Appendix J

Selection and Implementation of Alternatives Report
for Jersey City MUA

Jersey City Municipal Utilities Authority

Selection and Implementation of Alternatives Report

NJPDES Permit No. NJ0108723

March 2020

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SECTION A - INTRODUCTION

This Jersey City Municipal Utilities Authority (JCMUA) Selection and Implementation of Alternative Report (SIAR) was prepared in accordance with the requirements of the JCMUA's Surface Water Renewal Permit No. NJ0108723 (Permit), which regulates discharges from the JCMUA's combined sewer system (CSS). The JCMUA CSS consists of the following major areas and components:

- Drainage Areas:
  - East Side
  - West Side
- Subdrainage Areas:
  - West - W1 through W13
  - East - E1 through E19, E21, and E22
- 395 Subcatchment Areas
- Hydraulic Components:
  - 1478 Pipes with length, shape and roughness
  - 13 Weirs and 28 orifices
  - 21 Netting facilities and 25 CSO regulators
  - 4 Pumps
  - 21 Outfalls

A location map and system schematic are shown on Figures A-1 and A-2.

G:\GIS\JCMUA\Figures\CSO_Permit_Map.mxd

JCMUA Regulators *			
CSO Regulator Number	Regulator Name	Latitiude	Longitude
RE-1	Brown Place	40d 41m 16.58s	74d 05m 26.67s
RE-2	Richard Street	40d 41m 57.06s	74d 04m 44.33s
RE-3/4	Claremont and Carteret	40d 42m 15.52s	74d 03m 56.99s
RE-5/6	Mill Creek and Pine	40d 42m 45.80s	74d 03m 13.21s
RE-10	Grand Street	40d 42m 53.28s	74d 02m 00.65s
RE-11	York Street	40d 42m 55.93s	74d 01m 59.63s
RE-15	Second Street	40d 43m 19.41s	74d 02m 17.02s
RE-16	South Sixth Street	40d 43m 30.48s	74d 02m 24.18s
RE-17	North Sixth Street	40d 43m 30.97s	74d 02m 24.97s
RE-18	Fourteenth Street	40d 43m 53.20s	74d 02m 12.55s
RE-19	Eighteenth Street	40d 44m 06.66s	74d 02m 50.02s
RW-1	Secaucus Road	40d 45m 37.15s	74d 03m 07.50s
RW-2	Manhattan Avenue	40d 44m 52.98s	74d 03m 55.49s
RW-3	St. Paul's Avenue	40d 44m 26.11s	74d 04m 23.01s
RW-4	Van Winkle Avenue	40d 44m 19.06s	74d 04m 26.59s
RW-5-1	Broadway	40d 44m 16.44s	74d 04m 41.50s
RW-5-2	Broadway	40d 44m 20.00s	74d 04m 53.58s
RW-6	Sip Avenue	40d 44m 03.67s	74d 04m 50.79s
RW-7	Duncan Avenue	40d 43m 49.28s	74d 05m 05.54s
RW-8	Clendenny Avenue	40d 43m 22.47s	74d 05m 29.44s
RW-9	Claremont Avenue	40d 43m 05.91s	74d 05m 40.73s
RW-10	Fisk Street	40d 42m 57.19s	74d 05m 46.46s
RW-11	North Danforth Avenue	40d 42m 22.11s	74d 05m 57.26s
RW-12	South Danforth Avenue	40d 42m 21.56s	74d 05m 57.53s
RW-13	Mina Drive	40d 41m 58.41s	74d 06m 13.64s

* All JCMUA Regulators are equipped with tide gate(s)which were added as the secondary means of tidal intrusion prevention

JCMUA CSO Outfalls			
CSO Outfall	Associated CSO Regulator(s)	Latitiude	Longitude
001A CSO	RW-1	40d 45m 39.20s	74d 03m 11.53s
002A CSO	RW-2	40d 44m 50.66s	74d 04m 10.26s
003A CSO	RW-3	40d 44m 31.02s	74d 04m 36.86s
004A CSO	RW-4	40d 44m 24.33s	74d 04m 44.27s
005A CSO	RW-5	40d 44m 22.17s	74d 04m 56.16s
006A CSO	RW-6	40d 44m 04.25s	74d 04m 53.07s
007A CSO	RW-7	40d 44m 03.44s	74d 05m 37.30s
008A CSO	RW-8	40d 43m 32.97s	74d 05m 46.72s
009A CSO	RW-9	40d 43m 10.58s	74d 05m 51.81s
010A CSO	RW-10	40d 43m 03.59s	74d 06m 04.47s
011A CSO	RW-11, RW-12	40d 42m 13.77s	74d 06m 23.16s
013A CSO	RW-13	40d 41m 58.49s	74d 06m 16.24s
014A CSO	RE-1	40d 40m 46.86s	74d 04m 25.09s
015A CSO	RE-2	40d 41m 17.78s	74d 04m 32.70s
016A CSO	RE-3/4	40d 41m 46.99s	74d 03m 03.59s
018A CSO	RE-5/6	40d 42m 45.72s	74d 03m 12.92s
020A CSO	RE-10, RE-11	40d 42m 45.39s	74d 01m 59.67s
025A CSO	RE-15	40d 43m 15.99s	74d 01m 53.00s
026A CSO	RE-16, RE-17	40d 43m 26.90s	74d 02m 02.49s
028A CSO	RE-18	40d 43m 52.83s	74d 01m 51.48s
029A CSO	RE-19	40d 44m 03.57s	74d 02m 14.59s

JCMUA Pump Stations		
Pump Station	Latitude	Longitude
West Side Pump Station	40d 42m 55.47s	74d 5m 52.54s
East Side Pump Station	40d 42m 23.75s	74d 3m 32.95s
Pump Station 1	40d 40m 36.94s	74d 5m 14.6s
Pump Station 2	40d 40m 50.49s	74d 5m 51.91s
Pump Station 3	40d 41m 32.00s	74d 4m 51.41s
Pump Station 3B	40d 41m 15.01s	74d 4m 27.16s
Pump Station 3C	40d 41m 26.60s	74d 4m 15.37s
Pump Station 3D	40d 41m 24.87s	74d 4m 37.58s
Pump Station 4	40d 43m 20.51s	74d 3m 18.28s
Pump Station 5	40d 44m 54.01s	74d 2m 22.29s
Pump Station 5A	40d 44m 53.48s	74d 2m 22.80s
Pump Station 6	40d 43m 42.35s	74d 3m 49.53s
Pump Station 6A	40d 43m 43.45s	74d 3m 47.96s
Pump Station 7	40d 44m 29.47s	74d 3m 15.78s
Pump Station Bayside Park	40d 41m 53.21s	74d 4m 49.24s

JCMUA Netting and Screening Facilities **		
Name	Latitiude	Longitude
NF-001	40d 31m 25.01s	74d 3m 16.25s
NF-002	40d 30m 50.77s	74d 4m 01.56s
NF-003	40d 30m 24.70s	74d 4m 36.05s
NF-004	40d 30m 14.59s	74d 4m 49.42s
NF-005	40d 30m 05.68s	74d 5m 01.21s
NF-006	40d 30m 08.16s	74d 4m 57.92s
NF-007	40d 29m 35.03s	74d 5m 41.73s
NF-008	40d 29m 39.44s	74d 5m 35.89s
NF-009	40d 29m 24.04s	74d 5m 56.26s
NF-010	40d 29m 14.16s	74d 6m 09.31s
NF-011/012	40d 29m 15.85s	74d 6m 07.07s
NF-013	40d 29m 05.74s	74d 6m 20.44s
NF-014	40d 30m 12.35s	74d 4m 52.37s
NF-015	40d 30m 17.50s	74d 4m 45.57s
NF-016/017	40d 30m 50.98s	74d 4m 01.27s
NF-018	40d 31m 24.36s	74d 3m 17.10s
NF-021/022	40d 32m 19.39s	74d 2m 04.23s
NF-025	40d 32m 23.25s	74d 1m 59.12s
NF-026/027	40d 32m 14.90s	74d 2m 10.18s
NF-028	40d 32m 25.30s	74d 1m 56.40s
NF-029	40d 31m 41.27s	74d 2m 54.72s

** All JCMUA Netting Facilities are equipped with tide gate(s) which add as the primary means of tidal intrusion prevention

Legend
- Netting/Screening Facility
- Pump Station
- CSO Outfall
- CSO Regulator
- Muncipal Boundary

Sources:

Municipal Boundaries: New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS) - last Updated January 2, 2013

Road Centerlines: New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS) - Last Updated March 9, 2015

SEE INSET FOR PUMP STATIONS 1 AND 2

0 1,000 2,000 3,000 4,000

SCALE IN FEET

JERSEY CITY MUNICIPAL UTILITIES AUTHORITY
JERSEY CITY, NEW JERSEY

FIGURE A-1: CSO REGULATORS, OUTFALLS, PUMP STATIONSAND NETTING/SCREENING FACILITIES

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Inv. Elev. = -12.10 | Inv. Elev. = - 7.61 | Hudson River | Inv. Elev. = - 8.09 | Inv. Elev. = - 7.65 | Inv. Elev. = - 7.80 | Inv. Elev. = - 9.48 | New York Bay | Inv. Elev. = - 7.25 | Inv. Elev. = - 2.23 | Inv. Elev. = - 2.40

Colgate Manifold Project

60

Exchange Place Subdrainage Area E12 15 AC.

Sussex St. Subdrainage Area E9 5 AC.

Essex St. Subdrainage Area E8 39 AC.

Washington St. Subdrainage Area E7 7 AC.

RE-11

RE-10

72" (36")

See Note 1

87"H x 135" W oval

84"

York St. Subdrainage Area E11 234 AC.

Grand St. Subdrainage Area E10 124 AC.

Total NE interceptor flow

Sanitary flow From Industrial Park Near Cunningham Printing Co.

Total SE interceptor flow

36" (24")

RE-19 | 36" | RE-18 | 36" | RE-17 | RE-16 | 36" | RE-15 | 24" | RE-5/6 | 72" (84") | 41 | JCMUA Eastside Pump Station | 84" (66") | 40 | RE-3/4 | 25" (24.75") | RE-2 | 36" | RE-1

54

84" 58

104"H x 120"W oval

104"H x 120"W oval

78"

88"H x 136"W oval"

78"

78"

MH 20 | 42 | 54"

44 | 43

84" | 84"

Mill Creek Subdrainage Area E5/6 742 AC.

24" 72" (70")

96"

54" (53")

60" 33

Eighteenth St. Subdrainage Area E19 388 AC.

Fourteenth St. Subdrainage Area E18 522 AC.

N. Sixth St.. Subdrainage Area E17 98 AC.

S. Sixth St. Subdrainage Area E16 54 AC.

Second St. Subdrainage Area E15 127 AC.

Bay St. Subdrainage Area E14 66 AC.

Pearl St. Subdrainage Area E13 23 AC.

Claremont/ Carteret Subdrainage Area E3/4 742 AC.

Richard St. Subdrainage Area E2 240 AC.

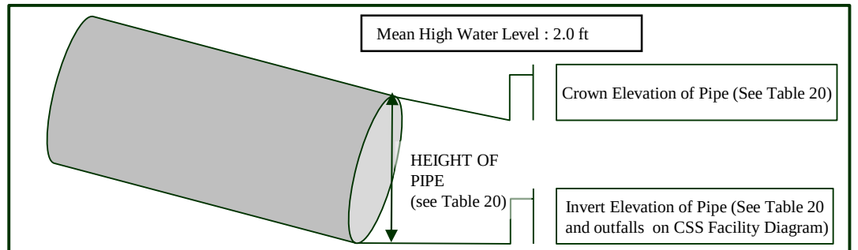
Brown Place Subdrainage Area E1 347 AC.

GENERAL NOTES:

1. Pipe diameters in parantheses (ex. (84")) indicate actual diameters observed in the field.

Legend

- Indicates a meter was moved and shows the direction of the move
- Trunk Sewer and outfalls
- Sewer Junction Chambers
- Central Branch of North East Sewer Interceptor
- North East Sewer Interceptor
- Waterfront North East Sewer Interceptor
- South East Sewer Interceptor
- North West Sewer Interceptor
- South West Sewer Interceptor
- **** City 1 — Flow from outside Jersey City boundary
- 3 — Flow Monitoring Location and Flow Meter Number. Flow Meter Locations colored purple are also designated for Water Quality Sampling
- ** — Flow Monitoring Location and Flow Meter Number is the same as flow meter located downstream from this location
- *** St. Subdrainage Area E## ## 23 AC.
- = Interceptor connection node/MH
- R*-## or R*-## — Regulator with Drainage Area and Subdrainage Number. Names of Regulators Corresponding with name of connecting Subdrainage Areas
- Subdrainage Area Name, Drainage Area, Subdrainage Number, and Acreage contained within Subdrainage Area. Yellow Subdrainage areas or Regulator are designated for Rain Gauge Monitoring locations. Lavender SDs are former CSO locations that have had sewers separated in to storm sewer and sanitary sewer systems.



Outfall Elevation versus Tide Elevation Diagram

Union City

North Bergen

42" | 42" | 37"H x 26" W oval | 48"

Secaucus Rd. Subdrainage Area W1 387 AC.*

Manhattan Ave. Subdrainage Area W2 184 AC.

St. Paul's Ave. Subdrainage Area W3 160 AC.

Van Winkle Ave. Subdrainage Area W4 112 AC.

Broadway Subdrainage Area W5 62 AC.

Sip Ave. Subdrainage Area W6 254 AC.

Duncan Ave. Subdrainage Area W7 212 AC.

Clendenny Ave. Subdrainage Area W8 259 AC.

Claremont Ave. Subdrainage Area W9 133 AC.

Fisk St. Subdrainage Area W10 230 AC.

N. Danforth Ave. Subdrainage Area W11 178 AC.

S. Danforth Ave Subdrainage Area W12 111 AC.

Mina Dr. Subdrainage Area W13 192 AC.

136" x 87" W oval | 6 * | 54" | 66" | 48"H x 96"W V-bottom rect. (84") | 30" | 60" | 36"H x 75"W flat bottom, arched top | 17 | 12" (18") | 48" | 70" (60") | 68"H x 105"W oval | 48" | 27 | 101" | 96" | 32 | 60"

RW-1 | 48" | RW-2 | 30" | RW-3 | 30" | RW-4 | 18" | RW-5 | 24" | RW-6 | 18" | RW-7 | 24" | RW-8 | 24" | RW-9 | 36" | RW-10 | 84" | 28 | RW-11 | RW-12 | 42" | RW-13

JCMUA Westside Pump Station

29

48"

Total NW interceptor flow

Total SW interceptor flow

96"H x 144 W rect.

Pinecrest Street 64

Inv. Elev. = -0.94 Penhorn Creek | Inv. Elev. = 1.88 | Inv. Elev. = -4.46 | Inv. Elev. = - 2.08 | Inv. Elev. = - 4.02 | Inv. Elev. = 1.07 Hackensack River | Inv. Elev. = - 3.12 | Inv. Elev. = - 1.34 | Inv. Elev. = - 1.23 | Inv. Elev. = - 1.91 | JC Force Main to PVSC | Inv. Elev. = -4.66 | Inv. Elev. = - 3.63

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JERSEY CITY MUNICIPAL UTILITIES AUTHORITY
JERSEY CITY, NJ

COMBINED SEWER SYSTEM FACILITY FLOW DIAGRAM for 2020

FIGURE A-2

This SIAR is part of the JCMUA's Long Term Control Plan (LTCP) process for combined sewer overflow (CSO) control, which will culminate with the implementation of a set of CSO control measures, as approved by the New Jersey Department of Environmental Protection (NJDEP). The JCMUA SIAR is a subset of a regional SIAR that was prepared and coordinated by the Passaic Valley Sewerage Commission (PVSC). The PVSC regional report, including this JCMUA SIAR as an appendix, was prepared as a cooperative effort between PVSC and the eight other CSO Permittees identified in this JCMUA SIAR. The objectives of this report are described in the list below.

- In accordance with D.3.a., this SIAR provides information that can be used in coordination with the CSO permittees to develop one regional alternative in accordance with D.3.a., if it is determined to be feasible and acceptable to all permittees
- In accordance with G.4., the JCMUA Development and Evaluation of Alternatives Report (DEAR) was prepared and submitted to NJDEP and this SIAR provides a summary of the short-listed CSO alternatives evaluated in the DEAR that were determined to be most advantageous for JCMUA.
- In accordance with G.4.c., this SIAR states whether the JCMUA SIAR was developed based on the Presumption or Demonstration Approach
- In accordance with G.5. a. this SIAR provides additional modeling and evaluation of various combinations of the CSO abatement alternatives identified in the JCMUA DEAR. These evaluations were completed to develop a "Knee of the Curve Analysis" to help guide the selection of alternatives by determining the optimal ratio of total project cost versus CSO volume removed based on the DEAR's most favorable alternatives and their specific site conditions and other influencing factors within Jersey City (the City)
- In accordance with G.6. of the CSO permit, "Operational Plan", this SIAR describes the O&M program that would need to be added to the JCMUA's existing O&M Program and Manual in accordance with D.3.a and G.10, to address the final LTCP CSO control facilities in this SIAR and operating strategies, including but not limited to, maintaining Green Infrastructure, staffing and budgeting, I/I, and emergency plans. However, as per the permit requirements, the modifications to the JCMUA O&M program would not be required until the JCMUA has an approved final LTCP
- In accordance with the G. 7. of the permit "Maximizing treatment at the existing CSO Permit", this SIAR describes CSO abatement alternatives, including various specific site conditions, percent capture, and other factors, that were considered by the JCMUA for Jersey City which are designed to maximize the flow to the PVSC STP for removal of maximum pollutants practical in accordance with the following requirements and criteria:

    - The capture of more than 85% of the volume of combined sewage discharge from the JCMUA CSS as generated by precipitation events on an annual average basis as indicated in G.4.f. ii of the permit where NJDEP and PVSC permittees have

agreed that 2004 is a year that represents this annual average.
    - Hudson County Force Main (HCFM) flows as per the agreement between PVSC and the JCMUA.

- In accordance with item G.8. of the CSO General Permit, this SIAR has developed Jersey City's Financial Capability Analysis in accordance with EPA guidance documents and item G.8.c.iv. of the CSO General Permit.
- In accordance with item G.8. of the CSO General Permit, this SIAR has developed an Implementation Schedule which includes construction and financing milestones with the Project and Equivalent Uniform Annual Cost and progressive percent capture associated with each phase or stage of the LTCP work. This implementation schedule takes into consideration the items listed in G.8.c.i through viii r
- In accordance with item G.9. of the CSO General Permit, this SIAR contains a proposed post construction monitoring program as a part of the LTCP implementation schedule
- In accordance with item G.2. of the CSO General Permit, this SIAR contains documentation as proof that sufficient public participation has been completed both within the JCMUA city limits and the PVSC region which meets the requirements of item G2 of the CSO General Permit
- The complete objective of this SIAR is to provide the JCMUA and NJDEP with an approvable LTCP which addresses the requirements stated in the JCMUA CSO General Permit items G2 and G6 through G9.

SECTION B - SCREENING OF CSO CONTROL TECHNOLOGIES

The JCMUA DEAR was revised in response to NJDEP comments and resubmitted. NJDEP approved the DEAR on January17, 2020. Based upon the information provided in the JCMUA DEAR, Table B-1 was developed to list the CSO abatement technologies with the following

- Type of control (i.e. Source, Collection System, or Storage/Treatment)
- Effectiveness rating as a CSO Volume control
- Effectiveness rating as a CSO Bacteria control
- Community benefits
- A description of the technology's implementation and operation factors
- Whether it could be considered with other associated technologies or not
- Whether it is currently implemented in Jersey City
- If the technology warranted a full evaluation in the DEAR or if it should be screened out from further consideration

The technologies highlighted in Table B-1 were selected for full evaluation as CSO control technologies most feasible and applicable for Jersey City's unique conditions. Complete evaluations of the following technologies were completed in the DEAR as required by item G.5 of the CSO General Permit:

- **Source Control:**
  - Rainwater Harvesting (rain barrels or cisterns)
  - Bioswales
  - Rain Gardens
  - Trees
  - Planter boxes with trees
- **Collection System Controls:**
  - Inflow and infiltration (I/I) reduction by rehabilitation of sewers
  - Sewer separation which provides additional conveyance and address as some flooding issues in the downtown area of Jersey City
- **Storage:**
  - Tunnels
  - Storage Tanks as Treatment Shafts

SECTION C - EVALUATION OF ALTERNATIVES

The JCMUA DEAR screened, modeled, developed, and evaluated the performance of alternatives that were selected for the JCMUA service area. Both the Regional and JCMUA DEARs were submitted and confirmed to have been received by NJDEP on Friday morning, June 28, 2019. The JCMUA received comments on the JCMUA DEAR on September 25, 2019 and the JCMUA's consultant, Arcadis, addressed NJDEP's comments. The JCMUA DEAR was revised as appropriate to address those comments and it was resubmitted to the NJDEP as Appendix E of the Regional DEAR. The JCMUA and Arcadis conducted 11 public participation proceedings to present the results of the DEAR in 2019 and all were conducted after normal business hours when most citizens could attend.

C.1 INTRODUCTION

The JCMUA DEAR was prepared in accordance with the requirements of the JCMUA's Surface Water Renewal Permit No. NJ0108723 (Permit), which regulates discharges from the JCMUA's combined sewer system (CSS). Knowledge gained from the DEAR has been used to assist in the selection and implementation of a set of CSO control measures.

The JCMUA DEAR was a subset of a regional Development & Evaluation of Alternatives Report that was prepared and coordinated by PVSC. The PVSC regional report was prepared as a cooperative effort between PVSC and the eight other CSO Permittees identified in this JCMUA Alternatives Report.

The objectives of the JCMUA DEAR report were as follows:

- To reflect the development and evaluation of the CSO abatement alternatives as they pertain to the specific site conditions and other influencing factors within Jersey City and to certain other areas outside Jersey City served by the JCMUA, except where various regional alternatives were considered;
- To provide information that can be used for future coordination with the Bayonne and North Bergen CSO permittees to develop one regional alternative;
- To consider existing and future conditions as they pertain to the development of alternatives.
- To describe various CSO abatement alternatives that were considered by the JCMUA for Jersey City based upon its specific site conditions and other factors;
- To screen a broad list of alternatives into a short list of alternatives that are determined to be most suitable for Jersey City specific site conditions and other influencing factors;
- To develop, through a more detailed evaluation process that includes performing model simulations of the various alternatives, the preliminary sizes and locations of those

technologies that were determined to provide feasible solutions to address the CSO Permit requirements and JCMUA's needs;

- To evaluate the performance of the short-listed CSO alternatives that were determined to be most advantageous. This includes estimating Jersey City's CSO percent volume captured, the reduction in number of overflows, and the reduction of overall CSO volume discharge as it pertains to the CSS drainage area owned and operated by the JCMUA; and
- To evaluate the alternatives and various combinations of the alternatives that present the most favorable evaluation results based on but not limited to siting, institutional issues, implementability, public acceptance, performance, and life cycle costs.

C.2 DEVELOPMENT AND EVALUATION OF ALTERNATIVES

There were a variety of CSO control technologies considered in the DEAR for the JCMUA service area. The evaluated control alternatives include storage tanks, deep tunnels, GI, I/I, SS and various other alternatives. Each alternative was evaluated in accordance with the factors of siting, institutional issues, implementability, public acceptance, cost and performance. The evaluation was based on a 1-5 grade scale with 5 being an excellent score and 1 being a poor score. The JCMUA also considered resilience by accounting for sea level rise by analyzing 100 years of tidal data. After each technology was evaluated it was determined that the following storage tank alternatives would be selected for further evaluation:

Table C.2-1: Alternatives Evaluated in the JCMUA DEAR

Alternative	% Capture	Volume Captured	CSO Events	Total Project Cost
9 Storage Tanks - 4 overflows	97.8	1,462.13	4	$ 883,530,000
9 Storage Tanks - 8 overflows	97.0	1,419.79	8	$ 833,480,000
9 Storage Tanks - 12 overflows	96.3	1,396.79	12	$ 721,520,000
9 Storage Tanks - 20 overflows	92.1	1,192.95	20	$ 546,640,000
DEAR 88.3% - 5 Storage Tanks with I/I, SS, and GI	88.3	1,007.89	60	$ 525,242,000

The 2004 typical year was used as a basis to evaluate each alternative. The typical year considers local changes to the climate based on a review of long-term precipitation data set from 1948 to 2015. As stated in the Typical Hydrologic Year Report, the trend line change from 1948 to 1970 contrasted to 1970 to 2015. From 1948 to 1970 there is a declining rainfall pattern however, from 1970 to 2015 there is an inclining rainfall pattern with an approximate change of +0.032 inch per year. The latter trend line which accounts for increased rainfall was then used to determine the typical year.

SECTION D - SELECTION OF RECOMMENDED LTCP

D.1 INTRODUCTION

This section of the Selection and Implementation of Alternatives Report presents the process used to evaluate the CSO control technologies being considered by the JCMUA.

D.2 LTCP SELECTION PROCESS

The current status of the water quality monitoring and modeling findings as described in Section D.3.3 is the basis for the selection of our LTCP Approach. Based upon the current status of these findings, the JCMUA has selected the Presumption Approach in accordance with N.J.A.C 7:14A-11 Appendix C. As stated in the JCMUA Jersey Pollutant Discharge Elimination (NJPDES) permit section G.4.f.ii, the JCMUA will select an alternative that will:

- Eliminate or capture for treatment no less than 85% by volume of the combined sewage collected in the CSS during precipitation events on a hydraulically connected system-wide annual average basis.

In this report and after implementing the selected process, the JCMUA will demonstrate as stated in the JCMUA Jersey Pollutant Discharge Elimination (NJPDES) permit section G.4.g that:

- The selected alternative program will provide the maximum pollution reduction benefits reasonably attainable, which the JCMUA considers is a capture above 85%.
- The planned control program is adequate to meet WQS and protect designated uses.
- The CSO discharges remaining after implementation of the planned control program will not preclude the attainment of WQS or the receiving waters' designated uses or contribute to their impairment.
- The planned control program is designed to allow cost effective expansion or cost-effective retrofitting if additional controls are subsequently determined to be necessary to meet WQS.

D.3 SELECTION OF ALTERNATIVES

During the selection process the alternatives selected in the DEAR found on Table C-1.1of this report underwent further evaluation. Three additional alternatives were evaluated. The 9 Storage Tanks alternatives for 4, 8, 12, and 20 overflows were remodeled to include the SS, II, and GI components found in the 88.3% Capture alternative. Additionally, a 9 Storage Tanks 0 overflow

alternative was modeled (based on the 2004 typical year), as well as 4 Tank, and 6 Tank Alternatives. Resiliency was also evaluated by reviewing high high tide data from 1938 to 2011, in addition to the rain fall and sea level rise evaluated in the DEAR. Descriptions of the evaluated alternatives during the selection process are as follows:

9 Storage Tanks - 0 overflows with I/I, SS, and GI Alternative

- This alternative consists of 9 storage tanks in the same locations stated in the DEAR
- Storage tanks were sized to allow 0 overflows during the 2004 typical year
- Includes the same GI, I/I, and SS programs described in DEAR 88.3% Alternative
- This alternative was developed to eliminate all overflows during the 2004 typical year

9 Storage Tanks – 4, 8, 12, and 20 overflows with I/I, SS, and GI Alternative

- Storage Tank Size and locations are the same as the ones stated in the DEAR
- The alternative was modified to include the same GI, I/I, and SS programs described in DEAR 88.3% Alternative
- This modification was done do show the effectiveness of a combined approach

88.3% Capture - 5 Storage Tanks with I/I, SS, and GI Alternative

- As stated in the DEAR

4 Storage Tank Alternative

- The 4 Storage alternative consists of four storage tanks on the West Side of Jersey City. Each tank was sized for four overflows.
- The number of tanks were decreased to reduce cost.
- This alternative was evaluated to achieve a minimum of 85% capture while limiting CSOs to the Hackensack River. CSOs on the West Side of Jersey City flow into the Hackensack River which is the water body most affected by Jersey City CSOs.

6 Storage Tank Alternative

- This alternative consists of 6 storage tanks, four tanks on the West Side and two on the East.
    - The two northern tanks on the West Side of Jersey City are sized for 4 overflows
    - The two southern tanks are sized for 20 overflows.
    - The two tanks on the east side intercept CSO from southeast Jersey City and are sized for 20 overflows.
- This scenario was evaluated to achieve a minimum of 85% capture and alleviate flooding on the East Side of the City.

D.3.1 Description

The factors evaluated during the selection and implementation process were CSO overflows, water quality standards (WQS), non-monetary factors, and cost. CSO overflows and WQS were

evaluated using performance data from PCSWMM modeling. The non-monetary factors evaluated during the selection process were public acceptance, environmental impact, social benefits and multi-use consideration. To determine cost, alternatives were evaluated using present worth or total project cost. Detailed descriptions of these factors can be found in the JCMUA DEAR submitted to NJDEP.

D.3.2 Remaining Overflows

The following eight alternatives were chosen to undergo further evaluation. The remaining overflows resulting from the eight alternatives plus the existing baseline conditions are shown below:

Table D.3-1: SIAR Alternatives Overflow Results

Alternative	Overflow Volume (MG)	Volume Captured	Percent Capture	Percent Reduction
Baseline	1,5574	-	-	-
9 Storage Tanks - 0 overflows with I/I, SS, and GI	0	1,5574	100	100
9 Storage Tanks - 4 overflows with I/I, SS, and GI	95.3	1,462	97.8	93.9
9 Storage Tanks - 8 overflows with I/I, SS, and GI	137.6	1,420	97	91.2
9 Storage Tanks - 12 overflows with I/I, SS, and GI	160.6	1,397	96.3	89.7
9 Storage Tanks - 20 overflows with I/I, SS, and GI	364.5	1,193	92.1	76.6
88.3% Capture - 5 Storage Tanks with I/I, SS, and GI	549.6	1,008	88.3	64.7
4 Storage Tanks – 4 sized for 4 overflows, with I/I, SS, and GI	667.3	890	85.7	57.2
6 Storage Tanks – 4 sized for 20 overflows, 2 sized for 4 overflows with I/I, SS, and GI	579.1	978	87.8	62.8

All the scenarios evaluated reduced the overflow volume by over 60%. The range of overflow volumes was from 95.3 to 549.6 MG. Despite the disparity in the number of overflows, each alternative prevents over 1,000 MG of CSOs from entering the surrounding water bodies.

D.3.3 Ability to Meet Water Quality Standards

Jersey City CSOs discharge into the five following water bodies:

- Penhorn Creek is an FW2-NT/SE2(C2) stream in which there may be a salt water/freshwater interface where the E. Coli levels shall not exceed a geometric mean of 126/100 ml or a single sample maximum of 235/100 ml
- Hackensack River (SE2) is a saline estuary where it is required the Geometric Mean of Fecal Coliforms in this waterbody should not exceed 770/100 ml

- Hackensack River (SE3) is a saline estuary where it is required the Geometric Mean of Fecal Coliforms in this waterbody should not exceed 1500/100 ml

- Newark Bay (SE3) is saline estuary where it is required the Geometric Mean of Fecal Coliforms in this waterbody should not exceed 1500/100 ml

- Hudson River (SE2) is a saline estuary where it is required the Geometric Mean of Fecal Coliforms in this waterbody should not exceed 770/100 ml

Table D.3.3-1 shows the CSO names and numbers with their drainage and subdrainage area designations which discharge into the waterways described above with their respective Stream Classifications. Appendix A contains the NJDEP Water Quality Standards, Surface Water Classifications and a Penhorn Creek investigation.

The Baseline Compliance Monitoring Report (BCMR) has been certified by the JCMUA and was submitted by PVSC and on behalf of all members of the NJCSO group on June 26, 2018. The "NJCSO Group Compliance Monitoring Program Report" was NJDEP approved on March 1, 2019. The "Preliminary Conclusions" of original submission of the report were as follows:

- "The BCMR was not designed to provide an adequate data volume for assessing attainment of water quality standards, which would have required five samples per month at each sampling location to compute monthly geometric means."

- "The lower regions of the Passaic and Hackensack River appear likely to violate water quality criteria, but attainment appears to be closer to Newark Bay

- "The larger waterbodies (Newark Bay, Hudson River, Arthur Kill, Kill Van Kull) appear to meet existing water quality criteria. Newark Bay and the Kills are primarily SE3 waterbodies….."

The comments received from NJDEP from September 7, 2018. Some conclusions were deleted then the BCMR was approved. Water Quality Graphs relevant to Jersey City's waterways are included in Appendix B. Based upon the NJDEP comments the BCMR, does not "demonstrate attainment of appliable water quality standards.". However, based upon the WQ data graphs significant non compliance cannot be proven either. So the results are inconclusive.

However, PVSC submitted a "Pathogen Water Quality Model (PWQM) Quality Assurance Project Plan (QAPP)" as dated May 19, 2016 (revised January 14, 2017). As described in the QAPP: "The enhanced, validated model will be used to project bacteria concentrations in the waters of the NY/NJ Harbor complex under existing and anticipated future conditions to demonstrate attainment of applicable water quality standards." The subject PWQM QAPP was approved by NJDEP. The water quality model was prepared, calibrated, and the results were presented to the NJCSO Group and later to the NJDEP Modeling Evaluation Group (MEG).

Currently, the method of determining geometric means of the ambient bacterial quality by "Use Attainment Units" within the waterbodies has not been accepted by NJDEP MEG as a method of demonstrating compliance with the NJ Water Quality Standard results. So, for the present time, the JCMUA will proceed with the Presumption Approach until an acceptable set of modeling results are presented and accepted by the NJDEP that demonstrates compliance. Details of the planned approach are discussed in Section D.2.

Table D.3.3-2: JCMUA CSOs, the Receiving Waters Discharged to & their Characteristics

Drainage Area	Outfall and Regulator Name (Regulator Number)	Outfall number	Sub Drainage Area (SDA) Numbers	Name of Receiving Water	NJ Stream Classification	Bacterial Quality Standard, ###/100 ml (###/100 ml)[2]
WESTSIDE DRAINAGE AREA (W)	Secaucus Road (RW-1)	A CSO	W1	Penhorn Creek	FW2-NT/SE2[1]	E. C. <= 126 (235)
	Manhattan Avenue (RW-2)	A CSO	W2	Penhorn Creek	FW2-NT/SE2[1]	E. C. <= 126 (235)
	St. Paul's Avenue (RW-3)	A CSO	W3	Hackensack River	SE2	F. C. <= 770
	Van Winkle Avenue (RW-4)	A CSO	W4	Hackensack River	SE2	F. C. <= 770
	Broadway Avenue (RW-5)	A CSO	W5	Hackensack River	SE2	F. C. <= 770
	Sip Avenue (RW-6)	A CSO	W6	Hackensack River	SE2	F. C. <= 770
	Duncan Avenue (RW-7)	A CSO	W7	Hackensack River	SE3	F. C. <= 1,500
	Clendenny Avenue (RW-8)	A CSO	W8	Hackensack River	SE3	F. C. <= 1,500
	Claremont Avenue (RW-9)	A CSO	W9	Hackensack River	SE3	F. C. <= 1,500
	Fisk Street (RW-10)	A CSO	W10	Hackensack River	SE3	F. C. <= 1,500
	North and South Danforth Avenue (RW-11/12)	A CSO	W11/12	Newark Bay	SE3	F. C. <= 1,500
	Mina Drive (RW-13)	A CSO	W13	Newark Bay	SE3	F. C. <= 1,500
EASTSIDE DRAINAGE AREA (E)	Brown Place (RE-1)	A CSO	E1	Hudson River	SE2	F. C. <= 770
	Richard Street (RE-2)	A CSO	E2	Hudson River	SE2	F. C. <= 770
	Claremont & Carteret (RE-3/4)	A CSO	E34	Hudson River	SE2	F. C. <= 770
	Mill Creek & Pine (RE-5/6)	A CSO	E56	Hudson River	SE2	F. C. <= 770
	Grand Street (RE-10/11)	A CSO	E10/11	Hudson River	SE2	F. C. <= 770
	Second Street (RE-15)	A CSO	E15	Hudson River	SE2	F. C. <= 770
	Sixth Street (RE-16/17)	A CSO	E16/17	Hudson River	SE2	F. C. <= 770
	Fourteenth Street (RE-18)	A CSO	E18	Hudson River	SE2	F. C. <= 770
	Eighteenth Street (RE-19)	A CSO	E19	Hudson River	SE2	F. C. <= 770

D.3.4 Non-Monetary Factors

The non-monetary factors that influenced the selection process were public acceptance, environmental impact, social benefits and multi-use consideration. Details on the specific non-monetary factors influencing the selection process can be seen below:

- Siting - The alternatives range from being sited entirely within the public right-of-way of roads to requiring construction in public spaces or easements on private properties.

- Institutional Issues - Institutional issues pertain to factors and influences from various organizational, social, community, or other special interest groups that may have significant impacts on the success or failure of a given project. In Jersey City, the relevant institutional issues evaluation was as follows:
    - Real Estate: Jersey City has a very successful real estate market which make alternatives that require land acquisition less favorable than alternatives that can be placed on public rights-of-way or easements.
    - Government Institutions: NJ Transit, the US Postal Service, and County agencies, and State parklands are government institutions that will have to be managed with all the alternatives.
    - Special Interest Groups: Multiple members from the Jersey City Stormwater Treatment and Resiliency Team (JC START), Sustainable Jersey City, and the Hudson County Sierra Club Group have attended at least one of six public presentation events about the evaluation of these alternatives. They clearly have stated that they want additional green infrastructure including, but not limited to, bioswales, rain gardens, trees, and rain barrels or cisterns included in the JCMUA plan.
    - Utility rate payers: Since this LTCP will require rate increases to cover the costs, most Jersey City rate payers have an interest in the selection and implementation of alternatives. With respect to the implementation of alternatives to address CSOs, it is important to provide technically sound and cost-effective solutions to mitigate impacts to the rates.
    - Location equity: In general, care should be taken to ensure that implementation and benefits of the CSO control technologies are fairly distributed across groups of varying socioeconomic status.

- Implementability - Implementability and technical issues for each alternative identified in this JCMUA Alternatives Report were evaluated based on criteria from the EPA CSO Guidance for Long-Term Control Plan document. Implementability and technical issues consist of constructability, reliability, operability, and adaptability. Definitions of these factors are as follows:

  - Constructability – Constructability refers to the level of challenges associated with activities during the project construction phase.
  - Reliability – Reliability is based on the positive track record of these technologies as well as their complexity.
  - Operability – Consideration of operability includes the requirements for personnel to complete O&M and waste management.
  - Adaptability – The ability for an alternative to be implemented in phases affects the adaptability. Phased implementation is beneficial because the capital costs can be distributed over time.

- Public Acceptance - The JCMUA and Arcadis have completed 5 public meetings with presentations of the results of the Preliminary DEAR followed by 30 minutes or more for a question and answer period. In addition to taking the comments of the public into consideration, the JCMUA evaluated the following factors based on criteria from the EPA CSO Guidance for Long-Term Control Plan.
  - Environmental Impact – When assessing the environmental impact of a project the impact on nature and the residents must be assessed. Effects on nature and residents include water quality, threats to endangered species, wetlands impacts, soil erosion, flooding, habitat destruction, noise, traffic, and utilities relocation.
  - Social Benefit – An alternative that adds positive aspects to the lives of Jersey City residents would be viewed positively by Jersey City residents. An alternative that adds to the physical and or mental well-being of the residents would be preferred.
  - Multi-use Considerations – An alternative which serves a use to the public would be beneficial in gaining support for its implementation.

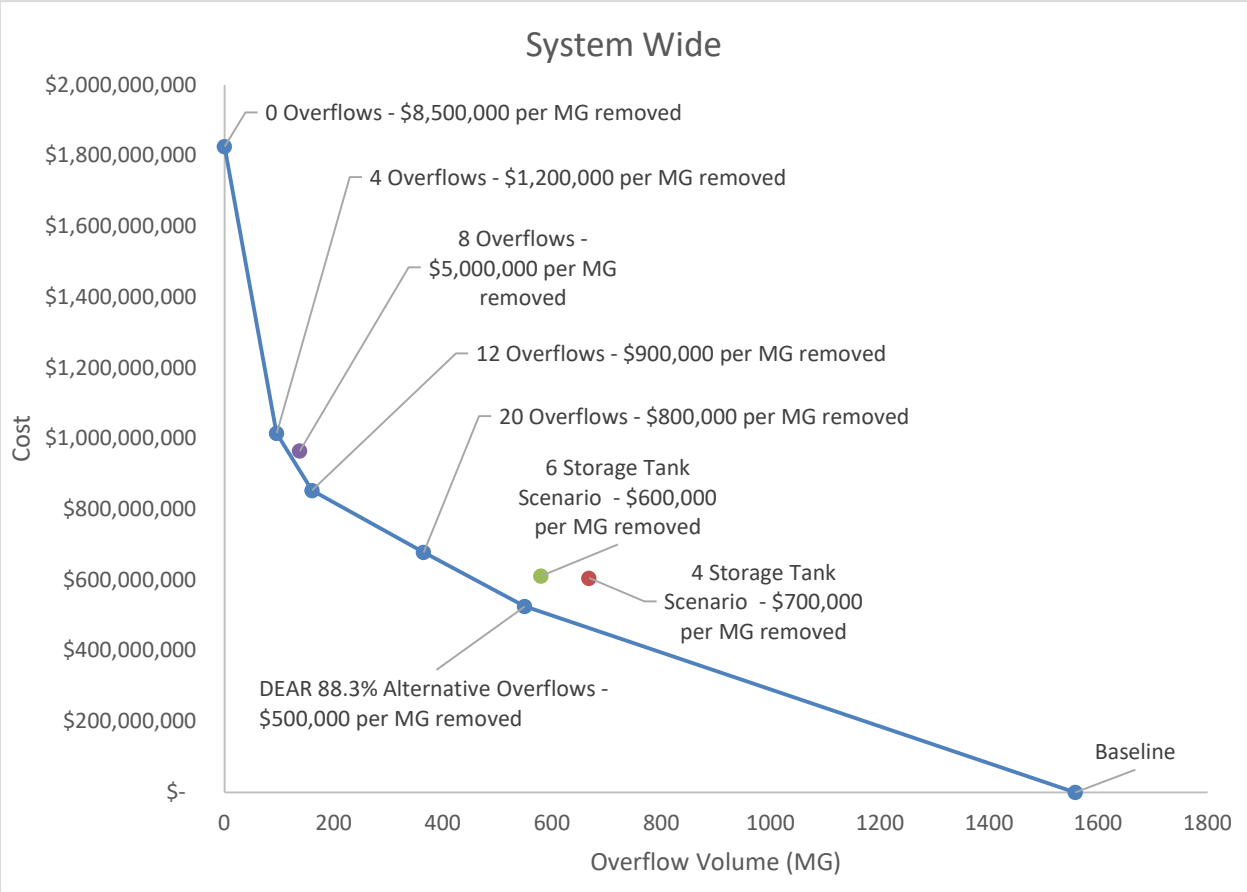
D.3.5 Cost Opinion

Detailed cost opinions of the evaluated alternatives are presented in the Appendix C. The cost and performance analysis was prepared in accordance with Passaic Valley Sewerage Commissioners CSO Long Term Control Plan Updated Technical Guidance Manual (January 2018). All Present Worth Costs include the costs for capital costs, land costs, and O&M costs over a 20-year period or life of the project. All capital costs include an additional 25% for contingencies, 20% for engineering costs and 15% for contractor overhead and profit. An interest rate of 2.75% and a 20-year life cycle was assumed for present value calculations. The total present worth (TPW) cost is calculated as the sum of the capital cost, land cost, and the O&M costs multiplied by a 15.227 PW factor. All costs have been adjusted for present day worth using the ENR construction indices. The cost estimates were used to determine the most cost-effective alternative. Cost-effectiveness was the leading monetary factor.

D.3.6 Selection of Recommended Alternative

As stated in Section D.2, the JCMUA has elected to proceed with the Presumption Approach. By selecting this approach, the recommended alternative must eliminate or capture for treatment no less than 85% by volume of the combined sewage collected in the CSS during precipitation events on a hydraulically connected system-wide annual average basis. In addition to performance, cost and non-monetary factors were also evaluated when selecting an alternative. Based on public participation and our analysis of the non-monetary factors, it was determined that an alternative which included GI was important to the residents of Jersey City and should be included in the selected plan. To evaluate cost, the knee of the curve analysis was used to determine the most cost-effective alternative. The knee of the curve graph used to select the recommended alternative is shown in Figure D.3-1.

Figure D.3-1: Knee of the Curve Analysis



The JCMUA's goal is to spend money wisely to maximize CSO removal. Based on the knee of the curve graph, the 88.3% capture goal achieves the best capture per dollar ($500,000 per MG). The other alternatives have a cost per million gallon (MG) that range from $600,000 per MG up to $8,500,000 per MG. These alternatives more expensive and would force the JCMUA to spend

more money less efficiently. As noted in figure D.3-1, the DEAR 88.3% capture alternative achieves over 85% capture and costs $500,000 per million gallons of CSOs removed. This alternative is both cost effective and less expensive. Based on the factors identified in this SIAR report it was determined that 88.3% Capture Alternative would be selected by the JCMUA.

D.4 DESCRIPTION OF RECOMMENDED LTCP

D.4.1 JCMUA'S CURRENT RECOMMENDED LTCP

Currently, the selected Municipal LTCP will consist of a combination of the following alternatives:

- **Source Control:** GI on 7% of the impervious areas of Jersey City as shown on Figure D.4.1-1. This work will be completed within public easements and roadways using following specific GI methods:
    - Bioswales
    - Rain Gardens
    - Trees
    - Planter boxes with trees
    - Encouraging water conservation through education and the use of low flow yield toilet and shower head fixtures
- **Collection System Controls:**
    - Table D.4.1-1 shows sewer subdrainage area locations and the linear footages of sewer that are planned for rehabilitation by used of cured in place pipe (CIPP) or other methods to reduce or eliminate Inflow and infiltration (I/I) wherever possible in the JCMUA CSS.
    - Sewer separation along Bates Street, Bright Street, and Jersey Avenue to address flooding issues in the downtown area of Jersey City (See Appendix D for a plan view of this work and its location.)
- **Storage Tanks:**
    - Five Treatment Shaft type storage tanks at the following locations and as shown on Figure D.4.1-2:
        - One Secaucus and Manhattan Treatment Shaft in the West Side Drainage Area
        - One St. Paul's, Van Winkle, and Broadway Treatment Shaft in the West Side Drainage Area
        - One Sip to Fisk Treatment Shaft in the West Side Drainage Area
        - One Danforth and Mina Treatment Shaft in the West Side Drainage Area
        - One Fourteenth and Eighteenth Street Treatment Shaft in the East Side Drainage Area

The remaining outfalls on the East side will remain unchanged.

D.4.2 JCMUA'S POSSIBLE REGIONAL LTCP SELECTIONS

The alternative describe above is referred to in the overall Regional DEAR as Municipal Alternative 1. While this is currently the best option for the JCMUA at the present time there are Regional Alternatives developed by PVSC which are still being considered by the JCMUA. The Regional Alternatives 3b Modified and Alternative 7 are the two being considered for possible implementation.

B-1W2: GW-1.3'
B-2W1: GW-4"
B-1W3A: GW-6.8'
B-3W2: GW-4'
Bedrock-32'+
B4W3: GW-1'
Bedrock: 77'+
B-4W1: GW-7'
Bedrock: 27'+
B-5-2W2:GW-3'
Bedrock-67'+
B-6W1:GW-7'
B-7W1:GW-8'
Bedrock-47'
B-MA: GW-9.2'
B-BEL:Bedrock-21'+
B-8W1:GW-7'
Bedrock: 32'
B-9W1:GW-7.5'
Bedrock- 32'+
B-10W1:GW-9.5'
Bedrock 42'+
B-12W1: GW-8.9'
Bedrock- 32'+
B-13W2: GW-9'
Bedrock: 42'+
B-PL:GW-16.6'
B-FAM: Bedrock-7'
B-DU: Bedrock-12'
B-FAV:Bedrock 10.5'
B-JE: Bedrock-12'
B-BER:Bedrock-4'
B-NU: Bedrock 21'+
B-BE1:Bedrock 12'
B-AS: GW-8'
Bedrock-12'
B-UN: Bedrock-7'
B-NS:Bedrock-10'
B-SU:Bedrock-3.5'
B-ME: Bedrock-11'
B-VR:GW-8'
Bedrock-15'
B-CH:Bedrock-1'
B-MI: GW-7.6'
Bedrock-11'
B-GA: GW-14'
Bedrock-16'
B-CL: GW-6.5'
Bedrock-11'
B-BE2: GW-6.6
Bedrock-11'
B-PR2: Bedrock-6'
B-PR1: Bedrock-9'
B-2E2:GW-7'
Bedrock: 42'+
B-1E5: Bedrock-11'
B29E1: Bedrock- 40'+
B-18E2: GW-8'
SB9-2: GW-6'
SB10-1: GW-9'
SB10-2: GW-13'
SB9-1: GW-6'
SB8-3: GW-6'
SB8-2: GW-6'
SB6-2: GW-5.5'
SB8-1: GW-6'
SB6-4:GW-6'
SB6-1:GW-11'
SB6-3: GW-12'
B-16/17E1:GW-10'
B-15E1: GW-9'
Bedrock:110'
2nd Street Netting Facility:
GW-9'
Bedrock-110'
B1-E11: GW-5.5'
Bedrock-32'
B1-E11: GW-5.5'
B-18E4:Bedrock-8'
B-MO: GW-11.2'
B-JO: GW-9.8'
B-HA: GW-12'
B-LA: GW-14.4'
B-PI: Bedrock-11.6'
B-VA: GW-12.1'
B-3/4E1:GW-11'
Bedrock: 37'+
RE-3/4: GW-11'
B-1E3: GW-10'
Bedrock-13'
B-WH: GW-17.5'
RE-2:GW-7'
B-13W2: GW-9'
Bedrock: 42'+

Legend
- Netting Facility
- Regulator
- Model Node
- NJDEP STORET Water Quality Monitoring Location
- Model Link
- Hudson County Stream
- 10-foot Contour
- Optimal Green Infrastructure Location
- Railroad
- Watershed Management Area
- HUC14 Boundary
- County Boundary
- Municipality Boundary
- Subdrainage Area Boundary
- Subcatchment
- Slope Greater than 15%

Geology
- Jurassic Diabase
- Lockatong Formation

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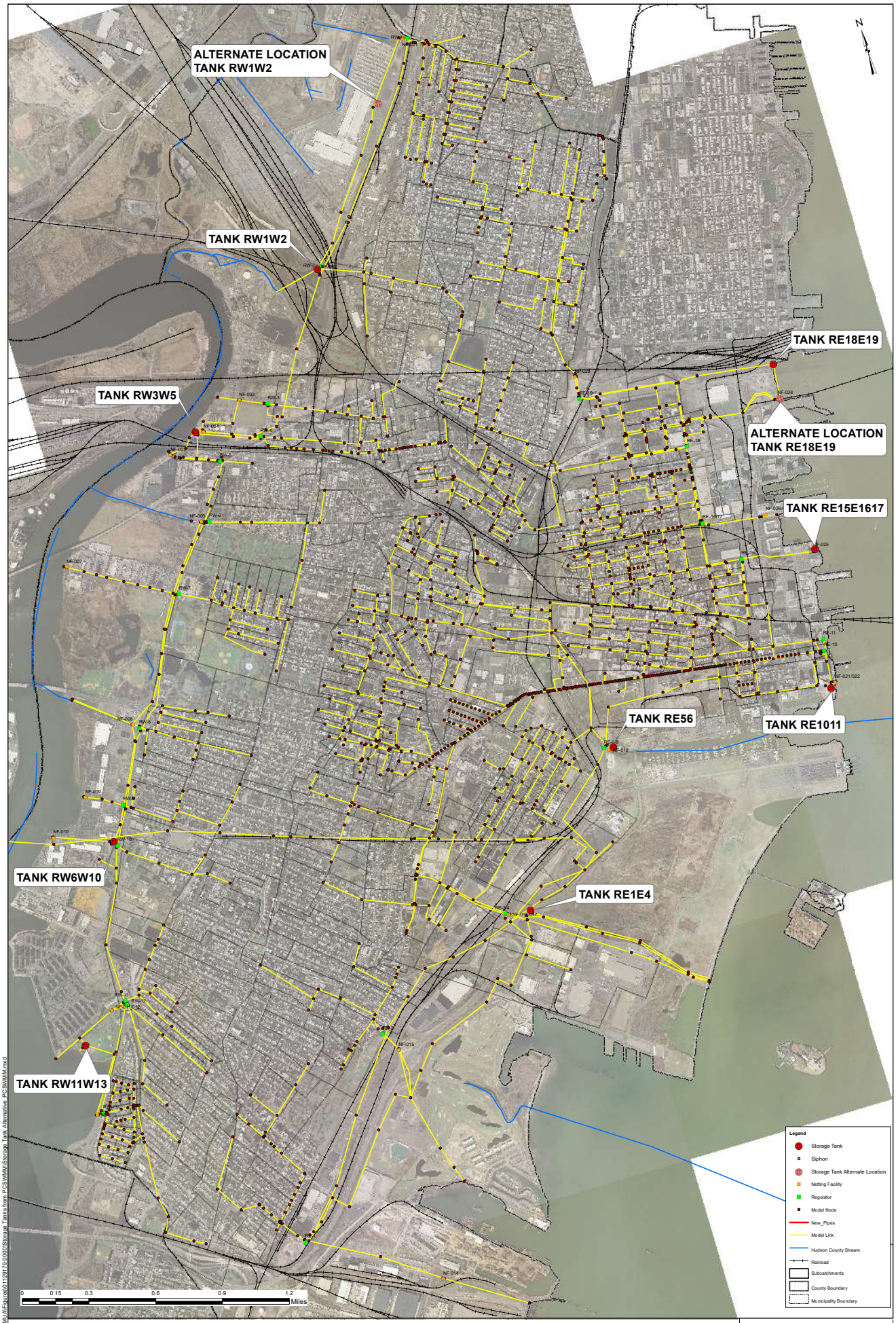
JERSEY CITY MUNICIPAL UTILITIES AUTHORITY
SELECTION AND IMPLEMENTATION OF ALTERNATIVES REPORT
OPTIMAL GREEN INFRASTRUCTURE LOCATIONS

FIGURE D.4.1-1

Table D.4.1-1 Inflow and Infiltration Flow Per Sub Drainage Area

Sub Drainage Area (SDA)	Sum of I-I flow, CFS	Pipes Length (ft)
Brown Place(RE-1)	0.10	7369
Richard Street(RE-2)	0.16	9059
Claremont & Carteret (RE-3/4)	0.07	8441
Mill Creek & Pine (RE-5/6)	0.16	16550
Grand Street(RE-10/11)	0.08	5875
Second Street(RE-15)	0.03	4967
Sixth Street (RE-16/17)	0.03	6273
Fourteenth Street(RE-18)	0.23	10642
Eighteenth Street(RE-19)	0.02	1838
Secaucus Road(RW-1)	0.01	4974
Manhattan Avenue(RW-2)	0.00	0
St. Paul's Avenue(RW-3)	0.00	794
Van Winkle Avenue(RW-4)	0.01	1020
Broadway Avenue 1(RW-5)	0.00	0
Sip Avenue(RW-6)	0.00	0
Duncan Avenue(RW-7)	0.00	142
Clendenny Avenue(RW-8)	0.12	1238
Claremont Avenue(RW-9)	0.00	0
Fisk Street(RW-10)	0.24	2891
N. and S. Danforth Avenue(RW-11/12)	0.08	3772
Mina Drive(RW-13)	0.02	2050
Grand Total	**1.36**	**87896**



JCMUA GROUPED STORAGE TANK LOCATIONS

FIGURE D.4.1-2

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SECTION E - FINANCIAL CAPABILITY

E.1 INTRODUCTION

This section of the JCMUA's Selection and Implementation of Alternatives Report (SIAR) quantifies the projected affordability impacts of JCMUA's proposed long term CSO controls for the JCMUA combined sewer system (CSS) and updates the 2019 preliminary FCA memo that was intended to guide the development and selection of long term controls. This section is excerpted from a memorandum prepared by the Passaic Valley Sewerage Commission (PVSC) which is incorporated as Appendix P of PVSC's SELECTION AND IMPLEMENTATION OF ALTERNATIVES FOR LONG TERM CONTROL PLANNING FOR COMBINED SEWER SYSTEMS - REGIONAL REPORT (Regional Report).

The Financial Capability assessment is a two-step process including ***Affordability*** which evaluates the impact of the CSO control program on the residential ratepayers and ***Financial Capability*** which examines a permittee's ability to finance the program. Affordability is measured in terms of the Residential Indicator (RI) which is the percentage of median household income spent on wastewater services. Total wastewater services exceeding 2.0% of the median household income are considered to impose a high burden by USEPA. The financial capability analysis uses metrics similar to the municipal bond rating agencies.

USEPA encourages the use of additional information and metrics to more accurately capture the impacts of the proposed CSO controls on the permittee and its residents. Therefore, the FCA includes information on the impacts of future costs among lower income residents and within the context of local costs of living.

Detailed discussion of the FCA for the PVSC service area and Permittees can be found in the Regional Report and a detailed analysis of the JCMUA's FCA can be found in the FCA Memorandum specifically written for JCMUA attached as part of Appendix P of the Regional Report.

E.2 BASELINE CONDITIONS (WITHOUT CSO CONTROLS)

The estimated annual cost for wastewater services for a typical single-family residential user for 2019 is $482. This estimate is based on typical residential potable water usage of 4,500 gallons monthly. Based on the estimated MHI of $65,300 the Residential Indicator was approximately 0.7% in 2019, or at the border or what the EPA guidance defines as a low burden. By definition the current residential indicator for one half of the households is greater than the 0.7%.

In Jersey City as of 2017, 18.7% of the population was living below the poverty line. The total Census households are broken out by income brackets on Table E-1 below, along with the respective current Residential Indicators by income bracket. The RI for each bracket was calculated from the mid-point income within the bracket. At the lowest income levels, the current RI is already between 2.1% and 8.3%.

Table E.1: Analysis of the Current Residential Indicator

Income Bracket	Households		Bracket Average Income	Bracket RI at Typical Cost per Household
	Number	Cumulative		
Less than $10,000	8,818	8,818	$5,000	8.34%
$10,000 to $14,999	5,377	14,195	$12,500	3.34%
$15,000 to $24,999	9,457	23,652	$20,000	2.09%
$25,000 to $34,999	7,901	31,553	$30,000	1.39%
$35,000 to $49,999	10,331	41,884	$42,500	0.98%
$50,000 to $74,999	14,468	56,352	$62,500	0.67%
$75,000 to $99,999	10,216	66,568	$87,500	0.48%
$100,000 to $149,999	15,064	81,632	$125,000	0.33%
$150,000 to $199,999	7,961	89,593	$175,000	0.24%
$200,000 or more	10,456	100,049	$200,000	0.21%

PVSC has developed a time-based model that calculates annual costs and revenue requirements based on assumed program costs, schedules and economic variables such as interest and inflation rates. The residential indicator is calculated for each year based upon the costs per typical residential users which changes annually based on the annual system revenue requirements.

The estimated inflationary impacts on wastewater costs per typical single family residential user without additional CSO control costs are shown on Table E-2. The costs are projected to the year2051. The use of 2051 is based on the LTCP implementation schedule for JCMUA's Municipal Control Alternative in Section F of this SIAR report which targets the completion of capital improvements through 2050.

The regional alternative would result in lowered overall costs for the control of CSOs within the PVSC service area. Under this approach, both the costs of the regional facilities such as a relief interceptor and the resultant savings would be allocated amongst the PVSC municipalities with combined sewer systems. As the basis of this allocation remains under discussion as of the writing of this SIAR, the FCA focuses on implementation of the Municipal Control Alternative. Should the permittees come to agreement on the cost allocation for the Regional Control Plan, the FCA will be revisited to reassess the affordability and schedule for implementation of the LTCP.

Assuming inflation, the projected cost per typical single family residential user are projected to increase from $482 in 2019 to $1,082 in 2051.

Table E.2: JCMUA Projected Residential Indicator in 2051 Without CSO Controls

Metric	Baseline (2019 unless noted)	Cost per Typical Residential Wastewater User in 2051
RI	0.7%	0.9%
Annual $	$482	$1,082

E.3 SUMMARY AND CONCLUSION

E.3.1 Affordability Impacts of the Selected CSO Controls

JCMUA has identified a long term CSO control strategy that will achieve 85% capture of wet weather flows during the typical year utilizing controls within and implemented by the City. PVSC and the PVSC combined sewered municipalities have also developed a potential regional control strategy that would result in lower overall capital costs. These Selected Municipal Alternative CSO controls are summarized on Table 3-3 Appendix P of PVSC's SELECTION AND IMPLEMENTATION OF ALTERNATIVES OR LONG TERM CONTROL PLANNING FOR COMBINED SEWER SYSTEMS – REGIONAL REPORT (Regional Report).

Implementation of the JCMUA Municipal Control Alternative through 2050 would result in projected annual costs per typical single family user of $703 (without inflation) works out to a 1.1% RI in 2051. Accounting for inflation, annual costs would grow to $1,652 with a residential indicator of 1.3% in 2051 as shown on Table E-3.

Table E.3: JCMUA Projected Residential Indicator Upon Full Implementation of the Municipal CSO Control Alternative

Metric	Baseline (2019)	Cost per Typical Residential Wastewater User in 2051			
		No LTCP		Municipal Control Alternative	
		With Inflation	Without Inflation	With Inflation	Without Inflation
RI	0.7%	0.9%	0.8%	1.3%	1.1%
Annual $	$482	$1,082	$506	$1,606	$691

This analysis does not reflect the current and lingering financial impacts as a result of the COVID -19 pandemic and should be revisited upon memorializing the LTCP implementation schedule in the JCMUA's next NJPDES Permit.

E.3.2 Financial Capability Assessment

The second part of the financial capability assessment - calculation of the financial capability indicator for the permittee - includes six items that fall into three general categories of debt, socioeconomic, and financial management indicators. The six items are:

- Bond rating
- Total net debt as a percentage of full market real estate value
- Unemployment rate
- Median household income
- Property tax revenues as a percentage of full market property value
- Property tax revenue collection rate

Each item is given a score of three, two, or one, corresponding to ratings of strong, mid-range, or weak, according to EPA-suggested standards. The overall financial capability indicator is then derived by taking a simple average of the ratings. This value is then entered into the financial capability matrix to be compared with the residential indicator for an overall capability assessment.

As shown on Table E-5, the overall score for the financial indicators is 2.0 yielding an EPA Qualitative Score of "midrange". This calculation is based on the use of six of the six indicators that are applicable to JCMUA. The derivation of this score is presented in the detailed FCA memorandum presented in Appendix P of the PVSC Regional Report. As each of the financial indicators are generally based upon publicly available data from 2017 or earlier, this analysis does not reflect the current and lingering impacts of the COVID -19 pandemic and should be revisited upon memorializing the LTCP implementation schedule in the City's next NJPDES Permit.

Table E.4: Permittee Financial Capability Indicator Benchmarks

Indicator	Rating	Numeric Score
Bond Rating	Mid-Range	2
Overall Net Debt as a Percent of Full Market Property Value	Strong	3
Unemployment Rate	Weak	1
Median Household Income	Weak	1
Property Tax as a Percent of Full Market Property Value	Mid-Range	2
Property Tax Collection Rate	Strong	3
	Total	12
Overall Indicator Score: (numeric score / number of applicable indicators)		2.0
	EPA Qualitative Score	Mid-Range

E.3.3 Implementation Feasibility Implications

The affordability analysis detailed above has documented that the capital expenditures under JCMUA's Municipal Control Alternative along with related operation and maintenance costs would result in a Residential Indicator of 1.3% in 2051.

Additional economic factors are presented in the JCMUA FCA Memorandum presented in Appendix P of the SELECTION AND IMPLEMENTATION OF ALTERNATIVES FOR LONG TERM CONTROL PLANNING FOR COMBINED SEWER SYSTEMS - REGIONAL REPORT enforcing the limits to the affordability of CSO controls and the City's financial capability.

While the affordability analysis detailed above has documented that the selected $765 million (current dollars) Municipal Control Alternative along with related operation and maintenance costs would result in a Residential Indicator of "medium impact" under EPA's criteria; the reality of the high poverty rates, low household incomes compared to the rest of New Jersey and nationally, and the high costs of living in Jersey City argue strongly that the EPA metric understates the impacts of the CSO control costs on the residents of the City. Jersey City is and is likely to remain financially distressed due to structural economic factors beyond its direct control and its ability to afford and finance future CSO control facilities is restricted. As evidenced by its New Jersey Municipal Revitalization Index score in the top 11th percentile, Jersey City's capacity for additional CSO controls, beyond those proposed in the SIAR, is limited.

E.3.4 Potential Impacts of the COVID-19 Pandemic in Affordability

The projections and conclusions concerning the affordability of the Municipal Control Alternative proposed in this SIAR Jersey City and JCMUA's financial capability to finance the CSO control program are premised on the baseline financial conditions of JCMUA as well as the economic conditions in New Jersey and the United States generally at the time that work on this SIAR commenced. While the impacts of the pandemic on the long-term affordability of the CSO LTCP are obviously still unknown, it is reasonable to expect that there will be potentially significant impacts. There are several dimensions to these potential impacts, including reduced utility revenues and household incomes.

Given the current and likely continuing uncertainties as to the New Jersey and national economic conditions, JCMUA will be reticent to commit to long term capital expenditures for CSO controls without the incorporation of adaptive management provisions, including provisions to revise and reschedule the long term CSO controls proposed in this SIAR based on emergent economic conditions beyond the permittees' control. As detailed in Section F of JCMUA's SIAR, these provisions could include scheduling the implementation of specific CSO control measures to occur during the five year NJPDES permit cycles. A revised affordability assessment should be

performed during review of the next NJPDES permit to identify controls that are financially feasible during that next permit period.

SECTION F - RECOMMENDED LONG-TERM CONTROL PLAN

F.1 INTRODUCTION

This Section of the Selection and Implementation of Alternatives Report (SIAR) describes the following:

- How the selected and recommended LTCP described in Section D.4 can be implemented, designed and constructed in the most affordable manner possible by the JCMUA
- The total project and annual costs, proposed method of funding, and the proposed cost distribution over next 20 to 30 years within Jersey City
- A schedule for preliminary design, final design, and construction of all the facilities
- The basis and predicted goals of the LTCP
- The intended water quality improvement that is predicted to over time after construction of each stage of this LTCP
- Next steps to be completed after approval of the Long Term Control Plan in regards to and operational plan for the LCTP facilities, post construction monitoring to demonstrate the effectiveness of CSO water quality improvement facilities, and future studies or investigations may need to be implemented to improve the implementation process of the LTCP.

F.2 RECOMMENDED LTCP

F.2.1 Recommended LTCP

The JCMUA is committing to negotiate a cost sharing plan for the Regional Alternative with those Permittees in the PVSC Sewer District that have selected the Regional Alternative within an agreed upon timeframe as approved by the NJDEP. If the agreement is reached during that time then the JCMUA accepts the Implementation Schedule as shown in Figure F.4-1 as their LTCP of the projects stated on this schedule through the Summer of 2038 which is the same as currently proposed on both Regional and Municipal LTCP plans. If no agreement is reached on the Regional Plan, the JCMUA LTCP would be the projects shown on Figure F.4-1.

The Regional LTCP is the preferred plan, however if negotiations are unsuccessful for the regional plan the Municipal LTCP will be selected. The Municipal LTCP described in Section D.4. is recommended because it meets the CSO permit requirements and objectives stated in Section A of this report. This is demonstrated by the following:

- The selected LTCP program of the alternative described in Section D.4, can achieve a percent capture by volume above 85% in accordance with Part IV. G. 4 F. iii of CSO Permit NJ)108723. As shown in Table 3.2, the selected LTCP program, will achieve a 88.3% capture.

- No facts justify a CSO abatement program that achieves CSO controls substantially greater than the percent capture by volume of this selected LTCP, 88.3%, based on the following:

    - There is no official, confirmed, or quantitative evidence, water quality related or other, that proves achieving a percent capture greater than 85% on the Jersey City CSO's will substantially improve the water quality around Jersey City and outside of Jersey City.

    - While it is accepted that NJDEP has deemed CSOs as a point source that requires CSO abatement controls, the Baseline Monitoring Report and the associated water quality modeling has provided some data that indicates that the CSO discharges surrounding Jersey City have less of an water quality impact than the Non-Point Sources of pollution upstream of Jersey City. The initial data set certainly support that additional data should be collected with continued refinement of the water quality modeling to better quantify the actual impacts of CSO on the receiving waters around Jersey City and the region. However, until the water quality monitoring and modeling issues are resolved to form conclusions that satisfy the NJDEP requirements, there is no purpose to providing controls substantially higher that the 85% capture criterion until there is a resolution of the water quality issues regarding impacts of CSOs on overall water quality.

- In accordance with the G. 7. of the permit, "Maximizing treatment at the existing Sewage Treatment Plant (STP)", the selected LTCP described in Section D.4 does convey 100% of the sewage captured and stored in the storage tanks and enhanced inline system to the STP at PVSC. All modeled simulations in the DEAR and this SIAR successfully achieved the required CSO percent captures stated while also meeting the following criteria:

    - There was no increased the flooding in the interceptor or in the trunk sewers within Jersey City beyond that which exists now.
    - There is no increase of the existing hydraulic grade line on the Hudson County Force Main (HCFM), because force main flows were maintained and not increased beyond the maximum flow limit available to the JCMUA as per the flow agreement between PVSC and the JCMUA. The subject agreement is dated September 24, 1985 and executed by Robert J. Davenport, former PVSC Chairman and Anthony R. Cucci, former Mayor of Jersey City.

- Once implemented, JCMUA System will have an overall percent capture of 88.3%. Also the recommended plan is primarily providing the greatest water quality benefits to the Hackensack River and Penhorn Creek where the need is greatest because the Westside Drainage Area alone will have a percent capture of 94%. The Hackensack River receives CSOs from the Westside Subdrainage Areas of the city and those Subdrainage Areas tributary to Penhorn Creek which is a tributary to the Hackensack River. Penhorn Creek is the water body that receives the highest Jersey City CSO volume to stream flow ratio and so it will receive the highest water quality benefit relative to all Jersey Citys' flowing waterbodies.

- The selected LTCP was chosen because it has the most optimal cost to benefit per gallon ratio when using the knee of the curve analysis described in section D.3.6. Section D. 3. 6 and its associated figure include a "knee of the curve" analysis, Figure D.3-1, indicates that the cost of CSO abatement increases exponentially with each level of treatment higher than the 85% capture criterion of the Presumption Approach stated in Part IV. G. 4 f. iii of CSO Permit NJ)108723.

- In addition to the Section D.3.6 knee of the curve analysis and the uncertain, but possibly favorable, circumstances regarding water quality surrounding Jersey City as described above, it would not be "reasonable" to expend more funds to address CSOs beyond 88.3% capture until the water quality conclusions have be formally accepted by NJDEP. This cost versus benefit analysis also supports that expending funds substantially higher than the cost of 85% is not justified at this time until the water quality monitoring and modeling issues related to CSOs and Non-Point Sources are completely addressed.

- This recommended LTCP is flexible and adaptable to changes during the implementation program period. Changes over the 20- or 30-year period may be deemed necessary based on unforeseen circumstances that will occur over an extended period. The GI, I/I, sewer separation, and storage tanks can be implemented in phases that could change over time for several reasons. Based on this fact the recommended LTCP will also address section G.4.g. iv, where it "….allows for cost effective expansion or retrofitting if additional controls…" are needed in years to come.

Based upon all the facts and available circumstances, discussed in this section we conclude that the recommended LTCP also addresses the permit requirements cited in G.4.g items i. through iv.

F.2.2 Adequate levels of CSO Volume Reduction for Jersey City

The objective of this section is to demonstrate that the recommended LTCP also complies with the CSO Capture Volume for Hudson County as described on Table C-8 of the DEAR conditional approval letter from NJDEP dated January 17, 2020 and in the approved Regional

DEAR. In that letter, Table C-8 shows that in order for Hudson County to obtain 85% capture of their CSO volume, Hudson County will have to capture an additional 1,260 MG from the Jersey City baseline modeled condition. Based upon this requirement, the JCMUA's modeled results for the baseline condition and the recommended LTCP described in D.4 (i.e. - "Municipal Alternative 1") in the Regional DEAR, we have confirmed and interpreted the numbers shown in Table F.2.2-1.

Table F.2.2-1: Jersey City and Hudson County CSO Volumes and their Percent Captures before and after Recommend LTCP Implementations

Categories	Type of Volume Descriptions	Jersey City CSO Volumes, MG	Jersey City's Percentage of Volume Captured,	Projected Volumes for Hudson County, MG	Hudson Percentage of Volume Captured,
Baseline Condition Before LTCP implementation	Total Wet Weather Volumes	5,651.2		6,411	
	Baseline Wet Weather Overflow Volume	1557.4	72%	2,222	65%
	Volume Captured to PVSC	4093.8		4,189	
Recommended LTCP	Total Wet Weather Volumes	4683.3		6,411	
	Wet Weather Overflow Volume, MG	549.6	88.3%	962	85%
	Volume Captured to PVSC	4133.7		5,449	
Jersey City's Volume Capture versus HC requirement		1007.8		1,260	

The information indicates the following:

- The percent capture calculations shown are equal to the Volume Captured/Total Wet weather Volumes and the method used by Jersey City is consistent with method shown on Table C-8 from NJDEP's January 17, 2020 letter.
- All the values for Jersey City are taken from the JCMUA DEAR and this report. Table F.2.2.1 indicates that after implementation of Jersey City's recommended LTCP the CSO Captured Volume increases by 1007.8 MG.
- Jersey City recommended LTCP will achieve 80% of the goal for all of Hudson County

Demographics from the U.S. Census can be used to determine if Jersey City's 1007.8 MG of additional volume captured is adequate to provide their share of the Hudson County's 1260 MG requirements for 85% capture in the county. Table F.2.2-2 provides Hudson County demographics for population, numbers of households, Land Area, Median Household Income (MHI) and estimated cumulative gross income (MHI X households). Jersey City's maximum percentage of all of these factors is 70%, which is "Jersey City's Estimated % of the 3 Citys' Cumulative Gross income". Demographics like these have been used to determine each municipalities cost share on the BCMR.

Table F.2.2-2: Hudson County Demographics

Categories of Census Data	Actual or Derived CENSUS 2018 Facts	North Bergen township, NJ	Bayonne , NJ	Jersey City, NJ
Published Actual Census Data	Population estimates, July 1, 2018, (V2018)	61,627	65,083	265,549
	Households, 2014-2018	21,900	24,975	101,007
	Median household income (in 2018 dollars), 2014-2018	$61,734	$59,924	$65,923
	Land area in square miles, 2010	5.13	5.8	14.79
Unpublished Census Fact derived from Actual published data	Estimate Cumulative Gross Income of Municipality, $Millions	$1,352	$1,497	$6,659
	Jersey City's Estimated % of Population			67.7%
	Jersey City's Estimated % of Households			68.3%
	Jersey City's Estimated % of MHI			35.1%
	Jersey City's Estimated % of Land Area			57.5%
	Jersey City's Estimated % of the 3 Citys' Cumulative Gross income			70.0%

Therefore, based upon any of these methods the most that should be considered as being Jersey City's adequate share of the 1260 MG additional captured CSO volume is 70% of it or 882 MG. However, the JCMUA's recommended LTCP provides 1007.8 MG of the 1260 MG or 80% of the additional captured CSO volume.

F.2.3 Operational Plan

Upon approval of the LTCP, the recommended LTCP will also provide the required Operations Plan in accordance with G.6. of the CSO permit, "Operational Plan". This Plan will describe the O&M program that would need to be added to the JCMUA's existing O&M Program and Manual to address the final LTCP CSO control facilities in the approved LTCP. The minimum items that will be addressed in the Operational Plan will be as follows:

- operating strategies,
- green infrastructure maintenance plans for each type of GI
- staffing and budgeting
- I/I
- emergency plans

F.2.4 Post Construction Monitoring and LTCP updates

The JCMUA General Permit requires that the recommended LTCP be flexible and adaptable by the use of several phases of design and construction during the LTCP implementation period. In parallel with the phased implementation program of the LTCP, post construction monitoring

with updated information will be completed regularly after the end and startup of each construction phase. The objective the post monitoring and LTCP updates will be the following:

- Demonstration of compliance at completion of each construction phase and prior to the next construction phase to reassess CSO abatement needs and requirements.
- An updated LTCP may be completed at these different stages to determine if any new and more effective CSO abatement technologies become available, and if any new water quality modeling results have emerged since the last phase of construction.

F.3 IMPLEMENTATION COST OPINION

Table F.3-1 provides a complete and comprehensive opinion of probable construction cost including total capital, O&M, and annual costs for each technology and each phase of post monitoring with LTCP update. Cumulative costs will be provided at each phase of construction also but a more detailed distribution of these costs is discussed in Section F.5 following the presentation of the implementation schedule in Section F4.

Table F.3-1: Capital, Land, O, and Totals Annual Costs for the JCMUA Recommended Municipal Alternative 1 with 88.3% Capture

Description	Estimated Quantities	Unit Cost	Units	Total
JCMUA Selected LTCP: Alternative 1 - Phase I-A - Sewer Rehabilitation and I/I Elimination				
Replacement of Existing Sewer with 12 DI Sewer Pipes	2,100	50	L.F.	$ 169,000
Replacement of Existing Sewer with 18 DI Sewer Pipes	32,000	70	L.F.	$ 3,896,000
Replacement of Existing Sewer with 24 DI Sewer Pipes	6,970	95	L.F.	$ 1,140,000
Replacement of Existing Sewer with 30 DI Sewer Pipes	12,460	130	L.F.	$ 2,769,000
Replacement of Existing Sewer with 36 DI Sewer Pipes	6,600	200	L.F.	$ 1,869,000
Replacement of Existing Sewer with 42 DI Sewer Pipes	9,390	260	L.F.	$ 3,145,000
Replacement of Existing Sewer with 48 DI Sewer Pipes	10,360	300	L.F.	$ 4,219,000
Replacement of Existing Sewer with 54 DI Sewer Pipes	2,440	380	L.F.	$ 1,127,000
Replacement of Existing Sewer with 60 DI Sewer Pipes	1,950	450	L.F.	$ 1,117,000
Replacement of Existing Sewer with 66 DI Sewer Pipes	920	540	L.F.	$ 604,000
Replacement of Existing Sewer with 72 DI Sewer Pipes	960	630	L.F.	$ 714,000
Replacement of Existing Sewer with 78 DI Sewer Pipes	590	730	L.F.	$ 497,000
Replacement of Existing Sewer with 84 DI Sewer Pipes	760	830	L.F.	$ 706,000
Replacement of Existing Sewer with 96 DI Sewer Pipes	390	1070	L.F.	$ 452,000
Bypass hose			L.S.	$ 2,200
6" pump rental	260	650	Wk	$ 169,000
6" pump fuel cost	43,680	18	HR	$ 786,240
Pump operator cost	43,680	50	HR	$ 2,184,000
Construction Total Cost				$ 25,570,000
Total Cost & Other Jersey City Specific Costs (25%)*				$ 31,960,000
Overhead and Profit (15%)				$ 4,794,000
Total Capital Cost for Phase - I-A				**$ 36,754,000**
Annual O & M Cost				$ -
Total Project (Present Worth) Cost				**$ 36,754,000**
***Total Annual financing and O&M costs for Phase - I-A**				**$ 2,410,000**
JCMUA Selected LTCP: Alternative 1 - Phase I-B - Bates and Bright Street to Jersey Avenue Sewer Separation Project				
Sewer Separation Total Construction Cost	28.9	$ 300,000	Acres	$ 8,670,000
Total Cost & Other Jersey City Specific Costs (25%)*				$ 10,840,000
Total Capital Cost for Phase - I-B				**$ 10,840,000**
Annual O & M Cost				**$ -**
Total Project (Present Worth) Cost				**$ 10,840,000**
***Total Annual financing and O&M costs for Phase - I-B**				**$ 710,000**
JCMUA Selected LTCP: Alternative 1 - Phase I-C - Green Infrastructure to Control 7% of Impervious Area In Jersey City				
Green Infrastructure Total Construction Cost	188	$ 390,000	AC.	$ 73,320,000
Total Cost & Other Jersey City Specific Costs (25%)*				$ 91,650,000
Total Capital Cost				**$ 91,650,000**
Annual O & M Cost	188	$ 2,250		$ 420,000
Total Project (Present Worth) Cost				**$ 98,050,000**
***Total Annual financing and O&M costs for Phase - I-C**				**$ 6,440,000**
Phase - 1-D: Post Construction Monitoring and Updating the LTCP for 2027				**$ 460,000**
JCMUA Selected LTCP: Alternative 1 - Phase II-A - Penhorn Creek Treatment Shaft 1 - Secaucus to Manhattan				
Tanks including Installation	6.2	$ 4,106,900	MG.	$ 81,940,000
Total Cost & Other Jersey City Specific Costs (25%)*				$ 102,430,000
Total Capital Cost				**$ 102,430,000**
Land Use	**0.35**	**$ 5,123,300**	**AC.**	**$ 1,810,000**
Annual O & M Cost				$ 150,000
Total Project (Present Worth) Cost				**$ 106,520,000**
***Total Annual financing and O&M costs for Phase - II-B**				**$ 7,000,000**
Phase - II-B: Post Construction Monitoring and Updating the LTCP for 2032				**$ 560,000**
JCMUA Selected LTCP: Alternative 1 - Phase III-A - Penhorn Creek Treatment Shaft 2 - St. Paul's (W3), Van Winkle (W4) and Broadway (W5)				
Tanks including Installation	7.05	$ 3,970,300	MG.	$ 91,120,000
Total Cost & Other Jersey City Specific Costs (25%)*				$ 113,900,000
Total Capital Cost				**$ 113,900,000**
Land Use	**0.41**	**$ 5,123,300**	**AC.**	**$ 2,080,000**
Annual O & M Cost				$ 160,000
Total Project (Present Worth) Cost				**$ 118,420,000**
***Total Annual financing and O&M costs for Phase - III-A**				**$ 7,780,000**
Phase - III-B: Post Construction Monitoring and Updating the LTCP for 2038				**$ 710,000**
Overhead and Profit is included in each item as stated in the April 8th, 2020 PVSC Cost Standardization Memo				
*** The Other costs are for 'Traffic control, unstable subsurface conditions due to "Fill", rock excavation, soil remediation, outfall Diversion chambers.**				

**Annual Financing over a 20 year periods @ 2.75% interest

Table F.3-1: Capital, Land, O, and Totals Annual Costs for the JCMUA Recommended Municipal Alternative 1 with 88.3% Capture

Description	Estimated Quantities	Unit Cost	Units	Total
JCMUA Selected LTCP: Alternative 1 - Phase IV-A - Hackensack River Treatment Shaft - Sip(W6), Duncan(W7), Clenndenny (W8), Claremont (W9) and Fisk (W10)				
Tanks including Installation	10.15	$ 3,672,200	MG.	$ 123,120,000
Total Cost & Other Jersey City Specific Costs (25%)*				$ 153,900,000
Total Capital Cost				**$ 153,900,000**
Land Use	**0.52**	**$ 5,123,300**	**AC.**	**$ 2,670,000**
Annual O & M Cost				$ 190,000
Total Project (Present Worth) Cost				**$ 159,460,000**
***Total Annual financing and O&M costs for Phase - IV-A**				**$ 10,470,000**
Phase - IV-B: Post Construction Monitoring and Updating the LTCP for 2042				**$ 830,000**
JCMUA Selected LTCP: Alternative 1 - Phase V-A - Newark Bay Treatment Shaft - Danforth (W11/12) and Mina (W13)				
Tanks including Installation	4.3	$ 4,585,200	MG.	$ 60,570,000
Total Cost & Other Jersey City Specific Costs (25%)*				$ 75,710,000
Total Capital Cost				**$ 75,710,000**
Land Use	**0.3**	**$ 5,123,300**	**AC.**	**$ 1,560,000**
Annual O & M Cost				$ 130,000
Total Project (Present Worth) Cost				**$ 79,250,000**
***Total Annual financing and O&M costs for Phase - V-A**				**$ 5,200,000**
Phase - V-B: Post Construction Monitoring and Updating the LTCP for 2046				**$ 970,000**
JCMUA Selected LTCP: Alternative 1 - Phase VI-A - North Hudson Treatment Shaft - 14th (E-18) and 18th Street (E-19)				
Tanks including Installation	3.2	$ 5,146,600	MG.	$ 47,450,000
Total Cost & Other Jersey City Specific Costs (25%)*				$ 59,310,000
Total Capital Cost				**$ 59,310,000**
Land Use	**0.3**	**$ 5,123,300**	**AC.**	**$ 1,560,000**
Annual O & M Cost				$ 110,000
Total Project (Present Worth) Cost				**$ 62,540,000**
***Total Annual financing and O&M costs for Phase - VI-A**				**$ 4,110,000**

Overhead and Profit is included in each item as stated in the April 8th, 2020 PVSC Cost Standardization Memo

*** The Other costs are for 'Traffic control, unstable subsurface conditions due to "Fill", rock excavation, soil remediation, outfall Diversion chambers.**

SUMMARY OF CAPITAL, LAND, ANNUAL OPERATION AND MAINTENANCE COSTS

TOTAL CAPITAL COSTS=	**$**	**644,494,000**
TOTAL LAND COSTS=	**$**	**9,680,000**
TOTAL CAPITAL AND LAND COSTS=	**$**	**654,174,000**
TOTAL OPERATION AND MAINTENANCE COSTS=	**$**	**1,160,000**
TOTAL PROJECT (PRESENT WORTH) COSTS=	**$**	**671,840,000**
TOTAL POST CONTSTRUCTION MONITORING AND LTCP UPGRADE COSTS=	**$**	**3,530,000**

*Annual Financing over a 20 year periods @ 2.75% interest

F.4 IMPLEMENTATION SCHEDULE

Based upon the conclusions of Section E.3 and F.3 which indicated the citizens of Jersey City carry a Medium Financial Capability Burden and have among the highest property taxes in the U.S.A. Figure F.4-1 presents is a comprehensive schedule showing all Phases I-A through VI-B to provide a complete LTCP program. The proposed implementation schedule for the LTCP has the following characteristics:

- An extended implementation schedule of 30 years to ease the burden on Jersey City residents especially for the 12.4% of the population who make less than $25,000 per household

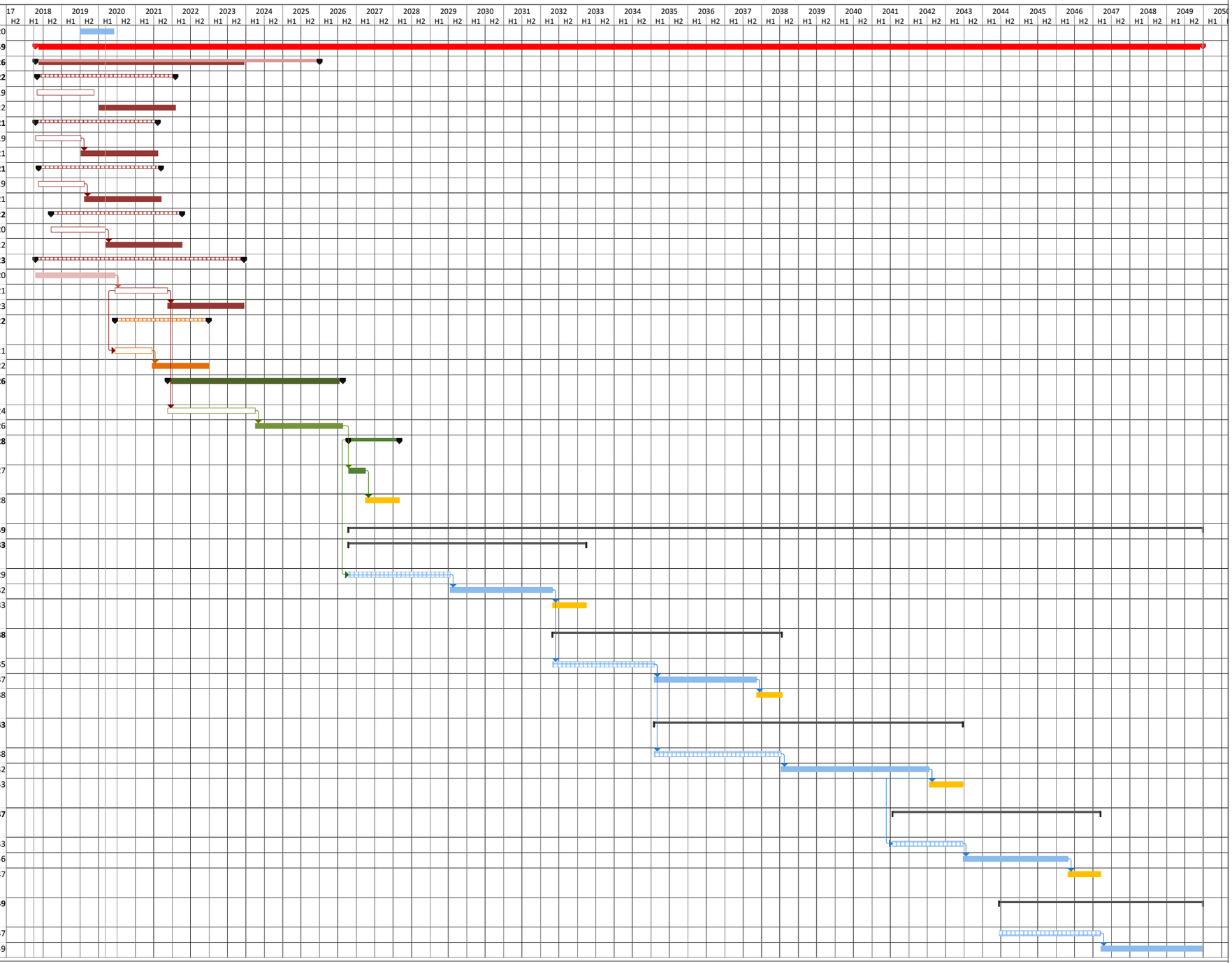
- An upfront implementation of the Green Infrastructure (GI), combined Sewer System source controls and repairs in the first 7 years. GI was one of the most requested CSO abatement measures for this LTCP by several attendees of the Supplemental CSO Team and Community Public Meetings during 2018 and 2019.

- Regular post construction monitoring results with LTCP updates every 5.5 years to demonstrate compliance at the completion of each construction phase and prior to the next construction phase to reassess CSO abatement needs and requirements, any new CSO abatement technologies, and any new water quality modeling results which make have emerged since the last phase of construction.

Jersey City Municipal Utilities Authority (JCMUA)
Long Term Control Plan (LTCP): Selection and Implementation of Alternatives Report

Figure F.4-1: SELECTED LTCP IMPLEMENTATION SCHEDULE FOR DESIGN, CONSTRUCTION, AND POST CONSTRUCTION MONITORING

ID	Task Name	Duration	Start	Finish
1	JCMUA LTCP: Selection and Implementation of Alternatives Report	240 days	Fri 6/28/19	Mon 6/1/20
2	**JCMUA Selected LTCP: Municipal Alternative 1**	**8263 days**	**Sun 4/15/18**	**Fri 12/24/49**
3	**Sewer Rehabilitation and I/I Elimination**	**2007 days**	**Sun 4/15/18**	**Thu 1/1/26**
4	**Phase 5**	**973 days**	**Tue 5/1/18**	**Mon 1/31/22**
5	Design	402 days	Tue 5/1/18	Fri 11/15/19
6	C/A	540 days	Thu 1/2/20	Mon 1/31/22
7	**Phase 6a**	**860 days**	**Mon 4/16/18**	**Mon 8/9/21**
8	Design	320 days	Mon 4/16/18	Tue 7/9/19
9	C/A	540 days	Wed 7/10/19	Mon 8/9/21
10	**Phase 6b**	**862 days**	**Wed 5/16/18**	**Fri 9/10/21**
11	Design	322 days	Wed 5/16/18	Mon 8/12/19
12	C/A	540 days	Tue 8/13/19	Fri 9/10/21
13	**phase 7a**	**922 days**	**Mon 9/17/18**	**Thu 4/7/22**
14	Design	382 days	Mon 9/17/18	Mon 3/9/20
15	C/A	540 days	Tue 3/10/20	Thu 4/7/22
16	**phase 8**	**1470 days**	**Mon 4/16/18**	**Tue 12/12/23**
17	Condition Assessment	560 days	Mon 4/16/18	Thu 6/11/20
18	Design	370 days	Fri 6/12/20	Mon 11/15/21
19	C/A	540 days	Tue 11/16/21	Tue 12/12/23
20	**Bates and Bright Street to Jersey Avenue Sewer Separation Project**	**660 days**	**Fri 6/12/20**	**Tue 12/27/22**
21	Design	260 days	Fri 6/12/20	Mon 6/14/21
22	C/A	400 days	Tue 6/15/21	Tue 12/27/22
23	**Green Infrastructure to Control 7% of Impervious Area In Jersey City**	**1240 days**	**Tue 11/16/21**	**Tue 8/18/26**
24	Design	620 days	Tue 11/16/21	Tue 4/2/24
25	C/A	620 days	Wed 4/3/24	Tue 8/18/26
26	**2028 Post Construcion Monitoring and Update of LTCP**	**360 days**	**Wed 10/14/26**	**Tue 2/29/28**
27	Evalution of Size Reduction attributed to I/I reduction, Sewer Separation, and Rain Gardens	120 days	Wed 10/14/26	Tue 3/30/27
28	Post Construcion Monitoring and Update LTCP based upon results of Evaluation	240 days	Wed 3/31/27	Tue 2/29/28
29	**Treatment Shaft Systems**	**6053 days**	**Wed 10/14/26**	**Fri 12/24/49**
30	**Penhorn Creek Treatment Shaft 1 - Secaucus (W1) to Manhattan (W2)**	**1685 days**	**Wed 10/14/26**	**Tue 3/29/33**
31	Design	720 days	Wed 10/14/26	Tue 7/17/29
32	Construction	725 days	Wed 7/18/29	Tue 4/27/32
33	2032 Post Construcion Monitoring and Update of LTCP	240 days	Wed 4/28/32	Tue 3/29/33
34	**Penhorn Creek Treatment Shaft 2 - St. Paul's (W3), Van Winkle (W4) and Broadway (W5)**	**1625 days**	**Wed 4/28/32**	**Tue 7/20/38**
35	Design	720 days	Wed 4/28/32	Tue 1/30/35
36	Construction	725 days	Wed 1/31/35	Tue 11/10/37
37	2038 Post Construcion Monitoring and Update of LTCP	180 days	Wed 11/11/37	Tue 7/20/38
38	**Hackensack River Treatment Shaft - Sip(W6), Duncan(W7), Clenndenny (W8), Claremont (W9) and Fisk (W10)**	**2188 days**	**Wed 1/31/35**	**Fri 6/19/43**
39	Design	900 days	Wed 1/31/35	Tue 7/13/38
40	Construction	1048 days	Wed 7/14/38	Fri 7/18/42
41	2042 Post Construcion Monitoring and Update of LTCP	240 days	Mon 7/21/42	Fri 6/19/43
42	**Newark Bay Treatment Shaft - Danforth (W11/12) and Mina (W13)**	**1475 days**	**Mon 7/22/41**	**Fri 3/15/47**
43	Design	500 days	Mon 7/22/41	Fri 6/19/43
44	Construction	743 days	Mon 6/22/43	Wed 4/25/46
45	2046 Post Construcion Monitoring and Update of LTCP	232 days	Thu 4/26/46	Fri 3/15/47
46	**North Hudson Treatment Shaft - 14th (E-18) and 18th Street (E-19)**	**1445 days**	**Mon 6/13/44**	**Fri 12/24/49**
47	Design	720 days	Mon 6/13/44	Fri 3/15/47
48	Construction	725 days	Mon 3/18/47	Fri 12/24/49



Project: JCMUA_Envisioned_LTCP
Date: Tue 3/10/20

Task, Split, Milestone, Summary, Project Summary, External Tasks, External Milestone, Inactive Task, Inactive Milestone, Inactive Summary, Manual Task, Duration-only, Manual Summary Rollup, Manual Summary, Start-only, Finish-only, Deadline, Progress, Manual Progress

\\NJ05FP01\Data\Project\01129_JCMUA\01129179_2018_CSO_Permit_Services\E_Selected_Plan_for_LTCP\LTCP Schedules\JCMUA_Envisioned_LTCP12162019_DEAR85%_overflows_w_GI-SS-IIovr30years031020.mpp

F.5 JCMUA LTCP IMPLEMENTATION SCHEDULE FOR LTCP COSTS

Table F.5-1 presents the annual costs and costs per household for each project throughout the implementation period. This period of years includes 30-year implementation period and the 20-year loan payoff period after the start of design for the last phase of the LTCP.

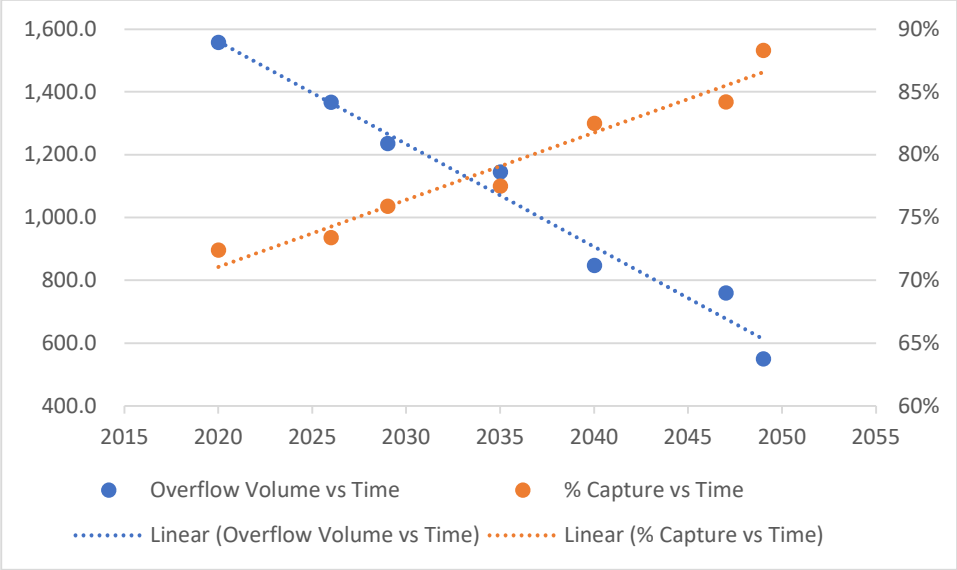
Name of Phase>>>	Sewer Rehabilitation and I/I Elimination	Bates and Bright Street to Jersey Avenue Sewer Separation Project	Green Infrastructure to Control 7% of Impervious Area In Jersey City	2027 Post Construction Monitoring and Update of LTCP	Penhorn Creek Treatment Shaft 1 - Secaucus (W1) to Manhattan (W2)	2032 Post Construction Monitoring and Update of LTCP	Penhorn Creek Treatment Shaft 2 - St. Paul's (W3), Van Winkle (W4) and Broadway (W5)	2038 Post Construction Monitoring and Update of LTCP	Hackensack River Treatment Shaft - Sip(W6), Duncan(W7), Clenndenny (W8), Claremont (W9) and Fisk (W10)	2042 Post Construction Monitoring and Update of LTCP	Newark Bay Treatment Shaft - Danforth (W11/12) and Mina (W13)	2044 Post Construction Monitoring and Update of LTCP	North Hudson Treatment Shaft - 14th (E-18) and 18th Street (E-19)	Total Annual Cost for All LTCP Phases
Planned Year for Startup	2018	2020	2021	2027	2026	2032	2032	2038	2035	2042	2039	2046	2044	
Capital Cost	$ 36,745,000	$ 10,840,000	$ 91,650,000	$ 460,000	$ 104,240,000	$ 560,000	$ 115,980,000	$ 710,000	$ 156,570,000	$ 830,000	$ 77,270,000	$ 970,000	$ 60,870,000	
Annual O&M	$ -	$ -	$ 420,000	$ -	$ 150,000	$ -	$ 160,000	$ -	$ 190,000	$ -	$ 130,000	$ -	$ 110,000	
Annual costs needed (Based on 20 years @ Interest Rate 2.75%)	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	
Years in the Payment Drawdown Schedule	**Specific Payments for the "Phase Name" in a given Year**													
2018	$ 2,410,000	$ -	$ -		$ -		$ -		$ -		$ -		$ -	$ 2,410,000
2019	$ 2,410,000	$ -	$ -		$ -		$ -		$ -		$ -		$ -	$ 2,410,000
2020	$ 2,410,000	$ 710,000	$ -		$ -		$ -		$ -		$ -		$ -	$ 3,120,000
2021	$ 2,410,000	$ 710,000	$ 6,440,000		$ -		$ -		$ -		$ -		$ -	$ 9,560,000
2022	$ 2,410,000	$ 710,000	$ 6,440,000		$ -		$ -		$ -		$ -		$ -	$ 9,560,000
2023	$ 2,410,000	$ 710,000	$ 6,440,000		$ -		$ -		$ -		$ -		$ -	$ 9,560,000
2024	$ 2,410,000	$ 710,000	$ 6,440,000		$ -		$ -		$ -		$ -		$ -	$ 9,560,000
2025	$ 2,410,000	$ 710,000	$ 6,440,000		$ -		$ -		$ -		$ -		$ -	$ 9,560,000
2026	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ -		$ -		$ -		$ -	$ 16,560,000
2027	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ -		$ -		$ -		$ -	$ 16,560,000
2028	$ 2,410,000	$ 710,000	$ 6,440,000	$ 460,000	$ 7,000,000		$ -		$ -		$ -		$ -	$ 17,020,000
2029	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ -		$ -		$ -		$ -	$ 16,560,000
2030	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ -		$ -		$ -		$ -	$ 16,560,000
2031	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ -		$ -		$ -		$ -	$ 16,560,000
2032	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000	$ 560,000	$ 7,780,000		$ -		$ -		$ -	$ 24,900,000
2033	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ 7,780,000		$ -		$ -		$ -	$ 24,340,000
2034	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ 7,780,000		$ -		$ -		$ -	$ 24,340,000
2035	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ -		$ -	$ 34,810,000
2036	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ -		$ -	$ 34,810,000
2037	$ 2,410,000	$ 710,000	$ 6,440,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ -		$ -	$ 34,810,000
2038	$ -	$ 710,000	$ 6,440,000		$ 7,000,000		$ 7,780,000	$ 710,000	$ 10,470,000		$ -		$ -	$ 33,110,000
2039	$ -	$ 710,000	$ 6,440,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ -	$ 37,600,000
2040	$ -	$ -	$ 6,440,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ -	$ 36,890,000
2041	$ -	$ -	$ 420,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ -	$ 30,870,000
2042	$ -	$ -	$ 420,000		$ 7,000,000		$ 7,780,000		$ 10,470,000	$ 830,000	$ 5,200,000		$ -	$ 31,700,000
2043	$ -	$ -	$ 420,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ -	$ 30,870,000
2044	$ -	$ -	$ 420,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 34,980,000
2045	$ -	$ -	$ 420,000		$ 7,000,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 34,980,000
2046	$ -	$ -	$ 420,000		$ 150,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 28,130,000
2047	$ -	$ -	$ 420,000		$ 150,000		$ 7,780,000		$ 10,470,000		$ 5,200,000	$ 970,000	$ 4,110,000	$ 29,100,000
2048	$ -	$ -	$ 420,000		$ 150,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 28,130,000
2049	$ -	$ -	$ 420,000		$ 150,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 28,130,000
2050	$ -	$ -	$ 420,000		$ 150,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 28,130,000
2051	$ -	$ -	$ 420,000		$ 150,000		$ 7,780,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 28,130,000
2052	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 20,510,000
2053	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 20,510,000
2054	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 10,470,000		$ 5,200,000		$ 4,110,000	$ 20,510,000
2055	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 5,200,000		$ 4,110,000	$ 10,230,000
2056	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 5,200,000		$ 4,110,000	$ 10,230,000
2057	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 5,200,000		$ 4,110,000	$ 10,230,000
2058	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 5,200,000		$ 4,110,000	$ 10,230,000
2059	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 130,000		$ 4,110,000	$ 5,160,000
2060	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 130,000		$ 4,110,000	$ 5,160,000
2061	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 130,000		$ 4,110,000	$ 5,160,000
2062	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 130,000		$ 4,110,000	$ 5,160,000
2063	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 130,000		$ 4,110,000	$ 5,160,000
2064	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 130,000		$ 110,000	$ 1,160,000
2065	$ -	$ -	$ 420,000		$ 150,000		$ 160,000		$ 190,000		$ 130,000		$ 110,000	$ 1,160,000
													MAXIMUMS=	$ 37,600,000

F.6 CSO REDUCTION VERSUS TIME

The selected alternative will decrease Jersey City's CSO overflow volume at the completion of each phase. The current CSO conditions in Jersey City are referred to as baseline conditions. The baseline CSO overflow volume is 1557.4 MG and percent capture is 72.4% in Jersey City. A description of each phase and their impact on CSO can be found below by order of completion:

- Downtown/Grand Street partial sewer separation will be completed December 2022
- I/I Reduction and Sewer Rehabilitation will be completed January 2023
- Installation of Bioswales/Rain Gardens (100 sites) will be completed August 2026
    - After completing the first three phases of the selected plan the percent capture in Jersey City will increase to 73.4% and the overflow volume will decrease to 1,367 MG
- Tank 1 will be completed April 2032
    - After the implementation of Tank 1 the percent capture in Jersey City will increase to 75.9% and the CSO overflow volume will decrease to 1,235.6 MG
- Tank 2 will be completed November 2037
    - After the implementation of Tank 2 the percent capture in Jersey City will increase to 77.5% and the CSO overflow volume will decrease to 1,144.6 MG
- Tank 3 will be completed July 2043
    - After the implementation of Tank 3 the percent capture in Jersey City will increase to 82.5% and the CSO overflow volume will decrease to 847.5 MG
- Tank 4 will be completed April 2046
    - After the implementation of Tank 4 the percent capture in Jersey City will increase to 84.2% and the CSO overflow volume will decrease to 759.2 MG
- Tank 5 will be completed December 2049
    - After the implementation of Tank 5 the percent capture in Jersey City will increase to 88.3% and the CSO overflow volume will decrease to 549.6 MG

Figure F.6-2: Overflow Volume and % Capture vs Time



Each point on the graph marks the point when a phase described in the schedule will be completed. There is a gradual decrease in overflow volume and increase in percent capture after each phase in the program, with large increases in percent capture and decreases in overflow volume between 2035 and 2047.

Appendix A
New Jersey Surface Water Quality Standards

N. J. A. C. 7:9B

Surface Water Quality Standards

Statutory Authority: N.J.S.A. 58:10A-1 et seq., 58:11A-1 et seq., and 13:1D-1 et seq.

Re-adopted: October 17, 2016
Last Amended - May 6, 2019 (51 N.J.R. 613(b))
For regulatory history and effective dates, see the New Jersey Administrative Code

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CHAPTER 9B SURFACE WATER QUALITY STANDARDS

SUBCHAPTER 1. SURFACE WATER QUALITY STANDARDS

7:9B-1.1 Scope of subchapter

Unless otherwise provided by rule or statute, this subchapter shall constitute the rules of the Department of Environmental Protection governing matters of policy with respect to the protection and enhancement of surface water resources, class definitions and quality criteria, use designation and quality criteria for the mainstem of the Delaware River including the Delaware Bay, the classification of surface waters of the State, procedures for establishing water quality-based effluent limitations, modification of water quality-based effluent limitations, procedures for reclassifying specific segments for less restrictive uses and procedures for reclassifying specific segments for more restrictive uses pursuant to N.J.S.A. 13:1D-1 et seq., the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq.

7:9B-1.2 Construction

This subchapter shall be liberally construed to permit the Department and its various divisions to discharge their statutory functions.

7:9B-1.3 Severability

If any subchapter, section, subsection, provision, clause, or portion of this chapter, or the application thereof to any person, is adjudged unconstitutional or invalid by a court of competent jurisdiction, such judgment shall be confined in its operation to the subchapter, section, subsection, clause, portion, or application directly involved in the controversy in which such judgment shall have been rendered and it shall not affect or impair the remainder of this chapter or the application thereof to other persons.

7:9B-1.4 Definitions

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

"Acute toxicity" means a lethal or severe adverse sublethal effect (for example, immobilization of daphnids) to an organism exposed to a toxic substance for a relatively short period of time. Acute toxicity is measured by short-term bioassays, generally of 48 or 96 hour duration.

"Agricultural water supply" means water used for field crops, livestock, horticulture, and silviculture.

"Aquatic substrata" means soil material and associated biota underlying the water.

"Best management practices" or "BMPs" means the methods, measures or practices to prevent or reduce the amount of pollution from point or nonpoint sources including structural and nonstructural controls and operation and maintenance procedures.

"Bioaccumulation" means the increase of the concentration of a substance within the tissues of an organism, to levels in excess of that substance's ambient environmental concentration, directly from the water or through the ingestion of food (usually other organisms).

"Bioassay" means a toxicity test using aquatic organisms to determine the concentration or amount of a toxic substance causing a specified response in the test organisms under stated test conditions.

"Biota" means the animal and plant life of an ecosystem; flora and fauna collectively.

"Calculable changes" means changes to water quality characteristics as demonstrated by any acceptable mathematical, predictive method.

"Carcinogen" means a toxic substance capable of inducing a cancer response, including Group A (human carcinogen), Group B (probable human carcinogen) or Group C (possible human carcinogen) categorized in accordance with the USEPA Guidelines for Carcinogen Risk Assessment, 51 Fed. Reg. 33992, 1986 incorporated herein by reference, as amended or supplemented.

"C1" means Category One waters.

"C2" means Category Two waters.

"Category one waters" means those waters designated in the tables in N.J.A.C. 7:9B-1.15(c) through (i), for purposes of implementing the antidegradation policies set forth at N.J.A.C. 7:9B-1.5(d), for protection from measurable changes in water quality based on exceptional ecological significance, exceptional recreational significance, exceptional water supply significance or exceptional fisheries resource(s) to protect their aesthetic value (color, clarity, scenic setting) and ecological integrity (habitat, water quality and biological functions).

"Category two waters" means those waters not designated as Outstanding National Resource Waters or Category One at N.J.A.C. 7:9B-1.15 for purposes of implementing the antidegradation policies set forth at N.J.A.C. 7:9B-1.5(d).

"Chlorine produced oxidants" means the sum of free and combined chlorine and bromine as measured by the methods approved under N.J.A.C. 7:18. In fresh waters the oxidants measured are comprised predominantly of hypochlorous acid (HOCl), hypochlorite ion (OCl^-), monochloramine and dichloramine. In saline waters the oxidants measured are comprised predominantly of the oxidants listed for fresh waters plus hypobromous acid (HOBr), hypobromite ion (OBr^-) and bromamines.

"Chronic toxicity" means death or other adverse impacts that affect the growth, survival, or reproductive success of an organism or its progeny after a relatively long exposure period to toxic substances. Chronic toxicity is measured using intermediate-term or long-term bioassays.

“Complete mix” means a twenty five percent (25%) or less variation in concentration across the transect of the water body.

"Criteria" means those elements of the Surface Water Quality Standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When the criteria are met, water quality will generally protect the designated use.

"Department" means the New Jersey Department of Environmental Protection.

"Designated use" means those surface water or ground water uses, both existing and potential, that have been established by the Department for waters of the State.

"Diadromous fish" means fish that spend most of their life in one type of water, either fresh or saline, and migrate to the other type to spawn.

"Disinfection" means the removal, destruction, or inactivation of pathogenic and indicator organisms.

“Dissolved metal” means the concentration of metal that passes through a 0.45 μm membrane filter (as defined in “Methods for Chemical Analysis of Water and Wastes,” EPA-600/4-79-020, March 1979).

"DRBC" means Delaware River Basin Commission.

“DRBC Water Quality Regulations” means the DRBC Administrative Manual – Part III Water Quality Regulations dated September 27, 2006, including all amendments and supplements thereto.

“EC50” means the median effective concentration of a toxic substance expressed as a statistical estimate of the concentration that has a specified adverse effect on 50 percent of the test organisms under specified test conditions, based on the results of an acute bioassay.

“Exceptional ecological significance” means:

1. Waterbodies with suitable habitat verified by the Department to support Bog Turtle, Brook Floater, Dwarf Wedgemussel, Eastern Pondmussel, Eastern Lampmussel, Green Floater, and/or Triangle Floater and documented occurrence(s) of at least one of these species verified by the Department for inclusion in the Natural Heritage Program; or
2. A waterbody supporting an exceptional aquatic community as demonstrated by a nonimpaired benthic macroinvertebrate community as measured by the Department’s Rapid Bioassessment Protocol (see http://www.state.nj.us/dep/wms/bfbm/rbpinfo.html) and at least two of the following factors:

i. Optimal habitat as measured by the Department's Stream Habitat Assessment (see http://www.state.nj.us/dep/wms/bfbm/rbpinfo.html);
ii. Excellent fish community as measured by the Fish Index of Biotic Integrity (see http://www.state.nj.us/dep/wms/bfbm/fishibi.html);
iii. Water quality data that demonstrates compliance with aquatic life criteria pursuant to N.J.A.C. 7:9B-1.14(d) for dissolved oxygen, temperature, total phosphorus, and total suspended solids; or
iv. Impervious surface that is:
    (1) less than two percent for a HUC 14 of five square miles; or
    (2) less than or equal to 10 percent for a HUC 14 of greater than or equal to five square miles.

"Exceptional fisheries resource(s)" means waterbodies confirmed by the Department as supporting trout production and classified as FW2-TP or waterbodies approved by the Department for unrestricted shellfish harvest pursuant to Shellfish Growing Water Classification rules at N.J.A.C 7:12.

"Exceptional water supply significance" means a water supply system that serves a population greater than 100,000, including any reservoirs and their natural tributaries from source to the reservoir.

"Existing uses" means those uses actually attained in the waterbody on or after November 28, 1975, whether or not they are included in the Surface Water Quality Standards.

"Federal Act" means the "Federal Water Pollution Control Act" (33 U.S.C. § 1251 et seq.), commonly referred to as the Clean Water Act, including all subsequent supplements and amendments.

"Fresh water(s)" means all nontidal and tidal waters generally having a salinity, due to natural sources, of less than or equal to 3.5 parts per thousand at mean high tide.

"FW" means the general surface water classification applied to fresh waters.

"FW1" means those fresh waters, as designated in N.J.A.C. 7:9B-1.15(j), that are to be maintained in their natural state of quality (set aside for posterity) and not subjected to any man-made wastewater discharges or increases in runoff from anthropogenic activities. These waters are set aside for posterity because of their clarity, color, scenic setting, other characteristic of aesthetic value, unique ecological significance, exceptional recreational significance, exceptional water supply significance or exceptional fisheries resource(s).

"FW2" means the general surface water classification applied to those fresh waters that are not designated as FW1 or Pinelands Waters.

"Groundwater" means that portion of water beneath the land surface that is within the zone of saturation (below the water table) where pore spaces are filled with water.

“Heat dissipation area” means a mixing zone, as may be designated by the Department, into which thermal effluents may be discharged for the purpose of mixing, dispersing, or dissipating such effluents without creating nuisances, hazardous conditions, or violating the provisions of this chapter, the Surface Water Quality Standards.

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

“Important species” means species that are commercially valuable (for example, within the top 10 species landed, by dollar value); recreationally valuable; threatened or endangered; critical to the organization and/or maintenance of the ecosystem; or other species necessary in the food web for the well-being of the species identified in this definition.

“Industrial water supply” means water used for processing or cooling.

“Intermittent stream” means a stream with a MA7CD10 flow of less than one-tenth (0.1) cubic foot per second.

“Lake, pond, or reservoir” means any impoundment, whether naturally occurring or created in whole or in part by the building of structures for the retention of surface water, excluding sedimentation control and stormwater retention/detention basins and ponds designed for treatment of wastewater. Lakes, ponds, and reservoirs are characterized by a long term or permanent downgradient restriction of surface water flow from the impoundment and areas of quiescent water within the body of the impoundment. Lakes, ponds, and reservoirs are frequently characterized by greater water depths within the impoundment than either the upgradient or downgradient surface water flow and by shallow water lateral edges containing emergent or submerged plant species. For regulatory purposes, the upgradient boundary of a lake, pond, impoundment, or reservoir shall be considered to be the point at which areas of greater depth and relatively quiescent water can be differentiated from the upgradient surface water input into the impoundment under average flow conditions.

“LC50” means the median lethal concentration of a toxic substance, expressed as a statistical estimate of the concentration that kills 50 percent of the test organisms under specified test conditions, based on the results of an acute bioassay.

“Load allocation” means the portion of a receiving water’s total maximum daily load (TMDL) for a specific pollutant that is allocated to existing or future nonpoint sources of pollution.

“MA1CD10” means the minimum average one day flow with a statistical recurrence interval of 10 years.

"MA7CD10" means the minimum average seven consecutive day flow with a statistical recurrence interval of 10 years.

"MA30CD10" means the minimum average 30 consecutive day flow with a statistical recurrence interval of ten years.

"Measurable changes" means changes measured or determined by a biological, chemical, physical, or analytical method, conducted in accordance with USEPA approved methods as identified in 40 C.F.R. 136 or other analytical methods (for example, mathematical models, ecological indices) approved by the Department, that might adversely impact a water use (including, but not limited to, aesthetics).

"Natural flow" means the water flow that would exist in a waterway without the addition of flow of artificial origin.

"Natural water quality" means the water quality that would exist in a waterway or a waterbody without the addition of water or waterborne substances from artificial origin.

"NJPDES" means New Jersey Pollutant Discharge Elimination System.

"Non-carcinogen" means a toxic substance not categorized as a carcinogen, including Group D (not classifiable as to human carcinogenicity) or Group E (evidence of non-carcinogenicity for humans) categorized in accordance with the USEPA Guidelines for Carcinogen Risk Assessment, 51 Fed. Reg. 33992, 1986 incorporated herein by reference, as amended or supplemented.

"Nondegradation waters" means those waters set aside for posterity because of their clarity, color, scenic setting, other characteristic of aesthetic value, unique ecological significance, exceptional recreational significance, or exceptional water supply significance. These waters include all waters designated as FW1 in this subchapter.

"Nonpersistent" means degrading relatively quickly, generally having a half-life of less than 96 hours.

"Nonpoint source" or "NPS" means:

1. Any man-made or man-induced activity, factor, or condition, other than a point source, from which pollutants are or may be discharged;
2. Any man-made or man-induced activity, factor, or condition, other than a point source, that may temporarily or permanently change any chemical, physical, biological, or radiological characteristic of waters of the State from what was or is the natural, pristine condition of such waters, or that may increase the degree of such change; or
3. Any activity, factor, or condition, other than a point source, that contributes or may contribute to water pollution.

"Nontrout waters" means fresh waters that have not been designated in N.J.A.C. 7:9B-1.15(c) through (i) as trout production or trout maintenance. These waters are generally not suitable for trout because of their physical, chemical or biological characteristics, but are suitable for a wide variety of other fish species.

"NPDES" means National Pollutant Discharge Elimination System.

"NT" means nontrout waters.

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

"Outstanding National Resource Waters" or "ONRW" means high quality waters that constitute an outstanding national resource (for example, waters of National/State Parks and Wildlife Refuges and waters of exceptional recreational or ecological significance). Waters classified as FW1 waters and Pinelands waters are Outstanding National Resource Waters.

"Persistent" means relatively resistant to degradation, generally having a half life of over 96 hours.

"Pinelands waters" means all waters within the boundaries of the Pinelands Area, except those waters designated as FW1 in N.J.A.C. 7:9B-1.15(j), as established in the Pinelands Protection Act (N.J.S.A. 13:18A-1 et seq.) and shown on Plate 1 of the "Comprehensive Management Plan" adopted by the New Jersey Pinelands Commission in November 1980.

"PL" means the general surface water classification applied to Pinelands Waters.

"Point source" or "PS" means any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

"Pollutant" means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 et. Seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, agricultural and construction waste or runoff or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works as defined at N.J.A.C. 7:14A-1.2. "Pollutant" includes both hazardous and nonhazardous pollutants.

"Potable surface water intake" means any structure or apparatus used to withdraw surface waters directly or indirectly that is conveyed to a potable treatment plant or is used for other potable purposes.

"Primary contact recreation" means water related recreational activities that involve significant ingestion risks and includes, but is not limited to, wading, swimming, diving, surfing, and water skiing.

"Public hearing" means a legislative type hearing before a representative or representatives of the Department providing the opportunity for public comment, but does not include cross-examination.

"Regulatory mixing zones" means areas of surface waters established pursuant to this chapter for the purpose of initial mixing, dispersion, or dissipation of wastewater effluent at or near the discharge point. Regulatory mixing zones may be established for applicable criteria.

"River mile" or "R.M." means the distance, measured in statute miles, between two locations on a stream, with the first location designated as mile zero. For example, mile zero for the Delaware River is located at the intersection of the center line of the navigation channel and a line between the Cape May Light, New Jersey, and the tip of Cape Henlopen, Delaware.

"Saline waters" means waters having salinities generally greater than 3.5 parts per thousand at mean high tide.

"SC" means the general surface water classification applied to coastal saline waters.

"SE" means the general surface water classification applied to saline waters of estuaries.

"Secondary contact recreation" means recreational activities where the probability of water ingestion is minimal and includes, but is not limited to, boating and fishing.

"Shellfish" means those mollusks commonly known as clams, oysters, or mussels.

"Shellfish waters" means waters classified as Approved, Seasonally Approved, Special Restricted, Seasonally Special Restricted or Condemned in accordance with the Shellfish Growing Water Classification rules N.J.A.C. 7:12.

"Site-specific criteria" means an alternative criterion established, at N.J.A.C. 7:9B-1.14(g), in place of an existing Statewide criterion, to protect existing or designated uses for specified waterbody(ies).

"State Act" means the New Jersey "Water Pollution Control Act," N.J.S.A. 58:10A-1 et seq., as amended.

"Stream temperature" means the temperature of a stream outside of a designated heat dissipation area.

"Surface water classifications" means names assigned by the Department as set forth at N.J.A.C. 7:9B-1.15I through (j) to waters having the same designated uses and water quality criteria (for example, FW1, PL, FW2-NT, SE1, SC).

"Surface Water Quality Standards" (SWQS) means the rules, in this chapter, N.J.A.C. 7:9B, which set forth, designated uses, use classifications, and water quality criteria for the State's waters based upon such uses, and the Department's policies concerning these uses, classifications and criteria.

"Surface waters" means water at or above the land's surface which is neither groundwater nor contained within the unsaturated zone, including, but not limited to, the ocean and its tributaries, all springs, streams, rivers, lakes, ponds, wetlands, and artificial waterbodies.

"Thermal alterations" means the increase or decrease in the temperature of surface waters, above or below the natural temperature, that may be caused by the activities of man.

"Tidal waters" means fresh or saline water under tidal influence, up to the head of tide.

"TM" means trout maintenance.

"Total maximum daily load" or "TMDL" means a total maximum daily load formally established pursuant to Section 7 of the Water Quality Planning Act (N.J.S.A. 58:11A-7) and Section 303(d) of the Clean Water Act, 33 U.S.C. §§1251 et seq. A TMDL is the sum of individual wasteload allocations for point sources, load allocations for nonpoint sources of pollution, other sources such as tributaries, or adjacent segments, and allocations to a reserve or margin of safety for an individual pollutant.

"Total recoverable metal" means the concentration of metal in an unfiltered sample following treatment with hot dilute mineral acid (as defined in "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1979, incorporated herein by reference).

"Toxic substance" or "toxic pollutant" means any pollutant identified pursuant to the Federal Act, or any pollutant or combination of pollutants, including disease causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly or indirectly by ingestion through food chains, may, on the basis of the information available to the Department, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformation, in such organisms or their offspring. Toxic pollutants shall, include but not be limited, to those pollutants identified pursuant to Section 307 of the Federal Act or Section 4 of the State Act, or in the case of "sludge use or disposal practices," any pollutant identified pursuant to Section 405(d) of the Federal Act.

"TP" means trout production.

"Trout maintenance waters" means waters designated at N.J.A.C. 7:9B-1.15(c) through (i) for the support of trout throughout the year.

"Trout production waters" means waters designated at N.J.A.C. 7:9B-1.15(c) through (i) for use by trout for spawning or nursery purposes during their first summer.

"Unsaturated zone" means the subsurface volume between the land's surface and the top of the saturated zone (water table), where moisture does not fill all the pore spaces in the formation or soil.

"USEPA" means the United States Environmental Protection Agency.

"Wasteload allocation" or "WLA" means the portion of a receiving water's total maximum daily load for a specific pollutant that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation.

"Water effect ratio" or "WER" means the ratio of an acute (or chronic) toxicity value derived from a site study to the acute (or chronic) toxicity value derived from a laboratory study for a particular toxic substance. The WER is multiplied by the aquatic life protection criterion for a given toxic substance to derive a site-specific aquatic life protection criterion.

"Water quality-based effluent limitations" means effluent limitations established so that the quality of the waters receiving a discharge will meet the surface water quality criteria and policies of this chapter after the introduction of the effluent.

"Watershed-specific translators" means numeric translators developed, as part of a total maximum daily load (TMDL) in accordance with N.J.A.C. 7:15-5, to demonstrate compliance with the narrative criterion pursuant to N.J.A.C. 7:9B-1.14(d)4i. to protect existing or designated uses for specified watershed(s).

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

"Wetlands" means those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation. The Department shall evaluate the parameters of hydrology, soils, and vegetation to determine the presence and extent of wetlands.

"Zone" means the general surface water classification applied to the mainstem Delaware River and Delaware Bay.

7:9B-1.5 Statements of policy

(a) General policies are as follows:

1. These Surface Water Quality Standards apply to all surface waters of the State.
2. Water is vital to life and comprises an invaluable natural resource which is not to be abused by any segment of the State's population or economy. It is the policy of the State to restore, maintain and enhance the chemical, physical and biological integrity of its waters, to protect the public health, to safeguard the aquatic biota, protect scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, agricultural and other reasonable uses of the State's waters.
3. The restoration, maintenance and preservation of the quality of the waters of the State for the protection and preservation of public water supplies is a paramount interest of the citizens of New Jersey. In order to provide adequate, clean supplies of potable water, it is the policy of the State that all fresh waters be protected as potential sources of public water supply. Therefore, point and nonpoint sources of pollutants shall be regulated to attain compliance with the Surface Water Quality Standards human health criteria outside of regulatory mixing zones.
4. Toxic substances in waters of the State shall not be at levels that are toxic to humans or the aquatic biota, or that bioaccumulate in the aquatic biota so as to render them unfit for human consumption.
5. The introduction of carcinogenic, mutagenic, or teratogenic substances into the environment is of particular concern to the Department. Human health-based ambient criteria have been established in freshwaters due to consumption of fish and water, and in saline water due to consumption of fish. For carcinogens, the criteria have been established at levels which would result in no greater than a one-in-one-million lifetime excess cancer risk. For non-carcinogens, the criteria have been established which would result in no appreciable risk of deleterious effect.
6. Existing uses shall be maintained and protected. Designated uses shall, as soon as technically and economically feasible, be attained wherever these uses are not precluded by natural conditions. Where existing criteria are inadequate to support the existing or designated uses, the criteria shall be changed to support the existing uses.
7. The restoration of saline waters to levels which permit unrestricted shellfish harvesting is an objective of the Department.
8. The Department encourages the use of reclaimed water for beneficial reuse to help preserve the highest quality water and reduce the export of freshwater out of basins in support of meeting water supply needs and natural resource protection.
9. The Department uses the Integrated Water Quality Monitoring and Assessment Methods developed pursuant to N.J.A.C. 7:15-5.2 to evaluate water quality data and identify waters where water quality does not meet the Surface Water Quality Standards at N.J.A.C. 7:9B as required by Section 303(d) and 305(b) of the Federal Clean Water Act.

(b) Interstate waters policies are as follows:

1. The designated uses and water quality criteria for the fresh and saline waters under the jurisdiction of the Delaware River Basin Commission shall be as established in accordance with N.J.A.C. 7:9B-1.13 and 1.14I through (g).
2. The designated uses and water quality criteria for waters under the jurisdiction of the Interstate Environmental Commission in the New Jersey/New York metropolitan area shall be as established in this subchapter, or in accordance with the prevailing Water Quality Regulations of the Interstate Environmental Commission, including all amendments and future supplements thereto, whichever are more stringent.

(c) General technical policies are as follows:

1. The natural water quality shall be used in place of the promulgated water quality criteria of N.J.A.C. 7:9B-1.14 for all water quality characteristics that do not meet the promulgated water quality criteria as a result of natural causes.
2. Water quality criteria are expected to be maintained during periods when nontidal or small tidal stream flows are at or greater than the MA7CD10 flow, except as provided below:
   i. For acute aquatic life protection criteria, the design flow shall be the MA1CD10 flow;
   ii. For chronic aquatic life protection criteria for ammonia, the design flow shall be the MA30CD10 flow; and
   iii. For human health criteria for carcinogens listed at N.J.A.C. 7:9B-1.14(f)7, the design flow shall be the flow which is exceeded 75 percent of the time for the appropriate "period of record" as determined by the United States Geological Survey.
3. Water quality criteria are expected to be maintained in intermittent streams during all natural flow conditions. When an intermittent stream does not contain natural flow of sufficient magnitude to determine water quality, the criteria to be maintained in the intermittent stream will be those pertaining to the measurable natural flow immediately downstream of the intermittent stream.
4. All analytical data to be incorporated by the Department in water quality monitoring or other activities shall be from laboratories approved or certified by the Department for the analysis of those specific parameters. If certification is not offered for the specific parameter, the laboratory performing the analysis shall, at a minimum, hold certification in the category of certification covering that type of parameter.
5. The Department shall utilize the parameter specific criteria contained in N.J.A.C. 7:9B-1.14 in the development of chemical specific water quality-based effluent limitations for point source discharges. Whenever parameter specific criteria have not been adopted, the Department will utilize the best available scientific information in the development of chemical specific water quality-based effluent limitations for point source discharges. Ambient criteria published by the United States Environmental Protection Agency pursuant to section 304(a) of the Federal Clean Water Act represent the minimum acceptable best scientific information to be

used in the development of water quality-based effluent limitations for point source discharges.

6. When the Department promulgates a new or revised maximum contaminant level (MCL) in the Safe Drinking Water Act rules at N.J.A.C. 7:10 for a parameter for which there is an established human health based criterion at N.J.A.C. 7:9B-1.14(f)7, the Department shall modify the human health based criterion based on the toxicity factor used to establish the MCL and shall incorporate the modified criterion into N.J.A.C. 7:9B-1.14(f)7. The Department shall publish a notice of administrative change in the New Jersey Register.
7. The Department shall utilize a geometric mean to assess compliance with the bacterial quality indicators at N.J.A.C.7:9B-1.14(d)1ii-iii. The geometric mean shall be calculated using a minimum of five samples collected over a thirty-day period. The single sample maximum shall be used for beach notification in accordance with N.J.A.C. 8:26 and to identify where additional ambient water quality sampling is needed to calculate a geometric mean.
8. Temperature criteria at N.J.A.C. 7:9B-1.14(d) apply unless an alternative effluent limitation is approved in accordance with Section 316(a) of the Clean Water Act, 33 U.S.C. 1326(a).
    i. Properly treated wastewater discharge shall be deemed in compliance with the temperature criteria if the ambient stream temperature measured outside the regulatory heat dissipation area does not increase by more than:
        (1) 0.6 degrees Celsius in FW2-TP waters
        (2) 1.2 degrees Celsius in FW2-TM waters
        (3) 2.8 degrees Celsius in FW2-NT waters
        (4) 2.2 degrees Celsius in SE and SC waters from September through May
        (5) 0.8 degrees Celsius in SE and SC waters from June through August
    ii. Thermal alterations to lakes, ponds, or reservoirs shall not be permitted unless it can be shown to be beneficial to the designated and existing uses.

(d) Antidegradation policies applicable to all surface waters of the State are as follows:

1. Existing uses shall be maintained and protected. Designated uses shall be maintained or, as soon as technically and economically feasible, be attained wherever these uses are not precluded by natural conditions.
    i. The maintenance, migration, and propagation of threatened or endangered species (as defined under the Federal Endangered Species Act of 1973 as amended, 16 U.S.C. 1531 *et seq*., and/or the New Jersey Endangered and Nongame Species Conservation Act N.J.S.A. 23:2A-1 et seq.) is considered an existing use that must be maintained.
    ii. No irreversible changes may be made to existing water quality that would impair or preclude attainment of the designated uses of a waterway.
    iii. No changes shall be allowed in waters which constitute an outstanding National or State resource or in waters that may affect these outstanding resource waters.

iv. Where water quality exceeds levels necessary to support the designated uses, including but not limited to, propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the Department finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the Department's continuing planning process (see N.J.A.C. 7:15-2.2), which includes, but is not limited to, the NJPDES Regulations (N.J.A.C. 7:14A), that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

v. Where a lower classification of water (including the antidegradation designation) may impinge upon a higher classification/antidegradation designation of water, the Department shall ensure that the quality and uses of the higher classification/antidegradation water are protected.

vi. A waterway or waterbody from which water is transferred to another waterway or waterbody shall be treated as a tributary to the waterway or waterbody receiving the transferred water.

vii. Modifications of water quality-based effluent limitations established to implement the antidegradation policy may be granted pursuant to N.J.A.C. 7:9B-1.8 and 1.9.

2. Antidegradation policies applicable to a waterbody are as follows:

i. The quality of nondegradation waters shall be maintained in their natural state (set aside for posterity) and shall not be subject to any manmade wastewater discharges. The Department shall not approve any activity which, alone or in combination with any other activities, might cause changes, other than toward natural water quality, in the existing surface water quality characteristics.

ii. For Pinelands waters, the Department shall not approve any activity which alone or in combination with any other activities, might cause changes, other than toward natural water quality, in the existing surface water quality characteristics. This policy shall apply as follows:

(1) This policy is not intended to interfere with water control in the operation of cranberry bogs or blueberry production.

(2) New or expanded discharges are not allowed, unless authorized by the Pinelands Commission in accordance with Pinelands Comprehensive Management Plan, N.J.A.C. 7:50-4.61 through 4.70.

iii. Category One Waters shall be protected from any measurable changes (including calculable or predicted changes) to the existing water quality. Water quality characteristics that are generally worse than the water quality criteria, except as due to natural conditions, shall be improved to maintain or provide for the designated uses where this can be accomplished without adverse impacts on organisms, communities, or ecosystems of concern.

iv. For Category Two Waters, water quality characteristics that are generally better than, or equal to the water quality standards shall be maintained within a range of quality that shall protect the existing/designated uses as determined by studies acceptable to the Department, relating existing/designated uses to water quality. Where such studies are not available or are inconclusive, water

quality shall be protected from changes that might be detrimental to the attainment of the designated uses or maintenance of the existing uses. Water quality characteristics that are generally worse than the water quality criteria shall be improved to meet the water quality criteria.

v. For waters of mainstem of the Delaware River designated as Special Protection Waters pursuant to the DRBC Water Quality Regulations Article 3 Section 3.10.3A2, the antidegradation policies are as specified in the DRBC Water Quality Regulations.

(e) Water quality-based effluent limitation policies are as follows:

1. Water quality-based effluent limitations may be established so as to minimize total expenditures, subject to social and environmental constraints, so that the provisions of the water quality standards (which includes the antidegradation policies) are met. This policy may result in the assignment of different levels of treatment to different dischargers where this proves more beneficial on a study area basis.
2. Modifications of water quality-based effluent limitations established to implement the water quality standards (which includes the antidegradation policies) granted pursuant to N.J.A.C. 7:9B-1.8 and 1.9, shall provide for effluent limits at least as stringent as those required pursuant to sections 301, 306, and 307 of the Federal Clean Water Act or the minimum BOD5 effluent standards at N.J.A.C. 7:14A-12.4, where applicable, whichever are more stringent.
3. Water quality-based effluent limitations developed in accordance with N.J.A.C. 7:14A-13.6 shall not interfere with the attainment of the Surface Water Quality Standards, including the antidegradation policies.
4. When a discharge is made to a tidal waterway in the reach where the salinity varies from less than 3.5 ppt. to greater than 3.5 ppt., or the salinity data are inconclusive, the Department shall establish as water quality-based effluent limitations the more stringent of the limitations, on a parameter specific basis, required for the upstream FW waters or the downstream SE waters.
5. Where the effluent limitations developed pursuant to N.J.A.C. 7:14A-13.6 are below the level of detectability of the procedures in N.J.A.C. 7:18 the Department will use an effluent limitation of nondetectable in any NJPDES permit.
6. Compliance schedules may be issued in accordance with N.J.A.C. 7:14A-6.4 when it is demonstrated by a discharger that new or revised water quality-based effluent limitations, based on ambient criteria adopted or revised after July 1, 1977, cannot be consistently met with the facility's existing treatment process. No schedule of compliance may be allowed for parameter specific water quality-based effluent limitations where the parameter specific ambient water quality criterion, which was the basis for developing that limitation, was adopted prior to July 1, 1977, and has not been revised since adoption.
7. The Department may require characterization monitoring in NJPDES permits for mercury and PCBs using the USEPA approved method 1631 for mercury (Guidelines Establishing Test Procedures for the Analysis of Pollutants; Measurement of Mercury in Water; Revisions to EPA Method 1631, 40 C.F.R. 136,

Fed. Reg. 67:65876, October 29, 2002) incorporated herein by reference, as amended and supplemented, available at http://www.epa.gov/waterscience/methods/1631.html, as supplimented and amended and 1668A for PCBs (Method 1668, Revision A: Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by HRGC/HRMS. EPA-821-R-00-002, December 1999) incorporated herein by reference, as amended and supplemented, available at http://www.epa.gov/Region8/water/wastewater/biohome/biosolidsdown/methods/1668a5.pdf.

(f) Whole Effluent Toxicity Requirements shall be established for NJPDES point sources in accordance with N.J.A.C. 7:14A–13.6(d).

(g) Nutrient policies are as follows:

1. These policies apply to all waters of the State.
2. The Department may develop watershed-specific translators or site-specific criteria through a Total Maximum Daily Load (TMDL). Site specific criteria shall be incorporated at N.J.A.C. 7:9B-1.14(g).
3. The Department shall establish water quality-based effluent limits for nutrients, in addition to or more stringent than the effluent standard in N.J.A.C. 7:14A-12.7, as necessary to meet a wasteload allocation established through a TMDL, or to meet the criteria at N.J.A.C. 7:9B-1.14(d)4.
4. Activities resulting in the nonpoint discharge of nutrients shall implement the best management practices determined by the Department to be necessary to protect the existing or designated uses.

(h) A permittee may request that a regulatory mixing zone be established by the Department for applicable criteria except as otherwise provided in this section. Regulatory mixing zones may be evaluated as part of the development of water quality-based effluent limitation(s) to provide for the initial dispersion of the effluent in the receiving water body at or near the discharge point.

1. The following are the general conditions for establishing regulatory mixing zones:
   i. Regulatory mixing zones shall be established in accordance with this subsection;
   ii. Water quality criteria may be exceeded within the regulatory mixing zone; however, surface water quality criteria must be met at the edge of the regulatory mixing zone;
   iii. The regulatory mixing zone shall be no larger than that portion of the receiving water where complete mixing occurs;
   iv. Regulatory mixing zones shall not be used for, or considered as a substitute for, minimum treatment technology required by the Federal and State Acts or other applicable Federal or State laws or regulations;

v. Regulatory mixing zones shall be established to assure that significant mortality does not occur to free swimming or drifting organisms;
   (1) In individual regulatory mixing zones, discharges which meet acute effluent toxicity of $LC_{50} \geq 50\%$ shall be deemed to comply with this requirement.
   (2) In cases of extended regulatory mixing zones resulting from multiple, conjoined individual regulatory mixing zones, site-specific studies to demonstrate no significant mortality shall be required, taking into account factors including, time of travel, concentration, and the toxicity of the parameters in question;

vi. The existing and designated uses outside the regulatory mixing zone shall not be adversely affected;

vii. The total area and volume of a waterbody assigned to a regulatory mixing zone shall be limited to that which will not adversely affect beneficial uses or interfere with biological communities or populations of important species (for example, commercially or recreationally significant species; or threatened or endangered species);

viii. Regulatory mixing zones, including those for shore hugging plumes, shall not extend into recreational areas, potable surface water intakes (1,500 feet upstream and 500 feet downstream or to the farthest point of backwatering due to the intake, whichever is more protective), shellfish harvesting areas, threatened or endangered species habitat, and other important biological or natural resource areas;

ix. The regulatory mixing zone shall not inhibit or impede the passage of aquatic biota; and

x. Overlapping regulatory mixing zones shall not inhibit or impede the passage of aquatic biota.

2. Spatial limitations for regulatory mixing zones delineate the maximum area in which the initial mixing may occur. A site-specific study performed in accordance with (h)3 below will be used to determine dilution in tidal water bodies and in nontidal water bodies where mixing is not shown to be rapid and complete. A maximum area shall be applied in any one of the following four situations:

i. Heat dissipation areas shall be established as follows:
   (1) For discharges to FW2-NT, FW2-TM, and SE waters, not more than one-quarter (1/4) of the cross section and/or volume of the water body at any time or more than two-thirds (2/3) of the surface from shore to shore at any time.
   (2) For discharges to lakes, ponds, reservoirs, bays or coastal waters, the heat dissipation areas shall be developed on a case-by-case basis.
   (3) A discharger may be granted a larger heat dissipation area pursuant to 33 U.S.C. 1326(a) Section 316(a) of the Clean Water Act.

ii. For discharges to tidal water bodies:
   (1) Regulatory mixing zones for chronic and human health criteria are limited to one fourth of the distance between the discharge port closest to the

shoreline and the shoreline during average tidal conditions, or 100 meters, whichever is greater; and

(2) Regulatory mixing zones for acute criteria are limited by the distances calculated in accordance with the USEPA "Technical Support Document For Water Quality-Based Toxics Control" USEPA, EPA/505/2-90-001, March 1991, incorporated herein by reference. In no case shall a regulatory mixing zone for acute criteria extend more than 100 meters from the discharge point or include more than five percent of the total surface area of a water body based on critical ambient tidal conditions during low slack, astronomical spring tide for the applicable exposure period.

iii. For discharges to non-tidal water bodies:

(1) Regulatory mixing zones for chronic and human health criteria shall be based on the design flows at (c)2 above. If rapid, complete mix is demonstrated, the entire available design flow may be used in dilution calculations. If rapid, complete mix is not demonstrated, only that portion of the design flow that can be demonstrated to mix with the effluent within 100 meters from the discharge point may be used in dilution calculations; and

(2) Regulatory mixing zones for acute criteria shall be based on the MA1CD10 design flow. If rapid, complete mix is demonstrated, the entire available design flow may be used in dilution calculations. If rapid, complete mix is not demonstrated, only that portion of the design flow that can be demonstrated to mix with the effluent within a downstream distance calculated in accordance with the USEPA "Technical Support Document For Water Quality-Based Toxics Control" USEPA, EPA/505/2-90-001, March 1991 may be used. In no case shall a regulatory mixing zone for acute criteria extend more than 100 meters from the discharge point or include more than five percent of the total surface area of a water body based on the design flow.

iv. Site-specific spatial dimensions of the regulatory mixing zone for an approved multiport diffuser shall be determined by the Department. The dimensions of the site-specific regulatory mixing zone and the allowable dilution at the edge of the regulatory mixing zone may be established using appropriate diffuser models (for example, CORMIX, PLUMES), tracer studies, or other field studies approved by the Department in accordance with (h)3 below.

3. A regulatory mixing zone study shall be conducted in accordance with a workplan pre-approved by the Department. General protocols for conducting mixing zone studies are described in the USEPA "Technical Support Document For Water Quality-Based Toxics Control" USEPA, EPA/505/2-90-001, March 1991. In addition, the following principles apply:

i. The design flows to be used in calculating available dilution in nontidal waters shall be based on the design flows specified at (c)2 above; and

ii. In tidal waters, the regulatory mixing zone for an acute criteria shall be based on critical ambient tidal conditions during low slack, astronomical spring tide

for the applicable exposure period. Regulatory mixing zones for chronic and human health criteria shall be based on average conditions during a normal tidal cycle.

4. In order to determine waste load allocations and NJPDES/DSW permit effluent limitations that will comply with the regulatory mixing zone requirements, instream pollutant concentrations at the boundary of the regulatory mixing zone shall be determined as follows:
   i. The instream concentrations shall be determined using either a general mass balance equation or a mathematical model, if available; or the information generated during the course of a study as described at (h)2 above.
   ii. If the regulatory mixing zone is based upon the guidance and procedures in the USEPA "Technical Support Document For Water Quality-Based Toxics Control" USEPA, EPA/505/2-90-001, March 1991, the Technical Support Document will also be used to determine instream concentrations at the boundary of the regulatory mixing zone.
5. Regulatory mixing zones are prohibited as follows:
   i. For indicators of pathogenic quality, including fecal coliform, E. Coli and enterococci;
   ii. In intermittent streams;
   iii. For new or increased discharges to lakes, ponds, and reservoirs;
   iv. For discharges to areas of waters with documented occurrences of any threatened or endangered species listed pursuant to the Federal or State Threatened and Endangered Species Acts (Endangered Species Act of 1973, 16 U.S.C. § 1531 et seq.; New Jersey Endangered and Non Game Species Conservation Act of 1973, N.J.S.A. 23:2A-1 et seq.; Endangered Plant Species List Act, N.J.S.A. 13:1B-15.151 et seq.), if those discharges would likely have an adverse effect on the species or its associated habitat;
   v. For heat dissipation areas in FW2-TP waters;
   vi. For heat dissipation areas within 1,500 feet of the shoreline in SC waters;
   vii. For new discharges of the following pollutants:
      (1) alpha-BHC (alpha-HCH);
      (2) beta-BHC (beta-HCH);
      (3) gamma-BHC (gamma HCH / Lindane);
      (4) Chlordane;
      (5) 4,4'-DDD (p,p'-TDE);
      (6) 4,4'-DDE;
      (7) 4,4'-DDT;
      (8) Dieldrin;
      (9) Hexachlorobenzene;
      (10) Hexachlorobutadiene;
      (11) Mercury;
      (12) Mirex;
      (13) Pentachlorobenzene;
      (14) Polychlorinated biphenyls (PCBs);
      (15) 1,2,4,5-Tetrachlorobenzene;

(16) 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD); and
(17) Toxaphene; and

viii. For new or expanded discharges, within 1,500 feet upstream of a potable surface water intake (including any reservoir) and 500 feet downstream or to the farthest point of backwatering due to the intake, whichever is more protective.

7:9B-1.6 Establishment of water quality-based effluent limitations

(a) Water quality-based effluent limitations shall be established for NJPDES point sources in accordance with N.J.A.C. 7:14A.

(b) For new and/or expanding NJPDES point sources, the water quality-based effluent limitations shall comply with the antidegradation policies at N.J.A.C. 7:9B-1.5(d) above.

(c) Water quality-based effluent limits for chlorine produced oxidants based on the criteria in N.J.A.C. 7:9B-1.14(f) are not applicable where:
1. The aquatic community of a waterbody is exposed to one or more point source discharges of non-contact cooling water that is intermittently chlorinated to control condenser biofouling;
2. The total period of such exposure to chlorinated wastewater is two hours per day or less; and
3. The maximum concentration of chlorine produced oxidants in the effluents of such discharges shall not exceed 200 μg/L.

(d) The Department may authorize compliance schedules in accordance with individual NJPDES permits to allow the permittee time to comply with new effluent limitations.

7:9B-1.7 Waterway loadings in areawide water quality management plans

Any total maximum daily load, wasteload allocation, or load allocation established as an amendment to an areawide water quality management plan under N.J.A.C. 7:15-5.4 shall be consistent with all of the provisions of this subchapter.

7:9B-1.8 Procedures for modifying water quality-based effluent limitations for individual dischargers to Category One waters

(a) An applicant requesting modification of a water quality-based effluent limitation, established on a case-by-case basis, must demonstrate, to the satisfaction of the Department, after public notice (including notice to affected municipalities) and a public hearing (where sufficient public interest exists), that:
1. Some change in ambient water quality should be allowed because of necessary and justifiable social or economic development;
2. Alternative effluent limitations, at least as stringent as the technology-based effluent limitations required by either sections 301, 306, and 307 of the Federal Clean Water Act, or the effluent limitations resulting from application of the minimum BOD5

effluent standards in N.J.A.C. 7:14A-12.4 (where applicable), whichever are more stringent, will not interfere nor be injurious to the existing or designated uses; and

3. Where the requested modified effluent limitations would result in contravention of the water quality criteria or the degradation of the natural water quality, whichever is less stringent:
   i. The water quality criteria are not attainable because of natural background; or
   ii. The water quality criteria are not attainable because of irretrievable man-induced conditions; or
   iii. Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
   iv. Controls more stringent than those required by Sections 301(b) and 306 of the Federal Clean Water Act would result in substantial and widespread adverse social and economic impact.

(b) It is the responsibility of the applicant to provide the Department with all the information needed to evaluate the requested modification(s).

(c) Modified effluent limitations may be renewed if the discharger demonstrates, to the Department's satisfaction, after public notice (including notice to affected municipalities) and a public hearing (where sufficient interest exists), that the basis for issuing the modification still exists and there have been no adverse impacts on the existing uses.

(d) Where water quality criteria are not currently met the Department shall not grant a modification, as set forth in this section, establishing an effluent limitation less stringent than the limitation(s) in the existing permit, unless the criteria are not met because of natural conditions.

7:9B-1.9 Procedures for modifying water quality-based effluent limitations for individual dischargers to Category Two waters.

(a) The criteria for modifying water quality-based effluent limitations established on a case-by-case basis are:

1. The applicant for modification of effluent limitations for parameters that are currently better than the water quality criteria must demonstrate, to the satisfaction of the Department, after public notice (including notice to affected municipalities) and a public hearing (where sufficient public interest exists), that:
   i. Some degradation of water quality parameters currently better than the water quality criteria should be allowed because of necessary and justifiable social or economic development; and
   ii. Alternative effluent limitations, at least as stringent as the technology-based effluent limitations required by either sections 301, 306, and 307 of the Federal Clean Water Act, or the effluent limitations resulting from application of the effluent standards (where applicable) in N.J.A.C. 7:14A-12, whichever are more stringent, will not interfere with nor be injurious to the existing or designated uses.

2. The applicant for modification of effluent limitations for parameters that are currently equal to or currently do not meet the water quality criteria in this subchapter must demonstrate, to the satisfaction of the Department, after public notice (including notice to affected municipalities) and a public hearing (where sufficient public interest exists), that:
   i. The water quality criteria are not attainable because of natural background; or
   ii. The water quality criteria are not attainable because of irretrievable man-induced conditions; or
   iii. Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the water quality criteria, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
   iv. Controls more stringent than those required by Section 301(b) and 306 of the Federal Clean Water Act would result in substantial and widespread adverse social and economic impact.

(b) Where water quality criteria are not currently met the Department shall not grant a modification, as set forth in this section, establishing an effluent limitation less stringent than the limitation(s) in the existing permit, unless the criteria are not met because of natural conditions.

(c) Modified effluent limitations may be renewed if the discharger demonstrates, to the satisfaction of the Department, after public notice (including notice to affected municipalities) and a public hearing (where sufficient interest exists), that the basis for issuing the modification still exists and there have been no adverse impacts on the existing uses.

7:9B-1.10 Procedures for reclassifying specific segments for less restrictive uses

(a) The Department will entertain petitions, for reclassification of specific segments to less restrictive uses, or may decide to initiate reclassification proceedings on its own, at any time.

(b) Any reclassification proceedings will include full documentation of the items contained in (d) and (e) below. The documentation will be prepared by either the Department (where the Department has initiated the reclassification on its own) or the petitioner for the reclassification.

(c) The Department shall issue public notice to all interested parties (including affected municipalities) and shall hold public hearing(s) as part of any reclassification proceeding.

(d) The Department or the petitioner, as indicated in (b) above, shall include in the reclassification documentation appropriate water quality studies and analyses, biological studies and analyses, environmental, social, and economic studies as are necessary to demonstrate the satisfaction of (e)1 and 2 below, in addition to at least one of the remaining criteria in (e) below.

(e) The Department may establish less restrictive uses than the designated uses only after it has been demonstrated to the satisfaction of the Department that:
   1. None of the uses being removed are existing uses; and

2. The uses to be removed will not be attained by implementing effluent limits required by Sections 301(b) and 306 of the Federal Clean Water Act in conjunction with implementation of cost-effective and reasonable best management requirements for nonpoint source pollution control; and
3. The existing designated use is not attainable because of natural background; or
4. The existing designated use is not attainable because of irretrievable man-induced conditions; or
5. Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
6. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
7. Controls more stringent than those required by Sections 301(b) and 306 of the Federal Clean Water Act would result in substantial and widespread adverse social and economic impact.

(f) Any reclassification for less restrictive uses, established pursuant to this section shall be reviewed during each review of water quality standards pursuant to Section 303 of the Federal Clean Water Act (at least once every three years). Either the Department or the original petitioner, as indicated in (b) above, shall be responsible for supplying documentation showing that the bases for the reclassification still exist.

(g) In those cases in which a thermal discharge is involved, the procedures for reclassifying segments for less restrictive use shall be consistent with section 316 of the Federal Clean Water Act.

7:9B-1.11 Procedures for reclassifying specific segments for more restrictive uses

(a) The Department will entertain petitions, for reclassification of specific segments, pursuant to (e) below, or may decide to initiate reclassification proceedings on its own, at any time.

(b) The Department may entertain petitions for reclassification of specific segments, pursuant to (f) below, at any time.

(c) Documentation supporting the petition for reclassification for more restrictive use(s) shall be prepared by the petitioner for such reclassification, where one exists, or by the Department, where it decides to initiate such reclassification on its own.

(d) The Department shall issue public notice to all interested parties (including affected municipalities and dischargers) and shall hold public hearing(s) as part of any reclassification proceeding.

(e) A reclassification for more restrictive uses shall be made whenever:
1. It is demonstrated to the satisfaction of the Department that there are existing uses of the specific segment that are not included in the designated uses; or
2. Where a reclassification for less restrictive uses has been granted pursuant to N.J.A.C. 7:9B-1.10, the bases for the reclassification no longer exist; or

3. It is demonstrated to the satisfaction of the Department that any uses in Section 101(a)(2) of the Federal Clean Water Act, protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, which are not included in the designated uses listed in this subchapter are attainable.

(f) A reclassification for more restrictive uses may be made when:

1. It is demonstrated to the satisfaction of the Department that the waters should be set aside to represent the natural aquatic environment and its associated biota; or
2. It is demonstrated to the satisfaction of the Department that a more restrictive use is necessary to protect a unique ecological system or threatened/endangered species.

(g) In those cases in which a thermal discharge is involved, the procedures for reclassifying segments for more restrictive uses shall be consistent with section 316 of the Federal Clean Water Act.

7:9B-1.12 Designated uses of FW1, PL, FW2, SE1, SE2, SE3, and SC waters

(a) In all FW1 waters the designated uses are:

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

(b) In all PL waters the designated uses are:

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

(c) In all FW2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary 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.

(d) In all SE1 waters the designated uses are:
1. Shellfish harvesting in accordance with N.J.A.C. 7:12;
2. Maintenance, migration and propagation of the natural and established biota;
3. Primary contact recreation; and
4. Any other reasonable uses.

(e) In all SE2 waters the designated uses are:
1. Maintenance, migration and propagation of the natural and established biota;
2. Migration of diadromous fish;
3. Maintenance of wildlife;
4. Secondary contact recreation; and
5. Any other reasonable uses.

(f) In all SE3 waters the designated uses are:
1. Secondary contact recreation;
2 Maintenance and migration of fish populations;
3 Migration of diadromous fish;
4. Maintenance of wildlife; and
5. Any other reasonable uses.

(g) In all SC waters the designated uses are:
1. Shellfish harvesting in accordance with N.J.A.C. 7:12;
2. Primary contact recreation;
3. Maintenance, migration and propagation of the natural and established biota; and
4. Any other reasonable uses.

7:9B-1.13 Designated uses of mainstem Delaware River and Delaware Bay

(a) The designated uses for the mainstem Delaware River and Delaware Bay are those contained in the DRBC Water Quality Regulations.

(b) The designated uses for other waters under the jurisdiction of the DRBC are as set forth at N.J.A.C. 7:9B-1.12.

7:9B-1.14 Surface water quality criteria

(a) Surface water quality criteria for FW1 waters shall be maintained as to quality in their natural state.

(b) Surface water quality criteria for PL waters are as follows:
1. These 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.
   i. For Nitrate-Nitrogen a level of 2 mg/L shall be maintained in the surface waters unless it is shown that a lower level must be maintained to protect the existing surface water quality.

ii. A pH level between 3.5 and 5.5 shall be maintained unless it is demonstrated that a pH level outside of that range is necessary to protect the existing/ designated uses.

2. The water quality criteria for existing discharges are the water quality criteria contained in "Surface Water Quality Standards" as adopted in March 1981, except that:

i. The criteria for Nitrate-Nitrogen and pH promulgated in N.J.A.C. 7:9B-1.14(b)1 for PL waters apply instead of the 1981 criteria, and;

ii. The criteria for phosphorous, bacterial quality, and toxic substances promulgated in N.J.A.C. 7:9B-1.14(c) through (g) apply instead of the 1981 criteria, as though the freshwater portions of the PL waters were classified as FW2 and the saline portions were classified as SE1.

(c) Unless site-specific criteria are established at (g) below, State-wide criteria apply for FW2, SE, and SC waters as listed in accordance with (d) through (f) below.

(d) Surface Water Quality Criteria for FW2, SE and SC Waters:

7:9B-1.14(d) General Surface Water Quality Criteria for FW2, SE and SC Waters:
(Expressed as Maximum concentrations unless otherwise noted)

Substance	Criteria		Classifications
1. Bacterial quality (Counts/100 ml)	i.	Shellfish Harvesting: Bacterial Indicators shall not exceed, in all shellfish waters, the standard for approved shellfish waters as established by the National Shellfish Sanitation Program as set forth in its current manual of operations.	Shellfish Waters
	ii.	Primary Contact Recreation:	
		(1) Enterococci levels shall not exceed a geometric mean of 35/100 ml, or a single sample maximum of 104/100 ml.	SE1 and SC
		(2) E. Coli levels shall not exceed a geometric mean of 126/100 ml or a single sample maximum of 235/100 ml.	All FW2
	iii.	Secondary Contact Recreation:	
		(1) Fecal coliform levels shall not exceed a geometric mean of 770/100 ml.	SE2
		(2) Fecal coliform levels shall not exceed a geometric mean of 1500/100ml.	SE3
2. Dissolved oxygen (mg/L)	i.	Not less than 7.0 at any time;	FW2-TP
	ii.	24 hour average not less than 6.0. Not less than 5.0 at any time (see paragraph viii below);	FW2-TM
	iii.	24 hour average not less than 5.0, but not less than 4.0 at any time (see paragraph viii below);	FW2-NT (except as in iv below), SE1

7:9B-1.14(d) General Surface Water Quality Criteria for FW2, SE and SC Waters:
(Expressed as Maximum concentrations unless otherwise noted)

	Substance		Criteria	Classifications
		iv.	Not less than 4.0 at any time;	Tidal portions of FW2-NT tributaries to the Delaware River, between Rancocas Creek and Big Timber Creek inclusive.
		v.	Not less than 5.0 at any time;	SC
		vi.	Not less than 4.0 at any time;	SE2
		vii.	Not less than 3.0 at any time; and	SE3
		viii.	Supersaturated dissolved oxygen values shall be expressed as their corresponding 100 percent saturation values for purposes of calculating 24 hour averages.	FW2-TM, FW2-NT, SE1
3.	Floating, colloidal, color and settleable solids; petroleum hydrocarbons and other oils and grease	i.	None noticeable in the water or deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota. None which would render the waters unsuitable for the designated uses.	All Classifications
4.	Nutrients	i.	Except as due to natural conditions, nutrients shall not be allowed in concentrations that render the waters unsuitable for the existing or designated uses due to objectionable algal densities, nuisance aquatic vegetation, diurnal fluctuations in dissolved oxygen or pH indicative of excessive photosynthetic activity, detrimental changes to the composition of aquatic ecosystems, or other indicators of use impairment caused by nutrients.	All Classifications

7:9B-1.14(d) General Surface Water Quality Criteria for FW2, SE and SC Waters:
(Expressed as Maximum concentrations unless otherwise noted)

Substance	Criteria			Classifications
	ii.	Phosphorus (mg/L)*		
		(1)	Non Tidal Streams: Concentrations of total P shall not exceed 0.1 in any stream, unless watershed-specific translators are established pursuant to N.J.A.C. 7:9B-1.5(g)2 or if the Department determines that concentrations do not render the waters unsuitable in accordance with (d)4i. above.	FW2
		(2)	Lakes: Concentrations of total P shall not exceed 0.05 in any lake, pond or reservoir, or in a tributary at the point where it enters such bodies of water, unless watershed-specific translators are developed pursuant to N.J.A.C. 7:9B-1.5(g)2 or if the Department determines that concentrations do not render the waters unsuitable in accordance with (d)4i. above.	FW2
5. pH (Standard Units)	i.	6.5-8.5		FW2 waters listed at 1.15(d), (f), (g) and (i), All SE
	ii.	4.5 – 7.5		FW2 waters listed at 1.15(c), (e) and (h)
	iii.	Natural pH conditions shall prevail.		SC

7:9B-1.14(d) General Surface Water Quality Criteria for FW2, SE and SC Waters:
(Expressed as Maximum concentrations unless otherwise noted)

	Substance		Criteria	Classifications
6.	Radioactivity	i.	Prevailing regulations including all amendments and future supplements thereto adopted by the U.S. Environmental Protection Agency pursuant to Sections 1412, 1445, and 1450 of the Public Health Services Act, as amended by the Safe Drinking Water Act (PL 93-523)	All Classifications
7.	Solids, Suspended (mg/L) (Non-filterable residue)	i.	25.0	FW2-TP, FW2-TM
		ii.	40.0	FW2-NT
		iii.	None of which would render the water unsuitable for the designated uses.	All SE, SC
8.	Solids, Total Dissolved (mg/L) (Filterable Residue)	i.	No increase in background which may adversely affect the survival, growth or propagation of the aquatic biota. Compliance with water quality-based WET limitations or $LC_{50} \geq 50$ percent, whichever is more stringent, shall be deemed to meet this requirement.	FW2
		ii.	No increase in background which would interfere with the designated or existing uses, or 500 mg/L, whichever is more stringent.	FW2
		iii.	None which would render the water unsuitable for the designated uses.	All SE
9.	Sulfate (mg/L)	i.	250	FW2

7:9B-1.14(d) General Surface Water Quality Criteria for FW2, SE and SC Waters:
(Expressed as Maximum concentrations unless otherwise noted)

	Substance		Criteria	Classifications
10.	Taste and odor producing substances	i.	None offensive to humans or which would produce offensive taste or odors in water supplies and biota used for human consumption. None which would render the water unsuitable for the designated uses.	All Classifications
11.	Temperature	i.	Temperatures shall not exceed a daily maximum of 22 degrees Celsius or rolling seven-day average of the daily maximum of 19 degrees Celsius, unless due to natural conditions	FW2-TP
		ii.	Temperatures shall not exceed a daily maximum of 25 degrees Celsius or rolling seven-day average of the daily maximum of 23 degrees Celsius, unless due to natural conditions	FW2-TM
		iii.	Temperatures shall not exceed a daily maximum of 31 degrees Celsius or rolling seven-day average of the daily maximum of 28 degrees Celsius, unless due to natural conditions	FW2-NT
		iv.	No thermal alterations which would cause temperatures to exceed 29.4 degrees Celsius (85 degree Fahrenheit) Summer seasonal average	SE
		v.	No thermal alterations which would cause temperatures to exceed 26.7 degrees Celsius (80 degree Fahrenheit) Summer seasonal average	SC

7:9B-1.14(d) General Surface Water Quality Criteria for FW2, SE and SC Waters:
(Expressed as Maximum concentrations unless otherwise noted)

	Substance		Criteria	Classifications
12.	Toxic Substances (general)	i.	None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota, produce undesirable aquatic life, or which would render the waters unsuitable for the designated uses.	All Classifications
		ii.	None which would cause standards for drinking water to be exceeded after appropriate treatment.	FW2
		iii.	Toxic substances shall not be present in concentrations that cause acute or chronic toxicity to aquatic biota, or bioaccumulate within an organism to concentrations that exert a toxic effect on that organism or render it unfit for consumption.	All Classifications
		iv.	The concentrations of nonpersistent toxic substances in the State's waters shall not exceed one-twentieth (0.05) of the acute definitive LC_{50} or EC_{50} value, as determined by appropriate bioassays conducted in accordance with N.J.A.C. 7:18.	All Classifications
		v.	The concentration of persistent toxic substances in the State's waters shall not exceed one-hundredeth (0.01) of the acute definitive LC_{50} or EC_{50} value, as determined by appropriate bioassays conducted in accordance with N.J.A.C. 7:18.	All Classifications
13.	Turbidity (Nephelometric Turbidity Unit-NTU)	i.	Maximum 30-day average of 15 NTU, a maximum of 50 NTU at any time.	FW2, SE3
		ii.	Maximum 30-day average of 10 NTU, a maximum	SE1, SE2

7:9B-1.14(d) General Surface Water Quality Criteria for FW2, SE and SC Waters:
(Expressed as Maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications
	of 30 NTU at any time.	
	iii. Levels shall not exceed 10.0 NTU.	SC

* See N.J.A.C. 7:9B-1.14(g) for site-specific criteria

(e) Surface Water Quality Criteria for Ammonia are derived in accordance with the formulas set forth below. Acute criteria are expressed as three-hour average using MA1CD10 flow and chronic criteria are expressed as 30-day average using MA30CD10 flow. No exceedance of criteria shall be permitted at or above the design flows specified.

	CAS Number		Criteria	Classification
Ammonia, un-ionized (mg NH_3-N/L)	7664-41-7	(1)	at pH < 8.30 $0.179*10^{0.026(Temp-20) + 0.41 (pH-7.80)}$(a) $0.046*10^{0.026(Temp-20) + 0.41 (pH-7.80)}$(c) at pH ≥ 8.30 $0.179*10^{0.026(Temp-20) + 0.20}$(a) $0.046*10^{0.026(Temp-20) + 0.20}$(c)	FW2-TP, FW2-TM
		(2)	at pH < 8.30 $0.201*10^{0.026(Temp-20) + 0.41 (pH-7.80)}$(a) (Summer[1]) $0.054*10^{0.026(Temp-20) + 0.41 (pH-7.80)}$(c) (Summer[1]) $0.232*10^{0.026(Temp-20) + 0.41 (pH-7.80)}$(a) (Winter[2]) $0.060*10^{0.026(Temp-20) + 0.41 (pH-7.80)}$(c) (Winter[2]) at pH ≥ 8.30 $0.201*10^{0.026(Temp-20) + 0.20}$(a) (Summer[1]) $0.054*10^{0.026(Temp-20) + 0.20}$(c) (Summer[1]) $0.232*10^{0.026(Temp-20) + 0.20}$(a) (Winter[2]) $0.060*10^{0.026(Temp-20) + 0.20}$(c) (Winter[2])	FW2-NT
		(3)	at pH < 8.30 $0.238*10^{0.026(Temp-20) + 0.41 (pH-7.80)}$(a) $0.061*10^{0.026(Temp-20) + 0.41 (pH-7.80)}$(c)	PL
		(4)	0.115(a); 0.030(c)	All SE
		(5)	0.094(a); 0.024(c)	SC

1 Summer spawning period from March 1st through October 31st.

2 Winter non-spawning period from November 1st through February 28/29th.

(a) Acute aquatic life protection criterion

(c) Chronic aquatic life protection criterion

(f) Surface Water Quality Criteria for Toxic Substances are as follows:

1. Acute aquatic life protection criteria are determined with no exceedance at or above the MA1CD10 flow and expressed as one-hour average except,
   i. for copper the criteria are expressed as 24-hour average, and
   ii. for cadmium, chromium, lead, mercury, nickel, silver, and zinc the criteria are expressed as 6-hour average.
2. Chronic aquatic life protection criteria are determined with no exceedance at or above the MA7CD10 flow and expressed as four-day average.
3. Freshwater aquatic criteria for cadmium, chromium III, copper, nickel, silver, and zinc are expressed as a function of water hardness. Criteria can be calculated at any hardness using these equations as listed below. Criteria thus calculated are multiplied by appropriate conversion factor (CF) to convert total recoverable metal into dissolved metal and by the default Water Effect Ratio (WER) of 1.0.

General formula $WER\ [e^{(V[\ln(\text{hardness})] + \ln A - V[\ln Z])}]\ CF$

where:

V = pooled slope
A = FAV at given hardness
Z = selected value of hardness

Cadmium:

Acute dissolved criterion $WER\ [e^{(1.0166\ (\ln\ [\text{hardness}])-3.924)}]\ 0.651$

Chronic dissolved criterion $WER\ [e^{(0.7409\ (\ln\ [\text{hardness}])-4.719)}]\ 0.651$

Chromium III:

Acute dissolved criterion $WER\ [e^{(0.819\ (\ln\ [\text{hardness}])+3.7256)}]\ 0.277$

Chronic dissolved criterion $WER\ [e^{(0.819\ (\ln\ [\text{hardness}])+0.6848)}]\ 0.277$

Copper:

Acute dissolved criterion $WER\ [e^{(0.9422\ (\ln\ [\text{hardness}])-1.7)}]\ 0.908$

Chronic dissolved criterion $WER\ [e^{(0.8545\ (\ln\ [\text{hardness}])-1.702)}]\ 0.908$

Nickel:

Acute dissolved criterion $WER\ [e^{(0.846\ (\ln\ [\text{hardness}])+2.255)}]\ 0.846$

Chronic dissolved criterion $WER\ [e^{(0.846\ (\ln\ [\text{hardness}])+0.0584)}]\ 0.846$

Silver:

Acute dissolved criterion	$WER\ [e^{(1.72\ (ln\ [hardness])-6.59)}]\ 0.85$

Zinc:

Acute or dissolved criterion	$WER\ [e^{(0.8473\ (ln\ [hardness])+0.884)}]\ 0.950$
Chronic dissolved criterion	$WER\ [e^{(0.8473\ (ln\ [hardness])+0.884)}]\ 0.950$

4. Freshwater criteria for pentachlorophenol are expressed as a function of pH. Criteria are derived in accordance with the formula set forth below:
   Acute criterion $= e^{(1.005[pH]-4.869)}$
   Chronic criterion $= e^{(1.005[pH]-5.134)}$
5. Human health noncarcinogenic effect-based criteria are expressed as a 30-day average with no frequency of exceedance at or above the MA7CD10 flow.
6. Human health carcinogenic effect-based criteria are based on a risk level of one-in-one-million and are expressed as a 70-year average with no frequency of exceedance at or above the design flow as specified at N.J.A.C. 7:9B-1.5(c)2iii.

7. SURFACE WATER QUALITY CRITERIA FOR TOXIC SUBSTANCES:

(µg/L)

Toxic Substance	CAS Number	Fresh Water (FW2) Criteria			Saline Water (SE & SC) Criteria		
		Aquatic		Human Health	Aquatic		Human Health
		Acute	Chronic		Acute	Chronic	
Acenaphthene	83-32-9			670(h)			990(h)
Acrolein	107-02-8			6.1(h)			9.3(h)
Acrylonitrile	107-13-1			0.051(hc)			0.25(hc)
Aldrin	309-00-2	3.0		0.000049(hc)	1.3		0.000050(hc)
Ammonia, un-ionized	7664-41-7	See N.J.A.C. 7:9B-1.14(e)			See N.J.A.C. 7:9B-1.14(e)		
Anthracene	120-12-7			8,300(h)			40,000(h)
Antimony	7440-36-0			5.6(h)(T)			640(h)(T)
Arsenic	7440-38-2	340(d)(s)	150(d)(s)	0.017(hc)(T)	69(d)(s)	36(d)(s)	0.061(hc)(T)
Asbestos	1332-21-4			$7x10^6$fibers/L >10µm(h)			
Barium	7440-39-3			2,000(h)(T)			
Benz(a)anthracene	56-55-3			0.038(hc)			0.18(hc)
Benzene	71-43-2			0.15(hc)			3.3(hc)
Benzidine	92-87-5			0.000086(hc)			0.00020(hc)
3,4-Benzofluoranthene (Benzo(b)fluoranthene)	205-99-2			0.038(hc)			0.18(hc)
Benzo(k)fluoranthene	207-08-9			0.38(hc)			1.8(hc)
Benzo(a)pyrene (BaP)	50-32-8			0.0038(hc)			0.018(hc)
Beryllium	7440-41-7			6.0(h)(T)			42(h)(T)
alpha-BHC (alpha-HCH)	319-84-6			0.0026(hc)			0.0049(hc)
beta-BHC (beta-HCH)	319-85-7			0.0091(hc)			0.017(hc)
gamma-BHC (gamma-HCH/Lindane)	58-89-9	0.95		0.98(h)	0.16		1.8(h)
Bis(2-chloroethyl) ether	111-44-4			0.030(hc)			0.53(hc)
Bis(2-chloroisopropyl) ether	108-60-1			1,400(h)			65,000(h)
Bis(2-ethylhexyl) phthalate	117-81-7			1.2(hc)			2.2(hc)
Bromodichloromethane (Dichlorobromomethane)	75-27-4			0.55(hc)			17(hc)
Bromoform	75-25-2			4.3(hc)			140(hc)
Butyl benzyl phthalate	85-68-7			150(h)			190(h)
Cadmium	7440-43-9	(a)	(a)	3.4(h)(T)	40(d)(s)	8.8(d)(s)	16(h)(T)
Carbon tetrachloride	56-23-5			0.33(hc)			2.3(hc)
Chlordane	57-74-9	2.4	0.0043	0.00010(hc)	0.09	0.0040	0.00011(hc)

Toxic Substance	CAS Number	Fresh Water (FW2) Criteria			Saline Water (SE & SC) Criteria		
		Aquatic		Human Health	Aquatic		Human Health
		Acute	Chronic		Acute	Chronic	
Chloride	16887-00-6	860,000	230,000	250,000(ol)			
Chlorine Produced Oxidants (CPO)	7782-50-5	19	11		13	7.5	
Chlorobenzene	108-90-7			210(h)			2,500(h)
Chloroform	67-66-3			68(h)			2,100(h)
2-Chloronaphthalene	91-58-7			1,000(h)			1,600(h)
2-Chlorophenol	95-57-8			81(h)			150(h)
Chlorpyrifos	2921-88-2	0.083	0.041		0.011	0.0056	
Chromium	7440-47-3			92(h)(T)			750(h)(T)
Chromium^{+3}	16065-83-1	(a)	(a)				
Chromium^{+6}	18540-29-9	15(d)(s)	10(d)(s)		1,100(d)(s)	50(d)(s)	
Chrysene	218-01-9			3.8(hc)			18(hc)
Copper*	7440-50-8	(a)	(a)	1,300(h)(T)	4.8(d)(s)	3.1(d)(s)	
Cyanide (Total)	57-12-5	22(fc)	5.2(fc)	140(h)	2.7(fc)	2.7(fc)	140(h)
4,4'-DDD (p,p'-TDE)	72-54-8			0.00031(hc)			0.00031(hc)
4,4'-DDE	72-55-9			0.00022(hc)			0.00022(hc)
4,4'-DDT	50-29-3	1.1	0.0010	0.00022(hc)	0.13	0.0010	0.00022(hc)
Demeton	8065-48-3		0.1			0.1	
Dibenz(a,h)anthracene	53-70-3			0.0038(hc)			0.018(hc)
Dibromochloromethane (Chlorodibromomethane)	124-48-1			0.40(hc)			13(hc)
Di-n-butyl phthalate	84-74-2			2,000(h)			4,500(h)
1,2-Dichlorobenzene	95-50-1			2,000(h)			6,200(h)
1,3-Dichlorobenzene	541-73-1			2,200(h)			8,300(h)
1,4-Dichlorobenzene	106-46-7			550(h)			2,200(h)
3,3'-Dichlorobenzidine	91-94-1			0.021(hc)			0.028(hc)
1,2-Dichloroethane	107-06-2			0.29(hc)			28(hc)
1,1-Dichloroethylene	75-35-4			4.7(h)			100(h)
trans-1,2-Dichloroethylene	156-60-5			590(h)			43,000(h)
2,4-Dichlorophenol	120-83-2			77(h)			290(h)
1,2-Dichloropropane	78-87-5			0.50(hc)			15(hc)
1,3-Dichloropropene (cis and trans)	542-75-6			0.34(hc)			21(hc)

Toxic Substance	CAS Number	Fresh Water (FW2) Criteria			Saline Water (SE & SC) Criteria		
		Aquatic		Human Health	Aquatic		Human Health
		Acute	Chronic		Acute	Chronic	
Dieldrin	60-57-1	0.24	0.056	0.000052(hc)	0.71	0.0019	0.000054(hc)
Diethyl phthalate	84-66-2			17,000(h)			44,000(h)
2,4-Dimethyl phenol	105-67-9			380(h)			850(h)
4,6-Dinitro-o-cresol	534-52-1			13(h)			280(h)
2,4-Dinitrophenol	51-28-5			69(h)			5,300(h)
2,4-Dinitrotoluene	121-14-2			0.11(hc)			3.4(hc)
1,2-Diphenylhydrazine	122-66-7			0.036(hc)			0.20(hc)
Endosulfans (alpha and beta)	115-29-7	0.22	0.056	62(h)	0.034	0.0087	89(h)
Endosulfan sulfate	1031-07-8			62(h)			89(h)
Endrin	72-20-8	0.086	0.036	0.059(h)	0.037	0.0023	0.060(h)
Endrin aldehyde	7421-93-4			0.059(h)			0.060(h)
Ethylbenzene	100-41-4			530(h)			2,100(h)
Fluoranthene	206-44-0			130(h)			140(h)
Fluorene	86-73-7			1,100(h)			5,300(h)
Guthion	86-50-0		0.01			0.01	
Heptachlor	76-44-8	0.52	0.0038	0.000079(hc)	0.053	0.0036	0.000079(hc)
Heptachlor epoxide	1024-57-3	0.52	0.0038	0.000039(hc)	0.053	0.0036	0.000039(hc)
Hexachlorobenzene	118-74-1			0.00028(hc)			0.00029(hc)
Hexachlorobutadiene	87-68-3			0.44(hc)			18(hc)
Hexachlorocyclopenta-diene	77-47-4			40(h)			1,100(h)
Hexachloroethane	67-72-1			1.4(hc)			3.3(hc)
Indeno(1,2,3-cd)pyrene	193-39-5			0.038(hc)			0.18(hc)
Isophorone	78-59-1			35(hc)			960(hc)
Lead	7439-92-1	38(d)(s)	5.4(d)(s)	5.0(h)(T)	210(d)(s)	24(d)(s)	
Malathion	121-75-5		0.1			0.1	
Manganese	7439-96-5						100(h)(T)
Mercury	7439-97-6	1.4(d)(s)	0.77(d)(s)	0.050(h)(T)	1.8(d)(s)	0.94(d)(s)	0.051(h)(T)
Methoxychlor	72-43-5		0.03	40(h)		0.03	
Methyl bromide (bromomethane)	74-83-9			47(h)			1,500(h)
Methyl t-butyl ether (MTBE)	1634-04-4			70(h)			

Toxic Substance	CAS Number	Fresh Water (FW2) Criteria			Saline Water (SE & SC) Criteria		
		Aquatic		Human Health	Aquatic		Human Health
		Acute	Chronic		Acute	Chronic	
Methylene chloride	75-09-2			2.5(hc)			310(hc)
Mirex	2385-85-5		0.001			0.001	
Nickel	7440-02-0	(a)	(a)	500(h)(T)	64(d)(s)	22(d)(s)	1,700(h)(T)
Nitrate (as N)	14797-55-8			10,000(h)			
Nitrobenzene	98-95-3			17(h)			690(h)
N-Nitrosodi-n-butylamine	924-16-3			0.0063(hc)			0.22(hc)
N-Nitrosodiethylamine	55-18-5			0.00023(hc)			0.13(hc)
N-Nitrosodimethylamine	62-75-9			0.00069(hc)			3.0(hc)
N-Nitrosodiphenylamine	86-30-6			3.3(hc)			6.0(hc)
N-Nitrosodi-n-propylamine (Di-n-propylnitrosamine)	621-64-7			0.0050(hc)			0.51(hc)
N-Nitrosopyrrolidine	930-55-2			0.016(hc)			34(hc)
Parathion	56-38-2	0.065	0.013				
Pentachlorobenzene	608-93-5			1.4(h)			1.5(h)
Pentachlorophenol	87-86-5	(b)	(b)	0.27(hc)	13	7.9	3.0(hc)
Phenol	108-95-2			10,000(h)			860,000(h)
Phosphorous (yellow)	7723-14-0					0.1	
Polychlorinated biphenyls (PCBs)	1336-36-3		0.014	0.000064(hc)		0.030	0.000064(hc)
Pyrene	129-00-0			830(h)			4,000(h)
Selenium	7782-49-2	20(s)	5.0(s)	170(h)(T)	290(d)(s)	71(d)(s)	4,200(h)(T)
Silver	7440-22-4	(a)		170(h)(T)	1.9(d)(s)		40,000(h)(T)
Sulfide-hydrogen sulfide (undissociated)	7783-06-4		2			2	
1,2,4,5-Tetrachlorobenzene	95-94-3			0.97(h)			1.1(h)
2,3,7,8-Tetrachlorodibenzo -p-dioxin (TCDD)	1746-01-6			0.0000000050(hc)			0.0000000051(hc)
1,1,2,2-Tetrachloroethane	79-34-5			4.7(h)			110(h)
Tetrachloroethylene	127-18-4			0.34(hc)			1.6(hc)
Thallium	7440-28-0			0.24(h)(T)			0.47(h)(T)
Toluene	108-88-3			1,300(h)			15,000(h)
Toxaphene	8001-35-2	0.73	0.0002	0.00028(hc)	0.21	0.0002	0.00028(hc)
1,2,4-Trichlorobenzene	120-82-1			21(h)			42(h)

Toxic Substance	CAS Number	Fresh Water (FW2) Criteria			Saline Water (SE & SC) Criteria		
		Aquatic		Human Health	Aquatic		Human Health
		Acute	Chronic		Acute	Chronic	
1,1,1-Trichloroethane	71-55-6			120(h)			2,600(h)
1,1,2-Trichloroethane	79-00-5			13(h)			350(h)
Trichloroethylene	79-01-6			1.0(hc)			12(hc)
2,4,5-Trichlorophenol	95-95-4			1,800(h)			3,600(h)
2,4,6-Trichlorophenol	88-06-2			0.58(hc)			1.0(hc)
Vinyl chloride	75-01-4			0.082(hc)			8.1(hc)
Zinc	7440-66-6	(a)	(a)	7,400(h)(T)	90(d)(s)	81(d)(s)	26,000(h)(T)

(a) Criteria as listed at (f)3 above as formula

(b) Criteria as listed at (f)4 above as formula

(d) Criterion is expressed as a function of the Water Effect Ratio (WER). For criterion in the table, WER equates to the default value of 1.0.

(fc) Criteria expressed as free cyanide (as CN)/L

(h) Human health noncarcinogen

(hc) Human health carcinogen

(ol) Organoleptic effect-based criterion with no frequency of exceedance at or above the MA7CD10 flow

(s) Dissolved criterion

(T) Total recoverable criterion

* See N.J.A.C. 7:9B-1.14(g) for site-specific criteria

(g) Site-specific surface water quality criteria listed below apply to specific waterbodies that supersede the Statewide criteria listed at (d) through (f) above. Any site-specific criterion developed through a Total Maximum Daily Load (TMDL) adopted as an amendment to the Statewide Water Quality Management Plan or the applicable Areawide Water Quality Management Plan in accordance with N.J.A.C. 7:15-5.4 shall be incorporated into this section. The Department shall publish a notice of administrative change in the New Jersey Register.

1.

Toxic Substance	CAS Number	Freshwater Criteria			Saline water Criteria			Waterbodies
		Aquatic		Human Health	Aquatic		Human Health	
		Acute	Chronic		Acute	Chronic		
Copper (μg/L dissolved)	7440508				7.9	5.6		Newark Bay, Raritan Bay, Arthur Kill, Kill Van Kull, saline portions of the Passaic, Hackensack, and Hudson Rivers and saline portions of tributaries to all of these waters.

2.

Substance	Criteria	Duration	Waterbody	Associated HUC14 Name	Associated HUC14 Number
Total Phosphorus (mg/L)(A)	0.050	Annual average	Carnegie Lake (Mercer & Middlesex Counties)	Stony Bk (Princeton)	02030105090090
				Millstone R (Rt. 1 to Cranbury Bk)	02030105100140
				Millstone R (Heathcote Bk to Harrison St.)	02030105110020
	0.053	Annual average	Gordon Pond (Middlesex County)	Devils Brook	02030105100110
	0.040	Annual average	Grovers Mill Pond (Mercer County)	Bear Brook (below Trenton Road)	02030105100130
	0.059	Annual average	Peddie Lake (Mercer County)	Rocky Brook (below Monmouth Co line)	02030105100050
	0.043	Annual average	Plainsboro Pond (Middlesex County)	Cranbury Brook (below NJ Turnpike)	02030105100090

(A) In accordance with the Amendment to the Lower Raritan/Middlesex, Mercer County, Monmouth County, Northeast, Upper Delaware and Upper Raritan Water Quality Management Plans; Total Maximum Daily Load Report for the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments Watershed Management Areas 8, 9 and 10; adopted May 24, 2016 at 48 N.J.R. 1321(a)). The TMDL Report may be downloaded at https://www.nj.gov/dep/wms/bears/docs/raritan_tmdl_adopted.pdf.

3.

Substance	Criteria	Duration	Waterbody	Associated HUC14 Name	Associated HUC14 Number
Chlorophyll *a* (µg/L)[(B)]	20	Seasonal average (June 15th to September 1st)	Dundee Lake	Passaic R Lwr (Dundee Dam to F.L. Ave)	02030103120080
	10	Seasonal average (June 15th to September 1st)	Wanaque Lake	Wanaque Reservoir (below Monks gage)	02030103070050

(B) Chlorophyll *a* is a watershed-specific translator applicable for the lakes identified above where the total phosphorus criterion of 0.1 mg/L does not apply to the upstream waterbodies identified in Table (i) below in accordance with the Amendment to the Northeast, Upper Raritan, Sussex County and Upper Delaware Water Quality Management Plans; Total Maximum Daily Load Report for the Non-Tidal Passaic River Basin Addressing Phosphorus Impairments. Watershed Management Areas 3, 4 and 6; adopted April 24, 2008 at 40 N.J.R. 2574(b). The TMDL Report may be downloaded at https://www.nj.gov/dep/wms/bears/docs/passaic_tmdl.pdf.

i. The total phosphorus criterion of 0.1 mg/L at N.J.A.C. 7:9B-1.14(d)4ii(1) does not apply to the following waterbodies

Waterbody	Associated HUC14 Name	Associated HUC14 Number
Passaic River from source to Dundee Lake Dam, including all named and unnamed tributaries	Passaic R Upr (above Osborn Mills)	02030103010010
	Passaic R Upr (Dead R to Osborn Mills)	02030103010070
	Passaic R Upr (Plainfield Rd to Dead R)	02030103010110
	Passaic R Upr (Snyder to Plainfield Rd)	02030103010120
	Passaic R Upr (40d 45m to Snyder Ave)	02030103010130
	Passaic R Upr (Columbia Rd to 40d 45m)	02030103010150
	Passaic R Upr (Hanover RR to Columbia Rd)	02030103010160
	Passaic R Upr (Rockaway to Hanover RR)	02030103010170
	Passaic R Upr (Pine Bk br to Rockaway)	02030103010180
	Passaic R Upr (Pompton R to Pine Bk)	02030103040010
	Passaic R Lwr (pump stn to Pompton R)	02030103120100
	Passaic R Lwr (Goffle Bk to pump stn)	02030103120110
	Passaic R Lwr (Fair Lawn Ave to Goffle)	02030103120070
	Passaic R Lwr (Dundee Dam to F.L. Ave)	02030103120080
High Mountain Brook, entire length	Meadow Brook/High Mountain Brook	02030103070060
Meadow Brook, entire length	Meadow Brook/High Mountain Brook	02030103070060
Wanaque River from Wanaque Reservoir dam to Pequannock River including all named and unnamed tributaries	Meadow Brook/High Mountain Brook	02030103070060
	Wanaque R/Posts Bk (below reservoir)	02030103070070
Posts Brook including all named and unnamed tributaries	Wanaque R/Posts Bk (below reservoir)	02030103070070
Ramapo River from Pompton Lake to Pompton River including all named and unnamed tributaries	Ramapo R (below Crystal Lake bridge)[P]	02030103100070[P]

Pompton River from confluence with Pequannock River to Passaic River, including all named and unnamed all tributaries	Pequannock R (below Macopin gage)[P]	02030103050080[P]
	Pompton River	02030103110020
Beaver Brook including all named and unnamed all tributaries	Lincoln Park tribs (Pompton River)	02030103110010
Preakness (Singac) Brook, entire length	Preakness Brook / Naachtpunkt Brook	02030103120030
Goffle Brook, entire length	Goffle Brook	02030103120050
Molly Ann Brook, entire length	Molly Ann Brook	02030103120040
Deepavaal Brook, entire length	Deepavaal Brook	02030103120060
Peckman River, entire length	Peckman River (above CG Res trib)	02030103120010
	Peckman River (below CG Res trib)	02030103120020
Canoe Brook, entire length	Canoe Brook	02030103010140
Slough Brook, entire length	Slough Brook	02030103010190
Crooked Brook including all named and unnamed all tributaries	Montville tribs.	02030103030160
Rockaway River, from downstream boundary of Jersey City (Boonton) Reservoir to Passaic River including all named and unnamed tributaries	Rockaway R (Passaic R to Boonton dam)	02030103030170
Whippany River from Washington Valley Road to Passaic River including all named and unnamed all tributaries	Greystone / Watnong Mtn tribs	02030103020030
	Whippany R (Lk Pocahontas to Wash Val Rd)	02030103020040
	Whippany R (Malapardis to Lk Pocahontas)	02030103020050
	Whippany R (Rockaway R to Malapardis Bk)	02030103020100
Dead River, entire length	Dead River (above Harrisons Brook)	02030103010080
	Dead River (below Harrisons Brook)	02030103010100
Harrisons Brook, entire length	Harrisons Brook	02030103010090
Primrose Brook, entire length	Primrose Brook	02030103010020
Loantaka Brook, entire length	Loantaka Brook	02030103010040
Great Brook including all named and unnamed all tributaries	Great Brook (above Green Village Rd)	02030103010030
	Great Brook (below Green Village Rd)	02030103010050
Malapardis Brook, entire length	Malapardis Brook	02030103020060
Black Brook, entire length	Black Brook (Hanover)	02030103020070
Black Brook including all named and unnamed all tributaries	Black Brook (Great Swamp NWR)	02030103010060
Troy Brook including all named and unnamed tributaries	Troy Brook (above Reynolds Ave)	02030103020080
	Troy Brook (below Reynolds Ave)	02030103020090

P Partial HUC14

(h) Surface water quality criteria for waters under the jurisdiction of the DRBC:

1. Mainstem Delaware River and Delaware Bay:
   i. For parameters with criteria in the DRBC Water Quality Regulations, the criteria contained therein are the applicable criteria.
   ii. For parameters without criteria in the DRBC Water Quality Regulations, the criteria at (c) above are the applicable criteria and shall be applied as follows:
      (1) Criteria applicable to FW2-NT waters apply where salinities are less than or equal to 3.5 parts per thousand (ppt) at mean high tide;
      (2) Criteria applicable to SE waters apply where salinities are greater than 3.5 ppt at mean high tide; and
      (3) Where salinities vary from 3.5 ppt or less, to greater than 3.5 ppt, at mean high tide, the more stringent of the FW2-NT or SE criteria apply.
2. Tributaries to the mainstem Delaware River and Delaware Bay:
   i. The applicable criteria are those contained in the DRBC Water Quality Regulations; or
   ii. The criteria at (c) above, whichever are more stringent.
3. For all waters under the jurisdiction of the DRBC where criteria are not established in the DRBC Water Quality Regulations, or at (c) above, the Department shall use criteria based upon the best available scientific information, in accordance with (d)1ii above and N.J.A.C. 7:9B-1.5(c)5, to establish water quality-based effluent limitations.

7:9B-1.15 Surface water classifications for the waters of the State of New Jersey

(a) This section contains the surface water classifications for the waters of the State of New Jersey. Surface water classifications are presented in tabular form. Subsections (c) through (i) contain surface water classifications by major drainage basin. Subsection (j) lists FW1 waters by tract within basins and subsection (k) identifies the Outstanding National Resource Waters of the State. Interstate waters of the mainstem Delaware River are under the jurisdiction of the DRBC and the designations are contained in the DRBC Water Quality Regulations.

(b) The following are instructions for the use of N.J.A.C. 7:9B-1.15(c) through (j) respectively:
1. The surface water classification subsections give the surface water classifications and antidegradation designations for waters of the State.
2. Within each basin the waters are listed alphabetically and segment descriptions begin at the headwaters and proceed downstream.
3. To find a stream:
   i. Determine which major drainage basin the stream is in;
   ii. Look for the name of the stream in the appropriate table and find the classification;

iii. For unnamed or unlisted streams, find the stream or other waterbody that the stream of interest flows into and look for the classification of that stream or waterbody. The classification of the stream of interest may then be determined by referring to (b)5 below. If the second stream or waterbody is also unlisted, repeat the process until a listed stream or waterbody is found. Use (b)5iv below to classify streams entering unlisted lakes.

4. To find a lake or other non-stream waterbody:
   i. Determine which major drainage basin the waterbody is in;
   ii. Look for the waterbody name in the appropriate table;
   iii. If the waterbody is not listed, use (b)5ii, 5iii, 5vi, and 5vii below to determine the appropriate classification.
5. To find waterways or waterbodies not listed at N.J.A.C. 7:9B-1.15(c) through (i), use the following instructions:
   i. Unnamed or unlisted freshwater streams that flow into streams classified as FW2-TP, FW2-TM, or FW2-NT take the classification of the classified stream they enter, unless the unlisted stream is a PL water which is covered in (b)5vii below. If the stream could be a C1 water, see (b)5vi below.
   ii. All freshwater lakes, ponds and reservoirs that are five or more acres in surface area, that are not located entirely within the Pinelands Area boundaries (see (b)5vii below) and that are not specifically listed as FW2-TP or FW2-TM are classified as FW2-NT. This includes lakes, ponds and reservoirs on segments of streams which are classified as FW2-TM or FW2-TP such as Saxton Lake on the Musconetcong River. If the waterbody could be a C1 water, also check (b)5vi below.
   iii. All freshwater lakes, ponds and reservoirs, that are less than five acres in surface area, upstream of and contiguous with FW2-TP or FW2-TM streams, and which are not located entirely within the Pinelands Area boundaries (see(b)5vii below) are classified as FW2-TM. All other freshwater lakes, ponds and reservoirs that are not otherwise classified in this subsection or the following tables are classified as FW2-NT. If the waterbody could be a C1 water, also check (b)5vi below.
   iv. Unnamed or unlisted streams that enter FW2 lakes, ponds and reservoirs take the classification of either the listed tributary stream flowing into the lake with the highest classification or the listed tributary stream leaving the lake with the highest classification, whichever has the highest classification, or, if there are no listed tributary or outlet streams to the lake, the first listed stream downstream of the lake. If the stream is located within the boundaries of the Pinelands Area, see (b)5.vii. below; if it could be a C1 water, also see (b)5vi below.
   v. Unlisted saline waterways and waterbodies are classified as SE1 in the Atlantic Coastal Basin. Unlisted saline waterways which enter SE2 or SE3 waters in the Passaic, Hackensack and New York Harbor Complex basin are classified as SE2 unless otherwise classified in (f) below. Freshwater portions of unlisted streams entering SE1, SE2, or SE3 waters are classified as FW2-NT. This only applies to waters that are not PL waters (see (b)5vii

below). If the waterbody or waterway could be a C1 water, also see (b)5vi below.

vi. All waterbodies that have been designated by the Department as Category One are specifically listed in 1.15(c) through (i).

vii. All waterways or waterbodies, or portions of waterways or waterbodies, that are located within the boundaries of the Pinelands Area established at N.J.S.A. 13:18A-11a are classified as PL unless they are listed as FW1 waters in (j) below. A tributary entering a PL stream is classified as PL only for those portions of the tributary that are within the Pinelands Area. Lakes are classified as PL only if they are located entirely within the Pinelands Area.

6. The following 10 classifications are used for the sole purpose of identifying the water quality classification of the waters listed in the tables in (c) through (j) below:

i. "FW1" means those fresh waters, as designated in N.J.A.C. 7:9B-1.15(j), and as defined at N.J.A.C. 7:9B-1.4.

ii. "FW2-TP" means FW2 trout production.

iii. "FW2-TM" means FW2 trout maintenance.

iv. "FW2-NT" means FW2 non trout.

v. "PL" means Pinelands Waters.

vi. "SE1" means saline estuarine waters whose designated uses are listed in N.J.A.C. 7:9B-1.12(d).

vii. "SE2" means saline estuarine waters whose designated uses are listed in N.J.A.C. 7:9B-1.12(e).

viii. "SE3" means saline estuarine waters whose designated uses are listed in N.J.A.C. 7:9B-1.12(f).

ix. "SC" means the general surface water classification applied to saline coastal waters.

x. FW2-NT/SE1 (or a similar designation that combines two classifications) means a waterway in which there may be a salt water/fresh water interface. The exact point of demarcation between the fresh and saline waters must be determined by salinity measurements and is that point where the salinity reaches 3.5 parts per thousand at mean high tide. The stream is classified as FW2-NT in the fresh portions (salinity less than or equal to 3.5 parts per thousand at mean high tide) and SE1 in the saline portions.

7. The following water quality designations are used in (c) through (i), respectively, below:

i. "(C1)" means Category One waters;

ii. "(tp)" indicates trout production in waters which are classified as FW1. This is for information only and does not affect the water quality criteria for those waters;

iii. "(tm)" indicates trout maintenance in waters which are classified as PL or FW1. For FW1 waters this is for information only and does not affect the water quality criteria for those waters.

(c) The following surface water classifications are for waters of the Atlantic Coastal Basin:

Waterbody	Classification
ABRAMS CREEK	
(Marmora) - Entire length, except portion outside the boundaries of the MacNamara Wildlife Management Area	FW2-NT/SE1(C1)
(Griscom) - Portions of the Creek and tributaries outside of the MacNamara Wildlife Management Area	FW2-NT/SE1
ABSECON BAY (Absecon) - All waters within Absecon Wildlife Management Area	SE1(C1)
ABSECON CREEK	
(Egg Harbor) - North and South Branches from their origins downstream to the boundary of the Pinelands Protection and Preservation Area	PL
(Absecon) – Boundary of the Pinelands Protection and Preservation Area to Mill Road Dam	FW2-NT
(Absecon) - Mill Road Dam to Absecon Bay, except portions within Absecon Wildlife Management Area	SE1
ARNOLD POND (Barnegat)	FW2-NT/SE1(C1)
ATLANTIC OCEAN	
(Offshore) - Waters from the shoreline out to the three mile limit, except areas described below	SC
(Beach Haven) - Waters of the Atlantic Ocean out to the State's three mile limit from Beach Haven Inlet to Cape May Point, excluding waters classified as Prohibited in accordance with N.J.A.C. 7:12	SC(C1)
TRIBUTARIES, ATLANTIC OCEAN	
(New Jersey Coast) - All those streams or segments of streams that flow directly into the Atlantic Ocean or into back bays of the Ocean which are not included elsewhere in this list, are not within the boundaries of the Pinelands Protection or Preservation Areas and are not mapped as C1 waters by the Department	FW2-NT/SE1
(Pinelands) - All streams or segments of streams which flow directly into the Atlantic Ocean or into back bays of the Ocean, are within the boundaries of the Pinelands Protection and Preservation Areas and are not classified as FW1 in this Table	PL
(New Jersey Coast) - All streams or segments of streams which flow directly into the Atlantic Ocean or into	

back bays of the Ocean, are mapped as C1 waters by the Department, are not trout maintenance waters, and are not classified as FW1 in this Table	FW2-NT/SE1(C1)
BABCOCK CREEK (Marmora) - Entire length	FW2-NT/SE1(C1)
BALLANGER CREEK	
(New Gretna) - Source to Pollys Ditch	FW2-NT/SE1
(New Gretna) - Pollys Ditch to Bay	SE1(C1)
BANKS CREEK (Marmora) - Entire length	SE1(C1)
BARNEGAT BAY	
(Barnegat National Wildlife Refuge) - All waters within the boundaries of the Barnegat National Wildlife Refuge	SE1(C1)
(Barnegat Bay) - All waters of the Bay	SE1(C1)
(Island Beach State Park) - All freshwater ponds within the boundaries of Island Beach State Park	FW1
(Island Beach State Park) - All waters in the Park, not classified as FW1 above	FW2-NT/SE1(C1)
BARNEGAT BAY TRIBUTARIES - See ATLANTIC OCEAN, TRIBUTARIES	
BASS RIVER	
(Oswego Lake) - Source to Pineland Protection and Preservation Area boundary at the Garden State Parkway, except those branches described separately below	PL
(New Gretna) - Pineland Protection and Preservation Area boundary to the boundary of shellfish waters	FW2-NT/SE1
(New Gretna) - Boundary of shellfish waters to Mullica River	SE1(C1)
(Bass River State Forest) - Tommy's Branch from its headwaters to the Bass River State Forest Recreation Area service road	FW1
(Bass River State Forest) - Falkenburg Branch of Lake Absegami from its headwaters to the Lake	FW1
BATSTO RIVER	
(Browns Mills) - Entire length, except waters described separately below	PL
(Wharton) - Skit Branch and tributaries from their headwaters to the confluence with Robert's Branch	FW1
(Wharton) - The easterly branches of the Batsto River from Batsto Village upstream to the confluence with Skits Branch	FW1
BEACH THOROFARE (Margate) - Entire length	SE1(C1)
BEAR SWAMP BROOK	
(Howell)- Entire Length	FW2-NT(C1)
BIG ELDER CREEK	

(Sea Isle City) - Segment within the boundaries of Marmora Wildlife Management Area	SE1(C1)
(Sea Isle City) - Segment outside the boundaries of Marmora Wildlife Management Area	SE1
BIG GRAVELING CREEK (Great Bay) - Entire length	SE1(C1)
BIG GREAVES CREEK	
(MacNamara) - Segment of the Creek outside the boundaries of MacNamara Wildlife Management Area	SE1
(MacNamara) - Creek and tributaries within the boundaries of MacNamara Wildlife Management Area	SE1(C1)
BIG THOROFARE	
(Tuckerton) - Source to boundary of Great Bay Blvd. Wildlife Management Area	SE1
(Tuckerton) - Segment within the boundaries of Great Bay Blvd. Wildlife Management Area	SE1(C1)
BLUEFISH BROTHERS (Stone Harbor) - Entire length	SE1(C1)
BLUEFISH CREEK (Stone Harbor) - Entire length	SE1(C1)
BOG BRANCH CREEK (Middletown) - Entire length, except portions within the Pinelands Protection and Preservation Area	SE1(C1)
(Middletown) - Portions within the Pinelands Protection and Preservation Area	PL
BRIGANTINE (Edwin B. Forsythe National Wildlife Refuge) - All waters within the boundaries of the Edwin B. Forsythe National Wildlife Refuge, except portions of Cedar Creek and Cedar Run	FW2-NT/SE1(C1)
BRISBANE LAKE	
(Allaire State Park) - The Lake and its tributaries	FW2-NT(C1)
BROAD CREEK (New Gretna) - Entire length	SE1(C1)
BROAD THOROFARE	
(Longport) - South of Rt. 152	SE1
(Longport) - North of Rt. 152	SE1(C1)
BROTHERS CREEK (Burleigh) - Entire length	SE1(C1)
CABBAGE THOROFARE (Great Bay) - Entire length	SE1(C1)
CEDAR BRIDGE BRANCH (Lakewood) - Entire length	FW2-NT
CEDAR CREEK	
(Manahawkin) - Source to boundaries of the Manahawkin Wildlife Management Area	FW2-NT/SE1
(Manahawkin) - Creek and tributaries within the boundaries of the Manahawkin Wildlife Management Area	FW2-NT/SE1(C1)
CEDAR CREEK	
(Cedar Crest) - Source to the boundaries of the Pinelands Protection and Preservation Area at the Garden	

State Parkway, except branches described separately below	PL
(Berkeley) - Garden State Parkway to US Highway 9, except portions within Edwin B. Forsythe National Wildlife Refuge	FW2-NT
(Berkeley) – Portions within Edwin B. Forsythe National Wildlife Refuge	FW2-NT(C1)
(Berkeley) - US Highway 9 to Barnegat Bay, except portions within Edwin B. Forsythe National Wildlife Refuge	FW2-NT/SE1
(Greenwood Forest) - Webbs Mill Branch and tributaries located entirely within the boundaries of Greenwood Forest Wildlife Management Area	FW1
(Greenwood Forest) - Chamberlain's Branch from its origins to a point 1000 feet west of Route 539	FW1
(Greenwood Forest) - Those portions of the tributaries to Chamberlain's Branch originating and wholly contained within the boundaries of the Greenwood Forest Wildlife Management Area	FW1
CEDAR HAMMOCKS CREEK (English Creek Landing) - Entire length	SE1(C1)
CEDAR RUN	
(Stafford) - Source to the boundaries of the Pinelands Protection and Preservation Area at the Garden State Parkway	PL
(Cedar Run) - Garden State Parkway to US Highway 9, except portions within Edwin B. Forsythe National Wildlife Refuge	FW2-NT
(Cedar Run) – portions within Edwin B. Forsythe National Wildlife Refuge upstream of US Highway 9	FW2-NT(C1)
(Cedar Run) - US Highway 9 to the boundaries of the Barnegat National Wildlife Refuge, except portions within Edwin B. Forsythe National Wildlife Refuge	FW2-NT/SE1
(Cedar Run) – portions within Edwin B. Forsythe National Wildlife Refuge downstream of US Highway 9	FW2-NT/SE1(C1)
(Barnegat) - National Wildlife Refuge boundaries to Barnegat Bay	FW2-NT/SE1(C1)
CEDAR SWAMP CREEK	
(Cedar Spring) - Entire length, except segment described separately below	FW2-NT/SE1
(Marmora) - Creek and tributaries within the boundaries of the MacNamara Wildlife Management Area	FW2-NT/SE1(C1)
CHAMBERLAIN BRANCH - See CEDAR CREEK	
CHANNEL CREEK (Barnegat Bay) - Entire length	SE1(C1)
CHARLEY CREEK (Marmora) - Entire length	FW2-NT/SE1(C1)

CLEAR STREAM (JACKSON) - Entire length	FW2-TM(C1)
COLLINS TIDE PONDS (Barnegat)	FW2-NT/SE1(C1)
COMMANDO CREEK (Marmora) - Entire length	SE1(C1)
CRANBERRY BROOK (Monmouth) - Entire length	FW2-NT/SE1
DAVENPORT BROOK	
(Berkeley) - Source to the boundaries of the Pinelands Protection and Preservation Area at the Penn Central railroad tracks	PL
(Toms River) - Railroad tracks to confluence with Wrangel Brook	FW2-NT
DEEP CREEK (Herbertsville) - Entire length	FW2-NT
DEEP RUN (Wharton) - Run and tributaries from their sources to Springer's Brook	FW1
DICKS BROOK (Larrabee's Crossing) - Entire length	FW2-NT(C1)
DINNER POINT CREEK (Staffordsville) - Entire length	SE1(C1)
DOCK THOROFARE (Northfield) - Entire length	SE1(C1)
DOUGHTY RESERVOIR (Atlantic city)	FW2-NT(C1)
DOVE MILL BRANCH - See TOMS RIVER	
EDWARD CREEK	
(Ocean City) - Source to the boundary of Marmora Wildlife Management Area	SE1
(Ocean City) - Boundary of Marmora Wildlife Management Area to Horn Creek	SE1(C1)
FALKENBURG BRANCH - See BASS RIVER	
FLAT CREEK (Marmora) - Entire length	FW2-NT/SE1(C1)
FLATTERAS CREEK (Beach Haven Heights) - Entire length	SE1(C1)
FORKED RIVER	
(Lacey) - River and branches from their sources to the boundaries of the Pinelands Protection and Preservation Area at the Garden State Parkway	PL
(Forked River) - Garden State Parkway to Barnegat Bay	FW2-NT/SE1
FORTESCUE (Fortescue) - All waters within the Fortescue Wildlife Management Area	FW2-NT/SE1(C1)
GIBSON CREEK	
(Gibson Landing) - Entire length, except segment described below	PL
(Marmora) - Segment and tributaries within the MacNamara Wildlife Management Area	FW2-NT/SE1(C1)
GLENDOLA RESERVOIR (Glendola)	FW2-NT(C1)
GO THROUGH CREEK	
(Burleigh) - Entire length, except segment described below	SE1
(Burleigh) - Segment within the boundaries of the Marmora Wildlife Management Area	SE1(C1)
GOING THROUGH CREEK (English Creek Landing)	SE1(C1)

GREAT BAY (Brigantine) - All waters of the Bay and all natural waterways which are tributary to the Bay and all waters, including both natural and manmade channels and ponds within the boundaries of the Edwin B. Forsythe National Wildlife Refuge and the Great Bay Wildlife Management Area	FW2-NT/SE1(C1)
GREAT EGG HARBOR RIVER	
(Berlin) - Source to confluence with Tinker Branch	FW2-NT
(Berlin) - Tinker Branch, the River from its confluence with Tinker Branch, and all tributaries within the Pinelands Protection and Preservation Area, downstream to the boundary at the Rt. 40 bridge in Mays Landing	PL
(Winslow) - All tributaries or segments of tributaries outside of the boundaries of the Pinelands Protection and Preservation Area, downstream to Rt. 40 at Mays Landing	FW2-NT
(Mays Landing) - Rt. 40 bridge to Great Egg Harbor, except those tributaries described separately below	SE1
(Mays Landing) - All tributaries or segments of tributaries within the boundaries of the Pinelands Protection and Preservation Areas	PL
(Egg Harbor) - Tributaries and all other waters within MacNamara Wildlife Management Area, except tributary described below	FW2-NT/SE1(C1)
(Tuckahoe) - Hawkins Creek and the stream adjacent to and north of Hawkin's Creek, and their tributaries, from their origins to the point where the influence of impoundment begins	FW1
GREAT SOUND (Avalon) - All waters within Great Sound State Park	SE1(C1)
GREAT THOROFARE	
(Ventnor) - West of Rt. 40	SE1(C1)
(Ventnor) - East of Rt. 40	SE1
GRISCOM CREEK (Gibson Landing) - Entire length	FW2-NT/SE1(C1)
GUNNING RIVER	
(Barnegat) - Entire length, except segment described below	FW2-NT/SE1
(Barnegat) - Stream and tributaries within the boundaries of Barnegat National Wildlife Refuge	FW2-NT/SE1(C1)
HALFWAY CREEK	
(Middletown) - Source to the boundary of the MacNamara Wildlife Management Area	FW2-NT/SE1
(MacNamara) - Creek and tributaries within the boundaries of the MacNamara Wildlife Management Area	SE1(C1)
HARRY POND (Barnegat)	FW2-NT/SE1(C1)

HATFIELD CREEK (Beach Haven Heights) - Entire length	SE1(C1)
HAWKINS CREEK	
(Tuckahoe) - Source to the point where the influence of impoundment begins	FW1
(Tuckahoe) - Downstream of the influence of impoundment	SE1(C1)
HAY STACK BROOK (Howell) - Entire length	FW2-NT(C1)
HOSPITALITY CREEK (Longport) - Entire length	SE1(C1)
JACOVY CREEK (Stone Harbor) - Entire length	SE1(C1)
JAKES BRANCH	
(Berkeley) - Source to the boundaries of the Pinelands Protection and Preservation Area at the Garden State Parkway	PL
(Beachwood) - Garden State Parkway to Toms River	FW2-NT/SE1
JAY CREEK	SE1(C1)
JIMMIES CREEK	
(Great Bay) - Source to the boundary of Great Bay Wildlife Management Area	SE1(C1)
(Parkers Landing) - Segments of the Creek outside the boundaries of Great Bay Wildlife Management Area	SE1
JOSH CREEK (Stone Harbor) - Entire length	SE1(C1)
JUDIES CREEK	
(Great Bay) - Source to widening of creek	SE1
(Great Bay) - Widening of creek to mouth	SE1(C1)
JUMPING BROOK (Neptune) - Entire length	FW2-NT/SE1
KNOLL POND (Barnegat)	FW2-NT/SE1(C1)
LAKES BAY (Ventnor)	SE1(C1)
LAKES CHANNEL (Ventnor) - Entire length	SE1(C1)
LITTLE GREAVES CREEK (MacNamara) - Entire length	SE1(C1)
LITTLE SCOTCH BONNET	
(Stone Harbor) - Entire length, except segment described below	SE1
(Stone Harbor) - Segment within the boundaries of Marmora Wildlife Management Area	SE1(C1)
LITTLE THOROFARE (Tuckerton) - Entire length	SE1(C1)
LONG BROOK (JACKSON) - Entire length	PL
LONG POINT CREEK (Marmora) - Entire length	FW2-NT/SE1(C1)
LONG SWAMP BROOK	
(Squankum) - Entire length	FW2-NT(C1)
LOWER LONG REACH (Stone Harbor) - Entire length	SE1(C1)
LUDLAM CREEK (Marmora) - Entire length	SE1(C1)
MAIN MARSH CREEK (Brigantine) - Entire length	SE1(C1)
MANAHAWKIN CREEK	
(Manahawkin) - Source to the boundaries of Manahawkin Wildlife Management Area	FW2-NT/SE1

(Manahawkin) - Within the boundaries of the Wildlife Management Area	FW2-NT/SE1(C1)
MANASQUAN RESERVOIR (Oak Glen)	FW2-NT(C1)
TRIBUTARIES	
(Oak Glen) -All tributaries upstream of Manasquan Reservoir from source to the Reservoir	FW2-NT(C1)
MANASQUAN RIVER	
MAIN STEM	
(Freehold) - Source to Rt. 9 bridge, except tributaries described separately under Tributaries, below	FW2-NT
(Howell) - Rt. 9 bridge to the West Farms Road Bridge in Howell Township, except tributaries described separately under Tributaries, below	FW2-TM
(Howell) - West Farms Road Bridge in Howell Township to the downstream boundary of Manasquan River Wildlife Management Area, except tributaries described separately	FW2-TM(C1)
(Brick) - Downstream boundary of Manasquan River Wildlife Management Area to surf waters	SE1
TRIBUTARIES, MANASQUAN RIVER	
(Adelphia) - Entire length	FW2-NT
(Allaire) - Those portions of the first and second southerly tributaries west of the Hospital Rd. which are located entirely within the boundaries of Allaire State Park	FW1(tm)
(Mill Run) - Entire length of Mill Run, including Brisbane Lake and its tributaries, except easterly tributary to Mill Run described as FW1 below	FW2-NT(C1)
(Allaire State Park) - The easterly tributary to Mill Run upstream of Brisbane Lake, located entirely within the Allaire State Park boundaries	FW1
(Freehold) - Tributaries within the boundaries of Turkey Swamp Wildlife Management Area	FW2-NT(C1)
MARMORA WILDLIFE MANAGEMENT AREA	
(Strathmere) - All waters within the boundaries of Marmora Wildlife Management Area	FW2-NT/SE1(C1)
MARSH BOG BROOK	
(Farmingdale) - Entire length	FW2-NT(C1)
MASONS CREEK (Marmora) - Entire length	SE1(C1)
MCNEALS BRANCH - See TUCKAHOE RIVER	
METEDECONK RIVER	
SOUTH BRANCH	
(Lakewood) - Entire length, including all tributaries	FW2-NT(C1)
NORTH BRANCH METEDECONK RIVER	
(Freehold) - Source to Aldrich Rd., including all tributaries	FW2-NT(C1)

(Lakewood) - Aldrich Rd. to Lanes Mills, except Haystack Brook listed separately	FW2-TM(C1)
(Brick) - Lanes Mills to confluence with Metedeconk River, South Branch, including the westerly tributary	FW2-NT(C1)
MAIN STEM METEDECONK RIVER	
(Brick) - Confluence of North and South branches to Forge Pond	FW2-NT(C1)
(Brick) - Forge Pond to Barnegat Bay	FW2-NT/SE1
MIDDLE RIVER	
(Tuckahoe) - Entire length, except the segment described below	FW2-NT/SE1
(Middletown) - Segment within the boundaries of MacNamara Wildlife Management Area	FW2-NT/SE1(C1)
MILE THOROFARE (Brigantine) - Entire length	SE1(C1)
MILL RUN (Allaire) - See BRISBANE LAKE	
MINGAMAHONE BROOK	
MAINSTEM	
(Farmingdale) - Entire length, except East Branch described separately below	FW2-TM(C1)
EAST BRANCH	
(Farmingdale) - Source to confluence with mainstem north of Farmingdale	FW2-NT(C1)
MIREY RUN	
(MacNamara) – Entire length, outside the boundaries of Pinelands Protection and Preservation Area	FW2-NT/SE1(C1)
(MacNamara) – Portion of the Run within the boundaries of the Pinelands Protection and Preservation Area	PL
MIRY RUN	
(Thelma) – Source to boundaries of the Pinelands Protection and Preservation Area	PL
(Catowba) – Boundaries of the Pinelands Protection and Preservation Area to Thelma Ave.	FW2-NT
(Catowba) – Thelma Ave. to Great Egg Harbor River	FW2-NT/SE1
MOTT CREEK (Brigantine) - Entire length	SE1(C1)
MUD CREEK (MacNamara) - Entire length	SE1(C1)
MUDDY FORD BROOK (Larrabee's Crossing) - Entire length	FW2-TM(C1)
MULBERRY THOROFARE (Northfield) - Entire length	SE1(C1)
MULLICA RIVER	
(Berlin) - Source to Pinelands Protection and Preservation Area boundaries at the Garden State Parkway, except branches and tributaries described below	PL
(Wharton) - Stream in the southeasterly corner of the Wharton State Forest located between Ridge Rd.	

and Seaf Weeks Rd., downstream to the boundaries of the Wharton State Forest	FW1
(Wharton) - Gun Branch from its headwaters to US Rt. 206	FW1
(New Gretna) - River and tributaries from the Pinelands Protection and Preservation Area boundary to Great Bay	SE1(C1)
(Wharton) - Brooks and tributaries between and immediately to the west of Tylertown and Crowleytown, from their headwaters to the head of tide at mean high water	FW1
NARROWS CREEK (Middletown) - Entire length	SE1(C1)
NORTH CHANNEL POND (Stone Harbor)	FW2-NT/SE1(C1)
OLDMAN CREEK (Stone Harbor) - Entire length	SE1(C1)
OTTER CREEK (Middletown) - Entire length	SE1(C1)
OYSTER CREEK	
(Brookville) - Source to the boundaries of the Pinelands Protection and Preservation Area at the Garden State Parkway	PL
(Forked River) - Garden State Parkway to Barnegat Bay	FW2-NT/SE1
OYSTER CREEK (Great Bay) - Entire length	SE1(C1)
REEVY BRANCH - See SHARK RIVER	
RING ISLAND CREEK (Stone Harbor) - Entire length	SE1(C1)
RISLEY CHANNEL (Margate) - Entire length	SE1(C1)
ROUNDABOUT CREEK (New Gretna) - Entire length	SE1(C1)
SALT CREEK (Stone Harbor) - Entire length	SE1(C1)
SCULL BAY (Linwood)	SE1(C1)
SEDGE CREEK (MacNamara) - Entire length	SE1(C1)
SHARK CREEK (Stone Harbor) - Entire length	SE1(C1)
SHARK RIVER (See also SHARK RIVER BROOK)	
(Glendola) - Remsen Mill Road to Atlantic Ocean	SE1
SHARK RIVER BROOK (See also SHARK RIVER)	
(Colts Neck) - Source to Rt. 33	FW2-NT(C1)
(Neptune) - Rt. 33 to Remsen Mill Road, including all unnamed tributaries	FW2-TM(C1)
TRIBUTARIES	
REEVY BRANCH (Reevytown) - Source to confluence with Shark River Brook	FW2-NT(C1)
ROBINS SWAMP BROOK (Neptune) - Source to confluence with Shark River Brook	FW2-TM(C1)
SARAH GREEN BROOK (Neptune) - Source to confluence with Shark River Brook	FW2-TM(C1)
SOUTH BROOK (Wall) - Source to confluence with Shark River Brook	FW2-TM(C1)
WEBLYS BROOK (Wall) - Source to confluence with Shark River Brook	FW2-NT(C1)

SHELL THOROFARE (Wildwood Gables) - Entire length	SE1(C1)
SHELTER ISLAND BAY (Margate)	SE1(C1)
SHELTER ISLAND WATERS (Margate) - Entire length	SE1(C1)
SKIT BRANCH - See BATSTO RIVER	
SOD THOROFARE (Linwood) - Entire length	SE1(C1)
SOUTHEAST CREEK (Stone Harbor) - Entire length	SE1(C1)
SQUANKUM BROOK	
(Squankum) - Entire length	FW2-NT(C1)
STEELMAN BAY (Somers Point)	SE1(C1)
SWAN POND (Marmora)	FW2-NT/SE1(C1)
SWAN POND RACE (Marmora) - Entire length	FW2-NT/SE1(C1)
TAUGH CREEK	
(Whitesboro) - Entire length, except segment described below	SE1(C1)
(Whitesboro) - Portions outside the boundaries of Marmora Wildlife Management Area	SE1
TIMBER SWAMP BROOK	
(Oak Glen) - Manasquan Reservoir dam to its confluence with the Manasquan River	FW2-NT(C1)
TINKER BRANCH - See GREAT EGG HARBOR RIVER	
TITMOUSE BROOK (Howell) - Entire length	FW2-TM(C1)
TOMMYS BRANCH - See BASS RIVER	
TOMS RIVER	
MAIN STEM	
(Holmeson) - Source to Cassville Road bridge except those tributaries described separately under Tributaries below	FW2-NT
(Cassville) – Cassville Road bridge to the Route 528 bridge, including all tributaries	FW2-NT(C1)
(Whitesville) - Route 528 bridge to Pinelands Protection and Preservation Area boundaries at the NJ Central Railroad tracks, except tributaries described separately, under Tributaries below	PL(tm)
(Manchester) - NJ Central Railroad tracks to the Route 571 bridge, except tributaries described separately, under Tributaries below	FW2-TM(C1)
(Toms River) - Route 571 bridge to the Route 37 bridge, except tributaries described separately, under Tributaries below	FW2-NT(C1)
(Toms River) - Route 37 bridge to Barnegat Bay, except tributaries described separately, under Tributaries below	FW2-NT/SE1
TRIBUTARIES, TOMS RIVER	
(Holmeson) - Tributaries within the boundaries of the Pinelands Protection and Preservation Area	PL

(West of Pleasant Grove) – Source to the Pinelands Protection and Preservation Area boundary, including all tributaries	FW2-TM(C1)
(Toms River) - All tributaries within the boundaries of the Pinelands Protection and Preservation Area	PL
(Archer's Corners) - All tributaries outside the boundaries of the Pinelands Protection Area and within the boundaries of Colliers Mills Wildlife Management Area	FW2-NT(C1)
DOVE'S MILL BRANCH	
(Van Hiseville) - Source to Bunker Hill Lake, including all tributaries	FW2-NT(C1)
MAPLE ROOT BRANCH (Jackson) - Source to confluence with Toms River	PL
WRANGEL BROOK	
(Whiting) – Source to Green Branch, including all tributaries but not including Green Branch and portions within the boundaries of the Pinelands Protection and Preservation Area	FW2-NT(C1)
(Manchester) – Green Branch to the confluence with Davenport Branch, except portions within the boundaries of the Pinelands Protection and Preservation Area	FW2-NT
(Berkeley) – Davenport Branch to Toms River, except portions within the boundaries of the Pinelands Protection and Preservation Area	FW2-NT/SE1
TUCKAHOE LAKE (Tuckahoe)	FW2-NT(C1)
TUCKAHOE RIVER	
(Milmay) - Source to Pinelands Protection and Preservation Area boundary at Rt. 49	PL
(Head of River) - McNeals Branch and the River within the boundaries of the Peaselee Wildlife Management Area, except tributaries within the boundaries of the Pinelands Protection and Preservation Area, described separately below	FW2-NT/SE1(C1)
(Head of River) - Tributaries within the Pinelands Protection and Preservation Area boundaries	PL
(Tuckahoe) - Edge of Fish and Wildlife Management Area at confluence with Warners Mill Stream to Great Egg Harbor, except segment described separately below	FW2-NT/SE1(C1)
(Tuckahoe) - River, tributaries and all other waters within boundaries of the MacNamara Wildlife Management Area	FW2-NT/SE1(C1)
TULPEHOCKEN CREEK	

(Wharton) - Creek and tributaries from their origin to the confluence with Featherbed Branch	FW1
(Wharton) - The westerly tributaries and those natural ponds within the lands bounded by Hawkins (Bulltown-Hawkins) Rd., Hampton Gate (Tuckerton) Rd., and Sandy Ridge Rd.	FW1
TURTLE GROUND CREEK (Jeffers Landing) - Entire length	SE1(C1)
TURTLE GUT (Ventnor) - Entire length	SE1(C1)
WADING RIVER	
(Chatsworth) - Entire length, except tributaries described separately below	PL
(Greenwood Forest) - Westerly tributary to Howardsville Cranberry Bog Reservoir and other tributaries located entirely within the boundaries of the Greenwood Forest Wildlife Management Area	FW1
WARNERS MILL STREAM	
(Head of River) - Source to Pinelands Protection and Preservation Area boundary at Aetna Dr.	PL
(Head of River) - Aetna Dr. to boundary of the Peaselee Wildlife Management Area	FW2-NT/SE1
(Head of River) - Within the boundaries of the Peaselee Wildlife Management Area to the Tuckahoe River	FW2-NT/SE1(C1)
WEBBS MILL BRANCH - See CEDAR CREEK	
WIGWAM CREEK	
(Great Bay) - Source to Rt. 9	FW2-NT/SE1
(Great Bay) - Rt. 9 to Mott Creek	SE1(C1)
WINTER CREEK (New Gretna) - Entire length	SE1(C1)
WHIRLPOOL CHANNEL (Margate) - Entire length	SE1(C1)
WORLDS END CREEK (New Gretna) - Entire length	SE1(C1)
WRANGLE CREEK (Forked River) - Entire length and all waters within Forked River Game Farm	FW2-NT/SE1(C1)
WRECK POND BROOK (Wall) - Entire length	FW2-NT

(d) The following surface water classifications are for waters of the Upper Delaware River Basin:

Waterbody	Classification
ALEXAUKEN CREEK (Lambertville) - Entire length, including all tributaries	FW2-TM(C1)
ALLAMUCHY CREEK (Allamuchy) - Entire length	FW2-NT(C1)
ALLAMUCHY POND (Allamuchy)	FW2-NT(C1)
ALLAMUCHY POND TRIBUTARIES (Allamuchy) - All tributaries that are located entirely within the boundaries of Allamuchy State Park and that flow into Allamuchy Pond	FW1
ALMS HOUSE BROOK	
(Hampton) - Source to, but not including, County Farm Pond	FW2-TM
(Frankford) - County Farm Pond to Paulins Kill	FW2-NT
AMWELL LAKES (Lambertville)	FW2-NT(C1)
ANDOVER JUNCTION BROOK	
(Andover) - Source to Valentines Pond	FW2-TM
(Andover) - Valentines Pond to Kymer Brook	FW2-TM(C1)
ANDOVER JUNCTION BROOK LAKES (Andover) – All unlisted lakes greater than five acres	FW2-NT(C1)
ASHROE LAKE (Stokes State Forest)	FW2-NT(C1)
ASHROE LAKE TRIBUTARIES	
(Stokes State Forest) -Tributary to the Lake from Deer Lake and portion of southernmost tributary to Ashroe Lake outside of the Stokes State Forest boundary	FW2-TP(C1)
(Stokes State Forest) - Southernmost tributary to the Lake from its source to the Stokes State Forest boundary	FW1(tp)
ASSUNPINK CREEK	
(Trenton) - Source to confluence with the Delaware River, except segments described separately below	FW2-NT
(Roosevelt) - Creek and those tributaries within the boundaries of the Assunpink Wildlife Management Area	FW2-NT(C1)
(Quaker Bridge) - Portions of the creek within the boundaries of Van Ness Refuge	FW2-NT(C1)
BARKERS MILL BROOK (Independence) - Entire length	FW2-TP(C1)
BEAR BROOK (Johnsonburg) - Entire length	FW2-TP(C1)
BEAR CREEK	
(Johnsonburg) - Mud Pond to the Erie-Lackawanna Railroad trestle north of Johnsonburg	FW1(tm)

(Frelinghuysen) - Erie-Lackawanna Railroad trestle to confluence with Trout Brook, including all unnamed and unlisted tributaries	FW2-TM(C1)
(Frelinghuysen) - Confluence with Trout Brook to Pequest River	FW2-TM
BEATTY'S BROOK (Penwell) - Entire length	FW2-TP(C1)
BEAVER BROOK (Hope) - Entire length, except tributary described below	FW2-NT
(East of Mununka Chunk) – Entire length, including all tributaries	FW2-TM
BEAVER BROOK (Jefferson) - Source to, but not including, Lake Shawnee	FW2-NT
BEERSKILL	
(High Point State Park) - Source to boundary of High Point State Park at 41°15'48" N, 74°45'49" W	FW1(tp)
(Shaytown) - Boundary of High Point State Park to confluence with Little Flat Brook	FW2-TP(C1)
BIG FLAT BROOK	
(Montague) - Sawmill Pond to confluence with Parker Brook, except segments described under the listing for Flat Brook, below	FW2-NT(C1)
(Sandyston) - Confluence with Parker Brook, through the Blewitt Tract, to the confluence with Flat Brook, except tributaries described under the listing for Flat Brook, below	FW2-TP(C1)
(Tuttles Corner) - Outlet stream from Lake Ashroe to its confluence with Big Flat Brook	FW2-TP(C1)
BLAIR CREEK	
(Hardwick) - Source to Bass Lake	FW2-NT
(Hardwick Center) - Bass Lake outlet to Paulins Kill	FW2-TM
BOWERS BROOK	
(Hackettstown) - Source downstream to Rt. 517	FW2-TP(C1)
(Hackettstown) - Route 517 to the confluence with Musconetcong River	FW2-TM(C1)
BRASS CASTLE CREEK (Brass Castle) - Entire length	FW2-TP(C1)
BROOKALOO SWAMP (Hope) - Entire length	FW2-TM
BUCKHORN CREEK (Hutchinson) - Entire length	FW2-TP(C1)
CLEARVIEW CREEK (Hampton) - Source to Alms House Brook	FW2-NT
CLOVE (MILL) BROOK	
(Montague) - Lake Marcia outlet to State line, except tributaries described below	FW2-TP(C1)
(High Point State Park) - The second and third northerly tributaries to Clove Brook, the tributaries to Steeny Kill Lake, and those tributaries downstream of Steeny Kill Lake that originate in High Point State	

Park downstream to their confluence with Clove Brook or to the High Point State Park Boundaries	FW1(tp)
(High Point State Park) - Those northerly tributaries to Mill Brook that are located due west of Steeny Kill Lake, within the boundaries of High Point State Park	FW1(tp)
COOPERMINE BROOK (Pahaquarry) - Entire length	FW1
CRANBERRY LAKE (Byram)	FW2-TM(C1)
CRANBERRY LAKE OUTLET STREAM	
(Byram) - Entire length within Cranberry Lake State Park	FW2-NT(C1)
(Byram) - Stream outside of Cranberry Lake State Park	FW2-NT
CRISS BROOK (Stokes State Forest) - Entire length within the boundaries of Stokes State Forest	FW1(tp)
CULVER'S CREEK (Frankford) - Entire length	FW2-TM
CULVER'S LAKE (Frankford)	FW2-TM
DEER LAKE (Sandyston)	FW2-NT(C1)
DEER PARK POND	
(Allamuchy) - Pond and tributaries to the pond within Allamuchy State Park, except those tributaries classified as FW1, below	FW2-NT(C1)
(Allamuchy) - All tributaries to the Pond and to its outlet stream that are located entirely with the boundaries of Allamuchy State Park	FW1
(Allamuchy) - Deer Park Pond outlet stream downstream to Musconetcong River	FW2-TM(C1)
DELAWANNA CREEK	
(Delaware) - Source downstream to, but not including, Delaware Lake	FW2-TM
(Delaware) – Delaware Lake dam downstream to Delaware River, including tributaries	FW2-TP(C1)
DELAWARE AND RARITAN CANAL (Lambertville) - Entire length	FW2-NT
DELAWARE RIVER TRIBUTARIES	
(Holland) - Entire length	FW2-TP(C1)
(Port Jervis) - Unnamed or unlisted direct tributaries that are north of Big Timber Creek, are outside of the Pinelands Protection and Preservation Areas, and are not mapped as C1 waters by the Department	FW2-NT
(Knowlton) - Source, north of Hope-Delaware Road, to confluence with the Delaware River 0.5 mile south of Ramseysburg	FW2-TP(C1)
(Titusville) - Unnamed tributaries through Washington Crossing State Park	FW2-NT(C1)
DONKEY'S CORNER BROOK (Delaware Water Gap) - Entire length	FW1
DRY BROOK (Branchville) - Entire length	FW2-NT

DUCK POND (Swartswood)	FW2-NT(C1)
DUNNFIELD CREEK	
(Del. Water Gap) - Source to Rt. I-80	FW1(tp)
(Del. Water Gap) - Rt. I-80 to Delaware River, except tributaries described below	FW2-TP(C1)
(Worthington) - All unnamed waters that are located entirely within the boundaries of the Worthington State Forest	FW1
FIDDLERS CREEK (Titusville) - Entire length	FW2-TM
FLAT BROOK	
(Flatbrook-Roy) - Confluence of Big Flat Brook and Little Flat Brook to the boundary of Flatbrook-Roy Wildlife Management Area, except segments described below	FW2-TP(C1)
(Walpack) - Flatbook-Roy Wildlife Management Area boundary to the Delaware River, except segments described below	FW2-TM(C1)
(Stokes State Forest) - Two tributaries to Flat Brook which originate along Struble Road in Stokes State Forest to their confluences with Flat Brook within the boundaries of Flatbrook-Roy Wildlife Management Area	FW1(tm)
(High Point) - All surface water of the Flat Brook drainage area within the boundaries of High Point State Park and Stokes State Forest, except the following waters:	FW1
1. Saw Mill Pond and Big Flat Brook downstream to the confluence with Flat Brook;	
2. Mashipacong Pond and its outlet stream (Parker Brook) to the confluence with Big Flat Brook;	
3. Lake Wapalanne and its outlet stream to the confluence with Big Flat Brook;	
4. Lake Ocquittunk and waters connecting it with Big Flat Brook;	
5. Stony Lake and its outlet stream (Stony Brook) to the confluence with Big Flat Brook;	
6. Kittatinny Lake, that portion of its inlet stream outside the Stokes State Forest boundaries, and its outlet stream, including the Shotwell Camping Area tributary, to the confluence with Big Flat Brook;	

7. Deer Lake and its outlet stream to Lake Ashroe;	
8. Lake Ashroe, portions of its tributaries outside the Stokes State Forest boundaries, and its outlet stream to the confluence with Big Flat Brook;	
9. Lake Shawanni and its outlet stream to its confluence with Flat Brook;	
10. Crigger Brook and tributary to its confluence with Big Flat Brook	
(Del. Water Gap) - All tributaries to Flat Brook that flow from the Kittatiny Ridge and are located entirely within the boundaries of the Delaware Water Gap National Recreation Area	FW1
FORKED BROOK (Stokes State Forest) - Entire length	FW2-TP(C1)
FURNACE (OXFORD) BROOK	
(Oxford) - Source to railroad bridge at Oxford	FW2-TP(C1)
(Oxford) - Railroad bridge to Pequest River	FW2-NT
FURNACE LAKE (Oxford)	FW2-TM
GARDNERS POND (Andover)	FW2-TM(C1)
HAINESVILLE POND (Hainesville)	FW2-NT(C1)
HAKIHOKAKE CREEK (Milford) - Entire length, including headwaters known as Little York Creek	FW2-TP(C1)
TRIBUTARIES	
(Wydner) - Source to confluence with Hakihokake Creek west of York Road	FW2-TP(C1)
HALFWAY HOUSE BROOK (Franklin) - Entire length	FW2-TP(C1)
HANCES BROOK (Rockport) - Entire length	FW2-TP(C1)
HARIHOKAKE CREEK	
(Alexandria) - Source to Rt. 519 bridge, including all tributaries	FW2-NT(C1)
(Frenchtown) - Rt. 519 bridge to Delaware River, including all tributaries	FW2-TM(C1)
HARRISONVILLE LAKE (Harrisonville)	FW2-NT(C1)
HATCHERY BROOK (Hackettstown) - Entire length	FW2-TM(C1)
HIDDEN VALLEY LAKE (Lake Lenape)	FW2-NT(C1)
HONEY RUN (Hope) - Entire length	FW2-TM
HOPATCONG, LAKE (Hopatcong)	FW2-TM
ILLIFF, LAKE (Andover)	FW2-TM(C1)
INDEPENDENCE CREEK	
(Alphano) - Source to Alphano Rd.	FW2-TP(C1)
(Alphano) - Alphano Rd. to Pequest River	FW2-NT
JACKSONBURG CREEK (Blairstown) - Entire length	FW2-TM
JACOBS CREEK (Hopewell) - Entire length	FW2-NT
KITTATINNY LAKE (Sandyston)	FW2-NT(C1)

KITTATINNY LAKE TRIBUTARY	
(Stokes State Forest) - Source to boundary of Stokes State Forest	FW1(tp)
(Sandyston) - State Forest boundary to Kittatinny Lake	FW2-TP(C1)
KNOWLTON BROOK (Knowlton) - Entire length	FW2-TP(C1)
KURTENBACH'S BROOK (Waterloo) - Entire length	FW2-TP(C1)
KYMER BROOK (Andover) - Entire length, including all tributaries, except tributaries immediately north and immediately south of Clearwater	FW2-NT(C1)
LAKE - See listing under Name	
LITTLE FLAT BROOK	
(High Point State Park) - Source to boundary of High Point State Park	FW1(tp)
(Layton) - State park boundary to, but not including, tributary described below, to confluence with Big Flat Brook	FW2-TP(C1)
(Flatbrook-Roy) - Tributary which originates north of Bevans-Layton Rd. downstream to the first pond adjacent to the Fish and Game headquarters building	FW1(tp)
LITTLE NISHISAKAWICK CREEK (Frenchtown) - Entire length	FW2-NT(C1)
LITTLE SHABACUNK CREEK (Lawrence) - Entire length	FW2-NT
LITTLE SWARTSWOOD LAKE (Swartswood)	FW2-NT(C1)
LITTLE YORK CREEK (Little York) - Entire length	FW2-TP(C1)
LOCKATONG CREEK	
(Kingwood) - Source to Idell Bridge	FW2-NT(C1)
(Raven Rock) - Idell Bridge to Delaware River	FW2-TM(C1)
LOMMASONS GLEN BROOK (Lommasons Glen) - Entire length	FW2-TP(C1)
LOPATCONG CREEK	
(Phillipsburg) - Source to a point 560 feet (straight line distance) upstream of the Penn Central railroad track, including all tributaries	FW2-TP(C1)
(Phillipsburg) - From a point 560 feet (straight line distance) upstream of the Penn Central railroad track downstream to the confluence with the Delaware River	FW2-TM
LUBBERS RUN	
(Byram) - Entire length, except portion described below	FW2-TM
(Byram) - Lackawanna Lake downstream to the confluence with the Cowboy Creek	FW2-TM(C1)
MARCIA LAKE	
(High Point State Park) - Entire Lake	FW2-TM(C1)
(High Point State Park) - Outlet stream from the Lake to the confluence with Clove (Mill) Brook	FW2-TP(C1)
MASHIPACONG POND (Montague)	FW2-NT(C1)

MERRILL CREEK (Harmony) - Entire length, but not including Merrill Creek Reservoir	FW2-TP(C1)
MERRILL CREEK RESERVOIR (Harmony)	FW2-TM
MILL BROOK (Montague) - See CLOVE BROOK	
MILL BROOK (Broadway) - Entire length	FW2-TP(C1)
MINE BROOK	
(Mt. Olive) - Source to, but not including, Upper Mine Brook Reservoir, downstream to Lower Mine Brook Reservoir outlet	FW2-TM
(Mt. Olive) - Lower Mine Brook Reservoir outlet downstream to Drakestown Road bridge	FW2-TP(C1)
(Hackettstown) - Drakestown Road bridge downstream to confluence with Musconetcong River	FW2-TM
TRIBUTARIES	
(Drakestown) - Source downstream to, but not including, Burd Reservoir	FW2-TP(C1)
(Drakestown) - Burd Reservoir downstream to confluence with Mine Brook	FW2-TM
(Washington) - Entire length of tributary which joins Mine Brook approximately 280 yards upstream of the confluence with the Musconetcong River	FW2-TP(C1)
MIRY RUN (Mercerville) - Entire length	FW2-NT
MOORE CREEK (Hopewell) - Entire length	FW2-TM
MOUNTAIN LAKE (Liberty)	FW2-TM
MOUNTAIN LAKE BROOK	
(Liberty) - Source to Mountain Lake	FW2-TM
(White) - Mountain Lake dam to Pequest River	FW2-NT
MUDDY BROOK (Hope) - Entire length	FW2-NT
MUD POND (Johnsonburg)	FW1
MUSCONETCONG LAKE (Byram)	FW2-NT
MUSCONETCONG RIVER	
(Hackettstown) - Lake Hopatcong dam to and including Saxton Lake, except tributaries described separately	FW2-TM
(Saxton Falls) - Saxton Lake to the Delaware River, including all unnamed and unlisted tributaries	FW2-TM(C1)
TRIBUTARIES	
(Anderson) - Entire length	FW2-TP(C1)
(Changewater) - Entire length	FW2-TP(C1)
(Deer Park Pond) - See DEER PARK POND	
(Franklin) - Entire length	FW2-TP(C1)
(N. of Hackettstown) - Entire length	FW2-TM
(Lebanon) - Entire length	FW2-TP(C1)
(Port Murray) - Entire length	FW2-TP(C1)
(S. of Point Mtn.)	FW2-TP(C1)
(S. of Schooley's Mtn. Brook) - Entire length	FW2-TP(C1)

(Waterloo) - Tributary west of Kurtenbach's Brook from source downstream to Waterloo Valley Road bridge	FW2-TP(C1)
NEW WAWAYANDA LAKE (Andover)	FW2-TM(C1)
NISHISAKAWICK CREEK (Frenchtown) - Entire length	FW2-NT(C1)
OCQUITTUNK LAKE	
(Stokes State Forest) - Entire lake	FW2-NT(C1)
(Stokes State Forest) - From the outlet of the Lake to the confluence with Big Flat Brook	FW2-TP(C1)
OCQUITTUNK LAKE TRIBUTARY (Stokes State Forest) - Source to Ocquittunk Lake	FW1(tp)
PARKER BROOK (Montague) - Entire length	FW2-TP(C1)
PAULINA CREEK (Paulina) - Entire length	FW2-TM
PAULINS KILL	
EAST BRANCH	
(Andover) - Source to Limecrest quarry	FW2-NT(C1)
(Lafayette) - Limecrest quarry to confluence with Paulins Kill, West Branch, except tributary described below	FW2-TP(C1)
TRIBUTARY EAST BRANCH	
(Sussex Mills) - Entire length of tributary to the East Branch at Sussex Mills	FW2-NT(C1)
WEST BRANCH (Newton) - Entire length	FW2-NT
MAIN STEM	
(Blairstown) - Confluence of East and West branches to Rt. 15 bridge (bench mark 507)	FW2-TM
(Hampton) - Rt. 15 bridge (bench mark 507) to Balesville dam	FW2-NT(C1)
(Hampton) - Balesville dam to Paulins Kill Lake dam	FW2-NT
(Paulins Kill Lake) - Paulins Kill Lake dam to Delaware River, except tributaries described separately below	FW2-TM
TRIBUTARIES, MAIN STEM	
(Blairstown) - Entire length of tributary east of Walnut Valley	FW2-TM
(E. of Hainesburg Station) - Entire length	FW2-TM
(E. of Vail) - Source downstream to confluence with outlet stream of Lake Susquehanna	FW2-TM
(Emmons Station) - Entire length	FW2-TP(C1)
(Stillwater) - Entire length	FW2-TM
(Stillwater Station) - Entire length	FW2-TP(C1)
PEQUEST RIVER	
(Springdale) - Source to Tranquility bridge, except FW1 segments described below	FW2-TM
(Whittingham) - Northwesterly tributaries, including Big Spring, located within the boundaries of the Whittingham Wildlife Management Area, southwest	

of Springdale, from their origins to their confluence with the Pequest River	FW1(tm)
(Whittingham) - Stream and tributaries within the Whittingham Wildlife Management Area, except those classified as FW1, above	FW2-TM(C1)
(Vienna) - Tranquility bridge to Lehigh and Hudson River railway bridge	FW2-NT
(Townsbury) - Lehigh and Hudson River railway bridge to the upstream most boundary of the Pequest Wildlife Management Area	FW2-NT(C1)
(Townsbury) - Upstream most boundary of the Pequest Wildlife Management Area boundary to the downstream most boundary of the Pequest Wildlife Management Area	FW2-TM(C1)
(Townsbury) - Downstream most Pequest Wildlife Management Area boundary to Delaware River	FW2-TM
TRIBUTARIES	
(Janes Chapel) - Headwater and tributaries downstream to the upstream boundary of Pequest Wildlife Management Area	FW2-TM
(Townsbury) - Tributaries within the Pequest Wildlife Management Area	FW2-TM(C1)
(Petersburg) - Headwaters and tributaries downstream to Ryan Road bridge	FW2-TP(C1)
PLUM BROOK (Sergeantsville) - Entire length	FW2-TM(C1)
POHATCONG CREEK	
MAIN STEM	
(Mansfield) - Source to Karrsville bridge, including all tributaries	FW2-TP(C1)
(Pohatcong) - Karrsville bridge to Rt. 519 bridge, except tributaries listed separately	FW2-TM(C1)
(Springtown) - Rt. 519 bridge to Delaware River, including all tributaries	FW2-TP(C1)
TRIBUTARIES	
(Greenwich) - Entire length	FW2-TP(C1)
(New Village) - Entire length	FW2-TP(C1)
(Willow Grove) - Entire length	FW2-TP(C1)
POND BROOK (Middleville) - Swartswood Lake outlet to Trout Brook	FW2-NT
POPHANDUSING BROOK	
(Hazen) - Source downstream to Route 519 bridge	FW2-TP(C1)
(Belvidere) - Route 519 bridge downstream to confluence with the Delaware River	FW2-TM
RUNDLE BROOK (Del. Water Gap) - Source to Sussex County Route 615	FW1

SAMBO ISLAND BROOK (Del. Water Gap) - Entire length	FW1
SAMBO ISLAND POND (Del. Water Gap)	FW1
SANDYSTON CREEK (Sandyston) - Entire length	FW2-TP(C1)
SAWMILL POND (High Point)	FW2-NT(C1)
SCHOOLEYS MTN. BROOK (Schooley's Mtn.) - Entire length	FW2-TP(C1)
SHABAKUNK CREEK (Ewing) - Entire length	FW2-NT
SHABBECONG CREEK (Washington) – Entire length	FW2-TM(C1)
SHAWANNI CREEK	
(Stokes State Forest) - Headwaters and tributaries downstream to, but not including, Shawanni Lake	FW1(tp)
(Stokes State Forest) - Outlet of Shawanni Lake downstream to confluence with Flat Brook	FW2-TP(C1)
SHAWANNI LAKE (Stokes State Forest)	FW2-NT(C1)
SHIMERS BROOK	
(Millville) - Entire length, except those segments designated FW1, below	FW2-TP(C1)
(High Point) - That segment of Shimers Brook and all tributaries within the boundaries of High Point State Park	FW1(tp)
SHIPETAUKIN CREEK (Lawrenceville) - Entire length	FW2-NT
SILVER LAKE (Hope)	FW2-TM
SMITH FERRY BROOK (Del. Water Gap) - Entire length	FW1
SPARTA JUNCTION BROOK (Sparta Junction) - Entire length	FW2-TM(C1)
SPRING MILLS BROOK (Milford) – Entire length	FW2-TP(C1)
STEELE RUN	
(Washington Crossing State Park) - Source to confluence with westerly tributary	FW1
(Titusville) - Confluence with westerly tributary to the Delaware River	FW2-NT
STEENY KILL LAKE (High Point)	FW1
STEPHENSBURG BROOK (Stephensburg) - Entire length	FW2-TP(C1)
STONY BROOK (Knowlton) - Entire length	FW2-TP(C1)
STONY BROOK	
(Stokes State Forest) - Source and tributaries, wholey contained within Stokes State Forest, from their origins to, but not including, Stony Lake	FW1(tp)
(Stokes State Forest) - Tributary originating approximately one mile west of the Branchville Reservoir to the confluence with Stony Brook	FW1(tp)
(Stokes State Forest) - Outlet of Stony Lake to the confluence with Big Flat Brook	FW2-TP(C1)
STONY LAKE (Stokes State Forest)	FW2-TM(C1)
TRIBUTARIES - See STONY BROOK	
SUNFISH POND (Worthington) - The pond and its outlet stream to the Delaware River	FW1

SWAN CREEK (Lambertville) - Entire length	FW2-NT
SWARTSWOOD CREEK (Swartswood) - Entire length	FW2-TM
SWARTSWOOD LAKE (Stillwater)	FW2-TM(C1)
TAR HILL BROOK	
(Lake Lenape) - Source to, but not including, Lake Lenape	FW2-TM(C1)
(Lake Lenape) - Lake Lenape to Andover Junction Brook	FW2-NT(C1)
TILLMAN BROOK (Walpack) - Entire length	FW1(tp)
TROUT BROOK (Hackettstown) - Entire length	FW2-TM(C1)
TROUT BROOK (Tranquility) - Entire length	FW2-TP(C1)
TROUT BROOK (Hope) - Entire length	FW2-TM
TROUT BROOK (Allamuchy) - Entire length, including all tributaries	FW2-NT
TROUT BROOK	
(Middleville) - Source to confluence with Pond Brook	FW2-TP(C1)
(Middleville) - Confluence with Pond Brook to Paulins Kill	FW2-NT
TUNNEL BROOK (Oxford Mtn.) - Entire length, including all tributaries	FW2-TP(C1)
TURKEY HILL BROOK (Bethlehem) - Entire length	FW2-TP(C1)
TUTTLES CORNER BROOK (Tuttles Corner) - Entire length	FW2-TP(C1)
VANCAMPENS BROOK (Millbrook) - Entire length	FW2-TP(C1)
WAPALANNE LAKE (Stokes State Forest)	FW2-NT(C1)
WARFORD CREEK (Barbertown) – Entire length	FW2-TP(C1)
WELDON BROOK (Jefferson Township) - From source to, but not including, Lake Shawnee	FW2-TM
WEST PORTAL CREEK (West Portal) - Entire length	FW2-TP(C1)
WHITE BROOK (Montague) - Entire length	FW2-TP(C1)
WHITE LAKE (Hardwick)	FW2-TM
WICKECHEOKE CREEK	
(Locktown) - Source to confluence with Plum Brook, including all tributaries	FW2-NT(C1)
(Stockton) - Confluence with Plum Brook to Delaware River, including all tributaries	FW2-TM(C1)
WILLS BROOK (Mt. Olive) - Entire length	FW2-TM
YARDS CREEK (Blairstown) - Entire length	FW2-TP(C1)

(e) The following surface water classifications are for waters of the Lower Delaware River Basin:

Waterbody	Classification
ALLOWAY CREEK	
(Alloways) – Source to Greenwich Street, including all tributaries and Alloway Lake	FW2-NT
(Quinton) – Greenwich Street to Delaware Bay	SE1
(Quinton) – All named and unnamed tributaries of Alloway Creek from Greenwich Street to Delaware Bay	FW2-NT/SE1
ASSISCUNK CREEK	
(Columbus) - Headwaters to confluence with Barkers Brook, including all tributaries	FW2-NT(C1)
(Burlington) - Confluence with Barkers Brook to the Delaware River	FW2-NT
BALDRIDGE CREEK	
(Salem Creek) - Entire length, except segments described below	FW2-NT/SE1(C1)
(Salem Creek) - Segments outside the boundaries of the Supawna National Wildlife Refuge	FW2-NT/SE1
BAY PONDS (Egg Island)	FW2-NT/SE1(C1)
BEADONS CREEK (Fortescue) - Entire length	SE1(C1)
BEAVERDAM BRANCH	
(Glassboro) - Source to boundary of the Glassboro Wildlife Management Area	FW2-NT
(Glassboro) - Within the boundaries of Glassboro Wildlife Management Area	FW2-NT(C1)
BIG TIMBER CREEK (Westville) - Entire length	FW2-NT
BLACKBIRD GUT (Newport) - Entire length	SE1(C1)
BLACKS CREEK (Bordentown) - Entire length	FW2-NT
BOILER DITCH (Egg Island) - Entire length	FW2-NT/SE1(C1)
BUCKS DITCH (Mad Horse Creek) - Entire length	SE1(C1)
BUCKSHUTEM CREEK	
(Centre Grove) - Entire length, except segments described separately below	FW2-NT
(Edward G. Bevan) - Creek and tributaries within the boundaries of Edward G. Bevan Wildlife Management Area, except those tributaries described separately below	FW2-NT(C1)
(Edward G. Bevan) - Joshua and Pine Branches to their confluence with Buckshutem Creek	FW1
CAT GUT (Mad Horse Creek) - Entire length	SE1(C1)

CEDAR BRANCH (Manumuskin River) - Source to Manumuskin River	FW1
CEDAR BRANCH (Edward G. Bevan) - Entire length	FW1
CEDAR BRANCH (Edward G. Bevan) - See NANTUXENT CREEK	
CEDAR CREEK	
(Dividing Creek Station) - Entire length, except portions described separately below	FW2-NT
(Edward G. Bevan) - Those tributaries to Cedar Creek that originate in and are located entirely within the boundaries of Edward G. Bevan Wildlife Management Area	FW1
CEDARVILLE POND (Cedarville)	FW2-NT(C1)
CHERRY TREE CREEK (Mad Horse Creek) - Entire length	SE1(C1)
CLARKS POND (Bridgeton)	FW2-NT(C1)
CLINT MILLPOND (Beaver Swamp)	FW2-NT(C1)
COHANSEY RIVER	
(Beals Mill) – Source to Park Drive, including all tributaries and Sunset Lake	FW2-NT
(Bridgeton) – Park Drive to the Railroad crossing	FW2-NT/SE1
(Bridgeton) – Railroad crossing to Delaware Bay	SE1
(Bridgeton) – All named and unnamed tributaries of Cohansey River from Irving Road to Delaware Bay, unless otherwise classified	FW2-NT/SE1
COOPER BRANCH - See RANCOCAS CREEK	
COOPER RIVER (Camden) - Entire length	FW2-NT
COURTENY PONDS (Egg Island)	FW2-NT/SE1(C1)
CROSSWICKS CREEK (Bordentown) - Entire length	FW2-NT
CROW CREEK (S. Dennis) - Entire length	FW2-NT/SE1(C1)
DEER PARK BRANCH - See RANCOCAS CREEK	
DELAWARE RIVER TRIBUTARIES	
(Brooklawn) - Unnamed or unlisted direct tributaries, south of Big Timber Creek and north of Oldmans Creek, that are outside of the Pinelands Protection and Preservation Areas and are not designated as C1 waters by the Department	FW2-NT/SE2
(Penns Grove) - Unnamed or unlisted direct tributaries, south of and including Oldmans Creek, that are outside of the Pinelands Protection and Preservation Areas and are not designated as C1 waters by the Department	FW2-NT/SE1
(Pinelands) - All streams or segments of streams which flow directly into the Delaware River, are within the boundaries of the Pinelands Area and are not classified FW1 waters in this Table	PL
DENNIS CREEK	

(South Dennis) - Entire length, except segments described below	FW2-NT/SE1
(Woodbine) - All tributaries within the boundaries of the Pinelands Protection and Preservation Areas	PL
(Dennis Creek) - Segment of the Creek, all tributaries, and all other surface waters within the boundaries of the Dennis Creek Wildlife Management Area	FW2-NT/SE1(C1)
DEVILS GUT	
(Mad Horse Creek) - Entire length, except tributaries described below	SE1(C1)
(Mad Horse Creek) - Tributaries outside the Mad Horse Creek Wildlife Management Area	SE1
DIVIDING CREEK	
(Lores Mill) – Source to Highland Street, except those segments described below	FW2-NT
(Dividing Creek) – Highland Street to Delaware Bay, except those segments described below	FW2-NT/SE1
(Edward G. Bevan) - Those segments of tributaries that are located entirely within the boundaries of the Edward G. Bevan Wildlife Management Area	FW1
DIVISION CREEK (Dix) - Entire length	SE1(C1)
DOCTORS CREEK	
(Red Creek) - Entire length, except segment described below	FW2-NT
(Imlaystown) - Segment within Imlaystown Lake Wildlife Management Area	FW2-NT(C1)
DRUMBO CREEK	
(Dix) - Entire length, except segment described below	FW2-NT/SE1
(Dix) - Segment within the boundaries of Dix Wildlife Management Area	FW2-NT/SE1(C1)
EAST CREEK	
(Dennis) - Source to boundaries of the Pinelands Protection and Preservation Area, except those portions described separately below	PL
(Belleplain) - A stream and tributary that originate just south of East Creek Mill Rd., 1.2+miles north-northeast of Eldora and are located entirely within the boundaries of Belleplain State Forest	FW1
(Belleplain) - All tributaries to Lake Nummi from their origins downstream to the Lake	FW1
(Eldora) - Boundary of the Pinelands Protection and Preservation Area to Delaware Bay, except segment within the boundaries of the Dennis Creek Wildlife Management Area	SE1

(Eldora) – All named and unnamed tributaries of East Creek from the boundary of Pinelands Protection and Preservation Area to Delaware Bay, except segment within the boundaries of the Dennis Creek Wildlife Management Area	FW2-NT/SE1
(Dennis Creek) - Segment within the boundaries of the Dennis Creek Wildlife Management Area	SE1(C1)
ELDER GUT (Egg Island) - Entire length	FW2-NT/SE1(C1)
FISHING CREEK (Egg Island) - Entire length	FW2-NT/SE1(C1)
FISHING CREEK	
(Canton) - Source to Mad Horse Creek Wildlife Management Area and all tributaries outside of the boundaries of Mad Horse Creek Wildlife Management Area	SE1
(Mad Horse Creek) - Creek and tributaries within the boundaries of Mad Horse Creek Wildlife Management Area	SE1(C1)
GOOSE POND (Mad Horse Creek)	SE1(C1)
GOSHEN CREEK	
(Woodbine) - Entire length except segment described below	SE1
(Dennis Creek) - Segment and all tributaries within the Dennis Creek Wildlife Management Area	SE1(C1)
GRAVELLY RUN (Edward G. Bevan) - Downstream to the Edward G. Bevan Wildlife Management Area boundaries	FW1
HIGBEE BEACH (Higbee Beach Wildlife Management Area) All waters within the boundaries of Higbee Beach Wildlife Management Area	FW2-NT/SE1(C1)
HIGHS BEACH (Highs Beach) - All waters within the Wildlife Management Area south of Highs Beach	FW2-NT/SE1(C1)
IMLAYSTOWN LAKE (Imlaystown)	FW2-NT(C1)
INDIAN DITCH (Egg Island) - Entire length	FW2-NT/SE1(C1)
ISLAND DITCH (Egg Harbor) - Entire length	FW2-NT/SE1(C1)
JADE RUN (Brendan T. Byrne State Forest) - Entire length	FW1
JOSHUA BRANCH - See BUCKSHUTEM CREEK	
KING POND (Egg Island)	SE1(C1)
LAHAWAY CREEK	
(Prospertown) - Entire length, except tributaries described separately below	FW2-NT
(Colliers Mills) - All tributaries which originate in the Colliers Mills Wildlife Management Area north-northeast of Archers Corners, from their sources to the boundaries of the Colliers Mills Wildlife Management Area	FW1

LITTLE EASE RUN	
(Glassboro) - Entire length, except portion described separately below	FW2-NT
(Glassboro) - Run and tributaries within the Glassboro Wildlife Management Area, except tributary described separately below	FW2-NT(C1)
(Glassboro) - The portion of a branch of Little Ease Run situated immediately north of Stanger Avenue, and entirely within the Glassboro Wildlife Management Area	FW1
(Glassboro) - The first and second easterly tributaries to Little Ease Run north of Academy Road	FW1
LOGAN POND (Repaupo)	FW2-NT(C1)
LONG POND (Mad Horse Creek)	SE1(C1)
LONE TREE CREEK (Egg Island) - Entire length	SE1(C1)
LOWER BROTHERS CREEK (Egg Island) - Entire length	SE1(C1)
LOWER DEEP CREEK (Mad Horse Creek) - Entire length	SE1(C1)
MAD HORSE CREEK	
(Canton) - Source to the boundary of Mad Horse Creek Wildlife Management Area and all tributaries outside the boundaries of the Wildlife Management Area	FW2-NT/SE1
(Mad Horse Creek) - Creek and all waters within the Mad Horse Creek Wildlife Management Area	FW2-NT/SE1(C1)
MALAPATIS CREEK	
(Mad Horse Creek) - Entire length, except segment described below	SE1(C1)
(Mad Horse Creek) - Portions of the Creek beyond the boundaries of the Mad Horse Creek Wildlife Management Area	SE1
MANANTICO CREEK	
(Millville) - Entire length, except segment described below	FW2-NT
(Manantico) - Segment within the boundaries of the Manantico Ponds Wildlife Management Area	FW2-NT(C1)
MANTUA CREEK	
(Sewell)_ - Source to Wenonah Ave., including all tributaries	FW2-NT
(Montua) - Wenonah Ave. to Delaware River	FW2-NT/SE2
MASON CREEK	
(Springville) - Entire length, except segment described below	FW2-NT
(Medford) - Segment within Medford Wildlife Management Area	FW2-NT(C1)
MASONS RUN	
(Pine Hill) - Source to Little Mill Road	FW2-TP(C1)

(Lidenwold) - Little Mill Rd. to confluence with Big Timber Creek	FW2-NT
MAURICE RIVER	
MAIN STEM	
(Willow Grove) - Source to Willow Grove Road	FW2-NT
(Willow Grove) – Willow Grove Road to the confluence with Green Branch	FW2-NT(C1)
(Brotmanville) - Confluence with Green Branch to northern boundary of the Union Lake Wildlife Management Area	FW2-NT
(Vineland) – Boundary of the Union Lake Wildlife Management Area to confluence with Blackwater Branch	FW2-NT(C1)
(Vineland) - Confluence with Blackwater Branch to the Union Lake Dam, except tributaries described under Tributaries below	FW2-NT
(Millville) - Union Lake Dam to Delaware Bay, except tributaries described under Tributaries below	SE1
(Millville) – All named and unnamed tributaries of Maurice River from Union Lake Dam to Delaware Bay, except tributaries described under Tributaries below, unless otherwise classified	FW2-NT/SE1
TRIBUTARIES, MAURICE RIVER	
(Willow's Grove) - Those portion of tributaries that are within the boundaries of the Pinelands Protection and Preservation Area	PL
(Vineland) – All tributaries within the boundaries of the Union Lake Wildlife Management Area	FW2-NT(C1)
(Matts Landing) - All tributaries within the Wildlife Management Area that borders Delaware Bay	FW2-NT/SE1(C1)
MCCORMICK POND (Egg Island)	FW2-NT/SE1(C1)
MACDONALD BRANCH - See RANCOCAS CREEK	
MIDDLE BROTHERS CREEK (Egg Island) - Entire length	SE1(C1)
MIDDLE MARSH CREEK	
(Dix) - All fresh waters which originate in and are located entirely within the boundaries of the Dix Wildlife Management Area	FW1
MILE BRANCH - Entire length	FW1
MILL CREEK	
(Carmel) - Entire length, except segment described below	FW2-NT
(Union Lake) - Creek and tributaries within the boundaries of the Union Lake Wildlife Management Area	FW2-NT(C1)
MOUNT MISERY BROOK	
(Woodmansie) - Entire length, except segments described below	PL

SOUTH BRANCH, MOUNT MISERY BROOK	
(Brendan T. Byrne State Forest) - All tributaries to the South Branch that are located entirely within the boundaries of Brendan T. Byrne State Forest	FW1
(Pasadena) - The two easterly branches of the Branch which are located entirely within the boundaries of the Pasadena Wildlife Management Area	FW1
MUDDY CREEK	
(Mad Horse Creek) - Entire length, except segments described below	SE1(C1)
(Mad Horse Creek) - Segments outside of the boundaries of the Mad Horse Creek Wildlife Management Area	SE1
MUDDY RUN	
(Elmer) - Entire length, except segments described below	FW2-NT
(Elmer) - Portion of the Run within Elmer Lake Wildlife Management Area	FW2-NT(C1)
(Centerton) - Portion of the Run within Parvin State Park	FW2-NT(C1)
(Pittsgrove) - Portion of the run within Union Lake Wildlife Management Area	FW2-NT(C1)
MUSKEE CREEK	
(Port Elizabeth) - Source to boundary of Pinelands Protection and Preservation Area, except segments described separately below	PL
(Peaselee) - The Middle Branch from its origin to the boundaries of the Peaselee Wildlife Management Area	FW1
(Peaselee) - Those portions of the tributaries to Slab Branch which are located entirely within the boundaries of the Peaselee Wildlife Management Area	FW1
(Bricksboro) - Pinelands Protection and Preservation Area boundaries to Maurice River	FW2-NT
NANCY GUT	
(Nantuxent) - Source to the boundary of Nantuxent Creek Wildlife Management Area	SE1(C1)
(Newport) - Stream and all tributaries outside of the boundaries of the Nantuxent Creek Wildlife Management Area	SE1
NANTUXENT CREEK	
(Newport Landing) - Entire length, except segment described below	FW2-NT/SE1
(Nantuxent) - All waters within the boundaries of Nantuxent Creek Wildlife Management Area	FW2-NT/SE1(C1)
OLDMANS CREEK	

(Lincoln) – Source to the eastern boundary of the Harrisonville Lake Wildlife Management Area boundary	FW2-NT
(Harrisonville) – Eastern boundary of the Harrisonville Lake Wildlife Management Area to Kings Highway by Porches Mill, including all tributaries	FW2-NT(C1)
(Oldmans) – Kings Highway by Porches Mill to Main Street	FW2-NT
(Oldmans) – Main Street to the Delaware River	FW2-NT/SE1
ORANOAKEN CREEK	
(Fortescue) - Source to boundary of Egg Island Berrytown Wildlife Management Area	FW2-NT/SE1
(Egg Island) - Creek and tributaries within the boundaries of the Egg Island Berrytown Wildlife Management Area	FW2-NT/SE1(C1)
PARGEY CREEK	
(Asbury) – Source to Swedesboro Ave.	FW2-NT
(Gibbstown) - Swedesboro Avenue to Repaupo Creek, except segments described below	FW2-NT/SE2
(Logans Pond) - Segment within the boundaries of Logans Pond Wildlife Management Area	FW2-NT/SE2(C1)
PARVIN LAKE (Parvin State Park)	FW2-NT(C1)
PATTYS FORK - See MAD HORSE CREEK	
PENNSAUKEN CREEK (Cinnaminson) - Entire length	FW2-NT
PIERSONS DITCH (Egg Island) - Entire length	FW2-NT/SE1(C1)
PINE BRANCH - See BUCKSHUTEM CREEK	
POMPESTON CREEK	
(Cinnaminson) – Entire length, except portion described below	FW2-NT
(Riverton) - Route 130 bridge to Broad Street bridge	FW2-NT(C1)
RACCOON CREEK	
(Mullica Hill) – Source to Kings Highway	FW2-NT
(Grand Sprute) - Kings Highway to Delaware River	FW2-NT/SE2
RANCOCAS CREEK	
NORTH BRANCH	
(North Hanover) - Source to boundary of the Pinelands Protection and Preservation Area at Pemberton	PL
(Pemberton) - Boundary of the Pinelands Protection and Preservation Area to the Delaware River, except tributaries described below	FW2-NT
(Pemberton) - Tributaries within the boundaries of the Pinelands Protection and Preservation Areas	PL
SOUTH BRANCH RANCOCAS CREEK	

(Southhampton) - Source to Pinelands Protection and Preservation Area boundaries at Rt. 206 bridge south of Vincentown	PL
(Vincentown) - Vincentown to Delaware River, except tributaries described separately below	FW2-NT
(Vincentown) - All tributaries within the Pinelands Protection and Preservation Area	PL
COOPER BRANCH RANCOCAS CREEK	
(Woodmansie) - Entire length, except portions described separately, below	PL
(Brendan T. Byrne State Forest) - Branch and tributaries downstream to Pakim Pond, and tributaries to Cooper Branch located entirely within the Brendan T. Byrne State Forest boundaries	FW1
DEER PARK BRANCH RANCOCAS CREEK	
(Buckingham) - Stream and tributaries near Buckingham to confluence with Pole Bridge Branch	FW1
MACDONALDS BRANCH RANCOCAS CREEK	
(Woodmansie) - Entire length, except as described separately below	PL
(Brendan T. Byrne State Forest) - Branch and tributaries located entirely within Brendan T. Byrne State Forest	FW1
SHINNS BRANCH RANCOCAS CREEK	
(Brendan T. Byrne State Forest) - Branch and tributaries located entirely within the boundaries of Brendan T. Byrne State Forest, from their sources to the forest boundary	FW1
(Lebanon Lake Estates) - Forest boundary to lake	PL
ROARING DITCH	
(Heislerville) - Entire length, except segment described below	SE1
(Eldora) - Ditch and all tributaries within the Dennis Creek Wildlife Management Area boundaries	SE1(C1)
ROWANDS POND (Clementon) - Pond, inlet stream and outlet stream within Rowands Pond Wildlife Management Area	FW2-NT(C1)
SALEM RIVER	
(Upper Pittsgrove) – Source to Slabtown Road, including all tributaries	FW2-NT(C1)
(Woodstown) – Slabtown Road to the confluence with Nichomus Run	FW2-NT
(Sharptown) – Nichomus Run to Major Run, including Nichomus Run, Major Run, and their tributaries	FW2-NT(C1)

(Salem) – Major Run to the confluence with the Delaware River	FW2-NT/SE1
SAVAGES RUN (East Creek)	
(Belleplain State Forest) - Entire length, except portions described separately, below	PL
(Belleplain State Forest) - Those two tributaries and portions thereof downstream of Lake Nummi and all tributaries to Lake Nummi that are located entirely within the boundaries of Belleplain State Forest	FW1
SHAWS MILL POND (Cedarville)	FW2-NT/SE1(C1)
TRIBUTARIES	
(Edward G. Bevan) - Cedar and Mile Branches to Shaw's Mill Pond	FW1
SHINNS BRANCH - See RANCOCAS CREEK	
SHORE DITCH (Mad Horse Creek) - Entire length	SE1(C1)
SILVER LAKE FORK - See MAD HORSE CREEK	
SLAB BRANCH - See MUSKEE CREEK	
SLUICE CREEK	
(Cedar Grove) – Source to lower boundary of Clint Millpond, except segment with in Beaver Swamp Wildlife Management Area	FW2-NT
(Cedar Grove) – Segment and tributaries within the Beaver Swamp Wildlife Management Area	FW2-NT(C1)
(South Dennis) - Clint Millpond to Dennis Creek, except segment within the Dennis Creek Wildlife Management Area	SE1
(South Dennis) - All named and unnamed tributaries to Sluice Creek from Clint Millpond to Dennis Creek, except segment within the Dennis Creek Wildlife Management Area	FW2-NT/SE1
(Dennis Creek) - Segments of tributaries within the Dennis Creek Wildlife Management Area	SE1(C1)
STEEP RUN (Mauricetown) - Entire length	FW2-NT(C1)
STOW CREEK	
(Jericho) – Source to Buckhorn Road	FW2-NT
(Stow Creek Landing) - Buckhorn Road to Delaware River, except tributaries within the boundaries of the Mad Horse Creek Wildlife Management Area	SE1
(Stow Creek Landing) – Tributaries of Stow Creek from Buckhorn Road to Delaware River, except tributaries within the boundaries of the Mad Horse Creek Wildlife Management Area	FW2-NT/SE1
(Mad Horse Creek) - Tributaries within the boundaries of the Mad Horse Creek Wildlife Management Area	FW2-NT/SE1(C1)

STRAIGHT CREEK (Berrytown) - Entire length	SE1(C1)
THREE MOUTHS (Egg Island)	FW2-NT/SE1(C1)
THUNDERGUST BROOK	
(Deerfield) - Entire length, except segment described below	FW2-NT
(Deerfield) - That segment within the boundaries of Parvin State Park	FW2-NT(C1)
THUNDERGUST LAKE (Parvin State Park)	FW2-NT(C1)
TURNERS FORK - See MAD HORSE CREEK	
UPPER BROTHERS CREEK (Egg Island) - Entire length	SE1(C1)
UPPER DEEP CREEK (Mad Horse Creek) - Entire length	SE1(C1)
WEST CREEK	
(Halberton) - Source to the boundary of the Pinelands Protection and Preservation Areas, except those portions described separately, below	PL
(Belleplain) - The portion of the tributary that originates about 0.9 miles southeast of Hoffman's Mill and is located entirely within the boundaries of Belleplain State Forest	FW1
(Belleplain) - Those tributaries that originate about 0.5 miles upstream of Hoffman's Mill and are located entirely within the boundaries of Belleplain State Forest	FW1
(Belleplain) - Eastern branch of the easterly tributary to Pickle Factory Pond from its origin to its confluence with the western branch	FW1
(Delmont) - Boundary of the Pinelands Protection and Preservation Area to the Delaware Bay, except portions within the boundary of the Fish and Game lands, except tributaries described below	SE1
(Delmont) – All named and unnamed tributaries from the boundary of the Pinelands Protection and Preservation Area to the Delaware Bay, except tributaries described below	FW2-NT/SE1
(Delmont) – Portions within the Fish and Game lands	SE1(C1)
WIDGEON PONDS (Egg Island)	FW2-NT/SE1(C1)

(f) The following surface water classifications are for waters of the Passaic, Hackensack and New York Harbor Complex Basin:

Waterbody	Classification
AMES LAKE (Hibernia)	FW2-NT(C1)
APSHAWA BROOK (Macopin) - Entire length	FW2-TP(C1)
ARTHUR KILL	
(Perth Amboy) - The Kill and its saline New Jersey tributaries between the Outerbridge Crossing and a line connecting Ferry Pt., Perth Amboy to Wards Pt., Staten Island, New York	SE2
(Elizabeth) - From an east-west line connecting Elizabethport with Bergen Pt., Bayonne to the Outerbridge Crossing	SE3
(Woodbridge) - All freshwater tributaries	FW2-NT
BEAR SWAMP BROOK (Mahwah) - Entire length	FW2-TP(C1)
BEAR SWAMP LAKE (Ringwood State Park)	FW2-NT(C1)
BEAVER BROOK	
(Meriden) - From Splitrock Reservoir Dam downstream to Meriden Road Bridge	FW2-TP(C1)
(Denville) - Meriden Road Bridge to Rockaway River, including Mount Hope and White Meadow Lakes and all unnamed and unlisted tributaries	FW2-NT(C1)
TRIBUTARIES	
(Meriden) - Two tributaries located approximately three quarters of a mile southwest of Meriden	FW2-TP(C1)
BEECH BROOK	
(West Milford) - From State line downstream to Monksville Reservoir, including all tributaries	FW2-TP(C1)
BELCHER CREEK (W. Milford) - Entire length	FW2-NT
BERRYS CREEK (Secaucus) - Entire length	FW2-NT/SE2
BLACK BROOK	
(Meyersville) - Entire length, except segment described below	FW2-NT
(Great Swamp) - Segment and tributaries within the Great Swamp National Wildlife Refuge	FW2-NT(C1)
BLUE MINE BROOK	
(Wanaque) - Headwaters downstream to lower Snake Den Road bridge	FW2-TP(C1)
(Wanaque) - Lower Snake Den Road bridge to the confluence with Wanaque Reservoir	FW2-TM(C1)
BOONTON RESERVOIR - See JERSEY CITY RESERVOIR	

BRUSHWOOD POND (Ringwood State Park)	FW2-TM(C1)
BUCKABEAR POND (Newfoundland) - Pond, its tributaries and connecting stream to Clinton Reservoir	FW2-NT(C1)
BURNT MEADOW BROOK (Green Pond) - Source downstream to confluence with Green Pond Brook, including Lake Denmark and all tributaries	FW2-NT(C1)
BURNT MEADOW BROOK (Stonetown) - Entire length	FW2-TP(C1)
CANISTEAR RESERVOIR (Vernon)	FW2-TM(C1)
CANISTEAR RESERVOIR TRIBUTARY	
(Vernon) – The eastern tributary to the Reservoir	FW2-NT(C1)
(Vernon) - The southern branch of the eastern tributary to the Reservoir	FW1
CANOE BROOK (Chatham) - Entire length	FW2-NT
CEDAR POND (Postville) - Pond and all tributaries	FW1
CHARLOTTESBURG RESERVOIR (Charlottesburg)	FW2-TM(C1)
..TRIBUTARIES	
(Charlottesburg) – All unnamed tributaries	FW2-TP(C1)
(Charlottesburg) – Unnamed lake on the southeastern tributary to the Reservoir	FW2-NT(C1)
CHERRY RIDGE BROOK	
(Vernon) - Tributaries not contained within Wawayanda State Park and Newark Watershed lands	FW2-NT
(Wawayanda State Park) - Brook and tributaries upstream of Canistear Reservoir located entirely within the boundaries of Wawayanda State Park and the Newark Watershed lands	FW1
CLINTON BROOK (W. Milford) - Clinton Reservoir dam to Pequannock River	FW2-TP(C1)
CLINTON RESERVOIR (W. Milford)	FW2-TM(C1)
CLOVE BROOK - See STAG BROOK	
COOLEY BROOK	
(W. Milford) - Entire length, except segments described below	FW2-TP(C1)
(Hewitt State Forest) - Segments of the brook and all tributaries which originate and are located entirely within Hewitt State Forest	FW1(tp)
CORYS BROOK (Warren) - Entire length	FW2-NT
CRESSKILL BROOK	
(Alpine) - Source to Duck Pond Rd. bridge, Demarest	FW2-TP(C1)
(Demarest) - Duck Pond Rd. bridge to Tenakill Brook	FW2-NT(C1)
CROOKED BROOK TRIB. (East of Sheep Hill) - Entire length	FW2-TP(C1)
CUPSAW BROOK	
(Skylands) - Entire length, including all tributaries and Cupsaw Lake	FW2-NT(C1)
DEAD RIVER (Liberty Corners) - Entire length	FW2-NT

DEN BROOK (Randolph) - Entire length, including all tributaries and lakes	FW2-NT(C1)
TRIBUTARY (Randolph) - Tributary west of Shongum Lake	FW2-TP(C1)
DUCK POND (Ringwood)	FW2-NT(C1)
DUNKER POND BROOK (West Milford Township) - Entire length, including Dunker Pond and all tributaries, except Lud-Day Brook	FW2-NT(C1)
DURHAM POND (Rockaway)	FW2-NT(C1)
ELIZABETH RIVER	
(Elizabeth) - Source to Broad St. bridge, Elizabeth and all freshwater tributaries	FW2-NT
(Elizabeth) - Broad St. bridge to mouth	SE3
EMMA LAKE (Hibernia)	FW2-NT(C1)
ERSKINE BROOK (Ringwood) – Entire length	FW2-TM(C1)
ERSKINE LAKES (Ringwood)	FW2-NT(C1)
FOX BROOK (Mahwah) - Entire length	FW2-NT
GIRL SCOUT POND (Hibernia)	FW2-NT(C1)
GLASMERE POND (Ringwood)	FW2-NT(C1)
GOFFLE BROOK (Hawthorne) - Entire length	FW2-NT
GRANNEY BROOK - See SPRING BROOK	
GRANNIS BROOK (Morris Plains) - Entire length	FW2-NT
GREAT BROOK	
(Chatham) - Entire length, except segment described below	FW2-NT
(Great Swamp) - Segment within the boundaries of the Great Swamp National Wildlife Refuge	FW2-NT(C1)
GREEN BROOK	
(W. Milford) - Entire length, except those segments described below	FW2-TP(C1)
(Hewitt State Forest) - Those segments and tributaries which originate and are located entirely within the Hewitt State Forest boundaries	FW1(tp)
GREEN POND (Rockaway)	FW2-TM
GREEN POND BROOK	
(Picatinny Arsenal) - Green Pond outlet to, but not including, Picatinny Lake	FW2-TP(C1)
(Wharton) - Picatinny Lake and its outlet stream to the confluence with the Rockaway River, including all tributaries	FW2-NT(C1)
GREENWOOD LAKE (W. Milford)	FW2-TM
HACKENSACK RIVER	
(Oradell) - New York/New Jersey State line to Oradell dam, including Lake Tappan and all tributaries draining to the Hackensack River above Oradell Dam	FW2-NT(C1)

(Oradell) - Main stem and saline tributaries from Oradell dam to the confluence with Overpeck Creek	SE1
(Little Ferry) - Main stem and saline tributaries from Overpeck Creek to Route 1 and 9 crossing	SE2
(Kearny Point) - Main stem downstream from Route 1 and 9 crossing	SE3
TRIBUTARIES	
(Oradell) - Tributaries joining the main stem between Oradell dam and the confluence with Overpeck Creek	FW2-NT/SE1
(Little Ferry) - Tributaries joining the main stem downstream of Overpeck Creek	FW2-NT/SE2
HANKS POND (Clinton) - Pond and all tributaries	FW1
HARMONY BROOK (Brookside) - Entire length	FW2-TP(C1)
HARRISONS BROOK (Bernards) - Entire length	FW2-NT
HAVEMEYER BROOK (Mahwah) - Entire length	FW2-TP(C1)
HEWITT BROOK (W. Milford) - Entire length	FW2-TP(C1)
HIBERNIA BROOK	
(Marcella) - Source to first Green Pond Road bridge downstream of Lake Emma	FW2-TP(C1)
(Hibernia) - First Green Pond Road bridge to confluence with Beaver Brook	FW2-TM(C1)
TRIBUTARY	
(Lake Ames) - Source to, but not including, Lake Ames	FW2-TP(C1)
HIGH MOUNTAIN BROOK (Ringwood) - Source to, but not including, Skyline Lake	FW2-TP(C1)
HOHOKUS BROOK (Hohokus) - Entire length	FW2-NT
HUDSON RIVER	
(Rockleigh) - River and saline portions of New Jersey tributaries from the New Jersey-New York boundary line in the north to its confluence with the Harlem River, New York	SE1
(Englewood Cliffs) - River and saline portions of New Jersey tributaries from the confluence with the Harlem River, New York to a north-south line connecting Constable Hook (Bayonne) to St. George (Staten Island, New York)	SE2
TRIBUTARIES	
(Rockleigh) - Freshwater portions of tributaries to the Hudson River in New Jersey	FW2-NT
INDIAN GROVE BROOK (Bernardsville) - Entire length	FW2-TP(C1)
JACKSON BROOK	
(Mine Hill) - Source to the boundary of Hurd Park, Dover, including all tributaries	FW2-TP(C1)
(Dover) - Hurd Park to Rockaway River	FW2-NT(C1)

JENNINGS CREEK (W. Milford) - State line to Wanaque River	FW2-TP(C1)
JERSEY CITY RESERVOIR (Boonton)	FW2-TM(C1)
KANOUSE BROOK (Newfoundland) - Entire length	FW2-TP(C1)
KIKEOUT BROOK (Butler) - See STONE HOUSE BROOK	
KILL VAN KULL (Bayonne) - Westerly from a north-south line connecting Constable Hook (Bayonne) to St. George (Staten Island, New York)	SE3
LAKE RICKONDA OUTLET STREAM (Monks) - That segment of the outlet stream from Lake Rickonda within Ringwood State Park	FW2-TM(C1)
LAKE STOCKHOLM BROOK	
(Stockholm) - Entire length, except tributaries described separately below	FW2-TP(C1)
(Stockholm) - Portion of westerly tributary, from its origins to about 1000 feet south of the Route 23 bridge, located entirely within the boundaries of the Newark watershed	FW1(tp)
(Stockholm) - Brook between Hamburg Turnpike and Vernon-Stockholm Rd. to its confluence with Lake Stockholm Brook, north of Rt. 23	FW1(tp)
LITTLE POND BROOK (Oakland) - Entire length	FW2-TP(C1)
LOANTAKA BROOK	
(Green Village) - Entire length, except segment described below	FW2-NT
(Great Swamp) - Brook and all tributaries within the boundaries of Great Swamp National Wildlife Refuge	FW2-NT(C1)
LUD-DAY BROOK (Camp Garfield) - Source downstream to its confluence with the southwestern outlet stream from Clinton Resevoir just upstream of the confluence of the outlet stream and a tributary from Camp Garfield	FW1
MACOPIN RIVER	
(Newfoundland) - Source to Echo Lake dam, including Echo Lake	FW2-NT
(Newfoundland) - Echo Lake dam downstream to Pequannock River	FW2-TP(C1)
TRIBUTARY	
Mathews Brook (Echo Lake) - Entire length, including all tributaries	FW2-NT
MEADOW BROOK	
(Wanaque) - Skyline Lake and its outlet stream to E. Belmont Ave., including all tributaries	FW2-NT(C1)
(Wanaque) - E. Belmont Ave. downstream to Wanaque River	FW2-TP(C1)

MILL BROOK	
(Randolph) - Source to Route 10 bridge, including all tributaries	FW2-TP(C1)
(Randolph) – Route 10 bridge to Rockaway River	FW2-TM(C1)
TRIBUTARIES	
(N. of Union Hill) - Entire length	FW2-TP(C1)
MONKSVILLE RESERVOIR (Long Pond Iron Works State Park)	FW2-TM(C1)
MORSES CREEK (Linden) - Entire length	FW2-NT/SE3
MOSSMANS BROOK (West Milford) - Source to confluence with Clinton Reservoir	FW2-TP(C1)
MT. TABOR BROOK (Morris Plains) - Entire length	FW2-NT
NEWARK BAY (Newark) - North of an east-west line connecting Elizabethport with Bergen Pt., Bayonne up to the mouths of the Passaic and Hackensack Rivers	SE3
NOSENZO POND (Upper Macopin)	FW2-NT(C1)
OAK RIDGE RESERVOIR (Oak Ridge)	FW2-TM(C1)
OAK RIDGE RESERVOIR TRIBUTARIES	
(Oak Ridge) - Northwestern tributary to Reservoir	FW1(tm)
(Oak Ridge) – Southwestern tributary to Reservoir	FW2-TM(C1)
OHIO BROOK (Morris Township) - Source downstream to Morristown town line	FW2-TM
ORADELL RESERVOIR (Oradell)	FW2-NT(C1)
TRIBUTARIES	
(Oradell) - All named and unnamed tributaries that are not listed separately, that drain into Oradell Reservoir above the Oradell Dam	FW2-NT(C1)
OVERPECK CREEK (Palisades Park) - Entire length	FW2-NT/SE2
PACOCK BROOK	
(Canistear) - Brook and tributaries upstream of Canistear Reservoir located entirely within the boundaries of the Newark Watershed	FW1
(Canistear) – Brook including Marshall Pond upstream of Canistear Reservoir located outside the boundaries of the Newark Watershed	FW2-NT(C1)
(Stockholm) - Outlet stream of Canistear Reservoir to Pequannock River	FW2-NT(C1)
PASCACK BROOK (Hackensack) - New York/New Jersey State line to confluence with the Oradell Reservoir, including Woodcliff Lake, and all tributaries	FW2-NT(C1)
PASSAIC RIVER	
(Mendham) - Source downstream to, but not including, Osborn Pond or tributaries described separately below	FW2-TP(C1)
(Paterson) - Outlet of Osborn Pond to Dundee Lake dam	FW2-NT

(Little Falls) - Dundee Lake dam to confluence with Second River	FW2-NT/SE2
(Newark) - Confluence with Second River to mouth	SE3
TRIBUTARIES	
(Great Piece Meadows State Park) - Tributaries within Great Piece Meadows State Park	FW2-NT(C1)
PECKMAN RIVER (Verona) - Entire length	FW2-NT
PEQUANNOCK RIVER	
MAIN STEM	
(Vernon) - Source to confluence with Pacock Brook	FW1(tp)
(Hardyston) - River and the easterly tributary from Pacock Brook to, but not including, Oak Ridge Reservoir	FW2-TP(C1)
(Newfoundland) - Outlet of Oak Ridge Reservoir downstream to Charlottesburg Reservoir, including all unnamed tributaries, but not including Charlottesburg Reservoir	FW2-TP(C1)
(Charlottesburg) - Outlet of Charlottesburg Reservoir to, but not including, Macopin Reservoir or the tributaries described separately below	FW2-TP(C1)
(Kinnelon) - Macopin Reservoir outlet to Hamburg Turnpike bridge in Pompton Lakes Borough	FW2-TP(C1)
(Riverdale) - Hamburg Turnpike bridge in Pompton Lakes Borough to confluence with Wanaque River	FW2-TM
(Pompton Plains) - Confluence with Wanaque River downstream to confluence with Pompton River	FW2-NT
TRIBUTARIES	
(Copperas Mtn.) - Entire length	FW2-TP(C1)
(Smoke Rise) - Entire length	FW2-TP(C1)
(Green Pond Junction) - Tributary at Green Pond Junction from its origin downstream to Route 23	FW1(tm)
(Jefferson) - Tributary joining the main stem about 3500+ feet southeast of the Sussex-Passaic County line, near Jefferson from its origin to about 2000 feet upstream of the pond	FW1(tm)
(Maple Lake) – Entire length, including all tributaries	FW2-TP(C1)
(Lake Kampfe) - Source to, but not including, Lake Kampfe	FW2-TM
(Lake Kampfe) - Lake Kampfe to Pequannock River, except tributary described separately below	FW2-NT
(Lake Kampfe) - Tributary within the boundaries of Norvin Green State Forest, originating west of Torne Mtn.	FW2-NT(C1)
(Suntan Lake) – Entire length, including all tributaries	FW2-TP(C1)
PILES CREEK (Grasselli) - Entire length	SE3
POMPTON LAKE (Pompton Lakes)	FW2-NT
POMPTON RIVER (Wayne) - Entire length	FW2-NT
POND BROOK (Oakland) - Entire length	FW2-NT

POSTS BROOK	
(Bloomingdale) - Source to confluence with Wanaque River, except Wanaque Reservoir and segment described below	FW2-NT
(Norvin Green State Forest) - That segment of the stream and all tributaries within the boundaries of Norvin Green State Forest	FW2-NT(C1)
PREAKNESS (SINGAC) BROOK	
(Wayne) - Source to, but not including, Barbour Pond	FW2-TP(C1)
(Barbour Pond) - Pond to Passaic River	FW2-NT
PRIMROSE BROOK	
(Harding) - Source to Lees Hill Road bridge	FW2-TP(C1)
(Harding) - Lees Hill Road bridge to Great Swamp National Wildlife Refuge boundary	FW2-NT
(Great Swamp) - Wildlife Refuge boundary to Great Brook	FW2-NT(C1)
RAHWAY RIVER	
SOUTH BRANCH	
(Rahway) - Source to Hazelwood Ave., Rahway	FW2-NT
(Rahway) - Hazelwood Ave. to mouth	SE2
MAIN STEM	
(Rahway) - Upstream of Pennsylvania Railroad bridge	FW2-NT
(Linden) - Penn. Railroad bridge to Route 1&9 crossing	SE2
(Carteret) - Route 1&9 crossing to mouth	SE3
RAMAPO LAKE (Ramapo) - Lake and all outlet streams and tributaries within the boundaries of Ramapo Mtn. State Forest	FW2-NT(C1)
RAMAPO RIVER	
(Mahwah) - State line to confluence with Fox Brook	FW2-NT
(Mahwah) – Confluence with Fox Brook to Patriots Way bridge	FW2-NT(C1)
(Mahwah) – Patriots Way bridge to Pompton River	FW2-NT
TRIBUTARY (Oakland) - Entire length	FW2-TP(C1)
RICKONDA LAKE (Ringwood)	FW2-NT(C1)
RINGWOOD CREEK	
(Ringwood) - Entire length, including all tributaries	FW2-TM(C1)
RINGWOOD MILL POND (Ringwood)	FW2-NT(C1)
ROCKAWAY RIVER	
(Wharton) - Source to Washington Pond outlet, including all lakes and unnamed and unlisted tributaries	FW2-NT(C1)
(Dover) - Washington Pond outlet downstream to Route 46 bridge, including all tributaries	FW2-TM(C1)
(Boonton) - Route 46 bridge to, but not including Jersey City Reservoir, including all unnamed and unlisted tributaries	FW2-NT(C1)
(Boonton) - Jersey City Reservoir to Passaic River	FW2-NT

RUSSIA BROOK	
(Sparta) - Source to Lake Hartung dam, including all tributaries	FW2-NT(C1)
(Milton) - Lake Hartung dam to, but not including, Lake Swannanoa, including all tributaries	FW2-TM(C1)
(Longwood) - Lake Swannanoa and its outlet stream to the confluence with the Rockaway River	FW2-NT(C1)
TRIBUTARIES	
(S. of Mt. Paul) – Entire length	FW2-TP(C1)
SADDLE RIVER	
(Upper Saddle River) - State line to confluence with Pleasant Brook, including all tributaries	FW2-TP(C1)
(Saddle River) - Pleasant Brook to Allendale Rd. bridge	FW2-TM
(Lodi) - Allendale Rd. bridge to Marsellus Place	FW2-NT
(Lodi) - Marsellus Place to Passaic River	FW2-NT/SE3
SAWMILL CREEK (Pompton Plains) - Entire length	FW2-NT
SCARLET OAK POND (Mahwah)	FW2-TM
SHEPPARD LAKE (Ringwood)	FW2-TM(C1)
SINGAC BROOK - See PREAKNESS BROOK	
SLOUGH BROOK (Livingston) - Entire length	FW2-NT
SMITH CREEK (Woodbridge) - Entire length	FW2-NT/SE3
SPLIT ROCK RESERVOIR (Rockaway)	FW2-TM(C1)
TRIBUTARIES	
(Farny State Park)- Three tributaries within Farny State Park	FW2-NT(C1)
(Rockaway) - All tributaries that drain into Split Rock Reservoir outside Farny State Park	FW2-TP(C1)
SPRING (GRANNEY) BROOK (Mine Hill) - Entire length	FW2-TP(C1)
SPRING GARDEN BROOK (Florham) - Entire length	FW2-NT
STAG (CLOVE) BROOK (Mahwah) - Entire length	FW2-TP(C1)
STEPHENS BROOK	
(Roxbury) - Entire length, including all tributaries, except segment described separately, below	FW2-NT(C1)
(Berkshire Valley) - That segment north of the boundaries of the Berkshire Valley Wildlife Management Area	FW1
STONE HOUSE BROOK	
(Kinnelon) - Source to Valley Road bridge	FW2-NT
(Butler) - Valley Road bridge to confluence with Pequannock River	FW2-TP(C1)
STONY BROOK (Boonton) – Entire length, including all tributaries	FW2-NT(C1)
SURPRISE LAKE (Hewitt)	FW1
SWAN POND (Ringwood)	FW2-NT(C1)
TAPPAN, LAKE (Old Tappan)	FW2-NT(C1)
TELEMARK LAKE (Hibernia)	FW2-NT(C1)

TENAKILL BROOK (Demarest) - Entire length, including all tributaries, except Cresskill Brook	FW2-NT(C1)
TERRACE POND (Wawayanda)	FW2-NT(C1)
TIMBER BROOK (Kitchell) - Entire length, including all tributaries	FW2-NT(C1)
TROY BROOK (Troy Hills) - Entire length	FW2-NT
WALLACE BROOK (Randolph) - Source downstream to, but not including Hedden Park Lake	FW2-TP(C1)
WANAQUE RESERVOIR	FW2-TM(C1)
TRIBUTARIES (Wanaque Reservoir) - All unnamed and unlisted tributaries that drain into Wanaque Reservoir	FW2-TM(C1)
WANAQUE RIVER	
MAIN STEM	
(Wanaque) - Greenwood Lake outlet, through Wanaque Wildlife Management Area and Long Pond Iron Works State Park, including the Monksville Reservoir, to the Monksville Reservoir dam at Stonetown Road, except tributary south of Jennings Creek (Hewitt) described separately below	FW2-TM(C1)
(Pompton Lakes) - Wanaque Reservoir dam to Wanaque Ave. bridge including unnamed tributaries	FW2-TP(C1)
(Pompton Lakes) - Wanaque Ave. bridge downstream to Pequannock River	FW2-TM
TRIBUTARY	
(Hewitt) - Entire length of tributary south of Jennings Creek	FW2-TP(C1)
WEST BROOK (W. Milford) - Entire length	FW2-TP(C1)
WEST POND (Hewitt)	FW1
WEYBLE POND (Ringwood)	FW2-NT(C1)
WHIPANNY RIVER	
(Brookside) - Source to Whitehead Rd. bridge	FW2-TP(C1)
(Morristown) - Whitehead Rd. bridge to Rockaway River	FW2-NT
TRIBUTARIES	
(Brookside) - Entire length	FW2-TP(C1)
(E. of Brookside) - Entire length	FW2-TM
(E. of Washington Valley) - Entire length	FW2-TM
(Gillespie Hill) - Entire length	FW2-TP(C1)
(Shongum Mtn.) - Entire length	FW2-NT
WONDER LAKE (West Milford)	FW2-NT(C1)
WOODBRIDGE CREEK (Woodbridge) - Entire length	FW2-NT/SE3
WOODCLIFF LAKE (Woodcliff Lake)	FW2-NT(C1)

(g) The following surface water classifications are for waters of the Upper Raritan River and Raritan Bay Basin:

Waterbody	Classification
ALLERTON CREEK (Allerton) - Entire length	FW2-NT
AMBROSE BROOK (Piscataway) - Entire length	FW2-NT
AMWELL LAKE (Syndertown)	FW2-NT(C1)
ASSISCONG CREEK (Flemington) - Entire length	FW2-NT
BACK BROOK (Vanliew's Corners) - Entire length	FW2-NT
BALDWINS CREEK	
(Pennington) - Entire length, except segment described separately below	FW2-NT
(Baldwin) - Segment within the boundaries of Baldwin Lake Wildlife Management Area	FW2-NT(C1)
BEAVER BROOK	
(Cokesbury) - Source to Reformatory Road bridge	FW2-TP(C1)
(Annandale) - Reformatory Rd. bridge to Beaver Ave., bridge	FW2-TM
(Annandale) - Beaver Ave. bridge downstream to the lower most I-78 bridge	FW2-TP(C1)
(Clinton) - Lower most I-78 bridge downstream to, the South Branch Raritan River	FW2-TM
BEDEN BROOK (Montgomery) - Entire length	FW2-NT
BLACK BROOK (Polktown) - Entire length	FW2-TP(C1)
BLACK RIVER - See LAMINGTON RIVER	
BLUE BROOK (Mountainside) - Entire length	FW2-NT
BOULDER HILL BROOK (Tewksbury) - Entire length	FW2-TP(C1)
BOUND BROOK (Dunellen) - Entire length	FW2-NT
BUDD LAKE (Mt. Olive)	FW2-NT(C1)
TRIBUTARIES	
(E. of Budd Lake) - Entire Length	FW2-TM
(W. of Budd Lake) - Entire Length	FW2-NT
BURNETT BROOK (Ralston) - Entire length	FW2-TP(C1)
BUSHKILL BROOK	
(Flemington) – Source and tributary downstream to Rt. 31 Bridge	FW2-TM
(Flemington) – Rt. 31 bridge downstream to South Branch Raritan River	FW2-NT
CAPOOLONG (CAKEPOULIN) CREEK (Sydney) - Entire length	FW2-TP(C1)
CHAMBERS BROOK (Whitehouse) - Entire length	FW2-NT
COLD BROOK (Oldwick) - Entire length	FW2-TP(C1)
CRAMERS CREEK (Hamden) - Entire length	FW2-NT

CRUSER BROOK (Montgomery) - Entire length	FW2-NT
CUCKELS BROOK (Bridgewater) - Entire length	FW2-NT
DAWSONS BROOK (Ironia) - Entire length	FW2-TP(C1)
DRAKES BROOK	
(Ledgewood) - Source downstream to Hillside Avenue bridge	FW2-TM(C1)
(Flanders) - Hillside Avenue bridge to confluence with the South Branch Raritan River	FW2-NT(C1)
TRIBUTARY (Mt. Olive) - Source downstream to Central Railroad bridge	FW2-TP(C1)
DUCK POND RUN (Port Mercer) - Entire length	FW2-NT
DUKES BROOK (Somerville) - Entire length	FW2-NT
ELECTRIC BROOK (Schooley's Mtn.) - Entire length	FW2-TP(C1)
FLANDERS BROOK (Flanders) - Entire length	FW2-TP(C1)
FLANDERS CANAL (Flanders) - Entire length	FW2-NT(C1)
FROG HOLLOW BROOK (Califon) - Entire length	FW2-TP(C1)
GLADSTONE BROOK (St. Bernards School) - Entire length	FW2-TP(C1)
GRANDIN BROOK (see SIDNEY BROOK)	
GREEN BROOK	
(Watchung) - Source to Rt. 22 bridge	FW2-TM
(Plainfield) - Route 22 bridge to Raritan River	FW2-NT
GUINEA HOLLOW BROOK (Tewksbury)	FW2-TP(C1)
HACKLEBARNEY BROOK (Hacklebarney) - Entire length	FW2-TP(C1)
HEATHCOTE BROOK (Kingston) - Entire length	FW2-NT
HERZOG BROOK (Pottersville) - Entire length	FW2-TP(C1)
HICKORY RUN (Califon) - Entire length	FW2-TP(C1)
HOCKHOCKSON BROOK (Colts Neck) - Entire length	FW2-TM
HOLLAND BROOK (Readington) - Entire length	FW2-NT
HOLLOW BROOK (Pottersville) - Entire length	FW2-TP(C1)
HOOKS CREEK LAKE (Cheesequake State Park)	FW2-NT(C1)
HOOPSTICK BROOK (Bedminister) - Entire length	FW2-NT
INDIA BROOK (NORTH BRANCH, RARITAN RIVER)	
(Randolph) - Entire length	FW2-TP(C1)
KRUEGER'S BROOK - (Flanders) - Entire length	FW2-TP(C1)
LAMINGTON RIVER (BLACK RIVER)	
(Succasunna) - Source to Rt. 206 bridge	FW2-NT(C1)
(Milltown) - Rt. 206 bridge to confluence with Rinehart Brook	FW2-TM(C1)
(Pottersville) - Confluence with Rinehart Brook to Camp Brady bridge, Bedminister	FW2-TP(C1)
(Vliettown) - Camp Brady bridge to confluence with Cold Brook	FW2-TM
(Oldwick) – Confluence with Cold Brook to the Route 523 bridge, including all tributaries	FW2-TM(C1)

(Burnt Mills) –Route 523 bridge to North Branch, Raritan River, including all tributaries	FW2-NT(C1)
TRIBUTARY (Ironia) - Source downstream to, but not including, Bryant Pond	FW2-TP(C1)
LEDGEWOOD BROOK (Ledgewood) - Entire length	FW2-TP(C1)
LITTLE BROOK (Califon) - Entire length	FW2-TP(C1)
LOMERSON BROOK - See HERZOG BROOK	
MCVICKERS BROOK (Mendham) - Entire length	FW2-TM(C1)
MIDDLE BROOK (Greater Cross Roads) - Entire length	FW2-NT
MIDDLE BROOK	
EAST BRANCH (Springdale) - Entire length	FW2-TM
WEST BRANCH (Martinsville) - Entire length	FW2-NT
MAIN STEM (Bound Brook) - Confluence of East and West branches to Raritan River	FW2-NT
MILFORD BROOK (Lafayette Mills) - Entire length	FW2-NT
MINE BROOK (Mine Brook) - Entire length	FW2-NT
TRIBUTARIES	
(East of Mine Mt.) - Entire length	FW2-TP(C1)
(South of Mine Mt.) - Source downstream to Douglass Road Bridge	FW2-TP(C1)
MULHOCKAWAY CREEK (Pattenburg) - Entire length	FW2-TP(C1)
NESHANIC RIVER (Reaville) - Entire length	FW2-NT
NORTON BROOK (Norton) - Entire length	FW2-TP(C1)
OAKDALE CREEK (Chester) - Entire length	FW2-TP(C1)
PEAPACK BROOK (Gladstone) - Entire length	FW2-TP(C1)
PETERS BROOK (Somerville) - Entire length	FW2-NT
PIGEON SWAMP (Pigeon Swamp State Park) - All waters within the boundaries of Pigeon Swamp State Park	FW2-NT(C1)
PIKE RUN (Belle Meade) - Entire length	FW2-NT
PLEASANT RUN (Readington) - Entire length	FW2-NT
PRESCOTT BROOK (Stanton Station) - Entire length	FW2-TM
RARITAN BAY - Entire drainage	FW2-NT/SE1
RARITAN RIVER	
NORTH BRANCH (Also see INDIA BROOK)	
(Pleasant Valley) - Source to, but not including, Ravine Lake	FW2-TP(C1)
(Far Hills) - Ravine Lake dam to Rt. 512 bridge	FW2-TM
(Bedminister) - Rt. 512 bridge to confluence with South Branch, Raritan River	FW2-NT
SOUTH BRANCH RARITAN RIVER	
(Mt. Olive) - Source to the dam that is 390 feet upstream of the Flanders-Drakestown Road bridge and the two tributaries which originate north and east of the Budd Lake Airfield	FW2-NT(C1)
(Mt. Olive) - Dam to confluence with Turkey Brook	FW2-TM(C1)

(Middle Valley) - Confluence with Turkey Brook to Rt. 512 bridge	FW2-TP(C1)
(Califon) - Rt. 512 bridge to downstream end of Packers Island, except segment described separately, below	FW2-TM
(Ken Lockwood Gorge) - River and tributaries within Ken Lockwood Gorge Wildlife Management Area	FW2-TM(C1)
(Neshanic Sta.) - Downstream end of Packers Island to confluence with North Branch, Raritan River	FW2-NT
TRIBUTARIES, SOUTH BRANCH RARITAN RIVER	
(Long Valley) - Entire length	FW2-TP(C1)
(High Bridge) - Entire length	FW2-TM
(S. of Hoffmans) - Entire length	FW2-TP(C1)
(S. of Schooley's Mt.) - Entire length	FW2-TP(C1)
MAIN STEM RARITAN RIVER	
(Bound Brook) - From confluence of North and South Branches to Landing Lane bridge in New Brunswick and all freshwater tributaries downstream of Landing Lane bridge.	FW2-NT
(Sayreville) - Landing Lane bridge to Raritan Bay and all saline water tributaries	SE1
RINEHART BROOK (Hacklebarney) - Entire length	FW2-TP(C1)
ROCK BROOK (Montgomery) - Entire length	FW2-NT
ROCKAWAY CREEK	
NORTH BRANCH	
(Mountainville) - Source to Rt. 523 bridge	FW2-TP(C1)
(Whitehouse) - Rt. 523 bridge to confluence with South Branch	FW2-TM
SOUTH BRANCH	
(Clinton) - Headwaters to Readington Township boundary including all tributaries	FW2-TP(C1)
(Clinton) - Readington Township boundary to Lake Cushetunk, including all tributaries	FW2-TM(C1)
(Whitehouse) - Lake Cushetunk to its confluence with main stem Rockaway Creek	FW2-TM
MAIN STEM (Whitehouse) - Confluence of North and South Branches to Lamington River	FW2-NT
ROCKY RUN - (Lebanon) - Entire length	FW2-TP(C1)
ROUND VALLEY RESERVOIR (Clinton)	FW2-TP(C1)
ROYCE BROOK (Manville) - Entire length	FW2-NT
SIDNEY BROOK	
(Grandin) – Headwaters downstream to the Route 513 bridge, including all tributaries	FW2-TM(C1)
(Grandin) - Route 513 bridge to its confluence with the South Branch Raritan River, including all tributaries	FW2-NT(C1)
SIMONSON BROOK (Griggstown) - Entire length	FW2-NT

SIX MILE RUN	
(Franklin Church) - Entire length, except segment described below	FW2-NT
(Hillsborough) - Segment within the boundaries of Six Mile Run State Park	FW2-NT(C1)
SPOOKY BROOK (Bound Brook)	FW2-NT
SPRUCE RUN	
(Glen Gardner) - Source to, but not including, Spruce Run Reservoir	FW2-TP(C1)
(Clinton) - Spruce Run Reservoir dam to Raritan River, South Branch	FW2-TM
SPRUCE RUN RESERVOIR (Union) - Reservoir and tributaries	FW2-TM(C1)
STONY BROOK (Washington) - Entire length	FW2-TP(C1)
STONY BROOK	
(Hopewell) - Source to Old Mill Road, except that segment described below	FW2-NT
(Hopewell) - Old Mill Road to Quaker Road	FW2-NT(C1)
(Carnegie Lake) - Quaker Road to Millstone River, including Carnegie Lake	FW2-NT
(Snydertown) - Brook and tributaries within Amwell Lake Wildlife Management Area	FW2-NT(C1)
STONY BROOK (Watchung) - Entire length	FW2-NT
SUN VALLEY BROOK (Mt Olive) - Entire length	FW2-TP(C1)
TANNERS BROOK (Washington) - Entire length	FW2-NT(C1)
TEETERTOWN BROOK (Lebanon) - Entire length	FW2-TP(C1)
TEN MILE RUN (Franklin) - Entire length	FW2-NT
TROUT BROOK (Hacklebarney) - Entire length	FW2-TP(C1)
TURKEY BROOK (Mt. Olive) - Entire length	FW2-TP(C1)
TURTLEBACK BROOK (Middle Valley) - Entire length	FW2-NT
WALNUT BROOK (Flemington) - Entire length	FW2-TM
WILLOUGHBY BROOK (Buffalo Hollow) - Entire length	FW2-TP(C1)

(h) The following surface water classifications are for waters of the Lower Raritan River and Raritan Bay Basin:

Waterbody	Classification
BARCLAY BROOK (Redshaw Corners) - Entire length	FW2-NT
BEAR BROOK (West Windsor) - Entire length	FW2-NT
BIG BROOK (Vanderberg) - Entire length, including all tributaries and lakes	FW2-NT(C1)
BLACKBERRY CREEK	
(Oceanport) - Source to a line beginning on the easternmost extent of Gooseneck Point and bearing approximately 162 degrees True North to its terminus on the westernmost extent of an unnamed point of land in the vicinity of the western extent of Cayuga Ave. in Oceanport	SE1
(Oceanport) - Creek below the line described above	SE1(C1)
BRANCHPORT CREEK	
(Long Branch) - Source to a line beginning on the northernmost extent of an unnamed point of land lying north of Pocano Ave. in Oceanport and bearing approximately 055 degrees True North to its terminus on the westernmost extent of the northern bulkhead at the lagoon located between France Rd. and Lori Rd. in Monmouth Beach	FW2-NT/SE1
(Monmouth Beach) - Creek below line described above	SE1(C1)
CEDAR BROOK (Spotswood) - Entire length	FW2-NT
CHEESEQUAKE STATE PARK WATERS (S. Amboy) - Fresh waters within the park upstream of the limits of tidal influence	FW2-NT(C1)
CLAYPIT CREEK	
(Navesink) - Source to widening of the Creek near Linden Ave. and just north to the Locust Ave. bridge in Navesink	FW2-NT/SE1
(Navesink) - Widening of Creek to Navesink River	SE1(C1)
CRANBURY BROOK (Old Church) - Entire length	FW2-NT
DEEP RUN (Old Bridge) - Entire length	FW2-NT
DEVILS BROOK (Schalks) - Entire length	FW2-NT
GANDER BROOK (Manalapan) - Entire length	FW2-NT
GREAT DITCH (S. Brunswick) - That portion of Great Ditch and its tributaries within Pigeon Swamp State Park	FW2-NT(C1)
IRELAND BROOK (Paulus Corners) - Entire length	FW2-NT
IRESICK BROOK (Spotswood) - Entire length	FW2-NT
LAWRENCE BROOK	

(Deans) - Source to the intake of the New Brunswick Water Department at Weston's Mill Dam	FW2-NT
(New Brunswick) - Weston's Mill Dam to Raritan River	SE1
LITTLE SILVER CREEK	
(Shrewsbury) - Source to a line beginning on the eastern bank of that unnamed lagoon located between Wardell Ave. and Oakes Rd. in Rumson and bearing approximately 171 degrees T (True North) to its terminus on the south shore of Little Silver Creek	FW2-NT/SE1
(Rumson) - Creek below line described above	SE1(C1)
MANALAPAN BROOK	
(Jamesburg) - Source to Duhernal Lake dam, except tributary described separately below	FW2-NT
(Tennent) - That portion of the tributary at Tennent along the boundary of Monmouth Battlefield State Park	FW2-NT(C1)
MATCHAPONIX BROOK (WEAMACONK CREEK)	
(Mount Mills) - Entire length, except segments described below	FW2-NT
(Freehold) - The brook and tributaries within the boundaries of Monmouth Battlefield State Park	FW2-NT(C1)
MCGELLAIRDS BROOK	
(Englishtown) - Entire length, except tributary described separately below	FW2-NT
(Freehold) - Tributary within Monmouth Battlefield State Park	FW2-NT(C1)
MILLSTONE RIVER (Hightstown) - Entire length	FW2-NT
MINE BROOK (Colts Neck) - Entire length, including all tributaries	FW2-NT(C1)
NAVESINK RIVER	
(Red Bank) - Source to a line starting at a point at the northeast end of Blossom Cove, bearing approximately 142 degrees T (True North), through navigational aid C23 to the south bank near Riverview Hospital	SE1
(Rumson) - River southeast of the line described above, except segment described below	SE1(C1)
(Monmouth Beach) - All water south and east of a line beginning on the northwesternmost point of land on Raccoon Island (in the vicinity of the western extent of Highland Ave.) in Monmouth Beach, and bearing approximately 056 degrees T (True North) to the southernmost point of a small unnamed island, and then bearing approximately 091 degrees T (True North) to its terminus on the northernmost point of	

land located at the northern extent of Monmouth Parkway in Monmouth Beach and all waters south of a line beginning on the western shoreline (just east of Monmouth Parkway in Monmouth Beach) and bearing approximately 081 degrees T (True North), intersecting Channel Marker Flashing Red 4 and Channel Marker Flashing Red 2 and terminating on the eastern shoreline of the Galilee section of Monmouth Beach.	SE1
OAKEYS BROOK (Deans) - Entire length	FW2-NT
OCEANPORT CREEK	
(Fort Monmouth) - Source to a line beginning on the easternmost extent of Horseneck Point and bearing approximately 140 degrees T (True North) to its terminus on the westernmost extent of an unnamed point of land located at the westernmost extent of Monmouth Boulevard in Oceanport	FW2-NT/SE1
(Oceanport) - Creek downstream of line described above	SE1(C1)
PARKERS CREEK	
(Fort Monmouth) - Source to a line beginning on the easternmost extent of Horseneck Point and bearing approximately 000 degrees T (True North) to its terminus on Breezy Point on the Little Silver side (north) side of the creek	FW2-NT/SE1
(Fort Monmouth) - Creek downstream of line described above	SE1(C1)
PINE BROOK (Clarks Mills) - Entire length	FW2-NT
PINE BROOK (Cooks Mill) - Entire length	FW2-TM
RAMINESSIN (HOP) BROOK (Holmdel) - Entire length, including all tributaries	FW2-TM(C1)
SANDY HOOK BAY (Sandy Hook)	SE1
SHREWSBURY RIVER	
(Little Silver) - Source to Rt. 36 highway bridge	SE1(C1)
(Highlands) - Rt. 36 bridge to Sandy Hook Bay	SE1
SOUTH RIVER	
(Old Bridge) - Duhernal Lake to intake of the Sayreville Water Department	FW2-NT
(Sayreville) - Below the intake of the Sayreville Water Department	SE1
SWIMMING RIVER RESERVOIR (Red Bank)	FW2-NT(C1)
TRIBUTARIES (Swimming River Reservoir) – All unnamed and unlisted tributaries to Swimming River Reservoir	FW2-NT(C1)
SWIMMING RIVER	
(Red Bank) - Swimming River Reservoir dam to Normandy Road	FW2-NT

(Red Bank) - Normandy Road to the Navesink River	SE1
TENNENT BROOK (Old Bridge) - Entire length	FW2-NT
TEPEHEMUS BROOK (Manalapan) - Entire length	FW2-NT
TOWN NECK CREEK	
(Little Silver) - Source to a line beginning on the easternmost extent of the unnamed point of land located just east of Paag Circle on the south bank of Town Neck Creek and bearing approximately 095 degrees True North and terminating on Silver Point	FW2-NT/SE1
(Little Silver) - Creek below the line described above	SE1(C1)
WEAMACONK CREEK - See MATCHAPONIX BROOK	
WEMROCK BROOK	
(Millhurst) - Entire length, except that segment described below	FW2-NT
(Monmouth Battlefield State Park) - Those segments of the brook and its tributaries within the boundaries of Monmouth Battlefield State Park	FW2-NT(C1)
WEMROCK POND (Monmouth Battlefield State Park)	FW2-NT(C1)
WILLOW BROOK (Holmdel) - Entire length, including all tributaries	FW2-NT(C1)
YELLOW BROOK (Colts Neck) - Entire length, including all tributaries	FW2-NT(C1)

(i) The following surface water classifications are for waters of the Wallkill River Basin:

Waterbody	Classification
BEARFORT WATERS (Wawayanda)	FW2-NT(C1)
BEAVER RUN (Wantage) - Entire length, except tributaries that originate in Wantage Township	FW2-NT(C1)
BLACK CREEK	
(McAfee) - Source to Rt. 94 bridge, except those tributaries described separately, below	FW2-TM
(Vernon) - Rt. 94 bridge to Pochuck Creek	FW2-NT
TRIBUTARIES	
(Hamburg) - Three tributaries to Black Creek which originate in the former Hamburg Mtn. Wildlife Management Area from their sources to the former Management Area boundaries	FW1(tm)
(Rudeville) - Triburaries within the former Hamburg Mtn. Wildlife Management Area not classified as FW1, above	FW2-TM(C1)
(McAfee) - Entire length	FW2-TP(C1)
(Vernon Valley) - Entire length	FW2-NT
BLUE HERON LAKE (Sparta)	FW2-NT(C1)
CEDAR SWAMP - See RUTGERS CREEK	
CLOVE CREEK (Colesville) - Entire length	FW2-TM
CLOVE BROOK	
(Wantage) - Source to, but not including, Clove Acres Lake, except those tributaries described separately below	FW2-TM
(Sussex) - Clove Acres Lake to Papakating Creek	FW2-NT
(High Point) - Those portions of the two northernmost tributaries located entirely within High Point State Park boundaries, immediately east of Lake Marcia	FW1(tp)
FRANKLIN POND (Hamburg Mtn.)	FW2-NT
TRIBUTARY (Franklin) – Southeastern tributary to Franklin Pond	FW2-NT(C1)
FRANKLIN POND CREEK	
(Hardyston) - Source to, but not including, Franklin Pond	FW2-TP(C1)
(Hamburg Mtn.) - Tributaries within the Hamburg Mtn.Wildlife Management Area	FW2-TM(C1)
TRIBUTARY (Hamburg Mtn.) - The first tributary to Franklin Pond Creek just south of Hamburg Mountain, flowing toward the Wallkill River and located entirely within the former Hamburg Mtn. Wildlife Management Area	FW1(tm)

GLENWOOD BROOK (Glenwood) - Outlet of Glenwood Lake to State line	FW2-TM
HAMBURG CREEK	
(Hamburg Mtn.) - Source to Route 517 bridge, Rudeville, except tributary described separately below	FW2-TM(C1)
(Hardistonville) - Route 517 bridge to Wallkill River	FW2-NT(C1)
(Hamburg Mtn.) - The third tributary just southwest of Hamburg Mtn. flowing toward the Wallkill River and located entirely within the Hamburg Mtn. Wildlife Management Area	FW1
HANFORD BROOK (Hanford) - Entire length within New Jersey	FW2-NT
HAWTHORNE LAKE (Sparta)	FW2-NT(C1)
HEATERS POND (Ogdensburg)	FW2-NT(C1)
LAKE LOOKOUT (Wawayanda)	FW1
LAKE LOOKOUT BROOK (Wawayanda) - Brook and tributaries from source in Newark City holdings, through the Wawayanda State Park, to confluence with the outlet stream from Lake Wawayanda	FW1
LAKE RUTHERFORD (Wantage) - The Lake and its tributaries	FW1(tm)
LAUREL POND (Wawayanda) - Laurel Pond, including its outlet stream and tributaries, to the outlet stream from Lake Wawayanda	FW1
LIVINGSTON PONDS (Wawayanda) - The two northwestern ponds which are within State Park lands	FW2-NT(C1)
LIVINGSTON PONDS BROOK (Wawayanda State Park) - Source downstream to State line	FW2-TP(C1)
LONG HOUSE BROOK	
(Upper Greenwood Lake) - Source to State line, except segment described below	FW2-NT
(Upper Greenwood Lake) - Segment within the boundaries of Hewitt State Forest	FW2-NT(C1)
LOUNSBERRY HOLLOW BROOK	
(Vernon Valley) - Outlet of Glenwood Lake to Pochuck Creek	FW2-TM
MOHAWK LAKE (Sparta) – Lake and its tributaries	FW2-NT
MORRIS LAKE (Sparta)	FW2-NT(C1)
MUD POND (Hamburg)	FW2-NT(C1)
MUD POND OUTLET STREAM (Hamburg) - Outlet stream from the Pond downstream to confluence with Hamburg Creek, including all tributaries	FW2-TP(C1)
PAPAKATING CREEK	
MAIN STEM	
(Frankford) - Source to Route 629 bridge, including all tributaries	FW2-TM(C1)

(Wantage) – Route 629 bridge to Lehigh and New England railroad crossing in Wantage Township, including all tributaries, except tributary east of Roys, Lake Windsor tributary, and the tributary that drains into Papakating Creek immediately upstream of the Lehigh and New England railroad crossing in Wantage Township	FW2-NT(C1)
(Lewisburg) - Lehigh and New England railroad crossing in Wantage Township to Wallkill River	FW2-NT
WEST BRANCH	
(Wantage) –Source to the confluence with Libertyville tributary, including all tributaries except the two tributaries immediately west of Plumbsock	FW2-NT(C1)
LIBERTYVILLE TRIBUTARY (Libertyville) – Entire length, except Herzenberg Lake tributary and the tributary south of Herzenberg Lake	FW2-NT(C1)
PARKER LAKE (Wawayanda)	FW2-NT(C1)
POCHUCK CREEK	
(Vernon) - Source to State line, except segment described separately below	FW2-NT
(High Point) - Segment within State Park lands	FW2-NT(C1)
QUARRYVILLE BROOK - See WILLOW BROOK	
RUTGERS CREEK (High Point) - The Cedar Swamp headwaters of the tributary to Rutgers Creek located entirely within the High Point State Park boundaries just south of the State line	FW1
SAGINAW, LAKE (Sparta)	FW2-NT(C1)
SAND HILLS BROOK	
(Hamburg Mtn.) - The upstream portion of Sand Hills Brook, including the pond at its headwaters, located entirely within the boundaries of the Hamburg Mtn. Wildlife Management Area	FW1
(Hamburg) - Brook and tributaries beyond Management Area boundaries	FW2-NT
SAWMILL POND BROOK	
(W. Milford) - Entire length, except segment described separately below	FW2-NT
(Wawayanda) - Segment within the boundaries of Wawayanda State Park	FW2-NT(C1)
SILVER LAKE (Hamburg Mtn.)	FW2-NT
SPARTA GLEN BROOK (Sparta) - Entire length	FW2-TP(C1)
SPRING BROOK (Maple Grange) - Entire length	FW2-TP(C1)
SUMMIT LAKE (Hardyston)	FW2-NT
SUNSET LAKE (Sparta)	FW2-NT(C1)
TAMARACKS LAKE (Hardyston)	FW2-NT

TOWN BROOK (Vernon) - Entire length	FW2-TM
WALLKILL RIVER	
(Sparta) - Source to confluence with Sparta Glen Brook	FW2-NT(C1)
(Franklin) - Sparta Glen Brook to, but not including, Franklin Pond, including all unnamed and unlisted tributaries	FW2-TM(C1)
(Wantage) - Outlet of Franklin Pond to confluence with Beaver Run, including all unnamed and unlisted tributaries	FW2-NT(C1)
(Wantage) - Confluence with Beaver Run to State line	FW2-NT
TRIBUTARIES	
(Sparta) - Entire length but not including Lake Saginaw	FW2-TP(C1)
(Ogdensburg) - Entire length	FW2-TP(C1)
(East of Quarryville) – Unnamed standalone stream segment east of Willow (Quarryville) Brook	FW2-NT(C1)
WANTAGE BROOK (Wantage) - Entire length, including all tributaries	FW2-NT
WAWAYANDA CREEK	
(Vernon) - State line to Pochuck Creek, except unnamed tributary described below	FW2-TM
TRIBUTARIES	
(Wawayanda) - Source to State line	FW2-NT
(Wawayanda State Park) - Segments within State Park boundaries, except Livingston Ponds Brook as noted above	FW2-NT(C1)
WAWAYANDA LAKE (Wawayanda)	FW2-TM(C1)
WHITE LAKE (Sparta)	FW2-TM(C1)
WILDCAT BROOK (Franklin) - Entire length, including all tributaries	FW2-NT(C1)
WILDWOOD LAKE (Hamburg Mountain)	FW2-NT(C1)
WILLOW (QUARRYVILLE) BROOK (Wantage) - Entire length, including all tributaries	FW2-TM

(j) FW1 waters are listed by tract within basins:

ATLANTIC COASTAL PLAIN BASIN

ALLAIRE STATE PARK	MANASQUAN RIVER WATERSHED Those portions of the first and second southerly tributaries to the Manasquan River, which are west of Hospital Rd. and are located entirely within the boundaries of Allaire State Park The easterly tributary to Mill Run upstream of Brisbane Lake, located entirely within the boundaries of Allaire State Park
BASS RIVER STATE FOREST	BASS RIVER WATERSHED Tommy's Branch from its headwaters downstream to the Bass River State Forest Recreation Area service road Falkenburg Branch of Lake Absegami from its headwaters to the Lake
GREENWOOD FOREST WILDLIFE MANAGEMENT AREA	CEDAR CREEK WATERSHED Webbs Mill Branch and tributaries, located entirely within the Greenwood Forest Wildlife Management Area boundaries Chamberlain's Branch from its origins to a point 1000 feet west of Route 539 Those portions of the tributaries to Chamberlain's Branch originating and wholly contained within the boundaries of the Greenwood Forest Wildlife Management Area WADING RIVER WATERSHED Westerly tributary to the Howardsville Cranberry Bog Reservoir and other tributaries that are located entirely within the boundaries of the Greenwood Forest Wildlife Management Area
ISLAND BEACH STATE PARK	BARNEGAT BAY WATERSHED All freshwater ponds in Island Beach State Park

LESTER G. MACNAMARA WILDLIFE MANAGEMENT AREA	GREAT EGG HARBOR RIVER WATERSHED Hawkins Creek and tributaries and the next adjacent, northern stream and tributaries that enter the Great Egg Harbor River, from their origins downstream to where the influence of impoundment begins
TUCKAHOE PUBLIC FISHING HUNTING GROUNDS	See LESTER G. MACNAMARA WILDLIFE AND MANAGEMENT AREA
WHARTON STATE FOREST	MULLICA RIVER WATERSHED Deep Run and tributaries from their headwaters downstream to Springer's Brook Skit Branch and tributaries from their headwaters downstream to the confluence with Robert's Branch Tulpehocken Creek and tributaries from their sources downstream to the confluence with Featherbed Branch The westerly tributaries to Tulpehocken Creek and those natural ponds within the lands bounded by Hawkins (Bulltown-Hawkins) Rd., Hampton Gate (Tuckerton) Rd., and Sandy Ridge Rd. Stream in the southeasterly corner of the Wharton State Forest, located between Ridge Rd. and Seaf Weeks Rd. downstream to the boundaries of Wharton State Forest Brooks and tributaries to the Mullica River between and immediately to the west of Tylertown and Crowleytown, from their headwaters downstream to the head of tide at mean high water The easterly branches of the Batsto River from Batsto Village upstream to the confluence with Skit Branch Gun Branch from its headwaters downstream to U.S. Route 206

DELAWARE RIVER BASIN

ALLAMUCHY STATE PARK	MUSCONETCONG RIVER WATERSHED All those tributaries to Deer Park Pond and its outlet stream, that are located entirely within the boundaries of Allamuchy State Park
	PEQUEST RIVER WATERSHED All tributaries that are located entirely within Allamuchy State Park and flow into Allamuchy Pond
BELLEPLAIN STATE FOREST	EAST CREEK WATERSHED All tributaries to Lake Nummi from their origins downstream to the Lake.
	Those two tributaries to Savages Run and portions thereof downstream of Lake Nummi, which are located entirely within the Belleplain State Forest boundaries
	A stream and its tributaries that originate just south of East Creek Mill Rd., 1.2+ miles north-northeast of Eldora, and are located entirely within the boundaries of Belleplain State Forest
	WEST CREEK WATERSHED The portion of the tributary to West Creek that originates about 0.9 miles southeast of Hoffman's Mill and is located entirely within the boundaries of Belleplain State Forest
	Eastern branch of the easterly tributary to Pickle Factory Pond from its origin to its confluence with the western branch
	Those tributaries to the stream which enter West Creek approximately 0.5 miles upstream of Hoffman's Mill and which are located entirely within the boundaries of Belleplain State Forest
COLLIERS MILLS WILDLIFE MANAGEMENT AREA	CROSSWICKS CREEK WATERSHED All tributaries to Lahaway Creek originating in the Colliers Mills Wildlife Management Area north-northeast of Archers Corner, from their origins downstream to the boundaries of the Colliers Mills Wildlife Management Area

DELAWARE WATER GAP NATIONAL RECREATION AREA	DELAWARE RIVER WATERSHED All tributaries to Flat Brook flowing from the Kittatinny Ridge and located entirely within the boundaries of the Delaware Water Gap National Recreation Area Rundle Brook upstream of Sussex County Route 615 Smith Ferry Brook Donkey's Corner Brook Sambo Island Brook and Pond Coppermine Brook in Pahaquarry Dunnfield Creek to Route I-80
DIX WILDLIFE MANAGEMENT AREA	MIDDLE MARSH CREEK WATERSHED All fresh waters which originate in and are located entirely within the boundaries of the Dix Wildlife Management Area
EDWARD G. BEVAN WILDLIFE MANAGEMENT AREA	MAURICE RIVER WATERSHED Joshua and Pine Branches of Buckshutem Creek to their confluences with Buckshutem Creek Gravelly Run downstream to the boundaries of the Edward G. Bevan Wildlife Management Area NANTUXENT CREEK WATERSHED Cedar and Mile Branches to Shaw's Mill Pond DIVIDING CREEK WATERSHED Those tributaries to Cedar Creek which originate in and are located entirely within the boundaries of the Edward G. Bevan Wildlife Management Area Those portions of tributaries to Dividing Creek, located entirely within the boundaries of the Edward G. Bevan Wildlife Management Area

FLATBROOK-ROY WILDLIFE MANAGEMENT AREA	FLAT BROOK WATERSHED The tributary to Little Flat Brook which originates north of the Bevans-Layton Rd., downstream to the first pond adjacent to the Fish and Game headquarters building Two tributaries to Flat Brook which originate along Struble Rd. in Stokes State Forest, downstream to the confluence with Flat Brook within Flatbrook-Roy Wildlife Management Area boundaries
GLASSBORO WILDLIFE MANAGEMENT AREA	MAURICE RIVER WATERSHED The portion of a branch of Little Ease Run situated immediately north of Stanger Avenue, and entirely within the Glassboro Wildlife Management Area First and second easterly tributaries to Little Ease Run north of Academy Road
HIGH POINT STATE PARK AND STOKES STATE FOREST	CLOVE BROOK WATERSHED The second and third northerly tributaries to Clove Brook, those tributaries to Steeny Kill Lake, Steeny Kill Lake, and those downstream of the Lake which originate in High Point State Park, downstream to the confluence with Clove Brook or to the boundaries of High Point State Park The northerly tributaries to Mill Brook due west of Steeny Kill Lake, within the High Point State Park boundaries FLAT BROOK WATERSHED All surface waters of the Flat Brook drainage within the boundaries of High Point State Park and Stokes State Forest except the following: (1) Saw Mill Pond and Big Flat Brook downstream to the confluence with Flat Brook; (2) Mashipacong Pond and its outlet stream (Parker Brook) to the confluence with Big Flat Brook; (3) Lake Wapalanne and its outlet stream to the confluence with Big Flat Brook; (4) Lake Ocquittunk and waters connecting it with Big Flat Brook;

	(5) Stony Lake and its outlet stream (Stony Brook) downstream to the confluence with the Big Flat Brook;
	(6) Kittatinny Lake, that portion of its inlet stream outside the Stokes State Forest boundaries, and its outlet stream, including the Shotwell Camping Area tributary, to the confluence with Big Flat Brook;
	(7) Deer Lake and its outlet stream to Lake Ashroe;
	(8) Lake Ashroe, the portions of its tributaries outside the Stokes State Forest boundaries, and its outlet stream to the confluence with Big Flat Brook;
	(9) Lake Shawanni and its outlet stream to the confluence with Flat Brook;
	(10) Crigger Brook and its tributary to the confluence with Big Flat Brook
	SHIMERS BROOK WATERSHED
	The portion of Shimers Brook and its tributaries that are located within the boundaries of High Point State Park
JOHNSONBURG NATURAL AREA	PEQUEST RIVER WATERSHED
	Mud Pond and its outlet stream, Bear Creek, to the Erie-Lackawanna Railroad trestle, north of Johnsonburg
BRENDAN T. BYRNE STATE FOREST	RANCOCAS CREEK WATERSHED
	Deer Park Branch and tributaries near Buckingham, downstream to the confluence with Pole Bridge Branch
	Tributaries to the South Branch of Mount Misery Brook located entirely within the boundaries of BRENDAN T. BYRNE State Forest
	Cooper Branch and tributaries downstream to Pakim Pond and those tributaries to Coopers Branch downstream of Pakim Pond that are located entirely within the boundaries of BRENDAN T. BYRNE State Forest
	Shinns Branch and tributaries located entirely within the boundaries of BRENDAN T. BYRNE State Forest, from their sources to the forest boundary

	Jade Run located entirely within the boundaries of BRENDAN T. BYRNE State Forest
	MacDonalds Branch and tributaries located entirely within the boundaries of BRENDAN T. BYRNE State Forest, from their sources to the forest boundary
MILLVILLE FISH AND GAME TRACT	See EDWARD G. BEVAN WILDLIFE MANAGEMENT AREA
PASADENA WILDLIFE MANAGEMENT AREA	RANCOCAS CREEK WATERSHED The two easterly branches of the South Branch of Mount Misery Brook, located entirely within the boundaries of the Pasadena Wildlife Management Area
PEASELEE WILDLIFE MANAGEMENT AREA	MAURICE RIVER WATERSHED Middle Branch of Muskee Creek from its origin to the boundaries of the Peaselee Wildlife Management Area
	Cedar Branch of the Manumuskin River, from its origin to the boundaries of the Peaselee Wildlife Management Area
	Those portions of tributaries to Slab Branch located entirely within the boundaries of the Peaselee Wildlife Management Area
WASHINGTON CROSSING STATE PARK	STEELE RUN WATERSHED That portion of Steele Run, located within the boundaries of Washington Crossing State Park, to the confluence with the westerly tributary
WHITTINGHAM WILDLIFE MANAGEMENT AREA	PEQUEST RIVER WATERSHED Northwesterly tributaries to the Pequest River, including Big Spring, located within the boundaries of the Whittingham Wildlife Management Area southwest of Springdale, from their origins to their confluence with the Pequest River
WORTHINGTON STATE FOREST	DELAWARE RIVER WATERSHED Sunfish Pond and its outlet stream to the Delaware River. All unnamed waters located entirely within the boundaries of the Worthington State Forest

	DUNNFIELD CREEK WATERSHED Dunnfield Creek to I-80

PASSAIC RIVER, HACKENSACK RIVER, NY HARBOR COMPLEX BASIN

A. S. HEWITT STATE FOREST	WANAQUE RIVER WATERSHED Portions of Cooley Brook and tributaries which originate and are located entirely within the boundaries of Hewitt State Forest Surprise Lake Portions of Green Brook and tributaries which originate and are located entirely within the boundaries of Hewitt State Forest West Pond
BERKSHIRE VALLEY WILDLIFE MANAGEMENT AREA	ROCKAWAY RIVER WATERSHED Stephens Brook north of the boundaries of the Berkshire Valley Wildlife Management Area
CITY OF NEWARK HOLDINGS AND WAWAYANDA STATE PARK	PEQUANNOCK RIVER WATERSHED Cedar Pond and all tributaries Hanks Pond and all tributaries Tributary to Pequannock River at Green Pond Junction from its origin downstream to Route 23 Tributary joining the main stem of the Pequannock River 3500+ feet southeast of the Sussex-Passaic County line, near Jefferson from its origin to about 2000 feet upstream of the pond Pacack Brook and its tributaries upstream of Canistear Reservoir, located entirely within the boundaries of the Newark watershed and Wawayanda State Park Cherry Ridge Brook and its tributaries north of Canistear Reservoir, located entirely within the boundaries of the Newark watershed lands and Wawayanda State Park

	The southern branch of the easterly tributary to Canistear Reservoir
	Pequannock River and tributaries upstream of the confluence with Pacack Brook
	The northwestern tributary to Oak Ridge Reservoir
	The portion of the westerly tributary to Lake Stockholm Brook, from its origins to about 1000 feet south of the Route 23 Bridge, located entirely within the boundaries of the Newark watershed
	Lud-Day Brook downstream to its confluence with the southwestern outlet stream from Clinton Reservoir just upstream of the confluence of the outlet stream and a tributary from Camp Garfield
	Brook between Hamburg Turnpike and Vernon-Stockholm Road, downstream to its confluence with Lake Stockholm Brook, north of Rt. 23
RARITAN RIVER BASIN	NONE
WALLKILL RIVER BASIN	
CITY OF NEWARK HOLDINGS AND WAWAYANDA STATE PARK	LAKE LOOKOUT BROOK WATERSHED Lake Lookout, Lake Lookout Brook and tributaries from its headwaters in the Newark City holdings, downstream through the State-owned Wawayanda State Park to the confluence with the outlet stream from Lake Wawayanda
HAMBURG MOUNTAIN WILDLIFE MANAGEMENT	SAND HILLS BROOK WATERSHED The upstream portion of Sand Hills Brook, including the pond at its headwaters, located entirely within the boundaries of the Hamburg Mtn. Wildlife Management Area
	BLACK CREEK WATERSHED All those portions of three tributaries to Black Creek originating in the Hamburg Mtn. Wildlife Management Area, from their origin downstream to the Management Area boundaries

	FRANKLIN POND CREEK WATERSHED The first tributary to Franklin Pond Creek just south of Hamburg Mountain, flowing toward the Wallkill River and located entirely within the Hamburg Mtn. Wildlife Management Area
	HAMBURG CREEK WATERSHED The third tributary just southwest of Hamburg Mountain, which flows toward the Wallkill River and is located entirely within the Hamburg Mtn. Wildlife Management Area
HIGH POINT STATE PARK	CLOVE RIVER WATERSHED Those portions of the two northernmost tributaries to Clove River which are located entirely within the boundaries of High Point State Park, and are immediately east of Lake Marcia
	RUTGERS CREEK WATERSHED The Cedar Swamp headwaters of the tributary to Rutgers Creek, located entirely within the boundaries of High Point State Park, just south of the New Jersey-New York state line
SUSSEX BOROUGH WATER SUPPLY LAND	LAKE RUTHERFORD WATERSHED Lake Rutherford and tributaries, located northwest of Colesville
WAWAYANDA STATE PARK	LAUREL POND WATERSHED Laurel Pond, and its outlet stream and tributaries downstream to the outlet stream from Lake Wawayanda

(k) The following are the Outstanding National Resource Waters of the State:

1. FW1 Waters; and
2. PL Waters.

Penhorn Creek

Category: Waterbodies & Other Wetlands

Location: Located in the southeastern portion of the HMD, flows along the border of Secaucus and Jersey City in Hudson County, underneath the various New Jersey Transit rail lines that converge at the Secaucus Transfer Station. The creek outlets to the Hackensack River, just east of Malanka Landfill.

Current Land Use: Open Water

Site Description: Penhorn Creek is blocked from tidal inundation at two points by tide gates. The first is located just above the Hackensack River by the railroad crossing, while the second is located above Secaucus Road. Both tide gates have associated pump stations. The creek runs through the Croxton rail yards and other industrial areas, resulting in very poor water quality. The surrounding areas consist mainly of industrial grounds and monotypic common reed (*Phragmites australis*) stands.

Existing Site-Specific Data Inventory

A. Survey, Maps, and GIS

HMD data exists inclusive of this site. Detailed flood control survey completed in 2000.

B. Real Estate/Ownership

N/A

C. Site History & Land Use

General land use studies were conducted for an ecological resource plan completed for the HMD in 1978.

D. Biological Studies – Fauna

A benthos study was conducted in the creek for the Secaucus Transfer Station Project in 1990.

E. Biological Studies – General Environmental

Various general wetland studies were completed for an ecological resource plan for the HMD in 1978.

F. Geotechnical

No data obtained.

G. Hydraulics and Hydrology

Flood control survey conducted in 2000; study conducted between 1998 and 2004, including a two-dimensional hydrology ("child") model for the creek.

H. Water and Sediments

Water quality studies were conducted in the creek in 1990 and 1994. General water quality studies were completed for an ecological resource plan completed for the HMD in 1978.

I. Historical/Cultural Resources

A cultural resources study of the area associated with the Secaucus Interchange Project, including the creek, was completed in 1992.

J. Restoration/Remediation Design Plans

No data obtained.

Site Reports

Site #41 – Penhorn Creek

Category: Waterbodies & Other Wetlands

Location: Located in the southeastern portion of the HMD, flows along the border of Secaucus and Jersey City in Hudson County, underneath the various New Jersey Transit rail lines that converge at the Secaucus Transfer Station. The creek outlets to the Hackensack River, just east of Malanka Landfill.

Current Land Use: Open Water

Site Description: Penhorn Creek is blocked from tidal inundation at two points by tide gates. The first is located just above the Hackensack River by the railroad crossing, while the second is located above Secaucus Road. Both tide gates have associated pump stations. The creek runs through the Croxton rail yards and other industrial areas, resulting in very poor water quality. The surrounding areas consist mainly of industrial grounds and monotypic common reed (*Phragmites australis*) stands.

Existing Site Specific Data Inventory

* – Report repeated under multiple data categories and/or sites.

A. Survey, Maps, and GIS

Relevant survey, mapping, and GIS data for the Meadowlands can be found in the Meadowlands-wide site report under data category A.

1. ***ERDC, HMDC, & USACE – NYD. Flood Control Survey. 2000.** [2a] Survey performed for the HMD that consisted of: 1) cross-sections along the Hackensack River and its major tributaries, including Berry's Creek, Penhorn Creek, Sack Creek, and the Cayuga Dyke; 2) identifying 30 flood control structures along the Hackensack River; and 3) locating all bridges and piers within the study area. In addition, digital aerials were flown and geo-referenced. The vertical datum for the survey was NGVD29. At 13 of the 30 flood control structures, tide gages and single beam acoustic Doppler current meters were installed and monitored to measure velocity, head difference, and discharge at these locations.

B. Real Estate/Ownership

Not applicable.

C. Site History & Land Use

2. ***Mattson, C. P. Ecological and Resource Management Plan for the Hackensack Meadowlands. 1978.** [1a]A synopsis of what the then eight-year-old HMDC had learned about the Hackensack Estuary. Section 1 is an ecological primer, Section 2 provides information on the state of the estuary, and Section 3 presents natural resource management strategies for wetlands, water quality, open space, and land use planning.

D. Biological Studies – Fauna

3. ***Aguilar Associates & Consultants, Inc. Report on Surface Water Quality and Benthos Biological Studies for the Design Modification to the NEC for the Secaucus Transfer Station Project. June 1990.** [1] As part of the comprehensive environmental analysis of the Design Modifications to the Northeast Corridor for the Secaucus Transfer Station Project, surface water quality was analyzed and quantitative benthic studies were performed. Tests were conducted in four locations, including Penhorn Creek and three ponds near the NEC project area.

E. Biological Studies – General Environmental

4. ***Mattson, C. P. Ecological and Resource Management Plan for the Hackensack Meadowlands. 1978.** [1a]A synopsis of what the then eight-year-old HMDC had learned about the Hackensack Estuary. Section 1 is an ecological primer, Section 2 provides information on the state of the estuary, and Section 3 presents natural resource management strategies for wetlands, water quality, open space, and land use planning.

F. Geotechnical

No data obtained.

G. Hydraulics and Hydrology

5. ***ERDC, HMDC, & USACE – NYD. Flood Control Survey. 2000.** [2a] Survey performed for the HMD that consisted of: 1) cross-sections along the Hackensack River and its major tributaries, including Berry's Creek, Penhorn Creek, Sack Creek, and the Cayuga Dyke; 2) identifying 30 flood control structures along the Hackensack River; and 3) locating all bridges and piers within the study area. In addition, digital aerials were

flown and geo-referenced. The vertical datum for the survey was NGVD29. At 13 of the 30 flood control structures, tide gages and single beam acoustic Doppler current meters were installed and monitored to measure velocity, head difference, and discharge at these locations.

6. ***ERDC & USACE – NYD. The Hackensack Meadowlands Flood Control Study. 1998 – 2004 (On-going).** [2a] Undertaken to develop a numerical hydraulic model of the Hackensack River and its associated tidal marshes and channels. A parent model (one-dimensional hydrologic) is being developed for the Hackensack River Basin, while child models (two-dimensional hydrologic) are being developed for Berry's Creek, Penhorn Creek, Sack Creek, and the Cayuga Dyke. The study also includes the evaluation of the performance of proposed flood control structures and restored wetland areas with respect to flood elevations, as well as the effects of optimum maintenance on existing flood control structures.

H. Water and Sediments

7. ***Aguilar Associates & Consultants, Inc. Report on Surface Water Quality and Benthos Biological Studies for the Design Modification to the NEC for the Secaucus Transfer Station Project. June 1990.** [1] As part of the comprehensive environmental analysis of the Design Modifications to the Northeast Corridor for the Secaucus Transfer Station Project, surface water quality was analyzed and quantitative benthic studies were performed. Tests were conducted in four locations, including Penhorn Creek and three ponds near the NEC project area.

8. ***Konsevick, Edward, Christine Cheng Hobble, & Paul Lupini. Monitoring Effects of Urban Land Use of Esturine Water Quality, Hackensack Meadowlands District, New Jersey. November 1994.** [1] In 1993, the USGS, in cooperation with the HMDC, established a network of 14 ambient water monitoring sites, including the Hackensack River, Berry's Creek, Penhorn Creek, Sawmill Creek, Mill Creek, and Cromakill Creek, to characterize the current status of water quality in the HMD. Salinity, DO, fecal coliform, pH, TSS, turbidity, total phosphorous, ammonia, sulfate, BOD, COD, heavy metal concentrations were measured at each of the monitoring sites.

9. ***Mattson, C. P. Ecological and Resource Management Plan for the Hackensack Meadowlands. 1978.** [1a]A synopsis of what the then eight-year-old HMDC had learned about the Hackensack Estuary. Section 1 is an ecological primer, Section 2 provides information on the state of the estuary, and Section 3 presents natural resource management strategies for wetlands, water quality, open space, and land use planning.

10. ***Mattson, C., G. Potera, & M.E. Saks. Water Quality in a Disordered Ecosystem: A Report on the Water Quality Monitoring Study Performed in the Hackensack Meadowlands between June and September 1971. 1971.** [1a] Part of a natural resource inventory on which to base future land use decisions and against which to make future comparisons. Chemistry and water quality were measured at 11 sites, including Berry's Creek, Penhorn Creek, Losen Slote Creek, Bellman's Creek, Moonachie Creek, Mill Creek, and the Hackensack River.

I. Historical/Cultural Resources

11. **Geismar, Joan H. Stage 1A Cultural Resources Survey of the Impact Area of New Jersey Turnpike Secaucus Interchange Project Hudson County, New Jersey. July 1992.** [1a] The study area of this project includes Potters Field and Penhorn Creek. The study indicates that the banks of Penhorn Creek may harbor evidence of prehistoric or early historical use of the area by Native Americans. Parts of the proposed interchange in the vicinity of Potter's Field and Penhorn Creek will require an archaeological evaluation that should include soil boring data and possible soil testing.

J. Restoration/Remediation Design Plans

No data obtained.

K. Bibliographic Updates

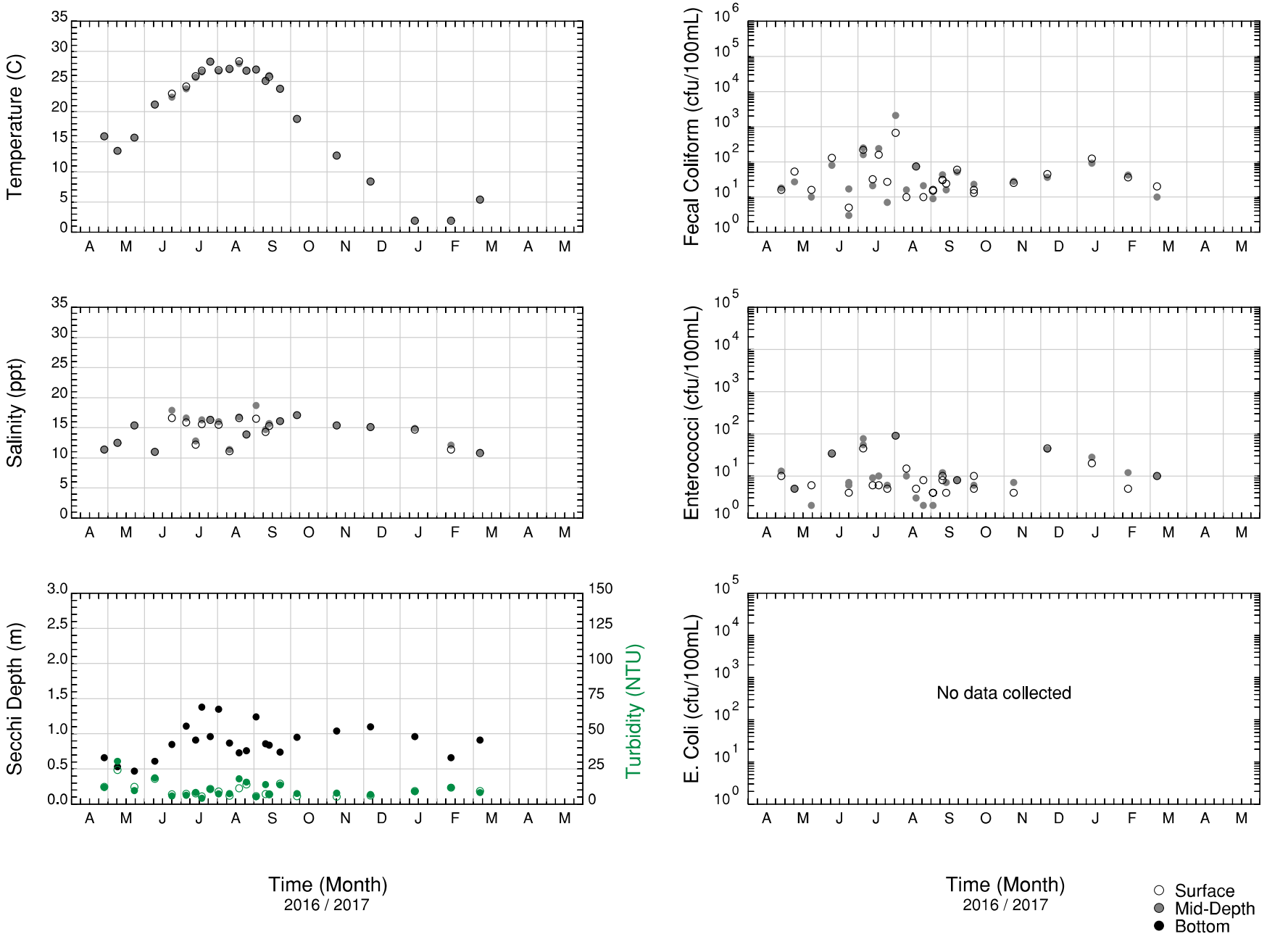
Site #41: Penhorn Creek

Appendix B

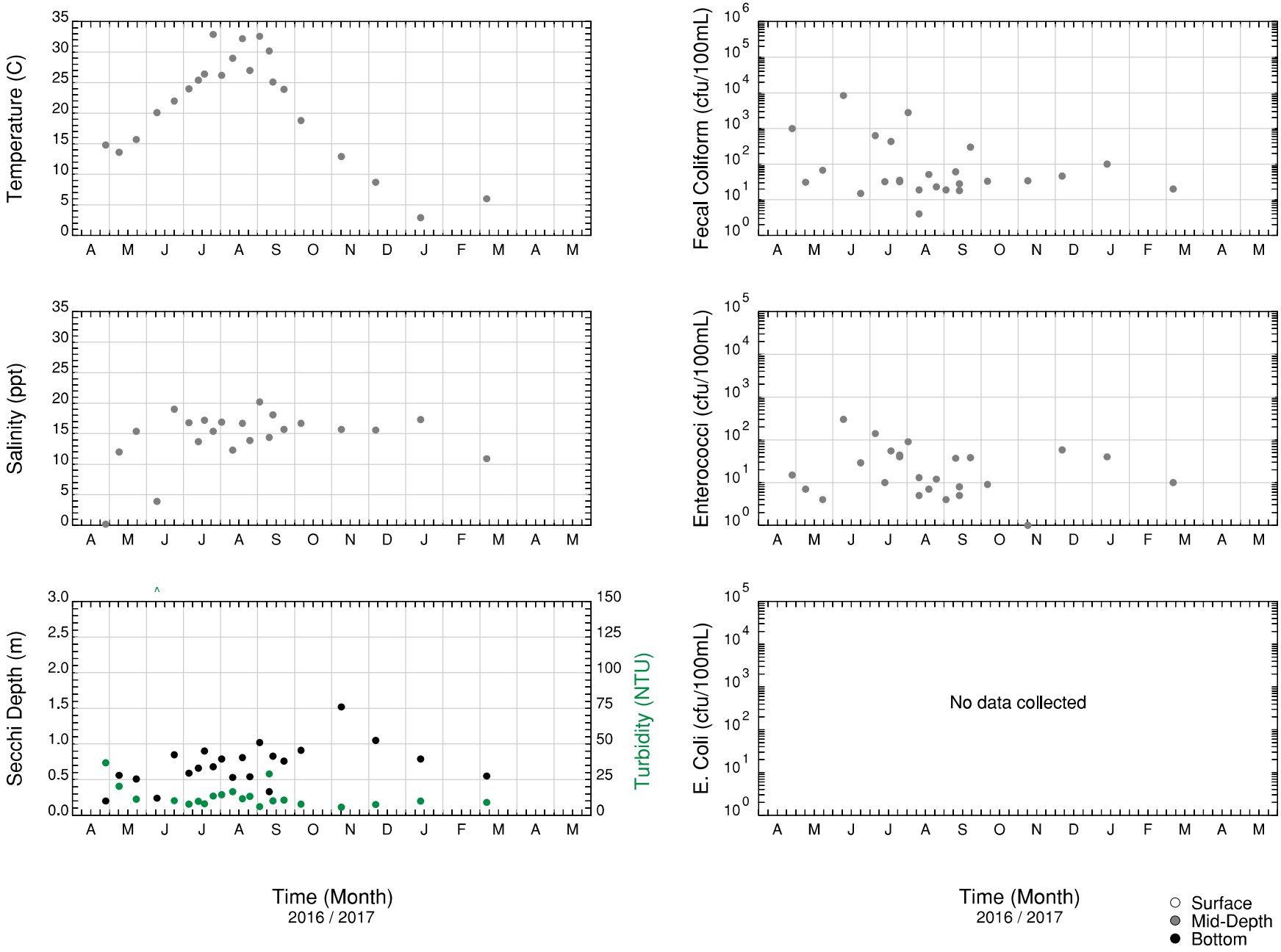
Jersey City Water Quality Compliance Monitoring

Figure 5 – Jersey City MUA (PVSC)

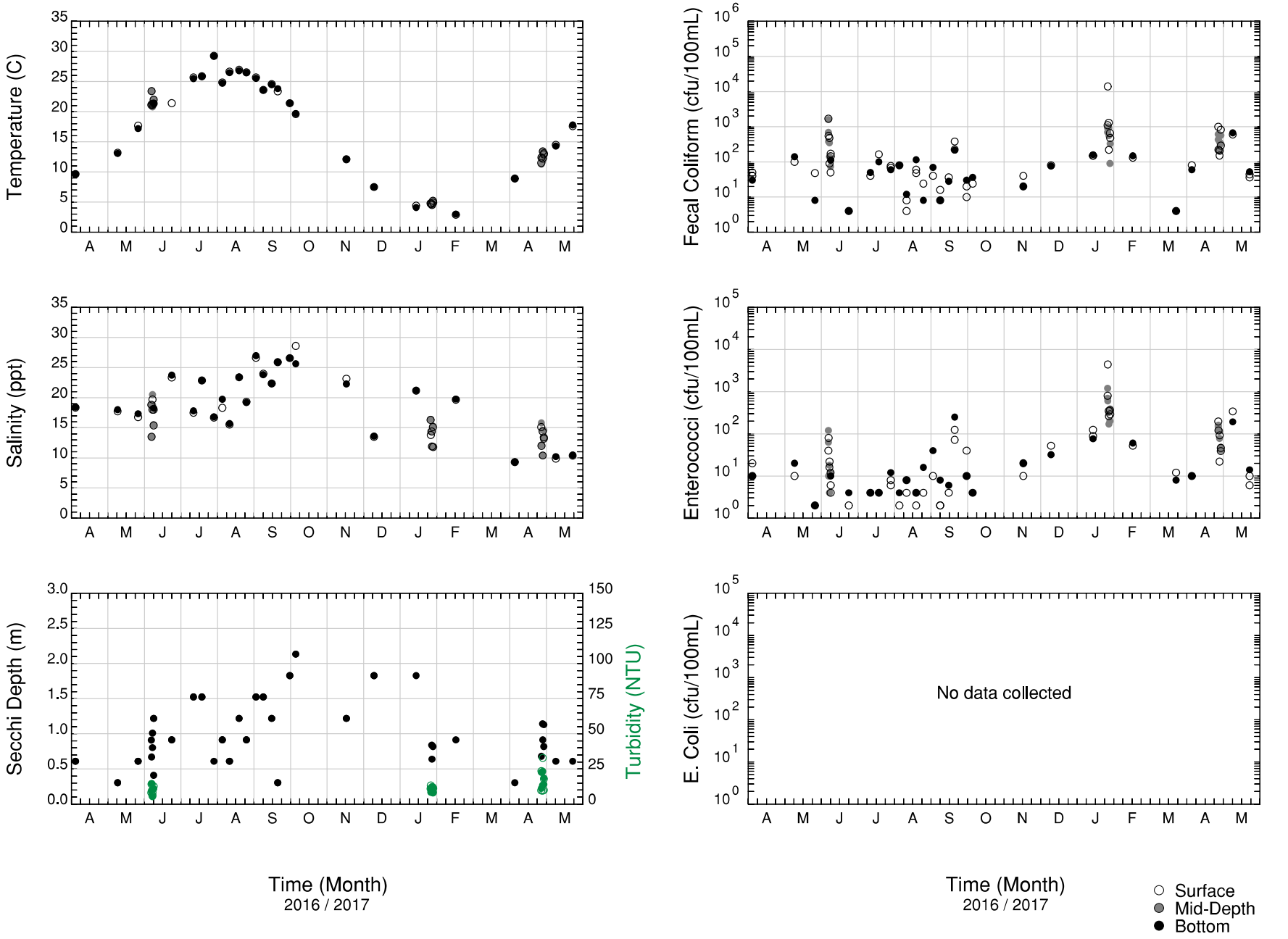
Hackensack River & Tributaries, Hackensack River, B7, (SE2)



Hackensack River & Tributaries, Penhorn Creek, S5, (SE2)

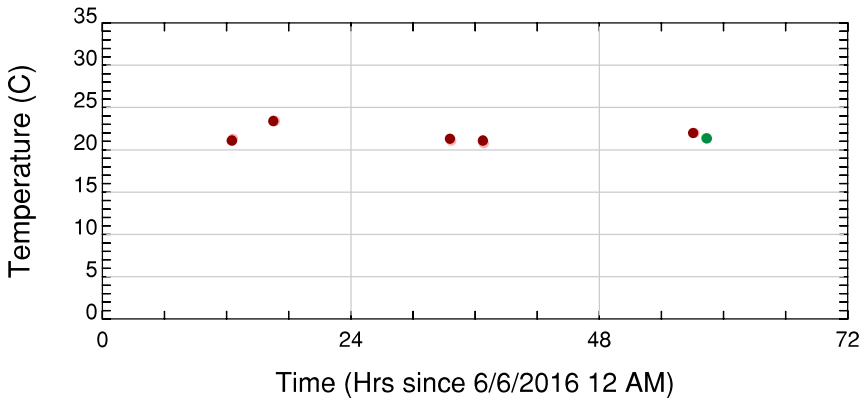


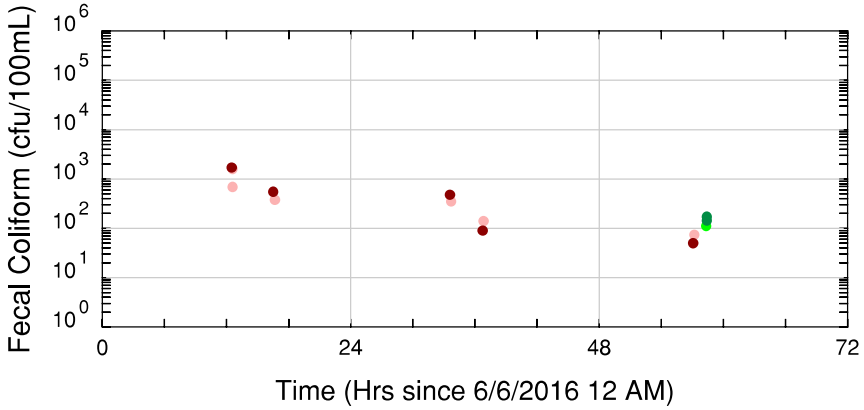
Hackensack River & Tributaries, Hackensack River, 15, (SE2)

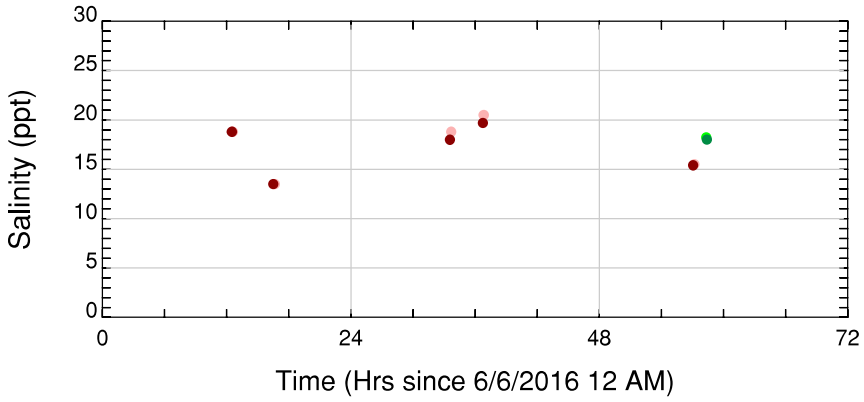


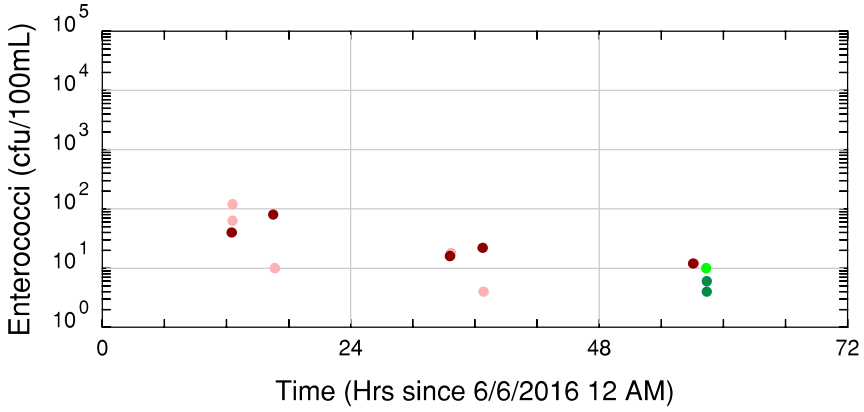
Hackensack River & Tributaries, Hackensack River, 15, (SE2)

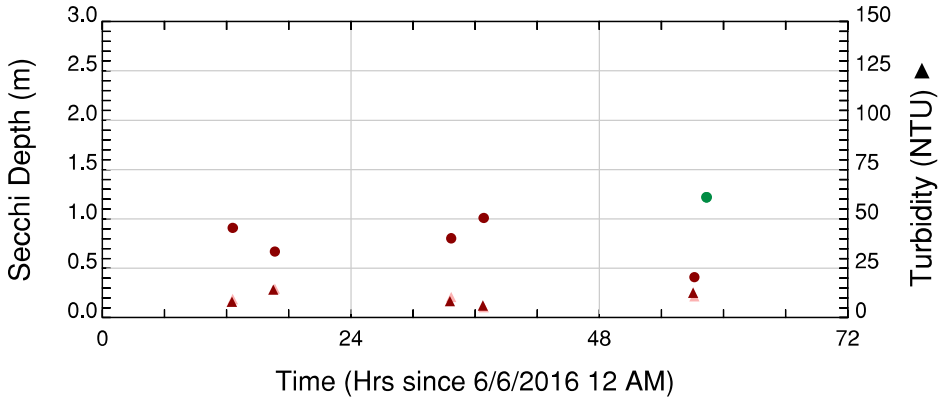
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

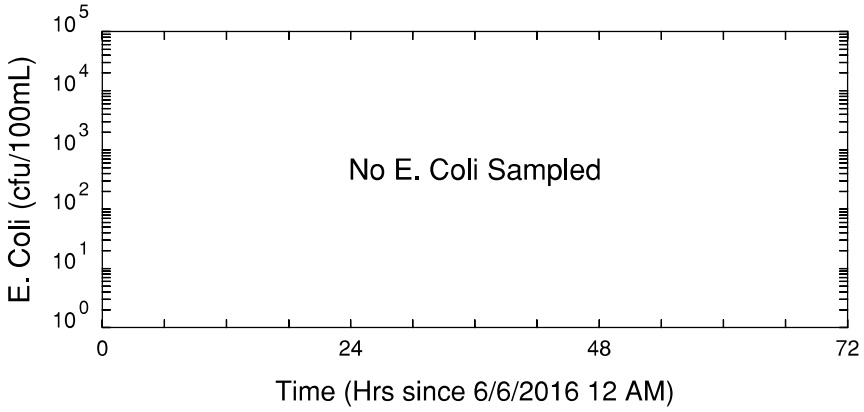






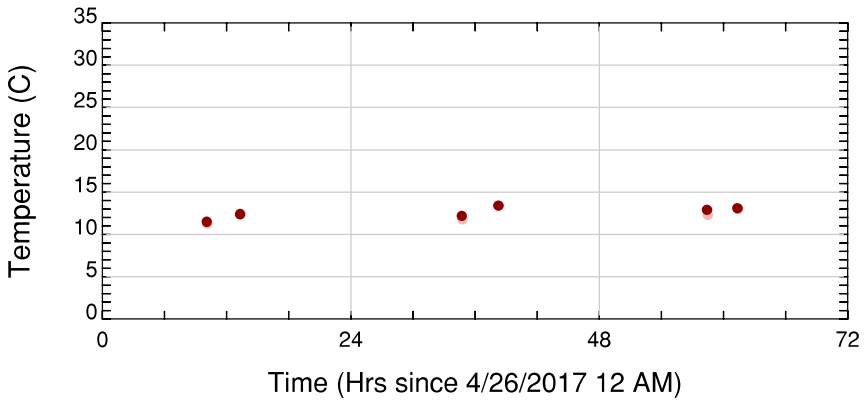


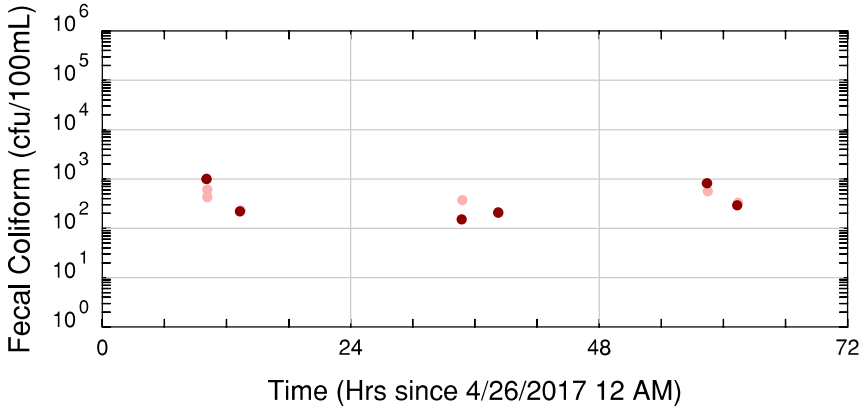


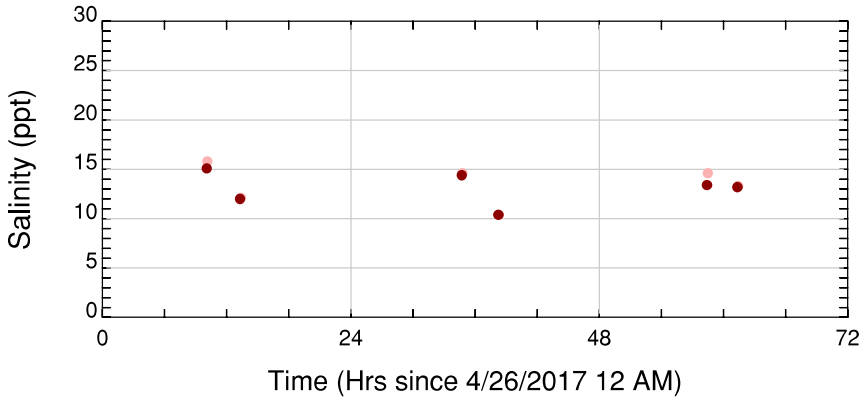


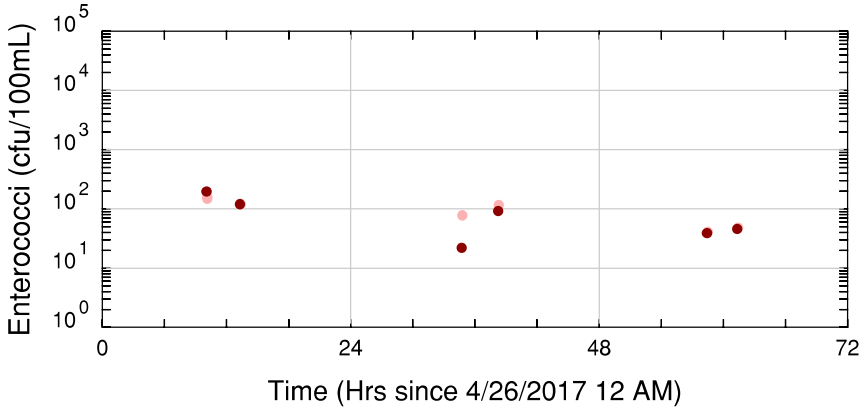
Hackensack River & Tributaries, Hackensack River, 15, (SE2)

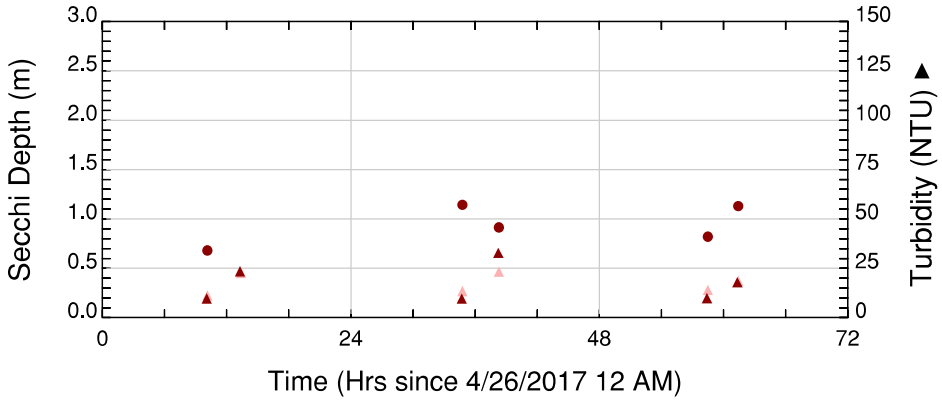
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

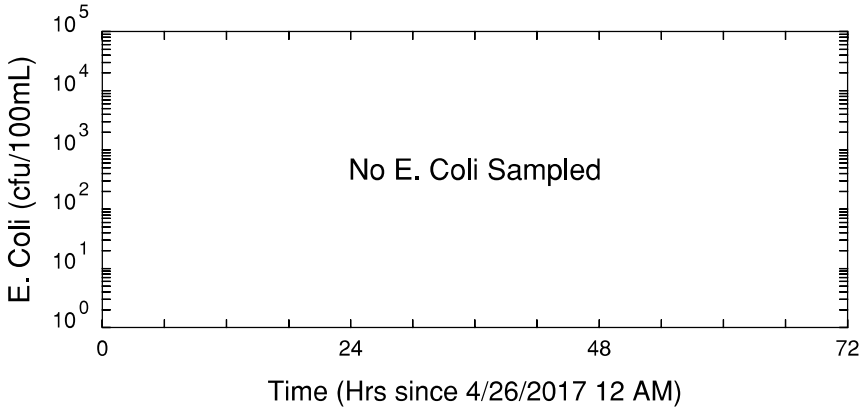






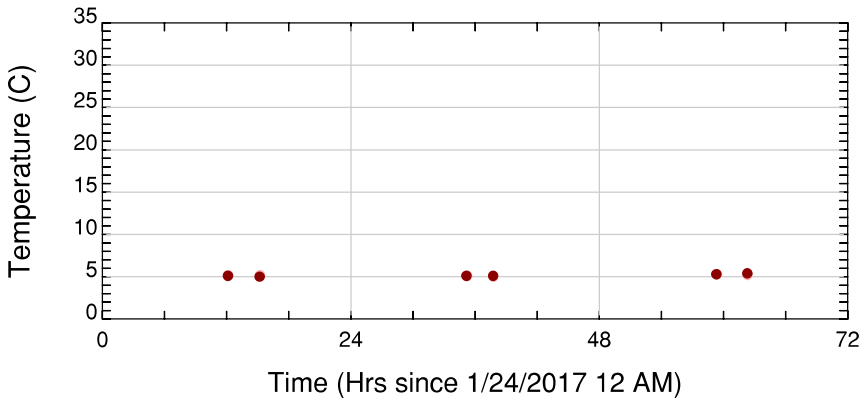


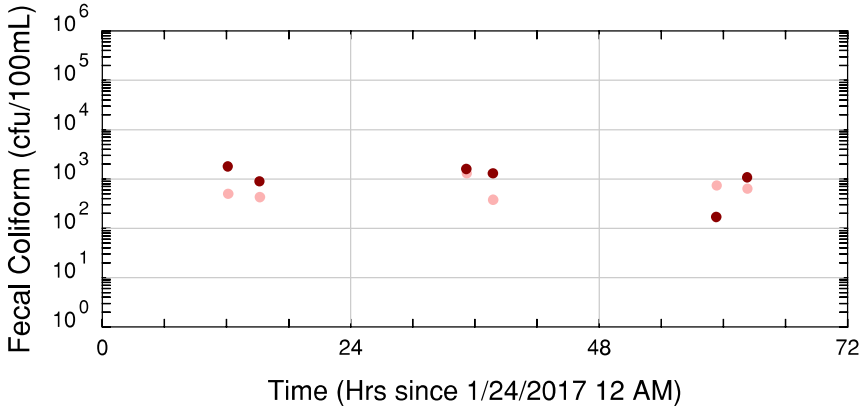


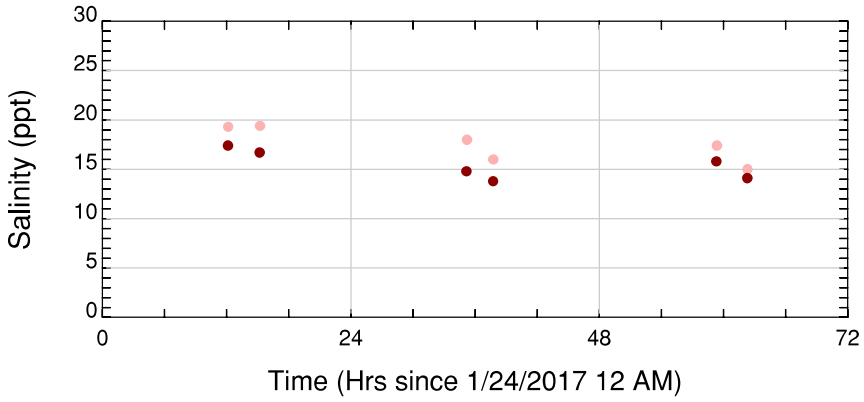


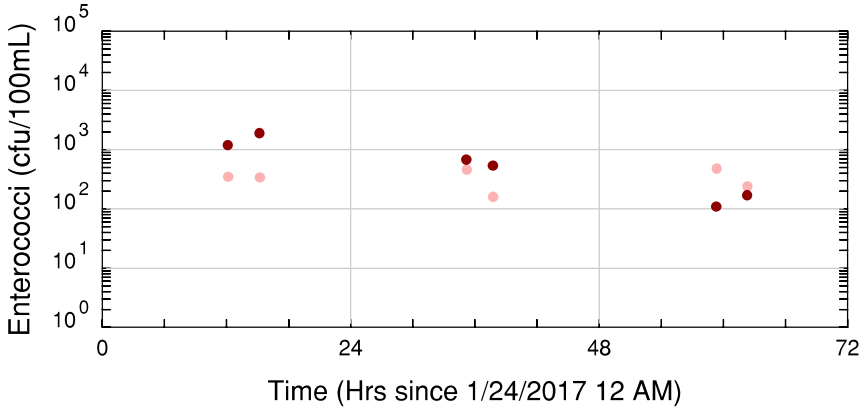
Newark Bay & Tributaries, Newark Bay, 17, (SE3)

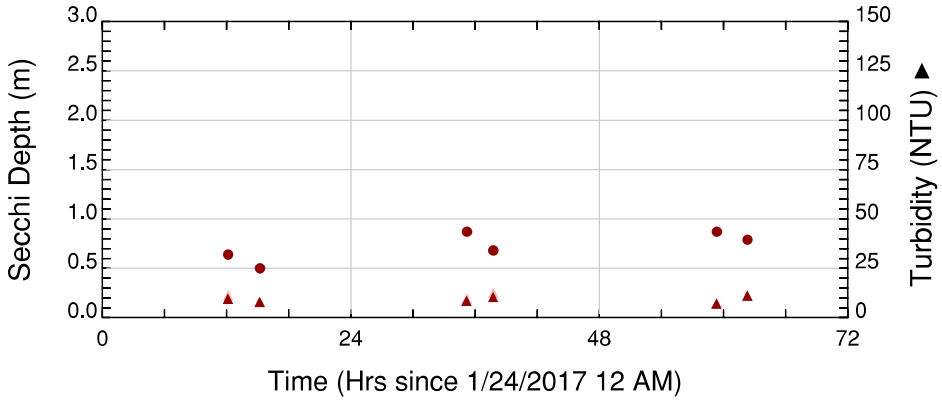
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

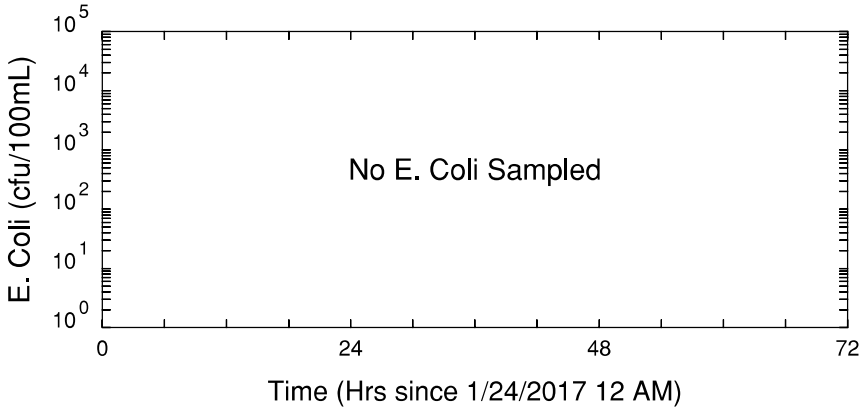




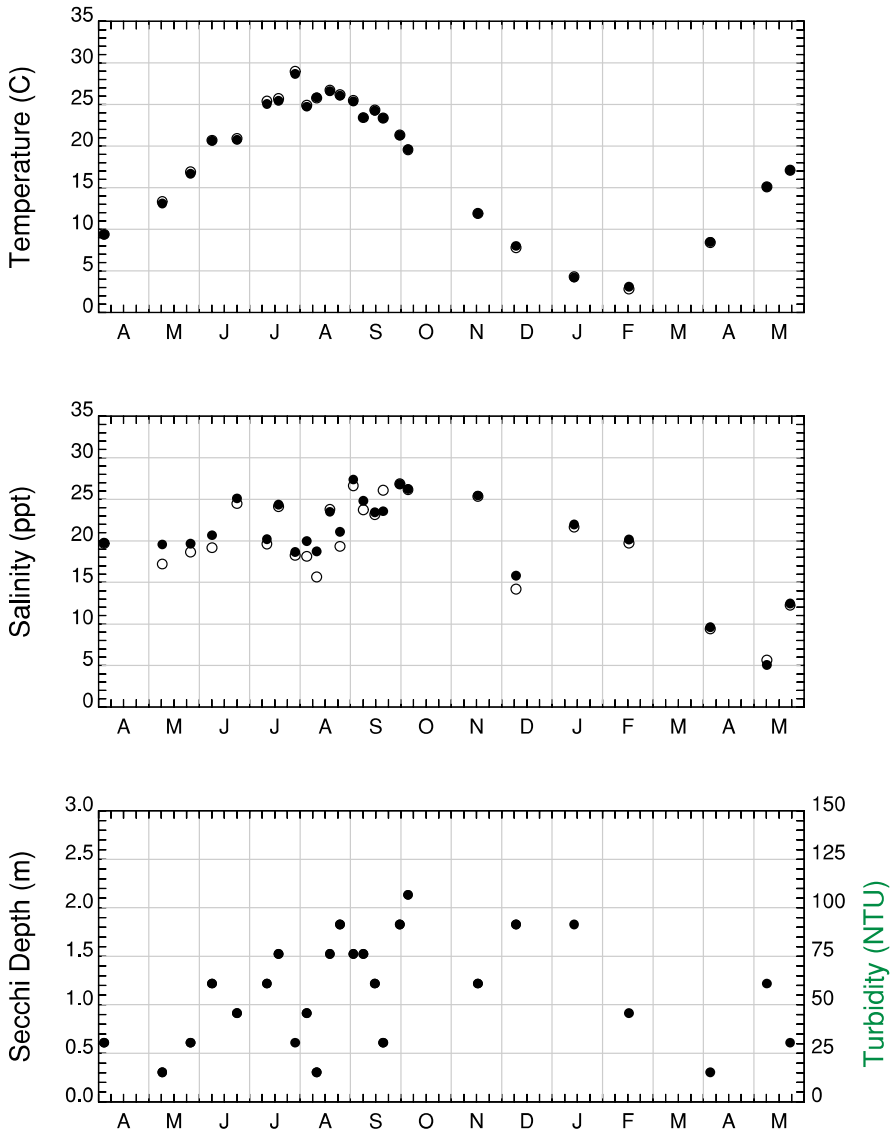


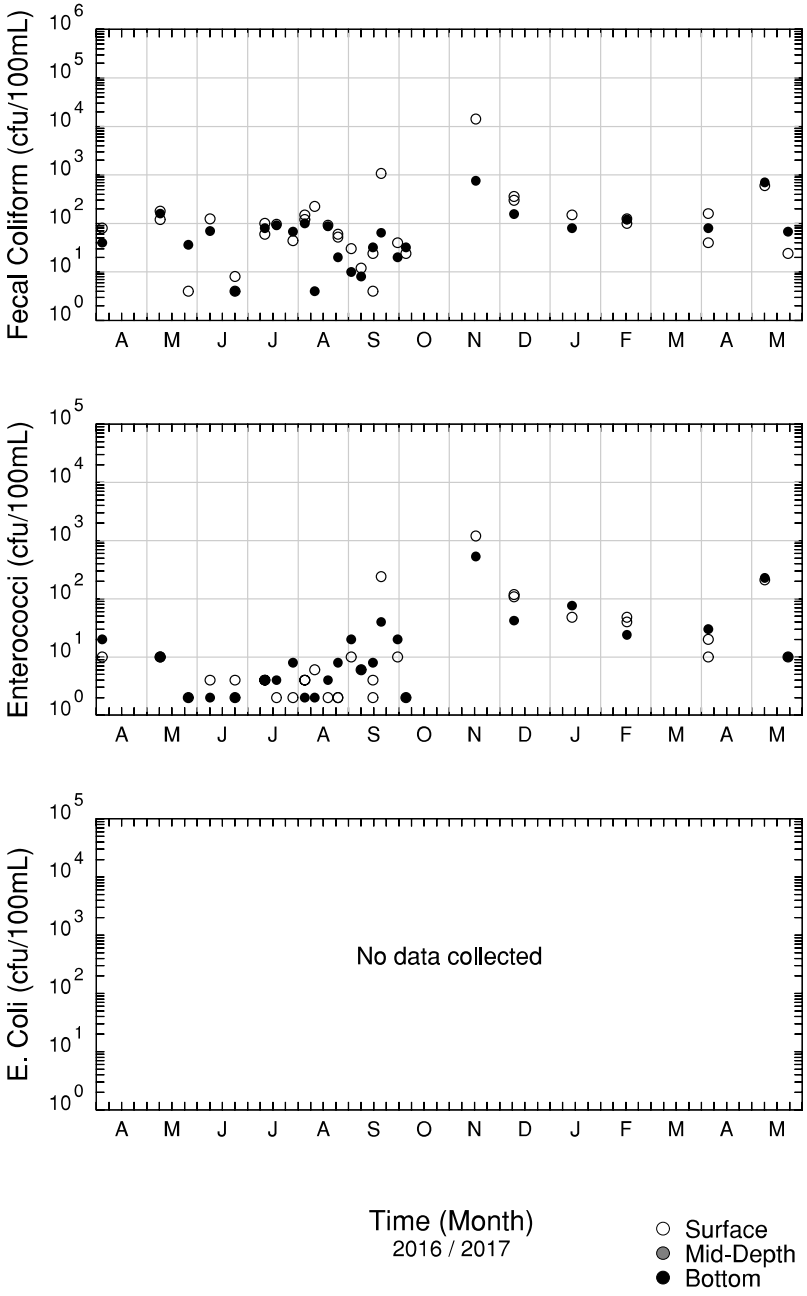




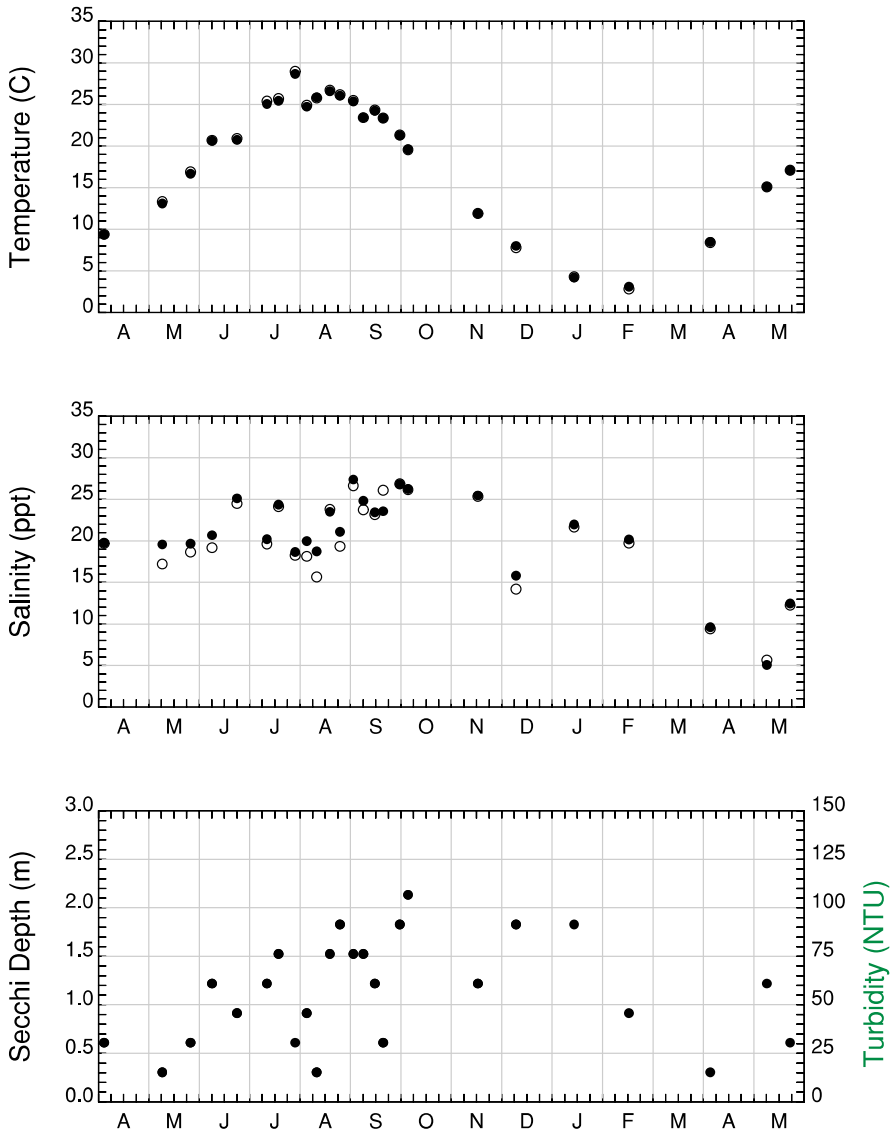


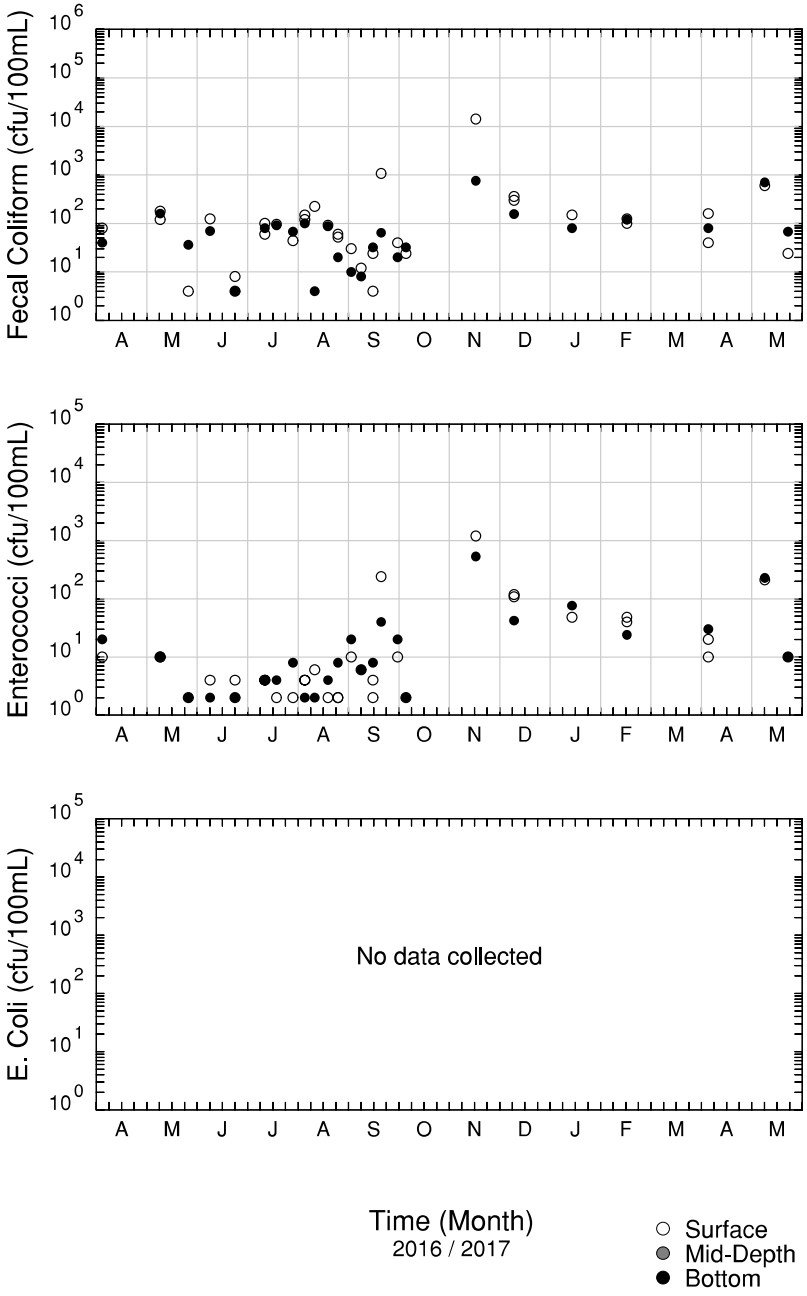
Hackensack River & Tributaries, Hackensack River, 16, (SE3)



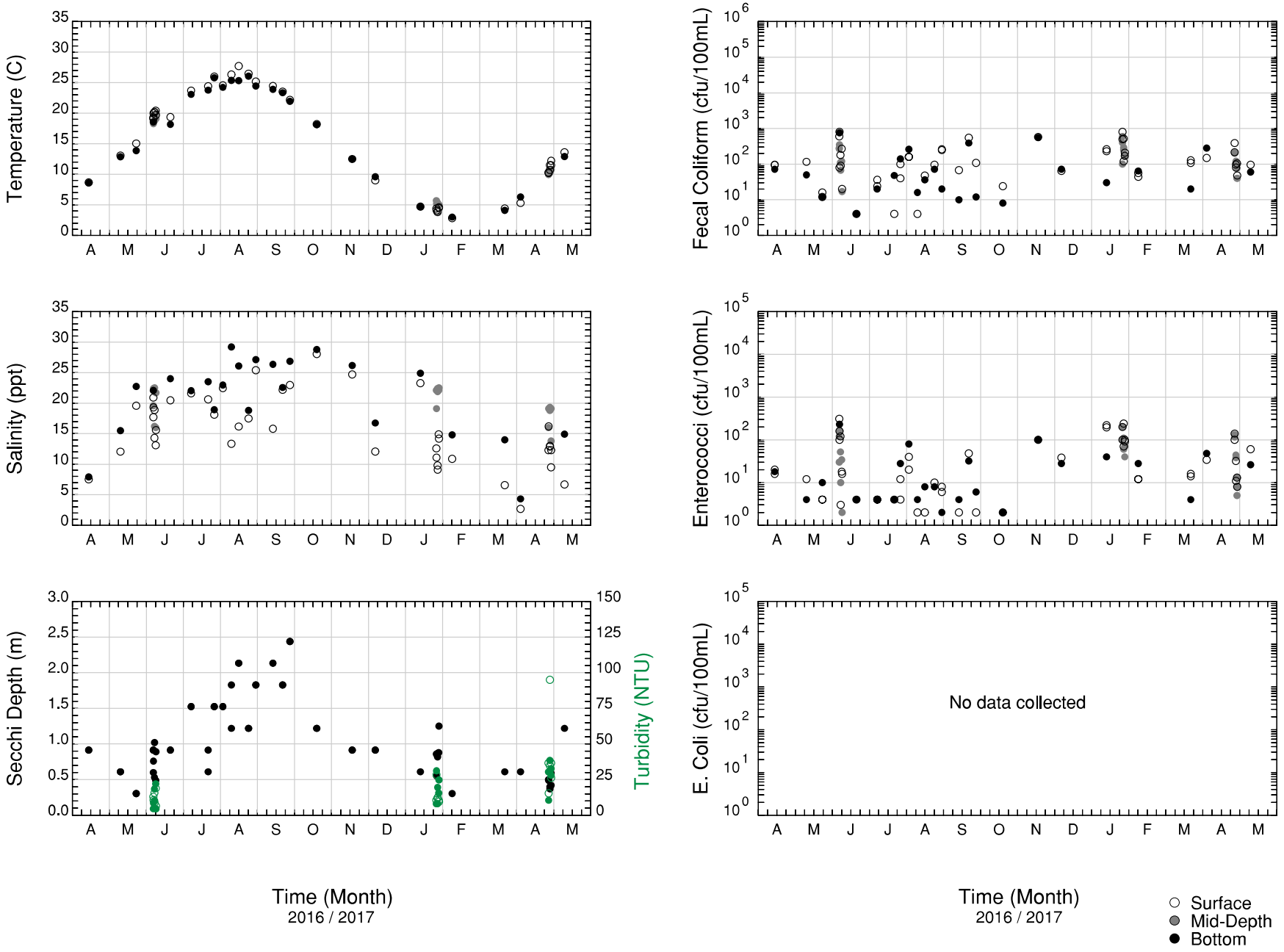


Hackensack River & Tributaries, Hackensack River, 16, (SE3)

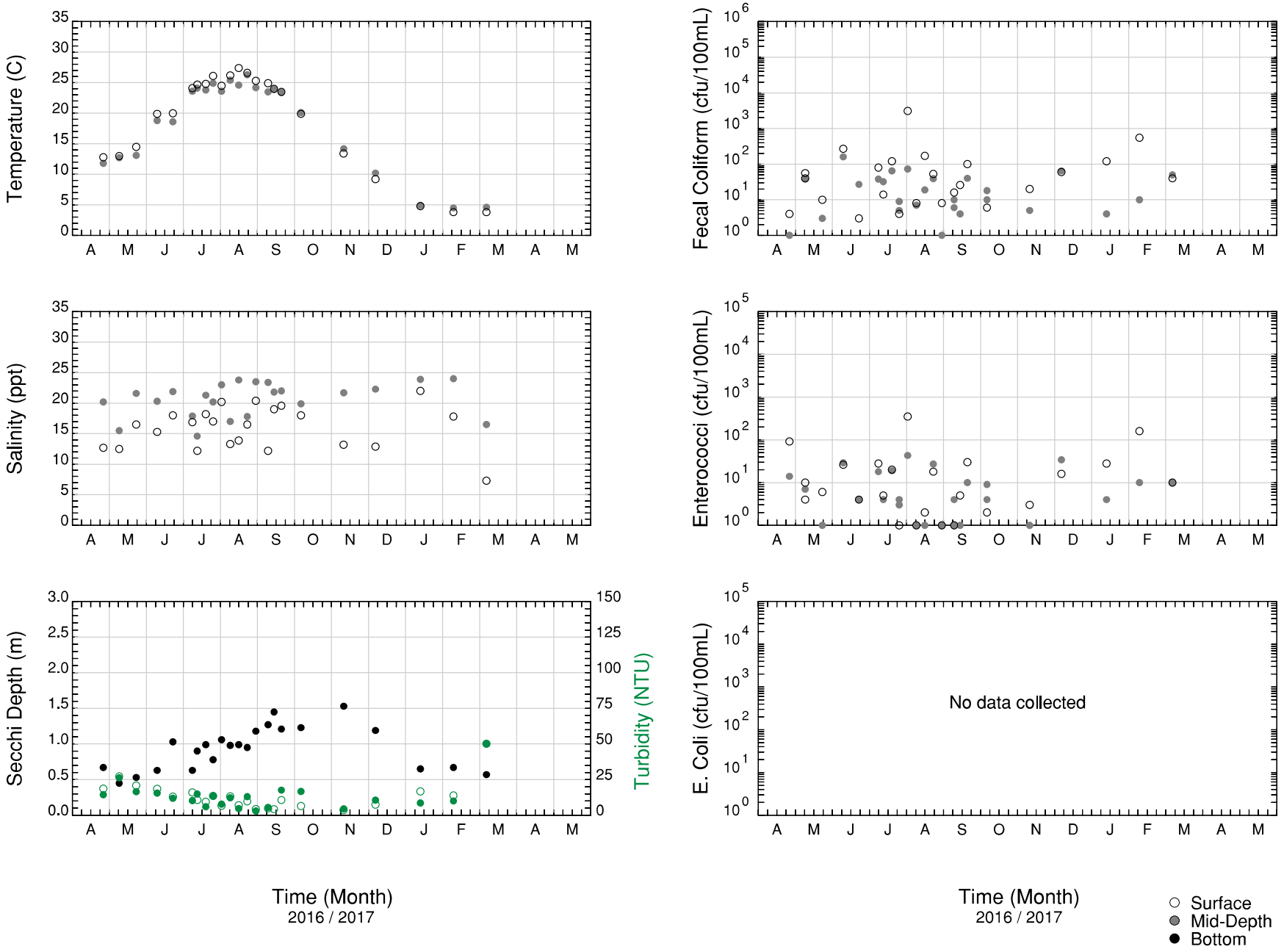




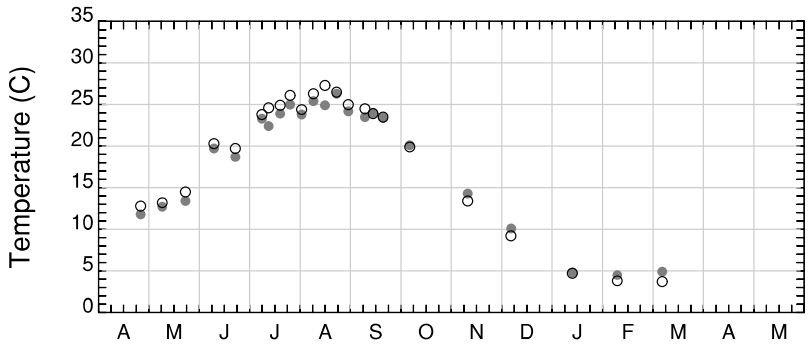
Hudson River, Upper Bay, Hudson River, 32, (SE2)

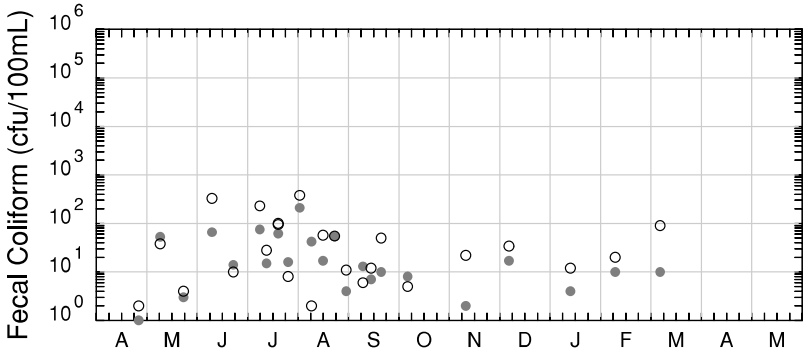


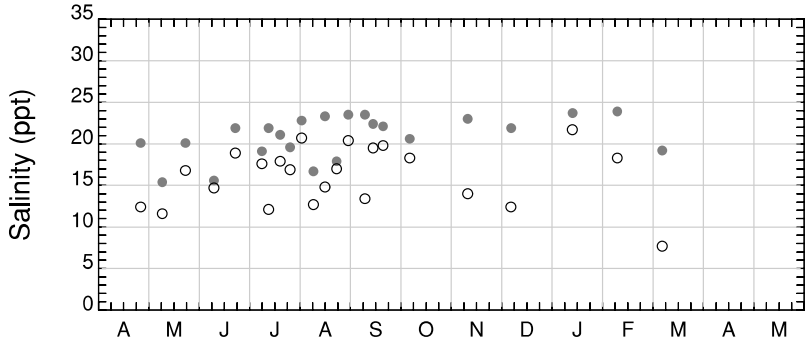
Hudson River, Upper Bay, Hudson River, B18A, (SE2)

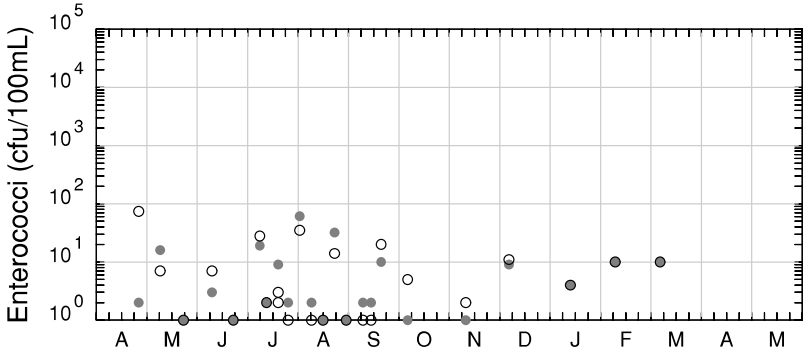


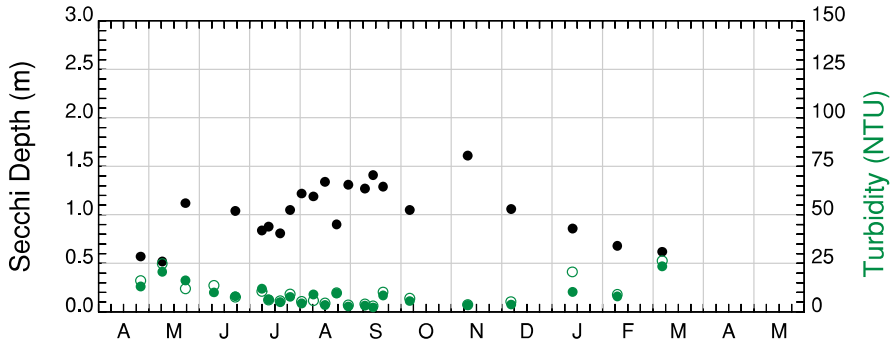
Hudson River, Upper Bay, Hudson River, B18B, (SE2)

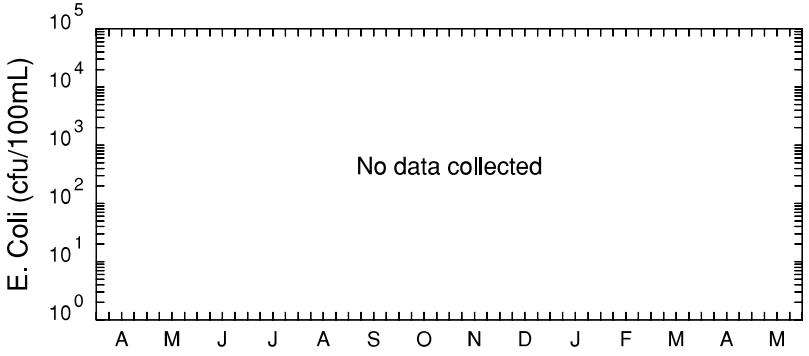










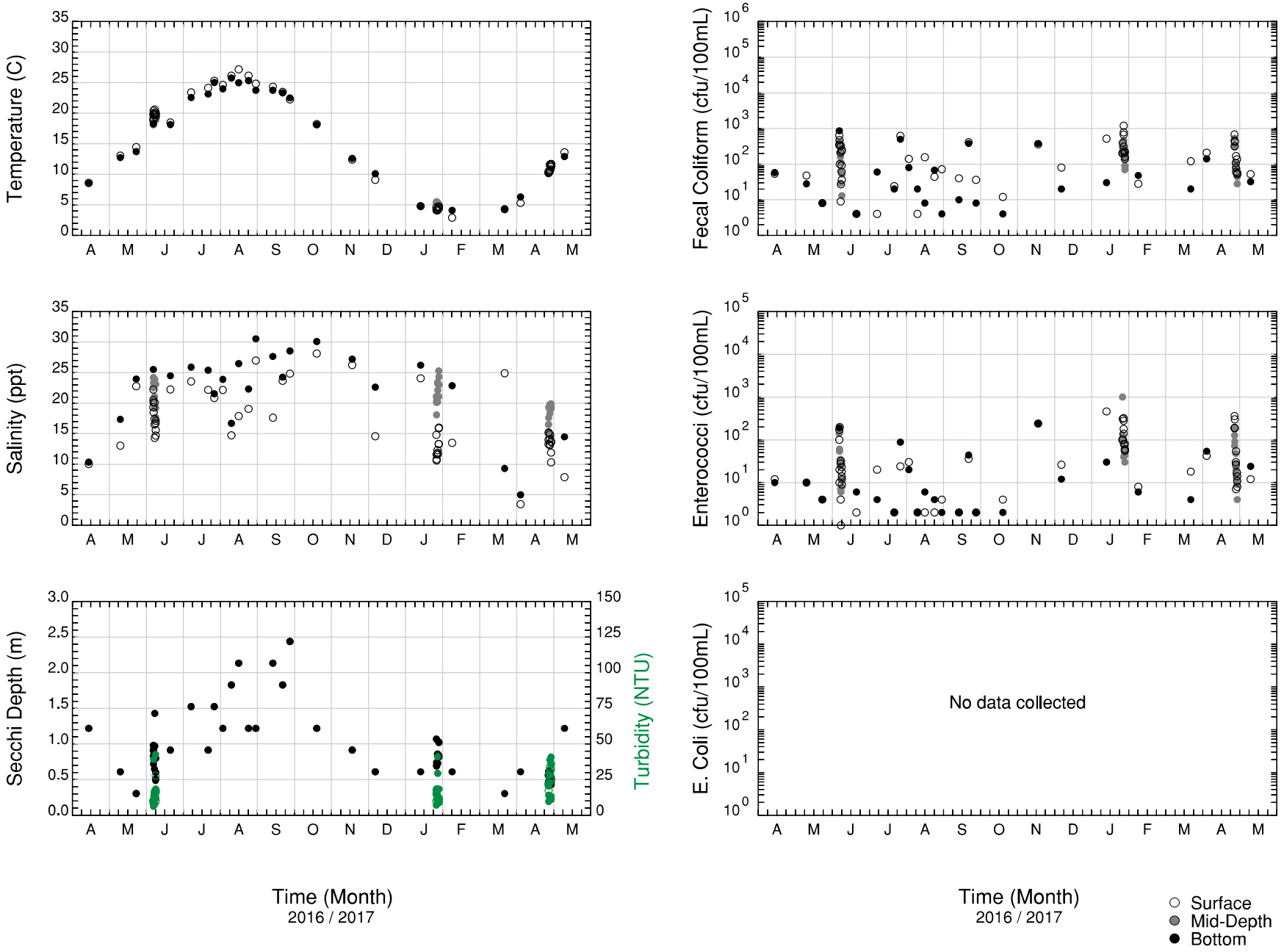


Time (Month)
2016 / 2017

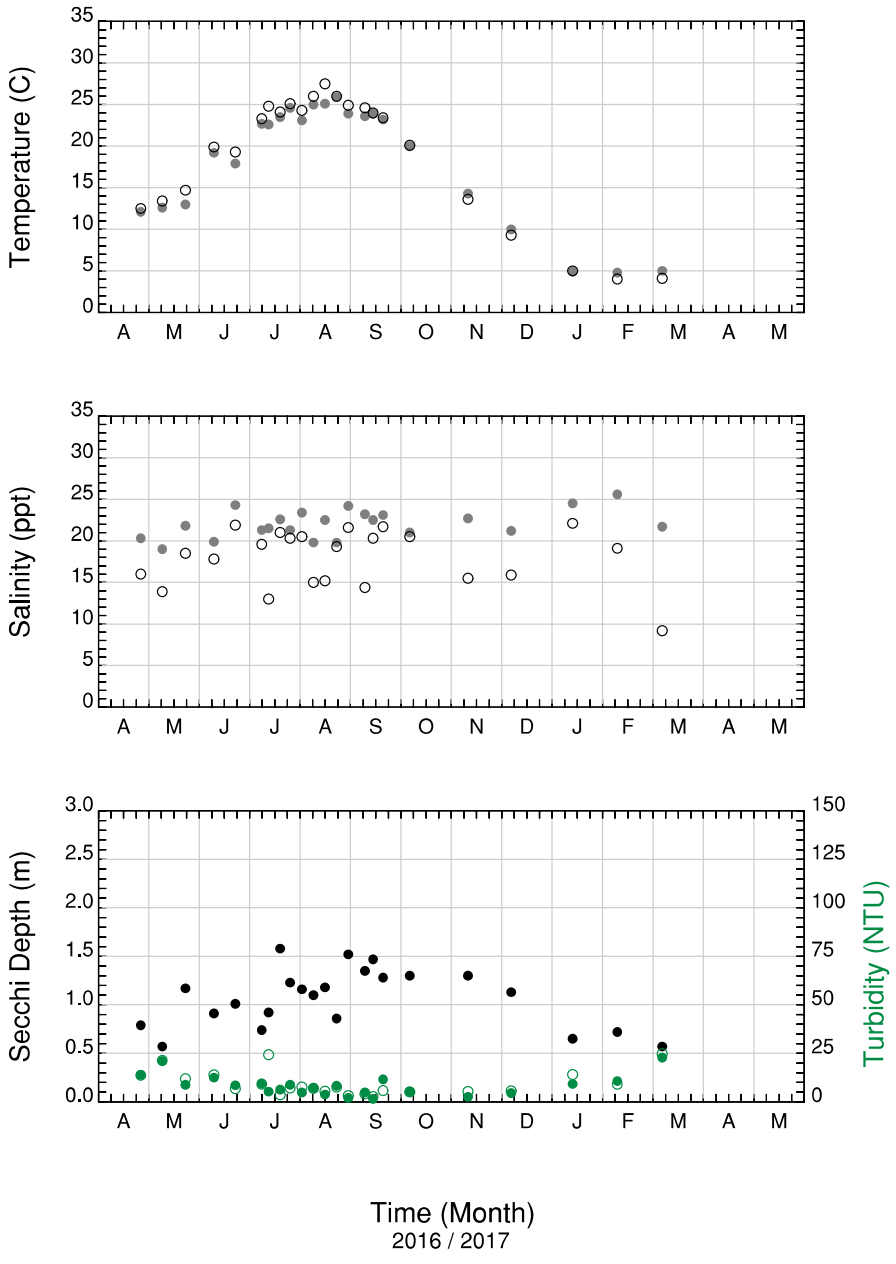
Time (Month)
2016 / 2017

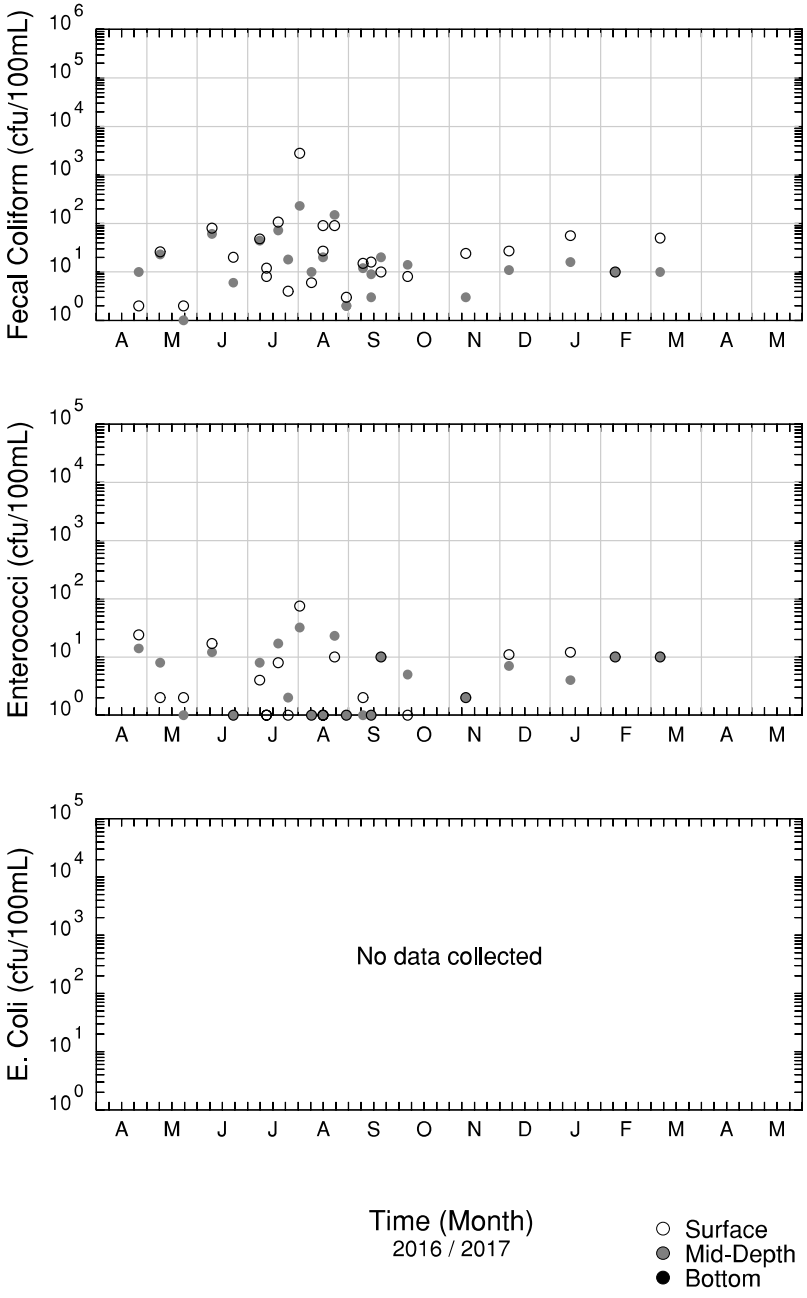
Surface
Mid-Depth
Bottom

Hudson River, Upper Bay, Hudson River, 33, (SE2)

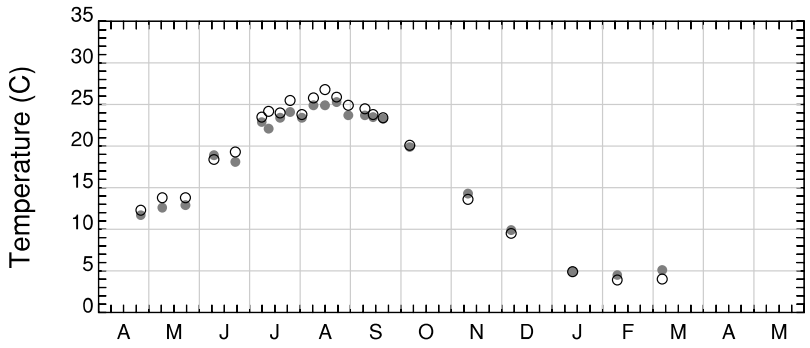


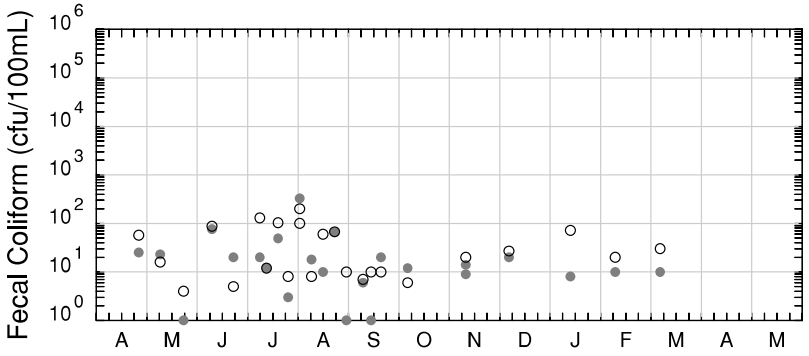
Hudson River, Upper Bay, Hudson River, B23A, (SE2)

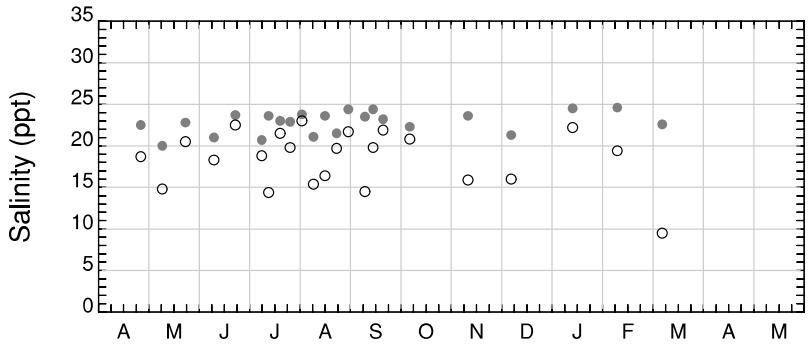


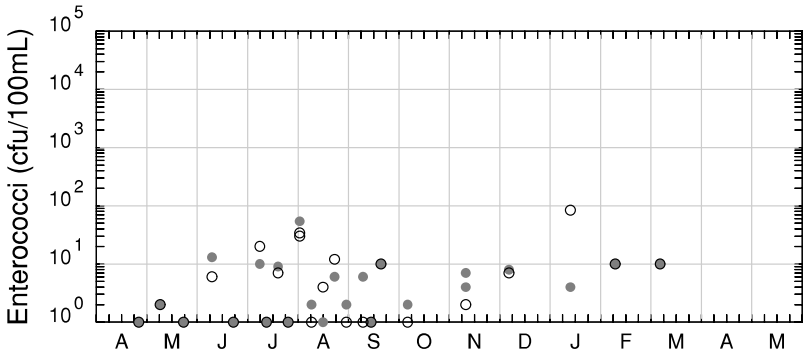


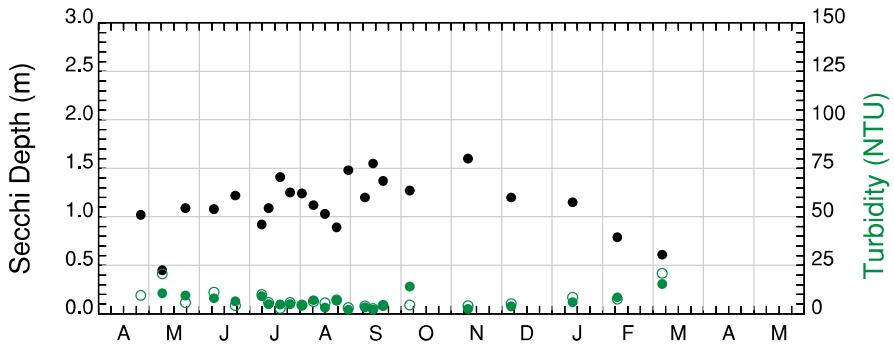
Hudson River, Upper Bay, Hudson River, B23B, (SE2)

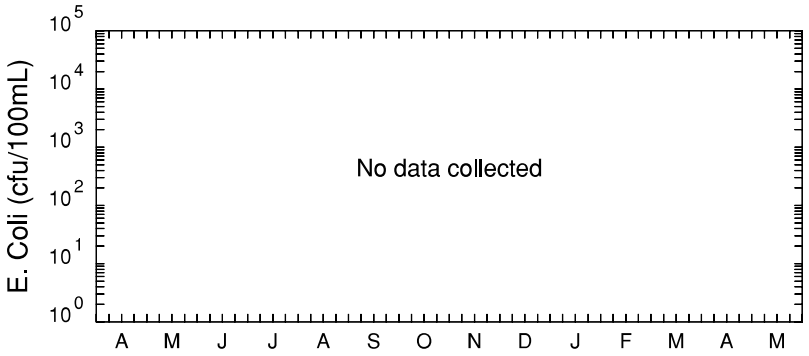










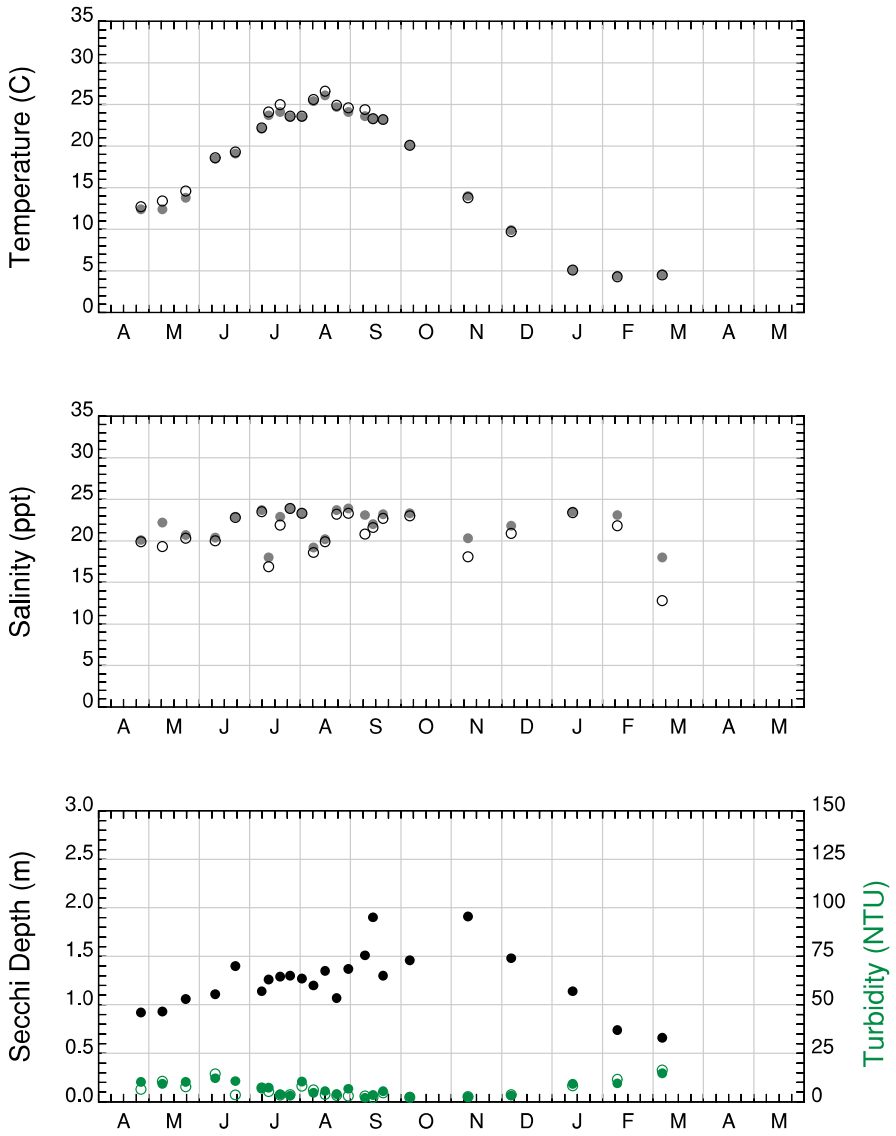


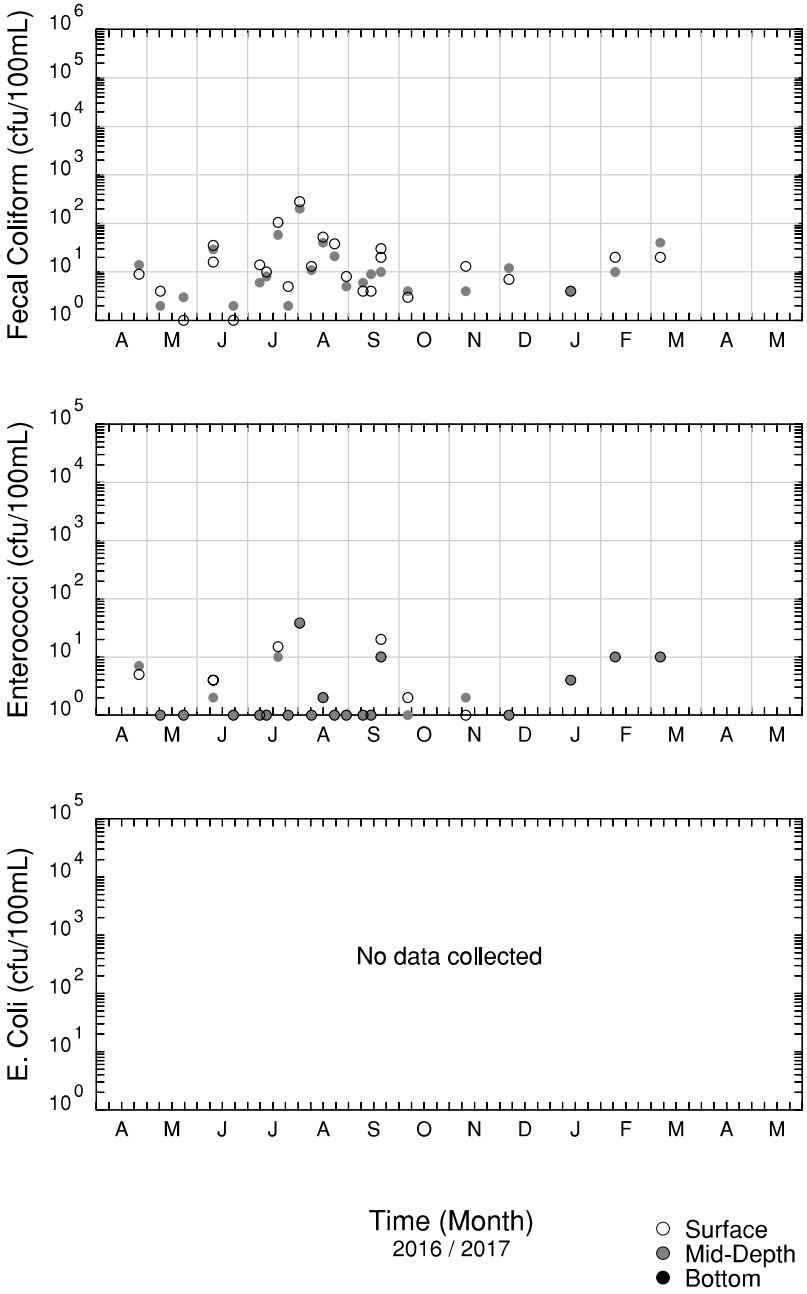
Time (Month)
2016 / 2017

Time (Month)
2016 / 2017

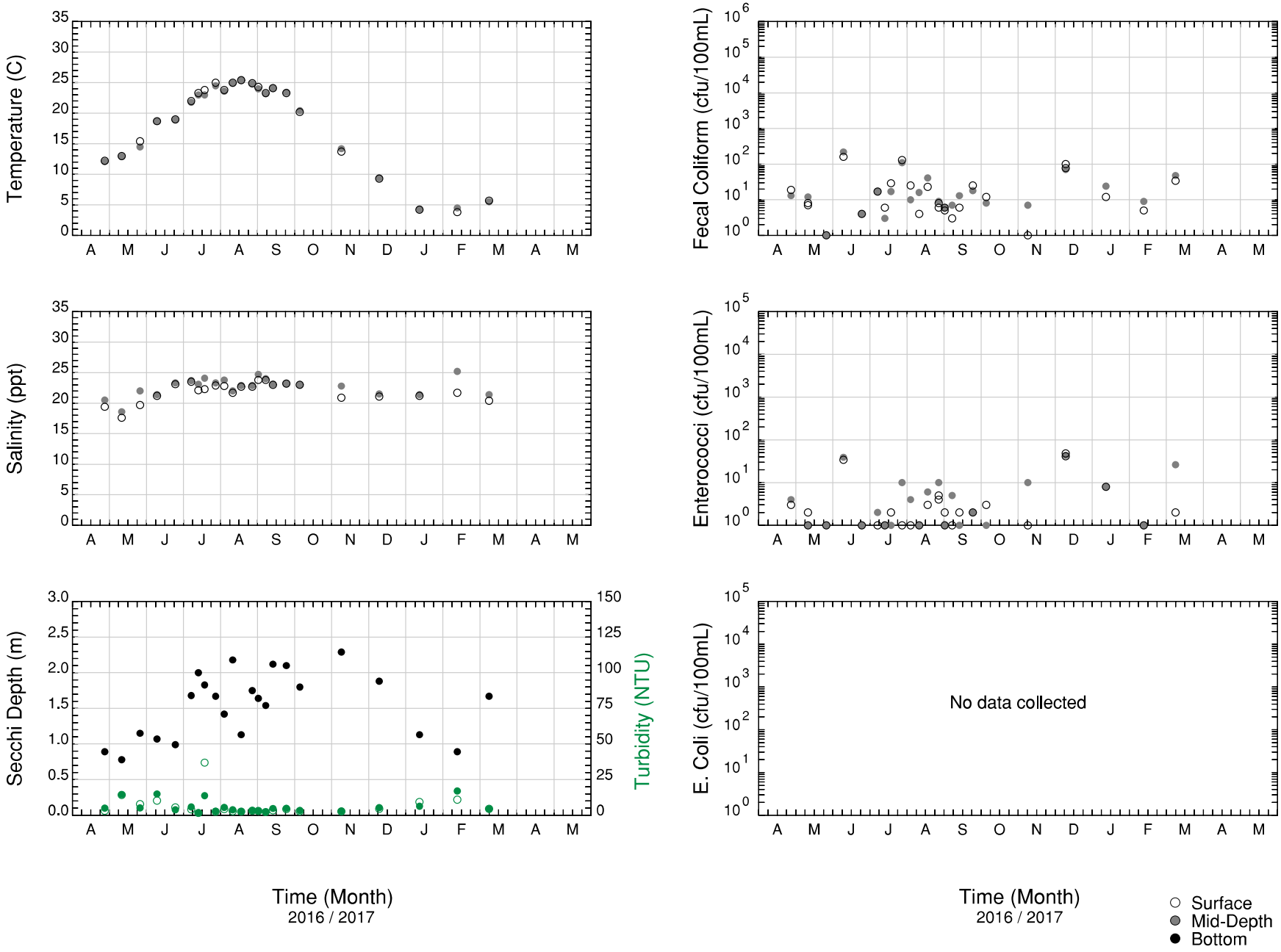
Surface
Mid-Depth
Bottom

Hudson River, Upper Bay, Upper Bay, B9, (SE2)



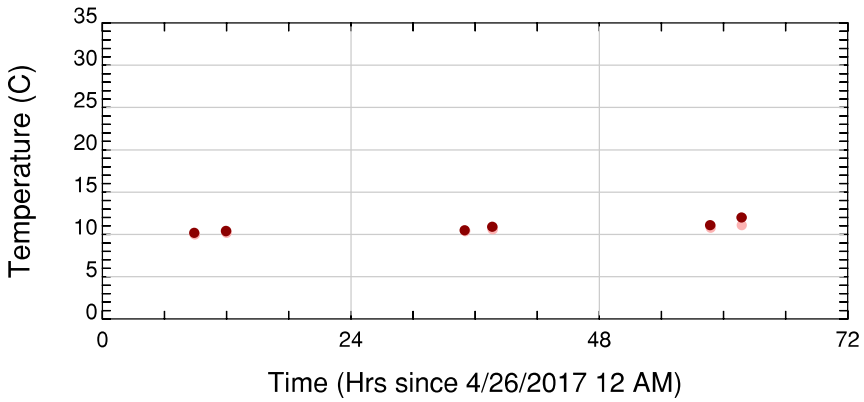


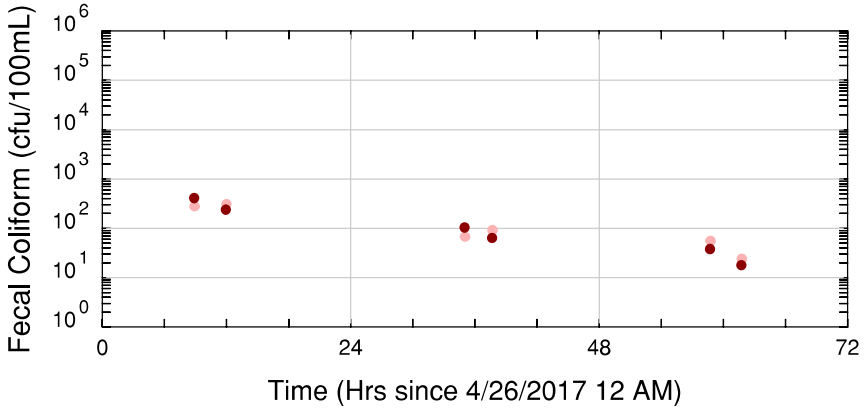
Hudson River, Upper Bay, Upper Bay, B20, (SE3)

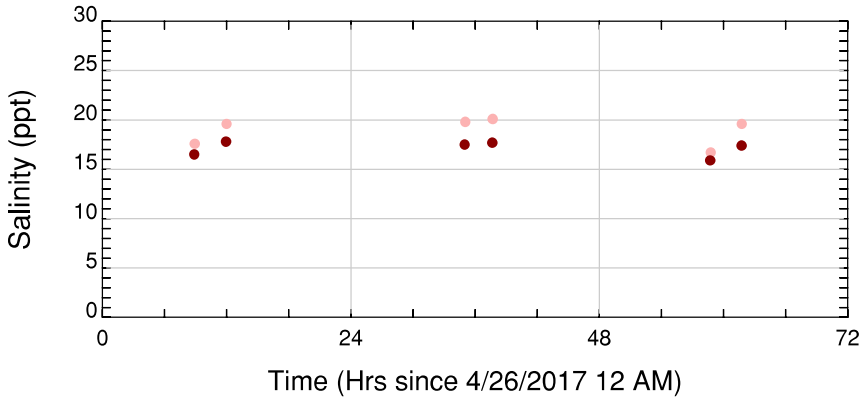


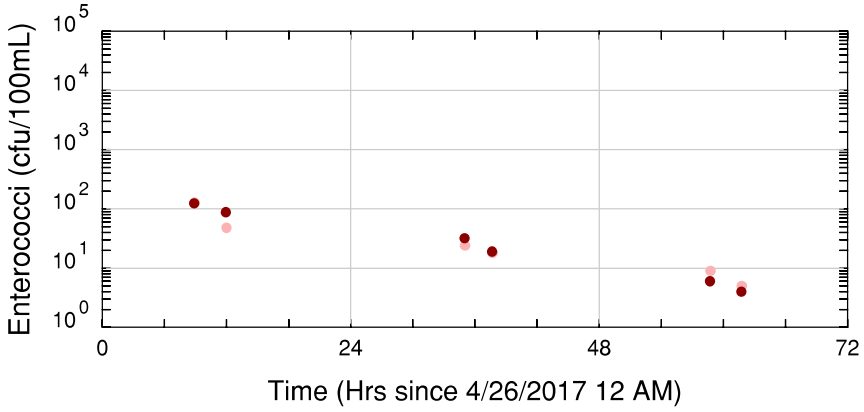
Hudson River, Upper Bay, Upper Bay, B26, (SE2)

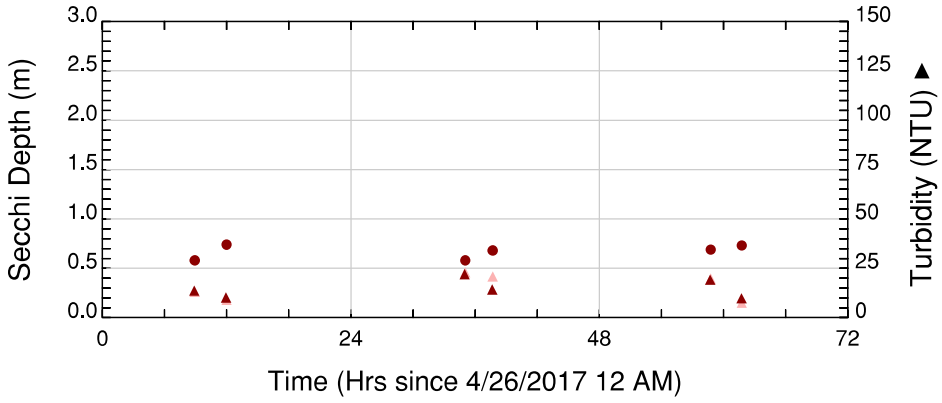
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

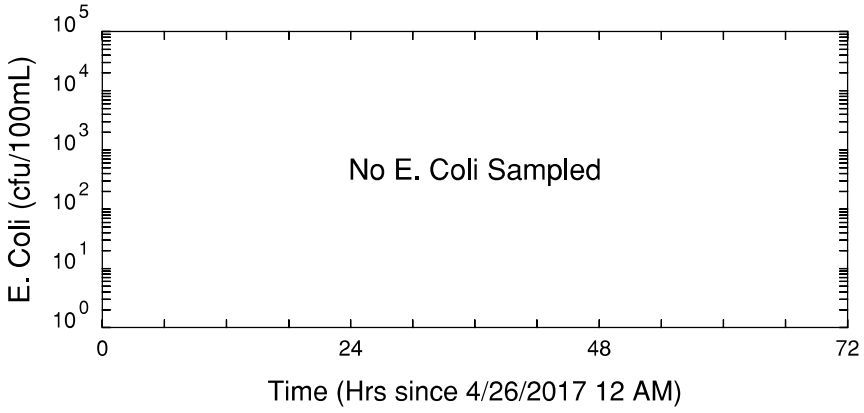






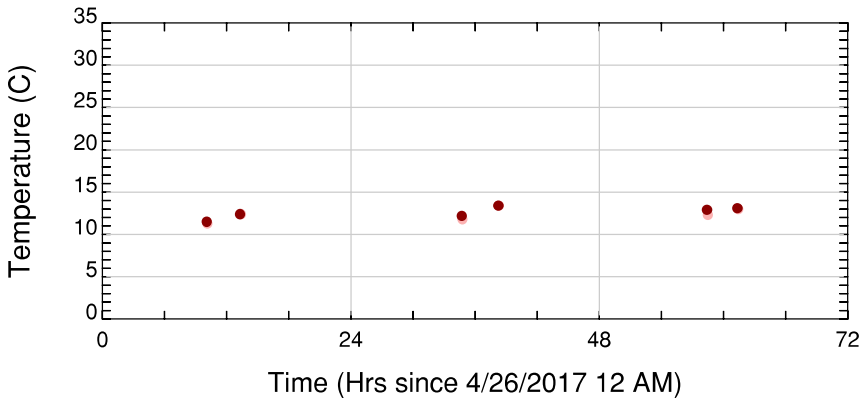


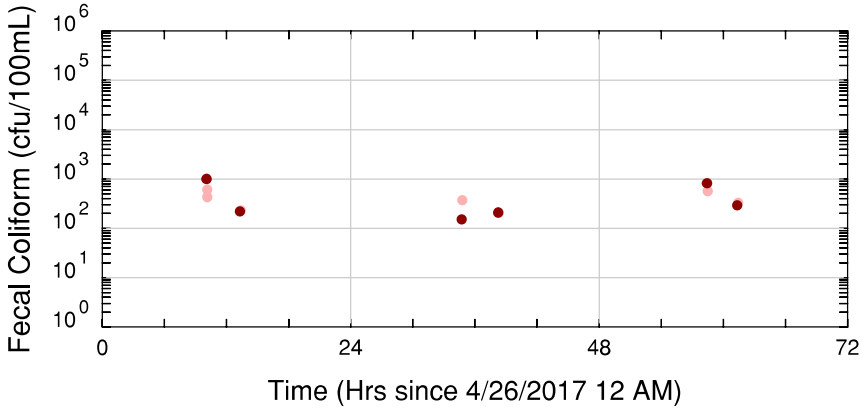


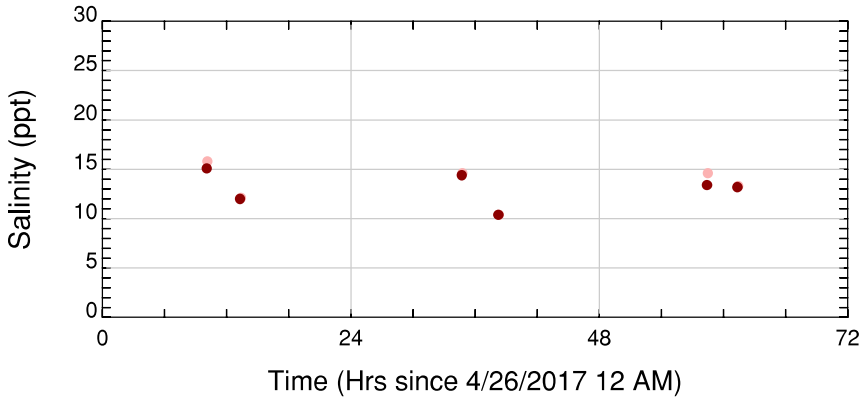


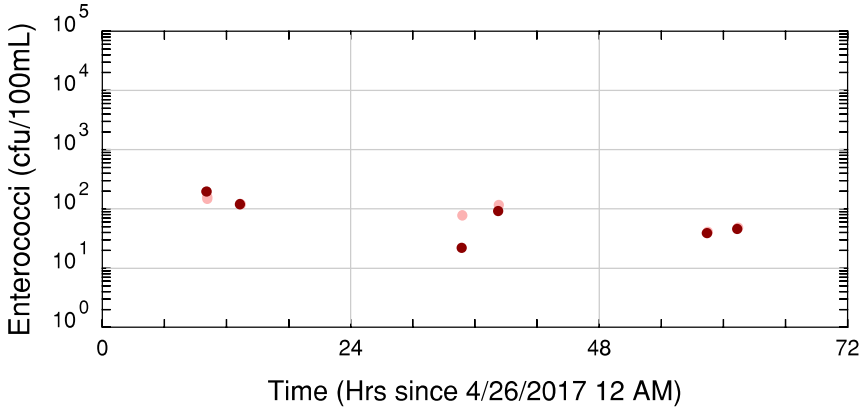
Hackensack River & Tributaries, Hackensack River, 15, (SE2)

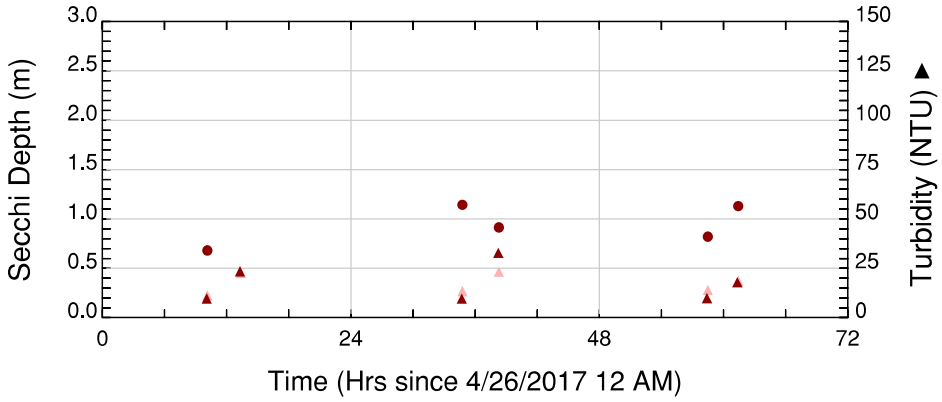
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

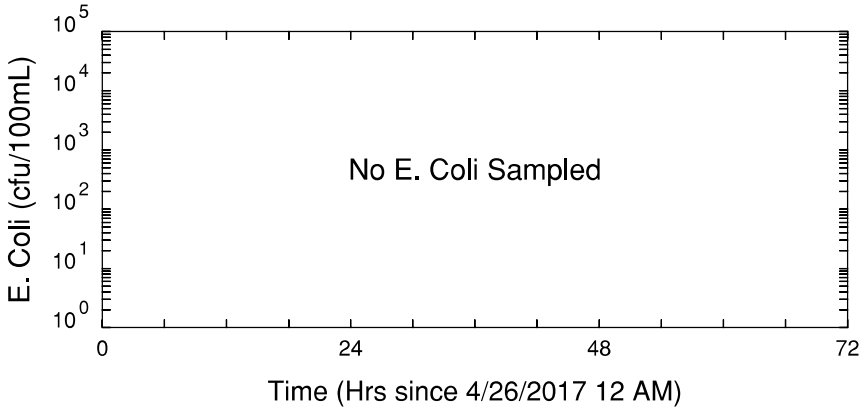






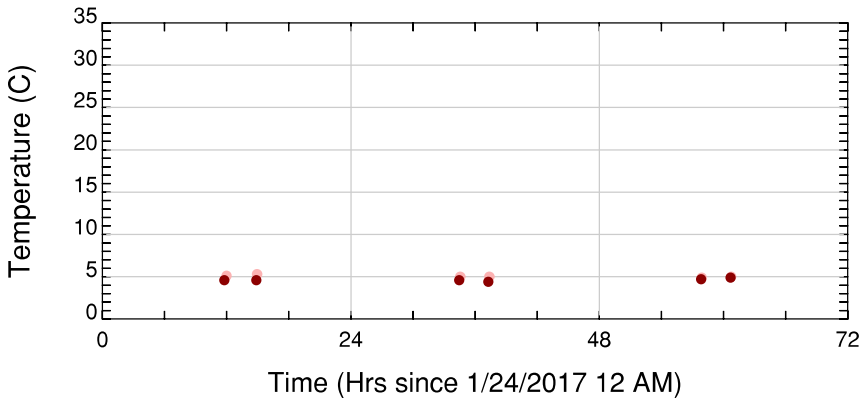


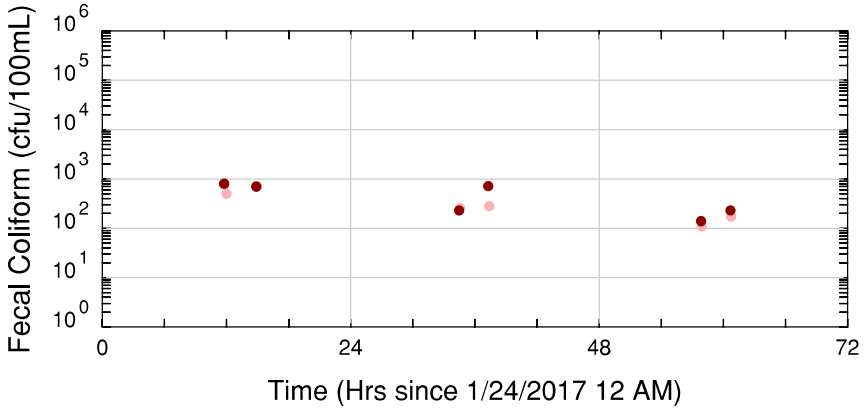


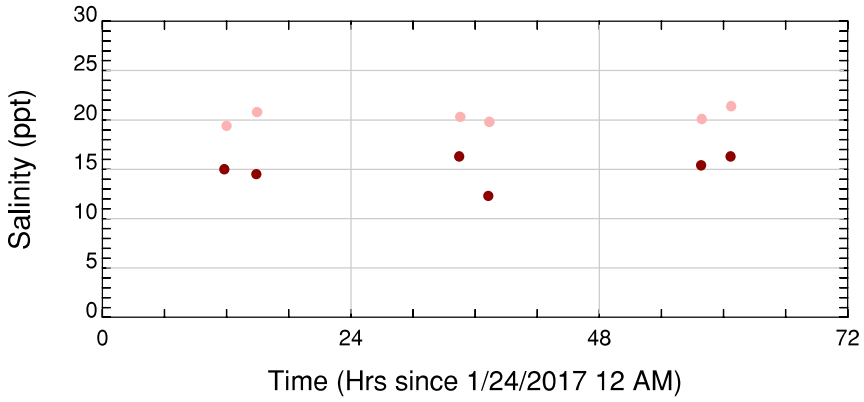


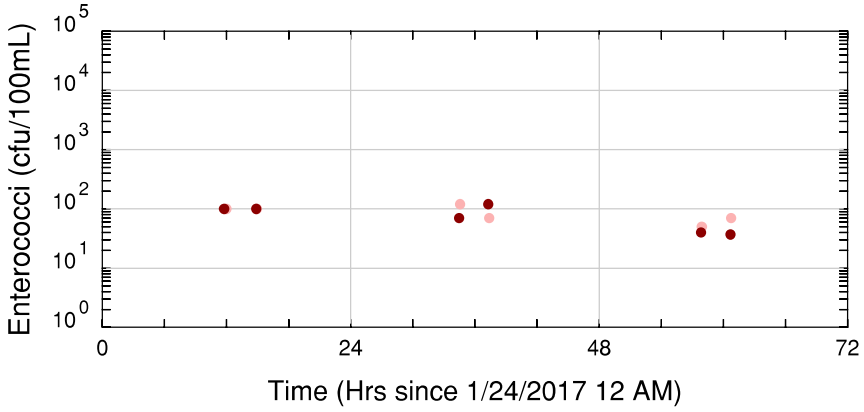
Hudson River, Upper Bay, Upper Bay, B26, (SE2)

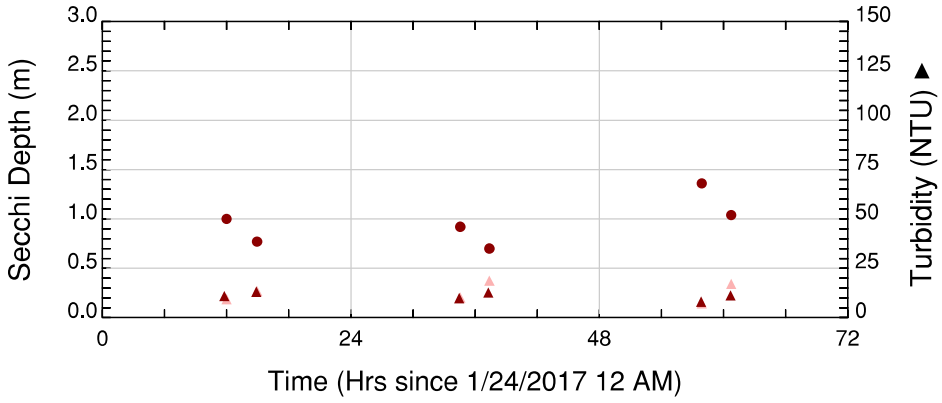
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

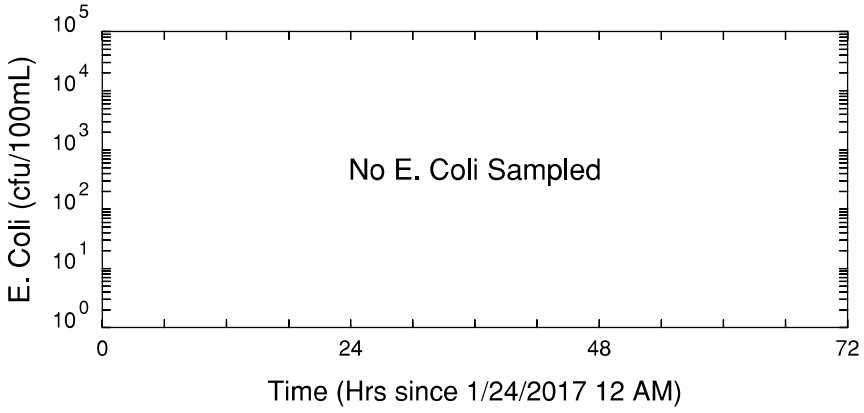






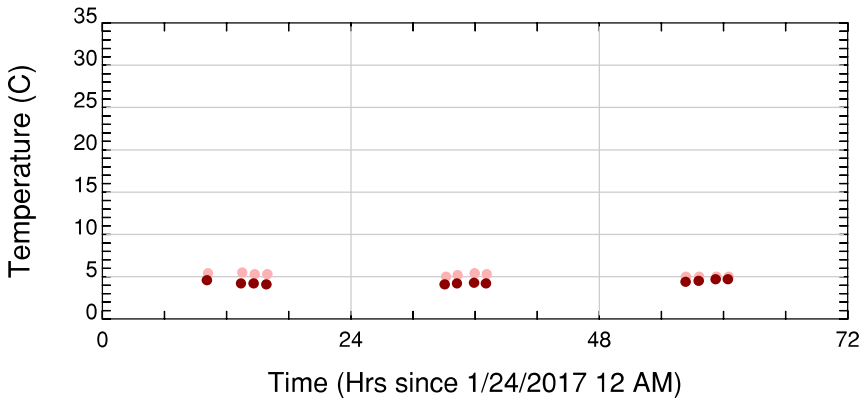


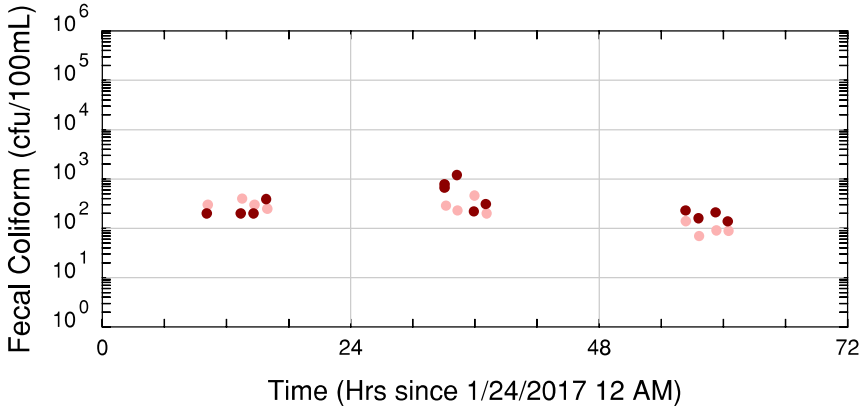


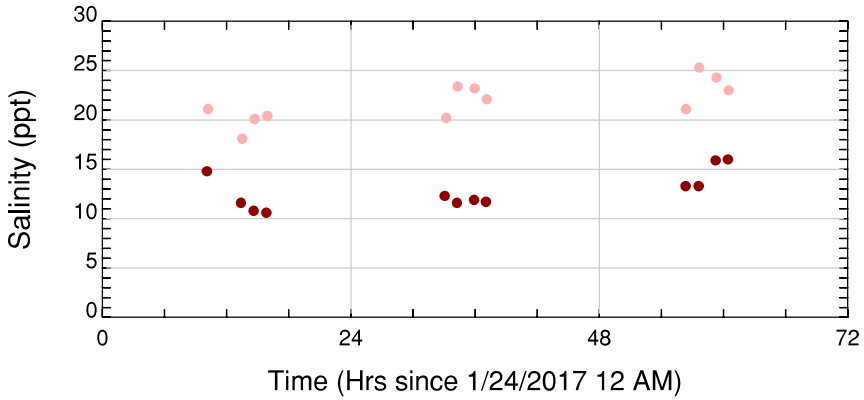


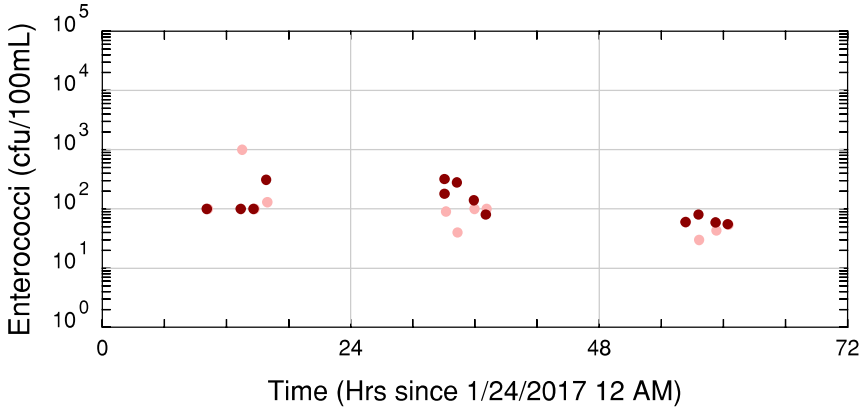
Hudson River, Upper Bay, Hudson River, 33, (SE2)

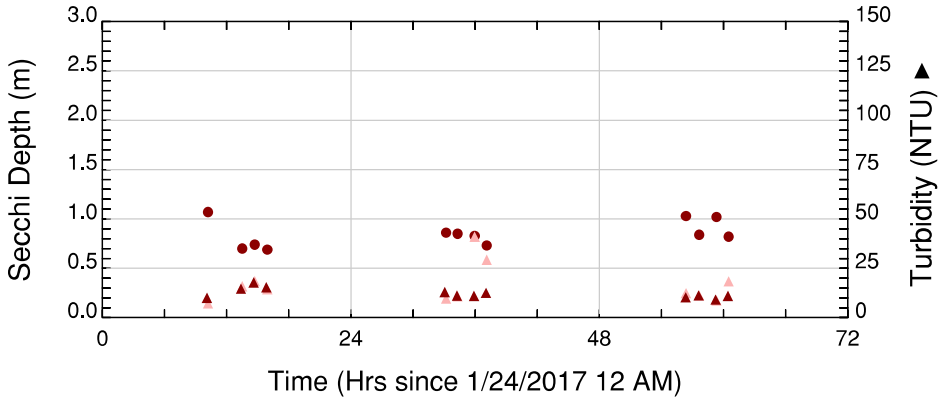
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

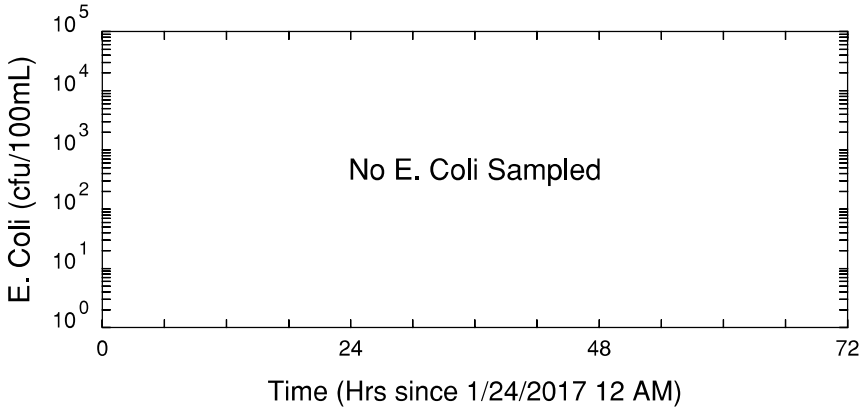






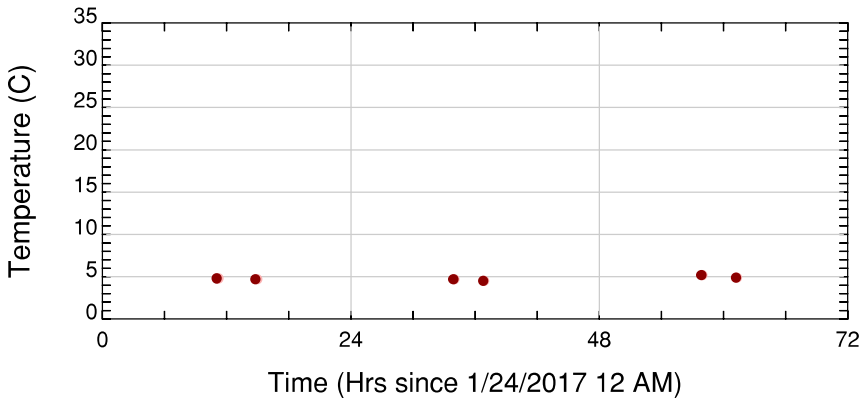


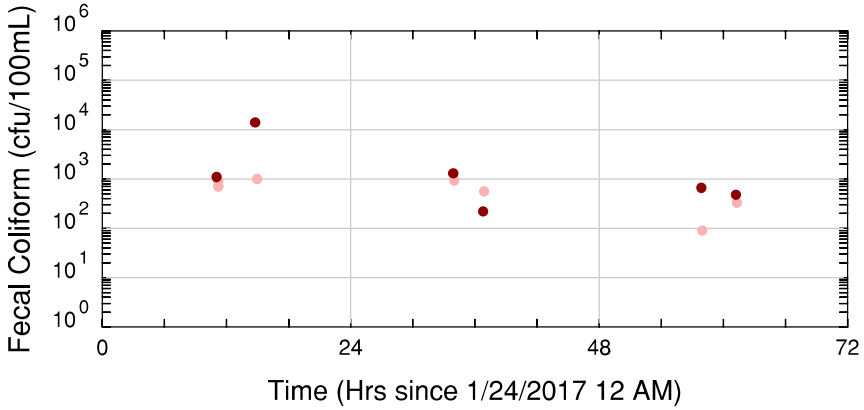


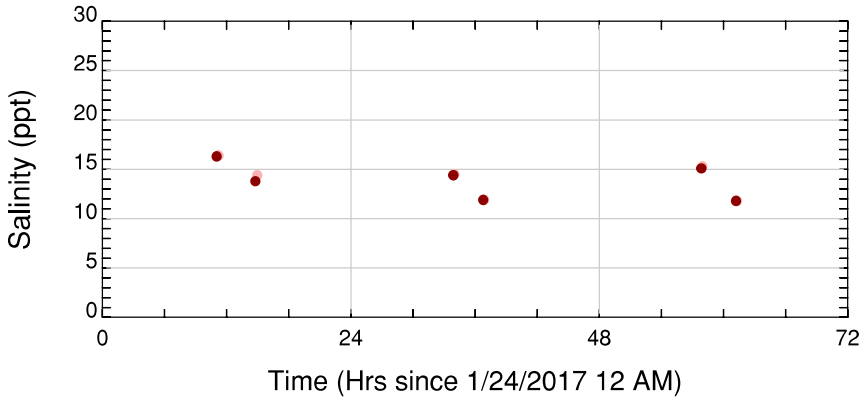


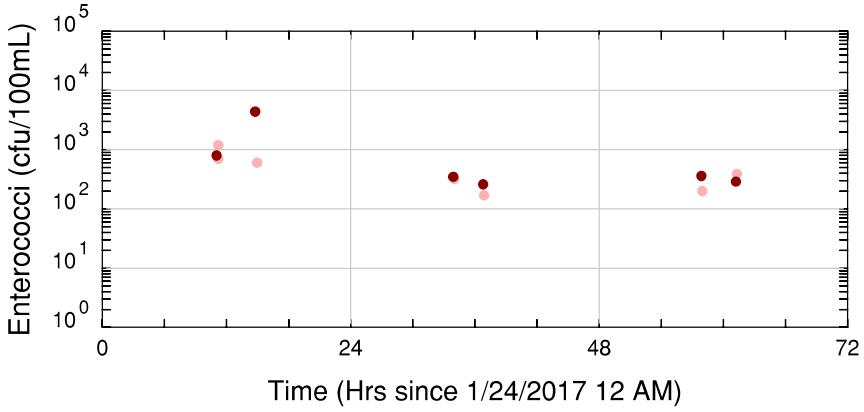
Hackensack River & Tributaries, Hackensack River, 15, (SE2)

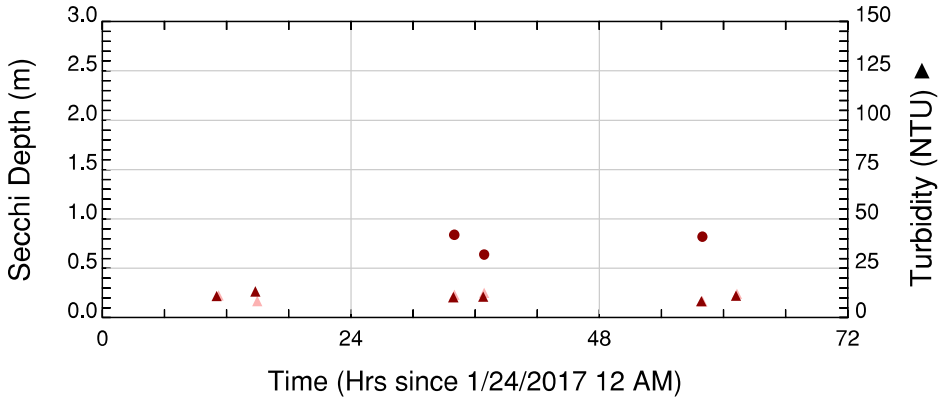
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

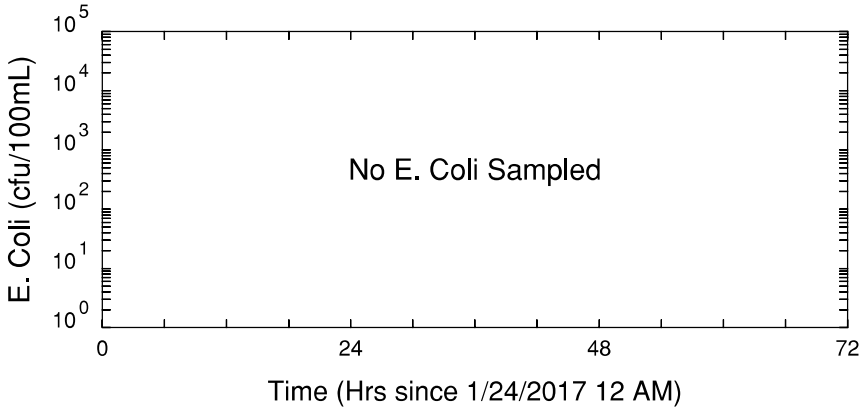






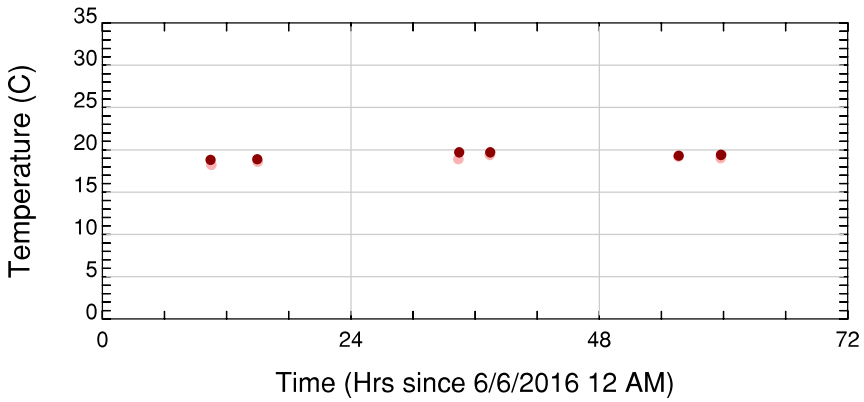


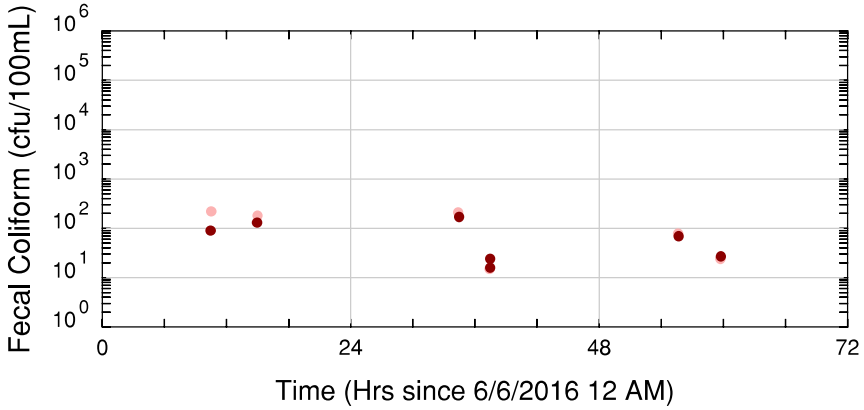


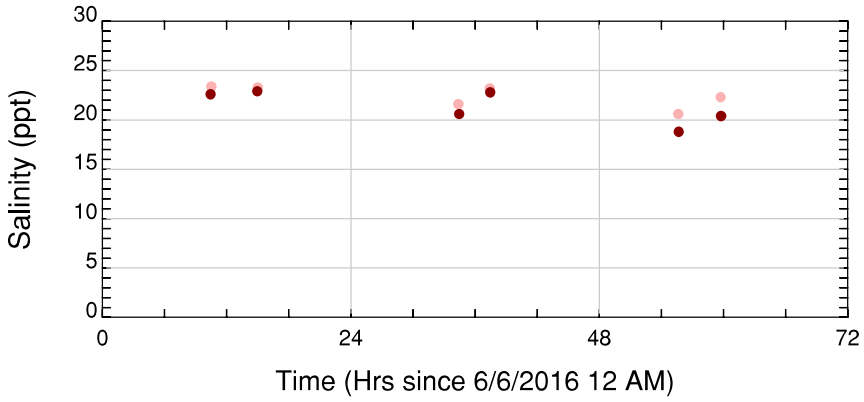


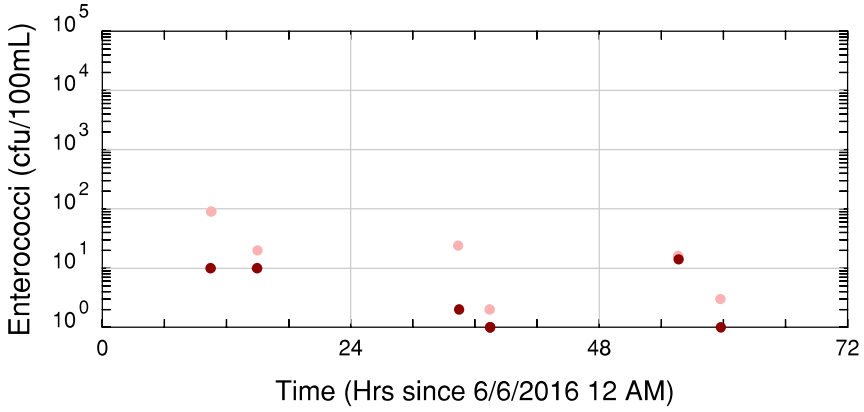
Hudson River, Upper Bay, Upper Bay, B26, (SE2)

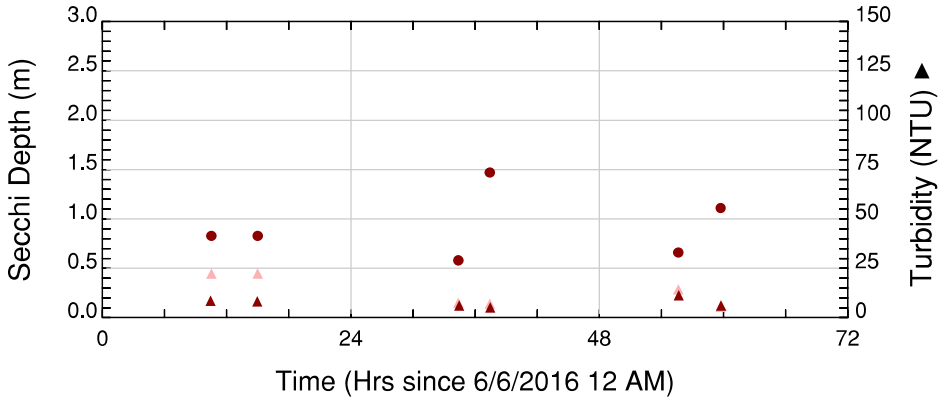
Surface/Mid-depth HDR
Surface/Mid/Bottom NJHDG

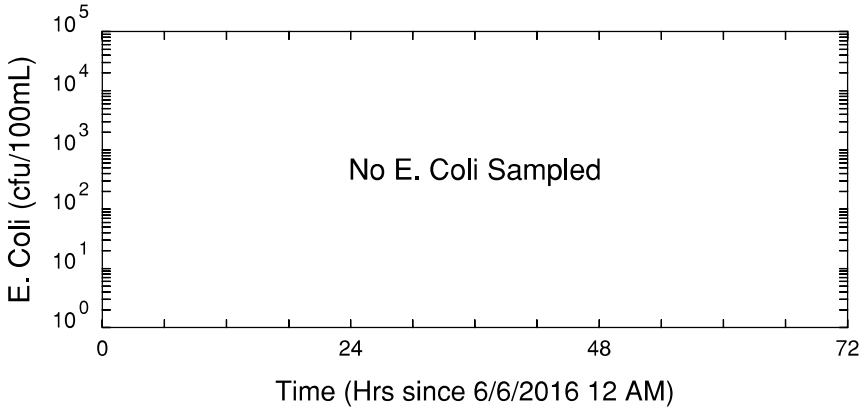












Appendix C
SIAR Costs

SIAR Alternitives Tank Costs

Construction Phase	Tank Location	Storage Tank			Present Worth Cost			
		Diameter (ft)	Tank Volume (MG)	Land Required (acres)	Total Capital Cost	Land Cost	Annual O&M Cost	Present Worth
Tank Size for 0 Overflows								
1	Secaucus / Manhattan	160	20	0.795	$138,350,000	$4,070,000	$33,470,000	$ 175,900,000
2	St. Paul's / Van Winkle / Broadway	134	14	0.614	$ 88,640,000	$3,140,000	$25,610,000	$ 117,400,000
3	York/Grand & Essex	134	14	0.614	$ 82,830,000	$3,140,000	$25,610,000	$ 111,590,000
4	Mill Creek & Pine	176	24	1.622	$253,530,000	$8,310,000	$71,990,000	$ 333,830,000
5	Second / Sixth	116	10	0.500	$ 64,430,000	$2,560,000	$20,890,000	$ 87,880,000
6	Sip / Duncan / Clendenny / Claremont / Fisk	243	45	1.548	$276,410,000	$7,930,000	$68,440,000	$ 352,790,000
7	Danforth & Mina	176	24	0.924	$141,250,000	$4,730,000	$39,220,000	$ 185,200,000
8	Fourteenth / Eighteenth	192	28	1.057	$166,200,000	$5,410,000	$45,280,000	$ 216,900,000
9	Brown / Richard / Claremont & Carteret	147	17	0.700	$ 91,740,000	$3,590,000	$16,770,000	$ 112,100,000
							Total Present Worth Cost	**$1,693,590,000**
Tank Size for 4 Overflows								
1	Secaucus / Manhattan	90	6	0.353	$ 70,780,000	$1,810,000	$ 1,000,000	$ 87,770,000
2	St. Paul's / Van Winkle / Broadway	100	7	0.406	$ 54,470,000	$2,080,000	$ 1,070,000	$ 72,910,000
3	York/Grand & Essex	80	5	0.305	$ 35,830,000	$1,560,000	$ 850,000	$ 50,280,000
4	Mill Creek & Pine	140	15	0.651	$ 88,060,000	$3,330,000	$ 1,790,000	$ 118,590,000
5	Second / Sixth	60	2	0.218	$ 21,700,000	$1,120,000	$ 610,000	$ 32,150,000
6	Sip / Duncan / Clendenny / Claremont / Fisk	186	26	1.004	$182,000,000	$5,140,000	$ 2,820,000	$ 230,030,000
7	Danforth & Mina	104	8	0.428	$ 62,740,000	$2,190,000	$ 1,180,000	$ 82,900,000
8	Fourteenth / Eighteenth	120	10	0.521	$ 75,040,000	$2,670,000	$ 1,350,000	$ 98,310,000
9	Brown / Richard / Claremont & Carteret	100	7	0.406	$ 91,740,000	$2,080,000	$ 1,100,000	$ 110,590,000
							Total Present Worth Cost	**$ 883,530,000**
Tank Size for 8 Overflows								
1	Secaucus / Manhattan	85	5.56	0.329	$ 67,650,000	$1,680,000	$ 940,000	$ 83,670,000
2	St. Paul's / Van Winkle / Broadway	80	4.89	0.305	$ 43,540,000	$1,560,000	$ 880,000	$ 58,510,000
3	York/Grand & Essex	80	4.51	0.305	$ 35,830,000	$1,560,000	$ 850,000	$ 50,280,000
4	Mill Creek & Pine	140	14.97	0.651	$ 88,070,000	$3,330,000	$ 1,790,000	$ 118,600,000
5	Second / Sixth	60	1.80	0.218	$ 21,170,000	$1,120,000	$ 600,000	$ 31,470,000
6	Sip / Duncan / Clendenny / Claremont / Fisk	181	25.11	0.962	$175,320,000	$4,930,000	$ 2,700,000	$ 221,330,000
7	Danforth & Mina	104	8.22	0.428	$ 62,740,000	$2,190,000	$ 1,180,000	$ 82,900,000
8	Fourteenth / Eighteenth	120	8.46	0.521	$ 66,490,000	$2,670,000	$ 1,200,000	$ 87,450,000
9	Brown / Richard / Claremont & Carteret	100	5.58	0.406	$ 82,840,000	$2,080,000	$ 940,000	$ 99,270,000
							Total Present Worth Cost	**$ 833,480,000**
Tank Size for 12 Overflows								
1	Secaucus / Manhattan	80	4.51	0.305	$ 62,330,000	$1,560,000	$ 850,000	$ 76,790,000
2	St. Paul's / Van Winkle / Broadway	80	4.14	0.305	$ 39,740,000	$1,560,000	$ 810,000	$ 53,680,000
3	York/Grand & Essex	80	4.14	0.305	$ 33,930,000	$1,560,000	$ 810,000	$ 47,870,000
4	Mill Creek & Pine	120	11.00	0.521	$ 67,990,000	$2,670,000	$ 1,430,000	$ 92,420,000
5	Second / Sixth	60	1.59	0.218	$ 20,100,000	$1,120,000	$ 580,000	$ 30,110,000
6	Sip / Duncan / Clendenny / Claremont / Fisk	153	17.96	0.743	$139,180,000	$3,810,000	$ 2,060,000	$ 174,280,000
7	Danforth & Mina	100	7.05	0.406	$ 56,800,000	$2,080,000	$ 1,070,000	$ 75,250,000
8	Fourteenth / Eighteenth	102	6.11	0.417	$ 54,630,000	$2,080,000	$ 990,000	$ 71,790,000
9	Brown / Richard / Claremont & Carteret	100	5.58	0.406	$ 82,840,000	$2,130,000	$ 940,000	$ 99,330,000
							Total Present Worth Cost	**$ 721,520,000**
Tank Size for 20 Overflows								
1	Secaucus / Manhattan	80	3.68	0.305	$ 58,150,000	$1,560,000	$ 770,000	$ 71,470,000
2	St. Paul's / Van Winkle / Broadway	80	3.01	0.305	$ 34,040,000	$1,560,000	$ 710,000	$ 46,440,000
3	York/Grand & Essex	80	1.80	0.305	$ 22,150,000	$1,560,000	$ 600,000	$ 32,900,000
4	Mill Creek & Pine	100	5.29	0.406	$ 39,130,000	$2,080,000	$ 920,000	$ 55,160,000
5	Second / Sixth	48	0.74	0.173	$ 15,850,000	$ 890,000	$ 510,000	$ 24,470,000
6	Sip / Duncan / Clendenny / Claremont / Fisk	120	10.15	0.521	$ 99,700,000	$2,670,000	$ 1,350,000	$ 122,980,000
7	Danforth & Mina	80	4.32	0.305	$ 43,030,000	$1,560,000	$ 830,000	$ 57,220,000
8	Fourteenth / Eighteenth	80	3.20	0.305	$ 39,910,000	$1,560,000	$ 730,000	$ 52,560,000
9	Brown / Richard / Claremont & Carteret	80	3.20	0.305	$ 70,780,000	$1,560,000	$ 730,000	$ 83,440,000
							Total Present Worth Cost	**$ 546,640,000**

SIAR Alternitives Tank Costs

Construction Phase	Tank Location	Storage Tank			Present Worth Cost			
		Diameter (ft)	Tank Volume (MG)	Land Required (acres)	Total Capital Cost	Land Cost	Annual O&M Cost	Present Worth
88.3% Capture Alternative								
1	Secaucus / Manhattan	90	6.18	0.353	$ 70,780,000	$1,810,000	$ 1,000,000	$ 87,770,000
2	St. Paul's / Van Winkle / Broadway	100	7.05	0.406	$ 54,470,000	$2,080,000	$ 1,070,000	$ 72,910,000
3	Sip / Duncan / Clendenny / Claremont / Fisk	120	10.15	0.521	$ 99,700,000	$2,670,000	$ 1,350,000	$ 122,980,000
4	Danforth & Mina	80	4.32	0.305	$ 43,030,000	$1,560,000	$ 830,000	$ 57,220,000
5	Fourteenth / Eighteenth	80	3.20	0.305	$ 39,910,000	$1,560,000	$ 730,000	$ 52,560,000
							Total Present Worth Cost	**$ 393,440,000**
4 Tank Scenario								
1	Secaucus / Manhattan	90	6.18	0.353	$ 70,780,000	$1,810,000	$ 1,000,000	$ 87,770,000
2	St. Paul's / Van Winkle / Broadway	100	7.05	0.406	$ 54,470,000	$2,080,000	$ 1,070,000	$ 72,910,000
6	Sip / Duncan / Clendenny / Claremont / Fisk	186	26.44	1.004	$139,180,000	$3,810,000	$ 2,060,000	$ 230,030,000
7	Danforth & Mina	104	8.22	0.428	$ 56,800,000	$2,080,000	$ 1,070,000	$ 82,900,000
							Total Present Worth Cost	**$ 473,610,000**
6 Tank Scenario								
1	Secaucus / Manhattan	90	6.18	0.353	$ 70,780,000	$1,810,000	$ 1,000,000	$ 87,770,000
2	St. Paul's / Van Winkle / Broadway	100	7.05	0.406	$ 54,470,000	$2,080,000	$ 1,070,000	$ 72,910,000
4	Mill Creek & Pine	100	5.29	0.406	$ 39,130,000	$2,080,000	$ 920,000	$ 55,160,000
6	Sip / Duncan / Clendenny / Claremont / Fisk	120	10.15	0.521	$ 99,700,000	$2,670,000	$ 1,350,000	$ 122,980,000
7	Danforth & Mina	80	4.32	0.305	$ 43,030,000	$1,560,000	$ 830,000	$ 57,220,000
9	Brown / Richard / Claremont & Carteret	80	3.20	0.305	$ 70,780,000	$1,560,000	$ 730,000	$ 83,440,000
							Total Present Worth Cost	**$ 479,480,000**

Green Infrastructure Alternative: 7% of Impervious Area Controled Cost				
Description	**Estimated Quantities**	**Unit Cost**	**Units**	**Total**
Green Infrastructure Total Construction Cost	188	$157,800	AC.	$ 29,670,000
Total Cost with Contingency (25%)				$ 37,090,000
Overhead and Profit (15%)				$ 5,560,000
Legal and Engineering Costs (20%)				$ 7,420,000
Total Capital Cost				**$ 50,070,000**
Maintenance Green Infrastructure				$ 1,500,000
Annual O & M Cost				$ 1,500,000
***Present Worth O & M Cost**				**$ 22,900,000**
***Total Present Worth**				**$ 72,970,000**

*20 years life cycle costs for operation and maitenance with an interest rate of 2.75% for present value calculation (P/A = 15.227)

Sewer Separation (SS) Bates Street Cost					
Description	**Estimated Quantities**	**Unit Cost**	**Units**	**Before Conversion**	**Total**
Bates Street Sewer Separation (modeled alternative)					
Sewer Separation Total Construction Cost	2,845	$ 2,800	L.F.	$ 5,024,270.00	$ 7,880,000
Total Cost with Contingency (25%)					$ 9,850,000
Overhead and Profit (15%)					$ 1,480,000
Legal and Engineering Costs (20%)					$ 1,970,000
Total Capital Cost					**$ 13,290,000**
Annual O & M Cost					$ 160,000
***Present Worth O & M Cost**					**$ 2,400,000**
***Total Present Worth**					**$ 15,690,000**

Description	Estimated Quantities	Unit Cost	Units	Total
CIPPL Rehabilitation of Existing 12 inch Sewer Pipes	2,100	50	L.F.	$ 169,000
CIPPL Rehabilitation of Existing 18 inch Sewer Pipes	32,000	70	L.F.	$ 3,896,000
CIPPL Rehabilitation of Existing 24 inch Sewer Pipes	6,970	95	L.F.	$ 1,140,000
CIPPL Rehabilitation of Existing 30 inch Sewer Pipes	12,460	130	L.F.	$ 2,769,000
CIPPL Rehabilitation of Existing 36 inch Sewer Pipes	6,600	200	L.F.	$ 1,869,000
CIPPL Rehabilitation of Existing 42 inch Sewer Pipes	9,390	260	L.F.	$ 3,145,000
CIPPL Rehabilitation of Existing 48 inch Sewer Pipes	10,360	300	L.F.	$ 4,219,000
CIPPL Rehabilitation of Existing 54 inch Sewer Pipes	2,440	380	L.F.	$ 1,127,000
CIPPL Rehabilitation of Existing 60 inch Sewer Pipes	1,950	450	L.F.	$ 1,117,000
CIPPL Rehabilitation of Existing 66 inch Sewer Pipes	920	540	L.F.	$ 604,000
CIPPL Rehabilitation of Existing 72 inch Sewer Pipes	960	630	L.F.	$ 714,000
CIPPL Rehabilitation of Existing 78 inch Sewer Pipes	590	730	L.F.	$ 497,000
CIPPL Rehabilitation of Existing 84 inch Sewer Pipes	760	830	L.F.	$ 706,000
CIPPL Rehabilitation of Existing 96 inch Sewer Pipes	390	1070	L.F.	$ 452,000
Install layflat hose	500	0.3	L.F.	$ 150
Breakdown/Clean/Load layflat hose	4,000	0.5	L.F.	$ 2,000
6" pump rental	260	650	Wk	$ 169,000
6" pump fuel cost	43,680	18	HR	$ 786,240
Pump operator cost	43,680	50	HR	$ 2,184,000
Construction Total Cost				$ 25,565,390.00
Total Cost with Contingency (25%)				$ 31,956,737.50
Overhead and Profit (15%)				$ 4,793,510.63
Legal and Engineering Costs (20%)				$ 6,391,347.50
Total Capital Cost				**$ 43,141,596**
Sewer Maintenance **(Not Applicable to Replacement of Existing System)****				$ -
Annual O & M Cost				$ -
Total Present Worth O & M Cost				-
***Total Present Worth**				**$ -**
*Total O & M Cost				-
***Total Present Worth**				**$ 43,141,596**

*20 years life cycle costs for operation and maintenance with an interest rate of 2.75% for present value calculation (P/A = 15.227)

**Sewer maintenance is current annual cost that the JCMUA pays not and not a new project cost

Appendix D
Partial Sewer Separation Design Drawings

NOTES:

1. MAP REFERENCES:
   - JERSEY CITY TAX MAP
   - JCMUA SEWER MAP - SHEET NO. 20
   - JCMUA WATER MAPS
   - BOUNDARY AND TOPOGRAPHIC SURVEY, BATES STREET, PREPARED BY DRESDNER ROBIN, PROVIDED BY JCMUA, DRAWING NO. V-001, JOB NO. 706-17, DATED 2-02-2018
   - THIS DOCUMENT IS NOT A SURVEY. ALL LOCATIONS SHOWN ON THIS DOCUMENT ARE APPROXIMATE AND MUST BE VERIFIED BY A LICENSED LAND SURVEYOR.
   - PRIOR TO ADVANCING THIS CONCEPTUAL INFRASTRUCTURE PLAN, A COMPLETE TOPOGRAPHIC AND BOUNDARY SURVEY MUST BE COMPLETED FOR THE BATES STREET REDEVELOPMENT AREA.
2. CONCEPTUAL DESIGN BASED ON DISCUSSION WITH JCMUA AND AS OUTLINED IN THE BATES STREET REDEVELOPMENT PLAN
3. SIDEWALKS SHALL BE A MINIMUM OF 15' WIDE BETWEEN FACE OF CURB AND FACE OF BUILDING
4. ONE WAY STREETS SHALL BE 30' WIDE CURB TO CURB. TWO WAY STREETS SHALL BE 36' WIDE CURB TO CURB.
5. COLDEN, BROOK AND BRIGHT STREETS SHALL HAVE BIO-PLANTERS INSTALLED ON BOTH SIDES OF THE STREET AT THE INTERSECTIONS OF BATES STREET AND CENTER STREET.
6. THE 15' WIDE SIDEWALKS SHALL INCLUDE A 4' WIDE PERVIOUS PAVER SIDEWALK BEHIND THE CURB ON ALL STREETS WITHIN THE REDEVELOPMENT AREA.
7. THE BATES STREET REDEVELOPMENT PLAN MUST COMPLETE THE STUDY TO PROVIDE A SEPARATED SEWER SYSTEM, NEW STORM INFRASTRUCTURE AND NEW WATER SYSTEMS.
8. A NEW SANITARY SEWER SYSTEM CAN BE PROVIDED TO THE BATES STREET REDEVELOPMENT AREA BY INSTALLING A NEW STEEL CASING UNDER GRAND STREET AND CONNECTING INTO THE EXISTING 84" DIA. INTERCEPTOR SEWER. THIS WILL REMOVE SANITARY SEWER WASTE FROM THE COMBINED SEWER.
9. THE EXISTING 8" WATER MAINS CAN BE REPLACED WITH NEW 12" DIP WATER MAINS ON COLDEN, BROOK, BRIGHT, CENTER, AND BATES STREETS. THE NEW 12" DIP WATER MAINS CAN BE LOOPED AND CONNECTED INTO THE EXISTING 30" DISTRIBUTION WATER MAIN.
10. BATES, COLDEN, BROOK, BRIGHT AND CENTER STREETS CAN BE ELEVATED TO A MINIMUM ELEVATION OF 8. GRAND STREET ELEVATION WILL REMAIN THE SAME.
11. THE EXISTING BRICK SEWERS WILL BE REPLACED WITH NEW RCP STORM SEWERS.

BARBARA PL.
(EXISTING 2-WAY)
MERSELES STREET
(FUTURE ONE WAY)
PACIFIC AVENUE
NJ TURNPIKE - ROUTE 78
CENTER STREET
(ONE WAY)
BLOCK 15701
PSE&G SUBSTATION
GRAND STREET
MERSELES STREET
(ONE WAY)
48"X72" ERCP
BROOK STREET
(PAPER STREET)
NYTP RAMP
54" RCP
INVERT SIPHON
PROPOSED OPEN GREEN SPACE UNDER I- 78
NJ TURNPIKE - ROUTE 78
MERSELES STREET
48"X76" ERCP
24" RCP
42" CB
CHAMBER TO BE RECONSTRUCTED TO CONNECT NEW 54" RCP COMBINED SEWER
EXISTING 8" WM TO BE REPLACED WITH NEW 12" WATER MAINS (TYP.)
EXISTING 42" CB TO BE REMOVED
NJTP RAMP
(ONE WAY)
CENTER STREET
48" RCP
48" STEEL
MONTGOMERY STREET
BLOCK 13801
BLOCK 13802
BLOCK 13803
BLOCK 13805
COLDEN STREET
BROOK STREET
BRIGHT STREET
YORK STREET
(ONE WAY)
TERMINATE NEW SANITARY SEWER SYSTEM
48" ST (TO BE REMOVED)
12" PVC SAN
18" RCP STORM
24" RCP STORM
36" RCP STORM
12" DIP WM
(2) 12" G.V.
(3) 12" G.V.
BATES STREET
POTENTIAL OPEN GREEN SPACE
COLGATE STREET
TWIN 84" RCP (OUTFALL)
72" ST
GILCHRIST STREET
48" STEEL COMBINED SEWER TO BE REMOVED OR CAPPED AND ABANDONED
OLD COLONY SQUARE SHOPPING CENTER
BLOCK 12605
18" PVC SAN
48" RCP STORM
BRUNSWICK STREET
MONMOUTH STREET
84" INTERCEPTOR MAIN
DRIVEWAY
RWJ BARNABAS-HEALTH
JERSEY CITY MEDICAL CENTER
SCHOOL
MATCH LINE
MATCH LINE

LEGEND:
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATER MAIN
- PROPOSED COMBINED SEWER

BATES STREET REDEVELOPMENT AREA
BRIGHT STREET ALTERNATIVE

DATE: AUGUST 24, 2018
REVISED: OCTOBER 3, 2018
REVISED: OCTOBER 17, 2018

60 30 0 60
SCALE: 1"=60'

MATCH LINE

MATCH LINE

DRIVEWAY

GRAND STREET

RWJ BARNABAS-HEALTH
JERSEY CITY MEDICAL CENTER

SCHOOL

MONMOUTH STREET

VARICK STREET

JERSEY AVENUE

DRIVEWAY

MEADOW LANE (PAPER STREET)

PARKING LOT

(PAPER STREET)

MORRIS BOULEVARD

NJ TRANSIT R.O.W.

REGENT STREET

DORSET STREET (PAPER STREET)

RIVER STREET (PAPER STREET)

RIVER STREET

GRAND STREET

BRIGHT STREET

(ONE WAY)
YORK STREET

MONTGOMERY STREET

JERSEY AVENUE

VAN VORST PARK

NEW DOGHOUSE SANITARY MANHOLE

MH TO REMAIN AND BE RECONSTRUCTED

TWIN 54" CB TO BE REPLACED WITH 54" RCP

NEW SANITARY MH (TYP.)

90 LF OF NEW STEEL CASING UNDER GRAND STREET

84" INTERCEPTOR MAIN

12" PVC

60" RCP

36" RCP

24" DIP SAN

60" RCP STORM

60" RCP-SIPHON

48" RCP STORM

54" CB

30" CB

30" X 20" CB

48" X 36" CB

18" VP

18" RCP

BATES STREET REDEVELOPMENT AREA

BRIGHT STREET ALTERNATIVE

DATE: AUGUST 24, 2018
REVISED: OCTOBER 3, 2018
REVISED: OCTOBER 17, 2018

60 30 0 60
SCALE: 1"=60'