitation of septic systems or connection to a sewage treatment system, as appropriate.

10.4. Potential Sources of Fecal Impairment to Impaired Water Bodies

In an effort to locate pathogen sources to streams listed in this report, each stream segment was walked and potential sources noted based on the source categories listed in Section 10.2. The information gathered during those site visits is listed below by their respective WMA. The below are not considered to be a list of comprehensive sources, rather they will be used in conjunction with additional site visits, LDCs, and as appropriate, bacterial source tracking to identify actual pathogen sources.

10.4.1. Watershed Management Area 3

Macopin River at Macopin Reservoir (Site ID #01382450)

Potential sources noted within this watershed include detention basins at the upper end of Echo Lake, stables (Echo Lake Stables) located on east Echo Lake Road near Echo Lake above Macopin Gorge, and potential septic source located on Route 23 (City of Newark).

Wanaque River at Highland Avenue (Site ID #01387010)

Canada Geese were observed at a number of locations within this watershed. These areas include: the Wanaque Athletic Fields, Lake Inez, Lower Twin Lake (large geese population), and Skyland Lake. Possible problem stormwater detention basins were noted specifically at Pompton Lakes, Lake Inez and Skyland Lake. Potential failing septics noted at Dupont Village and Wanaque; these areas in the process of being sewered. . Possible pet sources observed at Lower Twin Lake and Skyland Lake.

Ramapo River near Mahwah (Site ID #01387500)

Potential sources in failing septic systems located in Oakland. Almost all Oakland is on septic systems, many failing and solid rock below ~3-feet. Stormwater outfalls present where Masonicus Brook and Mahwah Rivers converge. Canada geese observed at Ramapo College atlethic fields, and other recreational fields. Horse farms located across from Ramapo College. Crystal Lake (bathing beach) has been closed several times due to high fecal concentrations.

10.4.2. Watershed Management Area 4

Passaic River below Pompton River at Two Bridges (Site ID #01389005)

This entire segment is highly developed with many stormwater outfalls, however, much of this area was developed prior to the practice of constructing detention basins. This area may benefit from stormwater management retrofits. Sources upstream on the Pompton River at Packanack Lake (Site ID #01388600) include potential failing septic systems in the Hoffman Grove section of Wayne (110 homes potential); open manure storage observed on Black Oak Ridge Road and Cross Road. Canada Geese observed at Wayne Municipal Park (Sheffield Fields), Packanack Lake Country Club, Pompton Lakes crossroads at golf driving range, Old MacDonald Park, Pequannock Park (directly above testing site), and Kehum Park.

Preakness Brook near Little Falls (Site ID #01389080)

Potential sources include: animal agriculture from Van Pien Dairy Farm, pet sources from Tintle Park, wildlife and geese sources from Preakness Golf Course, High School on Valley Road, High Mountain Golf Course, Wetland area,

Deepavaal Brook at Fairfield (Site ID #01389138)

Geese were observed at Mountain Ridge Golf Course and Green Brook Country Club.

Passaic River at Little Falls (Site ID #01389500)

Geese observed at the Passaic County Golf Course on River Road and island middle of Passaic River. Potential human source from a significant homeless population. Several stormwater pipes observed to discharge directly to the river.

Peckman River at West Paterson (Site ID #01389600)

Geese and wildlife were observed in several areas including: town parks, reservoir lands, golf course, and Essex County park. Other potential sources included pet waste from residential areas located adjacent to the river and stormwater pipes discharging directly to river north of the golf course.

Goffle Brook at Hawthorne (Site ID #01389850)

Site visit confirmed over 200 geese, 150 ring-billed and laughing gulls, 75 ducks and 100 pigeons, and pets at Goffle Brook Park. Potential source includes failing septic systems in upper reach.

Diamond Brook at Fair Lawn (Site ID #01389860)

Geese, wildlife, pet wildlife observed at the Passaic County Park System. Geese observed at the Vander Plat Park fields. Garbage, including disposable diapers, observed behind Pathmark on Hemlock Ave. Geese observed at Fair Lawn Memorial Cemetery.

WB Saddle River at Upper Saddle River (Site ID #01390445)

Stormwater, Geese, and wildlife noted as potential sources.

Saddle River at Ridgewood (Site ID #01390500)

Potential septic system impact from homes located directly beside the river on Old Stone Church Road. Gulls, cormorants (16) and over 80 geese observed at Otto C. Pehle Section of Saddle River Park. Pets, wildlife observed throughout the watershed and potential impact from Wild Duck Pond Park.

Ramsey Brook at Allendale (Site ID #01390900)

Wildlife (geese, deer, foxes, and dogs) observed at Crestwood Park. Geese and other wildlife observed at Apple Ridge golf course, Ramsey Country Club golf course, Lake Street at Ramsey, and Napolekao Pond. Potentially failing septics in Mahwah.

HoHoKus Brook at the mouth of the Saddle River, Paramus (Site ID #01391100)

Potential failing septic systems in HoHoKus and Wyckoff. Geese observed or apparent at Whites' Pond, Saddle River Park, Glen Rock Section (50 geese observed), Dunkerhook Park, and Wild Duck Pond. Dog walking observed at Saddle River Park, Glen Rock Section and Dunkerhook Park. Poultry farm observed and appears to be an enclosed operation

Saddle River at Fairlawn (Site ID #01391200)

Wildlife (150 geese, 75 seagulls, 25 doves) observed at Saddle River park, Wild Duck Pond area. No-feed signs posted (dog and waterfowl both), however, people observed still feeding waterfowl. At the Saddle River Park at Rochelle Park, no geese were observed but physical signs apparent and ducks appear to be fed. Geese observed at Bergen County Golf Courses and Ridgewood Country Club.

Saddle River at Lodi (Site ID #01391500)

Geese and pet walking observed at the Main St. Cemetery.

10.4.3. Watershed Management Area 5

Hackensack River at River Vale (Site ID #01377000)

Geese observed at Golf Course, Open Spaces, and County Park. Septic Systems in Old Tappan recently converted to sewers.

Musquapsink Brook at River Vale (Site ID #01377499)

Canada Geese observed at elementary school ballfields and nearby cemeteries. No septics are located in this area. Pumping from the Saddle River and discharging to the Musquapsink Brook represents a potential source of FC.

Pascack Brook at Westwood (Site ID #01377500)

No septics are located in this area. Potential sources included: Woodcliff Lake Reservoir, Corporate Parks in Montvale (source of geese droppings to Bear Brook which feeds into Pascack Brook), waste management transfer station, geese around the Woodcliff Lake, stormdrains discharge into Woodcliff Lake, and street sweeping materials from DPWs for Park Ridge, Hillsdale, and Westwood.

Tenakill Brook at Cedar Lane at Closter (Site ID #01378387)

Potential sources include: failing septics in Alpine, geese and waterfowl at Tenakill Middle School ballfields, Alpine Country Club, Tenafly Park, Demarest Nature Center, and Demarest Park/Duck Pond. The municipal park is located adjacent to Demarest Duck pond along Tenakill Brook and is subjected to geese and other waterfowl depositing droppings on turf areas within the park. Demarest Duck Pond is also the receiving body for stormwater outfalls that capture runoff from nearby roads, residential areas and commercial areas. Dredging of Demarest Duck Pond is slated for completion during 2003. Demarest Borough is committed to the shoreline restoration and nonpoint source improvement to the pond and park area and has sought additional funding to stabilize 1,600 linear feet of degraded shoreline around Demarest Duck Pond along Tenakill Brook with a 20 foot wide native vegetative buffer. The Environmental Commission has already implemented several small restoration projects along Tenakill Brook and is an active participant in the Department's Watershed process.

Coles Brook at Hackensack (Site ID #01378560)

No septics or agriculture are located in this watershed. Geese/Waterfowl, disposable diapers, and dog waste observed at Van Saun Park. Potential sources of pet waste include Oradell, River Edge, Paramus, and Emerson residential areas. Geese observed at the Emerson Golf Course, Paramus Middle School alongside Bkanky Brook (feeds into Coles Brook). Zoo observed, however, recently tied to sanitary sewer.

10.4.4. Watershed Management Area 6

Black Brook at Madison (Site ID #01378855)

The headwaters of this segment include the Fairmount Country Club where geese are a contributing factor. At Green Village Packing Company on Britten Road in Green Village, residents have reported that the company has, in recent years, dumped its animal wastes and scraps into local woods. Following complaints, the company has been shipping them out via truck. Recent complaints are that the trucks leak. Other potential sources include: Miele Kennel, Rolling Knolls Landfill, Britten Road, Chatham, and wildlife (deer and geese)

Passaic River Near Millington (Site ID #01379000)

This segment is directly adjacent to the Great Swamp Wildlife Refuge, thus wildlife are a potential source. Geese populations were observed at the following locations: AT&T Corporation grounds off Madisonville Road, Somerset County Environmental Education Center ponds, Southard Park, Basking Ridge Golf Course, northeast of the intersection of White Bridge Road and Carlton Road, at the Southwest corner of the intersection of White Bridge Road and Pleasant Plains Road, east of Pleasant Plains Road, north of White Bridge Road; east of the Passaic River, north of Stone House Road; and south of White Bridge Road, east of Pleasant Plains Road in Long Hill Township. The majority of this watershed contains urbanized landuse that has many detention basins, pets, and deer. Other potential sources include: Somerset County horse stables and horse trails through Lord Stirling Park and livestock populations at the southwest corner of the intersection of White Bridge Road and Carlton Road; east of the Passaic River, north of Stone House Road; and east of Pleasant Plains Road between White Bridge Road and Sherwood Lane.

Dead River Near Millington (Site ID #01379200)

Potential sources in this watershed include: Geese (New Jersey National Golf Course, Pleasant Valley road near King George Road where a large geese population of approximately 1000 was observed), pets, livestock and pastures present.

Passaic River Near Chatham (Site ID #01379500)

The following potential sources in this watershed include: geese (at Canoe Brook Country Club, Brook Lake Country Club and Cedar Ridge Country Club), wildlife, failing septics, pets, detention basins, and landfills (Bradley Loren Landfill, Florham Park Borough Waste Landfill, Vitto Marchetto Sanitary Landfill, Passaic Township Sanitary Landfill)

Canoe Brook Near Summit (Site ID #01379530)

Geese are suspected at Essex Fells Country Club, Crestmont Country Club, East Orange Golf Club and Summit Municipal Golf Course. Wildlife, especially deer, and pets are also thought to contribute a bacteria load.

Rockaway River at Longwood Valley (Site ID #01379680)

Wildlife and failing septics noted as potential sources.

Rockaway River at Blackwell Street (Site ID #01379853)

Potential sources include Hurd Park (goose population, no riparian buffer), and landfills.

Beaver Brook near Rockaway (Site ID #01380100)

This watershed contains several lake communites; many of which are on septic systems. Thus the potential for failing septics exist throughout the watershed. A portion of this watershed is designated as wildlife management area or reservoir protection area, thus, wildlife contribution is a potential. Geese observed at Rockaway Township recreational field located off of Old Beach Glen.

Stony Brook at Boonton (Site ID #01380320)

Canada geese observed at the picnic area of Pyramid Mountain Natural Historic Area, and at Rockaway Valley athletic fields off of Rockaway Valley Road, in Caterbury, and on Hill Road. Livestock operations are located off of Hill Road abutting a tributary to the impaired segment, near intersection of Kingsland and Rockaway Valley, and at intersection of Birchwood and Valley.

Rockaway River at Pine Brook (Site ID #01381200)

Potential sources include: Sharkey Landfill, Ecology Lake Club Sanitary Land Fill, Knoll East County Club Golf Course, wildlife, and geese.

Passaic River at Two Bridges (Site ID #01382000)

Wildlife and leaking septics noted as potential sources.

10.5. Pathogen Indicators and Bacterial 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 than fecal coliform (USEPA, 2001). 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 10-15 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.

BST methods have already been successfully employed at the NJDEP in the past decade. Since 1988, the Department's Bureau of Marine Water Monitoring 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, MAR and DNA fingerprinting analyses of *E. coli* are underway in the Manasquan estuary to identify potential pathogen sources (Palladino and Tiedemann, 2002). These studies along with additional sampling within the watershed will be used to implement the necessary percent load reduction.

10.6. Reasonable Assurance

With the implementation of follow-up monitoring, source identification and source reduction, the Department is reasonably assured that New Jersey's Surface Water Quality Standards will be attained for fecal coliform. Activities directed in the watersheds to reduce fecal coliform loading shall include options, included but not limited to education projects that teach best management practices, approval of projects funded by CWA Section 319 Nonpoint Source (NPS) Grants, recommendations for municipal ordinances regarding feeding of wildlife and pooper-scooper laws, and stormwater control measures.

The fecal coliform reductions proposed in these TMDLs assume that existing NJPDES permitted municipal facilities will continue to meet New Jersey's Surface Water Quality Standard requirements for disinfection. Any future facility will be required to meet water quality standards for disinfection.

11.0 Public Participation

The Water Quality Management Planning Rules NJAC 7:15-7.2 require 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. Accordingly the Department shall propose each TMDL as an amendment to the appropriate areawide water quality management plan. As part of the public participation process for the development and implementation of the TMDLs for fecal coliform in the Northeast Water Region, the NJDEPs, Division of Watershed Management, Northeast Bureau worked collaboratively with a series of stakeholder groups throughout New Jersey as part of the Department's ongoing watershed management efforts.

The Department's watershed management process was designed to be a comprehensive stakeholder driven process that is representative of members from each major stakeholder group (agricultural, business and industry, academia, county and municipal officials, commerce and industry, purveyors and dischargers, and environmental groups). As stated previously, through the creation of this watershed management planning process over the past several years Public Advisory Committees (PACs) and Technical Advisory Committees (TACs) were created in all 20 WMAs. Whereas the PACs serve in an advisory capacity to the Department, and examined and commented on a myriad of issues in the watersheds, the TACs were focused on scientific, ecological, and engineering issues relevant to the mission of the PAC.

The Northeast Bureau discussed with the WMA 3, WMA 4, WMA 5 and WMA 6 TAC members the Department's TMDL process through a series of presentations and discussions that culminated in the development of the 32 TMDLs for Streams Impaired by Fecal Coliform in the Northeast Water Region. The below paragraphs outline public involvement.

- Integrated Listing Methodology presentations were made by the Northeast Bureau within the DWM to the Northeast TACs throughout the month June; requesting that they review the Integrated List and submit comments to the Department by the September deadline. Presentations were made to WMA 5 TAC on June 18, 2002; WMA 6 TAC on June 20, 2002; WMA 3 TAC on June 21, 2002; and WMA 4 TAC on June 27, 2002.
- Expedited Fecal Coliform and Lake TMDL presentations were given at the September TAC meetings. The finalized Sublist 5 list was also disseminated. The TACs were briefed about the executed Memorandum of Agreement between the Department and EPA Region 2 with the imminent timeline. The TACs were asked to review sites and think about sources for discussion at the October TAC meetings at which time the Northeast Bureau would bring maps with municipalities and impaired stream segments and other features to facilitate the conversation.
- At the October TAC meetings (WMA 5: October 15, 2002; WMA 3 October 19, 2002; WMA 4 October 24, 2002 and WMA 6 October 28, 2002) TAC members were asked to identify based on their local knowledge potential sources of impairment. Draft copies of the Northeast Fecal TMDL report were distributed for informational purposes only. TAC members were advised that the formal comment period would be during the New Jersey Register Notice, but that the Department was interested in their input on policy issues affecting the development of the TMDL.
- At the November and December TAC meetings, the draft Fecal TMDL Report was distributed for informal comments prior to the NJR Notice.

Additional public participation and input was received through the NJ EcoComplex. The Department contracted with Rutgers NJ EcoComplex (NJEC) in July 2001. The role of NJEC is to provide comments on the Department's management strategies, including those related to the development of TMDL values. NJEC consists of a review panel of New Jersey University professors who provide a review of the technical approaches developed by the Department. The New Jersey Statewide Protocol for Developing Fecal TMDLs was presented to NJEC on August 7, 2002 and was subsequently reviewed and approved. The statewide approach was also presented the Passaic TMDL Workgroup in May 2002 for their input and approval. The New Jersey's Statewide Protocol for Developing Lake and Fecal TMDLs was presented by the Northeast Bureau at the SETAC Fall Workshop on September 13, 2002 and met with their approval.

11.1. AmeriCorps Participation

AmeriCorps is a national service initiative that was started in 1993 and is the domestic Peace Corps. The New Jersey Watershed Ambassadors Program is a community-oriented AmeriCorps environmental program designed to raise awareness about watershed issues in New Jersey. Through this program, AmeriCorps members are placed in watershed management areas across the state to serve their local communities. Watershed Ambassadors monitor the rivers of New Jersey through River Assessment Teams (RATs) and Biological Assessment Teams (BATs) volunteer monitoring programs.

Representatives from the Department in conjunction with the Watershed Ambassadors conducted RATs surveys on each of the impaired segments. These visual assessments were conducted from October to December 2002.

11.2. Public Participation Process

In accordance with N.J.A.C. 7:15–7.2(g), these TMDLs are hereby proposed by the Department as an amendment to the Northeast Water Quality Management Plan. N.J.A.C. 7:15-3.4(g)5 states that when the Department proposes to amend the areawide plan on its own initiative, the Department shall give public notice by publication in a newspaper of general circulation in the planning area, shall send copies of the public notice to the applicable designated planning agency, if any, and may hold a public hearing or request written statements of consent as if the Department were an applicant. The public notice shall also be published in the New Jersey Register.

Notice of these TMDLs was published January 21, 2003 pursuant to the above noted Administrative Code, in order to provide the public an opportunity to review the TMDLs and submit comments. The Department has determined that due to the level of interest in these TMDLs, a public hearing will be held. Public notice of the hearing, provided at least 30 days before the hearing, was published in the New Jersey Register and in two newspapers of general circulation and will be mailed to the applicable designated planning agency, if any, and to each party, if any, who was requested to issue written statement of consents for the amendment.

All comments received during the public notice period and at any public hearings will become part of the record for these TMDLs. All comments will be considered in the establishment of these TMDLs and the ultimate adoption of these TMDLs. When the Department takes final agency action to establish these TMDLs, the final decision and supporting documentation will be sent to U.S.E.P.A. Region 2 for review and approval pursuant to 303(d) of the Clean Water Act (33 U.S.C. 1313(d)) and 40 CFR 130.7.

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Appendix A: Explanation of stream segments in Sublist 5 of the *2002 Integrated List of Waterbodies* for which TMDLs will not be developed in this report.

Data to support removing River Segments from List 5 to List 1 for Fecal Coliform.

- Pequannock River at Macopin Intake Dam, Station #01382500

Re-assessments of data from station #01382500, the Pequannock River at Macopin Intake Dam, indicate that the water quality standards are met at this location. Measurements taken between 2/22/1994 and 7/17/00 at Station #01382500, show a geometric mean of 34 CFU/100 ml, and that 7.8% of values are over 400 CFU/100ml.

River segments to be moved from Sublist 5 to Sublist 3 for fecal coliform.

- Wanaque River at Wanaque, #01387000;
- Hackensack River at New Milford, #01378500

Two segments listed on Sublist 5, station #01387000, the Wanaque River at Wanaque (WMA 3), and station #01378500 the Hackensack River at New Milford (WMA 5), were included on Sublist 5 based on their listings on previous 303(d) lists with no recent data to assess their current attainment status. Therefore, TMDLs will not be developed for these locations until and unless recent data indicated violations of the surface water quality standards.

River segments to be moved from Sublist 5 to Sublist 4 for fecal coliform.

- Whippany River at Morristown, #01381500;
- Whippany River near Pine Brook, #01381800

Two segments, #01381500, the Whippany River at Morristown, and #01381800, the Whippany River near Pine Brook, were included as part of the Whippany River Watershed Fecal Coliform TMDL adopted on 4/16/2000 and published in the New Jersey Register on 6/5/2000. Upon adoption of this TMDL Report, the Department will remove these two waterbodies for fecal coliform from Sublist 5 to move them to Sublist 4 as identified in the below table.

Sublist 5 river segments listed for fecal coliform for which TMDLs will not be developed in this report.

- Passaic River at Elmwood Park, #01389880

The Passaic River at Elmwood Park, segment #01389880, is located in an area affected by combined sewer overflows (CSOs). CSOs are sewage systems that use a single pipe to transport both stormwater runoff from rainstorms and sewage from households, businesses

and industries to sewage treatment plants. During dry weather, combined sewers send all wastewater to the STPs. During wet weather, stormwater quickly fills the combined sewers, which carry both sanitary sewage and runoff from streets, parking lots, and rooftops. The overflows carry bacteria from the untreated sewage as well as other pollutants in the stormwater. Additional potential FC sources were identified during a site visit on October 24, 2002 and include geese (at park on River Road across from High School), homeless populations, and dog pounds/shelters.

The methodology employed in this report is not appropriate for use in areas affected CSOs, thus, this stream segment will be addressed with a separate management approach.

List of Sublist 5 segments to be moved to Categories 1, 3 or 4 based upon reassessment of data, the need for current data, or the prior completion of a TMDL report.

WMA	Station Name/Waterbody	Site ID	New Sublist Listing	Explanation
03	Pequannock River at Macopin Intake Dam	01382500	Sublist 1	Re-assessment shows non-impairment
03	Wanaque River at Wanaque	01387000	Sublist 3	Updated monitoring needed
04	Passaic River at Elmwood Park	01389880	No change	CSO influence
05	Hackensack River at New Milford	01378500	Sublist 3	Updated monitoring needed
06	Whippany River at Morristown	01381500	Sublist 4	TMDL completed in 1999
06	Whippany River near Pine Brook	01381800	Sublist 4	TMDL completed in 1999

Appendix B: Municipal POTWs Located in the TMDLs' Project Areas

WMA	Station #	NJPDES	Facility Name	Discharge Type	Receiving waterbody
3	1387500	NJ0027774.001A	Oakland Boro - Oakwood Knolls	MMI	Ramapo River via storm sewer
3	1387500	NJ0080811.001A	Oakland Twp - Riverbend	MMI	Ramapo River
3	1387500	NJ0021253.001A	Ramapo BOE - Indian High	MMI	Pond Creek (Ramapo River)
3	1387500	NJ0053112.001A	Oakland Boro - Chapel Hill Estates	MMI	Ramapo River via pond and storm sewer
3	1387500	NJ0021342.001A	Oakland Boro Skyview-Highbrook STP	MMI	Caille Lk via unnamed tributary & storm sewer
3	1387500	NJ0021946.001A	US Army - Nike Base	MMI	Darlington Brook via unnamed tributary
3	1387500	NJ0030384.001A	Oakland BOE - Manito Ave	MMI	Caille Lake via unnamed tributary and storm sewer
3	1387500	NJ0030384.001V	Oakland BOE - Manito Ave	MMI	Caille Lake via unnamed tributary and storm sewer
4	1389600	NJ0025330.001A	Cedar Grove Twp STP	MMJ	Peckman River
4	1389600	NJ0024490.004A	Verona Twp	MMJ	Peckman River
4	1389600	NJ0021687.001A	Essex County Hospital	MMJ	Peckman River
4	1389080	NJ0028002.001A	Wayne Twp - Mountain View	MMJ	Singac Brook (Preakness)
4	1389080	NJ0021261.001A	NJDHS-NJ Development Center	MMI	Passaic River
6	1379200	NJ0022845.001A	Harrison Brook STP	MMJ	Dead River
6	1379500	NJ0020427.001A	Caldwell Boro STP	MMJ	Passaic River via unnamed tributary
6	1379500	NJ0024511.001A	Livingston Twp	MMJ	Passaic River
6	1379500	NJ0025518.001A	Florham Park SA	MMJ	Passaic River
6	1379500	NJ0024937.001A	Molitor Water Pollution	MMJ	Passaic River
6	1379500	NJ0021636.001A	New Providence Boro	MMJ	Passaic River
6	1379500	NJ0024937.002A	Molitor Water Pollution	MMJ	Passaic River
6	1379500	NJ0027961.001A	Berkeley Heights	MMJ	Passaic River
6	1379500	NJ0020427.SL3A	Caldwell Boro STP	MMJ	Sludge Application
6	1379500	NJ0020427.SL3B	Caldwell Boro STP	MMJ	Sludge Application
6	1379500	NJ0020427.SL3M	Caldwell Boro STP	MMJ	Sludge Application
6	1381200	NJ0022349.001A	Rockaway Valley SA	MMJ	Rockaway River
6	1381200	NJ0024970.001A	Parsippany-Troy Hills SA	MMJ	Whippany River
6	1378855	NJ0020290.001A	Chatham Township - Main	MMI	Black Brook
6	1379200	NJ0021083.001A	Veterans Adm Medical Center	MMI	Harrisons Brook via unnamed tributary
6	1379200	NJ0022497.001A	Warren Twp SA - Stage 4	MMI	Dead River
6	1379200	NJ0050369.001A	Warren Twp SA - Stage 5	MMI	Dead River
6	1379500	NJ0020281.001A	Chatham Hill STP	MMI	Passaic River
6	1379500	NJ0052256.001A	Chatham Township - Chatham Glen	MMI	Passaic River

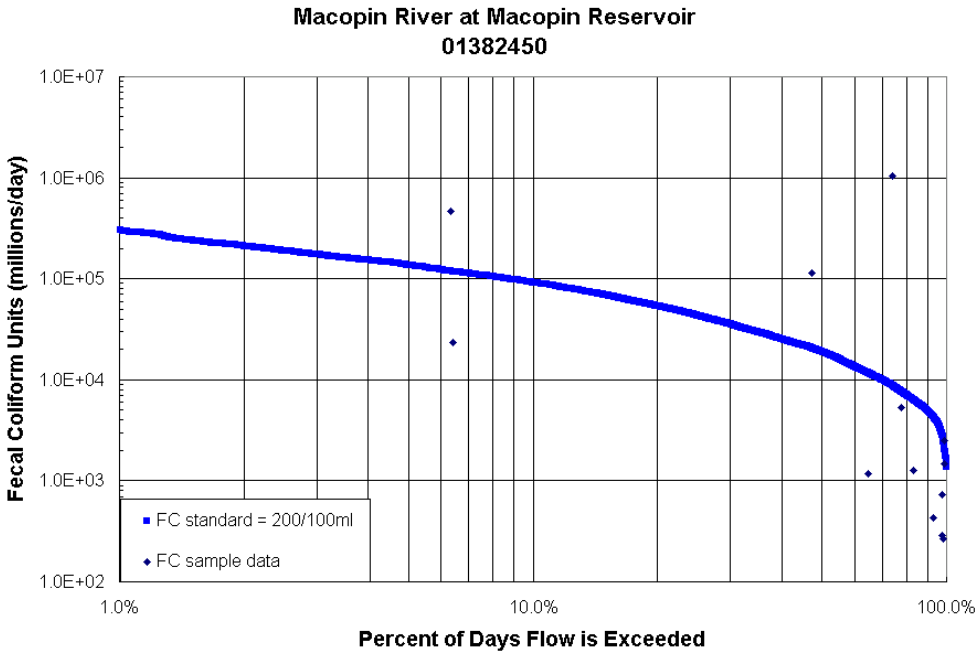
6	1379500	NJ0022489.001A	Warren Twp SA - Stage 1 & 2	MMI	Passaic River
6	1379500	NJ0024465.001A	Long Hill Twp STP - Stirling Hills	MMI	Passaic River
6	1379500	NJ0021938.001A	US Army - Nike Base	MMI	Passaic River
6	1380320	NJ0022276.001A	Stonybrook School	MMI	Untermeyer Lake via storm sewer
6	1379680	NJ0021091.001A	Jefferson Twp High - Middle School	MMI	Edison Brook
6	1379680	NJ0026867.001A	Jefferson Twp - White Rock	MMI	Mitt Pond (Russia Brook)
6	1379853	NJ0026603.001A	Randolph Twp BOE - High School	MMI	Mill Brook via unnamed tributary
6	1379853	NJ0032808.001A	Rockaway Townsquare Mall	MMI	Green Pond Brook

Appendix C: TMDL Calculations

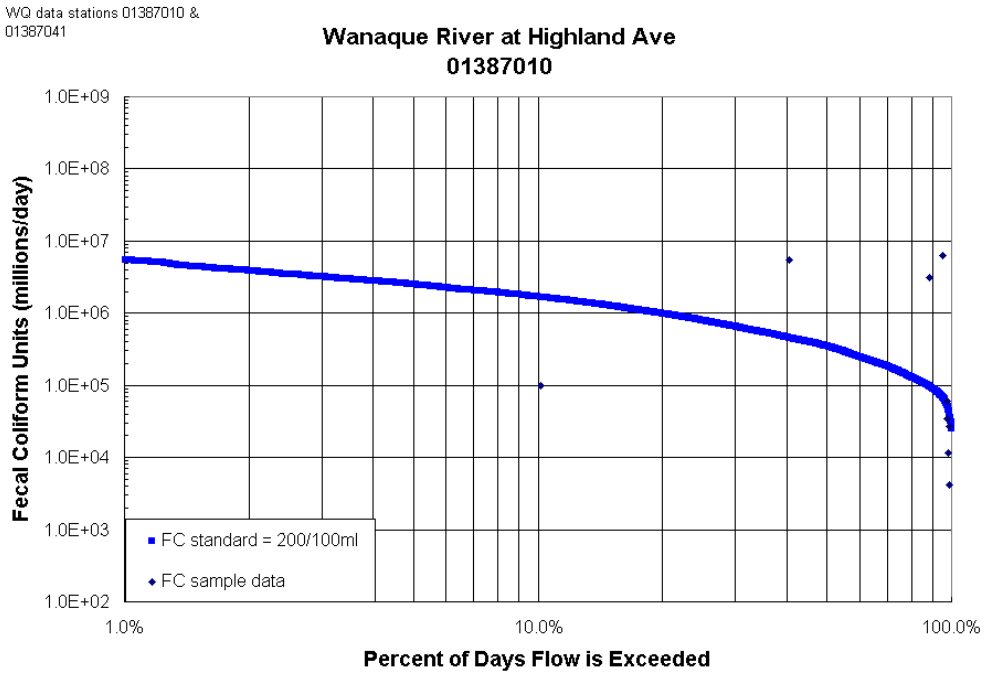
WMA	Station Names	303(d) Category 5 Segments	Water Quality Stations	Load Allocation (LA) and Margin of Safety (MOS)								Wasteload Allocation (WLA)
				200 FC/100ml Standard				400 FC/100ml Standard				
				Geometric mean CFU/100ml	MOS as a percent of the target concentration	Percent reduction without MOS	Percent reduction with MOS	Summer geometric mean CFU/100ml	MOS as a percent of the target concentration	Percent reduction without MOS	Percent reduction with MOS	
3	Macopin R at Echo Lake, Macopin R at Macopin Reservoir	01382450	01382410, 01382450	59	46%	-240%	-85%	59	46%	-16%	37%	37%
3	Wanaque R at Highland Avenue, Wanaque R at Pompton Lakes	01387010	01387010, 01387041	160	53%	-25%	42%	208	53%	67%	85%	85%
3	Ramapo R near Mahwah	01387500	01387500	291	44%	31%	61%	431	44%	84%	91%	91%
4	West Branch Saddle R at Upper Saddle River, Saddle R at Saddle River, Saddle R at Ridgewood Ave, Saddle R at Grove St., Ramsey Bk at Allendale, Hohokus Bk at Paramus, Saddle R at Rochelle Park, and Saddle R at Lodi	01390445, 01390500, 01390900, 01391100, 01391200, 01391500	01390445, 01390470, 01390510, 01390518, 01390900, 01391100, 01391490, 01391500	1,157	30%	83%	88%	1,144	30%	94%	96%	96%
4	Passaic R below Pompton R at Two Bridges, Passaic R at Little Falls, Preakness Bk, near Little Falls, Peckman R at W. Patterson, and Deepavaal Bk at Fairfield	01389005, 01389500, 01389080, 01389600, 01389138	01389500, 01389080, 01389600, 01389138	583	30%	66%	76%	652	30%	90%	93%	93%
4	Goffle Bk at Hawthorne, Diamond Bk at Fair Lawn	01389850, 01389860	01389850, 01389860	1,515	47%	87%	93%	1,544	47%	96%	98%	98%

WMA	Station Names	303(d) Category 5 Segments	Water Quality Stations	Load Allocation (LA) and Margin of Safety (MOS)								Wasteload Allocation (WLA)
				200 FC/100ml Standard				400 FC/100ml Standard				
				Geometric mean CFU/100ml	MOS as a percent of the target concentration	Percent reduction without MOS	Percent reduction with MOS	Summer geometric mean CFU/100ml	MOS as a percent of the target concentration	Percent reduction without MOS	Percent reduction with MOS	
5	Hackensack R. at Rivervale	01377000	01377000, 01376970	248	34%	19%	46%	294	34%	77%	85%	85%
5	Pascack Br at Westwood and Musquapsink Br at Rivervale	01377499, 01377500	01377499, 01377500	709	54%	72%	87%	709	54%	90%	96%	96%
5	Tenakill Br at Cedar Lane at Closter	01378387	01378387	159	91%	-26%	88%	159	91%	57%	96%	96%
5	Coles Br at Hackensack	01378560	01378560	1,093	68%	82%	94%	1,093	68%	94%	98%	98%
6	Black Brook at Madison, Passaic R nr Millington, Dead R nr Millington, Canoe Brook nr Summit, Passaic R nr Catham	01378855, 01379000, 01379200, 01379530, 01379500	01378855, 01379000, 01379200, 01379530, 01379500	675	29%	70%	79%	1,370	29%	95%	96%	96%
6	Rockaway R at Longwood Valley, Rockaway R at Berkshire Valley, Rockaway R at Blackwell St.	01379680, 01379853	01379680, 01379700, 01379853	253	54%	21%	64%	373	54%	82%	92%	92%
6	Beaver Brook at Rockaway	01380100	01380100	362	43%	45%	68%	362	43%	81%	89%	89%
6	Stony Brook at Boonton	01380320	01380320	214	32%	7%	37%	214	32%	68%	78%	78%
6	Rockaway R at Pine Brook	01381200	01381200	281	28%	29%	49%	571	28%	88%	91%	91%
6	Passaic R at Two Bridges	01382000	01382000	227	33%	12%	41%	276	33%	75%	83%	83%

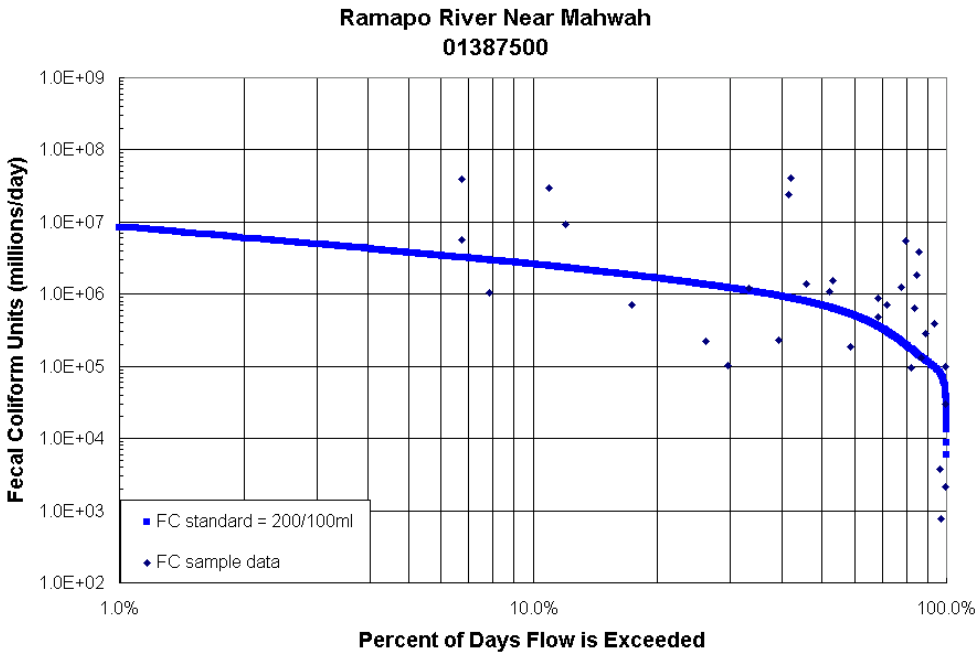
Appendix D: Load Duration Curves for each listed waterbody



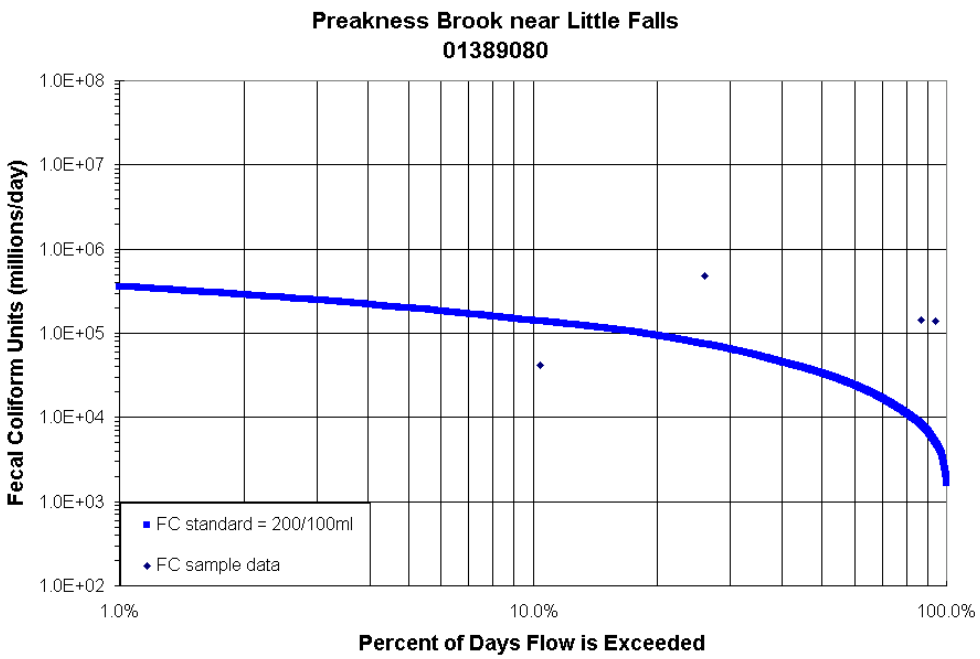
Load Duration Curve for Macopin River at Macopin Reservoir. Fecal coliform data from USGS station # 01382450 during the period 10/1997 through 8/2000. Water years 1970-2000 from USGS station # 01388500 (Pompton River at Pompton Plains NJ) were used in generating the FC standard curve.



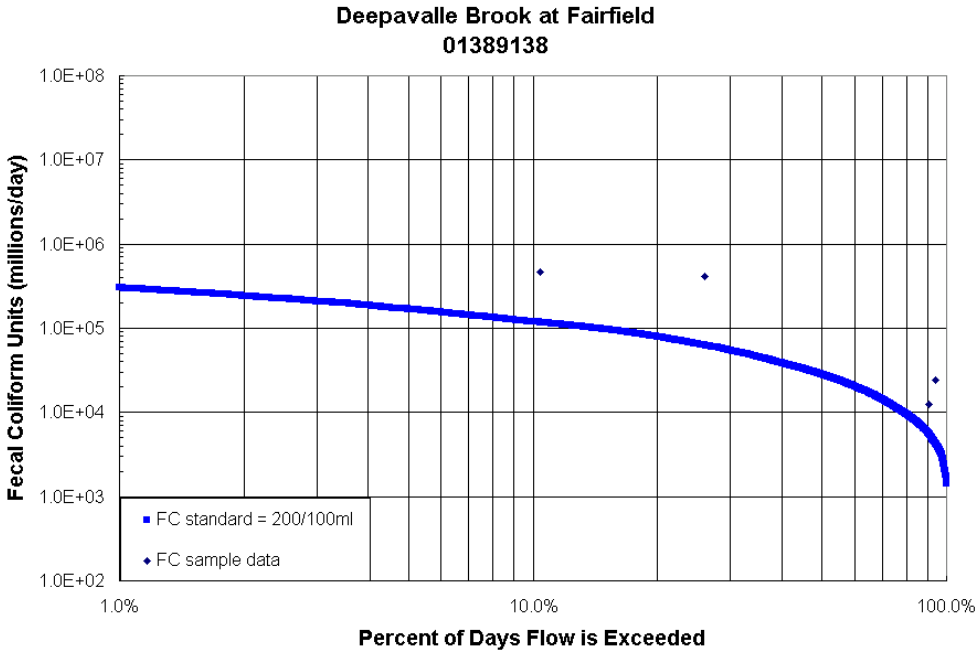
Load Duration Curve for Wanaque River at Highland Ave. Fecal coliform data from USGS station # 01387010 & 01387041 during the period 1/27/97 through 8/9/99. Water years 1970-2000 from USGS station # 01388500 (Pompton River at Pompton Plains NJ) were used in generating the FC standard curve.



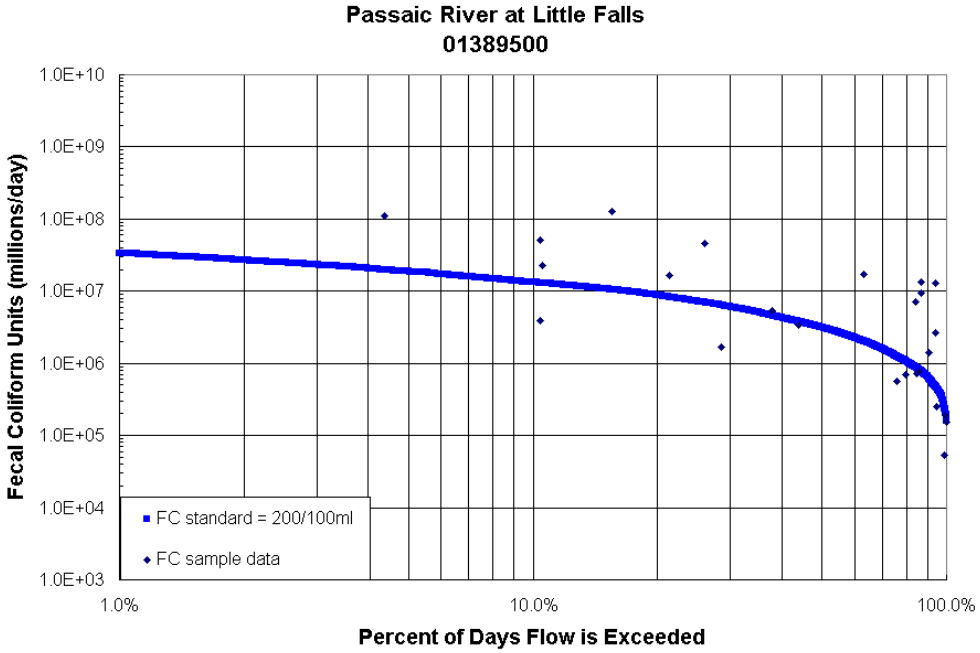
Load Duration Curve for Ramapo River Near Mahwah. Fecal coliform data from USGS station # 01387500 during the period 2/24/94 8/3/00. Water years 1970-2000 from USGS station # 01387500 (Ramapo River Near Mahwah) were used in generating the FC standard curve.



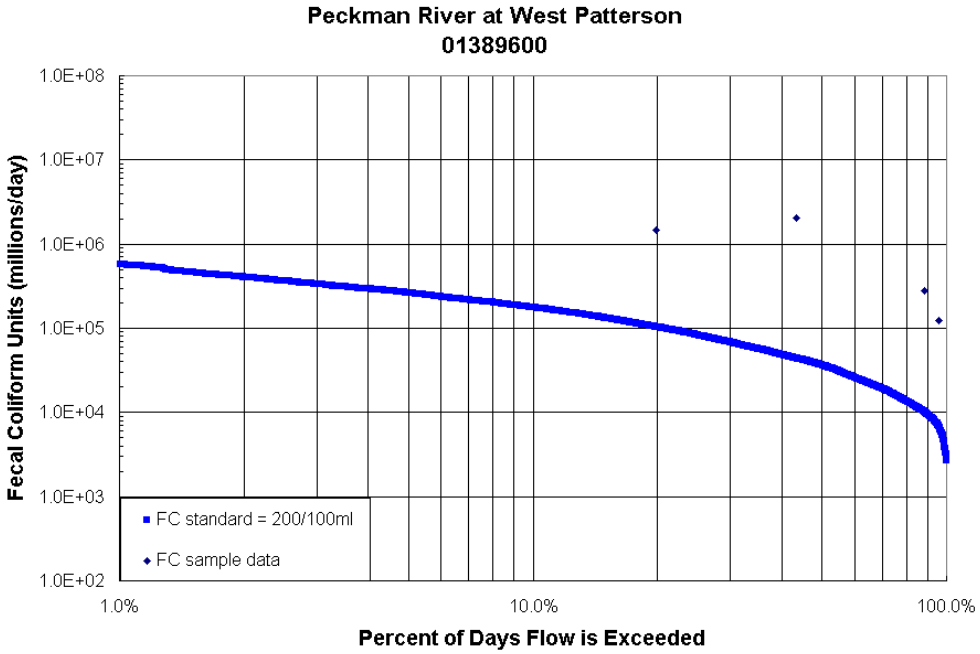
Load Duration Curve for Preakness Brook Near Little Falls. Fecal coliform data from USGS station # 01389080 during the period 4/16/98 through 9/23/98. Water years 1970-2000 from USGS station # 01389500 (Passaic River at Little Falls) were used in generating the FC standard curve.



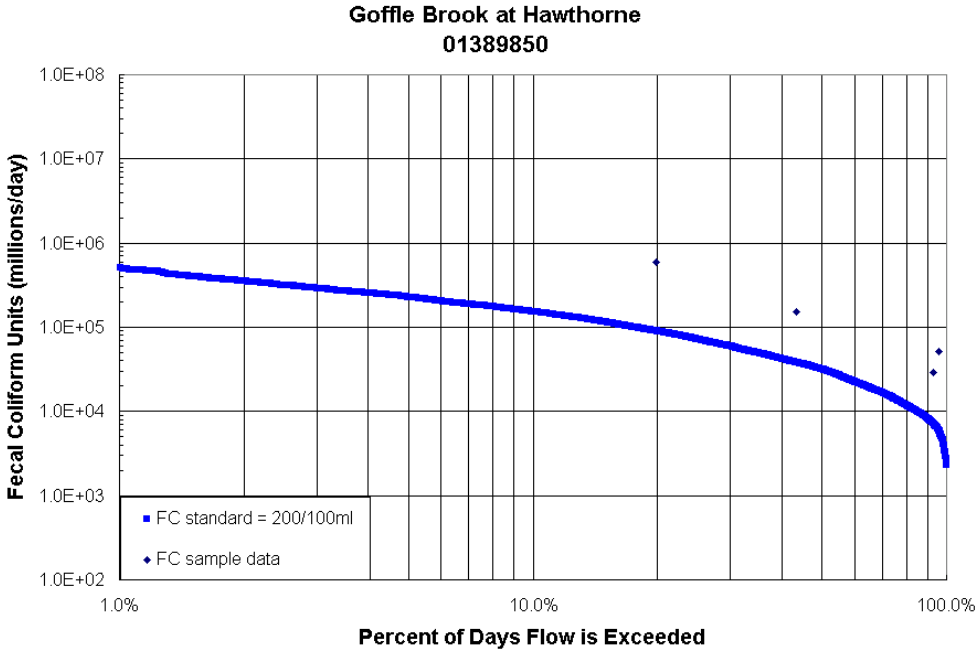
Load Duration Curve for Deepavalle Brook at Fairfield. Fecal coliform data from USGS station # 01389138 during the period 4/16/98 through 9/23/98. Water years 1970-2000 from USGS station # 01389500 (Passaic River at Little Falls) were used in generating the FC standard curve.



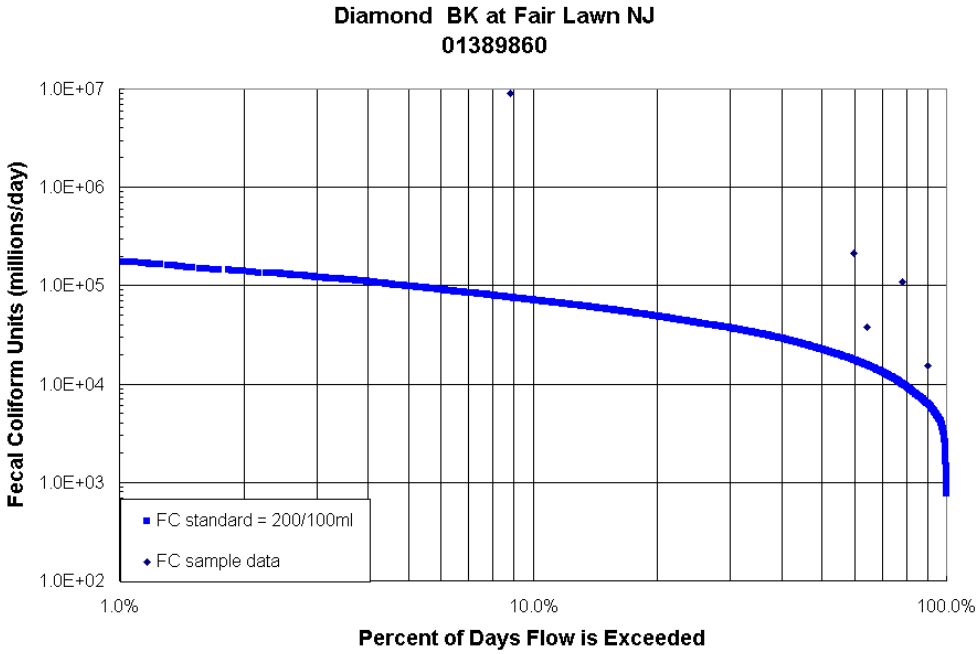
Load Duration Curve for the Passaic River at Little Falls. Fecal coliform data from USGS station # 01389500 during the period 2/18/94 through 9/23/98. Water years 1970-2000 from USGS station # 01389500 (Passaic River at Little Falls) were used in generating the FC standard curve.



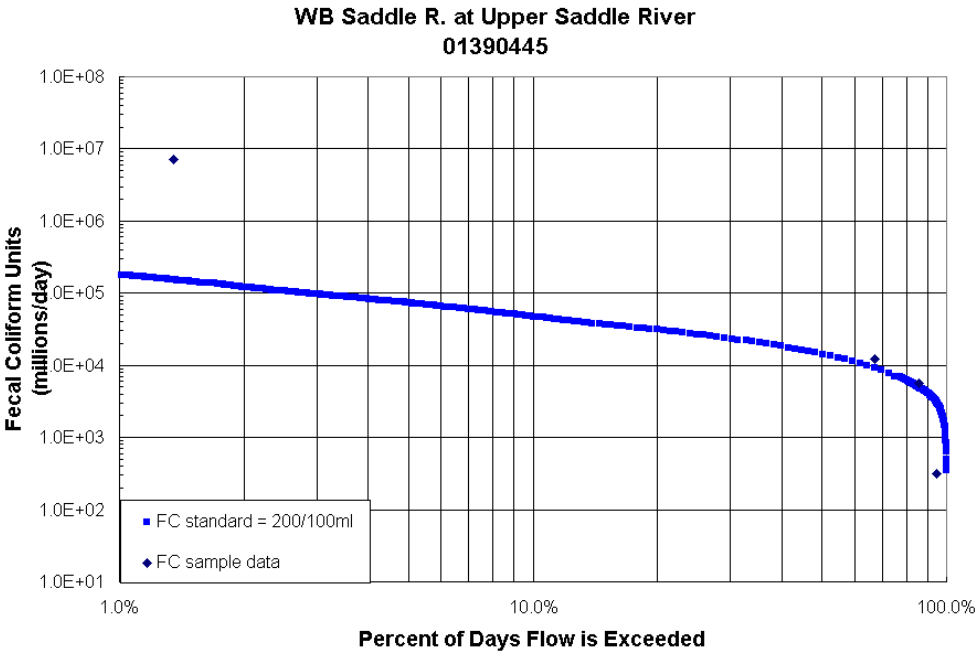
Load Duration Curve for Peckman River at West Patterson. Fecal coliform data from USGS station #01389600 during the period 4/23/98 through 9/24/98. Water years 1970-2000 from USGS station # 01388500 (Pompton River at Pompton Plains NJ) were used in generating the FC standard curve.



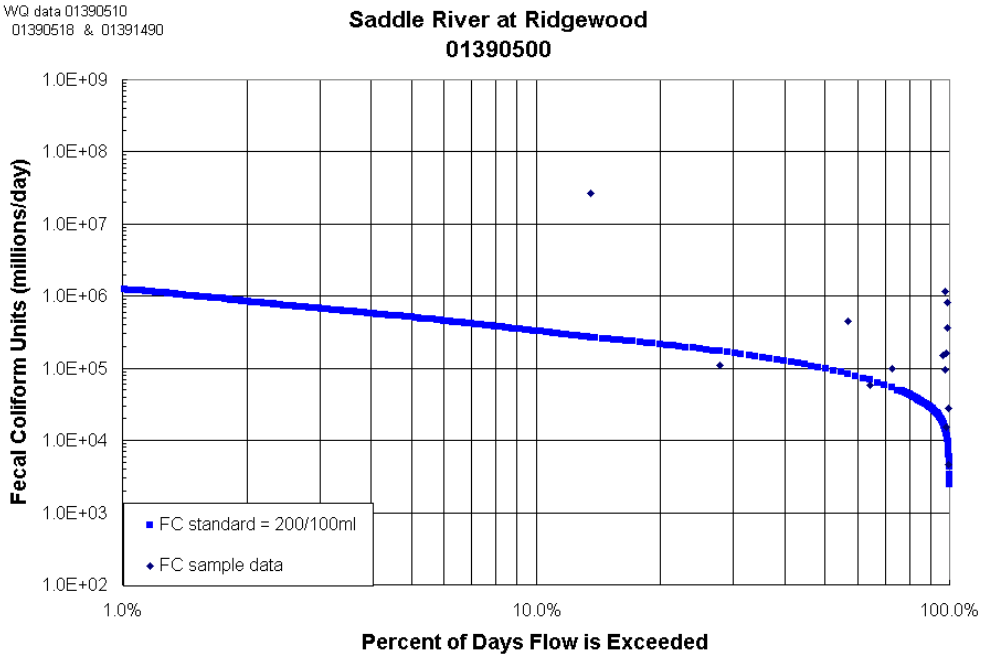
Load Duration Curve for Goffle Brook at Hawthorne. Fecal coliform data from USGS station # 01389850 during the period 4/23/98 through 9/24/98. Water years 1970-2000 from USGS station # 01388500 (Pompton River at Pompton Plains NJ) were used in generating the FC standard curve.



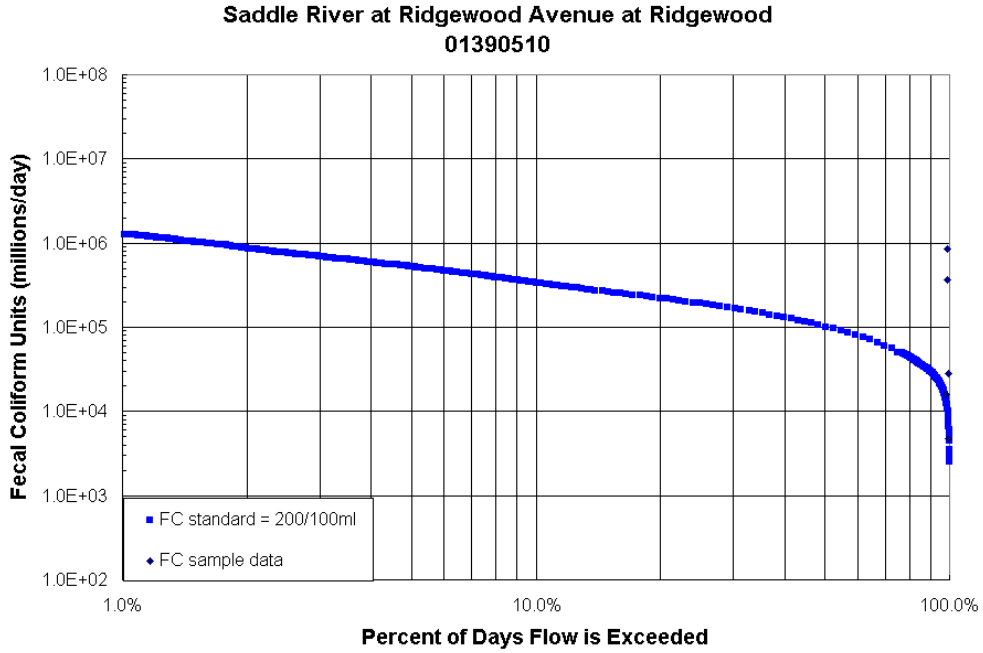
Load Duration Curve for Diamond Bk at Fair Lawn. Fecal coliform data from USGS station # 01389860 during the period 6/29/00-7/27/00. Water years 1970-2000 from USGS station # 01388500 (Pompton River at Pompton Plains NJ) were used in generating the FC standard curve



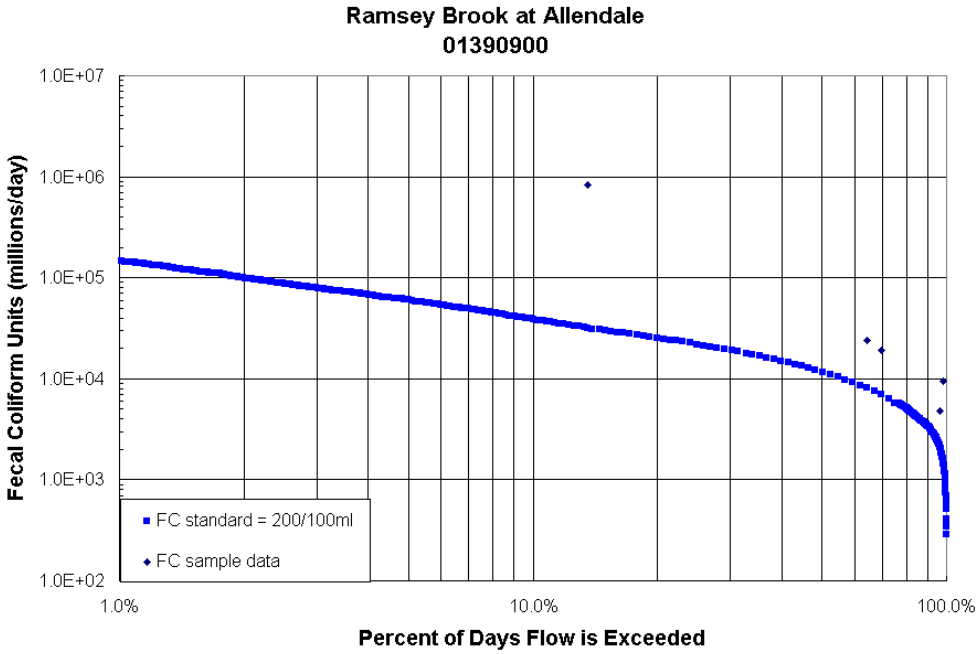
Load Duration Curve for WB Saddle R at Upper Saddle River. Fecal coliform data from USGS station # 01390445 during the period 11/4/99 through 8/7/00. Water years 1970-2001 from USGS station # 01390500 (Saddle River at Ridgewood) were used in generating the FC standard curve.



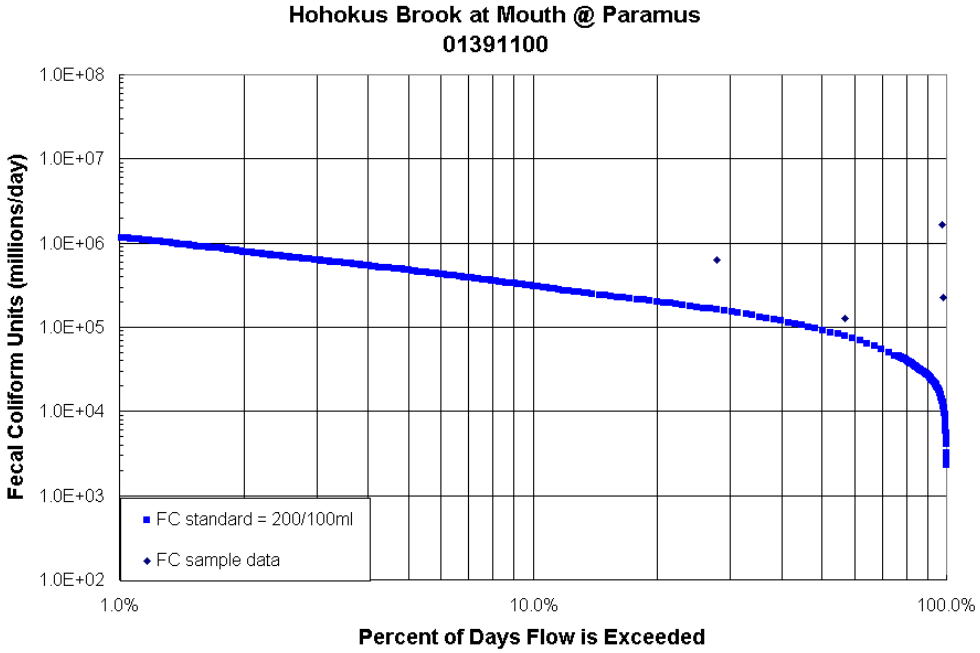
Load Duration Curve for Saddle R at Ridgwood. Fecal coliform data from USGS station # 01390510,01390518, & 01391490.during the period 11/6/97-8/9/99. Water years 1970-2001 from USGS station # 01390500 (Saddle River at Ridgewood) were used in generating the FC standard curve.



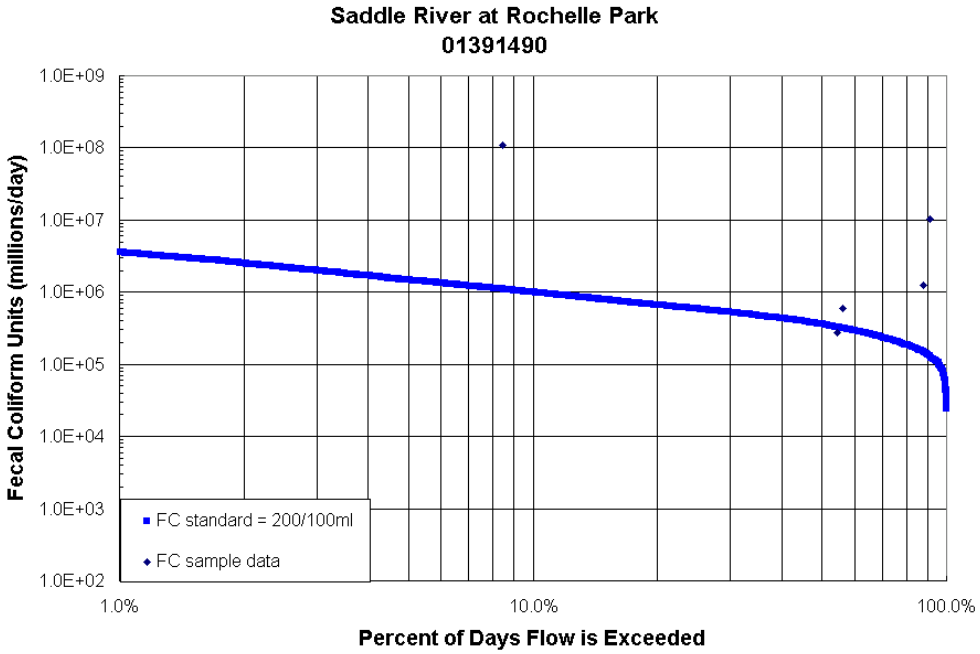
Load Duration Curve for Saddle River at Ridgewood Avenue at Ridgewood. Fecal coliform data from USGS station # 01390510 during the period 7/13/99 through 8/9/99. Water years 1970-2001 from USGS station # 01390500 (Saddle River at Ridgewood) were used in generating the FC standard curve.



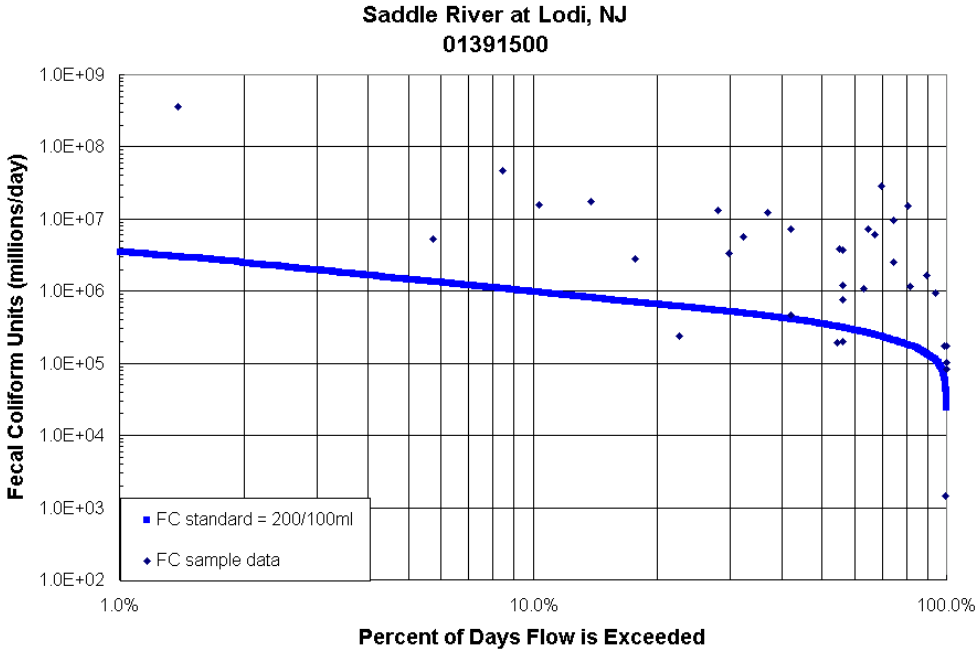
Load Duration Curve for Ramsey Brook at Allendale. Fecal coliform data from USGS station # 01390900 during the period 11/6/97 through 9/1/98. Water years 1970-2000 from USGS station # 01390500 (Saddle River at Ridgewood) were used in generating the FC standard curve.



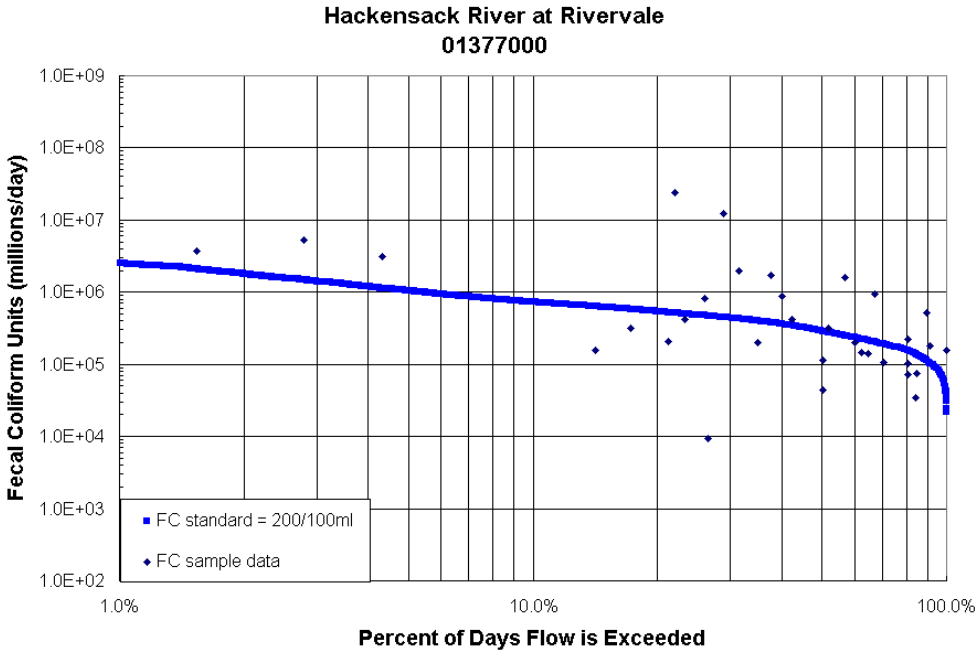
Load Duration Curve for Hohokus Brook at Mouth@ Paramus. Fecal coliform data from USGS station # 01391100 during the period 4/23/98 through 9/24/98. Water years 1970-2000 from USGS station # 01390500 (Saddle River at Ridgewood) were used in generating the FC standard curve.



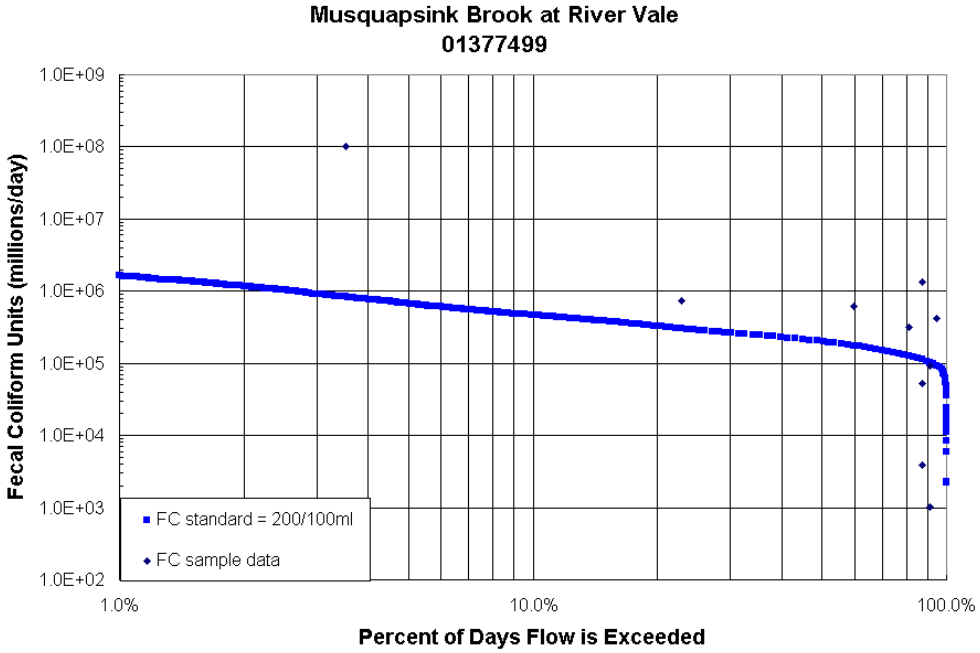
Load Duration Curve for Saddle River at Rochelle Park. Fecal coliform data from USGS station # 01391490 during the period 11/6/97 through 9/16/98. Water years 1970-2001 from USGS station # 01391500 (Saddle River at Lodi) were used in generating the FC standard curve.



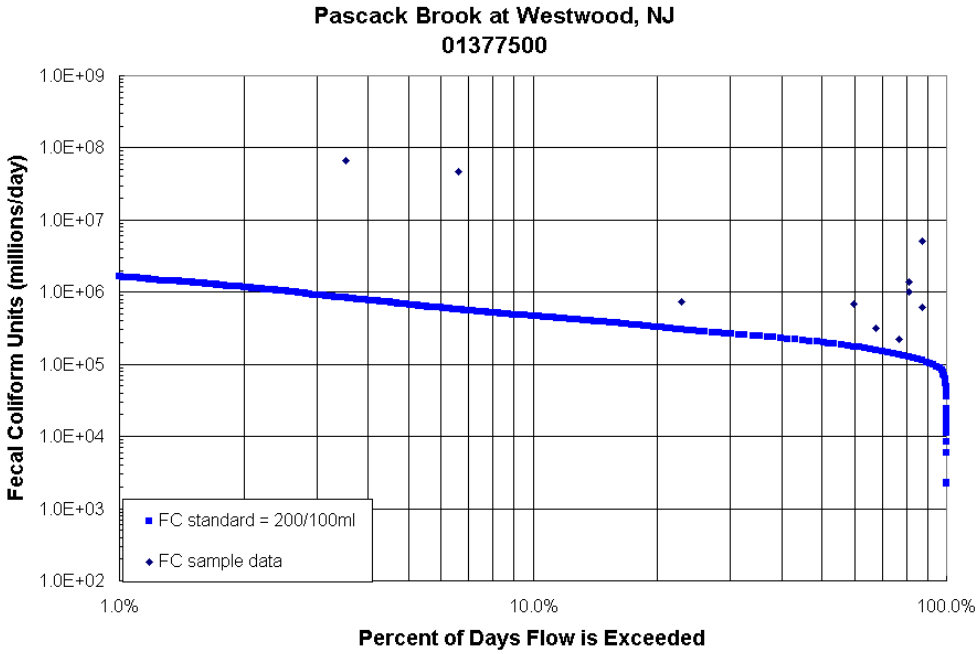
Load Duration Curve for Saddle River at Lodi. Fecal coliform data from USGS station # 01391500 during the period 2/22/94 through 9/13/00. Water years 1970-2000 from USGS station # 01391500 (Saddle River at Lodi) were used in generating the FC standard curve.



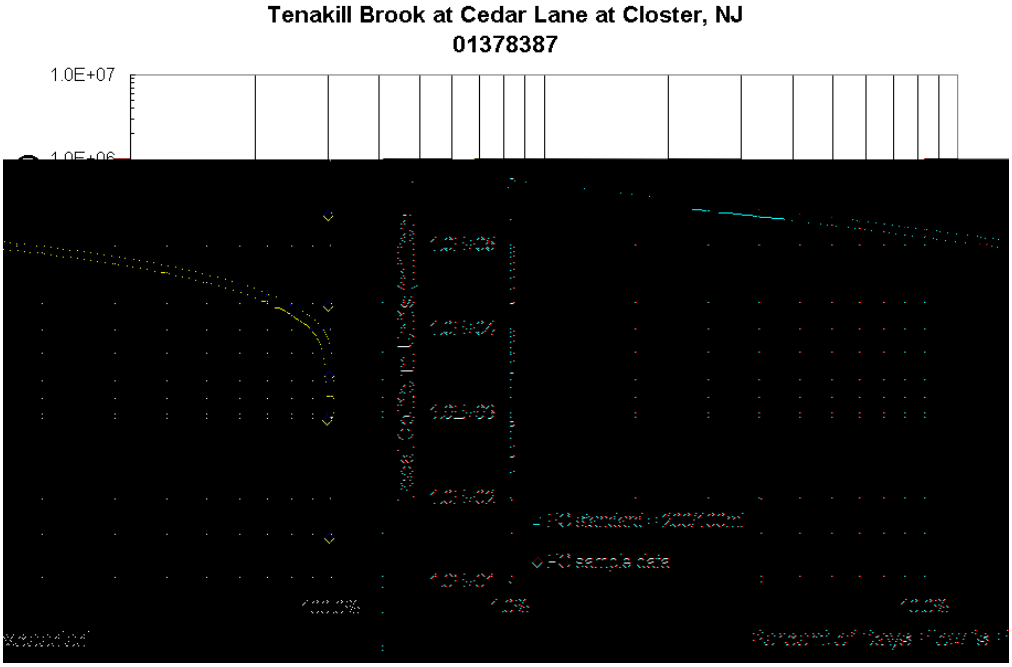
Load Duration Curve for the Hackensack River at Rivervale. Fecal coliform data from USGS station # 01377000 during the period 2/17/94 through 8/3/00. Water years 1970-2000 from USGS station # 01377000 (Hackensack River at Rivervale) were used in generating the FC standard curve.



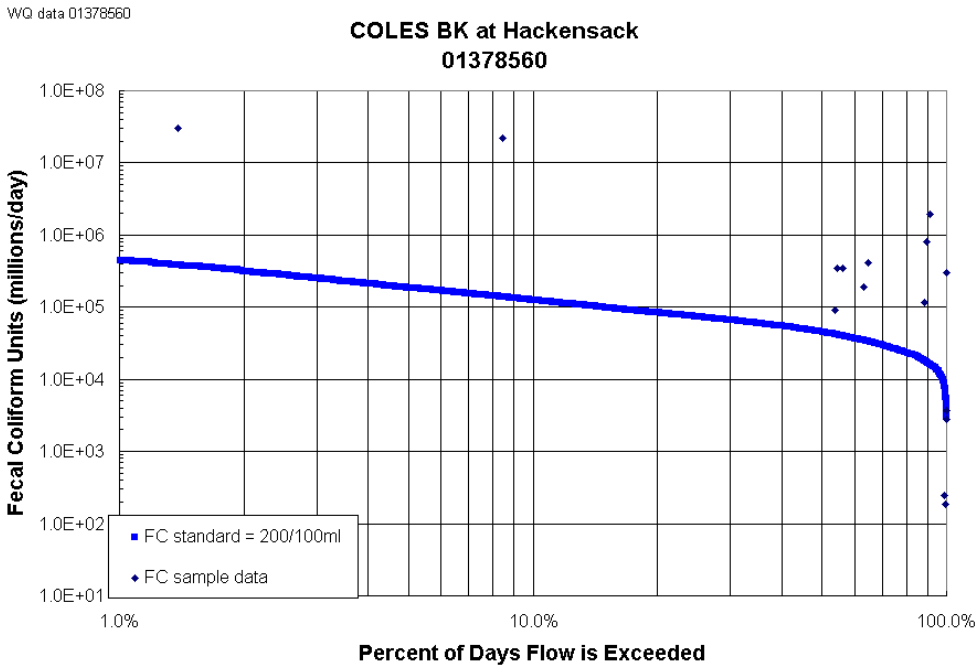
Load Duration Curve for Musquapsink Brook at River Vale. Fecal coliform data from USGS station # 01377499 during the period 7/13/99 through 9/7/00. Water years 1970-2000 from USGS station # 01377499 (Musquapsink Brook at River Vale) were used in generating the FC standard curve.



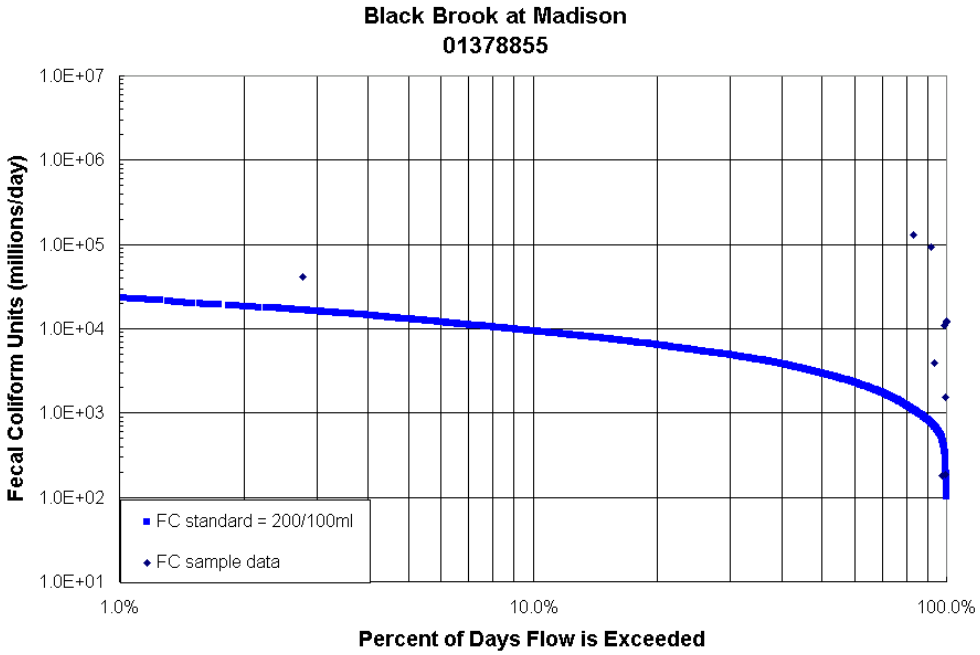
Load Duration Curve for Pascack Brook at Westwood. Fecal coliform data from USGS station # 01377500 during the period 6/1/98 through 9/6/98. Water years 1970-2000 from USGS station # 01377500 (Pascack Brook at Westwood) were used in generating the FC standard curve.



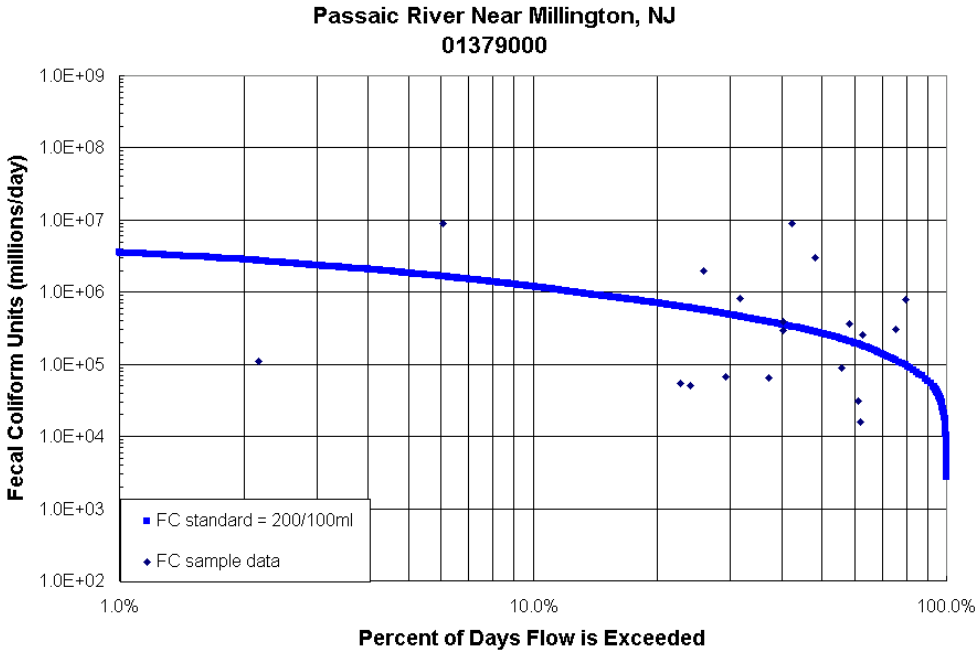
Load Duration Curve for Tenakill Brook at Cedar Lane at Closter. Fecal coliform data from USGS station # 01378387 during the period 7/13/99 through 8/9/99. Water years 1970-2001 from USGS station # 01390500 (Saddle River at Ridgewood) were used in generating the FC standard curve.



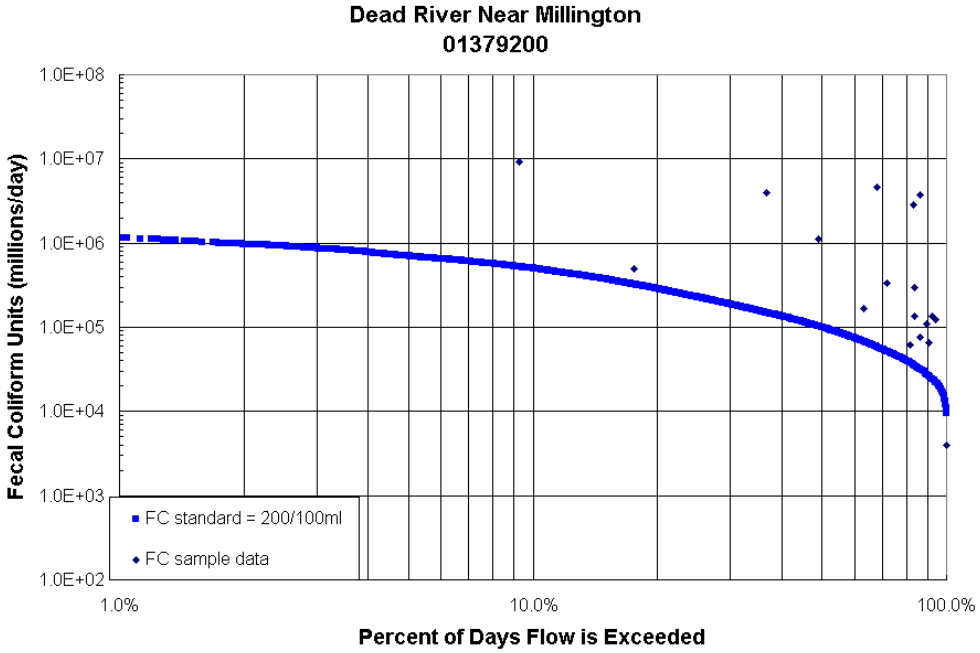
Load Duration Curve for the COLES BK at Hackensack. Fecal coliform data from USGS station # 01378560 during the period 11/5/97 through 8/23/00. Water years 1970-2001 from USGS station # 01391500 (Saddle River at Lodi) were used in generating the FC standard



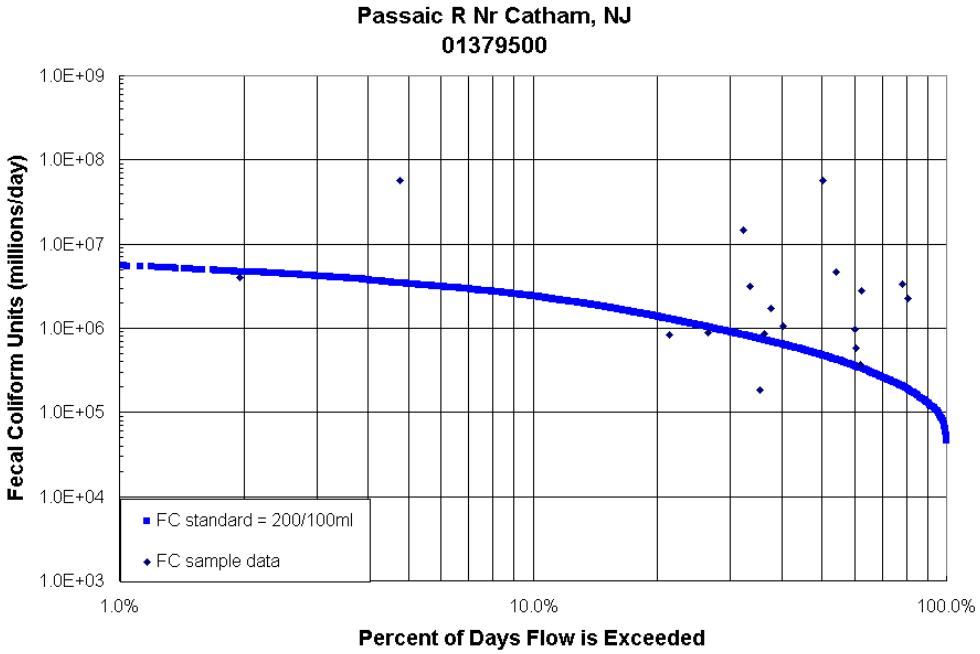
Load Duration Curve for Black Brook at Madison. Fecal coliform data from USGS station # 01378855 during the period 11/18/97 through 9/1/99. Water years 1970-2000 from USGS station # 01380500 (Rockaway River above Reservoir at Boonton) were used in generating the FC standard curve.



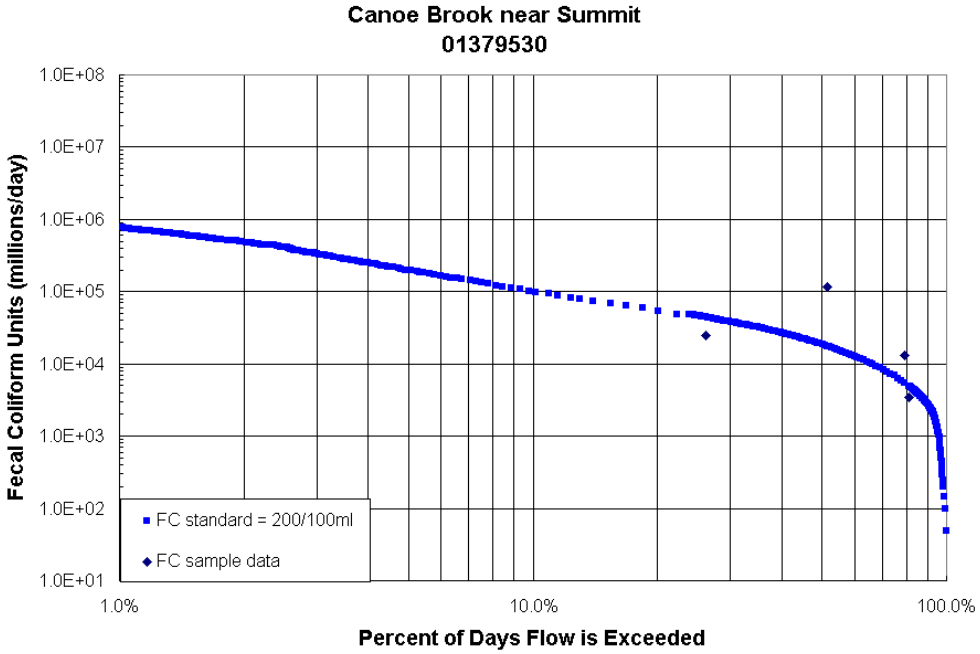
Load Duration Curve for the Passaic R Nr Millington. Fecal coliform data from USGS station # 01379000 during the period 10/1997 through 8/2000. Water years 1970-2000 from USGS station # 01379000 (Passaic R Nr Millington) were used in generating the FC standard curve.



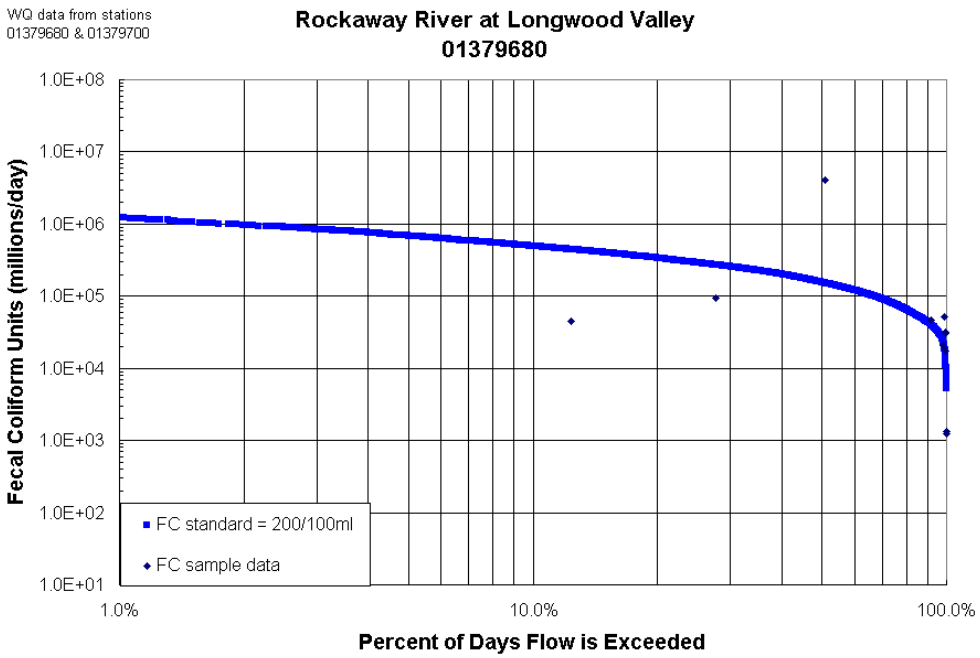
Load Duration Curve for the Dead River Near Millington. Fecal coliform data from USGS station # 01379200 during the period 10/1997 through 8/2000. Water years 1970-2000 from USGS station # 01379500 (Passaic R Nr Catham) were used in generating the FC standard curve.



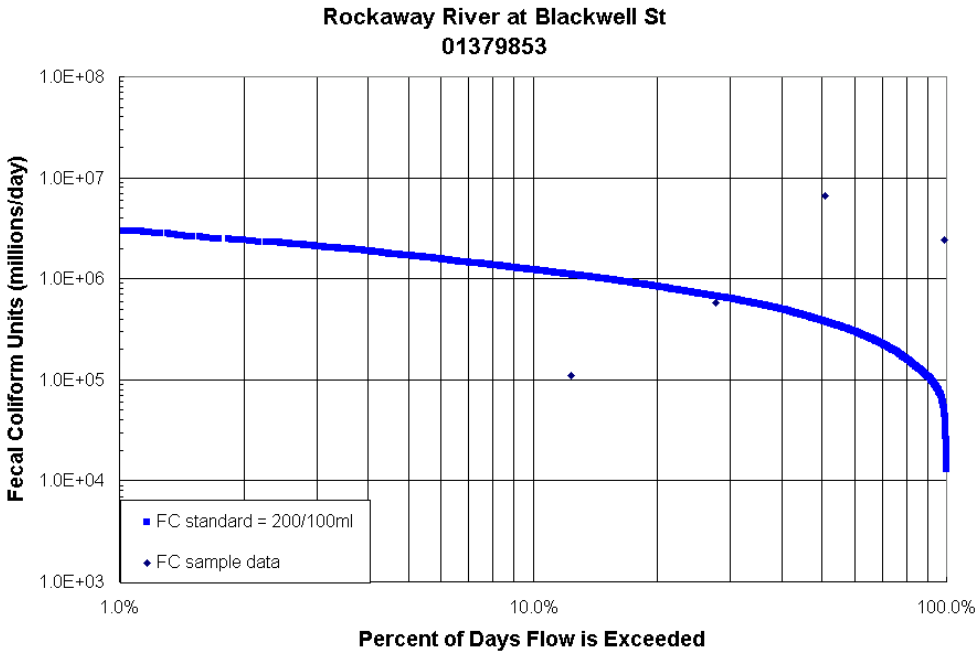
Load Duration Curve for the Passaic R Nr Catham. Fecal coliform data from USGS station # 01379500 during the period 10/1997 through 8/2000. Water years 1970-2000 from USGS station # 01379500 (Passaic R Nr Catham) were used in generating the FC standard curve.



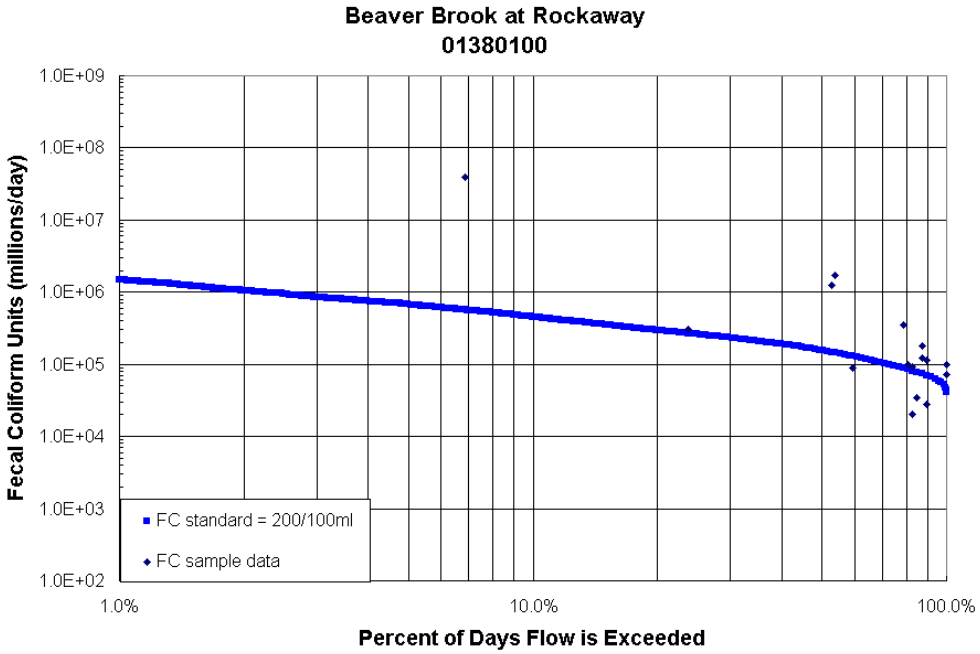
Load Duration Curve for Canoe Brook near Summit. Fecal coliform data from USGS station # 01379530 during the period 4/23/98 through 9/16/98. Water years 1970-2000 from USGS station # 01379530 (Canoe Brook near Summit) were used in generating the FC standard curve.



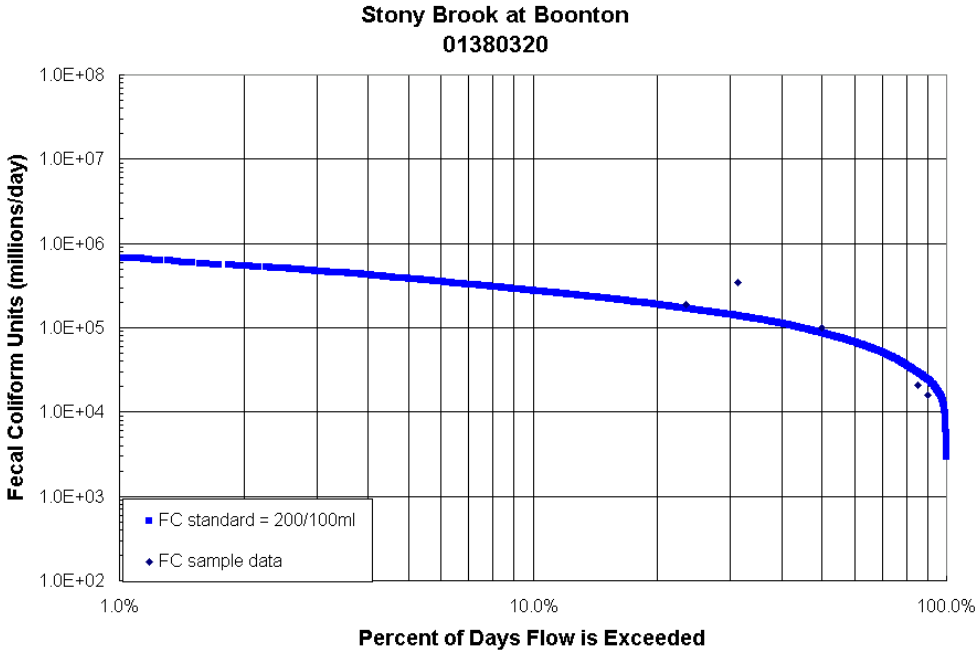
Load Duration Curve for Rockaway River at Longwood Valley. Fecal coliform data from USGS station # 01379680 & 01379700 during the period 1/27/97 through 9/2/99. Water years 1970-2000 from USGS station # 01380500 (Rockaway River above Reservoir at Boonton) were used in generating the FC standard curve.



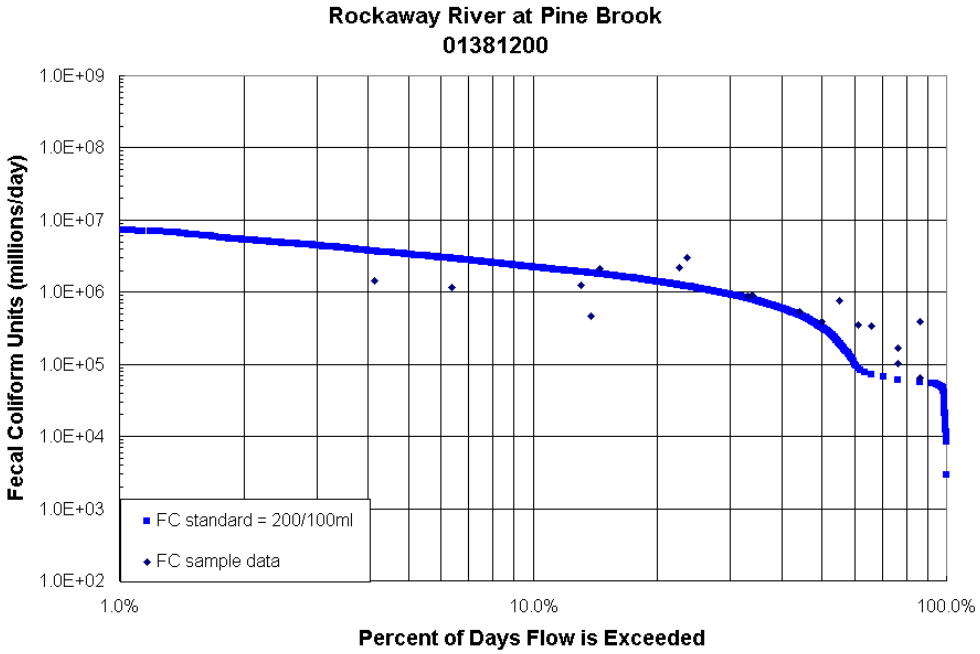
Load Duration Curve for Rockaway River at Berkshire Valley. Fecal coliform data from USGS station # 01379853 during the period 4/15/98 through 9/22/98. Water years 1970-2000 from USGS station # 01380500 (Rockaway River above Reservoir at Boonton) were used in generating the FC standard curve.



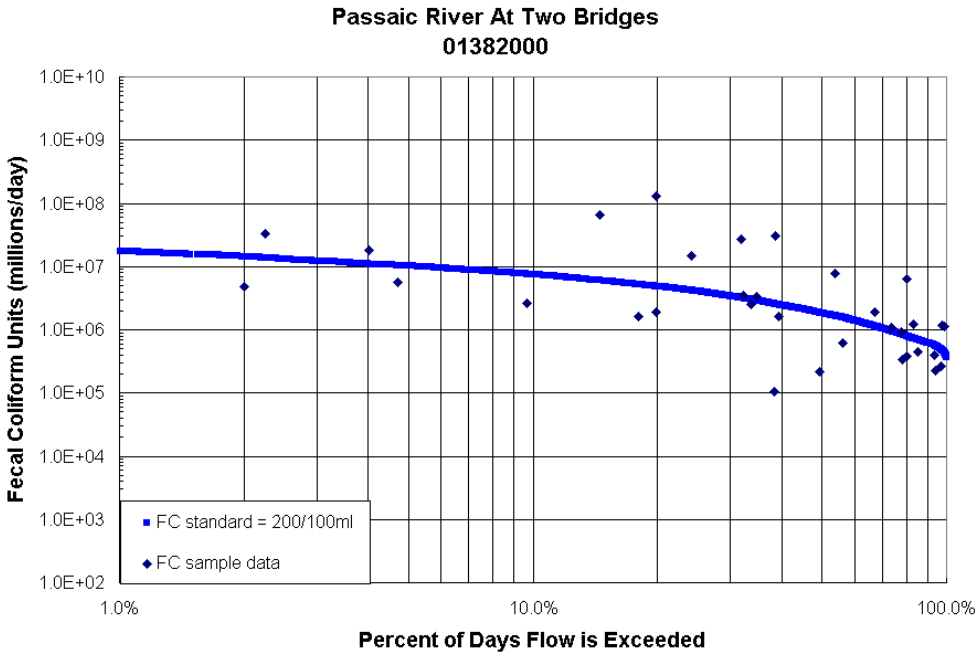
Load Duration Curve for the Beaver Brook At Rockaway. Fecal coliform data from USGS station # 01380100 during the period 11/13/97 through 8/7/2000. Water years 1970-2000 from USGS station # 01381500 (Whippany River at Morristown, NJ) were used in generating the FC standard curve.



Load Duration Curve for Stony Brook At Boonton. Fecal coliform data from USGS station # 01380320 during the period 12/13/99 through 9/7/00. Water years 1970-2000 from USGS station # 01380500 (Rockaway River above Reservoir at Boonton) were used in generating the FC standard curve.



Load Duration Curve for the Rockaway R at Pine Brook. Fecal coliform data from USGS station # 01381200 during the period 10/1997 through 8/2000. Water years 1970-2000 from USGS station # 01381000 (Rockaway River below Reservoir at Boonton, NJ) were used in generating the FC standard curve.



Load Duration Curve for the Passaic River at Two Bridges. Fecal coliform data from USGS station # 01382000 during the period 1/27/94 through 810/2000. Water years 1970-2000 from USGS station # 01381900 (Passaic R at Pine Brook, NJ) were used in generating the FC standard curve.

Amendment to the Northeast Water Quality Management Plan

Total Maximum Daily Loads for Phosphorus to Address Three (3) Stream Segments in the Northeast Water Region

Watershed Management Area 5 (Hackensack and Pascack Watersheds)

Proposed: July 5, 2005
Established: August 31, 2005
Approved: September 30, 2005
Adopted:

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

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1.0 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 (Department) developed the *2004 Integrated List of Waterbodies* addressing the overall water quality of the State's waters and, in Sublist 5, identifying the list of impaired waterbodies. On October 4, 2004, the Department adopted the *2004 Integrated List of Waterbodies* as an amendment to the Statewide Water Quality Management Plan, 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). In the Northeast Water Region, Watershed Management Area (WMA) 5, the *2004 Integrated List of Waterbodies* Sublist 5 identifies the three stream segments in Table 1 as impaired with respect to phosphorus, as indicated by the presence of phosphorus concentrations in excess of standards. A TMDL is required to be developed for each of the impairments listed on Sublist 5. A TMDL is developed to identify all the contributors of a pollutant of concern and the load reductions necessary to meet the Surface Water Quality Standards (SWQS) relative to that pollutant. TMDLs are established to address the phosphorus impairment in the waterbodies identified in Table 1.

Table 1 Impaired stream segments identified on the *2004 Integrated List of Waterbodies* to be addressed in this TMDL report.

Impairment Number	WMA	Station Name/Waterbody	Site ID	Sublist	Proposed Action
1	5	Coles Brook at Hackensack	01378560	5	Establish TMDL
2	5	Pascack Brook at Westwood	01377500, 5-PAS-1	5	Establish TMDL
3	5	Musquapsink Brook at River Vale	01377499	5	Establish TMDL

This TMDL report includes implementation strategies to achieve SWQS for phosphorus, including an additional measure, which will be included in the municipal stormwater permits for municipalities within the affected watersheds, to adopt a low phosphorus fertilizer ordinance. The TMDLs in this report were proposed and will be adopted by the Department as amendments to the appropriate area-wide water quality management plans in accordance with N.J.A.C. 7:15-3.4(g). This TMDL report was developed consistent with the United States Environmental Protection Agency's (USEPA'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.

2.0 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 SWQS 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.

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 without violating a state's water quality standards and allocates that loading capacity 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).

This report establishes three TMDLs that address phosphorus impairment in 25.7 impaired river miles with respect to the waterbodies identified in Table 2. These TMDLs include management approaches to reduce loadings of phosphorus from various sources in order to attain applicable surface water quality standards for phosphorus. With respect to the phosphorus impairment, the waterbodies will be moved to Sublist 4 following approval of the TMDLs by EPA. Two of the waterbodies found in Table 2 have additional impairments other than total phosphorus. Pascack Brook at Westwood (01377500) is listed for Arsenic and Mercury, and Musquapsink Brook at River Vale (01377499) is listed for Arsenic. These additional impairments will be addressed in future TMDL reports.

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. The Department believes that the TMDLs in this report address the following 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. Waste load 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.

3.0 Pollutant of Concern and Area of Interest

Pollutant of Concern

The pollutant of concern for these TMDLs is total phosphorus. For the segments in the Northeast Water Region - WMA 5 identified in Table 2, phosphorus concentrations were found to exceed New Jersey's SWQS, found at N.J.A.C. 7-9B. The three impaired segments were assigned a Medium priority ranking in the *2004 Integrated List of Waterbodies* Sublist 5.

Table 2 Waterbodies listed for phosphorus impairment in the Northeast Water Region - WMA 5 for which TMDLs are proposed

TMDL Number	WMA	Station Name/Waterbody	Site ID	County(s)	Impaired River Miles
1	5	Coles Brook at Hackensack	01378560	Bergen	11.8
2	5	Pascack Brook at Westwood	01377500, 5-PAS-1	Bergen	6.6
3	5	Musquapsink Brook at River Vale	01377499	Bergen	7.3
Total Impaired River Miles:					**25.7**

Applicable Water Quality Standards

The impaired segments addressed in this document are classified as Fresh Water 2 (FW2). As stated in N.J.A.C. 7:9B-1.14(c) of the SWQS for FW2 waters, the standards for phosphorus are as follows:

> Phosphorus, Total (mg/l):
>
> i. Lakes: Phosphorus as total P shall not exceed 0.05 in any lake, pond, reservoir, or in a tributary at the point where it enters such bodies of water, except where site-specific criteria are developed pursuant to N.J.A.C. 7:9B-1.5(g)3.
>
> ii. Streams: Except as necessary to satisfy the more stringent criteria in paragraph i. above or where site-specific criteria are developed pursuant to N.J.A.C. 7:9B1.5(g)3, phosphorus as total P shall not exceed 0.1 in any stream, unless it can be demonstrated that total P is not a limiting nutrient and will not otherwise render the waters unsuitable for the designated uses.

Also as stated in N.J.A.C. 7:9B-1.5(g)2:

> Nutrient policies are as follows:
>
> Except as due to natural conditions, nutrients shall not be allowed in concentrations that cause objectionable algal densities, nuisance aquatic vegetation, abnormal diurnal fluctuations in dissolved oxygen or pH, changes to the composition of aquatic ecosystems, or otherwise render the waters unsuitable for the designated uses.

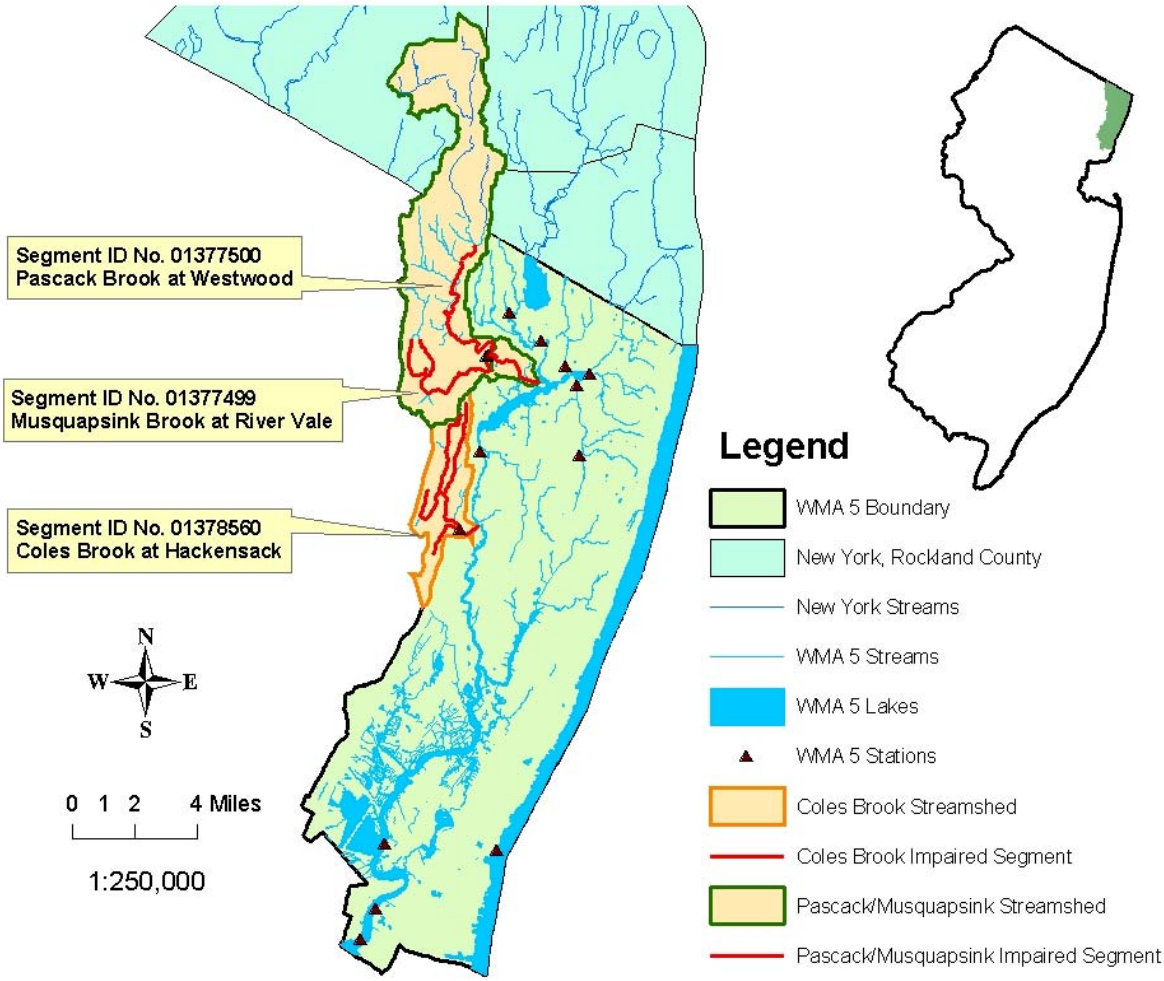
In all FW2 waters, the designated uses are (NJAC 7:9B-1.12):

> 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.

Area of Interest

These TMDLs will address 25.7 impaired river miles within the Northeast Water Region, Watershed Management Area 5. Based on the detailed county hydrography stream coverage, 67.61 overall stream miles in New Jersey and New York are affected by the TMDLs due to the fact that the implementation plans cover entire watersheds, not just impaired waterbody segments. The spatial extent of the impaired segments and the affected drainage areas are depicted in Figure 1.

Figure 1 Spatial extent of impaired segments and affected drainage areas: WMA 5



Watershed Management Area 5 - Hackensack, Hudson, Pascack

Watershed Management Area 5 (WMA 5) has a drainage area of approximately 165 square miles, which includes parts of Hudson and Bergen Counties. WMA 5 is comprised of three watersheds: Hackensack River Watershed, Hudson River Watershed and Pascack Brook Watershed. The Hackensack River originates in New York State and flows south to the Newark Bay. New Jersey's portion of the river is 31 miles long. The Hackensack River Watershed is approximately 85 square miles. Major tributaries include the Pascack Brook, Berry's Creek, Overpeck Creek, and Wolf Creek. The Pascack Brook Watershed has a drainage area of approximately 51 square miles.

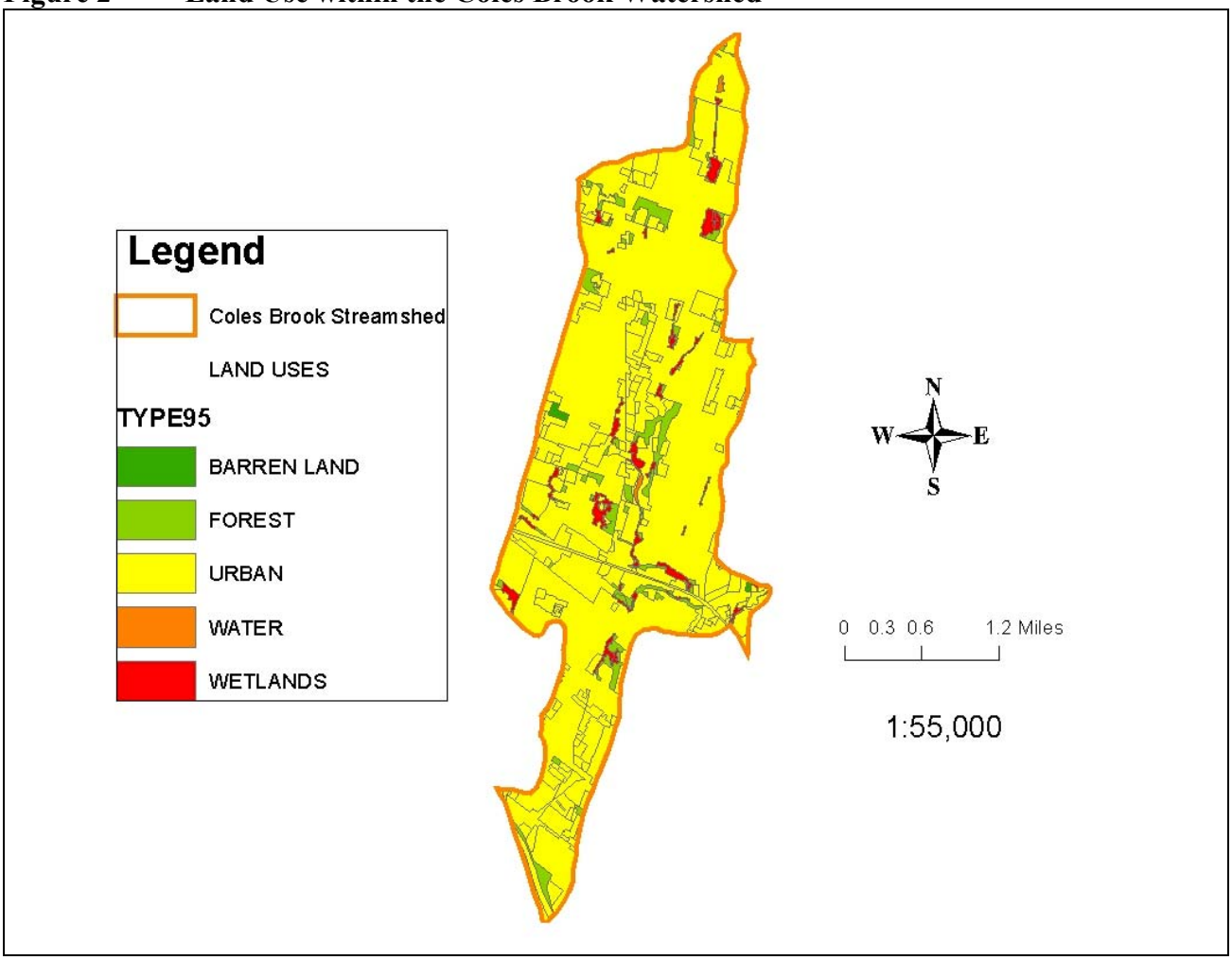
The Hudson River is 315 miles long and begins in New York State at Lake Tear of the Clouds on the southwest side of Mount Marcy, New York's highest peak. The Hudson River Watershed is approximately 29 square miles. The Hudson River forms the boundary between New Jersey and New York States.

Although WMA 5 is the most populated of all the WMAs, approximately 50% of the land is still undeveloped. More than 30% of the developed land is residential development. The remaining developed land is commercial/industrial use. Much of the lower Hackensack River Watershed is tidal marsh known as the Hackensack Meadowlands. This are is home to more than 700 plant and animal species including several rare and threatened species. The Hackensack Meadowlands Development Commission (HMDC) was created by an act of the New Jersey Legislature that became law in January 1969. The act gave the HMDC three mandates, environmental protection, economic development, and solid waste management. The HMDC district size is 19,730 acres, or 32 square miles. Land use in the affected drainage areas is predominantly urban and is presented in Tables 3 and 4, and depicted in Figures 2 and 3.

Table 3 River miles, Watershed size, and Area by Anderson Land Use Classification for Coles Brook

River miles and drainage area	Coles Brook at Hackensack 01378560
Sublist 5 impaired river miles	11.8
Total river miles within watershed and included in the implementation plan	15.5
Watershed size (acres)	4382
Landuse/Landcover (acres)	
Medium / high density residential	2986.8
Low density / rural residential	105.7
Commercial	495.6
Industrial	24.0
Mixed urban / other urban	417.4
Agriculture	0
Forest, wetland, water	341.7
Barren	10.7
Total	4381.9

Figure 2 Land Use within the Coles Brook Watershed



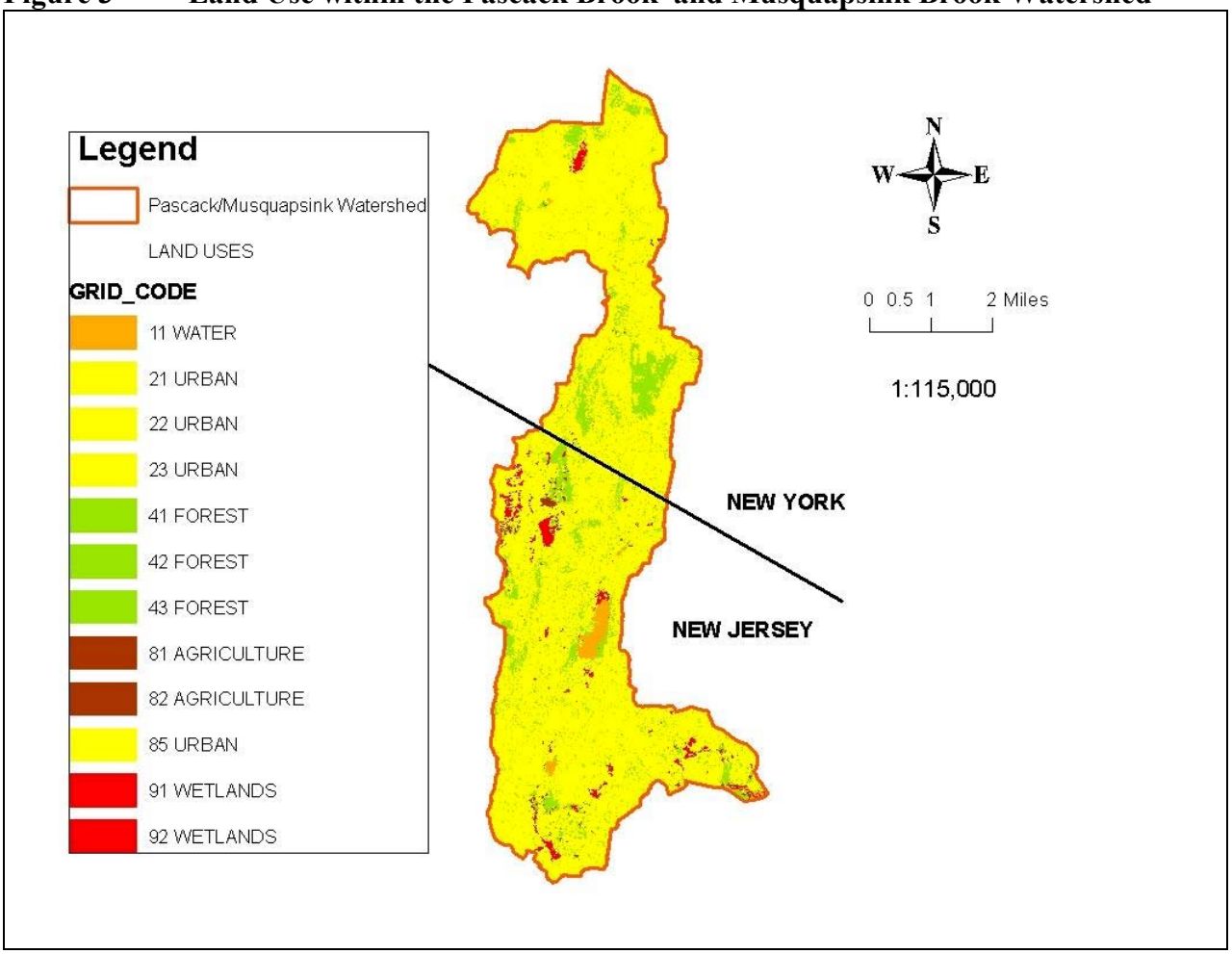
The Coles Brook impaired stream segment is classified as FW2-NT/SE1.

The information for Pascack Brook at Westwood and Musquapsink Brook at River Vale are, at times, addressed in the same figures and tables in this TMDL document. The monitoring station for Pascack Brook at Westwood (01377500) accurately characterizes the flows and water quality at Musquapsink Brook due to the Pascack station location directly below the confluence of the two streams. For this reason, the two impairments are addressed as one in certain areas of this document.

Table 4 River miles, Watershed size, and Area by USGS Land Use Classification for Pascack Brook and Musquapsink Brook

River miles and drainage area	Pascack Brook at Westwood, Musquapsink Brook at River Vale 01377500 (5-PAS-1), 01377499
Sublist 5 impaired river miles	13.9
Total river miles within watershed and included in the implementation plan	52.11
Watershed size (acres)	19101
Land use/Land cover (acres)	
Medium / high density residential	1743.4
Low density / rural residential	12669.7
Commercial	715.6
Industrial	0
Mixed urban / other urban	979.6
Agriculture	99.5
Forest, wetland, water	2893.1
Barren	0
Total	19100.9

Figure 3 Land Use within the Pascack Brook and Musquapsink Brook Watershed



The Pascack Brook and Musquapsink Brook impaired stream segments are classified as FW2-NTC1.

Data Sources

The Department's Geographic Information System (GIS) and GIS coverages for New York were used to describe characteristics of the affected drainage area and in developing this document. The following is general information regarding the data used:

- Land use/Land cover was taken from: "NJDEP 1995/97 Land use/Land cover Update for New Jersey (by WMA)", published 12/01/2000 by the NJDEP, Office of Information Resources Management (OIRM), Bureau of Geographic Information and Analysis (BGIA), and delineated by watershed management area.

- "NJDEP 2004 Integrated Report Results for Non-Tidal Rivers", published 6/2004 by NJDEP, Watershed Assessment Group (WAT). Online at: http://www.state.nj.us/dep/gis/digidownload/images/ir2004/ir_river_conventionals2004.gif

- Detailed stream coverage of New Jersey: Published 11/01/1998 by the NJDEP, Office of Information Resources Management (OIRM), Bureau of Geographic Information and Analysis (BGIA). "NJDEP Streams of New Jersey (1:24000)." Online at: http://www.state.nj.us/dep/gis/strmshp.html

- NJDEP 14 Digit Hydrologic Unit Code delineations for New Jersey (DEPHUC14), published 4/5/2000 by Department of Environmental Protection (NJDEP), New Jersey Geological Survey (NJGS). Online at: http://www.state.nj.us/dep/gis/digidownload/zips/statewide/dephuc14.zip

- NJDEP Digital Elevation Grid for New Jersey (10 meter) published 10/01/2004 by NJ Department of Environmental Protection (NJDEP), Office of Information Resources Management (OIRM), Bureau of Geographic Information Systems (BGIS). Online at: http://www.nj.gov/dep/gis/wmalattice.html

- "NJPDES Surface Water Discharges in New Jersey, (1:12,000)", published 09/12/2002 by NJDEP, Environmental Regulation (ER), Division of Water Quality (DWQ), Bureau of Point Source Permitting - Region 1 (PSP-R1). Online at: http://depnet/gis/digidownload/images/statewide/njpdesswd.gif

- "NJDEP 2004 Integrated Report Stations on Non-Tidal Rivers (Conventionals and Toxics)", published 6/2004 by NJDEP, Water Assessment Team (WAT). Online at: http://www.state.nj.us/dep/gis/digidownload/images/ir2004/ir_stations_river2004.gif

- "NJDEP Head of Tide Points for Watercourses of New Jersey", published 1986 by NJDEP, Office of Environmental Analysis (OEA), Coast Survey Ltd. (CTD). Online at: http://www.state.nj.us/dep/gis/digidownload/zips/statewide/hot.zip

- "NJDEP Surface Water Quality Standards of New Jersey", published 11/2003 by NJDEP, Division of Landuse Management, Bureau of Freshwater & Biological Monitoring. Online at: http://www.state.nj.us/dep/gis/digidownload/zips/statewide/swqs.zip

- "Hydrological Features of New Jersey Feature Map Service, New Jersey State Plane NAD83", published 2005 by New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS). Online at: Live Data and Maps (ArcIMS Feature Service) - Server=http://njgin.state.nj.us; Service=NJ_Hydrology_FS; ServiceType=feature

- "Municipal, County and State Boundaries of New Jersey Feature Map Service, New Jersey State Plane NAD83", published 2004 by New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS). Online at: Live Data and Maps (ArcIMS Feature Service) - Server=http://njgin.state.nj.us; Service=NJ_GovtBounds_FS; ServiceType=feature

- "Water Quality Management Areas", created 3/2002 by NJDEP, Water Assessment Team (WAT). Unpublished.

- "Dams in New Jersey", created 6/2003 by NJDEP, Division of Watershed Management (DWM). Unpublished.

- Hydrography (Census 2000) shapefiles downloaded from Cornell University Geospatial Information Repository (CUGIR) - Streams and lakes located in New York State, (Shapefile: 2001). http://cugir.mannlib.cornell.edu/browse_map/browse_map.html

National Land Cover Data (NLCD) for New York, last updated in July 2000, and for New Jersey, last updated in March 2000. The data was produced under the direction of the USGS as part of the Multi-Resolution Land Characterization (MRLC) Regional Land Cover Characterization Project. The data used the NLCD Land Cover Classification Systems to categorize land use. http://edcsgs9.cr.usgs.gov/pub/data/landcover/states/

- High Resolution Digital Ortho-imagery 2000-2001 for Hudson Valley/Catskill Region in New York State downloaded from New York State GIS Clearinghouse. http://www.nysgis.state.ny.us/gateway/mg/high_res.htm

- New York State Digital Elevation Models (DEM) in the format of ASCII DEM was downloaded for the Sloatsburg and Nyack areas from Cornell University Geospatial Information Repository (CUGIR). This information was published by the USGS in August 1998. http://cugir.mannlib.cornell.edu/browse_lis/dem_list.html

- New York State, Rockland County Boundaries, (Shapefile: 2001) http://cugir2.mannlib.cornell.edu/buckets/Display.jsp?id=7385

- New Jersey Environmental Management System (NJEMS)

4.0 Source Assessment

In order to evaluate and characterize phosphorus loadings in the waterbodies of interest in these TMDLs, and thus propose proper management responses, source assessments are critical. Source assessments include identifying the types of sources and their relative contributions to phosphorus loadings, in both time and space variables.

For the purposes of TMDL development, point sources include domestic and industrial wastewater treatment plants that discharge to surface water, 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 and 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.

There are no point sources, other than stormwater, that could contribute phosphorus to the impaired waterbodies. Stormwater point sources like nonpoint sources, derive their pollutant load from runoff from land surfaces and load reduction is accomplished through BMPs. The distinction is that stormwater point sources are regulated under the Clean Water Act. Stormwater point sources are or will be addressed through the management practices required through the discharge permits. The Tier A municipalities located in the affected streamsheds are identified in Appendix 3.

For the purposes of TMDL development, potential nonpoint sources include stormwater discharges that are not subject to regulation under NPDES, including Tier B municipalities, which are regulated under the NJPDES municipal stormwater permitting program, and 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. There are no Tier B municipalities within the affected streamsheds.

The phosphorus loads in the affected watersheds are contributed by stormwater point sources and nonpoint sources. These loads are effectively estimated using loading coefficients for land uses present in the watersheds. Watershed loads for total phosphorus were, therefore, estimated using the Unit Areal Load (UAL) methodology, which applies pollutant export coefficients obtained from literature sources to the land use patterns within the watershed, as described in USEPA's Clean Lakes Program guidance manual (Reckhow, 1979b). Land use was determined using the Department's GIS system from the 1995/1997 land use coverage for the Coles Brook impaired watershed. The Department reviewed phosphorus export coefficients from an extensive database (Appendix 1) and selected the land use categories and values shown in Table 5. In order to apply a uniform coverage for the entire Pascack Brook and Musquapsink Brook impaired watershed, land use was determined using the USGS 2000 National Land Cover Data (NLCD) for both New York and New Jersey. The NLCD classification of land use types is different from the Department's 1995/1997 land use classification. Adjustments were made to assign an appropriate TP Export Coefficient for each type of NLCD land use, shown in Table 5.

Table 5: Phosphorus export coefficients (Unit Areal Loads)

Land use/Land cover	LU/LC codes[1]	USGS Grid_code	UAL (kg TP/ha/yr)
Mixed density residential	1100	n/a	1.2
Medium / high density residential	1110, 1120, 1150	22	1.6
Low density / rural residential	1130, 1140	21	0.7
Commercial	1200	23	2.0
Industrial	1300, 1500	n/a	1.7
Mixed urban / other urban	other urban codes	85	1.0

[1] LU/LC code is an attribute of the land use coverage that provides the Anderson classification code for the land use. The Anderson classification system is a hierarchical system based on four digits. The four digits represent one to four levels of classification, the first digit being the most general and the fourth digit being the most specific description.

Land use/Land cover	LU/LC codes[1]	USGS Grid_code	UAL (kg TP/ha/yr)
Agricultural	2000	81, 82	1.5
Forest, wetland, water	1750, 1850, 2140, 2150, 4000, 5000, 6000, 7430, 8000	11, 41, 42, 43, 91, 92	0.1
Barren land	7000	32	0.5

Units: 1 hectare (ha) = 2.47 acres, 1 kilogram (kg) = 2.2 pounds (lbs), 1 kg/ha/yr = 0.89 lbs/acre/yr

5.0 Water Quality Analysis

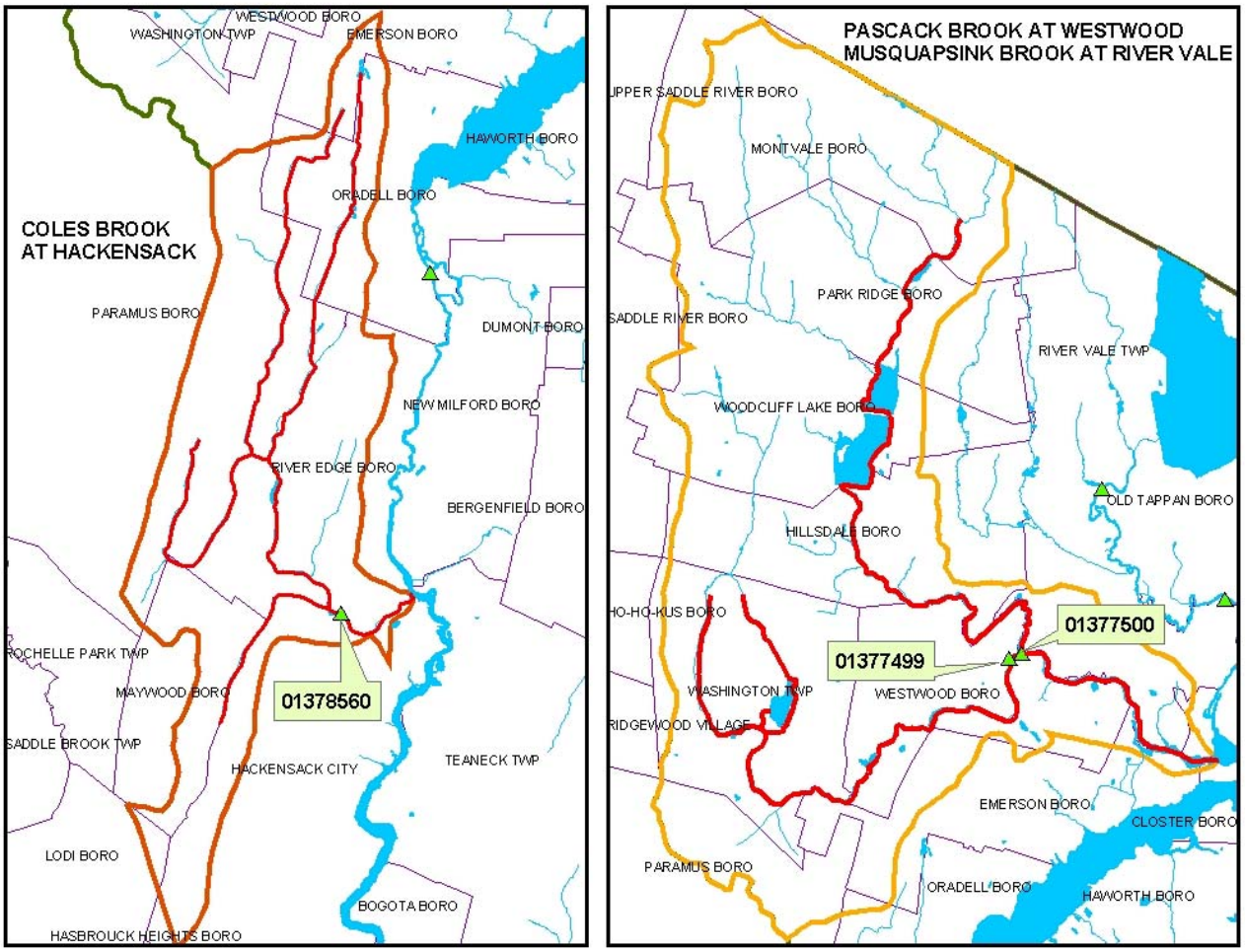
The data set used in this TMDL was generated by the USGS/NJDEP ambient monitoring program and the Department's supplemental monitoring project identified as the Existing Water Quality (EWQ) monitoring program. The USGS data spanned from November 1997 thru August 2003. The EWQ monitoring was conducted from August 2000 to August 2004. The sampling locations for the evaluated data are found in Figure 4. A summary of total phosphorus sampling data is found in Table 6 below. The full data set can be found in Appendix 2. Due to incomplete flow data available, some of the values within Appendix 2 were calculated by developing a stage/discharge relationship at the Coles Brook and Pascack Brook sampling sites. The calculated flow values were then used to perform the regression analyses in Section 6.0.

The information for Pascack Brook at Westwood and Musquapsink Brook at River Vale are, at times, addressed in the same figures and tables in this TMDL document. The monitoring station for Pascack Brook at Westwood (01377500) accurately characterizes the flows and water quality at Musquapsink Brook due to the Pascack station location directly below the confluence of the two streams. For this reason, the two impairments are addressed as one in certain areas of this document.

Table 6 Summary of Total Phosphorus sampling data

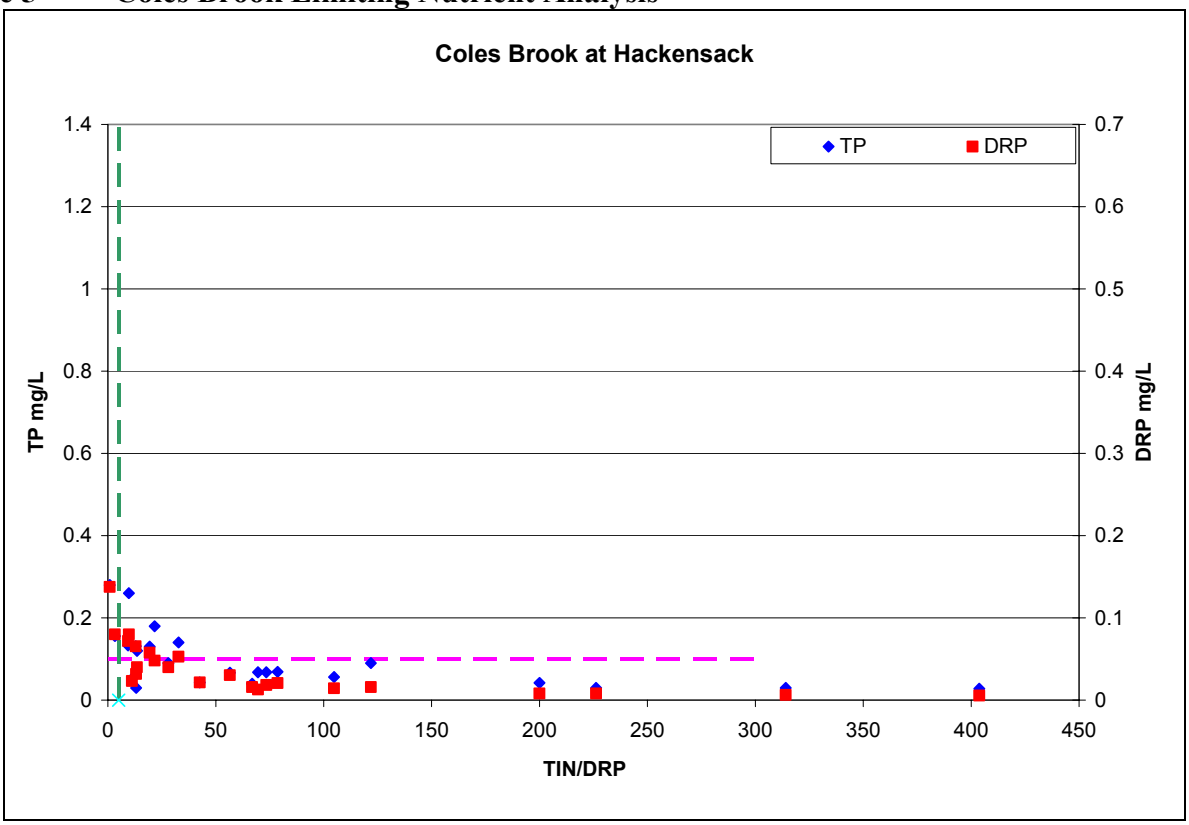
Water Quality Sample Locations	Site Number	# of samples	Average (mg/L)	% exceeding 0.1 mg/L
Coles Brook at Hackensack	01378560	24	0.10	37.5%
Pascack Brook at Westwood	01377500, 5-PAS-1	16	0.07	25%
Musquapsink Brook at River Vale	01377499	8	0.24	37.5%

Figure 4 Location of Monitoring Sites



The Department's March 2003 guidance document, entitled *"Technical Manual for Phosphorus Evaluations (N.J.A.C. 7:9B-1.14(c)) for NJPDES Discharge to Surface Water Permits"*, recommends considering ratios of nitrogen and phosphorus to suggest whether phosphorus is the limiting nutrient. When the ratio of total inorganic nitrogen (TIN) to total orthophosphate (TOP) or dissolved reactive phosphorus (DRP) is smaller than or equal to 5, then phosphorus is generally not limiting the system. This document may be downloaded from the Department's web page at www.state.nj.us/dep/dwq/techmans/phostcml.pdf. Figures 5-7 depict the relationship of these two key nutrients at each station. At these stations, when the total phosphorus exceeded 0.1 mg/L and the DRP < 0.05 mg/L, the ratio TIN/DRP exceeded 5. This suggests that phosphorus is the limiting nutrient and the 0.1 mg/l criterion applies. Detailed discussion of the nitrogen-phosphorus relationship is found in Appendix 4.

Figure 5 Coles Brook Limiting Nutrient Analysis



TIN = dissolved nitrite, nitrate and ammonia. TIN calculated as: a sum of dissolved ammonia (P00608) & dissolved nitrite and nitrate (P00631) or a sum of total ammonia (P00610) and total nitrite & nitrate (P00630)
DRP = dissolved reactive phosphorus: orthophosphorus (P00671) if available, or 80% dissolved phosphorus (P00666)

Figure 6 Pascack Brook Limiting Nutrient Analysis

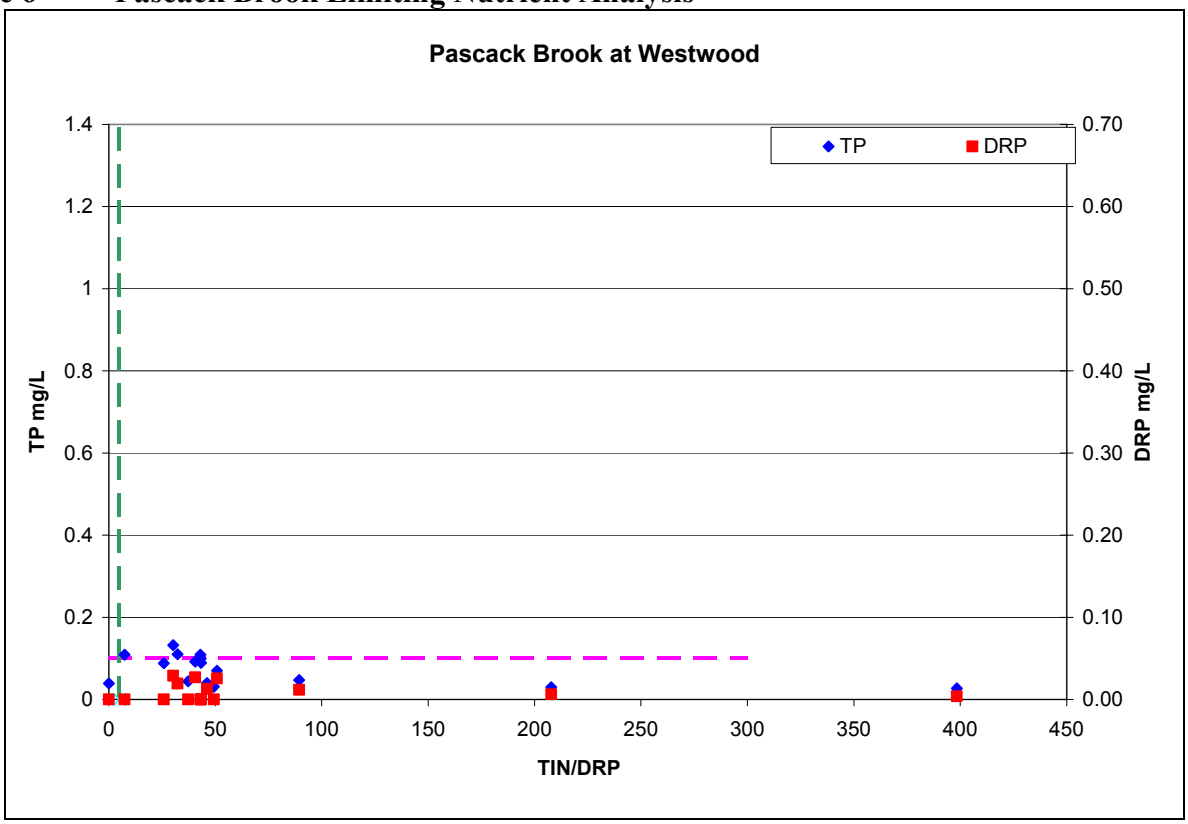
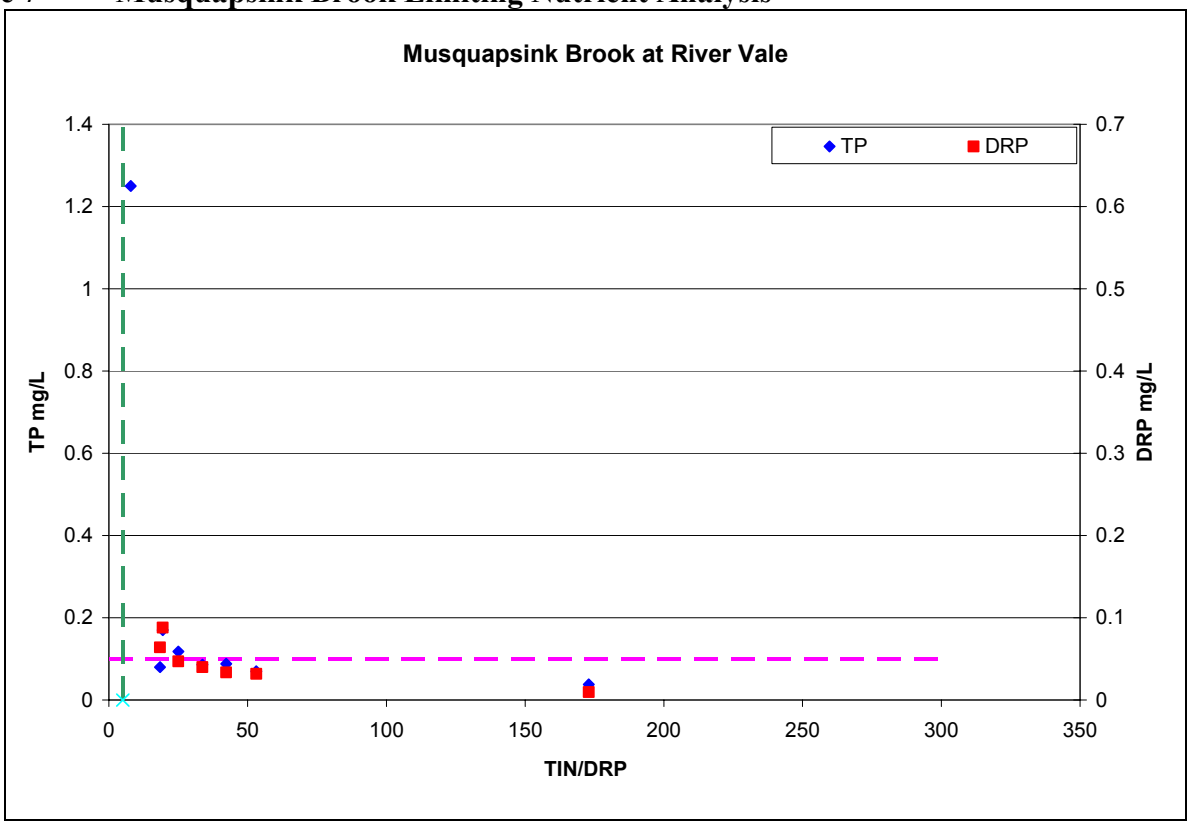


Figure 7 Musquapsink Brook Limiting Nutrient Analysis



Seasonal Variation/Critical Conditions

The application of a flow-integrated regression technique for determining loading reductions for impaired segments works well in watersheds that exhibit most of the loading exceedances from nonpoint and stormwater point sources of pollution. The analytical technique used to calculate these TMDLs represents the entire range of flows and all seasons for which the total phosphorus data were collected. Since the technique uses data from annual monitoring programs, seasonal variation and critical conditions are incorporated into the analysis by assessing the loadings over the entire range of flows. Therefore, the method implicitly represents all seasonal meteorological and hydrological conditions. The loading reduction calculated to attain SWQS will do so under all conditions, according to the data available. In this way, the TMDL addresses seasonal variation and critical conditions.

6.0 TMDL Calculations

A regression technique, derived from a load duration method (Stiles 2002), was developed by the Department for data-limited TMDLs where nonpoint and stormwater point sources are predominant. For this technique, linear regression is used to develop a flow-integrated relationship between measured pollutant concentrations and the associated flows at a single monitoring site. The method, known as the Flow-Integrated Reduction of Exceedances (FIRE), provides an accurate estimation of the load that will not cause an exceedance of the water quality standard. The FIRE method is applied over the entire range of flows, eliminating the need to establish a single target flow to estimate an average annual loading reduction. For this approach, calculated phosphorus loads based on actual data are plotted against corresponding flows. The regression relationship between the load and flow for exceedances of the SWQS is established and the regression line drawn. The target load line corresponding with the TP concentration of 0.1 mg/L is plotted on the same graph with the linear exceedance regression line. For this technique, a zero-intercept for the regression line is assumed. The zero intercept is within the 95 percent confidence interval, so the zero intercept cannot be rejected as the point of origin. In addition, given the predominance of nonpoint sources, at zero flow there would be zero load. Given a common intercept, the difference between the slopes of the two lines gives the percent load reduction needed to attain SWQS. The resultant percent reduction is the same whether the y-axis is expressed as pounds per day, pounds per year, or as metric units of kilograms per day or per year.

A Margin of Safety (MOS) must be provided to account for "lack of knowledge concerning the relationship between effluent limitations and water quality" (40 CFR 130.7(c)). A MOS accounts for uncertainty in the loading estimates, physical parameters and the model itself. The MOS, as described in USEPA guidance (Sutfin, 2002), can be either explicit or implicit (i.e., addressed through conservative assumptions used in establishing the TMDL). For this TMDL calculation, an explicit MOS has been incorporated as described below.

A percent loading reduction that includes a margin of safety is estimated by taking the difference between the upper 95 percent confidence limit of the slope of the exceedance regression line and the slope of the target loading. The margin of safety component is the difference between the exceedance regression line and the 95 percent confidence limit for the regression.

The regression results for the impaired segments are presented in Table 7 and 8, and Figure 8 and 9 below.

Table 7 **Coles Brook at Hackensack (01378560) Regression Analysis**

Results from Regression Analysis		
Target Loading Slope	**=**	**0.5390**
Exceedance Regression Slope	**=**	**0.7940**
Upper 95% Confidence Limit of Exceedance Regression Slope	**=**	**0.9927**

To achieve SWQS of 0.1 mg/L TP, the required reductions are as follows:

Required TP Load Reduction based on the regression line

$$(1-\frac{0.539}{0.7940})x100\% = 0.3212x100\% = 32.12\%$$

The portion of the reduction attributed to MOS is calculated as follows:

$$\text{MOS} = (1-\frac{0.794}{0.9927})x100\% = 0.2002x100\% = 20.02\%$$

Figure 8 Percent Reduction for the Coles Brook at Hackensack Using Regression Method

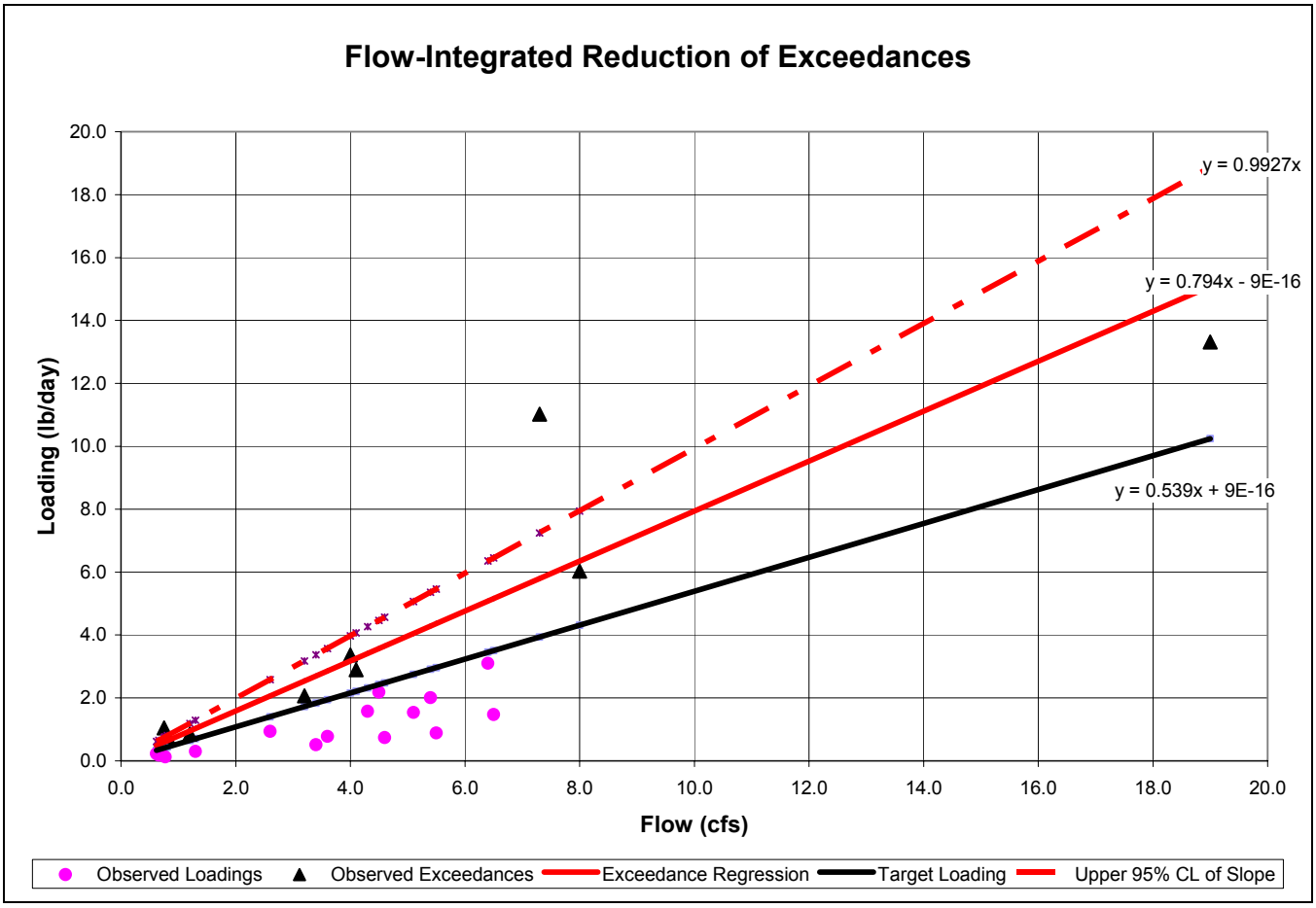


Table 8 Pascack Brook (01377500) and Musquapsink Brook (01377499) Regression Analysis

Results from Regression Analysis		
Target Loading Slope	**=**	**0.5390**
Exceedance Regression Slope	**=**	**0.6051**
Upper 95% Confidence Limit of Exceedance Regression Slope	**=**	**0.6824**

To achieve SWQS of 0.1 mg/L TP, the required reductions are as follows:

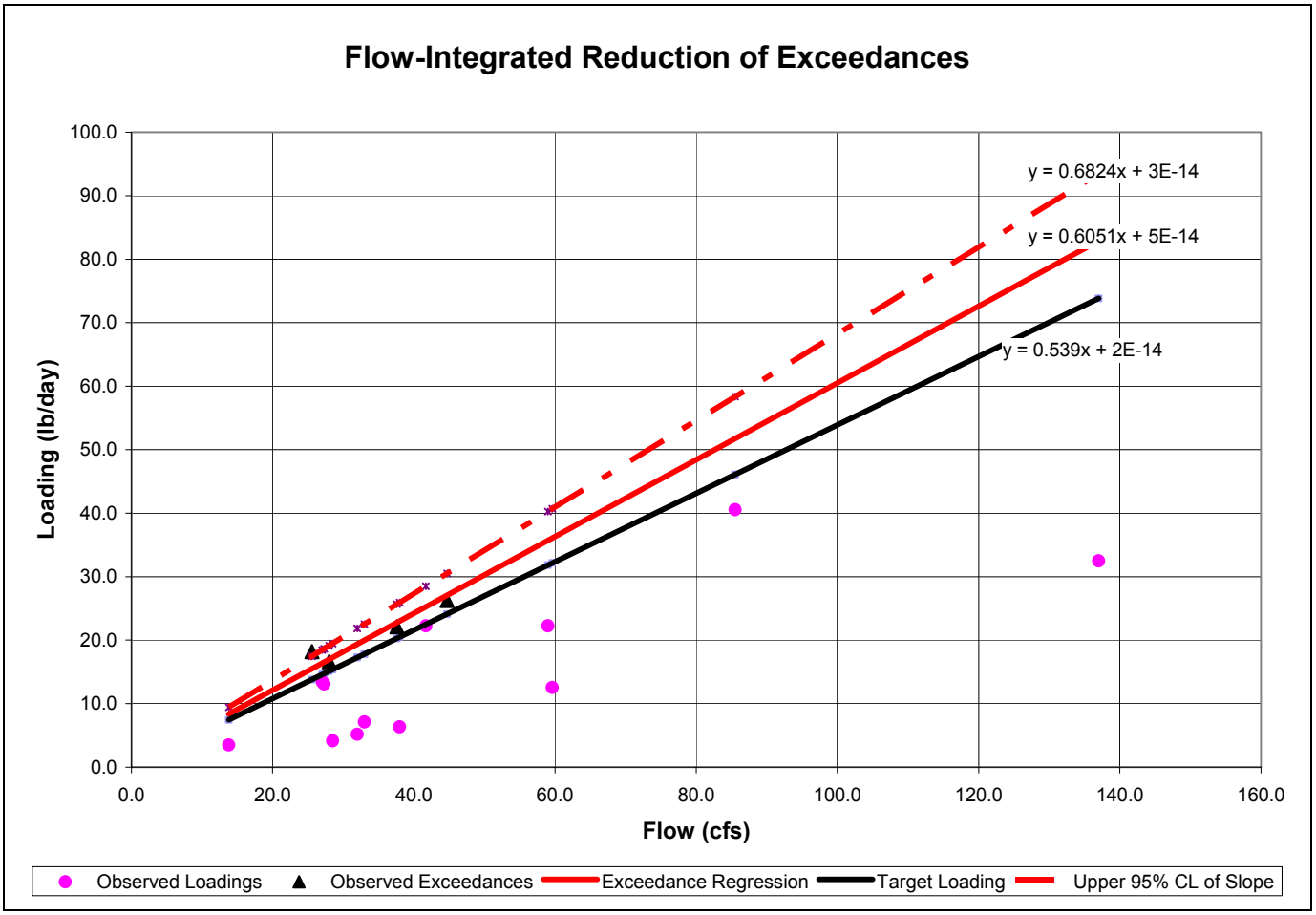
Required TP Load Reduction based on the regression line

$$(1-\frac{0.539}{0.6051})x100\% = 0.1092x100\% = 10.92\%$$

The portion of the loading reduction attributed to MOS is:

$$\text{MOS} = (1-\frac{0.6051}{0.6824})x100\% = 0.1132x100\% = 11.32\%$$

Figure 9 Percent Reduction for Pascack Brook and Musquapsink Brook Using Regression Method



To determine the TMDL for each stream segment, the target load is calculated as shown above. The load that corresponds to the MOS is calculated and then subtracted from the target load. The result is the allocable load. Loads from some land uses, specifically forest, wetland, water and barren land, are not adjustable. There are no measures that can reasonably be applied to runoff from these sources to reduce the loads generated. As a result, existing loads from these sources are equal to the future loads. Therefore, in order to achieve the TMDL, the load reduction from land uses for which reduction measures can reasonably be applied must be increased proportionally. The procedure to do this is described in more detail in Appendix 5.

Wasteload Allocations and Load Allocations

WLAs are established for all point sources, while LAs are established for nonpoint sources, as these terms are defined in "Source Assessment." There are no point sources, other than stormwater point sources in the affected streamsheds. Both WLAs and LAs are expressed as percent reductions for particular stream segments, and are differentiated as discussed below.

Stormwater discharges can be a point source or a nonpoint source, depending on NJPDES regulatory jurisdiction, yet the suite of measures to achieve reduction of loads from stormwater discharges is the same, regardless of this distinction. Stormwater point sources receiving a WLA are distinguished from

stormwater generating areas receiving a LA on the basis of land use. 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 9. 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 9 Distribution of WLAs and LAs among source categories

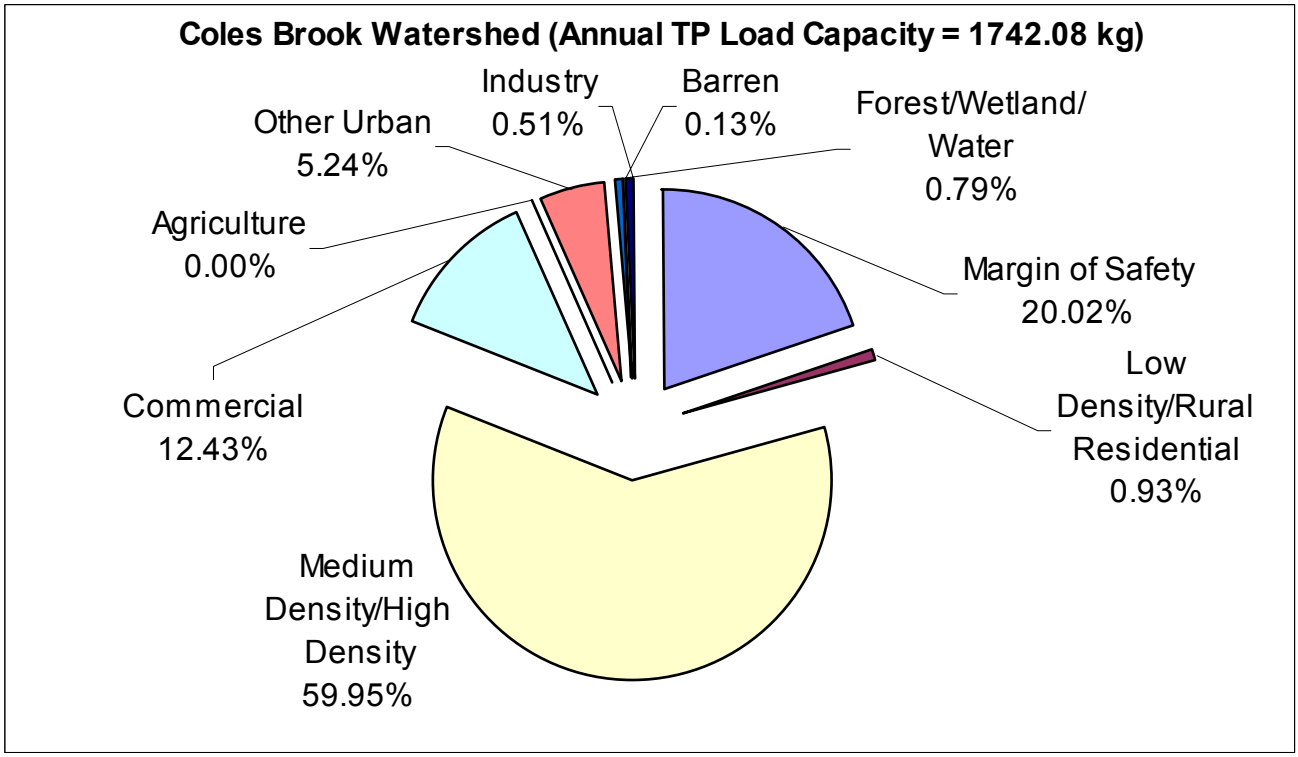
Source Category	TMDL Allocation
Nonpoint and Stormwater Sources	
Medium / high density residential	WLA
Low density / rural residential	WLA
Commercial	WLA
Industrial	WLA
Mixed urban / other urban	WLA
Agricultural	LA
Forest, wetland, water	LA
Barren land	LA

Wasteload allocations and load allocations for sources within the drainage area of the impaired segment are presented in Tables 10 and 11, and in Figures 10 and 11.

Table 10 TMDL calculations for the Coles Brook at Hackensack (01378560)

	Coles Brook Watershed			
	Current kg TP/yr (lbs/yr)	**Reduced kg TP/yr (lbs/yr)**	**% of Current Load**	**% Reduction**
Impaired Stream Calculated Load	2566.41 (5657.97)	n/a	100%	n/a
Loading capacity (LC)	n/a	1742.08 (3840.63)	67.88%	n/a
Load allocation (LC-MOS)	n/a	1393.32 (3071.75)	54.29%	n/a
Point Sources other than Stormwater	n/a			
Nonpoint and Stormwater Sources	**kg TP/yr (lbs/yr)**	**kg TP/yr (lbs/yr)**	**% of LC**	**% Reduction**
Medium / high density residential	1933.94 (4263.60)	1044.40 (2302.51)	59.95%	46.00%
Low density / rural residential	29.94 (66.00)	16.17 (35.65)	0.93%	46.00%
Commercial	401.13 (884.34)	216.62 (477.57)	12.43%	46.00%
Industrial	16.48 (36.33)	8.90 (19.62)	0.51%	46.00%
Mixed urban / other urban	168.93 (372.43)	91.23 (201.13)	5.24%	46.00%
Agricultural	0	0	0%	46.00%
Forest, wetland, water	13.83 (30.49)	13.83 (30.49)	0.79%	0%
Barren land	2.17 (4.78)	2.17 (4.78)	0.12%	0%
Margin of Safety (MOS)	n/a	348.76 (768.88)	22.63%	n/a
TOTAL	2566.41 (5657.97)	1742.08 (3840.63)	100.00%	32.12%

Figure 10 Phosphorus allocations for the Coles Brook at Hackensack (01378560)



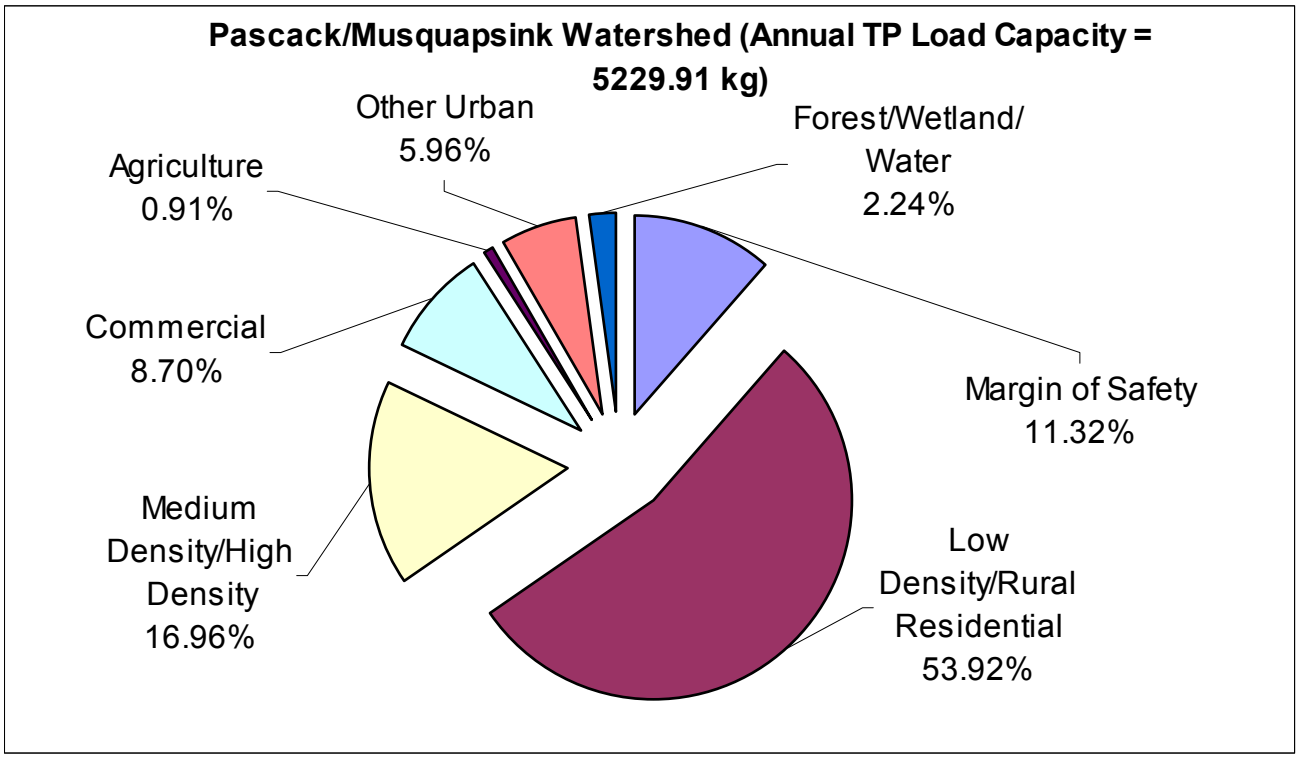
Where portions of the Pascack Brook watershed are located in New York State, the TP TMDL calculations below should be used as guidance for developing a load reduction level. New York State shall separately evaluate the headwaters' contributory TP load to the stream in detail. The TMDL for Pascack Brook requires the TP stream concentration meet the SWQS of 0.1 mg/l where the headwaters of the impaired segment enter New Jersey.

Table 11 TMDL calculations for Pascack Brook (01377500) and Musquapsink Brook (01377499)

	Pascack/Musquapsink			
	Current kg TP/yr (lbs/yr)	**Reduced kg TP/yr (lbs/yr)**	**% of Current Load**	**% Reduction**
Impaired Stream Calculated Load	5871.02 (12943.38)	n/a	100%	n/a
Loading capacity (LC)	n/a	5229.91 (11529.98)	89.08%	n/a
Load allocation (LC-MOS)	n/a	4637.88 (10224.78)	79.00%	n/a
Point Sources other than Stormwater	n/a			
Nonpoint and Stormwater Sources	**kg TP/yr (lbs/yr)**	**kg TP/yr (lbs/yr)**	**% of LC**	**% Reduction**
Medium / high density residential	1128.87 (2488.73)	886.95 (1955.39)	16.96%	21.43%
Low density / rural residential	3589.07 (7912.54)	2819.90 (6216.82)	53.92%	21.43%
Commercial	579.16 (1276.83)	455.04 (1003.19)	8.70%	21.43%
Industrial	0	0	0%	21.43%
Mixed urban / other urban	396.44 (874.00)	311.48 (686.70)	5.96%	21.43%
Agricultural	60.39 (133.14)	47.45 (104.61)	0.91%	21.43%
Forest, wetland, water	117.09 (258.14)	117.09 (258.14)	2.24%	0%
Barren land	0	0	0%	0%
Margin of Safety (MOS)	n/a	592.03 (1305.20)	11.32%	n/a
TOTAL	5871.02 (12943.38)	5229.91 (11529.98)	100.00%	10.92%

Figure 11 Phosphorus allocations for the Pascack Brook at Westwood (01377500) and

Musquapsink Brook at River Vale (01377499)



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 at this time. The loading capacity of each stream is expressed as a function of the current load, and both WLAs and LAs are expressed as percentage reductions for particular stream segments. Therefore, the percent reductions from current levels must be attained in consideration of any new sources that may accompany future development.

7.0 Follow-up Monitoring

The Water Resources Division of the U.S. Geological Survey and the Department have cooperatively operated the Ambient Stream Monitoring Network (ASMN) in New Jersey since the 1970s. The ASMN currently includes approximately 115 stations that are routinely monitored on a quarterly basis. A second ambient monitoring network, NJDEP's Supplemental Ambient Surface Water Network (100 stations), has improved spatial coverage for water quality monitoring in New Jersey. The data from this these networks have been used to assess the quality of freshwater streams and percent load reductions. The ambient networks, as well as targeted studies, will be the means to determine the effectiveness of TMDL implementation and the need for additional management strategies.

8.0 Implementation Plan

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, siting criteria, operating methods, or other alternatives" (USEPA, 1993).

The Department recognizes that TMDLs alone are not sufficient to restore impaired stream segments. The TMDL establishes the required pollutant reduction targets while the implementation plan identifies some of the regulatory and non-regulatory tools to achieve the reductions, matches management measures with sources, and suggests responsible entities for non-regulatory tools. This provides a basis for aligning available resources to assist with implementation activities. Projects proposed by the State, local government units and other stakeholders that would implement the measures identified within the impaired watershed are a priority for available State (for example, CBT) and federal (for example, 319(h)) funds. In addition, the Department's ongoing watershed management initiative will develop detailed watershed restoration plans for impaired stream segments in a priority order that will identify more specific measures to achieve the identified load reductions.

The stormwater facilities subject to regulation under NPDES in this watershed must be assigned WLAs. The WLAs for these point sources are expressed in terms of the required percent reduction for nonpoint sources and are applied to the land use categories that correspond to the areas regulated under industrial and municipal stormwater programs. The BMPs required through stormwater permits, including the additional measure discussed below, are generally expected to achieve the required load reductions. The success of these measures will be assessed through follow up monitoring. As needed through adaptive management, other additional measures may need to be identified and included in stormwater permits. Follow up monitoring or watershed restoration plans may determine that other additional measures are required, which would then be incorporated into Phase II permits. Additional measures that may be considered include, for example, more frequent street sweeping and inlet cleaning, or retrofit of

stormwater management facilities to include nutrient removal. A more detailed discussion of stormwater source control measures follows.

On February 2, 2004 the Department promulgated two sets of stormwater rules: The Phase II New Jersey Pollutant Discharge Elimination System (NJPDES) Stormwater Rules, N.J.A.C. 7:14A and the Stormwater Management Rules, N.J.A.C. 7:8

Municipal Stormwater Regulation Program

The Phase II NJPDES rules for the Municipal Stormwater Regulation Program require municipalities, highway agencies, and regulated "public complexes" to develop stormwater management programs consistent with the NJPDES permit requirements. The stormwater discharged through "municipal separate storm sewer systems" (MS4s) is regulated under the Department's Phase II NJPDES stormwater rules. Under these rules and associated general permits, Tier A municipalities are required to implement various control measures that should substantially reduce phosphorus loadings in the impaired watersheds. These control measures include adoption and enforcement of a pet waste disposal ordinance, prohibiting the feeding of unconfined wildlife on public property, cleaning catch basins, performing good housekeeping at maintenance yards, and providing related public education and employee training. These basic requirements will provide for a measure of load reduction from existing development. As the Phase II stormwater rules are a federal mandate, New York has also developed a municipal stormwater program.

Each impaired watershed was assessed for the applicability of a mandatory low phosphorous fertilizer ordinance to aid in the reduction of phosphorus loading from nonpoint sources. If the watershed contained a high percentage of agricultural land uses, it was determined that the greatest nonpoint source reductions would be achieved through the implementation of agricultural BMPs, and therefore the low phosphorus fertilizer ordinance for urban land uses was not required as an additional measure. However, in those sub-watersheds which contained a small percentage of agricultural land uses, and a high percentage of urban land uses, it was determined that the low phosphorus fertilizer ordinance was necessary in order to effectively reduce the phosphorus load originating from the urban land uses.

In the impaired watersheds covered by these established TMDLs, it was determined that the low phosphorus fertilizer ordinance was required based on the guidelines provided above.

Therefore, all municipalities with contributory drainage area into the impaired stream segments will be required to adopt an ordinance as an additional measure that prohibits the outdoor application of fertilizer other than low phosphorus fertilizer, consistent with a model ordinance provided by the Department. Fertilizer does not include animal or vegetable manure or compost. This model ordinance has been posted on www.njstormwater.org. The additional measure is as follows:

Low Phosphorus Fertilizer Ordinance

Minimum Standard – Municipalities listed in Appendix 3 shall adopt and enforce an ordinance, consistent with a model ordinance provided by the Department, to prohibit the outdoor application of fertilizer other than low phosphorus fertilizer, except:

Any application of fertilizer at a commercial farm that is exempted by the Right to Farm Act, N.J.S.A. 4:1C-1 et seq.

Any application of fertilizer needed for establishing new vegetation after land disturbance 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.

Measurable Goal - Municipalities listed in Appendix 3 shall certify annually that they have met the Low Phosphorus Fertilizer Ordinance minimum standard.

Implementation - Within 6 months from adoption of the TMDL, municipalities listed in Appendix 3 shall have fully implemented the Low Phosphorus Fertilizer Ordinance minimum standard.

Stormwater Management Rules

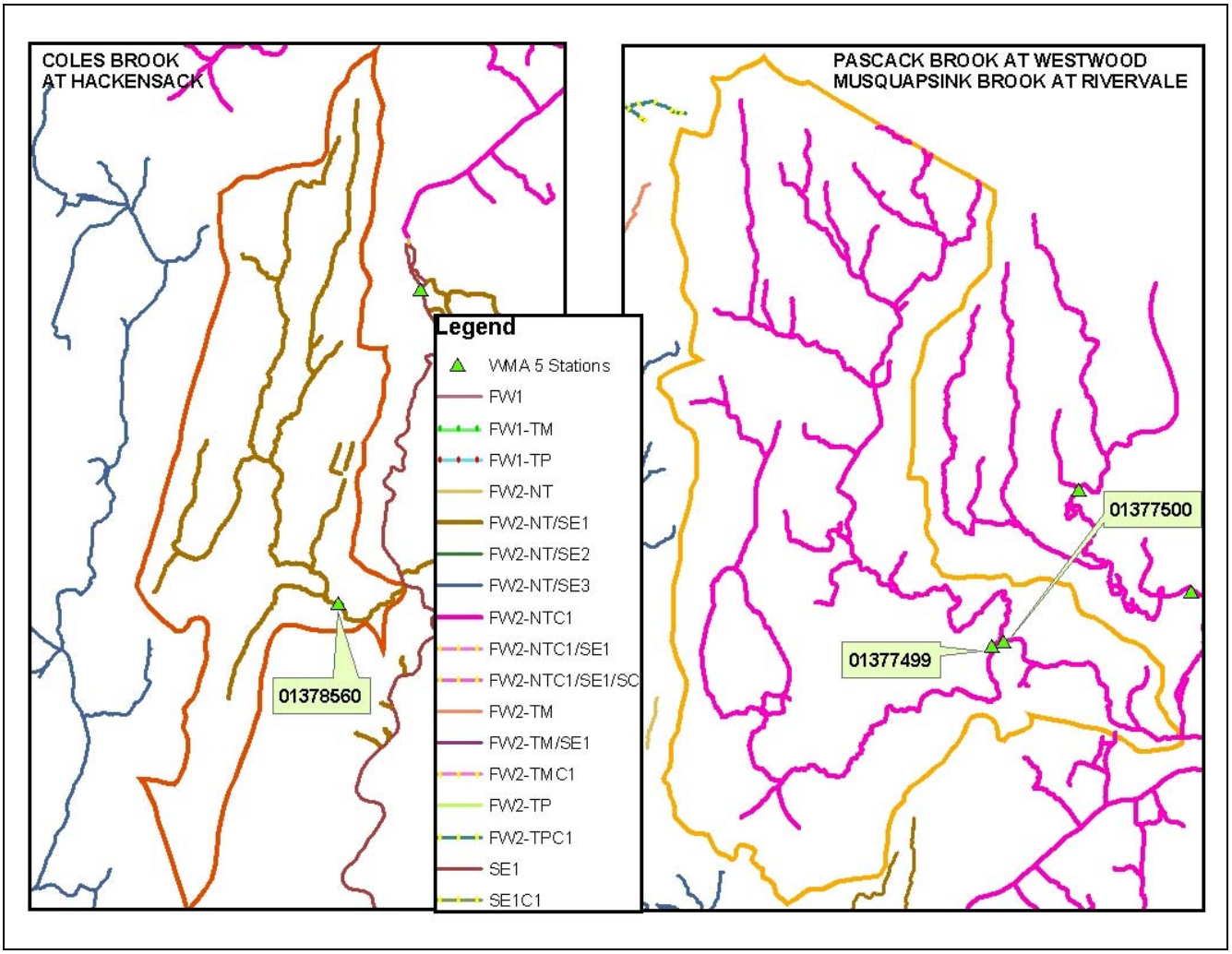
The Stormwater Management Rules have been updated for the first time since their original adoption in 1983. These rules establish statewide minimum standards for stormwater management in new development, and the ability to analyze and establish region-specific performance standards targeted to the impairments and other stormwater runoff related issues within a particular drainage basin through regional stormwater management plans. The Stormwater Management Rules are currently implemented through the Residential Site Improvement Standards (RSIS) and the Department's Land Use Regulation Program (LURP) in the review of permits such as freshwater wetlands, stream encroachment, CAFRA, and Waterfront Development.

The Stormwater Management Rules focus on the prevention and minimization of stormwater runoff and pollutants in the management of stormwater. The rules require every project to evaluate methods to prevent pollutants from becoming available to stormwater runoff and to design the project to minimize runoff impacts from new development through better site design, also known as low impact development. Some of the issues that are required to be assessed for the site are the maintenance of existing vegetation, minimizing and disconnecting impervious surfaces, and pollution prevention techniques. In addition, performance standards are established to address existing groundwater that contributes to baseflow and aquifers, to prevent increases to flooding and erosion, and to provide water quality treatment through stormwater management measures for TSS and nutrients.

As part of the requirements under the municipal stormwater permitting program, municipalities are required to adopt and implement municipal stormwater management plans and stormwater control ordinances consistent with the requirements of the stormwater management rules. As such, in addition to changes in the design of projects regulated through the RSIS and LURP, municipalities will also be updating their regulatory requirements to provide the additional protections in the Stormwater Management Rules within approximately two years of the issuance of the NJPDES General Permit Authorization.

Furthermore, the New Jersey Stormwater Management Rules establish a 300-foot special water resource protection area (SWRPA) around Category One (C1) waterbodies and their intermittent and perennial tributaries, within the HUC 14 subwatershed. In the SWRPA, new development is typically limited to existing disturbed areas to maintain the integrity of the C1 waterbody. C1 waters receive the highest form of water quality protection in the state, which prohibits any measurable deterioration in the existing water quality. Figure 12 shows the category one (C1) waterways in the Pascack Brook/Musquapsink Brook Watershed. Definitions for surface water classifications, detailed segment description, and designated uses may be found in various amendments to the Surface Water Quality Standards at www.state.nj.us/dep/wmm/sgwqt/sgwqt.html.

Figure 12 Category One Waterways within Coles Brook, Pascack Brook, and Musquapsink Brook



Segment Specific Measures

Source assessment within the impaired watersheds was conducted previously by the Department for the recently completed fecal coliform TMDLs and as part of the March 2005 Draft *Watershed Characterization and Assessment Report* prepared by Malcolm Pirnie for the Bergen County Department of Health Services. The findings confirm most of the sources will respond to the municipal stormwater management program basic measures and the additional measure established through this TMDL report. Corporate lawns and goose populations were identified as sources that need to be addressed beyond these measures. Goose management programs and corporate stewardship programs to effect alternative landscaping practices that minimize goose habitat and the need for fertilizer are the implementation measures identified to respond to these sources.

<u>Coles Brook (Site ID # 01378560)</u>

Based on the documented land uses in this watershed, total phosphorus loads are primarily contributed by runoff from high/medium residential properties and commercial lands. More specific sources include geese, pet waste, and fertilization of lawns and golf courses. According to data collected by United Water, headwaters and tributaries of the Pascack Brook show no signs of

phosphorus as being a concern until at least 1.0 mile downstream of Woodcliff Lake. Since the predominant land use downstream of Woodcliff Lake is residential, targeted programs should be developed and implemented to educate homeowners on stormwater management and the proper application of fertilizers. Since this watershed area is sewered, onsite wastewater treatment systems are not a potential source of pollution in this watershed. No agriculture is located in this watershed. Geese/waterfowl, disposable diapers, and dog waste were observed at Van Saun Park. Geese were observed at the Emerson Golf Course, Paramus Middle School alongside Behnke Brook (feeds into Coles Brook) and at commercial complexes. A zoo was observed but is serviced by sanitary sewers. Community based goose management programs are recommended as an implementation measure.

Musquapsink Brook at River Vale (Site ID #01377499) and Pascack Brook at Westwood (Site ID #01377500)

Canada Geese were observed at elementary school ballfields and nearby cemeteries in the Musquapsink Brook watershed. For Pascack Brook, a potential source of phosphorus is the Canada goose populations at Washington Lake, now known as Schlegel Lake in Washington Township. Schlegel Lake is a private waterbody, owned by the surrounding homeowners. Other sources included: Woodcliff Lake Reservoir, Corporate Parks in Montvale (source of geese droppings to Bear Brook which feeds into Pascack Brook). A goose management strategy should be developed for Schlegel Lake, for athletic fields and cemeteries, and commercial complexes that maintain large areas of grass. These areas provide habitat areas for Canada geese. A goose management strategy will reduce both fecal coliform and phosphorus load generated by the goose population. Efforts to reduce eutrophication in Schlegel Lake will benefit the overall watershed and the potable water supply to which the Musquapsink Brook flows. Commercial complexes with large area of grass also need to be fertilized; an inventory of the commercial facilities should be prepared and a targeted plan to promote alternative landscaping strategies should be implemented.

Current Implementation Projects

The Hackensack Riverkeeper, Inc. was awarded a 319(h) grant on February 9, 2001 to restore approximately 750 linear feet of Coles Brook. The subject area is located adjacent to Staib Park, Bergen County, New Jersey. The restoration project included:

- A decrease in impervious surfaces, which currently abut the riparian area;
- An increase in buffer area, which acts as a filtration for storm water runoff;
- In-stream bioengineering, which helps prevent further and future stream bank erosion;
- Bank stabilization through vegetative management;
- Erosion control; and
- A public stewardship and awareness program for local residents, schools, industries, and government officials.

Also, the Bergen County Department of Parks was awarded a 319(h) grant in 2002 to perform erosion control work on Van Saun Brook.

Priority Stream Segment Restoration Plans

In addition to the generic and specific, current and future implementation measures identified above, the Department, through its watershed management program, is undertaking the development of watershed restoration plans for priority stream segments. These restoration plans will identify specific measures and the means to accomplish them, beyond those identified in this TMDL report, that will assist in

attainment of the required load reductions. Due to the number of TMDLs recently generated, the Department must prioritize which stream segments will be the focus of initial consideration. The Department's nutrient policy states that, "Except as due to natural conditions, nutrients shall not be allowed in concentrations that cause objectionable algal densities, nuisance aquatic vegetation, abnormal diurnal fluctuations in dissolved oxygen or pH, changes to the composition of aquatic ecosystems, or otherwise render the water unsuitable for the designated uses (N.J.A.C. 7:9B-1.5(g)3)." With respect to nutrient TMDLs, the initial priority will be given to those streams where use impairments exist in the impaired stream or downstream lakes, beyond simple exceedance of the water quality criterion. Other priority considerations include:

- Headwater area;
- Proximity to drinking water supply;
- Proximity to recreation area;
- Possibility of adverse human health conditions;
- Proximity to a lake intake;
- Existence of eutrophication;
- Phosphorus is identified as the limiting nutrient;
- Existence of use impairments;
- Ability to create a measurable change;
- Probability of human source;
- Stream Classifications;
- High success level.

9.0 Reasonable Assurance

Commitment to carry out the activities described in the implementation plan to reduce phosphorus loads provides reasonable assurance that the SWQS will be attained for phosphorus in the (name of watershed/WMA or Water region). Reasonable Assurance for the implementation of these TMDLs has been considered for point and nonpoint sources for which phosphorus load reductions are necessary. Moreover, stormwater sources for which WLAs have been established will be regulated as NJPDES point sources. Follow-up monitoring will identify if the strategies implemented are completely, or only partially successful. It will then be determined if other management measures can be implemented to fully attain the SWQS or if it will be necessary to consider other approaches, such as use attainability.

10.0 Public Participation

The Water Quality Management Planning Rules at NJAC 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 shall propose each TMDL as an amendment to the appropriate area-wide water quality management plan in accordance with procedures at N.J.A.C. 7:15-3.4(g).

Outreach was performed in the form of presenting the TMDL process and method used in this document at the WMA 5 TAC meeting on May 17th, 2005. Printed, detailed maps of the three impaired segments were distributed. In addition, electronic maps showing the spatial extent of the impaired segments and a PowerPoint presentation describing the TMDL process and method used were posted online at http://www.state.nj.us/dep/watershedmgt/tmdl_segments.htm on June 1st, 2005 and public comment was solicited.

Amendment Process

In accordance with N.J.A.C. 7:15–7.2(g), these TMDLs were proposed by the Department as an amendment to the Northeast WQMP. Notice proposing these TMDLs was published on July 5, 2005 in the New Jersey Register and in newspapers of general circulation in the affected area in order to provide the public an opportunity to review the TMDLs and submit comments. In addition, a public hearing was held on the established TMDLs on August 9, 2005 with an informal presentation from 7:00 to 7:30pm, and the public hearing from 7:30 to 9:00pm at the Bergen County Dept. of Health Services, Community Services Building, 327 East Ridgewood Avenue, Paramus, New Jersey 07652-4895. Notice of the proposal and the hearing was provided to affected municipalities. The Department considered all timely comments prior to making a decision to adopt these TMDLs. The outcome of the public participation process is described in Appendix 6.

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Appendix 1: Database of Phosphorus Export Coefficients

In December 2001, the Department concluded a contract with the USEPA, Region 2, and a contracting entity, TetraTech, Inc., the purpose of which was to identify export coefficients applicable to New Jersey. As part of that contract, a database of literature values was assembled that includes approximately four-thousand values accompanied by site-specific characteristics such as location, soil type, mean annual rainfall, and site percent-impervious. In conjunction with the database, the contractor reported on recommendations for selecting values for use in New Jersey. Analysis of mean annual rainfall data revealed noticeable trends, and, of the categories analyzed, was shown to have the most influence on the reported export coefficients. Incorporating this and other contractor recommendations, the Department took steps to identify appropriate export values for these TMDLs by first filtering the database to include only those studies whose reported mean annual rainfall was between 40 and 51 inches per year. From the remaining studies, total phosphorus values were selected based on best professional judgment for eight land uses categories.

The sources incorporated in the database include a variety of governmental and non-governmental documents. All values used to develop the database and the total phosphorus values in this document are included in the below reference list.

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Appendix 2: Database of Sampling Results

		Total or Dissolved NH3-P00610 or P00608	Total or dissolved NO3+NO2-P00630 or P00631	Ortho P or 80% of total dissolved phosphorus-P00671 or P00666	TP - P00665		Discharge Inst. Flow, P00061	
Sample Date	**Station ID**	**NH_3**	**$NO_3 + NO_2$**	**DRP**	**TP**	**TIN/DRP**	**Flow, cfs**	**Data Source**
11/23/1998	1377499	0.03	1.15	0.064	0.08	18.44	n/a	USGS
2/4/1999	1377499	0.18	1.52	0.032	0.07	53.13	n/a	USGS
5/6/1999	1377499	0.03	1.68	0.088	0.17	19.43	n/a	USGS
8/24/1999	1377499	0.03	7.62	0.968	1.25	7.90	n/a	USGS
11/18/1999	1377499	0.06	1.36	0.0336	0.088	42.26	n/a	USGS
2/8/2000	1377499	0.04	1.62	0.0096	0.038	172.92	n/a	USGS
5/23/2000	1377499	0.19	0.99	0.0472	0.118	25.00	n/a	USGS
9/7/2000	1377499	0.03	1.32	0.04	0.086	33.75	n/a	USGS
11/5/1997	1377500	0.03	0.56	0.01	0.04	46.09	33.0	USGS
2/9/1998	1377500	0.03	1.3	0.01	0.03	207.81	32.0	USGS
5/19/1998	1377500	0.14	1.16	0.03	0.07	50.78	59.0	USGS
9/10/1998	1377500	0.03	0.59	0.02	0.11	32.29	28.0	USGS
11/22/1999	1377500	0.03	1	0.01	0.047	89.41	13.8	USGS
2/8/2000	1377500	0.03	1.5	0.00	0.027	398.44	28.5	USGS
5/25/2000	1377500	0.13	0.96	0.03	0.092	40.55	27.0	USGS
9/6/2000	1377500	0.05	0.82	0.03	0.132	30.21	25.6	USGS
11/13/02	1377500	0.038	0.542	0.078	0.109	7.44	37.6*	EWQ
2/24/03	1377500	0.173	1.13	0.035	0.044	37.23	137.0	EWQ
6/9/03	1377500	0.146	0.862	0.039	0.088	25.85	85.5	EWQ
9/8/03	1377500	0.053	1.03	0.025	0.089	43.32	27.3	EWQ
12/2/2003	1377500	0.133	1.2	0.027	0.031	49.37	38.0	EWQ
3/1/04	1377500	0.064	1.46	Non-Detect	0.039	Non-Calc	59.6*	EWQ
5/18/04	1377500	0.127	1.04	0.027	0.099	43.22	41.7*	EWQ
8/19/04	1377500	0.112	1.05	0.027	0.109	43.04	44.7*	EWQ
11/5/1997	1378560	0.03	1.04	0.016	0.04	66.88	3.6	USGS
2/3/1998	1378560	0.03	1.78	0.008	0.03	226.25	4.6	USGS
5/18/1998	1378560	0.21	1.74	0.016	0.09	121.88	6.4	USGS
8/4/1998	1378560	0.2	0.84	0.048	0.18	21.67	0.81	USGS
11/4/1998	1378560	0.03	0.39	0.032	0.03	13.13	0.77	USGS
1/25/1999	1378560	0.07	1.05	0.04	0.09	28.00	4.5	USGS
5/5/1999	1378560	0.03	0.51	0.04	0.12	13.50	3.2	USGS
8/4/1999	1378560	0.44	0.34	0.08	0.26	9.75	0.75	USGS
11/3/1999	1378560	0.03	0.09	0.1376	0.28	0.87	7.3	USGS
2/23/2000	1378560	0.07	1.53	0.008	0.042	200.00	6.5	USGS
5/2/2000	1378560	0.13	1.38	0.0144	0.056	104.86	5.1	USGS
8/23/2000	1378560	0.03	1.69	0.0304	0.067	56.58	2.6	USGS
11/1/2000	1378560	0.07	0.85	0.0216	0.043	42.59	1.3	USGS
2/13/2001	1378560	0.06	1.95	0.0064	0.03	314.06	5.5	USGS
5/3/2001	1378560	0.15	1.2	0.0184	0.068	73.37	4.3	USGS
8/13/2001	1378560	0.12	0.73	0.0656	0.131	12.96	4.1	USGS
11/14/2001	1378560	0.09	0.17	0.0232	0.052	11.21	0.66	USGS
3/13/2002	1378560	0.05	0.84	0.0128	0.068	69.53	0.62	USGS

5/28/2002	1378560	0.27	1.46	0.0528	0.14	32.77	8*	USGS
8/7/2002	1378560	0.08	0.59	0.072	0.133	9.31	1.2	USGS
11/14/2002	1378560	0.03	0.23	0.08	0.156	3.25	4	USGS
2/3/2003	1378560	0.101	2.16	0.0056	0.028	403.75	3.4	USGS
5/29/2003	1378560	0.215	1.42	0.0208	0.069	78.61	5.4	USGS
8/6/2003	1378560	0.195	0.92	0.0576	0.13	19.36	19	USGS

Footnote: * - These values were calculated by developing a stage/discharge relationship at this site. The values were then used to perform the regression analysis.

Appendix 3: Tier A Municipalities in Affected Drainage Areas

NJPDES Permit No.	Facility/Municipality Name	Discharge Type	Receiving Waterbody	Additional Measures
NJG0150061	Emerson Boro	Tier A Municipal Stormwater General Permit	Coles & Musquapsink	Low phosphorus ordinance
NJG0154504	Hackensack City	Tier A Municipal Stormwater General Permit	Coles Brook	Low phosphorus ordinance
NJG0151718	Harrington Park Boro	Tier A Municipal Stormwater General Permit	Pascack Brook	Low phosphorus ordinance
NJG0148202	Hillsdale Boro	Tier A Municipal Stormwater General Permit	Pascack & Musquapsink	Low phosphorus ordinance
NJG0150118	Lodi Boro	Tier A Municipal Stormwater General Permit	Coles Brook	Low phosphorus ordinance
NJG0152561	Maywood Boro	Tier A Municipal Stormwater General Permit	Coles Brook	Low phosphorus ordinance
NJG0153761	Montvale Boro	Tier A Municipal Stormwater General Permit	Pascack Brook	Low phosphorus ordinance
NJG0150525	Oradell Boro	Tier A Municipal Stormwater General Permit	Coles & Musquapsink	Low phosphorus ordinance
NJG0148288	Paramus Boro	Tier A Municipal Stormwater General Permit	Coles & Musquapsink	Low phosphorus ordinance
NJG0154539	Park Ridge Boro	Tier A Municipal Stormwater General Permit	Pascack Brook	Low phosphorus ordinance
NJG0150142	River Edge Boro	Tier A Municipal Stormwater General Permit	Coles Brook	Low phosphorus ordinance
NJG0152927	River Vale Twp	Tier A Municipal Stormwater General Permit	Pascack Brook	Low phosphorus ordinance
NJG0150541	Saddle River Boro	Tier A Municipal Stormwater General Permit	Pascack & Musquapsink	Low phosphorus ordinance
NJG0147729	Washington Twp	Tier A Municipal Stormwater General Permit	Pascack & Musquapsink	Low phosphorus ordinance
NJG0148462	Westwood Boro	Tier A Municipal Stormwater General Permit	Pascack & Musquapsink	Low phosphorus ordinance
NJG0149900	Woodcliff Lake Boro	Tier A Municipal Stormwater General Permit	Pascack & Musquapsink	Low phosphorus ordinance
n/a	Clarkstown (NY)	n/a	Pascack Brook	n/a
n/a	Orangetown (NY)	n/a	Pascack Brook	n/a
n/a	Ramapo (NY)	n/a	Pascack Brook	n/a

Appendix 4: Phosphorus Criterion Applicability Determination

This discussion is taken from the New Jersey Department of Environmental Protection's 2003 report, *Technical Manual for Phosphorus Evaluation for NJPDES Discharge to Surface Water Permits,* Division of Water Quality, N.J.A.C. 7:9b-1.14(c).

Is Phosphorus Limiting?

The limiting nutrient can be evaluated using available nutrient concentrations by using the following thresholds to exclude phosphorus as the limiting nutrient (The acronyms TIN and DRP refer to biologically-available forms of nitrogen and phosphorus, respectively: TIN = dissolved nitrite, nitrate and ammonia; DRP = dissolved reactive phosphorus):

IF	[DRP] $\geq$ 0.05 mg/l
OR	TIN/DRP $\leq$ 5
THEN	phosphorus can be excluded as the limiting nutrient

Figures A and B below show examples of how to plot pairs of TP and DRP data along a TIN/DRP axis to visually evaluate the phosphorus limitation thresholds at a particular location. By making the TP range twice the DRP range, the thresholds of 0.1 mg/l TP and 0.05 mg/l DRP coincide, simplifying the interpretation. Episodes when TP > 0.1 mg/l AND DRP $\leq$ 0.05 mg/l and TIN/DRP $\geq$ 5 can be identified by seeing TP in the upper right quadrant while DRP is in the lower right quadrant. If phosphorus cannot be excluded as the limiting nutrient for more than 10% of the samples that exceed the 0.1 mg/l threshold (a minimum of 2 samples), then the 0.1 mg/l criterion is applicable.

Figure A: Example of site where 0.1 mg/l criterion is applicable and exceeded

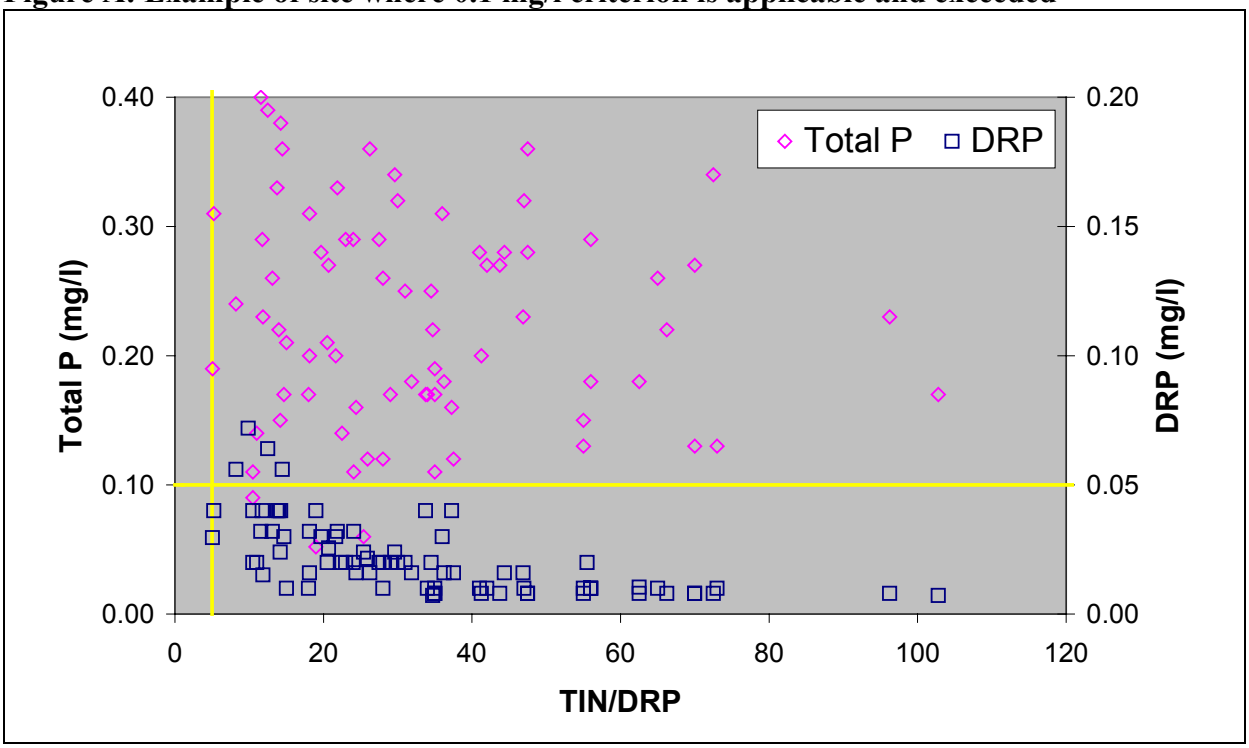
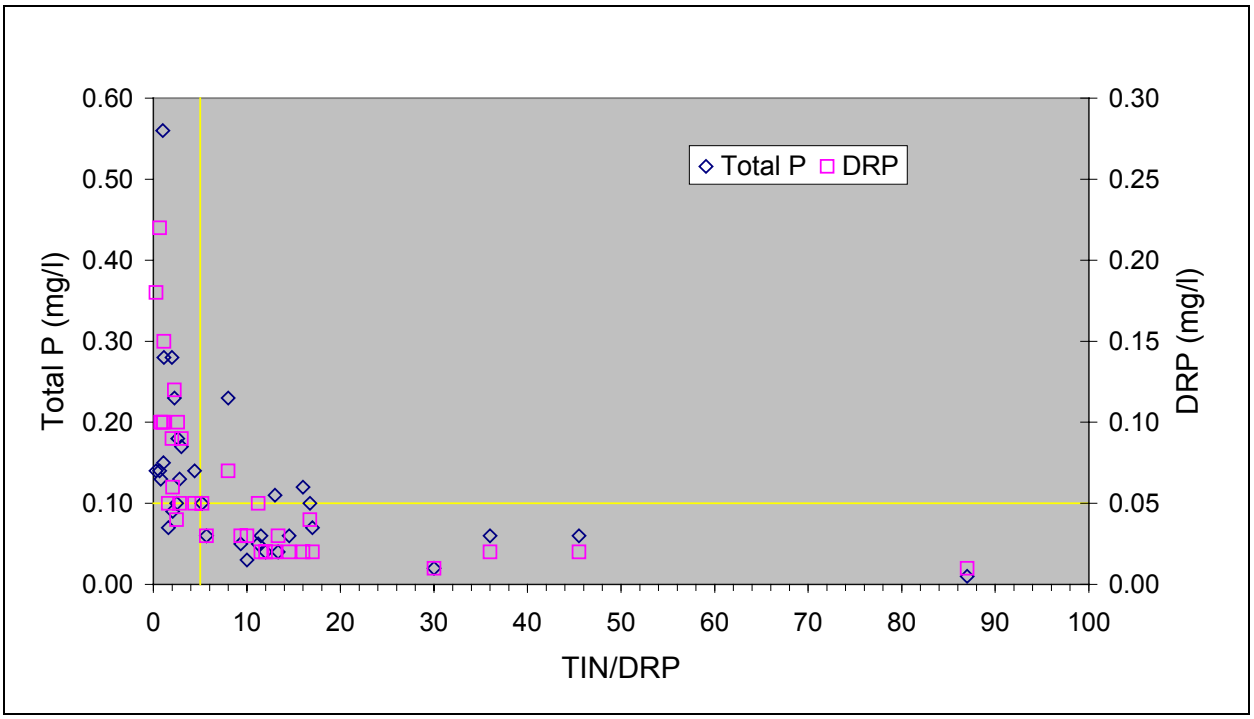


Figure B: Example of site where phosphorus is not limiting algal growth when 0.1 mg/l threshold is exceeded



Appendix 5: Methodology for Applying Percentage reductions to Land Use Loadings

The outputs of the FIRE method establish a percent reduction needed to meet the target load (that which will attain the applicable SWQS) and a margin of safety. These values are then applied to the existing land use loadings within the impaired streamshed to determine the load allocations for various land uses.

Existing loads are determined as follows. GIS is used to determine the area in acres of each of the land uses in the impaired watershed. The loading coefficients identified in the TMDL report are applied to the acres of land use to calculate an existing load for each land use in the impaired streamshed. Existing loads for point sources, other than stormwater point sources (essentially, wastewater treatment plants), if any, in the impaired streamshed are calculated using the average flow and concentration data from the discharge monitoring reports for the facilities. This load is added to the existing TP load calculated from land use.

To calculate the overall target load the percent reduction (the difference between the target load and the exceedance regression) as determined through FIRE is applied to the total existing load. The load associated with the margin of safety as determined through FIRE (the difference between the 95% confidence interval and the exceedance regression) is then removed from the overall target load (target loading line), leaving a reduced amount of loading now available to allocate. The load from any discharges is determined by taking the full permitted flow and assigning an effluent concentration. This load is also removed from the potential allocable load leaving a further reduced amount of allocable load for land uses.

There are a number of land uses from which a reduction in current load cannot be taken. These land uses include Forest, Water, Wetlands, and Barren land. The current loads for these land uses as calculated for existing load are carried over entirely as a component of the future load allocations. Therefore, for these land uses, the existing load and future load are equal. The sum of the non-reduced land use loads is then removed from the reduced allocable land use load leaving the final allocable land use load to be allocated among the land uses that are amenable to load reduction (urban and agricultural). This final allocable land use load is then applied to each land use category in proportion to the amount of each land use in the watershed.

The final percent reduction is calculated by comparing the final WLA or LA for each land use to the existing loads of those land uses. Because of the adjustments made in removing the loads associated with the MOS, the non-reduced land use loads, and discharges, the percent reduction associated with the final allocable land use load is higher than that which appears as an output to FIRE.

Example:

Land- Use	Existing Load	Percent Reduction	Allocation
Agriculture	100	88.85%	11.15
Barren	15	0%	15.00
Commercial	300	88.85%	33.45
Forest	125	0%	125.00
Low Density	40	88.85%	4.46
High Density	250	88.85%	27.88
Other Urban	15	88.85%	1.67
Water	100	0%	100.00
Wetlands	30	0%	30.00
Discharger A	25	0%	25.00
MOS			95.87
TOTAL	**1000**		**469.5**

Output from FIRE

Margin of Safety		**= 20.42%**
Target Loading		**= 46.95%**

Target Load

Target Load = 0.4695 * Existing Load
= 0.4695 * 1000
Target Load = 469.5 lb/yr

Margin of Safety

MOS = 0.2042* Target Load
= 0.2042* 469.5 lb/yr
= 95.87 lb/yr

Allocable Load

AL = Target Load – MOS
= 469.5 –95.87
= 373.63 lb/yr

Allocable Land Use Load

ALUL = AL- Future Discharge Load
= 373.6 – 25
= 348.63 lb/yr

SUM of Non Reducable Land Use Loads

Non Reduceable Land use Load = Existing Forest + Water & Wetlands Load + Barren Land Load
= 125 + 100 + 30 + 15
= 270 kg/yr

Final Allocable Land use Load

Final Allocable Land use Load = Allocable Land use Load – Non Reduce-able Land use Load
= 348.6 – 270
= 78.6 lb/yr

Final Percent Reduction

Final Percent Reduction = 1 – (Final allocable Land use load / Sum of existing load of Reduce-able land uses)
= 1 – (78.6/ 15+250+40+300+100)
= 1 – (78.6/705)
= 0.8885
= 88.85 %

Appendix 6: Response to Comments

This constitutes the New Jersey Department of Environmental Protection's (Department) response to comments raised during the comment period for the Total Maximum Daily Loads (TMDLs) for Total Phosphorus to Address 3 Streams in the Northeast Water Region's Watershed Management Area (WMA) 5, which were proposed July 5, 2005. These TMDLs were proposed as an amendment to the Northeast Water Quality Management Plan and include management approaches to reduce loadings of total phosphorus from various sources in order to attain applicable surface water quality standards for total phosphorus.

The notice proposing the TMDLs was published on July 5, 2005 in the New Jersey Register, the Express Times, and the Star Ledger. 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 August 9, 2005 at the Bergen County Dept. of Health Services, Community Services Building in Paramus, New Jersey. The public comment period ended on August 24, 2005.

Three verbal comments were received during the non-adversarial public hearing. The comments were received from:

1. Raymond Cywinski for United Water New Jersey. (1)
2. Arnold Vernick of the Technical Advisory Committee for WMA 5. (2)
3. Raymond Cywinski, Chairman of the Technical Advisory Committee for WMA 5. (3)

In attendance at the public hearing were Don Suess, Alia Benzecey, Tony DeCandia, Arnold Vernick, Raymond Cywinski, Touray Holland, Pat Kehrberger, Linda Morehouse, Chris Szegun, Jakob Franke, Christie Hirt, Lori Charkey and Mark Becker.

Department initiated changes to the document include the following:

1. The New Jersey Environmental Management System (NJEMS), which contains NJPDES permitted facility information evaluated during TMDL development, has been added to the document under "Data Sources".
2. Priority ranking and impairments not addressed by these TMDLs have been identified in the text.

3. Addition of an addendum demonstrating the methodology to convert the percent reductions obtained from applying FIRE to percent reductions per land use category.
4. Addition of an explanation regarding selection of municipalities that will be required to adopt a low phosphorus fertilizer ordinance.
5. Addition of an existing loads column to the tables identifying the allocation of the TMDL for each segment.

A summary of comments to the proposal and the Department's Responses to those comments follow. The numbers in brackets at the end of each comment corresponds to the verbal commenters listed above.

Comment 1.
United Water New Jersey strongly supports the July 5, 2005 proposed amendment to the Northeast Water Quality Management Plan for the Hackensack and Pascack Watersheds. United Water New Jersey looks forward to working with the NJDEP and New York State DEC and Pascack and Musquapsink watershed municipalities in developing and implementing watershed best management practices designed to reduce the phosphorus levels in the streams. (1)

Response 1.
The Department thanks the commenter for their support.

Comment 2.
Under certain conditions United Water New Jersey diverts water from the Saddle River to the Musquapsink Brook. Monitoring conducted by United Water New Jersey of the diverted water from the Saddle River shows elevated levels of phosphorus at times far in excess of the Surface Water Quality Standard (SWQS). During the months of June through September of 1999, diversions from the Saddle River showed phosphorus concentrations of over 3.0 to 7.0 milligrams/liter. Unless the proper effluent limitations for phosphorus are enforced for the Village of Ridgewood and Northwest Bergen Utilities Authority wastewater treatment plants, the reduction in loadings in the Pascack and Musquapsink will need to be lowered more than proposed to meet the SWQS. (1)

Response 2.
After reviewing the existing water allocation permits for the Saddle River, the Department has been unable to verify that conditions exist as stated in the comment. The Department would need more detailed information including sample data, diversion locations, and the dates of the occurrence(s) to fully evaluate the comment. The Department believes that the technical approach used to establish the loading capacity adequately considers the uncertainties (gaps and variability) in the data, the ability to model and predict concentration response relative to loadings, and the predictability of achieving a load reduction from applying a given management measure. The inclusion of both an implicit and explicit Margin of Safety (MOS) as part of the TMDL calculation is a reflection of the uncertainties and provides for reasonable assurance that the standard will be met.

Comment 3.
The Musquapsink Brook and Pascack Brook TMDLs are premature. There is a need for more data to document the quality of Musquapsink Brook, particularly in relationship to the diversion of water from the Saddle River. Does the diversion coincide with the time that the data was collected? (2)

Response 3.
The data collected and used by the Department is believed to be a representative characterization of the stream water quality and sufficient for development of TMDLs. Collection of additional data would

serve to delay implementation of measures to improve water quality. Assessment of effectiveness of the measures proposed through the ambient water quality network will determine if these measures need to be supplemented by additional measures.

Comment 4.
The Pascack Brook data needs to be collected before the confluence with Musquapsink Brook. Each of the two streams should be evaluated separately. (2)

Response 4.
The Department's *Integrated Water Quality Monitoring and Assessment Method* explains the relationship between monitoring location and spatial location delineation. As stated in the TMDL report, the monitoring station for Pascack Brook at Westwood (01377500) accurately characterizes the flows and water quality at Musquapsink Brook due to the Pascack station location directly below the confluence of the two streams. This approach provides a valid scope for assessing these impairments.

Comment 5.
The map of Pascack Brook shows that the impaired section ends at the New York State line. This is not addressed and should be clarified or corrected. (2)

Response 5.
The Pascack Brook TMDL requires the SWQS to be met at the State border. The Department is committed to working with the New York State Department of Environmental Conservation to address source reductions that may be needed within the New York portion of the watershed.

Comment 6.
Considering the TMDL document says 50 percent of WMA 5 is undeveloped, why is there no reserve capacity considered? (3)

Response 6.
Under this TMDL, the means identified for source reduction apply to new as well as existing development within the impaired watersheds. New development is expected to contribute a de minimus load relative to the existing land use it replaces. This is because new development, where applicable, must comply with municipal ordinances and measures to control the increased stormwater associated with the increased impervious cover of the developed area. The Stormwater Management Rules (N.J.A.C. 7:8) set forth the required components of regional and municipal stormwater management plans, and establish the stormwater management design and performance standards for new (proposed) development. The design and performance standards for new development include groundwater recharge, runoff quantity controls, runoff quality controls, and Category One buffers. Details of the performance standards can be found in Subchapter 5 of the Stormwater Management Rules and were created to address concerns of new development's affect on stream water quality. This is expected to effectively avoid increases in storm driven sources, thereby preventing the water quality problems that are attributed to the existing development and obviating the need for a reserve capacity.

Comment 7.
Municipalities have different implementation capabilities. Will the Department allow trading for the reduction of loading where one municipality that can get a larger reduction can credit another municipality for the excess reduction? (3)

Response 7.
The Department would consider trading proposals developed by affected municipalities.

Comment 8.
In the TMDL document, “Bkanky Brook” should be spelled as “Behnke Brook.” (3)

Response 8.
The Department appreciates the comment and has corrected the spelling.

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.
None currently in place.
2. Has the permittee adopted a Refuse Container/Dumpster Ordinance?
The Borough of Westwood adopted Article V, under Ordinance No. 10-07, "Refuse Containers and Dumpsters" on May 4, 2010.

Major Development Project List

Provide the following information for each approved development or redevelopment project that is regulated by the Tier A MS4 NJPDES Permit, and not exempted under N.J.A.C. 7:8-1.6(b).

Tier A Municipality: _____		NJPDES#: NJG_____			PI ID#: _____		Calendar Year: _____
Project Name	Block(s) / Lot(s)	5G3 Construction Stormwater Permit Auth.#	NJDEP Land Use Permit Required? (Y/N)	Total Area of Disturbance (acres)	Increase of Impervious > ¼ acre? (Y/N)	Variance or Exemption Granted As Per Part IV.B.4.h of the Tier A MS4 Permit	Design Reviewer(s)
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	
			Y☐ N☐		Y☐ N☐	Y☐ N☐	

Attachment D – Major Development Stormwater Summary

General Information

1. Project Name:
2. Municipality: County: Block(s): Lot(s):
3. Site Location (State Plane Coordinates – NAD83): E: N:
4. Date of Final Approval for Construction by Municipality:
   Date of Certificate of Occupancy:
5. Project Type (check all that apply):
   Residential ☐ Commercial ☐ Industrial ☐ Other (please specify) _____
6. Soil Conservation District Project Number:
7. Did project require an NJDEP Land Use Permit? Yes ☐ No ☐ Land Use Permit #:
8. Did project require the use of any mitigation measures? Yes ☐ No ☐
   If yes, which standard was mitigated? _____

Site Design Specifications

1. Area of Disturbance (acres): Area of Proposed Impervious (acres):
2. List all Hydrologic Soil Groups:
3. Please Identify the Amount of Each Best Management Practices (BMPs) Utilized in Design Below:
   Bioretention Systems ___ Constructed Wetlands ___ Dry Wells ___ Extended Detention Basins ___
   Infiltration Basins ___ Combination Infiltration/Detention Basins ___ Manufactured Treatment Devices___
   Pervious Paving Systems ___ Sand Filters ___ Vegetative Filter Strips ___ Wet Ponds ___
   Grass Swales ___ Subsurface Gravel Wetlands ___ Other _____

Storm Event Information

Storm Event - Rainfall (inches and duration): 2 yr.: _____ 10 yr.: _____

100 yr.: _____ WQDS: _____

Runoff Computation Method:
NRCS: Dimensionless Unit Hydrograph ☐ NRCS: Delmarva Unit Hydrograph ☐ Rational ☐ Modified Rational ☐
Other: _____

Basin Specifications (answer all that apply)

If more than one basin, attach multiple sheets

1. Type of Basin: Surface/Subsurface (select one): Surface ☐ Subsurface ☐
2. Owner (select one):
   ☐ Public ☐ Private: If so, Name: Phone number:
3. Basin Construction Completion Date:
4. Drain Down Time (hr.):
5. Design Soil Permeability (in./hr.):
6. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
7. Groundwater Recharge Methodology (select one): 2 Year Difference ☐ NJGRS ☐ Other ☐ NA ☐
8. Groundwater Mounding Analysis (select one): Yes ☐ No ☐ If, Yes Methodology Used:
9. Maintenance Plan Submitted: Yes ☐ No ☐ Is the Basin Deed Restricted: Yes ☐ No ☐

Comments:

Name of Person Filling Out This Form: _____ Signature: _____

Title: _____ Date: _____

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*				
1. Type of Basin:	Surface/Subsurface (select one): Surface ◯	Subsurface ◯		
2. Owner (select one): ◯ Public	◯ Private: If so, Name:	Phone number:		
3. Basin Construction Completion Date:				
4. Drain Down Time (hr.):				
5. Design Soil Permeability (in./hr.):				
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained:			
7. Groundwater Recharge Methodology (select one):	2 Year Difference ◯	NJGRS ◯	Other ◯	NA ◯
8. Groundwater Mounding Analysis (select one):	Yes ◯	No ◯	If, Yes Methodology Used:	
9. Maintenance Plan Submitted:	Yes ◯	No ◯	Is the Basin Deed Restricted:	Yes ◯ No ◯

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*				
1. Type of Basin:	Surface/Subsurface (select one): Surface ◯	Subsurface ◯		
2. Owner (select one): ◯ Public	◯ Private: If so, Name:	Phone number:		
3. Basin Construction Completion Date:				
4. Drain Down Time (hr.):				
5. Design Soil Permeability (in./hr.):				
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained:			
7. Groundwater Recharge Methodology (select one):	2 Year Difference ◯	NJGRS ◯	Other ◯	NA ◯
8. Groundwater Mounding Analysis (select one):	Yes ◯	No ◯	If, Yes Methodology Used:	
9. Maintenance Plan Submitted:	Yes ◯	No ◯	Is the Basin Deed Restricted:	Yes ◯ No ◯

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*				
1. Type of Basin:	Surface/Subsurface (select one): Surface ◯	Subsurface ◯		
2. Owner (select one): ◯ Public	◯ Private: If so, Name:	Phone number:		
3. Basin Construction Completion Date:				
4. Drain Down Time (hr.):				
5. Design Soil Permeability (in./hr.):				
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained:			
7. Groundwater Recharge Methodology (select one):	2 Year Difference ◯	NJGRS ◯	Other ◯	NA ◯
8. Groundwater Mounding Analysis (select one):	Yes ◯	No ◯	If, Yes Methodology Used:	
9. Maintenance Plan Submitted:	Yes ◯	No ◯	Is the Basin Deed Restricted:	Yes ◯ No ◯

Name of Person Filling Out This Form: _____ Signature: _____

Title: _____ Date: _____

Attachment E – Best Management Practices for Municipal Maintenance Yards and Other Ancillary Operations

The Tier A Municipality shall implement the following practices at municipal maintenance yards and other ancillary operations owned or operated by the municipality. Inventory of Materials and Machinery, and Inspections and Good Housekeeping shall be conducted at all municipal maintenance yards and other ancillary operations. All other Best Management Practices shall be conducted whenever activities described below occur. Ancillary operations include but are not limited to impound yards, permanent and mobile fueling locations, and yard trimmings and wood waste management sites.

Inventory of Materials and Machinery

The SPPP shall include a list of all materials and machinery located at municipal maintenance yards and ancillary operations which could be a source of pollutants in a stormwater discharge. The materials in question include, but are not limited to: raw materials; intermediate products; final products; waste materials; by-products; machinery and fuels; and lubricants, solvents, and detergents that are related to the municipal maintenance yard operations and ancillary operations. Materials or machinery that are not exposed to stormwater at the municipal maintenance yard or related to its operations do not need to be included.

Inspections and Good Housekeeping

1. Inspect the entire site, including the site periphery, monthly (under both dry and wet conditions, when possible). Identify conditions that would contribute to stormwater contamination, illicit discharges or negative impacts to the Tier A Municipality's MS4. Maintain an inspection log detailing conditions requiring attention and remedial actions taken for all activities occurring at Municipal Maintenance Yards and Other Ancillary Operations. This log must contain, at a minimum, a record of inspections of all operations listed in Part IV.B.5.c. of this permit including dates and times of the inspections, and the name of the person conducting the inspection and relevant findings. This log must be kept on-site with the SPPP and made available to the Department upon request. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for additional information.

2. Conduct cleanups of spills of liquids or dry materials immediately after discovery. All spills shall be cleaned using dry cleaning methods only. Clean up spills with a dry, absorbent material (i.e., kitty litter, sawdust, etc.) and sweep the rest of the area. Dispose of collected waste properly. Store clean-up materials, spill kits and drip pans near all liquid transfer areas, protected from rainfall.

3. Properly label all containers. Labels shall be legible, clean and visible. Keep containers in good condition, protected from damage and spillage, and tightly closed when not in use. When practical, store containers indoors. If indoor storage is not practical, containers may be stored outside if covered and placed on spill platforms or clean pallets. An area that is graded and/or bermed to prevent run-through of stormwater may be used in place of spill platforms or clean pallets. Outdoor storage locations shall be regularly maintained.

Fueling Operations

1. Establish, maintain and implement standard operating procedures to address vehicle fueling; receipt of bulk fuel deliveries; and inspection and maintenance of storage tanks, including the associated piping and fuel pumps.

   a. Place drip pans under all hose and pipe connections and other leak-prone areas during bulk transfer of fuels.

   b. Block storm sewer inlets, or contain tank trucks used for bulk transfer, with temporary berms or temporary absorbent booms during the transfer process. If temporary berms or booms are being used instead of blocking the storm sewer inlets, all hose connection points associated with the transfer of fuel shall be within the temporarily bermed or boomed area during the loading/unloading of bulk fuels. A trained employee shall be present to supervise the bulk transfer of fuel.

   c. Clearly post, in a prominent area of the facility, instructions for safe operation of fueling equipment. Include all of the following:
      - "Topping off of vehicles, mobile fuel tanks, and storage tanks is strictly prohibited"
      - "Stay in view of fueling nozzle during dispensing"
      - Contact information for the person(s) responsible for spill response.

   d. Immediately repair or replace any equipment, tanks, pumps, piping and fuel dispensing equipment found to be leaking or in disrepair.

Discharge of Stormwater from Secondary Containment

The discharge pipe/outfall from a secondary containment area (e.g. fuel storage, de-icing solution storage, brine solution) shall have a valve and the valve shall remain closed at all times except as described below. A municipality may discharge stormwater accumulated in a secondary containment area if a visual inspection is performed to ensure that the contents of aboveground storage tank have not come in contact with the stormwater to be discharged. Visual inspections are only effective when dealing with materials that can be observed, like petroleum. If the contents of the tank are not visible in stormwater, the municipality shall rely on previous tank inspections to determine with some degree of certainty that the tank has not leaked. If the municipality cannot make a determination with reasonable certainty that the stormwater in the secondary containment area is uncontaminated by the contents of the tank, then the stormwater shall be hauled for proper disposal.

Vehicle Maintenance

1. Operate and maintain equipment to prevent the exposure of pollutants to stormwater.

2. Whenever possible, conduct vehicle and equipment maintenance activities indoors. For projects that must be conducted outdoors, and that last more than one day, portable tents or covers shall be placed over the equipment being serviced when not being worked on, and drip pans shall be used at all times. Use designated areas away from storm drains or block storm drain inlets when vehicle and equipment maintenance is being conducted outdoors.

On-Site Equipment and Vehicle Washing and Wash Wastewater Containment

1. Manage any equipment and vehicle washing activities so that there are no unpermitted discharges of wash wastewater to storm sewer inlets or to waters of the State.

2. Tier A Municipalities which cannot discharge wash wastewater to a sanitary sewer or which cannot otherwise comply with 1, above, may temporarily contain wash wastewater prior to proper disposal under the following conditions:

   a. Containment structures shall not leak. Any underground tanks and associated piping shall be tested for integrity every 3 years using appropriate methods determined by "*The List of Leak Detection Evaluations for Storage Tank Systems*" created by the National Work Group on Leak Detection Evaluations (NWGLDE) or as determined appropriate and certified by a professional engineer for the site specific containment structure(s)**.**

   b. For any cathodically protected containment system, provide a passing cathodic protection survey every three years.

   c. Operate containment structures to prevent overfilling resulting from normal or abnormal operations, overfilling, malfunctions of equipment, and human error. Overfill prevention shall include manual sticking/gauging of the tank before each use unless system design prevents such measurement. Tank shall no longer accept wash wastewater when determined to be at 95% capacity. Record each measurement to the nearest ½ inch.

   d. Before each use, perform inspections of all visible portions of containment structures to ensure that they are structurally sound, and to detect deterioration of the wash pad, catch basin, sump, tank, piping, risers, walls, floors, joints, seams, pumps and pipe connections or other containment devices. The wash pad, catch basin, sump and associated drains should be kept free of debris before each use. Log dates of inspection; inspector's name, and conditions. This inspection is not required if system design prevents such inspection.

   e. Containment structures shall be emptied and taken out of service immediately upon detection of a leak. Complete all necessary repairs to ensure structural integrity prior to placing the containment structure back into service. Any spills or suspected release of hazardous substances shall be immediately reported to the NJDEP Hotline (1-877-927-6337) followed by a site investigation in accordance with N.J.A.C. 7:26C and N.J.A.C 7:26E if the discharge is confirmed.

   f. All equipment and vehicle wash wastewater placed into storage must be disposed of in a legally permitted manner (e.g. pumped out and delivered to a duly permitted and/or approved wastewater treatment facility).

   g. Maintain a log of equipment and vehicle wash wastewater containment structure clean-outs including date and method of removal, mode of transportation (including name of hauler if applicable) and the location of disposal. See Underground Vehicle Wash Water Storage Tank Use Log at end of this attachment.

   h. Containment structures shall be inspected annually by a NJ licensed professional engineer. The engineer shall certify the condition of all structures including: wash pad, catch basin, sump, tank, piping, risers to detect deterioration in the, walls, floors, joints, seams, pumps and pipe connections or other containment devices using the attached Engineer's Certification of Annual Inspection of Equipment and Vehicle Wash Wastewater Containment Structure. This

certification may be waived for self-contained systems on a case-by-case basis. Any such waiver would be issued in writing by the Department.

3. Maintain all logs, inspection records, and certifications on-site. Such records shall be made available to the Department upon request.

Salt and De-icing Material Storage and Handling

1. Store material in a permanent structure.
2. Perform regular inspections and maintenance of storage structure and surrounding area.
3. Minimize tracking of material from loading and unloading operations.
4. During loading and unloading:
   a. Conduct during dry weather, if possible;
   b. Prevent and/or minimize spillage; and
   c. Minimize loader travel distance between storage area and spreading vehicle.
5. Sweep (or clean using other dry cleaning methods):
   a. Storage areas on a regular basis;
   b. Material tracked away from storage areas;
   c. Immediately after loading and unloading is complete.
6. Reuse or properly discard materials collected during cleanup.
7. Temporary outdoor storage is permitted only under the following conditions:
   a. A permanent structure is under construction, repair or replacement;
   b. Stormwater run-on and de-icing material run-off is minimized;
   c. Materials in temporary storage are tarped when not in use;
   d. The requirements of 2 through 6, above are met; and
   e. Temporary outdoor storage shall not exceed 30 days unless otherwise approved in writing by the Department;
8. Sand must be stored in accordance with Aggregate Material and Construction Debris Storage below.

Aggregate Material and Construction Debris Storage

1. Store materials such as sand, gravel, stone, top soil, road millings, waste concrete, asphalt, brick, block and asphalt based roofing scrap and processed aggregate in such a manner as to minimize stormwater run-on and aggregate run-off via surface grading, dikes and/or berms (which may include sand bags, hay bales and curbing, among others) or three sided storage bays. Where possible the open side of storage bays shall be situated on the upslope. The area in front of storage bays and adjacent to storage areas shall be swept clean after loading/unloading.

2. Sand, top soil, road millings and processed aggregate may only be stored outside and uncovered if in compliance with item 1 above and a 50-foot setback is maintained from surface water bodies, storm sewer inlets, and/or ditches or other stormwater conveyance channels.

3. Road millings must be managed in conformance with the "Recycled Asphalt Pavement and Asphalt Millings (RAP) Reuse Guidance" (see www.nj.gov/dep/dshw/rrtp/asphaltguidance.pdf) or properly disposed of as solid waste pursuant to N.J.A.C. 7:26-1 et seq.

4. The stockpiling of materials and construction of storage bays on certain land (including but not limited to coastal areas, wetlands and floodplains) may be subject to regulation by the Division of Land Use Regulation (see www.nj.gov/dep/landuse/ for more information).

Street Sweepings, Catch Basin Clean Out, and Other Material Storage

1. For the purposes of this permit, this BMP is intended for road cleanup materials as well as other similar materials. Road cleanup materials may include but are not limited to street sweepings, storm sewer clean out materials, stormwater basin clean out materials and other similar materials that may be collected during road cleanup operations. These BMPs do not cover materials such as liquids, wastes which are removed from municipal sanitary sewer systems or material which constitutes hazardous waste in accordance with N.J.A.C. 7:26G-1.1 et seq.

2. Road cleanup materials must be ultimately disposed of in accordance with N.J.A.C. 7:26-1.1 et seq. See the "Guidance Document for the Management of Street Sweepings and Other Road Cleanup Materials" (www.nj.gov/dep/dshw/rrtp/sweeping.htm).

3. Road cleanup materials placed into storage must be, at a minimum:

   a. Stored in leak-proof containers or on an impervious surface that is contained (e.g. bermed) to control leachate and litter; and

   b. Removed for disposal (in accordance with 2, above) within six (6) months of placement into storage.

Yard Trimmings and Wood Waste Management Sites

1. These practices are applicable to any yard trimmings or wood waste management site:

   a. Owned and operated by the Tier A Municipality;
      i. For staging, storing, composting or otherwise managing yard trimmings, or
      ii. For staging, storing or otherwise managing wood waste, and

   b. Operated in compliance with the Recycling Rules found at N.J.A.C. 7:26A.

2. Yard trimmings or wood waste management sites must be operated in a manner that:

   a. Diverts stormwater away from yard trimmings and wood waste management operations; and
   b. Minimizes or eliminates the exposure of yard trimmings, wood waste and related materials to stormwater.

3. Yard trimmings and wood waste management site specific practices:

   a. Construct windrows, staging and storage piles:
      i. In such a manner that materials contained in the windrows, staging and storage piles (processed and unprocessed) do not enter waterways of the State;
      ii. On ground which is not susceptible to seasonal flooding;
      iii. In such a manner that prevents stormwater run-on and leachate run-off (e.g. use of covered areas, diversion swales, ditches or other designs to divert stormwater from contacting yard trimmings and wood waste).

   b. Maintain perimeter controls such as curbs, berms, hay bales, silt fences, jersey barriers or setbacks, to eliminate the discharge of stormwater runoff carrying leachate or litter from the site to storm sewer inlets or to surface waters of the State.

   c. Prevent on-site storm drain inlets from siltation using controls such as hay bales, silt fences, or filter fabric inlet protection.

   d. Dry weather run-off that reaches a municipal stormwater sewer system is an illicit discharge. Possible sources of dry weather run-off include wetting of piles by the site operator; uncontrolled pile leachate or uncontrolled leachate from other materials stored at the site.

   e. Remove trash from yard trimmings and wood waste upon receipt.

   f. Monitor site for trash on a routine basis.

   g. Store trash in leak-proof containers or on an impervious surface that is contained (e.g. bermed) to control leachate and litter;

   h. Dispose of collected trash at a permitted solid waste facility.

   i. Employ preventative tracking measures, such as gravel, quarry blend, or rumble strips at exits.

Roadside Vegetation Management

1. Tier A Municipalities shall restrict the application of herbicides along roadsides in order to prevent it from being washed by stormwater into the waters of the State and to prevent erosion caused by de-vegetation, as follows: Tier A Municipalities shall not apply herbicides on or adjacent to storm drain inlets, on steeply sloping ground, along curb lines, and along unobstructed shoulders. Tier A Municipalities shall only apply herbicides within a 2 foot radius around structures where overgrowth presents a safety hazard and where it is unsafe to mow.

ENGINEERS CERTIFICATION OF ANNUAL INSPECTION OF EQUIPMENT AND VEHICLE WASH WASTEWATER CONTAINMENT STRUCTURE

(Complete a separate form for each vehicle wash wastewater containment structure)

Permittee: _____ NJPDES Permit No: _____

Containment Structure Location: _____

The annual inspection of the above referenced vehicle wash wastewater containment structure was conducted on _____ (date). The containment structure and appurtenances have been inspected for:

1. The integrity of the structure including walls, floors, joints, seams, pumps and pipe connections
2. Leakage from the structure's piping, vacuum hose connections, etc.
2 Bursting potential of tank.
3. Transfer equipment
4. Venting
5. Overflow, spill control and maintenance.
6. Corrosion, splits, and perforations to tank, piping and vacuum hoses

The tank and appurtenances have been inspected for all of the above and have been determined to be:

Acceptable _____

Unacceptable _____

Conditionally Acceptable _____

List necessary repairs and other conditions: _____

_____

_____

_____

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment (N.J.A.C. 7:14A-2.4(d)).

Name (print): _____ Seal:

Signature: _____

Date: _____

Underground Vehicle Wash Water Storage Tank Use Log

Name and Address of Facility _____

Facility Permit Number _____

Tank ID Number _____ Tank Location _____

Tank Volume _____ gallons Tank Height _____ inches

95% Volume _____ gallons 95% Volume _____ inches

Date and Time	Inspector	Height of Product Before Introducing Liquid (inches)	Is Tank Less Than 95% Full? (Y/N)	Visual Inspection Pass? (Y/N)	Comments

Notes: The volume of liquid in the tank should be measured **before** each use.

Liquid **should not be introduced** if the tank contains liquid at 95% of the capacity or greater.

A visual inspection of all exposed portions of the collection system should be performed before each use. Use the comments column to document the inspection and any repairs.

Underground Vehicle Wash Water Storage Tank Pump Out Log

Name and Address of Facility _____
Facility Permit Number _____

Tank ID Number _____ Tank Location _____
Tank Volume _____ gallons

Date and Time of Pump Out	Volume of Liquid Removed	Waste Hauler *	Destination of the Liquid Disposal *

*** The Permittee must maintain copies of all hauling and disposal records and make them available for inspection.**