STORMWATER POLLUTION PREVENTION PLAN (SPPP)

Submitted To:

City of Burlington
525 High Street
Burlington, NJ 08016

Submitted By:

Pennoni Associates Inc.
515 Grove Street, Suite 1B
Haddon Heights, NJ 08035

Hugh Dougherty, PE
New Jersey License No. 34634

Proj. No. BCSEX 18000.03

Date: September 30, 2018

SPPP Signature Page

Municipality Information

Municipality: City of Burlington County: Burlington

NJPDES # : NJG 0153109 PI ID #: 171529

Team Member/Title: Mark Staravoj / Superintendent of Sewage and Drainage

Effective Date of Permit Authorization (EDPA): 01/01/2018

Date of Completion: 01/26/2005 Date of most recent update: 09/30/2018

"I certify that this SPPP includes all of the information and items identified in Attachment A of the Tier A Municipal Stormwater General Permit. 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."

(Signature) (Date)

(Print Name) (Title)

(NOTE: A new SPPP signature page should be attached each time the SPPP is updated or modified, excluding data entries. Previous SPPP signature pages shall be retained as part of the SPPP.)

Tier A Municipal Stormwater Regulation Program

Stormwater Pollution Prevention Team Members

Number of team members may vary.

Completed by: *Pennoni Associates*
Title: *Sewer and Drainage Engineer*
Date: *09/30/2018*
Municipality: *City of Burlington*
County: *Burlington*
NJPDES #: NJG*0153109*
PI ID #: *171529*

Stormwater Program Coordinator: *Mark Staravoj*
Title: *Superintendent of Sewage and Drainage*
Office Phone #: *609-386-0035*
Emergency Phone #: *609-386-3300*

Public Notice Coordinator: *Cindy A. Crivaro*
Title: *Municipal Clerk*
Office Phone #: *609-386-0200, x 101*
Emergency Phone #: *609-386-3300*

Post-Construction Stormwater Management Coordinator: *K. Wendell Bibbs, PE*
Title: *Land Use Board Engineer*
Office Phone #: *856-303-1245*
Emergency Phone #: *856-303-1245*

Local Public Education Coordinator: *John Alexander*
Title: *Director of Public Affairs*
Office Phone #: *609-386-4070*
Emergency Phone #: *609-386-3300*

Ordinance Coordinator: *M. Lou Garty, Esq.*
Title: *Municipal Attorney*
Office Phone #: *856-673-0609*
Emergency Phone #: _____

Public Works Coordinator: *Craig Leshner*
Title: *Supervisor of Public Works*
Office Phone #: *609-386-0307*
Emergency Phone #: *609-386-0307*

Employee Training Coordinator: *Kenneth Shine*
Title: *Project Manager*
Office Phone #: *856-547-0505*
Emergency Phone #: *609-820-5803*

Other: _____
Title: _____
Office Phone #: _____
Emergency Phone #: _____

SPPP Form 2 - Public Notice

Municipality Information

Municipality: *City of Burlington* County: *Burlington*

NJPDES # : NJG*0153109* PI ID #:*171529*

Team Member/Title:*Cindy A. Crivaro, Municipal Clerk*

Effective Date of Permit Authorization (EDPA):***1/1/18***

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

For meetings where public notice is required under the Open Public Meetings Act ("Sunshine Law," N.J.S.A. 10:4-6, et seq.), the City of Burlington provides public notice in a manner that complies with the requirements of that Act. Notice is provided in the newspaper, The Burlington County Times. This information is also provided on the City's website, www.burlingtonNJ.us.

For the adoption of the Municipal Stormwater Management Plan and other municipal actions, the City of Burlington complies with the public notice requirements of the Municipal Land Use Law(N.J.S.A. 40:55-1 et. seq.).

For the adoption of stormwater management ordinances and where any ordinances must be read and adopted, the City of Burlington complies with the requirements of N.J.S.A.40:49-1et.seq.

Elements of the MS4 program is availabe to the public upon request and copies of the Stormwater Pollution Prevention Plan, Municipal Stormwater Management Plan and other related ordinances are posted on the City's website, www.burlingtonNJ.us.

The City maintains records to demonstrate compliance and can produce them upon request.

SPPP Form 3 – New Development and Redevelopment Program

Municipality Information

Municipality: *City of Burlington* County: *Burlington*

NJPDES # : NJG*0153109* PI ID #: *171529*

Team Member/Title: *K. Wendell Bibbs, PE, Land Use Board Engineer*

Effective Date of Permit Authorization (EDPA): *4/1/04*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

The City has adopted, implemented, and enforces a Municipal Stormwater Management Plan and stormwater control ordinances in accordnace with the permit requirements (Stormwater Management codes attached).

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

Engineers and others who review stormwater management design for development and redevelopment projects will complete the Department approved Stormwater Management Design Review Course once every 5 years. City board members and governing body members who review applications will complete the online training tool.

Long-term maintenance of BMP's and stormwater facilities owned and operated by the City are provided for under this SPPP.

Long-term maintenance of BMP's and stormwater facilities that are not owned and/or operated by the City are provided for under the stormwater control ordinances by requiring design engineers to prepare a specific maintenance plan that identifies the parties responsible for ensuring maintenance and compliance. In addition, facilities owners/operators are required to report to the City annually, as described more fully under Form 13 - Stormwater Facility Maintenance.

All improvements within the City that trigger compliance with the Tier A MS4 NJPDES permit are required to provide storm drain inlets (new and/or retro-fits) that control the passage of solids and floatables.

The City has an adopted Stormwater Management Plan (SMWP).

The City will complete a Major Development Stormwater Summary for each structural and non-structural stormwater measure associated with development and redevelopment projects.

Major Development Stormwater Summary (Attachment D)

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 (circle all that apply): Residential Commercial Industrial Other (please specify) _____
6. Soil Conservation District Project Number:
7. Did project require 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.: _____ WQ DS: _____
Runoff Computation Method (circle one): 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 (circle one)
2. Owner (circle 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 (circle one): 2 Year Difference NJGRS Other NA
8. Groundwater Mounding Analysis (circle 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*
10. Type of Basin: Surface/Subsurface (circle one)
11. Owner (circle one): Public Private: If so, Name: Phone number:
12. Basin Construction Completion Date:
13. Drain Down Time (hr.):
14. Design Soil Permeability (in./hr.):
15. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
16. Groundwater Recharge Methodology (circle one): 2 Year Difference NJGRS Other NA
17. Groundwater Mounding Analysis (circle one): Yes No If, Yes Methodology Used:
18. 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*
19. Type of Basin: Surface/Subsurface (circle one)
20. Owner (circle one): Public Private: If so, Name: Phone number:
21. Basin Construction Completion Date:
22. Drain Down Time (hr.):
23. Design Soil Permeability (in./hr.):
24. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
25. Groundwater Recharge Methodology (circle one): 2 Year Difference NJGRS Other NA
26. Groundwater Mounding Analysis (circle one): Yes No If, Yes Methodology Used:
27. 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*
28. Type of Basin: Surface/Subsurface (circle one)
29. Owner (circle one): Public Private: If so, Name: Phone number:
30. Basin Construction Completion Date:
31. Drain Down Time (hr.):
32. Design Soil Permeability (in./hr.):
33. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
34. Groundwater Recharge Methodology (circle one): 2 Year Difference NJGRS Other NA
35. Groundwater Mounding Analysis (circle one): Yes No If, Yes Methodology Used:
36. Maintenance Plan Submitted: Yes No Is the Basin Deed Restricted: Yes No

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

Title: _____ Date: _____

City of Burlington, NJ
Monday, October 1, 2018

Chapter 207. Land Development

Article VI. Stormwater Management

[Added by Ord. No. 5-2006; amended 2-6-2007 by Ord. No. 01-2007]

§ 207-53. Scope and purpose.

A. Policy statement. Flood control, groundwater recharge, and pollutant reduction through nonstructural or low-impact techniques shall be explored before relying on structural 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 article to establish minimum stormwater management requirements and controls for major development, as defined in § **207-54**.

C. Applicability.

(1) This article 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 at N.J.A.C. 5:21.

(2) This article shall also be applicable to all major developments undertaken by Burlington City.

(3) This article contains requirements specific to the City of Burlington for site plans and subdivisions of less than one acre in disturbance that require preliminary or final site plan or subdivision review.

(4) This article does not apply to single-family residential applications that do not meet the definition of major development.

D. Compatibility with other permit and ordinance requirements. Development approvals issued for subdivisions and site plans pursuant to this article 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 article shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This article is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this article 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.

§ 207-54. Definitions.

Unless specifically defined below, words or phrases used in this article shall be interpreted so as to give them the meaning they have in common usage and to give this article 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.

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.

DESIGNATED CENTER

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

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; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and 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 article 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.

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 City of Burlington or other public body, and is designed and used for collecting and conveying stormwater.
[Added 7-20-2010 by Ord. No. 18-2010]

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, Burlington City, 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.

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
[Added 7-20-2010 by Ord. No. 18-2010]

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."

§ 207-55. General standards.

A. Design and performance standards for stormwater management measures.

(1) Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in § **207-56**. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

(2) The standards in this article 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.

B. 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 any surface that is in direct contact with an existing storm drain inlet on that property unless the storm drain inlet either:
[Added 7-20-2010 by Ord. No. 18-2010]

(1) Already meets the design standard in § **207-56E(3)** to control passage of solid and floatable materials; or

(2) Is retrofitted or replaced to meet the standard in § **207-56E(3)** prior to the completion of the project.

C. C. Enforcement. This article shall be enforced by the Zoning Officer or Code Enforcement Officer of the City of Burlington.
[Added 7-20-2010 by Ord. No. 18-2010]

D. D. 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 the maximum amount permitted by N.J.S.A. 40:49-5 for each storm drain inlet that is not retrofitted to meet the design standard.
[Added 7-20-2010 by Ord. No. 18-2010]

§ 207-56. Stormwater management requirements for major development.

A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with § **207-62**.

B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department′ Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly Helonias bullata (swamp pink) and/or Clemmys 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 from 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 nonstructural stormwater management strategies set forth at Subsection **E** into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in 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 postconstruction. "Time of concentration" is defined as the time it takes for runoff to

travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;

(e) Minimize land disturbance, including clearing and grading;

(f) Minimize soil compaction;

(g) Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;

(h) Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;

(i) Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:

[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) 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:

[1] The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or

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

[3] 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. This type of curb opening inlet is only required in areas of the City that are outside of the floodplain.

(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)**;

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

[5] Where the area flows to the Kennedy Lake system.

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

(5) Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in § **207-60**, 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 § **207-57**, 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 postconstruction 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. An "urban redevelopment area" is defined as previously developed portions of areas delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1). The entire City of Burlington is located in Metropolitan Planning Area (PA1) on the New Jersey State Plan and Redevelopment Plan Map.

[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 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 § **207-57**, complete one of the following:

[1] Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, postconstruction 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 postconstruction 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 postconstruction 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 postconstruction 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. The applicant shall use the Federal Emergency Management Association (FEMA) maps to determine if the site is located in the tidal flood hazard area within the City of Burlington.

[5] Underground detention facilities are not recommended as a design solution unless the detention facility is located above the flood elevation. The City of Burlington will not accept maintenance responsibility for underground stormwater detention facilities. Exemptions from the runoff quantity design and performance standards due to the flood elevation condition may be offset through mitigation projects of equal value.

G. Stormwater runoff quality standards.

(1) Stormwater management measures shall be designed to reduce the postconstruction 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, 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)	Time (minutes)	Cumulative Rainfall (inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

(2) For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in § **207-60**, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in § **207-60**. 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, PO Box 418, Trenton, New Jersey, 08625-0418.

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

$$R = A + B - (AXB)/100$$

Where

R = total TSS percent load removal from application of both BMPs, and

A = the TSS percent removal rate applicable to the first BMP

B = the TSS percent removal rate applicable to the second BMP

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 § **207-59C**
Sand filter	80
Vegetative filter strip	60 to 80
Wet pond	50 to 90

(4) If there is more than one on-site drainage area, the eighty-percent TSS removal rate 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 postconstruction 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 § **207-60**.

(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 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 applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or center line of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.

(b) All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the standard for off-site stability in the "Standards For Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.

(c) If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the standard for off-site stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

[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 ninety-five-percent TSS postconstruction removal rate;

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

[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.

§ 207-57. Requirements for nonresidential development of less than one acre.

For nonresidential development of less than one acre in size, the stormwater management system will be evaluated by the Municipal Engineer based on the location of the site in relation to the floodplain, the location of the site in relation to the Kennedy Lake system that provides water quality, and the recharge requirements based on the definition under NJAC 7:8-1.2 of urban redevelopment area as a previously developed portion of an area delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1). "Disturbance" for the purpose of this section is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

§ 207-58. 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 have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

(3) In computing 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 following:

(1) The New Jersey Geological Survey Report GSR-32 , A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference, as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual at http://www.state.nj.us/dep/njgs/; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

§ 207-59. 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 § **207-62B**.

(3) Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.

(4) At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of 2 1/2 inches in diameter.

(5) Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at § **207-62**.

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 § **207-56** of this article.

C. Manufactured treatment devices may be used to meet the requirements of § **207-56** of this article, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

§ 207-60. 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)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625; (609) 292-5540;

(2) The Rutgers Cooperative Extension Service, 732-932-9306; and

(3) The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625; (609) 292-5540.

§ 207-61. Mitigation plan.

A. Variance or exemption from stormwater design standards.

(1) A variance or exemption from the design standards for stormwater management basins may be granted only upon a finding by the City of Burlington Land Use Board that the variance or exemption will be mitigated by the construction of a stormwater project of equal construction value within the same subdrainage area (HUC-14).

(2)

In order to be granted a variance or exemption, a development must demonstrate that the design standard cannot be met due to unusual circumstances on the existing property, such as projects that cannot provide stormwater detention above the floodplain elevation. Variances or exemptions are not recommended for properties that have not been previously developed.

(3) In order to be granted a variance or exemption, the applicant will be required to perform a preliminary stormwater management design and cost analysis of the stormwater system that would be required to meet all the stormwater management requirements of N.J.A.C. 7:8, Subchapter 5. This analysis will be utilized to determine and select the mitigation project to be constructed by the applicant.

B. Mitigation projects. Variances or exemptions are to be granted only upon the condition that the applicant provides a mitigation project of equal value within the same subwatershed as delineated by the HUC 14. All mitigation projects are to be under the review and approval of the City Engineer. The mitigation projects proposed within the City of Burlington are:

(1) Stormwater outfall retrofit: provide water quality measures at existing stormwater outfalls within the same HUC14 under the guidance of the City Engineer. Review of each outfall condition should be performed with the City Engineer before selecting one or more of the following options:

(a) Outlet structure modifications (i.e., tide gate).

(b) Installation of in-line or end-of-pipe best management practice (BMP) as approved by the NJDEP to pretreat stormwater draining into an existing outfall.

(2) River, creek or lake bank stabilization. Stabilization projects other than those listed meeting the following criteria may be presented for review and approval by the City Engineer. Stabilization projects will be reviewed for the following benefits:

(a) Stabilization of eroded river, creek or lake banks where public or private property or structures are threatened.

(b) Stabilization of eroded river, creek or lake banks to reduce sediment deposition and improve water quality.

§ 207-62. 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.

B. Requirements for trash racks, overflow grates and escape provisions.

(1) A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:

(a) The trash rack shall have parallel bars, with no greater than six-inch spacing between the bars.

(b) The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.

(c) The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.

(d) The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.

(2) An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:

(a) The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.

(b) The overflow grate spacing shall be no less than two inches across the smallest dimension.

(c) The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.

(3) For purposes of this Subsection **B(3)**, "escape provisions" mean 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 § **207-62C**, a freestanding outlet structure may be exempted from this requirement.

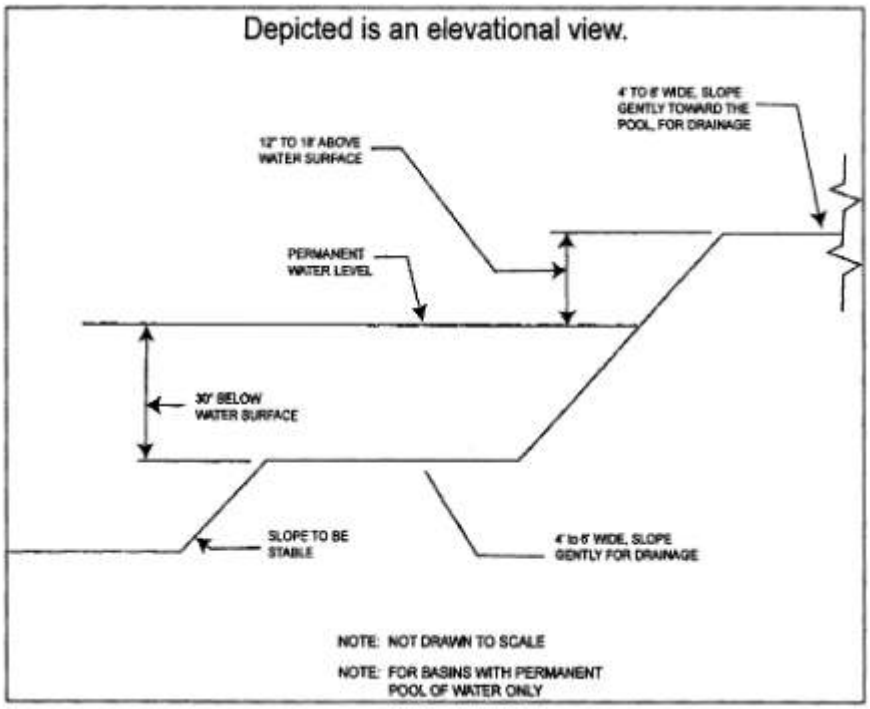
(b) Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than 2 1/2 feet. Such safety ledges shall be comprised of two steps. Each step shall be four feet to six feet in width. One step shall be located approximately 2 1/2 feet below the permanent water surface, and the second step shall be located one to 1 1/2 feet above the permanent water surface. See § **207-62D** 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.

(1) A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

D. Illustration of safety ledges in a new stormwater management basin:



§ 207-63. 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 article, 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 article.

(3) The applicant shall submit 15 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 Land Use Board to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this article.

C. Checklist requirements.

(1) The following information shall be required:

(a) Topographic base map. The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 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.

(b) Environmental site analysis. A written and graphic description of the natural and man-made features of the site and its environs is required. 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.

(c) 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 ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

(d) Land use planning and source control plan. This plan shall provide a demonstration of how the goals and standards of §§ **207-55** through **207-58** 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.

(e) Stormwater management facilities map. The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

[1] 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.

[2] 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.

(f) Calculations.

[1] Comprehensive hydrologic and hydraulic design calculations for the predevelopment and postdevelopment conditions for the design storms specified in § **207-56** of this article.

[2] When the proposed stormwater management control measures (e.g., infiltration basins) depends 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.

(g) Maintenance and repair plan. The design and planning of the stormwater management facility shall meet the maintenance requirements of § **207-64**.

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

§ 207-64. Maintenance and repair.

A. Applicability.

(1) Projects subject to review as in § **207-53C** of this article shall comply with the requirements of Subsections **B** and **C**.

B. General maintenance.

(1) The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

(2) The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). 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 municipality or another governmental agency.

(10) In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to effect maintenance and repair of the facility in a manner that is approved by the Municipal Engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or county may immediately proceed to do so and shall bill the cost thereof to the responsible person.

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.

§ 207-65. Violations and penalties.

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this article shall be subject to a fine not to exceed $5,000.

§ 207-66. When effective.

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

SPPP Form 4- Local Public Education Program

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *John Alexander, Director of Public Affairs*

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

Local Public Education Program

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

The City has implemented a Public Education and Outreach Program with this SPPP that focuses on pollution prevention activities and totals at least 12 points as required (points system attached).

The City labels storm drain inlets that do not have permanent wording cast into the structure and replaces them as needed.

The City advertises public involvement through website notices and newspaper ads.

Attachment B – Points System for Public Education and Outreach Activities

The Tier A Municipality shall implement a Public Education and Outreach Program that focuses on educational and pollution prevention activities about the impacts of stormwater discharges on surface water and groundwater and to involve the public in reducing pollutants in stormwater runoff and mitigating flow.

The Tier A Municipality shall **annually** conduct educational activities that total at least **12 points** and include activities from at least three of the five categories found below. At a minimum, at least one of the activities shall involve educating businesses and the general public of hazards associated with illicit connections and improper disposal of waste. Each approved activity is listed below with an assigned point value. Additional information on how to conduct these Public Education and Outreach activities can be found under Notes and Definitions Part IV.A.3 and 4 of this Tier A MS4 NJPDES permit. Records shall be kept necessary to demonstrate compliance with this requirement, including date of activities and any other relevant documentation.

Category 1: General Public Outreach		
Activity	**Description**	**Points**
Website and Social Media	Maintain a stormwater related page on the municipal website or on a municipal social media site. The web page may include links to other stormwater related resources, including the NJDEP stormwater website (www.njstormwater.org).	1
Newspaper Ad	Use Department created and approved stormwater education materials available on www.cleanwaternj.org to publish an ad in a newspaper or newsletter that serves the municipality.	1
Radio/Television	Broadcast a radio or television public service announcement from www.cleanwaternj.org on a local radio or municipal public service channel.	1
Green Infrastructure Signage	Post signs at municipally-owned green infrastructure sites that describe the function and importance of the infrastructure, contact phone number, municipal identification number, and/or website for more information. *New signs receive 0.5 credits per sign. Existing signs that are maintained or upgraded receive 0.25 credits per sign. A maximum of 5 credits are allowed.	5*
Billboard/Sign	Produce and maintain (for credit in subsequent years) a billboard or sign which can be displayed on a bus, bus stop shelter, recreation field (outfield sign), or other similar public venue.	2
Mural	Produce and maintain (for credit in subsequent years) the planning and painting of a stormwater pollution themed mural, storm drain art or other artwork at a local downtown/commercial area or other similar public venue.	2
Stormwater Facility Signage	Post signs at municipally-owned stormwater management basins or other structural stormwater related facilities that describe the function and importance of the facility, contact phone number, municipal identification number, and/or website for more information. *New signs receive 0.5 credits per sign. Existing signs that are maintained or upgraded receive 0.25 credits per sign. A maximum of 5 credits are allowed.	5*

Category 2: Targeted Audiences Outreach		
Activity	**Description**	**Points**
Stormwater Display	Present a stormwater related display or materials at any municipal event (e.g., Earth Day, town picnic), at the municipal building or other similar public venue.	1
Promotional Item	Distribute an item or items with a stormwater related message (e.g., refrigerator magnets, temporary tattoos, key chains, bookmarks, pet waste bag dispensers, coloring books, and pens or pencils). Municipality must initially have available a minimum number of the items equal to 10% of the municipal population.	2
Mailing or e-Mailing Campaign	Provide information to all known owners of stormwater facilities not owned or operated by the municipality (i.e., privately owned) highlighting the importance of proper maintenance of stormwater measures. For assistance, see information at www.nj.gov/dep/stormwater/maintenance_guidance.htm.	3
Mailing or e-Mailing Campaign	Distribute any of the Department's educational brochures, tip cards, or a municipally produced equivalent (e.g., community calendar, newsletter, or recycling schedule) via a mailing to every resident and business in the municipality.	2
Ordinance Education	Distribute a letter or e-mail from the mayor or municipal official to every resident and business in the municipality highlighting the requirements and environmental benefits of the Pet Waste, Wildlife Feeding, Litter Control, Improper Disposal of Waste, Containerized Waste/Yard Waste Collection, Private Storm Drain Inlet Retrofitting and Illicit Connection ordinances. Provide a link to the municipal website where subject ordinances are posted.	3

Category 3: School / Youth Education and Activities		
Activity	**Description**	**Points**
School Presentations	Provide water-related educational presentation(s) and/or activities to local preschool, elementary, middle, and/or high school classes using municipal staff or local partner organizations. Topics could include stormwater, nonpoint source pollution, watersheds, water conservation and water quality. For ideas, see information at www.nj.gov/dep/seeds. *Presentations receive 1 credit per presentation, with a maximum of 5 credits allowed.	5*
Water Education Workshops	Provide water-related professional development workshops for local teachers from a registered NJ Department of Education Professional Development Provider.	2
Storm Drain Labeling	Organize a project to label and/or maintain storm drain labels (that are not already precast with a message) with a scout troop, local school district, or faith based group, or other community youth group for a minimum of 40 labels. This project could also include stenciling over precast labels to improve legibility.	3
Educational Contest for Schools	Organize an educational contest with a local school district or a local community organization serving youth to design a poster, magnet, rain stick, rain barrel or other craft/art object. Contest themes shall have an appropriate stormwater message. Winning entries are to be displayed at publicly accessible locations within the municipality such as at the town hall, library, post office, or school. The winning design should be shown on the municipality's website or social media site, if practical.	3
AmeriCorps Event	Coordinate an event (e.g. volunteer stream monitoring, educational presentations, or stormwater awareness project) through AmeriCorps NJ Watershed Ambassador Program	4
Clean-up	Sponsor or organize a litter clean up for a scout troop, local school district, faith based group or other community youth group along a local waterway, public park, stormwater facility, or in an area with storm drains that discharge to a local lake or waterway.	3

Category 4: Watershed/Regional Collaboration		
Activity	**Description**	**Points**
Regional Stormwater Collaboration	Participate in a regional stormwater, community collaborative or other watershed-based group on a regular basis to discuss impaired waterbodies, TMDLs, regional stormwater related issues, or watershed restoration plans that address those waterbodies. Evaluate, develop and implement remedies that resolve stormwater-related issues within the affected waterbody or watershed.	3
Green Infrastructure Workshop	Organize or participate in a rain barrel, rain garden or other green infrastructure workshop on a regional or watershed basis. This could be a partnership exercise with a local watershed organization, utility, university, school, youth/faith based group, and/or other organization.	3
Community Activity	Organize or participate in the organization of a regional or watershed based event to carry out stormwater activities such as stormwater facility maintenance or litter clean-up. The municipality may identify and enter into a partnership agreement with a local group such as a watershed organization, utility, university, school, youth/faith based group, and/or other organization to carry out these activities.	3

Category 5: Community Involvement Activities		
Activity	**Description**	**Points**
Volunteer Stormwater Assessment or Stream Monitoring	Establish a volunteer stormwater facility assessment (inspection, inventory and/or mapping) or stream monitoring program for a waterbody within the municipality in order to gauge the health of the waterway through chemical, biological or visual monitoring protocols. Contact NJDEP's AmeriCorps NJ Watershed Ambassador Program or review USEPA National Directory of Volunteer Monitoring Programs.	3
Rain Barrel Workshop	Organize or participate in a rain barrel workshop. This could be a partnership exercise with a local watershed organization, university, school, youth/faith based group, and/or other nonprofit.	3
Rain Garden Workshop	Organize or participate in a rain garden training or installation workshop. This could be a partnership exercise with a local watershed organization, university, school, youth/faith based group, and/or other nonprofit.	3
Community Event	Organize or participate in the organization of a community event to carry out stormwater activities such as stormwater measure maintenance or a stream buffer restoration. The municipality may identify and enter into a partnership agreement with a local group such as a watershed organization, university, utility, school, youth/faith based group, and/or other nonprofit to carry out these activities.	3
Community Involvement	Organize a project with a local organization to create and post signs at either green and/or gray stormwater infrastructure sites or facilities that describe the function and importance of the facility, contact phone number, municipal identification number, and/or website for more information. *Signs receive 0.5 credits per sign. A maximum of 5 credits are allowed.	5*

Public Education Records (Website)

Public Education Records (Newspaper)

Public Education Records (Billboard/Sign)

Public Education Records (Stormwater Display)

Public Education Records (Promotional Item)

Public Education Records (Mailing Campaign)

Public Education Records (Clean-up)

NJDEP Brochures for Annual Distribution

SPPP Form 5 – Storm Drain Inlet Labeling

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *Mark Staravoj, Superintendent of Sewage and Drainage*

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

Storm Drain Inlet Labeling

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

The storm drain inlet labeling program was coordinated and completed by the Department of Sewage and Drainage. All storm drain inlets along municipal streets with sidewalks, within plazas, in parking areas, and maintenance yards operated by the City of Burlington have been be labeled with stainless steel medallions that read "Dump No Waste - Drains to River" with a picture of a fish on it.

For all new development activities, the City of Burlington's land use ordinance requires the developer to install storm drain inlet labeling. Labeled inlets are also required on all reconstruction projects.

During the annual inlet inspection/cleaning program, the labels are checked to ensure that they are intact and visible. Labels that have worn or become illegible are replaced.

SPPP Form 6 – MS4 Outfall Pipe Mapping

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *Mark Staravoj, Superintendent of Sewage and Drainage*

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

The outfall mapping for the entire City was completed by the Sewer and Drainage Engineer on 8/1/2006 and is available on a map entitled "Stormwater Pollution Prevention Plan Outfall Location Map." The scale of the map is 1" = 1250'.

Please see attached map.

The City has an outfall pipe map that is updated yearly. The outfall pipe map includes all known tidal and non-tidal discharges to surface water bodies.

As municipal improvement, development, and redevelopment projects are completed, the outfall maps will be updated.

The outfall pipe map will be provided to NJDEP by December 31, 2018 and will be submitted electronically via NJDEP's electronic system which NJDEP will identify in the future.

GENERAL NOTES:

1. A FIELD SURVEY OF THE SITE WAS NOT PERFORMED BY PENNONI ASSOCIATES IN ASSOCIATION WITH THIS PLAN. ALL DATA, TOPOGRAPHY, EXISTING CONDITIONS, AND ALL OTHER FEATURES DEPICTED HEREON ARE BASED UPON PROVIDED AERIAL SURVEY DATA DATED 1990 AND FROM EXISTING MAPS PROVIDED BY THE CITY OF BURLINGTON.

2. LOCATIONS OF ON AND OFF SITE UTILITIES AS SHOWN ARE APPROXIMATE AND MAY OR MAY NOT BE COMPLETE. THE NATURE AND EXACT LOCATION OF EXISTING UTILITIES SHOULD BE VERIFIED PRIOR TO INITIATING ANY ACTIVITY THAT MAY AFFECT THEIR USE OR LOCATION.

3. UNLESS SPECIFICALLY STATED OR SHOWN HEREON TO THE CONTRARY, THIS SURVEY IS MADE SUBJECT TO AND DOES NOT LOCATE OR DELINEATE:

   A. RIGHTS OR INTERESTS OF THE UNITED STATES OF AMERICA OR STATE OF NEW JERSEY OVER LANDS NOW OR FORMERLY FLOWED BY TIDEWATER, BUT NO LONGER VISIBLE OR PHYSICALLY EVIDENT, OR LANDS CONTAINING ANY ANIMAL, MARINE, OR BOTANICAL SPECIES REGULATED BY OR UNDER THE JURISDICTION OF ANY FEDERAL, STATE, OR LOCAL AGENCY.

   B. ANY SUBSURFACE OR SUBTERRANEAN CONDITION, EASEMENTS OR RIGHTS, INCLUDING, BUT NOT LIMITED TO MINERAL OR MINING RIGHTS, OR THE LOCATION OF OR RIGHTS TO ANY SUBSURFACE STRUCTURES, CONTAINERS OR FACILITIES OR ANY OTHER NATURAL OR MAN-MADE SUBSURFACE CONDITION WHICH MAY OR MAY NOT AFFECT THE USE OR DEVELOPMENT POTENTIAL OF THE SUBJECT PROPERTY.

4. A. THE LOCATION OF THE EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN HAVE BEEN TAKEN FROM EXISTING UTILITY RECORDS AVAILABLE AT THE TIME THESE PLANS WERE PREPARED AND FROM SURFACE OBSERVATION OF THE SITE.

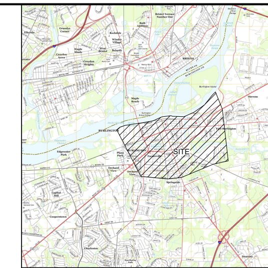
   B. COMPLETENESS OR ACCURACY OF LOCATION AND DEPTH OF UNDERGROUND UTILITIES AND STRUCTURES IS NOT GUARANTEED.

   C. THE CONTRACTOR SHALL VERIFY LOCATIONS AND DEPTHS OF ALL UNDERGROUND UTILITIES AND STRUCTURES BEFORE THE START OF WORK.

5. PROPERTY BOUNDARY INFORMATION AND BEARING SYSTEM BASED PROVIDED ELECTRONIC FILES PROVIDED BY CITY OF BURLINGTON. NO FIELD SURVEY TO VERIFY ANY BOUNDARY INFORMATION DEPICTED HEREON WAS PERFORMED.

6. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88) BASED ON GPS OBSERVATION.

7. HORIZONTAL COORDINATE DATUM IS IN NEW JERSEY STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983 (NJSPCS NAD 83) BASED ON GPS OBSERVATION.



LOCATION MAP
SCALE: 1"=5000'

LAT./LONG.: N 40°04'28" W 74°51'22"
SOURCE: USGS QUADRANGLE MAPS

PENNONI ASSOCIATES INC.
515 Grove Street, Suite 1B
Haddon Heights, NJ 08035
T 856.547.0505 F 856.547.9174

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

CITY OF BURLINGTON

BURLINGTON COUNTY
STATE OF NEW JERSEY

OUTFALL LOCATION MAP

CITY OF BURLINGTON
525 HIGH STREET
BURLINGTON, NJ 08016

DATE	NO.	REVISIONS	BY

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON THE EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATE; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM.

PROJECT	BCSE1500
DATE	06/23/2015
DRAWING SCALE	1"=300'
DRAWN BY	VARIOUS
APPROVED BY	DSD

V0601

SHEET 1 OF 5

SPPP Form 7 – Illicit Connection Elimination Program

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *Mark Staravoj, Superintendent of Sewage and Drainage*

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

The City implements and enforces this Illicit Connection Elimination Program and has adopted an illicit connection ordinance.

The City will conduct dry weather inspections as part of routine maintenance activities. In addition, the City will conduct visual dry weather inspections of outfall pipes owned/operated by the City at least once every 5 years for signs of dry weather flow. If dry weather flows are observed, further investigation will be performed beginning with increased inspections and potable water tests of the discharge. Further investigations will be performed with the goal of tracing the discharge to its source, notifying the source, and taking necessary action to eliminate the discharge.

Within 3 months of a complaint/report of a potential illicit connection, the City will respond to investigate.

When dry weather flow is observed, the attached Illicit Connection Inspection Report Forms will be completed.

SPPP Form 8 – Illicit Connection Records

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *Mark Staravoj, Superintendent of Sewage and Drainage*

Effective Date of Permit Authorization (EDPA): *4/1/04*

Date of Completion: *1/26/05* Date of most recent update: *5/26/09*

Prior to May 2, 2006

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

Total number of inspections performed this year? *0*

Number of outfalls found to have a dry weather flow? *n/a*

Number of outfalls found to have an illicit connection? *n/a*

How many illicit connections were eliminated? *n/a*

Of the illicit connections found, how many remain? *n/a*

May 2, 2006 – May 1, 2007

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

Total number of inspections performed this year? *23*

Number of outfalls found to have a dry weather flow? *0*

Number of outfalls found to have an illicit connection? *0*

How many illicit connections were eliminated? *n/a*

Of the illicit connections found, how many remain? *n/a*

May 2, 2007 – May 1, 2008

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

Total number of inspections performed this year? *0*

Number of outfalls found to have a dry weather flow? *n/a*

Number of outfalls found to have an illicit connection? *n/a*

How many illicit connections were eliminated? *n/a*

Of the illicit connections found, how many remain? *n/a*

May 2, 2008 – May 1, 2009

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

Total number of inspections performed this year? *37*

Number of outfalls found to have a dry weather flow? *0*

Number of outfalls found to have an illicit connection? *0*

How many illicit connections were eliminated? *n/a*

Of the illicit connections found, how many remain? *n/a*

SPPP Form 8 – Illicit Connection Records

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *Mark Staravoj, Superintendent of Sewage and Drainage*

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *9/30/18*

Prior to May 2, 2017

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

Total number of inspections performed this year? *60*

Number of outfalls found to have a dry weather flow? *0*

Number of outfalls found to have an illicit connection? *0*

How many illicit connections were eliminated? *n/a*

Of the illicit connections found, how many remain? *n/a*

May 2, 2017 – May 1, 2018

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

Total number of inspections performed this year? _____

Number of outfalls found to have a dry weather flow? _____

Number of outfalls found to have an illicit connection? _____

How many illicit connections were eliminated? _____

Of the illicit connections found, how many remain? _____

May 2, 2018 – May 1, 2019

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

Total number of inspections performed this year? _____

Number of outfalls found to have a dry weather flow? _____

Number of outfalls found to have an illicit connection? _____

How many illicit connections were eliminated? _____

Of the illicit connections found, how many remain? _____

May 2, 2019 – May 1, 2020

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

Total number of inspections performed this year? _____

Number of outfalls found to have a dry weather flow? _____

Number of outfalls found to have an illicit connection? _____

How many illicit connections were eliminated? _____

Of the illicit connections found, how many remain? _____

Illicit Connection Forms

Illicit Connection Inspection Report Form

Public Complex Information

Public Complex: _____

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 question #1 and #3, there is probably not an illicit connection and you can skip to question #7.
   (NOTE: This form **does not** need to be submitted to the Department, but should be kept with your SPPP.)

   If you answered "**YES**" to either question, please continue on to question #5.
   (NOTE: This form will need to be submitted to the Department with the Annual Report and Certification.)

5. **PHYSICAL OBSERVATIONS**:

(a) **ODOR**: none☐ sewage☐ sulfide☐ oil☐ gas☐ rancid/sour☐ other☐: _____

(b) **COLOR**: none☐ yellow☐ brown☐ green☐ red☐ gray☐ other☐: _____

(c) **TURBIDITY**: none☐ cloudy☐ opaque☐

(d) **FLOATABLES**: none☐ petroleum☐ sheen☐ sewage☐ other☐: _____

(e) **DEPOSITS/STAINS**: none☐ sediment☐ oily☐ other☐: _____

(f) **VEGETATION CONDITIONS**: normal☐ excessive growth☐ inhibited growth☐

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

IDENTIFY STRUCTURE: _____

DAMAGE: none☐ concrete spalling/cracking☐ peeling paint☐
metal corrosion☐ other damage☐

6. **ANALYSES OF OUTFALL FLOW SAMPLE:**
   * field calibrate instruments in accordance with manufacturer's instructions prior to testing.

(a) **DETERGENTS**: _____ mg/L

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

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

(b) **AMMONIA (as N) TO POTASSIUM RATIO**: _____

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

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

(c) **FLUORIDE**: _____ mg/L

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

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

(d) **TEMPERATURE**: _____ °F

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

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

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

   If "**YES**", what is the suspected source? _____

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

8. Has the investigation of the suspected illicit connection been completed? Y (☐) N (☐)

   If "**YES**", proceed to question #9.

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

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

   If "**YES**", identify the source (including whether the source is from the Public Complex or another entity). _____

   What plan of action will follow to eliminate the illicit connection or report the illicit connection to the NJDEP? _____

   _____

   _____

   _____

   _____

   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: ***Burlington City*** County ***Burlington***

NJPDES # : **NJG*0153109*** PI ID #: ***171529***

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 9 – Yard Waste Ordinance/Collection Program

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # :*0153109* PI ID #: *171529*

Team Member/Title: *Craig Leshner, Surpervisor of Public Works*

Effective Date of Permit Authorization (EDPA):*1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

The City of Burlington adopted a yard waste ordinance that prohibits all yard wastes from being placed at the curb or along the street more than seven days prior to scheduled collections, unless they are bagged or otherwise containerized. The ordinance also prohibits the placing of yard waste closer than 10-feet from any storm sewer inlet along the street, unless they are bagged or otherwise containerized.

The City uses mass mailing of leaf collection schedules and posts leaf collection dates on the City's website to notify residents of pickup dates.

The Department of Public Works performs leaf collections by neighborhood. Leaf collections are performed twice per month in each neighborhood during leaf collection season.

SPPP Form 10 - Ordinances

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *M. Lou Garty, Esq., Municipal Attorney*

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

Pet Waste *5/2/06*

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

Litter *12/1992*

Improper Waste Disposal *5/2/06*

Wildlife Feeding *5/2/06*

Yard Waste *5/2/06*

Illicit Connections *5/2/06*

How will these ordinances be enforced?

The following additional ordinances were adopted on the following dates:
-Refuse Container/Dumpster Ordinance: 7/10/2010
-Private Storm Drain Inlet Retrofitting Ordinance: 7/20/2010

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

Pet Waste Ordinance

City of Burlington, NJ
Friday, August 3, 2018

Chapter 84. Animals

Article VI. Pet Waste

[Adopted by Ord. No. 6-2006 (Ch. 6.18 of the 1996 Municipal Code)]

§ 84-49. Purpose.

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

§ 84-50. Definitions.

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

IMMEDIATE
That 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 a designated waste receptacle, or other suitable container, and discarded in a refuse container which is regularly emptied by the municipality or some other refuse collector; or disposal into a system designed to convey domestic sewage for proper treatment and disposal.

§ 84-51. Requirement for disposal.

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

§ 84-52. 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.

§ 84-53. Enforcement.

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

§ 84-54. 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 $1,000.

Litter Ordinance

City of Burlington, NJ
Friday, August 3, 2018

Chapter 217. Littering

[HISTORY: Adopted by the Common Council of the City of Burlington by Ord. No. 8-1997 (Ch. 8.24 of the 1996 Municipal Code). Amendments noted where applicable.]

GENERAL REFERENCES
Junkyards — See Ch. **201**.
Property maintenance — See Ch. **265**.
Solid waste — See Ch. **300**.
Streets and sidewalks — See Ch. **306**.
Abandoned vehicles — See Ch. **340**.
Vehicles and traffic — See Ch. **344**.

§ 217-1. Definitions.

As used in this chapter, the following terms shall have the meanings indicated:

GARBAGE
Putrescible animal and vegetable wastes resulting from the handling, preparation, cooking and consumption of food.

LITTER
Garbage, refuse and rubbish as defined herein, and all other waste material which, if thrown or deposited as required herein, tends to create a danger to public health, safety and welfare.

PERSON
As defined in § **1-15**. For purposes of any fine, penalty or imprisonment the term ″person″ shall include the officer and directors of a corporation or other legal entity having officers and directors.

PUBLIC PLACE
Any and all streets, sidewalks, boulevards, alleys, beaches or other public ways, and any and all public parks, squares, spaces, docks, grounds and buildings.

REFUSE
All putrescible and nonputrescible solid wastes (except body wastes), including garbage, rubbish, ashes, street cleanings, dead animals, abandoned automobiles and solid market and industrial wastes.

RUBBISH
Nonputrescible solid wastes, consisting of both combustible and noncombustible wastes, such as paper, wrappings, cigarettes, cardboard, tin cans, yard clippings, leaves, wood, glass, bedding, crockery and similar materials.

SOLID WASTE
Garbage, refuse and other discarded materials resulting from industrial, commercial or agricultural operations, or from domestic or community activities, and shall include all other waste materials, including liquids.

VEHICLE

Every device in, upon or by which any person or property is or may be transported or drawn upon a highway, including devices used exclusively upon stationary rails or tracks.

§ 217-2. Littering prohibited.

[Amended 7-21-2009 by Ord. No. 13-2009[1]]

No person shall sweep, throw or deposit litter in or upon any occupied, open or vacant property, whether owned by such person or not, or in or upon any street, sidewalk, park or other public place, or any pond, lake, stream or other body of water within the City, except in public receptacles or in authorized private receptacles for collection. Persons placing litter in public receptacles or in authorized private receptacles shall do so in such a manner as to prevent it from being carried or deposited by the elements upon any street, sidewalk or other public place or upon private property.

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

§ 217-3. Receptacles required.

The City shall provide litter receptacles at the linear quarter mile in active retail commercially zoned areas and in parks. Persons owning or controlling buildings held out for use by the public, including schools, government buildings and railroad and bus stations; drive-in restaurants; self-service refreshment areas; construction sites; gasoline service stations; shopping centers; parking lots; campgrounds; marinas, boat moorage and fueling stations; boat launching areas and other similar uses shall provide adequate litter receptacles. The sponsor of any special event to which the public is invited, such as sporting events, parades, carnivals and festivals, shall be responsible for providing adequate receptacles and providing for their servicing.

§ 217-4. Litter thrown by persons in vehicles.

No person, while a driver or passenger in a vehicle, shall throw or deposit litter upon any street or other public place or into any sewer or catchbasin within the City or upon private property.

§ 217-5. Truck loads causing litter.

No person shall drive or move any truck or other vehicle within the City unless such vehicle is so constructed or loaded as to prevent any load, contents or litter from being blown or deposited upon any street, alley or other public place; nor shall any person drive or move any vehicle or truck within the City, the wheels or tires of which carry onto or deposit in any street, alley or other public place mud, dirt, sticky substances, litter or foreign matter of any kind.

§ 217-6. Transportation from outside City.

No person shall bring, remove, transport or collect any litter from outside the City or into the City for the purpose of dumping or disposing thereof, unless authorized by the City. No truck or other vehicle containing litter which has been transported into the City shall be parked or allowed to remain standing on any street in the City or any public property for a period in excess of two hours.

§ 217-7. Dumping of solid waste in unauthorized places prohibited.

No person shall discard or dump any household, commercial or industrial solid waste in any place not specifically designated for the purpose of solid waste storage or disposal.

§ 217-8. Sweeping litter into gutters or other public places prohibited.

No person, including merchants owning or occupying a place of business, shall sweep into or deposit in any gutter, street, sewer, catchbasin or other public place within the City the accumulation of litter from any building or lot or from any public or private sidewalk or driveway. Persons owning or occupying property shall keep the sidewalk in front of their premises free of litter.

§ 217-9. Owner to maintain property litter free.

Each person owning any property, building or structure within the City shall keep and cause to be kept the sidewalk and curb abutting such property, building or structure and all areaways, backyards, court and alleys free from litter.

§ 217-10. Open or overflowing waste bins prohibited.

Open or overflowing commercial, industrial or residential waste disposal bins are prohibited.

§ 217-11. Violations and penalties.

The minimum penalty for violation of each section of this chapter, except § **217-7**, is $300. The minimum penalty for violation of § **217-7** is $1,000. Each and every day in which a violation of any provision of this chapter exists shall constitute a separate violation. Any person convicted of a first offense under § **217-2** shall be subject to a minimum fine of $224 payable through the City Violations Bureau.

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

Improper Waste Disposal Ordinance

City of Burlington, NJ
Friday, August 3, 2018

Chapter 277. Sewers

Article III. Improper Disposal of Waste

[Adopted by Ord. No. 8-2006 (Ch. 8.57 of the 1996 Municipal Code)]

§ 277-24. 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 City of Burlington so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

§ 277-25. Definitions.

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

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
: 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 City of Burlington 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.

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.

§ 277-26. Prohibited conduct.

The spilling, dumping, or disposal of materials other than stormwater to the municipal separate storm sewer system operated by the City of Burlington 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.

§ 277-27. Exceptions to prohibition.

The following are exceptions to the prohibition set forth in § **277-26**:

A. Water line 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: 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. 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.

§ 277-28. Enforcement.

This article shall be enforced by the Police Department and/or other municipal officials of the City of Burlington.

§ 277-29. Violations and penalties.

Any person(s) who continues to be in violation of the provisions of this article, after being duly notified, shall be punishable as provided in Chapter **1**, Article **III**, General Penalty.

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

Wildlife Feeding Ordinance

City of Burlington, NJ
Friday, August 3, 2018

Chapter 84. Animals

Article VII. Wildlife Feeding

[Adopted by Ord. No. 7-2006 (Ch. 6.17 of the 1996 Municipal Code)]

§ 84-55. 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 City of Burlington so as to protect public health, safety and welfare, and to prescribe penalties for failure to comply.

§ 84-56. Definitions.

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

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.

§ 84-57. Prohibited conduct.

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

B. Except as provided in Article **VIII**, Feral/Community Cats, of this article, no person shall attract or feed wild and/or stray domestic animals, including but not limited to stray and/or feral cats, stray dogs, Canadian geese, skunks, squirrels, buzzards, opossums, turkeys, beavers, muskrats, and/or minks within the City of Burlington, whether the property is publicly or privately owned. Nothing contained herein shall prohibit persons from feeding birds on their private property using bird feeders or other receptacles. This article shall not apply to an Animal Control Officer in the performance of his/her official duties or to state and/or federal wildlife officials in the performance of their official duties.
[Added 12-10-2013 by Ord. No. 09-2013]

§ 84-58. Enforcement.

A. This article shall be enforced by the Police Department or other municipal officials of the City of Burlington.

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

§ 84-59. Violations and penalties.

[Amended 12-10-2013 by Ord. No. 09-2013]

Any person who violates any provision of this article shall be required to appear in the Municipal Court and, upon conviction thereof, be liable to a penalty of not less than $100 nor more than $500 for a first offense and not more than $1,250 and community service for a period not to exceed 40 hours for a second or subsequent offense. Each day a particular violation continues shall constitute a separate offense.

Yard Waste Ordinance

City of Burlington, NJ
Friday, August 3, 2018

Chapter 300. Solid Waste

Article III. Yard Waste Collection

[Adopted by Ord. No. 9-2006 (Secs. 13.08.150 to 13.08.170 of the 1996 Municipal Code)]

§ 300-30. Purpose.

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

§ 300-31. Definitions.

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

CONTAINERIZED
The placement of yard waste in a trash can, bucket, bag or other vessel so 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, and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas within the street lines.

YARD WASTE
Leaves and grass clippings.

§ 300-32. Placement for collection.

Sweeping, raking, blowing or otherwise placing yard waste that is not containerized at the curb or along the street is only allowed during the seven days prior to a scheduled and announced collection, and yard waste 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 such party shall be deemed in violation of this article.

§ 300-33. Enforcement.

The provisions of this article shall be enforced by the City of Burlington.

§ 300-34. 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**, Article **III**, General Penalty.

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

Illicit Connection Ordinance

City of Burlington, NJ
Friday, August 3, 2018

Chapter 277. Sewers

Article II. Illicit Connections

[Adopted by Ord. No. 4-2006 (Ch. 13.21 of the 1996 Municipal Code)]

§ 277-19. Purpose.

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

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

§ 277-20. Definitions.

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

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 City of Burlington, unless that discharge is authorized under a NJPDES permit other than the Tier A municipal stormwater general permit (NJPDES Permit Number 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 City of Burlington 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."

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.

§ 277-21. 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 City of Burlington any domestic sewage, noncontact cooling water, process wastewater, or other industrial waste (other than stormwater).

§ 277-22. Enforcement.

This article shall be enforced by the Police Department and/or other municipal officials of the City of Burlington.

§ 277-23. Violations and penalties.

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

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

Retrofitting of Storm Drain Inlets Ordinance

City of Burlington, NJ
Thursday, August 2, 2018

Chapter 207. Land Development

Article VI. Stormwater Management

§ 207-55. General standards.

A. Design and performance standards for stormwater management measures.

(1) Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in § **207-56**. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

(2) The standards in this article 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.

B. 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 any surface that is in direct contact with an existing storm drain inlet on that property unless the storm drain inlet either:
[Added 7-20-2010 by Ord. No. 18-2010]

(1) Already meets the design standard in § **207-56E(3)** to control passage of solid and floatable materials; or

(2) Is retrofitted or replaced to meet the standard in § **207-56E(3)** prior to the completion of the project.

C. C. Enforcement. This article shall be enforced by the Zoning Officer or Code Enforcement Officer of the City of Burlington.
[Added 7-20-2010 by Ord. No. 18-2010]

D. D. 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 the maximum amount permitted by N.J.S.A. 40:49-5 for each storm drain inlet that is not retrofitted to meet the design standard.
[Added 7-20-2010 by Ord. No. 18-2010]

§ 207-56. Stormwater management requirements for major development.

A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with § **207-62**.

B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department' Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly Helonias bullata (swamp pink) and/or Clemmys 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 from 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 nonstructural stormwater management strategies set forth at Subsection **E** into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in 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 postconstruction. ″Time of concentration″ is defined as the time it takes for runoff to travel from the hydraulically

most distant point of the watershed to the point of interest within a watershed;

(e) Minimize land disturbance, including clearing and grading;

(f) Minimize soil compaction;

(g) Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;

(h) Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;

(i) Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:

[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) 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:

[1] The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or

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

[3] 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. This type of curb opening inlet is only required in areas of the City that are outside of the floodplain.

(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)**;

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

[5] Where the area flows to the Kennedy Lake system.

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

(5) Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in § **207-60**, 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 § **207-57**, 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 postconstruction 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. An "urban

redevelopment area" is defined as previously developed portions of areas delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1). The entire City of Burlington is located in Metropolitan Planning Area (PA1) on the New Jersey State Plan and Redevelopment Plan Map.

[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 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 § **207-57**, complete one of the following:

[1] Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, postconstruction 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 postconstruction 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 postconstruction 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 postconstruction 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. The applicant shall use the Federal Emergency Management Association (FEMA) maps to determine if the site is located in the tidal flood hazard area within the City of Burlington.

[5] Underground detention facilities are not recommended as a design solution unless the detention facility is located above the flood elevation. The City of Burlington will not accept maintenance responsibility for underground stormwater detention facilities. Exemptions from the runoff quantity design and performance standards due to the flood elevation condition may be offset through mitigation projects of equal value.

G. Stormwater runoff quality standards.

(1) Stormwater management measures shall be designed to reduce the postconstruction 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, 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)	Time (minutes)	Cumulative Rainfall (inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

(2) For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in § **207-60**, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in § **207-60**. 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, PO Box 418, Trenton, New Jersey, 08625-0418.

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

R = A + B - (AXB)/100

Where

R = total TSS percent load removal from application of both BMPs, and

A = the TSS percent removal rate applicable to the first BMP

B = the TSS percent removal rate applicable to the second BMP

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 § **207-59C**
Sand filter	80
Vegetative filter strip	60 to 80
Wet pond	50 to 90

(4) If there is more than one on-site drainage area, the eighty-percent TSS removal rate 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 postconstruction 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 § **207-60**.

(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 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 applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or center line of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.

(b) All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the standard for off-site stability in the "Standards For Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.

(c) If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the standard for off-site stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

[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 ninety-five-percent TSS postconstruction removal rate;

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

[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.

Refuse Container/Dumpster Ordinance

City of Burlington, NJ
Thursday, August 2, 2018

Chapter 300. Solid Waste

Article I. Collection

§ 300-4. Duty to provide receptacles; specifications.

A. Refuse containers and dumpsters.
[Amended 7-20-2010 by Ord. No. 17-2010]

(1) Any person who controls, whether owned, leased, or operated, a refuse container or dumpster must ensure that such container or dumpster is covered at all times and shall prevent refuse from spilling out or overflowing.

(2) 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 City of Burlington.

(3) The following are exempt from the above:

(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 National Pollutant Discharge Elimination System (NPDES) permit.

(e) Large bulky items (e.g., furniture, bound carpet and padding, white goods placed curbside for pickup).

B. The use of baskets as receptacles for waste materials shall not be permitted.

C. Receptacles that are badly broken or otherwise fail to meet the requirements of this section may be classed as rubbish and may be collected as such.

D. In dwellings, tenements and apartment houses containing three dwelling units or fewer, the receptacles shall be purchased and maintained, in the absence of a contract, by the tenants. In dwellings, tenements and apartment houses of more than three dwelling units, such receptacles shall be purchased and maintained, in the absence of a contract, by the landlord.

E. Enforcement. This section shall be enforced by the City of Burlington Code Enforcement Officer.
[Added 7-20-2010 by Ord. No. 17-2010]

F. Any person(s) who is found to be in violation of the provisions of this section shall be subject to the maximum amount permitted by N.J.S.A. 40:49-5.
[Added 7-20-2010 by Ord. No. 17-2010]

Ordinance Enforcement Log

SPPP Form 11 – Storm Drain Inlet Retrofitting

Municipality Information

Municipality: City of Burlington County Burlington

NJPDES # :0153109 PI ID #: 171529

Team Member/Title: Mark Staravoj, Supt, of Sewer & Drainage

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

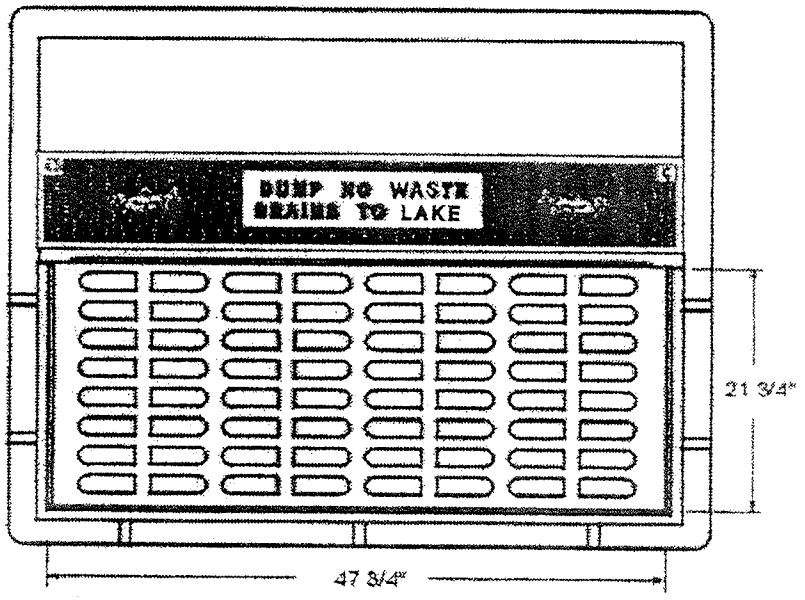
The City of Burlington uses the NJDOT bicycle safe grate style of storm drain inlet with a clear space no bigger than two inches across the smallest dimension and cast with "DUMP NO WASTE" and "DISCHARGES TO RIVER" labels. In addition, inlets with curb pieces will have Type J-Eco curb heads.

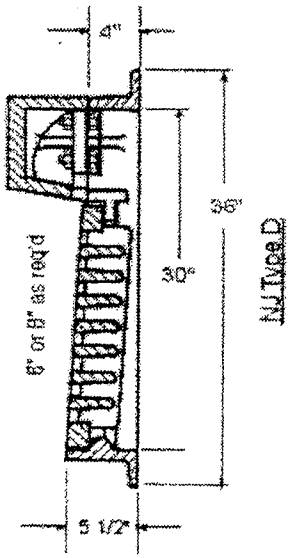
Repaving, repairing,reconstruction or alteration project name	Projected start date	Start date	Date of completion	# of storm drain inlets	# of storm drains w/ hydraulic exemptions
High Street Reconstruction		*9/04*	*4/05*	*8*	
Frances Street Improvements		*10/04*	*1/05*	*6*	
Wood Street Sanitary Sewer		*2/05*	*4/05*	*2*	
West Federal Street Improv.		*4/05*		*6*	
Lawrence St. Reconstruction		*4/12*	*9/12*	*14*	

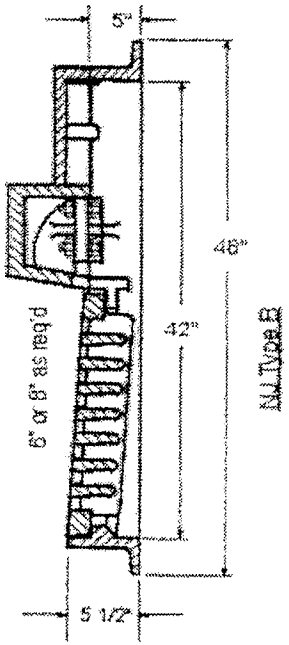
Are you claiming any alternative device exemptions or historic place exemptions for any of the above projects? Please explain:

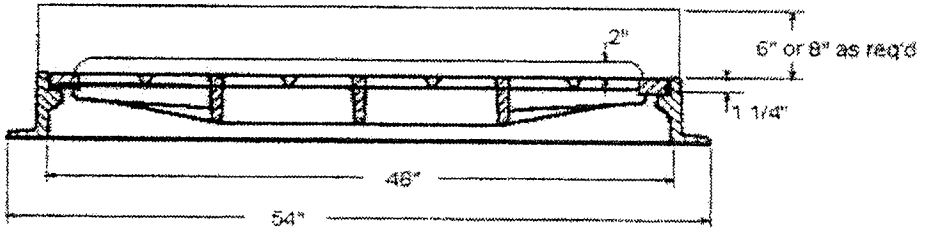
The City of Burlington does not operate any alternative devices within the municipality. At this time we do not plan on installing any such devices for repaving, repairing, reconstruction, or alteration projects. We also do not plan on claiming any historic place exemptions.

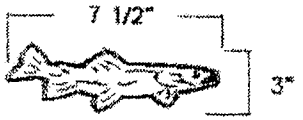
Inlet Details











DRAINS TO BAY
DRAINS TO RIVER
DRAINS TO LAKE
DRAINS TO OCEAN
DRAINS TO WATERWAYS

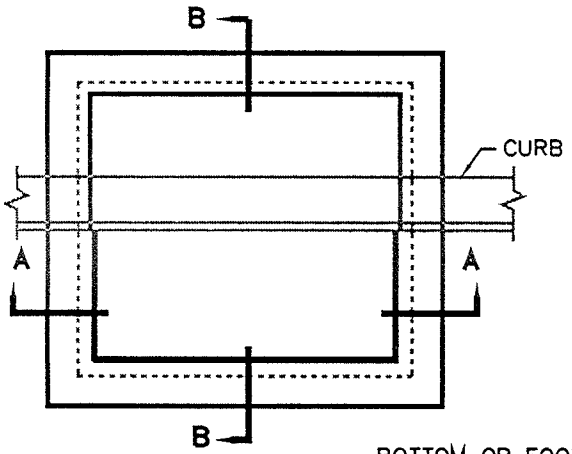
NAME PLATE OPTIONS

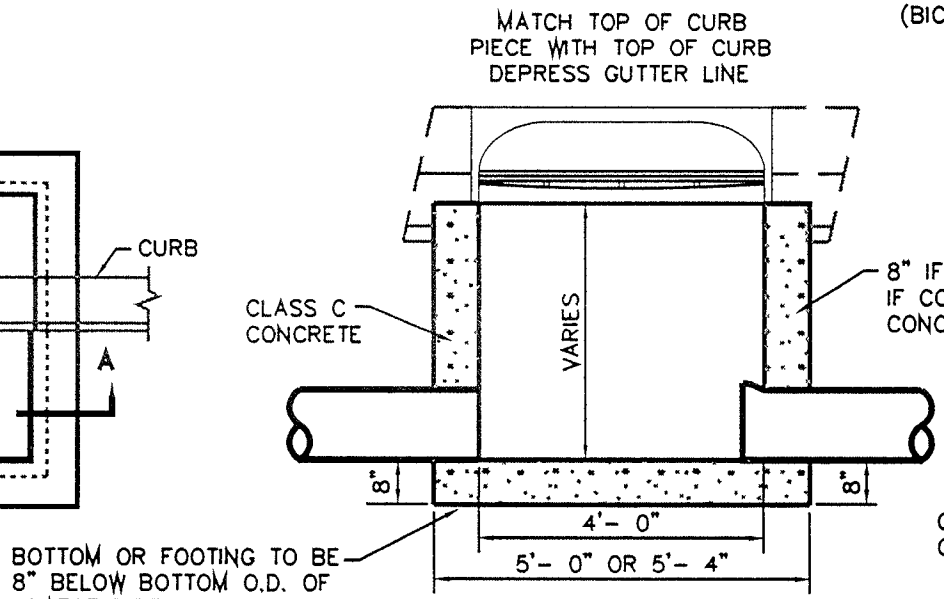
3D BROOK TROUT DESIGN

TYPE P2 – ECO CURB PIECE WITH BICYCLE SAFE GRATE

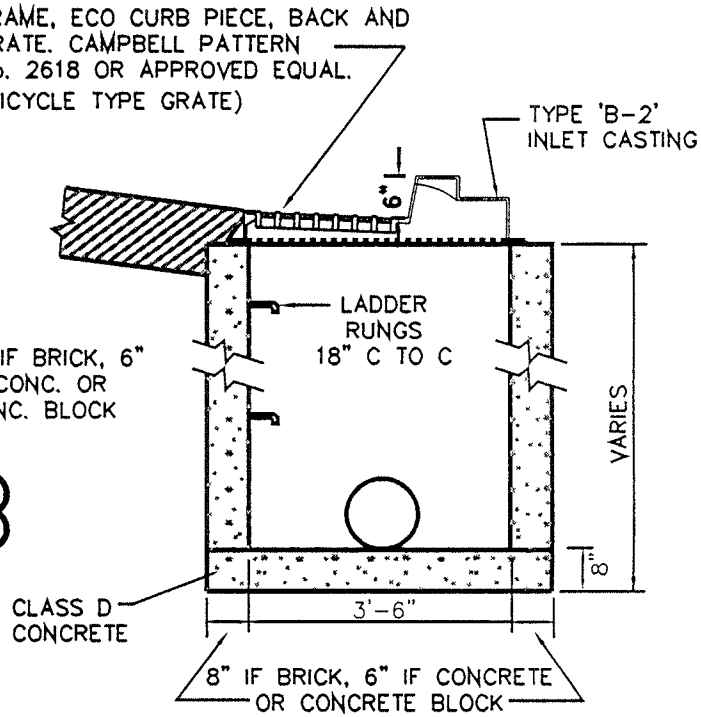
N.T.S.

NOTE:
THE CURB PIECE SHALL BE 6" UNLESS SPECIFIED OTHERWISE.





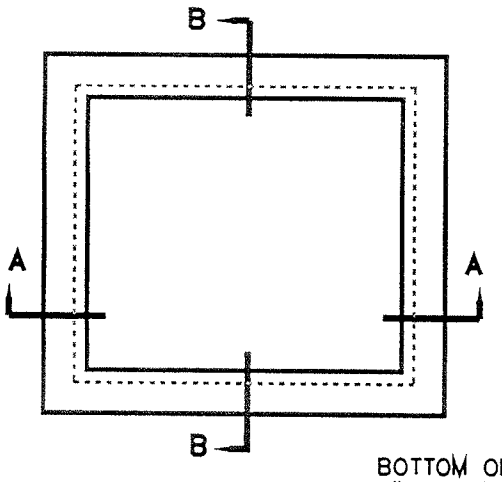
SECTION A-A



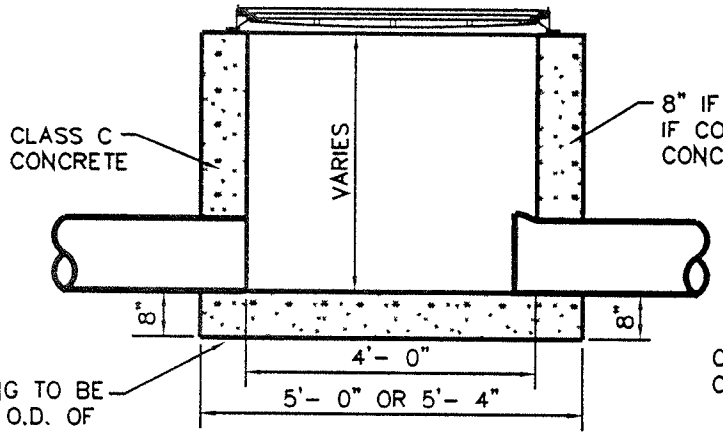
SECTION B-B

TYPE 'B' INLET DETAIL

N.T.S.

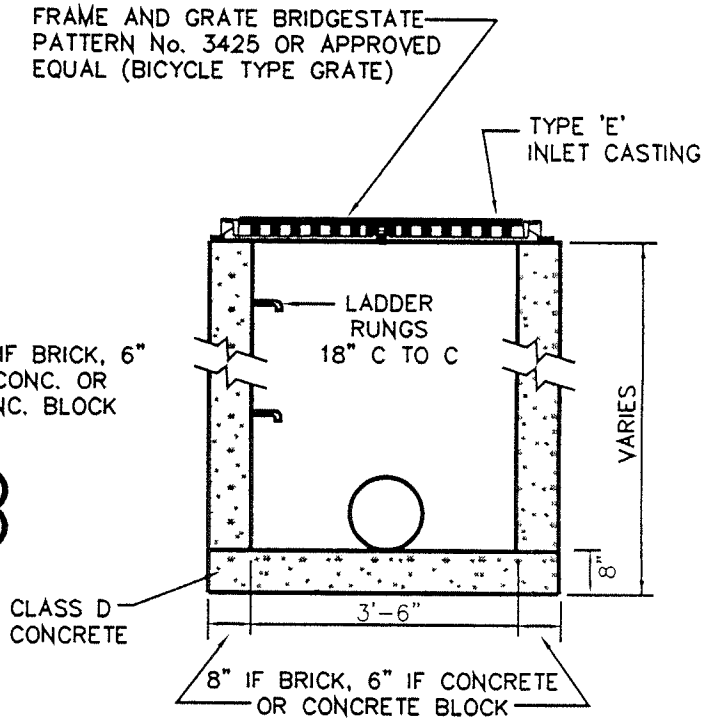


INSTALL POURED CONCRETE INVERT CHANNEL, EXCEPT AT TERMINAL INLETS, WHERE THE BOTTOM WILL BE DISHED AND SLOPED TOWARD THE OUTLET PIPE AT A RATE OF 2" PER FOOT.



BOTTOM OR FOOTING TO BE 8" BELOW BOTTOM O.D. OF LOWEST PIPE.

SECTION A-A



SECTION B-B

TYPE 'E' INLET DETAIL

N.T.S.

SPPP Form 12 – Street Sweeping and Road Erosion Control Maintenance

Municipality Information

Municipality: City of Burlington County: Burlington

NJPDES # :0153109 PI ID #: 171529

Team Member/Title: Craig Leshner, Supervisor of Public Works

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *3/02/18*

Street Sweeping

Please describe the street sweeping schedule that you will maintain.
(NOTE: Attach a street sweeping log containing the following information: date and area swept, # of miles swept and the total amount of materials collected.)

The City of Burlington endeavors to sweep all street within the municipality twice per month when weather permits.

At a minimum, the City will sweep all municipally-owned, curbed streets with storm drains that have a posted speed limit of 35 MPH or less, in predominantly commercial areas once per month and all streets within the City at least once per year.

Road Erosion Control Maintenance

Describe your Road Erosion Control Maintenance Program, including inspection schedules. A list of all sites of roadside erosion and the repair technique(s) you will be using for each site should be attached to this form.
(NOTE: Attach a road erosion control maintenance log containing the following information: location, repairs, date)

All streets within City jurisdiction are curbed and are not subject to erosion.

Street Sweeping Log

SPPP Form 12a - Street Sweeping Log

Road Name	# of Miles	Date	Amount of Material Collected
Total Number of Miles			

SPPP Form 13 – Stormwater Facility Maintenance

Municipality Information

Municipality: City of Burlington County: Burlington

NJPDES # :0153109 PI ID #: 171529

Team Member/Title: Mark Staravoj, Supertintendent of Sewage and Drainage

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

The City will inspect all City-owned storm drain inlets and catch basins at least once every 5 years.

The City has implemented an annual catch basin cleaning program to maintain catch basin function and efficiency. All catch basins are inspected once each year. Catch basins are cleaned if there is sediment, trash, or other debris observed. The amount of material removed from the inlets is recorded.

At the time of cleaning, the catch basins are inspected for proper function. Maintenance is scheduled and performed for any basins in disrepair. Additionally, the City responds to complaints of catch basin "clogging" on a case-by-case basis and cleans out debris where identified.

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

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

The City will maintain a log of stormwater facilities inspections and maintenance performed utilizing the attached forms. If facilities are found to not be functioning properly and repairs are not made, then the necessary repairs will be documented, prioritized, and scheduled for repairs.

In addition, for stormwater facilities not owned and operated by the City, the City will require the owner/operator to report annually on their operations and maintenance plans, the status of their stormwater facilities, and provide their inspection/maintenance logs.

Catch Basin Log

INLET STRUCTURE INSPECTION FORM

Date:_____ Time:_____ AM _____PM

Current Weather Condition (circle one): (Sunny; Overcast)

Inlet Number: _____

Inlet Location (Street/GPS/Other):_____

Inlet Type (grate/curb type/eco-head/bicycle safe/other):_____

Conditions at Inlet:

1. **Debris blocking grate: _____YES _____NO**

2. **Casting damaged: _____YES _____NO**
   - **a. grate: _____YES _____NO**
   - **b. curbpiece: _____YES _____NO**
   - **c. medallion: _____YES _____NO**
   - **d. bolts missing:_____YES _____NO**

3. **Sink hole near inlet: _____YES _____NO**

4. **Debris inside inlet box: _____YES _____NO**

5. **Is inlet box damaged: _____YES _____NO**
   - **a. cracks: _____YES _____NO**
   - **b. open joints: _____YES _____NO**
   - **c. settlement: _____YES _____NO**

6. **Dry Weather Flow: _____YES* _____NO**

(* If YES, schedule follow up inspection using Illicit Connection Inspection Form.)

Observations/comments:

_____

_____

_____

Inspected by:_____

City Facility Maintenance Log

Stormwater Basin Inspection Program – Inspection Checklist

Date Inspector Organization Current Weather Weather, past 72 hours

Basin Database ID Approximate basin Location (municipality and nearest street)

Basin Type: ☐ Detention ☐ Infiltration ☐ Infiltration/Detention combo ☐ Wet Pond ☐ Subsurface ☐ Other

DEP Item #	Inspection Criteria	✓	Comments	Reinspection Date	Reinspection Comments
Forebay	***Note embankment failure, leakage, excessive deposits etc***				
A1.1	Inlet scour or erosion	☐			
A1.2	Clogged pipes or excessive sediment	☐			
A1.3	Damaged outlet /overflow structure	☐			
MTD (pretreat) A2	***Inspect as able***	☐			
BMP (pretreat) A3	***Inspect as able***	☐			
Pond Area	***Note canditians for wet and dry ponds may differ***				
B1	Standing Water / algae / floatables / mosquitos present	☐			
B2	Excessive Sediment /deltas/emergent vegetation	☐			
B3	Erosion / Channelization/Rip Rap damaged	☐			
B4	Animal Burrows /wildlife/ waterfowl present	☐			
B5	Uneven Bed (dry basin)	☐			
B6	Sink holes or subsidence –dry or wet basin	☐			
B7	Low flow channel damaged or needs cleaning	☐			
B8	Basin liner or aerator damaged	☐			
Vegetatian	***Nate if vegetation is being maintained including desirable spp***				
C1	Excessive bare soil	☐			
C2	Overgrown /invasive / design vegetation present	☐			
C3	Tree growth in basin	☐			
Embankment D1	***Basin side slopes – erosian, slides, seeps, bare sail etc***	☐			
Outlet	***Nate outlet structure and discharge point(s)***				
E1	Outlet trash accumulation (20%+)	☐			
E2	Damaged Trash rack	☐			
E3	Outlet Orifi damaged or non-functioning/ retrofit?	☐			
E4	Outlet COP damaged or erosion below outlet	☐			
ES	Standing water in the outlet structure	☐			
Emergency Spillway	***Nate condition of spillway and spillway lining***				
F1	Trees on spillway	☐			
F2	Damaged/failed/ obstructed /eroded spillway	☐			
Misc.	***Note conditian of appurtenont structures etc.***				
G1	Broken security fence	☐			
G2	Broken/missing Gate	☐			
G3	Damaged/missing sign	☐			
G4	Access to basin blocked (vegetation growth, trash etc)	☐			

Overall Condition: ☐ **Satisfactory** ☐ **Maintenance Required** ☐ **Needs Repair** ☐ **Possible Retrofit Candidate** **Comments:**

Private Facility Maintenance Log

<<Owner Address>>

RE: NJDEP Tier A Municipal Stormwater Discharge Permit
Stormwater Facilities Management
Notification Letter

Dear Private Owner:

This letter is to notify you that beginning in 2019 the City must require that you perform an annual inspection of your stormwater facilities and deliver a copy of the results to _____.

BACKGROUND

On January 1, 2018 the New Jersey Department of Environmental Protection ("NJDEP") Tier A Municipal Stormwater Discharge General Permits ("Permit") became effective. One of the new elements of the Permit requires that municipalities implement a program to ensure adequate long-term cleaning, operation, and maintenance of stormwater facilities not owned and operated by the Tier A Municipality.

REPORTING ELEMENTS

You are responsible for the operation and maintenance of the stormwater facilities on your property. The City is currently requesting that you report to us annually on the status of your facilities. Stormwater facilities include but are not limited to:

- drainage inlets,
- detention basins,
- retention basins,
- infiltration basins,
- wet ponds,
- stormwater conveyances (pipes, swales, channels, ditches),
- sand filters,
- constructed wetlands,
- bioretention systems,
- manufactured treatment devices,
- pervious paving systems.

We have enclosed sample inspection reports for your convenience. Please review your site for these facilities and report to us on the condition of each applicable feature. To obtain additional information regarding the inspection, maintenance, and repair of stormwater facilities, please review the guidance documents which are available through NJDEP at https://www.nj.gov/dep/stormwater/maintenance_guidance.htm.

We request that your first annual inspection report be submitted no later than December 31, 2019. Please feel free to contact us with any questions.

515 Grove Street
Suite 1B
Haddon Heights, NJ 08035
T: 856-547-0505
F: 856-547-9174
www.pennoni.com

Stormwater BMP Inspection Form

Section 1. Preliminary Information

NAME:_____ DATE: _____

ADDRESS:_____ TAX PARCEL #:_____

WEATHER CONDITIONS:_____ LAST RAIN EVENT:_____

INSPECTOR:_____

_____

Section 2. System Conditions

Type of BMP(s): _____

General condition of grounds: Dry Damp Wet Spongy Soggy

Photographs taken: Y/N As-Built Plan available? Y/N

	YES	NO	COMMENTS
DEWATERING			
Standing water observed			
DOWNSPOUTS/ROOF DRAINS			
Roof drains/downspouts clean			
Downspouts in good condition			
Roof drains connected to facility as required			
INLETS/MANHOLES			
Clear of debris			
Good condition			
SEDIMENT TRAPS			
Obviously trapping sediment			
Over 50% of storage volume remaining			
VEGETATION			
Drainage area stabilized			
Evidence of erosion			
OUTLETS/OVERFLOW			
Good condition			
Evidence of erosion			

COMMENTS OF PROPERTY OWNER:

COMMENTS OF INSPECTOR:

INSPECTOR SIGNATURE:

SPPP Form 14 - Outfall Pipe Stream Scouring Remediation

Municipality Information

Municipality: City of Burlington County: Burlington

NJPDES # :0153109 PI ID #: 171529

Team Member/Title: Mark Staravoj, Superintendent of Sewage and Drainage

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

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

The City will inspect City-owned stormwater outfalls for localized stream scouring at least once every 5 years. If localized stream scouring is detected the City will further investigate and identify corrective action to reduce stormwater rate or volume if possible. Work may be prioritized and scheduled for completion. All work performed with comply with the Standards for Soil Erosion and Sediment Control in New Jersey, N.J.A.C. 2:90-1, the requirements for bank stabilization and channel restoration, N.J.A.C. 7:13 et seq., and N.J.A.C. 7:8.

Outfall Pipe Stream Scouring Log

SPPP Form 15 – De-icing Material Storage

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *Craig Leshner, Supervisor of Public Works*

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

De-icing Material Storage

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

De-icing materials are stored in a permament structure located at the City's Wastewater Treatment Plant.

The City will perform regular inspections of the structure and surrounding area. Loading and unloading will be conducted during dry weather, when possible, and care will be taken to avoid spilling and tracking of materials. Spilled/tracked material will be cleaned up immediately following loading/unloading operations.

In the event that temporary storage facilities are needed, the materials will be tarped when not in use and temporary conditions will not last more than 30 days unless approved by NJDEP Compliance & Enforcement.

The City will inspect for stormwater runoff issues/impacts in the vicinity of the storage areas.

In addition, the following applies to sand storage:

1. Store sand in such a manner as to minimize stormwater run-on and run-off.

2. Store outside, tarped, and maintain a 50-foot setback from surface water bodies,storm sewer inlets, and/or ditches or other stormwater conveyance channels.

.

SPPP Form 16 - Standard Operating Procedures

Municipality Information

Municipality: *City of Burlington* County: *Burlington*

NJPDES #: 0153109 PI ID#: 171529

Team Member/ Title: Craig Leshner, Supervisor of Public Works

Effective Date of Permit Authorization (EDPA): ***1/1/18***

Date of Completion: 1/26/05 Date of most recent update: 03/02/18

BMP	Date SOP went into effect	Describe your inspection schedule
Fueling Operations (including the required practices listed in Attachment D of the permit)	1/1/2005	*Municipal vehicles are fueled outside of the municipality.*
Vehicle Maintenance (including the required practices listed in Attachment D of the permit)	1/1/2005	*Monthly inspections are held to ensure that the SOP is being met. The SOP is kept at the DPW garage located on Mitchell Avenue.*
Good Housekeeping Practices (including the required practices listed in Attachment D of the permit) **Attach inventory list required by Attachment D of the permit.**	1/1/2005	*Monthly inspections of all municipal maintenance yards and ancillary operations are held. The SOP and Inventory Lists are kept at the DPW garage located on Mitchell Avenue.*

Attachment E

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**

Inventory List

Inspection Reports

SPPP Form 17 – Employee Training

Municipality Information

Municipality: *City of Burlington* County *Burlington*

NJPDES # : *0153109* PI ID #: *171529*

Team Member/Title: *Kenneth Shine, Project Manager*

Effective Date of Permit Authorization (EDPA): *1/1/18*

Date of Completion: *1/26/05* Date of most recent update: *09/30/2018*

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

The City will train all employees within 3 months of them commencing duty and will maintain sign-in sheets.

Annual Training will include review of this SPPP, applicable recordkeeping, and detailed training as needed.

Bi-Annual Training topics will include Yard Waste collection, Monthly Street Sweeping, Illicit Connection identification, Outfall Pipe mapping, Outfall Scour detection and control, Maintenance Yard operations (and SOP review), Waste Disposal, Municipal Ordinance review, Stormwater Facilities Maintenance, Construction and Development requirements.

Municipal board and governing body members that review and approve projects for new and redevelopment projects will complete the online training tool provided by the NJDEP and will continue to review at least one tool found at <www.nj.gov/dep/stormwater/training.htm> once per term of service

Public Works Training Log

CITY OF BURLINGTON
NJDEP STORMWATER REGULATIONS
EMPLOYEE TRAINING PROGRAM

SIGN-IN SHEET

NAME	**DATE**

Board and Governing Body Training Log

Municipal board and governing body members that review and approve projects for new and redevelopment projects will complete the online training tool provided by the NJDEP and will continue to review at least one tool found at www.nj.gov/dep/stormwater/trainging.htm once per term of service.

Stormwater Pollution Prevention Annual Report

SPPP Form 18 – TMDL Information

Municipality Information	
	Municipality: *City of Burlington* County *Burlington*
	NJPDES # : *0153109* PI ID #: *171529*
	Team Member/Title: *Mark Staravoj, Superintendent of Sewage and Drainage*
	Effective Date of Permit Authorization (EDPA): *1/1/18*
	Date of Completion: *October 2018* Date of most recent update: *9/30/2018*

Identify waterbodies with segments that are wholly or partially within or bordering the municipality with approved and/or adopted TMDLs and their related pollutants. Describe any prioritization or strategies that have been developed to address the stormwater related pollutants. Reference other forms as necessary.

According to the search tool provided by the NJDEP, (found at www.nj.gov/dep/dwq/msr-tmdl-rh.htm) the following waterbodies are subjected to the corresponding TMDLs:

LDRV tributaries (Assiscunk to Blacks Ck) – Mercury
Assiscunk Ck. (below Neck Rd.); LDRV tributaries (Beverly to Assiscunk Ck., Bustleton Creek area) – Polychlorinated Biphenyls (PCBs)

The City will use the TMDL information to prioritize any stormwater facility maintenance that is required based on the area in which the facilities are located.

The City may address the Mercury TMDL by regulating the common sources of mercury pollutants such as factory smoke, solid/medical waste incineration, and some manufacturing processes.

The City will address the PCB TMDL by collecting PMP reports from all applicable discharge points and ensure that the PMP reports are updated annually. (See attached)

MSRP ANNUAL REPORT - Tier A

You have completed the Annual Report submittal process. You may print or save a copy of this submittal report for your records.

Service ID: 812231
Facility Name: BURLINGTON CITY
Reporting Period: January 1, 2017 through December 31, 2017
NJPDES Permit #: NJG0153109
Activity ID: DST170001

Contacts

Name: MARK STARAVOJ
Title: SUPERINTENDENT SEWAGE/DRAINAGE
Contact Type: Stormwater Coordinator
Organization Name: BURLINGTON CITY
Organization Type: Municipal
E-Mail: KSHINE@PENNONI.COM
Phone: (609) 386-0035 (Work Phone Number)
(609) 747-9293 (Fax Number)
Contact Address: 900 W BROAD ST
Burlington, New Jersey 08016

Uploaded Attachments

Attachment Name	Attachment Description	File Name
2017 MS4 Annual Report and Cer	Supplemental Questionnaire	2017 MS4 Tier A Permit Annual Report-Supplemental Questionaire.pdf
Auth to Submit for Burl City	approval to sign report	Auth to Submit for Burl City.pdf

Annual Report Details - Part A

Municipality Information

Team member responsible for completing the report:	Ken Shine
Team member email address:	kshine@pennoni.com

Stormwater Pollution Prevention Plan

1. Has the municipality revised its Stormwater Pollution Prevention Plan during the last calendar year?	No
2. Date of the last revised SPPP:	

Public Notice

1. Is the municipality complying with applicable State and local public notice requirements when providing for public participation in the ongoing development and implementation of the stormwater program?	Yes

Report Details - Part B

Post-Construction Stormwater Management in New Development and Redevelopment

1. Is the municipality reviewing and approving major development residential projects in accordance with the Residential Site Improvement Standards (RSIS)?	Yes
2. Did the municipality adopt a municipal stormwater management plan?	Yes
3. Most recent date of adopted municipal stormwater management plan:	04/27/2005
4. Status of this plan (if not adopted):	
5. Did the municipality adopt the municipal stormwater control ordinance provided by NJDEP without change?	Yes
6. Most recent date the municipality adopted a municipal stormwater control ordinance:	05/02/2006
7. What is the current status of the ordinance?	
8. Did the municipality submit the adopted municipal stormwater management plan to the appropriate county review agency for approval?	Yes
9. Most recent date the adopted Municipal Stormwater Management Plan was submitted to the appropriate county review agency for approval:	03/06/2007
10. If yes, did the municipality send the adopted municipal stormwater control ordinance to the appropriate county review agency for approval?	Yes
11. Most recent date the adopted Municipal Stormwater Control Ordinance was submitted to the appropriate county review agency for approval:	03/06/2007
12. Status of county review:	Approved
13. Did the municipality adopt the review agency's required amendments and resubmit to the county review agency?	
14. Is the Stormwater Control Ordinance in effect?	Yes
15. Most recent effective date of Stormwater Control Ordinance:	05/06/2007

16. Ordinance Number(s):	01-2007
17. What is the current status of the adopted plan and ordinance?	
18. Are you reviewing projects as part of your site plan and sub-division approval process to ensure that they comply with your municipality's effective municipal stormwater control ordinance(s)?	Yes
19. How many projects that were subject to either the municipal stormwater control ordinance or the stormwater provisions of RSIS did the municipality review?	1
20. Does the municipal stormwater management plan contain a mitigation plan?	Yes
21. Has the municipality granted any variances or exemptions from the design and performance standards for stormwater management measures set forth in the approved municipal stormwater management plan and stormwater control ordinance(s)?	No
22. If yes, how many variances or exemptions from the design and performance standards has the municipality granted?	
23. If granted any variances or exemptions, did you submit a written report to the county review agency describing the variance or exemption and the required mitigation?	
24. Does the municipality's plan review evaluate storm drain inlet protection for solids and floatables in accordance with Attachment C of the permit?	Yes
25. Does the municipality require plans for long-term operation and maintenance for stormwater BMPs?	Yes
26. Are you ensuring that adequate long-term operation and maintenance of stormwater BMPs is being performed on property that you do not own or operate? **Please keep an inventory of stormwater BMPs indicating type, function and location in a format provided by the Department onsite and available for inspection or upon request.**	Yes
27. Briefly indicate how this is being accomplished (e.g., ordinance requiring operation and maintenance by private entity; operation and maintenance by you or other governmental entity):	Ordinance requiring operation and maintenance of private facilities.
28. Is the municipality's stormwater management plan re-examined at each re-examination of the master plan in accordance with N.J.A.C. 7:8-4?	N/A - we did not re-examine our master plan this year
29. Date re-examination report was last adopted:	

Report Details - Part C

Local Public Education Program

1. Have you developed a Local Public Education Program?	Yes

2. Have you conducted educational activities that total a minimum of 10 points (between January 1, 2017 and December 31, 2017)?	Yes
3. School Presentations (1 point per visit / maximum of 5 points per year):	0
4. Website (1 point):	1
5. Stormwater Display (2 points):	2
6. Giveaway (2 points):	0
7. Citizen Stormwater Advisory Committee (2 points):	0
8. Utilize Department Materials (2 points each / maximum of 4 points per year):	4
9. Poster Contest (2 points):	0
10. Stormwater Training for Elected Municipal Officials (3 points):	0
11. Mural (3 points):	0
12. Mailing (3 points):	3
13. Partnership Agreement / Local Event (3 points):	0
14. Ordinance Education (5 points):	0

Storm Drain Inlet Labeling

1. Have you established a storm drain inlet labeling program?	Yes
2. Indicate the percentage or number of sectors labeled to date:	100%
3. Other Amount:	
4. Is your municipality maintaining the labels (i.e. replacing and/or repainting)?	Yes

Improper Disposal of Waste

Have you adopted and are you enforcing a regulatory mechanism for:

1. Pet Waste Ordinance:	Yes
2. Date adopted:	05/02/2006
3. Litter Ordinance/State Litter Statute:	Litter Ordinance
4. Date adopted:	12/15/1992
5. Improper Disposal of Waste Ordinance:	Yes
6. Date adopted:	05/02/2006
7. Wildlife Feeding Ordinance:	Yes
8. Date adopted:	05/02/2006
9. Containerized Yard Waste Ordinance / Yard Waste Collection Program Ordinance:	Yard Waste Collection Program Ordinance

10. Date adopted:	05/02/2006
11. Illicit Connection Ordinance:	Yes
12. Date adopted:	05/02/2006
13. Refuse Container/Dumpster Ordinance:	Yes
14. Date adopted:	05/18/2010
15. Private Storm Drain Inlet Retrofitting Ordinance:	Yes
16. Date adopted:	05/18/2010
17. Status of these ordinances (if not adopted):	
18. Method(s) of enforcement (e.g., summons, warnings, additional signs, etc.):	Police Department
19. Are you distributing the Pet Waste Information Sheets with pet licenses?	Yes

Report Details - Part D

MS4 Outfall Pipe Mapping

1. Has the municipality completed the mapping of the MS4 outfall pipes?	Yes
2. Date completed:	03/15/2018
3. Number of outfall pipes that you operate in the municipality:	91
4. How many MS4 outfall pipes are mapped?	91

Illicit Connection Elimination Program

1. Does the municipality have an ongoing program to detect and eliminate illicit connections to municipally owned or operated outfall pipes?	Yes
2. How many outfall pipes were inspected during the past calendar year?	91
3. Number of illicit connections detected during the past calendar year:	0
4. Number of illicit connections eliminated during the past calendar year: **Please attach, in a format provided by the Department, a list of all outfalls found to have an illicit connection since the inception of the program. The list must include the outfall location, receiving water body, source of illicit connection and the date the illicit connection was eliminated.**	0

Street Sweeping Program

1. In the past calendar year, were all required streets swept?	Yes
2. What was the total number of miles swept?	580

List the total amount of materials collected for each month since January 1, 2017, in tons.

3. Units:	Tons
4. January:	12.7
5. February:	28.32
6. March:	0
7. April:	8.05
8. May:	0
9. June:	11.91
10. July:	0
11. August:	42.61
12. September:	0
13. October:	8.08
14. November:	0
15. December:	0
16. Total (Note: 1.053 cubic yards = 1 ton):	111.67
17. Explain the reason if reporting zero (0) for a month above:	Street sweeper was out for repair in March, May, and July. Due to lack of manpower the program was shut down in November for the remainder of the year.

Storm Drain Inlet Retrofitting

1. Has the municipality completed repaving, repairing, reconstruction, or alterations on any road surfaces in direct contact with municipally owned or operated storm drain inlets?	Yes
2. Approximately what percentage of storm drains within the municipality currently meet the standard?	7

Stormwater Facility Maintenance

Stormwater facilities include, but are not limited to, catch basins, extended detention basins, low flow bypasses, underground detention, dry wells, manufactured treatment devices, pervious paving buffers, infiltration basins/trenches, sand filters, constructed wetlands, wet ponds, bioretention, rooftop vegetated cover, vegetative filters, and stormwater conveyance systems. Stormwater facility inventories that indicate the type, function, and location of the facility must be kept onsite and available for inspection or upon request in a format provided by the Department. The format is available as SPPP Form 13 at: http://www.nj.gov/dep/dwq/pdf/Tier_A/A%20-%20pdf%206.pdf**.**

1. Have you developed a Stormwater Facility Maintenance Program?	Yes

Other Stormwater Facilities

1. Were all stormwater facilities that you operate inspected?	Yes
2. Were any found to be in need of cleaning or repair in order to function properly?	Yes
3. During the past calendar year, were any stormwater facilities (excluding catch basins) cleaned?	Yes
4. Were repairs made?	N/A - no repairs needed
5. Describe repair(s) or if repairs have not yet been made, provide a schedule for the repair(s):	

Catch Basins

1. Total number of catch basins that the municipality operates:	1262
2. Total number of catch basins inspected:	1262
3. Total number of catch basins cleaned:	1262
4. Amount of materials removed from catch basins, in tons, during the past calendar year:	43
5. Units:	Tons

Report Details - Part E

Outfall Pipe Stream Scouring Remediation

For all outfall pipes undergoing remediation through a scour remediation program, attach additional page(s) as necessary indicating the location of the outfall pipe (including the alphanumeric identifier), the repair start date, and the repair completion date.

1. Has the municipality developed a prioritized list of outfall pipes requiring outfall pipe stream scouring remediation?	N/A - no outfalls meet the stream scouring requirement

De-icing Material and Sand Storage

1. Does the municipality have a permanent structure for all de-icing material storage?	Yes
2. If sand is being stored outside, is it set back 50 feet from storm sewer inlets, ditches or other stormwater conveyance channels, and surface water bodies?	N/A - no sand stored outdoors

Fueling Operations

1. Is the municipality implementing Standard Operating Procedures for vehicle fueling and receiving of bulk fuel deliveries at maintenance yard operations?	N/A - no fueling

Vehicle Maintenance

1. Is the municipality implementing Standard Operating Procedures for vehicle maintenance and repair activities at maintenance yard operations?	Yes

Good Housekeeping Practices

1. Is the municipality implementing Good Housekeeping Practices for all materials or machinery listed in the Inventory Requirements for Municipal Maintenance Yard Operations (including maintenance activities and ancillary operations)?	Yes

Equipment and Vehicle Washing

1. Has the municipality implemented measures to properly handle the discharge of equipment and vehicle wash wastewater from municipal maintenance yard operations?	Yes
2. Please indicate which option you implemented to eliminate the unpermitted discharge:	Connected to sanitary sewer
3. Date the management measure was implemented:	02/13/2009
4. What is the NJPDES permit number that authorizes the discharge of vehicle and equipment wash wastewater?	
5. Is the municipality maintaining records of vehicle and equipment washing?	

Annual Employee Training

1. Did the municipality conduct training for employees on stormwater related topics as required under the MS4 permit (e.g., police officers trained on ordinances)?	Yes
2. List date(s) of employee training:	01/12/2017

Report Details - Part F

Sharing of Responsibilities

Does the municipality share services with another entity to satisfy a permit requirement?	Yes

For each of the following, indicate if you are relying on another entity to satisfy all or part of any permit requirements. Please provide additional information for any "Yes" answers in the provided Comments field.

1. Public notice:	No
2. Comments:	
3. Ensure compliance with RSIS for stormwater management:	No
4. Comments:	
5. Municipal stormwater management plan:	No
6. Comments:	
7. Municipal stormwater control ordinance:	No
8. Comments:	
9. Long term operation and maintenance of BMPs (post-construction):	No
10. Comments:	
11. Storm drain inlet design standard (post-construction):	No
12. Comments:	
13. Local public education program:	No
14. Comments:	
15. Storm Drain Inlet Labeling Program:	No
16. Comments:	
17. Illicit connection elimination program:	No
18. Comments:	

19. Street sweeping:	No
20. Comments:	
21. Storm drain inlet retrofitting:	No
22. Comments:	
23. Maintenance of municipally operated stormwater facilities:	No
24. Comments:	
25. Outfall pipe stream scouring:	No
26. Comments:	
27. De-icing and sand storage:	No
28. Comments:	
29. Fueling operations:	Yes
30. Comments:	City owned and operated vehicles are fueled in Burlington Township.
31. Vehicle maintenance:	No
32. Comments:	
33. Good Housekeeping:	No
34. Comments:	
35. Vehicle and Equipment Washing:	No
36. Comments:	
37. Employee Training:	No
38. Comments:	

Incidents of Non-compliance

Based on the answers you provided above, the Department has identified the following possible permit compliance issues. Please complete the Incidents of Non-compliance section and identify steps being taken to correct these deficiencies.

- Your municipality has not revised your Stormwater Pollution Prevention Plan to incorporate changes required by the renewal permit.

1. Did your Public Complex have any incidents of non-compliance?	Yes
2. Identify the steps being taken to remedy the noncompliance and to prevent such incidents from recurring. **(If the text box is not large enough to complete this section, please provide your report as an attachment and upload it on the next screen. Please reference the attachment in the textbox.)**	The Stormwater Pollution Prevention Plan is being updated in 2018 to comply with the MS4 Tier A renewal permit.

Certification

Certifier:	Ken Shine
Certifier ID:	KENSHINE
Challenge/Response Question:	What is your favorite food?
Challenge/Response Answer:	******
Certification PIN:	******
Date/Time of Certification:	04/30/2018 22:37

"I certify under penalty of law that this Annual Report and Certification and all attached documents were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate this information. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering this information, the information in this Annual Report and Certification and all attached documents is, to the best of my knowledge and belief, true, accurate and complete.

"I certify that the municipality is in compliance with its stormwater program, Stormwater Pollution Prevention Plan (SPPP) and the NJPDES Tier A Municipal Stormwater General Permit No. NJG0153109 except for any incidents of non-compliance which are identified herein. For any incidents of non-compliance, the Annual Report identifies the steps being taken to remedy the non-compliance and to prevent such incidents from recurring.

"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."

Please note, no changes will be allowed to be made to this report upon its certification. If you need to correct or modify the report after certification, please contact your case manager at (609) 633-7021 so they may enable that function.

Ken Shine	04/30/2018
General	**Date**

Instructions for Saving and Submitting the

2017 MS4 Tier A Permit Annual Report - Supplemental Questionnaire

1. Once opened, please save the Questionnaire to your computer, using the "Save As" function. This can be done by going to FILE > then Save As… or Shift + Ctrl + S.
2. Complete the Questionnaire.
3. Once you have completed the Questionnaire, use the "Save" function to save your answers to the Questionnaire to your computer. This can be done by going to FILE > then Save or Ctrl + S.
4. The completed and saved Questionnaire must then be uploaded as an attachment, in Part 7, to your Annual Report before the Annual Report is submitted to the Department.
5. To access the Annual Report, open the link to "NJDEP Online Portal" at http://www.nj.gov/dep/dwq/tier_a.htm. In Part 7, you will be asked to complete information regarding the file(s) to be uploaded. Navigate to your saved Questionnaire and then hit the "Upload" button in the lower right section of Part 7. The Annual Report will indicate if the Questionnaire was successfully uploaded. Then click on the "Continue" button and proceed with finalizing your Annual Report.

Your Annual Report will be considered incomplete if the Supplemental Questionnaire is not attached. If you experience any difficulty in this process, please contact your municipal case manager at 609-633-7021.

Please note that use of Adobe Reader XI is recommended. This free software is available for download at http://get.adobe.com/reader/ . If you have an earlier version of Adobe Reader, please go to the Adobe website at http://tv.adobe.com/watch/acrobat-x-tips-tricks/quick-tip-how-to-save-form-data-in-adobe-reader/ for detailed instructions on how to save your completed Questionnaire.

2017 MS4 Tier A Permit Annual Report - Supplemental Questionnaire

General Information

A. Municipal Information

Municipality: Burlington City	County: Burlington

1. Has the municipality identified the stormwater team in the SPPP? (•) Yes ( ) No

2. Municipal Population: 9920	3. Municipal Area (acres/sqm.): 3.06

B. Sharing of Responsibilities – Permit Section D1

1. If the municipality shares services, what requirement do the shared services satisfy?

- [ ] Public Notice
- [ ] Post-Construction Stormwater Management in New Development and Redevelopment
- [ ] Local Public Education
- [ ] Improper Disposal of Waste
- [ ] Illicit Connection Elimination and MS4 Outfall Pipe Mapping
- [ ] Solids and Floatable Controls
- [ ] Maintenance Yard Operations
- [ ] Employee Training
- [x] N/A, there are no shared services

Permit Implementation - Ordinances

A. Ordinances - Permit Sections F5 and F6

1. *Pet Waste Ordinance*
Entity responsible for enforcement: City of Burlington Police

2. *Litter Ordinance/State Litter Statute*
Entity responsible for enforcement: City of Burlington Police

3. *Improper Disposal of Waste Ordinance*
Entity responsible for enforcement: City of Burlington Police

4. *Wildlife Feeding Ordinance*
Entity responsible for enforcement: City of Burlington Police

5. *Containerized Yard Waste Ordinance/Collection Program*
Entity responsible for enforcement: City of Burlington Police

6. *Illicit Connection Ordinance*
Entity responsible for enforcement: City of Burlington Police

7. *Refuse Container/Dumpster Ordinance*
Entity responsible for enforcement: City of Burlington Police

8. *Private Storm Drain Inlet Retrofitting Ordinance:*
Entity responsible for enforcement: City of Burlington Police

9a. How many violations of these ordinances were enforced?

168

9b. Which of the above ordinances had the most violations?

Improper Disposal of Waste (132)

B. Illicit Connection Elimination Program – Permit Section F6

1. During the past calendar year, has the municipality identified any pipes or discharges with unknown owners entering the MS4? ◯ Yes ◉ No
2. If yes, how many? N/A

C. Storm Drain Inlet Retrofitting – Permit Section F7b

Existing storm drain inlets are required to be retrofitted to meet the design standard (contained in Attachment C of the permit) when such inlets are owned or operated by the Tier A Municipality and are in direct contact with repaving, repairing (excluding repair of individual potholes), reconstruction, resurfacing (including top coating or chip sealing with asphalt emulsion or a thin base of hot bitumen), or alterations of facilities owned or operated by the Tier A Municipality. For exemptions to this standard, refer to "Exemptions" in Attachment C.

1. At the completion of the above projects, did all of the storm drain inlets meet this standard? ◉ Yes ◯ No

Permit Implementation - Inventory

A. MS4 Outfall Pipe Mapping – Permit Section F6

1. Which map format is used:

◯ Tax Map ◯ SIIA ◯ Electronic (e.g. AutoCAD, Micro Station, GIS) ◉ USGS Quadrangle ◯ Other

1a. If other, what is the format that the municipality uses?

2. Date of last revision: 3/15/2018

3. Is the map updated annually? ◉ Yes ◯ No

4. Has the municipality investigated its MS4 for previously unmapped outfalls? ◉ Yes ◯ No

4a. How many outfalls were found? 0

5. What percentage of mapped outfalls in the municipality have been visually inspected during the last calendar year?

100%

6. Are the municipality's outfall pipes labelled in the field? ◯ Yes ◉ No

6a. If yes, do the labels match the alphanumeric code in the municipality's map? ◯ Yes ◯ No

7. Does the municipality's map identify outfalls that do not discharge to surface waters? ◉ Yes ◯ No

8. Does the municipality's map identify surface water body names? ◉ Yes ◯ No

9. Does the municipality's map identify streets? ◉ Yes ◯ No

10. Does the municipality's map identify blocks and lots? ◯ Yes ◉ No

11. Does the municipality's map identify MS4 conveyance systems (pipes, swales, ditches)? ◉ Yes ◯ No

12. Does the municipality's map identify other stormwater facilities? ◯ Yes ◉ No

12a. Please identify other stormwater facilities noted on the map (select as many as apply):

- ☐ Bioretention Systems
- ☐ Dry Wells
- ☐ Grass Swales
- ☐ Manufactured Treatment Devices (MTDs)
- ☐ Rooftop Vegetated Cover
- ☐ Vegetative Filters
- ☐ Retrofitted Storm Drain Inlets
- ☐ Constructed Stormwater Wetlands
- ☐ Extended Detention Basins
- ☐ Infiltration Basins
- ☐ Pervious Paving Systems
- ☐ Sand Filters
- ☐ Wet Ponds

13. Does the municipality's map identify areas with scour, erosion, and/or flooding and drainage control issues?

◉ Yes ◯ No

B. Storm Drain Inlet Labeling – Permit Section F4b

1. How many labels have been replaced or repainted during the past calendar year to ensure legibility?
   53

Permit Implementation - Inventory

A. Stormwater Facility Inspection and Maintenance – Permit Section F7c

Stormwater facilities include, but are not limited to, catch basins, extended detention basins, low flow bypasses, underground detention, dry wells, manufactured treatment devices, pervious paving, riparian buffers, infiltration basins/ trenches, sand filters, constructed wetlands, wet ponds, bioretention, rooftop vegetated cover, vegetative filters, and stormwater conveyance systems. Stormwater facility inventories that indicate the type, function, and location of the facility must be kept onsite and available for inspection or upon request in a format provided by the Department. The format is available as SPPP Form 13 at: http://www.nj.gov/dep/dwq/pdf/Tier_A/A%20-%20pdf%206.pdf

1. Does the municipality's stormwater maintenance program include the following:

1a. An inventory of facilities? (•) Yes ( ) No
1b. An inspection schedule? (•) Yes ( ) No
1c. A maintenance schedule? (•) Yes ( ) No
1d. An inspection log noting when inspections were conducted? (•) Yes ( ) No
1e. A maintenance log noting any maintenance performed on individual facilities? (•) Yes ( ) No

2. Does the municipality inspect stormwater facilities that are not owned by the municipality? (•) Yes ( ) No
2a. Does the municipality review maintenance logs for stormwater facilities that are not owned by the municipality?
( ) Yes (•) No

3. During the past calendar year, how many stormwater facilities (excluding catch basins) were repaired?
   0

4. During the past calendar year, how many stormwater facilities (excluding catch basins) were cleaned?
   1

B. Stormwater Facility Inspection and Maintenance – Permit Section F7c

1. Does the municipality have a stormwater outfall pipe scouring detection, remediation, and maintenance program?
( ) Yes (•) No
2. How many instances of scour has the municipality found during the past calendar year?
   N/A Outfalls are to tidal waters

Permit Implementation - Inventory

A. De-icing Material and Sand Storage – Permit Section F8a

1. What type of de-icing material does the municipality use (select as many as appropriate)?

- [x] Sodium Chloride
- [ ] Calcium Chloride
- [ ] Potassium Acetate
- [ ] Brine Solution
- [ ] Unknown
- [ ] Other (if other, please specify):

B. Equipment and Vehicle Washing – Permit Section F8b

1. Does the municipality utilize an underground storage tank for managing vehicle wash wastewater? ( ) Yes (•) No

2. Which of the following options does the municipality use to manage vehicle wash wastewater? (select all that apply)

- ☐ Vehicle wash reclaim system
- ☐ Capture and haul system
- ☑ Discharge to sanitary sewer
- ☐ Discharge to groundwater
- ☑ Washed off site
- ☐ Do not wash vehicles

Permit Implementation – Stormwater Management – Permit Section F3

Note: This portion of the annual report should be completed by a person knowledgeable in post-construction stormwater management project review and approvals.

1. Name of person completing this section: Ken Shine
2. Title of person completing this section: Project Manager

A. Municipal Stormwater Management Plan (Plan)

1. Most recent date of re-examination of municipal master plan: June 2010
2. Does the plan identify and address water bodies of concern (listed on Impaired Water Bodies List, TMDL, high quality water, existing erosion)? ◉ Yes ○ No
3. Does the plan identify and address areas of inadequate drainage? ◉ Yes ○ No
4. Does the plan include programs or BMPs and associated timeframes specifically addressing these impairments or pollutants? ◉ Yes ○ No
5. Does the plan identify how to incorporate future development pressures on the existing stormwater management infrastructure? ◉ Yes ○ No
6. Are mitigation projects listed in the municipality's mitigation plan? ◉ Yes ○ No ○ No mitigation plan

B. Stormwater Control Ordinance

1. What is the ordinance's definition of major development?

   Any development that provides for ultimately disturbing one or more acres of land. "Disturbance" for the purpose of this article is the placement of the impervious surface or exposures and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

2. Has the municipality adopted a new stormwater control ordinance during the past year? ○ Yes ◉ No
3. If yes, did the municipality send the adopted municipal stormwater control ordinance to the appropriate county review agency for approval? ○ Yes ○ No

C. Review of Major Development for Stormwater Management

1. Did the municipality have any agricultural development projects that were granted exemptions under the Right to Farm Act? ○ Yes ◉ No
2. Do any municipal ordinances promote the use of nonstructural strategies? ◉ Yes ○ No ○ Unknown
3. Does the municipality hold pre-application meetings to discuss incorporation of nonstructural strategies for individual projects? ◉ Yes ○ No
4. Does the municipality allow infiltration BMPs to infiltrate during the 2, 10, or 100 year storm events for quantity control? ◉ Yes ○ No
5. Does the municipality conduct municipal inspections of sites both during and after the construction is completed to ensure that BMPs function as designed? ◉ Yes ○ No

D. Inventory and Maintenance

Stormwater facility inventories that indicate the type, function, and location of the facility must be kept onsite and available for inspection or upon request in a format provided by the Department. The format is available as SPPP Form 13 at: http://www.nj.gov/dep/dwq/pdf/Tier_A/A%20-%20pdf%206.pdf.

1. Did the municipality update its map and inventory to include newly approved projects constructed within the last calendar year? (•) Yes ( ) No

2. How many infiltration BMPs were approved during the past calendar year? 0

3. How many subsurface infiltration basins have been constructed during the past calendar year? 0

3a. How many of these subsurface infiltration basins were inspected during construction in the past calendar year? N/A

3b. Did the final inspection include the following? Mark all that apply:

- [ ] Permeability test
- [ ] Visual inspection
- [ ] Check for drain down time
- [x] Unknown

4. Select the methods the municipality uses to ensure that stormwater facilities that are **not owned** by the municipality will be properly maintained:

- [ ] Maintained by municipality
- [ ] Inspections
- [ ] Homeowners associations
- [ ] Shared services
- [ ] Fees
- [ ] Surety bonds
- [x] Other

4a. If other, what are the methods for ensuring stormwater facilities are maintained? Code Enforcement

5. In the past calendar year, has the municipality reviewed and approved any major residential developments that place an individual property owner as the responsible entity for the maintenance of any stormwater management facility(ies) that receive drainage from multiple parcels? ( ) Yes (•) No

E. Stormwater Management Training

1. Have any of the current members of the planning or zoning board taken any NJDEP provided training for board members on the Stormwater Management rules? (•) Yes ( ) No ( ) Unknown

2. Have the municipality's inspector(s) for stormwater management taken any of the following classes:

2a. Stormwater Management and BMPs for Engineers through Rutgers University or NJDEP : (•) Yes ( ) No ( ) Unknown

2b. Municipal Engineering Construction Inspection Program, Part 1 through Rutgers University: (•) Yes ( ) No ( ) Unknown

2c. Municipal Engineering Construction Inspection Program, Part 2 through Rutgers University: (•) Yes ( ) No ( ) Unknown

2d. Soils & Site Evaluation for Septic Disposal Systems & Stormwater BMPs through Rutgers University: ( ) Yes ( ) No (•) Unknown

2e. Other stormwater training classes: Stormwater Management Design Review Course

3. How many construction inspectors for stormwater management does the municipality have? 8

4. How many operation and maintenance inspectors for stormwater management does the municipality have? 6

5. How many plan reviewers for stormwater management does the municipality have? 3

6. How many municipal engineers/stormwater plan reviewers have taken the NJDEP Stormwater Management and BMP Manual course offered through Rutgers University or NJDEP? 5

Education

A. Annual Employee Training – Permit Section F9

1. Is the municipality maintaining a record of the dates on which employees have received training? (●) Yes ( ) No
2. Type of training media on those dates: ☑ Video ☑ Mentoring ☐ Vendor Training

This Supplemental Questionnaire must be attached to your Annual Report to be considered complete. If you experience any difficulty in this process, please contact your municipal case manager at 609-633-7021.

1. Once you have completed the Questionnaire, use the "Save" function to save your answers to the Questionnaire to your computer. This can be done by going to FILE > then Save or Ctrl + S.
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MSRP ANNUAL REPORT - Tier A

You have completed the Annual Report submittal process. You may print or save a copy of this submittal report for your records.

Service ID:	690765
Facility Name:	BURLINGTON CITY
Reporting Period:	January 1, 2016 through December 31, 2016
NJPDES Permit #:	NJG0153109
Activity ID:	DST090001

Contacts

Name:	MARK STARAVOJ
Title:	SUPERINTENDENT SEWAGE/DRAINAGE
Contact Type:	Stormwater Coordinator
Organization Name:	BURLINGTON CITY
Organization Type:	Municipal
E-Mail:	KSHINE@PENNONI.COM
Phone:	(609) 747-9293 (Fax Number) (609) 386-0035 (Work Phone Number)
Contact Address:	900 W BROAD ST Burlington, New Jersey 08016

Uploaded Attachments

Attachment Name	Attachment Description	File Name
Supplimental Questionnaire		Burlington City 2016 NJDEP Supplimental Questionnaire.pdf

Annual Report Details - Part A

Municipality Information

Team member responsible for completing the report:	Kenneth Shine
Team member email address:	kshine@pennoni.com

Stormwater Pollution Prevention Plan

1. Has the municipality revised its Stormwater Pollution Prevention Plan during the last calendar year?	No
2. Date of the last revised SPPP:	

Public Notice

1. Is the municipality complying with applicable State and local public notice requirements when providing for public participation in	Yes

the ongoing development and implementation of the stormwater program?	

Report Details - Part B

Post-Construction Stormwater Management in New Development and Redevelopment

1. Is the municipality reviewing and approving major development residential projects in accordance with the Residential Site Improvement Standards (RSIS)?	Yes
2. Did the municipality adopt a municipal stormwater management plan?	Yes
3. Most recent date of adopted municipal stormwater management plan:	04/27/2005
4. Status of this plan (if not adopted):	
5. Did the municipality adopt the municipal stormwater control ordinance provided by NJDEP without change?	Yes
6. Most recent date the municipality adopted a municipal stormwater control ordinance:	05/02/2006
7. What is the current status of the ordinance?	
8. Did the municipality submit the adopted municipal stormwater management plan to the appropriate county review agency for approval?	Yes
9. Most recent date the adopted Municipal Stormwater Management Plan was submitted to the appropriate county review agency for approval:	03/06/2007
10. If yes, did the municipality send the adopted municipal stormwater control ordinance to the appropriate county review agency for approval?	Yes
11. Most recent date the adopted Municipal Stormwater Control Ordinance was submitted to the appropriate county review agency for approval:	03/06/2007
12. Status of county review:	Approved
13. Did the municipality adopt the review agency's required amendments and resubmit to the county review agency?	
14. Is the Stormwater Control Ordinance in effect?	Yes
15. Most recent effective date of Stormwater Control Ordinance:	05/06/2007
16. Ordinance Number(s):	01-2007
17. What is the current status of the adopted plan and ordinance?	
18. Are you reviewing projects as part of your site plan and sub-division approval process to ensure that they comply with your municipality's effective municipal stormwater control ordinance(s)?	Yes
19. How many projects that were subject to either the municipal stormwater control ordinance or the stormwater provisions of RSIS did the municipality review?	0

20. Does the municipal stormwater management plan contain a mitigation plan?	Yes
21. Has the municipality granted any variances or exemptions from the design and performance standards for stormwater management measures set forth in the approved municipal stormwater management plan and stormwater control ordinance(s)?	No
22. If yes, how many variances or exemptions from the design and performance standards has the municipality granted?	
23. If granted any variances or exemptions, did you submit a written report to the county review agency describing the variance or exemption and the required mitigation?	
24. Does the municipality's plan review evaluate storm drain inlet protection for solids and floatables in accordance with Attachment C of the permit?	Yes
25. Does the municipality require plans for long-term operation and maintenance for stormwater BMPs?	Yes
26. Are you ensuring that adequate long-term operation and maintenance of stormwater BMPs is being performed on property that you do not own or operate? **Please keep an inventory of stormwater BMPs indicating type, function and location in a format provided by the Department onsite and available for inspection or upon request.**	Yes
27. Briefly indicate how this is being accomplished (e.g., ordinance requiring operation and maintenance by private entity; operation and maintenance by you or other governmental entity):	Ordinance requiring operation and maintenance of private facilities
28. Is the municipality's stormwater management plan re-examined at each re-examination of the master plan in accordance with N.J.A.C. 7:8-4?	N/A - we did not re-examine our master plan this year
29. Date re-examination report was last adopted:	

Report Details - Part C

Local Public Education Program

1. Have you developed a Local Public Education Program?	Yes
2. Have you conducted educational activities that total a minimum of 10 points (between January 1, 2016 and December 31, 2016)?	Yes
3. School Presentations (1 point per visit / maximum of 5 points per year):	0
4. Website (1 point):	1
5. Stormwater Display (2 points):	2
6. Giveaway (2 points):	0
7. Citizen Stormwater Advisory Committee (2 points):	0
8. Utilize Department Materials (2 points each / maximum of 4	4

points per year):	
9. Poster Contest (2 points):	0
10. Stormwater Training for Elected Municipal Officials (3 points):	0
11. Mural (3 points):	0
12. Mailing (3 points):	3
13. Partnership Agreement / Local Event (3 points):	0
14. Ordinance Education (5 points):	0

Storm Drain Inlet Labeling

1. Have you established a storm drain inlet labeling program?	Yes
2. Indicate the percentage or number of sectors labeled to date:	100%
3. Other Amount:	
4. Is your municipality maintaining the labels (i.e. replacing and/or repainting)?	Yes

Improper Disposal of Waste

Have you adopted and are you enforcing a regulatory mechanism for:

1. Pet Waste Ordinance:	Yes
2. Date adopted:	05/02/2006
3. Litter Ordinance/State Litter Statute:	Litter Ordinance
4. Date adopted:	12/15/1992
5. Improper Disposal of Waste Ordinance:	Yes
6. Date adopted:	05/02/2006
7. Wildlife Feeding Ordinance:	Yes
8. Date adopted:	05/02/2006
9. Containerized Yard Waste Ordinance / Yard Waste Collection Program Ordinance:	Yard Waste Collection Program Ordinance
10. Date adopted:	05/02/2006
11. Illicit Connection Ordinance:	Yes
12. Date adopted:	05/02/2006
13. Refuse Container/Dumpster Ordinance:	Yes
14. Date adopted:	05/18/2010
15. Private Storm Drain Inlet Retrofitting Ordinance:	Yes
16. Date adopted:	05/18/2010
17. Status of these ordinances (if not adopted):	
18. Method(s) of enforcement (e.g., summons, warnings, additional signs, etc.):	Police Department

19. Are you distributing the Pet Waste Information Sheets with pet licenses?	Yes

Report Details - Part D

MS4 Outfall Pipe Mapping

1. Has the municipality completed the mapping of the MS4 outfall pipes?	Yes
2. Date completed:	08/01/2006
3. Number of outfall pipes that you operate in the municipality:	90
4. How many MS4 outfall pipes are mapped?	90

Illicit Connection Elimination Program

1. Does the municipality have an ongoing program to detect and eliminate illicit connections to municipally owned or operated outfall pipes?	Yes
2. How many outfall pipes were inspected during the past calendar year?	90
3. Number of illicit connections detected during the past calendar year:	0
4. Number of illicit connections eliminated during the past calendar year: **Please attach, in a format provided by the Department, a list of all outfalls found to have an illicit connection since the inception of the program. The list must include the outfall location, receiving water body, source of illicit connection and the date the illicit connection was eliminated.**	0

Street Sweeping Program

1. In the past calendar year, were all required streets swept?	Yes
2. What was the total number of miles swept?	156

List the total amount of materials collected for each month since January 1, 2016, in tons.

3. Units:	Tons
4. January:	0
5. February:	0
6. March:	5.13
7. April:	1.31

8. May:	2.13
9. June:	1.39
10. July:	3.84
11. August:	3.54
12. September:	1.02
13. October:	1.1
14. November:	0
15. December:	0
16. Total (Note: 1.053 cubic yards = 1 ton):	19.46
17. Explain the reason if reporting zero (0) for a month above:	January and February is was too cold to operate the street sweeper. November & December leaf collection was underway.

Storm Drain Inlet Retrofitting

1. Has the municipality completed repaving, repairing, reconstruction, or alterations on any road surfaces in direct contact with municipally owned or operated storm drain inlets?	Yes
2. Approximately what percentage of storm drains within the municipality currently meet the standard?	6

Stormwater Facility Maintenance

Stormwater facilities include, but are not limited to, catch basins, extended detention basins, low flow bypasses, underground detention, dry wells, manufactured treatment devices, pervious paving buffers, infiltration basins/trenches, sand filters, constructed wetlands, wet ponds, bioretention, rooftop vegetated cover, vegetative filters, and stormwater conveyance systems. Stormwater facility inventories that indicate the type, function, and location of the facility must be kept onsite and available for inspection or upon request in a format provided by the Department. The format is available as SPPP Form 13 at: http://www.nj.gov/dep/dwq/pdf/Tier_A/A%20-%20pdf%206.pdf**.**

1. Have you developed a Stormwater Facility Maintenance Program?	Yes

Other Stormwater Facilities

1. Were all stormwater facilities that you operate inspected?	Yes
2. Were any found to be in need of cleaning or repair in order to function properly?	Yes
3. During the past calendar year, were any stormwater facilities (excluding catch basins) cleaned?	Yes

4. Were repairs made?	N/A - no repairs needed
5. Describe repair(s) or if repairs have not yet been made, provide a schedule for the repair(s):	

Catch Basins

1. Total number of catch basins that the municipality operates:	1262
2. Total number of catch basins inspected:	1262
3. Total number of catch basins cleaned:	1262
4. Amount of materials removed from catch basins, in tons, during the past calendar year:	40
5. Units:	Tons

Report Details - Part E

Outfall Pipe Stream Scouring Remediation

For all outfall pipes undergoing remediation through a scour remediation program, attach additional page(s) as necessary indicating the location of the outfall pipe (including the alphanumeric identifier), the repair start date, and the repair completion date.

1. Has the municipality developed a prioritized list of outfall pipes requiring outfall pipe stream scouring remediation?	N/A - no outfalls meet the stream scouring requirement

De-icing Material and Sand Storage

1. Does the municipality have a permanent structure for all de-icing material storage?	Yes
2. If sand is being stored outside, is it set back 50 feet from storm sewer inlets, ditches or other stormwater conveyance channels, and surface water bodies?	N/A - no sand stored outdoors

Fueling Operations

1. Is the municipality implementing Standard Operating Procedures for vehicle fueling and receiving of bulk fuel deliveries at maintenance yard operations?	N/A - no fueling

Vehicle Maintenance

1. Is the municipality implementing Standard Operating Procedures for vehicle maintenance and repair activities at maintenance yard	Yes

operations?	

Good Housekeeping Practices

1. Is the municipality implementing Good Housekeeping Practices for all materials or machinery listed in the Inventory Requirements for Municipal Maintenance Yard Operations (including maintenance activities and ancillary operations)?	Yes

Equipment and Vehicle Washing

1. Has the municipality implemented measures to properly handle the discharge of equipment and vehicle wash wastewater from municipal maintenance yard operations?	Yes
2. Please indicate which option you implemented to eliminate the unpermitted discharge:	Connected to sanitary sewer
3. Date the management measure was implemented:	02/13/2009
4. What is the NJPDES permit number that authorizes the discharge of vehicle and equipment wash wastewater?	
5. Is the municipality maintaining records of vehicle and equipment washing?	

Annual Employee Training

1. Did the municipality conduct training for employees on stormwater related topics as required under the MS4 permit (e.g., police officers trained on ordinances)?	Yes
2. List date(s) of employee training:	10/17/2016

Report Details - Part F

Sharing of Responsibilities

Does the municipality share services with another entity to satisfy a permit requirement?	Yes

For each of the following, indicate if you are relying on another entity to satisfy all or part of any permit requirements. Please provide additional information for any "Yes" answers in the provided Comments field.

1. Public notice:	No
2. Comments:	
3. Ensure compliance with RSIS for stormwater management:	No

4. Comments:	
5. Municipal stormwater management plan:	No
6. Comments:	
7. Municipal stormwater control ordinance:	No
8. Comments:	
9. Long term operation and maintenance of BMPs (post-construction):	No
10. Comments:	
11. Storm drain inlet design standard (post-construction):	No
12. Comments:	
13. Local public education program:	No
14. Comments:	
15. Storm Drain Inlet Labeling Program:	No
16. Comments:	
17. Illicit connection elimination program:	No
18. Comments:	
19. Street sweeping:	No
20. Comments:	
21. Storm drain inlet retrofitting:	No
22. Comments:	
23. Maintenance of municipally operated stormwater facilities:	No
24. Comments:	
25. Outfall pipe stream scouring:	No
26. Comments:	
27. De-icing and sand storage:	No
28. Comments:	
29. Fueling operations:	Yes
30. Comments:	City owned and operated vehicles are fueled in Burlington Township
31. Vehicle maintenance:	No
32. Comments:	
33. Good Housekeeping:	No
34. Comments:	
35. Vehicle and Equipment Washing:	No
36. Comments:	
37. Employee Training:	No
38. Comments:	

Incidents of Non-compliance

Based on the answers you provided above, the Department has identified the following possible permit compliance issues. Please complete the Incidents of Non-compliance section and identify steps being taken to correct these deficiencies.

- Your municipality has not revised your Stormwater Pollution Prevention Plan to incorporate changes required by the renewal permit.

1. Did your Public Complex have any incidents of non-compliance?	Yes
2. Identify the steps being taken to remedy the noncompliance and to prevent such incidents from recurring. **(If the text box is not large enough to complete this section, please provide your report as an attachment and upload it on the next screen. Please reference the attachment in the textbox.)**	The Stormwater Pollution Prevention Plan will be updated when the renewal permit is issued.

Certification

Certifier:	Vincent DiCastelnuovo
Certifier ID:	VDICASTELNUOVO
Challenge/Response Question:	What is your favorite food?
Challenge/Response Answer:	******
Certification PIN:	******
Date/Time of Certification:	04/28/2017 16:10

"I certify under penalty of law that this Annual Report and Certification and all attached documents were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate this information. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering this information, the information in this Annual Report and Certification and all attached documents is, to the best of my knowledge and belief, true, accurate and complete.

"I certify that the municipality is in compliance with its stormwater program, Stormwater Pollution Prevention Plan (SPPP) and the NJPDES Tier A Municipal Stormwater General Permit No. NJG0153109 except for any incidents of non-compliance which are identified herein. For any incidents of non-compliance, the Annual Report identifies the steps being taken to remedy the non-compliance and to prevent such incidents from recurring.

"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."

Please note, no changes will be allowed to be made to this report upon its certification. If you need to correct or modify the report after certification, please contact your case manager at (609) 633-7021 so they may enable that function.

Vincent DiCastelnuovo	04/28/2017
General	**Date**

Instructions for Saving and Submitting the

2016 MS4 Tier A Permit Annual Report - Supplemental Questionnaire

1. Once opened, please save the Questionnaire to your computer, using the "Save As" function. This can be done by going to FILE > then Save As... or Shift + Ctrl + S.
2. Complete the Questionnaire.
3. Once you have completed the Questionnaire, use the "Save" function to save your answers to the Questionnaire to your computer. This can be done by going to FILE > then Save or Ctrl + S.
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Your Annual Report will be considered incomplete if the Supplemental Questionnaire is not attached. If you experience any difficulty in this process, please contact your municipal case manager at 609-633-7021.

Please note that use of Adobe Reader XI is recommended. This free software is available for download at http://get.adobe.com/reader/ . If you have an earlier version of Adobe Reader, please go to the Adobe website at http://tv.adobe.com/watch/acrobat-x-tips-tricks/quick-tip-how-to-save-form-data-in-adobe-reader/ for detailed instructions on how to save your completed Questionnaire.

2016 MS4 Tier A Permit Annual Report - Supplemental Questionnaire

General Information

A. Municipal Information

Municipality: City of Burlington	County: Burlington
1. Has the municipality identified the stormwater team in the SPPP? (•) Yes ( ) No	
2. Municipal Population: 9920	3. Municipal Area (acres/sqm.): 3.06 sqm

B. Sharing of Responsibilities – Permit Section D1

1. If the municipality shares services, what requirement do the shared services satisfy?

- [ ] Public Notice
- [ ] Post-Construction Stormwater Management in New Development and Redevelopment
- [ ] Local Public Education
- [ ] Improper Disposal of Waste
- [ ] Illicit Connection Elimination and MS4 Outfall Pipe Mapping
- [ ] Solids and Floatable Controls
- [ ] Maintenance Yard Operations
- [ ] Employee Training
- [x] N/A, there are no shared services

Permit Implementation - Ordinances

A. Ordinances - Permit Sections F5 and F6

1. *Pet Waste Ordinance*
Entity responsible for enforcement: City of Burlington Police

2. *Litter Ordinance/State Litter Statute*
Entity responsible for enforcement: City of Burlington Police

3. *Improper Disposal of Waste Ordinance*
Entity responsible for enforcement: City of Burlington Police

4. *Wildlife Feeding Ordinance*
Entity responsible for enforcement: City of Burlington Police

5. *Containerized Yard Waste Ordinance/Collection Program*
Entity responsible for enforcement: City of Burlington Police

6. *Illicit Connection Ordinance*
Entity responsible for enforcement: City of Burlington Police

7. *Refuse Container/Dumpster Ordinance*
Entity responsible for enforcement: City of Burlington Police

8. *Private Storm Drain Inlet Retrofitting Ordinance:*
Entity responsible for enforcement: City of Burlington Police

9a. How many violations of these ordinances were enforced?

Data not readily available

9b. Which of the above ordinances had the most violations?

Data not readily available

B. Illicit Connection Elimination Program – Permit Section F6

1. During the past calendar year, has the municipality identified any pipes or discharges with unknown owners entering the MS4? ◯ Yes ◉ No
2. If yes, how many?

C. Storm Drain Inlet Retrofitting – Permit Section F7b

Existing storm drain inlets are required to be retrofitted to meet the design standard (contained in Attachment C of the permit) when such inlets are owned or operated by the Tier A Municipality and are in direct contact with repaving, repairing (excluding repair of individual potholes), reconstruction, resurfacing (including top coating or chip sealing with asphalt emulsion or a thin base of hot bitumen), or alterations of facilities owned or operated by the Tier A Municipality. For exemptions to this standard, refer to "Exemptions" in Attachment C.

1. At the completion of the above projects, did all of the storm drain inlets meet this standard? ◉ Yes ◯ No

Permit Implementation - Inventory

A. MS4 Outfall Pipe Mapping – Permit Section F6

1. Which map format is used:

◯ Tax Map ◯ SIIA ◉ Electronic (e.g. AutoCAD, Micro Station, GIS) ◯ USGS Quadrangle ◯ Other

1a. If other, what is the format that the municipality uses?

2. Date of last revision: 6/23/2015

3. Is the map updated annually? ◉ Yes ◯ No

4. Has the municipality investigated its MS4 for previously unmapped outfalls? ◉ Yes ◯ No

4a. How many outfalls were found? 0

5. What percentage of mapped outfalls in the municipality have been visually inspected during the last calendar year?

100%

6. Are the municipality's outfall pipes labelled in the field? ◯ Yes ◉ No

6a. If yes, do the labels match the alphanumeric code in the municipality's map? ◯ Yes ◉ No

7. Does the municipality's map identify outfalls that do not discharge to surface waters? ◉ Yes ◯ No

8. Does the municipality's map identify surface water body names? ◉ Yes ◯ No

9. Does the municipality's map identify streets? ◉ Yes ◯ No

10. Does the municipality's map identify blocks and lots? ◯ Yes ◉ No

11. Does the municipality's map identify MS4 conveyance systems (pipes, swales, ditches)? ◉ Yes ◯ No

12. Does the municipality's map identify other stormwater facilities? ◯ Yes ◉ No

12a. Please identify other stormwater facilities noted on the map (select as many as apply):

- ☐ Bioretention Systems
- ☐ Dry Wells
- ☐ Grass Swales
- ☐ Manufactured Treatment Devices (MTDs)
- ☐ Rooftop Vegetated Cover
- ☐ Vegetative Filters
- ☐ Retrofitted Storm Drain Inlets
- ☐ Constructed Stormwater Wetlands
- ☐ Extended Detention Basins
- ☐ Infiltration Basins
- ☐ Pervious Paving Systems
- ☐ Sand Filters
- ☐ Wet Ponds

13. Does the municipality's map identify areas with scour, erosion, and/or flooding and drainage control issues?

◉ Yes ◯ No

B. Storm Drain Inlet Labeling – Permit Section F4b

1. How many labels have been replaced or repainted during the past calendar year to ensure legibility?
   42

Permit Implementation - Inventory

A. Stormwater Facility Inspection and Maintenance – Permit Section F7c

Stormwater facilities include, but are not limited to, catch basins, extended detention basins, low flow bypasses, underground detention, dry wells, manufactured treatment devices, pervious paving, riparian buffers, infiltration basins/ trenches, sand filters, constructed wetlands, wet ponds, bioretention, rooftop vegetated cover, vegetative filters, and stormwater conveyance systems. Stormwater facility inventories that indicate the type, function, and location of the facility must be kept onsite and available for inspection or upon request in a format provided by the Department. The format is available as SPPP Form 13 at: http://www.nj.gov/dep/dwq/pdf/Tier_A/A%20-%20pdf%206.pdf

1. Does the municipality's stormwater maintenance program include the following:
1a. An inventory of facilities? (•) Yes ( ) No
1b. An inspection schedule? (•) Yes ( ) No
1c. A maintenance schedule? (•) Yes ( ) No
1d. An inspection log noting when inspections were conducted? (•) Yes ( ) No
1e. A maintenance log noting any maintenance performed on individual facilities? (•) Yes ( ) No

2. Does the municipality inspect stormwater facilities that are not owned by the municipality? (•) Yes ( ) No
2a. Does the municipality review maintenance logs for stormwater facilities that are not owned by the municipality?
( ) Yes (•) No

3. During the past calendar year, how many stormwater facilities (excluding catch basins) were repaired?
   6

4. During the past calendar year, how many stormwater facilities (excluding catch basins) were cleaned?
   1 (Mitchell Avenue Outfall)

B. Stormwater Facility Inspection and Maintenance – Permit Section F7c

1. Does the municipality have a stormwater outfall pipe scouring detection, remediation, and maintenance program?
( ) Yes (•) No
2. How many instances of scour has the municipality found during the past calendar year?
   N/A Outfalls are to tidal waters.

Permit Implementation - Inventory

A. De-icing Material and Sand Storage – Permit Section F8a

1. What type of de-icing material does the municipality use (select as many as appropriate)?

- [x] Sodium Chloride
- [ ] Calcium Chloride
- [ ] Potassium Acetate
- [ ] Brine Solution
- [ ] Unknown
- [ ] Other (if other, please specify):

B. Equipment and Vehicle Washing – Permit Section F8b

1. Does the municipality utilize an underground storage tank for managing vehicle wash wastewater? ( ) Yes (•) No

2. Which of the following options does the municipality use to manage vehicle wash wastewater? (select all that apply)

- ☐ Vehicle wash reclaim system
- ☐ Capture and haul system
- ☑ Discharge to sanitary sewer
- ☐ Discharge to groundwater
- ☑ Washed off site
- ☐ Do not wash vehicles

Permit Implementation – Stormwater Management – Permit Section F3

Note: This portion of the annual report should be completed by a person knowledgeable in post-construction stormwater management project review and approvals.

1. Name of person completing this section: Ken Shine
2. Title of person completing this section: Project Manager

A. Municipal Stormwater Management Plan (Plan)

1. Most recent date of re-examination of municipal master plan: June 2010
2. Does the plan identify and address water bodies of concern (listed on Impaired Water Bodies List, TMDL, high quality water, existing erosion)? ◉ Yes ○ No
3. Does the plan identify and address areas of inadequate drainage? ◉ Yes ○ No
4. Does the plan include programs or BMPs and associated timeframes specifically addressing these impairments or pollutants? ◉ Yes ○ No
5. Does the plan identify how to incorporate future development pressures on the existing stormwater management infrastructure? ◉ Yes ○ No
6. Are mitigation projects listed in the municipality's mitigation plan? ◉ Yes ○ No ○ No mitigation plan

B. Stormwater Control Ordinance

1. What is the ordinance's definition of major development?

   Any development that provides for ultimately disturbing one or more acres of land. "Disturbance" for the purpose of this article is the placement of impervious surface or exposures and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

2. Has the municipality adopted a new stormwater control ordinance during the past year? ○ Yes ◉ No
3. If yes, did the municipality send the adopted municipal stormwater control ordinance to the appropriate county review agency for approval? ○ Yes ○ No

C. Review of Major Development for Stormwater Management

1. Did the municipality have any agricultural development projects that were granted exemptions under the Right to Farm Act? ○ Yes ◉ No
2. Do any municipal ordinances promote the use of nonstructural strategies? ◉ Yes ○ No ○ Unknown
3. Does the municipality hold pre-application meetings to discuss incorporation of nonstructural strategies for individual projects? ◉ Yes ○ No
4. Does the municipality allow infiltration BMPs to infiltrate during the 2, 10, or 100 year storm events for quantity control? ◉ Yes ○ No
5. Does the municipality conduct municipal inspections of sites both during and after the construction is completed to ensure that BMPs function as designed? ◉ Yes ○ No

D. Inventory and Maintenance

Stormwater facility inventories that indicate the type, function, and location of the facility must be kept onsite and available for inspection or upon request in a format provided by the Department. The format is available as SPPP Form 13 at: http://www.nj.gov/dep/dwq/pdf/Tier_A/A%20-%20pdf%206.pdf.

1. Did the municipality update its map and inventory to include newly approved projects constructed within the last calendar year? (•) Yes ( ) No
2. How many infiltration BMPs were approved during the past calendar year? 0
3. How many subsurface infiltration basins have been constructed during the past calendar year? 0

3a. How many of these subsurface infiltration basins were inspected during construction in the past calendar year? N/A

3b. Did the final inspection include the following? Mark all that apply:

- [ ] Permeability test
- [ ] Visual inspection
- [ ] Check for drain down time
- [ ] Unknown

4. Select the methods the municipality uses to ensure that stormwater facilities that are **not owned** by the municipality will be properly maintained:

- [ ] Maintained by municipality
- [ ] Inspections
- [ ] Homeowners associations
- [ ] Shared services
- [ ] Fees
- [ ] Surety bonds
- [x] Other

4a. If other, what are the methods for ensuring stormwater facilities are maintained? Code Enforcement

5. In the past calendar year, has the municipality reviewed and approved any major residential developments that place an individual property owner as the responsible entity for the maintenance of any stormwater management facility(ies) that receive drainage from multiple parcels? ( ) Yes (•) No

E. Stormwater Management Training

1. Have any of the current members of the planning or zoning board taken any NJDEP provided training for board members on the Stormwater Management rules? (•) Yes ( ) No ( ) Unknown
2. Have the municipality's inspector(s) for stormwater management taken any of the following classes:

2a. Stormwater Management and BMPs for Engineers through Rutgers University or NJDEP : (•) Yes ( ) No ( ) Unknown

2b. Municipal Engineering Construction Inspection Program, Part 1 through Rutgers University: (•) Yes ( ) No ( ) Unknown

2c. Municipal Engineering Construction Inspection Program, Part 2 through Rutgers University: (•) Yes ( ) No ( ) Unknown

2d. Soils & Site Evaluation for Septic Disposal Systems & Stormwater BMPs through Rutgers University: ( ) Yes ( ) No (•) Unknown

2e. Other stormwater training classes: Unknown

3. How many construction inspectors for stormwater management does the municipality have? 8

4. How many operation and maintenance inspectors for stormwater management does the municipality have?
   6
5. How many plan reviewers for stormwater management does the municipality have? 3
6. How many municipal engineers/stormwater plan reviewers have taken the NJDEP Stormwater Management and BMP Manual course offered through Rutgers University or NJDEP? 5

Education

A. Annual Employee Training – Permit Section F9

1. Is the municipality maintaining a record of the dates on which employees have received training? (●) Yes ( ) No
2. Type of training media on those dates: [✓] Video [✓] Mentoring [ ] Vendor Training

This Supplemental Questionnaire must be attached to your Annual Report to be considered complete. If you experience any difficulty in this process, please contact your municipal case manager at 609-633-7021.

1. Once you have completed the Questionnaire, use the "Save" function to save your answers to the Questionnaire to your computer. This can be done by going to FILE > then Save or Ctrl + S.
2. The completed and saved Questionnaire must then be uploaded as an attachment, in Part 7, to your Annual Report before the Annual Report is submitted to the Department.
3. To access the Annual Report, open the link to "NJDEP Online Portal" at http://www.nj.gov/dep/dwq/tier_a.htm. In Part 7, you will be asked to complete information regarding the file(s) to be uploaded. Navigate to your saved Questionnaire and then hit the "Upload" button in the lower right section of Part 7. The Annual Report will indicate if the Questionnaire was successfully uploaded. Then click on the "Continue" button and proceed with finalizing your Annual Report.

SPPP Form 18 – TMDL Information

Municipality Information	
	Municipality: *City of Burlington* County *Burlington*
	NJPDES # : *0153109* PI ID #: *171529*
	Team Member/Title: *Mark Staravoj, Superintendent of Sewage and Drainage*
	Effective Date of Permit Authorization (EDPA): *1/1/18*
	Date of Completion: *October 2018* Date of most recent update: *9/30/2018*

Identify waterbodies with segments that are wholly or partially within or bordering the municipality with approved and/or adopted TMDLs and their related pollutants. Describe any prioritization or strategies that have been developed to address the stormwater related pollutants. Reference other forms as necessary.

According to the search tool provided by the NJDEP, (found at www.nj.gov/dep/dwq/msr-tmdl-rh.htm) the following waterbodies are subjected to the corresponding TMDLs:

LDRV tributaries (Assiscunk to Blacks Ck) – Mercury
Assiscunk Ck. (below Neck Rd.); LDRV tributaries (Beverly to Assiscunk Ck., Bustleton Creek area) – Polychlorinated Biphenyls (PCBs)

The City will use the TMDL information to prioritize any stormwater facility maintenance that is required based on the area in which the facilities are located.

The City may address the Mercury TMDL by regulating the common sources of mercury pollutants such as factory smoke, solid/medical waste incineration, and some manufacturing processes.

The City will address the PCB TMDL by collecting PMP reports from all applicable discharge points and ensure that the PMP reports are updated annually. (See attached)

Total Maximum Daily Load (TMDL) Information

Amendment to the Atlantic, Cape May, Lower Delaware, Lower Raritan-Middlesex, Mercer, Monmouth, Northeast, Ocean, Sussex, Tri-County, Upper Delaware and Upper Raritan Water Quality Management Plans

Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewide

Proposed: June 15, 2009
Established: September 10, 2009
Approved: September 25, 2009
Adopted: June 10, 2010

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

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Executive Summary

In accordance with Section 305(b) and 303(d) of the Federal Clean Water Act (CWA), the State of New Jersey, Department of Environmental Protection (Department or NJDEP) published the *2008 Integrated Water Quality Monitoring and Assessment Report*, which provides information on water quality conditions and trends, and various management strategies and actions being employed to protect and improve water quality. The report includes the List of Water Quality Limited Waters, also known as the 303(d) List, which identifies waters that do not attain an applicable designated use because of a known pollutant and for which a TMDL must be established. On March 3, 2008, the Department proposed the *2008 List of Water Quality Limited Waters* (40NJR4835(c)) 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 in accordance with the Water Quality Management Planning rules at N.J.A.C. 7:15-6.4(a). The Environmental Protection Agency has approved this list. The *2008 List of Water Quality Limited Waters* identifies 256 waters as impaired with respect to mercury, as indicated by the presence of mercury concentrations in fish tissue in excess of New Jersey fish consumption advisories and/or not complying with the Surface Water Quality Standards (SWQS) for mercury at N.J.A.C. 7:9B.

A TMDL has been developed to address mercury impairment in 122 waters identified in Table 1 below. These are waters whose main source of contamination is air deposition. Waters that are tidal, where there are other significant sources of mercury or where cooperative efforts have been or are expected to be undertaken are not addressed in this TMDL pending additional study.

Table 1. Assessment Units Covered by this TMDL

Watershed Management Area (WMA)	Assessment Unit ID	Waterbody Name	2006 Integrated list	2008 Integrated list
01	02040104090020	Clove Brook (Delaware R)	Sublist 5	Sublist 5
01	02040104130010	Little Flat Brook (Beerskill and above)	Sublist 5	Sublist 5
01	02040104140010	Big Flat Brook (above Forked Brook)	Sublist 5	Sublist 5
01	02040105030020	Swartswood Lake and tribs	Sublist 5	Sublist 5
01	02040105030030	Trout Brook	Sublist 5	Sublist 5
01	02040105050040	Yards Creek	Sublist 3	Sublist 3*
01	02040105090040	Mountain Lake Brook	Sublist 5	Sublist 5
01	02040105140040	Merrill Creek	Sublist 5	Sublist 5
01	02040105140060	Pohatcong Ck (Springtown to Merrill Ck)	Sublist 3	Sublist 3*
01	02040105150020	Lake Hopatcong	Sublist 5	Sublist 5
01	02040105150060	Cranberry Lake / Jefferson Lake & tribs	Sublist 5	Sublist 5
02	02020007040040	Highland Lake/Wawayanda Lake	Sublist 5	Sublist 5
03	02030103050020	Pacock Brook	Sublist 5	Sublist 5
03	02030103050030	Pequannock R (above OakRidge Res outlet)	Sublist 5	Sublist 5
03	02030103050040	Clinton Reservior/Mossmans Brook	Sublist 5	Sublist 5

03	02030103050060	Pequannock R(Macopin gage to Charl'brg)	Sublist 5	Sublist 5
03	02030103050080	Pequannock R (below Macopin gage)	Sublist 5	Sublist 5
03	02030103070030	Wanaque R/Greenwood Lk(aboveMonks gage)	Sublist 5	Sublist 5
03	02030103070050	Wanaque Reservior (below Monks gage)	Sublist 5	Sublist 5
03	02030103110020	Pompton River	Sublist 5	Sublist 5
06	02030103010170	Passaic R Upr (Rockaway to Hanover RR)	Sublist 5	Sublist 5
06	02030103020040	Whippany R(Lk Pocahontas to Wash Val Rd)	Sublist 5	Sublist 5
06	02030103020080	Troy Brook (above Reynolds Ave)	Sublist 5	Sublist 5
06	02030103030030	Rockaway R (above Longwood Lake outlet)	Sublist 5	Sublist 5
06	02030103030040	Rockaway R (Stephens Bk to Longwood Lk)	Sublist 5	Sublist 5
06	02030103030070	Rockaway R (74d 33m 30s to Stephens Bk)	Sublist 5	Sublist 5
06	02030103030090	Rockaway R (BM 534 brdg to 74d 33m 30s)	Sublist 5	Sublist 5
06	02030103030110	Beaver Brook (Morris County)	Sublist 5	Sublist 5
06	02030103030140	Rockaway R (Stony Brook to BM 534 brdg)	Sublist 5	Sublist 5
06	02030103030150	Rockaway R (Boonton dam to Stony Brook)	Sublist 5	Sublist 5
06	02030103030170	Rockaway R (Passaic R to Boonton dam)	Sublist 5	Sublist 5
08	02030105010030	Raritan River SB(above Rt 46)	Sublist 5	Sublist 5
08	02030105010040	Raritan River SB(74d 44m 15s to Rt 46)	Sublist 3	Sublist 3*
08	02030105010050	Raritan R SB(LongValley br to 74d44m15s)	Sublist 3	Sublist 3*
08	02030105010060	Raritan R SB(Califon br to Long Valley)	Sublist 3	Sublist 3*
08	02030105020040	Spruce Run Reservior / Willoughby Brook	Sublist 5	Sublist 5
08	02030105020090	Prescott Brook / Round Valley Reservior	Sublist 5	Sublist 5
08	02030105020100	Raritan R SB(Three Bridges-Prescott Bk)	Sublist 3	Sublist 3*
08	02030105040010	Raritan R SB(Pleasant Run-Three Bridges)	Sublist 3	Sublist 3*
08	02030105040040	Raritan R SB(NB to Pleasant Run)	Sublist 3	Sublist 3*
09	02030105080020	Raritan R Lwr (Rt 206 to NB / SB)	Sublist 3	Sublist 3*
09	02030105080030	Raritan R Lwr (Millstone to Rt 206)	Sublist 3	Sublist 3*
09	02030105120080	South Fork of Bound Brook	Sublist 3	Sublist 3*
09	02030105120100	Bound Brook (below fork at 74d 25m 15s)	Sublist 3	Sublist 3*
09	02030105120140	Raritan R Lwr(I-287 Piscatway-Millstone)	Sublist 5	Sublist 5
09	02030105130050	Lawrence Bk (Church Lane to Deans Pond)	Sublist 3	Sublist 3*
09	02030105130060	Lawrence Bk (Milltown to Church Lane)	Sublist 3	Sublist 3*

09	02030105140020	Manalapan Bk(incl LkManlpn to 40d16m15s)	Sublist 3	Sublist 3*
09	02030105140030	Manalapan Brook (below Lake Manalapan)	Sublist 5	Sublist 5
09	02030105160030	Duhernal Lake / Iresick Brook	Sublist 3	Sublist 3*
10	02030105090050	Stony Bk(Province Line Rd to 74d46m dam)	Sublist 3	Sublist 3*
10	02030105100130	Bear Brook (below Trenton Road)	Sublist 3	Sublist 5
10	02030105110020	Millstone R (HeathcoteBk to Harrison St)	Sublist 3	Sublist 5
10	02030105110110	Millstone R (BlackwellsMills to BedenBk)	Sublist 3	Sublist 3*
10	02030105110140	Millstone R(AmwellRd to BlackwellsMills)	Sublist 3	Sublist 3*
10	02030105110170	Millstone River (below Amwell Rd)	Sublist 3	Sublist 3*
12	02030104060020	Matawan Creek (above Ravine Drive)	Sublist 3	Sublist 3*
12	02030104060030	Matawan Creek (below Ravine Drive)	Sublist 5	Sublist 5
12	02030104070070	Swimming River Reservior / Slope Bk	Sublist 3	Sublist 3*
12	02030104070090	Nut Swamp Brook	Sublist 3	Sublist 5
12	02030104090030	Deal Lake	Sublist 3	Sublist 3*
12	02030104090080	Wreck Pond Brook (below Rt 35)	Sublist 3	Sublist 5
12	02030104100050	Manasquan R (gage to West Farms Rd)	Sublist 5	Sublist 5
13	02040301030040	Metedeconk R SB (Rt 9 to Bennetts Pond)	Sublist 5	Sublist 5
13	02040301060050	Dove Mill Branch (Toms River)	Sublist 5	Sublist 5
13	02040301070010	Shannae Brook	Sublist 5	Sublist 5
13	02040301070030	Ridgeway Br (Hope Chapel Rd to HarrisBr)	Sublist 5	Sublist 5
13	02040301070040	Ridgeway Br (below Hope Chapel Rd)	Sublist 5	Sublist 5
13	02040301070080	Manapaqua Brook	Sublist 3	Sublist 5
13	02040301070090	Union Branch (below Blacks Br 74d22m05s)	Sublist 5	Sublist 5
13	02040301080030	Davenport Branch (above Pinewald Road)	Sublist 3	Sublist 5
13	02040301090050	Cedar Creek (GS Parkway to 74d16m38s)	Sublist 5	Sublist 5
13	02040301130030	Mill Ck (below GS Parkway)/Manahawkin Ck	Sublist 3	Sublist 3*
13	02040301130050	Westecunk Creek (above GS Parkway)	Sublist 5	Sublist 5
13	02040301140020	Mill Branch (below GS Parkway)	Sublist 3	Sublist 3*
13	02040301140030	Tuckerton Creek (below Mill Branch)	Sublist 3	Sublist 3*
14	02040301150080	Batsto R (Batsto gage to Quaker Bridge)	Sublist 5	Sublist 5
14	02040301160030	Mullica River (Rt 206 to Jackson Road)	Sublist 5	Sublist 5
14	02040301160140	Mullica River (39d40m30s to Rt 206)	Sublist 5	Sublist 5
14	02040301160150	Mullica R (Pleasant Mills to 39d40m30s)	Sublist 5	Sublist 5
14	02040301180060	Oswego R (Andrews Rd to Sim Place Resv)	Sublist 3	Sublist 3*
14	02040301180070	Oswego River (below Andrews Road)	Sublist 5	Sublist 5

14	02040301190050	Wading River WB (Jenkins Rd to Rt 563)	Sublist 5	Sublist 5
14	02040301200010	Beaver Branch (Wading River)	Sublist 5	Sublist 5
14	02040301200050	Bass River EB	Sublist 3	Sublist 3*
15	02040302030020	GEHR (AC Expressway to New Freedom Rd)	Sublist 5	Sublist 5
15	02040302040050	Collings Lakes trib (Hospitality Branch)	Sublist 5	Sublist 5
15	02040302040130	GEHR (Lake Lenape to Mare Run)	Sublist 5	Sublist 5
15	02040302050120	Middle River / Peters Creek	Sublist 3	Sublist 3*
16	02040206210050	Savages Run (above East Creek Pond)	Sublist 5	Sublist 5
16	02040206210060	East Creek	Sublist 5	Sublist 5
17	02040206030010	Salem River (above Woodstown gage)	Sublist 5	Sublist 5
17	02040206070030	Canton Drain (above Maskell Mill)	Sublist 5	Sublist 5
17	02040206080050	Cohansey R (incl CornwellRun - BeebeRun)	Sublist 3	Sublist 5
17	02040206090030	Cohansey R (Rocaps Run to Cornwell Run)	Sublist 5	Sublist 5
17	02040206100060	Nantuxent Creek (above Newport Landing)	Sublist 3	Sublist 3*
17	02040206130010	Scotland Run (above Fries Mill)	Sublist 5	Sublist 5
17	02040206130040	Scotland Run (below Delsea Drive)	Sublist 5	Sublist 5
17	02040206140010	MauriceR(BlkwtrBr to/incl WillowGroveLk)	Sublist 5	Sublist 5
17	02040206150050	Muddy Run (incl ParvinLk to Palatine Lk)	Sublist 3	Sublist 3*
17	02040206180050	Menantico Creek (below Rt 552)	Sublist 3	Sublist 3*
18	02040202100020	Pennsauken Ck NB (incl StrwbrdgLk-NJTPK)	Sublist 3	Sublist 5
18	02040202110030	Cooper River (above Evesham Road)	Sublist 5	Sublist 5
18	02040202110040	Cooper R (Wallworth gage to Evesham Rd)	Sublist 5	Sublist 5
18	02040202110050	Cooper River (Rt 130 to Wallworth gage)	Sublist 5	Sublist 5
18	02040202120010	Big Timber Creek NB (above Laurel Rd)	Sublist 5	Sublist 5
18	02040202120020	Big Timber Creek NB (below Laurel Rd)	Sublist 5	Sublist 5
18	02040202120030	Big Timber Creek SB (above Lakeland Rd)	Sublist 5	Sublist 5
18	02040202120040	Big T Ck SB(incl Bull Run to LakelandRd)	Sublist 5	Sublist 5
18	02040202120050	Big Timber Creek SB (below Bull Run)	Sublist 5	Sublist 5
18	02040202120060	Almonesson Creek	Sublist 5	Sublist 5
18	02040202120090	Newton Creek (LDRV-Kaighn Ave to LT Ck)	Sublist 5	Sublist 5
18	02040202120100	Woodbury Creek (above Rt 45)	Sublist 5	Sublist 5
18	02040202130030	Chestnut Branch (above Sewell)	Sublist 5	Sublist 5
18	02040202150020	Raccoon Ck (Rt 45 to/incl Clems Run)	Sublist 3	Sublist 3*
18	02040202150040	Raccoon Ck (Russell Mill Rd to Rt 45)	Sublist 5	Sublist 5
19	02040202030050	Bucks Cove Run / Cranberry Branch	Sublist 5	Sublist 5
19	02040202050050	Friendship Ck (below/incl Burrs Mill Bk)	Sublist 3	Sublist 3*

19	02040202050060	Rancocas Creek SB(above Friendship Ck)	Sublist 3	Sublist 3*
19	02040202050080	Rancocas Ck SB (Vincentown-FriendshipCk)	Sublist 3	Sublist 3*
19	02040202050090	Rancocas Ck SB (BobbysRun to Vincentown)	Sublist 3	Sublist 3*
20	02040201090030	LDRV tribs (Assiscunk Ck to Blacks Ck)	Sublist 5	Sublist 5

* Data became available in these assessment units after the 2008 list was approved indicating fish tissue levels that would result in listing of these waters in accordance with the current listing methodology; therefore, these assessment units will also be addressed in this TMDL.

The target for the TMDL is a concentration of 0.18 µg/g in fish tissue, which is the concentration at which the recommended rate of fish consumption for the high risk population is not more than 1 meal per week of top trophic level fish. At this concentration unlimited consumption is appropriate for the general population. An overall reduction of 84.3% in existing mercury loads is required to achieve the target. In its *New Jersey Mercury Reduction Plan*, the Department outlines measures needed to achieve these reductions.

The TMDLs in this report were proposed on June 15, 2009 and, having completed the public participation process, shall be adopted by the Department as amendments to the Atlantic, Cape May, Lower Delaware, Lower Raritan-Middlesex, Mercer, Monmouth, Northeast, Ocean, Sussex, Tri-County, Upper Delaware and Upper Raritan Water Quality Management Plans in accordance with N.J.A.C. 7:15-6.4. This TMDL report was developed consistent with the United States Environmental Protection Agency's (USEPA or EPA) May 20, 2002 guidance document entitled, "Guidelines for Reviewing TMDLs under Existing Regulations issued in 1992" (Sutfin, 2002), which describes the general statutory and regulatory requirements for approvable TMDLs, as well as EPA's more specific guidance memo for the subject type of TMDL, dated September 29, 2008 and entitled "Elements of Mercury TMDLs Where Mercury Loadings are Predominantly from Air Deposition" (Hooks, 2008).

1.0. Introduction

Mercury is a persistent, bio-accumulative toxin that can be found in solid, liquid, or vapor form. Mercury can cause a variety of harmful health effects including damage to the brain, central nervous system, and kidneys and is particularly harmful to children and pregnant and nursing women. Mercury comes from various natural and anthropogenic sources, including volcanic activity, burning of some forms of coal, use in dental procedures and manufacturing, use and disposal of products containing mercury. Most often, mercury enters the environment in gas or particulate form and is deposited on surfaces, often through precipitation, which washes deposited mercury into waterways. There it undergoes a natural chemical process and is converted to a more toxic form – methyl mercury. The methyl mercury builds up in the tissues of fish and animals, increasing its concentration as it moves up through the food chain, which results in high levels of mercury in some of the foods we eat. At certain levels, fish consumption advisories are triggered.

Mercury contamination in the environment is ubiquitous, not only in New Jersey, but worldwide. Mercury contamination is a global issue because the overwhelming source of mercury is air deposition. Consequently, mercury pollution will not be abated on a state by state basis alone, but must be controlled by regional, national and international efforts. In recognition of this, the New England Interstate Water Pollution Control Commission (NEIWPCC) established the *Northeast Regional Mercury Total Maximum Daily Load* dated October 24, 2007 (Northeast Regional TMDL), a regional TMDL for the states of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont which addressed impairments due to mercury contamination of waterbodies where the main source of mercury contamination is air deposition. It was approved by EPA on December 20, 2007. As EPA has approved establishment of regional TMDLs for mercury impairments where the primary source is air deposition using the NEIWPCC approach, the Department has determined that it is appropriate for New Jersey to develop a similar TMDL for comparable impairments in New Jersey, not only to recommend a course of action to reduce mercury contamination in New Jersey, but to further emphasize that substantial source reductions from outside New Jersey will be needed to achieve water quality objectives. Therefore, New Jersey has developed a statewide TMDL that will complement the Northeast Regional TMDL developed for the northeast states.

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 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. 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 Department combines these reports into the Integrated Water Quality Monitoring and Assessment Report and assigns each designated use within the assessment unit to one of five sublists. An assessment unit is listed as Sublist 1 if all designated uses are assessed and attained. (The Department does not include the fish consumption use for this sublist.) If some but not all uses are attained, an assessment unit is placed on Sublist 2 for attained uses. If the Department

did not have data to assess a use, the assessment unit is placed on Sublist 3 for that use. If a use is not attained, the assessment unit will be placed on Sublist 5, or Sublist 4 if there is an approved TMDL, there are other enforceable management measures in effect or the impairment is due to pollution, not a pollutant. Sublist 5 constitutes the list of waters for which a TMDL may be required, also known as the 303(d) list. In accordance with the *2008 Integrated Water Quality Monitoring and Assessment Methods*, although there is a State-wide fish consumption advisory for mercury, only waters with actual fish tissue monitoring data that exceed the threshold which results in a consumption restriction (greater than 0.07 mg/kg) are placed on Sublist 5. All other assessment units are listed on Sublist 3 for this use. Based on the TMDL analysis, which demonstrates that reduction of natural sources of mercury would be needed in order to achieve the level necessary to allow unlimited consumption for high risk populations, the Department intends to revise its Assessment Method when developing future Integrated Water Quality Monitoring and Assessment Reports to allow that a limit of 1 meal per week for the high risk population would be considered as attaining the use with respect to mercury-based fish consumption (listing threshold would be results greater than 0.18 μg/g).

The *2008 List of Water Quality Limited Waters* currently identifies 256 Assessment Units as impaired due to mercury in surface water and/or fish tissue. This report establishes 122 TMDLs for mercury contamination based on fish tissue concentration whose source is largely air deposition. Waters where there are other significant sources of mercury in a waterbody, as indicated by a water column concentration in excess of the Surface Water Quality Standards, documentation of high levels of mercury in ground water or the presence of hazardous waste sites where mercury is a contaminant of concern, are deferred at this time, pending additional study. Tidal waters are also excluded because the approach used in this TMDL is intended for waters not affected by tidal dynamics. In addition, areas that are included in the spatial extent of the on-going interstate effort to address mercury impairments in the New York/New Jersey Harbor are excluded from this TMDL. A similar interstate effort is an appropriate means of addressing mercury impairments in the shared waters of the Atlantic Ocean and the Delaware River and Estuary, and these waters are deferred as well.

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 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 waste load allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

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. EPA has also issued guidance for the development of TMDLs for mercury impairments that are due primarily to air deposition (Hooks, 2008).

2.0. Pollutant of Concern, Applicable Surface Water Quality Standards, and Area of Interest

2.1 Pollutant of Concern

The pollutant of concern for these TMDLs is mercury. According to the current assessment methodology, an assessment unit is listed as impaired for mercury if the data show water column concentrations in excess of the Surface Water Quality Standards (SWQS) or fish tissue concentrations that would result in any limitations on fish consumption. These advisories are not SWQS, but they do indicate a limitation on the use of the waters. As previously discussed, this TMDL is limited to assessment units where impairment is attributed to fish tissue in excess of advisory thresholds, where the mercury is primarily from air deposition. The assessment units addressed are identified in Table 1. These listings have a medium priority ranking in the *2008 List of Water Quality Limited Waters* (40NJR4835(c)).

2.2 Applicable Surface Water Quality Standards and Fish Consumption Advisory Criteria

Most of the waters addressed in this report are classified in the Surface Water Quality Standards (SWQS) at N.J.A.C. 7:9B as Fresh Water 2 (FW2), either Non-Trout (NT), Trout Maintenance (TM) or Trout Production (TP). Some waters are classified as Pinelands (PL) or Freshwater 1 (FW1). A few Assessment Units include waters classified as FW2-NT/SE1 or FW2-NT/SE2. If the measured salinity is less than 3.5 parts per thousand at mean high tide, the FW2-NT classification applies. The TMDL does not apply to fresh or saline tidal waters. If the majority of the waters in the HUC 14 subwatershed are fresh and non-tidal, that assessment unit was included in this TMDL. Therefore, even though portions of some assessment units are noted as including the SE (Saline Estuarine) designation, these designations are not affected and are not discussed below. Table 2 below lists the surface water classifications for the assessment units addressed in this document and Table 3 provides the numeric criteria for mercury.

Table 2. Surface Water Classifications for the Assessment Units Addressed Under this TMDL

WMA	Assessment Unit ID	Waterbody Name	Surface Water Classifications
01	2040104090020	Clove Brook (Delaware River)	FW1, FW1-TP, FW2-TPC1, FW2-TPMC1
01	2040104130010	Little Flat Brook (Beerskill And Above)	FW1, FW2-TP, FW2-TPC1, FW2-NTC1
01	2040104140010	Big Flat Brook (Above Forked Brook)	FW1, FW2-NTC1
01	2040105030020	Swartswood Lake And Tributaries	FW2-TM, FW2-TMC1, FW2-NT, FW2-NTC1
01	2040105030030	Trout Brook	FW2-TPC1, FW2-NT
01	2040105050040	Yards Creek	FW2-TPC1, FW2-NT
01	2040105090040	Mountain Lake Brook	FW2-TM, FW2-NT

01	2040105140040	Merrill Creek	FW2-TPC1, FW2-TM
01	2040105140060	Pohatcong Creek (Springtown To Merrill Creek)	FW2-TPC1, FW2-TMC1
01	2040105150020	Lake Hopatcong	FW2-TM, FW2-NT
01	2040105150060	Cranberry Lake / Jefferson Lake & Tributaries	FW2-TMC1, FW2-NT, FW2-NTC1
02	2020007040040	Highland Lake/Wawayanda Lake	FW2-NT, FW2-NTC1
03	2030103050020	Pacock Brook	FW1, FW1-TP, FW2-NTC1
03	2030103050030	Pequannock River (Above Oak Ridge Reservoir Outlet)	FW1-TP, FW1-TM, FW2-TP, FW2-TPC1, FW2-TMC1, FW2-NT
03	2030103050040	Clinton Reservior/Mossmans Brook	FW1, FW2-TPC1, FW2-TP, FW2-TMC1, FW2-NTC1
03	2030103050060	Pequannock River (Macopin Gage To Charl'brg)	FW1-TM, FW2-TPC1, FW2-TP, FW2-TM, FW2-TMC1, FW2-NT
03	2030103050080	Pequannock River (Below Macopin Gage)	FW2-TPC1, FW2-TP, FW2-NTC1, FW2-TM, FW2-NT
03	2030103070030	Wanaque River /Greenwood Lake (Above Monks Gage)	FW2-TPC1, FW2-TM, FW2-TMC1, FW2-NT, FW2-NTC1
03	2030103070050	Wanaque Reservoir (Below Monks Gage)	FW2-TPC1, FW2-TMC1, FW2-NTC1
03	2030103110020	Pompton River	FW2-NT
06	2030103010170	Passaic River Upper (Rockaway To Hanover Rr)	FW2-NT
06	2030103020040	Whippany River(Lake Pocahontas To Washington Valley Rd)	FW2-TM, FW2-NT
06	2030103020080	Troy Brook (Above Reynolds Ave)	FW2-NT
06	2030103030030	Rockaway River (Above Longwood Lake Outlet)	FW2-NTC1
06	2030103030040	Rockaway River (Stephens Brook To Longwood Lake)	FW2-NTC1
06	2030103030070	Rockaway RIVER (74d 33m 30s To Stephens Brook)	FW1, FW2-NTC1, FW2-TPC1, FW2-TMC1
06	2030103030090	Rockaway River (BM 534 Bridge To 74d 33m 30s)	FW2-NTC1, FW2-NT
06	2030103030110	Beaver Brook (Morris County)	FW2-TPC1, FW2-TMC1, FW2-NTC1
06	2030103030140	Rockaway River (Stony Brook To BM 534 Bridge)	FW2-NTC1
06	2030103030150	Rockaway River (Boonton Dam To Stony Brook)	FW2-TMC1, FW2-NTC1, FW2-NT
06	2030103030170	Rockaway River (Passaic River To Boonton Dam)	FW2-NT
08	2030105010030	Raritan River South Branch (Above Route 46)	FW2-NT, FW2-TM, FW2-NTC1
08	2030105010040	Raritan River South Branch(74d 44m 15s To Route 46)	FW2-NTC1, FW2-TPC1, FW2-NT, FW2-TMC1

08	2030105010050	Raritan River South BRANCH(Longvalley Brook To 74d44m15s)	FW2-TPC1, FW2-NT
08	2030105010060	Raritan River South Branch(Califon Brook To Long Valley)	FW2-TPC1, FW2-NT
08	2030105020040	Spruce Run Reservior / Willoughby Brook	FW2-TPC1, FW2-TMC1, FW2-TM, FW2-NT
08	2030105020090	Prescott Brook / Round Valley Reservoir	FW2-TPC1, FW2-TM, FW2-NT
08	2030105020100	Raritan River South Branch(Three Bridges-Prescott Brook)	FW2-TM, FW2-NT
08	2030105040010	Raritan River South Branch(Pleasant Run-Three Bridges)	FW2-NT
08	2030105040040	Raritan River South Branch(North Branch To Pleasant Run)	FW2-NT
09	2030105080020	Raritan River Lower (Route 206 To North Branch / South Branch)	FW2-NT
09	2030105080030	Raritan River Lower (Millstone To Route 206)	FW2-NT
09	2030105120080	South Fork Of Bound Brook	FW2-NT
09	2030105120100	Bound Brook (Below Fork At 74d 25m 15s)	FW2-NT
09	2030105120140	Raritan River Lwr(I-287 Piscatway-Millstone)	FW2-NT
09	2030105130050	Lawrence Brook (Church Lane To Deans Pond)	FW2-NT
09	2030105130060	Lawrence Brook (Milltown To Church Lane)	FW2-NT
09	2030105140020	Manalapan Brook(Incl Lakemanlpn To 40d16m15s)	FW2-NT
09	2030105140030	Manalapan Brook (Below Lake Manalapan)	FW2-NT
09	2030105160030	Duhernal Lake / Iresick Brook	FW2-NT
10	2030105090050	Stony Brook(Province Line Rd To 74d46m Dam)	FW2-NT
10	2030105100130	Bear Brook (Below Trenton Road)	FW2-NT
10	2030105110020	Millstone River (Heathcotebk To Harrison St)	FW2-NT
10	2030105110110	Millstone River (Blackwellsmills To Beden Brook)	FW2-NT
10	2030105110140	Millstone River(Amwellrd To Blackwellsmills)	FW2-NT
10	2030105110170	Millstone River (Below Amwell Rd)	FW2-NT
12	2030104060020	Matawan Creek (Above Ravine Drive)	FW2-NT/SE1
12	2030104060030	Matawan Creek (Below Ravine Drive)	FW2-NT/SE1
12	2030104070070	Swimming River Reservoir / Slope Brook	FW2-NTC1
12	2030104070090	Nut Swamp Brook	FW2-NT/SE1
12	2030104090030	Deal Lake	FW2-NT/SE1
12	2030104090080	Wreck Pond Brook (Below Route 35)	FW2-NT, FW2-NT/SE1
12	2030104100050	Manasquan River (Gage To West Farms Road)	FW2-TMC1, FW2-NTC1

13	2040301030040	Metedeconk River South Branch (Rt 9 To Bennetts Pond)	FW2-TMC1, FW2-NTC1
13	2040301060050	Dove Mill Branch (Toms River)	FW2-NTC1, PL
13	2040301070010	Shannae Brook	FW2-NT, PL
13	2040301070030	Ridgeway Brook (Hope Chapel Rd To Harrisbrook)	PL
13	2040301070040	Ridgeway Brook (Below Hope Chapel Rd)	PL, FW2-NT/SE1
13	2040301070080	Manapaqua Brook	PL, FW2-NT/SE1
13	2040301070090	Union Branch (Below Blacks Brook 74d22m05s)	PL, FW2-NT/SE1
13	2040301080030	Davenport Branch (Above Pinewald Road)	PL
13	2040301090050	Cedar Creek (GS Parkway To 74d16m38s)	PL
13	2040301130030	Mill Creek (Below Gs Parkway)/Manahawkin Creek	PL, FW2-NT, FW2-NTC1/SE1
13	2040301130050	Westecunk Creek (Above Garden State Parkway)	PL
13	2040301140020	Mill Branch (Below Garden State Parkway)	FW2-NT/SE1
13	2040301140030	Tuckerton Creek (Below Mill Branch)	PL, FW2-NTC1/SE1, FW2-NT/SE1
14	2040301150080	Batsto River (Batsto Gage To Quaker Bridge)	FW1, PL
14	2040301160030	Mullica River (Route 206 To Jackson Road)	PL
14	2040301160140	Mullica River (39d40m30s To Rt 206)	PL
14	2040301160150	Mullica RIVER (Pleasant Mills To 39d40m30s)	PL
14	2040301180060	Oswego River (Andrews Rd To Sim Place Reservoir)	PL
14	2040301180070	Oswego River (Below Andrews Road)	PL
14	2040301190050	Wading River West Branch (Jenkins Road To Route 563)	PL
14	2040301200010	Beaver Branch (Wading River)	PL
14	2040301200050	Bass River East Branch	PL, FW1
15	2040302030020	Great Egg Harbor (Atlantic City Expressway To New Freedom Road)	PL, FW2-NT
15	2040302040050	Collings Lakes Tributary (Hospitality Branch)	PL
15	2040302040130	Great Egg Harbor (Lake Lenape To Mare Run)	PL
15	2040302050120	Middle River / Peters Creek	FW1, /SE1 C1, FW2-NTC1/SE1
16	2040206210050	Savages Run (Above East Creek Pond)	FW1, PL,
16	2040206210060	East Creek	FW1, PL, FW2-NTC1/SE1, FW2-NT/SE1
17	2040206030010	Salem River (Above Woodstown Gage)	FW2-NTC1, FW2-NT
17	2040206070030	Canton Drain (Above Maskell Mill)	FW2-NT/SE1

17	2040206080050	Cohansey River (Including Cornwell Run – Beebe Run)	FW2-NT/SE1
17	2040206090030	Cohansey R (Rocaps Run To Cornwell Run)	FW2-NT/SE1
17	2040206100060	Nantuxent Creek (Above Newport Landing)	FW1, FW2-NTC1/SE1, FW2-NT/SE1
17	2040206130010	Scotland Run (Above Fries Mill)	FW2-NT
17	2040206130040	Scotland Run (Below Delsea Drive)	FW2-NT
17	2040206140010	Mauriceriver(Blackwater Book To Include Willow Grovelake)	FW2-NT, FW2-NTC1
17	2040206150050	Muddy Run (Including Parvin Lake To Palatine Lake)	FW2-NT, FW2-NTC1
17	2040206180050	Menantico Creek (Below Route 552)	FW2-NT, FW2-NTC1
18	2040202100020	Pennsauken Creek North Branch (Including Strawbridge Lake-Njtpk)	FW2-NT
18	2040202110030	Cooper River (Above Evesham Road)	FW2-NT
18	2040202110040	Cooper River (Wallworth Gage To Evesham Road)	FW2-NT
18	2040202110050	Cooper River (Route 130 To Wallworth Gage)	FW2-NT
18	2040202120010	Big Timber Creek North Branch (Above Laurel Road)	FW2-NT
18	2040202120020	Big Timber Creek North Branch (Below Laurel Road)	FW2-TPC1, FW2-NT
18	2040202120030	Big Timber Creek South Branch (Above Lakeland Road)	FW2-NT
18	2040202120040	Big Timber Creek South Branch(Including Bull Run To Lakeland Road)	FW2-NT
18	2040202120050	Big Timber Creek South Branch (Below Bull Run)	FW2-NT
18	2040202120060	Almonesson Creek	FW2-NT
18	2040202120090	Newton Creek (Ldrv-Kaighn Ave To Lt Creek)	FW2-NT
18	2040202120100	Woodbury Creek (Above Rt 45)	FW2-NT/SE2
18	2040202130030	Chestnut Branch (Above Sewell)	FW2-NT/SE2
18	2040202150020	Raccoon Creek (Rt 45 To/Include Clems Run)	FW2-NT/SE2
18	2040202150040	Raccoon Creek (Russell Mill Road To Route 45)	FW2-NT/SE2
19	2040202030050	Bucks Cove Run / Cranberry Branch	PL
19	2040202050050	Friendship Creek (Below/Including Burrs Mill Brook)	PL
19	2040202050060	Rancocas Creek South Branch(Above Friendship Creek)	PL
19	2040202050080	Rancocas Creek South Branch (Vincentown-Friendship Creek)	PL, FW2-NT
19	2040202050090	Rancocas Creek South Branch (Bobbys Run To Vincentown)	FW2-NT
20	2040201090030	Lower Delaware River Tributaries (Assiscunk Creek To Blacks Creek)	FW2-NT

C1 refers to Category One, a specific category of water relevant with respect to the antidegradation policies in the SWQS.

In all FW1 waters, the designated uses are (NJAC 7:9B-1.12):

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 (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.

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

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

Table 3. Mercury Water Column Criteria (µg/l)

Toxic substance	Fresh Water (FW2) Criteria		
	Aquatic		Human Health
	Acute	Chronic	
Mercury	1.4(d) (s)	0.77(d) (s)	0.05(h)(T)

d = criterion expressed as a function of the water effects ratio
T = total
h = noncarcinogenic effect-based human health criteria
s = dissolved

Surface water quality criteria for FW1 waters are that they shall be maintained as to quality in their natural state. PL waters shall be maintained as to quality in their existing state or that quality necessary to attain or protect the designated uses, whichever is more stringent.

In addition N.J.A.C. 7:9B-1.5(a) 4 includes the requirement that "Toxic substances in water shall not be at levels that are toxic to humans or the aquatic biota so as to render them unfit for human consumption."

Fish consumption advisories are jointly issued by the New Jersey Department of Environmental Protection and the New Jersey Department of Health and Senior Services. They provide advice to the general population and high-risk individuals (for example, women of childbearing age and children) concerning the number of meals that represent safe levels of consumption of recreational fish from New Jersey waters. Fish consumption advisories for mercury include information on how to limit risk by providing guidance on the types and sizes of fish and the number of meals to eat. They are not promulgated standards, but they are used for determining whether the fish consumption use is met. Where fish tissue levels exceed the advisory thresholds, a waterbody is listed on the 303(d) list. The New Jersey fish consumption advisories are as follows:

Table 4. New Jersey Fish Consumption Advisory Thresholds (from Toxics in Biota Committee 1994)

Advisories for the high risk population*	
Mercury (TR) Concentration in Fish Tissue	**Advisory**
Greater than 0.54 µg/g (ppm)	Do not eat
Between 0.19 and 0.54 µg/g (ppm)	One meal per month
Between 0.08 and 0.18 µg/g (ppm)	One meal per week
0.07 µg/g (ppm) or less	Unlimited consumption
Advisories for the general population	
Mercury (TR) Concentration in Fish Tissue	**Advisory**
Greater than 2.81 µg/g (ppm)	Do not eat
Between 0.94 and 2.81 µg/g (ppm)	One meal per month
Between 0.35 and 0.93 µg/g (ppm)	One meal per week
0.34 µg/g (ppm) or less	Unlimited consumption

TR – Total Recoverable Mercury

* The high risk population consists of women of childbearing years, pregnant and nursing mothers and children.

Under the current assessment methodology, an assessment unit was listed as not attaining the fish consumption use if fish tissue data indicated that any restriction of consumption would be necessary, in other words if the fish tissue concentration was above 0.07 µg/g. However, based on this TMDL analysis, this level in fish tissue can be caused solely by natural sources of mercury in some waters (see Section 5 *TMDL Calculations* below). Therefore, the Department intends to revise the assessment methodology in the development of future lists (2010) to reflect a minimal level of consumption advisory for the high risk population. It is expected that the

future assessment method will use a tissue concentration of greater than 0.18 µg/g as the listing threshold, which would allow consumption by the high risk population of one meal per week. Therefore, the target for this TMDL is 0.18 µg/g total mercury fish tissue concentration. Big Timber Creek would not have been listed using this listing threshold, however, because it is listed on the 2008 303(d) list, it will be included in this TMDL document. All other waters included in this TMDL exceed the 0.18 ug/g fish tissue target.

Because fish consumption advisories are not SWQS and a TMDL must demonstrate attainment of the applicable SWQS, it is necessary to demonstrate that using this fish tissue target will also attain the applicable SWQS for mercury. This is done using bioaccumulation factors (BAFs), to convert the levels found in the fish tissue to a water column value so there can be a direct comparison with the State's current water quality criterion of 0.050 µg/L as total mercury. There is no numerical standard for waters classified as PL or FW1. The 0.18 ug/g fish tissue target is a human health endpoint which is protective of all waters, regardless of a waterbody's designation. NJAC 7:9B-1.5(a) 4's narrative standard regarding toxic substances is applicable to all waters. Absent a numeric standard for FW1 and PL waters, the narrative standard was applied and implemented using the 0.18 ug/g mercury fish tissue target. In addition the target of 0.18 µg/L requires the reduction of mercury to near natural background levels (see TMDL calculations in section 5 below) and as such is protective of waters with PL and FW1 designations.

New Jersey is engaged in an ongoing effort to develop regional BAFs. As this work is not complete, the EPA national default values will be used for this TMDL. A BAF of 1,690,000 L/kg was selected, which is based on the averaging of EPA national default values for trophic level 3 and trophic level 4 fish of 2,700,000 and 680,000 L/kg, respectively. Averaging the two values assumes a diet of 50% of these higher trophic level fish. This BAF is for methyl mercury. A further conversion to a corresponding total mercury concentration in the water column can be calculated by using the ratio of dissolved methyl mercury to total mercury. Data available from the various regions of New Jersey show that the ratios range from 0.059 to 0.005 (pers. comm. G. A. Buchanan, NJDEP, May 5, 2009). A ratio of 0.055 can be calculated from national data (EPA, 1997). The water column mercury concentration, 0.021 ug/L, expressed as total mercury using the selected BAF and the most conservative conversion factor (0.005) is lower than the mercury surface water criterion of 0.050 ug/L. Therefore, the use of a fish tissue criterion as a TMDL target ensures that the SWQS will be met if the TMDL fish tissue target is met.

The following formula was used for this comparison:

WCV (µg/L) =[Fish Tissue Value (mg/kg)/BAF (L/kg) x 1000 µg/mg] / dissolved MeHg to total Hg

Where:

WCV = water column mercury concentration
Fish Tissue Value = 0.18 mg/kg
BAF = 1,690,000 L/kg

Therefore:

WCV (µg/L)(as total Hg) = [0.18 mg/Kg/1,690,000 L/kg x 1000 µg/mg]/ 0.005 = **0.021 µg/L total Hg**

In other words, when a fish tissue target of 0.18 mg/kg is met, the water column mercury concentration would be 0.021 µg/L, which is below the surface water quality criterion of 0.050 µg/L).

2.3 Area of Interest

In accordance with the *2008 Integrated Water Quality Monitoring and Assessment Methods*, although there is a State-wide fish consumption advisory for mercury, only waters with actual fish tissue monitoring data that exceed the threshold which results in a consumption restriction (greater than 0.07 mg/kg) are placed on Sublist 5. All other assessment units are listed on Sublist 3 for this use.

The *2008 List of Water Quality Limited Waters* currently identifies 256 assessment units as impaired due to mercury in surface water and/or fish tissue. This report establishes 122 TMDLs for mercury contamination based on fish tissue concentration whose source is largely air deposition. Waters where there are other significant sources of mercury in a waterbody, as indicated by a water column concentration in excess of the Surface Water Quality Standards (61 listings), documentation of high levels of mercury in ground water (15 listings) or the presence of hazardous waste sites where mercury is a contaminant of concern (8), are deferred at this time, pending additional study. Tidal waters (35) are also excluded because the approach used in this TMDL is intended for waters not affected by tidal dynamics. In addition, areas that are included in the spatial extent of the on-going interstate effort to address mercury impairments in the New York/New Jersey Harbor are excluded from this TMDL (6). A similar interstate effort is an appropriate means of addressing mercury impairments in the shared waters of the Atlantic Ocean (37) and the Delaware River and Estuary (9) and these waters are deferred as well. See Appendix A for a listing of the deferred assessment units.

Additional fish tissue data not available when the *2008 List of Water Quality Limited Waters* was developed were evaluated and 37 additional assessment units were found to have fish tissue concentrations that would have resulted in listing of those assessment units under the current assessment methodology (see those indicated with an asterisk in Table 1). These assessment units also meet the other criteria for being addressed under this TMDL (no other significant sources, non-tidal, outside the spatial extent of interstate study). Therefore, these assessment units will be addressed under this TMDL.

As additional fish tissue data is obtained, it is expected that other assessment units will be identified that conform to the parameters established for this TMDL approach and would appropriately be addressed by this TMDL, had the data been available. Therefore, in addition to the impaired waters listed Table 1, this TMDL may, in appropriate circumstances, also apply to waterbodies that are identified in the future as being impaired for mercury. For such waterbodies, this TMDL may apply if, after listing the waters for mercury impairment and taking into account all relevant comments submitted on the Impaired Waters List, the Department determines, with EPA approval of the list, that this TMDL should apply to future mercury impaired waterbodies. Under these circumstances, the assessment units will be placed on Sublist 4.

The assessment units addressed in this TMDL are listed in Table 1 and depicted in Figure 1. The assessment units encompass 724,236 acres throughout the state.

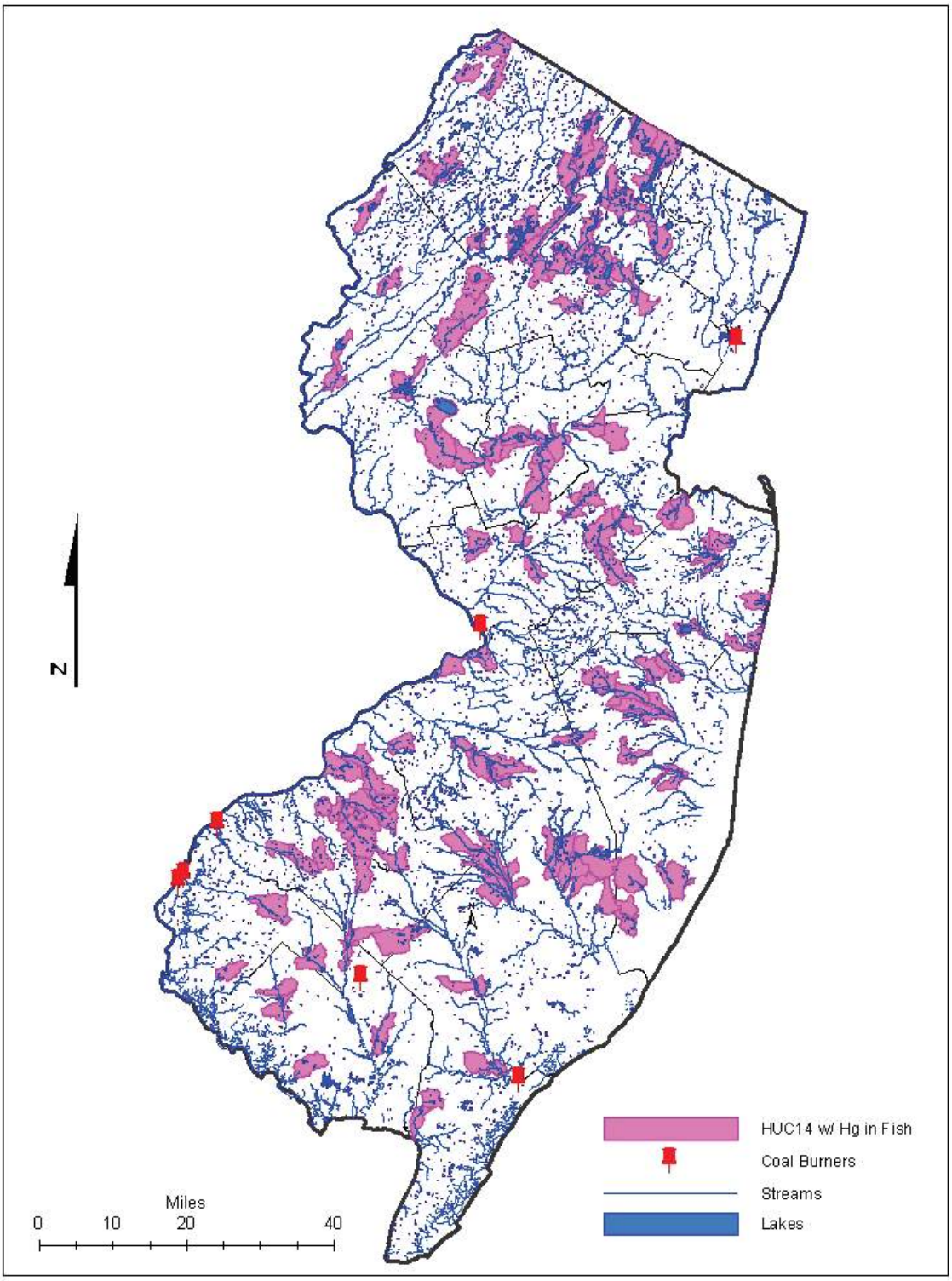


Figure 1. Assessment Units Addressed in this TMDL

3.0. Data Analysis

3.1 Fish Tissue Data

Beginning in 1994, research on freshwater fish found mercury concentrations exceeding the risk-based health advisories established by the State of New Jersey. Additional data were developed and reported in Academy of Natural Sciences, Philadelphia (ANSP) (1999), Ashley and Horwitz (2000), Horwitz et al. (2005) and Horwitz et al. (2006). The Department's Routine Monitoring Program for fish tissue began in 2002. The purpose of this monitoring program is to enhance waterbody assessments; amend existing advisories or, if necessary, develop new advisories; assist the NJDEP in evaluating trends in contaminant concentrations of these selected species; and to determine the need for additional research and monitoring studies. The sampling program is based on a rotating assessment of contamination in five regions of the state on a 5-year cycle. The regions consist of:

1. Passaic River Region;
2. Marine/Estuarine Coastal Region;
3. Raritan River Region;
4. Atlantic Coastal Inland Waterways Region; and
5. Upper and Lower Delaware River Region.

Sampling in the Passaic Region was conducted in 2002-2003 and the Marine/Estuarine Region in 2004-06. The results were reported in Horwitz, et al. (2005 and 2006). In the third year of the cycle, the Raritan River Region was sampled for freshwater fish, blue crabs and marine fish. In 2006-2007, species important to recreational anglers in the Raritan estuaries and adjacent oceanic waters and in two southern New Jersey coastal bays were sampled.

The initial data set consulted included 2,474 samples that had been analyzed for mercury in fish tissue in the waters of New Jersey collected through the above sampling programs and from localized investigations. All fish were analyzed using microwave digestion and cold vapor atomic absorption. Based on an evaluation of data quality, all samples before 1990 were excluded because of issues with background contamination in the labs analyzing samples. A small number of fish tissue samples were derived from whole fish samples. Only samples where the fillets were analyzed were retained to ensure a consistent basis for comparison. Locations with known mercury contamination from other sources were eliminated to avoid influences beyond air deposition (water column exceedances, presence of hazardous sites with mercury, groundwater levels with elevated mercury). All tidal areas were excluded, including those from the areas of on-going or anticipated interstate studies (New York/New Jersey Harbor, Atlantic Ocean and Delaware River and Bay). The final data set used for this TMDL analysis included 1,368 samples from 26 different species (see Appendix B).

This TMDL is based on the linear relationship between mercury levels in the air and water and that a BAF can relate fish tissue concentration to water column concentration. This means that if the existing load is responsible for the observed mercury levels in fish, then one can calculate the load that will result in the target concentration in fish and the associated water column

concentration using the BAF, to ensure the SWQS are attained. The steady state bioaccumulation equation is:

$$C_{\text{fish t1}} = BAF * C_{\text{water t1}}$$

where:
$C_{\text{fish t1}}$ and $C_{\text{water t1}}$ represent methyl mercury concentration in fish and water at time t_1, respectively;
BAF represents the bioaccumulation factor, which is constant for a given age and length fish in a specific water body.

For a future time, t_2, when mercury concentrations have changed, but all other parameters remain constant, the following equation applies:

$$C_{\text{fish t2}} = BAF * C_{\text{water t2}}.$$

Combining both equations produces the following:

$$C_{\text{fish t1}} / C_{\text{fish t2}} = C_{\text{water t1}} / C_{\text{water t2}}.$$

Then, with methyl mercury water column concentrations being proportional to mercury air deposition load, therefore:

$$C_{\text{fish t1}} / C_{\text{fish t2}} = L_{\text{air t1}} / L_{\text{air t2}}$$

where:
$L_{\text{air t1}}$ and $L_{\text{air t2}}$ represent mercury loads from the air deposition at time 1 and time 2.

Mercury concentration in fish increases with both age and length (see Figure 2). In order to derive a representative existing fish tissue concentration as a basis to calculate the load reduction required to achieve the target concentration, it is necessary to statistically standardize the data. The fish tissue mercury concentrations were statistically adjusted to a "standard-length fish". Because many fish are larger than the standard length and therefore higher in mercury, the TMDL analysis targets the 90th percentile mercury tissue concentration of the distribution of all length-standardized fish evaluated. This will provide an implicit margin of safety and be more protective than using a mean or median concentration value. In addition, because growth rates and levels of mercury accumulation will vary between waterbodies, using the 90th percentile tissue concentration will be protective of waterbodies with higher levels of accumulation.

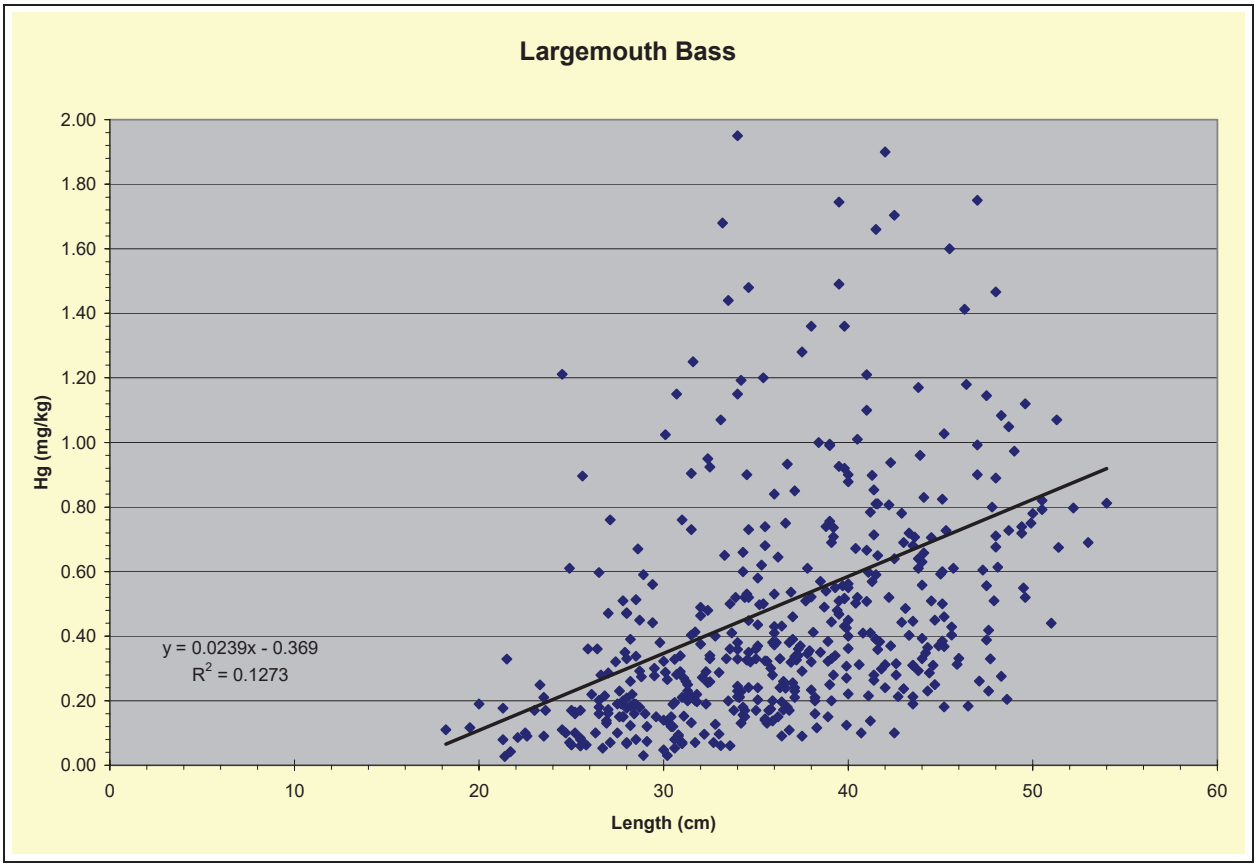


Figure 2. Relationship Between Length and Mercury Concentration in Fish Tissue

The Northeast Regional TMDL analyzed four different species of top trophic level fish, comparing the mean, 80th and 90th percentile concentrations. The authors chose the smallmouth bass (*Micropterous dolomieu*), because of the rate of bioaccumulation of mercury and its ubiquitous distribution throughout the Northeast States. The smallmouth bass is not well distributed throughout New Jersey, therefore it was not an appropriate indicator species for this TMDL. However, the largemouth bass (*Micropterus salmoides*), of the same genus and with the same diet of crayfish, frogs and fish, is well distributed throughout New Jersey. Samples are available from 69% of the listed assessment areas. The chain pickerel was also considered because it is represented by the second largest number of samples in the data set and has a high average mercury concentration (see tables 5 and 6 below). Its diet consists of invertebrates and fish. However, it is not as well distributed throughout New Jersey. Because of the larger sample size and better distribution, the largemouth bass was chosen to be the indicator for this TMDL effort. Using either fish yields a similar reduction factor.

Table 5. Data on Methyl Mercury Concentration in Fish Fillet Samples (n = number of samples, Average = arithmetic mean concentration)

Species List	2000-2007		1990-1999	
	n	Average	n	Average
American Eel	72	0.4	6	0.47
Black Crappie	15	0.15	32	0.19
Bluegill	75	0.14	2	0.03
Bluegill Sunfish	3	0.07	20	0.18
Brown Bullhead	32	0.07	79	0.19
Brown Trout	2	0.08	1	0.2
Chain Pickerel	82	0.658	166	0.685
Channel Catfish	9	0.22	10	0.15
Common Carp	36	0.11	5	0.04
Hybrid Striped Bass	0		6	0.27
Lake Trout	5	0.14	12	0.46
Largemouth Bass	152	0.54	224	0.56
Mud sunfish	0		3	1.01
Northern Pike	6	0.29	6	0.24
Pike	0		3	0.39
Pumpkinseed Sunfish	0		19	0.37
Rainbow Trout	0		6	0.11
Redbreast Sunfish	16	0.16	4	0.24
Rock Bass	19	0.33	4	0.46
Smallmouth Bass	13	0.34	22	0.47
Striped x White Bass Hybrid	5	0.29	0	
Walleye	10	0.4	6	0.74
White Catfish	8	0.19	15	0.27
White perch	12	0.18	22	0.42
White Sucker	3	0.23	0	
Yellow Bullhead	33	0.23	32	0.63
Yellow Perch	27	0.36	28	0.51

An analysis of covariance model was used to estimate the length-adjusted concentrations of mercury in largemouth bass. Scatter plots indicated that a log transformation for mercury would approximately linearize the relationship between mercury and length, so the model used the log to the base 10 of mercury as the dependent variable. The independent variables were length and water body. Water bodies were considered to be fixed effects. The result of this analysis was to create a length-adjusted mercury concentration for each water body.

A model was also run in order to determine whether the length-adjusted concentrations changed over time. In order to do this, an independent variable defining the decade in which the sample was taken (1992 – 1999 vs. 2000 – 2007) was included in the model along with length and water body. This model was significant ($p < 0.001$) with an R-square of 82%. Mercury concentrations varied significantly ($p < 0.001$) with length, waterbody and the decade in which the samples were taken.

Because decade was a significant effect, the two decades were analyzed separately. The adjusted estimates were calculated at the mean length of 35.11cm for data collected from 1992-1999 and 39.78 cm for data collected from 2000-2007.

For the 1992-1999, the data set included 49 water bodies. The number of fish sampled from each water body ranged from 1 to 12. The independent variables included length and water body. This model run was significant ($p < 0.001$) with an R-square of 89%. Mercury concentration varied significantly ($p < 0.001$) with both length and waterbody. The 90th percentile of the length-adjusted mercury concentration is $10^{(0.0448)} = 1.109$ µg/g.

The 2000-2007 dataset included 46 water bodies. The number of fish sampled from each water body ranged from 3 to 5. The independent variables included length and water body. This model run was significant ($p < 0.001$) with an R-square of 85%. Mercury concentration varied significantly ($p < 0.001$) with both length and waterbody. The 90th percentile of the length adjusted mercury concentration is $10^{(0.0607)} = 1.150$ µg/g.

The statistical analyses were performed in SAS version 9.1.3.

Because the mercury concentration varies with the waterbody, the 90th percentile fish tissue concentration is used to calculate the reduction factor. This will be protective of all the waterbodies, even those with higher fish tissue mercury concentrations.

Table 6. Mercury Concentrations Related to Fish Length for 2000-2007 Data

Species	Standard Length (cm)	Mean Hg Concentration (ppm) at Standard Length	80th percentile Hg Concentration (ppm) at Standard Length	90th percentile Hg Concentration (ppm) at Standard Length
Largemouth bass	35.11	0.531	0.64	1.15
Chain pickerel	41.61	0.59	1.26	1.29

Figure 3 shows the distribution of methyl mercury concentrations in all species in the 2000–2007 data set and concentrations in the largemouth bass for the same period. The graph shows that targeting the 90th percentile concentration in largemouth bass corresponds to the 93rd percentile concentration for all fish species. Therefore, targeting the concentration of 90th percentile for largemouth bass, means that approximately 93% of all fish populations tested will comply with

the TMDL target concentration. There is much environmental variability. Some lakes will show decreases in mercury more quickly, some more slowly. Both the Minnesota and the Northeast States regional TMDLs were based on the 90th percentile concentration. Therefore the 90th percentile target is in keeping with mercury TMDLs EPA has previously approved.

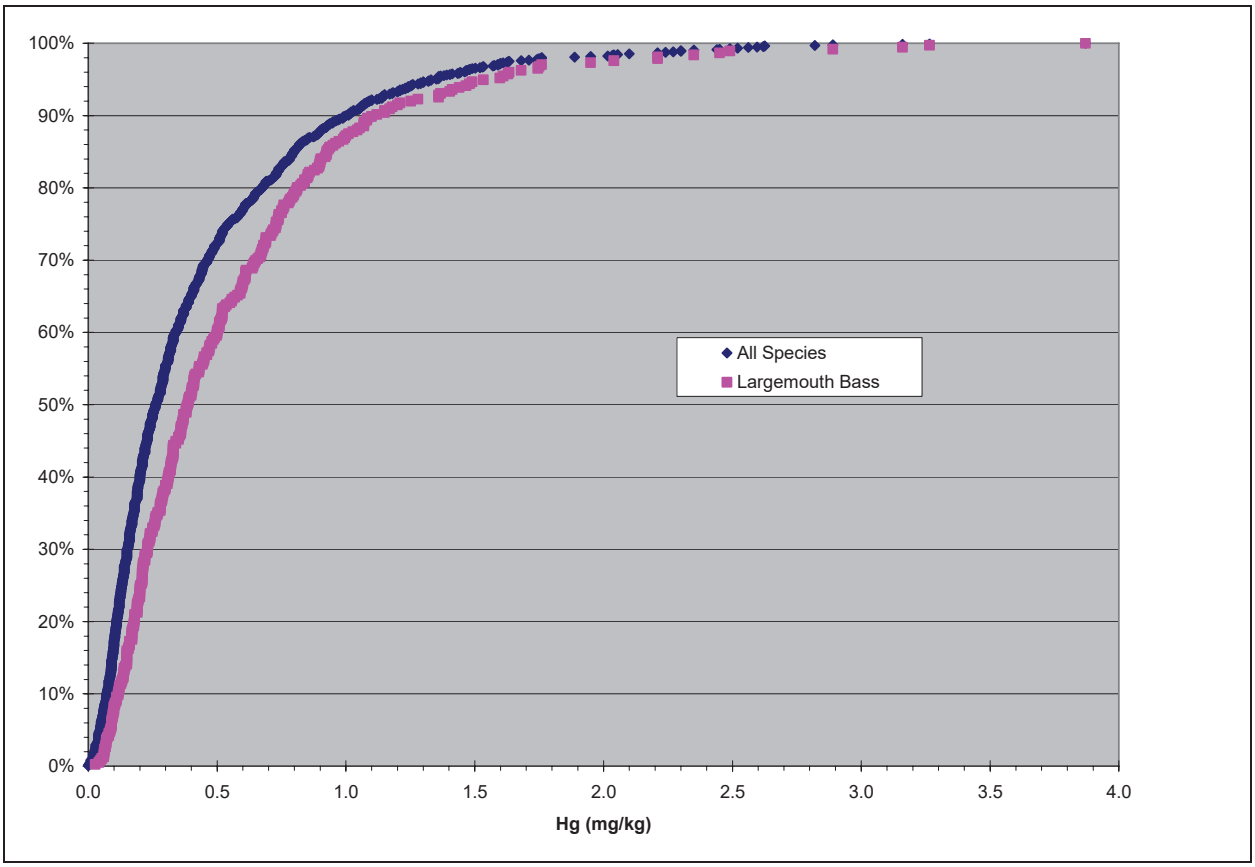


Figure 3. Cumulative Distribution of Mercury Concentrations in Fish Tissues

Based on the linear relationship premise, a Reduction Factor (RF) based on the existing and target fish tissue concentrations is calculated as follows:

RF= (EFMC-TFMC)/EFMC

where:
EFMC = the existing fish mercury concentration for the selected fish species.
TFMC = target fish mercury concentration

or:
0.84 = (1.15 µg/g-0.18 µg/g) /1.15 µg/g

As discussed above, the EFCM for this study is 1.15 µg/g, which represents the 90th percentile concentration based on standard length for largemouth bass. The target fish tissue concentration is 0.18 µg/g, which will allow a consumption rate of 1 meal per week for the high risk population. For unlimited consumption of fish for the high risk population, the reduction factor would need to be 0.94. As discussed below, natural sources of mercury, which cannot be reduced, make this reduction factor unattainable. However, the TMDL calculation includes an implicit margin of safety based on a number of conservative assumptions. Therefore, it is possible that unlimited consumption for the high risk population may be attainable if the identified anthropogenic reductions are achieved. In any case, although this TMDL target will not allow unlimited consumption of top trophic level fish for high risk groups using the multiple conservative assumptions in this analysis, mercury will be reduced at all trophic levels, allowing greater options for safe consumption of fish at the lower trophic levels and one meal per week of the top trophic levels by the high risk population.

4.0. Source Assessment

In order to evaluate and characterize mercury loadings on a statewide basis source assessments are critical. Source assessments include identifying the types of sources and their relative contributions to mercury loadings and are necessary to develop proper management responses to reduce loadings and attain water quality targets.

Air deposition is the primary source of the mercury impairments addressed in this TMDL. A recent study was undertaken in partnership with the states and USEPA Regional Air and Water Offices to use atmospheric deposition modeling to quantify contributions of specific sources and source categories to mercury deposition within each of the lower 48 states (ICF, 2008). The annual simulation was performed based on data that represented late 90's emission profiles for most source categories. The primary modeling system used for this study is the Regional Modeling System for Aerosols and Deposition (REMSAD). REMSAD is a three-dimensional grid model designed to calculate the concentrations of pollutants by simulating the physical and chemical processes in the atmosphere that affect pollutant concentrations. REMSAD simulates both wet and dry deposition of mercury. REMSAD also includes algorithms for the reemission of previously deposited mercury (originating from anthropogenic and natural sources) into the atmosphere from land and water surfaces. The Particle and Precursor Tagging Methodology (PPTM) feature allows the user to tag or track emissions from selected sources or groups of sources, and quantify their contribution to mercury deposition throughout the modeling domain and simulation period. Results from the Community Multiscale Air Quality (CMAQ) modeling system were used to enhance the analysis of the effects of global background on mercury deposition. The outputs from three global models were used to specify the boundary conditions for both REMSAD and CMAQ and thus represent a plausible range of global background contributions based on current scientific understanding.

Preparation and quality assurance of the mercury emissions inventory were critical for the air deposition load modeling. Based on the emissions data utilized by USEPA in the Clean Air Mercury Rule (CAMR) modeling, detailed summaries of the top emitters in the CAMR mercury inventory for each state were prepared and provided to the appropriate EPA regional offices and

state agencies for review. An effort was made to update emissions to the 2001 timeframe in addition to the general QA/QC that performed by the states and EPA regions. Then based on the state's input, any errors in the data were corrected. Table 7 lists New Jersey's emission inventory as it was used in the model. This inventory was developed based on the Department's 2001 mercury emission estimates (ICF, 2008). For the total of the three forms of mercury emission load, approximately 60% was due to air point sources and 40% from air nonpoint sources. Air point sources include fuel combustion-electric utilities, industrial facilities and other combustion facilities. Air nonpoint sources include human cremation, fluorescent lamp breakage, miscellaneous volatilization and other non-stationary sources.

Table 7. Summary of Emissions Inventory of New Jersey in Tons per Year (tpy) (ICF, 2008)

Facility Name	HG0* (tpy)	HG2* (tpy)	HGP* (tpy)	Total (tpy)
B.L. England	0.094	0.016	0.004	0.114
Hudson*	0.011	0.028	0.003	0.041
Mercer	0.030	0.015	0.011	0.057
Deepwater	0.002	0.004	0.000	0.006
Logan Generating Company - L.P.	0.001	0.000	0.000	0.002
Chambers Cogeneration - L.P.	0.010	0.006	0.004	0.021
Co Steel Raritan	0.090	0.011	0.011	0.112
Atlantics States Cast Iron Pipe	0.033	0.004	0.004	0.041
U.S. Pipe & Fndy. Co	0.019	0.011	0.000	0.030
Co Steel Sayreville*	0.178	0.022	0.022	0.222
Essex County RRF*	0.047	0.123	0.042	0.212
Camden RRF*	0.011	0.029	0.010	0.050
Union County RRF	0.003	0.008	0.003	0.014
Gloucester County	0.002	0.005	0.002	0.009
Warren Energy RF	0.001	0.001	0.001	0.003
Howarddown	0.002	0.001	0.001	0.004
Hoeganese	0.005	0.003	0.002	0.010
Camden County Muassi	0.005	0.003	0.002	0.010
Stony Brook Regional Sewerage Authority	0.011	0.007	0.005	0.023
Bayshore Regional Sewerage Authority	0.004	0.002	0.002	0.008
Somerset Raritan Valley Sewerage Authority	0.007	0.004	0.003	0.014
Northwest Bergen County Utilities Authority	0.005	0.003	0.002	0.010
Parsippany – Troy Hills Township WWTP	0.004	0.003	0.002	0.009
Atlantic County Utilities Authority	0.003	0.002	0.001	0.006
Gloucester County Utilities Authority	0.001	0.001	0.000	0.002
Point Source Total	0.579	0.312	0.137	1.030
Non-point Source	0.464	0.096	0.055	0.613
Total	1.043	0.408	0.192	1.643

*HG0 - elemental mercury vapor; HG2 - divalent mercury compounds in gas phase; HGP - divalent mercury compounds in particulate phase.

As summarized in Table 8 below, a total of 594 kg of annual mercury load due to air deposition was estimated for New Jersey. "Background" refers to the effects of initial and boundary concentrations and embodies the effects of global emissions, altogether, about 52% of the total

load. Emissions from New Jersey are contributing 12.5% of the total load. The emissions from five surrounding states contribute 26% of the total load.

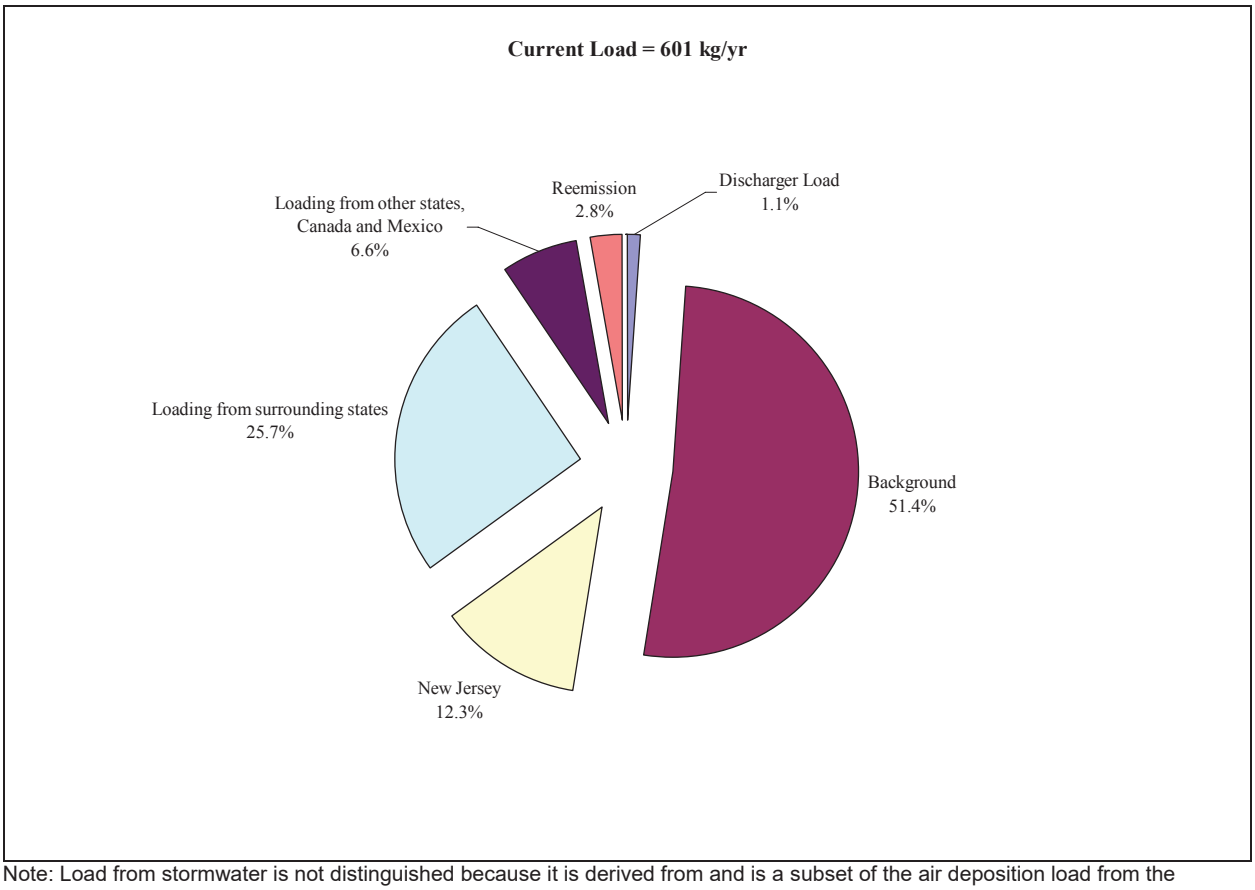
Table 8. Mercury Air Deposition Load for New Jersey (pers. com. D. Atkinson, March 26, 2009, see Appendix D)

Category	Load (kg/yr)	Percent of Total Load
Background	309.0	52.0%
Background-reemission	16.9	2.8%
New Jersey	74.1	12.5%
Loading from the surrounding state (Total)	154.6	26.0%
Pennsylvania	102.8	17.3%
Maryland	25.1	4.2%
New York	13.7	2.3%
Delaware	11.1	1.9%
Connecticut	1.8	0.3%
Loading from other states, Canada and Mexico	39.6	6.7%
Total	594.2	100%

Under the Clean Water Act (CWA), air deposition is a nonpoint source of mercury. Mercury deposited from air sources reaches the surface water as the result of direct deposition on the water surface and through stormwater runoff. Under the CWA, stormwater discharges subject to regulation under the National Pollutant Discharge Elimination System (NPDES) are a point source. In New Jersey, this includes facilities with individual or general industrial stormwater permits and Tier A municipalities and state and county facilities regulated under the New Jersey Pollutant Discharge Elimination System (NJPDES) municipal stormwater permitting program. Stormwater discharges that are not subject to regulation under NPDES, such as Tier B municipalities regulated under the NJPDES municipal stormwater permitting program, and direct stormwater runoff from land surfaces are nonpoint sources. Stormwater point sources derive their pollutant load from runoff from land surfaces and the necessary load reduction for this TMDL will be accomplished in the same way as for stormwater that is a nonpoint source, that is by reducing the air deposition load. The distinction is that, under the Clean Water Act stormwater point sources are assigned a WLA while nonpoint sources are assigned a LA. For this TMDL, the proportion of the air deposition loading attributed to stormwater point sources has been estimated by determining the amount of urban land located within Tier A municipalities. Based on NJDEP's 2002 land use coverage, the area of urban land use within the Tier A municipalities is about 25.6% of the entire state. Applying this percentage to the entire load due to air deposition is the best approximation of the air deposition load subject to stormwater regulation and this proportion of the air deposition load will be assigned a WLA.

Surface water discharges of sanitary and industrial wastewater that have the potential to discharge mercury are the other potential point source category which must be assigned a WLA. The Department reviewed over 240 existing major and minor municipal surface water discharge locations. Industrial surface water dischargers with mercury limits in their permits regulated under the New Jersey Pollutant Discharge Elimination System (NJPDES) were also included as the potential point sources for this TMDL. Since this TMDL is limited to non-tidal water, facilities discharging to coastal water were excluded. By examining the locations of the outfall pipes, approximately two-thirds of initially identified municipal and industrial surface water discharge facilities were used to estimate the point source loading from them.

Various sources of data were assessed in order to estimate an appropriate loading to attribute to discharge facilities. Due to the high detection limit of the standard method for analyzing the samples collected from the dischargers, mercury concentrations reported to date were generally listed as non-detected in the Monitoring Report Forms. Dental facilities are believed to be the largest source of mercury reaching wastewater treatment plants. Through the recently adopted New Jersey Pollutant Discharge Elimination System, Requirements for Indirect Users – Dental Facilities rules, N.J.A.C. 7:14A-21.12, dental facilities that generate amalgam waste are required to comply with best management practices and install amalgam separators. The amalgam separators will allow the mercury containing amalgam to be collected and recycled, thereby reducing the amount entering the environment through sludge incineration. The Department required major wastewater treatment facilities to carryout baseline monitoring of their effluent to determine mercury levels prior to implementation of the new dental requirements. However, the data from this monitoring effort are not yet available for use in this TMDL. As part of the New York-New Jersey Harbor TMDL development, in 2000 and 2001 a total of 30 samples were collected from 11 Publicly Owned Treatment Works (POTWs) in New Jersey which discharge to the Harbor (GLEC, 2008). Total recoverable mercury concentrations ranged from 8.32 to 74.9 ng/L, with a mean of 30.09 ng/L and a median of 19.75 ng/L. The Department believes that the mercury effluent concentrations found in these facilities will serve as an appropriate representation of effluent quality in the state. Therefore, the median concentration of 19.75 ng/L was used as a typical mercury concentration for treatment facilities. The total permitted flows for selected facilities is about 250 MGD. Using that flow and the selected median concentration, the total mercury load from these facilities is estimated to be 6.8 kg/year. This loading (6.8 kg/yr) is also a conservative assumption of the existing point source load since the permitted flow was used instead of the actual flow. The loading attributed to discharge facilities is insignificant at approximately 1% of the total load. Figure 4 shows the distribution of the current total load of mercury.



Note: Load from stormwater is not distinguished because it is derived from and is a subset of the air deposition load from the different air sources identified.

Figure 4. Distribution of the Current Mercury Load

5.0. TMDL Calculation

Methods similar to those used in the *Northeast Regional TMDL* (2007) are employed below to calculate the TMDL. A total source load (TSL), described in Section 4, and reduction factor (RF), as described in Section 3, are used to define the TMDL by applying the reduction factor to the total source load, as shown in Equation 1 below.

$$TMDL = TSL \times (1\text{-}RF)$$

where:

- TMDL is the total maximum daily load (kg/yr) that is expected to result in attainment of the target fish tissue mercury concentration.
- TSL is the existing total source load (kg/yr), and is equal to the sum of the existing point source load and the existing nonpoint source load
- RF is the reduction factor required to achieve the target fish mercury concentration.

To allow a consumption rate for the high risk population of one meal per week, the required reduction is 84.3 % (1 - 0.18/1.15 = 84.3%). The total existing loading from air deposition and the treatment facilities discharging into non-tidal waters is 601.kg/yr. In this load, 6.8 kg/yr (about 1%) comes from NJPDES regulated facilities with discharges to surface water in non-tidal waters. Due to the insignificant percentage contribution from this source category, reductions from this source category are not required in this TMDL. Therefore, individual WLAs are not being assigned to the various facilities through this TMDL. Individual facilities have been and will continue to be assessed to determine if a water quality based effluent limit should be assigned to prevent localized exceedances of SWQS and to ensure that the aggregate WLA is not exceeded. As discussed above and in the Reasonable Assurance section below, the recently implemented dental amalgam rules are expected to significantly reduce the amounts of mercury entering wastewater treatment facilities. At this time, it is not known what effect this will have on effluent concentrations. The post-implementation monitoring will be assessed to determine the effect of best management practices (BMPs) for the handling of dental amalgam waste and installation and proper operation of amalgam separators and the need for adaptive management with regard to this source in air deposition impacted waterbodies. Waterbodies that may be impacted by NJPDES regulated facilities with discharges to surface water (those with water column exceedances of the SWQS) have been excluded from the TMDL and will be addressed individually at a later date.

Based on results of several paleolimnological studies (NEIWPCC, et.al. 2007) in the Northeast, the natural mercury deposition is estimated to range between 15 % and 25 % of deposition fluxes for circa 2000. Natural sources cannot be controlled and are expected to remain at the same long-term average. It is assumed, in this study, that 25% of the background and background reemission is due to natural sources and can not be reduced (Ruth Chemerys and John Graham Pers. Comm. April 28, 2009). Twenty-five percent of the background and background reemission load is about 81.5 kg/yr, which is 13.6% of the total existing load. Including the load of 6.8 kg/yr attributed to surface water dischargers, the portion of the existing load that is not expected to be reduced is about 14.7%. If 0.07 ug/g (the fish concentration for unlimited consumption by the high risk population) were used as the TMDL target, the required reduction would be 93.9% of the existing load, which is greater than the entire anthropogenic load of 85.3% (1-14.7%) and clearly unattainable. For this reason, the concentration level (0.18 ug/g) that allows the high risk population to consume fish once per week was used as the target for this TMDL and will also be used as the threshold in future assessments of impairment. In order to achieve the overall 84.3% reduction of the existing load to attain the target of 0.18 mg/kg in fish tissue, a reduction of 98.8% of the anthropogenic source load would be needed. An implicit margin of safety (MOS) is used in this study, therefore, the MOS term of the TMDL equation is set to zero. Figure 5 presents the distribution of the TMDL to achieve the target concentration that will allow one meal per week by the high risk population.

Table 9. Mercury TMDL for One Meal per Week by High Risk Population

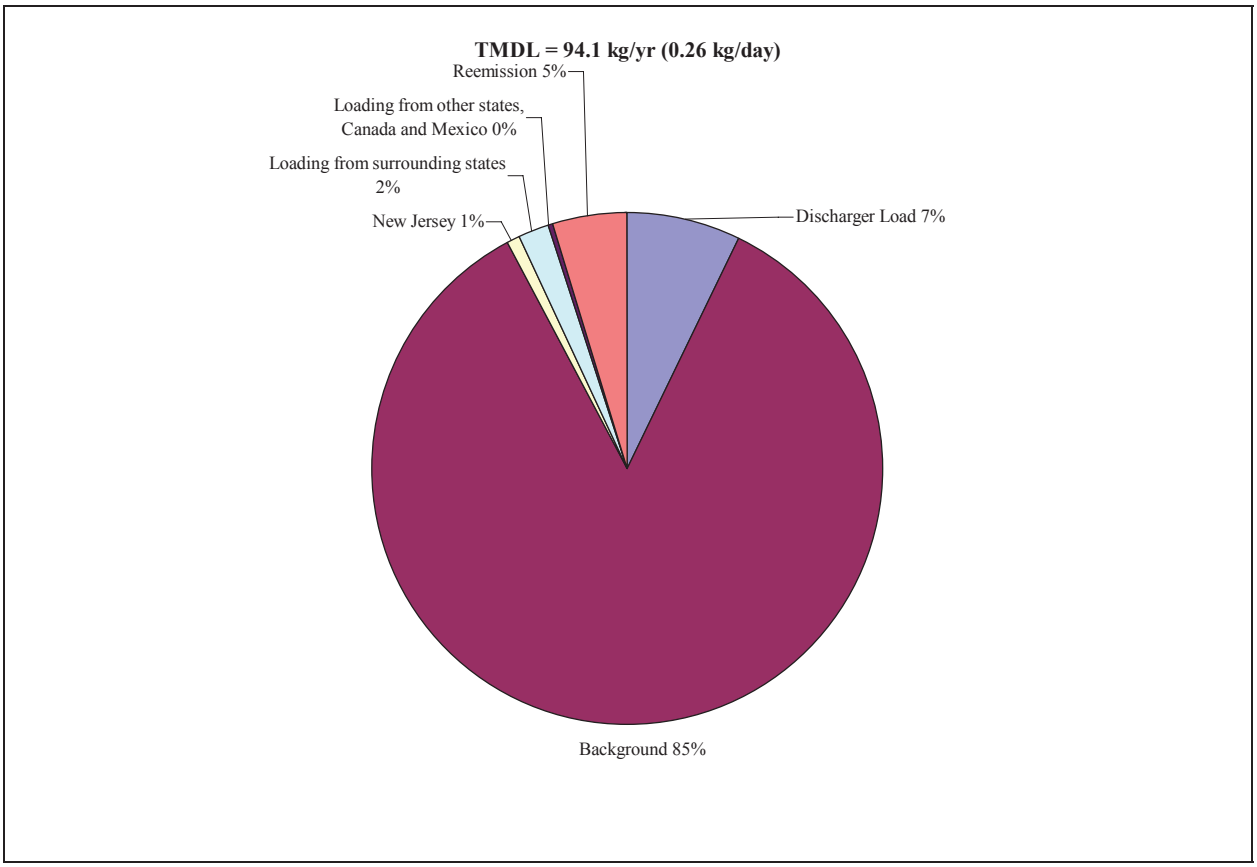
Category	Existing Load (kg/yr)	TMDL Load		Percent Reduction
		kg/yr	kg/day	
Total Annual Load	**601.0**	**94.1**	**0.26**	**84.3%**
Discharger Load (WLA)	6.8	6.8	0.02	-
Air Deposition Load (LA/WLA)	594.2	87.3	0.24	85.3%
Background due to natural source	77.3	77.3	0.21	-
Background due to anthropogenic sources	231.8	2.6	0.01	98.9%
New Jersey	74.1	0.8	0.002	98.9%
Loading from surrounding states	154.6	1.8	0.005	98.9%
Loading from other states, Canada and Mexico	39.6	0.4	0.001	98.9%
reemission due to natural source	4.2	4.2	0.01	-
Reemission due to anthropogenic source	12.7	0.1	0.0004	98.9%

Note: The TMDL loadings presented in the above table were rounded to 0.1 kg/yr. Percents of required reductions were calculated based on values with more significant digits. Using the values from the table to calculate the percent reduction may generate inaccurate results.

Table 10. Distribution of Air Deposition Load between LA and WLA under the TMDL Condition

Air Deposition Load	Annual Load (kg/yr)	Daily Load (kg/day)	Percent of Loading Capacity
Total	87.3	0.24	92.8%
WLA	22.3	0.06	23.7%
LA	65.0	0.18	69.1%

The urban storm water WLA portion of the air deposition load is derived by applying the percentage of urban land within Tier A municipalities (25.6%) to the overall air deposition load (87.3 kg/yr) based on the assumption that this load reaches the water bodies through regulated stormwater sources (see discussion in Section 4). Thus, under the TMDL conditions the WLA has been approximated to be 22.3 kg/yr (87.3 * 0.256), equivalent to 0.06 kg/day (Table 10). The air deposition rate under the TMDL condition is not available to conduct a more precise calculation of the stormwater WLA. More accuracy in developing this WLA is not necessary because the major source of mercury in stormwater is air deposition. Mercury in stormwater must be reduced by reducing air deposition and not through the usual stormwater measures. Therefore a WLA that represents an approximation of the total stormwater load is sufficient for the purposes of this TMDL. Individual stormwater WLAs would not change the response.



Note: Load from stormwater is not distinguished because it is derived from and is a subset of the air deposition load from the different air sources identified.

Figure 5. Distribution of TMDL for One Meal per Week by High Risk Population

As discussed in Section 5.2, multiple conservative assumptions have been made so that the calculated TMDL includes an implicit Margin of Safety (MOS). Therefore, the MOS term of the TMDL equation is set equal to zero. As explained above, a reduction of 85.3% (1-88.3/601) is the highest possible overall reduction that can be expected. The required reduction to achieve unlimited consumption for the high risk population is higher, (1 – 0.07/1.15 = 93.9%). Nevertheless, given the multiple conservative assumptions, this reduction may be achievable. Data gathered following implementation of the TMDL will be used to evaluate success in achieving goals.

5.1. Seasonal Variation/Critical Conditions

40 CFR 130.7(c)(1) requires that "TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numerical WQS with seasonal variations". Calculated TMDLs shall take into account critical conditions for stream flow, loading, and water quality parameters."

The relative contribution of local, regional, and long-range sources of mercury to fish tissue levels in a waterbody are affected by the speciation of natural and anthropogenic emission sources. The amount of bioavailable methyl mercury in water and sediments is a function of the relative rates of mercury methylation and demethylation. Factors such as pH, length of the aquatic food chain, temperature and dissolved organic carbon can affect bioaccumulation. (EPA, 2009). These factors influence the extent to which mercury bioaccumulates in fish and may vary seasonally and spatially. However, mercury concentrations in fish tissue represent accumulation of the life span of a fish. Use of a fish tissue target integrates spatial and temporal variability, making seasonal variation and critical conditions less significant. In addition, the TMDL fish target value is human health-based, reflecting a longer- term exposure.

In New Jersey, data show levels of mercury in some species of fish in the Pinelands sampling region are generally higher compared to fish in other sampling regions of the state. The reductions called for in this TMDL will attain the target fish tissue concentration in the Pinelands, thereby ensuring that the target is met statewide, within the areas addressed by the TMDL.

5.2. Margin of Safety

A TMDL must include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA 303(d)(1)(C), 40C.F.R.130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described.

The MOS included in this TMDL is implicit because of the following conservative assumptions:

- The 90th percentile fish mercury concentration based on the largemouth bass, *Micropterus salmoides*. This species of fish has the highest concentration of the species that are ubiquitous throughout the state
- The percent reduction does not account for additional reductions in methyl mercury that may occur as a result of the implementation of ongoing state and federal programs to reduce sulfur emissions. Reductions in sulfur deposition and sulfate-reducing bacterial activity will decrease the rate of mercury methylation. This TMDL does not account for potential mercury reductions associated with decreased sulfur deposition.

6.0. Monitoring

The Department has engaged in various monitoring efforts that have provided significant insight into mercury contamination issues, some of which are described below. In order to effectively assess progress toward achieving mercury reduction objectives, several monitoring programs are recommended, including:

- A primary monitoring strategy for measuring the levels of mercury and calculating trends is the previously mentioned Routine Fish Monitoring Program for Toxics in Fish. This comprehensive program divides the State's waters into five regions that are sampled on a rotating basis for contaminants in fish. Since mercury is persistent in the environment, accumulates in biological tissue, and biomagnifies in the food chain, adverse impacts to non-aquatic, piscivorous (fish eating) organisms may arise from very low surface water concentrations. Fish tissue sampling provides a cost-effective measure to understanding the effects of mercury in the food chain and the environment.

- A mercury water monitoring program is needed to understand the extent and magnitude of the State's mercury contamination and its effect on aquatic organisms. Such a program must have a comprehensive scope and long-term sampling period. Recent mercury studies from the United State Geological Survey (USGS) have suggested the use of screening tools to target areas where elevated concentrations of mercury may occur. These studies have suggested looking at the presence of wetlands within watersheds, dissolved organic carbon and suspended sediment concentrations, and stream flow. High dissolved oxygen content (DOC) and suspended sediment concentrations, increased stream flow, and larger wetland areas may point to elevated mercury concentrations. The sampling requirements would consist of total and methyl mercury in the water column as well as methyl mercury in fish tissue. The locations would extend to all regions of the state such as the Pinelands, Northern New Jersey, Delaware Estuary, and Atlantic Estuary. Each region would have at least five randomized sampling locations as well as a reference site, which are small undeveloped watersheds with no known sources of mercury contamination other than air deposition. This sampling is not needed on a yearly basis, but quarterly sampling once every 2-5 years is appropriate. An ongoing project, that is targeting local air source reduction by sampling for mercury in fish, water column, and leaves at four locations from 2007 to 2013, is expected to impact the development of the statewide mercury monitoring program by refining sampling frequencies, protocols, and objectives. In addition, an ongoing study in collaboration with USGS involves establishing a baseline for natural background levels for mercury in surface waters to discern the location of impairments that may have anthropogenic sources in addition to atmospheric deposition e.g. mercurial pesticides on orchard, crops and golf courses and which may have other natural sources, e.g. geologic. This evaluative monitoring has been completed in the Inner and Outer Coastal Plain, Raritan River Basin, Papakating and Wallkill River Watersheds. The investigation is ongoing in the Millstone River Basin, Crosswicks Creek Watershed and Passaic River Basin.

- One hundred POTWs in New Jersey submitted baseline data on mercury concentrations in their treatment plant effluent. These samples were analyzed using the most sensitive analytical method for mercury in wastewater, Method 1631E. This baseline data will be used to determine the effectiveness of the implementation of the dental BMPs and the installation of the amalgam separators. These POTWs are

required to conduct additional mercury sampling and analyses, using the same analytical method, after amalgam separator installation.

- In-stream monitoring to evaluate effectiveness of the dental amalgam rule is required at target locations upstream and downstream of the POTW discharge. The monitoring sites will be sampled semi-annually to evaluate ambient water quality before and after the rule's implementation to observe the significance of the reductions. Currently, only one site has been targeted. This project needs to expand by selecting suitable locations based on reviewing the POTW effluent data.

- Air sampling under the National Mercury Monitoring Deposition Network is required to continue to monitor long-term loadings and trends from atmospheric deposition. This program currently has only one site in the New Brunswick area. Additional sites in southern and northern portions of the state this network are needed to improve knowledge of depositional rates for different regions of the state and assist in atmospheric deposition source track down.

Monitoring studies already carried out have provided the following information:

- The Department's Air Program has collected speciated ambient mercury concentration data from several Tekran units that can be used to estimate dry deposition. To date, over two years' data from units at two locations, Elizabeth and New Brunswick have been checked for quality and are in the process of being evaluated. Data on wet deposition is being collected in New Brunswick and is analyzed by the National Mercury Deposition Network.

- Water monitoring data collected by NJDEP/USGS in the Ambient and Supplemental Surface Water Networks show that of the 1,752 results since 1997, nearly 67% had concentrations less than the detection levels. None of the total mercury values exceeded the current acute freshwater aquatic life criterion for dissolved mercury of 1.4 microgram per liter (ug/l) or the chronic criterion of 0.77 ug/l, but 3% of the samples exceeded the human health criterion of 0.05 ug/l. Other mercury studies and projects by NJDEP and USGS over the years show similar results, the majority of mercury concentrations are below detection levels. Detection levels have improved since 1997 with detection levels between 0.04 and 0.1 ug/l to detection levels between 0.01 and 0.02 ug/l since 2004.

- In response to the need for detection of low levels of mercury, the Department initiated a preliminary study of low level mercury occurrence in surface waters. Using EPA's method 1631E, the project consisted of 33 filtered samples with accompanying field blanks at 23 unique stations across the state. The detection level at the Wisconsin laboratory being used was 0.04 ppt. Results did not exceed any of the existing surface water quality criteria. Mercury concentrations did not appear to be influenced by land use, but did appear to increase with stream flow. The findings suggest that air deposition is a major influence on in-stream mercury concentrations. In 2007, the Department conducted a follow-up study to determine seasonal

variability in total and methyl mercury concentrations at 7 reference stations, small undeveloped watersheds with no known sources of mercury contamination other than air deposition. Although total mercury showed no seasonal patterns, methyl mercury had elevated levels during the summer due to higher methylation rates during the warmer months. In addition, the project verified new sampling protocols that allow one person to conduct low level mercury sampling, thereby reducing manpower requirements and allowing this sampling to be incorporated into an ambient or routine program.

- A 150 well, statewide, shallow Ground Water Quality Monitoring Network, which was stratified as a function of land use, has been established and is sampled on a 5 year cycle for mercury and other contaminants. During the first 5 year sampling cycle from 1999 to 2004, mercury concentrations were found to range from <0.01 to 1.7 ug/L in ground water from 148 wells and only 5 of those were detectable above the laboratory reporting limits. In addition, other ground water data has been collected under the Private Well Testing Act that required private wells in 9 Southern New Jersey counties to test for mercury. A total of 25,270 wells were tested with a concentration range of 114.2 ug/l to "not detected". Approximately 1% had concentrations above the drinking water maximum contaminate level (MCL) of 2 ug/l. An analysis of the data showed no obvious geographic or land use patterns for the elevated mercury results.

7.0. Reasonable Assurance

New Jersey has a long history of working toward the reduction of mercury contamination within the state and working with interstate organizations to reduce the mercury both coming into and leaving the state. Much progress has been made. Because of New Jersey's past successes in the reduction of mercury, the actions New Jersey has underway and its commitment to implementing further actions as necessary, including working with neighboring states to reduce sources originating from outside the state, there is reasonable assurance that the goals of the TMDL will be met.

New Jersey began working to reduce mercury releases to the environment in 1992 with the formation of a Mercury Task Force. That Task Force examined the many routes and sources of mercury exposure and found air emissions to be the number one source of mercury contamination in New Jersey. The Task Force identified the largest source of mercury air emissions in New Jersey as Municipal Solid Waste (MSW) Incinerators. The Task Force recommended a statewide mercury emission standard for MSW Incinerators, which was implemented in 1996. In addition to the MSW incinerator standards, New Jersey passed the "Dry Cell Battery Management Act" in 1992, banning the use of mercury in certain batteries. These two efforts reduced MSW incinerator mercury emissions by 97% between 1992 and 2006.

In 1998, New Jersey convened a second Mercury Task Force. The second Task Force consisted of representatives from government, emission sources, public interest groups, academia, and fishing organizations. This Task Force was charged with reviewing the current science on

mercury impacts on human health and ecosystems, inventorying and assessing mercury sources, and developing a comprehensive mercury reduction plan for NJ. The "New Jersey Mercury Task Force Report" published in December 2001 established a goal of the virtual elimination of anthropogenic sources of mercury and provided recommendations and targets for further reducing mercury emissions in New Jersey. The Task Force Report is available at http://www.nj.gov/dep/dsr/mercury_task_force.htm

In 2007 the Department's Mercury Workgroup evaluated New Jersey's progress towards meeting the goals and recommendations of the Task Force and began putting together a Mercury Reduction Plan to identify the necessary additional actions to continue to reduce mercury emissions in New Jersey. The reduction plan will serve as the implementation plan for these TMDLs.

Below is a summary of actions that have been taken to reduce New Jersey's mercury loadings.

- To participate in and support regional, national, and global efforts to reduce mercury uses, releases, and exposures New Jersey is a member of the Interstate Mercury Education and Reduction Clearinghouse (IMERC), a member of the Northeast Waste Management Officials Association (NEWMOA), the Quicksilver Caucus, Northeast States for Consolidated Air Use Management (NESCAUM), Environmental Council of the States (ECOS), and Toxics in Packaging.

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- In conjunction with NEWMOA, informational brochures were developed for tanning salons and property managers concerning the management of mercury containing fluorescent lamps. The brochures were sent to every tanning salon and property management company in the state.

- New Jersey works with interstate organizations to assist in the development of federal legislation that minimizes the use of mercury in products. The Department is a member of and works with the Northeast Waste Management Officials Association (NEWMOA) on mercury issues. The Department will participate in any effort conducted by NEWMOA or other interstate organization to develop federal legislation to minimize the use of mercury in products.

- On December 6, 2004, New Jersey adopted regulations to establish new requirements for coal-fired boilers, in order to decrease emissions of mercury. These rules are located at http://www.state.nj.us/dep/aqm/Sub27-120604.pdf.

- On December 6, 2004, New Jersey adopted regulations to establish new requirements for iron or steel melters in order to decrease emissions of mercury. The Department provided three years to reduce mercury contamination of scrap through elimination and separation measures. If the source reduction measures do not achieve emission reduction, the rule requires the installation and operation of mercury air pollution control and requires achieving mercury standard starting 1/2010. These rules are located at http://www.state.nj.us/dep/aqm/Sub27-120604.pdf.

- On December 6, 2004, New Jersey adopted regulations to establish new requirements for Hospital/medical/infectious waste (HMIW) incinerators in order to prevent or decrease emissions of mercury by ensuring that the mercury emissions from HMIW incinerators will be maintained at low levels. These rules are located at http://www.state.nj.us/dep/aqm/Sub27-120604.pdf.

- The Department has closely monitored mercury sewage sludge levels and has taken action where existing authority would allow the imposition of a sewage sludge limit or a discharge limitation. For example, the POTW with the highest sewage sludge mercury concentrations was identified and the industry responsible voluntarily agreed to shut down all production of mercury-containing diagnostic kits. Increased focus on removing mercury from products, as well as the proposed dental rule noted above, should continue the decreasing trend of detectable concentrations of mercury found in sewage sludge.

- On December 6, 2004, New Jersey adopted revised regulations to establish new requirements for municipal solid waste (MSW) incinerators in order to prevent or decrease emissions of mercury by requiring MSW incinerators to further reduce their mercury emissions. These rules are located at http://www.state.nj.us/dep/aqm/Sub27-120604.pdf.

- The Department has included all mercury containing products in the Universal Waste Rule which allows generators of waste mercury containing products to manage the waste under less stringent regulations than the Hazardous Waste Regulations. In addition, every county in the state holds at least one household hazardous waste (HHW) collection per year. Most counties hold multiple collections and 3 counties (Burlington, Monmouth, and Morris) have permanent collection sites. Households generating mercury containing products can properly dispose of the items at their county's collection.

- Legislation banning the sale of mercury thermometers was passed in April 2005.

- The New Jersey Legislature passed the Mercury Switch Removal Act of 2005 requiring automobile recycling facilities to remove mercury auto switches from vehicles prior to sending the vehicles for recycling. Automobile recyclers located in New Jersey were required to begin removing the mercury auto switches in May 2006. Manufacturers have stopped using mercury switches in convenience lighting.

- The Department adopted new rules on October 1, 2007 to curtail the release of mercury from dental facilities into the environment. The new rules, under most circumstances, exempt a dental facility from the requirement to obtain an individual permit for its discharge to a POTW, if it implements best management practices (BMPs) for the handling of dental amalgam waste and installs and properly operates an amalgam separator. Dental facilities were required to implement the BMPs by October 1, 2008 and must install and operate an amalgam separator by October 1, 2009. These measures are expected to prevent at least 95 percent of the mercury wastes from being sent to the

POTW and result in approximately 2,550 pounds of mercury removed from the environment each year.

- The Department participated in the Quicksilver Caucus, which developed methods for the retirement and sequestering of mercury.

The out of state contributions to the depositional load of mercury are too great for New Jersey to eliminate mercury contamination of fish tissue by reducing sources originating within its borders alone. New Jersey will work with EPA and other states to eliminate mercury sources nationwide. EPAs efforts to issue MACT (Maximum Achievable Control Technology) standards for utilities to reduce the depositional load of mercury are supported by New Jersey. In October 2008, the New England Interstate Water Pollution Control Commission (NEIWPCC), on behalf of seven states, submitted a petition under the Clean Water Act Section 319(g) requesting EPA to convene an interstate conference to address mercury deposition to the Northeast from upwind states. The petition builds on the Northeast States' regional mercury TMDL (approved by EPA in 2007), which indicates that reductions in mercury deposition from outside the region are needed to meet water quality standards. New Jersey will participate actively in this conference when it is held.

8.0. Implementation Plan

The implementation actions below are the recommendations of the Department's Mercury Task Force (NJDEP, 2009) intended to reduce anthropogenic sources of mercury:

1) Consider developing legislation that reflects the provisions of the Mercury Education and Reduction Model Act prepared by the Northeast Waste Management Officials' Association (NEWMOA), as part of the New England Governors' Mercury Action Plan. This plan addresses mercury-containing products and limits the sale of mercury for approved purposes. Provisions of the model legislation have been adopted by 16 states, including all of the New England states.

2) Continue monitoring of mercury in environmental media. Needed follow-up monitoring is described in Section 6 and is essential for determining the effectiveness of the mercury Total Maximum Daily Load (TMDL).

3) New Jersey contributes only 12.5% to the state mercury deposition; 52% is background deposition (natural and anthropogenic) and the remaining percentage comes from surrounding states, Mexico, and Canada. Reductions required in this TMDL can not be achieved from the New Jersey anthropogenic air sources alone. Mercury reductions on the nationwide and global scales are necessary to meet the TMDL targets set up above.

4) The Department plans to update its mercury water quality criteria based upon the EPA recommended Clean Water Act Section 304(a) for methyl mercury in fish tissue. This criterion requires the development of regional bioaccumulation factors (BAFs) to address differences in the rate of methylation based on other water quality parameters such as pH and

dissolved organic carbon. While the EPA's recommended Clean Water Act Section 304(a) water quality criterion is based on a methyl mercury fish tissue concentration value of 0.3 mg/kg, New Jersey plans to develop criteria based upon a methyl mercury fish tissue concentration of 0.18 mg/kg which is based upon consumption of 1 meal per week by high risk individuals. Updating the mercury criteria based on EPA's recommendation will require calculating BAFs for New Jersey that involves additional surface water and fish tissue sampling. This information will also be used to reevaluate the previously proposed wildlife mercury criteria using updated regional BAFs. The revised mercury criteria will be used to develop TMDLs for areas of the State not covered by the Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition. In calculating an updated, revised mercury SWQS for human health and wildlife, the Department will divide the state into four regional waters: Pinelands, Non-Pinelands, Delaware Estuary tidal waters, and Atlantic tidal waters. Surface water and fish tissue data will be collected and used to develop new BAFs for each region of the state. The data results will then be applied in calculating the mercury criteria for each region. In 2009, the Department expects to begin data collection in the Pinelands region with plans to continue collection in non-Pinelands water the following year. The next action is to collect data for the Delaware Estuary and Atlantic tidal waters.

5) The existing regulations concerning mercury will continue to be implemented, enforced, and evaluated for effectiveness. This includes the regulations on mercury emissions from air sources, the removal of automobile mercury switches and the dental amalgam regulations.

9.0. Public Participation

There have been various efforts to inform and educate the general public as well as the regulated community about the effects of mercury and the need to reduce anthropogenic sources. The regulatory controls regarding mercury are described in Section 7 and some of the outreach to the general public are noted below.

Over the years the Department, in cooperation with the Department of Health and Senior Services has conducted a great deal of public outreach to the fishing community to inform them of the fish consumption advisories. Surveys were done to determine how best to reach the public. As a result the fish advisories are posted in both Spanish and English. Brochures have been developed and are distributed to doctors and WIC (the federal Women, Infants and Children nutrition program) centers. The Department of Health seafood inspectors distribute and check for postings as part of their inspections.

Currently the Department's Urban Fishing Program educates children from the Newark Bay Complex and throughout New Jersey about their local watershed. Children learn about how people's actions affect the water and human health, and what they can do to help. The NJDEP's Divisions of Watershed Management and Science, Research and Technology in conjunction with the Division of Fish and Wildlife, the Hackensack RiverKeeper, the City of Bayonne and the Municipal Utilities Authority of Bayonne have offered the program for over 10 years. The first several years of the Urban Watershed Program were conducted only in the Newark Bay

Complex. The program has now expanded to other urban areas around the state. Trenton and Camden have participated over the last three years, and we hope to add several more cities in the future.

In conjunction with NEWMOA, informational brochures were developed for tanning salons and property managers concerning the management of mercury containing fluorescent lamps. The brochures were sent to every tanning salon and property management company in the state.

There has been additional public outreach and opportunity for comment for the TMDL itself. In accordance with N.J.A.C. 7:15–7.2(g), this TMDL was proposed by the Department as an amendment to the Atlantic, Cape May, Lower Delaware, Lower Raritan-Middlesex, Mercer, Monmouth, Northeast, Ocean, Sussex, Tri-County, Upper Delaware and Upper Raritan Water Quality Management Plans.

Notice proposing this TMDL was published on June 15, 2009 in the New Jersey Register and in newspapers of general circulation in the affected area in order to notify the public of the opportunity to review the TMDL and submit comments. In addition, an informational presentation followed by a public hearing for the proposed TMDL was held on July 15, 2009. Notice of the proposal and the hearing was also provided to affected Designated Planning Agencies and dischargers in the affected watersheds. One member of the public attended the hearing and declined to comment. No comments were submitted during the public comment period. Various minor edits to the proposal document have been made for clarification.

10.0. Data Sources

Geographic Information System (GIS) data from the Department was used extensively to describe the areas addressed in this document.

- State Boundary of New Jersey, Published by New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), May 20, 2008. On line at: https://njgin.state.nj.us/NJ_NJGINExplorer/jviewer.jsp?pg=DataDownloads

- Watersheds (Subwatersheds by name - DEPHUC14), Drainage basins are delineated from 1:24,000-scale (7.5-minute) USGS quadrangles. The delineations have been developed for general purpose use by USGS District staff over the past 20 years. Arc and polygon attributes have been included in the coverage with basin names and ranks of divides, and 14-digit hydrologic unit codes. *Originator:* U.S. Geological Survey, William H. Ellis, Jr. *Publication_Date:* 19991222 http://www.state.nj.us/dep/gis/digidownload/zips/statewide/dephuc14.zip

- NJDEP 2002 Waters of New Jersey (Lakes and Ponds), *Edition* 2008-05-01. The data was created by extracting water polygons which represented lakes and ponds from the 2002 land use/land cover (LU/LC) layer from NJ DEP's geographical information systems (GIS) database http://www.state.nj.us/dep/gis/digidownload/zips/statewide/njwaterbody.zip

- NJDEP 2002 Waters of New Jersey (Rivers, Bays and Oceans), *Version* 20080501; *Edition:* 20080501. The data was created by extracting water polygons which represented Rivers, Bays and Oceans from the 2002 land use/land cover (LU/LC) layer from NJ DEP's geographical information systems (GIS) database. *Online Linkage* http://www.state.nj.us/dep/gis/digidownload/zips/statewide/njarea.zip

- NJPDES Surface Water Discharges in New Jersey, (1:12,000), Version 20090126, *Edition:* 2009-01-26. This is a 2009 update of the 2002 data. New Jersey Pollutant Discharge Elimination System (NJPDES) surface water discharge pipe GIS point coverage compiled from GPSed locations, NJPDES databases, and permit applications. This coverage contains the surface water discharge points and the receiving waters coordinates for the active as well as terminated pipes. *Online Linkeage*: http://www.state.nj.us/dep/gis/digidownload/zips/statewide/njpdesswd.zip

- NJDEP Surface Water Quality Standards of New Jersey *Edition:* 200812. This data is a digital representation of New Jersey's Surface Water Quality Standards in accordance with "Surface Water Quality Standards for New Jersey Waters" as designated in N.J.A.C. 7:9 B. The Surface Water Quality Standards (SWQS) establish the designated uses to be achieved and specify the water quality (criteria) necessary to protect the State's waters. Designated uses include potable water, propagation of fish and wildlife, recreation, agricultural and industrial supplies, and navigation. These are reflected in use classifications assigned to specific waters. When interpreting the stream classifications and anti-degradation designations, the descriptions specified in the SWQS at N.J.A.C. 7:9B-1.15 always take precedence. The GIS layer reflects the stream classifications and anti-degradation designations adopted as of June 16, 2008, and it is only supplemental to SWQS and is not legally binding. http://www.state.nj.us/dep/gis/digidownload/zips/statewide/swqs.zip

- "Water Management Areas", created 03/2002 by NJDEP, Division of Watershed Management, the last update January, 2009. *Online Linkage*. http://www.state.nj.us/dep/gis/digidownload/zips/statewide/depwmas.zip

- NJDEP Known Contaminated Site List for New Jersey, 2005, *Edition:* 200602; The Known Contaminated Sites List for New Jersey 2005 are those sites and properties within the state where contamination of soil or ground water has been identified or where there has been, or there is suspected to have been, a discharge of contamination. This list of Known Contaminated Sites may include sites where remediation is either currently under way, required but not yet initiated or has been completed. http://www.state.nj.us/dep/gis/digidownload/zips/statewide/kcsl.zip

- Groundwater Contamination Areas (CKE); this data layer contains information about areas in the state which are specified as the Currently Known Extent (CKE) of ground water pollution. CKE areas are geographically defined areas within which the local ground water resources are known to be compromised because the water quality exceeds drinking water and ground water quality standards for specific contaminants. NJDEP Currently Known Extent of Groundwater Contamination (CKE) for New Jersey, 2007. *Edition:* 200703. *Online Linkage:* http://www.state.nj.us/dep/gis/digidownload/zips/statewide/cke.zip

11.0. References

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October 24, 2007, Northeast Regional Mercury Total Maximum Daily Load.
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Appendix A

Listed Assessment units that were excluded from the Statewide TMDL

Waterbody	Name	Reason for Exclusion from TMDL
02030103120070-01	Passaic River Lwr (Fair Lawn Ave to Goffle)	Mercury in surface water
02030103120080-01	Passaic River Lwr (Dundee Dam to F.L. Ave)	Mercury in surface water
02030103120090-01	Passaic River Lwr (Saddle R to Dundee Dam)	Mercury in surface water
02030103150030-01	Passaic River Lwr (Second R to Saddle R)	Mercury in surface water
02030103150040-01	Passaic River Lwr (4th St br to Second R)	Mercury in surface water
02030103150050-01	Passaic River Lwr (Nwk Bay to 4th St brdg)	Mercury in surface water
02030103170030-01	Hackensack River (above Old Tappan gage)	Mercury in surface water
02030103170060-01	Hackensack River (Oradell to Old Tappan gage)	Mercury in surface water
02030103180030-01	Hackensack River (Ft Lee Rd to Oradell gage)	Mercury in surface water
02030103180080-01	Hackensack River (Rt 3 to Bellmans Ck)	Mercury in surface water
02030103180090-01	Hackensack River (Amtrak bridge to Rt 3)	Mercury in surface water
02030103180100-01	Hackensack River (below Amtrak bridge)	Mercury in surface water
02030104010020-01	Kill Van Kull West	Mercury in surface water
02030104010020-02	Newark Bay / Kill Van Kull (74d 07m 30s)	Mercury in surface water
02030104010030-01	Kill Van Kull East	Mercury in surface water
02030104010030-02	Upper NY Bay / Kill Van Kull (74d07m30s)	Mercury in surface water
02030104020030-01	Arthur Kill North	Mercury in surface water
02030104030010-01	Arthur Kill South	Mercury in surface water
02030104050120-01	Arthur Kill waterfront (below Grasselli)	Mercury in surface water
02040105210060-01	Jacobs Creek (above Woolsey Brook)	Mercury in surface water
02040105230050-01	Assunpink Creek (Shipetaukin to Trenton Rd)	Mercury in surface water
02040201050040-01	Crosswicks Creek (Walnford to Lahaway Ck)	Mercury in surface water
02040201050050-01	Crosswicks Creek (Ellisdale trib - Walnford)	Mercury in surface water
02040201050070-01	Crosswicks Creek (Doctors Ck-Ellisdale trib)	Mercury in surface water
02040206140040-01	Blackwater Branch (above/incl Pine Br)	Mercury in surface water
02040206140050-01	Blackwater Branch (below Pine Branch)	Mercury in surface water
02040206200010-01	Middle Branch / Slab Branch	Mercury in surface water
02040206200020-01	Muskee Creek	Mercury in surface water
02040301020040-01	Muddy Ford Brook	Mercury in surface water
02040301070080-01	Manapaqua Brook	Mercury in surface water
02040301170010-01	Hammonton Creek (above 74d43m)	Mercury in surface water
02040301170020-01	Hammonton Creek (Columbia Rd to 74d43m)	Mercury in surface water
02040302020020-01	Absecon Creek SB	Mercury in surface water
02040302020030-01	Absecon Creek (AC Reserviors) (gage to SB)	Mercury in surface water
02030103010180-01	Passaic River Upr (Pine Bk br to Rockaway)	Mercury in surface water
02030103040010-01	Passaic River Upr (Pompton R to Pine Bk)	Mercury in surface water
02030103120100-01	Passaic River Lwr (Goffle Bk to Pompton R)	Mercury in surface water
02030103180060-01	Berrys Creek (above Paterson Ave)	Mercury in surface water
02030103180070-01	Berrys Creek (below Paterson Ave)	Mercury in surface water
02030105160070-01	South River (below Duhernal Lake)	Mercury in surface water
02040202020030-01	Rancocas Creek NB (incl Mirror Lk-Gaunts Bk)	Mercury in surface water
02040202020040-01	Rancocas Creek NB (NL dam to Mirror Lk)	Mercury in surface water
02040202100060-01	Pennsauken Creek (below NB / SB)	Mercury in surface water
02040301020050-01	Metedeconk River NB (confluence to Rt 9)	Mercury in surface water
02040301040020-01	Metedeconk River (Beaverdam Ck to confl)	Mercury in surface water
02040302050060-01	Great Egg Harbor River (Miry Run to Lake Lenape)	Mercury in surface water

02040302050130-01	Great Egg Harbor River (GEH Bay to Miry Run)	Mercury in surface water
Delaware River 1	Delaware River 1C2	Mercury in surface water
Delaware River 2	Delaware River 1C3	Mercury in surface water
Delaware River 3	Delaware River 1C4	Mercury in surface water
Delaware River 4	Delaware River 1D1	Mercury in surface water
Delaware River 5	Delaware River 1D2	Mercury in surface water
Delaware River 6	Delaware River 1D3	Mercury in surface water
Delaware River 7	Delaware River 1D4	Mercury in surface water
Delaware River 8	Delaware River 1D5	Mercury in surface water
Delaware River 9	Delaware River 1D6	Mercury in surface water
Delaware River 10	Delaware River 1E1	Mercury in surface water
Delaware River 11	Delaware River 1E2	Mercury in surface water
Delaware River 12	Delaware River 1E3	Mercury in surface water
Delaware River 13	Delaware River 1E4	Mercury in surface water
Delaware River 14	Delaware River 1E5	Mercury in surface water
Delaware River 15	Delaware River 2	Mercury in surface water
Delaware River 16	Delaware River 3	Mercury in surface water
Delaware River 17	Delaware River 4	DRBC
Delaware River 18	Delaware River 5A	DRBC
Delaware River 19	Delaware River 5B	DRBC
Delaware River 20	Delaware River 5C	DRBC
02040204910010-02	Delaware Bay (Cape May Pt to Dennis Ck) offshore	DRBC
02040204910010-01	Delaware Bay (CapeMay Pt to Dennis Ck) inshore	DRBC
02040204910040-01	Delaware Bay (Cohansey R to FishingCk)	DRBC
02040204910020-02	Delaware Bay (Dennis Ck to Egg Islnd Pt) offshore	DRBC
02040204910020-01	Delaware Bay (DennisCk to Egg Islnd Pt) inshore	DRBC
02040301200030-02	Wading River (below Rt 542)	Tidal
02040301200080-02	Mullica River (GSP bridge to Turtle Ck)	Tidal
02040301210010-02	Mullica River (below GSP bridge)	Tidal
02030104020030-02	Elizabeth River (below Elizabeth CORP BDY)	Tidal
02030104030010-02	Morses Creek / Piles Creek	Tidal
02030104080040-01	Shrewsbury River (above Navesink River)	Tidal
02030104090040-01	Shark River (above Remsen Mill gage)	Tidal
02030104090060-01	Shark River (below Remsen Mill gage)	Tidal
02030104910020-01	Sandy Hook Bay (east of Thorns Ck)	Tidal
02040201030010-01	Duck Creek and UDRV to Assunpink Ck	Tidal
02030104060010-01	Cheesequake Creek / Whale Creek	Tidal
02030104070110-01	Navesink River (below Rt 35) / Lower Shrewsbury	Tidal
02040301080060-01	Toms River Lwr (Rt 166 to Oak Ridge Pkwy)	Tidal
02030104070110-01	Navesink River (below Rt 35) / Lower Shrewsbury	Tidal
02030104060060-01	Pews Creek to Shrewsbury River	Tidal
02040301080060-01	Toms River Lwr (Rt 166 to Oak Ridge Pkwy)	Tidal
02040301200030-02	Wading River (below Rt 542)	Tidal
02030104080010-01	Little Silver Creek / Town Neck Creek	Tidal
02040301200080-02	Mullica River (GSP bridge to Turtle Ck)	Tidal
02040301210010-02	Mullica River (below GSP bridge)	Tidal
02040302020010-01	Absecon Creek NB	Tidal
02040302020040-01	Absecon Creek (below gage)	Tidal

02030104080010-01	Little Silver Creek / Town Neck Creek	Tidal
02030104080020-01	Parkers Creek / Oceanport Creek	Tidal
02030104080030-01	Branchport Creek	Tidal
02040201070030-01	Shady Brook / Spring Lake / Rowan Lake	Tidal
02040202120080-01	Big Timber Creek (below NB/SB confl)	Tidal
02040202130040-01	Mantua Creek (Edwards Run to rd to Sewell)	Tidal
02040202140040-01	Moss Branch / Little Timber Creek (Repaupo)	Tidal
02040202140050-01	Repaupo Creek (below Tomlin Sta Rd) / Cedar Swamp	Tidal
02040202160020-01	Oldmans Creek (Rt 45 to Commissioners Rd)	Tidal
02040206090080-01	Cohansey River (Greenwich to 75d17m50s)	Tidal
02040206090100-01	Cohansey River (below Greenwich)	Tidal
02030104010010-01	Newark Airport Peripheral Ditch	Tidal
02040206100040-01	Cedar Creek (above Rt 553)	Tidal
02040206160030-01	Maurice River (Union Lake to Sherman Ave)	Other sources of Hg
02030103030070-01	Rockaway River (74d 33m 30s to Stephens Bk)	Other sources of Hg
02030103100070-01	Ramapo River (below Crystal Lake bridge)	Other sources of Hg
02040201050060-01	Ellisdale Trib (Crosswicks Creek)	Other sources of Hg
02040201070020-01	Crosswicks Creek (below Doctors Creek)	Other sources of Hg
02030103100060-01	Crystal Lake / Pond Brook	Other sources of Hg
02030104060040-01	Chingarora Creek to Thorns Creek	Other sources of Hg
02030104060050-01	Waackaack Creek	Other sources of Hg
02030105160090-01	Red Root Creek / Crows Mill Creek	Hg in groundwater
02030105160100-01	Raritan River Lwr (below Lawrence Bk)	Hg in groundwater
02040105230020-01	Assunpink Creek (New Sharon Br to/incl Lake)	Hg in groundwater
02040105230030-01	New Sharon Branch (Assunpink Creek)	Hg in groundwater
02040105230040-01	Assunpink Creek (Trenton Rd to New Sharon Br)	Hg in groundwater
02040105240010-01	Shabakunk Creek	Hg in groundwater
02040105240050-01	Assunpink Creek (below Shipetaukin Ck)	Hg in groundwater
02040201030010-01	Duck Creek and UDRV to Assunpink Ck	Hg in groundwater
02040201040040-01	Jumping Brook (Monmouth Co)	Hg in groundwater
02040301160020-01	Mullica River (above Jackson Road)	Hg in groundwater
02040301170040-01	Mullica River (Batsto R to Pleasant Mills)	Hg in groundwater
02040301170060-01	Mullica River (Rt 563 to Batsto River)	Hg in groundwater
02040301170080-01	Mullica River (Lower Bank Rd to Rt 563)	Hg in groundwater
02040301170130-01	Mullica River (Turtle Ck to Lower Bank Rd)	Hg in groundwater
02040301190050-01	Wading River WB (Jenkins Rd to Rt 563)	Hg in groundwater
02040301200020-01	Wading River (Rt 542 to Oswego River)	Hg in groundwater
02030103180040-01	Overpeck Creek	HEP
02030103180050-01	Hackensack River (Bellmans Ck to Ft Lee Rd)	HEP
02030104050060-01	Rahway River (Robinsons Br to Kenilworth Blvd)	HEP
02030104050100-01	Rahway River (below Robinsons Branch)	HEP
02030105120170-01	Raritan River Lwr (Lawrence Bk to Mile Run)	HEP
02030105160100-01	Raritan River Lwr (below Lawrence Bk)	HEP
02040302940010-01	Atlantic Ocean (34th St to Corson Inl) inshore	Tidal
02040302940010-02	Atlantic Ocean (34th St to Corson Inl) offshore	Tidal
02040302920010-01	Atlantic Ocean (Absecon In to Ventnor) inshore	Tidal
02040302920010-02	Atlantic Ocean (Absecon In to Ventnor) offshore	Tidal
02040301920010-02	Atlantic Ocean (Barnegat to Surf City) offshore	Tidal
02040301920010-01	Atlantic Ocean (Barnegat to Surf City)inshore	Tidal

02040302940050-01	Atlantic Ocean (CM Inlet to Cape May Pt) inshore	Tidal
02040302940050-02	Atlantic Ocean (CM Inlet to Cape May Pt) offshore	Tidal
02030902940020-01	Atlantic Ocean (Corson to Townsends Inl) inshore	Tidal
02030902940020-02	Atlantic Ocean (Corson to Townsends Inl) offshore	Tidal
02040302930010-01	Atlantic Ocean (Great Egg to 34th St) inshore	Tidal
02040302930010-02	Atlantic Ocean (Great Egg to 34th St) offshore	Tidal
02040301920030-01	Atlantic Ocean (Haven Bch to Lit Egg) inshore	Tidal
02040301920030-02	Atlantic Ocean (Haven Bch to Lit Egg) offshore	Tidal
02040302940040-01	Atlantic Ocean (Hereford to Cape May In) inshore	Tidal
02040302940040-02	Atlantic Ocean (Hereford to Cape May In) offshore	Tidal
02040301910020-01	Atlantic Ocean (Herring Is to Rt 37) inshore	Tidal
02040301910020-02	Atlantic Ocean (Herring Is to Rt 37) offshore	Tidal
02040302910010-01	Atlantic Ocean (Ltl Egg to Absecon In) inshore	Tidal
02040302910010-02	Atlantic Ocean (Ltl Egg to Absecon In) offshore	Tidal
02040301910010-01	Atlantic Ocean (Manasquan/Herring Is) inshore	Tidal
02040301910010-02	Atlantic Ocean (Manasquan/Herring Is) offshore	Tidal
02030104920020-01	Atlantic Ocean (Navesink R to Whale Pond) inshore	Tidal
02030104920020-02	Atlantic Ocean (Navesink R to Whale Pond) offshore	Tidal
02040301910030-01	Atlantic Ocean (Rt 37 to Barnegat Inlet) inshore	Tidal
02040301910030-02	Atlantic Ocean (Rt 37 to Barnegat Inlet) offshore	Tidal
02030104920010-01	Atlantic Ocean (Sandy H to Navesink R) inshore	Tidal
02030104920010-02	Atlantic Ocean (Sandy H to Navesink R) offshore	Tidal
02030104930020-01	Atlantic Ocean (Shark R to Manasquan) inshore	Tidal
02030104930020-02	Atlantic Ocean (Shark R to Manasquan) offshore	Tidal
02040301920020-01	Atlantic Ocean (Surf City to Haven Be) inshore	Tidal
02040301920020-02	Atlantic Ocean (Surf City to Haven Be) offshore	Tidal
02030902940030-01	Atlantic Ocean (Townsends to Hereford In) inshore	Tidal
02030902940030-02	Atlantic Ocean (Townsends to Hereford In) offshore	Tidal
02040302920020-01	Atlantic Ocean (Ventnor to Great Egg) inshore	Tidal
02040302920020-02	Atlantic Ocean (Ventnor to Great Egg) offshore	Tidal
02030104930010-01	Atlantic Ocean (Whale Pond to Shark R) inshore	Tidal

Appendix B

Fish Tissue Data

Location	Species	Field (or lab) Total Length (cm)	Hg (mg/kg) ug/g wet wt	Year
Alcyon Lake	Largemouth Bass	28.6	0.67	1992
Alcyon Lake	Largemouth Bass	33.7	0.41	1992
Batsto Lake	Yellow Bullhead	23.7	0.23	1992
Batsto Lake	Brown Bullhead	26.5	0.18	1992
Batsto Lake	Chain Pickerel	57.3	1.06	1992
Batsto Lake	Largemouth Bass	27.1	0.76	1992
Batsto Lake	Largemouth Bass	35.4	1.20	1992
Batsto Lake	Largemouth Bass	37.5	1.28	1992
Big Timber Creek	Black Crappie	15.5	0.07	1992
Big Timber Creek	Brown Bullhead	29.4	0.05	1992
Big Timber Creek	Brown Bullhead	31	0.06	1992
Big Timber Creek	Channel Catfish	42.3	0.09	1992
Big Timber Creek	White Catfish	33.4	0.08	1992
Big Timber Creek	White Catfish	29.6	0.09	1992
Big Timber Creek	Largemouth Bass	33.0	0.10	1992
Big Timber Creek	Largemouth Bass	28.2	0.12	1992
Big Timber Creek	Largemouth Bass	25.5	0.06	1992
Clementon Lake	Chain Pickerel	35.5	0.14	1992
Clementon Lake	Chain Pickerel	33	0.16	1992
Clementon Lake	Chain Pickerel	40	0.16	1992
Clementon Lake	Chain Pickerel	50.5	0.32	1992
Clementon Lake	Chain Pickerel	48.6	0.37	1992
Clementon Lake	Chain Pickerel	47.6	0.38	1992
Clementon Lake	Largemouth Bass	35.9	0.28	1992
Clementon Lake	Largemouth Bass	38.7	0.49	1992
Clinton Reservoir	Largemouth Bass	28.2	0.39	1992
Clinton Reservoir	Largemouth Bass	34.3	0.60	1992
Clinton Reservoir	Largemouth Bass	34.6	0.73	1992
Clinton Reservoir	Largemouth Bass	44.1	0.83	1992
Clinton Reservoir	Largemouth Bass	36.0	0.84	1992
Clinton Reservoir	Largemouth Bass	37.1	0.85	1992
Cooper River Park Lake	Black Crappie	16.7	0.04	1992
Cooper River Park Lake	Black Crappie	18.1	0.10	1992
Cooper River Park Lake	Black Crappie	18.4	0.12	1992
Cooper River Park Lake	Largemouth Bass	19.5	0.12	1992
Cooper River Park Lake	Largemouth Bass	21.4	0.03	1992
Cooper River Park Lake	Largemouth Bass	21.7	0.04	1992
Cooper River Park Lake	Largemouth Bass	25.5	0.08	1992
Cooper River Park Lake	Largemouth Bass	28	0.07	1992
Cooper River Park Lake	Largemouth Bass	30.8	0.09	1992

Cooper River Park Lake	Largemouth Bass	32.2	0.10	1992
Cooper River Park Lake	Largemouth Bass	32.8	0.13	1992
Cooper River Park Lake	Largemouth Bass	35.5	0.14	1992
Cooper River Park Lake	Largemouth Bass	43.5	0.31	1992
Cooper River Park Lake	Largemouth Bass	44	0.56	1992
Cooper River Park Lake	Largemouth Bass	22.1	0.09	1992
Cooper River Park Lake	Largemouth Bass	25.5	0.08	1992
Cooper River Park Lake	Largemouth Bass	28	0.07	1992
Cooper River Park Lake	Largemouth Bass	30.8	0.09	1992
Cooper River Park Lake	Largemouth Bass	35.5	0.14	1992
Cooper River Park Lake	Largemouth Bass	43.5	0.31	1992
Cranberry Lake	Chain Pickerel	42.4	0.27	1992
Cranberry Lake	Chain Pickerel	56.9	0.37	1992
Cranberry Lake	Chain Pickerel	55.5	0.37	1992
Cranberry Lake	Hybrid Striped Bass	38.2	0.29	1992
Cranberry Lake	Hybrid Striped Bass	37	0.31	1992
Cranberry Lake	Hybrid Striped Bass	52	0.43	1992
Crystal Lake	Brown Bullhead	19.8	0.02	1992
Crystal Lake	Brown Bullhead	20	0.05	1992
Dundee Lake	Brown Bullhead	27.1	0.19	1992
Dundee Lake	Brown Bullhead	29.3	0.20	1992
East Creek Lake	Chain Pickerel	31.5	0.79	1992
East Creek Lake	Chain Pickerel	34..5	1.03	1992
East Creek Lake	Chain Pickerel	41.4	1.33	1992
East Creek Lake	Chain Pickerel	39	1.33	1992
East Creek Lake	Chain Pickerel	51	1.59	1992
East Creek Lake	Chain Pickerel	40	1.76	1992
East Creek Lake	Chain Pickerel	50	2.30	1992
East Creek Lake	Chain Pickerel	46.2	2.44	1992
East Creek Lake	Chain Pickerel	52.5	2.82	1992
East Creek Lake	Yellow Bullhead	26.8	1.29	1992
East Creek Lake	Yellow Bullhead	27.4	1.47	1992
Evans Lake	Largemouth Bass	27.8	0.15	1992
Evans Lake	Largemouth Bass	21.5	0.33	1992
Harrisville Lake	Chain Pickerel	40	0.99	1992
Harrisville Lake	Chain Pickerel	33.5	1.21	1992
Harrisville Lake	Chain Pickerel	28.3	1.71	1992
Harrisville Lake	Chain Pickerel	45.7	1.74	1992
Harrisville Lake	Chain Pickerel	51.4	2.10	1992
Harrisville Lake	Yellow Bullhead	27.5	1.36	1992
Lake Carasaljo	Chain Pickerel	34.9	0.28	1992
Lake Hopatcong	Chain Pickerel	35.1	0.19	1992
Lake Hopatcong	Chain Pickerel	48	0.22	1992
Lake Hopatcong	Chain Pickerel	47.3	0.35	1992
Lake Hopatcong	Chain Pickerel	45	0.37	1992
Lake Hopatcong	Chain Pickerel	53	0.64	1992
Lake Hopatcong	Largemouth Bass	39.9	0.27	1992
Lake Hopatcong	Largemouth Bass	41.4	0.28	1992
Lake Hopatcong	Largemouth Bass	29.5	0.30	1992

Lake Nummy	Chain Pickerel	35	1.36	1992
Lake Nummy	Yellow Bullhead	26.7	0.32	1992
Lake Nummy	Yellow Bullhead	27.8	0.32	1992
Lake Nummy	Yellow Bullhead	28.1	0.32	1992
Lenape Lake	Chain Pickerel	35.5	0.25	1992
Lenape Lake	Chain Pickerel	44.8	0.54	1992
Lenape Lake	Chain Pickerel	49.7	0.89	1992
Marlton Lake	Largemouth Bass	38	1.36	1992
Maskells Mill Lake	Chain Pickerel	28	0.37	1992
Merrill Creek	Rainbow Trout	25.3	0.04	1992
Merrill Creek	Rainbow Trout	24.7	0.08	1992
Merrill Creek Reservoir	Rainbow Trout	32.1	0.14	1992
Merrill Creek Reservoir	Rainbow Trout	37.5	0.14	1992
Merrill Creek Reservoir	Rainbow Trout	38.6	0.24	1992
Merrill Creek Reservoir	Lake Trout	51.3	0.44	1992
Merrill Creek Reservoir	Lake Trout	51.6	0.77	1992
Merrill Creek Reservoir	Lake Trout	53.2	0.79	1992
Merrill Creek Reservoir	Lake Trout	56.4	0.69	1992
Merrill Creek Reservoir	Largemouth Bass	30.9	0.29	1992
Merrill Creek Reservoir	Largemouth Bass	43.9	0.96	1992
Merrill Creek Reservoir	Largemouth Bass	41.0	1.21	1992
Monksville Reservoir	Chain Pickerel	39.3	0.21	1992
Monksville Reservoir	Chain Pickerel	42.4	0.36	1992
Monksville Reservoir	Chain Pickerel	64	1.14	1992
Monksville Reservoir	Largemouth Bass	28.7	0.45	1992
Monksville Reservoir	Largemouth Bass	33.9	0.52	1992
Monksville Reservoir	Largemouth Bass	38.4	1.00	1992
Mountain Lake	Largemouth Bass	31.8	0.22	1992
Mountain Lake	Largemouth Bass	37.4	0.37	1992
Mountain Lake	Largemouth Bass	47.0	0.90	1992
New Brooklyn Lake	Chain Pickerel	18.7	0.10	1992
New Brooklyn Lake	Chain Pickerel	37.7	0.23	1992
New Brooklyn Lake	Chain Pickerel	46.6	0.79	1992
Newton Creek, North	Brown Bullhead	29	0.02	1992
Newton Creek, North	Brown Bullhead	34.4	0.03	1992
Newton Creek, North	Brown Bullhead	32.3	0.03	1992
Newton Creek, North	Brown Bullhead	32.4	0.03	1992
Newton Creek, North	Channel Catfish	36.5	0.08	1992
Newton Creek, North	Channel Catfish	47.1	0.12	1992
Newton Creek, South	Brown Bullhead	25.9	0.04	1992
Newton Creek, South	Brown Bullhead	26.1	0.06	1992
Newton Creek, South	Brown Bullhead	29.5	0.18	1992
Newton Creek, South	Chain Pickerel	25.3	0.10	1992
Newton Creek, South	Largemouth Bass	37.1	0.23	1992
Newton Creek, South	Largemouth Bass	36.6	0.24	1992
Newton Creek, South	Largemouth Bass	30.7	1.15	1992
Newton Lake	Black Crappie	18.4	0.09	1992
Newton Lake	Black Crappie	19.4	0.11	1992
Newton Lake	Black Crappie	20.4	0.13	1992

Newton Lake	Largemouth Bass	30	0.05	1992
Newton Lake	Largemouth Bass	30.6	0.05	1992
Newton Lake	Largemouth Bass	33.6	0.06	1992
Newton Lake	Largemouth Bass	33.1	0.06	1992
Newton Lake	Largemouth Bass	25.8	0.06	1992
Newton Lake	Largemouth Bass	25.0	0.06	1992
Newton Lake	Largemouth Bass	31.0	0.07	1992
Newton Lake	Largemouth Bass	31.0	0.07	1992
Newton Lake	Largemouth Bass	29.1	0.07	1992
Newton Lake	Largemouth Bass	45.2	0.18	1992
Newton Lake	Largemouth Bass	41.1	0.22	1992
Newton Lake	Largemouth Bass	45.6	0.40	1992
Rancocas Creek	Channel Catfish	45.6	0.11	1992
Rockaway River	Brown Bullhead	31	0.12	1992
Rockaway River	Chain Pickerel	34	0.15	1992
Rockaway River	Chain Pickerel	30.6	0.15	1992
Rockaway River	Chain Pickerel	38.8	0.25	1992
Rockaway River	Chain Pickerel	40.7	0.29	1992
Rockaway River	Chain Pickerel	44.7	0.31	1992
Rockaway River	Rainbow Trout	53.6	0.04	1992
Rockaway River	Yellow Bullhead	21.2	0.15	1992
Rockaway River near Whippany	Largemouth Bass	26.4	0.36	1992
Rockaway River near Whippany	Largemouth Bass	28.9	0.59	1992
Rockaway River near Whippany	Largemouth Bass	31.5	0.73	1992
Round Valley Reservoir	Lake Trout	40	0.06	1992
Round Valley Reservoir	Lake Trout	54.4	0.14	1992
Round Valley Reservoir	Lake Trout	75.5	0.14	1992
Saw Mill Lake	Brown Bullhead	36.5	0.05	1992
Saw Mill Lake	Brown Bullhead	33.1	0.06	1992
Saw Mill Lake	Brown Bullhead	39.5	0.07	1992
Saw Mill Lake	Brown Bullhead	37.9	0.07	1992
Saw Mill Lake	Northern Pike	53.4	0.27	1992
Shadow Lake	Largemouth Bass	29.1	0.12	1992
Shadow Lake	Largemouth Bass	30.4	0.15	1992
Shadow Lake	Largemouth Bass	36.7	0.18	1992
Shadow Lake	Largemouth Bass	31.2	0.26	1992
Spring Lake	Largemouth Bass	37.1	0.21	1992
Spring Lake	Largemouth Bass	49.9	0.75	1992
Spring Lake	Largemouth Bass	47.8	0.80	1992
Spruce Run Reservoir	Hybrid Striped Bass	33.1	0.17	1992
Spruce Run Reservoir	Hybrid Striped Bass	37.1	0.19	1992
Spruce Run Reservoir	Hybrid Striped Bass	38.2	0.22	1992
Spruce Run Reservoir	Largemouth Bass	25.2	0.10	1992
Spruce Run Reservoir	Largemouth Bass	28.4	0.19	1992
Spruce Run Reservoir	Largemouth Bass	41.2	0.41	1992
Spruce Run Reservoir	Largemouth Bass	43.8	0.64	1992
Stafford Forge Main Line	Chain Pickerel	26.6	0.59	1992
Stafford Forge Main Line	Chain Pickerel	27.7	0.63	1992
Stafford Forge Main Line	Chain Pickerel	29.9	0.85	1992

Strawbridge Lake	Black Crappie	15.3	0.13	1992
Strawbridge Lake	Black Crappie	14.8	0.24	1992
Strawbridge Lake	Black Crappie	14.3	0.24	1992
Swartswood Lake	Chain Pickerel	39.6	0.09	1992
Swartswood Lake	Chain Pickerel	43.3	0.10	1992
Swartswood Lake	Chain Pickerel	42.3	0.12	1992
Swartswood Lake	Smallmouth Bass	30.8	0.12	1992
Swartswood Lake	Smallmouth Bass	35.5	0.18	1992
Swartswood Lake	Smallmouth Bass	37.5	0.29	1992
Wading River	Chain Pickerel	39.4	0.66	1992
Wading River	Chain Pickerel	40.8	0.68	1992
Wading River	Chain Pickerel	34.3	0.82	1992
Wading River	Chain Pickerel	37.3	1.09	1992
Wading River	Chain Pickerel	43.6	1.23	1992
Wanaque Reservoir	Chain Pickerel	38.7	0.33	1992
Wanaque Reservoir	Chain Pickerel	55.5	0.93	1992
Wanaque Reservoir	Smallmouth Bass	27.5	0.34	1992
Wanaque Reservoir	Smallmouth Bass	37.9	0.51	1992
Wanaque Reservoir	Largemouth Bass	32.8	0.40	1992
Wanaque Reservoir	Largemouth Bass	37.8	0.61	1992
Wanaque Reservoir	Largemouth Bass	36.6	0.75	1992
Wanaque Reservoir	Largemouth Bass	40.5	1.01	1992
Wanaque Reservoir	Largemouth Bass	43.8	1.17	1992
Wanaque Reservoir	Largemouth Bass	46.4	1.18	1992
Wilson Lake	Chain Pickerel	37.8	0.24	1992
Wilson Lake	Chain Pickerel	36.3	0.38	1992
Wilson Lake	Chain Pickerel	50.6	1.06	1992
Wilson Lake	Chain Pickerel	34.4	1.53	1992
Woodstown Memorial Lake	Black Crappie	17.5	0.08	1992
Woodstown Memorial Lake	Largemouth Bass	24.5	0.11	1992
Woodstown Memorial Lake	Largemouth Bass	27.8	0.20	1992
Woodstown Memorial Lake	Largemouth Bass	27.6	0.23	1992
Woodstown Memorial Lake	Largemouth Bass	39.3	0.34	1992
Woodstown Memorial Lake	Largemouth Bass	45.1	0.50	1992
Big Timber Creek	Channel Catfish	42.3	0.09	1993
Budd Lake	White Catfish	33.8	0.17	1993
Budd Lake	Northern Pike	54.8	0.11	1993
Budd Lake	Northern Pike	64	0.11	1993
Budd Lake	Northern Pike	68.5	0.14	1993
Canistear Reservoir	Largemouth Bass	36	0.41	1993
Canistear Reservoir	Largemouth Bass	42.2	0.52	1993
Canistear Reservoir	Largemouth Bass	40	0.55	1993
Canistear Reservoir	Largemouth Bass	45.7	0.61	1993
Canistear Reservoir	Largemouth Bass	43.5	0.68	1993
Canistear Reservoir	Largemouth Bass	39.1	0.69	1993
Canistear Reservoir	Largemouth Bass	38.8	0.74	1993
Carnegie Lake	Largemouth Bass	39.1	0.20	1993
Carnegie Lake	Largemouth Bass	32.3	0.29	1993
Carnegie Lake	Largemouth Bass	35.1	0.37	1993

Carnegie Lake	Largemouth Bass	44.7	0.45	1993
Carnegie Lake	Largemouth Bass	35.1	0.58	1993
Carnegie Lake	Largemouth Bass	51.3	1.07	1993
Corbin City Impoundment #3	Brown Bullhead	26.7	0.07	1993
Crystal Lake	Black Crappie	19.1	0.04	1993
Crystal Lake	Black Crappie	20.7	0.18	1993
Crystal Lake	Largemouth Bass	23.5	0.09	1993
Crystal Lake	Largemouth Bass	30.0	0.14	1993
Crystal Lake	Largemouth Bass	42.6	0.28	1993
Manasquan Reservoir	Largemouth Bass	31	0.76	1993
Manasquan Reservoir	Largemouth Bass	38.9	2.35	1993
Manasquan Reservoir	Largemouth Bass	36.4	2.45	1993
Manasquan Reservoir	Largemouth Bass	40	2.49	1993
Manasquan Reservoir	Largemouth Bass	38	2.89	1993
Manasquan Reservoir	Largemouth Bass	41.1	3.16	1993
Manasquan Reservoir	Largemouth Bass	40.3	3.87	1993
Maskells Mill Lake	Black Crappie	20.8	0.20	1993
Maskells Mill Lake	Black Crappie	26.3	0.29	1993
Maskells Mill Lake	Brown Bullhead	25.4	0.23	1993
Maskells Mill Lake	Brown Bullhead	28.9	0.31	1993
Maskells Mill Lake	Brown Bullhead	28.9	0.47	1993
Maskells Mill Lake	Largemouth Bass	25.9	0.36	1993
Maskells Mill Lake	Largemouth Bass	32.4	0.48	1993
Mullica River	Chain Pickerel	40.7	1.21	1993
New Brooklyn Lake	Chain Pickerel	46.2	0.82	1993
New Brooklyn Lake	Chain Pickerel	59.7	1.30	1993
Round Valley Reservoir	Largemouth Bass	25.2	0.16	1993
Round Valley Reservoir	Largemouth Bass	37.1	0.24	1993
Round Valley Reservoir	Largemouth Bass	35.1	0.24	1993
Spruce Run Reservoir	Northern Pike	63.2	0.41	1993
Spruce Run Reservoir	Northern Pike	64.2	0.39	1993
Woodstown Memorial Lake	Black Crappie	19.5	0.10	1993
Woodstown Memorial Lake	Black Crappie	37.3	0.22	1993
Batsto Lake	Bluegill sunfish	18.5	0.31	1994
Batsto Lake	Bluegill sunfish	22	0.33	1994
Batsto Lake	Bluegill sunfish	20	0.56	1994
Batsto Lake	Brown bullhead	30.5	0.16	1994
Batsto Lake	Brown bullhead	30	0.16	1994
Batsto Lake	Brown bullhead	28	0.16	1994
Batsto Lake	Brown bullhead	30	0.21	1994
Batsto Lake	Brown bullhead	30	0.25	1994
Batsto Lake	Chain pickerel	29	0.38	1994
Batsto Lake	Chain pickerel	29.5	0.43	1994
Batsto Lake	Chain pickerel	28.5	0.44	1994
Batsto Lake	Chain pickerel	30	0.44	1994
Batsto Lake	Chain pickerel	38	0.79	1994
Batsto Lake	Largemouth bass	27	0.47	1994
Batsto Lake	Largemouth bass	26.5	0.60	1994
Batsto Lake	Largemouth bass	31.5	0.90	1994

Batsto Lake	Largemouth bass	32.5	0.92	1994
Batsto Lake	Largemouth bass	34	1.15	1994
Carnegie Lake	Bluegill sunfish	16.2	0.06	1994
Carnegie Lake	Bluegill sunfish	16.8	0.02	1994
Carnegie Lake	Bluegill sunfish	17.5	0.05	1994
Carnegie Lake	White perch	20	0.13	1994
Carnegie Lake	White perch	20.5	0.19	1994
Carnegie Lake	White perch	21.1	0.11	1994
Carnegie Lake	White perch	21.2	0.20	1994
Carnegie Lake	White perch	21.4	0.19	1994
Carnegie Lake	Largemouth bass	43.0	0.24	1994
Carnegie Lake	Largemouth bass	45.2	0.37	1994
Carnegie Lake	Largemouth bass	43.5	0.45	1994
Carnegie Lake	Largemouth bass	48.0	0.68	1994
Carnegie Lake	Largemouth bass	54.0	0.81	1994
Merrill Creek Reservoir	Largemouth bass	41.0	0.67	1994
Merrill Creek Reservoir	Largemouth bass	39.5	0.93	1994
Merrill Creek Reservoir	Largemouth bass	36.7	0.93	1994
Merrill Creek Reservoir	Largemouth bass	41.0	1.10	1994
Merrill Creek Reservoir	Largemouth bass	49.6	1.12	1994
Monksville Reservoir	Largemouth bass	31.3	0.20	1994
Monksville Reservoir	Largemouth bass	31.2	0.21	1994
Monksville Reservoir	Largemouth bass	28.5	0.51	1994
Monksville Reservoir	Largemouth bass	41.2	0.78	1994
Monksville Reservoir	Largemouth bass	39	1.00	1994
Wilson Lake	Pumpkinseed sunfish	20.4	0.26	1994
Wilson Lake	Pumpkinseed sunfish	18.5	0.60	1994
Wilson Lake	Pumpkinseed sunfish	18.2	1.52	1994
Wilson Lake	Yellow perch	22	0.48	1994
Wilson Lake	Yellow perch	24.5	0.65	1994
Wilson Lake	Yellow perch	26.1	0.72	1994
Wilson Lake	Yellow perch	30	1.08	1994
Wilson Lake	Yellow perch	2.95	1.23	1994
Wilson Lake	Largemouth bass	35.5	0.74	1994
Wilson Lake	Largemouth bass	40.0	0.88	1994
Wilson Lake	Largemouth bass	25.6	0.90	1994
Wilson Lake	Largemouth bass	34.5	0.90	1994
Wilson Lake	Largemouth bass	47.0	1.75	1994
Carnegie Lake	Brown bullhead	30.1	0.03	1995
Carnegie Lake	Brown bullhead	31.1	0.05	1995
Carnegie Lake	Brown bullhead	28.2	0.06	1995
Carnegie Lake	Brown bullhead	28.5	0.10	1995
Carnegie Lake	Brown bullhead	29.4	0.12	1995
Carnegie Lake	Channel catfish	56.6	0.12	1995
Carnegie Lake	Channel catfish	61.8	0.16	1995
Carnegie Lake	Channel catfish	56.2	0.18	1995

Carnegie Lake	Channel catfish	41.2	0.44	1995
East Creek Lake	Brown bullhead	33.2	2.62	1995
East Creek Lake	Chain pickerel	31.2	0.65	1995
East Creek Lake	Chain pickerel	33.5	0.78	1995
East Creek Lake	Chain pickerel	35	0.99	1995
East Creek Lake	Chain pickerel	33.3	1.14	1995
East Creek Lake	Chain pickerel	33.7	1.35	1995
East Creek Lake	Pumpkinseed sunfish	11.3	0.35	1995
East Creek Lake	Pumpkinseed sunfish	11.4	0.43	1995
East Creek Lake	Pumpkinseed sunfish	11.4	0.53	1995
East Creek Lake	Yellow bullhead	11.7	0.30	1995
East Creek Lake	Yellow bullhead	22.3	0.73	1995
East Creek Lake	Yellow perch	18	0.67	1995
East Creek Lake	Yellow perch	20	0.82	1995
East Creek Lake	Yellow perch	22	0.90	1995
East Creek Lake	Yellow perch	24	0.95	1995
East Creek Lake	Yellow perch	20.1	1.01	1995
East Creek Lake	Largemouth bass	33.1	1.07	1995
East Creek Lake	Largemouth bass	33.5	1.44	1995
East Creek Lake	Largemouth bass	34	1.95	1995
East Creek Lake	Largemouth bass	38	2.04	1995
East Creek Lake	Largemouth bass	42	2.21	1995
Harrisville Lake	Chain pickerel	27.5	0.90	1995
Harrisville Lake	Chain pickerel	24.5	0.94	1995
Harrisville Lake	Chain pickerel	25	1.20	1995
Harrisville Lake	Chain pickerel	33.5	1.48	1995
Harrisville Lake	Chain pickerel	45	2.27	1995
Harrisville Lake	mud sunfish	11.1	0.76	1995
Harrisville Lake	mud sunfish	17.5	0.95	1995
Harrisville Lake	mud sunfish	18.5	1.32	1995
Harrisville Lake	Yellow bullhead	15.5	0.96	1995
Harrisville Lake	Yellow bullhead	32.5	2.52	1995
Lake Nummy	Chain pickerel	33.3	0.47	1995
Lake Nummy	Chain pickerel	33.3	0.49	1995
Lake Nummy	Chain pickerel	33.6	0.60	1995
Lake Nummy	Chain pickerel	33.7	0.63	1995
Lake Nummy	Chain pickerel	33.2	0.64	1995
Lake Nummy	Yellow bullhead	25.7	0.21	1995
Lake Nummy	Yellow bullhead	11	0.23	1995
Lake Nummy	Yellow bullhead	25.5	0.31	1995
Lake Nummy	Yellow bullhead	25.1	0.34	1995
Lake Nummy	Yellow perch	22.3	0.52	1995
Lake Nummy	Yellow perch	20	0.53	1995
Lake Nummy	Yellow perch	22.3	0.53	1995
Lake Nummy	Yellow perch	22.3	0.54	1995
Lake Nummy	Yellow perch	22.1	0.59	1995

Manasquan Reservoir	Black crappie	17.5	0.35	1995
Manasquan Reservoir	Black crappie	16.5	0.51	1995
Manasquan Reservoir	Black crappie	16.5	0.53	1995
Manasquan Reservoir	Bluegill sunfish	15	0.16	1995
Manasquan Reservoir	Bluegill sunfish	15.5	0.22	1995
Manasquan Reservoir	Bluegill sunfish	16.8	0.22	1995
Manasquan Reservoir	Bluegill sunfish	16.5	0.31	1995
Manasquan Reservoir	Bluegill sunfish	16.5	0.37	1995
Manasquan Reservoir	Brown bullhead	24	0.06	1995
Manasquan Reservoir	Brown bullhead	21.5	0.11	1995
Manasquan Reservoir	Brown bullhead	22	0.12	1995
Manasquan Reservoir	Brown bullhead	26	0.15	1995
Manasquan Reservoir	Brown bullhead	24	0.16	1995
Manasquan Reservoir	Chain pickerel	21.6	0.08	1995
Manasquan Reservoir	Chain pickerel	20	0.13	1995
Manasquan Reservoir	Chain pickerel	24.1	0.15	1995
Manasquan Reservoir	Chain pickerel	39.8	0.48	1995
Manasquan Reservoir	Yellow perch	19.5	0.11	1995
Manasquan Reservoir	Yellow perch	18	0.12	1995
Manasquan Reservoir	Yellow perch	21	0.17	1995
Manasquan Reservoir	Largemouth bass	27	0.29	1995
Manasquan Reservoir	Largemouth bass	28	0.47	1995
Manasquan Reservoir	Largemouth bass	39.5	1.49	1995
Manasquan Reservoir	Largemouth bass	39.5	1.75	1995
Manasquan Reservoir	Largemouth bass	44.5	2.21	1995
Merrill Creek Reservoir	Black crappie	25.3	0.09	1995
Merrill Creek Reservoir	Black crappie	26.1	0.12	1995
Merrill Creek Reservoir	Bluegill sunfish	14.6	0.05	1995
Merrill Creek Reservoir	Bluegill sunfish	172	0.09	1995
Merrill Creek Reservoir	Bluegill sunfish	25.4	0.16	1995
Merrill Creek Reservoir	Brown bullhead	26	0.12	1995
Merrill Creek Reservoir	Brown bullhead	27.9	0.14	1995
Merrill Creek Reservoir	Brown bullhead	29.5	0.14	1995
Merrill Creek Reservoir	Brown bullhead	25.4	0.16	1995
Merrill Creek Reservoir	Brown bullhead	25.1	0.17	1995
Merrill Creek Reservoir	Lake trout	56.7	0.38	1995
Merrill Creek Reservoir	Lake trout	56.5	0.44	1995
Merrill Creek Reservoir	Lake trout	60	0.46	1995
Merrill Creek Reservoir	Lake trout	58.6	0.51	1995
Merrill Creek Reservoir	Lake trout	64	0.73	1995
Merrill Creek Reservoir	Smallmouth bass	38.5	0.44	1995
Merrill Creek Reservoir	Smallmouth bass	40.1	0.44	1995
Merrill Creek Reservoir	Smallmouth bass	42.5	0.49	1995
Merrill Creek Reservoir	Smallmouth bass	39.3	0.63	1995
Merrill Creek Reservoir	Smallmouth bass	43.3	0.68	1995
Merrill Creek Reservoir	Yellow perch	31.2	0.20	1995
Merrill Creek Reservoir	Yellow perch	30.1	0.22	1995
Merrill Creek Reservoir	Yellow perch	34	0.32	1995
Monksville Reservoir	Brown bullhead	31.8	0.04	1995

Monksville Reservoir	Brown bullhead	31	0.06	1995
Monksville Reservoir	Brown bullhead	29	0.06	1995
Monksville Reservoir	Brown bullhead	28.5	0.09	1995
Monksville Reservoir	Brown bullhead	29.2	0.13	1995
Monksville Reservoir	Brown trout	45	0.20	1995
Monksville Reservoir	Pumpkinseed sunfish	19.2	0.09	1995
Monksville Reservoir	Pumpkinseed sunfish	18.1	0.14	1995
Monksville Reservoir	Pumpkinseed sunfish	18	0.25	1995
Monksville Reservoir	Smallmouth bass	31.6	0.26	1995
Monksville Reservoir	Smallmouth bass	27	0.28	1995
Monksville Reservoir	Smallmouth bass	37	0.33	1995
Monksville Reservoir	Walleye	35.5	0.30	1995
Monksville Reservoir	Walleye	41.4	0.42	1995
Monksville Reservoir	Walleye	42	0.48	1995
Monksville Reservoir	Walleye	47.6	0.80	1995
Monksville Reservoir	Walleye	45.9	0.98	1995
Monksville Reservoir	Walleye	52.2	1.44	1995
Monksville Reservoir	White perch	24.5	0.19	1995
Monksville Reservoir	White perch	26.8	0.55	1995
Monksville Reservoir	White perch	27	0.58	1995
Monksville Reservoir	White perch	28.5	0.74	1995
Monksville Reservoir	White perch	32.1	0.79	1995
Mullica River	Brown bullhead	25.5	0.26	1995
Mullica River	Brown bullhead	24.5	0.28	1995
Mullica River	Brown bullhead	22	0.40	1995
Mullica River	Chain pickerel	23.5	0.25	1995
Mullica River	Chain pickerel	30	0.45	1995
Mullica River	Chain pickerel	33.2	0.49	1995
Mullica River	Chain pickerel	46	0.62	1995
Mullica River	Chain pickerel	50.5	0.92	1995
Mullica River	Pumpkinseed sunfish	13	0.12	1995
Mullica River	Pumpkinseed sunfish	13	0.21	1995
Mullica River	Pumpkinseed sunfish	17	0.52	1995
Mullica River	White catfish	29.6	0.23	1995
Mullica River	White catfish	29	0.25	1995
Mullica River	White catfish	29	0.35	1995
Mullica River	White perch	18.3	0.34	1995
Mullica River	White perch	17.4	0.35	1995
Mullica River	White perch	20	0.36	1995
Mullica River	White perch	19	0.36	1995
Mullica River	White perch	21	0.51	1995
New Brooklyn Lake	Black crappie	21	0.08	1995
New Brooklyn Lake	Black crappie	21.8	0.16	1995
New Brooklyn Lake	Black crappie	21.5	0.19	1995

New Brooklyn Lake	Chain pickerel	20.5	0.13	1995
New Brooklyn Lake	Chain pickerel	29.7	0.20	1995
New Brooklyn Lake	Chain pickerel	34	0.25	1995
New Brooklyn Lake	Chain pickerel	43.9	0.48	1995
New Brooklyn Lake	Chain pickerel	32.5	0.64	1995
New Brooklyn Lake	Pumpkinseed sunfish	15.4	0.22	1995
New Brooklyn Lake	Pumpkinseed sunfish	16	0.28	1995
New Brooklyn Lake	Pumpkinseed sunfish	16.5	0.30	1995
New Brooklyn Lake	Yellow bullhead	20	0.05	1995
New Brooklyn Lake	Yellow bullhead	24.1	0.06	1995
New Brooklyn Lake	Yellow bullhead	23,8	0.08	1995
New Brooklyn Lake	Yellow bullhead	25.9	0.09	1995
New Brooklyn Lake	Yellow bullhead	26.9	0.20	1995
New Brooklyn Lake	Largemouth bass	23.3	0.25	1995
New Brooklyn Lake	Largemouth bass	27.4	0.32	1995
New Brooklyn Lake	Largemouth bass	31.7	0.41	1995
Wading River	Brown bullhead	31.5	0.62	1995
Wading River	Chain pickerel	42.5	0.46	1995
Wading River	Chain pickerel	35.1	0.49	1995
Wading River	Chain pickerel	28.5	0.55	1995
Wading River	Chain pickerel	22.3	0.55	1995
Wading River	Chain pickerel	32	0.71	1995
Wading River	White catfish	30.3	0.49	1995
Wading River	White catfish	30	0.60	1995
Wading River	Yellow bullhead	20.2	1.01	1995
Wading River	Yellow bullhead	30.3	1.59	1995
Wanaque Reservoir	Bluegill sunfish	17.2	0.07	1995
Wanaque Reservoir	Brown bullhead	35.8	0.01	1995
Wanaque Reservoir	Brown bullhead	36.2	0.03	1995
Wanaque Reservoir	Brown bullhead	34	0.07	1995
Wanaque Reservoir	Chain pickerel	51	0.12	1995
Wanaque Reservoir	Chain pickerel	47.5	0.18	1995
Wanaque Reservoir	Chain pickerel	50.5	0.37	1995
Wanaque Reservoir	Chain pickerel	47	0.41	1995
Wanaque Reservoir	Chain pickerel	50.6	0.43	1995
Wanaque Reservoir	Chain pickerel	56	0.73	1995
Wanaque Reservoir	Smallmouth bass	38.5	0.27	1995
Wanaque Reservoir	Smallmouth bass	29.6	0.29	1995
Wanaque Reservoir	Smallmouth bass	46.2	0.36	1995
Wanaque Reservoir	White catfish	41.5	0.12	1995
Wanaque Reservoir	White catfish	40.5	0.17	1995
Wanaque Reservoir	White catfish	37.1	0.17	1995
Wanaque Reservoir	White catfish	37.7	0.28	1995
Wanaque Reservoir	White catfish	42.9	0.33	1995
Wanaque Reservoir	White perch	27.2	0.35	1995
Wanaque Reservoir	White perch	30.7	0.63	1995

Wanaque Reservoir	White perch	36.8	0.65	1995
Wanaque Reservoir	White perch	32.1	0.75	1995
Wanaque Reservoir	White perch	33.9	1.18	1995
Wanaque Reservoir	Yellow bullhead	23.9	0.03	1995
Wanaque Reservoir	Largemouth bass	37.9	0.36	1995
Wanaque Reservoir	Largemouth bass	34.6	0.45	1995
Wanaque Reservoir	Largemouth bass	39.5	0.51	1995
Wanaque Reservoir	Largemouth bass	41.4	0.71	1995
Wanaque Reservoir	Largemouth bass	41.4	0.85	1995
Wilson Lake	Chain pickerel	29.5	0.66	1995
Wilson Lake	Chain pickerel	30.5	0.88	1995
Wilson Lake	Chain pickerel	25.7	0.91	1995
Wilson Lake	Chain pickerel	47	1.14	1995
Wilson Lake	Chain pickerel	47	1.30	1995
Boonton Reservoir	Brown Bullhead	30.5	0.01	1996
Boonton Reservoir	Brown Bullhead	32.8	0.02	1996
Boonton Reservoir	White Catfish	40	0.54	1996
Boonton Reservoir	Largemouth Bass	35	0.33	1996
Boonton Reservoir	Largemouth Bass	45.1	0.60	1996
Boonton Reservoir	Largemouth Bass	41.6	0.81	1996
Butterfly Bogs	Brown Bullhead	30.6	0.08	1996
Butterfly Bogs	Chain Pickerel	33.9	0.78	1996
Cedar Lake	Brown Bullhead	31.5	0.06	1996
Cedar Lake	Chain Pickerel	47.9	0.24	1996
Cedar Lake	Chain Pickerel	49.6	0.31	1996
Cedar Lake	Chain Pickerel	64.7	0.76	1996
Cedar Lake	Largemouth Bass	39	0.25	1996
Cedar Lake	Largemouth Bass	41.5	0.59	1996
Cedar Lake	Largemouth Bass	43.8	0.61	1996
Crater Lake	Brown Bullhead	30	0.39	1996
Crater Lake	Yellow Perch	21.6	0.29	1996
Crater Lake	Yellow Perch	19.9	0.43	1996
Crater Lake	Yellow Perch	27.9	0.58	1996
DeVoe Lake	Brown Bullhead	27	0.09	1996
DeVoe Lake	Chain Pickerel	41.5	0.14	1996
DeVoe Lake	Chain Pickerel	43	0.25	1996
DeVoe Lake	Chain Pickerel	48.5	0.27	1996
DeVoe Lake	Largemouth Bass	31.7	0.07	1996
DeVoe Lake	Largemouth Bass	34.1	0.21	1996
DeVoe Lake	Largemouth Bass	36.5	0.26	1996
Double Trouble Lake	Chain Pickerel	18.1	0.74	1996
Double Trouble Lake	Chain Pickerel	37.7	1.24	1996
Double Trouble Lake	Chain Pickerel	46.7	1.60	1996
Double Trouble Lake	Chain Pickerel	52.4	2.24	1996
Double Trouble Lake	Chain Pickerel	57.6	2.30	1996
Double Trouble Lake	Yellow Bullhead	26.1	0.82	1996
Double Trouble Lake	Yellow Bullhead	28.3	1.09	1996
Double Trouble Lake	Yellow Bullhead	26.6	1.18	1996
Echo Lake Reservoir	Largemouth Bass	30.4	0.12	1996

Echo Lake Reservoir	Largemouth Bass	34.4	0.15	1996
Echo Lake Reservoir	Largemouth Bass	29	0.16	1996
Echo Lake Reservoir	Largemouth Bass	35	0.17	1996
Green Turtle Lake	Chain Pickerel	28.1	0.11	1996
Green Turtle Lake	Chain Pickerel	44.7	0.14	1996
Green Turtle Lake	Chain Pickerel	44.6	0.15	1996
Green Turtle Lake	Yellow Perch	20.8	0.09	1996
Green Turtle Lake	Yellow Perch	24.6	0.10	1996
Green Turtle Lake	Largemouth Bass	23.6	0.17	1996
Green Turtle Lake	Largemouth Bass	26.1	0.22	1996
Green Turtle Lake	Largemouth Bass	34.7	0.32	1996
Greenwood Lake	White perch	18.3	0.00	1996
Greenwood Lake	White perch	19.2	0.02	1996
Greenwood Lake	Largemouth Bass	36.2	0.15	1996
Greenwood Lake	Largemouth Bass	34.3	0.18	1996
Greenwood Lake	Largemouth Bass	31.4	0.21	1996
Greenwood Lake	Largemouth Bass	36.3	0.24	1996
Greenwood Lake	Largemouth Bass	40	0.40	1996
Grovers Mill Pond	Brown Bullhead	33	0.08	1996
Grovers Mill Pond	Brown Bullhead	32.2	0.40	1996
Grovers Mill Pond	Chain Pickerel	35.3	0.12	1996
Grovers Mill Pond	Chain Pickerel	35.2	0.16	1996
Grovers Mill Pond	Chain Pickerel	37.2	0.16	1996
Grovers Mill Pond	Chain Pickerel	36.5	0.18	1996
Grovers Mill Pond	Largemouth Bass	31.3	0.25	1996
Grovers Mill Pond	Largemouth Bass	35.8	0.30	1996
Grovers Mill Pond	Largemouth Bass	35	0.36	1996
Grovers Mill Pond	Largemouth Bass	41.5	0.39	1996
Grovers Mill Pond	Largemouth Bass	28	0.47	1996
Hainesville Pond	Chain Pickerel	39.3	0.14	1996
Hainesville Pond	Chain Pickerel	36.6	0.14	1996
Hainesville Pond	Chain Pickerel	36.5	0.15	1996
Hainesville Pond	Largemouth Bass	30.3	0.13	1996
Hainesville Pond	Largemouth Bass	31.0	0.21	1996
Hainesville Pond	Largemouth Bass	31.3	0.23	1996
Malaga Lake	Chain Pickerel	32	0.73	1996
Malaga Lake	Chain Pickerel	29.3	0.88	1996
Malaga Lake	Chain Pickerel	36.2	0.97	1996
Malaga Lake	Chain Pickerel	31	0.99	1996
Malaga Lake	Chain Pickerel	34	1.38	1996
Malaga Lake	Largemouth Bass	32.4	0.95	1996
Passaic River at Hatfield Swamp	Pumpkinseed Sunfish	12.4	0.08	1996
Passaic River at Hatfield Swamp	Pumpkinseed Sunfish	12.6	0.09	1996
Passaic River at Hatfield Swamp	Black Crappie	18.1	0.30	1996
Passaic River at Hatfield Swamp	Black Crappie	18.9	0.32	1996
Passaic River at Hatfield Swamp	Bluegill Sunfish	18.9	0.19	1996
Passaic River at Hatfield Swamp	Black Crappie	20	0.21	1996

Passaic River at Hatfield Swamp	Black Crappie	20	0.22	1996
Passaic River at Hatfield Swamp	Yellow Bullhead	21.4	0.11	1996
Passaic River at Hatfield Swamp	Largemouth Bass	23	0.17	1996
Passaic River at Hatfield Swamp	Largemouth Bass	23.5	0.21	1996
Passaic River at Hatfield Swamp	Largemouth Bass	36	0.53	1996
Pompton River at Lincoln Park	Pike	27.8	0.17	1996
Pompton River at Lincoln Park	Pike	42	0.41	1996
Pompton River at Lincoln Park	Pike	66.6	0.59	1996
Pompton River at Lincoln Park	Yellow Perch	21	0.21	1996
Pompton River at Lincoln Park	Yellow Perch	24	0.26	1996
Pompton River at Lincoln Park	Largemouth Bass	35.4	0.50	1996
Pompton River at Lincoln Park	Largemouth Bass	35.5	0.68	1996
Raritan River at Millstone River	Brown Bullhead	25.4	0.06	1996
Raritan River at Millstone River	Brown Bullhead	27.5	0.07	1996
Raritan River at Millstone River	Channel Catfish	39.8	0.15	1996
Raritan River at Millstone River	Largemouth Bass	32.5	0.33	1996
Raritan River at Millstone River	Largemouth Bass	36.3	0.33	1996
Raritan River at Millstone River	Largemouth Bass	44.9	0.37	1996
Raritan River at Millstone River	Largemouth Bass	37	0.46	1996
Ridgeway Branch of Tom's River	Brown Bullhead	26.4	0.17	1996
Ridgeway Branch of Tom's River	Brown Bullhead	27	0.44	1996
Ridgeway Branch of Tom's River	Brown Bullhead	22.8	1.15	1996
Ridgeway Branch of Tom's River	Brown Bullhead	25.6	1.57	1996
Ridgeway Branch of Tom's River	Chain Pickerel	36	1.22	1996
Rockaway River near Whippany	Black Crappie	17.9	0.21	1996
Rockaway River near Whippany	Bluegill Sunfish	14.5	0.12	1996
Rockaway River near Whippany	Largemouth Bass	39.8	0.92	1996
South Branch Raritan River at Neshanic Station	Brown Bullhead	17.2	0.08	1996
South Branch Raritan River at Neshanic Station	Redbreast Sunfish	15.7	0.09	1996
South Branch Raritan River at Neshanic Station	Redbreast Sunfish	15.9	0.15	1996
South Branch Raritan River at Neshanic Station	Rock Bass	15	0.09	1996
South Branch Raritan River at Neshanic Station	Smallmouth Bass	20.7	0.18	1996
South Branch Raritan River at Neshanic Station	Largemouth Bass	18.2	0.11	1996
Speedwell Lake	Bluegill Sunfish	18.3	0.12	1996
Speedwell Lake	Bluegill Sunfish	19.7	0.13	1996
Speedwell Lake	Brown Bullhead	21	0.01	1996
Speedwell Lake	Largemouth Bass	27.5	0.10	1996
Speedwell Lake	Largemouth Bass	32.5	0.34	1996
Speedwell Lake	Largemouth Bass	36.1	0.38	1996
Steenykill Lake	Largemouth Bass	26.5	0.16	1996
Steenykill Lake	Largemouth Bass	27.5	0.19	1996
Steenykill Lake	Largemouth Bass	27.7	0.19	1996
Steenykill Lake	Largemouth Bass	27.8	0.15	1996
Steenykill Lake	Largemouth Bass	28.3	0.22	1996

Steenykill Lake	Largemouth Bass	29.6	0.15	1996
Sunset Lake	Bluegill Sunfish	11.2	0.05	1996
Sunset Lake	Chain Pickerel	30.7	0.09	1996
Sunset Lake	Largemouth Bass	22.5	0.10	1996
Sunset Lake	Largemouth Bass	33.8	0.17	1996
Sunset Lake	Largemouth Bass	38.2	0.21	1996
Sunset Lake	Largemouth Bass	38.5	0.35	1996
Sunset Lake	Largemouth Bass	53	0.69	1996
Wawayanda Lake	Chain Pickerel	35	0.25	1996
Wawayanda Lake	Chain Pickerel	39.5	0.28	1996
Wawayanda Lake	Chain Pickerel	40.5	0.29	1996
Wawayanda Lake	Chain Pickerel	37.9	0.31	1996
Wawayanda Lake	Chain Pickerel	42	0.34	1996
Wawayanda Lake	Chain Pickerel	42.4	0.44	1996
Oak Ridge Reservoir	Yellow Bullhead	24.5	0.25	1997
Oak Ridge Reservoir	Chain Pickerel	25	0.24	1997
Oak Ridge Reservoir	Chain Pickerel	28	0.29	1997
Oak Ridge Reservoir	Chain Pickerel	30.6	0.30	1997
Oak Ridge Reservoir	Brown Bullhead	33	0.02	1997
Oak Ridge Reservoir	Brown Bullhead	34.5	0.02	1997
Oak Ridge Reservoir	Smallmouth Bass	40.2	0.49	1997
Oak Ridge Reservoir	Chain Pickerel	58	0.30	1997
Oak Ridge Reservoir	Largemouth Bass	36.8	0.38	1997
Oak Ridge Reservoir	Largemouth Bass	42.5	0.64	1997
Oak Ridge Reservoir	Largemouth Bass	48	0.71	1997
Oak Ridge Reservoir	Largemouth Bass	48	0.89	1997
Pompton River at Pequannock River	Black Crappie	19.3	0.24	1997
Pompton River at Pequannock River	Pumpkinseed Sunfish	14.5	0.35	1997
Pompton River at Pequannock River	Pumpkinseed Sunfish	14.1	0.78	1997
Pompton River at Pequannock River	Redbreast Sunfish	13.7	0.32	1997
Pompton River at Pequannock River	Redbreast Sunfish	15.8	0.41	1997
Pompton River at Pequannock River	Rock Bass	19.2	0.54	1997
Pompton River at Pequannock River	Rock Bass	21.1	0.54	1997
Pompton River at Pequannock River	Rock Bass	22	0.68	1997
Pompton River at Pequannock River	Smallmouth Bass	29.6	0.57	1997
Pompton River at Pequannock River	Smallmouth Bass	36.8	1.02	1997
Pompton River at Pequannock River	Smallmouth Bass	25.4	1.10	1997
Pompton River at Pequannock River	Smallmouth Bass	27.8	1.14	1997
Pompton River at Pequannock River	Yellow Bullhead	26.2	0.80	1997
Pompton River at Pequannock River	Largemouth Bass	39	0.99	1997
Pompton River at Pequannock River	Largemouth Bass	39.8	1.36	1997
Whitesbog Pond	Chain Pickerel	23	0.43	1997
Whitesbog Pond	Chain Pickerel	31.5	0.58	1997
Whitesbog Pond	Chain Pickerel	34.3	0.74	1997
Whitesbog Pond	Chain Pickerel	32.5	0.76	1997
Whitesbog Pond	Chain Pickerel	39.6	1.02	1997
Willow Grove Lake	Brown Bullhead	33	0.23	1997

Willow Grove Lake	Brown Bullhead	32.4	0.28	1997
Willow Grove Lake	Chain Pickerel	31	0.76	1997
Willow Grove Lake	Chain Pickerel	48.1	1.03	1997
Willow Grove Lake	Chain Pickerel	36.5	1.13	1997
Willow Grove Lake	Chain Pickerel	45.2	1.26	1997
Willow Grove Lake	Chain Pickerel	53	1.29	1997
Willow Grove Lake	White Catfish	43	0.17	1997
Willow Grove Lake	Yellow Bullhead	28	0.82	1997
Willow Grove Lake	Yellow Bullhead	30.5	0.91	1997
Willow Grove Lake	Largemouth Bass	33.2	1.68	1997
Mullica River @ Green Bank	American Eel	45.7	0.51	1999
Mullica River @ Green Bank	American Eel	69	0.49	1999
Mullica River @ New Gretna	American Eel	42.5	0.3	1999
Mullica River, below dam @ Batsto Village	American Eel	29.7	0.65	1999
Mullica River, below dam @ Batsto Village	American Eel	39.5	0.04	1999
Mullica River, below dam @ Batsto Village	American Eel	46.3	0.8	1999
Stewart Lake (Woodbury)	Bluegill	15.9	0.03	1999
Stewart Lake (Woodbury)	Bluegill	16.4	0.03	1999
Stewart Lake (Woodbury)	Black Crappie	18.3	0.1	1999
Stewart Lake (Woodbury)	Brown Bullhead	25.4	0.01	1999
Stewart Lake (Woodbury)	Brown Bullhead	27.3	0.01	1999
Stewart Lake (Woodbury)	Brown Bullhead	31.1	0.04	1999
Stewart Lake (Woodbury)	Common Carp	43.8	0.01	1999
Stewart Lake (Woodbury)	Common Carp	49.3	0.04	1999
Stewart Lake (Woodbury)	Common Carp	54.5	0.08	1999
Stewart Lake (Woodbury)	Common Carp	59.8	0.03	1999
Stewart Lake (Woodbury)	Common Carp	65.8	0.03	1999
Stewart Lake (Woodbury)	Largemouth Bass	35.9	0.2	1999
Stewart Lake (Woodbury)	Largemouth Bass	38.9	0.15	1999
Stewart Lake (Woodbury)	Largemouth Bass	43.5	0.19	1999
Boonton Reservoir	rock bass	20.7	0.13	2002
Boonton Reservoir	rock bass	22.2	0.27	2002
Boonton Reservoir	rock bass	22.3	0.22	2002
Boonton Reservoir	rock bass	22.3	0.26	2002
Boonton Reservoir	smallmouth bass	38.9	0.39	2002
Boonton Reservoir	smallmouth bass	41.0	0.39	2002
Boonton Reservoir	smallmouth bass	43.4	0.52	2002
Boonton Reservoir	smallmouth bass	48.4	0.75	2002
Boonton Reservoir	largemouth bass	41.6	0.36	2002
Boonton Reservoir	largemouth bass	45.0	0.59	2002
Boonton Reservoir	largemouth bass	48.3	1.08	2002
Boonton Reservoir	largemouth bass	48.7	0.73	2002
Boonton Reservoir	largemouth bass	52.2	0.80	2002
Branch Brook Park	bluegill	14.5	0.16	2002
Branch Brook Park	bluegill	15.3	0.15	2002
Branch Brook Park	bluegill	15.5	0.24	2002

Branch Brook Park	common carp	60.5	0.10	2002
Branch Brook Park	common carp	69.0	0.19	2002
Branch Brook Park	common carp	69.5	0.19	2002
Branch Brook Park	common carp	72.5	0.07	2002
Canistear Reservoir	bluegill	18.5	0.11	2002
Canistear Reservoir	yellow perch	20.5	0.29	2002
Canistear Reservoir	bluegill	21.0	0.10	2002
Canistear Reservoir	bluegill	21.8	0.11	2002
Canistear Reservoir	yellow bullhead	24.5	0.12	2002
Canistear Reservoir	yellow bullhead	25.1	0.17	2002
Canistear Reservoir	yellow perch	25.3	0.18	2002
Canistear Reservoir	yellow perch	27.5	0.22	2002
Canistear Reservoir	yellow bullhead	27.6	0.16	2002
Canistear Reservoir	yellow bullhead	28.6	0.19	2002
Canistear Reservoir	chain pickerel	41.5	0.19	2002
Canistear Reservoir	chain pickerel	41.8	0.25	2002
Canistear Reservoir	chain pickerel	44.0	0.14	2002
Canistear Reservoir	chain pickerel	47.2	0.16	2002
Canistear Reservoir	bluegill	21.2	0.23	2002
Canistear Reservoir	largemouth bass	41.7	0.38	2002
Canistear Reservoir	largemouth bass	43.8	0.29	2002
Canistear Reservoir	largemouth bass	44.5	0.51	2002
Canistear Reservoir	largemouth bass	51.4	0.67	2002
Clinton Reservoir	redbreast sunfish	12.7	0.25	2002
Clinton Reservoir	redbreast sunfish	13.2	0.19	2002
Clinton Reservoir	redbreast sunfish	13.8	0.16	2002
Clinton Reservoir	redbreast sunfish	14.1	0.16	2002
Clinton Reservoir	rock bass	15.8	0.18	2002
Clinton Reservoir	rock bass	15.9	0.19	2002
Clinton Reservoir	rock bass	18.2	0.65	2002
Clinton Reservoir	yellow bullhead	28.2	0.43	2002
Clinton Reservoir	yellow bullhead	28.3	0.74	2002
Clinton Reservoir	yellow bullhead	28.4	0.44	2002
Clinton Reservoir	yellow bullhead	29.7	0.45	2002
Clinton Reservoir	white sucker	44.5	0.25	2002
Clinton Reservoir	chain pickerel	45.2	0.61	2002
Clinton Reservoir	white sucker	45.5	0.19	2002
Clinton Reservoir	white sucker	46.8	0.24	2002
Clinton Reservoir	chain pickerel	53.0	0.43	2002
Echo Lake Reservoir	bluegill	16.4	0.10	2002
Echo Lake Reservoir	bluegill	17.9	0.06	2002
Echo Lake Reservoir	bluegill	18.5	0.11	2002
Echo Lake Reservoir	bluegill	19.0	0.11	2002
Echo Lake Reservoir	yellow bullhead	22.4	0.09	2002
Echo Lake Reservoir	yellow bullhead	22.9	0.14	2002
Echo Lake Reservoir	yellow bullhead	26.4	0.16	2002
Echo Lake Reservoir	yellow bullhead	28.6	0.07	2002
Echo Lake Reservoir	chain pickerel	43.5	0.20	2002
Echo Lake Reservoir	chain pickerel	45.6	0.27	2002

Echo Lake Reservoir	chain pickerel	62.8	0.37	2002
Echo Lake Reservoir	largemouth bass	45.6	0.43	2002
Echo Lake Reservoir	largemouth bass	48.1	0.61	2002
Echo Lake Reservoir	largemouth bass	49.4	0.72	2002
Echo Lake Reservoir	largemouth bass	50.5	0.79	2002
Green Turtle Lake	bluegill	17.7	0.07	2002
Green Turtle Lake	bluegill	17.9	0.09	2002
Green Turtle Lake	bluegill	18.6	0.14	2002
Green Turtle Lake	bluegill	19.9	0.58	2002
Green Turtle Lake	largemouth bass	31.7	0.20	2002
Green Turtle Lake	largemouth bass	32.5	0.26	2002
Green Turtle Lake	largemouth bass	38.9	0.32	2002
Green Turtle Lake	largemouth bass	40.0	0.36	2002
Green Turtle Lake	largemouth bass	49.4	0.74	2002
Greenwood Lake	bluegill	19.0	0.08	2002
Greenwood Lake	bluegill	19.1	0.13	2002
Greenwood Lake	bluegill	19.2	0.07	2002
Greenwood Lake	bluegill	20.1	0.09	2002
Greenwood Lake	yellow bullhead	21.4	0.06	2002
Greenwood Lake	yellow bullhead	23.6	0.09	2002
Greenwood Lake	yellow bullhead	23.7	0.07	2002
Greenwood Lake	yellow bullhead	23.8	0.11	2002
Greenwood Lake	walleye		0.18	2002
Greenwood Lake	walleye		0.28	2002
Greenwood Lake	walleye		0.28	2002
Greenwood Lake	walleye		0.30	2002
Greenwood Lake	walleye		0.47	2002
Greenwood Lake	largemouth bass	39.9	0.31	2002
Greenwood Lake	largemouth bass	42.0	0.31	2002
Greenwood Lake	largemouth bass	42.6	0.31	2002
Greenwood Lake	largemouth bass	42.7	0.21	2002
Greenwood Lake	largemouth bass	44.4	0.29	2002
Monksville reservoir	bluegill	17.8	0.11	2002
Monksville reservoir	bluegill	18.5	0.08	2002
Monksville reservoir	yellow bullhead	19.4	0.11	2002
Monksville reservoir	bluegill	19.8	0.17	2002
Monksville reservoir	bluegill	19.9	0.13	2002
Monksville reservoir	yellow bullhead	23.0	0.13	2002
Monksville reservoir	yellow perch	27.6	0.17	2002
Monksville reservoir	yellow perch	34.9	0.17	2002
Monksville reservoir	chain pickerel	35.5	0.15	2002
Monksville reservoir	chain pickerel	38.4	0.19	2002
Monksville reservoir	walleye	44.4	0.44	2002
Monksville reservoir	walleye	47.8	0.55	2002
Monksville reservoir	chain pickerel	51.1	0.31	2002
Monksville reservoir	walleye	51.6	0.42	2002
Monksville reservoir	walleye	54.0	0.35	2002
Monksville reservoir	walleye	59.8	0.78	2002
Monksville Reservoir	Largemouth bass	26.5	0.20	2002

Monksville Reservoir	Largemouth bass	28.0	0.18	2002
Monksville Reservoir	Largemouth bass	31.5	0.13	2002
Monksville Reservoir	Largemouth bass	36.9	0.32	2002
Monksville Reservoir	Largemouth bass	44.0	0.39	2002
Oak Ridge Reservoir	bluegill	17.5	0.15	2002
Oak Ridge Reservoir	bluegill	18.1	0.11	2002
Oak Ridge Reservoir	bluegill	19.9	0.24	2002
Oak Ridge Reservoir	bluegill	20.0	0.28	2002
Oak Ridge Reservoir	yellow bullhead	23.8	0.10	2002
Oak Ridge Reservoir	yellow bullhead	28.5	0.23	2002
Oak Ridge Reservoir	largemouth bass	41.3	0.90	2002
Oak Ridge Reservoir	largemouth bass	41.6	0.65	2002
Oak Ridge Reservoir	largemouth bass	42.2	0.81	2002
Oak Ridge Reservoir	largemouth bass	45.1	0.82	2002
Pompton River at Lincoln Park	black crappie	17.5	0.19	2002
Pompton River at Lincoln Park	black crappie	20.3	0.29	2002
Pompton River at Lincoln Park	rock bass	20.8	0.64	2002
Pompton River at Lincoln Park	black crappie	21.4	0.15	2002
Pompton River at Lincoln Park	rock bass	21.5	0.60	2002
Pompton River at Lincoln Park	rock bass	23.7	0.83	2002
Pompton River at Lincoln Park	common carp	49.5	0.22	2002
Pompton River at Lincoln Park	common carp	49.9	0.47	2002
Pompton River at Lincoln Park	common carp	57.5	0.28	2002
Pompton River at Lincoln Park	common carp	58.7	0.39	2002
Pompton River at Lincoln Park	largemouth bass	34.6	0.35	2002
Pompton River at Lincoln Park	largemouth bass	35.2	0.50	2002
Pompton River at Lincoln Park	largemouth bass	39.2	0.74	2002
Rockaway River at Powerville	bluegill	15.8	0.11	2002
Rockaway River at Powerville	bluegill	16.0	0.11	2002
Rockaway River at Powerville	bluegill	16.1	0.13	2002
Rockaway River at Powerville	yellow bullhead	16.6	0.10	2002
Rockaway River at Powerville	yellow bullhead	22.5	0.28	2002
Rockaway River at Powerville	rock bass	23.3	0.29	2002
Rockaway River at Powerville	yellow bullhead	23.5	0.14	2002
Rockaway River at Powerville	rock bass	23.9	0.41	2002
Rockaway River at Powerville	rock bass	24.1	0.34	2002
Rockaway River at Powerville	rock bass	24.5	0.32	2002
Shepherds lake	redbreast sunfish	14.6	0.19	2002
Shepherds lake	rock bass	15.3	0.20	2002
Shepherds lake	redbreast sunfish	15.6	0.18	2002
Shepherds lake	redbreast sunfish	15.9	0.20	2002
Shepherds lake	rock bass	20.9	0.15	2002
Shepherds lake	brown bullhead	28.9	0.06	2002
Shepherds lake	brown bullhead	29.5	0.13	2002
Shepherds lake	brown bullhead	36.1	0.07	2002
Shepherds lake	largemouth bass	39.0	0.76	2002
Shepherds Lake	largemouth bass	39.2	0.71	2002
Shepherds Lake	largemouth bass	39.7	0.56	2002
Shepherds Lake	largemouth bass	40.4	0.67	2002

Shepherds Lake	largemouth bass	41.1	0.60	2002
Speedwell Lake	bluegill	15.4	0.10	2002
Speedwell Lake	bluegill	15.8	0.10	2002
Speedwell Lake	bluegill	18.6	0.13	2002
Speedwell Lake	bluegill	20.5	0.16	2002
Speedwell Lake	chain pickerel	25.9	0.09	2002
Speedwell Lake	chain pickerel	31.8	0.11	2002
Speedwell Lake	common carp	57.7	0.13	2002
Speedwell Lake	chain pickerel	59.6	0.26	2002
Speedwell Lake	common carp	61.7	0.10	2002
Speedwell Lake	common carp	62.5	0.14	2002
Speedwell Lake	common carp	63.6	0.05	2002
Split Rock Reservoir	bluegill	21.2	0.13	2002
Split Rock Reservoir	bluegill	21.4	0.21	2002
Split Rock Reservoir	bluegill	22.0	0.10	2002
Split Rock Reservoir	bluegill	22.6	0.12	2002
Split Rock Reservoir	yellow perch	26.2	0.10	2002
Split Rock Reservoir	yellow perch	29.5	0.15	2002
Split Rock Reservoir	yellow perch	30.0	0.13	2002
Split Rock Reservoir	yellow perch	30.0	0.34	2002
Split Rock Reservoir	brown bullhead	30.7	0.04	2002
Split Rock Reservoir	brown bullhead	39.0	0.04	2002
Split Rock Reservoir	chain pickerel	46.8	0.30	2002
Split Rock Reservoir	chain pickerel	49.0	0.32	2002
Split Rock Reservoir	chain pickerel	54.5	0.30	2002
Split Rock Reservoir	chain pickerel	57.0	0.32	2002
Split Rock Reservoir	chain pickerel	61.0	0.26	2002
Split Rock Reservoir	largemouth bass	35.5	0.32	2002
Split Rock Reservoir	largemouth bass	35.9	0.38	2002
Split Rock Reservoir	largemouth bass	38.0	0.32	2002
Split Rock Reservoir	largemouth bass	39.4	0.48	2002
Split Rock Reservoir	largemouth bass	40.5	0.52	2002
Wanaque Reservoir	yellow bullhead	18.8	0.10	2002
Wanaque Reservoir	yellow bullhead	19.9	0.08	2002
Wanaque Reservoir	bluegill	20.2	0.22	2002
Wanaque Reservoir	bluegill	20.4	0.23	2002
Wanaque Reservoir	bluegill	20.6	0.27	2002
Wanaque Reservoir	bluegill	21.2	0.41	2002
Wanaque Reservoir	yellow bullhead	22.2	0.16	2002
Wanaque Reservoir	yellow bullhead	22.9	0.17	2002
Wanaque Reservoir	largemouth bass	30.7	0.28	2002
Wanaque Reservoir	largemouth bass	34.2	0.23	2002
Wanaque Reservoir	largemouth bass	45.2	1.03	2002
Wanaque Reservoir	largemouth bass	48.0	1.47	2002
Wawayanda Lake	bluegill	17.9	0.14	2002
Wawayanda Lake	bluegill	18.2	0.21	2002
Wawayanda Lake	bluegill	18.3	0.21	2002
Wawayanda Lake	chain pickerel	26.4	0.23	2002
Wawayanda Lake	chain pickerel	27.1	0.23	2002
Wawayanda Lake	yellow bullhead	27.1	0.30	2002

Wawayanda Lake	chain pickerel	28.0	0.23	2002
Wawayanda Lake	yellow bullhead	28.3	0.45	2002
Wawayanda Lake	yellow bullhead	29.9	0.36	2002
Wawayanda Lake	chain pickerel	33.9	0.50	2002
Wawayanda Lake	chain pickerel	44.5	0.44	2002
Wawayanda Lake	largemouth bass	33.0	0.29	2002
Wawayanda Lake	largemouth bass	33.4	0.33	2002
Wawayanda Lake	largemouth bass	42.9	0.78	2002
Wawayanda Lake	largemouth bass	44.1	0.66	2002
Wawayanda Lake	largemouth bass	45.3	0.73	2002
Weequachic Lake	bluegill	16.4	0.12	2002
Weequachic Lake	bluegill	17.3	0.15	2002
Weequachic Lake	bluegill	17.4	0.09	2002
Weequachic Lake	white perch	17.7	0.10	2002
Weequachic Lake	white perch	17.9	0.08	2002
Weequachic Lake	white perch	18.0	0.09	2002
Weequachic Lake	brown bullhead	27.2	0.03	2002
Weequachic Lake	brown bullhead	30.0	0.03	2002
Weequachic Lake	brown bullhead	31.0	0.03	2002
Weequachic Lake	common carp	50.5	0.04	2002
Weequachic Lake	common carp	56.2	0.08	2002
Weequachic Lake	common carp	71.0	0.10	2002
Weequachic Lake	largemouth bass	34.0	0.21	2002
Weequachic Lake	largemouth bass	35.1	0.20	2002
Weequachic Lake	largemouth bass	45.9	0.31	2002
Weequachic Lake	largemouth bass	47.5	0.39	2002
Mullica River	American Eel	49.5	0.29	2004
Mullica River	American Eel	63.5	0.33	2004
Mullica River	American Eel	64.9	0.18	2004
Mullica River	American Eel	73.2	0.2	2004
Mullica River	American Eel	77	0.2	2004
Below New Market Pond Dam	American eel	68.2	0.08673	2006
Below New Market Pond Dam	American eel	69.9	0.11418	2006
Bound Brook @ Shepard Rd.	American eel	51.3	0.08569	2006
Bound Brook @ Shepard Rd.	American eel	54.3	0.08921	2006
Bound Brook @ Shepard Rd.	American eel	61.3	0.20208	2006
Budd Lake	bluegill	17.8	0.09949	2006
Budd Lake	bluegill	18.2	0.1561	2006
Budd Lake	bluegill	18.8	0.12716	2006
Budd Lake	brown bullhead	25.6	0.02337	2006
Budd Lake	brown bullhead	27.2	0.0193	2006
Budd Lake	brown bullhead	31.5	0.01034	2006
Budd Lake	white catfish	34.3	0.18067	2006
Budd Lake	white catfish	35.6	0.21846	2006
Budd Lake	white catfish	42.1	0.27947	2006
Budd Lake	northern pike	74.1	0.30651	2006
Budd Lake	northern pike	78.4	0.45883	2006
Budd Lake	northern pike	81	0.19917	2006
Budd Lake	largemouth bass	35.7	0.16964	2006
Budd Lake	largemouth bass	36.4	0.43134	2006

Budd Lake	largemouth bass	36.9	0.53606	2006
Budd Lake	largemouth bass	43.1	0.48615	2006
Budd Lake	largemouth bass	47.6	0.41803	2006
Carnegie Lake	Bluegill sunfish	16.7	0.06306	2006
Carnegie Lake	Bluegill sunfish	17.9	0.05655	2006
Carnegie Lake	Bluegill sunfish	19	0.10097	2006
Carnegie Lake	white perch	20.8	0.23403	2006
Carnegie Lake	white perch	20.8	0.14171	2006
Carnegie Lake	white perch	21	0.16152	2006
Carnegie Lake	largemouth bass	34.3	0.15636	2006
Carnegie Lake	largemouth bass	38.3	0.11614	2006
Carnegie Lake	largemouth bass	43.3	0.40243	2006
Carnegie Lake	largemouth bass	44.3	0.36529	2006
Carnegie Lake	largemouth bass	49.6	0.51996	2006
Davidson Mill Pond	bluegill	18.1	0.18292	2006
Davidson Mill Pond	bluegill	19	0.0504	2006
Davidson Mill Pond	bluegill	20.3	0.14941	2006
Davidson Mill Pond	chain pickerel	43.5	0.27161	2006
Davidson Mill Pond	chain pickerel	43.9	0.24405	2006
Davidson Mill Pond	chain pickerel	48.3	0.35285	2006
Davidson Mill Pond	American eel	75.2	0.20145	2006
Davidson Mill Pond	American eel	79	0.20049	2006
Davidson Mill Pond	largemouth bass	37.7	0.5091	2006
Davidson Mill Pond	largemouth bass	40.4	0.50194	2006
Davidson Mill Pond	largemouth bass	41.3	0.56886	2006
DeVoe Lake	brown bullhead	30.9	0.07703	2006
DeVoe Lake	brown bullhead	32.5	0.12689	2006
DeVoe Lake	brown bullhead	35.7	0.16058	2006
DeVoe Lake	chain pickerel	45.8	0.26277	2006
DeVoe Lake	chain pickerel	50	0.38873	2006
DeVoe Lake	chain pickerel	50.5	0.50737	2006
Duhernal Lake	bluegill	18.4	0.04042	2006
Duhernal Lake	bluegill	20.2	0.07774	2006
Duhernal Lake	bluegill	22.3	0.16006	2006
Duhernal Lake	brown bullhead	31.6	0.03663	2006
Duhernal Lake	brown bullhead	33.5	0.02588	2006
Duhernal Lake	brown bullhead	34.5	0.05482	2006
Duhernal Lake	largemouth bass	36.4	0.19646	2006
Duhernal Lake	largemouth bass	36.5	0.1712	2006
Duhernal Lake	largemouth bass	39.2	0.2798	2006
Farrington Lake	bluegill	17.2	0.09828	2006
Farrington Lake	bluegill	17.8	0.1512	2006
Farrington Lake	bluegill	18.7	0.11982	2006
Farrington Lake	yellow perch	20.6	0.17985	2006
Farrington Lake	yellow perch	20.7	0.22166	2006
Farrington Lake	yellow perch	25.7	0.41141	2006
Farrington Lake	brown bullhead	29.8	0.03402	2006
Farrington Lake	brown bullhead	34.7	0.04048	2006
Farrington Lake	brown bullhead	36.5	0.01656	2006
Farrington Lake	chain pickerel	43.2	0.19105	2006

Farrington Lake	chain pickerel	45.8	0.20378	2006
Farrington Lake	chain pickerel	48.8	0.48139	2006
Farrington Lake	largemouth bass	39.8	0.51737	2006
Farrington Lake	largemouth bass	41	0.50762	2006
Farrington Lake	largemouth bass	42.3	0.93764	2006
Farrington Lake	largemouth bass	46.3	1.41272	2006
Farrington Lake	largemouth bass	49	0.97277	2006
Lamington River @ Lamington	redbreast sunfish	15.8	0.12666	2006
Lamington River @ Lamington	redbreast sunfish	16.1	0.16744	2006
Lamington River @ Lamington	redbreast sunfish	16.6	0.14858	2006
Lamington River @ Lamington	smallmouth bass	18.6	0.13566	2006
Lamington River @ Lamington	smallmouth bass	20.6	0.18452	2006
Lamington River @ Lamington	smallmouth bass	22	0.12535	2006
Lamington River @ Lamington	brown trout	23.7	0.07503	2006
Lamington River @ Lamington	brown trout	26.1	0.08884	2006
Lamington River @ Lamington	American eel	53.7	0.18808	2006
Lamington River @ Lamington	American eel	60.2	0.39376	2006
Lamington River @ Lamington	American eel	63.2	0.24738	2006
Manalapan Lake	bluegill	18.4	0.04791	2006
Manalapan Lake	bluegill	18.4	0.07113	2006
Manalapan Lake	bluegill	18.6	0.04947	2006
Manalapan Lake	black crappie	21	0.09823	2006
Manalapan Lake	black crappie	21.4	0.10733	2006
Manalapan Lake	black crappie	22.8	0.14389	2006
Manalapan Lake	American eel	49.5	0.07662	2006
Manalapan Lake	American eel	53.4	0.12536	2006
Manalapan Lake	American eel	59.7	0.17554	2006
Manalapan Lake	largemouth bass	38	0.23315	2006
Manalapan Lake	largemouth bass	39.1	0.32996	2006
Manalapan Lake	largemouth bass	40.8	0.40945	2006
New Market Pond	bluegill	16.5	0.06683	2006
New Market Pond	bluegill	17	0.06511	2006
New Market Pond	bluegill	17.3	0.0888	2006
New Market Pond	black crappie	20.6	0.05647	2006
New Market Pond	black crappie	22.5	0.08984	2006
New Market Pond	black crappie	24.1	0.05213	2006
New Market Pond	brown bullhead	33.3	0.02354	2006
New Market Pond	brown bullhead	33.5	0.00063	2006
New Market Pond	American eel	34	0.02819	2006
New Market Pond	brown bullhead	34.5	0.00419	2006
New Market Pond	American eel	46.6	0.04004	2006
New Market Pond	American eel	48.5	0.10651	2006
New Market Pond	common carp	50.7	0.04819	2006
New Market Pond	common carp	52.7	0.05352	2006
New Market Pond	common carp	53	0.03293	2006
New Market Pond	largemouth bass	35.9	0.13736	2006
New Market Pond	largemouth bass	36.8	0.10944	2006
New Market Pond	largemouth bass	41.4	0.26315	2006
Raritan River @ Millstone River	redbreast sunfish	18.2	0.13396	2006
Raritan River @ Millstone River	redbreast sunfish	18.2	0.16323	2006

Raritan River @ Millstone River	redbreast sunfish	19.3	0.10685	2006
Raritan River @ Millstone River	smallmouth bass	30.9	0.29331	2006
Raritan River @ Millstone River	smallmouth bass	31	0.33445	2006
Raritan River @ Millstone River	white catfish	32.6	0.20333	2006
Raritan River @ Millstone River	white catfish	35.7	0.21395	2006
Raritan River @ Millstone River	smallmouth bass	37.3	0.26906	2006
Raritan River @ Millstone River	white catfish	40.1	0.23869	2006
Raritan River @ Millstone River	channel catfish	48.7	0.35862	2006
Raritan River @ Millstone River	channel catfish	53	0.17138	2006
Raritan River @ Millstone River	American eel	57.6	0.10876	2006
Raritan River @ Millstone River	common carp	57.9	0.12682	2006
Raritan River @ Millstone River	common carp	59.7	0.15017	2006
Raritan River @ Millstone River	channel catfish	63.7	0.16402	2006
Raritan River @ Millstone River	common carp	65.9	0.00431	2006
Raritan River @ Millstone River	American eel	70.6	0.24336	2006
Raritan River @ Millstone River	American eel	71	0.29174	2006
Raritan River at Millstone River	largemouth bass	32.4	0.25569	2006
Raritan River at Millstone River	largemouth bass	37.2	0.32619	2006
Raritan River at Millstone River	largemouth bass	43	0.6896	2006
Rosedale Lake in Pennington	bluegill	18.4	0.05062	2006
Rosedale Lake in Pennington	bluegill	18.7	0.06377	2006
Rosedale Lake in Pennington	bluegill	20.2	0.10783	2006
Rosedale Lake in Pennington	black crappie	24.1	0.10195	2006
Rosedale Lake in Pennington	black crappie	25.7	0.11855	2006
Rosedale Lake in Pennington	black crappie	30.8	0.12335	2006
Rosedale Lake in Pennington	common carp	62.2	0.11683	2006
Rosedale Lake in Pennington	common carp	64.1	0.10668	2006
Rosedale Lake in Pennington	common carp	66.8	0.10278	2006
Rosedale Lake in Pennington	largemouth bass	40	0.22114	2006
Rosedale Lake in Pennington	largemouth bass	47.6	0.22991	2006
Rosedale Lake in Pennington	largemouth bass	47.7	0.3298	2006
Round Valley Reservoir	bluegill	21.5	0.11044	2006
Round Valley Reservoir	bluegill	21.9	0.11996	2006
Round Valley Reservoir	bluegill	22	0.09508	2006
Round Valley Reservoir	white catfish	36.8	0.08206	2006
Round Valley Reservoir	white catfish	40	0.0991	2006
Round Valley Reservoir	lake trout	43.9	0.08773	2006
Round Valley Reservoir	channel catfish	50.2	0.11492	2006
Round Valley Reservoir	lake trout	52.2	0.10409	2006
Round Valley Reservoir	lake trout	53.7	0.2057	2006
Round Valley Reservoir	lake trout	54.9	0.12745	2006
Round Valley Reservoir	channel catfish	58.7	0.4599	2006
Round Valley Reservoir	channel catfish	61.8	0.06823	2006
Round Valley Reservoir	lake trout	66.5	0.18896	2006
Round Valley Reservoir	largemouth bass	30.6	0.19463	2006
Round Valley Reservoir	largemouth bass	41.8	0.2981	2006
Round Valley Reservoir	largemouth bass	45.1	0.38514	2006
South Branch Raritan River at Neshanic Station	redbreast sunfish	16.9	0.10381	2006

South Branch Raritan River at Neshanic Station	redbreast sunfish	17.7	0.09302	2006
South Branch Raritan River at Neshanic Station	redbreast sunfish	17.9	0.12138	2006
South Branch Raritan River at Neshanic Station	rock bass	20.4	0.24498	2006
South Branch Raritan River at Neshanic Station	rock bass	20.6	0.16647	2006
South Branch Raritan River at Neshanic Station	rock bass	21.1	0.2056	2006
South Branch Raritan River at Neshanic Station	smallmouth bass	34.9	0.31523	2006
South Branch Raritan River at Neshanic Station	common carp	37.2	0.05298	2006
South Branch Raritan River at Neshanic Station	smallmouth bass	41.1	0.38035	2006
South Branch Raritan River at Neshanic Station	common carp	42.7	0.05706	2006
South Branch Raritan River at Neshanic Station	common carp	46.1	0.04491	2006
South Branch Raritan River at Neshanic Station	smallmouth bass	49.9	0.39461	2006
South Branch Raritan River at Neshanic Station	American eel	63	0.29096	2006
South Branch Raritan River at Neshanic Station	American eel	69.9	0.22739	2006
South Branch Raritan River at Neshanic Station	American eel	72.5	0.25548	2006
South Branch Raritan River at Neshanic Station	largemouth bass	20	0.18969	2006
South Branch Raritan River at Neshanic Station	largemouth bass	21.3	0.17653	2006
South Branch Raritan River at Neshanic Station	largemouth bass	26.9	0.1382	2006
Spring Lake	common carp	48.3	0.04448	2006
Spring Lake	common carp	54.5	0.00202	2006
Spring Lake	common carp	64.6	0.0799	2006
Spruce Run Reservoir	channel catfish	41	0.06091	2006
Spruce Run Reservoir	striped x white bass hybrid	42.4	0.14346	2006
Spruce Run Reservoir	striped x white bass hybrid	48	0.18523	2006
Spruce Run Reservoir	striped x white bass hybrid	49.2	0.22875	2006
Spruce Run Reservoir	striped x white bass hybrid	53.6	0.39913	2006
Spruce Run Reservoir	striped x white bass hybrid	54.3	0.51704	2006
Spruce Run Reservoir	channel catfish	55.6	0.22611	2006
Spruce Run Reservoir	channel catfish	56.3	0.32477	2006
Spruce Run Reservoir	common carp	57.8	0.12598	2006
Spruce Run Reservoir	common carp	58.1	0.12418	2006
Spruce Run Reservoir	common carp	58.3	0.13401	2006
Spruce Run Reservoir	northern pike	65.5	0.31375	2006

Spruce Run Reservoir	northern pike	68.5	0.24939	2006
Spruce Run Reservoir	northern pike	76.8	0.20958	2006
Spruce Run Reservoir	largemouth bass	28.7	0.17957	2006
Spruce Run Reservoir	largemouth bass	35.8	0.17422	2006
Spruce Run Reservoir	largemouth bass	39.8	0.43026	2006
Spruce Run Reservoir	largemouth bass	42.9	0.44294	2006
Spruce Run Reservoir	largemouth bass	47.3	0.60489	2006
Weston Mill Pond	bluegill	17.7	0.06793	2006
Weston Mill Pond	bluegill	18.6	0.11264	2006
Weston Mill Pond	bluegill	18.9	0.2196	2006
Weston Mill Pond	yellow perch	25.3	0.27386	2006
Weston Mill Pond	black crappie	25.8	0.19928	2006
Weston Mill Pond	yellow perch	26.3	0.14497	2006
Weston Mill Pond	black crappie	26.9	0.28312	2006
Weston Mill Pond	black crappie	26.9	0.22769	2006
Weston Mill Pond	brown bullhead	27.1	0.01612	2006
Weston Mill Pond	brown bullhead	28.2	0.05252	2006
Weston Mill Pond	yellow perch	29.3	0.39874	2006
Weston Mill Pond	brown bullhead	35.7	0.0256	2006
Weston Mill Pond	chain pickerel	38.9	0.16182	2006
Weston Mill Pond	chain pickerel	45.9	0.28877	2006
Weston Mill Pond	chain pickerel	48	0.48049	2006
Weston Mill Pond	American eel	49.8	0.10278	2006
Weston Mill Pond	American eel	50.2	0.11332	2006
Weston Mill Pond	American eel	55.1	0.13674	2006
Weston Mill Pond	largemouth bass	38	0.52104	2006
Weston Mill Pond	largemouth bass	38.1	0.41189	2006
Weston Mill Pond	largemouth bass	39.5	0.46808	2006
Atsion Lake	American eel	31.2	0.33	2007
Atsion Lake	American eel	32.1	0.27	2007
Atsion Lake	American eel	51.7	0.52	2007
Atsion Lake	chain pickerel	33.2	0.47	2007
Atsion Lake	chain pickerel	39.6	0.69	2007
Atsion Lake	chain pickerel	44.7	0.82	2007
Batsto Lake	brown bullhead	32.9	0.29	2007
Batsto Lake	brown bullhead	33.4	0.22	2007
Batsto Lake	brown bullhead	36.18	0.16	2007
Batsto Lake	chain pickerel	23.7	0.30	2007
Batsto Lake	chain pickerel	35	0.78	2007
Batsto Lake	chain pickerel	35.5	0.85	2007
Batsto Lake	chain pickerel	35.9	0.44	2007
Batsto Lake	largemouth bass	35.5	1.25	2007
Batsto Lake	largemouth bass	35.6	1.07	2007
Batsto Lake	largemouth bass	36.7	0.85	2007
Batsto Lake	largemouth bass	37.2	0.10	2007
Cedar Lake	American eel	48.7	0.16	2007
Cedar Lake	American eel	54.2	0.18	2007
Cedar Lake	American eel	63.9	0.22	2007
Cedar Lake	largemouth bass	32.8	0.18	2007
Cedar Lake	largemouth bass	38.8	0.31	2007

Cedar Lake	largemouth bass	47	1.63	2007
Cedar Lake	white perch	30.7	0.33	2007
Cedar Lake	white perch	31.8	0.22	2007
Cedar Lake	white perch	37.4	0.51	2007
Cedarville Ponds	chain pickerel	30.6	0.65	2007
Cedarville Ponds	chain pickerel	32.5	0.46	2007
Cedarville Ponds	chain pickerel	34.4	0.53	2007
Cedarville Ponds	chain pickerel	35.4	0.54	2007
Cedarville Ponds	chain pickerel	43.1	0.69	2007
Cedarville Ponds	yellow perch	28	0.31	2007
Cedarville Ponds	yellow perch	28.8	0.33	2007
Cedarville Ponds	yellow perch	29.8	0.35	2007
Deal Lake	American eel	31	0.30	2007
Deal Lake	American eel	60	0.05	2007
Deal Lake	largemouth bass	38	0.09	2007
Deal Lake	largemouth bass	39.8	0.12	2007
Deal Lake	largemouth bass	40.2	0.14	2007
Deal Lake	white perch	16.3	0.02	2007
Deal Lake	white perch	18.1	0.04	2007
Deal Lake	white perch	20.2	0.18	2007
East Creek Lake	American eel	43.2	1.05	2007
East Creek Lake	American eel	51.8	1.02	2007
East Creek Lake	American eel	53.9	1.24	2007
East Creek Lake	chain pickerel	33.6	1.14	2007
East Creek Lake	chain pickerel	41.1	1.46	2007
East Creek Lake	chain pickerel	42.9	1.05	2007
East Creek Lake	largemouth bass	30.5	1.05	2007
East Creek Lake	largemouth bass	39.4	1.40	2007
East Creek Lake	largemouth bass	44.6	1.37	2007
Harrisville Lake	American eel	27.4	0.47	2007
Harrisville Lake	American eel	40.5	0.58	2007
Harrisville Lake	American eel	54.1	0.73	2007
Harrisville Lake	chain pickerel	27.6	1.05	2007
Harrisville Lake	chain pickerel	29.4	0.61	2007
Harrisville Lake	chain pickerel	30.4	0.91	2007
Harrisville Lake	chain pickerel	31.3	1.05	2007
Lake Absegami	American eel	31.6	0.36	2007
Lake Absegami	American eel	32.7	0.29	2007
Lake Absegami	American eel	47.5	0.80	2007
Lake Absegami	chain pickerel	35.3	1.32	2007
Lake Absegami	chain pickerel	35.4	1.26	2007
Lake Absegami	chain pickerel	43.5	1.24	2007
Lake Absegami	chain pickerel	47.6	1.62	2007
Lake Absegami	chain pickerel	58.7	1.39	2007
Lake Manahawkin	American eel	46.3	1.50	2007
Lake Manahawkin	American eel	56.1	1.43	2007
Lake Manahawkin	American eel	79.6	1.89	2007
Lake Manahawkin	largemouth bass	33.6	1.08	2007
Lake Manahawkin	largemouth bass	35.2	0.93	2007

Lake Manahawkin	largemouth bass	45.1	1.76	2007
Lake Nummy	yellow bullhead	29.2	0.44	2007
Lake Nummy	yellow bullhead	29.7	0.26	2007
Lake Nummy	yellow bullhead	33.4	0.79	2007
Lake Nummy	chain pickerel	46.2	1.07	2007
Lake Nummy	chain pickerel	56	2.56	2007
Lake Oswego	American eel	49.6	0.70	2007
Lake Oswego	American eel	60.5	0.46	2007
Lake Oswego	chain pickerel	26.6	0.82	2007
Lake Oswego	chain pickerel	27.7	0.76	2007
Lake Oswego	chain pickerel	42.1	0.42	2007
Lake Oswego	chain pickerel	46.8	2.05	2007
Lefferts Lake	brown bullhead	27.8	0.07	2007
Lefferts Lake	brown bullhead	28.8	0.10	2007
Lefferts Lake	brown bullhead	29.1	0.10	2007
Lefferts Lake	chain pickerel	43.9	0.11	2007
Lefferts Lake	chain pickerel	44.7	0.19	2007
Lefferts Lake	chain pickerel	46.7	0.21	2007
Lefferts Lake	yellow perch	23.8	0.10	2007
Lefferts Lake	yellow perch	24.4	0.12	2007
Lefferts Lake	yellow perch	25.3	0.09	2007
Lenape Lake	American eel	53	0.42	2007
Lenape Lake	American eel	58.7	1.06	2007
Lenape Lake	American eel	62.4	0.89	2007
Lenape Lake	largemouth bass	40	1.60	2007
Lenape Lake	largemouth bass	44.6	1.04	2007
Lenape Lake	largemouth bass	45.9	1.61	2007
Manasquan Reservoir	American eel	54.2	0.08	2007
Manasquan Reservoir	American eel	58	0.05	2007
Manasquan Reservoir	American eel	82.4	0.17	2007
Manasquan Reservoir	largemouth bass	40.1	0.10	2007
Manasquan Reservoir	largemouth bass	44.5	0.21	2007
Manasquan Reservoir	largemouth bass	49.2	0.40	2007
Maple Lake	American eel	44.1	0.81	2007
Maple Lake	American eel	48.6	0.81	2007
Maple Lake	American eel	53.6	1.02	2007
Maple Lake	largemouth bass	33.1	0.43	2007
Maple Lake	largemouth bass	33.7	0.84	2007
Maple Lake	largemouth bass	34.7	0.86	2007
Maple Lake	largemouth bass	38	1.48	2007
Marlu Lake	common carp	64.4	0.04	2007
Marlu Lake	common carp	66.6	0.04	2007
Marlu Lake	common carp	67.9	0.04	2007
Marlu Lake	largemouth bass	34.5	0.08	2007
Marlu Lake	largemouth bass	41.4	0.09	2007
Marlu Lake	largemouth bass	44.2	0.14	2007
Parvin Lake	American eel	63.1	0.12	2007
Parvin Lake	American eel	64.9	0.12	2007
Parvin Lake	chain pickerel	45.7	0.24	2007
Parvin Lake	chain pickerel	47.7	0.21	2007

Parvin Lake	chain pickerel	51.4	0.19	2007
Parvin Lake	largemouth bass	35.9	0.16	2007
Parvin Lake	largemouth bass	39.5	0.21	2007
Parvin Lake	largemouth bass	43.3	0.26	2007
Parvin Lake	largemouth bass	44.6	0.19	2007
Parvin Lake	largemouth bass	49	0.27	2007
Pohatcong Lake	American eel	44.3	0.44	2007
Pohatcong Lake	American eel	45.3	0.95	2007
Pohatcong Lake	American eel	66.2	0.72	2007
Pohatcong Lake	largemouth bass	41.7	0.78	2007
Pohatcong Lake	largemouth bass	41.7	0.69	2007
Pohatcong Lake	largemouth bass	42.7	0.61	2007
Pohatcong Lake	largemouth bass	43	0.64	2007
Pohatcong Lake	yellow perch	26.5	0.14	2007
Pohatcong Lake	yellow perch	31.2	0.36	2007
Pohatcong Lake	yellow perch	34.6	0.83	2007
Shenandoah Lake	American eel	46.8	0.42	2007
Shenandoah Lake	American eel	47.9	0.24	2007
Shenandoah Lake	American eel	75.5	0.42	2007
Shenandoah Lake	chain pickerel	35.3	0.34	2007
Shenandoah Lake	chain pickerel	41.2	0.23	2007
Shenandoah Lake	chain pickerel	41.4	0.32	2007
Shenandoah Lake	largemouth bass	40.5	0.37	2007
Shenandoah Lake	largemouth bass	41.6	0.46	2007
Shenandoah Lake	largemouth bass	43.2	0.65	2007
Swimming River Reservoir	American eel	42.2	0.04	2007
Swimming River Reservoir	American eel	66.1	0.07	2007
Swimming River Reservoir	American eel	68.9	0.08	2007
Swimming River Reservoir	largemouth bass	40	0.09	2007
Swimming River Reservoir	largemouth bass	42.7	0.09	2007
Swimming River Reservoir	largemouth bass	50.1	0.15	2007
Wading River	chain pickerel	36.3	2.60	2007
Wading River	chain pickerel	37.5	2.63	2007
Wading River	chain pickerel	40.7	2.03	2007
Wilson Lake	chain pickerel	34.7	1.58	2007
Wilson Lake	chain pickerel	37	1.36	2007
Wilson Lake	chain pickerel	54.7	2.02	2007
Wilson Lake	largemouth bass	35.4	1.53	2007
Wilson Lake	largemouth bass	38.9	1.63	2007
Wilson Lake	largemouth bass	40.9	3.27	2007
Wilson Lake	yellow perch	28	1.25	2007
Wilson Lake	yellow perch	28	1.46	2007
Wilson Lake	yellow perch	30	0.87	2007

Appendix C

Non-Tidal Surface Water NJPDES Facility List to Quantify Potential Hg Load

NJPDES Permit Number	Facility Name	Permitted Flow	Description
NJ0000876	HERCULES INC - KENVIL	0.7	Industrial
NJ0020036	DEPT OF VETERANS AFFAIRS	0.08	Municipal minor
NJ0020184	NEWTOWN WASTEWATER TREATMENT PLANT	1.4	Municipal major
NJ0020206	ALLENTOWN BORO WWTP	0.238	Municipal minor
NJ0020281	CHATHAM HILL STP	0.03	Municipal minor
NJ0020290	CHATHAM TWP MAIN STP	1	Municipal minor
NJ0020354	BRANCHBURG NESHANIC STP	0.055	Municipal minor
NJ0020389	CLINTON TOWN WWTP	2.03	Municipal major
NJ0020419	LONG POND SCHOOL WTP	0.01	Municipal minor
NJ0020427	CALDWELL WASTEWATER TREATMENT PLANT	4.5	Municipal major
NJ0020532	HARRISON TOWNSHIP TREATMENT PLANT	0.8	Municipal minor
NJ0020605	ALLAMUCHY SEWERAGE TREATMENT PLANT	0.6	Municipal minor
NJ0020711	WARREN CO TECHNICAL SCHOOL STP	0.012	Municipal minor
NJ0021083	VETERANS AFFAIRS NJ HEALTH CARE SYSTEM-LYONS	0.4	Municipal minor
NJ0021091	JEFFERSON TWP HIGH-MIDDLE SCHOOL	0.0275	Municipal minor
NJ0021105	ARTHUR STANLICK SCHOOL	0.013	Municipal minor
NJ0021113	WASHINGTON BORO WWTP	1.5	Municipal major
NJ0021253	INDIAN HILLS HIGH SCHOOL	0.0336	Municipal minor
NJ0021326	MEDFORD LAKES BOROUGH STP	0.55	Municipal minor
NJ0021334	MENDHAM BORO	0.45	Municipal minor
NJ0021342	SKYVIEW/HIBROOK WTP	0.023	Municipal minor
NJ0021369	HACKETTSTOWN MUA	3.48	Municipal major
NJ0021571	SPRINGFIELD TWP ELEM SCH STP	0.0075	Municipal minor
NJ0021636	NEW PROVIDENCE WWTP	1.5	Municipal major
NJ0021717	BUENA BOROUGH MUA	0.4	Municipal major
NJ0021865	FIDDLER'S ELBOW CTRY CLUB WWTP	0.03	Municipal minor
NJ0021890	MILFORD SEWER UTILITY	0.4	Municipal minor
NJ0021954	CLOVERHILL STP	0.5	Municipal minor
NJ0022047	RARITAN TOWNSHIP MUA STP	3.8	Municipal major
NJ0022063	SUSSEX COUNTY HOMESTEAD WTP	0.05	Municipal minor
NJ0022101	BLAIR ACADEMY	0.05	Municipal minor
NJ0022110	EDUCATIONAL TESTING SERVICE	0.08	Municipal minor
NJ0022144	HAGEDORN PSYCHIATRIC HOSPITAL	0.052	Municipal minor
NJ0022250	WOODSTOWN WASTEWATER TREATMENT PLANT	0.53	Municipal minor
NJ0022276	STONYBROOK SCHOOL	0.01	Municipal minor
NJ0022349	ROCKAWAY VALLEY REG SA	12	Municipal major
NJ0022381	NORTHERN BURLINGTON COUNTY	0.0135	Municipal minor
NJ0022390	NPDC SEWAGE TREATMENT PLANT	0.5	Municipal minor
NJ0022438	HELEN A FORT MIDDLE SCHOOL	0.05	Municipal minor

NJ0022489	WARREN TWP SEWERAGE AUTH STAGE I-II STP	0.47	Municipal minor
NJ0022497	WARREN STAGE IV STP	0.8	Municipal minor
NJ0022586	MARLBORO PSYCHIATRIC HOSP STP	1	Municipal major
NJ0022675	ROXBURY TOWNSHIP	2	Municipal major
NJ0022764	RIVER ROAD STP	0.1172	Municipal minor
NJ0022781	POTTERSVILLE STP	0.048	Municipal minor
NJ0022845	HARRISON BROOK STP	2.5	Municipal major
NJ0022918	ROOSEVELT BORO WTP	0.25	Municipal minor
NJ0022985	WRIGHTSTOWN BOROUGH STP	0.337	Municipal minor
NJ0023001	SALVATION ARMY CAMP TECUMSEH	0.018	Municipal minor
NJ0023124	MONTGOMERY HIGH SCHOOL STP	0.035	Municipal minor
NJ0023175	ROUND VALLEY MIDDLE SCHOOL	0.009	Municipal minor
NJ0023311	KINGWOOD TWP SCHOOL	0.0048	Municipal minor
NJ0023493	WASHINGTON TOWNSHIP MUA WTP	0.5	Municipal minor
NJ0023540	NAVAL WEAPONS STATION EARLE	0.37	Municipal minor
NJ0023663	CARRIER FOUNDATION WTP	0.04	Municipal minor
NJ0023698	POMPTON LAKES BORO MUA	1.2	Municipal major
NJ0023728	PINE BROOK STP	8.8	Municipal major
NJ0023736	PINELANDS WASTEWATER COMPANY	0.5	Municipal minor
NJ0023787	EAST WINDSOR WATER POLLUTION CONTROL PLANT	4.5	Municipal major
NJ0023841	LOUNSBERRY HOLLOW MIDDLE SCH STP	0.032	Municipal minor
NJ0023949	LEGENDS RESORT & COUNTRY CLUB	0.35	Municipal minor
NJ0024031	ELMWOOD WTP	2.978	Municipal major
NJ0024040	WOODSTREAM STP	1.7	Municipal major
NJ0024091	UNION TWP ELEMENTARY SCHOOL	0.011	Municipal minor
NJ0024104	UNITED WATER PRINCETON MEADOWS	1.64	Municipal major
NJ0024163	BIG `N` SHOPPING CENTER STP	0.02	Municipal minor
NJ0024414	WEST MILFORD SHOPPING CENTER STP	0.02	Municipal minor
NJ0024457	OUR LADY OF THE MAGNIFICAT	0.0012	Municipal minor
NJ0024465	LONG HILL TOWNSHIP OF STP	0.9	Municipal minor
NJ0024490	VERONA TWP WTP	4.1	Municipal major
NJ0024511	LIVINGSTON WATER POLLUTION CONTROL FACILITY	4.6	Municipal major
NJ0024716	PHILLIPSBURG TOWN STP	3.5	Municipal major
NJ0024759	EWING-LAWRENCE SA WTP	16	Municipal major
NJ0024791	RIDGEWOOD VILLAGE WPC FACILITY	5	Municipal major
NJ0024813	NORTHWEST BERGEN CNTY UA	16.8	Municipal major
NJ0024821	PEMBERTON TOWNSHIP MUA STP	2.5	Municipal major
NJ0024864	SOMERSET RARITAN VALLEY SA	21.3	Municipal major
NJ0024902	HANOVER SEWERAGE AUTHORITY	4.61	Municipal major
NJ0024911	BUTTERWORTH WATER POLLUTION CONTROL UTILITY	3.3	Municipal major
NJ0024929	WOODLAND WATER POLLUTION CONTROL UTILITY(WPCU	2	Municipal major
NJ0024937	MOLITOR WATER POLLUTION CONTROL FACILITY	5	Municipal major
NJ0024970	PARSIPPANY TROY HILLS	16	Municipal major
NJ0025160	HAMMONTON WTPF	1.6	Municipal major
NJ0025330	CEDAR GROVE STP	2	Municipal major

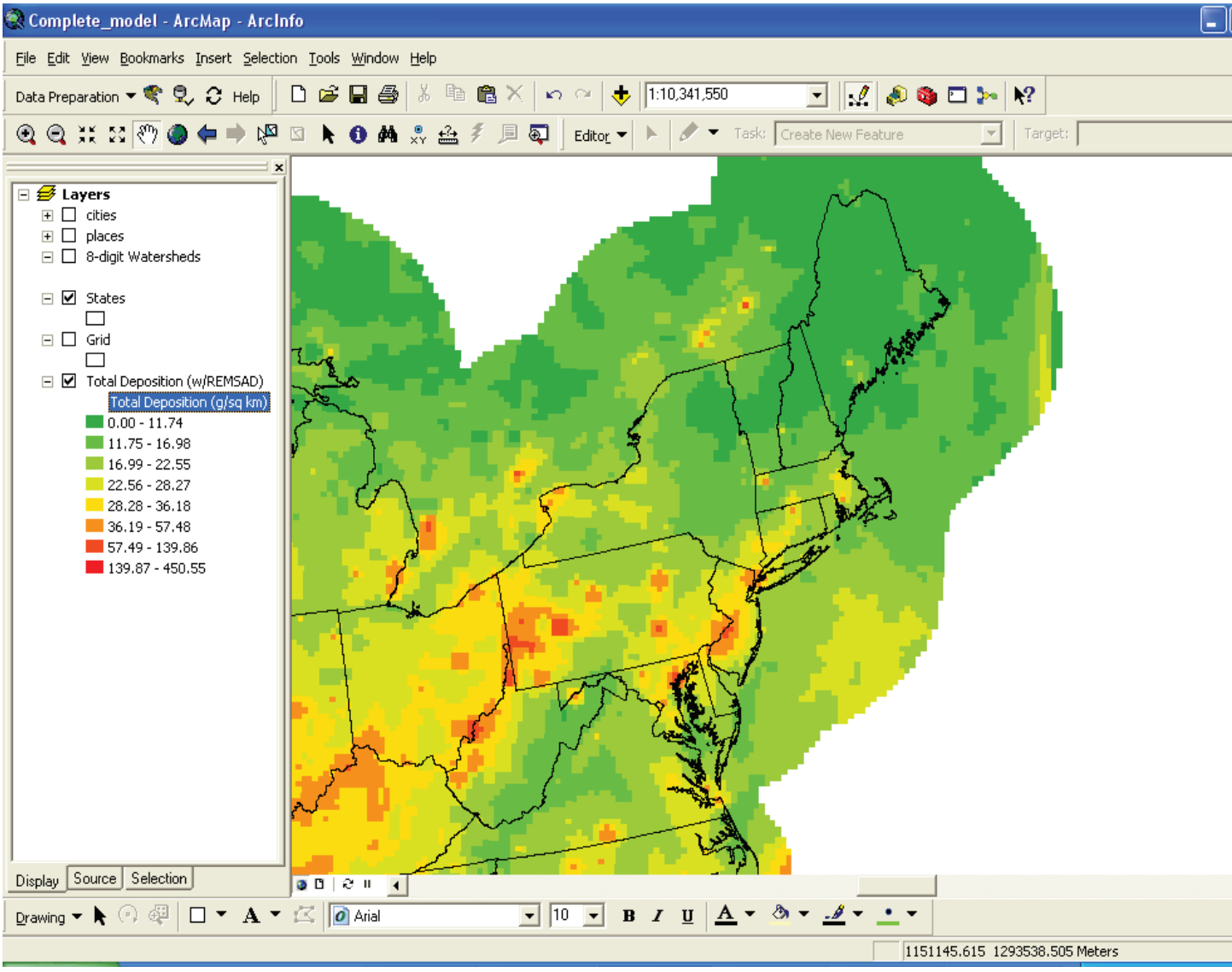
NJ0025496	MORRISTOWN SEWER UTILITY	6.3	Municipal major
NJ0025518	FLORHAM PARK SEWERAGE AUTH	1.4	Municipal major
NJ0026174	CRESCENT PARK STP	0.064	Municipal minor
NJ0026387	BERNARDSVILLE STP	0.8	Municipal minor
NJ0026689	GREYSTONE PARK PSYCH HOSPITAL	0.4	Municipal minor
NJ0026697	READINGTON TWP PUBLIC SCHOOL	0.017	Municipal minor
NJ0026719	ALBERT C WAGNER YOUTH CORRECTIONAL FACILITY	1.3	Municipal minor
NJ0026727	COLORADO CAFE WTP	0.0175	Municipal minor
NJ0026824	CHESTER SHOPPING CENTER	0.011	Municipal minor
NJ0026832	MEDFORD TWP WASTEWATER TREATMENT PLANT	1.75	Municipal major
NJ0026867	WHITE ROCK STP	0.1295	Municipal minor
NJ0026891	BURNT HILL TREATMENT PLANT #1	0.0153	Municipal minor
NJ0026905	STAGE II TREATMENT PLANT	0.48	Municipal minor
NJ0027006	RINGWOOD ACRES TREATMENT PLANT	0.036	Municipal minor
NJ0027031	HOLMDEL BD OF ED VILLAGE SCHOOL STP	0.01	Municipal minor
NJ0027049	POPE JOHN XXIII HIGH SCH WTP	0.022	Municipal minor
NJ0027057	SPARTA PLAZA WTP	0.05	Municipal minor
NJ0027065	SPARTA ALPINE SCHOOL	0.025	Municipal minor
NJ0027227	TRUMP NATIONAL GOLF COURSE	0.0005	Municipal minor
NJ0027464	HANOVER MOBILE VILLAGE ASSOC	0.02	Municipal minor
NJ0027511	CALIFORNIA VILLAGE SEWER PLANT	0.032	Municipal minor
NJ0027529	CAREONE @HOLMDEL	0.025	Municipal minor
NJ0027553	LESTER D. WILSON ELEM SCHOOL	0.0075	Municipal minor
NJ0027561	DELAWARE TOWNSHIP MUA	0.065	Municipal minor
NJ0027596	SPARTAN VILLAGE MOBILE HOME PK	0.038	Municipal minor
NJ0027669	AWOSTING STP	0.045	Municipal minor
NJ0027677	OLDE MILFORD ESTATES STP	0.172	Municipal minor
NJ0027685	HIGHVIEW ACRES STP	0.2	Municipal minor
NJ0027715	MERCER CO CORRECTION CTR STP	0.09	Municipal minor
NJ0027731	PRINCETON HEALTHCARE SYSTEM	0.296	Industrial
NJ0027774	OAKWOOD KNOLLS WWTP	0.035	Municipal minor
NJ0027821	MUSCONETCONG SEWERAGE AUTHORITY	5.79	Municipal major
NJ0027961	BERKELEY HEIGHTS WPCF	3.1	Municipal major
NJ0028002	MOUNTAIN VIEW STP	13.5	Municipal major
NJ0028304	QUALITY INN OF LEDGEWOOD	0.04	Municipal minor
NJ0028436	RARITAN TWP MUA-FLEMINGTON	2.35	Municipal major
NJ0028479	NJ TRAINING SCHOOL FOR BOYS	0.15	Municipal minor
NJ0028487	MOUNTAINVIEW CORRECTIONAL INSTITUTION	0.26	Municipal minor
NJ0028541	BIRCH HILL PARK STP	0.02	Municipal minor
NJ0028665	MOBILE ESTATES OF SOUTHAMPTON INC	0.06	Municipal minor
NJ0028894	KITTATINNY REG HS BD OF ED	0.045	Municipal minor
NJ0029041	REGENCY @ SUSSEX APT	0.08	Municipal minor
NJ0029386	TWO BRIDGES WASTEWATER TREATMENT PLANT	10	Municipal major
NJ0029432	ROBERT ERSKINE SCHOOL STP	0.008	Municipal minor
NJ0029475	HIGHTSTOWN BORO AWWTP	1	Municipal major

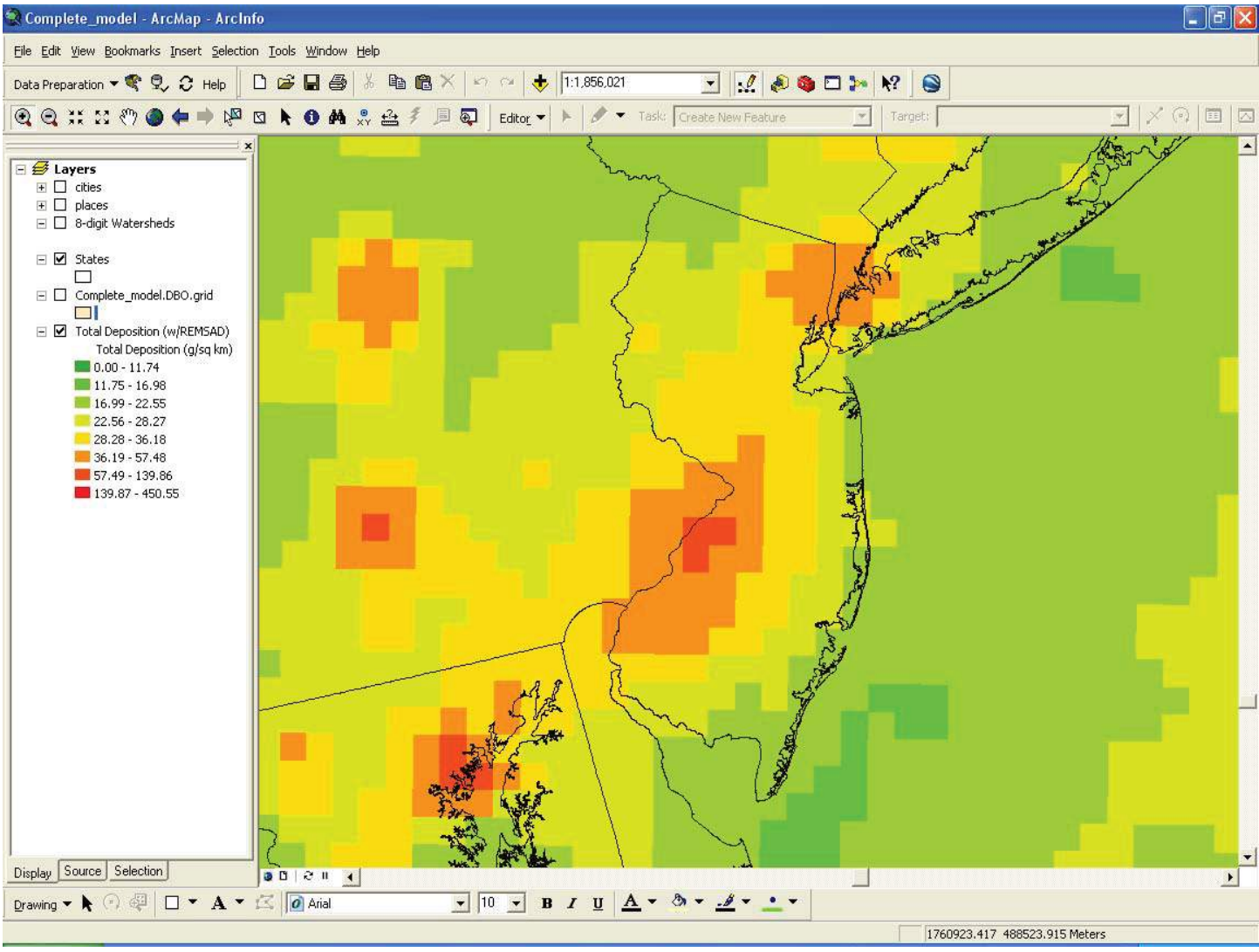
NJ0029831	FRENCHTOWN WASTEWATER TREATMENT PLANT	0.15	Municipal minor
NJ0029858	OAKLAND CARE CENTER INC	0.03	Municipal minor
NJ0031046	NORTH WARREN REG SCH DIST WTF	0.02	Municipal minor
NJ0031119	STONY BROOK RSA- RIVER ROAD STP	13.06	Municipal major
NJ0031585	HIGH POINT REGIONAL HS	0.03	Municipal minor
NJ0031615	CAMDEN COUNTY VOC & TECH SCHOOL	0.058	Municipal minor
NJ0031674	REMINGTON'S RESTAURANT	0.028	Municipal minor
NJ0031771	COLTS NECK INN HOTEL	0.006	Municipal minor
NJ0032395	RINGWOOD PLAZA STP	0.01168	Municipal minor
NJ0033995	ENVIRONMENTAL DISPOSAL CORP	2.1	Municipal major
NJ0035084	EXXONMOBIL RESEARCH & ENGINEERING CO	0.22	Industrial
NJ0035114	BELVIDERE AREA WWTF	0.5	Municipal minor
NJ0035301	STONY BROOK RGNL SEWERAGE AUTH	0.3	Municipal minor
NJ0035319	STONY BROOK RSA	0.3	Municipal minor
NJ0035483	OXFORD AREA WTF	0.5	Municipal minor
NJ0035670	ALEXANDRIA MIDDLE SCHOOL	0.011	Municipal minor
NJ0035718	HOLMDEL WASTEWATER TREATMENT FACILITY	0.04	Municipal minor
NJ0050130	RIVERSIDE FARMS STP	0.145	Municipal minor
NJ0050369	WARREN STAGE V STP	0.38	Municipal minor
NJ0050580	HAMPTON COMMONS WASTEWATER FACILITY	0.05	Municipal minor
NJ0052256	CHATHAM GLEN STP	0.155	Municipal minor
NJ0053112	CHAPEL HILL ESTATES STP	0.01	Municipal minor
NJ0053350	SUSSEX CNTY MUA UPPER WALLKILL FACILITY	3	Municipal major
NJ0053759	WANAQUE VALLEY REGIONAL SEWERAGE AUTHORITY	1.25	Municipal major
NJ0055395	BURLINGTON CNTY RESOURCE RECOVERY COMPLEX	2.075	Industrial
NJ0060038	PIKE BROOK STP	0.67	Municipal minor
NJ0067733	OXBRIDGE WASTEWATER TREATMENT PLANT	0.16	Municipal minor
NJ0069523	CHERRY VALLEY STP	0.286	Municipal minor
NJ0080811	RAMAPO RIVER RESERVE WWTP	0.1137	Municipal minor
NJ0098663	HOMESTEAD TREATMENT UTILITY	0.25	Municipal minor
NJ0098922	READINGTON-LEBANON SA	0.8	Municipal minor
NJ0100528	GLEN MEADOWS/TWIN OAKS STP	0.025	Municipal minor
NJ0102270	EVOINK DEGUSSA CORP	0.015	Industrial
NJ0102563	ROUTE 78 OFFICE AREA WWTF	0.09653	Municipal minor
NJ0109061	LONG VALLEY VILLAGE WTP	0.244	Municipal minor
NJ0136603	MORRIS LAKE WTP	0.2	Municipal minor
NJG0005134	HERCULES GROUNDWATER TREATMT AT GEO SPEC CHEM	0.432	Industrial

Footnote: TMDL Section 4.0 - Source Assessment describes list construction.

Appendix D

Mercury Air Deposition Load for New Jersey (provided by Mr. Dwight Atkinson of EPA)

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Help
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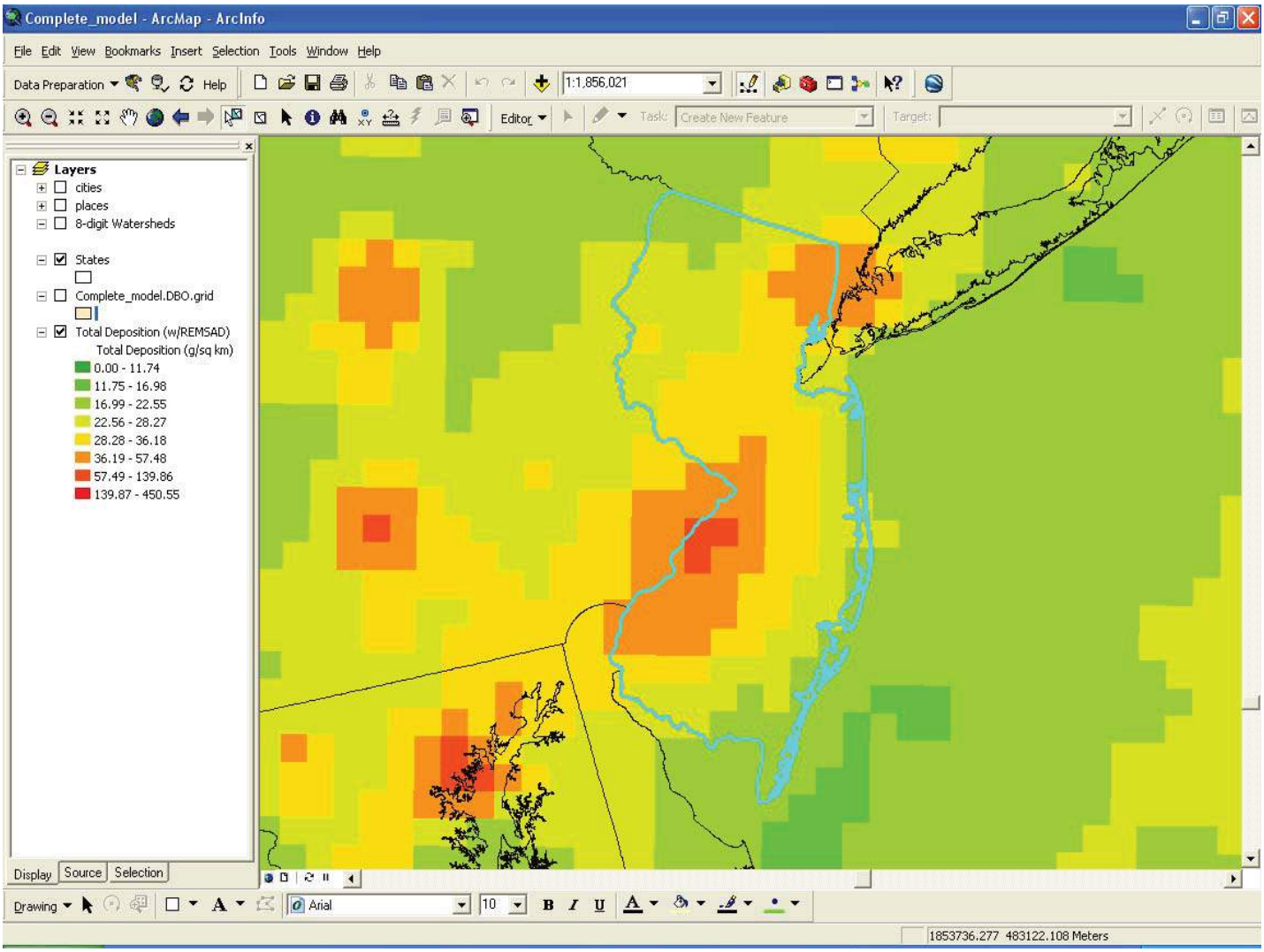
Editor
Task:
Create New Feature
Target:
Layers
cities
places
8-digit Watersheds
States
Complete_model.DBO.grid
Total Deposition (w/REMSAD)
Total Deposition (g/sq km)
0.00 - 11.74
11.75 - 16.98
16.99 - 22.55
22.56 - 28.27
28.28 - 36.18
36.19 - 57.48
57.49 - 139.86
139.87 - 450.55
Display
Source
Selection
Drawing
Arial
10
1760923.417 488523.915 Meters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Data Preparation
Help
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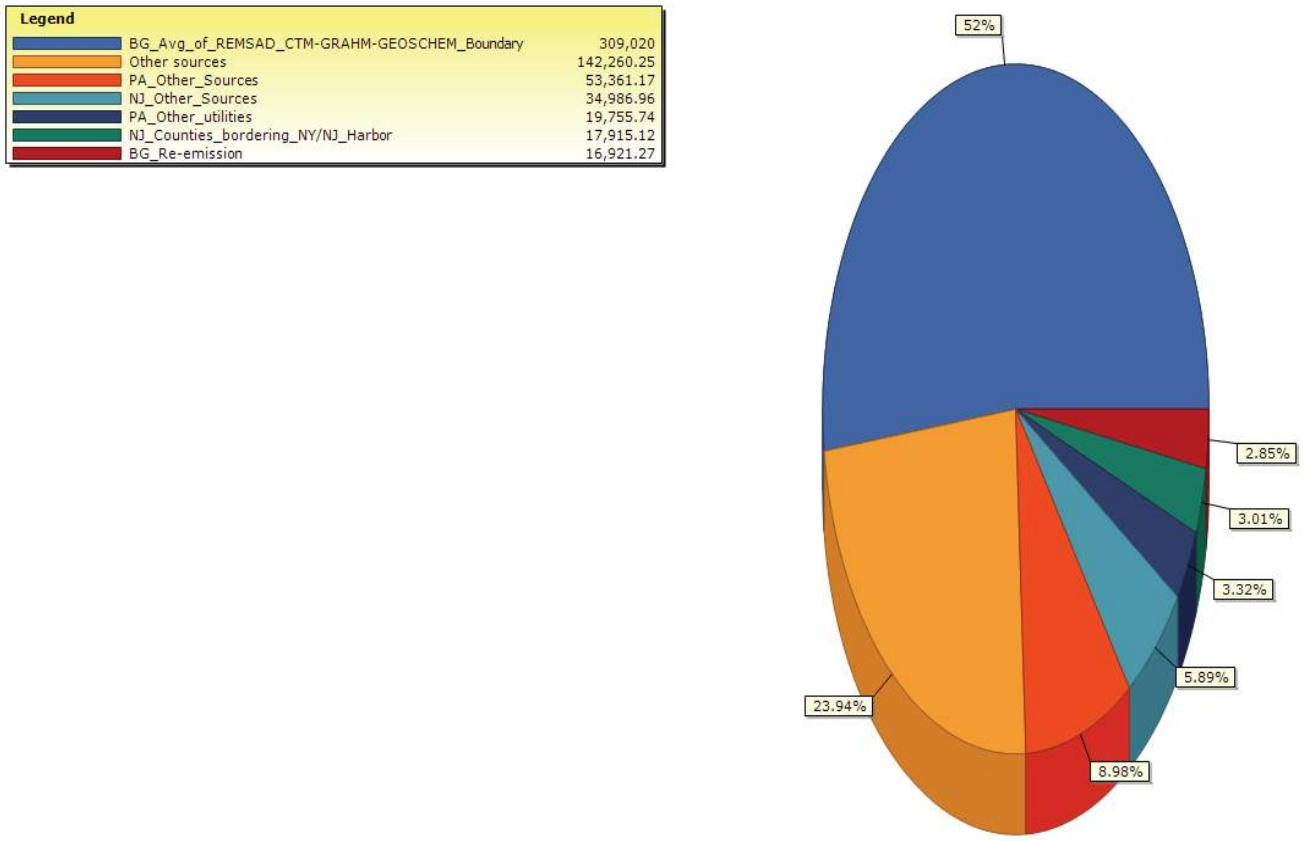
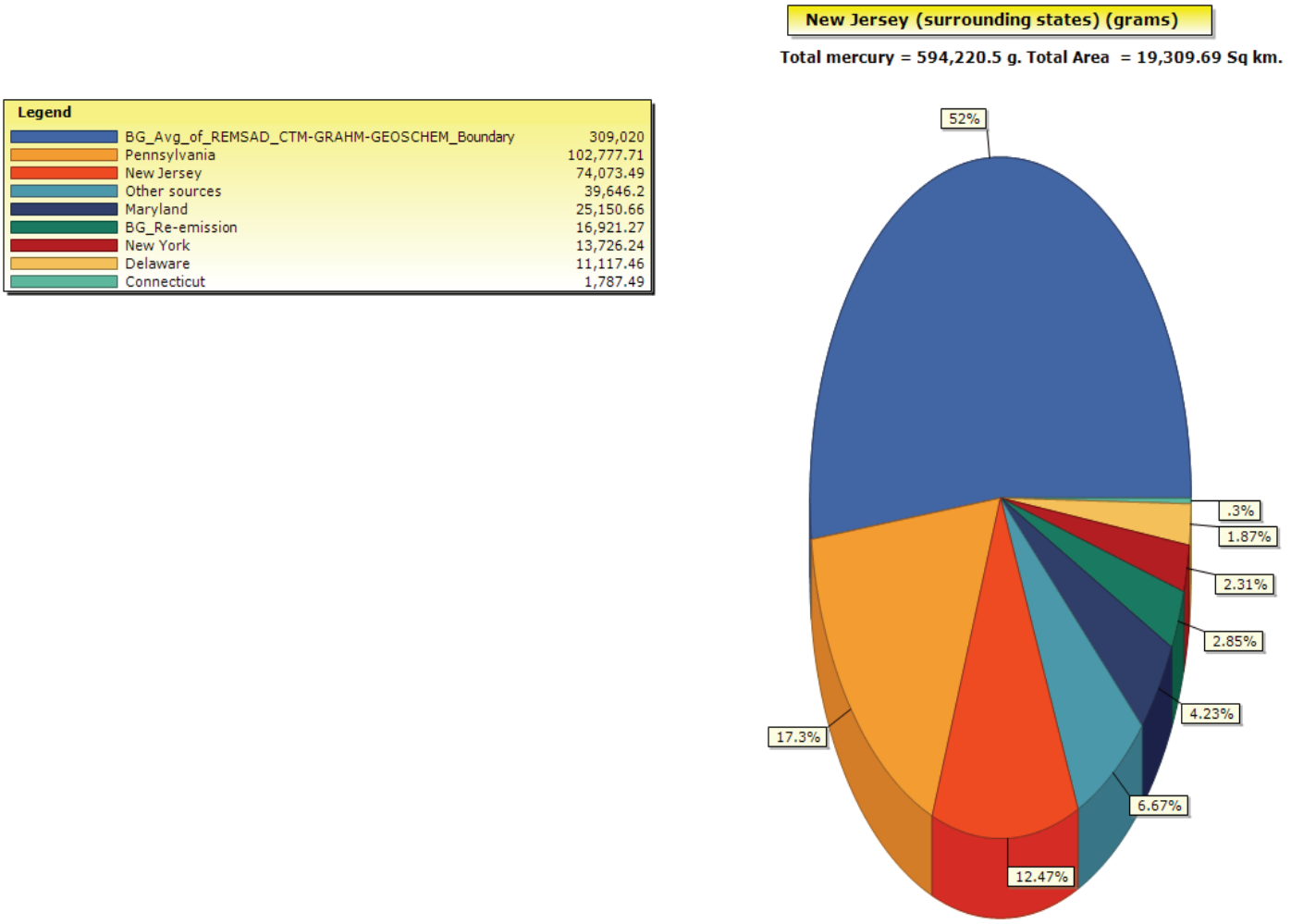
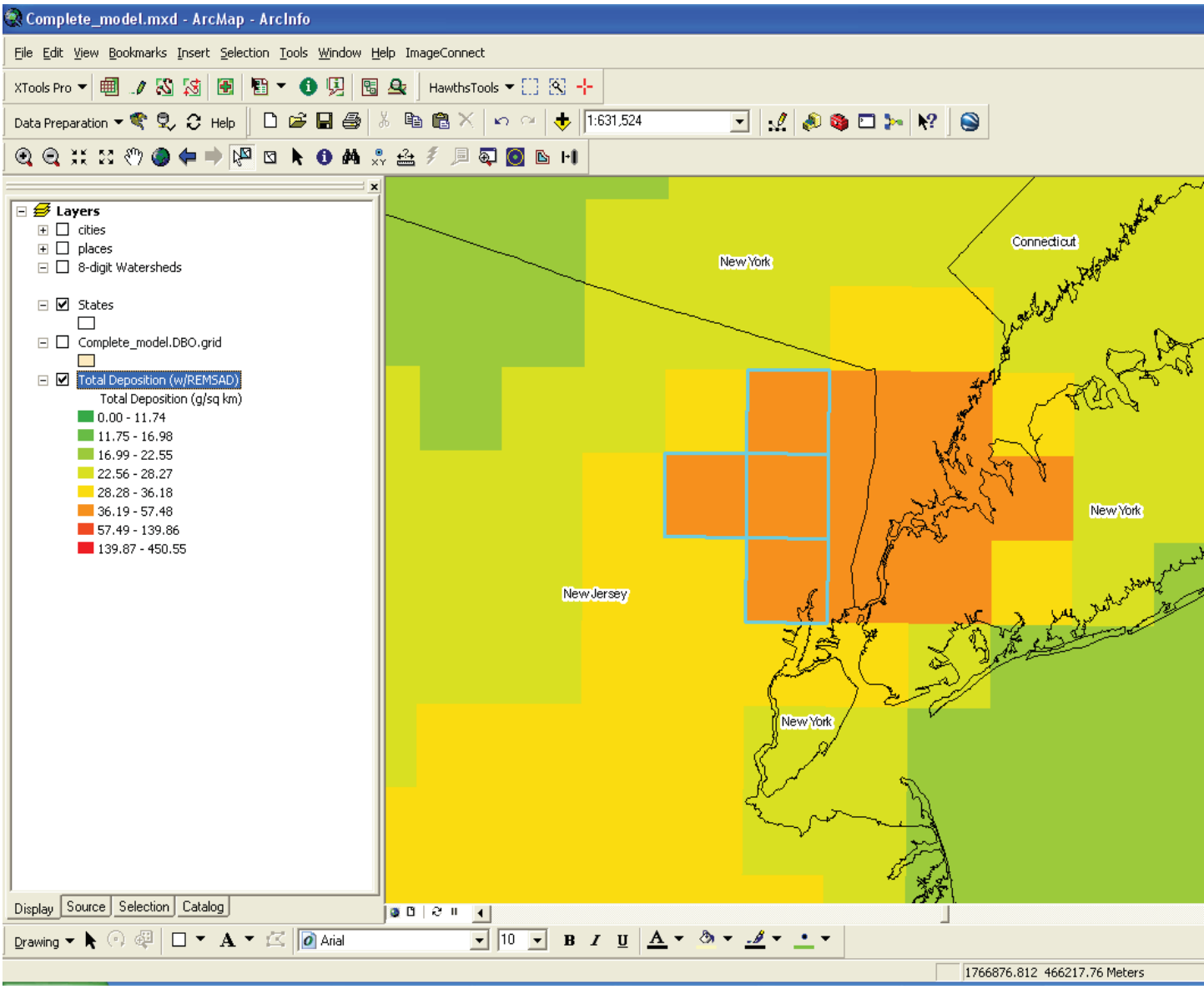
Editor
Task:
Create New Feature
Target:
Layers
cities
places
8-digit Watersheds
States
Complete_model.DBO.grid
Total Deposition (w/REMSAD)
Total Deposition (g/sq km)
0.00 - 11.74
11.75 - 16.98
16.99 - 22.55
22.56 - 28.27
28.28 - 36.18
36.19 - 57.48
57.49 - 139.86
139.87 - 450.55
Display
Source
Selection
Drawing
Arial
10
1853736.277 483122.108 Meters


Legend
BG_Avg_of_REMSAD_CTM-GRAHM-GEOSCHEM_Boundary 309,020
Other sources 142,260.25
PA_Other_Sources 53,361.17
NJ_Other_Sources 34,986.96
PA_Other_utilities 19,755.74
NJ_Counties_bordering_NY/NJ_Harbor 17,915.12
BG_Re-emission 16,921.27
New Jersey (grams)
Total mercury = 594,220.5 g. Total Area = 19,309.69 Sq km.
52%
2.85%
3.01%
3.32%
5.89%
23.94%
8.98%


New Jersey (surrounding states) (grams)
Total mercury = 594,220.5 g. Total Area = 19,309.69 Sq km.
Legend
BG_Avg_of_REMSAD_CTM-GRAHM-GEOSCHEM_Boundary 309,020
Pennsylvania 102,777.71
New Jersey 74,073.49
Other sources 39,646.2
Maryland 25,150.66
BG_Re-emission 16,921.27
New York 13,726.24
Delaware 11,117.46
Connecticut 1,787.49
52%
.3%
1.87%
2.31%
2.85%
4.23%
6.67%
12.47%
17.3%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cities
places
8-digit Watersheds
States
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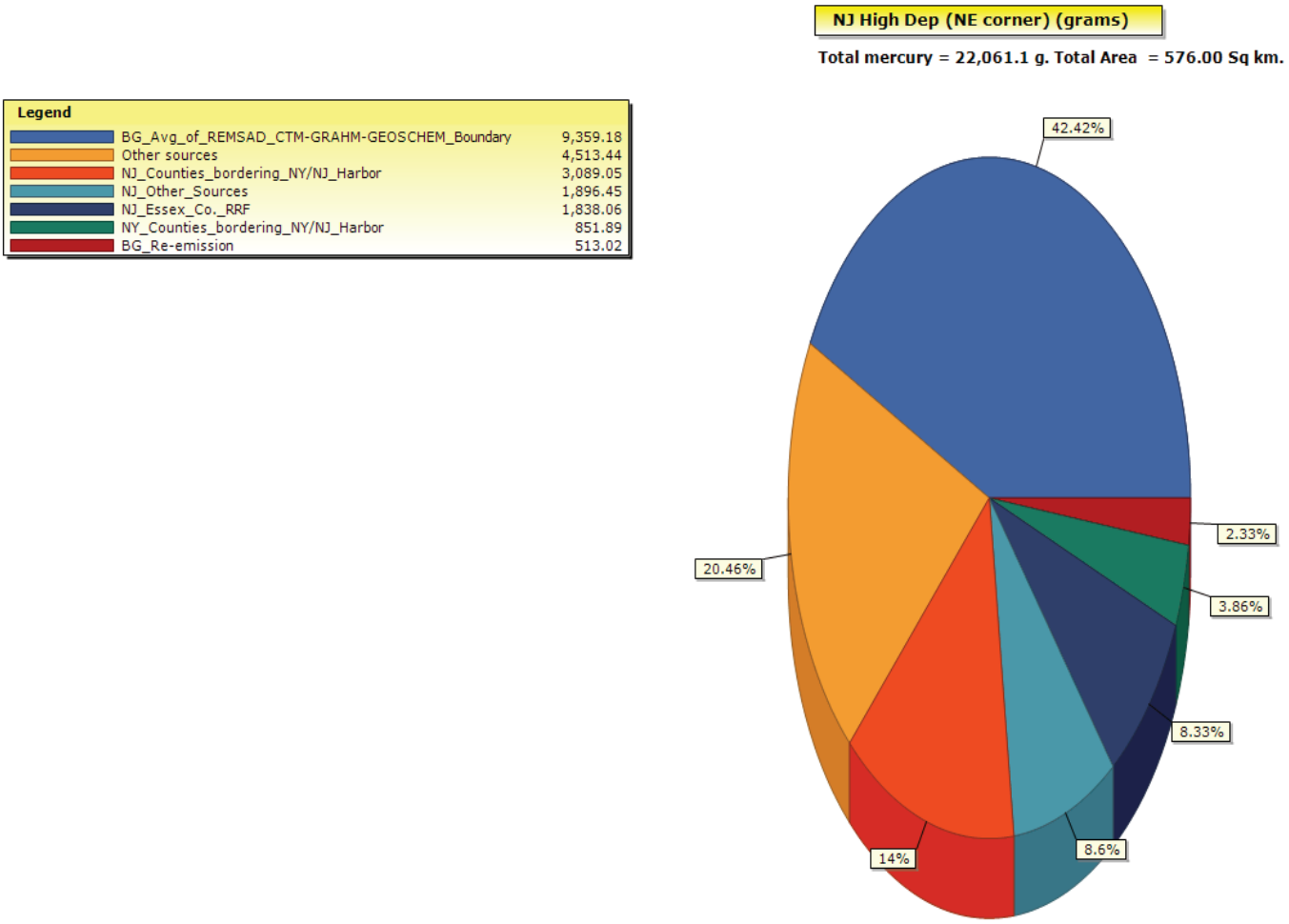
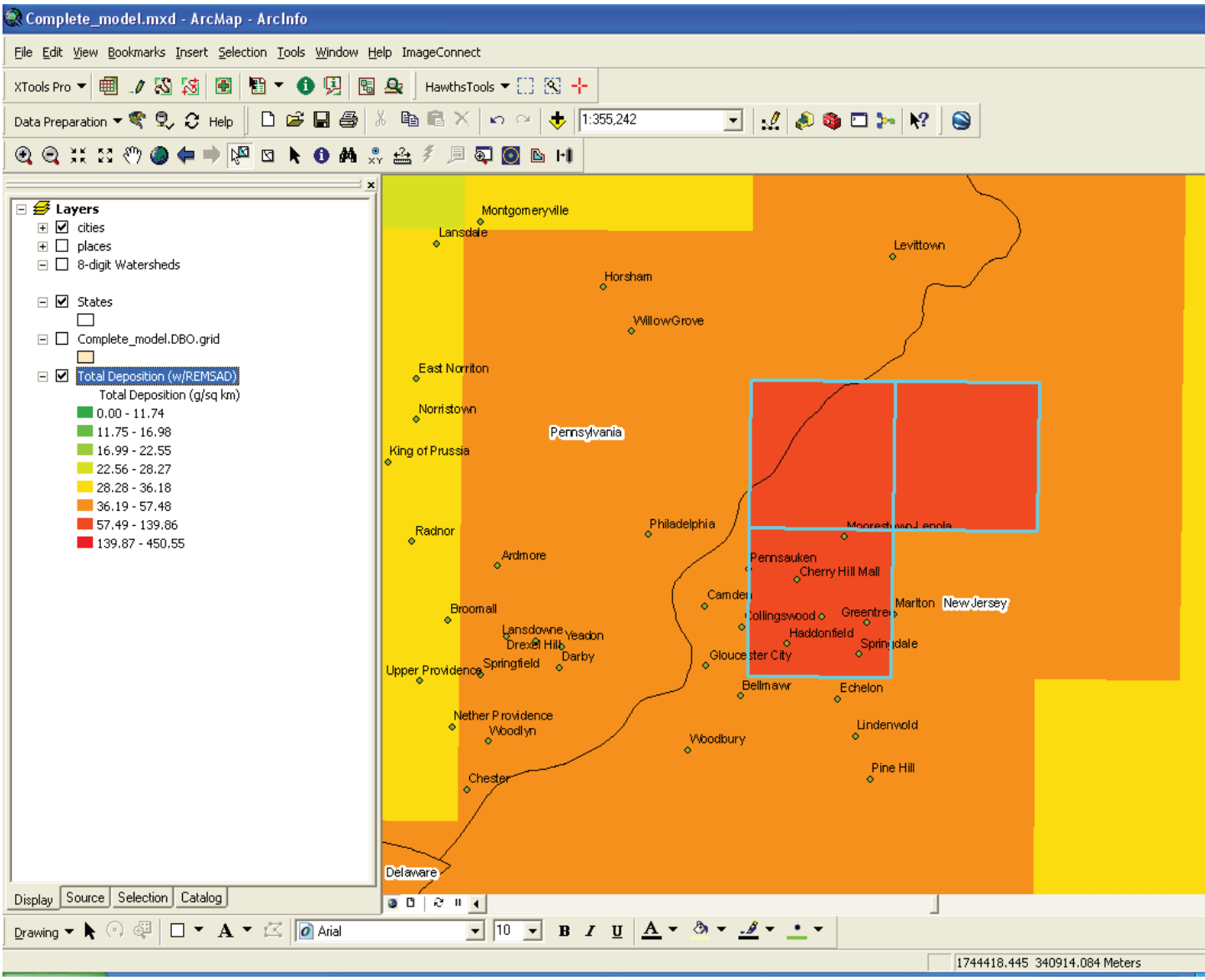
Total Deposition (w/REMSAD)
Total Deposition (g/sq km)
0.00 - 11.74
11.75 - 16.98
16.99 - 22.55
22.56 - 28.27
28.28 - 36.18
36.19 - 57.48
57.49 - 139.86
139.87 - 450.55
Display
Source
Selection
Catalog
Drawing
Arial
10
New York
Connecticut
New York
New Jersey
New York
1766876.812 466217.76 Meters


NJ High Dep (NE corner) (grams)
Total mercury = 22,061.1 g. Total Area = 576.00 Sq km.
Legend
BG_Avg_of_REMSAD_CTM-GRAHM-GEOSCHEM_Boundary 9,359.18
Other sources 4,513.44
NJ_Counties_bordering_NY/NJ_Harbor 3,089.05
NJ_Other_Sources 1,896.45
NJ_Essex_Co._RRF 1,838.06
NY_Counties_bordering_NY/NJ_Harbor 851.89
BG_Re-emission 513.02
42.42%
2.33%
3.86%
8.33%
8.6%
14%
20.46%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XTools Pro
HawthsTools
Data Preparation
Help
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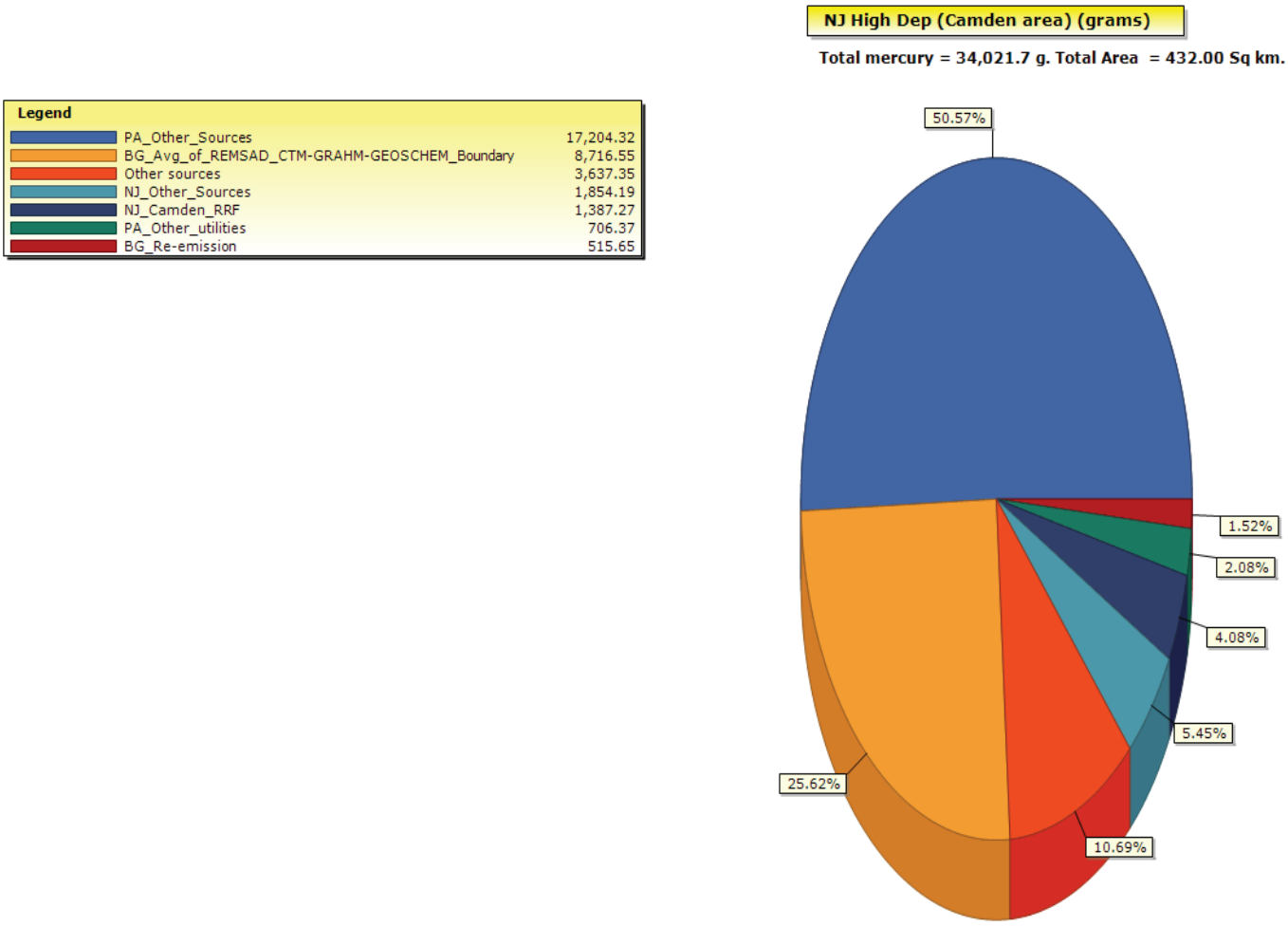
Layers
cities
places
8-digit Watersheds
States
Complete_model.DBO.grid
Total Deposition (w/REMSAD)
Total Deposition (g/sq km)
0.00 - 11.74
11.75 - 16.98
16.99 - 22.55
22.56 - 28.27
28.28 - 36.18
36.19 - 57.48
57.49 - 139.86
139.87 - 450.55
Display
Source
Selection
Catalog
Drawing
Arial
10
Montgomeryville
Lansdale
Levittown
Horsham
WillowGrove
East Norriton
Norristown
Pennsylvania
King of Prussia
Philadelphia
Radnor
Ardmore
Pennsauken
Cherry Hill Mall
Broomall
Lansdowne
Yeadon
Drexel Hill
Darby
Springfield
Upper Providence
Haddonfield
Gloucester City
Bellmawr
Echelon
Nether Providence
Woodlyn
Woodbury
Lindenwold
Pine Hill
Chester
Delaware
Marlton
New Jersey
1744418.445 340914.084 Meters


NJ High Dep (Camden area) (grams)
Total mercury = 34,021.7 g. Total Area = 432.00 Sq km.
Legend
PA_Other_Sources 17,204.32
BG_Avg_of_REMSAD_CTM-GRAHM-GEOSCHEM_Boundary 8,716.55
Other sources 3,637.35
NJ_Other_Sources 1,854.19
NJ_Camden_RRF 1,387.27
PA_Other_utilities 706.37
BG_Re-emission 515.65
50.57%
1.52%
2.08%
4.08%
5.45%
25.62%
10.69%

TOTAL MAXIMUM DAILY LOADS FOR POLYCHLORINATED BIPHENYLS (PCBs) FOR ZONES 2 - 5 OF THE TIDAL DELAWARE RIVER

DELAWARE RIVER BASIN COMMISSION
WEST TRENTON, NEW JERSEY

December 2003

Acknowledgements

This report was prepared by the Delaware River Basin Commission staff: Carol R. Collier, Executive Director. Dr. Thomas J. Fikslin and Dr. Namsoo Suk were the principal authors of the report. Dr. Fikslin is the Head of the Commission's Modeling & Monitoring Branch. Dr. Suk is a Water Resources Engineer/Modeler in the Modeling & Monitoring Branch. Significant technical contributions were made by Gregory J. Cavallo, Dr. Daniel S. L. Liao, Dr. Ronald A. MacGillivray, and John R. Yagecic. Richard W. Greene is gratefully acknowledged for his efforts in summarizing fish tissue data for PCBs, and for providing Figures 2 and 3 of the report. Technical recommendations were provided by the Commission's Toxic Advisory Committee and its TMDL Policies and Procedures Subcommittee.

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New Jersey Department of Environmental Protection
Pennsylvania Department of Environmental Protection
U.S. Environmental Protection Agency, Region II
U.S. Environmental Protection Agency, Region III
Rutgers University
Limno-Tech, Inc.

Suggested Citation

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EXECUTIVE SUMMARY

Introduction

On behalf of the states of Delaware, New Jersey and Pennsylvania, and in cooperation with the Delaware River Basin Commission, the United States Environmental Protection Agency Regions II and III (EPA) establish these total maximum daily loads (TMDLs) for polychlorinated biphenyls (PCBs) in the Delaware River Estuary. EPA establishes these TMDLs in order to achieve and maintain the applicable water quality criteria for PCBs designed to protect human health from the carcinogenic effects of eating the contaminated fish now found in the Delaware Estuary. In accordance with Section 303(d) of the Clean Water Act (CWA) and its implementing regulations, these TMDLs provide allocations to point sources (WLAs) discharging PCBs as well as allocations to nonpoint sources (LAs) of PCBs, and an explicit margin of safety to account for uncertainties. This TMDL report and its appendices set forth the basis for these TMDLs and allocations and discusses follow up strategies that will be necessary to achieve these substantial reductions of PCBs. EPA will continue to work with the Commission and the States to develop enhanced Stage 2 PCB TMDLs based on information to be collected and analyzed over the next several years. While EPA acknowledges that implementation of these TMDLs will be difficult and may take decades to fully achieve, the establishment of these TMDLs sets forth a framework and specific goals to protect human health and restore the Delaware River from the effects of PCB pollution.

Background

The states of Delaware, New Jersey and Pennsylvania have identified the Delaware Estuary as impaired on their respective lists pursuant to Section 303(d) of the CWA. The States identified the impairments based on their findings of elevated levels of polychlorinated biphenyls (PCBs) in the tissue of fish caught in this portion of the Delaware River. The listing was based upon failure to attain one of the estuary's primary designated uses – fishable waters and the inherent protection of human health from consumption of unsafe fish. When water quality standards, including a numeric criterion and a designated use, are not attained despite the technology-based control of industrial and municipal wastewater (point sources), the Clean Water Act requires that the impaired water be identified on the state's Section 303(d) list of impaired waters and that a total maximum daily load (TMDL) be developed. A TMDL expresses the maximum amount of a pollutant that a water body can receive and still attain standards. Once the load is calculated, it is allocated to all sources in the watershed – point and nonpoint – which then must reduce loads to the allocated levels in order to achieve and maintain the applicable water quality standards.

For management purposes, the Delaware River Estuary has been designated by the Delaware River Basin Commission (also referred to in this report as the Commission) as that section of the main stem of the Delaware River and the tidal portions of the tributaries thereto, between the head of Delaware Bay (River Mile 48.2) and the head of the tide at Trenton, New Jersey (River Mile 133.4). The portion of the Delaware where the river meets the sea, the estuary is characterized by varying degrees of salinity and complex water movements affected by river flows, wind and ocean tides. A map of the estuary showing the water quality management zones 2 through 5 that comprise the tidal Delaware River appears on the following page.

In the late 1980s, the states of Delaware, New Jersey and Pennsylvania began issuing fish consumption advisories for portions of the Delaware Estuary due to elevated concentrations of PCBs measured in fish

tissue. Today, the states' advisories cover the entire estuary and bay. The advisories range from a no-consumption recommendation for all species taken between the C&D Canal and the Delaware-Pennsylvania border to consumption of no more than one meal per month of striped bass or white perch in Zones 2 through 4. Why the need for such advisories? PCBs are classified as a probable human carcinogen by the U.S. Environmental Protection Agency (EPA). They also have been shown to have an adverse impact on human reproductive and immune systems and may act as an endocrine disruptor.

PCBs are a class of synthetic compounds that were typically manufactured through the progressive chlorination of batches of biphenyl to achieve a target percentage of chlorine by weight. Individual PCB compounds called congeners can have up to 10 chlorine atoms attached to a basic biphenyl structure consisting of two connected rings of six carbon atoms each. There are 209 patterns in which chlorine atoms may be attached, resulting in 209 possible PCB compounds. These compounds can be grouped into "homologs" defined by the number of chlorine atoms attached to the carbon rings. Thus, for example, PCB compounds that contain five chlorine atoms comprise a homolog referred to as pentachlorobiphenyls or penta-PCBs.


Blue Marsh Reservoir
Reading
Manatawny Cr.
Pottstown
Green Lane
Perkiomen Creek
Lake Galena
Neshaminy Creek
Delaware River
Assunpink Cr.
RM 133.4
Trenton
Crosswicks Creek
Blacks Creek
Wissahickon Cr.
Schuylkill River
RM 108.4
Zone 2
Marsh Creek Reservoir
Pennsylvania
Philadelphia
Rancocas Creek
Pennsauken Cr.
West Br. Brandywine Cr.
Brandywine Creek
Geist
Crum Cr.
Zone 4
RM 95
Camden
Zone 3
RM 78.83
Cooper River
White Clay Cr.
Wilmington
Hoopes Res.
Mantua Cr.
Big Timber Cr.
New Jersey
Raccoon Cr.
Oldmans Cr.
Maryland
Christina River
Salem River
Zone 5
Maurice River
C & D Canal
Salem
Alloway Cr.
Stowe Cr.
Cohansey River
RM 48.23
Union Lake
Zone 6
Smyrna River
Delaware
Leipsic River
Dover
Dennis Cr.
St. Jones River
Delaware Bay
Murderkill River
Mispillion River
Cedar Cr.
Milford
RM 0
Broadkill River
Lewes
Atlantic Ocean
N
0 5 10
Miles

Due to their stable properties, PCBs were used in hundreds of industrial and commercial applications, including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics and rubber products; and in pigments, dyes and carbonless copy paper, among other applications. PCB laden oil is often associated with electrical transformers. More than 1.5 billion pounds of PCBs were manufactured in the United States before their manufacture and general use, with a few small exceptions, was banned by the EPA in the late 1970s. Existing uses in some electrical equipment continue to be allowed. PCBs are hydrophobic and thus tend to bind to organic particles in sediment and soils. Their chemical stability allows them to persist in the environment for years. PCBs accumulate in the tissue of fish and other wildlife, entering the organism through absorption or ingestion. As a result, they may be present in fish and marine mammals at levels many times higher than in the surrounding water and at levels unsuitable for human consumption.

The water quality standards that form the basis for the TMDLs are the current Delaware River Basin Commission water quality criteria for total PCBs for the protection of human health from carcinogenic effects. These criteria were identified as the TMDL targets by a letter dated April 16, 2003 from the Regional Administrators of EPA Regions II and III to the Executive Director of the Delaware River Basin Commission. The criteria are 44.4 picograms per liter in Zones 2 and 3, 44.8 picograms per liter in Zone 4 and the upper portion of Zone 5, and 7.9 picograms per liter in lower Zone 5. The more stringent criterion in the lower estuary reflects a higher fish consumption rate utilized by the Commission and the State of Delaware, based upon an evaluation of fish consumption there. A consequence of the inconsistency in criteria is that a critical location occurs at the point between upper and lower Zone 5 where the criteria drop sharply from 44.8 picograms per liter to 7.9 picograms per liter. Achieving the lower standard in a portion of Zone 5 will require much larger reductions in the upper zones than would otherwise be necessary. Significant reductions are required throughout the estuary in any case, as ambient concentrations of PCBs in the water body currently exceed the criteria by two to three orders of magnitude.

PCBs have been dispersed throughout the environment by human activity. They enter the atmosphere as a gas, spill into soils and waterways, and lodge in sediments. They continue to be generated as a byproduct by some industrial processes. Thus, the sources of PCBs to the Delaware Estuary are multiple. They include loadings from the air, the main stem Delaware River above Trenton, tributaries to the Delaware both above and below Trenton, industrial and municipal point source discharges, combined sewer overflows, and storm water runoff, including runoff from seriously contaminated sites. For purposes of these TMDLs, point sources include all municipal and industrial discharges subject to regulation by the NPDES permit program, including combined sewer overflows and stormwater discharges. All other discharges are considered nonpoint sources.

Interagency and Interstate Cooperation

In the latter half of the 1990s, the three estuary states included the portions of Zones 2 through 5 of the Delaware River within their borders on their lists of impaired waters under Section 303(d) of the Clean Water Act, due to elevated levels of PCBs in estuary fish. This action required the states and EPA to agree upon a schedule for establishing TMDLs for PCBs. In order to provide for a single TMDL adoption process for the shared water body, one date for completion of the TMDLs – December 15, 2003 – was established. This is the date set for completion of the PCB TMDLs by a 1997 Consent Decree and Settlement Agreement in an action entitled *American Littoral Society and Sierra Club v. the United States Environmental Protection Agency et al.*, which established dates for adoption of TMDLs in the Delaware

Estuary. Because a unified legal process for issuance of the TMDLs could not be accomplished easily through independent state actions, at the request of the states, EPA agreed to issue the TMDLs for PCBs in the estuary on the states' behalf.

In the spring of 2000, the states and EPA asked the Delaware River Basin Commission to take the lead in developing the technical basis for the estuary PCB TMDLs. In consultation with its Toxics Advisory Committee (TAC), comprised of representatives from the states, EPA Regions II and III, municipal and industrial dischargers, academia, agriculture, public health, environmental organizations and fish and wildlife interests, the Commission undertook to do so. In September of 2000, the Commission established a panel of scientists expert in the modeling of hydrophobic contaminants such as PCBs to advise it and the TAC on the development of the complex hydrodynamic and water quality model required to develop the TMDLs. The Commission also initiated an extensive program of scientific investigations and data collection efforts. In response to a recommendation of the expert panel, in May of 2002 the Commission engaged a consultant experienced in water quality modeling to work closely with Commission staff to develop the model.

In consultation with the TAC, the Commission staff and the Delaware Estuary Program developed a strategy to address contamination of the Delaware Estuary by PCBs (the PCB Strategy). The PCB Strategy includes the following nine components: (1) determination of the water quality targets for PCBs; (2) characterization of PCB concentrations in the estuary ecosystem; (3) identification and quantification of all point and nonpoint sources and pathways of PCBs; (4) determination of the transport and fate of PCB loads to the estuary; (5) calculation of the TMDLs, including the wasteload and load allocations required for a TMDL;(6) development of an implementation plan to reduce PCBs entering the estuary; (7) initiation of an effort to increase public awareness of toxicity issues in the estuary; (8) long-term monitoring of PCB concentrations in air, water and sediments of the estuary; and (9) long-term monitoring of PCB concentrations in living resources of the estuary and impacts upon living resources of the estuary. The PCB Strategy is one component of EPA's reasonable assurance that the allocations of these TMDLs will ultimately be achieved.

In a cooperative effort, EPA, the Commission, the states, municipal and industrial dischargers and other stakeholders, have now completed the PCB Strategy components necessary for issuance of the TMDLs. This TMDL report discusses the identification of water quality targets for the TMDLs and calculation of the TMDLs in more detail below (components 1 and 5). An extensive program of scientific investigations and data collection efforts to further characterize PCB sources, concentrations and pathways in the estuary ecosystem is ongoing (components 2, 3 and 8). To date, studies have been assembled or undertaken on fish tissue, ambient water quality, sediment, air deposition, air-water exchange, bioaccumulation pathways, tributary loading, point source discharges, and stormwater loadings. The transport and fate of PCBs in the estuary ecosystem (component 4) has been established through the development of a complex mathematical model, also discussed below. The Commission has established a TMDL Implementation Advisory Committee (IAC) to develop strategies over the next two years for reducing PCB loads to the estuary and achieving the TMDLs (component 6). An effort to educate the public about toxicity issues in the estuary (component 7) began with a series of public information sessions in February and March of 2001. In October of 2002, a coalition of municipal and industrial dischargers sponsored a science symposium, at which the various scientific investigators presented their findings to date. A meeting among regulators and stakeholders on the TMDLs and their regulatory implications was held in April, 2003 (see Appendix 1).

EPA with assistance from the Commission and the States held three informational meetings about the proposed TMDLs on September 22, 24 and 25, 2003, and conducted a public hearing on the proposed

TMDLs on October 16, 2003. During the public comment period EPA received numerous written comments in addition to the testimony provided at the public hearing. EPA considered those comments in finalizing these TMDLs and prepared a Response to Comments document that is part of the record of this decision. Ongoing education initiatives regarding these issues continue to be carried out through the Delaware Estuary Program and the Partnership for the Delaware Estuary.

Development of the TMDLs

The three-year schedule for development of the estuary TMDLs by December 15, 2003 resulted in a decision to develop the TMDLs using a staged approach. The Stage 1 and Stage 2 TMDLs will each comply fully with EPA requirements and guidance. The staged approach will provide for adaptive implementation through execution of load reduction strategies while additional monitoring and modeling efforts proceed. As discussed below, these Stage 1 TMDLs are based on the best water quality-related monitoring data, modeling and scientific analysis available at this time. EPA expects that additional monitoring data and modeling results will be collected and developed following issuance of the Stage 1 TMDLs. This additional information will enable a more refined analysis to form the basis of the Stage 2 TMDLs. EPA will continue to work with the Commission and the States to develop and complete the Stage 2 TMDLs. Until the Stage 1 TMDLs are amended or replaced, the Stage 1 TMDLs are the final and effective TMDLs for purposes of the CWA.

EPA's regulations implementing Section 303(d) of the Clean Water Act provide that a TMDL must be expressed as the sum of the individual wasteload allocations (WLA) for point sources plus the load allocation (LA) for nonpoint sources plus a margin of safety (MOS). This definition may be expressed as the equation: TMDL = WLA + LA + MOS. A separate TMDL has been developed for each water quality management zone of the estuary. Each of the TMDLs must provide for achievement of the applicable water quality standards within the zone and also must ensure that water quality in downstream zones is adequately protected.

In June of 2002, the expert panel recommended that for the TMDLs to be completed by December 15, 2003, the Commission should develop and calibrate a water quality model for only one of the PCB homologs and use it to develop a set of TMDLs from which TMDLs for total PCBs could be extrapolated. This process became known as Stage 1 of an iterative approach to establishing the TMDLs for PCBs in the estuary. Since pentachlorobiphenyls were the dominant homolog in fish tissue monitored in the estuary, and since ambient data indicated that throughout the estuary this homolog represents approximately 25 percent of the total PCBs present, the pentachlorobiphenyls (penta-PCBs) were selected. Based on these recommendations and a review of the available data, EPA adopted this approach. Thus, based on the best scientific estimates and analysis as discussed further below, the Stage 1 TMDLs, WLAs and LAs for total PCBs were extrapolated, using a factor of 4 to 1, from TMDLs and allocations developed for penta-PCBs. EPA, the Commission and the States expect that the Stage 2 TMDLs, WLAs and LAs will be based on the summation of the PCB homolog groups, without the use of extrapolation. The partners intend that the Stage 2 TMDLs will be developed using all additional data collected and modeling performed after the establishment of these TMDLs. It is anticipated that the Stage 2 WLAs will be based upon an enhanced allocation methodology. When they are developed and established, the partners expect that the Stage 2 TMDLs will replace the Stage 1 TMDLs.

The TMDLs were calculated using both a conservative chemical model and a penta-PCB water quality model run until equilibrium was observed. This procedure was used because hydrophobic contaminants

like PCBs sorb to particulates and interact significantly with the sediments of the estuary. Sediments respond more slowly than the water column to changes in PCB concentrations in either medium, and allowing the water column and sediments to come into equilibrium is necessary to ensure that water quality criteria are met. A modified version of the TOXI5 water quality model was used (DRBC 2003a and 2003b). Both models utilized outputs from a DYNHYD5 hydrodynamic model that was extended from the head of the Delaware Bay to the mouth of the bay (DRBC 2003a). The models cycled inputs from the period February 1, 2002 until January 31, 2003. This one-year period was considered to be representative of long-term hydrological conditions for two important reasons. First, during this period flows of the two main tributaries to the estuary – the main stem Delaware River and the Schuylkill River – reasonably represent the flows during the approximately 90- and 70-year periods of record, respectively, for the two tributaries (see Figures 5 and 6). Precipitation data during the one-year period also is in good agreement with the long-term precipitation record with respect to the number and percentage of days with and without precipitation. Upon the recommendation of the expert panel, in order to maintain hydrological and meteorological relationships between the various inputs to the model, effluent flows were based upon data for the same one-year period, rather than on design flows. The same approach was used for inputs such as air temperature, water temperature and wind speed.

Penta-PCB TMDLs were calculated in a four step procedure. The procedure initially utilized the conservative chemical model to establish contribution factors for two of the major tributaries to the estuary – the Delaware River at Trenton and the Schuylkill River – and each of the four estuary zones. The contribution factor reflects the influence of the loading attributable to each tributary or zone on the PCB concentration at the critical location in Zone 5 where the water quality criterion for PCBs drops from 44.4 picograms per liter to 7.9 picograms per liter. If the criterion at this location is met, then the water quality criteria are met throughout the estuary. Once the contribution factors were established, the TMDLs were calculated over a one-year period to determine an annual median loading. The annual median was used in order to be consistent with the model simulations and the 70-year exposure for human health criteria. A description of the four steps follows:

1. Calculate the contribution factor (CF) for each of the estuary zones and two of the tributary model boundaries to that critical location in Zone 5 where the criterion of 7.9 picograms per liter (approximately 2.0 picograms per liter of penta-PCBs) is controlling.

2. Calculate the allowable loadings from each of these sources that will still ensure that the water quality target is met at the critical location utilizing the CF and the proportion of the assimilative capacity at the critical location allocated to each source. Iteratively determine the amount of assimilative capacity (in picograms per liter) provided by the sediments, and add this concentration to the penta-PCB water quality target. Recalculate the allowable loadings from each of the six sources using this revised water quality target.

3. Utilize the water quality model for penta-PCBs with these allowable loadings to confirm that the sediment concentrations have reached pseudo-steady state, and confirm that the penta-PCB water quality target is met in Zones 2 through 5.

4. Estimate the gas phase concentrations that would be in equilibrium with the penta-PCB water concentrations when the water quality targets are met, include these in the water quality model, and then iteratively adjust the gas phase concentration of penta-PCBs in the air until the water quality target is reached.

For purposes of calculating the TMDLs, EPA notes that the model assumes that PCB loads from the ocean, the C&D Canal, the major tributaries and the air are at levels that ensure that the water quality standards are achieved, rather than at the actual levels, which in every case are higher. Thus, in developing the TMDLs, both the ocean boundary and the C&D Canal boundary were set to an equivalent penta-PCB criterion of 2.0 picograms per liter, corresponding to a total PCB water quality criterion of 7.9 picograms per liter, the criterion in lower Zone 5 where each of these water bodies meets the estuary. Other programs and factors beyond the scope of these TMDLs will be necessary to reduce PCB loads from these sources. The actual concentration at the mouth of the Bay exceeds the water quality criterion by one to two orders of magnitude, while the current concentration at the C&D Canal boundary exceeds this value by almost three orders of magnitude. Similarly, the Schuylkill and Delaware River boundary conditions were set to 9.68 picograms per liter and 10.72 picograms per liter respectively, although the actual concentrations in the two water bodies at the point where they enter the estuary are 1800 and 1600 picograms per liter respectively. The air concentration of PCBs also is considered by the model. When water quality standards are achieved, however, there will be no significant net exchange between dissolved PCBs in water and gas phase PCBs in the air. Because gas phase PCBs do not provide a load to the estuary when the water quality standards are met, they are not allocated any portion of the TMDLs. Actual air concentrations in the estuary region, however, currently exceed the levels required for equilibrium by two orders of magnitude.

The TMDLs for penta-PCBs calculated with the four-step procedure were 64.34 milligrams per day for Zone 2, 4.46 milligrams per day for Zone 3, 14.18 milligrams per day for Zone 4, and 12.02 milligrams per day for Zone 5. The higher TMDLs in Zones 2 and 4 are the result of the assimilative capacity provided by the flows from the main stem Delaware River in Zone 2 and the Schuylkill River in Zone 4.

Each of the zone TMDLs was then apportioned into three components: the WLA, LA and MOS. EPA has based these allocations upon recommendations of the Commission's TAC. The committee recommended that an explicit MOS of 5% be allocated in each estuary zone, and further recommended that for the Stage 1 TMDLs, the proportion of the TMDLs allocated to WLAs and LAs should be based upon the current proportion of loadings from the various PCB source categories to each of the zones during the one-year cycling period of February 1, 2002 to January 31, 2003.

Stage 1 TMDLs were then calculated using the ratio of penta-PCBs to total PCBs observed in ambient water samples collected during five surveys that encompass the range of hydrological conditions typically observed in the estuary. Median penta- to total PCB ratios of 0.23, 0.25, 0.25 and 0.23 were observed in Zones 2 to 5, respectively. For these TMDLs, a fixed value of 0.25 was used for all zones to scale up the zone-specific TMDLs, WLAs, LAs and MOSs. The following table summarizes the TMDLs for each estuary zone for total PCBs as well as the allocations to WLAs, LAs and the MOSs.

Stage 1 TMDLs for Total PCBs

Estuary Zone	TMDL	WLA	LA	MOS
	mg/day	mg/day	mg/day	mg/day
Zone 2	257.36	11.03	233.46	12.87
Zone 3	17.82	5.67	11.26	0.89
Zone 4	56.71	6.54	47.34	2.84
Zone 5	48.06	15.62	30.04	2.40
Sum	379.96	38.86	322.10	19.00

In the proposed PCB TMDLs, the LAs contained the loadings from municipal separate storm sewer systems (MS4s), which are regulated as NPDES point sources. Loadings from MS4s are now identified and included as part of the WLAs with the LAs adjusted accordingly.

The portion of the TMDLs allocated to non-point sources is higher than the portion of the TMDLs allocated to point sources in all four estuary zones when the current loading proportions are used as the basis for allocating the zone TMDLs. This result is not unexpected. Nonpoint sources include, among other sources, contaminated sites, non-point source runoff, and the two main tributaries, which contribute greater loadings to the zones than the NPDES discharges (including stormwater discharges and combined sewer overflows) that comprise the point source contributions. The proportions vary between zones, with Zones 3 and 5 having the highest allocations to point sources (approximately 30%).

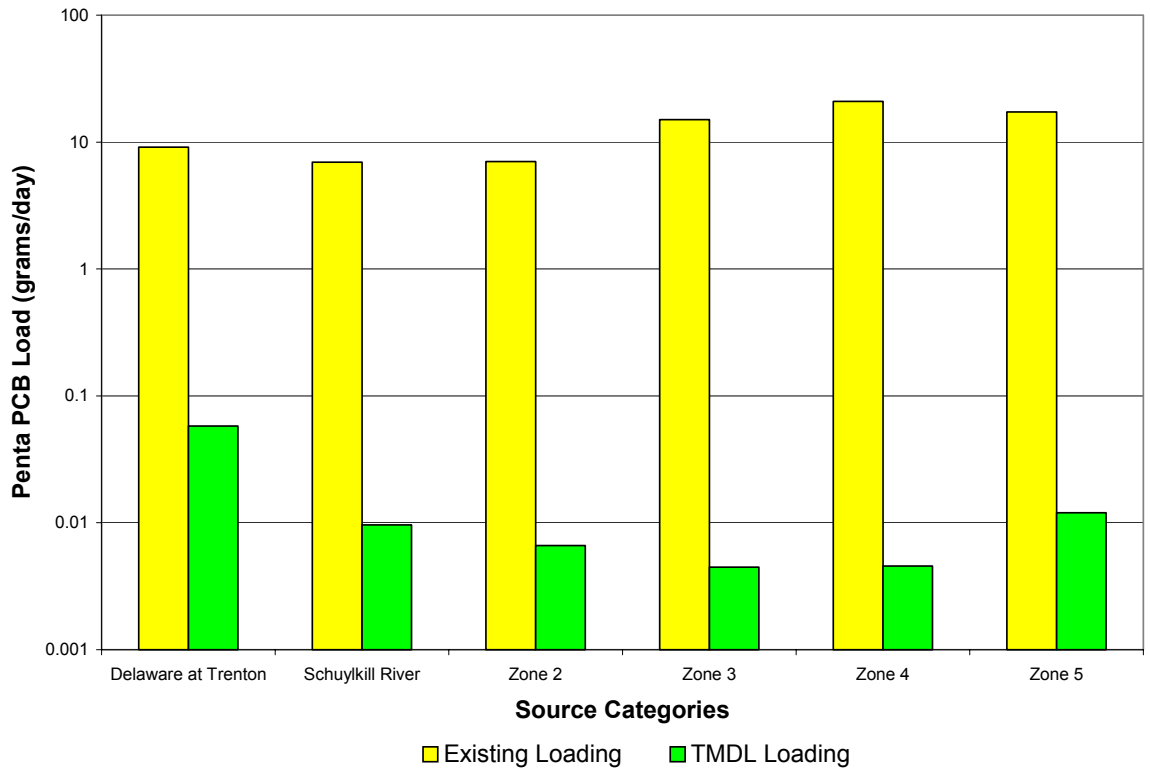
Implementing Load Reductions to Achieve the TMDLs

The following figure compares the current penta-PCB loadings for water quality management Zones 2 through 5 and the Delaware and Schuylkill Rivers to the Stage 1 TMDL penta-PCB loadings:

The chart illustrates that existing loadings are roughly two to three orders of magnitude higher than the TMDLs. Achieving the water quality standards for PCBs in the Delaware Estuary will require significant reductions from current loadings from both point and nonpoint sources. In

addition to reducing PCB loads from sources discharging directly to the estuary, reductions from sources in the non-tidal portion of the river, local and regional air emissions, and sources contributing to elevated PCB concentrations in the Atlantic Ocean will be necessary to achieve and maintain the applicable PCB standards and adequately protect human health.

These TMDLs focus on the instream conditions which need to be met to protect human health and establish individual wasteload allocations (WLAs) for 142 point sources that are deemed to be potential sources of penta-PCBs (see Appendix 2). In order to begin to implement these TMDLs, the NPDES permitting authorities believe that it is appropriate for these discharges to receive non-numeric water quality-based effluent limits (WQBELs) consistent with their



respective individual WLAs when their NPDES permits are reissued or otherwise modified.[1] The Delaware River Basin Commission may also separately require actions to implement these TMDLs. On December 3, 2003, the DRBC passed Resolution 2003-27 authorizing and directing the Executive Director to require dischargers and other responsible parties to conduct monitoring and/or other data collection and analyses to further characterize point and non-point loadings of toxic contaminants, including PCBs, to the Delaware Estuary for purposes of developing and implementing TMDLs or actions under the DRBC Water Quality Regulations. Requirements in NPDES permits or through DRBC regulations may include: (1) the use of Method 1668A, a highly sensitive analytical method capable of detecting very small amounts of PCBs, for any monitoring of influent and effluent to better quantify individual PCB congeners; (2) the development of a PCB minimization plan; and (3) implementation of appropriate PCB minimization measures identified through PCB minimization planning. The respective NPDES permitting authorities will determine the discharge-specific effluent controls consistent with the WLAs, and may consider the following factors: the relative loading of penta-PCBs, the type of discharge, the type of analytical method used to measure the 19 penta-PCB congeners, the number of the penta-PCB congeners that were detected, and the proportion of the zone WLA that is represented by the discharge loading. When Stage 2 TMDLs are issued, it is expected that all NPDES permits issued, reissued or modified will include numeric or non-numeric requirements consistent with the Stage 2 WLAs for each zone. The implementation strategy for the development of NPDES permit effluent limits consistent with the WLAs is discussed at greater length in Appendix 3 of this report.

Reducing point source discharges alone will not be sufficient to achieve the estuary water quality standards. Runoff from contaminated sites is a significant source of PCBs. For these TMDLs, EPA and the states evaluated forty-nine contaminated sites within the estuary watershed (see Appendix 4). The combined loads from these sites are estimated to comprise 57.09% of the loading to Zone 3; 38.04% of the loading to Zone 4 and 46% of the loading to Zone 5 (see Table 7). Contaminated sites make up a much smaller proportion of the loading in Zone 2 – only 0.42% – because of the lack of contaminated sites and the significant influence in this zone of the main stem Delaware River. In order to achieve the reductions required by the TMDLs, EPA and the States would need to undertake a concerted effort using the authorities under CERCLA, RCRA and the related state statutes.

Significant reductions will be required in point and nonpoint sources to the major tributaries. Currently, concentrations of PCBs in the Schuylkill and Delaware Rivers where they discharge to the estuary are approximately 1800 and 1600 picograms per liter, respectively. Even if all the TMDLs are achieved, the water quality criteria in the estuary will not be attained until the

[1]The States have indicated that a typical permit will include, among other requirements, the requirement to monitor the discharge using Method 1668A and to implement a PCB pollutant minimization program. The regulation at 40 CFR 122.44(k) allows the use of non-numeric, BMP-based WQBELs where a BMP is determined to be an appropriate means to control pollutants under specified circumstances. Where a permit uses such BMP WQBELs, compliance may be achieved by implementing such requirements.

concentration in the Schuylkill is reduced to 9.68 picograms per liter and the concentration in the main stem Delaware River falls to 10.72 picograms per liter.

Although the ocean boundary has a less significant influence on Zone 5 than does the main stem Delaware River, sources contributing to elevated PCB concentrations in the Atlantic Ocean also must be reduced. The concentration of PCBs in ocean water at the estuary boundary currently exceeds the water quality criterion for Delaware Bay by one to two orders of magnitude.

Finally, air concentrations of PCBs in the region currently are two orders of magnitude above the concentration required to achieve equilibrium and halt contributions of PCBs from the air to the water. Air monitoring data collected at several sites in New Jersey, Delaware and Pennsylvania suggest that PCB air concentrations primarily result from local sources. Thus, source reductions must focus on PCBs in the local and regional airshed.

These reductions cannot be achieved overnight. The Commission has created a TMDL Implementation Advisory Committee (IAC), with members from each of the estuary states, the major municipal dischargers and two of the smaller ones, industrial dischargers, and fishery, wildlife and environmental organizations. EPA Regions II and III also will participate, in an advisory role. The IAC will meet over a two-year period to develop creative and cost-effective strategies for achieving load reductions in the short term and attaining water quality standards in the longer term. Notably, some large dischargers already have undertaken studies to track down PCBs on a voluntary basis. However, due to the scope and complexity of the problem that has been defined through development of these TMDLs, achieving the estuary water quality standards for PCBs will take decades.

Additional Information

A notice about the proposed TMDLs for PCBs in the Delaware Estuary was published in the *Federal Register* and in each of the estuary states' registers on September 2, 2003. Additional notices were published in regional newspapers. The notices contained details about the comment period which closed on October 21, 2003, informational meetings and the public hearing for these TMDLs. Details about these events were also provided on the Commission's web site, at http://www.drbc.net. EPA received oral testimony from 8 groups or individuals and written comments from 30 groups or individuals from various sectors. After consideration of all data and information contained in the public comments, a document providing responses to these public comments has been prepared and appropriate revisions made to these final TMDLs.

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1. INTRODUCTION

1.1 Regulatory Background

Total Maximum Daily Loads or TMDLs are one of the approaches defined in the Clean Water Act (CWA) for addressing water pollution. The first approach of the CWA that was implemented by the U.S. EPA was the technology-based approach to controlling pollutants (Section 301). This approach was implemented in the mid-1970s through the issuance of permits authorized under Section 402 of the Act. The approach specified minimum levels of treatment for sanitary sewage and for various categories of industries. The other water quality-based approach was implemented in the 1980s. This approach includes water quality-based permitting and planning to ensure that standards of water quality established by States are achieved and maintained.

Section 303(d) of the Act establishes TMDLs as one of the tools to address those situations where the technology-based controls are not sufficient to meet applicable water quality standards for a water body (U.S. EPA, 1991). They are defined as the maximum amount of a pollutant that can be assimilated by a water body without causing the applicable water quality standard to be exceeded. The basis of a TMDLs is thus the water quality standard. This standard may be established for the protection of aquatic life, human health through ingestion of drinking water or resident fish, or wildlife. Under Section 303(d), States are required to identify, establish a priority ranking, and to develop TMDLs for those waters that do not achieve or are not expected to achieve water quality standards approved by the U.S. EPA. Federal regulations implementing Section 303(d) of the Clean Water Act provide that a TMDL must be expressed as the sum of the individual wasteload allocations for point sources (WLA) plus the load allocation for nonpoint sources (LA) plus a margin of safety (MOS). This definition may be expressed as the equation:

$$TMDL = WLA + LA + MOS$$

1.2 Study Area

Zones 2 through 5 of the Delaware River (Figure 1) have been designated by the Delaware River Basin Commission as that section of the mainstem of the Delaware River and the tidal portions of the tributaries thereto, between the head of Delaware Bay (River Mile 48.2) and the head of the tide at Trenton, New Jersey (River Mile 133.4). Zones 2 to 4 are bordered by the State of New Jersey and the Commonwealth of Pennsylvania. Zone 5 is bordered by the States of Delaware and New Jersey. Zone 2 encompasses the area from the head of the tide at Trenton to River Mile 108.4. Zone 3 encompasses the area from River Mile 108.4 to River Mile 95.0. Zone 4 encompasses the area from River Mile 95.0 to River Mile78.8, and Zone 5 encompasses the area from River Mile 78.8 to the head of Delaware Bay.

In 1989, the Delaware River Basin Commission created the Estuary Toxics Management Program to address the impact of toxic pollutants in the tidal Delaware River (also called the Delaware Estuary. The mission of this program was to develop policies and procedures to control the discharge of substances toxic to humans and aquatic biota from point sources discharging to this water body. In 1993, Commission staff identified several classes of pollutants and specific chemicals that were likely to exceed water quality criteria currently being developed under the program. These included polychlorinated biphenyls (PCBs), volatile organics, metals, chlorinated pesticides, chronic toxicity and acute toxicity. This list was subsequently included in the Delaware Estuary Programs's Comprehensive Conservation and Management Plan in 1996.

Beginning in the late 1980's, concern regarding the possible contamination of fish populations that were rebounding as dissolved oxygen levels improved resulted in a number of investigations of contaminant levels

in resident and anadromous fish species. These species included the white perch, channel catfish and striped bass. The studies subsequently identified PCBs and several chlorinated organics at elevated levels (DRBC, 1988; Greene and Miller, 1994; Hauge et al, 1990; U.S. F&WS, 1991 and 1992). These studies and other data collected by DRBC and the states resulted in fish consumption advisories being issued by all three states bordering the Estuary beginning in 1989. These advisories were principally based upon PCB contamination; and to a lesser degree, chlorinated pesticides such as DDT and its metabolites DDE and DDD, and chlordane.

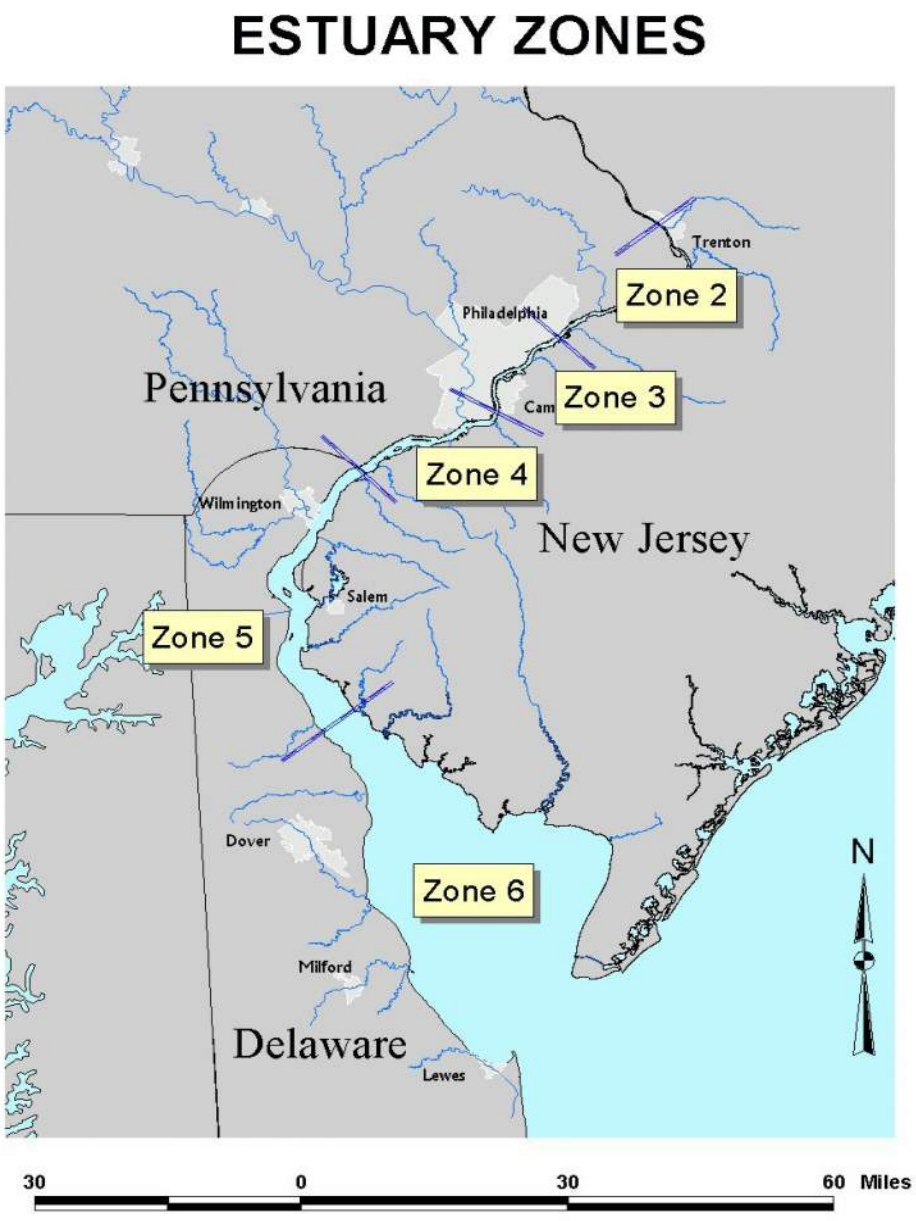
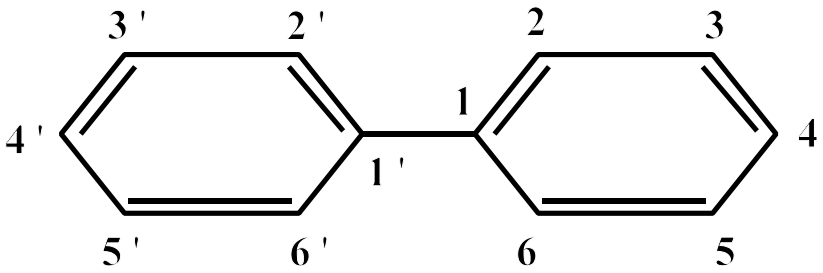


Figure1: Water Quality Zones of the Delaware River.

1.3 Polychlorinated biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are a class of man-made compounds that were manufactured and used extensively in electrical equipment such as transformers and capacitors, paints, printing inks, pesticides, hydraulic fluids and lubricants. Individual PCB compounds called congeners can have up to 10 chlorine atoms on a basic structure consisting of two connected rings of carbon atoms. There are 209 possible patterns where chlorine atoms can occur resulting in 209 possible PCB compounds. PCB compounds can be grouped by the number of chlorine atoms attached to the carbon rings. These groups are called homologs. PCB compounds containing five chlorine atoms, for example, are referred to as the pentachlorobiphenyls or penta-PCBs.



Although their manufacture and use were generally banned by federal regulations in the late 1970s, existing uses in electrical equipment and certain exceptions to the ban were allowed. In addition, PCBs may also be created as a by-product in certain manufacturing processes such as dye and pigment production. PCBs are hydrophobic, sorbing to organic particles such as soils and sediments and concentrating in the tissues of aquatic biota either directly or indirectly through the food chain.

1.4 Applicable Water Quality Standards and Numerical Target for TMDLs

Water quality criteria for toxic pollutants including Total PCBs were adopted on October 23, 1996 by the Commission and are included in Section 3.30 of Article 3 of the Commission's water quality regulations. The criteria do, however, differ between the zones of the estuary depending on the designated uses of the zone. In Zones 2 and 3, use of the water for public water supply after reasonable treatment is a designated use. In these two zones, human health criteria are based upon exposure to PCBs through ingestion of water and fish taken from these estuary zones. In Zone 4 and upper Zone 5 (above River Mile 68.75), use of the water for public water supply is not a designated use. In these two zones, human health criteria are based solely upon exposure to PCBs through ingestion of fish taken from these estuary zones. Current DRBC criteria assume a consumption rate of 6.5 grams per day (~½ pound meal every 35 days) is used in Zones 2, 3, 4, and the upper portion of Zone 5. This rate was the default national rate for freshwater fish consumption utilized in EPA's 1980 methodology for deriving human health criteria, and was used by the States in developing their freshwater water quality criteria. A consumption rate of 37.0 grams per day (~½ pound meal every 6 days) is used in the lower portion of Zone 5. This consumption rate is consistent with the rate utilized by the State of Delaware following a recent evaluation of available information on consumption rates.

Although criteria to protect aquatic life from acute and chronic effects of PCBs and criteria to protect human health from the carcinogenic and non-carcinogenic of PCBs were adopted, the most stringent standards adopted were based upon protecting human health from the carcinogenic effect of PCBs through ingestion

of water and fish taken from these estuary zones (Table 1). The applicable DRBC water quality criteria are therefore:

Table 1: DRBC Water Qaulity Criteria for Zones 2 to 5 of the Delaware Estuary

Estuary Zone	Exposure Route	
	Water & Fish Consumption	Fish Consumption Only
Zone 2 & 3	44.4 picograms per liter	
Zone 4 and upper Zone 5		44.8 picograms per liter
Lower Zone 5		7.9 picograms per liter

These criteria are currently the same as criteria adopted by State of New Jersey and the Commonwealth of Pennsylvania. The DRBC criteria for the lower portion of Zone 5 is also the same as the water quality criteria adopted by the State of Delaware; however, a slightly higher and therefore less stringent criteria was adopted for the upper portion of Zone 5.

As part of the effort to establish TMDLs for total PCBs and to update adopted water quality standards based upon new information, the Commission's Toxic Advisory Committee did consider adopting wildlife criteria for total PCBs and revising the human health criteria for carcinogens. The latter was necessitated by two actions by the U.S. Environmental Protection Agency: the updating of the cancer potency factor (i.e., slope factor), one of the key elements used to calculate the criterion, in December 1998 (U.S. EPA, 1998); and the issuance of revised guidance on developing human health water quality criteria in October 2000 (U.S. EPA, 2000). In February 2003, the Toxics Advisory Committee recommended adoption of a revised human health criterion for carcinogens Zones 2 through 5, and that the NJ state-wide water quality criterion for total PCBs for the Delaware Estuary (Zones 2 though 6) for the protection of wildlife be adopted following the impending adoption by the New Jersey Department of Environmental Protection. Refinement of the wildlife criterion based upon site-specific data could then proceed. The Committee also recommended that the Commission consider alternatives to the current risk level of 10^{-6} (another element in the calculation of the human health criterion for carcinogens). On March 19, 2003, the Commission passed a resolution authorizing public participation of the revised human health criteria for carcinogens and directing the Toxics Advisory Committee to initiate development of site-specific wildlife criteria for Zones 2 through 6 of the Delaware River. Since the basis for the TMDLs could be affected by criteria adoption by either the NJDEP or the DRBC, and the TMDLs must be based on the water quality criteria in force when the TMDL is approved, the Commission further directed that the Commission's Executive Director request U.S. Environmental Protection Agency Regions II and II to identify which criteria should be the basis for the TMDLs at this time. In a letter dated April 16, 2003, both U.S. EPA regional offices indicated that the current and applicable DRBC water quality criteria should be the basis for the TMDLs being developed by Commission staff for December 2003.

1.5 Listing under Section 303(d)

Until recently, the attainment of water quality standards for total PCBs could not be measured directly in samples of ambient water so States relied on measurements of contaminants in fish fillet samples collected from the estuary. This is possible since the amount in fish tissue is related to the water concentration by a factor known as the bioaccumulation factor or BAF. This factor accounts for the uptake and concentration

of a contaminant in the tissue either directly from the water or through the target species' food chain. Current and historical concentrations of total PCBs in filet samples collected from channel catfish in Zones 2 through 5 and white perch collected in Zones 2 through 6 are shown in Figures 2 and 3. While tissue concentrations have declined since the banning in the late 1970s, current levels in both species are approximately 800 to 1000 parts per billion (ppb), two to three orders of magnitude above the level expected to occur when estuary waters are at the water quality standards for total PCBs.

New Jersey was the first state to issue an advisory recommending no consumption of channel catfish in 1989. This was followed in 1990 by Pennsylvania who recommended no consumption of white perch, channel catfish and American eel caught between Yardley, PA above Trenton to the Pennsylvania/Delaware border.

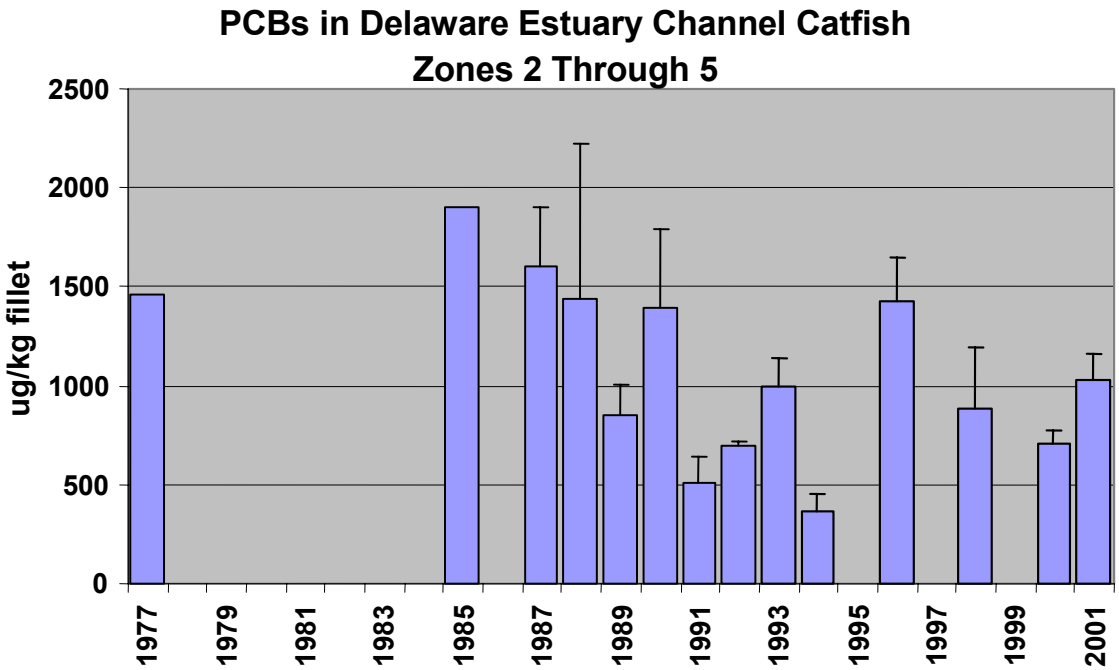


Figure 2: PCB concentrations in fillet samples of channel catfish collected from Zones 2 through 5 of the Delaware Estuary from 1977 to 2001. Units are in micrograms per kilogram or parts per billion (ppb). Graphs provided by Richard Greene, Delaware DNREC.

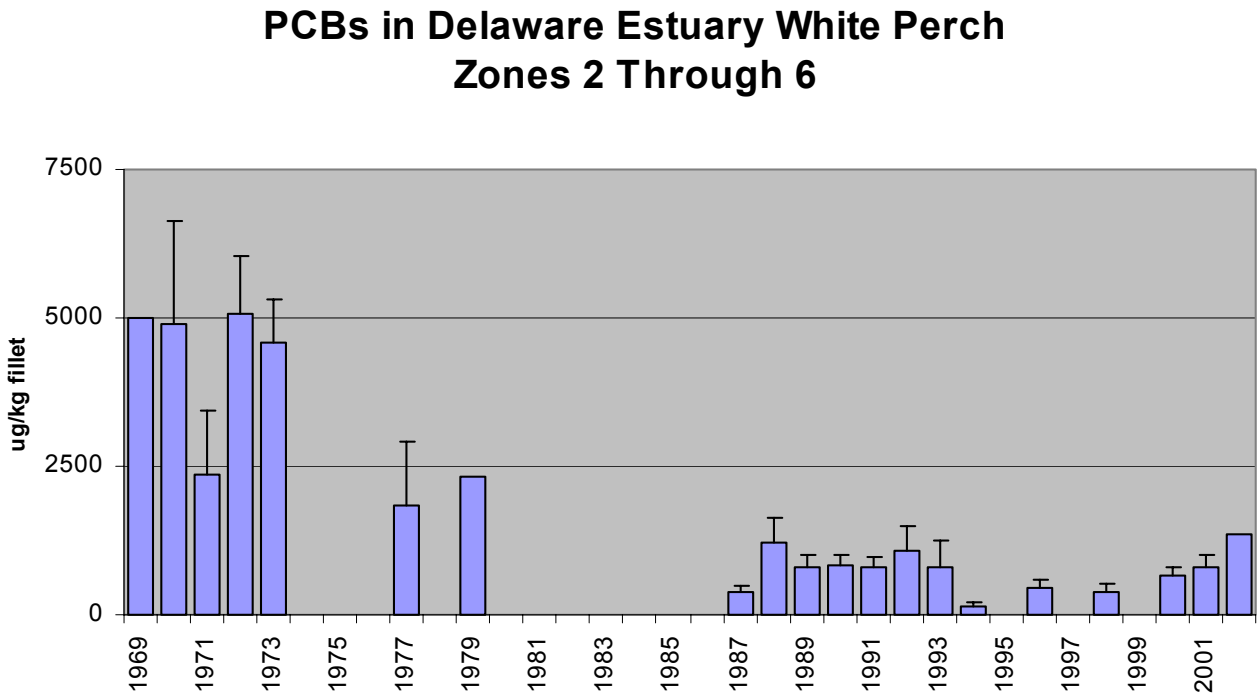


Figure 3: PCB concentrations in fillet samples of white perch collected from Zones 2 through 6 of the Delaware Estuary from 1977 to 2001. Units are in micrograms per kilogram or parts per billion (ppb). Graphs provided by Richard Greene, Delaware DNREC.

After conducting additional sampling in the lower tidal river, Delaware issued an advisory in 1994 recommending no consumption of striped bass, white perch, channel catfish and white catfish caught between the Pennsylvania/Delaware border and the Chesapeake and Delaware Canal (C&D Canal). These advisories remained essentially unchanged until 1999, when Pennsylvania recommended limited consumption (one meal per month) of white perch and striped bass, and one meal every two months for channel catfish in the same advisory area. Delaware meanwhile, increased the restrictions on consuming fish caught between the Pennsylvania/Delaware border and the C&D Canal to all fish species, and reduced the recommended consumption of striped bass, white perch, white catfish, channel catfish and American eel to one meal per year. In January 2003, New Jersey issued updated state-wide and water body-specific advisories due to PCB contamination that included Zones 2 through 5. These advisories contained recommended meal frequencies for two levels of lifetime cancer risk (10^{-5} and 10^{-6}), and for high risk individuals (children, infants, pregnant or nursing women, and women of child-bearing age). Recommended consumption (at a risk level of 10^{-6}) of channel catfish in Zones 2 to 4 is 6 meals per year while no consumption of striped bass in Zone 4 and all finfish in Zone 5 is recommended.

The New Jersey Department of Environmental Protection subsequently included Zones 2 through 5 of the Delaware River for PCBs in a report entitled "1998 Identification and Setting of Priorities for Section 303(d) Water Quality Limited Waters in New Jersey", September 15, 1998. By Memorandum of Agreement between U.S. Environmental Protection Agency, Region II and the New Jersey Department of Environmental Protection dated May 12, 1999, the NJDEP agreed to develop, public notice, respond to comments and submit to EPA, Total Maximum Daily Loads (TMDLs) for PCBs in the Delaware Estuary by September 15, 2003. This date was subsequently extended to December 31, 2003 in a revised Memorandum of Agreement dated September 16, 2002.

The Delaware Department of Natural Resources & Environmental Control (DNREC) first listed Zone 5 of the Delaware River for toxics in 1996. In 1998, DNREC again listed Zone 5 of the Delaware River, but specifically listed PCBs as a pollutant contributing to the impairment. In Attachment B to a Memorandum of Agreement between the Delaware Department of Natural Resources & Environmental Control and the U.S. Environmental Protection Agency, Region III dated July 25, 1997, DNREC agreed to complete the TMDLs for Zone 5 by December 31, 2002 provided that funding and certain other conditions were met. The MOA also provided that EPA Region III establish the TMDLs if DNREC was unable to complete the TMDLs by the date set forth in Attachment B. In a Consent Decree between the American Littoral Society, the Sierra Club, and the U.S. Environmental Protection Agency dated July 31, 1997, the U.S. EPA agreed to establish TMDLs by December 15, 2003 of the year following the state's deadline.

In a Consent Decree between the American Littoral Society and Public Interest Group of Pennsylvania, dated April 9, 1997, EPA agreed to approve or establish TMDLs for all water quality-limited segments listed on the 1996 303(d) list as impaired by sources other than acid mine drainage by April 9, 2007. PADEP listed Zones 2 to 5 of the Delaware River (included in areas E and G of the Pennsylvania State Water Plan) for priority organics including PCBs in both 1996 and 1998. No date has been set by PADEP for completion of the TMDLs for these water quality segments. The TMDLs currently being proposed will satisfy the commitments that resulted from these listings for each respective state.

1.6 Pollutant sources, loadings and ambient data

The basis for the inclusion of Zones 2 through 5 on the Section 303(d) lists of the estuary states was the levels of PCBs observed in fish tissue collected from the estuary. This was necessary since the common analytical method used for ambient water and wastewater had detection limits for total PCBs in the 500 nanogram per liter range. New Jersey was the first state to issue an advisory recommending no consumption of channel catfish in 1989. This was followed in 1990 by Pennsylvania who recommended no consumption of white perch, channel catfish and American eel caught between Yardley, PA above Trenton to the Pennsylvania/Delaware border. After conducting additional sampling in the lower tidal river, Delaware issued an advisory in 1994 recommending no consumption of striped bass, white perch, channel catfish and white catfish caught between the Pennsylvania/Delaware border and the Chesapeake and Delaware Canal C&D Canal.

Loadings of PCBs to the estuary from point sources were first investigated by the Delaware River Basin Commission in 1996 and 1997 (DRBC, 1998a). This study utilized a new analytical methodology (high resolution gas chromatography/high resolution mass spectrometry or HRGC/HRMS) and focused on discharges from five large sewage treatment plants and one industrial facility. The results of the study found effluent concentrations ranging from 1,430 to 45,140 picograms/L during dry weather, and 2,020 to 20,240 pg/L during wet weather. The dry weather sample from the effluent of the industrial facility had a concentration of 10,270 pg/L. In the spring of 2000, the Commission required 94 NPDES permittees to conduct monitoring of their continuous and stormwater discharges for 81 PCB congeners utilizing analytical methods that could achieve picogram per liter detection limits. The results of this monitoring were submitted to the Commission over the next two years, and indicated that loadings to the estuary zones from point sources were significant and of such magnitude to cause the water quality standards to be exceeded. Figures 4 and 5 present the cumulative loadings of total PCBs from continuous point source discharges during dry weather and wet weather, respectively.

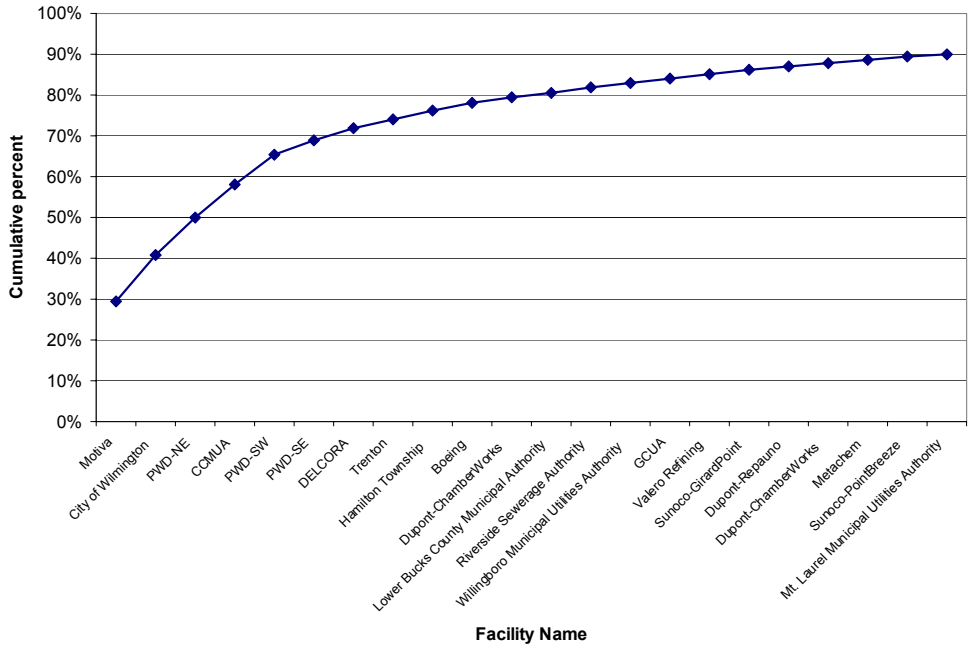


Figure 4: Cumulative loadings from continuous point source dischargers when the discharge was not influenced by precipitation (dry weather loadings).

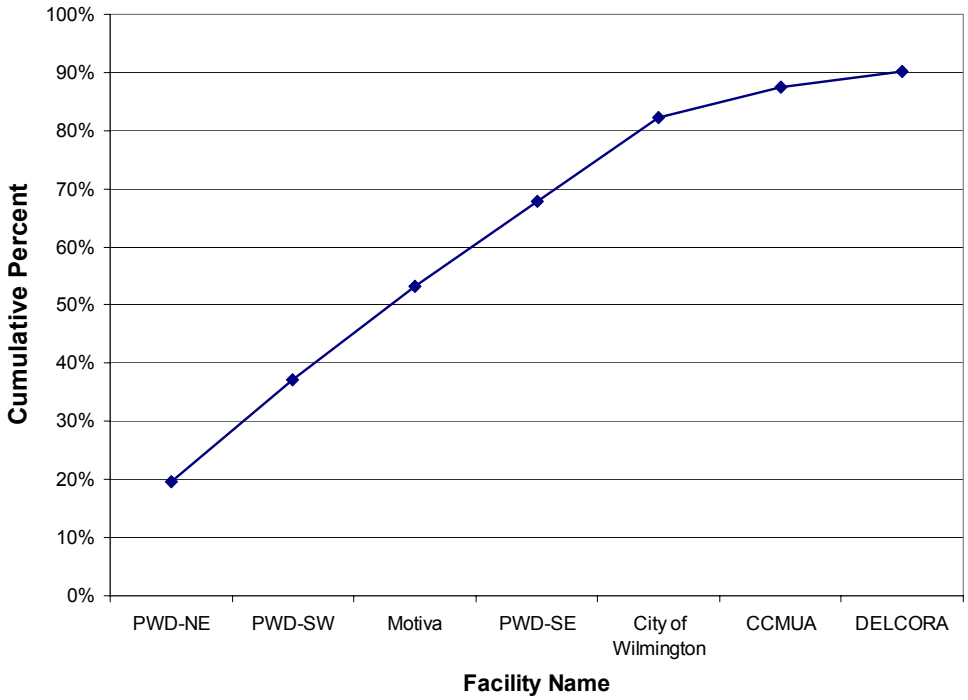


Figure 5: Loadings from continuous point source dischargers when the discharge was influenced by precipitation (wet weather loadings).

Beginning in September 2001, the Commission initiated surveys of the ambient waters of Zones 2 through 5 using the more sensitive HRGC/HRMS method (Method 1668A) and larger sample volumes to obtain data on PCBs adsorbed to particulate matter, PCBs adsorbed to dissolved organic matter and truly dissolved PCBs. Each survey involves sampling on a transect across the river at 15 locations between the C&D Canal and Trenton. A total of nine surveys have been completed to date with a focus on periods of intermediate and high inflows to the estuary. Figure 6 presents the results from surveys conducted in September 2001, May 2002, October 2002 and March 2003. Low flow conditions occurred during the September and October surveys (~3,300 cfs). Intermediate flow conditions (~16,000 cfs) occurred during the May survey, and high flow conditions (36,100 cfs) occurred during the March survey. As indicated in this graph, ambient concentrations of total PCBs based upon the sum of 124 congeners analyzed ranges between 443 and 10,136 pg/L with the highest values generally occurring during lower river inflows.

1.7 Other Required Elements for Establishing TMDLs

1.7.1 Seasonal variation

TMDL regulations at Section 130.32(b)(9) require the consideration of seasonal variation in environmental factors that affect the relationship between pollutant loadings and water quality impacts. Although seasonal variation is usually not as important for TMDLs based upon human health criteria for carcinogens since the duration for this type of criteria is a 70 year exposure, the Stage 1 TMDLs for total PCBs do include seasonal variation in several ways. Due to the interaction of PCBs with the sediments of the estuary, long-term model

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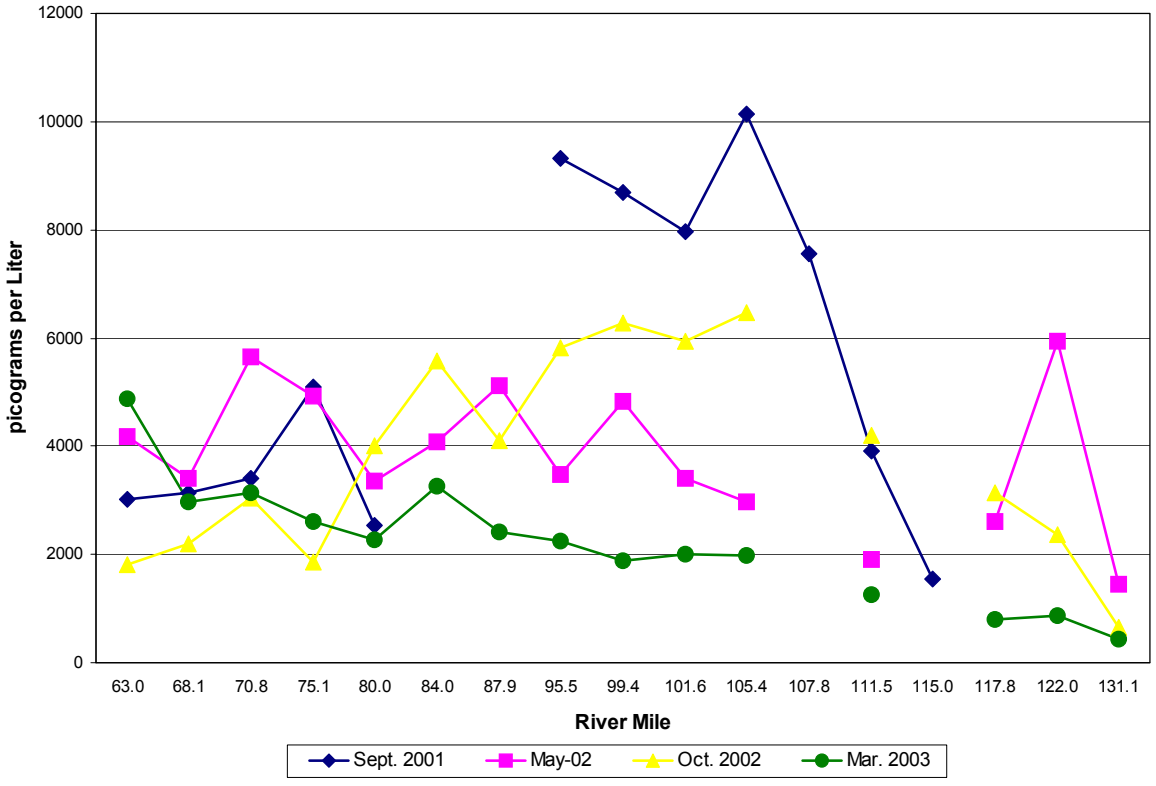

Figure 6: Concentrations of 124 PCB congeners at 15 locations in Zones 2 to 5 of the Delaware Estuary during varying flow conditions.

simulations were necessary to both confirm the model parameters established during the short-term calibration, and evaluate the time required for the sediments to reach pseudo steady-state with the overlying water column as loadings of PCBs were reduced.

The model will cycle model inputs from the period February 1, 2002 until January 31, 2003. This one year period is considered to be representative of long-term conditions (see Section 3.2.3.1), and is the same period utilized for long-term, decadal scale model simulations. Use of this one year cycling period, allowed consideration of seasonal variation in model input parameters such as tributary flows, tidal forcing functions, air and water temperature, wind velocity and loadings of penta-PCBs.

1.7.2 Monitoring Plan

The Delaware River Basin Commission has conducted nine surveys of the ambient waters of the Delaware Estuary between September 2001 and April 2003 to provide data for calibrating the water quality model for penta-PCBs that was used to establish the Stage 1 TMDLs. Samples collected during these surveys were analyzed using a more sensitive HRGC/HRMS method (Method 1668A) and larger sample volumes to obtain data at picogram per liter levels. The Commission plans to conduct additional surveys in both Zones 2 to 5 and in Delaware Bay (Zone 6) as part of the effort to calibrate water quality models for the other PCB homologs, and to establish and refine the TMDLs and associated WLAs and LAs for Stage 2. Contingent on available funding, the Commission plans to continue the ambient water surveys on a yearly basis to track the progress in achieving the load reductions and applicable water quality standards for PCBs.

In the spring of 2000, the Commission required 94 NPDES permittees to conduct monitoring of their continuous and stormwater discharges for 81 PCB congeners utilizing analytical methods that could achieve picogram per liter detection limits. The results of this monitoring indicated that loadings to the estuary zones from point sources were significant and of such magnitude to cause the water quality standards to be exceeded. These results have also be used to determine the need for and the frequency of additional monitoring in NPDES permits have been reissued in the last few years. Following approval of the Stage 1 TMDLs, most of the NPDES permittees included in the 2000 monitoring requirements will be required to conduct some additional monitoring using Method 1668A. These monitoring requirements will provided data in future years to assess the progress in achieving the TMDLs.

The Commission is also planning, contingent on available funding, to work cooperatively with the NJDEP and Rutgers University to continue air monitoring at Lums Pond near the western end of the C&D Canal and at a site in the NJ Pinelands which are located east of the estuary. Monitoring data at these sites and at a long-term site at Rutgers University will provided data to assess the long-term trends in regional background concentrations of PCBs (Lums Pond) and in regional concentrations in the estuary airshed.

1.7.3 Implementation Plan

Current EPA regulations do not require an implementation plan to be included with TMDLs. EPA NPDES regulations do require that effluent limitations must be consistent with approved WLAs [40 CFR Part 122.44(d)(1)(vii)(B)]. EPA regulations allow the use of non-numeric effluent limits in certain circumstances [40 CFR Part 122.44(K)]. In addition to EPA regulations, the Commission and its signatory parties currently have in place an implementation procedure for utilizing wasteload allocations and other effluent requirements formally issued by the Commission's Executive Director. This procedure has been in use for over 25 years with wasteload allocations for carbonaceous oxygen demand and other pollutants that were developed for discharges to the estuary. Section 4.30.7B.2.c.6). of the Commission regulations requires that WLAs developed by the Commission shall be referred to the appropriate state agency for use, as appropriate, in developing effluent limitations, schedules of compliance and other effluent requirements in NPDES permits.

As part of the implementation strategy, the NPDES permitting authorities believe that it is appropriate for 142 NPDES point source discharges to receive non-numeric WQBELs consistent with the WLAs. It is expected that the non-numeric WQBELs resulting from the Stage 1 WLAs require PCB minimization and reduction programs and additional monitoring using Method 1668A consistent with state and federal NPDES regulations. See Appendix 3 for details on the permit implications of this TMDL. These permit requirements are intended to expedite the reduction in PCB loadings to the estuary while Stage 2 TMDLs and WLAs are being completed.

A unique aspect of the implementation of these TMDLs is the establishment of a TMDL Implementation Advisory Committee (IAC)by the DRBC, which shall be asked to develop creative and cost-effective strategies for reducing PCB loadings and achieving the TMDLs for PCBs in the Delaware Estuary. The IAC will be encouraged to engage in creative, collaborative problem-solving. Its recommendations will be submitted to the Commission, which will consider them in consultation with all regulatory agencies whose approval is required to implement them. Each regulatory agency also will be represented on the IAC. The committee is expected to convene six times a year for two years.

1.7.4 Reasonable Assurance that the TMDLs will be Achieved

Data available to assess whether the TMDLs will be achieved include ambient water quality data collected by the Commission during routine surveys of Zones 2 through 6 of the Delaware River. Effluent quality data and source minimization plans required through NPDES permits issued by state permitting authorities will provide the basis for assessments regarding consistency with the WLAs developed or issued in Stage 1 and Stage 2. Commission regulations also require that the WLAs be reviewed and, if required, revised every five years, or as directed by the Commission. This will ensure that additional discharges of the pollutant or increased non-point source loadings in the future will be considered.

Achieving the reductions in the load allocations for tributaries will require the listing of the tributary on future Section 303(d) lists submitted by the estuary states for those tributaries that are not currently listed for impairment by PCBs, and completion and implementation of TMDLs for PCBs for those tributaries that are already listed as impaired by PCBs. Achieving the load reductions required for contaminated sites will require close coordination with the federal CERCLA programs and state programs overseeing the assessment and cleanup of these sites. In addition, the Commission has broad powers under Article 5 of the Delaware River Basin Compact (Public Law 87-328) to control future pollution and abate existing pollution in the waters of the basin including Section 2.3.5B of the Commission's Rules of Practice and Procedure (DRBC, 2002).

2. TWO STAGE APPROACH TO ESTABLISHING AND ALLOCATING TMDLs FOR PCBs

2.1 Background

Developing TMDLs for a complex pollutant in a complex estuarine ecosystem with numerous point and non-point sources is an enormous task requiring substantial levels of effort, funding and time. As discussed above, the deadlines contained in the Section 303(d) lists prepared by the States and approved by the U.S. EPA, Memoranda of Understanding, and Consent Decrees discussed above allocated five years for developing the TMDLs. A coordinated effort to develop the TMDLs was initiated in 2000 when Carol R. Collier, Executive Director of the Delaware River Basin Commission in a letter dated May 25, 2000 requested that U.S. EPA Regions II and III endorse the Commission as the lead agency in developing the TMDLs for PCBs in the Delaware Estuary. In a letter dated August 7, 2000, Region II endorsed the Commission's role as the lead agency to develop the TMDLs. An August 11, 2000 letter from Region III also acknowledge the important role of the Commission while identifying the legal constraints on the date for establishing the TMDLs. On July 26, 2000, the Commission passed Resolution 2000-13 stating that the Commission would continue its ongoing program to control the discharge of toxic substances, including PCBs, to the Delaware Estuary, and would work cooperatively with the signatory parties to the Delaware River Basin Compact and their agencies and affected parties in this effort.

2.2 Staged Approach

The complexity of a TMDL for a class of compounds such as PCBs, the limited time and data available, and the benefits of refining it through time with more data led to a decision to develop the TMDLs for PCBs in two stages consistent with EPA TMDL guidance. A staged approach provides for adaptive implementation through execution of load reduction strategies while additional monitoring and modeling efforts proceed. The approach recognizes that additional monitoring data and modeling results will be available following issuance of the Stage 1 TMDLs to enable a more refined analysis to form the basis of the Stage 2 TMDLs.

In the first stage, TMDLs and individual wasteload allocations were developed for each zone. Stage 1 WLAs were based upon a simplified methodology, while still meeting all of the regulatory requirements for establishing a TMDL. Consistent with the recommendations of an expert panel of scientists experienced with PCB modeling, these TMDLs were extrapolated from penta homolog data using the observed ratio in the Delaware Estuary of the penta homolog to total PCBs (see Section 3.4).

Stage 2 TMDLs, individual WLAs and LAs are targeted for development by December 31, 2005. Once the Stage 2 TMDLs are finalized, EPA expects the WLAs developed in Stage 2 to replace the Stage 1 WLAs. EPA expects the Stage 2 WLAs and LAs to be based on all of the monitoring data obtained through the development of the Stage 2 TMDLs, and the additional modeling that will be performed following the establishment of the Stage 1 TMDLs. Stage 2 TMDLs will also be based on the summation of the PCB homolog groups, without the use of extrapolation. It is anticipated that the Stage 2 WLAs will be based upon a more sophisticated allocation methodology than the Stage 1 WLAs, and will likely reflect application of the procedures set forth in the DRBC Water Quality Regulations.

As described in the documents released in April 2003 (Appendix 1) and following establishment of these TMDLs, the water quality-based effluent limitations (WQBELs) in NPDES permits that are issued, reissued or modified after the approval date must be consistent with the WLAs. The NPDES permitting authorities believe that these WQBELs will include non-numeric controls in the form of a best management practices (BMP) approach as the most appropriate way to identify and control discharges of PCBs consistent with the Stage 1 WLAs. Federal regulations (40 CFR Part 122.44(k)(4)) allow the use of non-numeric, BMP-based WQBELs in permits.

Guidelines describing appropriate NPDES permitting actions resulting from individual WLAs that may result following the establishment of the Stage 1 TMDLs by the U.S. Environmental Protection Agency are presented in Appendix 3. The guidelines include 1) the use of Method 1668A for any monitoring of the wastewater influent and effluent at a facility, 2) development of a PCB minimization plan, and 3) implementation of appropriate, cost-effective PCB minimization measures identified through the plan.

The identification of point source dischargers that are potentially significant sources of total PCBs is a dynamic process that depends on several factors including the availability and extent of PCB congener data for each discharge, the detection limit of the method used to analyze for PCB congeners, the flows used for each discharge, the procedure used to calculate the loadings, the location of the discharge in the estuary, and the proximity and loading of other sources of PCBs. EPA specifically requested comment on the list of significant point source dischargers, and has incorporated those comments, where appropriate, into this document (see Section 3.5). Expectations as to how the NPDES permits may appropriately address these specific WLAs can be found in Appendix 3.

An important component of the staged approach is the assessment and evaluation of options to control non-point sources of PCBs. These sources include contaminated sites (sites covered under CERCLA or RCRA), non-NPDES regulated stormwater discharges, tributaries to the estuary, air deposition, and contaminated sediments (see Section 1.4 and Appendix Tables 4-1). Addressing these sources is particularly important since contaminated sites and non-point stormwater discharges have been identified as the two largest categories of PCB loadings in this TMDL based upon current data and assessment procedures.

3. STAGE 1 APPROACH TO ESTABLISHING TMDLs

3.1 Background

TMDLs for total PCBs are estimates of the loading of the sum of all the PCB homologs that can enter the estuary and still meet the current water quality criteria. TMDLs are, by nature, abstract. They are the *projected*, not the current, loadings from all sources that should result in the achievement of water quality standards at all points in the estuary. Since current concentrations of PCB homologs are 500 times higher than the water quality criteria, the TMDLs and associated individual WLAs and LAs will be proportionately less.

In order to meet standards at all points in the estuary, some parts of the estuary will have to be less than the standard for that portion of the estuary. This is particularly true for these TMDLs in the Delaware Estuary since the water quality standards vary between the zones, and the standard in lower Zone 5 below the Delaware Memorial Bridges is approximately 5 times lower than the standards in Zones 2 to upper Zone 5 (see Section 1.4).

While simplistic approaches can be used to estimate TMDLs, significant effort has been devoted to developing and calibrating a hydrodynamic and water quality model for the Delaware Estuary to be used in establishing PCB TMDLs for this water body (DRBC, 2003a; DRBC, 2003b; DRBC, 2003c). There are several reasons why a more sophisticated approach is appropriate. These reasons include:

1. Zones 2 – 5 of the Delaware River are significantly influenced by tidal forces producing a 6 foot tidal range at Trenton, NJ and tidal excursions of up to 12 miles. The model incorporates this tidal movement in the hydrodynamic model (DRBC, 2003a).
2. PCBs are hydrophobic, sorb to dissolved, colloidal and particulate carbon, and are transported with carbon molecules and particulates associated with carbon. The model incorporates these

characteristics, partitions PCBs to each of these phases, and simulates the concentrations of the 3 phases in the estuary (DRBC, 2003b).

3. PCBs are a class of chemicals; each having different physical-chemical properties such as volatilization rate and partitioning rate. The model can incorporate these properties for each of the ten homolog groups (DRBC, 2003b).
4. There are many sources of PCBs enter the estuary at different locations in different amounts and at different times. The model can simulate the spatial and temporal nature of these sources (DRBC, 2003c).
5. A model can simulate the additional assimilative capacity provided by the burial of PCBs into the deeper layers of the estuary sediments, and the exchange of PCBs in the gas phase in the estuary airshed with the dissolved phase of PCBs in the ambient waters of the estuary (DRBC, 2003b).

3.2 Conceptual Approach

3.2.1 Guiding Principles

The TMDLs require that each source of PCBs including the sediment, air deposition meets water quality criteria by itself and in conjunction with all other sources. The procedure used to establish the TMDLs incorporates these principles by initially determining the concentration or loading from each source category followed by an assessment of the attainment of the water quality standards when loadings from all source categories are considered.

Another principle is that, when the water quality standards are met, additional loading of PCBs to the estuary is dependent on dilution by flows from other sources into the estuary, and the loss of PCBs through fate processes occurring in the estuary. Two of the source categories do not explicitly provide additional flows to the estuary and therefore do not provide assimilation capacity. The two sources are atmospheric dry deposition and gas phase transfer of PCBs, and contaminated sites. Ground and surface water flow from contaminated sites do occur, but these flows have not been adequately characterized and are not included in the current version of the penta-PCB model. As a result, the assimilative capacity for these sources must be obtained from other source categories.

All source categories and sources within categories are not created equally. Reductions in PCB loads in any source category will provide different amounts of assimilative capacity in different areas of the estuary. Figure7 illustrates this principle for the four boundaries of the penta-PCB model. In this example, each of the boundaries is set at a concentration of 100 milligrams per liter with the resulting model predicting ambient conservative chemical concentrations throughout the estuary. Of the four boundaries, the C&D Canal and the Schuylkill River have the smallest influence on conservative chemical concentrations in the estuary. This influence is also localized to the area where the source enters the estuary. The influence of the ocean boundary at the mouth of Delaware Bay appears to be limited to the Bay and the lower portions of Zone 5 (up to approximately River Mile 65). The Delaware River at Trenton, however, has a significant influence on the estuary conservative chemical concentrations from Zone 2 through Zone 5. Reductions in PCB loadings from the Delaware River at Trenton will therefore provide substantially more assimilative capacity in a larger area of the estuary.

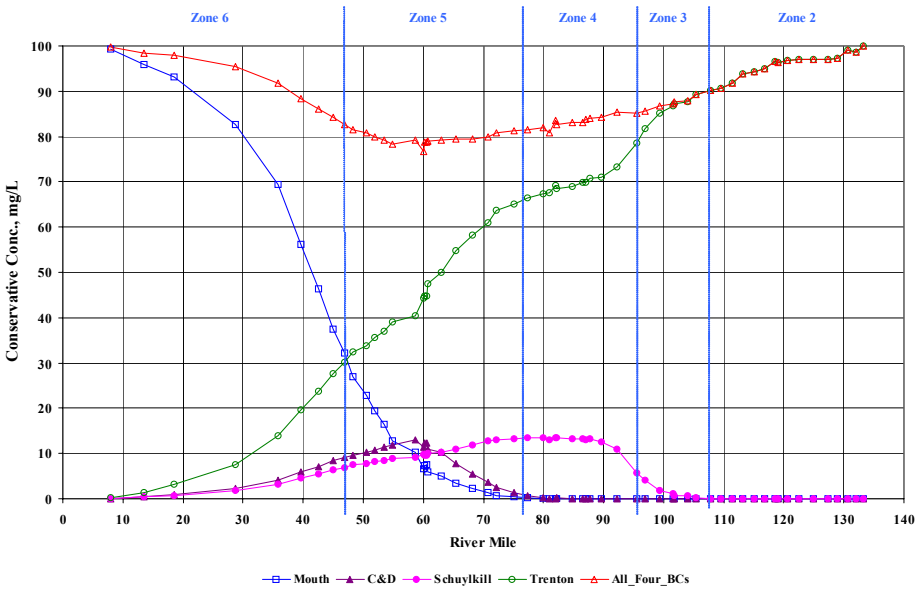

Figure 7: Relative impact of the four boundaries when the conservative chemical concentrations are set at 100 milligrams per liter.

Estuary sediments function as a sink or loss mechanism for PCBs through burial of PCBs that settle to the bottom of the estuary. This small (<1 cm/year) net deposition of particulates provides additional assimilation capacity in the estuary, and is incorporated in the calculation of the TMDLs for each of the zones.

Recent monitoring of air concentrations in the regional airshed surrounding the Delaware Estuary indicate that PCB concentrations are particularly high in the Philadelphia-Camden area, and contribute PCBs to the estuary through dry and wet deposition, and exchange of PCBs in the gas phase (Van Ry et al, 2002 and Figure 8). While the proportional loading of PCBs from dry and wet deposition is explicitly included in the load allocation portion of the TMDLs, the transfer of PCBs in the gas phase with dissolved PCBs in the estuarine waters is not since there will be no significant net exchange between dissolved PCBs in water and gas phase PCBs in the air (i.e., they will reach equilibrium) when water quality standards are achieved. The modeling approach used to develop the TMDLs takes this into account by setting the gas phase air concentrations at the equilibrium concentrations (see Section 3.3.1 and 3.3.5).

The difference between the current gas phase concentrations and the gas phase concentrations when the estuary meets standards, is a significant TMDL implementation issue since water quality standards will not be achieved without reducing the gas phase concentrations to a level where they are in equilibrium with the dissolved PCB concentrations at the water quality standard. Figure 8 illustrates the relative difference between the current gas phase air concentration of penta-PCBs in Zone 3 and the gas phase concentration at equilibrium with the dissolved penta-PCB concentrations when the TMDL is achieved.

Finally, the boundaries of the model which include the head of tide of the tributaries, the C&D Canal, and the mouth of Delaware Bay were assigned concentrations of penta-PCBs in determining the TMDLs and establishing WLAs. Section 4.20.4B.1 of the Commission's Water Quality Regulations specify that in establishing WLAs, the concentrations at the boundaries of the area of interest shall be set at the lower of

actual data or the applicable water quality criteria (DRBC, 1996). Thus for modeling purposes, tributaries or other boundaries cannot exceed the water quality criteria for the zone of the estuary that they enter or border. In developing these TMDLs, both the C&D Canal boundary and the mouth of Delaware Bay boundary were set to 7.9 pg/L. This is the criterion for Zone 5 where the canal enters the mainstem of the Delaware River, and is the current criterion for Zone 6 (Delaware Bay). The current concentrations of PCBs at the mouth of the Bay exceed this value by 2 orders of magnitude, while current concentrations at the C&D Canal boundary exceed this value by almost 3 orders of magnitude. Thus like the gas phase concentrations of PCBs in the air, PCB concentrations at both the C&D Canal and the ocean boundary must also be reduced in order to achieve the water quality standards. The relative influence of these boundaries at the critical compliance location must also be considered in determining the relative importance of the required reductions (see Figure 7).

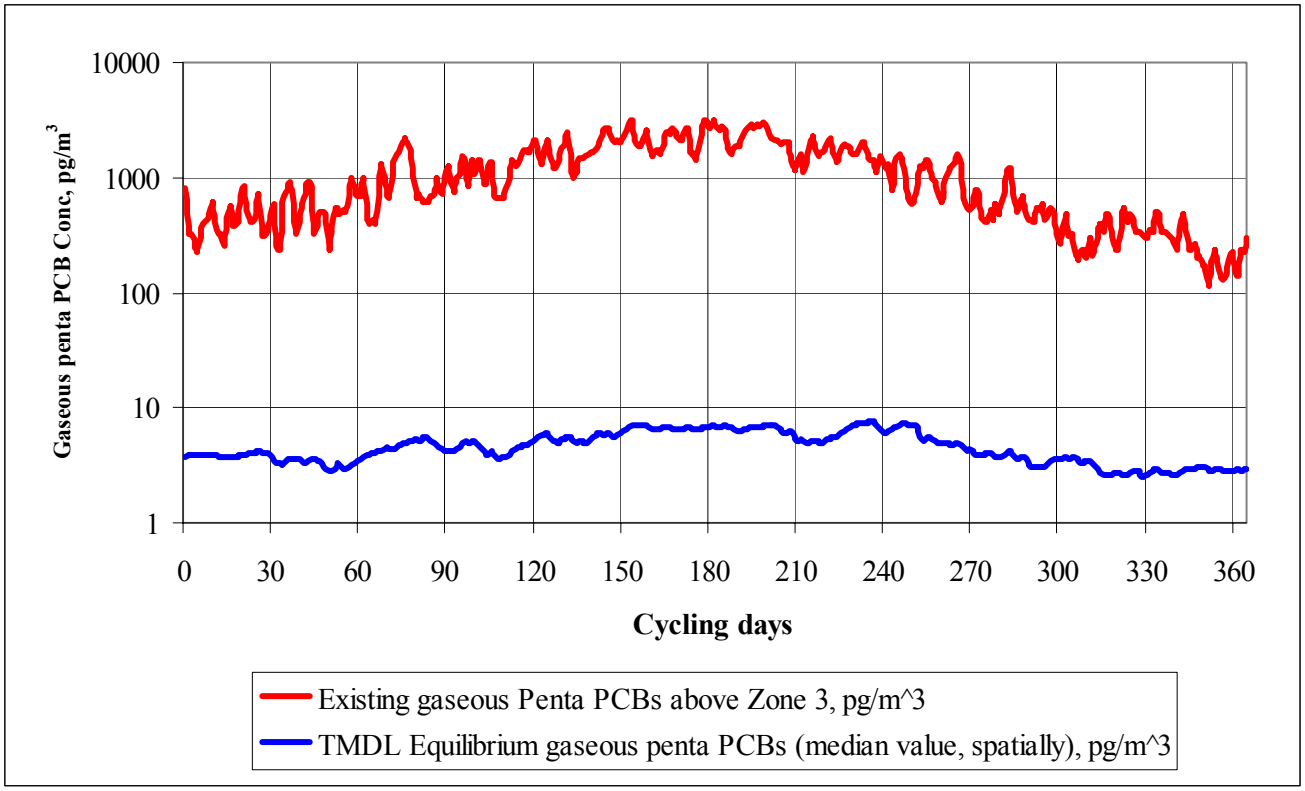

Figure 8: Atmospheric gas phase penta-PCB concentrations during the one year model cycling period based upon current data and the expected penta-PCB concentrations when the TMDLs are achieved.

3.2.2 Modeling Approach

Several mathematical models are used to develop the TMDLs for PCBs. The first is a hydrodynamic model that was extended to included Delaware Bay (Zone 6). The hydrodynamic model is discussed in Section 3.2.4.1 and fully described in the report entitled "DYNHYD5 Hydrodynamic Model (Version 2.0) and Chloride Water Quality Model for the Delaware River Estuary" (DRBC, 2003a). The water quality models used in this effort included an updated TOXI5 model for chlorides, and a new model for pentachlorobiphenyls (penta-PCBs)(DRBC, 2003b). The hydrodynamic and chloride models are discussed in Section 3.2.4.1 and

3.2.4.1, respectively and described in detail in the report on the hydrodynamic model (DRBC, 2003a). The organic carbon and penta-PCB models are discussed in Section 3.2.4.3 and fully described in the report entitled "PCB Water Quality Model for the Delaware Estuary (DELPCB)" (DRBC, 2003b).

TMDLs are calculated using both the conservative chemical model, and the penta-PCB water quality model run until equilibrium is observed. The model cycles model inputs from the period February 1, 2002 until January 31, 2003. This one year period is considered to be representative of long-term conditions (see Section 3.2.3.1), and is the same period utilized for the decadal scale (74 year) model simulations by HydroQual, Inc.

3.2.3 TMDL Approach

Although the water quality standards are expressed as total PCBs and the TMDLs must be expressed as Total PCBs, the current water quality model only addresses penta-PCBs. As discussed in Section 2.2, the TMDLs for total PCBs are extrapolated from TMDLs for penta-PCBs using the observed ratio in the Delaware River/Estuary of the penta homolog to total PCBs. Therefore, a water quality target for penta-PCBs must be established for use in the TMDL procedures. This target is determined by assuming that the ratio of penta-PCBs to total PCBs is approximately 0.25.

TMDLs for total PCBs for Zones 2 through 5 of the Delaware Estuary are established using a four step procedure. TMDLs are calculated over a one year period (annual median) to be consistent with both the model simulations and the 70 year exposure used for human health criteria. The procedure initially utilizes the conservative chemical model to establish contribution factors (Cfs) for two of the major tributaries to the estuary (the Delaware River at Trenton and the Schuylkill River), and each of the estuary zones. Allowable loadings are then calculated for each of these sources utilizing the CF and the proportion of the water quality target at the critical location allocated to each source. These loadings are used in the conservative chemical and penta-PCB models to establish the assimilative capacity provided by burial of PCBs into the estuary sediments. The gas phase concentrations that would be in equilibrium with the penta-PCB water concentrations when the water quality targets are met are then included in the water quality model. The model is then run to confirm that the water quality targets are still being met.

Following establishment of the TMDLs for each zone, each of the zone TMDLs are apportioned using the current percentage contribution for each of the source categories excluding loads from the Delaware River, Schuylkill River and contaminated sites based upon the respective loadings during the period Feb. 1, 2002 to Jan. 31, 2003 (Table 2, Figure 9)

Table 2: Apportionment of Zone TMDLs to Wasteload and Load Allocations excluding loads from the Delaware River, Schuylkill River and contaminated sites.

ZONE	WASTELOAD ALLOCATION	LOAD ALLOCATION
2	44.1%	55.9 %
3	78.1%	21.9 %
4	60.8%	39.2 %
5	63.4 %	36.6 %

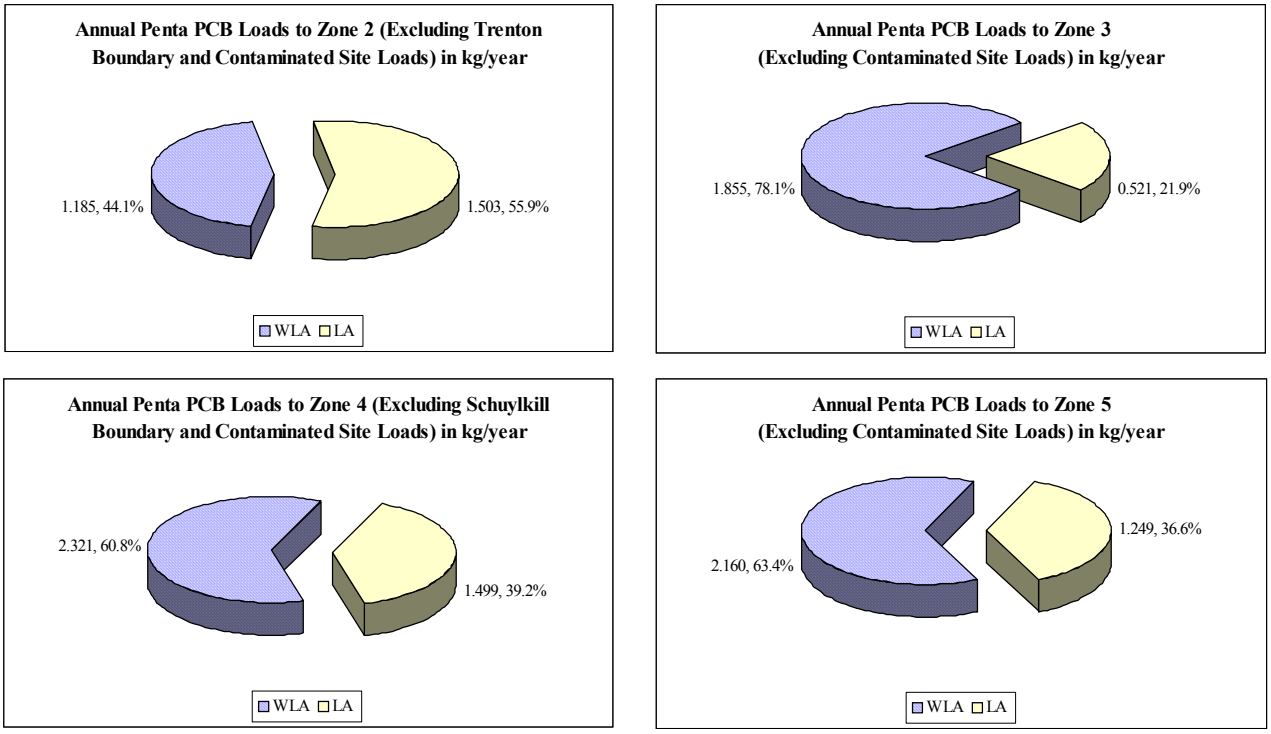

Figure 9: Apportionment of Zone TMDLs in kilograms per year (kg/year) to Wasteload and Load Allocations excluding loads from the Delaware River, Schuylkill River and contaminated sites.

The wasteload allocation portion of the TMDL represents those source categories that are regulated under the NPDES program (point sources, combined sewer overflows or CSOs, and municipal separate storm sewer systems or MS4s). The load allocation portion of the TMDL represents the remaining categories including contaminated sites, non-NPDES regulated stormwater discharges, tributaries and air deposition).

In accordance with the TMDL regulations, a portion of each zone TMDL must be allocated to a margin of safety. The margin of safety (MOS) is intended to account for any lack of knowledge concerning the relationships between pollutant loadings and receiving water quality. Commission regulations also require that a portion of the TMDL be set aside as a margin of safety, with the proportion reflecting the degree of uncertainty in the data and resulting water quality-based controls. The MOS can be incorporated into the TMDL either implicitly in the design conditions under which the TMDL is calculated or explicitly by assigning a fixed proportion of the TMDL. Since the conditions under which the TMDL is determined like tributary flows are related to the long-term conditions and not to design conditions associated with human health water quality standard for carcinogens (such as the harmonic mean flow of tributaries), expression of the MOS as an explicit percentage of each zone TMDL was considered the more appropriate approach. An explicit percentage of 5% was then utilized in the apportionment of the zone TMDLs. Both the apportionment of the zone TMDLs using the current percentage contribution and use of a margin of safety of 5% were recommended by the Commission's Toxic Advisory Committee.

3.2.4 Model Descriptions and Inputs

3.2.4.1 Hydrodynamic Model

Inputs to the hydrodynamic, conservative chemical and PCB models included daily tributary flows at the two major tributary boundary conditions, the Delaware River at Trenton and the Schuylkill River, and at 20 minor tributaries for the period February 1, 2002 to January 31, 2003. A comparison of the cumulative distribution curve for this one year period to the curve for the period of record for the Delaware River at Trenton (1912 to March 2003) and the Schuylkill River (1934 to March 2003) is presented in Figures 10 and 11, respectively. The figures indicate that the flows occurring during the one year cycling period are a reasonable representation of the flows during the period of record for these two tributaries.

The hydrodynamic model also includes precipitation induced flows for both point and non-point sources. The precipitation pattern occurring during the one year cycling period was compared to historical precipitation records (1872 to March 2003) maintained by the Franklin Institute (2003) to determine the degree to which the precipitation pattern for the one year cycling period was representative of the long term record. This comparison indicated good agreement for both the number and percentage of days when precipitation exceeded 0.01 inches, and the number and percentage of days when precipitation was less than 0.01 inches (Figures 12 and 13). This precipitation data was used to both calculate the flow of each discharge during precipitation events and determine when data collected during precipitation events would be used in loading calculations.

The tidal forcing function in the hydrodynamic model was based upon actual tide data for the one year cycling period. Since the major component of the tidal function has a periodicity of 12.42 hours and minor components with lunar and annual periodicity, this data set was considered representative of long-term tidal conditions. In addition, the expert panel recommended that alternative model inputs based upon design conditions not be used in TMDL simulations in order to maintain any hydrological relationships between the various inputs. For this reason, actual discharge flows for the point sources included in this TMDL determination during the one year cycling period were used rather than design effluent flows such as those specified in Section 4.30.7A.8. of the Commission's Water Quality Regulations or federal NPDES regulations. This is particularly important in the establishment of PCB TMDLs for the Delaware Estuary since the flow from a number of the point sources is significantly influenced by precipitation. For example, design effluent flows for the City of Philadelphia's wastewater treatment plants are approximately 200 million gallons per day, but can double during precipitation events. In addition, procedures have not been developed nor does the Commission's regulations specify procedures to establish design effluent flows for those discharges that are solely driven by precipitation (i.e., stormwater discharges). Such procedures and regulations will be developed for application in the Stage 2 TMDLs for PCBs, if necessary. The similarity of the precipitation pattern observed during the one year cycling period to the long term precipitation record suggests that the precipitation induced flows for both continuous and stormwater discharges used to develop the Stage 1 TMDLs may ultimately serve as design flows for these discharges.

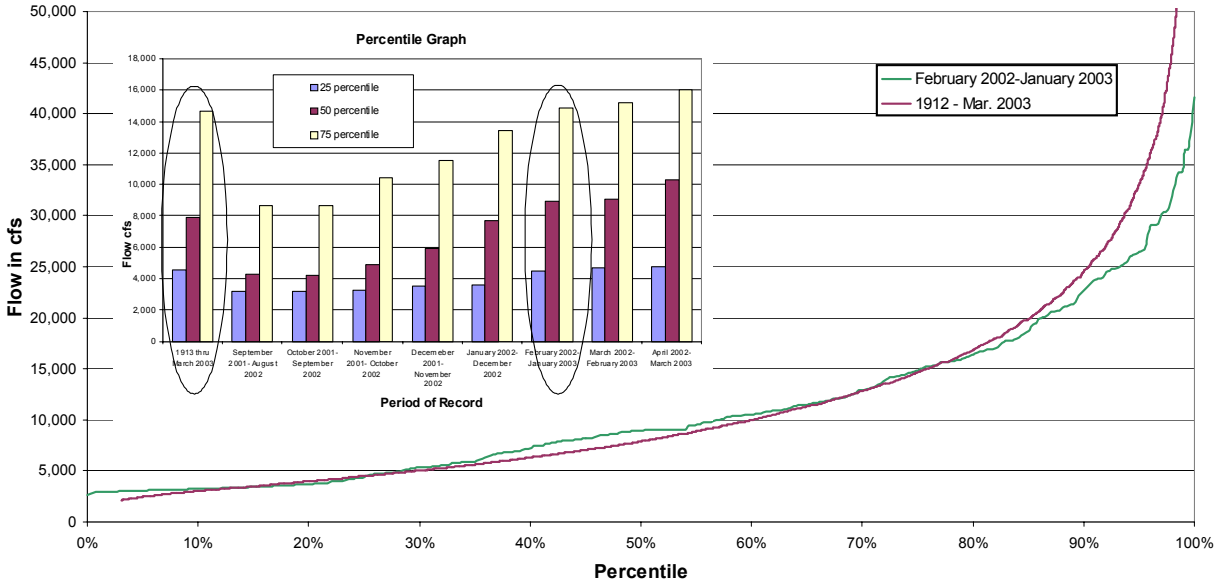

Figure 10: Cumulative distribution curve for the period of record for the Delaware River at Trenton (1912 to March 2003) compared to the period February 1, 2002 to January 31, 2003.

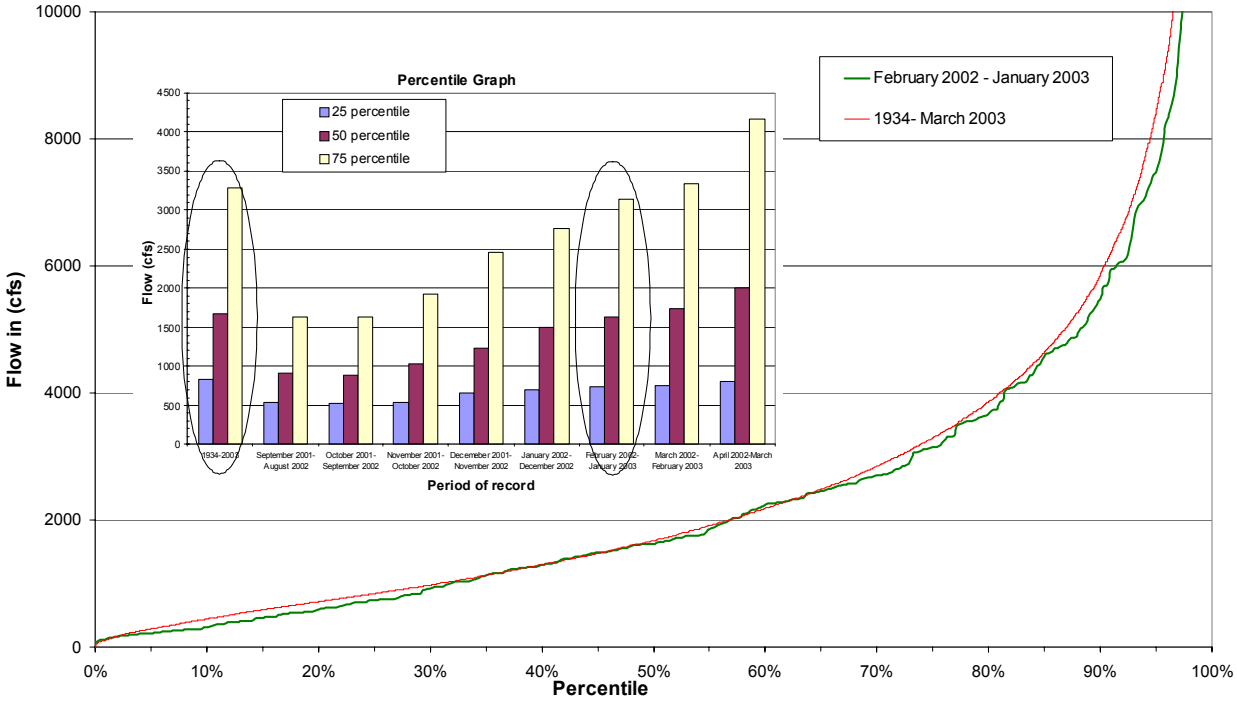

Figure 11: Cumulative distribution curve for the period of record for the Schuylkill River (1934 to March 2003) compared to the period February 1, 2002 to January 31, 2003.

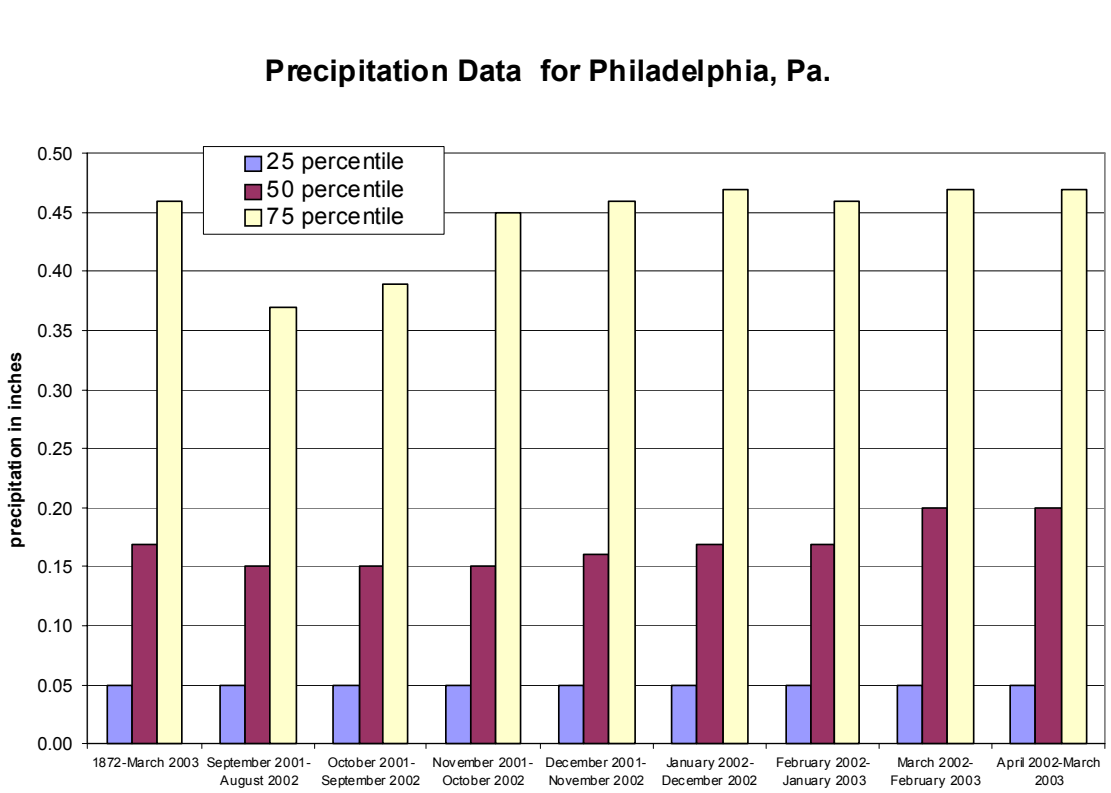

Figure 12: Percentile curves for precipitation data (events > 0.01 inches) for Philadelphia, PA from 1872 to March 2003 compared to the period February 1, 2002 to January 31, 2003.

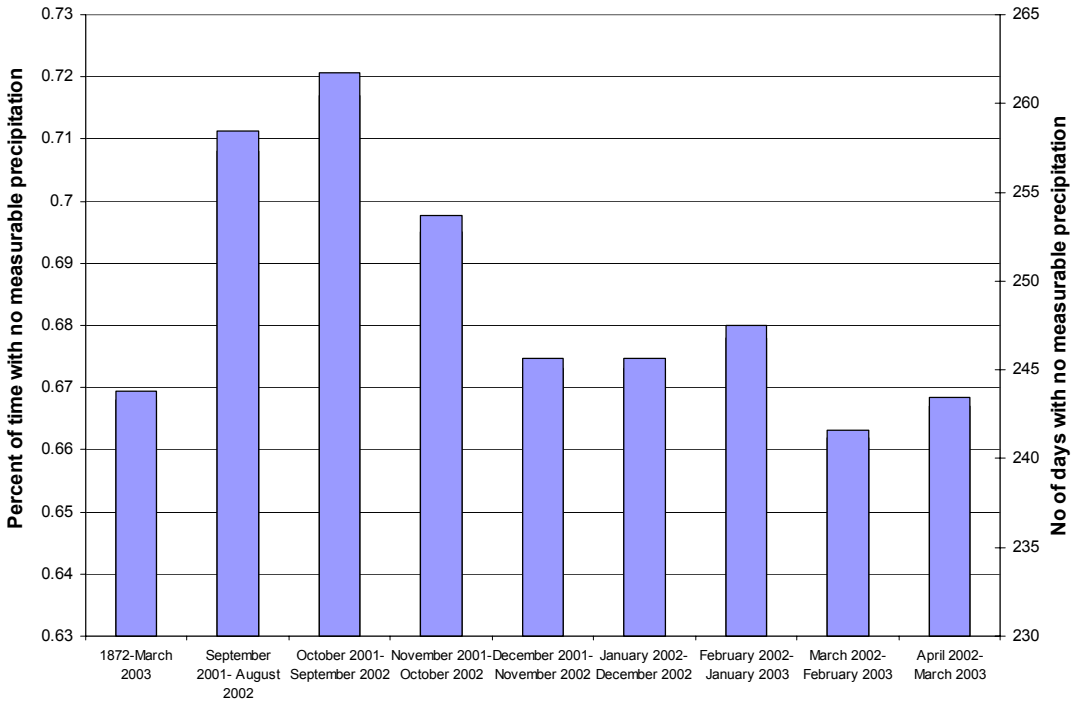

Figure 13: Percentile curves for precipitation data (days with precipitation < 0.01 inches) for Philadelphia, PA from 1872 to March 2003 compared to the period February 1, 2002 to January 31, 2003.

3.2.4.2 Conservative Chemical Water Quality Model

A TOXI5 (water quality) model consisting of 87 water column segments was then linked with the outputs from the calibrated DYNHYD5 hydrodynamic model and calibrated against the chloride concentrations. This model is based upon the U.S. EPA's Water Quality Simulation Program (WASP) Version 5.12., and does not include any fate processes for chlorides or any interaction of the chlorides with the sediment. The main objective in this calibration process was the determination of an advection factor and a set of dispersion coefficients for the water quality model to correctly simulate the dispersive mixing within the Estuary. Review of comparison plots and the results of regression analyses indicated that the model was able to reproduce the temporal and spatial trends, and the magnitude of the chloride concentrations, within a reasonable range throughout the tidal portion of the Delaware River.

3.2.4.3 Penta-PCB and Organic Carbon Water Quality Models

The calibrated hydrodynamic and conservative chemical model are used to drive mass balance models of organic carbon and penta-PCBs (DELPCB). DELPCB is a simulation program enhanced from the U.S. EPA's Water Quality Simulation Program (WASP) Version 5.12, and is fully described in DRBC (2003c). The organic carbon model has two organic carbon state variables and one inorganic solid (IS) as a control state variable. These variables are integrated with the one-dimensional hydrodynamic DYNHYD5 model to dynamically simulate these sorbent variables. The two carbon variables are biotic carbon (BIC), carbon generated internally by phytoplankton, and particulate detrital carbon (PDC) which consists of detritus and other forms of non-living carbon. The model treats the two organic carbon sorbents as non-conservative state variables that are advected and dispersed among water segments, that settle to and erode from benthic segments, and that move between benthic layer segments through net sedimentation.

The model also partitions penta-PCBs into particulate- PCB, truly dissolved-PCB, and dissolved organic carbon (DOC) bound phases treated as individual state variables. The real time model simulates tide-induced flows, and the spatial and temporal distributions of the organic carbon and penta-PCB variables. During the modeling process, using data generated by the hydrodynamic model, DELPCB simulates the spatial and temporal distributions of water quality parameters including BIC, PDC, total penta-PCB, particulate penta-PCB, and truly dissolved PCB, and DOC-bound PCB. The sum of the latter two is total dissolved penta-PCB.

3.2.4.4 Model Inputs

Additional inputs to the models include air and water temperature, wind data and the loadings of penta-PCBs from various source categories for the period February 1, 2002 to January 31, 2003. Water temperature data were obtained from three automatic water quality monitoring stations operated cooperatively by the DRBC and the U.S. Geological Survey at the Ben Franklin Bridge, Chester, PA and Reedy Island. Air temperature and wind speed data were obtained from the National Weather Service at the Philadelphia International Airport station.

Daily loadings of organic carbon and penta -PCBs were estimated for relevant source categories, including contaminated sites, non-point sources, point discharges, atmospheric deposition, and model boundaries, for each day of the one year cycling period. Detailed discussion of load development for each source category is described in Section 2 of the report entitled "Calibration of the PCB Water Quality Model for the Delaware Estuary for Carbon and Penta-PCBs" (DRBC, 2003c).

3.3 Procedure for Establishing TMDLs

3.3.1 Summary

TMDLs for total PCBs for Zones 2 through 5 of the Delaware Estuary are established using a multi-step procedure that incorporated the guiding principles discussed in Section 3.2.1. As discussed in Section 1.4, the existing DRBC water quality standards are used as the basis for the Stage 1 TMDLs. The selection of these standards establishes the transition from a standard of 44.8 pg/L in upper Zone 5 to a standard of 7.9 pg/L in lower Zone 5 as the critical location for ensuring that standards are met throughout the estuary. Standards that are lower than upstream water quality standards typically require ambient water concentrations in upstream waters to be lower than the applicable standards for those waters. In tidal waters such as the Delaware Estuary, downstream waters with less stringent water quality standards can have the same effect on upstream waters depending on the extent of upstream movement during flooding tides. With the use of the existing DRBC water quality standards as the basis for the TMDLs in Stage 1, the critical location occurs where the 7.9 pg/L standard becomes effective (River Mile 68.75, the site of the Delaware Memorial Bridges).

The procedure initially utilizes the conservative chemical model to establish contribution factors for two of the major tributaries to the estuary (the Delaware River at Trenton and the Schuylkill River), and each of the estuary zones. The reasons for utilizing the contribution factor approach and the conservative model are 1) TMDLs are controlled by the value of the standard at the critical location, and 2) computer simulation time is minimized permitting the numerous iterations necessary to perform the procedure (approximately five hours for a 50 year simulation with the penta-PCB water quality model). The factors represent the contribution of each of the six sources in picograms per liter to the concentration of penta-PCBs at the critical compliance location. The loading into each zone is assigned as distributed loadings by utilizing a weighting factor calculated using the surface area of the model segments within the zone. For each of the estuary zones, the contribution factor has the units of pg/L per unit of loading. The unit of loading is relative to magnitude of the water quality standard. For example, conventional pollutants with standards in units of milligrams per liter (parts per million) and toxic pollutants with standards in micrograms per liter (parts per billion), loading is often expressed in kilograms per day. With the standard for PCBs in the picograms per liter range, however, loading is more appropriately expressed in terms of milligrams per day. Different units are used for the two major tributaries since the model calculates the loading of PCBs from these tributaries using the daily flows and the concentration of penta-PCBs. Therefore, the contribution factor for these two sources are expressed in units of pg/L per pg/L of penta-PCBs at the tributary boundary compared to pg/L per 100 mg/day for the loadings from the zones.

TMDLs are calculated in a four step procedure (Figure 14). The four steps are:

1. Calculate the contribution factor for each of the estuary zones and two of the tributary model boundaries to the critical compliance point with the penta-PCB water quality target.
2. Determine the proportion of the water quality target allocated to each of these six sources utilizing the median daily flow contributed by each during the one year model cycling period. Calculate the allowable loadings from each of these sources utilizing the CF and the proportion of the water quality target at the critical location allocated to each source. Then utilize these loadings in the conservative chemical and penta-PCB models to establish the assimilative capacity provided by burial of PCBs into the estuary sediments. Iteratively determine the amount of assimilative capacity (in pg/L) provided by the sediments, and add this concentration to the penta-PCB water quality target. Recalculate the allowable loadings from each of the six sources using this revised water quality target.
3. Utilize the water quality model for penta-PCBs with these allowable loadings to confirm that the sediment concentrations have reached pseudo-steady state, and confirm that the penta-PCB water quality target is met in Zones 2 through 5. Initial

penta-PCB conditions in the water and sediments are updated to shorten the simulation time to reach peudo steady-state in Step 4.

4. Estimate the gas phase concentrations that would be in equilibrium with the penta-PCB water concentrations when the water quality targets are met, include these in the water quality model and then confirm that the water quality targets are still being met. Iteratively adjust the gas phase concentration of penta-PCBs in the air until the water quality target is reached. The air will neither be a source or sink for penta-PCBs when the estuary meets the water quality standard and gas phase concentrations are reduced to the equilibrium concentration.

3.3.2 Step 1

In determining the contribution factor for the two tributary boundaries and the four estuary zones, the boundary of interest is set to 1 pg/L and all other model boundaries except the one of interest are set to zero pg/L. Model simulations are then run for 10 years to ensure that equilibrium conditions are achieved, and the annual median value is then calculated for each model segment in the main stem of the river. Figures 15 through 17 illustrate how the contribution factor is determined for the four model boundaries. These figures indicate the concentration of penta-PCBs at the critical point when a concentration of 1 pg/L is set at the model boundary.

Table 3 lists the contribution factors determined by this analysis for all of the model boundaries and each of the estuary zones.

Table 3: Summary of the contribution factors from the model boundaries and the estuary zones at the criteria critical point (Model segment 24 - River Mile 68.1).

Estuary Zone/Boundary	**Contribution Factor [pg/L] per [100 mg/day]**	**Contribution Factor [pg/L] per [pg/L]**
Zone 2	1.9668	-
Zone 3	2.1428	-
Zone 4	2.2813	-
Zone 5	0.96704	-
Delaware River @ Trenton	-	0.5815
Schuylkill River	-	0.11839
Ocean & C&D Canal	-	-

3.3.3 Step 2

Once the contribution factors are determined, the next step is to determine the allowable loadings from each of these sources that will still ensure that the water quality target is met at the critical location. The following assumptions are made in determining these loadings:

a. The assimilative capacity at the critical location controls the allowable loadings from each source. In concentration units, this assimilative capacity is equal to one-quarter of the applicable water quality standard or 1.975 pg/L of penta-PCBs.
b. The influence from ocean (the mouth of Delaware Bay) and the C&D Canal are treated as background. This is based in part upon their minimal influence at the critical location..
c. Net burial of PCBs into the sediment results in a loss of PCBs from the system. This removal of PCBs provides assimilative capacity that can be utilized by other sources. At the critical location, this additional assimilative capacity is approximately 0.5 pg/L of penta-PCBs.
d. When the concentration of penta-PCBs meets the water quality targets throughout the estuary, the concentration of penta-PCBs in the gas phase will be at equilibrium with the truly dissolved penta-PCBs in the water column, and the net flux of penta-PCBs will be zero. Thus, the air will neither be a source or sink for penta-PCBs when the estuary meets the water quality standard and gas phase are concentrations are reduced to the equilibrium concentration.

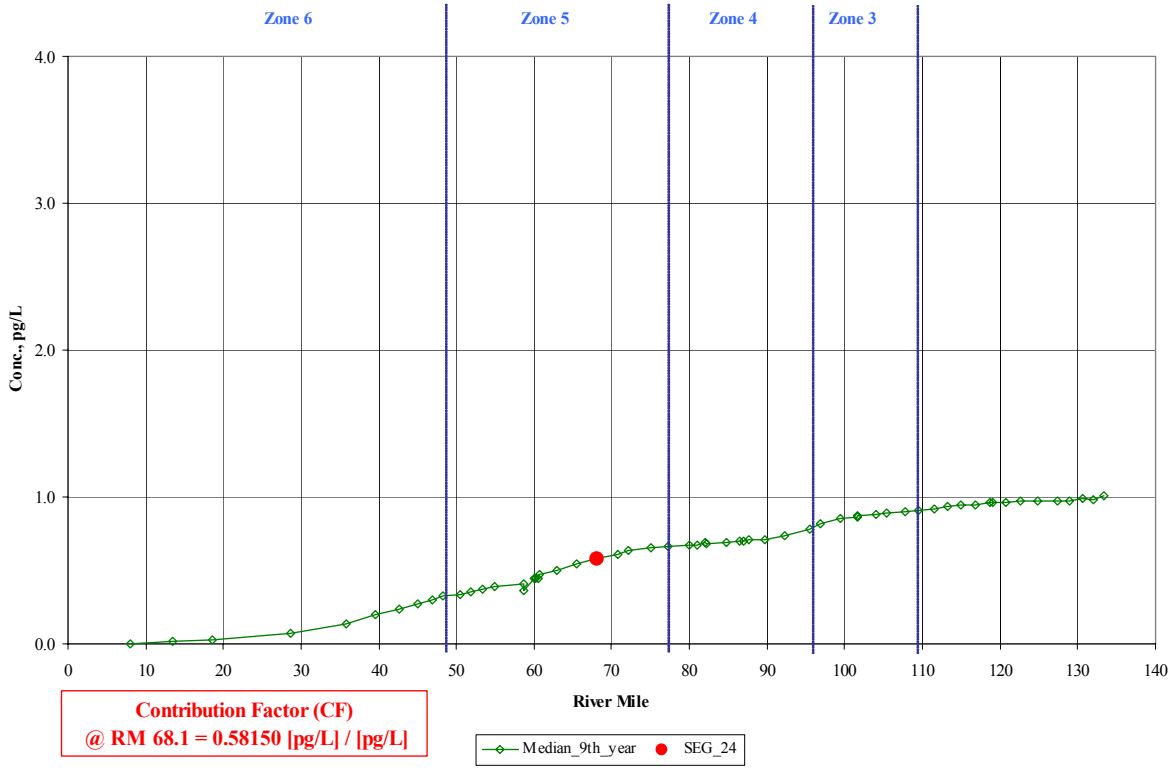

Figure 15: Simulated penta-PCB concentrations in the water column when the concentration of the Delaware River at Trenton, NJ is set to 1 picogram per liter.

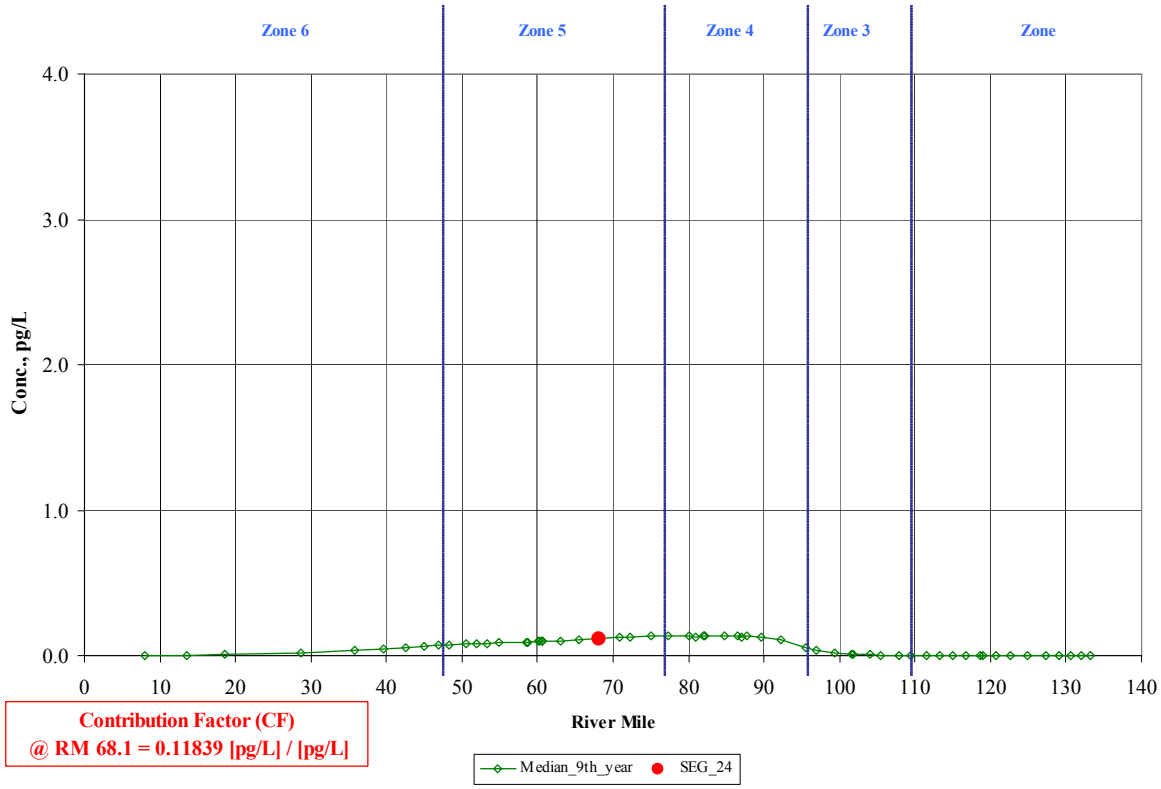

Figure 16: Simulated penta-PCB concentrations in the water column when the concentration of the Schuylkill River is set to 1 picogram per liter.

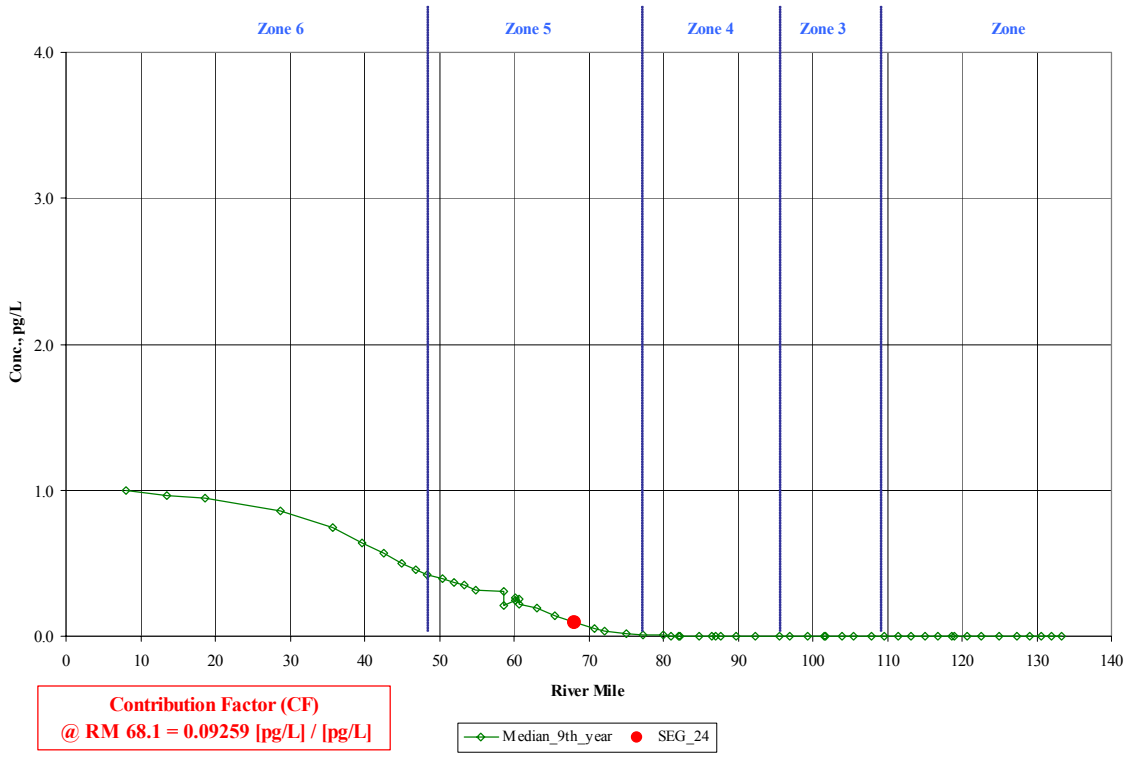

Figure 17: Simulated penta-PCB concentrations in the water column when the concentration at the mouth of Delaware Bay and the C&D Canal is set to 1 picogram per liter.

Using the principle that the assimilative capacity of the two tributary boundaries and each of the zones is based upon the inflow provided by each source, the percentage distribution of the assimilative capacity for each of these sources is established. Table 4 presents the flows for each of the sources during the one year model cycling period and the percentage distribution of the assimilative capacity based upon these flows. This distribution percentage is then applied to the penta-PCB water quality target of 1.975 pg/L to establish the contribution of each of the sources in picograms/liter to the target (Table 4). The influence of the mouth of Delaware Bay and the C&D Canal is first removed since this influence is considered background based in part on their minimal influence at the critical location. The additional assimilative capacity provided by the burial of PCBs into the estuary sediments was then estimated by inserting these loads in the conservative chemical and penta-PCB models. The results of this process was that the additional assimilative capacity was estimated to be 0.5 pg/L. This increased the assimilative capacity to 2.2921 pg/L (1.975 pg/L minus 0.183 pg/L for the background influences, plus 0.500 pg/L additional for burial by sediments) at the critical location. The contribution of each of the sources in picograms/liter to the target was then recalculated and used with the contribution factor to establish the allowable concentration or loadings for each of the tributary boundaries and estuary zones, respectively (Table 4).

At this point, a total allowable loading or assimilative capacity of 94.99 mg/day of penta-PCBs for all six sources was calculated. The majority of this loading was assigned to the two tributary boundaries, the Delaware River at Trenton and the Schuylkill River. Figure 18 graphically presents the available assimilative capacity at the critical location and the apportionment to each of the sources and estuary zones. Figure 19 presents the results of simulations using the conservative chemical model demonstrating that the calculated loadings result in attainment of the revised water quality target of 2.475 pg/L.

Table 4: Summary of Steps 1 and 2 of the Procedure for Establishing TMDLs

Sources of Loadings	Contribution Factor (CF)	Mean Daily Flow During 1 Year Cycling Period	Distribution Percentage	Concentration at the Critical Location	Allowable Concentrations or Loadings.	Allowable Loadings (TMDL)
Units	[pg/L] / [pg/L] or [pg/L] / [100mg/day]		%	pg/L	pg/L or mg/day	mg/day
Trenton	0.581500*	249.19	68.0	1.559	2.68*	57.727
Schuylkill	0.118390*	45.87	12.5	0.287	2.42*	9.609
Zone 2	1.966800	20.79	5.7	0.130	6.61	6.613
Zone 3	2.142800	15.26	4.2	0.095	4.46	4.455
Zone 4	2.281300	16.66	4.5	0.104	4.57	4.569
Zone 5	0.967040	18.57	5.1	0.116	12.02	12.016
Sum		366.3	100	2.2921	-	94.99

* - Units are either [pg/L] / [pg/L] or pg/L.

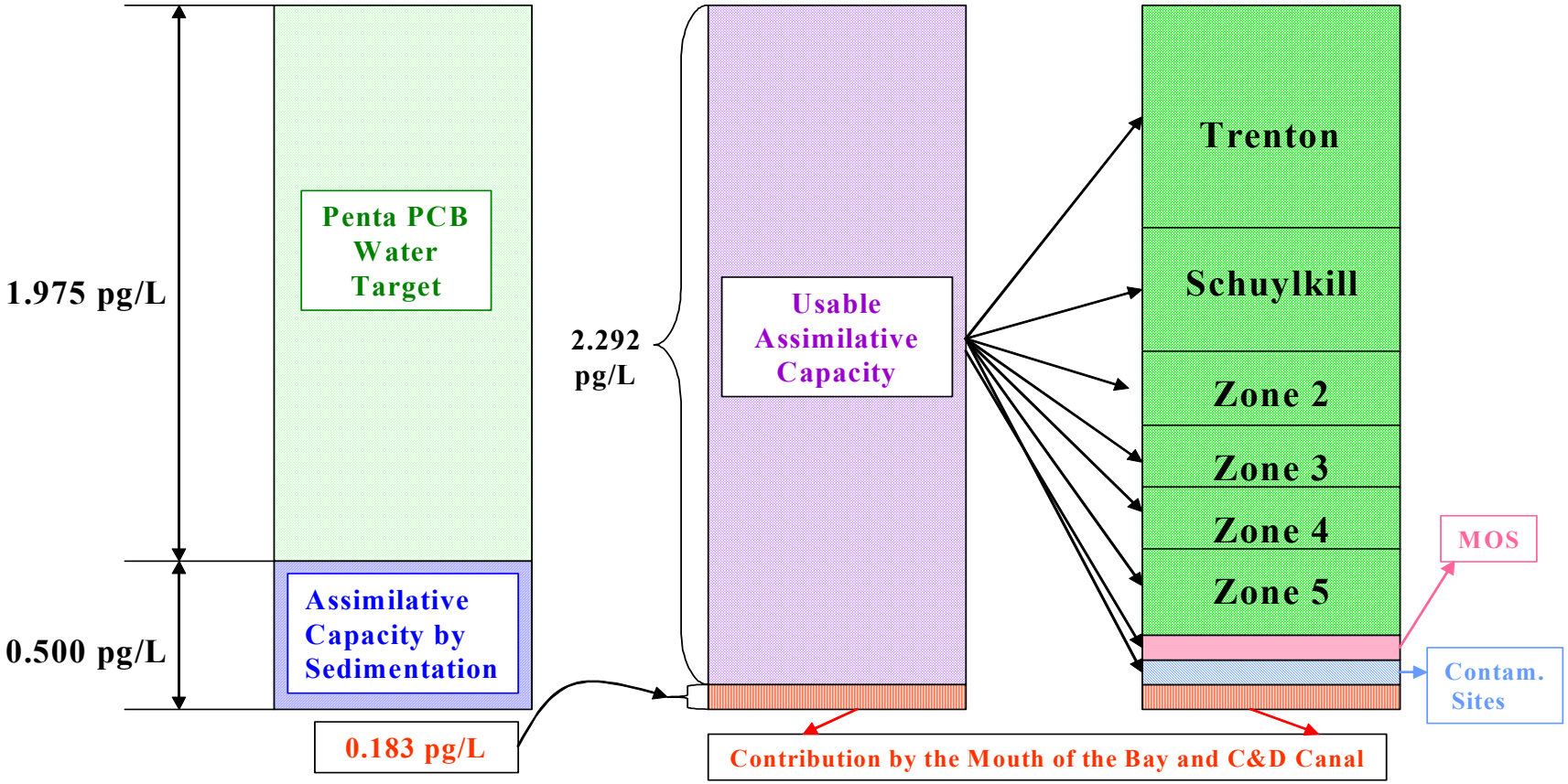

Figure 18: Graphical presentation of the allocation of the assimilative capacity at the critical location.

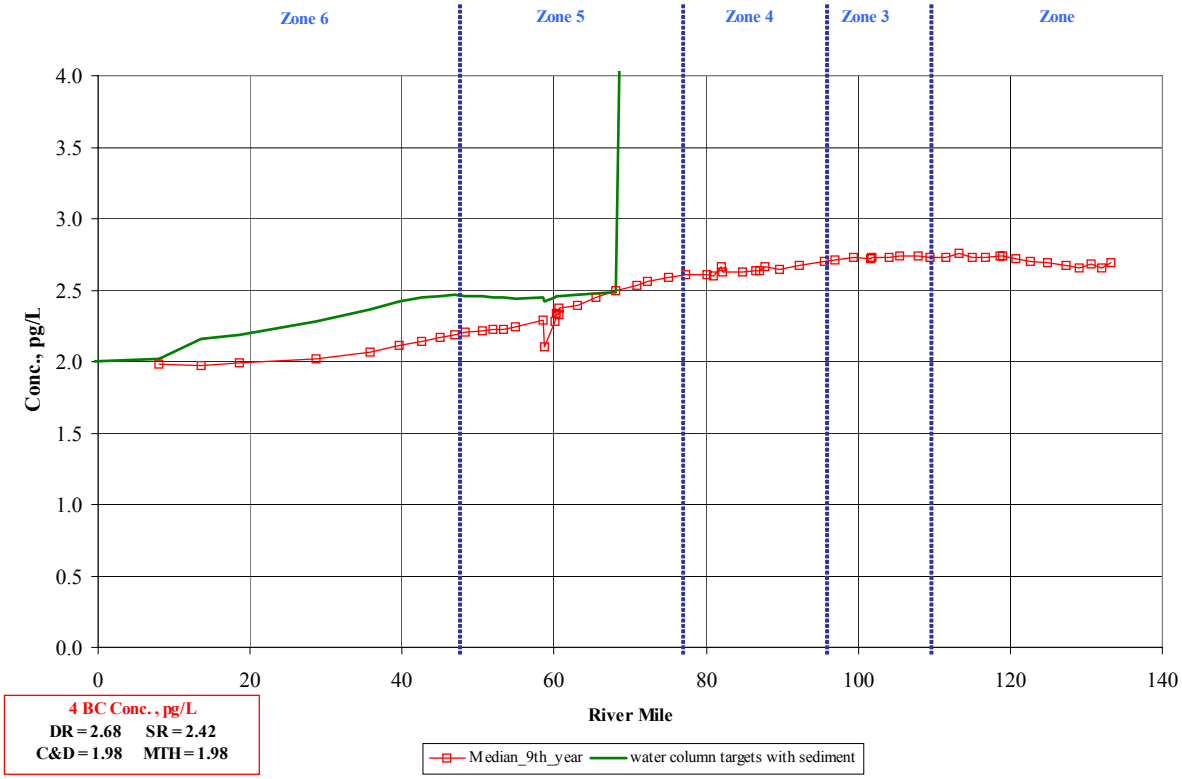

Figure 19: Simulated penta-PCB concentrations in the water column when loadings established in Step1 are used in the conservative chemical model.

3.3.4 Step 3

The next two steps will utilize the water quality model for penta-PCBs to confirm the assimilative capacity that was added due to the loss of PCBs by burial by the sediment, to confirm that sediment concentrations have reached steady-state, and to make final adjustments to account for the exchange of penta-PCBs in the truly dissolved phase with penta-PCBs in the gaseous phase in the estuary airshed.

In this step, the PCB water quality model is run with the initial water column concentrations set to the concentrations described by the final simulation with the conservative chemical model (Figure 19), the loadings from the model boundaries and to each estuary zone that were determined in Step 2, initial penta-PCB concentrations in the sediment, and no air-water exchange of gaseous penta-PCBs. The purpose of this simulation is to determine the sediment concentrations that are in equilibrium with the estuary concentrations that will meet the water quality target of 1.975 pg/L at the critical location. These simulations were run for 50 years to establish the point at which equilibrium was reach between the water column and the sediments. Figure 20 indicates the sediment concentration of penta-PCBs at six locations in the estuary corresponding to a model segment in each of the estuary zones and Delaware Bay. Note that sediment concentrations in all segments reach equilibrium after 20 to 30 years from the assigned initial conditions. The simulated median sediment concentrations at each of the model segments is presented in Figure 21. The amount of assimilative capacity provided by the loss of penta-PCBs to the sediment is illustrated in Figure 22. The figure indicates that the amount of assimilative capacity provided by the sediments varies along the estuary due to the varying

burial rates computed by the model. The assimilation capacity provided is about 0.5 pg/L at the critical location.

The penta-PCB model was then rerun for ten years with the initial sediment conditions set to these values along with the loadings from the model boundaries and to each of the estuary zones to confirm that the water quality target at the critical location was being met. Figure 23 presents a plot of the annual median values during the ninth year of the simulation, confirming that the water quality target is being met. Figure 24 demonstrates that the sediments are in equilibrium during the simulation period.

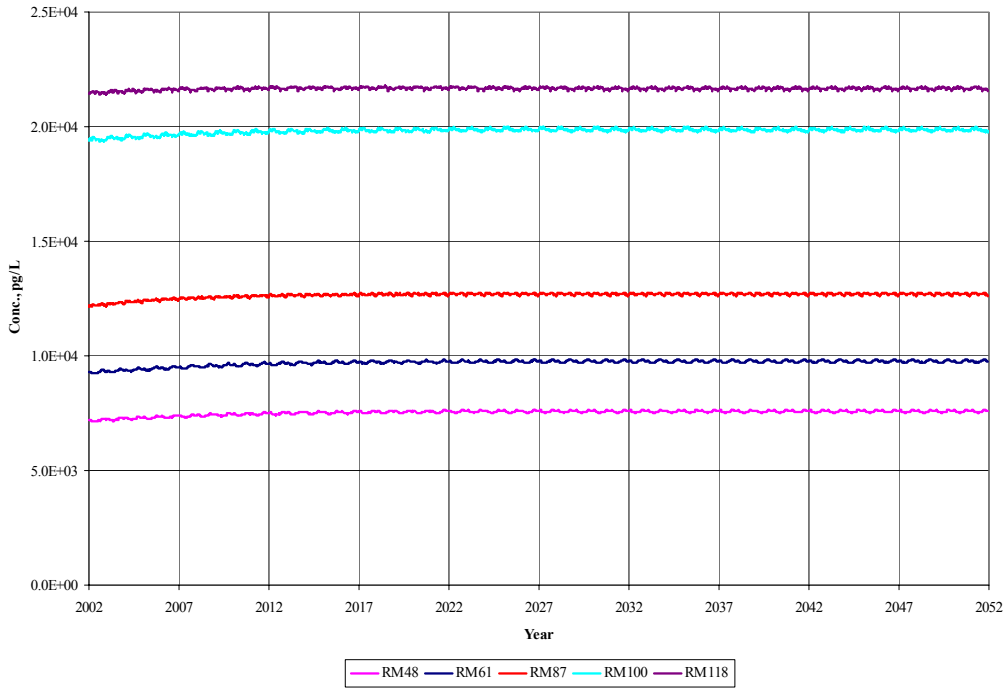

Figure 20: Temporal plot of penta-PCB concentrations in surface sediment layer during a 100 year simulation using the loads established in Step 2.

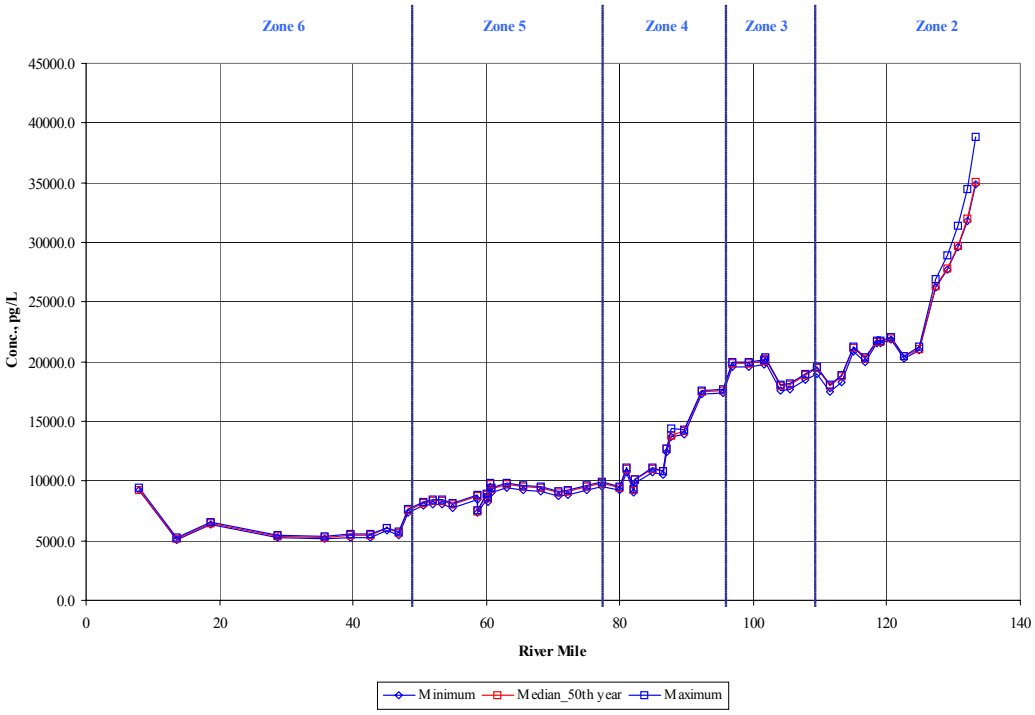

Figure 21: Spatial plot of simulated surface sediment concentrations of penta-PCBs in surface sediment layer during a 50 year simulation using the loads established in Step 2.

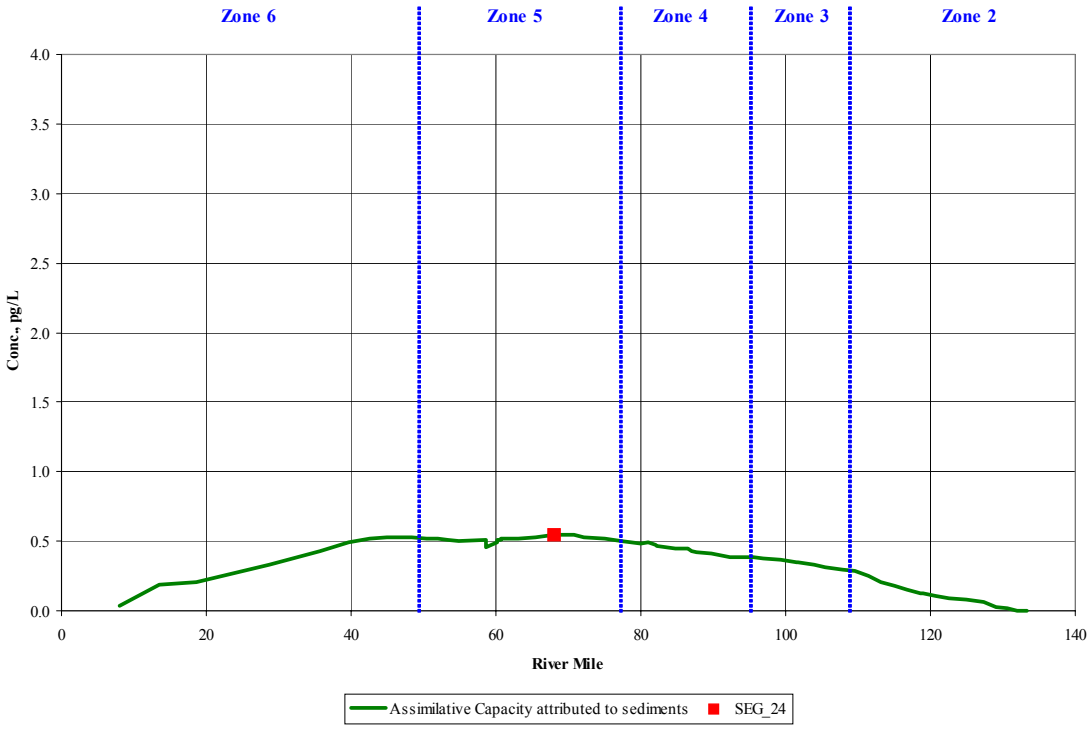

Figure 22: Spatial plot of the assimilative capacity in pg/L provided by the sediment layer.

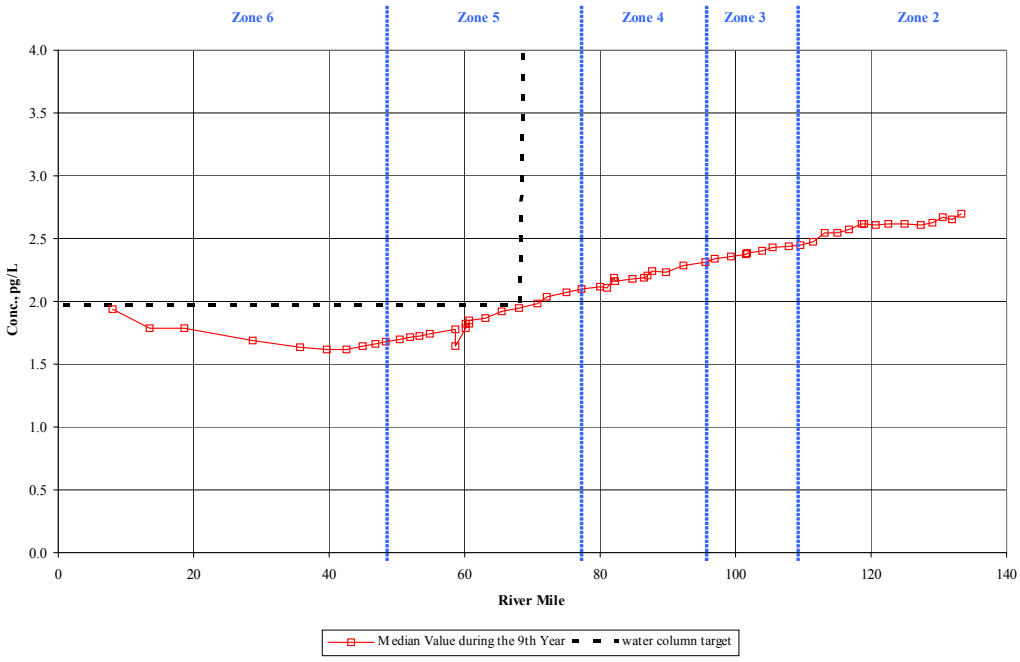

Figure 23: Spatial plot of the penta-PCBs in the water column during a 10 year simulation using the loads established in Step 2 and with new sediment initial conditions.

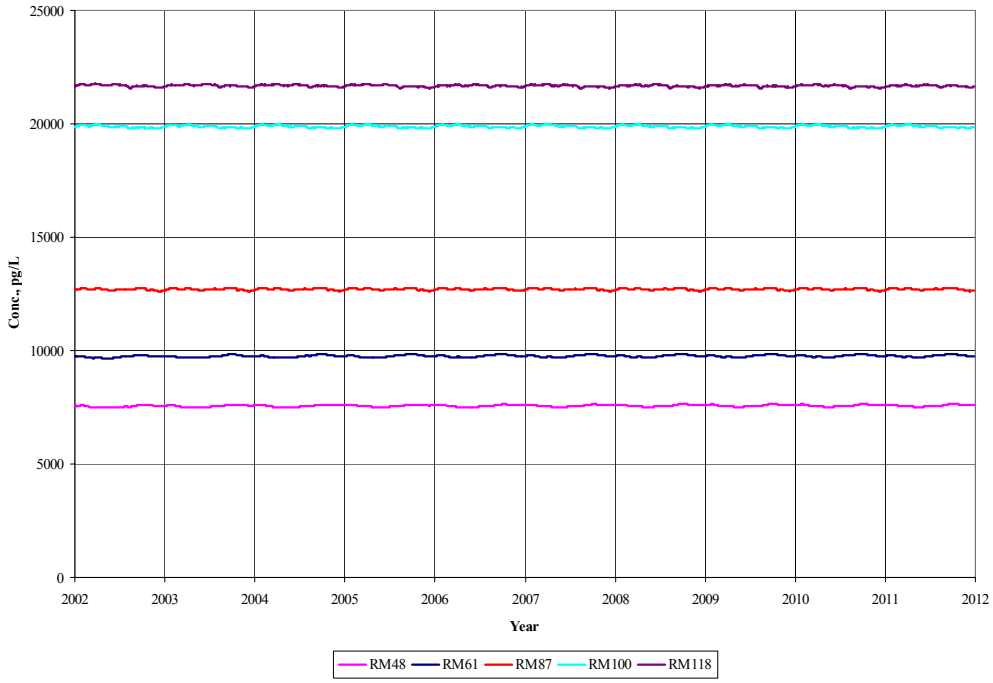

Figure 24: Temporal plot of the concentration of penta-PCBs in the surface sediment layer during a 10 year simulation using the loads established in Step 2 and with new sediment initial conditions.

3.3.5 Step 4

The final step in developing TMDLs for penta-PCBs for Zones 2 through 5 of the Delaware Estuary is to include the exchange of penta-PCBs between the gas phase in the atmosphere and truly dissolved penta-PCBs in the water. In the current model framework, the gas phase air concentrations are assigned, and are not dynamically simulated by the model. However, when the TMDL is achieved there should be close to zero net exchange between the water and air. It was therefore necessary to estimate the gas phase concentration that would be in equilibrium with the water quality targets (Figure 8) and then confirm that the water quality targets are still being met.

The penta-PCB water quality model utilizes the following formula to determine the volatilization rate of a chemical:

$$\frac{\partial C}{\partial t} = \frac{K_V}{D}\left[C_W - \frac{C_A}{H/RT_K}\right]$$

where: K_V = the transfer rate, meters per day
D = model segment depth in meters
C_W = truly dissolved fraction of the chemical in water, mg/L
C_A = atmospheric gas phase concentration, mg/L
H = Henry's Law Constant, atm-m^3/day
R = universal gas constant
T_K = water temperature in degrees Kelvin

At equilibrium, the volatilization rate will be zero. Therefore:

$$\left[C_W - \frac{C_A}{H/RT_K}\right] = 0$$

Rearranging this formula to calculate the atmospheric gas phase concentration for penta-PCBs:

$$C_W \times H/RT_K = C_A$$

Figure 25 presents the truly dissolved penta-PCB water concentrations predicted by the model from Step 4 and the corresponding equilibrium air concentrations of gaseous phase penta-PCBs for the one year cycling period.

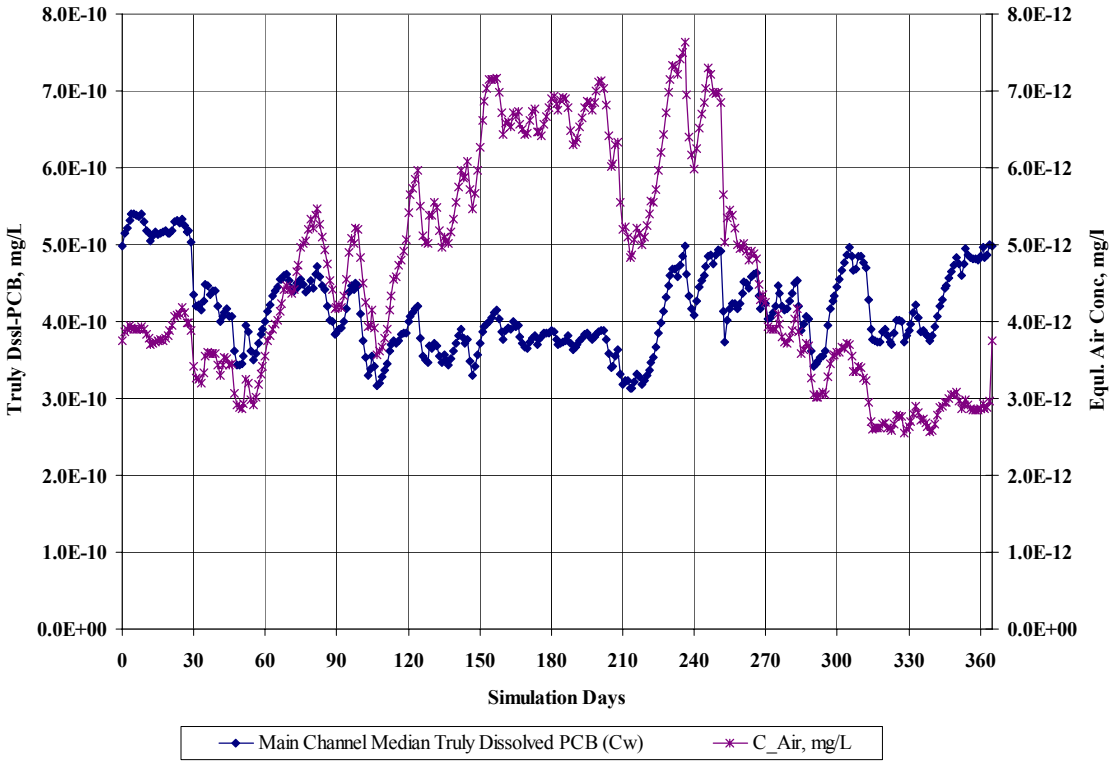

Figure 25: Back-calculated, equilibrium, median, gas phase penta-PCB concentrations during the one year model cycling period.

The penta-PCB water quality model is then run with the conditions obtained from Step 2 and 3 including the loadings from the model boundaries and to each estuary zone, initial penta-PCB concentrations in the sediment (Figure 24), and with back-calculated, equilibrium, median, gas phase penta-PCB concentrations during the one year model cycling period (Figure 25). The purpose of this simulation is to confirm that the penta-PCB concentrations in the sediments and the penta-PCB gas phase air concentrations are in equilibrium with the estuary concentrations that will meet the water quality target of 1.975 pg/L at the critical location when all fate processes are enabled in the model. These simulations were also run for 100 years to establish the point at which equilibrium was reached between the water column and the sediments. Figure 26 indicates the sediment concentration of penta-PCBs at five locations in the estuary corresponding to a model segment in each of the estuary zones and Delaware Bay. Note that sediment concentrations in all segments reach equilibrium after approximately 20 years. The simulated sediment concentrations at each of the model segments is presented in Figure 27. Figure 28 presents a plot of the annual median values during the 99th and 100th year of the simulation, confirming that the water quality target is being met.

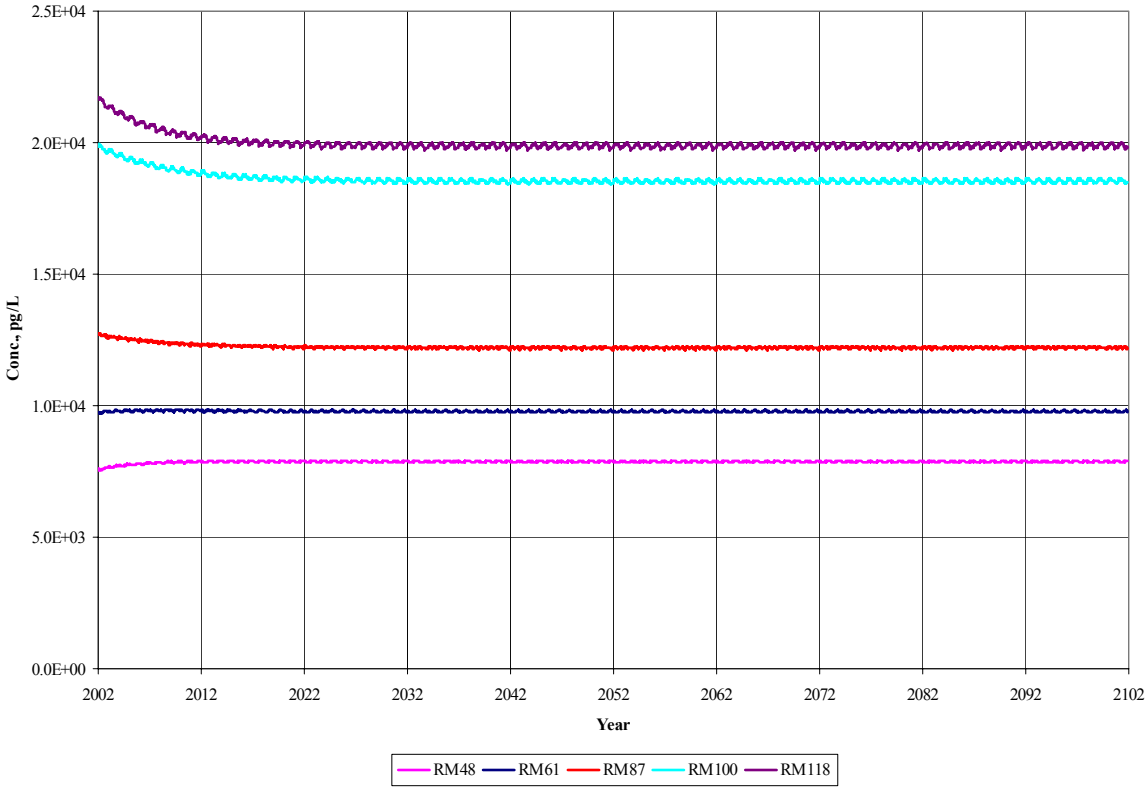

Figure 26: Temporal plot of penta-PCB concentrations in the surface sediment layer during a 100 year simulation with air-water exchange processes enabled.

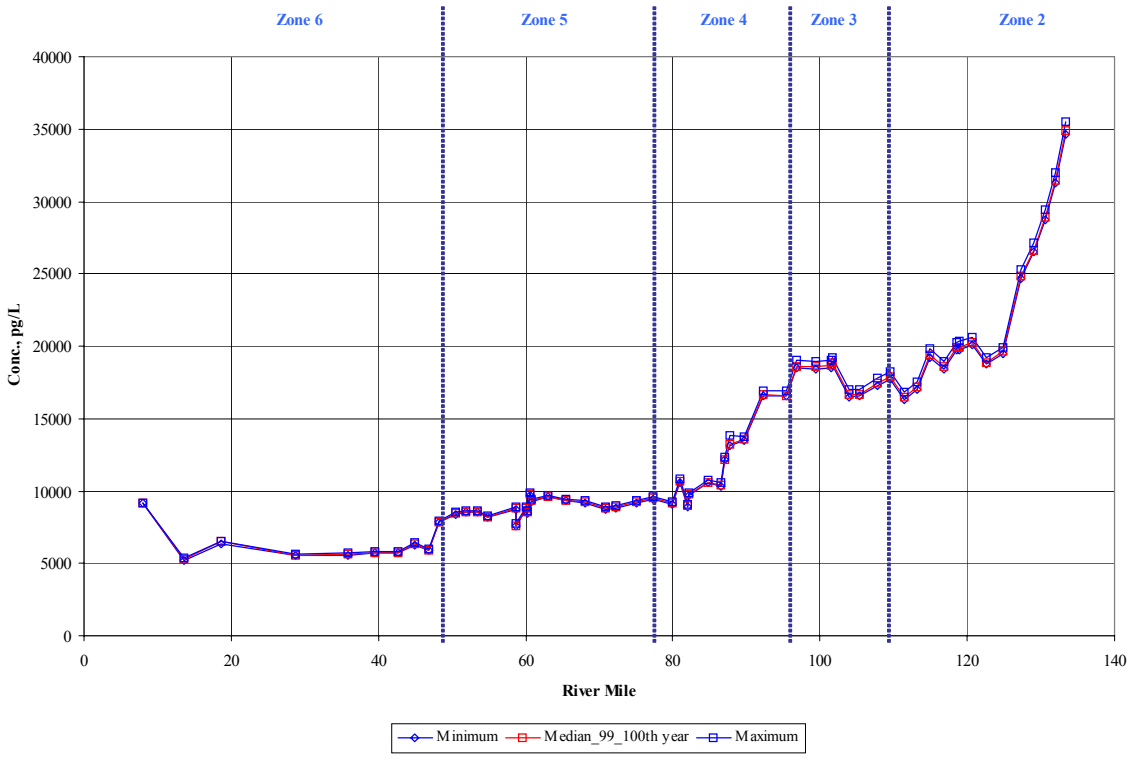

Figure 27: Spatial plot of penta-PCB concentrations in the surface sediment layer during a 100 year simulation with air-water exchange processes.

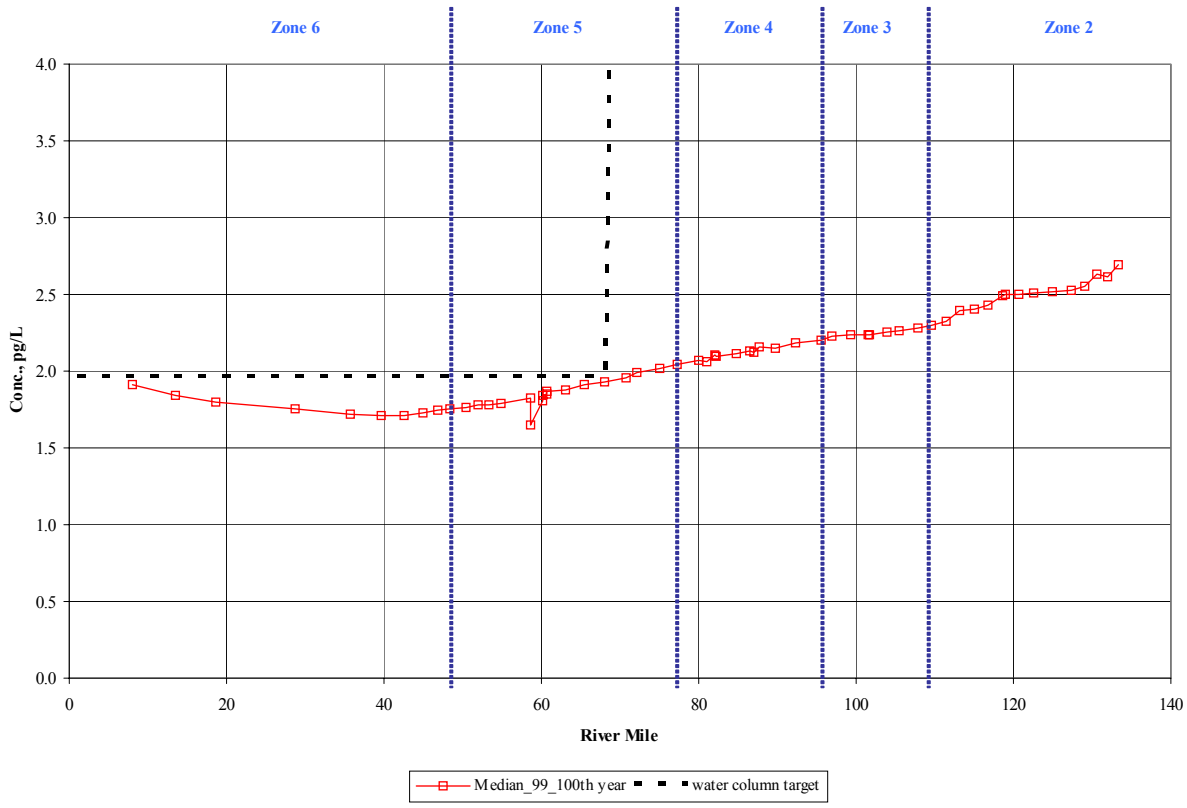

Figure 28: Spatial plot of the penta-PCBs in the water column during a 100 year simulation using the loads established in Step 2, new sediment initial conditions, and with air-water exchange processes enabled

4. TMDLs, WLAs and LAs for Total PCBs for Zones 2 to 5

4.1 TMDLs, WLAs and LAs for Penta- PCBs

Table 5 summarizes the calculated TMDLs (allowable loadings) for penta-PCBs for Zones 2 to 5 of the Delaware Estuary that were derived in Section 3.3.5. The loadings from the Delaware River at Trenton and the Schuylkill River are included in the Zone 2 and 4 TMDLs, respectively. The next step is to allocate the zone-specific TMDLs to a wasteload allocation portion or WLA, a load allocation portion or LA, and a margin of safety.

Table 5: TMDLs for penta-PCBs for Zones 2 through 5 of the Delaware Estuary

Estuary Zone	TMDL (milligrams / day)
Zone 2	**64.3400**
Zone 3	**4.4555**
Zone 4	**14.1779**
Zone 5	**12.0157**
Sum	**94.9891**

The Commission's Toxics Advisory Committee has made several recommendations on the policies and procedures to be used to establish these allocations. Federal regulations at 40 CFR Part 130.7(c)(1) require a margin of safety or MOS to be included in a TMDL to account for any lack of knowledge concerning the relationships between pollutant loadings and receiving water quality. Commission regulations also require that a portion of the TMDL be set aside as a margin of safety, with the proportion reflecting the degree of uncertainty in the data and resulting water quality-based controls. The margin of safety can be incorporated either implicitly in the design conditions used in establishing the TMDLs or explicitly by assigning a proportion of each TMDL. Both of these approaches were considered by the Toxics Advisory Committee who recommended that an explicit margin of safety of 5% be assigned in allocating the zone-specific TMDLs. This recommendation was based upon the use of a one year cycling period for the hydrodynamic and water quality model that mimics the period of record for the two major tributaries to the estuary rather than design tributary flows; and the use of tide data, precipitation data and the actual effluent flows that occurred during the one year cycling period. EPA finds these recommendations reasonable and supported by the evidence, and adopted them in these TMDLs. Table 6 presents the MOS allocation for each of the zones as well as the two tributary boundaries. This is necessary since the loadings from these tributaries are part of the PCB loadings to Zones 2 and 4

Table 6: Allocation of the Zone TMDLs to the 5% Margin of Safety

Sources of Loadings	Contribution Factor (CF)	TMDL	MOS	TMDL - MOS
	[pg/L] / [pg/L] or [pg/L] / [100mg/day]	mg/day	mg/day	mg/day
Delaware River	0.581500	57.727	2.886	54.841
Schuylkill River	0.118390	9.609	0.48	9.129
Zone 2	1.966800	6.613	0.331	6.282
Zone 3	2.142800	4.455	0.223	4.232
Zone 4	2.281300	4.569	0.228	4.341
Zone 5	0.967040	12.016	0.601	11.415
Sum		**94.989**	**4.749**	**90.24**

The committee recommended that for the Stage 1 TMDLs, the proportion of the TMDLS that are allocated to WLAs and LAs should be based upon the current loadings from the various PCB source categories to each of the zones during the one year cycling period (February 1, 2002 to January 31, 2003) used in the TMDL model simulations. EPA finds these recommendations reasonable and adopted them in these TMDLs.

Prior to allocation of the remaining portion of the TMDL between WLA and LA, the portion of the assimilative capacity allocated to contaminated sites was determined since the assimilative capacity for this source must also be shared between the estuary zones and the two boundary tributaries (see Section 3.2.1). Table 7 presents the load allocated to the contaminated sites by source and the remaining assimilative capacity that must still be allocated.

Table 7: Allocation of the Zone TMDLs to Contaminated Sites

Sources of Loadings	TMDL - MOS	% of Total Loading to Zone	Contaminated Site Allocation	TMDL - MOS - CS
	mg/day		mg/day	
Delaware River	54.841	-	0.229	54.612
Schuylkill River	9.129	-	3.473	5.656
Zone 2	6.282	0.42	0.026	6.256
Zone 3	4.233	57.09	2.416	1.816
Zone 4	4.340	38.04	1.651	2.689
Zone 5	11.415	46	5.251	6.164
	94.989	**-**	**13.046**	**77.193**

The remaining assimilative capacity can now be apportioned to WLAs and the rest of the sources that contribute to the LAs (Table 8). The WLA source categories include the continuous point source NPDES discharges, stormwater discharges permitted under the NPDES program, and combined sewer overflows (CSOs), and municipal separate storm sewer systems (MS4s).

EPA's regulations require NPDES-regulated storm water discharges to be addressed by the WLA component of a TMDL. Assessing the estimated loading from such discharges is relatively difficult compared to traditional point source discharges, as storm water discharge is typically calculated by quantifying the area

of urban and residential land uses in a basin. For this reason, it is important to have updated land use data and runoff coefficients.

In developing the Stage 1 TMDLs, the existing WLAs were calculated for traditional point source discharges based on effluent concentrations and the actual effluent flows during the one year model cycling period (see Section 3.2.4.1). A November 22, 2002 EPA Memorandum entitled, "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm water Source and NPDES Permit Requirements Based on Those WLAs" clarified existing regulatory requirements for municipal separate storm sewer systems (MS4s) connected with TMDLs. Where a TMDL has been developed, the MS4 community must receive a WLA rather than a LA. The Stage 1 TMDL explicitly assigns a portion of each of the zone WLAs to storm water discharges that do not have an individual NPDES permit. Appendix 6 presents the procedure used to develop each of these zone allocations to MS4s and the resulting MS4 loading in milligrams per day (mg/day).

The LA source categories also include the other smaller tributaries, non-point source loads not permitted under the NPDES program, dry and wet atmospheric deposition. Tables 9 and 10 summarize the categories included in the aggregate allocations to WLAs and LAs in each zone, respectively. Table 11 summarizes the allocations to WLAs, LAs and the MOS. Figures 29 to 32 graphically illustrate the proportion allocated.

Table 8: Summary of Zone TMDLs for penta-PCBs and the allocation to the major source categories for PCBs.

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Sources of Loadings	Contribution Factor (CF)	TMDL	MOS	Contaminated Site Allocation	Remaining Allocation	Allocation to Continuous Point Sources	Allocation to CSOs	Allocation to MS4s	Remaining Portion to the rest of LAs
	[pg/L] / [pg/L] or [pg/L] / [100mg/day]	mg/day	mg/day	mg/day	mg/day	mg/day	mg/day	mg/day	mg/day
Trenton	0.581500	57.727	2.886	0.229	54.611	0.000			
Schuylkill	0.118390	9.609	0.480	3.473	5.656	0.000			
Zone 2	1.966800	6.613	0.331	0.026	6.256	1.241	0.006	1.511	3.498
Zone 3	2.142800	4.455	0.223	2.416	1.816	0.771	0.462	0.185	0.398
Zone 4	2.281300	4.569	0.228	1.651	2.689	0.614	0.677	0.342	1.055
Zone 5	0.967040	12.016	0.601	5.250	6.165	3.132	0.182	0.592	2.259
Sum		94.989	4.749	13.046	77.193	5.758	1.327	2.630	7.211

Table 9: Summary of the Zone WLAs for penta-PCBs and their allocation to source categories.

Estuary Zone	WLA	NPDES continuous discharging point sources	CSOs	Municipal separate stormwater sewer service
	mg/day	mg/day	mg/day	mg/day
Zone 2	2.7574	1.2408	0.0059	1.5107
Zone 3	1.4180	0.7713	0.4620	0.1847
Zone 4	1.6338	0.6143	0.6772	0.3423
Zone 5	3.9062	3.1319	0.1822	0.5922
Sum	9.7155	5.7583	1.3272	2.6300

Table 10: Summary of the Zone LAs for penta-PCBs and their allocation to source categories.

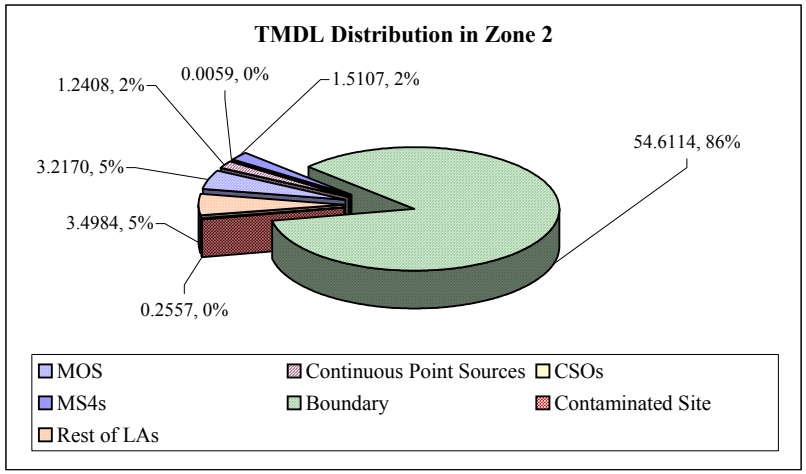
Estuary Zone	LAs	Boundary *	Contaminated Site	Others
	mg/day	mg/day	mg/day	mg/day
Zone 2	58.3656	54.6114	0.2557	3.4984
Zone 3	2.8147	0.0000	2.4164	0.3983
Zone 4	11.8351	5.6558	5.1240	1.0554
Zone 5	7.5087	0.0000	5.2501	2.2586
Sum	80.5242	60.2672	13.0462	7.2107

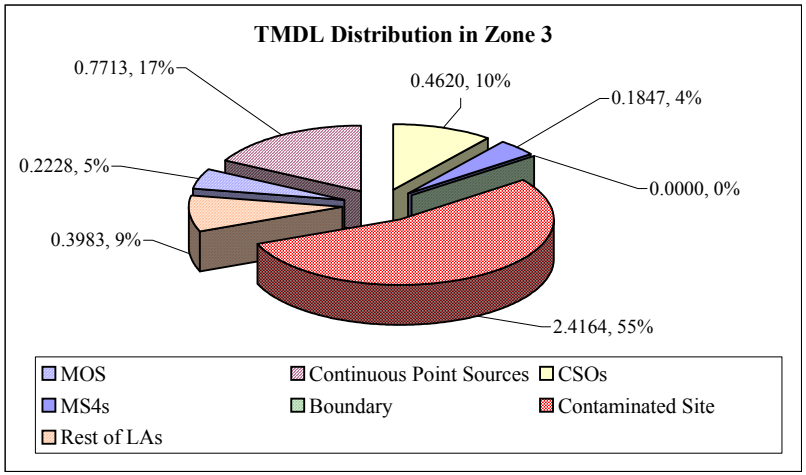
* - The boundary in Zone 2 is the Delaware River at Trenton, and the boundary in Zone 4 is the Schuylkill River.

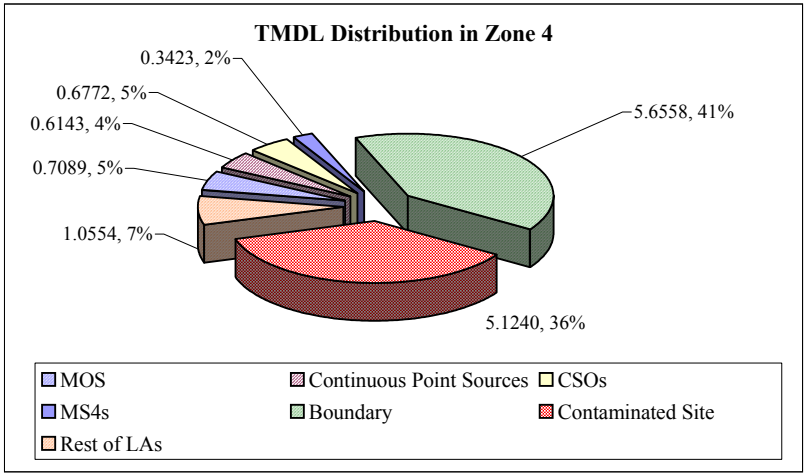
Table 11: Summary of the Zone TMDLs for penta-PCBs and their allocation to WLAs, LAs and a MOS.

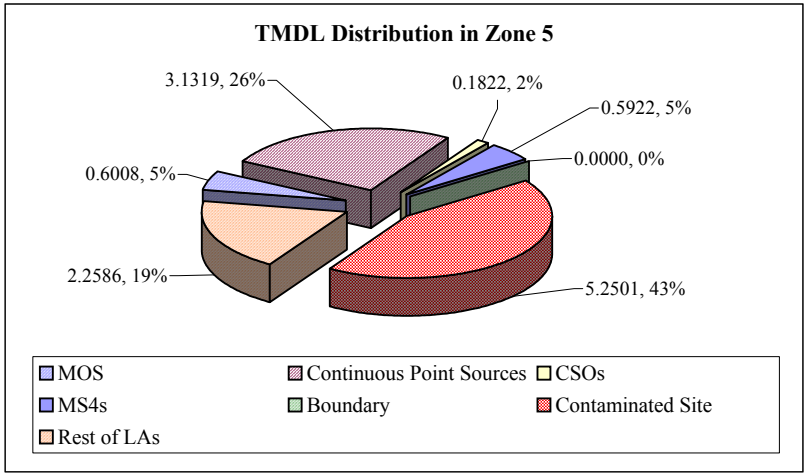
Estuary Zone	TMDL	WLA	LA	MOS
	mg/day	mg/day	mg/day	mg/day
Zone 2	64.3400	2.7574	58.3656	3.2170
Zone 3	4.4555	1.4180	2.8147	0.2228
Zone 4	14.1779	1.6338	11.8351	0.7089
Zone 5	12.0157	3.9062	7.5087	0.6008
Sum	94.9891	9.7155	80.5242	4.7495

Figures 29 - 32: Distribution of Zone TMDLs to Point sources and CSOs, and the Remainder of the Non-Point Sources (tributary boundary loads, the MOS and the Contaminated Site loading excluded).









4.2 TMDLs, WLAs and LAs for Total PCBs

4.2.1 Extrapolation from Penta to Total PCBs

As discussed in Sections 2.2 and 3.2.2, TMDLs for Total PCBs will be extrapolated from penta homolog data using the observed ratio in the Delaware Estuary of the penta homolog to total PCBs. This approach was recommended by the expert panel established by the Commission due to time limitations and the technical difficulty in developing and calibrating a PCB model for each of the ten PCB homologs. Data available to the panel at that time indicated that the proportion of penta-PCBs to Total PCBs at 15 locations sampled in the estuary ranged between 0.2 and 0.3 (20 to 30% of Total PCBs). Figure 33 presents the ratio of penta-PCBs to Total PCBs for each zone based upon data currently available. EPA finds this extrapolation to be reasonable and supported by the best available data.

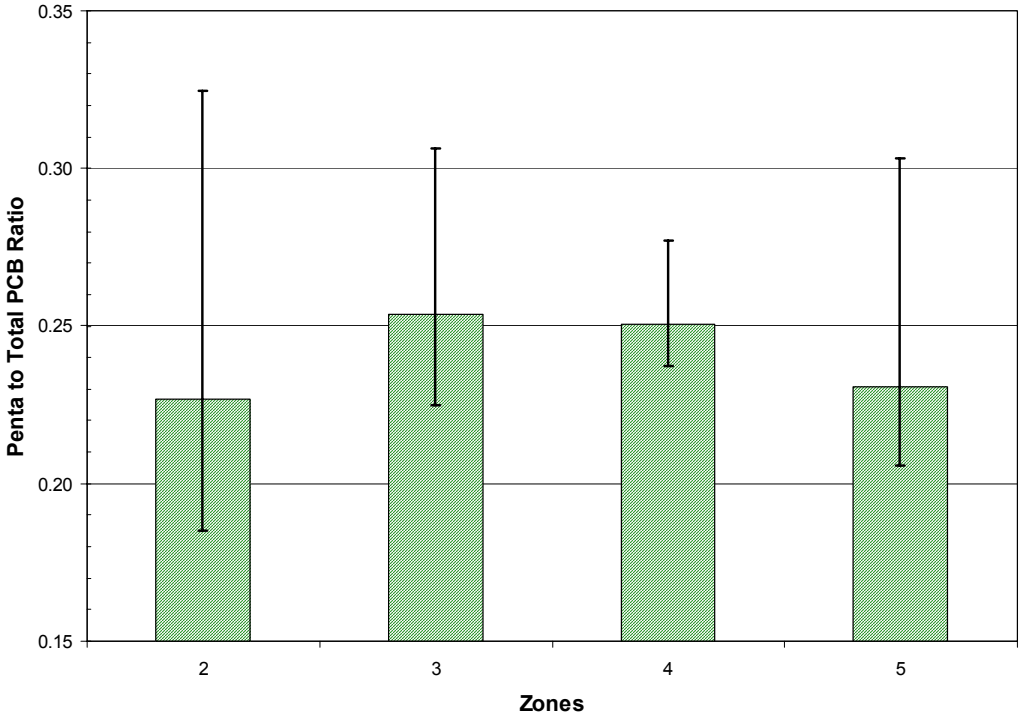


Figure 33: Ratio of Penta-PCBs to Total PCBs in ambient water samples collected from 15 sites in the Delaware Estuary during surveys conducted on September 18, 2001, March 15, 2002, April 11, 2002, October 8, 2002 and March19, 2003. Error bars indicate the minimum and maximum ratios observed at any sampling site during all five surveys.

This data supports the original data and indicates median penta- to total PCB ratios of 0.23, 0.25, 0.25 and 0.23 for Zones 2 to 5, respectively. For Stage 1 TMDLs, a fixed value of 0.25 was used for all zones to scale up the zone-specific TMDLs, WLAs, LAs and MOSs.

4.2.2 TMDLs, WLAs and LAs for Total PCBs

Table 12 summarizes the TMDLs for each estuary zone for total PCBs as well as the allocations to WLAs, LAs and the MOSs.

Table 12: TMDLs, WLAs, LAs and MOSs for Total PCBs for Zones 2 to 5 of the Delaware Estuary.

Estuary Zone	TMDL	WLA	LA	MOS
	mg/day	mg/day	mg/day	mg/day
Zone 2	257.36	11.03	233.46	12.87
Zone 3	17.82	5.67	11.26	0.89
Zone 4	56.71	6.54	47.34	2.84
Zone 5	48.06	15.63	30.04	2.40
Sum	379.96	38.86	322.10	19.00

4.2.3 Uncertainty Analysis for TMDLs, WLAs and LAs for Total PCBs

Uncertainty is associated with three elements of the Stage 1 TMDLs: 1) the use of annual median values for determining compliance with the penta-PCB water quality target, 2) the loading of penta-PCBs for each of the source categories that is used to apportion the TMDLs, and 3) the extrapolation of the penta-PCB TMDLs, aggregate and individual WLAs, and LAs to total PCBs.

As discussed in Section 3.2.1, TMDLs are calculated over a one year period (annual median) to be consistent with both the model simulations and the 70 year exposure used for human health criteria. The estuary, however, is dynamic with ambient PCB concentrations being affected by the amount of inflow from the tributaries, the variation in the tides over lunar and annual time scales, changes in both continuous and precipitation-induced wastewater flows, and the prevailing air and water temperature. Thus, ambient PCB concentrations will vary on both a daily and monthly basis about the annual median. The magnitude of this variation can be seen by plotting the annual minimum and annual maximum values that occur during long-term model simulations like those used to check whether a given set of loading assumptions results in compliance with the penta-PCB water quality target at the critical location (see Figure 28). Figure 34 illustrates the uncertainty associated with the use of annual median values by comparing annual minimum and maximum plots of water column concentrations of penta-PCBs during a 100 year simulation. The figure indicates that the annual variation is approximately +15% to -25%.

The uncertainty in the loading estimates for each of the source categories is discussed in Section 2.7 of the model calibration report (DRBC, 2003c). A Monte Carlo analysis was performed to examine and compare the uncertainty for the loading estimates for each PCB source category that were used in the 577 day model calibration period. This analysis indicated that the greatest uncertainty was associated with the tidal non-point source loads (90^{th} and 10^{th} percentiles of loading were 44.82 and 2.28 kilograms, respectively) followed by the contaminated site loads (90^{th} and 10^{th} percentiles of loading were 24.94 and 4.23 kilograms, respectively). Less uncertainty was associated with the loading from point sources (90^{th} and 10^{th} percentiles of loading were 8.53 and 5.16 kilograms, respectively)

The uncertainty in the extrapolation from penta-PCBs to total PCBs is illustrated in Figure 33. This figure indicates that while the zone ratios of penta-PCBs to total PCBs is close to 0.25, the uncertainty associated with the ratios varies between zones with the largest uncertainty occurring in Zone 2 (0.19 to 0.32) and the smallest occurring in Zone 4 (0.24 to 0.28).

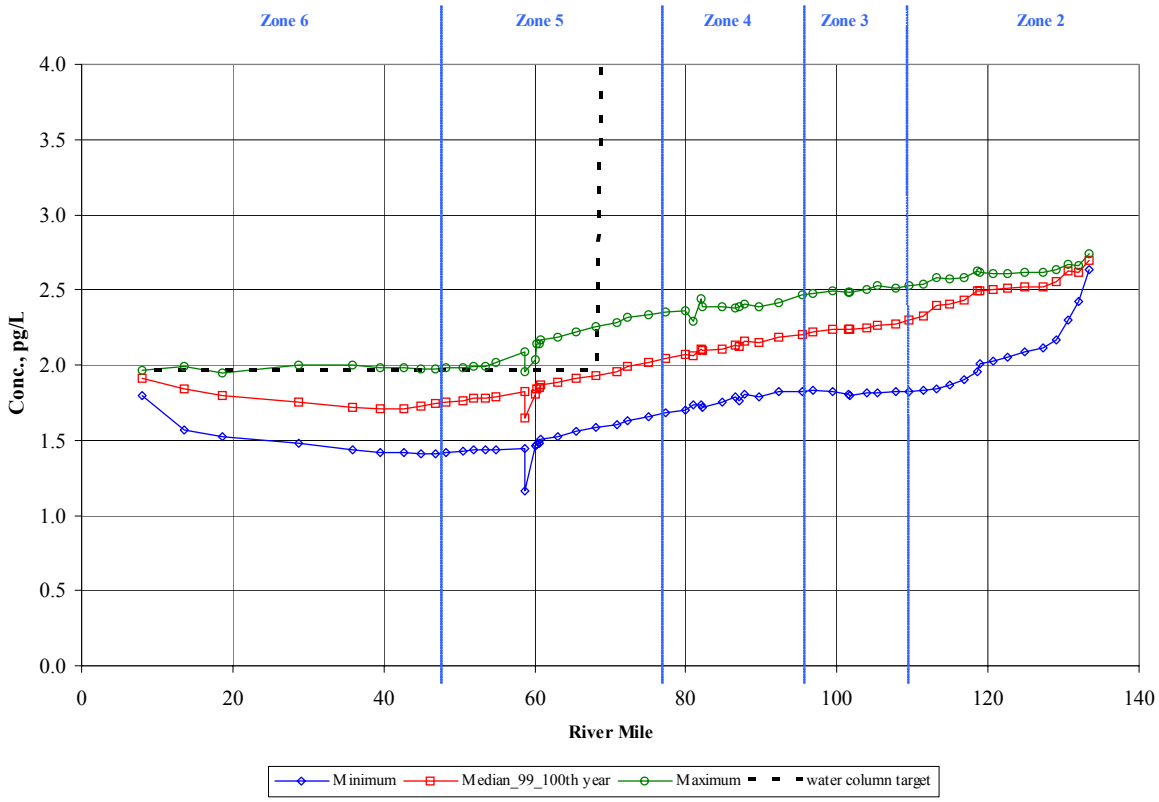


Figure 34: Spatial plots of the annual median, annual minimum and annual maximum values of water column penta-PCB concentrations during a 100 year simulation using the TMDL loads.

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Appendix 1

REDUCING PCB LOADINGS TO THE DELAWARE ESTUARY: A Staged Approach to Establishing TMDLs

Documents distributed at the April 29, 2003 meeting convened by the

U.S. Environmental Protection Agency, Regions II and III

Delaware River Basin Commission

Delaware Department of Natural Resources & Environmental Control

New Jersey Department of Environmental Protection

Pennsylvania Department of Environmental Protection

Appendix 2

Individual Wasteload Allocations for NPDES Discharges: Stage 1 TMDLs
for Total PCBs for Zones 2 to 5 of the Delaware Estuary

Appendix Table 2-1: Individual wasteload allocations for the point source discharges except CSOs and MS4s.

Serial No.	Serial No. per Zone	Facility Name	NPDES	DSN	ZONE	RM	Model Segment	Potential Group (category)	Current Loadings (Sept. 2003) mg/day	Pent-PCBs WLA mg/day	Total PCBs WLA mg/day
1	1	Morrisville WWTP	PA0026701	001	2	132.9	76	2	65.566	0.057280	0.229120
2	2	Trenton	NJ0020923	001	2	132.2	75	1	243.612	0.212825	0.851301
3	3	PSEG-Mercer	NJ0004995	441A	2	130.4	74	2	0.000	0.000000	0.000000
4	4	PSEG-Mercer	NJ0004995	441C	2	130.4	74	1	5.010	0.004377	0.017508
5	5	MSC Pre Finish Metals	PA0045021	001	2	130.1	74	2	0.646	0.000564	0.002256
6	6	Hamilton Township	NJ0026301	001	2	128.0	73	2	220.791	0.192889	0.771555
7	7	Yates Foil	NJ0004332	001B	2	128.0	73	2	0.070	0.000061	0.000244
8	8	Yates Foil	NJ0004332	002A	2	128.0	73	2	0.000	0.000000	0.000000
9	9	Bordentown Sewerage Authority	NJ0024678	001	2	128.0	71	2	26.292	0.022969	0.091877
10	10	U.S. Steel	PA0013463	002	2	127.4	71	1	61.390	0.053632	0.214527
11	11	U.S. Steel	PA0013463	103	2	127.0	71	1	10.056	0.008785	0.035141
12	12	U.S. Steel	PA0013463	203	2	127.0	71	1	3.787	0.003308	0.013234
13	13	Exelon-Fairless	PA0057088	001	2	126.6	71	2	0.000	0.000000	0.000000
14	14	Waste Management Grows Landfill	PA0043818	001	2	125.5	70	2	1.182	0.001033	0.004131
15	15	Lower Bucks County Municipal Authority	PA0026468	001	2	121.9	69	2	129.179	0.112854	0.451417
16	16	Florence Township	NJ0023701	001	2	121.4	68	2	15.682	0.013700	0.054802
17	17	GEON Company (Burlington) Polyone	NJ0004235	001A	2	120.3	68	2	15.051	0.013149	0.052595
18	18	Bristol Borough	PA0027294	001	2	118.7	66	2	29.383	0.025669	0.102677
19	19	US Pipe & Foundry	NJ0005266	002A	2	118.1	66	1	0.807	0.000705	0.002821
20	20	City of Burlington	NJ0024660	002	2	117.6	64	2	46.336	0.040480	0.161921
21	21	PSEG-Burlington	NJ0005002	WTPA	2	117.4	64	1	0.929	0.000812	0.003246
22	22	Rohm&Haas-Bristol	PA0012769	009	2	117.1	64	1	5.710	0.004988	0.019952

Serial No.	Serial No. per Zone	Facility Name	NPDES	DSN	ZONE	RM	Model Segment	Potential Group (category)	Current Loadings (Sept. 2003) mg/day	Pent-PCBs WLA mg/day	Total PCBs WLA mg/day
23	23	Burlington Township	NJ0021709	001	2	117.0	64	2	34.901	0.030490	0.121961
24	24	Colorite Polymers	NJ0004391	002A	2	117.0	64	2	0.008	0.000007	0.000030
25	25	Colorite Polymers	NJ0004391	003A	2	117.0	64	2	0.740	0.000646	0.002585
26	26	Bristol Township	PA0026450	001	2	116.8	64	2	34.732	0.030342	0.121370
27	27	Beverly Sewerage Authority	NJ0027481	001	2	114.7	63	1	18.890	0.016503	0.066010
28	28	Delran Sewerage Authority	NJ0023507	001	2	110.8	60	2	37.419	0.032691	0.130762
29	29	Mt. Holly Municipal Utilities Authority	NJ0024015	001	2	110.8	61	2	54.904	0.047965	0.191862
30	30	Mt. Laurel Municipal Utilities Authority	NJ0025178	001A	2	110.8	60	2	67.433	0.058911	0.235646
31	31	Riverton Borough	NJ0021610	001	2	110.8	61	1	3.853	0.003366	0.013464
32	32	Willingboro Municipal Utilities Authority	NJ0023361	001	2	110.8	61	2	123.392	0.107798	0.431194
33	33	AFG Industries	NJ0033022	001A	2	109.6	59	1	10.258	0.008962	0.035848
34	34	AFG Industries	NJ0033022	002	2	109.4	59	2	0.092	0.000080	0.000321
35	35	Hoeganaes Corp.	NJ0004375	001A	2	109.4	59	2	0.330	0.000288	0.001151
36	36	Hoeganaes Corp.	NJ0004375	003A	2	109.4	59	2	0.000	0.000000	0.000000
37	37	Cinnaminson Sewerage Authority	NJ0024007	001	2	108.9	59	1	27.980	0.024444	0.097778
38	38	Riverside Sewerage Authority	NJ0022519	001	2	108.8	59	1	124.107	0.108423	0.433693
39	1	Palmyra Borough	NJ0024449	001	3	107.7	58	2	19.235	0.005384	0.021536
40	2	Rohm&Haas-Philadelphia	PA0012777	001	3	106.1	56	2	15.974	0.004471	0.017885
41	3	Rohm&Haas-Philadelphia	PA0012777	003	3	106.1	56	1	2.175	0.000609	0.002435
42	4	Rohm&Haas-Philadelphia	PA0012777	007	3	106.1	56	2	0.003	0.000001	0.000003
43	5	NGC Industries	NJ0004669	001A	3	104.4	55	2	1.528	0.000428	0.001710
44	6	PWD-NE	PA0026689	001	3	104.1	55	1	1238.662	0.346711	1.386845
45	7	Citgo Petroleum	NJ0131342	001A	3	103.4	55	2	0.012	0.000003	0.000014
46	8	Exelon-Delaware	PA0011622	001	3	101.2	52	2	0.044	0.000012	0.000049

Serial No.	Serial No. per Zone	Facility Name	NPDES	DSN	ZONE	RM	Model Segment	Potential Group (category)	Current Loadings (Sept. 2003) mg/day	Pent-PCBs WLA mg/day	Total PCBs WLA mg/day
47	9	Exelon-Delaware	PA0011622	002	3	101.2	52	1	0.655	0.000183	0.000733
48	10	Exelon-Delaware	PA0011622	004	3	101.2	52	2	0.011	0.000003	0.000013
49	11	Exelon-Delaware	PA0011622	006	3	101.1	52	2	0.000	0.000000	0.000000
50	12	CCMUA	NJ0026182	001	3	98.0	49	1	818.459	0.229093	0.916372
51	13	PWD-SE	PA0026662	001	3	96.8	49	1	657.721	0.184101	0.736405
52	1	Coastal Mart / Coastal Eagle Point Oil	NJ0005401	003A	4	94.7	48	2	0.006	0.000002	0.000007
53	2	Coastal Mart / Coastal Eagle Point Oil	NJ0005401	001A	4	94.3	48	2	55.368	0.014863	0.059451
54	3	Metro Machine	PA0057479	DD2	4	93.2	44	1	49.040	0.013164	0.052656
55	4	Metro Machine	PA0057479	DD3	4	93.1	44	2	17.845	0.004790	0.019161
56	5	Kvaerner	PA0057690	019	4	92.8	44	1	0.100	0.000027	0.000108
57	6	Kvaerner	PA0057690	021	4	92.8	44	1	0.100	0.000027	0.000108
58	7	Kvaerner	PA0057690	012	4	92.7	44	1	22.608	0.006069	0.024275
59	8	Kvaerner	PA0057690	047	4	92.5	45	2	0.005	0.000001	0.000005
60	9	Sunoco-GirardPoint	PA0011533	015	4	92.5	45	2	99.167	0.026620	0.106481
61	10	Sunoco-PointBreeze	PA0012629	002	4	92.5	46	2	75.899	0.020374	0.081496
62	11	PWD-SW	PA0026671	001	4	90.7	43	1	1020.466	0.273932	1.095729
63	12	Ausimont	NJ0005185	001A	4	90.7	43	1	0.840	0.000225	0.000902
64	13	Ausimont	NJ0005185	002A	4	90.7	43	1	0.077	0.000021	0.000082
65	14	Chevron	NJ0064696	001A	4	90.5	43	2	0.157	0.000042	0.000169
66	15	Colonial Pipeline	NJ0033952	001A	4	90.5	43	2	0.087	0.000023	0.000094
67	16	BP Paulsboro	NJ0005584	002A	4	89.6	43	2	0.352	0.000095	0.000378
68	17	BP Paulsboro	NJ0005584	003A	4	89.4	43	2	7.006	0.001881	0.007522
69	18	GCUA	NJ0024686	001	4	88.4	43	1	113.497	0.030467	0.121868
70	19	Air Products	NJ0004278	001A	4	88.2	42	2	10.041	0.002695	0.010782

Serial No.	Serial No. per Zone	Facility Name	NPDES	DSN	ZONE	RM	Model Segment	Potential Group (category)	Current Loadings (Sept. 2003) mg/day	Pent-PCBs WLA mg/day	Total PCBs WLA mg/day
71	20	Valero Refining	NJ0005029	001A	4	87.7	42	1	99.473	0.026702	0.106809
72	21	Hercules	NJ0005134	001A	4	87.5	42	1	4.120	0.001106	0.004424
73	22	Greenwich Township	NJ0030333	001	4	87.0	42	2	12.110	0.003251	0.013003
74	23	Dupont-Repauno	NJ0004219	007	4	86.6	42	1	1.433	0.000385	0.001538
75	24	Dupont-Repauno	NJ0004219	001A	4	85.6	38	1	80.773	0.021682	0.086730
76	25	Boeing	PA0013323	002	4	85.4	38	1	158.353	0.042508	0.170032
77	26	Boeing	PA0013323	016	4	85.4	38	1	0.149	0.000040	0.000160
78	27	Tinicum Township	PA0028380	001	4	85.4	40	1	15.450	0.004147	0.016590
79	28	Boeing	PA0013323	001	4	85.2	38	1	29.068	0.007803	0.031212
80	29	Boeing	PA0013323	003	4	85.2	38	1	0.404	0.000108	0.000433
81	30	Boeing	PA0013323	007	4	85.2	38	1	0.235	0.000063	0.000252
82	31	Boeing	PA0013323	008	4	85.2	38	2	0.018	0.000005	0.000019
83	32	Exelon-Eddystone	PA0013716	001	4	85.2	38	1	0.064	0.000017	0.000069
84	33	Exelon-Eddystone	PA0013716	005	4	85.2	38	1	0.509	0.000137	0.000546
85	34	Exelon-Eddystone	PA0013716	007	4	85.2	38	2	0.000	0.000000	0.000000
86	35	Exelon-Eddystone	PA0013716	008	4	85.2	38	2	0.000	0.000000	0.000000
87	36	Kimberly Clark	PA0013081	029	4	83.2	36	1	0.086	0.000023	0.000092
88	37	DeGuessa-Huls Corp.	PA0051713	001	4	82.2	36	2	9.063	0.002433	0.009731
89	38	DELCORA	PA0027103	001	4	80.6	34	1	309.423	0.083061	0.332244
90	39	ConocoPhillips	PA0012637	002	4	80.2	34	2	0.000	0.000000	0.000000
91	40	ConocoPhillips	PA0012637	006	4	80.2	34	2	0.029	0.000008	0.000032
92	41	ConocoPhillips	PA0012637	007	4	80.2	34	1	0.511	0.000137	0.000549
93	42	ConocoPhillips	PA0012637	008	4	80.2	34	1	0.111	0.000030	0.000119
94	43	Harrison Township-Mullica Hill	NJ0020532	001	4	79.8	79	2	6.093	0.001636	0.006543

Serial No.	Serial No. per Zone	Facility Name	NPDES	DSN	ZONE	RM	Model Segment	Potential Group (category)	Current Loadings (Sept. 2003) mg/day	Pent-PCBs WLA mg/day	Total PCBs WLA mg/day
95	44	Safety Kleen	NJ0005240	001A	4	79.8	79	2	7.440	0.001997	0.007989
96	45	Safety Kleen	NJ0005240	002A	4	79.8	79	1	3.512	0.000943	0.003772
97	46	Swedesboro	NJ0022021	001	4	79.8	79	2	3.296	0.000885	0.003539
98	47	ConocoPhillips	PA0012637	101	4	79.6	34	2	0.000	0.000000	0.000000
99	48	ConocoPhillips	PA0012637	201	4	79.6	34	2	48.580	0.013041	0.052163
100	49	Logan Township	NJ0027545	001	4	79.5	34	2	12.114	0.003252	0.013007
101	50	Solutia	NJ0005045	001	4	79.2	34	2	12.228	0.003282	0.013130
102	1	General Chemical	DE0000655	001	5	77.9	33	2	0.000	0.000000	0.000000
103	2	Geon Company (Pedricktown) Polyone	NJ0004286	003	5	75.9	32	2	0.011	0.000007	0.000030
104	3	Geon Company (Pedricktown) Polyone	NJ0004286	001A	5	74.9	32	2	1.690	0.001135	0.004542
105	4	Dupont-Edgemoor	DE0000051	001	5	73.2	31	1	32.214	0.021641	0.086564
106	5	Dupont-Edgemoor	DE0000051	004	5	72.2	31	1	0.153	0.000103	0.000412
107	6	Conectiv-Edgemoor	DE0000558	041	5	71.8	31	2	0.008	0.000005	0.000020
108	7	City of Wilmington	DE0020320	001	5	71.6	31	2	1297.745	0.871802	3.487207
109	8	Carney's Point	NJ0021601	001	5	71.3	25	2	10.265	0.006896	0.027584
110	9	AMTRAK	DE0050962	003	5	70.7	30	1	2.002	0.001345	0.005378
111	10	AMTRAK	DE0050962	004	5	70.7	30	1	35.822	0.024065	0.096259
112	11	Penns Grove Sewer Authority	NJ0024023	001	5	70.7	28	1	23.206	0.015589	0.062357
113	12	Dupont-ChamberWorks	NJ0005100	001A	5	69.8	25	1	138.476	0.093026	0.372103
114	13	Dupont-ChamberWorks	NJ0005100	662A	5	69.8	25	1	102.854	0.069096	0.276383
115	14	Conectiv-Deepwater	NJ0005363	003A	5	69.1	24	2	0.000	0.000000	0.000000
116	15	Conectiv-Deepwater	NJ0005363	005	5	69.1	24	2	0.035	0.000024	0.000094
117	16	Conectiv-Deepwater	NJ0005363	006	5	69.1	24	2	0.006	0.000004	0.000017
118	17	Conectiv-Deepwater	NJ0005363	017	5	69.1	24	1	0.284	0.000191	0.000763

Serial No.	Serial No. per Zone	Facility Name	NPDES	DSN	ZONE	RM	Model Segment	Potential Group (category)	Current Loadings (Sept. 2003) mg/day	Pent-PCBs WLA mg/day	Total PCBs WLA mg/day
119	18	Dupont-ChamberWorks	NJ0005100	011A	5	68.9	24	2	0.004	0.000003	0.000010
120	19	Dupont-ChamberWorks	NJ0005100	013A	5	68.9	24	2	0.000	0.000000	0.000000
121	20	Pennsville Sewerage Authority	NJ0021598	001	5	65.1	23	1	63.353	0.042559	0.170237
122	21	OxyChem	DE0050911	001	5	62.2	81	1	1.798	0.001208	0.004831
123	22	OxyChem	DE0050911	002	5	62.2	81	1	0.168	0.000113	0.000453
124	23	Conectiv-DelawareCity	DE0050601	016	5	61.9	22	2	0.123	0.000082	0.000330
125	24	Conectiv-DelawareCity	DE0050601	033	5	61.9	22	2	0.005	0.000003	0.000012
126	25	Conectiv-DelawareCity	DE0050601	034	5	61.9	22	2	0.015	0.000010	0.000040
127	26	Metachem	DE0020001	002	5	61.9	22	1	1.713	0.001151	0.004604
128	27	Metachem	DE0020001	003	5	61.9	22	1	2.176	0.001462	0.005848
129	28	Metachem	DE0020001	001	5	61.5	21	2	81.182	0.054537	0.218147
130	29	Motiva	DE0000256	001	5	61.5	21	2	0.000	0.000000	0.000000
131	30	Motiva	DE0000256	601	5	61.5	21	1	0.000	0.000000	0.000000
132	31	Kaneka Delaware Corp.	DE0000647	001	5	61.4	21	2	2.266	0.001522	0.006089
133	32	Formosa Plastics	DE0000612	001	5	61.3	21	2	4.885	0.003281	0.013126
134	33	Motiva	DE0000256	101	5	61.0	21	1	2843.225	1.910027	7.640108
135	34	Delaware City STP (New Castle Co.)	DE0021555	001	5	60.1	18	2	4.085	0.002744	0.010976
136	35	City of Salem	NJ0024856	001	5	58.8	15	2	10.062	0.006760	0.027038
137	36	Port Penn STP (New Castle Co.)	DE0021539	001	5	54.8	12	2	0.487	0.000327	0.001308
138	37	PSEG-HopeCreek	NJ0025411	461A	5	52.0	11	2	0.000	0.000000	0.000000
139	38	PSEG-HopeCreek	NJ0025411	461C	5	52.0	11	1	0.915	0.000614	0.002457
140	39	PSEG-HopeCreek	NJ0025413	462A	5	52.0	11	2	0.011	0.000007	0.000029
141	40	PSEG-Salem	NJ0005622	485	5	51.0	77	2	0.000	0.000000	0.000000
142	41	PSEG-Salem	NJ0005622	489	5	51.0	77	1	0.984	0.000661	0.002644

Appendix 3

Permit Implications for NPDES Dischargers
resulting from Stage 1 TMDLs for PCBs

The staged approach to establishing TMDLs for PCBs for Zones 2 to 5 of the Delaware Estuary that was presented to interested parties in April 2003 by the regulatory agencies described appropriate NPDES permitting actions that would result following the establishment of the Stage 1 TMDLs by the U.S. Environmental Protection Agency. The criteria that were presented at that time utilized a cumulative loading approach to identify those discharges with the largest loading of penta-PCBs. The criteria have been expanded and refined since that time to include the quality of the penta-PCB data used to develop the loading estimates for the NPDES dischargers.

Approach:

NPDES dischargers (excluding CSOs and MS4s) were divided into two groups based upon the type of analytical method used to measure the 19 penta-PCB congeners, and the number of the penta-PCB congeners that were detected. Five criteria are considered in classifying NPDES point discharges into two groups.

The criteria for grouping the discharges is as follows:

1. Method used:
   a. 1668A
   b. 8082A

2. Discharge consists principally of non-contact cooling water.

3. If Method 1668A was used, the data was submitted at the detection limits specified in the method:
   a. Yes
   b. No

4. Average number of detected penta congeners per sampling event:
   a. 4 or greater
   b. Less than 4

5. Calculated loadings
   a. A discharge using Method 1668A with lower detection limits which is one of a group of discharges whose total cumulative loading is less than 10% of the zone waste load allocation.

Group 1

1. All discharges, except non-contact cooling water discharges, which have detected 4 or more penta PCB congeners per sampling event regardless of the method used and detection limits achieved, with the exception of those discharges using Method 1668A at the method specified detection limits whose cumulative loadings are less than the 10 percent of zone WLAs.

Group 2

1. All discharges with less than 4 congener detected per sampling event.
2. All discharges which have detected 4 or more penta PCB congeners per sampling event using Method 1668A at the method specified detection limits whose cumulative loadings are less than the 10 percent of zone WLAs.
3. All non-contact cooling water, regardless of the number of penta congeners detected, method used, or detection limits.

Permit Requirements:

Federal regulations implementing the NPDES program at 40 CFR Part 122.44(k)(4) allow the use of non-numeric, Best Management Practices-based WQBELs where a BMP approach is the reasonably necessary means to control pollutants to achieve the goals of the Clean Water Act. The uncertainty associated with several elements of the current TMDL development process including the PCB loadings calculations, the model inputs, and the extrapolation from penta-PCBs to total PCBs support this approach for Stage 1. EPA recommends that the groups receive the following permit requirements consisten with state and federal NPDES permit regulations.

Group 1 - Permit requirements will include waste minimization and reduction programs and additional monitoring with Method 1668A. Both requirements will be performed concurrently, and will be imposed when permit is reissued or modified. DRBC may also impose the requirements.

Group 2 - Permit requirements will include waste minimization and reduction programs (WMRP) and additional monitoring with Method 1668A. Monitoring will be performed in the first two years to confirm the presence and concentration of PCB congeners followed by the WMRP in the third year if the monitoring results confirm the concentrations and associated loading estimates for penta-PCBs, or result in loading estimates for other PCB homologs that exceed the individual WLAs for total PCBs for the discharge.

It is recommended that both requirements will be imposed when permit is reissued or modified. DRBC may also impose the requirements for selected discharges (i.e., non-contact cooling water discharges).

Note: Dischargers in both Groups are receiving individual WLAs. Therefore, the sum of all individual WLAs plus the aggregate WLA for CSOs will equal the proportion of the TMDL for each zone that is allocated to WLAs (Zone WLA).

EPA specifically requested comment and additional information during the public comment period regarding the assignment of discharges to each group. Based upon the comments received, no changes to the group assignments were necessary. The draft TMDL document utilizes data from point discharges that were submitted by April 2003. Some dischargers utilized method 1668A for analysis, however the data reported did not adhere to method detection limits specified by the method. Therefore all dischargers which utilized method 1668A were required to re-submit data at the detection limits specified by the method. As of the April date, some dischargers had resubmitted the data , however, there remained a group of dischargers who did not provide the data by April 2003. Many of these dischargers have provided data since April and the resubmitted data has been used to generate revised loadings and number of penta congeners detected (Appendix Tables 3-2 to 3-5). The resubmitted data had essentially two effects. It typically increased the number of detected congeners and changed the loadings estimates for the discharges.

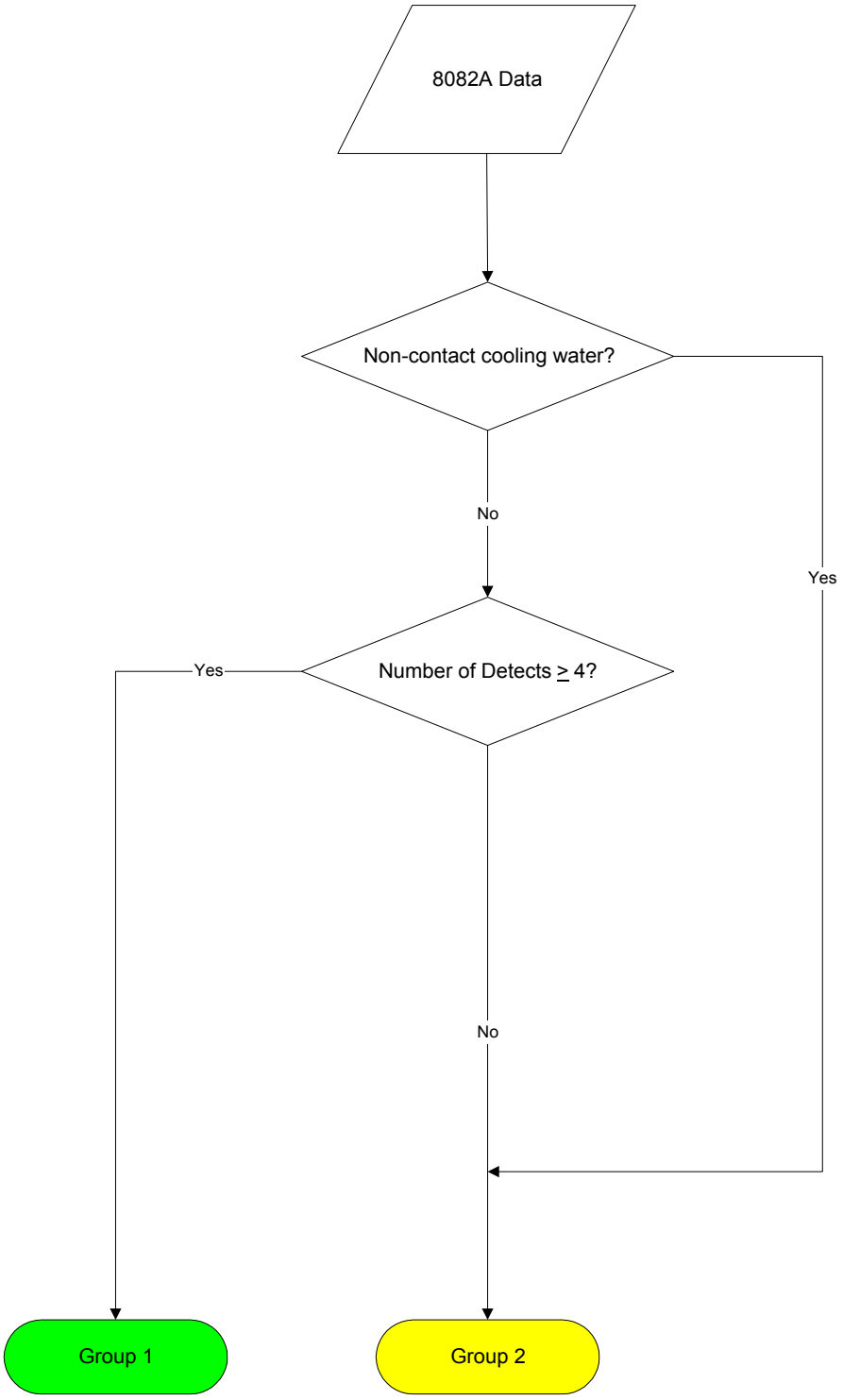
There are however, a small number of dischargers which utilized method 1668A for which we have not received resubmitted data as of September 11, 2003.

As indicated at that time, the identification of significant point source dischargers is a dynamic process that depends on several factors including the availability and extent of PCB congener data for each discharge, the flows used for each discharge, the procedure used to calculate the loadings, the location of the discharge in the estuary, and the proximity and loading of other sources of PCBs. As a result, the list of point source dischargers is subject to change both prior to December 2003 and during the development of the Stage 2 TMDLs.

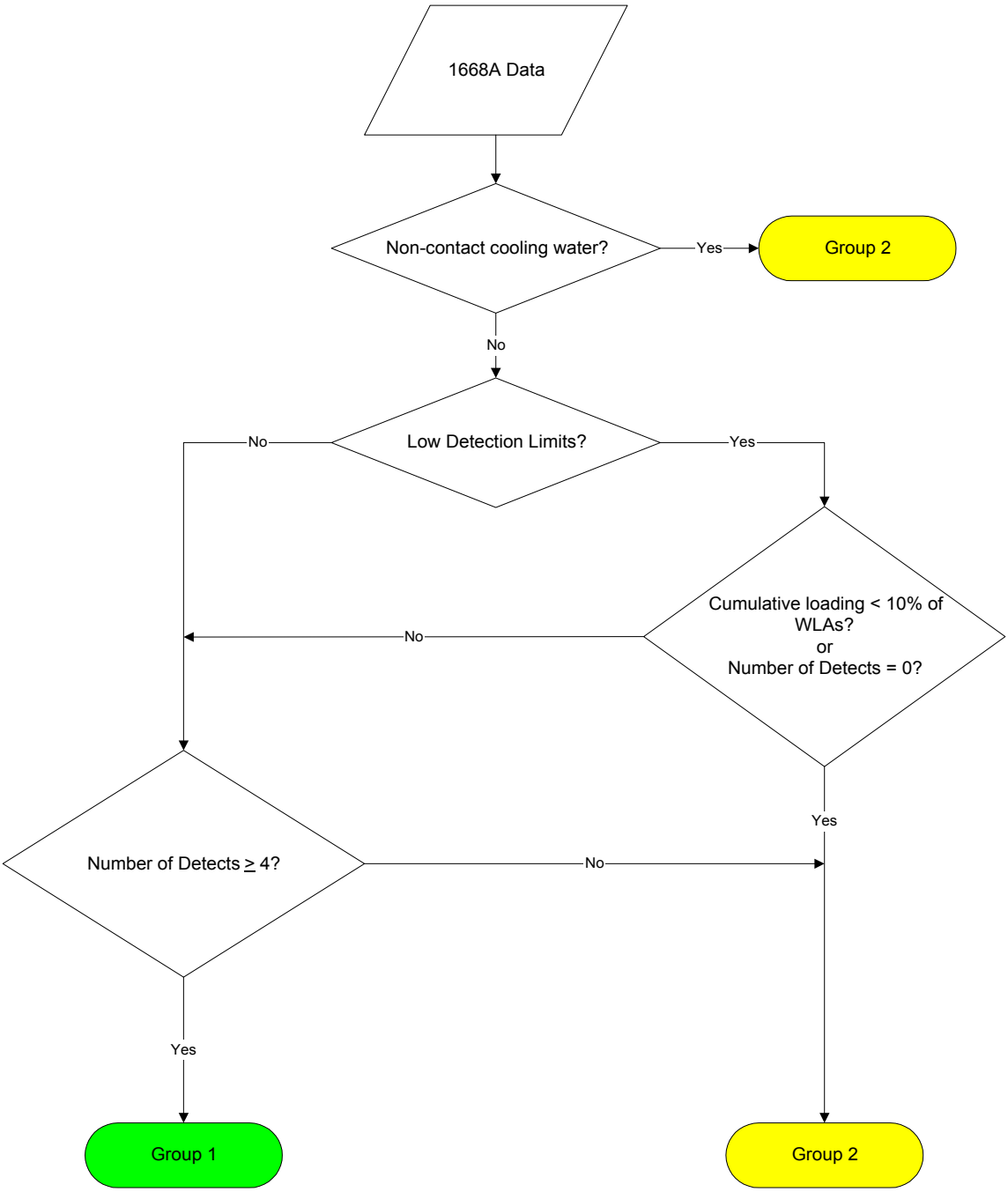
Appendix Tables 3-2 to 3-5 list the discharges assigned to each group as of September 11, 2003. Individual discharges from combined sewer overflows (CSOs) and municipal separate storm sewer systems (MS4s) have not been included in the tables. Table 9 lists the categorical allocation by zone to these two sources. Individual wasteload allocations for the point source dischargers included in the Stage 1 TMDLs are also listed in each table.

Appendix Table 3-1: Distribution of NPDES Discharges to each group in each zone of the Delaware Estuary.

	Number of Discharges				
	Zone 2	Zone 3	Zone 4	Zone 5	Total
Group 1	13	5	25	17	60
Group 2	25	8	25	24	82
Total	38	13	50	41	142



Appendix Figure 3-1: Selection process for permit requirements for NPDES discharges using Method 8082A.



Appendix Figure 3-2: Selection process for permit requirements for NPDES discharges using Method 1668A.

Appendix Table 3-2: Data used to assign the permit requirements for NPDES discharges in Zone 2.

Serial No.	Facility Name	DRBC ID	RM	# of DW SAMPLES	# of WW SAMPLES	Analytical Method 1668a	Submitted data at Method 1668A detection limits	Avg. # of congeners per sampling event (Sept 2003)	Non-Contact Cooling water	Current Loadings (Sept. 2003) mg/day	Cumulative loading percentage to WLA	Potential Group (category)
1	Trenton	NJ0020923-001	132.2	3	3	Yes	Yes	11.2	No	243.612	*	1
2	PSEG-Burlington	NJ0005002-WTPA	117.4	3	1	Yes	Yes	10.3	No	0.929	*	1
3	U.S. Steel	PA0013463-103	127.0	5	1	Yes	Yes	9.7	No	10.056	*	1
4	U.S. Steel	PA0013463-002	127.4	3	1	Yes	Yes	9.5	No	61.390	*	1
5	U.S. Steel	PA0013463-203	127.0	2	1	Yes	Yes	9.3	No	3.787	*	1
6	Rohm&Haas-Bristol	PA0012769-009	117.1	3	0	Yes	Yes	9.0	No	5.710	*	1
7	Riverside Sewerage Authority	NJ0022519-001	108.8	2	0	No	N/A	7.0	No	124.107	*	1
8	Beverly Sewerage Authority	NJ0027481-001	114.7	1	0	No	N/A	7.0	No	18.890	*	1
9	PSEG-Mercer	NJ0004995-441C	130.4	1	0	Yes	Yes	7.0	No	5.010	*	1
10	AFG Industries	NJ0033022-001A	109.6	1	0	No	N/A	6.0	No	10.258	*	1
11	US Pipe & Foundry	NJ0005266-002A	118.1	0	2	No	N/A	5.0	No	0.807	*	1
12	Cinnaminson Sewerage Authority	NJ0024007-001	108.9	3	3	No	N/A	4.0	No	27.980	*	1
13	Riverton Borough	NJ0021610-001	110.8	1	0	No	N/A	4.0	No	3.853	*	1
1	GEON Company (Burlington) Polyone	NJ0004235-001A	120.3	1	1	No	N/A	3.5	No	15.051	*	2
2	Willingboro Municipal Utilities Authority	NJ0023361-001	110.8	3	0	No	N/A	3.0	No	123.392	*	2
3	Hamilton Township	NJ0026301-001	128.0	3	0	No	N/A	2.7	No	220.791	*	2
4	Bristol Borough	PA0027294-001	118.7	3	3	No	N/A	2.3	No	29.383	*	2
5	City of Burlington	NJ0024660-002	117.6	3	0	No	N/A	2.0	No	46.336	*	2
6	Bristol Township	PA0026450-001	116.8	3	3	No	N/A	1.5	No	34.732	*	2
7	AFG Industries	NJ0033022-002	109.4	0	1	No	N/A	1.0	No	0.092	*	2
8	Mt. Holly Municipal Utilities Authority	NJ0024015-001	110.8	3	0	No	N/A	0.7	No	54.904	*	2
9	Delran Sewerage Authority	NJ0023507-001	110.8	3	0	No	N/A	0.3	No	37.419	*	2
10	Burlington Township	NJ0021709-001	117.0	3	0	No	N/A	0.3	No	34.901	*	2
11	Florence Township	NJ0023701-001	121.4	3	0	No	N/A	0.3	No	15.682	*	2
12	Lower Bucks County Municipal Authority	PA0026468-001	121.9	3	3	No	N/A	0.2	No	129.179	*	2

Serial No.	Facility Name	DRBC ID	RM	# of DW SAMPLES	# of WW SAMPLES	Analytical Method 1668a	Submitted data at Method 1668A detection limits	Avg. # of congeners per sampling event (Sept 2003)	Non-Contact Cooling water	Current Loadings (Sept. 2003) mg/day	Cumulative loading percentage to WLA	Potential Group (category)
13	Bordentown Sewerage Authority	NJ0024678-001	128.0	3	3	No	N/A	0.2	No	26.292	*	2
14	Mt. Laurel Municipal Utilities Authority	NJ0025178-001A	110.8	3	0	No	N/A	0.0	No	67.433	*	2
15	Morrisville WWTP	PA0026701-001	132.9	3	0	No	N/A	0.0	No	65.566	*	2
16	Waste Management Grows Landfill	PA0043818-001	125.5	1	0	No	N/A	0.0	No	1.182	*	2
17	MSC Pre Finish Metals	PA0045021-001	130.1	1	0	No	N/A	0.0	No	0.646	*	2
18	Hoeganaes Corp.	NJ0004375-001A	109.4	1	1	No	N/A	0.0	No	0.330	*	2
19	Hoeganaes Corp.	NJ0004375-003A	109.4	0	1	No	N/A	0.0	No	0.000	*	2
20	Exelon-Fairless	PA0057088-001	126.6	3	0	Yes	Yes	9.0	Yes	0.000	*	2
21	PSEG-Mercer	NJ0004995-441A	130.4	3	0	Yes	Yes	6.3	Yes	0.000	*	2
22	Colorite Polymers	NJ0004391-003A	117.0	1	0	Yes	Yes	2.0	No	0.740	65.9	2
23	Colorite Polymers	NJ0004391-002A	117.0	1	1	Yes	Yes	4.0	No	0.008	0.7	2
24	Yates Foil	NJ0004332-002A	128.0	0	1	Yes	Yes	2.0	No	0.000	0.0	2
25	Yates Foil	NJ0004332-001B	128.0	1	0	Yes	Yes	0.0	No	0.070	6.3	2

RM: River Mile
DW: Dry Weather
WW: Wet Weather
* Cumulative loading percentages to Zone WLA (minus portions to CSOs and MS4) are shown up to 100 percent.

Appendix Table 3-3: Data used to assign the permit requirements for NPDES discharges in Zone 3.

Serial No.	Facility Name	DRBC ID	RM	# of DW SAMPLES	# of WW SAMPLES	Analytical Method 1668a	Submitted data at Method 1668A detection limits	Avg. # of congeners per sampling event (Sept 2003)	Non-Contact Cooling water	Current Loadings (Sept. 2003) mg/day	Cumulative loading percentage to WLA	Potential Group (category)
1	PWD-NE	PA0026689-001	104.1	3	3	Yes	Yes	10.5	No	1238.662	*	1
2	CCMUA	NJ0026182-001	98.0	3	3	Yes	Yes	10.0	No	818.459	*	1
3	Exelon-Delaware	PA0011622-002	101.2	3	0	Yes	Yes	9.7	No	0.655	92.5	1
4	PWD-SE	PA0026662-001	96.8	3	3	Yes	Yes	9.7	No	657.721	*	1
5	Rohm&Haas-Philadelphia	PA0012777-003	106.1	1	0	Yes	Yes	7.0	No	2.175	*	1
1	NGC Industries	NJ0004669-001A	104.4	1	1	No	N/A	0.0	No	1.528	*	2
2	Palmyra Borough	NJ0024449-001	107.7	1	0	No	N/A	0.0	No	19.235	*	2
3	Exelon-Delaware	PA0011622-006	101.1	3	0	Yes	Yes	9.3	Yes	0.000	*	2
4	Rohm&Haas-Philadelphia	PA0012777-001	106.1	3	1	Yes	Yes	3.8	No	15.974	*	2
5	Citgo Petroleum	NJ0131342-001A	103.4	1	0	Yes	No	0.0	No	0.012	*	2
6	Rohm&Haas-Philadelphia	PA0012777-007	106.1	1	0	Yes	Yes	6.0	No	0.003	0.4	2
7	Exelon-Delaware	PA0011622-004	101.2	0	1	Yes	Yes	11.0	No	0.011	1.8	2
8	Exelon-Delaware	PA0011622-001	101.2	0	1	Yes	Yes	12.0	No	0.044	7.5	2

RM: River Mile
DW: Dry Weather
WW: Wet Weather
* Cumulative loading percentages to Zone WLA (minus portions to CSOs and MS4) are shown up to 100 percent.

Appendix Table 3-4: Data used to assign the permit requirements for NPDES discharges in Zone 4.

Serial No.	Facility Name	DRBC ID	RM	# of DW SAMPLES	# of WW SAMPLES	Analytical Method 1668a	Submitted data at Method 1668A detection limits	Avg. # of congeners per sampling event (Sept 2003)	Non-Contact Cooling water	Current Loadings (Sept. 2003) mg/day	Cumulative loading percentage to WLA	Potential Group (category)
1	Dupont-Repauno	NJ0004219-007	86.6	0	1	No	N/A	12.0	No	1.433	*	1
2	Exelon-Eddystone	PA0013716-001	85.2	0	1	Yes	Yes	12.0	No	0.064	14.2	1
3	Dupont-Repauno	NJ0004219-001A	85.6	3	1	Yes	Yes	11.5	No	80.773	*	1
4	Boeing	PA0013323-002	85.4	1	1	Yes	Yes	11.5	No	158.353	*	1
5	Kvaerner	PA0057690-019	92.8	0	1	Yes	Yes	11.0	No	0.100	57.0	1
6	Kvaerner	PA0057690-021	92.8	0	1	Yes	Yes	11.0	No	0.100	73.3	1
7	Boeing	PA0013323-001	85.2	1	0	Yes	Yes	11.0	No	29.068	*	1
8	PWD-SW	PA0026671-001	90.7	3	3	Yes	Yes	10.8	No	1020.466	*	1
9	Valero Refining	NJ0005029-001A	87.7	4	1	Yes	Yes	10.6	No	99.473	*	1
10	Exelon-Eddystone	PA0013716-005	85.2	0	1	Yes	Yes	10.0	No	0.509	*	1
11	Ausimont	NJ0005185-001A	90.7	0	1	Yes	Yes	10.0	No	0.840	*	1
12	Boeing	PA0013323-003	85.2	0	1	Yes	Yes	9.0	No	0.404	*	1
13	Boeing	PA0013323-016	85.4	0	1	Yes	Yes	8.0	No	0.149	97.5	1
14	Boeing	PA0013323-007	85.2	0	1	Yes	Yes	8.0	No	0.235	*	1
15	Tinicum Township	PA0028380-001	85.4	3	3	Yes	Yes	8.0	No	15.450	*	1
16	Safety Kleen	NJ0005240-002A	79.8	0	1	No	N/A	7.0	No	3.512	*	1
17	Kvaerner	PA0057690-012	92.7	3	0	Yes	Yes	7.0	No	22.608	*	1
18	DELCORA	PA0027103-001	80.6	3	3	Yes	Yes	6.7	No	309.423	*	1
19	GCUA	NJ0024686-001	88.4	5	0	Yes	Yes	6.4	No	113.497	*	1
20	ConocoPhillips	PA0012637-008	80.2	0	1	No	N/A	6.0	No	0.111	*	1
21	Metro Machine	PA0057479-DD2	93.2	4	0	No	N/A	6.0	No	49.040	*	1
22	Hercules	NJ0005134-001A	87.5	1	1	Yes	Yes	6.0	No	4.120	*	1
23	Kimberly Clark	PA0013081-029	83.2	0	2	Yes	Yes	5.5	No	0.086	40.6	1
24	ConocoPhillips	PA0012637-007	80.2	0	1	No	N/A	5.0	No	0.511	*	1
25	Ausimont	NJ0005185-002A	90.7	1	0	Yes	Yes	5.0	No	0.077	26.7	1

Serial No.	Facility Name	DRBC ID	RM	# of DW SAMPLES	# of WW SAMPLES	Analytical Method 1668a	Submitted data at Method 1668A detection limits	Avg. # of congeners per sampling event (Sept 2003)	Non-Contact Cooling water	Current Loadings (Sept. 2003) mg/day	Cumulative loading percentage to WLA	Potential Group (category)
1	ConocoPhillips	PA0012637-006	80.2	0	1	No	N/A	3.0	No	0.029	*	2
2	Coastal Mart / Coastal Eagle Point Oil	NJ0005401-003A	94.7	0	1	No	N/A	2.0	No	0.006	*	2
3	ConocoPhillips	PA0012637-002	80.2	3	1	No	N/A	1.5	Yes	0.000	*	2
4	ConocoPhillips	PA0012637-101	79.6	3	1	No	N/A	1.0	Yes	0.000	*	2
5	Swedesboro	NJ0022021-001	79.8	1	0	No	N/A	1.0	No	3.296	*	2
6	Logan Township	NJ0027545-001	79.5	1	1	No	N/A	1.0	No	12.114	*	2
7	Safety Kleen	NJ0005240-001A	79.8	3	0	No	N/A	0.7	No	7.440	*	2
8	Metro Machine	PA0057479-DD3	93.1	3	0	No	N/A	0.7	No	17.845	*	2
9	Chevron	NJ0064696-001A	90.5	1	0	No	N/A	0.0	No	0.157	*	2
10	Harrison Township-Mullica Hill	NJ0020532-001	79.8	1	0	No	N/A	0.0	No	6.093	*	2
11	DeGuessa-Huls Corp.	PA0051713-001	82.2	1	0	No	N/A	0.0	No	9.063	*	2
12	Air Products	NJ0004278-001A	88.2	1	0	No	N/A	0.0	No	10.041	*	2
13	Greenwich Township	NJ0030333-001	87.0	1	0	No	N/A	0.0	No	12.110	*	2
14	ConocoPhillips	PA0012637-201	79.6	3	0	No	N/A	0.0	No	48.580	*	2
15	Coastal Mart / Coastal Eagle Point Oil	NJ0005401-001A	94.3	3	0	No	N/A	0.0	No	55.368	*	2
16	Exelon-Eddystone	PA0013716-008	85.2	4	0	Yes	Yes	11.8	Yes	0.000	*	2
17	Exelon-Eddystone	PA0013716-007	85.2	3	0	Yes	Yes	11.7	Yes	0.000	*	2
18	Solutia	NJ0005045-001	79.2	3	0	Yes	No	1.3	No	12.228	*	2
19	Colonial Pipeline	NJ0033952-001A	90.5	0	1	Yes	No	0.0	No	0.087	*	2
20	BP Paulsboro	NJ0005584-002A	89.6	0	1	Yes	No	0.0	No	0.352	*	2
21	BP Paulsboro	NJ0005584-003A	89.4	1	0	Yes	No	0.0	No	7.006	*	2
22	Sunoco-PointBreeze	PA0012629-002	92.5	3	3	Yes	No	0.0	No	75.899	*	2
23	Sunoco-GirardPoint	PA0011533-015	92.5	3	3	Yes	No	0.0	No	99.167	*	2
24	Kvaerner	PA0057690-047	92.5	0	1	Yes	Yes	10.0	No	0.005	0.8	2
25	Boeing	PA0013323-008	85.2	0	1	Yes	Yes	13.0	No	0.018	3.7	2

Appendix Table 3-5: Data used to assign the permit requirements for NPDES discharges in Zone 5.

Serial No.	Facility Name	DRBC ID	RM	# of DW SAMPLES	# of WW SAMPLES	Analytical Method 1668a	Submitted data at Method 1668A detection limits	Avg. # of congeners per sampling event (Sept 2003)	Non-Contact Cooling water	Current Loadings (Sept. 2003) mg/day	Cumulative loading percentage to WLA	Potential Group (category)
1	AMTRAK	DE0050962-003	70.7	0	3	Yes	Yes	12.3	No	2.002	*	1
2	AMTRAK	DE0050962-004	70.7	0	3	Yes	Yes	12.0	No	35.822	*	1
3	OxyChem	DE0050911-002	62.2	0	3	Yes	Yes	11.0	No	0.168	16.8	1
4	Conectiv-Deepwater	NJ0005363-017	69.1	0	1	Yes	Yes	11.0	No	0.284	25.9	1
5	PSEG-Salem	NJ0005622-489	51.0	1	0	Yes	Yes	11.0	No	0.984	86.5	1
6	Metachem	DE0020001-003	61.9	0	4	No	N/A	9.5	No	2.176	*	1
7	Metachem	DE0020001-002	61.9	0	3	No	N/A	9.3	No	1.713	*	1
8	Dupont-Edgemoor	DE0000051-004	72.2	0	3	Yes	Yes	9.0	No	0.153	11.5	1
9	Dupont-Edgemoor	DE0000051-001	73.2	3	0	Yes	Yes	8.7	No	32.214	*	1
10	Dupont-ChamberWorks	NJ0005100-662	69.8	3	0	Yes	Yes	8.7	No	102.854	*	1
11	Dupont-ChamberWorks	NJ0005100-001	69.8	3	0	Yes	Yes	8.0	No	138.476	*	1
12	Motiva	DE0000256-101	61.0	3	3	Yes	Yes	7.5	No	2843.225	*	1
13	OxyChem	DE0050911-001	62.2	3	0	Yes	Yes	7.0	No	1.798	*	1
14	Penns Grove Sewer Authority	NJ0024023-001	70.7	1	0	No	N/A	7.0	No	23.206	*	1
15	PSEG-HopeCreek	NJ0025411-461C	52.0	1	0	Yes	Yes	5.0	No	0.915	55.1	1
16	Motiva	DE0000256-601	61.5	3	0	Yes	Yes	5.0	No	0.000 **	*	1
17	Pennsville Sewerage Authority	NJ0021598-001	65.1	3	0	No	N/A	4.7	No	63.353	*	1
1	Carney's Point	NJ0021601-001	71.3	3	0	No	N/A	2.7	No	10.265	*	2
2	General Chemical	DE0000655-001	77.9	3	3	No	N/A	2.2	Yes	0.000	*	2
3	Port Penn STP (New Castle Co.)	DE0021539-001	54.8	1	0	No	N/A	1.0	No	0.487	*	2
4	Metachem	DE0020001-001	61.5	3	3	No	N/A	1.0	No	81.182	*	2
5	City of Wilmington	DE0020320-001	71.6	3	3	No	N/A	0.8	No	1297.745	*	2
6	Geon Company (Pedricktown) Polyone	NJ0004286-003	75.9	0	1	No	N/A	0.0	No	0.011	*	2
7	Geon Company (Pedricktown) Polyone	NJ0004286-001A	74.9	1	0	No	N/A	0.0	No	1.690	*	2
8	Kaneka Delaware Corp.	DE0000647-001	61.4	1	1	No	N/A	0.0	No	2.266	*	2
9	Delaware City STP (New Castle Co.)	DE0021555-001	60.1	1	0	No	N/A	0.0	No	4.085	*	2

Serial No.	Facility Name	DRBC ID	RM	# of DW SAMPLES	# of WW SAMPLES	Analytical Method 1668a	Submitted data at Method 1668A detection limits	Avg. # of congeners per sampling event (Sept 2003)	Non-Contact Cooling water	Current Loadings (Sept. 2003) mg/day	Cumulative loading percentage to WLA	Potential Group (category)
10	Formosa Plastics	DE0000612-001	61.3	1	0	No	N/A	0.0	No	4.885	*	2
11	City of Salem	NJ0024856-001	58.8	3	0	No	N/A	0.0	No	10.062	*	2
12	PSEG-HopeCreek	NJ0025411-461A	52.0	3	0	Yes	Yes	9.7	Yes	0.000	*	2
13	Dupont-ChamberWorks	NJ0005100-013	68.9	3	0	Yes	Yes	9.3	Yes	0.000	*	2
14	PSEG-Salem	NJ0005622-485	51.0	3	0	Yes	Yes	9.0	Yes	0.000	*	2
15	Motiva	DE0000256-001	61.5	3	0	Yes	Yes	8.7	Yes	0.000	*	2
16	Conectiv-Deepwater	NJ0005363-003A	69.1	1	0	Yes	Yes	8.0	Yes	0.000	*	2
17	Dupont-ChamberWorks	NJ0005100-011	68.9	1	1	Yes	Yes	11.0	No	0.004	0.1	2
18	Conectiv-DelawareCity	DE0050601-033	61.9	0	3	Yes	Yes	11.7	No	0.005	0.3	2
19	Conectiv-Deepwater	NJ0005363-006	69.1	0	1	Yes	Yes	12.0	No	0.006	0.5	2
20	Conectiv-Edgemoor	DE0000558-041	71.8	0	3	Yes	Yes	10.7	No	0.008	0.7	2
21	PSEG-HopeCreek	NJ0025411-462A	52.0	0	1	Yes	Yes	0.0	No	0.011	1.0	2
22	Conectiv-DelawareCity	DE0050601-034	61.9	0	4	Yes	Yes	11.5	No	0.015	1.5	2
23	Conectiv-Deepwater	NJ0005363-005	69.1	0	1	Yes	Yes	10.0	No	0.035	2.6	2
24	Conectiv-DelawareCity	DE0050601-016	61.9	0	3	Yes	Yes	11.7	No	0.123	6.6	2

RM: River Mile
DW: Dry Weather
WW: Wet Weather
* Cumulative loading percentages to Zone WLA (minus portions to CSOs and MS4) are shown up to 100 percent.
** Flow is set to zero in the loading calculation because DSN 601 is an upstream monitoring point of DSN 101.

Appendix 4

Contaminated Sites and Municipalities with Combined Sewer Overflows (CSOs)
that were evaluated as part of the Stage 1 TMDLs

Appendix Table 4-1: Contaminated Sites evaluated as part of the Stage 1 TMDLs and their estimated Penta-PCB Load.

Facility	Daily penta-PCB Load (kg/day)	Estimate Prepared by
Castle Ford - DE-192	1.4374E-06	EPA
Forbes Steel & Wire Corp. - DE-165	5.1989E-06	EPA
Rogers Corner Dump - DE-246	1.0465E-04	EPA
Industrial Products - DE-030	5.1129E-05	EPA
Chicago Bridge and Iron - DE-038	3.2768E-03	EPA
ABM-Wade, 58th Street Dump - PA-0179	1.9739E-06	EPA
O'Donnell Steel Drum - PA-0305	3.4939E-07	EPA
Conrail-Wayne Junction - PA-215	2.3043E-03	EPA
CONRAIL, Morrisville Lagoons - PA-441*	5.4056E-06	EPA
Pennwalt Corp. - Cornwells Heights - PA-0031*	3.1227E-07	EPA
Front Street Tanker - PA-2298	1.9914E-06	EPA
8th Street Drum - PA-3272	8.9655E-07	EPA
East 10th Street Site - PA-2869	1.0076E-02	EPA
Metal Bank - PA-2119	9.9092E-05	EPA
Lower Darby Creek Area Site - PA-3424	1.8481E-04	EPA
Roebling Steel Co.	4.9609E-05	EPA
Bridgeport Rental & Oil Services (BROS)	5.8140E-04	EPA
Dana Transport Inc.	3.8523E-08	EPA
Harrison Avenue Landfill	6.2542E-03	EPA
Metal Bank groundwater pathway	9.8312E-07	DRBC
AMTRAK Former Refueling Facility	1.3182E-03	DNREC
Gates Engineering	6.8226E-10	DNREC
AMTRAK Wilmington Railyard	1.6238E-03	DNREC
Diamond State Salvage	0.0000E+00	DNREC
NeCastro Auto Salvage	1.2867E-05	DNREC
Hercules Research Center	4.6121E-06	DNREC
Dravo Ship Yard	5.3216E-05	DNREC
DP&L/Congo Marsh	2.7290E-07	DNREC
American Scrap & Waste	7.4230E-04	DNREC
Pusey & Jones Shipyard	1.6033E-06	DNREC
Delaware Car Company	0.0000E+00	DNREC
Bafundo Roofing	1.5692E-04	DNREC
Kreiger Finger Property	1.5828E-04	DNREC
Clayville Dump	0.0000E+00	DNREC
Electric Hose & Rubber	8.8694E-05	DNREC
Penn Del Metal Recycling	1.1407E-04	DNREC
E. 7th Street North & South	5.7992E-05	DNREC
Delaware Compressed Steel	6.2877E-06	DNREC
Newport City Landfill	0.0000E+00	DNREC
DuPont Louviers – MBNA	9.5516E-08	DNREC
North American Smelting Co.	1.2821E-05	DNREC
RSC Realty	3.4113E-05	DNREC
AMTRAK CNOC	0.0000E+00	DNREC
Wilmington Coal Gas – N	2.2378E-06	DNREC

Facility	Daily penta-PCB Load (kg/day)	Estimate Prepared by
Del Chapel Place	2.2515E-06	DNREC
Kruse Playground	1.0643E-06	DNREC
Budd Metal	6.3450E-06	DNREC
Fox Point Park Phase II	1.1708E-04	DNREC
Bensalem Redev LP (Elf Atochem)	1.7561E-05	PADEP

Appendix Table 4-2: Municipalities or Regional Authorities with Combined Sewer Overflows (CSOs) that were evaluated as part of the Stage 1 TMDLs

Municipality/Regional Authority	NPDES Nos.	Zone
City of Philadelphia Water Department	PA0026662 PA0026671 PA0026689	2, 3 and 4
Camden County Municipal Utilities Authority	NJ0108812 NJ0026182	3 and 4
Delaware County Regional Authority (DELCORA)	PA0027103	4
City of Wilmington	DE0020320	5

Appendix 5

Municipalities in Delaware, New Jersey, and Pennsylvania,
designated as Phase II Separate Stormwater Sewer Systems (MS4s)
within urbanized areas in the Delaware River Watershed

Appendix Table 5-1: Municipalities with Separate Stormwater Sewer Systems that have the potential to be included in the waste load allocation (LA) for PCBs for Zones 2 to 5 of the Delaware Estuary.

STATE	COUNTY NAME	MUNICIPALITY NAME
DE	KENT	CAMDEN TOWN
DE	KENT	DOVER CITY
DE	KENT	KENT COUNTY
DE	NEW CASTLE	NEWARK CITY
DE	NEW CASTLE/DE DOT	ARDEN
DE	NEW CASTLE/DE DOT	ARDENTOWN
DE	NEW CASTLE/DE DOT	ARDENCROFT
DE	NEW CASTLE/DE DOT	BELLEFONTE
DE	NEW CASTLE/DE DOT	DELAWARE CITY
DE	NEW CASTLE/DE DOT	ELSMERE
DE	NEW CASTLE/DE DOT	MIDDLETOWN
DE	NEW CASTLE/DE DOT	NEWPORT
DE	NEW CASTLE/DE DOT	NEW CASTLE
DE	NEW CASTLE/DE DOT	ODDESSA
DE	NEW CASTLE/DE DOT	TOWNSEND
DE	NEW CASTLE/DE DOT	CITY OF WILMINGTON
DE	KENT	WYOMING TOWN
NJ	ATLANTIC	BUENA BORO
NJ	ATLANTIC	BUENA VISTA TWP
NJ	BURLINGTON	BEVERLY CITY
NJ	BURLINGTON	BORDENTOWN CITY
NJ	BURLINGTON	BORDENTOWN TWP
NJ	BURLINGTON	BURLINGTON CITY
NJ	BURLINGTON	BURLINGTON TWP
NJ	BURLINGTON	CHESTERFIELD TWP
NJ	BURLINGTON	CINNAMINSON TWP
NJ	BURLINGTON	CINNAMINSON TWP
NJ	BURLINGTON	DELANCO TWP
NJ	BURLINGTON	DELRAN TWP
NJ	BURLINGTON	EASTAMPTON TWP
NJ	BURLINGTON	EDGEWATER PARK TWP
NJ	BURLINGTON	EVESHAM TWP
NJ	BURLINGTON	EVESHAM TWP
NJ	BURLINGTON	FIELDSBORO BORO
NJ	BURLINGTON	FLORENCE TWP
NJ	BURLINGTON	HAINESPORT TWP
NJ	BURLINGTON	LUMBERTON TWP
NJ	BURLINGTON	MANSFIELD TWP
NJ	BURLINGTON	MAPLE SHADE TWP
NJ	BURLINGTON	MEDFORD LAKES BORO
NJ	BURLINGTON	MEDFORD TWP
NJ	BURLINGTON	MOORESTOWN TWP
NJ	BURLINGTON	MOORESTOWN TWP
NJ	BURLINGTON	MOUNT HOLLY TWP

STATE	COUNTY NAME	MUNICIPALITY NAME
NJ	BURLINGTON	MOUNT LAUREL TWP
NJ	BURLINGTON	MOUNT LAUREL TWP
NJ	BURLINGTON	NEW HANOVER TWP
NJ	BURLINGTON	NORTH HANOVER TWP
NJ	BURLINGTON	PALMYRA BORO
NJ	BURLINGTON	PALMYRA BORO
NJ	BURLINGTON	PEMBERTON BORO
NJ	BURLINGTON	PEMBERTON TWP
NJ	BURLINGTON	RIVERSIDE TWP
NJ	BURLINGTON	RIVERTON BORO
NJ	BURLINGTON	SHAMONG TWP
NJ	BURLINGTON	SOUTHAMPTON TWP
NJ	BURLINGTON	SPRINGFIELD TWP
NJ	BURLINGTON	TABERNACLE TWP
NJ	BURLINGTON	TABERNACLE TWP
NJ	BURLINGTON	WESTAMPTON TWP
NJ	BURLINGTON	WILLINGBORO TWP
NJ	BURLINGTON	WOODLAND TWP
NJ	BURLINGTON	WRIGHTSTOWN BORO
NJ	CAMDEN	AUDUBON BORO
NJ	CAMDEN	AUDUBON PARK BORO
NJ	CAMDEN	BARRINGTON BORO
NJ	CAMDEN	BELLMAWR BORO
NJ	CAMDEN	BERLIN BORO
NJ	CAMDEN	BERLIN TWP
NJ	CAMDEN	BERLIN TWP
NJ	CAMDEN	BROOKLAWN BORO
NJ	CAMDEN	CAMDEN CITY
NJ	CAMDEN	CHERRY HILL TWP
NJ	CAMDEN	CLEMENTON BORO
NJ	CAMDEN	COLLINGSWOOD BORO
NJ	CAMDEN	GIBBSBORO BORO
NJ	CAMDEN	GIBBSBORO BORO
NJ	CAMDEN	GIBBSBORO BORO
NJ	CAMDEN	GLOUCESTER CITY
NJ	CAMDEN	GLOUCESTER CITY
NJ	CAMDEN	GLOUCESTER TWP
NJ	CAMDEN	GLOUCESTER TWP
NJ	CAMDEN	HADDON HEIGHTS BORO
NJ	CAMDEN	HADDON TWP (EAST)
NJ	CAMDEN	HADDON TWP (NORTH)
NJ	CAMDEN	HADDON TWP (SOUTH)
NJ	CAMDEN	HADDONFIELD BORO
NJ	CAMDEN	HI-NELLA BORO
NJ	CAMDEN	LAUREL SPRINGS BORO
NJ	CAMDEN	LAWNSIDE BORO
NJ	CAMDEN	LINDENWOLD BORO
NJ	CAMDEN	MAGNOLIA BORO
NJ	CAMDEN	MERCHANTVILLE BORO
NJ	CAMDEN	MOUNT EPHRAIM BORO
NJ	CAMDEN	OAKLYN BORO
NJ	CAMDEN	PENNSAUKEN TWP
NJ	CAMDEN	PINE HILL BORO
NJ	CAMDEN	PINE HILL BORO
NJ	CAMDEN	PINE VALLEY BORO
NJ	CAMDEN	RUNNEMEDE BORO
NJ	CAMDEN	SOMERDALE BORO
NJ	CAMDEN	STRATFORD BORO
NJ	CAMDEN	TAVISTOCK BORO
NJ	CAMDEN	VOORHEES TWP
NJ	CAMDEN	VOORHEES TWP

STATE	COUNTY NAME	MUNICIPALITY NAME
NJ	CAMDEN	VOORHEES TWP
NJ	CAMDEN	VOORHEES TWP
NJ	CAMDEN	WINSLOW TWP
NJ	CAMDEN	WINSLOW TWP
NJ	CAMDEN	WINSLOW TWP
NJ	CAMDEN	WOODLYNNE BORO
NJ	CAPE_MAY	CAPE MAY POINT BORO
NJ	CAPE_MAY	DENNIS TWP
NJ	CAPE_MAY	LOWER TWP
NJ	CAPE_MAY	LOWER TWP
NJ	CAPE_MAY	MIDDLE TWP
NJ	CAPE_MAY	WEST CAPE MAY BORO
NJ	CAPE_MAY	WOODBINE BORO
NJ	CUMBERLAND	BRIDGETON CITY
NJ	CUMBERLAND	COMMERCIAL TWP
NJ	CUMBERLAND	DEERFIELD TWP
NJ	CUMBERLAND	DOWNE TWP
NJ	CUMBERLAND	FAIRFIELD TWP
NJ	CUMBERLAND	GREENWICH TWP
NJ	CUMBERLAND	HOPEWELL TWP
NJ	CUMBERLAND	LAWRENCE TWP
NJ	CUMBERLAND	MAURICE RIVER TWP
NJ	CUMBERLAND	MILLVILLE CITY
NJ	CUMBERLAND	SHILOH BORO
NJ	CUMBERLAND	STOW CREEK TWP
NJ	CUMBERLAND	UPPER DEERFIELD TWP
NJ	CUMBERLAND	VINELAND CITY
NJ	GLOUCESTER	CLAYTON BORO
NJ	GLOUCESTER	DEPTFORD TWP
NJ	GLOUCESTER	DEPTFORD TWP
NJ	GLOUCESTER	DEPTFORD TWP
NJ	GLOUCESTER	EAST GREENWICH TWP
NJ	GLOUCESTER	ELK TWP
NJ	GLOUCESTER	ELK TWP
NJ	GLOUCESTER	ELK TWP
NJ	GLOUCESTER	FRANKLIN TWP
NJ	GLOUCESTER	GLASSBORO BORO
NJ	GLOUCESTER	GLASSBORO BORO
NJ	GLOUCESTER	GREENWICH TWP
NJ	GLOUCESTER	HARRISON TWP
NJ	GLOUCESTER	LOGAN TWP
NJ	GLOUCESTER	LOGAN TWP
NJ	GLOUCESTER	MANTUA TWP
NJ	GLOUCESTER	MONROE TWP
NJ	GLOUCESTER	MONROE TWP
NJ	GLOUCESTER	MONROE TWP
NJ	GLOUCESTER	NATIONAL PARK BORO
NJ	GLOUCESTER	NEWFIELD BORO
NJ	GLOUCESTER	PAULSBORO BORO
NJ	GLOUCESTER	PITMAN BORO
NJ	GLOUCESTER	SOUTH HARRISON TWP
NJ	GLOUCESTER	SOUTH HARRISON TWP
NJ	GLOUCESTER	SWEDESBORO BORO
NJ	GLOUCESTER	WASHINGTON TWP
NJ	GLOUCESTER	WASHINGTON TWP
NJ	GLOUCESTER	WASHINGTON TWP
NJ	GLOUCESTER	WENONAH BORO
NJ	GLOUCESTER	WEST DEPTFORD TWP
NJ	GLOUCESTER	WEST DEPTFORD TWP
NJ	GLOUCESTER	WESTVILLE BORO

STATE	COUNTY NAME	MUNICIPALITY NAME
NJ	GLOUCESTER	WOODBURY CITY
NJ	GLOUCESTER	WOODBURY CITY
NJ	GLOUCESTER	WOODBURY HEIGHTS BORO
NJ	GLOUCESTER	WOOLWICH TWP
NJ	GLOUCESTER	WOOLWICH TWP
NJ	MERCER	HAMILTON TWP
NJ	MERCER	TRENTON CITY
NJ	MERCER	TRENTON CITY
NJ	MERCER	WASHINGTON TWP
NJ	MONMOUTH	ALLENTOWN BORO
NJ	MONMOUTH	MILLSTONE TWP
NJ	MONMOUTH	UPPER FREEHOLD TWP
NJ	OCEAN	JACKSON TWP
NJ	OCEAN	JACKSON TWP
NJ	OCEAN	JACKSON TWP
NJ	OCEAN	LACEY TWP
NJ	OCEAN	MANCHESTER TWP
NJ	OCEAN	PLUMSTED TWP
NJ	SALEM	ALLOWAY TWP
NJ	SALEM	ALLOWAY TWP
NJ	SALEM	CARNEYS POINT TWP
NJ	SALEM	ELMER BORO
NJ	SALEM	ELSINBORO TWP
NJ	SALEM	LOWER ALLOWAYS CREEK TWP
NJ	SALEM	LOWER ALLOWAYS CREEK TWP
NJ	SALEM	LOWER ALLOWAYS CREEK TWP
NJ	SALEM	MANNINGTON TWP
NJ	SALEM	OLDMANS TWP
NJ	SALEM	PENNS GROVE BORO
NJ	SALEM	PENNSVILLE TWP
NJ	SALEM	PILESGROVE TWP
NJ	SALEM	PITTSGROVE TWP
NJ	SALEM	QUINTON TWP
NJ	SALEM	QUINTON TWP
NJ	SALEM	SALEM CITY
NJ	SALEM	UPPER PITTSGROVE TWP
NJ	SALEM	UPPER PITTSGROVE TWP
NJ	SALEM	WOODSTOWN BORO

STATE	COUNTY NAME	MUNICIPALITY NAME
PA	BUCKS	BENSALEM TWP.
PA	BUCKS	BRISTOL BORO
PA	BUCKS	BRISTOL TWP.
PA	BUCKS	BUCKINGHAM TWP.
PA	BUCKS	BUCKS COUNTY
PA	BUCKS	CHALFONT BORO
PA	BUCKS	DOYLESTOWN BORO
PA	BUCKS	DOYLESTOWN TWP.
PA	BUCKS	EAST ROCKHILL TWP.
PA	BUCKS	FALLS TWP.
PA	BUCKS	HILLTOWN TWP.
PA	BUCKS	HULMEVILLE BORO
PA	BUCKS	IVYLAND BORO
PA	BUCKS	LANGHORNE BORO
PA	BUCKS	LANGHORNE MANOR BORO
PA	BUCKS	LOWER MAKEFIELD TWP.
PA	BUCKS	LOWER SOUTHAMPTON TWP.
PA	BUCKS	MIDDLETOWN TWP.
PA	BUCKS	MORRISVILLE BORO
PA	BUCKS	NEW BRITAIN BORO
PA	BUCKS	NEW BRITAIN TWP.
PA	BUCKS	NEWTOWN BORO
PA	BUCKS	NEWTOWN TWP.
PA	BUCKS	NORTHAMPTON TWP.
PA	BUCKS	PENNDEL BORO
PA	BUCKS	PERKASIE BORO
PA	BUCKS	PLUMSTEAD TWP.
PA	BUCKS	SELLERSVILLE BORO
PA	BUCKS	SILVERDALE BORO
PA	BUCKS	SOLEBURY TWP.
PA	BUCKS	TULLYTOWN BORO
PA	BUCKS	UPPER MAKEFIELD TWP.
PA	BUCKS	UPPER SOUTHAMPTON TWP.
PA	BUCKS	WARMINSTER TWP.
PA	BUCKS	WARRINGTON TWP.
PA	BUCKS	WARWICK TWP.
PA	BUCKS	WEST ROCKHILL TWP.
PA	BUCKS	WRIGHTSTOWN TWP.
PA	BUCKS	YARDLEY BORO
PA	CHESTER	AVONDALE BORO
PA	CHESTER	BIRMINGHAM TWP.
PA	CHESTER	CALN TWP.
PA	CHESTER	CHARLESTOWN TWP.
PA	CHESTER	CHESTER COUNTY
PA	CHESTER	COATESVILLE CITY
PA	CHESTER	DOWNINGTOWN BORO
PA	CHESTER	EAST BRADFORD TWP.
PA	CHESTER	EAST BRANDYWINE TWP.
PA	CHESTER	EAST CALN TWP.
PA	CHESTER	EAST FALLOWFIELD TWP.
PA	CHESTER	EAST GOSHEN TWP.
PA	CHESTER	EAST MARLBOROUGH TWP.
PA	CHESTER	EAST PIKELAND TWP.
PA	CHESTER	EAST VINCENT TWP.
PA	CHESTER	EAST WHITELAND TWP.
PA	CHESTER	EASTTOWN TWP.
PA	CHESTER	FRANKLIN TWP.
PA	CHESTER	HONEYBROOK TWP.
PA	CHESTER	KENNETT SQUARE BORO
PA	CHESTER	KENNETT TWP.
PA	CHESTER	LONDON BRITAIN TWP.
PA	CHESTER	LONDON GROVE TWP.

STATE	COUNTY NAME	MUNICIPALITY NAME
PA	CHESTER	MALVERN BORO
PA	CHESTER	MODENA BORO
PA	CHESTER	NEW GARDEN TWP.
PA	CHESTER	NEW LONDON TWP.
PA	CHESTER	NEWLIN TWP.
PA	CHESTER	PARKESBURG BORO
PA	CHESTER	PENN TWP.
PA	CHESTER	PENNSBURY TWP.
PA	CHESTER	PHOENIXVILLE BORO
PA	CHESTER	POCOPSON TWP.
PA	CHESTER	SADSBURY TWP.
PA	CHESTER	SCHUYLKILL TWP.
PA	CHESTER	SOUTH COATESVILLE BORO
PA	CHESTER	SPRING CITY BORO
PA	CHESTER	THORNBURY TWP.
PA	CHESTER	TREDYFFRIN TWP.
PA	CHESTER	UPPER OXFORD TWP.
PA	CHESTER	UPPER UWCHLAN TWP.
PA	CHESTER	UWCHLAN TWP.
PA	CHESTER	VALLEY TWP.
PA	CHESTER	WALLACE TWP.
PA	CHESTER	WEST BRADFORD TWP.
PA	CHESTER	WEST BRANDYWINE TWP.
PA	CHESTER	WEST CALN TWP.
PA	CHESTER	WEST CHESTER BORO
PA	CHESTER	WEST GOSHEN TWP.
PA	CHESTER	WEST GROVE BORO
PA	CHESTER	WEST PIKELAND TWP.
PA	CHESTER	WEST SADSBURY TWP.
PA	CHESTER	WEST VINCENT TWP.
PA	CHESTER	WEST WHITELAND TWP.
PA	CHESTER	WESTTOWN TWP.
PA	CHESTER	WILLISTOWN TWP.
PA	DELAWARE	ALDAN BORO
PA	DELAWARE	ASTON TWP.
PA	DELAWARE	BETHEL TWP.
PA	DELAWARE	BROOKHAVEN BORO
PA	DELAWARE	CHADDS FORD TWP.
PA	DELAWARE	CHESTER CITY
PA	DELAWARE	CHESTER HEIGHTS BORO
PA	DELAWARE	CHESTER TWP.
PA	DELAWARE	CLIFTON HEIGHTS BORO
PA	DELAWARE	COLLINGDALE BORO
PA	DELAWARE	COLWYN BORO
PA	DELAWARE	CONCORD TWP.
PA	DELAWARE	DARBY BORO
PA	DELAWARE	DARBY TWP.
PA	DELAWARE	DELAWARE COUNTY
PA	DELAWARE	EAST LANSDOWNE BORO
PA	DELAWARE	EDDYSTONE BORO
PA	DELAWARE	EDGEMONT TWP.
PA	DELAWARE	FOLCROFT BORO
PA	DELAWARE	GLENOLDEN BORO
PA	DELAWARE	HAVERFORD TWP.
PA	DELAWARE	LANSDOWNE BORO
PA	DELAWARE	LOWER CHICHESTER TWP.
PA	DELAWARE	MARCUS HOOK BORO
PA	DELAWARE	MARPLE TWP.
PA	DELAWARE	MEDIA BORO
PA	DELAWARE	MIDDLETOWN TWP.
PA	DELAWARE	MILLBOURNE BORO
PA	DELAWARE	MORTON BORO

STATE	COUNTY NAME	MUNICIPALITY NAME
PA	DELAWARE	NETHER PROVIDENCE TWP.
PA	DELAWARE	NEWTOWN TWP.
PA	DELAWARE	NORWOOD BORO
PA	DELAWARE	PARKSIDE BORO
PA	DELAWARE	PROSPECT PARK BORO
PA	DELAWARE	RADNOR TWP.
PA	DELAWARE	RIDLEY PARK BORO
PA	DELAWARE	RIDLEY TWP.
PA	DELAWARE	ROSE VALLEY BORO
PA	DELAWARE	RUTLEDGE BORO
PA	DELAWARE	SHARON HILL BORO
PA	DELAWARE	SPRINGFIELD TWP.
PA	DELAWARE	SWARTHMORE BORO
PA	DELAWARE	THORNBURY TWP.
PA	DELAWARE	TINICUM TWP.
PA	DELAWARE	TRAINER BORO
PA	DELAWARE	UPLAND BORO
PA	DELAWARE	UPPER CHICHESTER TWP.
PA	DELAWARE	UPPER DARBY TWP.
PA	DELAWARE	UPPER PROVIDENCE TWP.
PA	DELAWARE	YEADON BORO
PA	MONTGOMERY	ABINGTON TWP.
PA	MONTGOMERY	AMBLER BORO
PA	MONTGOMERY	BRIDGEPORT BORO
PA	MONTGOMERY	BRYN ATHYN BORO
PA	MONTGOMERY	CHELTENHAM TWP.
PA	MONTGOMERY	COLLEGEVILLE BORO
PA	MONTGOMERY	CONSHOHOCKEN BORO
PA	MONTGOMERY	EAST GREENVILLE BORO
PA	MONTGOMERY	EAST NORRITON TWP.
PA	MONTGOMERY	FRANCONIA TWP.
PA	MONTGOMERY	GREEN LANE BORO
PA	MONTGOMERY	HATBORO BORO
PA	MONTGOMERY	HATFIELD BORO
PA	MONTGOMERY	HATFIELD TWP.
PA	MONTGOMERY	HORSHAM TWP.
PA	MONTGOMERY	JENKINTOWN BORO
PA	MONTGOMERY	LANSDALE BORO
PA	MONTGOMERY	LIMERICK TWP.
PA	MONTGOMERY	LOWER FREDERICK TWP.
PA	MONTGOMERY	LOWER GWYNEDD TWP.
PA	MONTGOMERY	LOWER MERION TWP.
PA	MONTGOMERY	LOWER MORELAND TWP.
PA	MONTGOMERY	LOWER POTTSGROVE TWP.
PA	MONTGOMERY	LOWER PROVIDENCE TWP.
PA	MONTGOMERY	LOWER SALFORD TWP.
PA	MONTGOMERY	MARLBOROUGH TWP.
PA	MONTGOMERY	MONTGOMERY TWP.
PA	MONTGOMERY	NARBERTH BORO
PA	MONTGOMERY	NORRISTOWN BORO
PA	MONTGOMERY	NORTH WALES BORO
PA	MONTGOMERY	PENNSBURG BORO
PA	MONTGOMERY	PERKIOMEN TWP.
PA	MONTGOMERY	PLYMOUTH TWP.
PA	MONTGOMERY	RED HILL BORO
PA	MONTGOMERY	ROCKLEDGE BORO
PA	MONTGOMERY	ROYERSFORD BORO
PA	MONTGOMERY	SALFORD TWP.
PA	MONTGOMERY	SCHWENKSVILLE BORO
PA	MONTGOMERY	SKIPPACK TWP.
PA	MONTGOMERY	SOUDERTON BORO
PA	MONTGOMERY	SPRINGFIELD TWP.

STATE	COUNTY NAME	MUNICIPALITY NAME
PA	MONTGOMERY	TELFORD BORO
PA	MONTGOMERY	TOWAMENCIN TWP.
PA	MONTGOMERY	TRAPPE BORO
PA	MONTGOMERY	UPPER DUBLIN TWP.
PA	MONTGOMERY	UPPER FREDERICK TWP.
PA	MONTGOMERY	UPPER GWYNEDD TWP.
PA	MONTGOMERY	UPPER HANOVER TWP.
PA	MONTGOMERY	UPPER MERION TWP.
PA	MONTGOMERY	UPPER MORELAND TWP.
PA	MONTGOMERY	UPPER PROVIDENCE TWP.
PA	MONTGOMERY	UPPER SALFORD TWP.
PA	MONTGOMERY	WEST CONSHOHOCKEN BORO.
PA	MONTGOMERY	WEST NORRITON TWP.
PA	MONTGOMERY	WHITEMARSH TWP.
PA	MONTGOMERY	WHITPAIN TWP.
PA	MONTGOMERY	WORCESTER TWP.
PA	PHILADELPHIA	PHILADELPHIA CITY
PA	PHILADELPHIA	PHILADELPHIA COUNTY

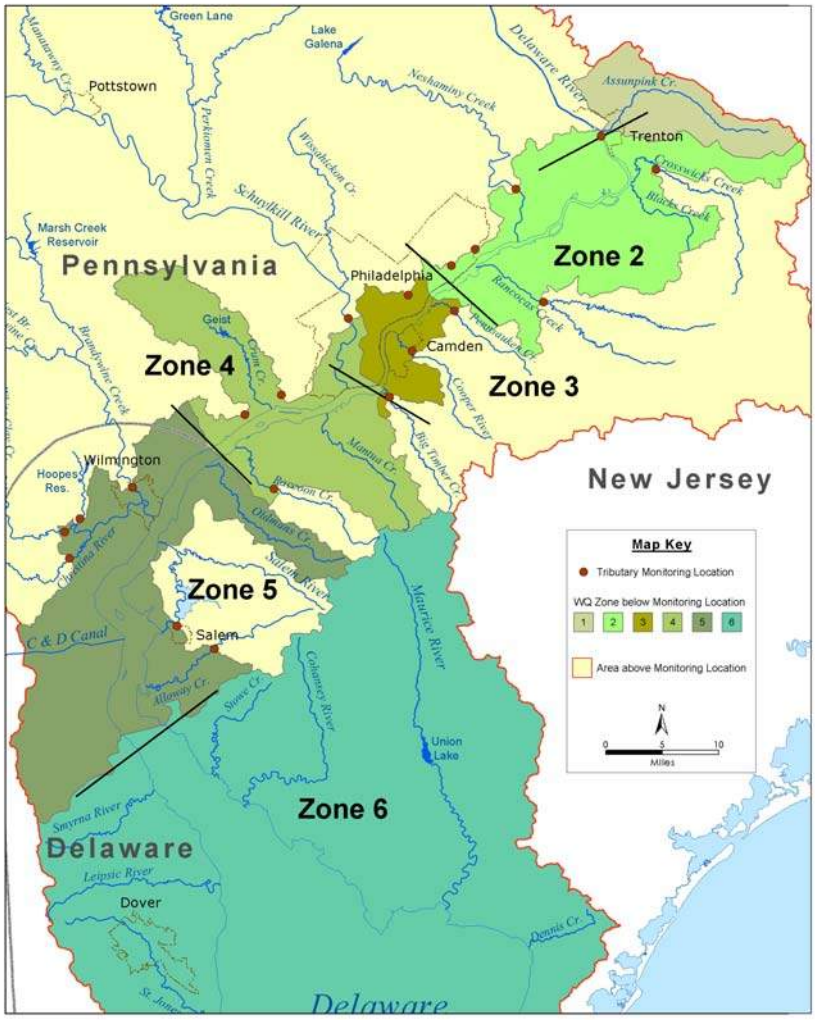
Appendix 6

Wasteload Allocation Estimates for Municipal Separate Storm Sewer Systems (MS4s)

A November 22, 2002 EPA Memorandum entitled, "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm water Source and NPDES Permit Requirements Based on Those WLAs" clarified existing regulatory requirements for municipal separate storm sewer systems (MS4s) connected with TMDLs, i.e. that where a TMDL has been developed, the MS4 community must receive a WLA rather than a LA. In the draft TMDL document, EPA identified two options for assigning MS4 WLAs. This Appendix outlines the method used to assign each zone with a single categorical WLA for multiple point sources of storm water discharges.

EPA's regulations require NPDES-regulated storm water discharges to be addressed by the WLA component of a TMDL. In order to estimate the portion of the Load Allocation (LA) that corresponds to separate storm sewer systems (MS4) so that these MS4 allocations could be converted to Wasteload Allocations (WLAs) we considered the land uses within each zone, downstream of the tributary monitoring locations. In order to be consistent with the WLAs, we only considered MS4's likely to discharge to the mainstem Delaware or tidal portions of tributaries. Since delineated MS4 service areas have not been identified for many communities, we assumed that approximately 90% of areas categorized as *High Intensity Residential* area, and 70% of areas categorized as either *Low Intensity Residential* or *Commercial / Industrial / Transportation* are served by MS4 systems. We assumed that the entire PCB load associated with MS4s would correspond to the Non-Point Source Runoff category previously defined. Appendix Figure 6-1 below shows the Non-Point Source area contributing to each Zone. Zone 6 is not included in this analysis, since no Zone 6 WLAs are being developed as part of this TMDL.

Appendix Figure 6-1. Non-point Source Areas by Zone.



In order to determine what portion of Non-Point Source Runoff volume corresponds to MS4 service areas, we computed both MS4 and non-MS4 runoff volumes for the 19 month continuous simulation period using the methodologies contained in *Urban Hydrology for Small Watersheds, Technical Release 55,* Soil Conservation Service (currently, Natural Resources Conservation Service), June 1986. Appendix Table 6-1 below shows the computation of the composite Curve Number (CN) for both the MS4 and non-MS4 areas by zone. Land use categories corresponding to wetlands and open water were not included in the calculation of composite CNs.

Appendix Table 6-1. Computation of Composite Curve Numbers for MS4 and Non-MS4 Areas by Zone.

	Land Use Value	Land Use Category	area (m^2)	CN	% MS4	MS4 Area (m^2)	Non-MS4 Area (M2)	CN x MS4 Area	Composite MS4 CN	CN x Non-MS4 Area	Composite Non-MS4 CN
zone 2	21	Low Intensity Residential	149,942,000	80	70.00%	104,959,400	44,982,600	8,396,752,000		3,598,608,000	
	22	High Intensity Residential	35,470,900	90	90.00%	31,923,810	3,547,090	2,873,142,900		319,238,100	
	23	Commercial/Industrial/Transportation	51,066,300	94	70.00%	35,746,410	15,319,890	3,360,162,540		1,440,069,660	
	32	Quarries/Strip Mines/Gravel Pits	13,057,200	95	0.00%	0	13,057,200	0		1,240,434,000	
	33	Transitional	3,193,340	91	0.00%	0	3,193,340	0		290,593,940	
	41	Deciduous Forest	110,273,000	76	0.00%	0	110,273,000	0		8,380,748,000	
	42	Evergreen Forest	3,564,690	76	0.00%	0	3,564,690	0		270,916,440	
	43	Mixed Forest	52,161,800	76	0.00%	0	52,161,800	0		3,964,296,800	
	81	Pasture/Hay	180,362,000	79	0.00%	0	180,362,000	0		14,248,598,000	
	82	Row Crops	54,280,000	82	0.00%	0	54,280,000	0		4,450,960,000	
	85	Urban/Recreational Grasses	8,976,360	79	0.00%	0	8,976,360	0		709,132,440	
			662,347,590			172,629,620	489,717,970	14,630,057,440	84.75	38,913,595,380	79.46
zone3	21	Low Intensity Residential	43,022,200	80	70.00%	30,115,540	12,906,660	2,409,243,200		1,032,532,800	
	22	High Intensity Residential	52,358,200	90	90.00%	47,122,380	5,235,820	4,241,014,200		471,223,800	
	23	Commercial/Industrial/Transportation	37,042,800	94	70.00%	25,929,960	11,112,840	2,437,416,240		1,044,606,960	
	32	Quarries/Strip Mines/Gravel Pits	104,987	95	0.00%	0	104,987	0		9,973,765	
	33	Transitional	8,749	91	0.00%	0	8,749	0		796,149	
	41	Deciduous Forest	8,324,080	76	0.00%	0	8,324,080	0		632,630,080	
	42	Evergreen Forest	67,075	76	0.00%	0	67,075	0		5,097,685	
	43	Mixed Forest	2,448,720	76	0.00%	0	2,448,720	0		186,102,720	
	81	Pasture/Hay	1,076,110	79	0.00%	0	1,076,110	0		85,012,690	
	82	Row Crops	1,238,450	82	0.00%	0	1,238,450	0		101,552,900	
	85	Urban/Recreational Grasses	2,780,200	79	0.00%	0	2,780,200	0		219,635,800	
			148,471,571			103,167,880	45,303,691	9,087,673,640	88.09	3,789,165,349	83.64
zone4	21	Low Intensity Residential	118,875,000	80	70.00%	83,212,500	35,662,500	6,657,000,000		2,853,000,000	
	22	High Intensity Residential	30,808,700	90	90.00%	27,727,830	3,080,870	2,495,504,700		277,278,300	
	23	Commercial/Industrial/Transportation	65,573,900	94	70.00%	45,901,730	19,672,170	4,314,762,620		1,849,183,980	
	32	Quarries/Strip Mines/Gravel Pits	1,148,050	95	0.00%	0	1,148,050	0		109,064,750	
	33	Transitional	4,413,330	91	0.00%	0	4,413,330	0		401,613,030	
	41	Deciduous Forest	143,833,000	76	0.00%	0	143,833,000	0		10,931,308,000	
	42	Evergreen Forest	4,900,350	76	0.00%	0	4,900,350	0		372,426,600	
	43	Mixed Forest	46,163,000	76	0.00%	0	46,163,000	0		3,508,388,000	
	81	Pasture/Hay	98,138,200	79	0.00%	0	98,138,200	0		7,752,917,800	
	82	Row Crops	37,478,300	82	0.00%	0	37,478,300	0		3,073,220,600	
	85	Urban/Recreational Grasses	15,321,200	79	0.00%	0	15,321,200	0		1,210,374,800	
			566,653,030			156,842,060	409,810,970	13,467,267,320	85.87	32,338,775,860	78.91
zone5	21	Low Intensity Residential	86,418,600	80	70.00%	60,493,020	25,925,580	4,839,441,600		2,074,046,400	
	22	High Intensity Residential	12,247,500	90	90.00%	11,022,750	1,224,750	992,047,500		110,227,500	
	23	Commercial/Industrial/Transportation	48,787,700	94	70.00%	34,151,390	14,636,310	3,210,230,660		1,375,813,140	
	32	Quarries/Strip Mines/Gravel Pits	5,088,940	95	0.00%	0	5,088,940	0		483,449,300	
	33	Transitional	1,818,800	91	0.00%	0	1,818,800	0		165,510,800	
	41	Deciduous Forest	151,311,000	76	0.00%	0	151,311,000	0		11,499,636,000	
	42	Evergreen Forest	8,114,110	76	0.00%	0	8,114,110	0		616,672,360	
	43	Mixed Forest	62,097,600	76	0.00%	0	62,097,600	0		4,719,417,600	
	81	Pasture/Hay	141,668,000	79	0.00%	0	141,668,000	0		11,191,772,000	
	82	Row Crops	198,928,000	82	0.00%	0	198,928,000	0		16,312,096,000	
	85	Urban/Recreational Grasses	18,823,700	79	0.00%	0	18,823,700	0		1,487,072,300	
			735,303,950			105,667,160	629,636,790	9,041,719,760	85.57	50,035,713,400	79.47

Using the composite CNs for MS4 and Non-MS4 areas and daily 24-hour precipitation totals, we computed daily runoff volumes. The daily 24-hour precipitation totals are daily means of the recorded totals from the Wilmington, Philadelphia, and Neshaminy precipitation gages. As indicated in Appendix Table 6-2 below, only storm events exceeding the computed initial abstraction (Ia) for each area result in runoff. Similarly, only days with measurable precipitation are included in Appendix Table 6-2. We summed the total runoff depth for the 19-month continuous simulation period and multiplied by the area to compute a total runoff volume. We computed the percentage of the total volume associated with the MS4 areas by dividing the MS4 runoff volume by the total of the MS4 and Non-MS4 runoff volumes. The percentage of the MS4 runoff volume is shown at the bottom of Appendix Table 6-2 below.

Appendix Table 6-2. Computation of Runoff Volume Generated by MS4s.

		Zone 2		Zone 3		Zone 4		Zone 5	
		MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4
	CN	84.75	79.46	88.09	79.46	88.09	83.64	85.87	79.47
	Area (m^2)	172,629,620	489,717,970	103,167,880	45,303,691	156,842,060	409,810,970	105,667,160	629,636,790
	Area (ft^2)	1,858,169,693	5,271,280,154	1,110,489,775	487,644,849	1,688,233,818	4,411,168,398	1,137,391,800	6,777,353,740
	S	1.80	2.58	1.35	2.58	1.35	1.96	1.65	2.58
	Ia	0.36	0.52	0.27	0.52	0.27	0.39	0.33	0.52
Date	Precip. (in)	Runoff (in)							
9/4/2001	0.72	0.060	0.015	0.112	0.015	0.112	0.047	0.075	0.015
9/10/2001	0.02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/14/2001	0.63	0.036	0.005	0.077	0.005	0.077	0.027	0.047	0.005
9/20/2001	0.31	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000
9/21/2001	0.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/24/2001	0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/25/2001	0.22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
...	...	...	...	...	...	...	...	...	...
2/21/2003	0.20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2/22/2003	1.96	0.751	0.515	0.936	0.515	0.936	0.696	0.809	0.515
2/23/2003	0.30	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000
2/27/2003	0.02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2/28/2003	0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3/2/2003	0.83	0.099	0.035	0.165	0.035	0.165	0.082	0.118	0.035
3/5/2003	0.34	0.000	0.000	0.003	0.000	0.003	0.000	0.000	0.000
3/6/2003	0.60	0.029	0.003	0.066	0.003	0.066	0.021	0.039	0.003
3/13/2003	0.04	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3/16/2003	0.04	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3/17/2003	0.04	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3/20/2003	1.55	0.472	0.293	0.620	0.293	0.620	0.429	0.518	0.294
3/21/2003	0.08	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3/26/2003	0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3/28/2003	0.03	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3/29/2003	0.34	0.000	0.000	0.003	0.000	0.003	0.000	0.000	0.000
3/30/2003	0.20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Runoff (in)	4.997	2.397	7.866	2.397	7.866	4.293	5.818	2.399
	Runoff (ft)	0.416447206	0.199708498	0.655529917	0.199708498	0.655529917	0.357726343	0.484831079	0.199887138
	Runoff (ft3)	773,829,578	1,052,719,443	727,959,270	97,386,821	1,106,687,774	1,577,991,140	551,442,894	1,354,705,843
% of Runoff from MS4		**42%**		**88%**		**41%**		**29%**	

The current MS4 loads for the cycling one year period are calculated using the runoff volume ratio as shown in Appendix Table 6-2 and non-point source runoff loads. Then, proportions of MS4 loads to total loads are calculated. Note that the total loads are defined as sum of point and non-point source loads excluding Trenton and Schuylkill boundary and contaminated site loads for this calculation. The existing MS4 load proportions are summarized in Appendix Table 6-3.

Appendix Table 6-3. Existing loads and proportions of MS4 loads by Zone for the cycling one year period.

Estuary Zone	NPS plus MS4 Loads	MS4 Loads	Total Loads* (Point plus Non-Point sources)	Proportion of MS4 loads to Total Loads*
	kg/365days	kg/365days	kg/365days	%
2	1.545	1.545 x 42 % = 0.649	2.688	24.15
3	0.275	0.275 x 88 % = 0.242	2.376	10.17
4	1.186	1.186 x 41 % = 0.486	3.820	12.73
5	1.129	1.129 x 29 % = 0.327	3.409	9.61

** Total loads, indicated here, are defined excluding Trenton and Schuylkill boundary and contaminated sites loads.*

Appendix Table 6-4 shows the Zone TMDLs excluding Trenton and Schuylkill boundary loads. In addition, the Table contains Zone specific MOS, allocations to contaminated site loads and allocatable portion to the rest of point and non-point source categories. The allocations to MS4s are calculated by proportion of MS4 loads to Total Loads shown in Appendix Table 6-3 and Allocatable portion to the rest of categories shown in Appendix Table 6-4. Summary of categorical WLAs and LAs are presented in Table 9 and Table 10 of the main text.

Appendix Table 6-4. Summary of the Zone TMDLs for penta-PCBs excluding Trenton and Schuylkill boundaries.

Estuary Zone	TMDL	MOS	Contaminated Site	Allocatable portion to the rest of categories	Allocations to MS4s
	mg/day	mg/day	mg/day	mg/day	mg/day
Zone 2	6.613	0.331	0.026	6.256	1.511
Zone 3	4.455	0.223	2.416	1.816	0.185
Zone 4	4.569	0.228	1.651	2.689	0.342
Zone 5	12.016	0.601	5.250	6.165	0.592

Municipal Stormwater Management Plan

CITY OF BURLINGTON

MUNICIPAL STORMWATER MANAGEMENT PLAN

PREPARED FOR:

CITY OF BURLINGTON
525 High Street
Burlington, New Jersey 08016

NJPES #NJG 0153109
PI ID # 171529
Burlington County

DRAFT: **MARCH 23, 2005**
FINAL: **APRIL 27, 2005**
REVISED: **AUGUST 1, 2006**

_____
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APPENDIXES

ATTACHMENT 1: Referred to on pages 11 and 19, the City of Burlington Stormwater Ordinance has been adopted and can be found in the Municipal Code on the Clerk's page of the City Website, www.burlingtonnj.us

1.0 Introduction - City of Burlington Stormwater Management Plan

This Municipal Stormwater Management Plan documents the strategy for the City of Burlington to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:1 4A-25 Municipal Stormwater Regulations. This plan contains all of the elements required as part of the municipal Tier A MS4 permit as described in N.J.A.C. 7:8 Section 4.2 of the Stormwater Management Rules. The City of Burlington does not contain more than one square mile of open space and agricultural land. As described in schedule for adoption of the stormwater management plan and ordinances N.J.A.C. 7: 8 Section 4.3, an exemption will be documented for the completion of elements N.J.A.C. 7:8-4.2 (c) 8 & 9 as part of this Stormwater Management Plan.

An aerial view of the City, which illustrates the major waterways, is provided in the Appendix, **Map 1**, **Existing Conditions**. This Municipal Stormwater Management Plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. Note that the definition of major development for the Stormwater Management Plan does not include the increase of impervious area by more than one quarter acre. The implementation of these standards into the City of Burlington Master Plan is intended to minimize the adverse impact of stormwater runoff on water quality and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan stresses best management practices with long-term operation and maintenance measures for existing and future stormwater facilities that perform well in the flood zone conditions within the City of Burlington and can be maintained by the City Public Works Department.

The City of Burlington Land Use Ordinance does not specifically address stormwater management design standards. Residential development is currently required to conform to the most current stormwater management requirements of N.J.A.C. 7:8 5.4 and 5.5 through conformance to the Residential Site Improvement Standards (RSIS). Under the review process, all non-residential development has been requested to meet water quality design standards by the municipal engineer.

For commercial development of less than one acre, the City of Burlington has the discretion to determine the stormwater management requirements. For non-residential development of less than one acre in size, the stormwater management system will be evaluated by the municipal engineer based on the location of the site in relation to the flood plain, the location of the site in relation to the Kennedy lake system that provides water quality, and the recharge requirements based on the definition under NJAC 7:8-1.2 of "urban redevelopment area" as a previously developed portion of an area delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1).

The final component of Burlington City Stormwater Management Plan is a mitigation plan that identifies what measures are necessary to offset the deficit created by granting an exemption from the stormwater design and performance standards. Stormwater management projects are identified according to sub-drainage area within the City of Burlington as alternative projects if a development project cannot meet the stormwater standards.

This plan has been prepared in conformance with the Management Plan for the Rancocas Creek Watershed dated March 2003 prepared by the Burlington County Department of Resource Conservation. This plan will be reviewed and approved by the Burlington County Planning Department in accordance with the NJPDES Permit for the municipality and NJAC 7:8-4.4.

2.0 Goals- City of Burlington

The goals of the City of Burlington Municipal Stormwater Management Plan are to:

- *Reduce flood damage, including damage to life and property;*
- *Improve and maintain water quality*
- *Improve existing Kennedy lake system that provides water quality and flood safety*
- *Protect public safety through the proper design and operation of best management practices.*
- *Reduce silting and scouring at outfalls;*
- *Reduce fecal coliform levels through wildlife habitat management*
- *Minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and*
- *Reduce runoff*
- *Maximize water supplies through better water management*

To achieve these goals, a variety of management strategies are proposed for implementation. These strategies have been developed in conformance with the recommendation of the Rancocas Creek Watershed Plan dated March 2003 prepared by the Burlington County Department of Resource Conservation.

3.0 Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See Figure 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration.

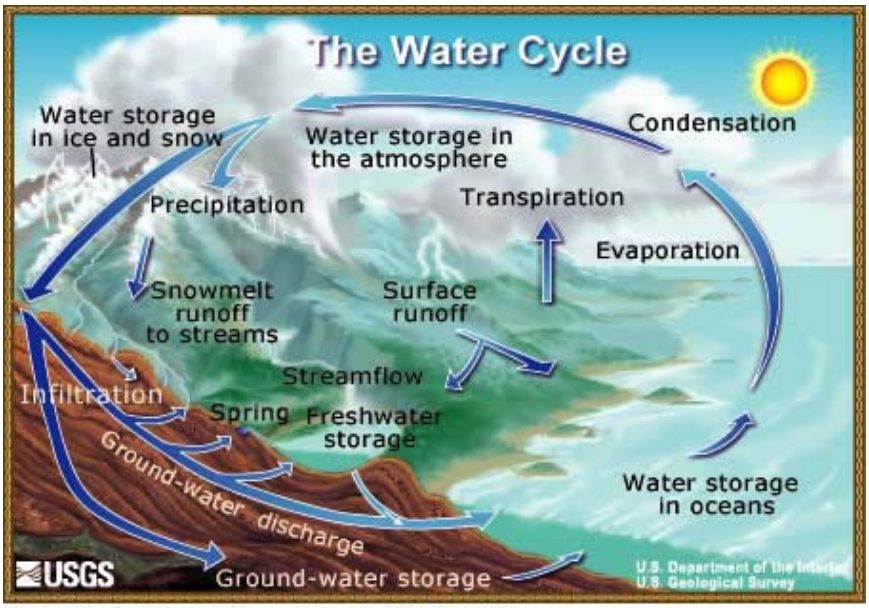


Illustration by John M. Evans, Colorado District, USGS

Figure 1. Hydrologic Cycle

Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new drainage problems and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Downstream erosion and sediment deposits can be seen in Photograph 1.

Photograph 1. Sediment Deposits

Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients. Groundwater recharge and well head protection areas are shown in the Appendix, on **Map 2, Groundwater Recharge and Wellhead Protection Areas** (WPAs).

4.0 Plan Consistency – Regional Stormwater Watershed Plan

Burlington City drains to the Assiscunk Creek. The Rancocas Creek is the adjacent drainage shed to the west of the Assiscunk Creek that also drains to the Delaware River. A regional watershed management plan for the Assiscunk Creek has not been developed. Therefore, this plan has been prepared in conformance Rancocas Creek Watershed Management Plan.

The NJDEP funded the Rancocas Watershed Management Plan through a grant with Burlington County. The Rancocas Creek Watershed Management Plan was finalized in March of 2003 by the Burlington County Department of Resource Conservation. The plan is the result of an effort from 1998 to 2003 by the New Jersey Department of Environmental Protection, the Public Advisory Committee (PAC), Omni Environmental, Burlington County Office of Land Use and six public subcommittees.

The Rancocas Creek Watershed Management Plan is a 29 page written summary report with a computer CD containing the Appendices. The Characterization and Assessment Report of the watershed is a Microsoft Power Point presentation contained on the CD. The assessment report is based on a water quality approach. The assessment reviews the NJDEP data and status of water quality for oxygen, phosphorous, nitrogen, fecal coliform, total dissolved solids and pH.

The Rancocas Creek Watershed Management Plan recommends that municipal ordinances should be enacted for commercial and industrial sites to require stormwater inserts to remove floatables, oils and other pollutants as well as long term maintenance insured by escrow accounts. The plan recommends strengthening buffer protection ordinances, with sample buffer protection ordinances provided. The report contains a ranking of open space parcels within Burlington County. A separate report by the Burlington County Soil Conservation compiling a prioritized list of “Action Now” projects for bank restoration and repair is referenced.

5.0 City of Burlington

5.1 Population and Land Use

The City of Burlington encompasses a 3.73 square mile area of Burlington County, New Jersey. Over the past thirty years, the increased commercial and residential development in the traditional agricultural regions of the County has resulted in a steady decline of the City's population. Over this period, the population has declined from 12,010 in 1970 to 10,246 in 1980 to 9,835 in 1990 to 9,736 in 2000. However, the City has experienced some development pressure in recent years as indicated by the chart of new building permits issued over the past ten years (see Table 1).

As of 2003, the City hosts two transit stops along the new Camden-Trenton Light Rail Line. The completion of the train line and the City's redevelopment efforts will likely create new redevelopment opportunities. The Stormwater Management Plan anticipates and plans for this new development activity in order to mitigate any negative effects on the City's waterways, such as increased stormwater runoff volumes and pollutant loads.

Table 1 - New Residential Building Permits

Year	Units
1991	3
1992	13
1993	19
1994	13
1995	8
1996	5
1997	0
1998	57
1999	41
2000	11
2001	13

The majority of land use within the City of Burlington is urban. The existing land uses within Burlington can be seen in the Appendix **Map 3, Land Use – Wetlands Designations.**

5.2 Description of Watershed

Burlington City is located within final reach of the Assiscunk Creek adjacent to the Delaware River. The Assiscunk Creek is located in the southwestern corner of Watershed Management Area 20, for the Assiscunk, Crosswicks and Doctors Creeks. Watershed Management Area 20 is one of the twenty major watersheds in the State of New Jersey shown in the Appendix on **Map 4, New Jersey's Watershed, Watershed Management Areas and Water Regions**.

The United States Geologic Survey (USGS) uses a 14 digit Hydrologic Unit Code (HUC 14) to delineate and name each sub-watershed with each major watershed area. There are three separate sub-watershed drainage delineations within the City of Burlington as shown in the Appendix on **Map 5, HUC-14 Delineation on USGS Quadrangle Map.**

The three watersheds within the City of Burlington are:

- 02040201100060, Assiscunk Creek (below Neck Road), Within Burlington City, drainage flows to the Assiscunk Creek.

- 02040201110010, LDRV tribs (Beverly to Assiscunk CK), Within Burlington City, drainage flows through the storm sewer system to the Kennedy lake system that is connected by the "city ditch" then to the City sewage treatment facility and then to the Delaware River.

- 02040201090030, LDRV, (Assiscunk Creek to Blacks Creek), land area adjacent to the Delaware River has overland surface runoff that reaches the Delaware River directly.

The majority of the land area within the City of Burlington is located below the flood plain elevation per the flood insurance rate maps prepared by the Federal Emergency Management Association (FEMA). The potential flood prone areas and flood prone areas are shown in the Appendix on **Map 6, Flood Prone Areas**.

The Kennedy lake system on the western side of the Assiscunk Creek provides a unique solution to the drainage and flood elevation conditions within Burlington City. In addition the City of Burlington has over 2,000 storm inlets located on city streets, an exceptional number for a 3.73 square mile area. By lowering the Kennedy lake system prior to a major storm event, the City of Burlington Engineer is able to reduce flood damage by draining the streets into the lake and city ditch system. The Kennedy lake system performs as a stormwater detention system and provides water quality for the western side of the municipality.

5.3 State Waterway Conditions

The New Jersey Department of Environmental Protection (NJDEP) and the USGS collect a variety of water quality information on the Assiscunk Watershed. The USGS conducts water quality sampling outside of the City of Burlington

The NJDEP has established and maintains an Ambient Biomonitoring Network (AMNET) of monitoring sites to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macro invertebrates by NJDEP on a five-year cycle. Benthic macro invertebrates include aquatic insects, worms, snails, crayfish and clams. Every five years, streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of bioethics related to benthic macroinvertebrate community dynamics. The AMNET sampling serves as an indicator of the stream health, but does not provide any information on the cause of the impairment.

There are no AMNET sites within the City of Burlington. The AMNET sites within close proximity to the City of Burlington are shown in the Appendix on **Map 8, AMNET and Stream Quality Monitoring Stations.** The closest AMNET station AN0142 is located on the Assiscunk Creek at Neck Road in Burlington Township and is noted as severely impaired.

The total maximum daily load, abbreviated TMDL, is the amount of a pollutant that can be accepted by a water body without exceeding water quality standards or interfering with the ability to use a water body for one or more of its designated uses. A TMDL is a tool used to achieve water quality standards through mathematical analysis of the percent reduction of a pollutant from a particular source needed to meet the concentration specified in the water quality

standards. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other best management practices or BMPs.

There have been two TMDLs issued for the Delaware River. One TMDL Report was issued by the New Jersey Department of Environmental Protection on September 2003 entitled Total Maximum Daily Loads for Polychlorinated Biphenyls (PCBs) for Zones 2-5 of the Tidal Delaware River as prepared by the Delaware River Basin Commission. Another TMDL entitled "Delaware River Estuary Zones 2 & 3" was developed through the Delaware River Basin Commission (DRBC) and The Estuary Program. This TMDL was approved by NJDEP on May 22, 2000 and established that the Delaware River is above assimilative capacity for tetrachloroethene (TCE) and 1,2-dichloroethane (1,2 DCE) in the tidal Delaware River. If numerical allocations are set in the future for these impairments, the Municipal Stormwater Management Plan will be amended to address the impairment and ordinances will be revised to implement the modifications.

6.0 Design and Performance Standards

All residential development projects over one acre must currently meet the storm water management design and performance standards of N.J.A.C. 7:8 through the implementation of the Residential Site Improvement Standards. All non-residential development over one acre will be required to conform to the design and performance standards of N.J.A.C. 7:8 through the implementation of the City of Burlington stormwater management plan. The City of Burlington stormwater management ordinance is provided as **Attachment 1**. As required by the New Jersey Department of Environmental Protection, alternative standards such as stormwater management plans from municipalities shall provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity and water quality impacts of major development projects as would be provided under the standards in N.J.A.C. 7:8-5. The three basic requirements of the stormwater regulation of NJAC 7:8-5 are:

1. Water Quantity – The peak rate of runoff for the 2, 10, and 100 year storm must be reduced by 50, 75, and 80 percent.

2. Water quality – Total suspended solids in the runoff water must be reduced by 80% by various methods.

3. Recharge – The annual amount of rainfall that previously infiltrated into the ground must continue to infiltrate into the ground after the storm is developed.

Since the City of Burlington is predominantly developed, there will be few opportunities for development on undisturbed land greater than one acre. The majority of development will occur on redevelopment parcels. Due to the unique characteristic of Burlington City the following stormwater characteristics are noted:

(1) Water Quantity. Per NJAC 7:8.Subchapter 5.4.a.3.iv, In tidal flood areas, the stormwater runoff analysis shall only be applied if the increase in volume of stormwater runoff could increase flood damage below the point of discharge. In areas of Burlington City, the water quantity calculation may not be applicable. The stormwater flow rates from the City of Burlington in relationship to the flow in the Delaware River may not warrant the peak rate of runoff reduction factors.

In areas above flood stage within Burlington City, actual reduction of existing 2, 10 and 100 year peak rates of runoff on redeveloped sites may not have any benefit or meet the stormwater management goals of the Burlington City. For development projects located at sites above flood stage that flow directly to the Delaware River or the Assiscunk Creek, water quality mitigation projects within those sub-watersheds meet the goals of the City of Burlington more than providing detention facilities that reduce the peak rate of runoff. For development projects located at sites above flood stage that flow to the Kennedy lake system, water quality mitigation projects to improve the lake discharge sites or lake edge stabilization projects meet the goals of the City of Burlington more than providing detention facilities to reduce the peak rate of runoff. The mitigation projects for sites above flood stage are especially warranted if the stormwater management design involves underground detention facilities that would be constructed below the flood stage elevation.

(2) Water Quality. Water Quality will be required for all major development projects that disturb more than one acre, except for projects that drain to the Kennedy lake system. For development projects that flow to the Kennedy lake system, water quality is presently provided through the bar screen before the City sewage treatment facility and the settlement time in the Kennedy lake system. The applicant will be required to demonstrate that the areas flow into the Kennedy lake system, based on the Burlington City storm drain system map.

For all other development sites, other than those flowing to the Kennedy lake system, water quality will be required for all major development projects that disturb more than one acre. In accordance with NJAC 7:8 Subchapter 5.5, a reduction of eighty percent (80%) of total suspended solids

is required through the TSS calculations and various best management practices (BMP's). New Jersey Best Management Practices Manual provides further design specifications for the best management practices (BMP's) selected. Manufactured treatment devices in accordance with the Best Management Practices Manual Chapter 9.6 and meeting the NJDEP certification requirements will constantly be changing and will be available on the New Jersey Stormwater website of njstormwater.org under Certified Stormwater Technologies.

(3) Recharge. Per NJAC 7:8.Subchapter 5.4.a.2.ii, the groundwater recharge requirement does not apply to projects within an "urban redevelopment area". The definition under NJAC 7:8-1.2 of an "urban redevelopment area" is a previously developed portion of an area delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1). Burlington City is located entirely within Metropolitan Planning Area PA-1 on the Policy Map of the New Jersey State Development and Redevelopment Plan. Therefore, if a site had been previously developed in the City of Burlington, and is now under consideration for development, recharge does not apply.

For commercial development of less than one acre, the City of Burlington has the discretion to determine the stormwater management requirements. For non-residential development of less than one acre in size, the stormwater management system will be evaluated by the municipal engineer based on the location of the site in relation to the flood plain, the location of the site in relation to the Kennedy lake system that provides water quality, and the recharge requirements based on the definition under NJAC 7:8-1.2 of "urban redevelopment area" as a previously developed portion of an area delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1).

The City of Burlington will address the water quality impairments of the Delaware River by implementing the Stormwater Pollution Prevention Plan in accordance with the MS4 Permit. By completing the street sweeping requirements, public education requirements, implementing the annual inlet cleaning requirements, and the outfall illicit connection program, the City of Burlington will improve the water quality of storm water reaching the Delaware River through the storm drains.

The City of Burlington will ensure the proper maintenance and on going repairs to all BMP's though the Public Works Department. The Planning Board reviews development plans to ensure they meet all of the requirements of the City's ordinance and/or the Residential Site Improvement Standards. A stormwater management long term maintenance plan will be required for all projects in conformance with

the applicable regulations. In addition all projects are also required to be designed in conformance with the Standards for Soil Erosion and Sediment Control in New Jersey even though a Soil Erosion and Sediment Control Plan Certification is only required for projects that disturb over 5,000 square feet. As part of any approval that may be granted by the Board it is standard procedure to include a condition for all outside agency approvals or permits to be obtained prior to the start of construction.

City inspectors observe construction of all projects to ensure that they are constructed in accordance with the approved plans and any permits that may have been issued. This includes ensuring that stormwater management facilities are constructed properly and that soil erosion control measures are being maintained. During Construction, any deficiencies noted in the field by the City's inspector that can not be resolved with the contractor are reported to the appropriate agency, typically the City Engineer, the NJDEP Bureau of Enforcement or the Burlington County Soil Conservation District for enforcement.

Storm Inlet in Conformance with Attachment C of Stormwater Regulations

7.0 Nonstructural Stormwater Management Strategies

The evaluation of the entire master plan (including the land use element), official map and development regulations (including the zoning ordinance) is element 8 of NJAC 7:8-4.2. This element is only required for communities with more than 1 square mile of developable land. The City of Burlington contains only 3.73 square miles, of which approximately 24% (0.9 square miles) remains to be developed as can be seen in Appendix **Map 9. Developable Lands Map.** The City of Burlington meets the requirements for exemption and is not required to complete the evaluation.

8.0 Land Use/Build-Out Analysis

The Land Use/Build-Out Analysis is element 9 of NJAC 7:8-4.2. This element is only required for communities with more than 1 square mile of developable land. The City of Burlington contains only 3.73 square miles, of which approximately 24% (0.9 square miles) remains to be developed as can be seen in Appendix **Map 9. Developable Lands Map.** The City of Burlington meets the requirements for exemption and is not required to complete this analysis.

9.0 Mitigation Plans

Exemptions are provided to lessen the impact of redevelopment of existing sites within the City of Burlington where stormwater standards cannot be imposed due to physical limitations on a site. Water quality exemptions are recommended since most of the City is located in the floodplain. The applicant should provide a mitigation project of equal value within the same sub-watershed as delineated by the HUC 14 that does not negatively impact sensitive receptors. The Delaware River is the only sensitive receptor within the City of Burlington for stormwater quality based upon the TMDLs for VOCs and PCBs and stormwater quantity to prevent erosion of its shoreline.

Mitigation Plan project submissions shall include for review:

1. A table to show the required values and the values provided in the project are equivalent
2. An alternatives analysis demonstrating that on-site compliance was maximized.
3. Narrative and supporting information regarding the need for the waiver.
4. Identify the sensitive receptor and demonstrate that the mitigation project contributes to the same sensitive receptor.
5. Design details to include but not be limited to drawings, calculations, and other information needed to evaluate the mitigation project.
6. List the party or parties responsible for the construction and the future operation and maintenance of the mitigation project. Submit ownership documentation or easements as applicable.
7. Maintenance Plan meeting the requirements of Section 12 of the City's drainage ordinance.
8. Construction schedule of the mitigation project and development project.

All mitigation projects are to be reviewed and approved by the City Engineer subject to all of the requirements of the Stormwater Ordinance. Proposed mitigation projects will be evaluated based on:

1. Project must be within the same area that would contribute to the receptor impacted by the project. If there is no specific sensitive receptor impacted, then the location of the mitigation project can be located anywhere within the City, preferably at a location that would provide the most benefit.
2. Legal authorization must be obtained to construct the project at the location selected. This includes the maintenance and any access needs for the project in the future.
3. The project should be close to the location of the original project, and if possible, be located upstream at a similar distance from the identified sensitive receptor. This distance should not be based on actual location, but on a similar hydraulic distance to the sensitive receptor.
4. Preference is given to one location that addresses any and all of the performance standards waived, rather than separate locations for each performance standard.
5. The project location must demonstrate no adverse impacts to other properties.

Mitigation projects for stormwater quantity proposed within the City of Burlington are:

1. <u>Stormwater Outfall Retrofit</u>

   Provide Water Quality measures at existing stormwater outfalls within the same HUC14 under the guidance of the City Engineer. Review of each outfall condition should be reviewed with the City Engineer before selecting one or more of the following options:

   a. Outlet Structure Modifications (i.e.: Replacement of defective or installation of new Tide Gates to control floatable and suspended solids from entering the City's storm drainage system and being deposited)

   b. Installation of in-line or end-of-pipe Best Management Practice (BMP) as approved by the NJDEP to pretreat stormwater draining into an existing stormwater management basin

2. Bank Stabilization

Bank stabilization projects meeting the following criteria may be presented for review and approval by the City Engineer. Stabilization projects will be reviewed for the following benefits:

a. Stabilization of eroded river banks where public or private property or structures are threatened.

b. Reduced sediment deposition in the river.

c. Improved water quality

3. Stormwater Recharge Systems

Construction of stormwater recharge systems in areas of the City with existing drainage problems can be addressed through compliance with the NJAC 7:8 Section 5 under the guidance of the City Engineer.

10.0 Summary

The Stormwater Management Plan presented for adoption on April 27, 2005 to the City of Burlington Land Use Board is required for the City of Burlington to meet the requirements of the Burlington City NJPDES MS4 permit. If adopted the stormwater management plan will become an element of the Burlington City Master Plan.

The ordinances included as Attachment 1 and 2 of the Appendixes of the City of Burlington Municipal Stormwater Management Plan must be reviewed and adopted by the City of Burlington Common Council prior to April 1, 2006 in order to go into effect and to meet the requirements of the Burlington City NJPDES MS4 permit. **(1.)**

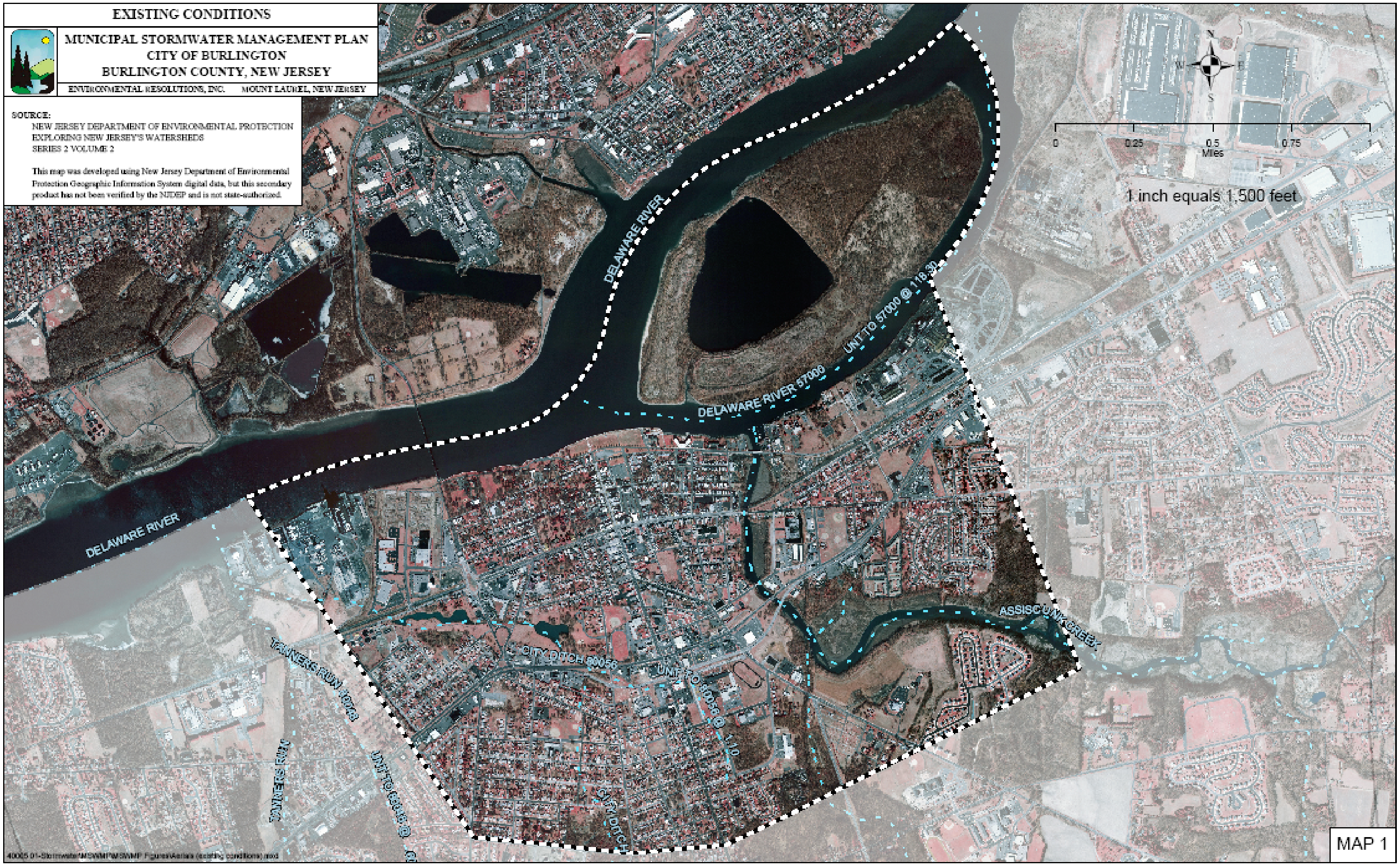
A copy of the adopted City of Burlington Stormwater Management Plan will be submitted to Burlington County Planning for review and approval. The plan has been prepared in conformance with the Rancocas Watershed Management Plan and NJAC 7:8.

The City of Burlington Stormwater Management Plan represents the beginning of a new process in which municipalities participate in improving water quality conditions from non-point source pollution. The City of Burlington's Stormwater Management Plan will improve the non-point source pollution conditions to the Delaware River and the Assiscunk River Watershed.

(1.) There is no Attachment 2; the reference is erroneous.

Appendix

Maps 1- 9


EXISTING CONDITIONS
MUNICIPAL STORMWATER MANAGEMENT PLAN
CITY OF BURLINGTON
BURLINGTON COUNTY, NEW JERSEY
ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY
SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
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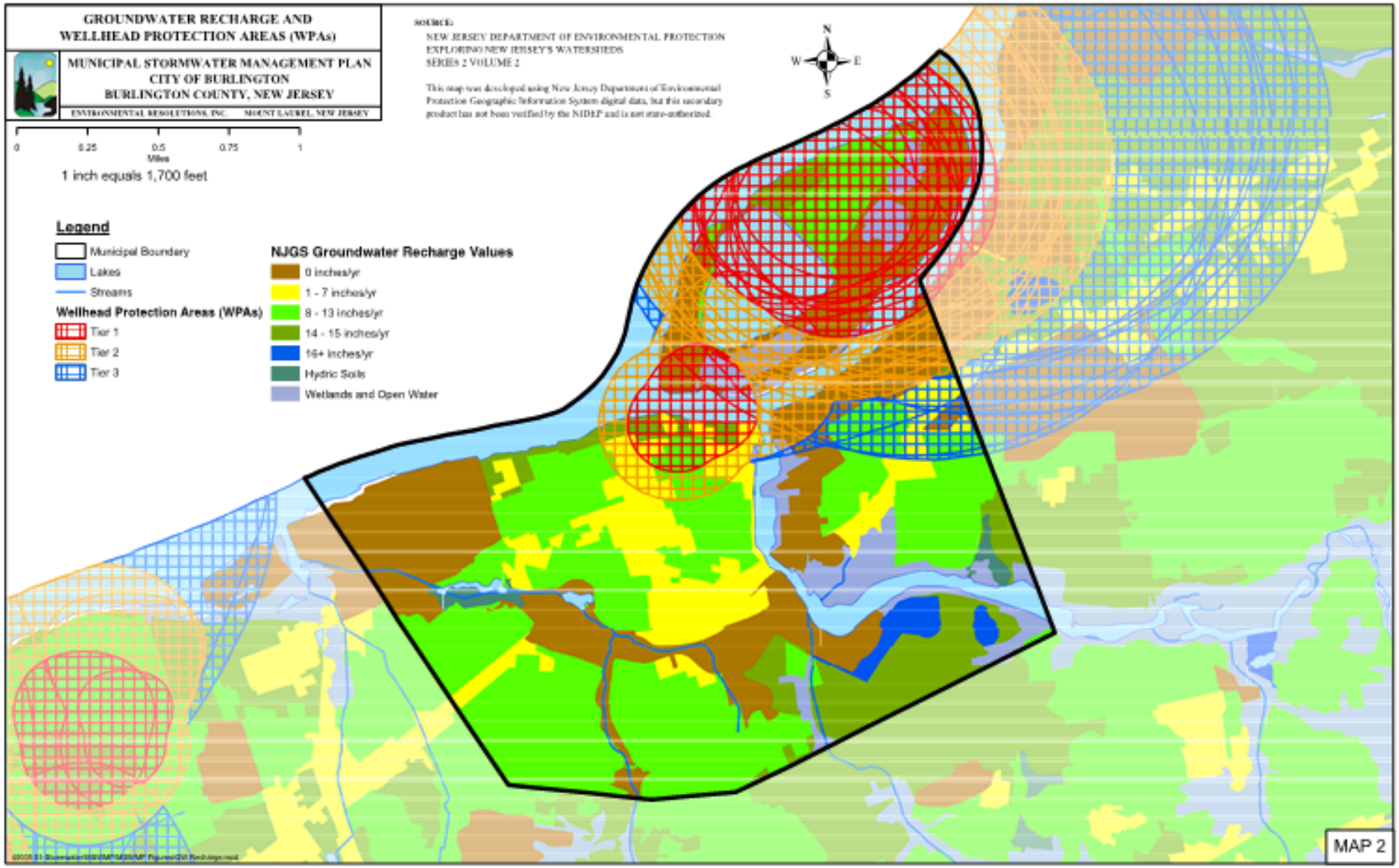
DELAWARE RIVER
ASSISCUNK CREEK
CITY DITCH 80056
CITY DITCH
MAP 1


GROUNDWATER RECHARGE AND
WELLHEAD PROTECTION AREAS (WPAs)
MUNICIPAL STORMWATER MANAGEMENT PLAN
CITY OF BURLINGTON
BURLINGTON COUNTY, NEW JERSEY
ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY
SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
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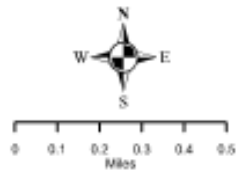
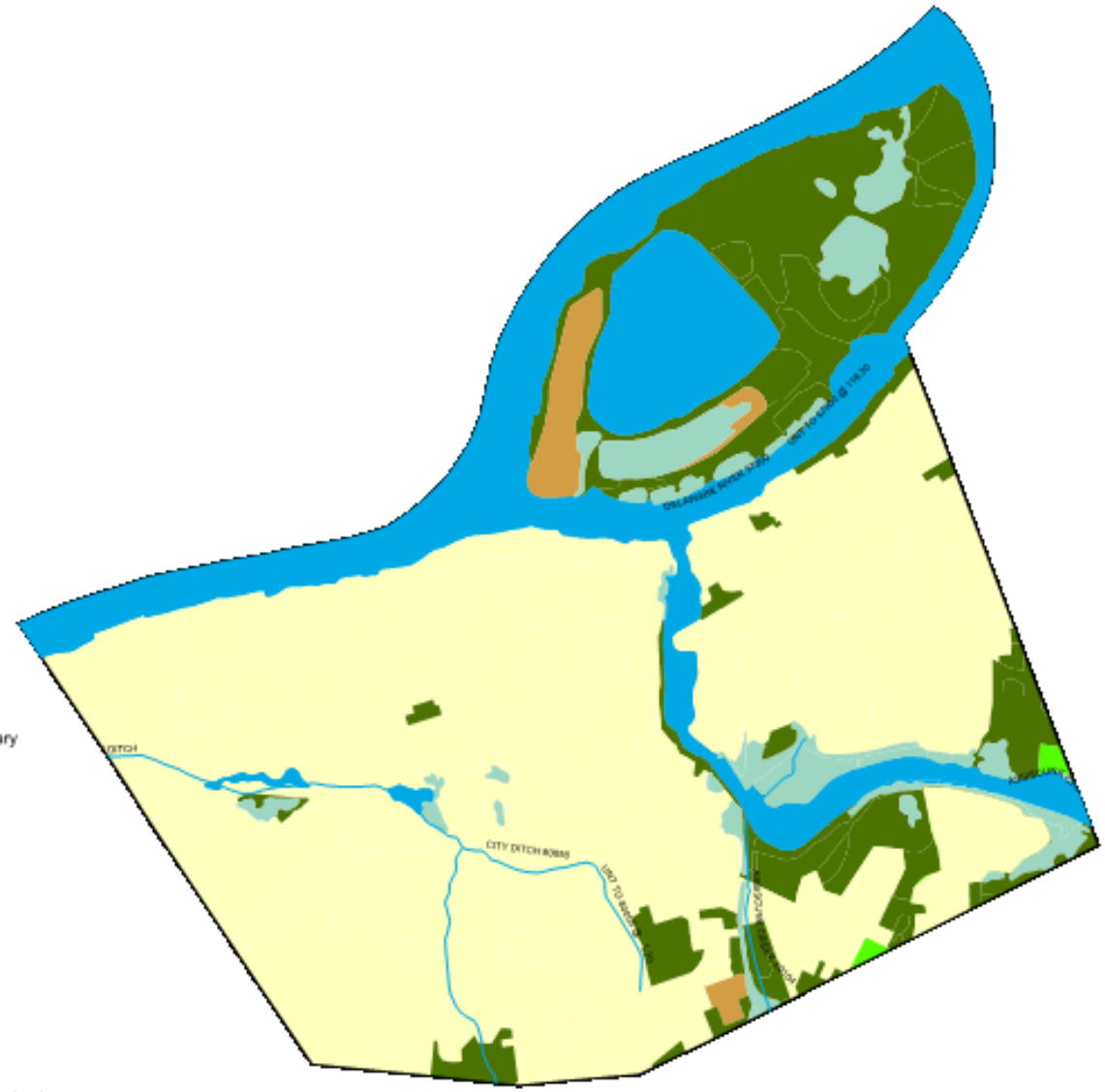
Miles
1 inch equals 1,700 feet
Legend
Municipal Boundary
Lakes
Streams
Wellhead Protection Areas (WPAs)
Tier 1
Tier 2
Tier 3
NJGS Groundwater Recharge Values
0 inches/yr
1 - 7 inches/yr
8 - 13 inches/yr
14 - 15 inches/yr
16+ inches/yr
Hydric Soils
Wetlands and Open Water
MAP 2

MAP 3



1 inch equals 1,500 feet



Legend

- Municipal Boundary
- Streams

LAND USE

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

SOURCE: NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2

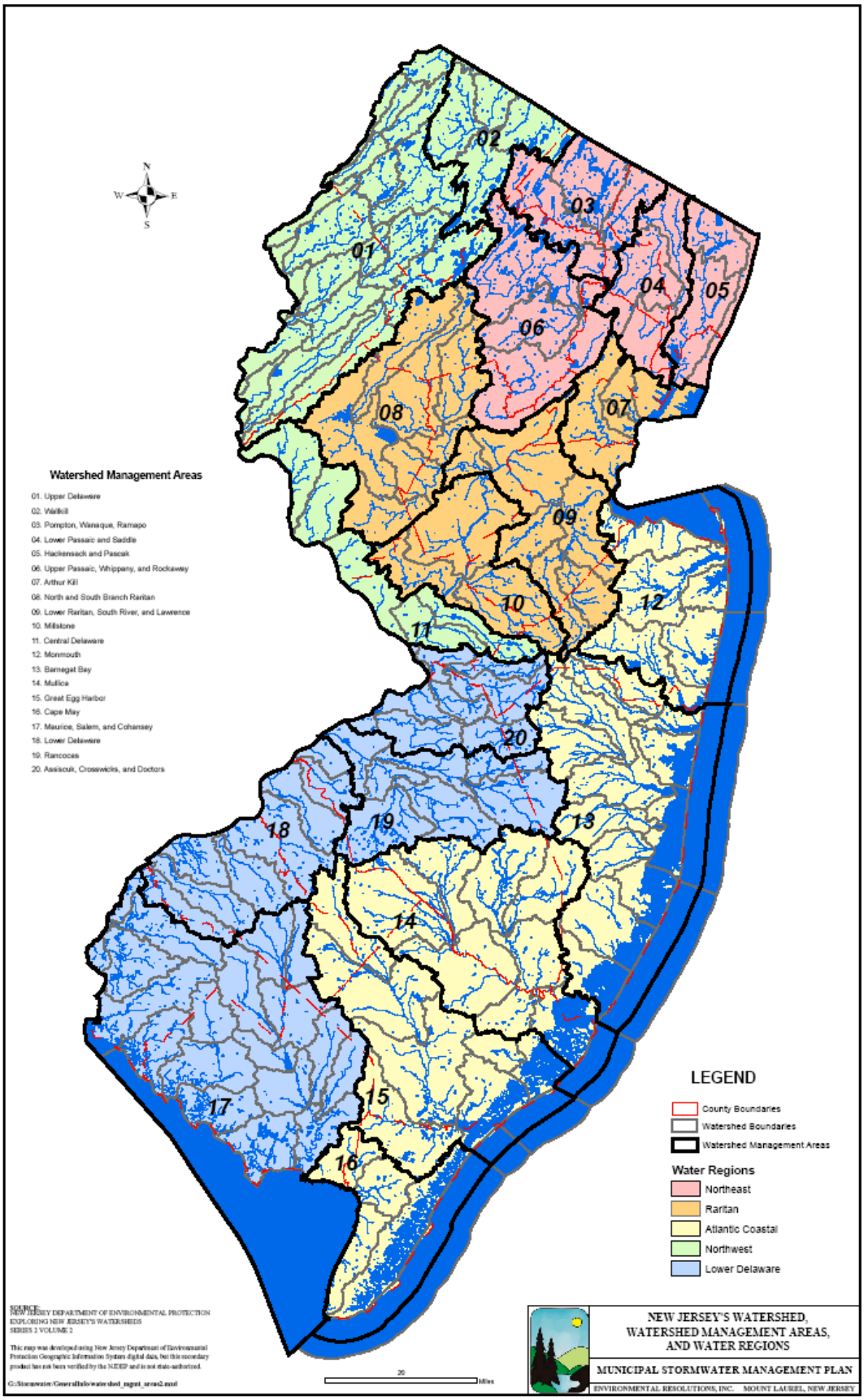
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.

LAND USE - WETLANDS DESIGNATIONS

MUNICIPAL STORMWATER MANAGEMENT PLAN
CITY OF BURLINGTON
BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

40005 01-Stormwater\MSWMP\MSWMP Figures\Wetlands.mxd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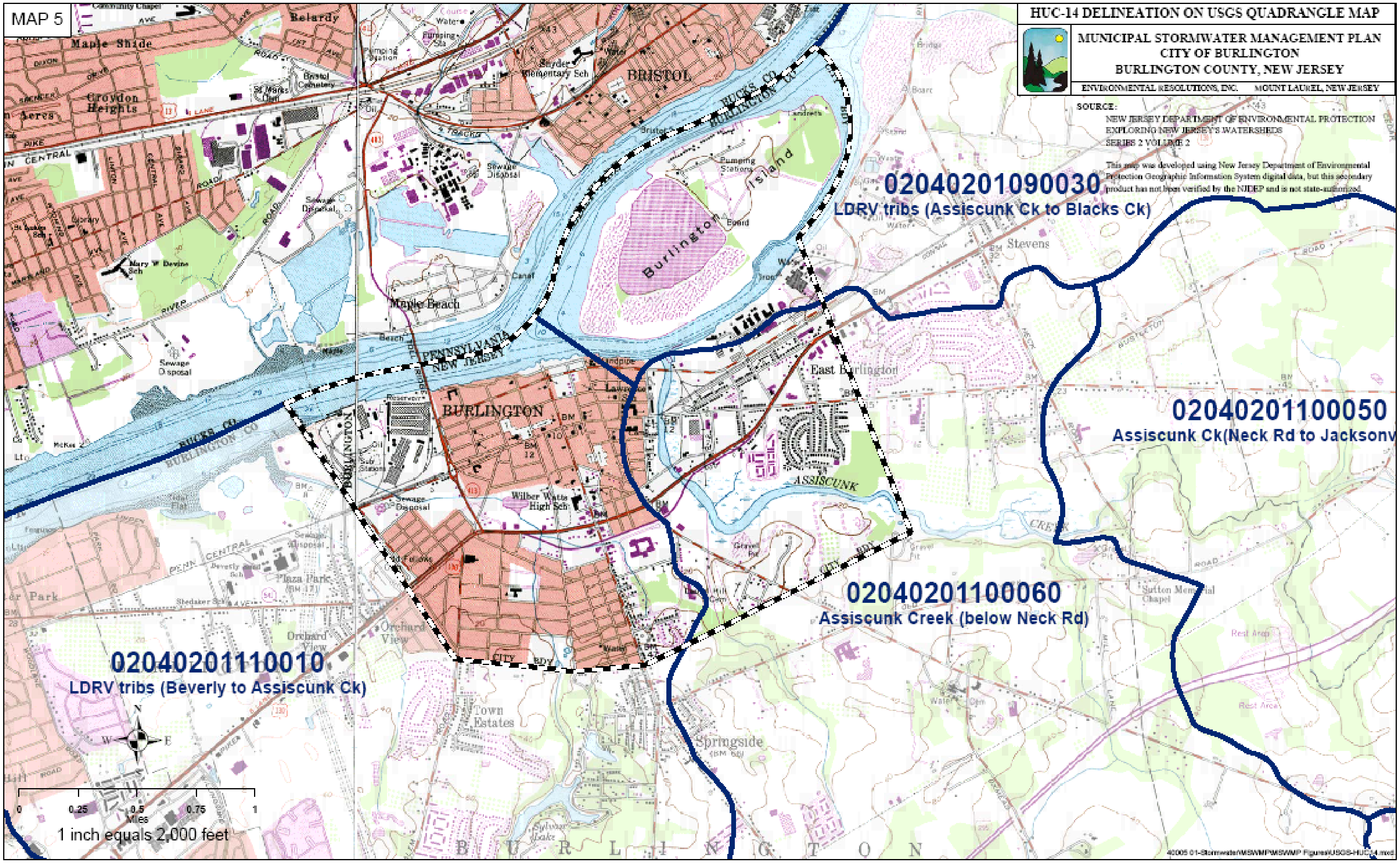
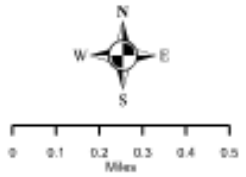
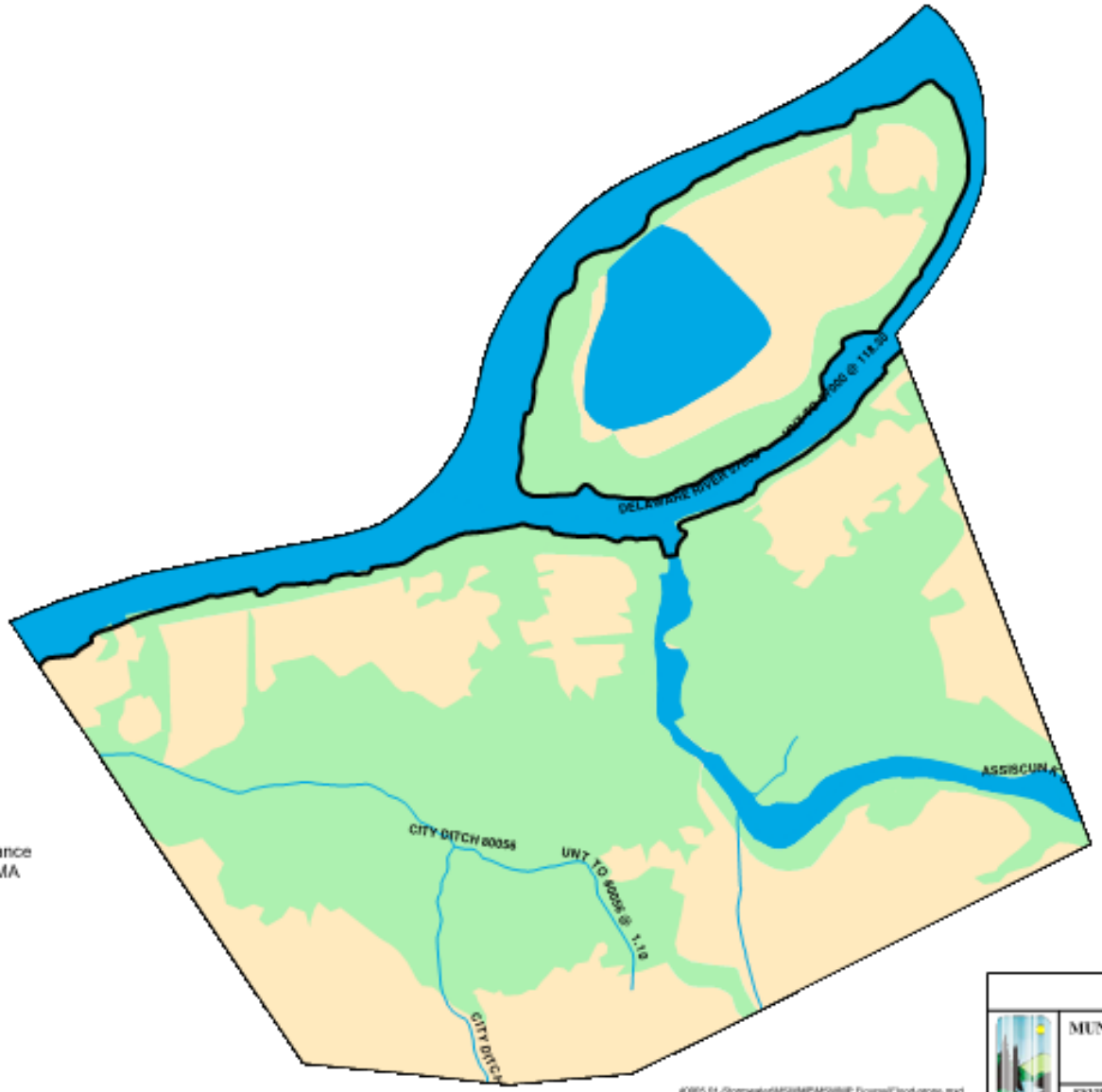
19
20
Watershed Management Areas
01. Upper Delaware
02. Wallkill
03. Pompton, Wanaque, Ramapo
04. Lower Passaic and Saddle
05. Hackensack and Pascak
06. Upper Passaic, Whippany, and Rockaway
07. Arthur Kill
08. North and South Branch Raritan
09. Lower Raritan, South River, and Lawrence
10. Millstone
11. Central Delaware
12. Monmouth
13. Barnegat Bay
14. Mullica
15. Great Egg Harbor
16. Cape May
17. Maurice, Salem, and Cohansey
18. Lower Delaware
19. Rancocas
20. Assiscunk, Crosswicks, and Doctors
LEGEND
County Boundaries
Watershed Boundaries
Watershed Management Areas
Water Regions
Northeast
Raritan
Atlantic Coastal
Northwest
Lower Delaware
SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 3 VOLUME 2
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
G:\Stormwater\GeneralInfo\watershed_mgmt_areas2.mxd
20
Miles
NEW JERSEY'S WATERSHED, WATERSHED MANAGEMENT AREAS, AND WATER REGIONS
MUNICIPAL STORMWATER MANAGEMENT PLAN
ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY


MAP 5
HUC-14 DELINEATION ON USGS QUADRANGLE MAP
MUNICIPAL STORMWATER MANAGEMENT PLAN
CITY OF BURLINGTON
BURLINGTON COUNTY, NEW JERSEY
ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY
SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
02040201090030
LDRV tribs (Assiscunk Ck to Blacks Ck)
02040201100050
Assiscunk Ck(Neck Rd to Jacksonv
02040201100060
Assiscunk Creek (below Neck Rd)
02040201110010
LDRV tribs (Beverly to Assiscunk Ck)
BURLINGTON
BRISTOL
Burlington Island
East Burlington
PENNSYLVANIA
NEW JERSEY
Springside
0 0.25 0.5 0.75 1
Miles
1 inch equals 2,000 feet

MAP 6



1 inch equals 1,500 feet



Legend

- Municipal Boundary
- Flood Plain per Flood Insurance Rate Maps prepared by FEMA
- Water
- Not a Floodprone Area
- Streams

SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2

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

FLOODPRONE AREAS

MUNICIPAL STORMWATER MANAGEMENT PLAN
CITY OF BURLINGTON
BURLINGTON COUNTY, NEW JERSEY

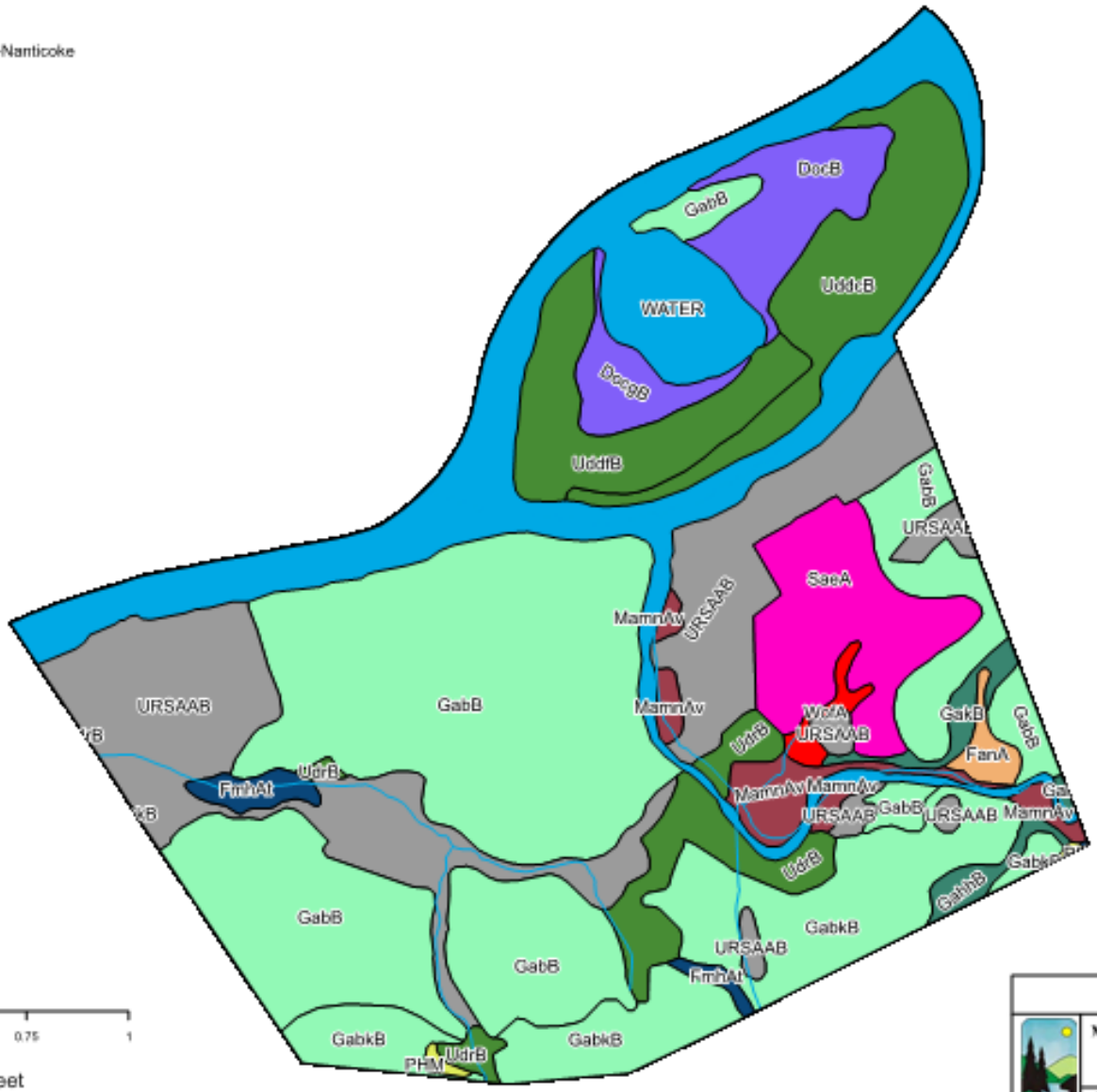
ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

40805.01 -Stormwater\MSWMP\MSWMP Figures\Flood-prone.mxd

MAP 7

Legend - Soil Types

- Water
- Downer
- Fallsington
- Fluvaquents
- Galestown
- Galloway
- Galloway sand
- Mannington-Nanticoke
- Pits, clay
- Sassafras
- Udorthents
- Urban land
- Woodstown



N
W E
S

0 0.25 0.5 0.75 1
Miles

1 inch equals 1,500 feet

SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
BWRPS 3 VOLUME 3

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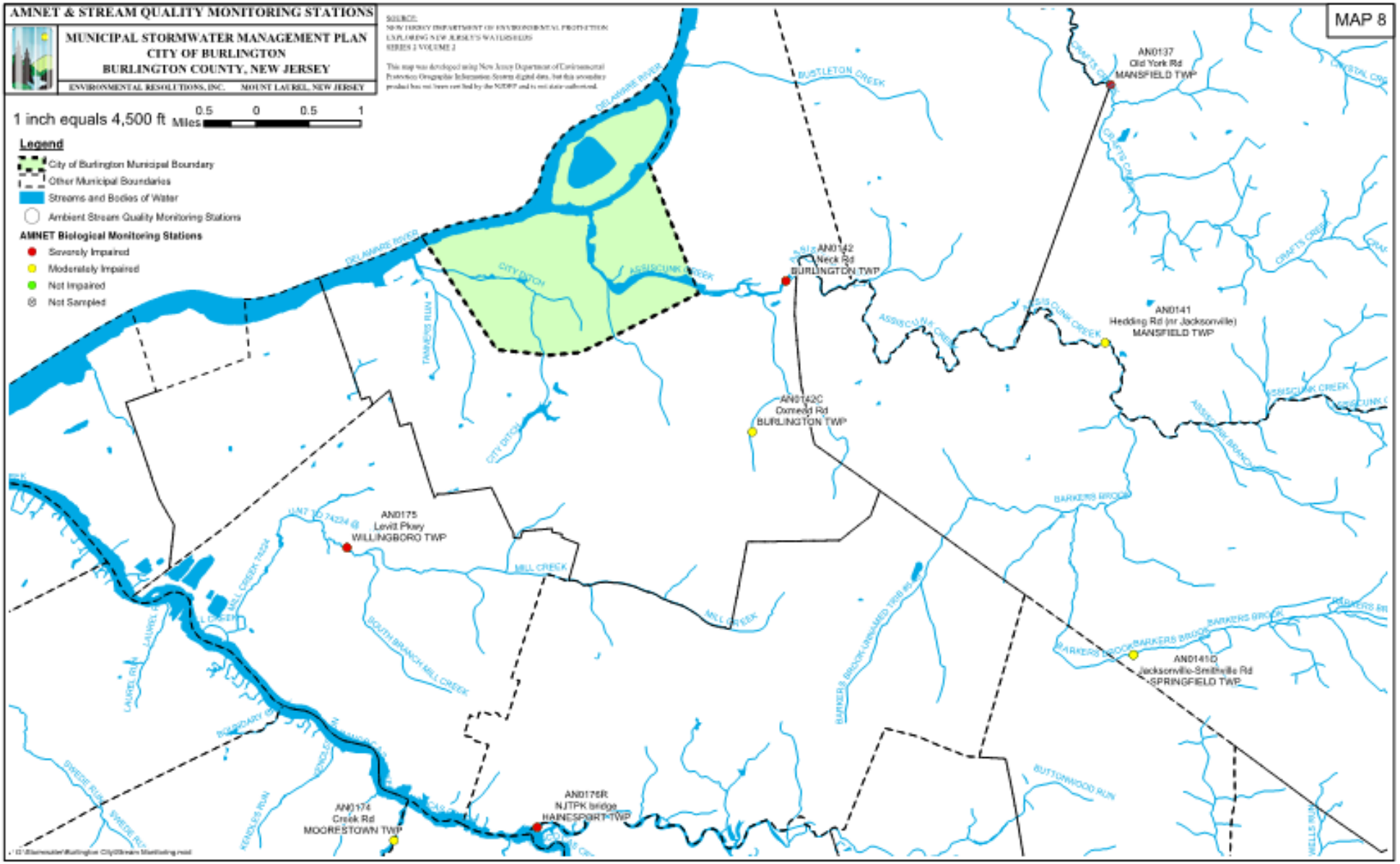
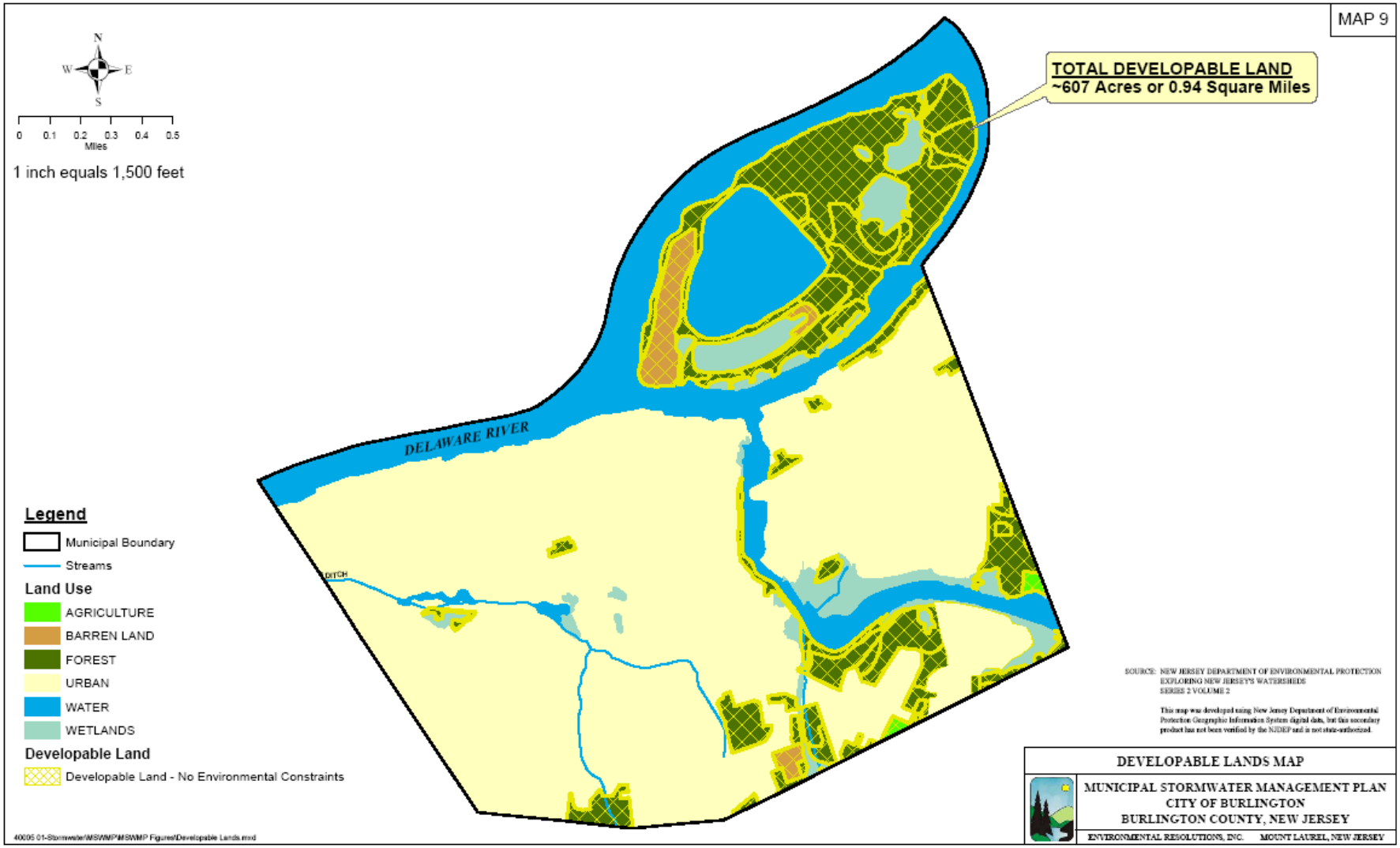
SOIL TYPES

MUNICIPAL STORMWATER MANAGEMENT PLAN
CITY OF BURLINGTON
BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY


AMNET & STREAM QUALITY MONITORING STATIONS
MUNICIPAL STORMWATER MANAGEMENT PLAN
CITY OF BURLINGTON
BURLINGTON COUNTY, NEW JERSEY
ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY
MAP 8
SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state authorized.
1 inch equals 4,500 ft
0.5 0 0.5 1
Miles
Legend
City of Burlington Municipal Boundary
Other Municipal Boundaries
Streams and Bodies of Water
Ambient Stream Quality Monitoring Stations
AMNET Biological Monitoring Stations
Severely Impaired
Moderately Impaired
Not Impaired
Not Sampled
AN0137
Old York Rd
MANSFIELD TWP
AN0142
Neck Rd
BURLINGTON TWP
AN0141
Hedding Rd (nr Jacksonville)
MANSFIELD TWP
AN0142C
Conrad Rd
BURLINGTON TWP
AN0175
Levitt Pkwy
WILLINGBORO TWP
AN0141D
Jacksonville-Smithville Rd
SPRINGFIELD TWP
AN0174
Creek Rd
MOORESTOWN TWP
AN0176R
NJTPK bridge
DELAWARE RIVER
BUSTLETON CREEK
CRAFTS CREEK
ASSISCUNK CREEK
CITY DITCH
TAWARIS RUN
MILL CREEK
SOUTH BRANCH MILL CREEK
BARKERS BROOK
BARKERS BROOK UNNAMED TRIB #3
BUTTONWOOD RUN
KENDLES RUN
SWEDE RUN
WELLS RUN

MAP 9



DEVELOPABLE LANDS MAP

MUNICIPAL STORMWATER MANAGEMENT PLAN
CITY OF BURLINGTON
BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

Stormwater Permit

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Mail Code - 401-02B
Water Pollution Management Element
Bureau of Nonpoint Pollution Control
P.O. Box 420 – 401 E. State St.
Trenton, NJ 08625-0420
Tel: (609) 633-7021 / Fax: (609) 777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

BOB MARTIN
Commissioner

December 8, 2017

SENT VIA EMAIL to: KSHINE@PENNONI.COM

Mark Staravoj
BURLINGTON CITY
437 HIGH ST
BURLINGTON, NJ 08016

Re: Stormwater Discharge General Permit Authorization Renewal
Category: R9 -Tier A Municipal Stormwater General Permit
NJPDES: NJG0153109 / PI ID #: 171529
BURLINGTON CITY
Burlington City, Burlington County

Dear Stormwater Program Coordinator:

Enclosed is New Jersey Pollutant Discharge Elimination System (NJPDES) Authorization to Discharge No. NJG0153109 (Category R9 -Tier A Municipal Stormwater General Permit) issued under the authority of Stormwater NJPDES Master General Permit No. NJ0141852 (Tier A Permit).

The permit and associated documents are posted at http://www.nj.gov/dep/dwq/tier_a.htm, where you can find a copy of the Tier A Permit, and a Response to Comments document, which includes a summary of the significant and relevant comments received during the Tier A Permit public comment period, the Department's responses, and an explanation of any changes from the draft action. In addition, you can also find a crosswalk which provides a detailed comparison of changes from 2009 to this 2017 permit, and a Frequently Asked Questions document. These documents will be useful in understanding your renewed Authorization.

If you have any questions or comments regarding the above referenced action, please contact Louisa Lubiak by telephone at 609-633-7021.

Sincerely,

James J. Murphy, Chief
Bureau of Nonpoint Pollution Control

C: Water Compliance and Enforcement Regional Office

New Jersey Department of Environmental Protection
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AUTHORIZATION TO DISCHARGE
R9 -Tier A Municipal Stormwater General Permit

Facility Name: BURLINGTON CITY

Permit Number: NJG0153109

Program Interest No.: 171529

Facility Address:
437 HIGH ST
BURLINGTON, NJ 08016

Type of Activity: Stormwater Discharge General Permit Authorization Renewal

Owner:
BURLINGTON CITY
437 HIGH ST
BURLINGTON, NJ 08016

Operating Entity:
BURLINGTON CITY
437 HIGH ST
BURLINGTON, NJ 08016

Issuance Date:	**Effective Date:**	**Expiration Date:**
12/08/2017	01/01/2018	12/31/2022

Your Request for Authorization under NJPDES General Permit No. NJ0141852 has been approved by the New Jersey Department of Environmental Protection.

Date: 12/08/2017

James J. Murphy, Chief
Bureau of Nonpoint Pollution Control

(Terms, conditions and provisions attached hereto)

Division of Water Quality

PART I
GENERAL REQUIREMENTS: NJPDES

A. General Requirements of all NJPDES Permits

1. Requirements Incorporated by Reference

a. The permittee shall comply with all conditions set forth in this permit and with all the applicable requirements incorporated into this permit by reference. The permittee is required to comply with the regulations, including those cited in paragraphs b. through e. following, which are in effect as of the effective date of the final permit.

b. General Conditions

Penalties for Violations	N.J.A.C. 7:14-8.1 et seq.
Incorporation by Reference	N.J.A.C. 7:14A-2.3
Toxic Pollutants	N.J.A.C. 7:14A-6.2(a)4i
Duty to Comply	N.J.A.C. 7:14A-6.2(a)1 & 4
Duty to Mitigate	N.J.A.C. 7:14A-6.2(a)5 & 11
Inspection and Entry	N.J.A.C. 7:14A-2.11(e)
Enforcement Action	N.J.A.C. 7:14A-2.9
Duty to Reapply	N.J.A.C. 7:14A-4.2(e)3
Signatory Requirements for Applications and Reports	N.J.A.C. 7:14A-4.9
Effect of Permit/Other Laws	N.J.A.C. 7:14A-6.2(a)6 & 7 & 2.9(c)
Severability	N.J.A.C. 7:14A-2.2
Administrative Continuation of Permits	N.J.A.C. 7:14A-2.8
Permit Actions	N.J.A.C. 7:14A-2.7(c)
Reopener Clause	N.J.A.C. 7:14A-6.2(a)10
Permit Duration and Renewal	N.J.A.C. 7:14A-2.7(a) & (b)
Consolidation of Permit Process	N.J.A.C. 7:14A-15.5
Confidentiality	N.J.A.C. 7:14A-18.2 & 2.11(g)
Fee Schedule	N.J.A.C. 7:14A-3.1
Treatment Works Approval	N.J.A.C. 7:14A-22 & 23

c. Operation And Maintenance

Need to Halt or Reduce not a Defense	N.J.A.C. 7:14A-2.9(b)
Proper Operation and Maintenance	N.J.A.C. 7:14A-6.12

d. Monitoring And Records

Monitoring	N.J.A.C. 7:14A-6.5
Recordkeeping	N.J.A.C. 7:14A-6.6
Signatory Requirements for Monitoring Reports	N.J.A.C. 7:14A-6.9

e. Reporting Requirements

Planned Changes	N.J.A.C. 7:14A-6.7
Reporting of Monitoring Results	N.J.A.C. 7:14A-6.8
Noncompliance Reporting	N.J.A.C. 7:14A-6.10 & 6.8(h)
Hotline/Two Hour & Twenty-four Hour Reporting	N.J.A.C. 7:14A-6.10(c) & (d)
Written Reporting	N.J.A.C. 7:14A-6.10(e) &(f) & 6.8(h)
Duty to Provide Information	N.J.A.C. 7:14A-2.11, 6.2(a)14 & 18.1
Schedules of Compliance	N.J.A.C. 7:14A-6.4
Transfer	N.J.A.C. 7:14A-6.2(a)8 & 16.2

PART II

GENERAL REQUIREMENTS: DISCHARGE CATEGORIES

A. Additional Requirements Incorporated By Reference

a. The Stormwater Management rules at N.J.A.C. 7:8.

b. Conditions for General Permits at N.J.A.C. 7:14A-6.13, including the Department's authority to require, for due cause, a Tier A Municipality to apply for and obtain a different stormwater permit for specific activities otherwise authorized under this permit.

c. Additional Conditions applicable to UIC permits at N.J.A.C. 7:14A-8.9, UIC Corrective Action (N.J.A.C. 7:14A-8.11) and UIC Operating Criteria (N.J.A.C. 7:14A-8.16).

d. Conditions for reopening and modification of small MS4 permits at N.J.A.C. 7:14A-16.4(b) and N.J.A.C. 7:14A-25.7(b).

e. Requirements for Discharges to Ground Water at N.J.A.C. 7:14A-7.

f. National Pollutant Discharge Elimination System (NPDES) Electronic Reporting rule at 40 CFR Part 127.

B. General Conditions

1. Notification of Non-Compliance

a. The Tier A Municipality shall notify the Department of any non-compliance when required by N.J.A.C. 7:14A-6.10 by contacting the DEP Hotline at 1-877-WARN-DEP.

2. Discharge of Pollutants

a. For discharges authorized by this permit, the Tier A Municipality is exempt from N.J.A.C. 7:14A-6.2(a)2. This exemption means that the discharge of any pollutant not specifically regulated in this NJPDES permit or listed and quantified in the RFA shall not constitute a violation of the permit.

3. Standard Reporting Requirements – Electronic Reporting of NJPDES Information

a. Unless already required by this permit to be submitted electronically by an earlier date, effective December 21, 2020, the below identified documents and reports shall be electronically submitted via the Department's designated electronic submission service:

i. General permit authorization requests (i.e. RFAs);

ii. General permit termination/revocation requests; and

iii. Municipal separate storm sewer system (MS4) program reports (see Part IV.G).

4. Other Regulatory Requirements

a. Permit conditions remain in effect and enforceable until and unless the permit is modified, renewed or revoked by the Department.

b. The issuance of this permit shall not be considered as a waiver of any applicable federal, State or local rules, regulations and ordinances.

c. In accordance with N.J.A.C. 7:14A-6.2(a)7, this permit does not authorize any infringement of State or local law or regulations, including, but not limited to, N.J.A.C. 7:50 (the Pinelands rules), N.J.A.C. 7:1-E (Discharges of Petroleum and other Hazardous Substances), regulations concerning threatened and endangered species and their designated critical habitat, and other Department rules. No discharge of hazardous substances (as defined in N.J.A.C. 7:1E-1.6) resulting from an onsite spill shall be deemed to be "pursuant to and in compliance with this permit" within the meaning of the Spill Compensation and Control Act at N.J.S.A. 58:10-23.11c.

d. While the Tier A Municipality is required to comply with applicable operation and maintenance requirements of N.J.A.C. 7:14A-6.12(a), the Tier A Municipality is exempt from the operations and maintenance manual requirements of N.J.A.C. 7:14A-6.12(c). This exemption applies only to discharges authorized under this permit and does not alter the operation and maintenance requirements for municipally or privately owned stormwater facilities specified in this permit or N.J.A.C. 7:8.

C. Eligibility

1. Permit Scope

a. The Tier A MS4 NJPDES Permit applies to all areas of New Jersey as follows:

i. This permit applies to all municipalities assigned to Tier A under N.J.A.C. 7:14A-25.3(a)1. Tier A Municipalities are generally located within the more densely populated regions of the state or along or near the Atlantic coast.

ii. On a case-by-case basis, the Department may use this permit to regulate municipalities assigned to Tier B under N.J.A.C. 7:14A-25.3(a). As used in this permit, the term "Tier A Municipality" includes Tier B Municipalities that seek or obtain authorization under this provision of this permit.

b. This permit applies to the owner or operator of the Municipal Separate Storm Sewer System (MS4) meaning the Tier A Municipality. The owner or operator is responsible for ensuring compliance with this permit.

c. The short title of this permit is the "Tier A MS4 NJPDES permit."

2. Authorized Discharges Under the Tier A MS4 NJPDES Permit

a. Eligible Stormwater Discharges – Except as provided in Part II.C.3 below, this permit authorizes all new and existing stormwater discharges to surface water and groundwater from:

i. Small MS4s (as defined at N.J.A.C. 7:14A-1.2) owned or operated by Tier A Municipalities; and

ii. Municipal maintenance yards and other ancillary operations (see Part IV.B.5.c) owned or operated by Tier A Municipalities.

b. Eligible Non-Stormwater Discharges – Except as identified in Part II.C.3.e below, the following new and existing non-stormwater discharges from small MS4s owned or operated by Tier A Municipalities and from Municipal maintenance yards and other ancillary operations (see Part IV.B.5.c) owned or operated by Tier A Municipalities are eligible for authorization under this permit:

i. Potable water line flushing and discharges from potable water sources, excluding the discharge of filter backwash and first flush water from potable well development/redevelopment activities utilizing chemicals in accordance with N.J.A.C. 7:9D. The volume of first flush water, which is a minimum of three times the volume of the well water column, shall be handled and disposed of properly;

ii. Uncontaminated ground water (e.g. infiltration, crawl space or basement sump pumps, foundation or footing drains, rising ground waters);

iii. Air conditioning condensate (excluding contact and non-contact cooling water; and industrial refrigerant condensate);

iv. Irrigation water (including landscape and lawn watering runoff);

v. Flows from springs, riparian habitats, wetlands, water reservoir discharges and diverted stream flows;

vi. Residential car washing water; and dechlorinated swimming pool discharges from single family residential homes;

vii. Sidewalk, driveway and street wash water;

viii. Flows from firefighting activities including the washing of fire fighting vehicles;

ix. Flows from clean water rinsing of beach maintenance equipment immediately following use and only if the equipment is used for its intended purpose;

x. Flows from clean water rinsing of equipment and vehicles used in the application of salt and de-icing materials. Prior to rinsing, all equipment shall be cleaned using dry methods such as shoveling and sweeping. Recovered materials are to be returned to storage or properly discarded; and

xi. Rinsing of equipment in Part II.C.2.b.ix and x, above is limited to exterior, undercarriage, and exposed parts and does not apply to engines or other enclosed machinery.

3. Discharges Not Authorized Under the Tier A MS4 NJPDES Permit

a. Stormwater Discharges Associated with Industrial Activity

i. The Tier A MS4 NJPDES Permit does not authorize "stormwater discharge associated with industrial activity" as defined in N.J.A.C. 7:14A-1.2 except as otherwise specifically provided in this permit.

ii. Types of facilities that a Tier A Municipality might operate and that are considered to be engaging in "industrial activity" include but are not limited to certain: 1) landfills; 2) transportation facilities (including certain local passenger transit and air transportation facilities); 3) facilities handling domestic sewage or sewage sludge; and 4) steam electric power generating facilities.

iii. Any municipality that operates an industrial facility with such a discharge must submit a separate Request for Authorization (RFA) or individual permit application for that discharge (see www.nj.gov/dep/dwq/forms_storm.htm). An RFA submitted for the Tier A MS4 NJPDES Permit does not qualify as an RFA for such a discharge.

iv. Yard Trimmings and Wood Waste Management Sites that are not owned and operated by the Tier A Municipality.

b. Stormwater Discharges Associated with Construction Activity

i. The Tier A MS4 NJPDES Permit does not authorize "stormwater discharges associated with construction activity" as described in N.J.A.C. 7:14A-24.10(a). In general, this is the discharge to surface water of stormwater from construction activity that disturbs at least one acre.

ii. Any municipality that operates a construction site with such a discharge shall submit a separate RFA under NJPDES Permit No. NJ0088323 (General Stormwater Permit Construction Activity, see www.nj.gov/dep/dwq/5g3.htm), or an application for an individual permit for that discharge. An RFA submitted for the Tier A MS4 NJPDES Permit does not qualify as an RFA for such a discharge. See Part IV.B.3 of the Tier A MS4 NJPDES Permit.

c. Stormwater Discharges Authorized under Another NJPDES Permit

i. The Tier A MS4 NJPDES Permit does not authorize any stormwater discharge that is authorized under another NJPDES permit.

ii. A Tier A Municipality does not have to implement measures contained in this NJPDES permit for stormwater discharges at facilities owned or operated by that municipality that are regulated under a separate NJPDES stormwater permit authorizing those discharges.

d. Stormwater Discharges that Conflict with a Water Quality Management Plan

i. The Tier A MS4 NJPDES Permit does not authorize stormwater discharges from projects or activities that conflict with an adopted Areawide or Statewide Water Quality Management Plan.

e. Non-Stormwater Discharges that are Contributors of Pollutants

i. If any of the discharges listed in Part II.C.2.b above are identified by the Tier A Municipality as a significant contributor of pollutants to or from the MS4, the Tier A Municipality must address the discharge as an illicit connection or as an improper disposal of waste as specified in Part IV.B.6 of this permit.

D. Administrative Process

1. Automatic Renewal of Authorizations

a. Upon reissuance of this general permit, existing authorizations shall be automatically renewed as provided by N.J.A.C. 7:14A-6.13(d)9 and 25.4(a)3 using the information provided in the permittees' most recently submitted RFA.

2. Notification of Changes

a. A Tier A Municipality shall provide a corrected RFA to the Department within 90 days of the effective date of a renewed authorization under this general permit if any information in its most recently submitted RFA is no longer true, accurate, and/or complete.

b. The Tier A Municipality shall notify the Department of any changes of its Municipal Stormwater Program Coordinator information using www.nj.gov/dep/dwq/pdf/msrp_update_form.pdf

c. A Tier A Municipality that already has authorization to discharge from a small MS4 under the Tier A permit does not need to submit an RFA for the expansion (e.g. new residential development) of an existing small MS4.

3. Requests for Authorization (RFA, see www.nj.gov/dep/dwq/forms_storm.htm)

a. New RFAs under the Tier A MS4 permit

i. A single RFA is required for the entire eligible discharge from the small MS4 owned or operated by and located within a single municipality. Multiple RFAs are not required for multiple municipal operations (e.g., municipally owned and operated maintenance yards or other ancillary operations, facilities, garages, and/or offices).

ii. An RFA shall include at a minimum: the name and address of the municipality; the name and address of the Municipal Stormwater Program Coordinator; a certification acknowledging the best management practices and measurable goals specified in the permit; and any other information as required by the Department.

b. Upon receipt of an RFA the Department may, in accordance with N.J.A.C. 7:14A-6.13, do one of the following:

i. Issue notification of authorization under this permit;

ii. Deny authorization under this permit and require submittal of an application for an individual permit; or

iii. Deny authorization under this permit and require submittal of an RFA for another general permit.

c. Reassignment of Municipality to Tier A

i. If a municipality receives notice from the Department (pursuant to N.J.A.C. 7:14A-25.3(a)(3)) that it has been reassigned from Tier B to Tier A (pursuant to N.J.A.C. 7:14A-25.3(a)(1) and (2)), the deadline to submit an RFA is 180 days after the receipt of that notice, unless the Department approves a later date.

PART III
Recordkeeping and Reporting

The Tier A Municipality shall keep records necessary to document, in the Annual Report and Certification, the status of compliance with the conditions of this permit. The requirement to keep records and to submit an Annual Report and Certification is found at Part IV.G of this permit.

PART IV

SPECIFIC REQUIREMENTS: NARRATIVE

Notes and Definitions

A. Footnotes

1. Acronyms

a. Stormwater acronyms included in this permit are as follows:

i. "BMP" - Best Management Practice

ii. "CFR" - Code of Federal Regulations

iii. "EDPA" - Effective Date of Permit Authorization

iv. "MS4" - Municipal Separate Storm Sewer System

v. "MSWMP" - Municipal Stormwater Management Plan

vi. "MSRP" - Municipal Stormwater Regulation Program

vii. "MTD" - Manufactured Treatment Device

viii. "N.J.A.C." - New Jersey Administrative Code

ix. "NJPDES" - New Jersey Pollutant Discharge Elimination System

x. "N.J.S.A." - New Jersey Statutes Annotated

xi. "RSIS" - Residential Site Improvement Standards

xii. "SPPP" - Stormwater Pollution Prevention Plan

xiii. "TMDL" - Total Maximum Daily Load

2. Internal Cross References

a. For the purposes of this permit:

i. References to Part IV Notes and Definitions are preceded with the words "Notes and Definitions" (e.g. Notes and Definitions Part IV.A.1 refers to Acronyms).

ii. References to Part IV Tier A MS4 NJPDES Permit are not preceded by descriptive text (e.g. Part IV.A.1 refers to Overview of the Tier A MS4 NJPDES Permit).

3. Department Resources for Guidance Relating to MS4 Issues

a. MS4 main website and related links: www.nj.gov/dep/dwq/msrp_home.htm

b. MS4 Tier A Guidance document: www. nj.gov/dep/dwq/tier_a_guidance.htm

Notes and Definitions

c. Construction Site Stormwater Runoff: www.nj.gov/dep/dwq/5g3.htm

d. Snow Removal and Disposal Policy: www.nj.gov/dep/dwq/bnpc_home.htm

e. Green Infrastructure and related links: www.nj.gov/dep/gi/

f. Stormwater management information and training tools: www.nj.gov/dep/stormwater/

g. Public education for stormwater pollution: www.cleanwaternj.org

h. Clean Communities, a statewide litter abatement program: www.njclean.org

i. Total Maximum Daily Load (TMDL) information: www.nj.gov/dep/dwq/msrp-tmdl-rh.htm

4. EPA Resources for Guidance Relating to MS4 Issues

a. EPA's MS4 website and related links: www.epa.gov/npdes/stormwater-discharges-municipal-sources

b. EPA’s National Menu of Stormwater Best Management Practices: www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater

c. EPA's guidance for Green Infrastructure: http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm

d. Guidance from EPA Region 3 for municipalities that wish to improve their municipal stormwater programs: www.epa.gov/npdes/pubs/region3_factsheet_swmp.pdf

e. EPA's Trash Free Waters resource page: www.epa.gov/trash-free-waters

f. Illicit Discharge Detection and Elimination Guidance www3.epa.gov/npdes/pubs/idde_manualwithappendices.pdf

B. Definitions

1. Definitions

a. All words and terms used in this permit shall have meanings as defined in the "Regulations Concerning the New Jersey Pollutant Discharge Elimination System" (N.J.A.C. 7:14A), unless otherwise stated or unless the context clearly requires a different meaning.

b. "Catch Basin" means a cistern, vault, chamber or well that is usually built along a street as part of the storm sewer system to capture sediment, debris, and pollutants.

c. "Effective Date of Permit Authorization" means the date the permittee's authorization to discharge under this Tier A MS4 NJPDES permit becomes effective. This date may be found on the permittee's Authorization to Discharge.

d. "Existing permittee" means a municipality that held an authorization to discharge under the Tier A MS4 NJPDES permit on or before December 31, 2017.

e. "Green infrastructure" means methods of stormwater management that reduce wet weather/stormwater volume, flow, or changes the characteristics of the flow into combined or separate sanitary or storm sewers, or surface waters, by allowing the stormwater to infiltrate, to be treated by vegetation or by soils, or to be stored for reuse. Green infrastructure includes, but is not limited to, pervious paving, bioretention basins, vegetated swales, and cisterns.

f. "Illicit connection" means any physical or non-physical (i.e. leak, flow, or overflow into the municipal separate storm sewer system) connection that discharges the following to a municipal separate storm sewer system (unless that discharge is authorized under a NJPDES permit other than this Tier A MS4 NJPDES permit);

   i. Domestic sewage;

   ii. Non-contact cooling water, process wastewater, or other industrial waste (other than stormwater); or

   iii. Any category of non-stormwater discharges that a permittee for the MS4 identifies as a source or significant contributor of pollutants pursuant to 40 C.F.R. 122.34(b)(3)(iii).

g. "Maintenance plan" means a maintenance plan pursuant to N.J.A.C. 7:8-5.2(b) and 5.8 prepared by the design engineer for the stormwater management measures incorporated into the design of a major development.

h. "Major development" means any development that provides for ultimately disturbing one or more acres of land and any additional development defined as "major development" by a municipality's stormwater control ordinance. Disturbance is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Projects undertaken by any government agency which otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1et seq., are also considered "major development."

i. "Manufactured treatment device" means a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff.

j. "Municipal separate storm sewer" means a municipal separate storm sewer as defined in N.J.A.C. 7:14A-1.2.

k. "Municipality" means a municipality as defined in the Municipal Land Use Law at N.J.S.A. 40:55D-5, that is, any city, borough, town, township, or village.

l. "New permittee" means a municipality that obtains its first authorization to discharge under the Tier A MS4 NJPDES permit on or after January 1, 2018.

m. "Permanent structure" means a permanent building or permanent structure that is anchored to a permanent foundation with an impermeable floor, and that is completely roofed and walled (a door is recommended, but not required). A fabric frame structure is a permanent structure if it meets the following specifications:

   i. Concrete blocks, jersey barriers or other similar material shall be placed around the interior of the structure to protect the side walls during loading and unloading of de-icing materials;

   ii. The design shall prevent stormwater run-on and run through and the fabric cannot leak;

   iii. The structure shall be erected on an impermeable slab;

   iv. The structure cannot be open sided; and

   v. The structure shall have a roll up door or other means of sealing the access way from wind driven rainfall.

n. "Small MS4" means all municipal separate storm sewers (other than "large" or "medium" municipal separate storm sewer systems as defined in N.J.A.C. 7:14A-1.2) that are:

   i. Owned or operated by municipalities described under N.J.A.C. 7:14A-25.1(b);

   ii. Owned or operated by county, State, interstate, or Federal agencies, and located at public complexes as described under N.J.A.C. 7:14A-25.2(a)2;

   iii. Owned or operated by county, State, interstate, or Federal agencies, and located at highways and other thoroughfares as described under N.J.A.C. 7:14A-25.2(a)3; or

   iv. Owned or operated by county, State, interstate, Federal, or other agencies, and receive special designation under N.J.A.C. 7:14A-25.2(a)4.

   v. Note that all MS4s covered under the Tier A MS4 NJPDES permit are "small MS4s".

o. "Solids and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids as defined at N.J.A.C. 7:14A-25.6(b)3iii.

p. "Storm drain inlet" means the point of entry into the storm drain system and is, where a catch basin is present, the uppermost portion (or cover) of a catch basin.

q. "Stormwater" means 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.

r. "Stormwater facility" includes, but is not limited to: catch basins, detention basins, retention basins, filter strips, riparian buffers, infiltration trenches, sand filters, constructed wetlands, wet basins, bioretention systems, low flow bypasses, and stormwater conveyances. Stormwater facilities include structural stormwater management measures.

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

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

u. "Stream scouring" means the erosion or removal of streambed or bank material by the physical action of flowing water and the sediment that it carries.

v. "Subsurface infiltration/detention system" means a vault, perforated pipe, and/or stone bed that is located entirely below the ground surface and that temporarily stores and attenuates stormwater runoff."

w. "Tier A Municipality's MS4" means an MS4 owned and operated by a Tier A Municipality.

x. "Wood waste" means source separated whole trees, tree trunks, tree parts, tree stumps, brush and leaves provided that they are not composted, and lumber (non-chemically treated and unpainted);

y. "Yard trimmings" means grass clippings, leaves, wood chips from tree parts, and brush.

z. "Yard waste" means loose leaves and grass clippings.

Tier A Municipal Stormwater General Permit

A. Permit Overview

1. Overview of the Tier A MS4 NJPDES Permit

a. The Tier A Municipality (i.e. the permittee) is required to develop, update, implement and enforce an MS4 stormwater program. A primary objective of the MS4 stormwater program is to implement best management practices and other measures that are designed to achieve the permit's requirement to reduce the discharge of pollutants from the Tier A Municipality's MS4, municipal maintenance yards and other ancillary operations, to the maximum extent practicable pursuant to N.J.A.C. 7:14A-25.6(a)1 and 40 CFR 122.34(a), to protect water quality, and to satisfy the applicable water quality requirements of the Clean Water Act.

2. Primary Plans Required by the Tier A MS4 NJPDES Permit

a. The Stormwater Pollution Prevention Plan (SPPP) documents the Tier A Municipality's stormwater program and describes the measures necessary for compliance with the Statewide Basic Requirements as well as any Other Control Measures, Additional Measures and/or Optional Measures (if deemed appropriate). See Part IV.F (SPPP) and Attachment A (Measurable Goals and Implementation Schedule for Existing Permittees) and Attachment A-1 (Measurable Goals and Implementation Schedule for New Permittees).

b. A significant component of the SPPP is the Municipal Stormwater Management Plan (MSWMP). The MSWMP is also a component of the municipal master plan (N.J.S.A. 40:55D-94). The MSWMP describes the municipality's strategy, structure and process for addressing stormwater runoff from new development and redevelopment to ensure compliance with the Stormwater Management rules (N.J.A.C. 7:8 et seq.). This strategy, structure and process also constitutes much of the post construction stormwater management program in this permit. See Part IV.B.4 (Post Construction). Any MSWMP that complies with N.J.A.C. 7:8 also complies with this condition and Part IV.B.4.f (MSWMP).

3. Summary of Tier A MS4 NJPDES Permit Requirements

a. The Tier A Municipality shall develop, update, implement and enforce a stormwater program as documented in an SPPP to ensure compliance with:

i. The Statewide Basic Requirements. See Part IV.B;

ii. Other Control Measures. See Part IV.C;

iii. Additional Measures. See Part IV.D; and

iv. Optional Measures, if deemed appropriate See Part IV.E.

b. The Tier A Municipality shall develop, update, implement and maintain a written SPPP in conformance with Attachment A (Measurable Goals and Implementation Schedule for Existing Permittees) and Attachment A-1 (Measurable Goals and Implementation Schedule for New Permittees). See Part IV.A.2.a and IV.F (SPPP).

c. The Tier A Municipality shall submit an Annual Report and Certification summarizing the status of compliance with this permit. See Part IV.G (Annual Report and Certification).

d. The Tier A Municipality shall adopt, amend and implement a written MSWMP. See Part IV.A.2.b and B.4.f (MSWMP).

e. The Tier A Municipality shall modify and update its stormwater program (including applicable plans and ordinances) to conform with applicable new legislation; or new or amended regulations. Such modification shall be completed and effective within 12 months of written notification by the Department of the need for modification.

B. Statewide Basic Requirements and Associated Conditions

1. Minimum Standards for Public Involvement and Participation Including Public Notice

a. Tier A Municipalities shall comply with applicable State and local public notice requirements when providing for public participation in the development and implementation of a MS4 stormwater program. Requirements include but are not limited to:

i. The Open Public Meetings Act ("Sunshine Law," N.J.S.A. 10:4-6 et seq.);

ii. Statutory procedures for the enactment of ordinances (N.J.S.A. 40:49-2), including the municipal stormwater control ordinance and other ordinances adopted to comply with Part IV of this permit; and

iii. 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 Tier A Municipality shall also ensure that applicants for development meet the notice requirements of N.J.S.A. 40:55D-12.

b. Tier A Municipalities shall make elements of its MS4 stormwater program available to the public:

i. Provide the current SPPP upon request as required by Part IV.F.1.g (SPPP);

ii. Post the current SPPP on its website to the extent required by Part IV.F.1.f (SPPP); and

iii. Post 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). See Part IV.B.4.f (MSWMP), 4.g (Stormwater Control Ordinance), 5.a (Community Wide Ordinances).

c. The Tier A Municipality may involve another entity (e.g. a watershed association) to satisfy one or more of the Tier A Municipality's NJPDES permit condition(s) (or component thereof) through the implementation of one or more best management practices or control measures. See Part IV.F.4 (Implementation of SPPP Conditions through Shared or Contracted Services).

d. The Tier A Municipality shall maintain records necessary to demonstrate compliance with the public participation requirements of a, above.

e. Existing Permittee: An existing permittee shall meet the minimum standards of this permit, and the measurable goals (including any recordkeeping) and implementation schedules for Public Involvement and Participation specified in Attachment A for Existing Permittees (Measurable Goals and Implementation Schedule).

2. Minimum Standards for Local Public Education and Outreach

a. The Tier A Municipality shall implement a Public Education and Outreach Program that focuses on educational and pollution prevention activities about the impacts of stormwater discharges on surface water and groundwater and to involve the public in reducing pollutants in stormwater and mitigating flow. The Tier A Municipality shall annually conduct activities that total at least 12 points and include activities from at least three of the five categories as set forth in Attachment B (Points System for Public Education and Outreach Activities). At a minimum, at least one of the activities shall involve educating businesses and the general public of hazards associated with illicit connections and improper disposal of waste. Records shall be kept necessary to demonstrate compliance with this requirement, including date of activities and any other relevant documentation.

b. The Tier A Municipality shall label all storm drain inlets for those drains that do not have permanent wording cast into the structure of the inlet. The Tier A Municipality shall also maintain the legibility of those labels and replace any labels that are missing or not legible. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for specific measures. This requirement shall include the following:

   i. All storm drain inlets along sidewalks that are adjacent to municipal streets;

   ii. All storm drain inlets within plazas, parking areas or maintenance yards that are operated by the municipality.

c. The Tier A Municipality shall advertise public involvement program(s) pertaining to education and outreach activities on the municipality's website, through a mailing, through newspaper advertisement, or other similar means.

d. Existing Permittee: An existing permittee shall meet the minimum standards of this permit, and the measurable goals (including any recordkeeping) and implementation schedules for Local Public Education and Outreach specified in Attachment A for Existing Permittees (Measurable Goals and Implementation Schedule).

3. Minimum Standards for Construction Site Stormwater Runoff

a. Construction site stormwater runoff activities are authorized under a separate NJPDES permit, generally the Construction Activity Stormwater General Permit No. NJ0088323 pursuant to N.J.A.C. 7:14A-25.6(b)2 (or an individual permit pursuant to N.J.A.C. 7:14A-24.7(a)2). See Part II.C.3.b and www.nj.gov/dep/dwq/5g3.htm. Pursuant to N.J.A.C. 7:14A-25.7(b), the Tier A Municipality is not required to reference construction site stormwater runoff control in its SPPP.

4. Minimum Standards for Post Construction Stormwater Management in New Development and Redevelopment

a. The Tier A Municipality shall develop, update, implement and enforce its stormwater management program to address post construction stormwater runoff in new development and redevelopment and to ensure compliance with the Stormwater Management rules at N.J.A.C. 7:8 et seq. In general, the regulations at N.J.A.C. 7:8:

   i. Contain requirements for stormwater management plans and stormwater control ordinances;

   ii. Provide information for the adoption and implementation of municipal stormwater management plans and regional stormwater management plans; and

   iii. Establish design, performance and maintenance standards for stormwater management measures and establish safety standards for stormwater management basins.

b. The post construction stormwater management program established by the Tier A Municipality shall address stormwater runoff from the following types of major development unless any additional development is defined as "major development" by a municipality's stormwater control ordinance:

   i. New development and redevelopment projects that disturb one acre or more and are not operated by the municipality (e.g. retail stores, residential complexes);

   ii. New development and redevelopment projects that disturb one acre or more and are operated by the municipality itself (e.g. town complex); and

   iii. All new development and redevelopment projects that disturb less than one acre and are part of a larger common plan of development or sale (e.g. phased residential development) that ultimately disturbs one acre or more.

c. The post construction stormwater management program established by the Tier A Municipality shall require compliance with the applicable design, performance and maintenance standards established under N.J.A.C. 7:8 et seq. for major development as defined in this permit.

d. The Tier A Municipality shall review and analyze development applications for compliance with Part IV.B.4 (Post Construction) of this permit even if a separate permit is required by the Department for the same or similar activity (e.g. a Land Use permit).

e. The post construction stormwater management program established by the Tier A Municipality shall ensure that any residential development and redevelopment projects that are subject to the Residential Site Improvement Standards (RSIS) for stormwater management (N.J.A.C. 5:21-7) comply with those standards, including any exception, waiver, or special area standard that was approved under N.J.A.C. 5:21 et seq.

f. The Tier A Municipality shall adopt, amend and implement a written Municipal Stormwater Management Plan (MSWMP), pursuant to N.J.A.C. 7:8 et seq., to describe the framework of the Tier A Municipality's strategy, structure and process for its post construction stormwater management program.

   i. The Tier A Municipality shall submit the adopted plan for approval to the County review agency in accordance with N.J.A.C. 7:8-4;

   ii. The Tier A Municipality shall notify the Department and post the approved plan and any amendments on its website (or otherwise comply with the notification requirements of N.J.A.C. 7:8-4.4(e)) within thirty days of the effective date of the plan. See Part IV.B.1.b.iii (Public Involvement and Participation);

   iii. The Tier A Municipality shall review and update its MSWMP as necessary, and as a part of the reexamination of its municipal master plan in accordance with N.J.A.C. 7:8-4.3(c) and (d).

g. In order to implement the post construction stormwater management program, the Tier A Municipality shall adopt, amend, implement and enforce a municipal stormwater control ordinance. The Tier A Municipality shall develop and adopt the contents of the ordinance in accordance with N.J.A.C. 7:8 et seq. A sample stormwater ordinance consistent with the requirements of the Stormwater Management Rules is posted at www.nj.gov/dep/stormwater/bmp_manual2.htm and a sample stormwater ordinance applicable to Pinelands Area Municipalities is posted at www.nj.gov/dep/stormwater/pinelands.htm. The municipal stormwater control ordinance shall include, at a minimum, the following elements:

i. Control aspects of residential development and redevelopment projects that are not pre-empted by the RSIS;

ii. Control stormwater from non-residential development and redevelopment projects, in accordance with the requirements at N.J.A.C. 7:8 et seq.; and

iii. Set forth special area standards approved by the Site Improvement Advisory Board for residential development or redevelopment projects under N.J.A.C. 5:21-3.5.

h. The Tier A Municipality shall only grant a variance or exemption from the design and performance standards for stormwater management measures if the municipality has a mitigation plan which meets the following requirements:

i. A mitigation plan must be included in an approved MSWMP and stormwater control ordinance(s). The mitigation plan shall identify measures that are necessary to offset the deficit created by granting the variance or exemption, and can be provided through a menu of design and performance standards with corresponding mitigation projects for different drainage areas within the municipality. See Chapter 3 of the NJ Stormwater BMP Manual at www.nj.gov/dep/stormwater/ for guidance; and

ii. The municipality submits, within 30 days after the grant of a variance or exemption, a written report to the county review agency and the Department describing the variance or exemption and the required mitigation. Submit the written report to the Department at:
NJDEP-DWQ-BNPC
Mail Code 401-02B
PO Box 420
Trenton, NJ 08625-0420

i. The Tier A Municipality shall:

i. Enforce, through the stormwater control ordinance(s) or a separate ordinance, compliance with the standards set forth in Attachment C (Design Standards for Storm Drain Inlets) of this permit to control passage of solid and floatable materials through storm drain inlets not installed by the Tier A Municipality; and

ii. Comply with the standards set forth in Attachment C (Design Standards for Storm Drain Inlets) of this permit to control passage of solid and floatable materials through storm drain inlets installed by the municipality.

j. The Tier A Municipality shall ensure adequate long-term cleaning, operation and maintenance of stormwater management measures:

i. Pursuant to Part IV.C.1.a (Stormwater Facilities Maintenance), owned or operated by the Tier A Municipality; and

ii. Pursuant to Part IV.C.1.b (Stormwater Facilities Maintenance), not owned or operated by the Tier A Municipality.

k. For each structural and non-structural stormwater measure (e.g. stormwater management basin, subsurface infiltration/detention system, manufactured treatment device, green infrastructure), the Tier A Municipality shall:

i. Complete a Major Development Stormwater Summary (as posted on the Department's website at www.nj.gov/dep/dwq/tier_a_forms.htm; courtesy copy provided as Attachment D of this permit) when an application is made to the Tier A Municipality after EDPA;

ii. Update the Major Development Stormwater Summary while stormwater measures are being installed;

iii. Finalize the Major Development Stormwater Summary once certificate of occupancy is issued; and

iv. Maintain a completed Major Development Stormwater Summary and make it available to the Department upon request.

l. The Stormwater Management rules (N.J.A.C. 7:8) and the Residential Site Improvement Standards for stormwater management (N.J.A.C. 5:21-7), independently and as implemented in this permit, apply to all areas of the Tier A Municipality.

m. Existing Permittee: An existing permittee shall meet the minimum standards of this permit, and the measurable goals (including any recordkeeping) and implementation schedules for Post Construction Stormwater Management in New Development and Redevelopment specified in Attachment A for Existing Permittees (Measurable Goals and Implementation Schedule).

5. Minimum Standards for Pollution Prevention / Good Housekeeping for Municipal Operators

a. Community Wide Ordinances: The Tier A Municipality shall adopt and enforce the following community wide ordinances to address improper disposal of waste:

i. Pet Waste Ordinance: Adopt and enforce an ordinance that requires pet owners or their keepers to immediately and properly dispose of their pet's solid waste deposited on any property, public or private, not owned or possessed by that person. Information on the Pet Waste Ordinance and the benefits of proper disposal of pet solid waste shall be distributed with pet licenses. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for a sample ordinance.

ii. Wildlife Feeding Ordinance: Adopt and enforce an ordinance that prohibits the feeding of any wildlife (e.g. Canada Geese) in any public park or on any other property owned or operated by the Tier A Municipality. Exclusions include wildlife confined in zoos, parks, or rehabilitation centers as well the following unconfined animals: (1) wildlife at environmental education centers; (2) feral cats as part of an approved Trap-Neuter-Release program; and (3) other kinds of unconfined animals, if any, that the ordinance specifically lists and excludes for reasons set forth in the ordinance. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for a sample ordinance.

iii. Litter Control Ordinance: Adopt and enforce a litter ordinance or enforce the existing State litter statute at N.J.S.A 13:1E-99.3. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for a sample ordinance.

iv. Improper Disposal of Waste Ordinance: Adopt and enforce an ordinance prohibiting the improper spilling, dumping, or disposal of materials other than stormwater into the MS4 system excluding those discharges as allowable under Part II.C.2.b. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for a sample ordinance.

v. Containerized Yard Waste/Yard Waste Collection Program Ordinances: (1) Adopt and enforce an ordinance that prohibits placing non-containerized yard wastes (defined as leaves and/or grass clippings) into the street; or (2) develop and implement a non-containerized yard waste collection and disposal program that includes adoption and enforcement of an ordinance that prohibits placing non-containerized yard waste at the curb or along the street within 10 feet of any storm drain inlet and at any time other than a set yard waste collection schedule. The frequency of yard waste pickups shall be determined at the discretion of the Tier A Municipality but shall be part of a set yard waste collection schedule which is noticed to all municipal residents and businesses. Any area, which the municipality determines to have no yard waste, will be exempt from the collections. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for sample ordinances.

vi. Private Storm Drain Inlet Retrofitting Ordinance: Adopt and enforce an ordinance requiring the retrofitting of existing storm drain inlets on private property to meet the standard in Attachment C (Design Standard for Storm Drain Inlets). Specifically, this ordinance: 1) shall apply to storm drain inlets, on property not owned or operated by the Tier A Municipality (e.g. condominium associations), that are in direct contact (i.e. contiguous) to repaving; repairing (excluding individual pothole repair); resurfacing (including top coating or chip sealing with asphalt emulsion or a thin base of hot bitumen); and reconstruction or alteration of facilities; and 2) shall not apply to a residential lot with one single family house. For a sample ordinance see www.nj.gov/dep/dwq/tier_a.htm.

vii. Additional ordinance requirements of this permit are found at Part IV.B.4.g (Stormwater Control Ordinance) above and Part IV.B.6.d (Illicit Connection Ordinance) below.

b. Community Wide Measures: The Tier A Municipality shall develop and continue to implement the following community wide pollution prevention/good housekeeping measures to control solids and floatables:

i. Street Sweeping: Tier A Municipalities shall sweep, at a minimum of once per month (weather and street surface conditions permitting), all streets (including roads or highways) that meet all of the following criteria: (1) the street is owned or operated by the municipality; (2) the street is curbed and has storm drains; (3) the street has a posted speed limit of 35 miles per hour or less; (4) the street is not an entrance or exit ramp; and (5) the street is in a predominantly commercial area.

ii. Catch Basin and Storm Drain Inlet Inspection and Cleaning: The Tier A Municipality shall inspect storm drain inlets and any associated catch basins that it owns or operates and remove sediment, trash, or debris when present. Each catch basin and inlet shall be inspected at least once every five years. The Tier A Municipality shall clean any municipally owned or operated storm drain inlet or catch basin as frequently as necessary to eliminate recurring problems and restore proper function.

iii. Tier A Municipality Storm Drain Inlet Retrofit: The Tier A Municipality shall retrofit existing Tier A Municipality owned or operated storm drain inlets that are: (1) in direct contact with any repaving, repairing (excluding individual pothole repair), or resurfacing (including top coating or chip sealing with asphalt emulsion or a thin base of hot bitumen); or (2) in direct contact with any reconstruction or alteration of facilities. Storm drain inlet retrofits shall meet the standard in Attachment C (Design Standards for Storm Drain Inlets).

c. Municipal Maintenance Yards and Other Ancillary Operations: The Tier A Municipality shall implement the best management practices described in Attachment E (Best Management Practices for Municipal Maintenance Yards and Other Ancillary Operations) for municipal maintenance yards and other ancillary operations owned or operated by the Tier A Municipality. Ancillary operations include but are not limited to impound yards, permanent and mobile fueling locations, and yard trimmings and wood waste management sites. The Inventory of Material and Machinery, and Inspections and Good Housekeeping practices specified in Attachment E shall be conducted at all municipal maintenance yards and other ancillary operations. Best Management Practices shall be implemented for the following activities, whenever such activities occur:

   i. Fueling Operations;

   ii. Discharge of Stormwater from Secondary Containment;

   iii. Vehicle Maintenance;

   iv. On-Site Equipment and Vehicle Washing and Wash Wastewater Containment;

   v. Salt and De-icing Material Storage and Handling;

   vi. Aggregate Material and Construction Debris Storage;

   vii. Street Sweepings, Catch Basin Clean Out, and Other Material Storage;

   viii. Yard Trimmings and Wood Waste Management Sites that are owned and operated by the Tier A Municipality; and

   ix. Roadside Vegetation Management.

d. Employee Training: The Tier A Municipality shall develop, update and implement an employee training program to address Tier A MS4 NJPDES permit components and SPPP requirements. All municipal employees shall receive training on those stormwater topics applicable to their title and duties within 3 months of commencement of duties. Records including sign in sheet(s), date(s) of training, and training agenda(s) shall be kept in the SPPP. Training shall occur at least once every two years, unless otherwise specified below:

   i. Yard Waste Collection Program (if applicable) – Provide training on frequency of yard waste pickups and schedule; and policy for how and when yard waste can be placed curbside. See Part IV.B.5.a.v (Yard Waste Ordinance).

   ii. Monthly Sweeping of Certain Streets in Predominantly Commercial Areas - Provide training on sweeping schedules and proper management of materials collected. See Part IV.B.5.b.i (Street Sweeping).

   iii. Illicit Connection Elimination and Outfall Pipe Mapping - Provide training on the impacts associated with illicit connections and details of the program including investigation techniques, physical observations, field sampling, and mapping procedures. See Part IV.B.6 (MS4 Outfall Pipe Mapping, and Illicit Discharge) and the National Menu of Stormwater Best Management Practices at www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater.

   iv. Outfall Pipe Stream Scouring Detection and Control - Provide training on how to identify outfall pipe stream scouring and contributing factors. See Part IV.B.6.b (Stream Scouring).

v. Maintenance Yard Operations (including Ancillary Operations) - Provide training annually on inventory of materials and machinery, inspections and good housekeeping; fueling operations; discharge of stormwater from secondary containment; vehicle maintenance; on-site equipment and vehicle washing and wash wastewater containment; salt and de-icing material storage and handling; aggregate material and construction debris storage; street sweeping, catch basin clean out, and other material storage; yard trimmings and wood waste management sites. See Part IV.B.5.c (Municipal Maintenance Yards and Other Ancillary Operations).

vi. Waste Disposal Education - Provide training on the impacts associated with improper waste disposal, how to respond to inquiries regarding improper waste disposal, and appropriate enforcement authority.

vii. Municipal Ordinances - Provide training on the following ordinances: Pet Waste Ordinance; Wildlife Feeding Ordinance; Litter Control Ordinance; Improper Disposal of Waste Ordinance; Containerized Yard Waste/Yard Waste Collection Ordinance; and the Private Storm Drain Inlet Ordinance. Training shall include an overview of these ordinance requirements, enforcement policies and the repercussions of non-compliance with these ordinances. See Part IV.B.5.a (Community Wide Ordinances).

viii. Stormwater Facility Maintenance – Provide training annually on maintenance of stormwater facilities, and catch basin and inlet cleaning methods. See Part IV.C.1 (Stormwater Facilities Maintenance), and Part IV.B.5.b.ii (Catch Basin and Storm Drain Inlets).

ix. Construction Activity/Post-Construction Stormwater Management in New Development and Redevelopment - Provide general training on the permitting requirements for construction activity and Post-Construction Stormwater Management in New Development and Redevelopment. See Part IV.B.3 (Construction Site Runoff) and B.4 (Post Construction).

x. Provide general training annually on the Tier A Municipality's SPPP, applicable recordkeeping requirements, and detailed training on any component applicable to an employee's title and duties. See Part IV.F (SPPP).

xi. Training may also be conducted on stormwater-related topics that serve an educational purpose for employees.

e. Stormwater Management Design Review Training: The Tier A Municipality shall ensure that all design engineers, municipal engineers and other individuals that review the stormwater management design for development and redevelopment projects on behalf of the municipality, complete the Department approved Stormwater Management Design Review Course (see www.nj.gov/dep/stormwater/training.htm) once every five years. This includes those individuals that review any projects that are subject to the Tier A Municipality's municipal stormwater management plan and control ordinance as described in Part IV.B.4 (Post Construction). Individuals that will review stormwater management design and have not completed this course within the past five years must attend the next scheduled course offering. If unable to attend, the Tier A Municipality must notify the Department in writing no later than thirty days after the missed course offering explaining why attendance was not possible and what alternate arrangements are being made. Training completed within five calendar years prior to EDPA qualifies towards this requirement. The Tier A Municipality is required to maintain a list of the dates and names of training program participants in its SPPP.

f. Municipal Board and Governing Body Member Related Training: The Tier A Municipality shall ensure that municipal board and governing body members that review and approve applications for development and redevelopment projects, complete the "Asking the Right Questions in Stormwater Review Training Tool" posted at www.nj.gov/dep/stormwater/training.htm. This includes those individuals that review any projects for compliance with Part IV.B.4 (Post Construction) of this permit. Training must be completed by current municipal board and governing body members on or before EDPA + 6 months and by new members within six months of commencing duties. Once per term of service thereafter, municipal board and governing body members must review at least of one of the tools offered under Post-Construction Stormwater Management found at the website above. The Tier A Municipality is required to maintain a list of the dates and names of training program participants in its SPPP.

g. Existing Permittee: An existing permittee shall meet the minimum standards of this permit, and the measurable goals (including any recordkeeping) and implementation schedules for Pollution Prevention / Good Housekeeping for Municipal Operators specified in Attachment A for Existing Permittees (Measurable Goals and Implementation Schedule).

6. Minimum Standards for MS4 Outfall Pipe Mapping, and Illicit Discharge and Scouring Detection and Control

a. Outfall Pipe Mapping: Tier A Municipalities shall develop, update and maintain an outfall pipe map showing the location of the end of all MS4 outfall pipes (tidal and non-tidal) owned or operated by the Tier A Municipality which discharge to a surface water body. The outfall pipe map shall:

i. Be current at the end of each calendar year;

ii. Show the location (and name, where known to the municipality) of all surface water bodies receiving discharges from those outfall pipes;

iii. Be included in the SPPP;

iv. Be provided to the Department by Existing Permittees on or before EDPA + 12 months and by New Permittees on or before EDPA + 36 months. New data points subsequently added to the map shall be provided to the Department annually thereafter; and

v. Be submitted electronically by December 21, 2020 via the Department's designated electronic submission service.

b. Stream Scouring: Tier A Municipalities shall develop, update and implement a program to detect, investigate and control any localized stream scouring from stormwater outfall pipes owned or operated by the municipality. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for specific measures. The Tier A Municipality shall, at a minimum:

i. Inspect each outfall pipe which discharges to a stream for localized stream scouring in the vicinity of the outfall pipe. Each outfall pipe shall be inspected at least once every five years;

ii. Inspect any outfall pipes newly identified in compliance with Part IV.B.6.a for localized stream scouring in the vicinity of the outfall pipe;

iii. When localized stream scouring is detected, document sources of stormwater that contribute to the outfall pipes identified in i and ii, above. Each identified source shall be investigated; and (1) where identified sources are located on property owned or operated by the Tier A Municipality, corrective action to reduce stormwater rate or volume shall be taken by the municipality when feasible, or (2) where identified sources are within the jurisdiction of but not located on property owned or operated by the Tier A Municipality, the municipality shall ensure proper operation and maintenance of stormwater facilities located thereon pursuant to Part IV.C.1.b (Stormwater Facilities Maintenance), below;

iv. Prioritize, schedule and complete remediation of identified localized stream scouring and take action based upon the requirements of Part IV.B.6.b.iii(1) and (2), above. If not completed, a schedule for completion shall be maintained as required in Part IV.C.1.a.iv (Stormwater Facilities Maintenance); and

v. All stream scouring restoration shall be made in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey at N.J.A.C. 2:90-1 (e.g., Conduit Outlet Protection 12-1) and the requirements for bank stabilization and channel restoration found at N.J.A.C. 7:13 et seq. All associated maintenance or repairs to stormwater facilities shall be made in accordance N.J.A.C 7:8.

c. Illicit Discharge Detection and Elimination: The Tier A Municipality shall develop, update, implement and enforce an ongoing Illicit Discharge Detection and Elimination Program in accordance with this permit. This program shall be documented in the written SPPP, as required in Part IV.F.1.a.iii (SPPP). See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for specific measures. See also USEPA Guidance at www3.epa.gov/npdes/pubs/idde_manualwithappendices.pdf. The Tier A Municipality shall, at a minimum:

i. Conduct visual dry weather inspection of all outfall pipes owned or operated by the municipality at least once every five years to determine if dry weather flow or other evidence of illicit discharge is present. Dry weather flow is flow occurring 72 hours after a rain event.

ii. Investigate the source if evidence of illicit discharge is found;

iii. Eliminate non-stormwater discharges that are traced to their source and found to be illicit connections;

iv. Document investigations and actions taken using the Department's Illicit Connection Inspection Report Form. See www.nj.gov/dep/dwq/tier_a_forms.htm;

v. Inspect any outfall pipes newly identified in compliance with Part IV.B.6.a for illicit discharges;

vi. Investigate dry weather flows discovered during routine inspection and maintenance of other elements of the MS4; and

vii. Investigate, within three months of receipt, complaints and reports of illicit connections, including those from operating entities of interconnected MS4s.

d. The Tier A Municipality shall adopt and enforce an ordinance that prohibits illicit connections to the municipal separate storm sewer system operated by the Tier A Municipality. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for a sample ordinance.

e. Existing Permittee: An existing permittee shall meet the minimum standards of this permit, and the measurable goals (including any recordkeeping) and implementation schedules for MS4 Outfall Pipe Mapping, and Illicit Discharge and Scouring Detection and Control specified in Attachment A for Existing Permittees (Measurable Goals and Implementation Schedule).

C. Other Control Measures

1. Minimum Standards for Stormwater Facilities Maintenance

a. The Tier A Municipality shall develop, update and implement a program to ensure adequate long-term cleaning, operation and maintenance of all municipally owned or operated stormwater facilities.

i. Stormwater facility inspection and maintenance must be performed pursuant to any maintenance plans, or more frequently as needed, to ensure the proper function and operation of the stormwater facility. See www.nj.gov/dep/stormwater/maintenance_guidance.htm.

ii. The Tier A Municipality shall maintain a log sufficient to demonstrate compliance with this section; including but not limited to the stormwater facility inspected, location information of the facility inspected (location information must be specific enough to locate and identify the stormwater facility in the field; e.g. geographic coordinates), name of inspector, date of inspection, findings, and any preventative and corrective maintenance performed. Example Maintenance Logs and Inspection Records forms which are sufficient to demonstrate compliance with this section are available at www.nj.gov/dep/stormwater/maintenance_guidance.htm.

iii. The Tier A Municipality shall certify annually that municipally owned or operated stormwater facilities are properly functioning.

iv. If stormwater facilities were found not to be functioning properly and repairs were not made, then necessary preventive and corrective maintenance shall be documented and prioritized, and a schedule for such repairs shall be maintained. The Tier A Municipality shall prioritize this schedule based upon but not limited to: (1) environmental, health and safety concerns; (2) the findings of catch basin and storm drain inlet inspections performed pursuant to Part IV.B.5.b.ii, above; (3) the findings of stream scouring inspections performed pursuant to Part IV.B.6.b, above; and (4) to incorporate the findings pursuant to Part IV.C.2 (TMDL Information), below.

b. The Tier A Municipality shall develop, update, implement and enforce a program to ensure adequate long-term cleaning, operation and maintenance of stormwater facilities not owned or operated by the Tier A Municipality, not subject to the conditions of another NJPDES stormwater permit and constructed after February 7, 1984.

i. The Tier A Municipality shall ensure that stormwater facility maintenance is performed pursuant to any maintenance plans, or more frequently as needed to ensure the proper function and operation of the stormwater facility. See www.nj.gov/dep/stormwater/maintenance_guidance.htm.

ii. The Tier A Municipality shall maintain a log sufficient to demonstrate compliance with this section; including but not limited to the actions taken by the municipality to enforce compliance with the long-term cleaning, operation and maintenance program; the stormwater facility that was the subject of the action; location information of the facility that was the subject of the action (location information must be specific enough to locate and identify the stormwater facility in the field; e.g. geographic coordinates); the name of person taking the action; the date of the action; and the findings. Example Maintenance Logs and Inspection Records forms which are sufficient to demonstrate compliance with this section are available at www.nj.gov/dep/stormwater/maintenance_guidance.htm.

c. The Tier A Municipality shall maintain copies of all maintenance plans, as defined in Notes and Definitions Part IV.B.1.g of this permit, for stormwater facilities approved by the municipality. The Tier A municipality shall make copies of these maintenance plans available to the Department upon request.

d. Existing Permittee: An existing permittee shall meet the minimum standards of this permit, and the measurable goals (including any recordkeeping) and implementation schedules for Stormwater Facilities Maintenance specified in Attachment A for Existing Permittees (Measurable Goals and Implementation Schedule).

2. Minimum Standards for Total Maximum Daily Load (TMDL) Information

a. Incorporation of TMDL Information Into the SPPP

i. The Tier A Municipality shall annually review approved or adopted TMDL reports to identify stormwater related pollutants listed therein and associated with any segment of surface water wholly or partially within or bordering the Tier A Municipality. This information may be accessed at www.nj.gov/dep/dwq/msrp-tmdl-rh.htm;

ii. The Tier A Municipality shall use TMDL information identified in i, above to, at a minimum, (1) assist in the prioritization of stormwater facility maintenance including schedules for repairs required at Part IV.B.6.b.iv (Stream Scouring) and IV.C.1.a.iv (Stormwater Facilities Maintenance), above; and (2) identify and develop strategies to address specific sources of stormwater related pollutants contributing to discharges authorized under this Tier A MS4 NJPDES permit. Strategies may include but are not limited to those found in the implementation section of approved or adopted TMDL reports (for examples see "Total Maximum Daily Load (TMDL) Guidance for Tier A MS4 Permittees" found at www.nj.gov/dep/dwq/msrp-tmdl-rh.htm); and

iii. The Tier A Municipality shall annually update its SPPP to list information identified in i and ii, above; and

iv. The Tier A Municipality shall incorporate any strategies identified in ii(2), above as an Optional Measure. See Part IV.E (Optional Measures) and Part IV.F.1.c (SPPP), below.

b. Existing Permittee: An existing permittee shall meet the minimum standards of this permit, and the measurable goals (including any recordkeeping) and implementation schedules for Total Maximum Daily Load (TMDL) Information specified in Attachment A for Existing Permittees (Measurable Goals and Implementation Schedule).

D. Additional Measures

1. Incorporation of Additional Measures

a. Additional Measures are non-numeric (e.g., best management practices) or numeric effluent limitations that are expressly required to be included in a Tier A Municipality's stormwater program by a TMDL; a regional stormwater management plan; other elements of an adopted areawide Water Quality Management Plan; or the adopted Statewide Water Quality Management Plan.

b. The Department will provide written notice of the adoption of any Additional Measure(s) to any affected Tier A Municipality. The Department will list each adopted Additional Measure in a minor modification to the Tier A MS4 NJPDES permit. For any required Additional Measure(s) other than numeric effluent limitations, the required Additional Measure(s) will specify the best management practices that shall be implemented and the measurable goals. The required Additional Measure(s) will also specify the implementation schedule.

E. Optional Measures

1. Incorporation of Optional Measures

a. Optional Measures are BMPs, developed by the Tier A Municipality, that extend beyond the requirements of the Tier A MS4 NJPDES permit and that prevent or reduce pollution to waters of the State.

b. The Tier A Municipality may, at its own discretion, incorporate Optional Measures into its MS4 stormwater program. Such BMPs shall be identified in the SPPP as Optional Measures.

c. Failure to implement an Optional Measure identified in the SPPP shall not be considered a violation of the NJPDES permit.

2. Refuse Container / Dumpster Ordinance

a. Tier A Municipalities have the option of adopting and enforcing an ordinance requiring dumpsters and other refuse containers that are outdoors or exposed to stormwater to be covered at all times. This ordinance serves to prevent the spilling, dumping, leaking, or otherwise discharge of liquids, semi-liquids or solids from the containers. This ordinance is not intended for litter receptacles; individual homeowner trash and recycling containers; containers that hold large bulky items (e.g., furniture, bound carpet and padding); permitted temporary demolition containers; and refuse containers at industrial facilities authorized to discharge stormwater under a valid NJPDES permit. For a sample ordinance see www.nj.gov/dep/dwq/tier_a.htm.

F. Stormwater Pollution Prevention Plan (SPPP)

1. SPPP Requirements

a. The Tier A Municipality shall develop, update, implement, and maintain a written SPPP (see the Tier A Municipal Guidance document www.nj.gov/dep/dwq/tier_a_guidance.htm) that:

i. Identifies the person designated as the Municipal Stormwater Program Coordinator (Stormwater Coordinator) per Part IV.F.2, below and the members of the SPPP Team.

ii. Documents the municipality's Tier A MS4 Stormwater Program including a description of shared or contracted services as allowed under Part IV.F.4, below.

iii. Describes the measures necessary for compliance with all components of the Tier A MS4 NJPDES permit including all measures described in Part IV.B, C, D and E above.

iv. Reflects the measurable goals, implementation schedules, record keeping and other requirements in Attachment A for Existing Permittees and Attachment A-1 for New Permittees (Measurable Goals and Implementation Schedule).

b. The Tier A Municipality's Stormwater Coordinator shall sign and date the SPPP per Part IV.F.3, below.

c. The Tier A Municipality shall review the SPPP at least annually and update it as often as necessary to reflect changes related to the municipality's Tier A MS4 Stormwater Program. Any amendments to the SPPP:

i. Shall continue to meet the requirements of this permit;

ii. Shall be signed and dated by the Stormwater Coordinator; and

iii. Shall be retained for a period of at least five years from the date of amendment unless the Department issues a written notice to extend the retention period.

d. The SPPP shall include any records required by this Tier A MS4 NJPDES permit. See Attachment A for Existing Permittees and Attachment A-1 for New Permittees (Measurable Goals and Implementation Schedule) for additional detail.

e. The Department may notify the Tier A Municipality at any time that the SPPP does not meet one or more of the minimum requirements. Within thirty (30) days after receiving such notification unless otherwise specified by the Department, the Tier A Municipality shall amend the SPPP to adequately address all deficiencies, and written certification of such amendments shall be submitted to the Department.

f. The current SPPP shall be posted on the Tier A Municipality's website no later than EDPA + 90 days with updates posted annually thereafter. The version posted on the website can exclude:

i. Inspection logs and other required record keeping; and

ii. The names of SPPP Team members but must include the name of the Stormwater Coordinator.

g. The SPPP shall be made available to the Department and public upon request pursuant to N.J.A.C. 7:14A-25.6(j)2.

2. Designation of the Municipal Stormwater Program Coordinator (Stormwater Coordinator)

a. Each Tier A Municipality shall designate a Stormwater Coordinator.

b. The Stormwater Coordinator shall be either a principal executive officer or a ranking elected official as required at N.J.A.C. 7:14A-4.9(a)3;

c. A principal executive officer or ranking elected official of the Tier A Municipality may assign this responsibility, as allowed at N.J.A.C. 7:14A-4.9(b), to a duly authorized representative who has overall responsibility for the operation of municipal stormwater facilities or municipal environmental matters;

d. If an assignment under b or c, above changes, then a new assignment of responsibility shall be submitted to the Department. This is accomplished through completion of the online MSRP Annual Report (see Part IV.G Annual Report and Certification below) or the Stormwater Program Coordinator Information Update Sheet posted at www.nj.gov/dep/dwq/pdf/msrp_update_form.pdf. This information shall be submitted to the Department within 30 days of such change taking place.

3. Responsibilities of the Municipal Stormwater Program Coordinator (Stormwater Coordinator)

a. The Tier A Municipality shall designate a Municipal Stormwater Program Coordinator (Stormwater Coordinator). The Stormwater Coordinator is responsible for:

i. Coordinating the permittee's implementation of the SPPP and Tier A MS4 NJPDES permit conditions;

ii. Signing and dating the SPPP;

iii. Coordinating the completion and submittal of the Annual Report and Certification; and

iv. Certifying, signing and dating the Annual Report.

4. Implementation of SPPP Conditions through Shared or Contracted Services

a. The Tier A Municipality may rely on another governmental, private, or nonprofit entity to satisfy one or more of the Tier A Municipality's MS4 NJPDES permit conditions, or component thereof, through the implementation of best management practices or control measures. This is only allowable provided the following conditions are met:

i. The other entity implements the best management practice(s) or control measure(s);

ii. The particular best management practice(s) or control measure(s), or component(s) thereof, is at least as stringent or as frequent as the corresponding NJPDES permit requirement;

iii. The other entity agrees in writing or is required by law to implement the measure(s), or component(s) thereof, in such a manner that is in compliance with the Tier A MS4 NJPDES permit on the Tier A Municipality's behalf; and

iv. The Tier A Municipality specifies in its SPPP (1) which NJPDES permit conditions will be implemented by another entity and (2) the name of the responsible entity.

b. For any projects or activities which the Tier A Municipality assigns to another entity which is a private contractor, the awarded contract shall require the contractor to conduct such projects or activities in such a manner that is in compliance with the Tier A MS4 NJPDES permit.

c. The Tier A Municipality is responsible for compliance with this permit if the other entity fails to implement the measure(s) or component(s), thereof.

G. Annual Report and Certification

1. Reporting Requirements

a. The Tier A Municipality shall complete an Annual Report, including any Supplemental Questions, using the electronic format provided by the Department via the MSRP Annual Report service accessed through the Regulatory Services Portal (www.njdeponline.com). The Annual Report shall summarize the status of compliance with the conditions of this permit. Specifically, this includes compliance for the subject year between January 1 and December 31 with the Statewide Basic Requirements (Part IV.B), Other Control Measures (Part IV.C), Additional Measures (Part IV.D), Optional Measures (Part IV.E), Stormwater Pollution Prevention Plan (Part IV.F), and any other Tier A MS4 NJPDES permit conditions listed on the Annual Report form, including Supplemental Questions.

b. The Stormwater Coordinator shall certify, sign and date the Annual Report.

c. Submit an Annual Report and Certification: on or before May 1st annually to the Department through the Regulatory Services Portal (instructions at www.nj.gov/dep/dwq/tier_a.htm).

d. A copy of each Annual Report and Certification shall be kept at a central location and shall be made available to the Department for inspection.

e. The Tier A Municipality shall retain the Annual Report and Certification as well as any records required to be kept by this permit for a period of at least five years.

f. The Tier A Municipality shall document in the Annual Report (1) if it relies on another entity to satisfy one or more of the Tier A Municipality's MS4 NJPDES permit conditions as described in Part IV.F.4.a (Implementation of SPPP Conditions through Shared or Contracted Services), above; (2) which NJPDES permit conditions will be satisfied by another entity; and (3) the name of the governmental, private, or nonprofit entity.

Attachment A – Measurable Goals and Implementation Schedule for Existing Permittees

General

The following table specifies the Measurable Goals and Implementation Schedule of this Tier A MS4 NJPDES Permit for Existing Permittees. Each Measurable Goal and Implementation Schedule is associated with a permit citation and a summary of the associated Minimum Standard. The summary of Minimum Standard column represents a paraphrase of permit conditions. Actual Minimum Standards are found in Part IV of the permit.

An indication of whether the cited Minimum Standard is a new requirement is provided in the last column. Where a requirement is not new and not modified (and for some that are modified), the Existing Permittee is expected to be in compliance on the Effective Date of Permit Authorization (EDPA). For most new requirements (and for some modified requirements), additional time is provided for achieving compliance.

See below for specific Measurable Goals that shall be documented in the SPPP. **The SPPP shall be updated as required by Part IV.F.1.c, above.** The Implementation Schedule refers to the date that a Minimum Standard must be incorporated into the Tier A Municipality's stormwater program, along with any ongoing requirements. In addition to the requirements of Part IV.F.1 above, the SPPP shall identify and discuss the Minimum Standard of each Statewide Basic Requirement (Part IV.B, above) and Other Control Measures (Part IV.C, above) where the following information is required for each item:

- Describe the method of implementation;
- Include required recordkeeping;
- Include an implementation schedule, consistent with permit requirements, including interim milestones;
- Include any special diagrams required by the permit (e.g., stormwater facilities map); and
- Include inspection and maintenance schedules, as appropriate.

This table does not include Measurable Goals and an Implementation Schedule for the Notes and Definitions Part IV, Part IV.A (Permit Overview), Part IV.D (Additional Measures), IV.E (Optional Measures), IV.F (SPPP), and IV.G (Annual Report and Certification) because these are not Statewide Basic Requirements or Other Control Measures (see N.J.A.C. 7:14A-25.6). While not included in this table, Notes and Definitions Part IV, Part IV.A, D, E, F, and G are permit requirements and compliance is required.

Measurable Goals for Statewide Basic Requirements and Other Conditions of this Permit for Existing Permittees				
Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
Public Involvement and Participation Including Public Notice				
Provide for public notice under the Open Public Meetings Act, statutory procedures for enactment of ordinances, and Municipal Land Use Law when providing for public participation in the development and implementation of a stormwater program, and maintain records necessary to demonstrate compliance.	IV.B.1.a & d	Certify in each annual report that all public notice requirements have been met and relevant records kept. Reference in the SPPP the location of associated municipal records.	EDPA	No
Provide the current SPPP to the public upon request.	IV.B.1.b.i	Certify in each annual report that the SPPP was made available to the public.	EDPA	No
Post the current SPPP on the municipality's website.	IV.B.1.b.ii	Certify in each annual report that the SPPP has been posted on the municipality's website (to the extent required by Part IV.F.1.f) and that the posted SPPP is current.	EDPA + 90 days	Yes
Post the current Municipal Stormwater Management Plan (MSWMP) and related ordinances on the municipality's website.	IV.B.1.b.iii	Certify in each annual report that the MSWMP and related ordinances have been posted on the municipality's website and that the posted documents are current.	EDPA + 90 days	Yes
Local Public Education and Outreach				
Implementation of a Public Education and Outreach Program by conducting activities that total a minimum of 12 points on an annual basis.	IV.B.2.a	Certify in each annual report that the minimum point value has been met and report point totals in the Annual Report. Maintain records of materials and activities from Attachment B, including dates of activities and any other relevant documentation (e.g. brochures, pictures, sign-in sheets, press clippings).	EDPA	Modified
Label storm drain inlets, maintain the legibility of those labels, and replace labels that are missing or not legible along sidewalks that are adjacent to municipal streets; and within plazas, parking areas or maintenance yards operated by the municipality.	IV.B.2.b	Certify in each annual report that storm drains have been properly labeled and/or maintained. Records tracking storm drain inlet label status shall be kept with the SPPP.	EDPA	No

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
Advertise public involvement program(s) pertaining to education and outreach activities.	IV.B.2.c	Certify in each annual report that public involvement program(s) have been properly advertised on the website, through a mailing, through newspaper advertisement, or other similar means. Public advertisement records shall be kept with the SPPP.	EDPA + 12 months	Yes
Post Construction Stormwater Management in New Development and Redevelopment				
Develop, update, implement and enforce its post construction stormwater management program in new development and redevelopment to ensure compliance with the Stormwater Management rules (N.J.A.C. 7:8).	IV.B.4.a, b, c, d, e, f, g, h, i, j, l	Certify in each annual report that the Tier A Municipality has developed, and is implementing and enforcing a program to address stormwater runoff from new development and redevelopment projects. Records demonstrating compliance with Part IV.B.4 shall be kept, or their location shall be referenced, in the SPPP.	EDPA	No
For each structural and non-structural stormwater measure (e.g. basins), for which an application is made to the municipality after EDPA, the municipality shall complete, update, finalize and maintain a Major Development Stormwater Summary.	IV.B.4.k	Certify in each annual report that Major Development Stormwater Summaries (Attachment D) have been completed and records have been maintained by the Tier A municipality. Records demonstrating compliance with Part IV.B.4 shall be kept, or their location shall be referenced, in the SPPP.	EDPA	Yes
Pollution Prevention/Good Housekeeping - Community Wide Ordinances				
Adopt and enforce a pet waste ordinance. Distribute pet waste ordinance information with pet licenses.	IV.B.5.a.i	Certify in each annual report the date the ordinance was adopted, that it is being enforced and that pet waste ordinance information is distributed with pet licenses. A log of enforcement actions and information distribution dates shall be kept in the SPPP.	EDPA	No
Adopt and enforce a wildlife feeding ordinance.	IV.B.5.a.ii	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA	No

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
Adopt and enforce a litter control ordinance.	IV.B.5.a.iii	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA	No
Adopt and enforce an improper disposal of waste ordinance.	IV.B.5.a.iv	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA	No
Adopt and enforce a containerized yard waste / yard waste collection program ordinance.	IV.B.5.a.v	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA	No
Adopt and enforce a private storm drain inlet retrofitting ordinance	IV.B.5.a.vi	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA	No
Pollution Prevention/Good Housekeeping - Community Wide Measures				
Develop and continue to implement street sweeping measures as specified at Part IV.B.5.b.i.	IV.B.5.b.i	Certify in each annual report that a street sweeping schedule is being maintained as well as records including the date and areas swept, number of miles of streets swept, and the total amount of materials collected in wet tons. Include totals in the Annual Report and keep records in the SPPP.	EDPA	No
Develop and continue to implement catch basin and storm drain inlet inspection and cleaning measures as specified at Part IV.B.5.b.ii.	IV.B.5.b.ii	Certify in each annual report that a catch basin and storm drain inlet inspection and cleaning schedule is being maintained, and a log indicating the number of municipally owned and operated catch basins and inlets within the municipality, the number of catch basins and inlets inspected, and the number cleaned is being maintained. Maintain records documenting the amount of materials collected in wet tons during cleaning activities in the SPPP. Include totals in the Annual Report.	EDPA	Modified

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
Develop and continue to implement storm drain inlet retrofit measures as specified at Part IV.B.5.b.iii.	IV.B.5.b.iii	Certify in each annual report that a record of the number and location of storm drain inlets retrofitted as well as the number and location of storm drain inlets exempted is being maintained. Include totals in the Annual Report and keep records in the SPPP.	EDPA	No
Pollution Prevention/Good Housekeeping - Municipal Maintenance Yards and Other Ancillary Operations				
Implement the BMP's found in Attachment E, including the Inventory of Materials and Machinery, and Inspections and Good Housekeeping practices, at Municipal Maintenance Yards and Other Ancillary Operations.	IV.B.5.c	Certify in each annual report that the SPPP includes all applicable requirements and that the requirements (including maintenance of inspection logs and tracking forms) of Attachment E have been met. Keep records required by Attachment E in the SPPP.	EDPA	No
BMPs shall be implemented for fueling operations.	IV.B.5.c.i	Certify in each annual report that BMPs in Attachment E have been implemented for fueling operations.	EDPA	No
BMPs shall be implemented for discharge of stormwater from secondary containment.	IV.B.5.c.ii	Certify in each annual report that BMPs in Attachment E have been implemented for discharge of stormwater from secondary containment.	EDPA	No
BMPs shall be implemented for vehicle maintenance.	IV.B.5.c.iii	Certify in each annual report that BMPs in Attachment E have been implemented for vehicle maintenance.	EDPA	No
BMPs shall be implemented for on-site equipment and vehicle washing and wash wastewater containment.	IV.B.5.c.iv	Certify in each annual report that BMPs in Attachment E have been implemented for on-site equipment and vehicle washing and wash wastewater containment.	EDPA	Modified
BMPs shall be implemented for salt and de-icing material storage and handling.	IV.B.5.c.v	Certify in each annual report that BMPs in Attachment E have been implemented for salt and de-icing material storage and handling.	EDPA	No
BMPs shall be implemented for aggregate material and construction debris storage.	IV.B.5.c.vi	Certify in each annual report that BMPs in Attachment E have been implemented for aggregate material and construction debris storage.	EDPA + 12 months	Yes

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
BMPs shall be implemented for street sweepings and catch basin clean-out material storage.	IV.B.5.c.vii	Certify in each annual report that BMPs in Attachment E have been implemented for street sweepings and catch basin clean-out material storage.	EDPA + 12 months	Yes
BMPs shall be implemented for yard trimmings and wood waste management sites.	IV.B.5.c.viii	Certify in each annual report that BMPs in Attachment E have been implemented for yard trimmings and wood waste management sites.	EDPA + 12 months	Yes
BMPs shall be implemented for roadside vegetation management.	IV.B.5.c.ix	Certify in each annual report that BMPs in Attachment E have been implemented for roadside vegetation management.	EDPA + 12 months	Yes
Pollution Prevention/Good Housekeeping - Training Program				
Provide training to municipal employees within 3 months of commencement of duties, and at least once every two years thereafter, to address all required components. The exceptions are Part IV.B.5.d.v, viii, and x which require annual training instead of once every two years.	IV.B.5.d	Certify in each annual report that employee training has been conducted, and maintain records including sign in sheet(s), date(s) of training, and training agenda(s). These records shall be kept in the SPPP.	EDPA + 12 months	Modified
Ensure that individuals that review development and redevelopment projects for compliance with N.J.A.C. 7:8 on behalf of the municipality complete Department approved training once every five years.	IV.B.5.e	Certify in each annual report that individuals reviewing projects have completed the required training, and maintain a list of the names and dates that individuals received training. This list shall be kept in the SPPP.	EDPA + 12 months	Yes
Ensure that current Municipal Board and Governing Body Members that review and approve applications for development and redevelopment projects complete the "Training Tool" on or before EDPA + 6 months, and by new members within 6 months of commencement of duties. Once per term of service thereafter, Municipal Board and Governing Body Members must review at least one of the tools offered under the Post-Construction Stormwater Management website.	IV.B.5.f	Certify in each annual report that municipal board and governing body members have completed the necessary training, and maintain a list of the names and dates that individuals completed training. This list shall be kept in the SPPP.	EDPA + 6 months	Yes

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
MS4 Outfall Pipe Mapping and Illicit Discharge and Scouring Detection and Control				
Develop, update and maintain an MS4 Outfall Pipe Map showing the location of the end of all outfall pipe which discharge to a surface water body.	IV.B.6.a.i	Certify in each annual report that the outfall pipe map is current at the end of the calendar year.	EDPA	No
Show the location (and name where known) of all surface water bodies receiving discharges from those outfall pipes.	IV.B.6.a.ii	Certify in each annual report that the surface water bodies associated with each outfall pipe end is located on the map.	EDPA	No
Include Outfall Pipe map in the SPPP	IV.B.6.a.iii	Certify in each annual report following the implementation deadline that the Outfall Pipe Map is included in the SPPP.	EDPA +12 months	Yes
Provide Outfall Pipe Map to the Department	IV.B.6.a.iv	Certify in each annual report following the implementation deadline that the Outfall Pipe Map and any new data points subsequently added to the map have been provided to the Department.	EDPA +12 months	Yes
Submitted the Outfall Pipe Map information to the Department electronically by December 21, 2020	IV.B.6.a.v	Submit the Outfall Pipe Map information to the Department using Department's designated electronic submission service by December 21, 2020.	12/21/2020	Yes
Develop, update and implement a program to detect, investigate and control localized stream scouring from stormwater outfall pipes.	IV.B.6.b	Certify in each annual report that municipally owned outfall pipes have received the required visual inspection at least once every five years and maintain a log indicating the number and location of outfall pipes inspected, repairs prioritized, and repairs scheduled or performed. Certify in the annual report that a repair schedule has been prepared for those that have not been completed. Keep records required by Part IV.B.6.b in the SPPP.	EDPA + 12 months	Modified

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
Develop, update, implement and enforce an ongoing Illicit Discharge Detection and Elimination Program.	IV.B.6.c	Certify in each annual report that the municipality has developed a program to detect and eliminate illicit discharges and has conducted inspections required at Part IV.B.6.c at least once every five years. Document all investigations and actions taken on the Department's Illicit Connection Inspection Report Form. Keep records required by Part IV.B.6.c in the SPPP.	EDPA	Modified
Adopt and enforce an ordinance that prohibits illicit connections to the MS4 operated by the Tier A Municipality.	IV.B.6.d	Certify in each annual report that the ordinance is being maintained and the date it was adopted. A log of enforcement actions shall be kept in the SPPP.	EDPA	No
Stormwater Facilities Maintenance				
Develop, update and implement a program to ensure adequate long-term cleaning, operation and maintenance of all stormwater facilities owned or operated by the Tier A Municipality.	IV.C.1.a	Certify in each annual report that the municipality has developed, updated and implemented a program to ensure adequate long-term cleaning, operation and maintenance of all municipally owned stormwater facilities. Records required by Part IV.C.1.a, a.i, a.ii, a.iii and a.iv shall be kept, or their location shall be referenced, in the SPPP.	EDPA	Modified
Inspect and maintain stormwater facilities pursuant to any maintenance plans, or more frequently as needed, to ensure proper function and operation of each stormwater facility.	IV.C.1.a.i	Certify in each annual report that inspections and maintenance was performed pursuant to any maintenance plans, or more frequently as needed, to ensure proper function and operation of stormwater facilities.	EDPA	Modified

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
Maintain a log sufficient to demonstrate compliance with this section; including but not limited a list of inspections and preventative and corrective maintenance performed, and a schedule for repairs to be made.	IV.C.1.a.ii	Certify in each annual report that a maintenance log is kept that, at a minimum, records the stormwater facility inspected, location information of the facility inspected (location information must be specific enough to locate and identify the stormwater facility in the field; e.g. geographic coordinates), name of inspector, date of inspection, findings, and any preventative and corrective maintenance performed.	EDPA	Modified
Certify annually that municipally owned or operated stormwater facilities are properly functioning.	IV.C.1.a.iii	Certify in each annual report that all municipally owned or operated stormwater facilities are properly functioning.	EDPA	No
If stormwater facilities were found not to be functioning properly and repairs not made, then necessary preventative and corrective maintenance shall be documented and prioritized and a schedule for maintenance shall be maintained.	IV.C.1.a.iv	Certify in each annual report that a prioritized schedule of necessary preventive and corrective maintenance exists for stormwater facilities inspected and found not to be functioning properly. The municipality shall prioritize this schedule as specified in Part IV.C.1.iv.	EDPA	Modified
Develop, update, implement and enforce a program to ensure adequate long-term cleaning, operation and maintenance of stormwater facilities not owned or operated by the Tier A Municipality, not subject to the conditions of another NJPDES stormwater permit and constructed after February 7, 1984.	IV.C.1.b	Certify in each annual report that the municipality has developed, updated, implemented and enforced a program to ensure adequate long-term cleaning, operation and maintenance of stormwater facilities not owned and operated by the municipality, not subject to the conditions of another NJPDES stormwater permit and constructed after February 7, 1984. Records required by Part IV.C.1.b, b.i and b.ii shall be kept, or their location shall be referenced, in the SPPP.	EDPA + 12 months	Modified

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
Ensure that stormwater facility inspection and maintenance is performed pursuant to any maintenance plans, or more frequently as needed to ensure proper function and operation of each stormwater facility.	IV.C.1.b.i	Certify in each annual report that maintenance was performed pursuant to any maintenance plans, or more frequently, to ensure proper function and operation of stormwater facilities not owned and operated by the municipality.	EDPA + 12 months	Modified
Maintain a log sufficient to demonstrate compliance with this section; including but not limited actions taken by the municipality to enforce compliance with the long-term cleaning, operation and maintenance program.	IV.C.1.b.ii	Certify in each annual report that a log is being kept that, at a minimum, records the actions taken by the municipality to enforce compliance with the long-term cleaning, operation and maintenance program; the stormwater facility that was the subject of the action; location information of the facility that was the subject of the action (location information must be specific enough to locate and identify the stormwater facility in the field; e.g. geographic coordinates); the name of person taking the action; the date of the action; and the findings.	EDPA + 12 months	Modified
Maintain copies of all maintenance plans for stormwater facilities approved by the municipality, and make them available to the Department upon request.	IV.C.1.c	Certify in each annual report that copies of all maintenance plans are kept on file. Records required by Part IV.C.1.c shall be kept, or their location shall be referenced, in the SPPP.	EDPA + 12 months	Yes
Total Maximum Daily Load (TMDL) Info.				
Annually review approved or adopted TMDL reports to identify stormwater related pollutants listed therein and associated with any segment of surface water wholly or partially within or bordering the Tier A Municipality.	IV.C.2.a.i	Certify in each annual report that approved or adopted TMDLs have been identified and reviewed and stormwater related pollutants identified. Records required by Part IV.C.2.a.i, a.ii and a.iii shall be kept in the SPPP.	EDPA + 12 months	Yes

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**	**New Requirement?**
Use TMDL information identified in compliance with Part IV.C.2.a.i to: (1) assist in the prioritization of stormwater facility maintenance including schedules for repairs related to Stream Scouring and Stormwater Facilities Maintenance; and (2) identify and develop strategies to address specific sources of stormwater related pollutants contributing to discharges authorized under this Tier A MS4 NJPDES permit.	IV.C.2.a.ii	Certify in each annual report that the municipality has used information identified in compliance with Part VI.C.2.a.i to (1) assist in the prioritization of repairs as required at Part IV.B.6.b.iv (Stream Scouring) and IV.C.31.a.iv (Stormwater Facilities Maintenance); and (2) identify and develop strategies to address specific sources of stormwater related pollutants contributing to discharges authorized under this Tier A MS4 NJPDES permit.	EDPA + 12 months	Yes
Update SPPP to list information identified in Part VI.C.2.a.i and ii.	IV.C.2.a.iii	Certify in each annual report that the municipality has updated its SPPP to list information identified in Part VI.C.2.a.i and ii.	EDPA + 12 months	Yes
Incorporate any strategies identified in Part VI.C.2.a.ii(2) as an Optional Measure	IV.C.2.a.iv	Certify in each annual report that the municipality has incorporated any strategies identified in Part VI.C.2.a.ii(2) as an Optional Measure.	EDPA + 12 months	Yes

Attachment A-1 – Measurable Goals and Implementation Schedule for New Permittees

General

The following table specifies the Measurable Goals and Implementation Schedule of this Tier A MS4 NJPDES Permit for New Permittees. Each Measurable Goal and Implementation Schedule is associated with a permit citation and a summary of the associated Minimum Standard. The summary of Minimum Standard column represents a paraphrase of permit conditions. Actual Minimum Standards are found in Part IV of the permit.

See below for specific Measurable Goals that shall be documented in the SPPP. **The SPPP shall be created by EDP + 12 months and updated on annual basis thereafter as required by Part IV.F.** The Implementation Schedule refers to the date that a Minimum Standard must be incorporated into the Tier A Municipality's stormwater program, along with any ongoing requirements. In addition to the requirements of Part IV.F above, the SPPP shall identify and discuss the Minimum Standard of each Statewide Basic Requirement (Part IV.B, above) and Other Control Measures (Part IV.C, above) where the following information is required for each item:

- Describe the method of implementation;
- Include required recordkeeping;
- Include an implementation schedule, consistent with permit requirements, including interim milestones;
- Include any special diagrams required by the permit (e.g., stormwater facilities map); and
- Include inspection and maintenance schedules, as appropriate.

This table does not include Measurable Goals and an Implementation Schedule for the Notes and Definitions Part IV, Part IV.A (Permit Overview), Part IV.D (Additional Measures), IV.E (Optional Measures), IV.F (SPPP), and IV.G (Annual Report and Certification) because these are not Statewide Basic Requirements or Other Control Measures (see N.J.A.C. 7:14A-25.6). While not included in this table, Notes and Definitions Part IV, Part IV.A, D, E, F, and G are permit requirements and compliance is required.

Measurable Goals for Statewide Basic Requirements and Other Conditions of this Permit for New Permittees			
Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**
Public Involvement and Participation Including Public Notice			
Provide for public notice under the Open Public Meetings Act, statutory procedures for enactment of ordinances, and Municipal Land Use Law when providing for public participation in the development and implementation of a stormwater program, and maintain records necessary to demonstrate compliance.	IV.B.1.a & d	Certify in each annual report that all public notice requirements have been met and relevant records kept. Reference in the SPPP the location of associated municipal records.	EDPA
Provide the current SPPP to the public upon request.	IV.B.1.b.i	Certify in each annual report that the SPPP was made available to the public.	EDPA + 12 months
Post the current SPPP on the municipality's website.	IV.B.1.b.ii	Certify in each annual report that the SPPP has been posted on the municipality's website (to the extent required by Part IV.F.1.f) and that the posted SPPP is current.	EDPA + 12 months)
Post the current Municipal Stormwater Management Plan (MSWMP) and related ordinances on the municipality's website.	IV.B.1.b.iii	Certify in each annual report that the MSWMP and related ordinances have been posted on the municipality's website and that the posted documents are current.	EDPA + 90 days
Local Public Education and Outreach			
Implementation of a Public Education and Outreach Program by conducting activities that total a minimum of 12 points on an annual basis.	IV.B.2.a	Certify in each annual report that the minimum point value has been met and report point totals in the Annual Report. Maintain records of materials and activities from Attachment B, including dates of activities and any other relevant documentation (e.g. brochures, pictures, sign-in sheets, press clippings).	EDPA

Summary of Minimum Standard (See Part IV for specific permit requirements)	**Permit Cite**	**Measurable Goal** (See Part IV for specific permit requirements)	**Implementation Schedule**
Label storm drain inlets, maintain the legibility of those labels, and replace labels that are missing or not legible along sidewalks that are adjacent to municipal streets; and within plazas, parking areas or maintenance yards operated by the municipality.	IV.B.2.b	Certify in each annual report that storm drains have been properly labeled and/or maintained. Records tracking storm drain inlet label status shall be kept with the SPPP.	EDPA
Advertise public involvement program(s) pertaining to education and outreach activities.	IV.B.2.c	Certify in each annual report that public involvement program(s) have been properly advertised on the website, through a mailing, through newspaper advertisement, or other similar means. Public advertisement records shall be kept with the SPPP.	EDPA + 12 months
Post Construction Stormwater Management in New Development and Redevelopment			
Develop, update, implement and enforce its post construction stormwater management program in new development and redevelopment to ensure compliance with the Stormwater Management rules (N.J.A.C. 7:8).	IV.B.4.a, b, c, d, e, f, g, h, i, j, l	Certify in each annual report that the Tier A Municipality has developed, and is implementing and enforcing a program to address stormwater runoff from new development and redevelopment projects. Records demonstrating compliance with Part IV.B.4 shall be kept, or their location shall be referenced, in the SPPP.	EDPA
For each structural and non-structural stormwater measure (basins), for which an application is made to the municipality after EDPA, the municipality shall complete, update, finalize and maintain a Major Development Stormwater Summary.	IV.B.4.k	Certify in each annual report that Major Development Stormwater Summaries (Attachment D) have been completed and records have been maintained by the Tier A municipality. Records demonstrating compliance with Part IV.B.4 shall be kept, or their location shall be referenced, in the SPPP.	EDPA

Pollution Prevention/Good Housekeeping - Community Wide Ordinances			
Adopt and enforce a pet waste ordinance. Distribute pet waste ordinance information with pet licenses.	IV.B.5.a.i	Certify in each annual report the date the ordinance was adopted, that it is being enforced and that pet waste ordinance information is distributed with pet licenses. A log of enforcement actions and information distribution dates shall be kept in the SPPP.	EDPA + 12 months
Adopt and enforce a wildlife feeding ordinance.	IV.B.5.a.ii	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA + 12 months
Adopt and enforce a litter control ordinance.	IV.B.5.a.iii	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA + 12 months
Adopt and enforce an improper disposal of waste ordinance.	IV.B.5.a.iv	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA + 12 months
Adopt and enforce a containerized yard waste / yard waste collection program ordinance.	IV.B.5.a.v	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA + 12 months
Adopt and enforce a private storm drain inlet retrofitting ordinance	IV.B.5.a.vi	Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.	EDPA + 12 months
Pollution Prevention/Good Housekeeping - Community Wide Measures			
Develop and continue to implement street sweeping measures as specified at Part IV.B.5.b.i.	IV.B.5.b.i	Certify in each annual report that a street sweeping schedule is being maintained as well as records including the date and areas swept, number of miles of streets swept, and the total amount of materials collected in wet tons. Include totals in the Annual Report and keep records in the SPPP.	EDPA + 24 months

Develop and continue to implement catch basin and storm drain inlet inspection and cleaning measures as specified at Part IV.B.5.b.ii.	IV.B.5.b.ii	Certify in each annual report that a catch basin and storm drain inlet inspection and cleaning schedule is being maintained, and a log indicating the number of municipally owned and operated catch basins and inlets within the municipality, the number of catch basins and inlets inspected, and the number cleaned is being maintained. Maintain records documenting the amount of materials collected in wet tons during cleaning activities in the SPPP. Include totals in the Annual Report.	EDPA + 24 months
Develop and continue to implement storm drain inlet retrofit measures as specified at Part IV.B.5.b.iii.	IV.B.5.b.iii	Certify in each annual report that a record of the number and location of storm drain inlets retrofitted as well as the number and location of storm drain inlets exempted is being maintained. Include totals in the Annual Report and keep records in the SPPP.	EDPA + 12 months
Pollution Prevention/Good Housekeeping - Municipal Maintenance Yards and Other Ancillary Operations			
Implement the BMP's found in Attachment E, including the Inventory of Materials and Machinery, and Inspections and Good Housekeeping practices, at Municipal Maintenance Yards and Other Ancillary Operations.	IV.B.5.c	Certify in each annual report that the SPPP includes all applicable requirements and that the requirements (including maintenance of inspection logs and tracking forms) of Attachment E have been met. Keep records required by Attachment E in the SPPP.	EDPA + 12 months
BMPs shall be implemented for fueling operations.	IV.B.5.c.i	Certify in each annual report that BMPs in Attachment E have been implemented for fueling operations.	EDPA + 12 months
BMPs shall be implemented for discharge of stormwater from secondary containment.	IV.B.5.c.ii	Certify in each annual report that BMPs in Attachment E have been implemented for discharge of stormwater from secondary containment.	EDPA + 12 months
BMPs shall be implemented for vehicle maintenance.	IV.B.5.c.iii	Certify in each annual report that BMPs in Attachment E have been implemented for vehicle maintenance.	EDPA + 12 months

BMPs shall be implemented for on-site equipment and vehicle washing and wash wastewater containment.	IV.B.5.c.iv	Certify in each annual report that BMPs in Attachment E have been implemented for on-site equipment and vehicle washing and wash wastewater containment.	EDPA + 60 months
BMPs shall be implemented for salt and de-icing material storage and handling.	IV.B.5.c.v	Certify in each annual report that BMPs in Attachment E have been implemented for salt and de-icing material storage and handling.	EDPA + 60 months
BMPs shall be implemented for aggregate material and construction debris storage.	IV.B.5.c.vi	Certify in each annual report that BMPs in Attachment E have been implemented for aggregate material and construction debris storage.	EDPA + 18 months
BMPs shall be implemented for street sweepings and catch basin clean-out material storage.	IV.B.5.c.vii	Certify in each annual report that BMPs in Attachment E have been implemented for street sweepings and catch basin clean-out material storage.	EDPA + 18 months
BMPs shall be implemented for yard trimmings and wood waste management sites.	IV.B.5.c.viii	Certify in each annual report that BMPs in Attachment E have been implemented for yard trimmings and wood waste management sites.	EDPA + 18 months
BMPs shall be implemented for roadside vegetation management.	IV.B.5.c.ix	Certify in each annual report that BMPs in Attachment E have been implemented for roadside vegetation management.	EDPA + 18 months
Pollution Prevention/Good Housekeeping - Training Program			
Provide training to municipal employees within 3 months of commencement of duties, and at least once every two years thereafter, to address all required components. The exceptions are Part IV.B.5.d.v, viii, and x which require annual training instead of once every two years.	IV.B.5.d	Certify in each annual report that employee training has been conducted, and maintain records including sign in sheet(s), date(s) of training, and training agenda(s). These records shall be kept in the SPPP.	EDPA + 12 months
Ensure that individuals that review development and redevelopment projects for compliance with N.J.A.C. 7:8 on behalf of the municipality complete Department approved training once every five years.	IV.B.5.e	Certify in each annual report that individuals reviewing projects have completed the required training, and maintain a list of the names and dates that individuals received training. This list shall be kept in the SPPP.	EDPA + 12 months

Ensure that current Municipal Board and Governing Body Members that review and approve applications for development and redevelopment projects complete the "Training Tool" on or before EDPA + 6 months, and by new members within 6 months of commencement of duties. Once per term of service thereafter, Municipal Board and Governing Body Members must review at least one of the tools offered under the Post-Construction Stormwater Management website.	IV.B.5.f	Certify in each annual report that municipal board and governing body members have completed the necessary training, and maintain a list of the names and dates that individuals completed training. This list shall be kept in the SPPP.	EDPA + 6 months
MS4 Outfall Pipe Mapping and Illicit Discharge and Scouring Detection and Control			
Develop, update and maintain an MS4 Outfall Pipe Map showing the location of the end of all outfall pipe which discharge to a surface water body.	IV.B.6.a.i	Certify in each annual report following the implementation deadline that the outfall pipe map is current at the end of the calendar year.	EDPA + 36 months
Show the location (and name where known) of all surface water bodies receiving discharges from those outfall pipes.	IV.B.6.a.ii	Certify in each annual report following the implementation deadline that the surface water bodies associated with each outfall pipe end is located on the map.	EDPA + 36 months
Include Outfall Pipe map in the SPPP	IV.B.6.a.iii	Certify in each annual report following the implementation deadline that the Outfall Pipe Map is included in the SPPP.	EDPA + 36 months
Provide Outfall Pipe Map to the Department	IV.B.6.a.iv	Certify in each annual report following the implementation deadline that the Outfall Pipe Map and any new data points subsequently added to the map have been provided to the Department.	EDPA + 36 months
Submitted the Outfall Pipe Map information to the Department electronically by December 21, 2020	IV.B.6.a.v	Submit the Outfall Pipe Map information to the Department using Department's designated electronic submission service by December 21, 2020.	12/21/2020

Develop, update and implement a program to detect, investigate and control localized stream scouring from stormwater outfall pipes.	IV.B.6.b	Certify in each annual report that municipally owned outfall pipes have received the required visual inspection at least once every five years and maintain a log indicating the number and location of outfall pipes inspected, repairs prioritized, and repairs scheduled or performed. Certify in the annual report that a repair schedule has been prepared for those that have not been completed. Keep records required by Part IV.B.6.b in the SPPP.	EDPA + 60 months
Develop, update, implement and enforce an ongoing Illicit Discharge Detection and Elimination Program.	IV.B.6.c	Certify in each annual report that the municipality has developed a program to detect and eliminate illicit discharges and has conducted inspections required at Part IV.B.6.c at least once every five years. Document all investigations and actions taken on the Department's Illicit Connection Inspection Report Form. Keep records required by Part IV.B.6.c in the SPPP.	EDPA + 60 months
Adopt and enforce an ordinance that prohibits illicit connections to the MS4 operated by the Tier A Municipality.	IV.B.6.d	Certify in each annual report that the ordinance is being maintained and the date it was adopted. A log of enforcement actions shall be kept in the SPPP.	EDPA + 12 months
Stormwater Facilities Maintenance			
Develop, update and implement a program to ensure adequate long-term cleaning, operation and maintenance of all stormwater facilities owned or operated by the Tier A Municipality.	IV.C.1.a	Certify in each annual report that the municipality has developed, updated and implemented a program to ensure adequate long-term cleaning, operation and maintenance of all municipally owned stormwater facilities. Records required by Part IV.C.1.a, a.i, a.ii, a.iii and a.iv shall be kept, or their location shall be referenced, in the SPPP.	EDPA + 18 months

Inspect and maintain stormwater facilities pursuant to any maintenance plans, or more frequently as needed, to ensure proper function and operation of each stormwater facility.	IV.C.1.a.i	Certify in each annual report that inspections and maintenance was performed pursuant to any maintenance plans, or more frequently as needed, to ensure proper function and operation of stormwater facilities.	EDPA + 18 months
Maintain a log sufficient to demonstrate compliance with this section; including but not limited a list of inspections and preventative and corrective maintenance performed, and a schedule for repairs to be made.	IV.C.1.a.ii	Certify in each annual report that a maintenance log is kept that, at a minimum, records the stormwater facility inspected, location information of the facility inspected (location information must be specific enough to locate and identify the stormwater facility in the field; e.g. geographic coordinates), name of inspector, date of inspection, findings, and any preventative and corrective maintenance performed.	EDPA + 18 months
Certify annually that municipally owned or operated stormwater facilities are properly functioning.	IV.C.1.a.iii	Certify in each annual report that all municipally owned or operated stormwater facilities are properly functioning.	EDPA + 18 months
If stormwater facilities were found not to be functioning properly and repairs not made, then necessary preventative and corrective maintenance shall be documented and prioritized and a schedule for maintenance shall be maintained.	IV.C.1.a.iv	Certify in each annual report that a prioritized schedule of necessary preventive and corrective maintenance exists for stormwater facilities inspected and found not to be functioning properly. The municipality shall prioritize this schedule as specified in Part IV.C.1.iv.	EDPA + 18 months
Develop, update, implement and enforce a program to ensure adequate long-term cleaning, operation and maintenance of stormwater facilities not owned or operated by the Tier A Municipality, not subject to the conditions of another NJPDES stormwater permit and constructed after February 7, 1984.	IV.C.1.b	Certify in each annual report that the municipality has developed, updated, implemented and enforced a program to ensure adequate long-term cleaning, operation and maintenance of stormwater facilities not owned and operated by the municipality, not subject to the conditions of another NJPDES stormwater permit and constructed after February 7, 1984. Records required by Part IV.C.1.b, b.i and b.ii shall be kept, or their location shall be referenced, in the SPPP.	EDPA + 18 months

Ensure that stormwater facility inspection and maintenance is performed pursuant to any maintenance plans, or more frequently as needed to ensure proper function and operation of each stormwater facility.	IV.C.1.b.i	Certify in each annual report that maintenance was performed pursuant to any maintenance plans, or more frequently, to ensure proper function and operation of stormwater facilities not owned and operated by the municipality.	EDPA + 18 months
Maintain a log sufficient to demonstrate compliance with this section; including but not limited actions taken by the municipality to enforce compliance with the long-term cleaning, operation and maintenance program.	IV.C.1.b.ii	Certify in each annual report that a log is being kept that, at a minimum, records the actions taken by the municipality to enforce compliance with the long-term cleaning, operation and maintenance program; the stormwater facility that was the subject of the action; location information of the facility that was the subject of the action (location information must be specific enough to locate and identify the stormwater facility in the field; e.g. geographic coordinates); the name of person taking the action; the date of the action; and the findings.	EDPA + 18 months
Maintain copies of all maintenance plans for stormwater facilities approved by the municipality, and make them available to the Department upon request.	IV.C.1.c	Certify in each annual report that copies of all maintenance plans are kept on file. Records required by Part IV.C.1.c shall be kept, or their location shall be referenced, in the SPPP.	EDPA + 12 months
Total Maximum Daily Load (TMDL) Info.			
Annually review approved or adopted TMDL reports to identify stormwater related pollutants listed therein and associated with any segment of surface water wholly or partially within or bordering the Tier A Municipality.	IV.C.2.a.i	Certify in each annual report that approved or adopted TMDLs have been identified and reviewed and stormwater related pollutants identified. Records required by Part IV.C.2.a.i, a.ii and a.iii shall be kept in the SPPP.	EDPA + 12 months

Use TMDL information identified in compliance with Part IV.C.2.a.i to: (1) assist in the prioritization of stormwater facility maintenance including schedules for repairs related to Stream Scouring and Stormwater Facilities Maintenance; and (2) identify and develop strategies to address specific sources of stormwater related pollutants contributing to discharges authorized under this Tier A MS4 NJPDES permit.	IV.C.2.a.ii	Certify in each annual report that the municipality has used information identified in compliance with Part VI.C.2.a.i to (1) assist in the prioritization of repairs as required at Part IV.B.6.b.iv (Stream Scouring) and IV.C.31.a.iv (Stormwater Facilities Maintenance); and (2) identify and develop strategies to address specific sources of stormwater related pollutants contributing to discharges authorized under this Tier A MS4 NJPDES permit.	EDPA + 12 months
Update SPPP to list information identified in Part VI.C.2.a.i and ii.	IV.C.2.a.iii	Certify in each annual report that the municipality has updated its SPPP to list information identified in Part VI.C.2.a.i and ii.	EDPA + 12 months
Incorporate any strategies identified in Part VI.C.2.a.ii(2) as an Optional Measure	IV.C.2.a.iv	Certify in each annual report that the municipality has incorporated any strategies identified in Part VI.C.2.a.ii(2) as an Optional Measure.	EDPA + 12 months

Attachment B – Points System for Public Education and Outreach Activities

The Tier A Municipality shall implement a Public Education and Outreach Program that focuses on educational and pollution prevention activities about the impacts of stormwater discharges on surface water and groundwater and to involve the public in reducing pollutants in stormwater runoff and mitigating flow.

The Tier A Municipality shall **annually** conduct educational activities that total at least **12 points** and include activities from at least three of the five categories found below. At a minimum, at least one of the activities shall involve educating businesses and the general public of hazards associated with illicit connections and improper disposal of waste. Each approved activity is listed below with an assigned point value. Additional information on how to conduct these Public Education and Outreach activities can be found under Notes and Definitions Part IV.A.3 and 4 of this Tier A MS4 NJPDES permit. Records shall be kept necessary to demonstrate compliance with this requirement, including date of activities and any other relevant documentation.

Category 1: General Public Outreach		
Activity	**Description**	**Points**
Website and Social Media	Maintain a stormwater related page on the municipal website or on a municipal social media site. The web page may include links to other stormwater related resources, including the NJDEP stormwater website (www.njstormwater.org).	1
Newspaper Ad	Use Department created and approved stormwater education materials available on www.cleanwaternj.org to publish an ad in a newspaper or newsletter that serves the municipality.	1
Radio/Television	Broadcast a radio or television public service announcement from www.cleanwaternj.org on a local radio or municipal public service channel.	1
Green Infrastructure Signage	Post signs at municipally-owned green infrastructure sites that describe the function and importance of the infrastructure, contact phone number, municipal identification number, and/or website for more information. *New signs receive 0.5 credits per sign. Existing signs that are maintained or upgraded receive 0.25 credits per sign. A maximum of 5 credits are allowed.	5*
Billboard/Sign	Produce and maintain (for credit in subsequent years) a billboard or sign which can be displayed on a bus, bus stop shelter, recreation field (outfield sign), or other similar public venue.	2
Mural	Produce and maintain (for credit in subsequent years) the planning and painting of a stormwater pollution themed mural, storm drain art or other artwork at a local downtown/commercial area or other similar public venue.	2
Stormwater Facility Signage	Post signs at municipally-owned stormwater management basins or other structural stormwater related facilities that describe the function and importance of the facility, contact phone number, municipal identification number, and/or website for more information. *New signs receive 0.5 credits per sign. Existing signs that are maintained or upgraded receive 0.25 credits per sign. A maximum of 5 credits are allowed.	5*

Category 2: Targeted Audiences Outreach		
Activity	**Description**	**Points**
Stormwater Display	Present a stormwater related display or materials at any municipal event (e.g., Earth Day, town picnic), at the municipal building or other similar public venue.	1
Promotional Item	Distribute an item or items with a stormwater related message (e.g., refrigerator magnets, temporary tattoos, key chains, bookmarks, pet waste bag dispensers, coloring books, and pens or pencils). Municipality must initially have available a minimum number of the items equal to 10% of the municipal population.	2
Mailing or e-Mailing Campaign	Provide information to all known owners of stormwater facilities not owned or operated by the municipality (i.e., privately owned) highlighting the importance of proper maintenance of stormwater measures. For assistance, see information at www.nj.gov/dep/stormwater/maintenance_guidance.htm.	3
Mailing or e-Mailing Campaign	Distribute any of the Department's educational brochures, tip cards, or a municipally produced equivalent (e.g., community calendar, newsletter, or recycling schedule) via a mailing to every resident and business in the municipality.	2
Ordinance Education	Distribute a letter or e-mail from the mayor or municipal official to every resident and business in the municipality highlighting the requirements and environmental benefits of the Pet Waste, Wildlife Feeding, Litter Control, Improper Disposal of Waste, Containerized Waste/Yard Waste Collection, Private Storm Drain Inlet Retrofitting and Illicit Connection ordinances. Provide a link to the municipal website where subject ordinances are posted.	3

Category 3: School / Youth Education and Activities		
Activity	**Description**	**Points**
School Presentations	Provide water-related educational presentation(s) and/or activities to local preschool, elementary, middle, and/or high school classes using municipal staff or local partner organizations. Topics could include stormwater, nonpoint source pollution, watersheds, water conservation and water quality. For ideas, see information at www.nj.gov/dep/seeds. *Presentations receive 1 credit per presentation, with a maximum of 5 credits allowed.	5*
Water Education Workshops	Provide water-related professional development workshops for local teachers from a registered NJ Department of Education Professional Development Provider.	2
Storm Drain Labeling	Organize a project to label and/or maintain storm drain labels (that are not already precast with a message) with a scout troop, local school district, or faith based group, or other community youth group for a minimum of 40 labels. This project could also include stenciling over precast labels to improve legibility.	3
Educational Contest for Schools	Organize an educational contest with a local school district or a local community organization serving youth to design a poster, magnet, rain stick, rain barrel or other craft/art object. Contest themes shall have an appropriate stormwater message. Winning entries are to be displayed at publicly accessible locations within the municipality such as at the town hall, library, post office, or school. The winning design should be shown on the municipality's website or social media site, if practical.	3
AmeriCorps Event	Coordinate an event (e.g. volunteer stream monitoring, educational presentations, or stormwater awareness project) through AmeriCorps NJ Watershed Ambassador Program	4
Clean-up	Sponsor or organize a litter clean up for a scout troop, local school district, faith based group or other community youth group along a local waterway, public park, stormwater facility, or in an area with storm drains that discharge to a local lake or waterway.	3

Category 4: Watershed/Regional Collaboration		
Activity	**Description**	**Points**
Regional Stormwater Collaboration	Participate in a regional stormwater, community collaborative or other watershed-based group on a regular basis to discuss impaired waterbodies, TMDLs, regional stormwater related issues, or watershed restoration plans that address those waterbodies. Evaluate, develop and implement remedies that resolve stormwater-related issues within the affected waterbody or watershed.	3
Green Infrastructure Workshop	Organize or participate in a rain barrel, rain garden or other green infrastructure workshop on a regional or watershed basis. This could be a partnership exercise with a local watershed organization, utility, university, school, youth/faith based group, and/or other organization.	3
Community Activity	Organize or participate in the organization of a regional or watershed based event to carry out stormwater activities such as stormwater facility maintenance or litter clean-up. The municipality may identify and enter into a partnership agreement with a local group such as a watershed organization, utility, university, school, youth/faith based group, and/or other organization to carry out these activities.	3

Category 5: Community Involvement Activities		
Activity	**Description**	**Points**
Volunteer Stormwater Assessment or Stream Monitoring	Establish a volunteer stormwater facility assessment (inspection, inventory and/or mapping) or stream monitoring program for a waterbody within the municipality in order to gauge the health of the waterway through chemical, biological or visual monitoring protocols. Contact NJDEP's AmeriCorps NJ Watershed Ambassador Program or review USEPA National Directory of Volunteer Monitoring Programs.	3
Rain Barrel Workshop	Organize or participate in a rain barrel workshop. This could be a partnership exercise with a local watershed organization, university, school, youth/faith based group, and/or other nonprofit.	3
Rain Garden Workshop	Organize or participate in a rain garden training or installation workshop. This could be a partnership exercise with a local watershed organization, university, school, youth/faith based group, and/or other nonprofit.	3
Community Event	Organize or participate in the organization of a community event to carry out stormwater activities such as stormwater measure maintenance or a stream buffer restoration. The municipality may identify and enter into a partnership agreement with a local group such as a watershed organization, university, utility, school, youth/faith based group, and/or other nonprofit to carry out these activities.	3
Community Involvement	Organize a project with a local organization to create and post signs at either green and/or gray stormwater infrastructure sites or facilities that describe the function and importance of the facility, contact phone number, municipal identification number, and/or website for more information. *Signs receive 0.5 credits per sign. A maximum of 5 credits are allowed.	5*

Attachment C - Design Standards for Storm Drain Inlets

Application of Design Standard

The below design standard applies to the following types of storm drain inlet installation or retrofit projects unless a more stringent standard is specified by the municipality's stormwater control ordinance:

- Storm drain inlets installed as part of new development and redevelopment (public or private) that disturb one acre or more;
    - Storm drain inlets installed as part of new development and redevelopment (public or private) that disturb less than one acre that are part of a larger common plan of development or sale (e.g. phased residential development) that ultimately disturbs one acre or more;
- Tier A Municipality owned or operated storm drain inlets must be retrofitted where the storm drains are (1) in direct contact with any repaving, repairing (excluding individual pothole repair), or resurfacing (including top coating or chip sealing with asphalt emulsion or a thin base of hot bitumen); or (2) in direct contact with any reconstruction or alteration of facilities; and
- Privately owned or operated storm drain inlets (e.g. condomium association) must be retrofitted where the storm drains are (1) in direct contact with anyrepaving, repairing (excluding individual pothole repair), or resurfacing (including top coating or chip sealing with asphalt emulsion or a thin base of hot bitumen); or (2) in direct contact with any reconstruction or alteration of facilities. This does not include single family homes.

Design Standard

Grates in pavement or other ground surfaces shall meet either of the following standards:

- The New Jersey Department of Transportation (NJDOT) bicycle safe grate standards described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (see www.nj.gov/transportation/publicat/pdf/BikeComp/introtofac.pdf); or
- A grate where each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is not greater than 0.5 inches across the smallest dimension. Note that the Residential Site Improvement Standards at N.J.A.C. 5:21include requirements for bicycle safe grates.

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 used to collect stormwater from the surface into a storm drain or surface water body.

For curb-openings inlets, including curb-opening inlets in combination inlets, the clear space in the curb opening, or each individual clear space if the curb opening has two or more clear spaces, shall have an area of no more than seven (7.0) square inches or be no greater than two (2.0) inches across the smallest dimension.

Exemptions from the Design Standard

- Where each individual clear space in the curb opening in existing curb-opening inlets does not have an area of more than nine (9.0) square inches;

- Where the review agency determines that the standards would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets;

- Where flows from the water quality design storm as specified in N.J.A.C. 7:8 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

  A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or

  A bar screen having a bar spacing of 0.5 inches;

  Note that these exemptions do not authorize any infringement of requirements in the Residential Site Improvement Standards for bicycle safe grates in new residential development (N.J.A.C. 5:21-4.18(b)2 and 7.4(b)1).

- Where flows are conveyed through a trash rack that has parallel bars with one inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in N.J.A.C. 7:8; or

- Where the Department 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 the standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

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 (circle all that apply): Residential Commercial Industrial Other (please specify) _____
6. Soil Conservation District Project Number:
7. Did project require 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.: _____ WQ DS: _____
Runoff Computation Method (circle one): 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 (circle one)
2. Owner (circle 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 (circle one): 2 Year Difference NJGRS Other NA
8. Groundwater Mounding Analysis (circle 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*
10. Type of Basin: Surface/Subsurface (circle one)
11. Owner (circle one): Public Private: If so, Name: Phone number:
12. Basin Construction Completion Date:
13. Drain Down Time (hr.):
14. Design Soil Permeability (in./hr.):
15. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
16. Groundwater Recharge Methodology (circle one): 2 Year Difference NJGRS Other NA
17. Groundwater Mounding Analysis (circle one): Yes No If, Yes Methodology Used:
18. 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*
19. Type of Basin: Surface/Subsurface (circle one)
20. Owner (circle one): Public Private: If so, Name: Phone number:
21. Basin Construction Completion Date:
22. Drain Down Time (hr.):
23. Design Soil Permeability (in./hr.):
24. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
25. Groundwater Recharge Methodology (circle one): 2 Year Difference NJGRS Other NA
26. Groundwater Mounding Analysis (circle one): Yes No If, Yes Methodology Used:
27. 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*
28. Type of Basin: Surface/Subsurface (circle one)
29. Owner (circle one): Public Private: If so, Name: Phone number:
30. Basin Construction Completion Date:
31. Drain Down Time (hr.):
32. Design Soil Permeability (in./hr.):
33. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
34. Groundwater Recharge Methodology (circle one): 2 Year Difference NJGRS Other NA
35. Groundwater Mounding Analysis (circle one): Yes No If, Yes Methodology Used:
36. 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**