Metedeconk River Watershed Protection & Restoration Plan

2013 New Jersey Water Environment Association Annual Conference

Wednesday, May 15, 2013

Robert Karl, BTMUA

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Funded by the New Jersey Department of Environmental Protection Watershed Restoration Program

John S. Truhan Consulting Engineers, Inc.

Brick Township MUA
System Overview

- Provide drinking water to >100,000 people in Brick, Point Pleasant, Point Pleasant Beach, and Howell

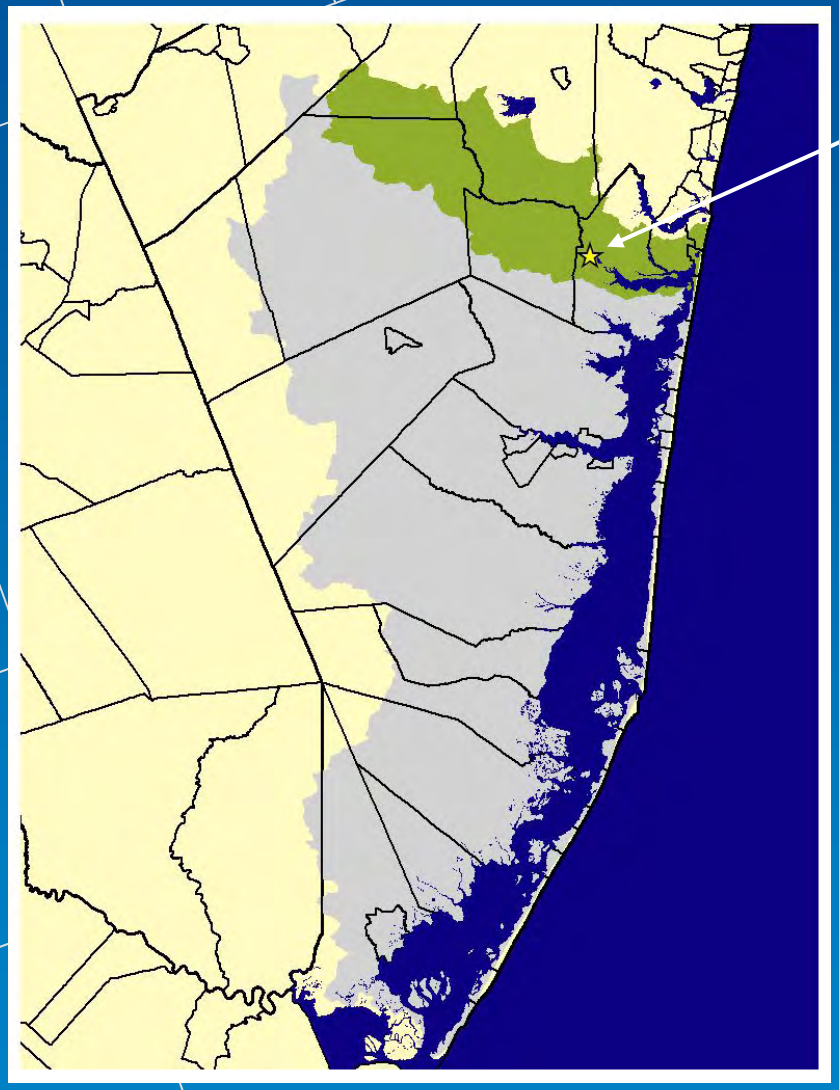
- 16 MGD conventional treatment plant
- Water Sources:
  - Metedeconk River surface water intake
  - 860 MG pumped raw water storage reservoir
  - Wells screened in the P-R-M, Kirkwood-Cohansey and Englishtown Aquifers
  - Aquifer Storage and Recovery (ASR) well

Brick Township MUA

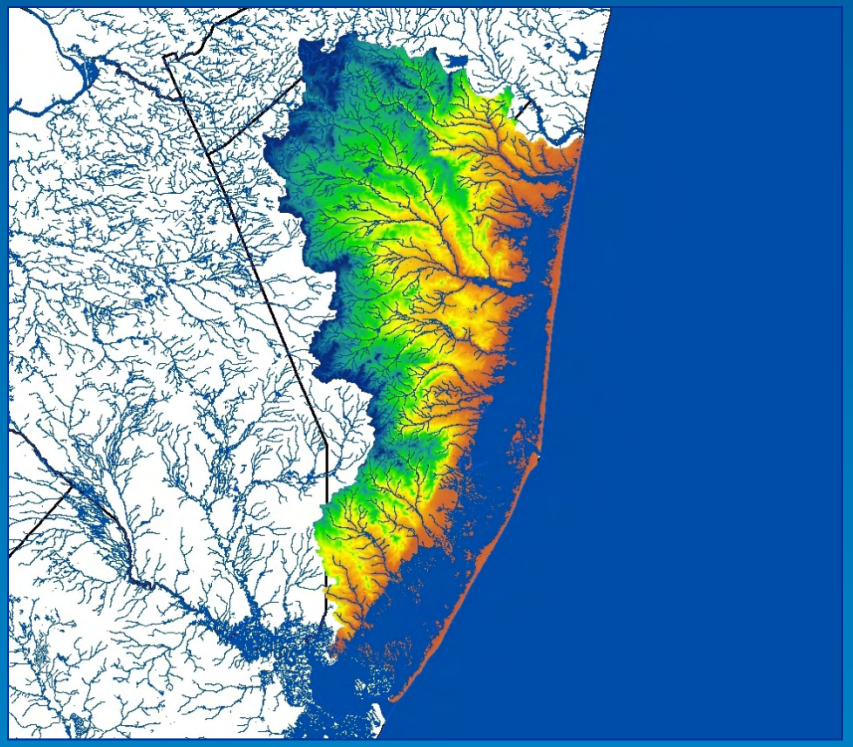
System Overview

- Metedeconk River is BTMUA's primary water supply source
  - Supplies approximately 70% of total source water
  - Brick Reservoir filled from Metedeconk River intake

BTMUA and Metedeconk Watershed in Relation to the Barnegat Bay Watershed



BTMUA

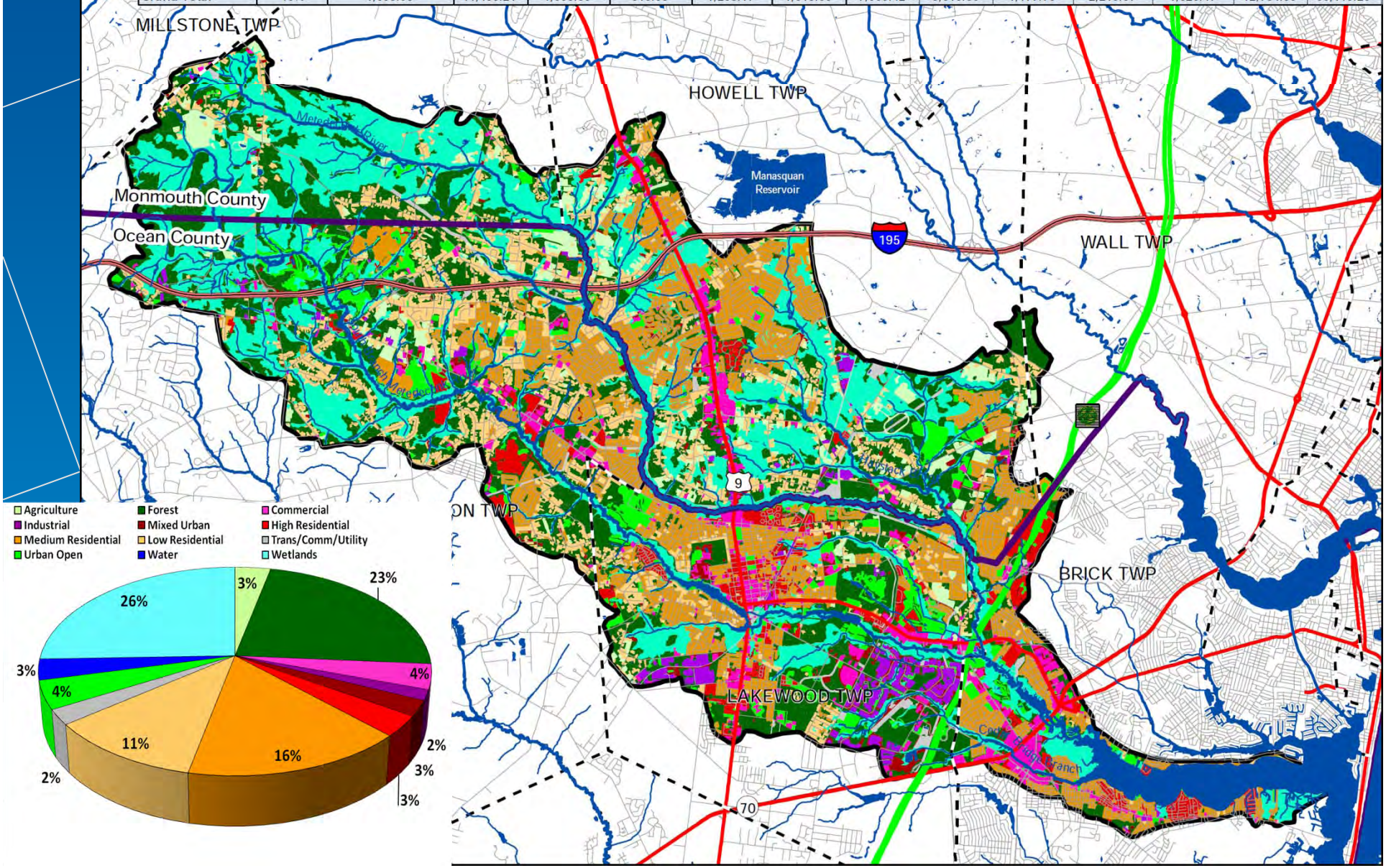


The Metedeconk River Watershed

- Northern-most watershed “naturally” contributing to the Barnegat Bay (part of National Estuary Program)
- Watershed characteristics are typical of the Barnegat Bay region:
  - Sandy, well-drained soils
  - Abundance of wetland areas
  - Gentle topography with few slopes > 5%

- Largely undisturbed riparian corridor
- Baseflow (i.e. groundwater stream discharge) accounts for roughly 70% of the flow in the Metedeconk River (100% during periods of low precipitation)
- Very few NJPDES discharges in basin (all minor, except MS4s)

Municipality	Percent Impervious	Acres												
		Agriculture	Forest	Commercial	Industrial	Mixed Urban	High Residential	Medium Residential	Low Residential	Trans/Comm /Utility	Urban Open	Water	Wetlands	Grand Total
Brick Township	24%	0.00	453.92	492.42	11.25	157.50	472.37	1,204.87	57.35	175.01	210.06	1,222.97	668.05	5,125.77
Freehold Township	2%	315.17	2,024.54	7.83	1.98	25.43	0.00	0.66	581.48	47.83	62.64	20.16	3,600.03	6,687.74
Howell Township	14%	814.72	2,525.13	490.50	107.81	271.12	153.97	2,834.67	1,634.88	297.61	382.43	66.66	3,545.27	13,124.77
Jackson Township	12%	404.29	3,625.38	274.36	92.36	256.56	331.23	1,773.17	2,499.23	288.64	654.95	100.91	3,443.23	13,744.30
Lakewood Township	22%	135.61	2,636.77	688.00	593.64	495.66	660.43	2,129.37	776.69	363.43	889.92	214.00	1,524.59	11,108.13
Millstone Township	10%	10.46	44.24	5.44	3.55	1.91	0.00	1.22	34.21	4.32	0.00	1.76	3.41	110.52
Wall Township	7%	15.33	143.23	0.00	0.00	0.00	0.00	21.46	26.96	0.93	10.06	0.00	0.00	217.98
Grand Total	15%	1,695.58	11,453.21	1,958.55	810.58	1,208.17	1,618.00	7,965.42	5,610.80	1,177.76	2,210.07	1,626.47	12,784.59	50,119.20



BTMUA Source Water Protection & Management Philosophy

- Health of aquatic systems is declining nationwide
- Acute/chronic anthropogenic impacts
- Water industry: More effective to protect source than rely solely upon WTP
- BTMUA relies on water quality/quantity of Metedeconk River and aquifers
- Obligation to protect our source water

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BRICK UTILITIES

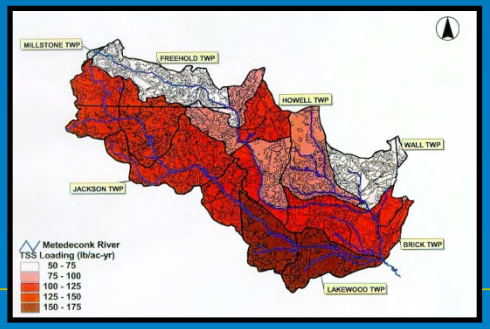
Past Metedeconk Watershed Protection Efforts

- BTMUA
  - Preliminary Metedeconk River Watershed Study (1989)
  - Metedeconk River Watershed Management Plan Phase I: Watershed Characterization and Preliminary Analysis (2000)
  - Trust for Public Land Source Water Stewardship Project (2003)
- OTHERS
  - Phase I Diagnostic – Feasibility Study of Lake Carasaljo (Lakewood Township, 2005)
  - Barnegat Bay Comprehensive Conservation and Management Plan – Barnegat Bay NEP (2004)
  - Barnegat Bay 2020 – A Vision for the Future of Conservation (Trust for Public Land; 2008)
  - Barnegat Bay NEP Strategic Plan 2008-2011 (BBNEP, 2008)

Metedeconk River Watershed Protection & Restoration Plan

Project Overview

- Funded by the New Jersey Department of Environmental Protection's Watershed Restoration Program
- $666,000 grant from NJDEP
  - $200,000 for Metedeconk plan development
  - $466,000 for implementation of highest-priority projects identified in the plan
- $91,500 BTMUA in-kind match for planning phase



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Project Overview (cont'd)

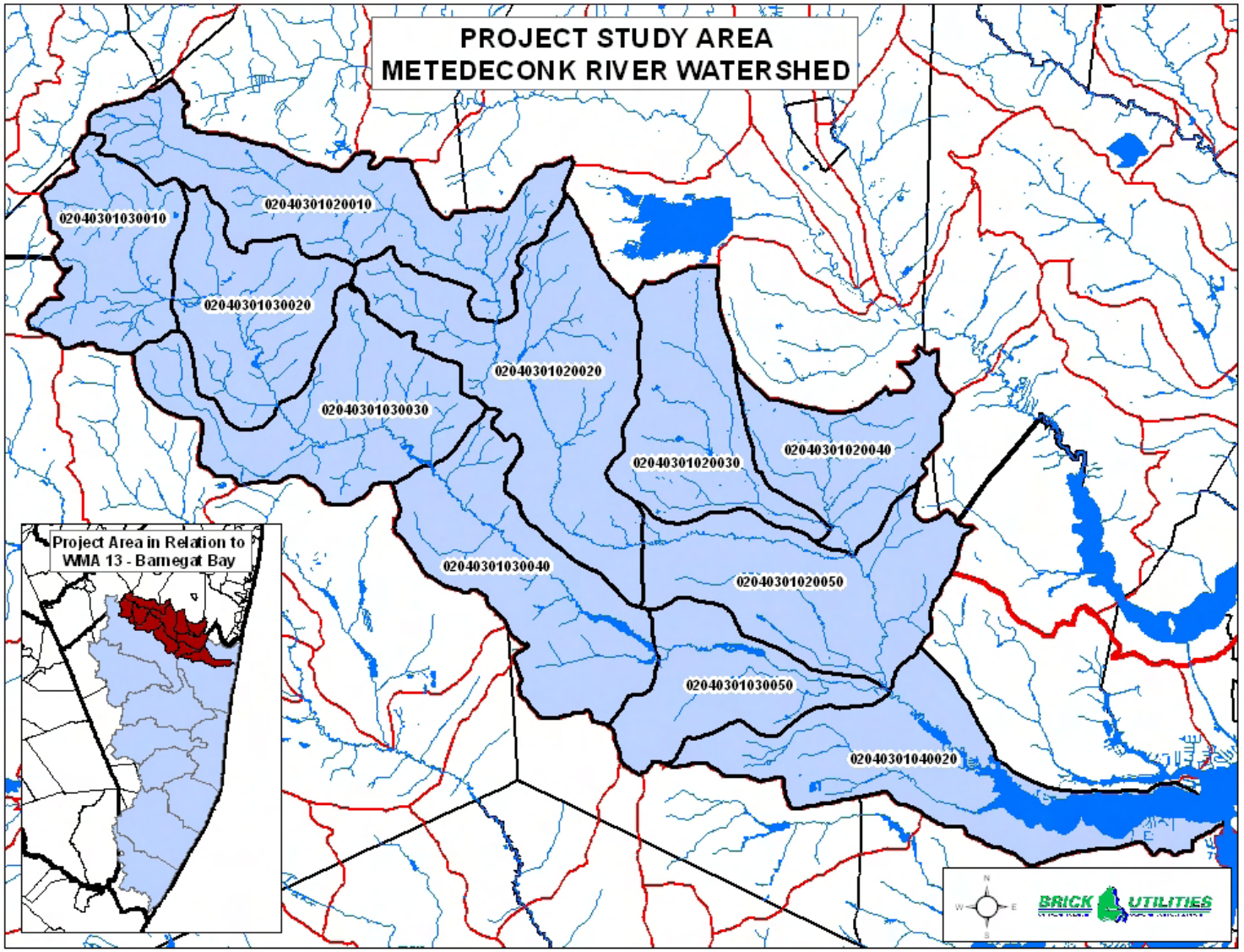
- Main project goals:
  - Preserve the Metedeconk River as a viable water supply source for the region
  - Protect the health of the Barnegat Bay estuary
  - Eliminate water quality impairments, address TMDLs, and attain compliance with the surface water quality standards throughout the watershed
- Project results in formal plan
  - Strategy for Metedeconk watershed protection & restoration
  - Prioritized listing of projects/management actions that can be carried out by any of the stakeholders

Project Overview (cont'd)

- Plan must follow USEPA watershed plan guidance:

  "Handbook for Developing Watershed Plans to Restore and Protect Our Waters"

- Nine (9) minimum elements of watershed plans


PROJECT STUDY AREA
METEDECONK RIVER WATERSHED
02040301030010
02040301020010
02040301030020
02040301020020
02040301030030
02040301020030
02040301020040
02040301030040
02040301020050
02040301030050
02040301040020
Project Area in Relation to
WMA 13 - Barnegat Bay
BRICK UTILITIES

Project Tasks

- Task 1 - Stakeholder Advisory Committee
- Task 2 - Visual Assessment Project Plan (VAPP)
- Task 3 - Watershed Technical Analysis
- Task 4 - Set Plan Objectives
- Task 5 - Identification of Watershed Management Strategies
- Task 6 - Education and Outreach Program
- Task 7 - Quality Assurance Project Plan
- Task 8 - Development of the Metedeconk River Watershed Protection and Restoration Plan
- Task 9 - Development of Conceptual Design Plans
- Task 10 - Final Report
- Task 11 – Plan Implementation (Phase 2)

The Stakeholder Process
Metedeconk Stakeholder Advisory Committee

- Most important was a *diverse and representative* group
  - Federal & State agencies
  - Municipal representatives
  - Monmouth & Ocean Counties
  - Barnegat Bay Partnership
  - Developers, Agriculture & businesses
  - Academia
  - NGOs, interested citizens
  - Water/wastewater utilities


The Barnegat Bay Beat

A Quarterly Publication of the Barnegat Bay National Estuary Program

Fall/Winter 2009

Charting the course for the future of the Metedeconk River watershed

By Rob Kael
Brick Township Municipal Utilities Authority
and Bob Mancini
New Jersey Department of Environmental Protection

The Metedeconk River is a critical water resource for northern Ocean and southern Monmouth Counties. It flows through the municipalities of Freehold, Howell, Millstone, and Wall in Monmouth County, and Brick, Jackson, Lakewood, and Point Pleasant Borough in Ocean County and eventually empties into the Barnegat Bay estuary. As one of the major sources of fresh water to the Barnegat Bay, it provides countless economic, recreational, and aesthetic benefits to the region. It also serves as the principal water supply source for the Brick Township Municipal Utilities Authority (Brick Utilities), which provides drinking water to more than 100,000 area residents in four municipalities: Brick, Howell, Point Pleasant Beach, and Point Pleasant Borough.

Brick Utilities has been studying the Metedeconk River and working to protect its watershed for nearly two decades. In addition, considerable watershed protection measures have been undertaken by various agencies and institutions, including the Barnegat Bay National Estuary Program (BBNEP), the New Jersey Department of Environmental Protection (NJDEP), the Trust for Public Land, the U.S. Geological Survey, Monmouth University, and Rutgers University.

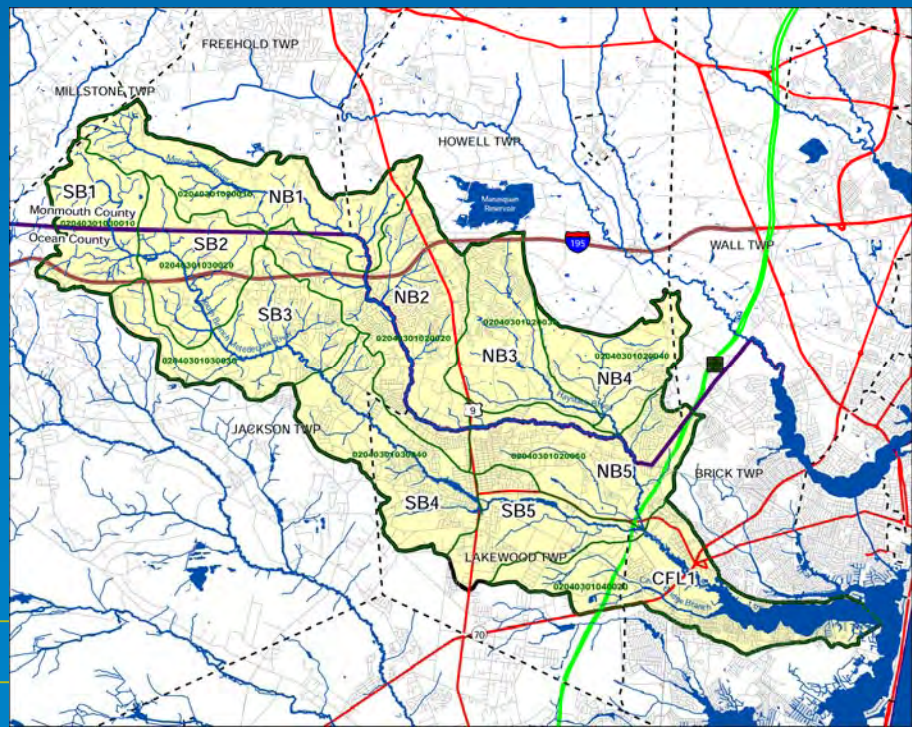
The municipalities of the Metedeconk

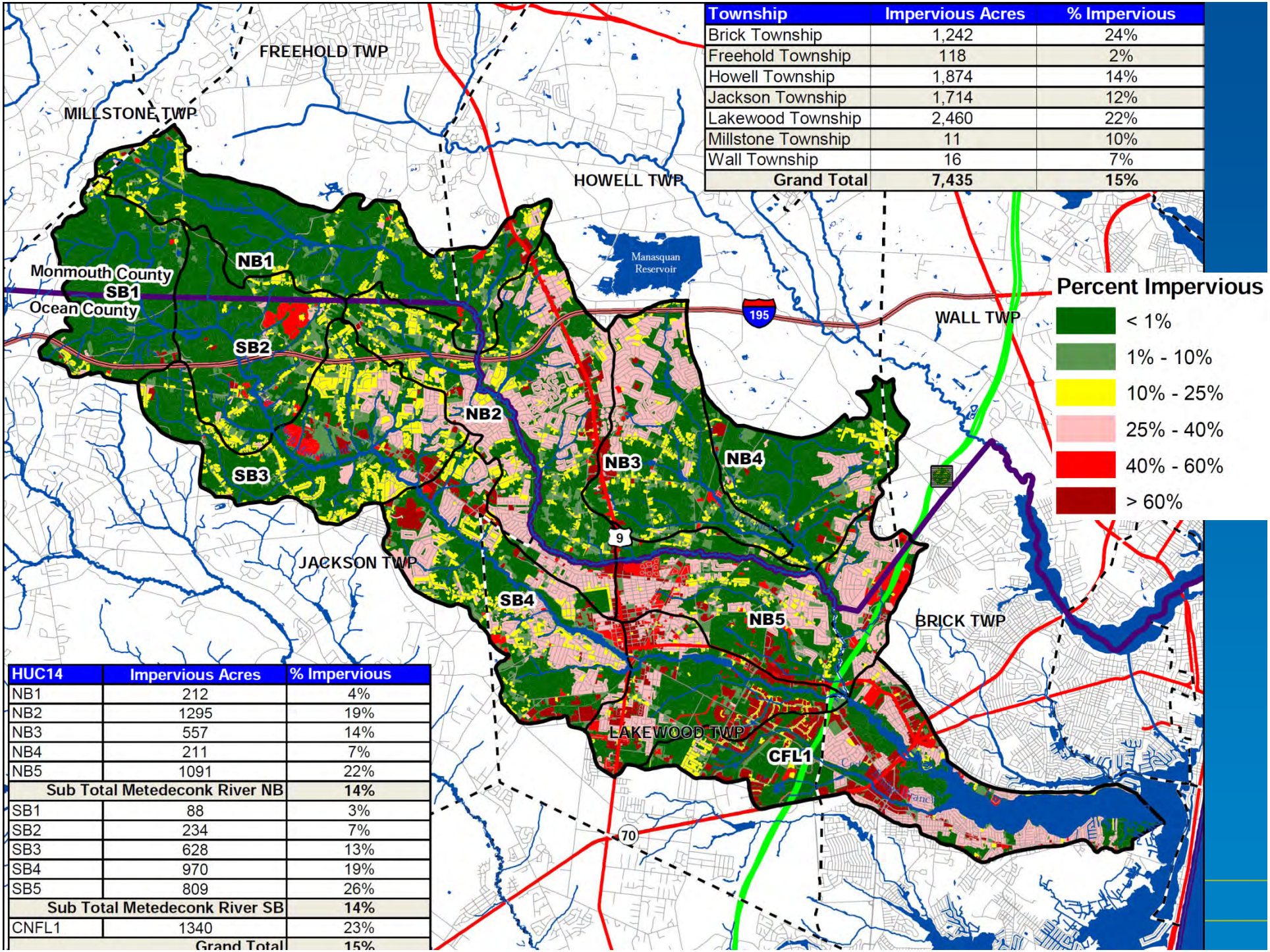
continued on page 2

- SAC role:
  - Explore issues and local concerns
  - Guide plan development and prioritize problems and strategies
  - Provide critical analysis of the project's progress and direction
  - Meetings held at key stages of project
- Committee input vital to the success of project
- Project team put considerable effort towards engaging the watershed stakeholders
- Result is plan built consensus that is broadly supported

Summary of Major Issues

- Stormwater is the primary issue within the watershed



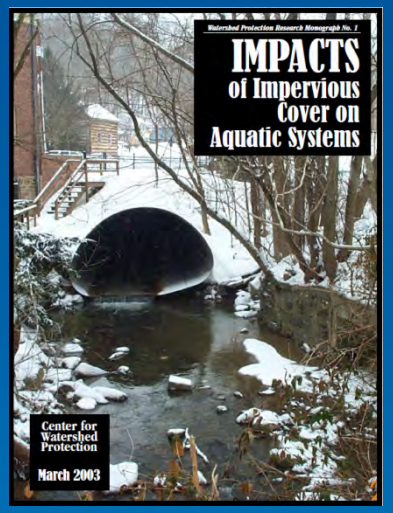


Township	Impervious Acres	% Impervious
Brick Township	1,242	24%
Freehold Township	118	2%
Howell Township	1,874	14%
Jackson Township	1,714	12%
Lakewood Township	2,460	22%
Millstone Township	11	10%
Wall Township	16	7%
Grand Total	**7,435**	**15%**

HUC14	Impervious Acres	% Impervious
NB1	212	4%
NB2	1295	19%
NB3	557	14%
NB4	211	7%
NB5	1091	22%
Sub Total Metedeconk River NB		**14%**
SB1	88	3%
SB2	234	7%
SB3	628	13%
SB4	970	19%
SB5	809	26%
Sub Total Metedeconk River SB		**14%**
CNFL1	1340	23%
Grand Total		**15%**

Impervious Cover

- Percent impervious cover within the "unstable" category



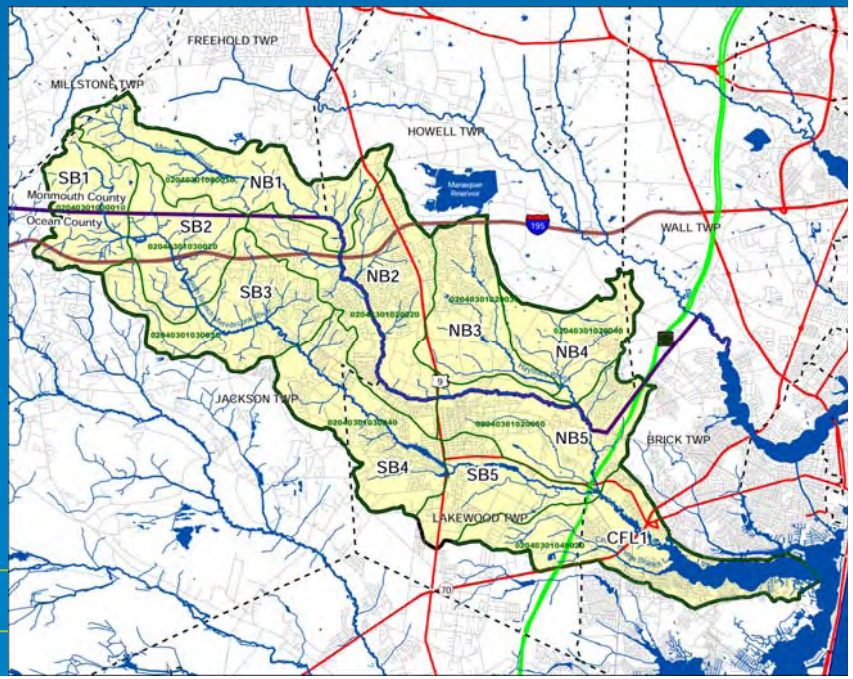
% Impervious	Channel Stability	Water Quality	Stream Biodiversity	Pollutants of Concern	Characteristic
0-10	Stable	Good to Excellent	Good to Excellent	Sediment, temperature	Stable
11-25	Unstable	Fair to Good	Fair to Good	…& nutrients, metals	Unstable
26-100	Highly Unstable	Fair to Poor	Poor	…& bacteria	Highly unstable

from Schueler, 1995

Summary of Major Issues

- Stormwater is the primary issue within the watershed

- Overall water quality still holding, but degrading
  - TMDLs & 303(d)



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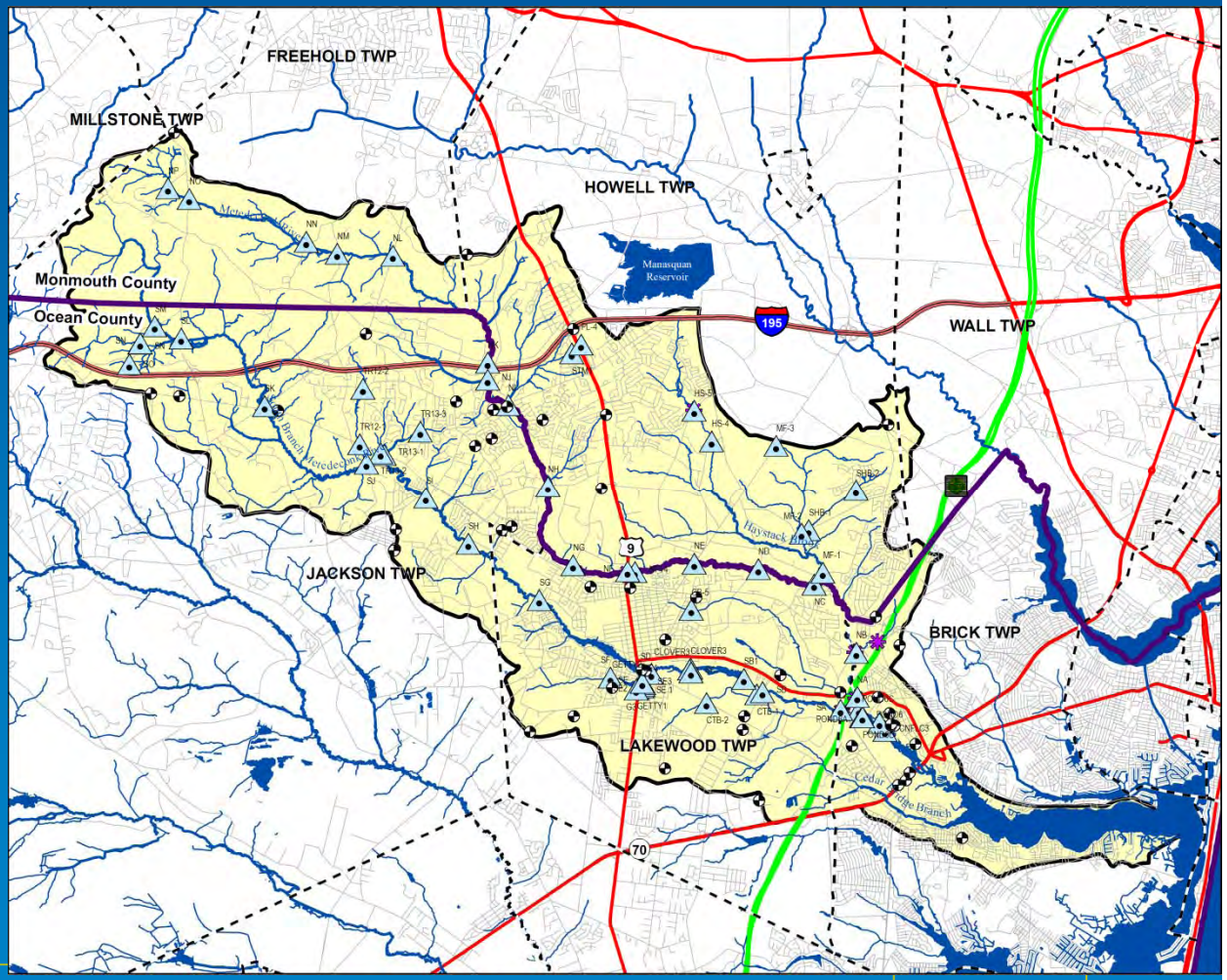
BRICK UTILITIES

Water Quality: Surface Water

- BTMUA Monitoring Program
  - Extensive, including 68 sampling stations
  - North and South Branches
- Routine samples collected at or immediately upstream of intake
- USGS, EPA



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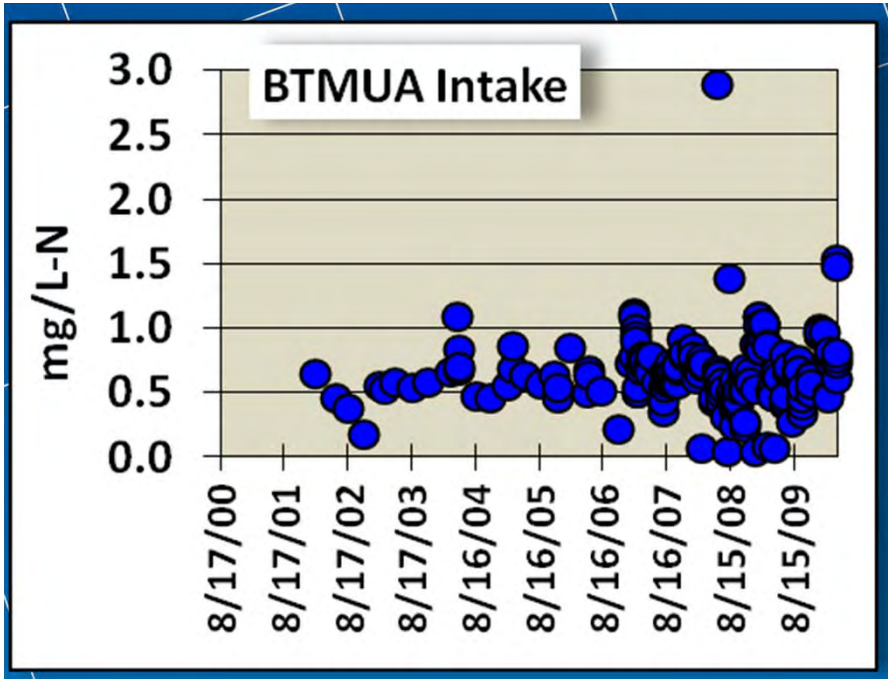

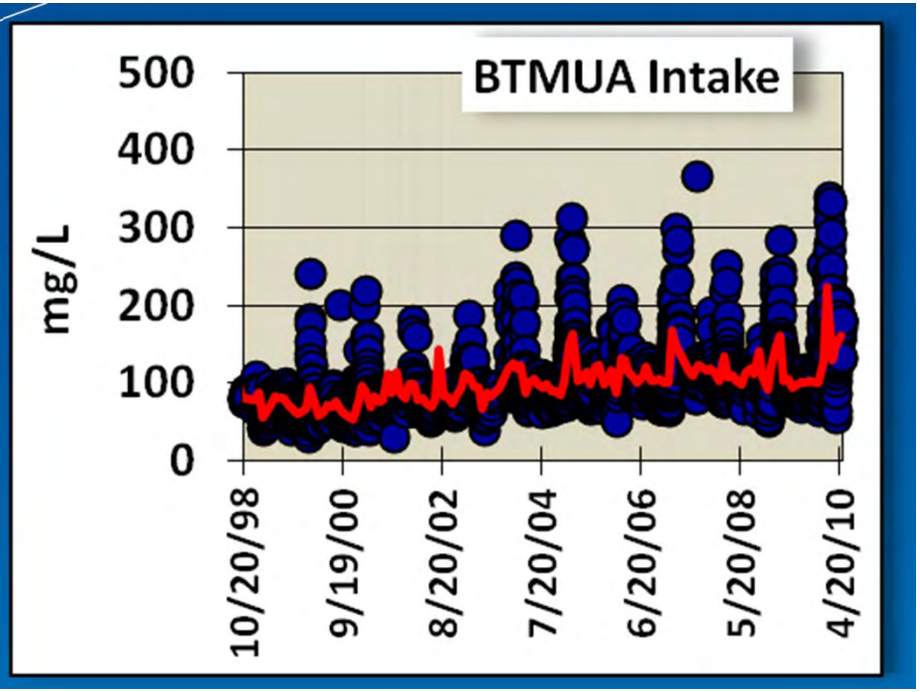

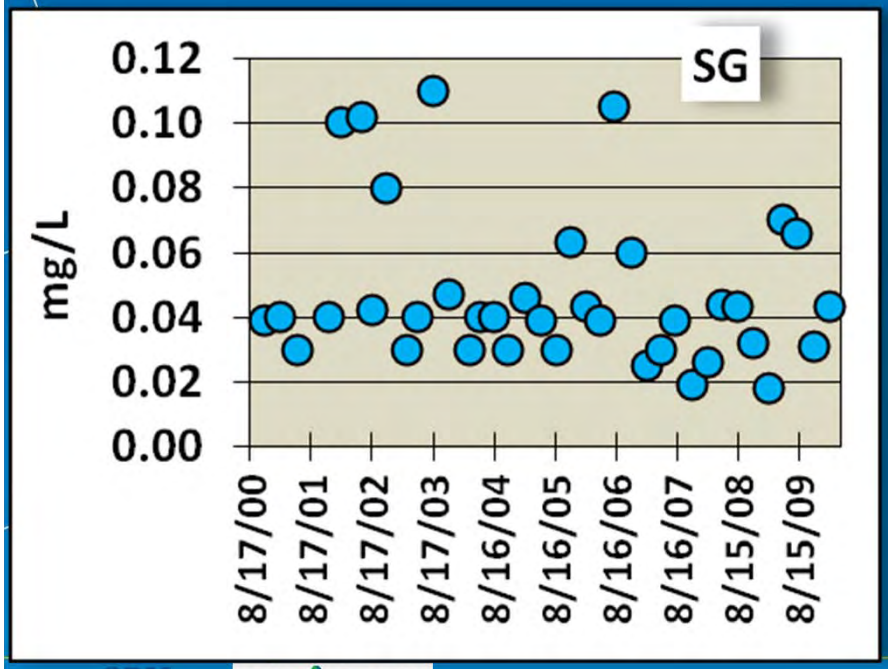

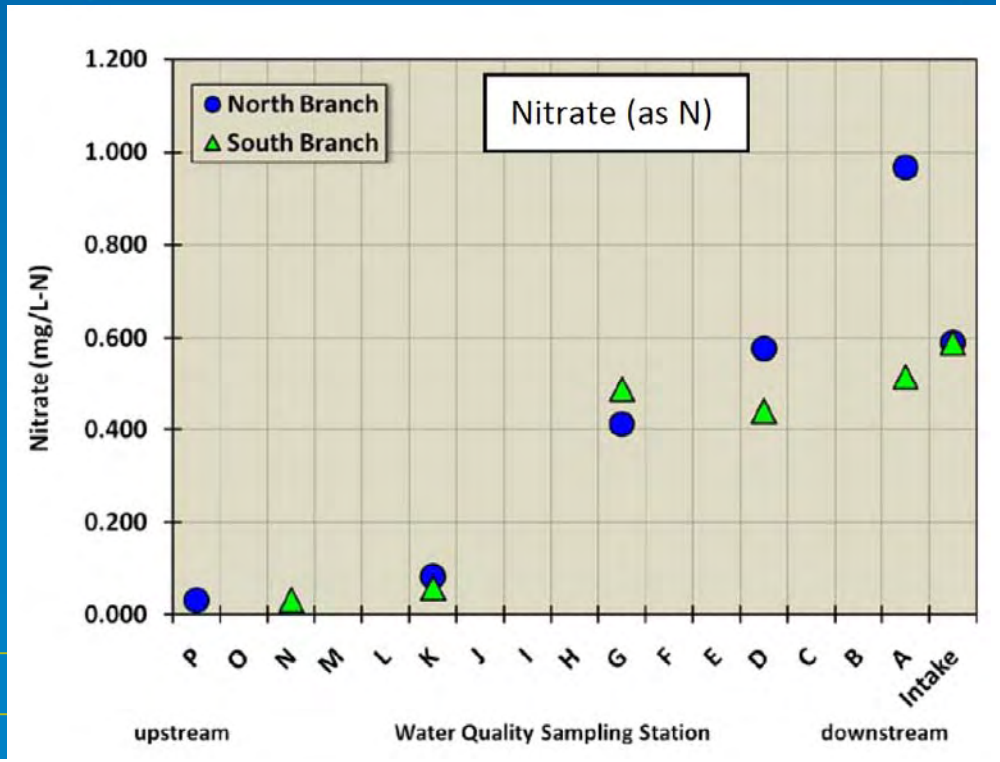

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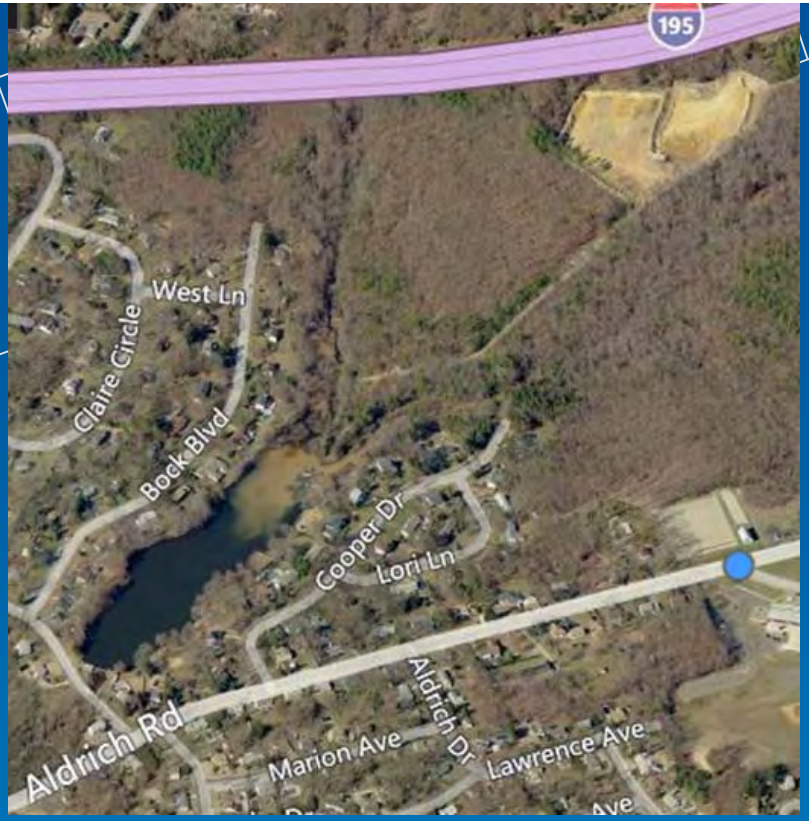
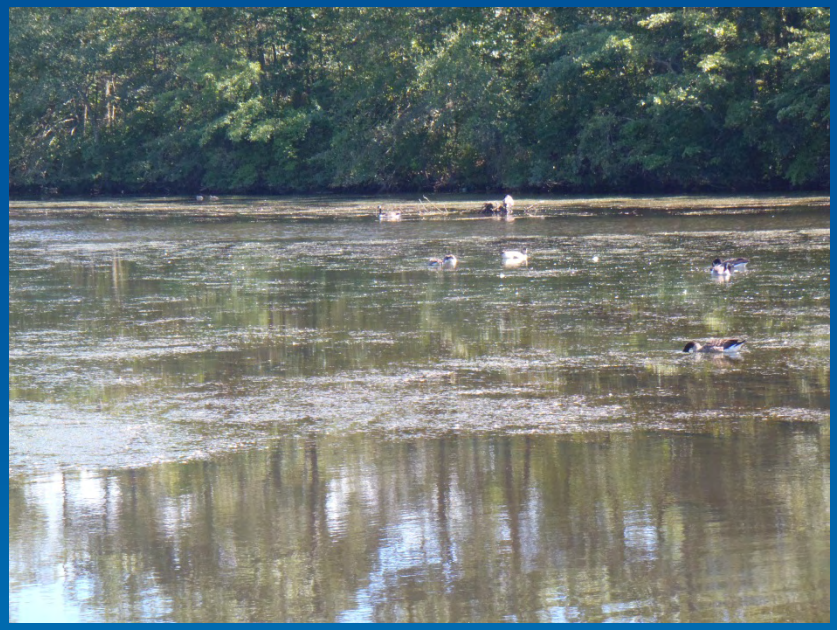
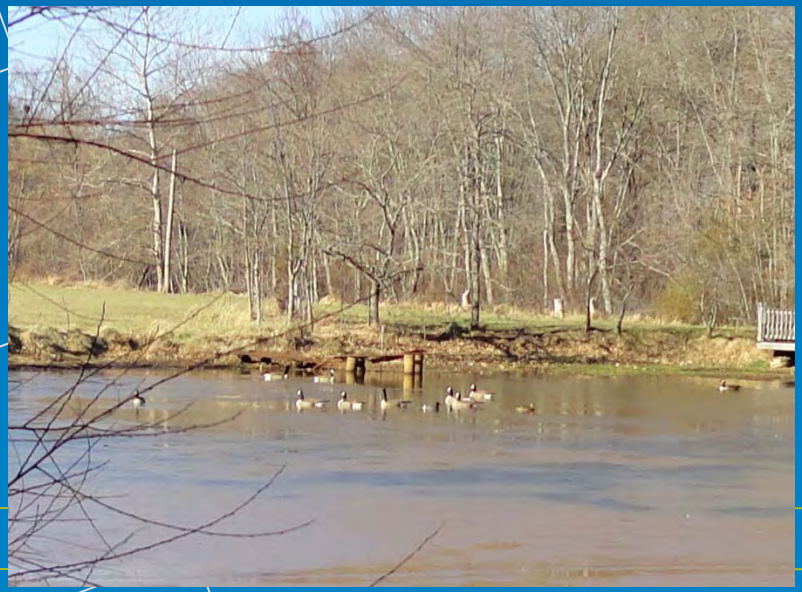
BRICK UTILITIES


195
West Ln
Claire Circle
Boeck Blvd
Cooper Dr
Lori Ln
Aldrich Rd
Aldrich Dr
Marion Ave
Lawrence Ave





List of Identified Impairments

Subbasin	HUC14	Area (mi^2)	Subwatershed Name	TMDL	2010 Integrated List (Priority Ranking)
NB-1	02040301020010	8.6	Metedeconk R NB (above I-195)	Phosphorus, Stream Fecal Coliform	Dissolved Oxygen (M)**, Arsenic (L), DDD(L), DDT(L), DDE(L), Chlordane in Fish Tissue(L), Mercury in Fish Tissue(L), PCB in Fish Tissue(L), Turbidity*, Lead*
NB-2	02040301020020	10.9	Metedeconk R NB (Rt 9 to I-195)	Stream Fecal Coliform	Dissolved Oxygen(M)**, Temperature(M), Arsenic(L), Turbidity*
NB-3	02040301020030	6.1	Haystack Brook	Stream Fecal Coliform	Cause Unknown(M)
NB-4	02040301020040	4.8	Muddy Ford Brook	Stream Fecal Coliform	TP(M), TSS(M), Arsenic(L)**, Mercury in Water Column(L)
NB-5	02040301020050	7.9	Metedeconk R NB (confluence to Rt 9)	Stream Fecal Coliform	Temperature(M), Arsenic(L)**, Lead*
SB-1	02040301030010	5	Metedeconk R SB (above I-195 exit 21 rd)	Stream Fecal Coliform	Dissolved Oxygen (M)**, Arsenic (L), Lead*
SB-2	02040301030020	5.6	Metedeconk R SB (74d19m15s to I-195 X21)	Stream Fecal Coliform	Turbidity*
SB-3	02040301030030	7.6	Metedeconk R SB (Bennetts Pd to 74d19m15s)	Stream Fecal Coliform	Cause Unknown (M), Polychlorinated biphenyls(L), Mercury in Fish Tissue(L), Chlordane in Fish Tissue(L)
SB-4	02040301030040	7.8	Metedeconk R SB (Rt 9 to Bennetts Pond)	Stream Fecal Coliform, Lake Fecal Coliform	Arsenic(L)**
SB-5	02040301030050	4.8	Metedeconk R SB (confluence to Rt 9)	Stream Fecal Coliform	Arsenic(L)**, Lead*
CNFL-1	02040301040020	9.2	Metedeconk R (Beaverdam Ck to confl)	Stream Fecal Coliform, Lake Fecal, Total Coliform	Arsenic(L)**, Cause Unknown(M)

* = listed on draft 2012 303(d) list

** = listed on 2010 303(d) List, but NOT included on draft 2012 303(d) list

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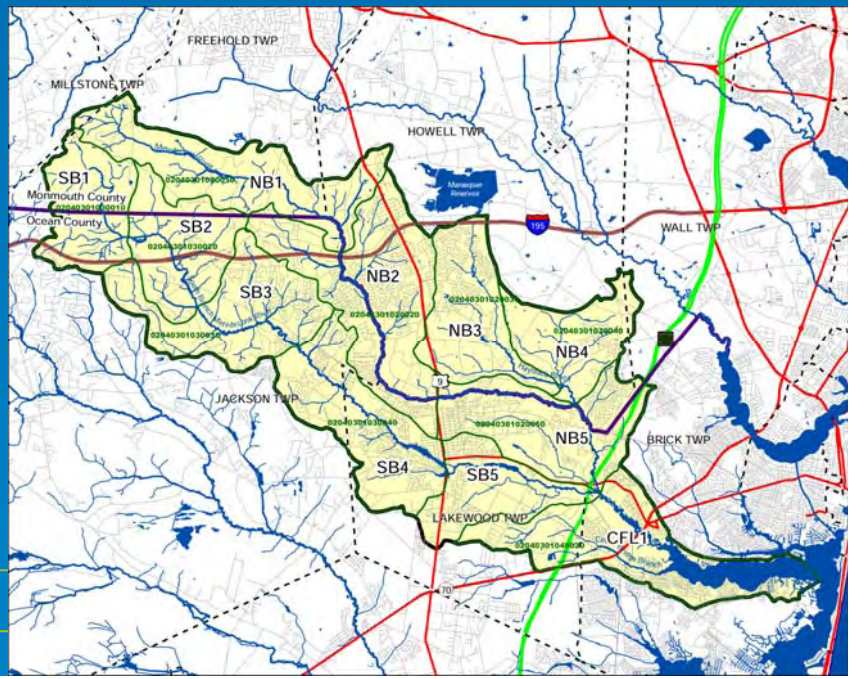
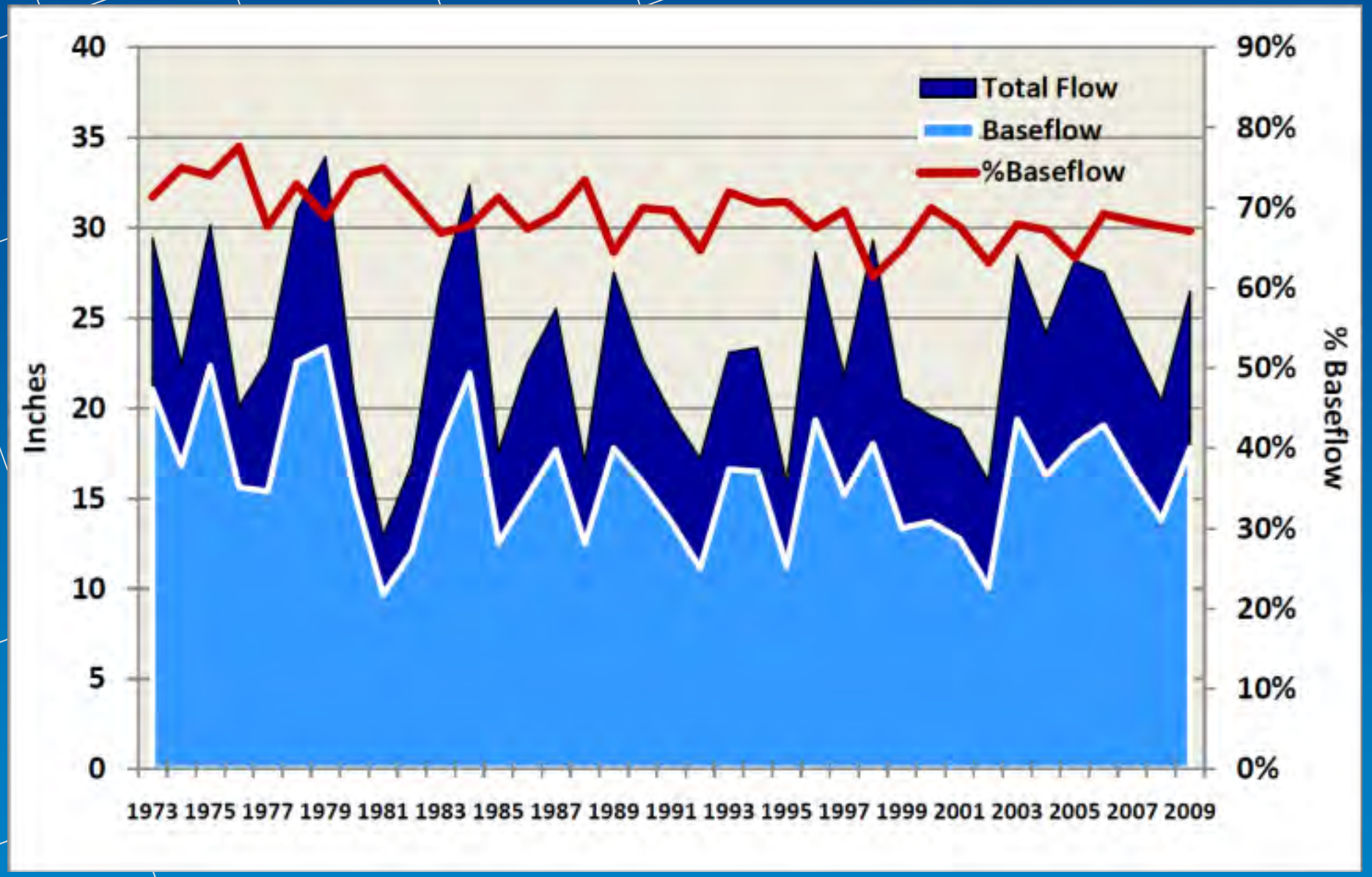
Summary of Major Issues

- Stormwater is the primary issue within the watershed
- Water quality still holding, but degrading
  - TMDLs & 303(d)
- Natural flow regime is degrading (higher % runoff)

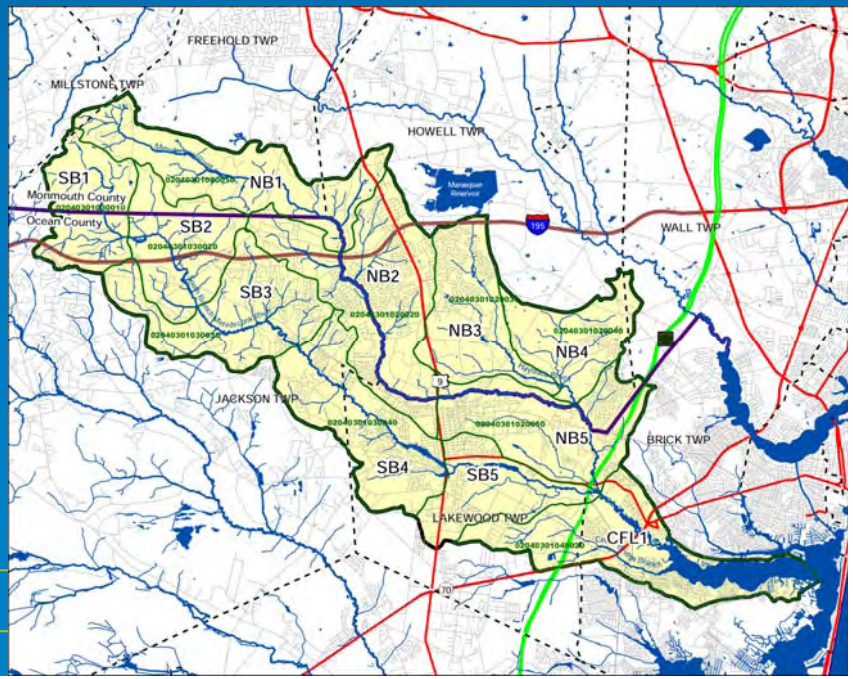


CDM Smith BRICK UTILITIES

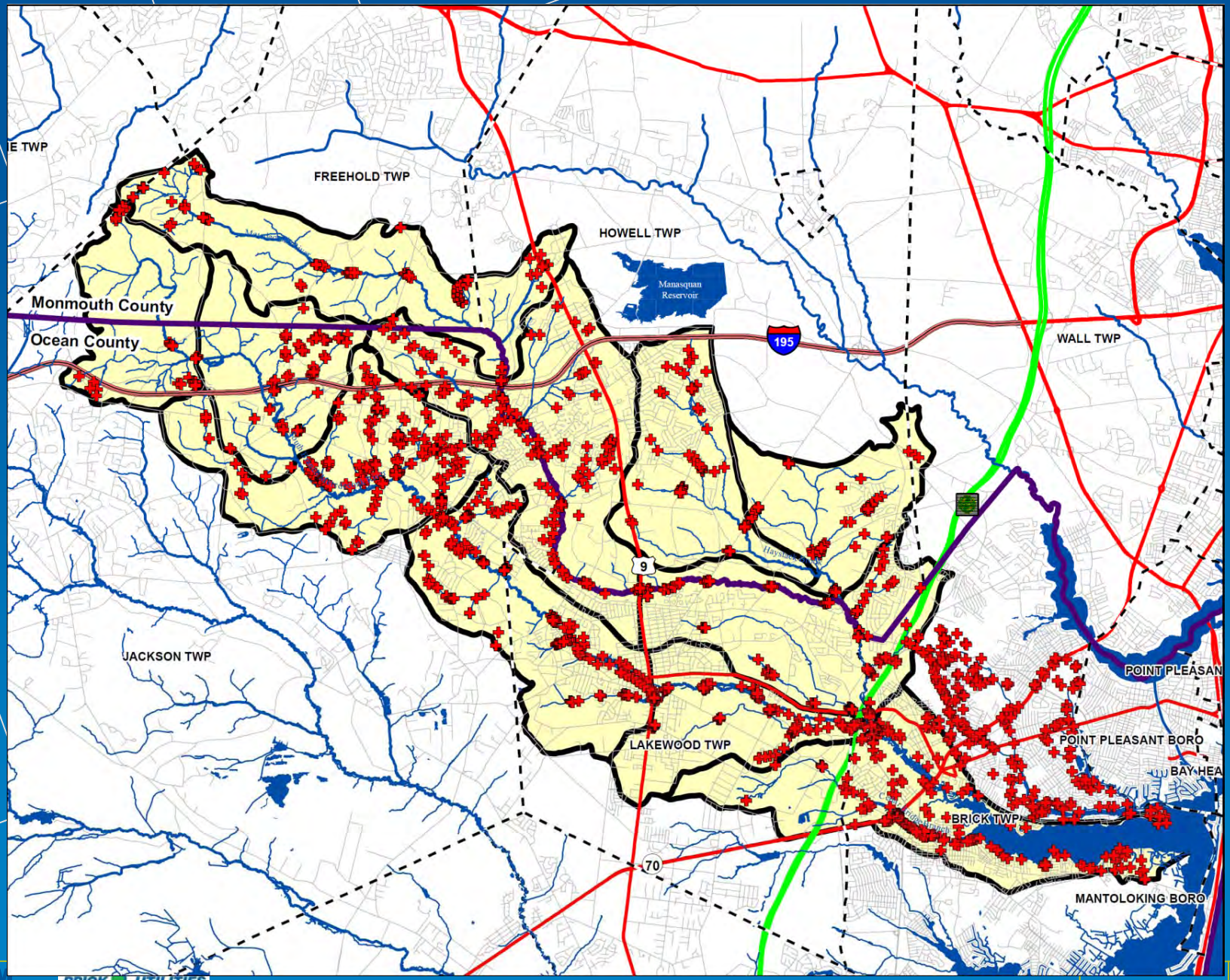

Total Flow
Baseflow
%Baseflow
Inches
% Baseflow
40
35
30
25
20
15
10
5
0
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1973 1975 1977 1979 1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009

Summary of Major Issues

- Stormwater is the primary issue within the watershed
- Water quality still holding, but degrading
  - TMDLs & 303(d)
- Natural flow regime is degrading (higher % runoff)
- Data gaps
  - Groundwater
- Antiquated infrastructure



BRICK UTILITIES


E TWP
FREEHOLD TWP
HOWELL TWP
Manasquan Reservoir
Monmouth County
Ocean County
195
WALL TWP
9
JACKSON TWP
LAKEWOOD TWP
POINT PLEASAN
POINT PLEASANT BORO
BAY HEA
BRICK TWP
70
MANTOLOKING BORO

The "Plan"

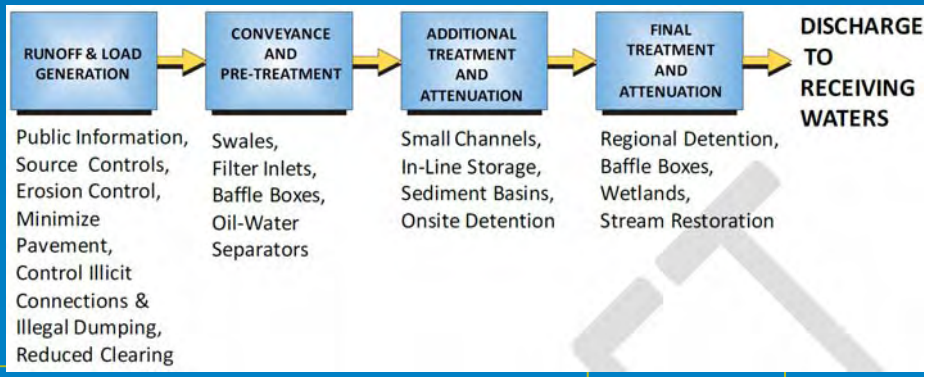
- Retrofit existing stormwater detention basins
- Install structural BMP at existing direct outfalls;
  - If possible

- Source control and flow path BMPs;
- Resource conservation and protection;
- Development of ordinances to require LID development techniques on all new and redevelopment within the watershed

The "Plan"

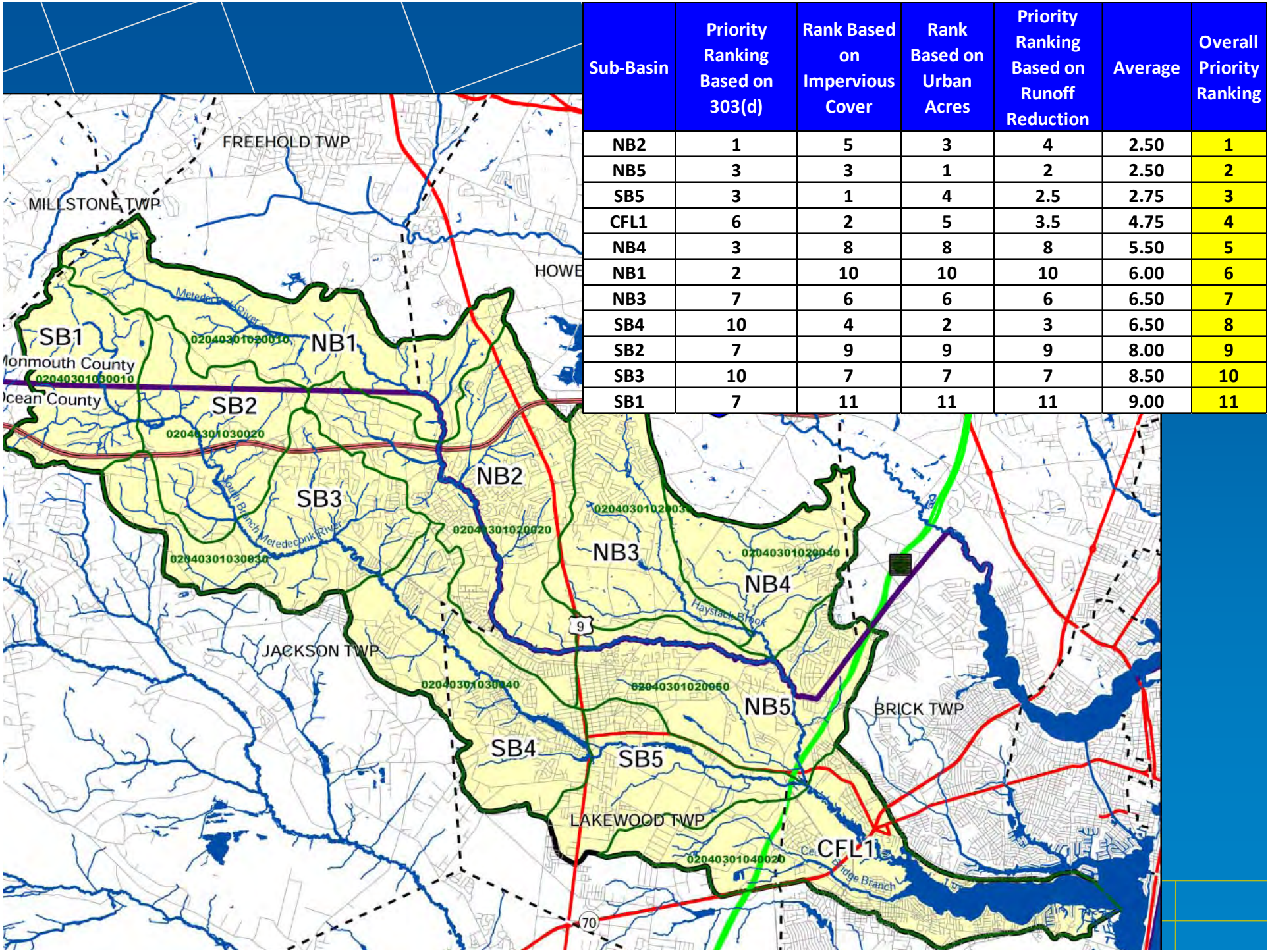
- Develop and implement aggressive education and outreach program
  - Including Municipal Zoning Boards
- Establish a Metedeconk River Watershed Committee
- Treatment Train Approach

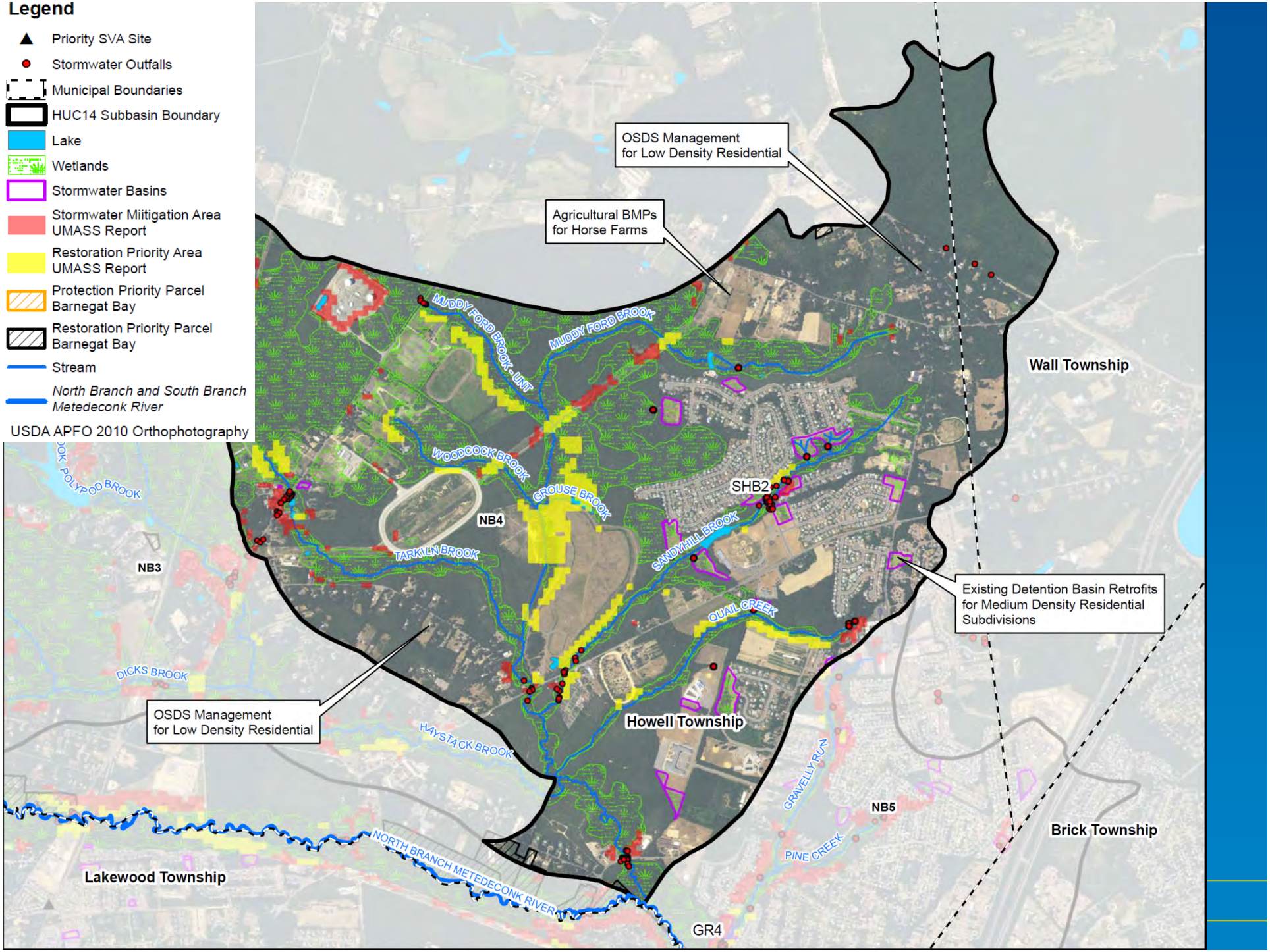
From AHBL/Puget Sound Partnership, 2011



CDM Smith BRICK UTILITIES

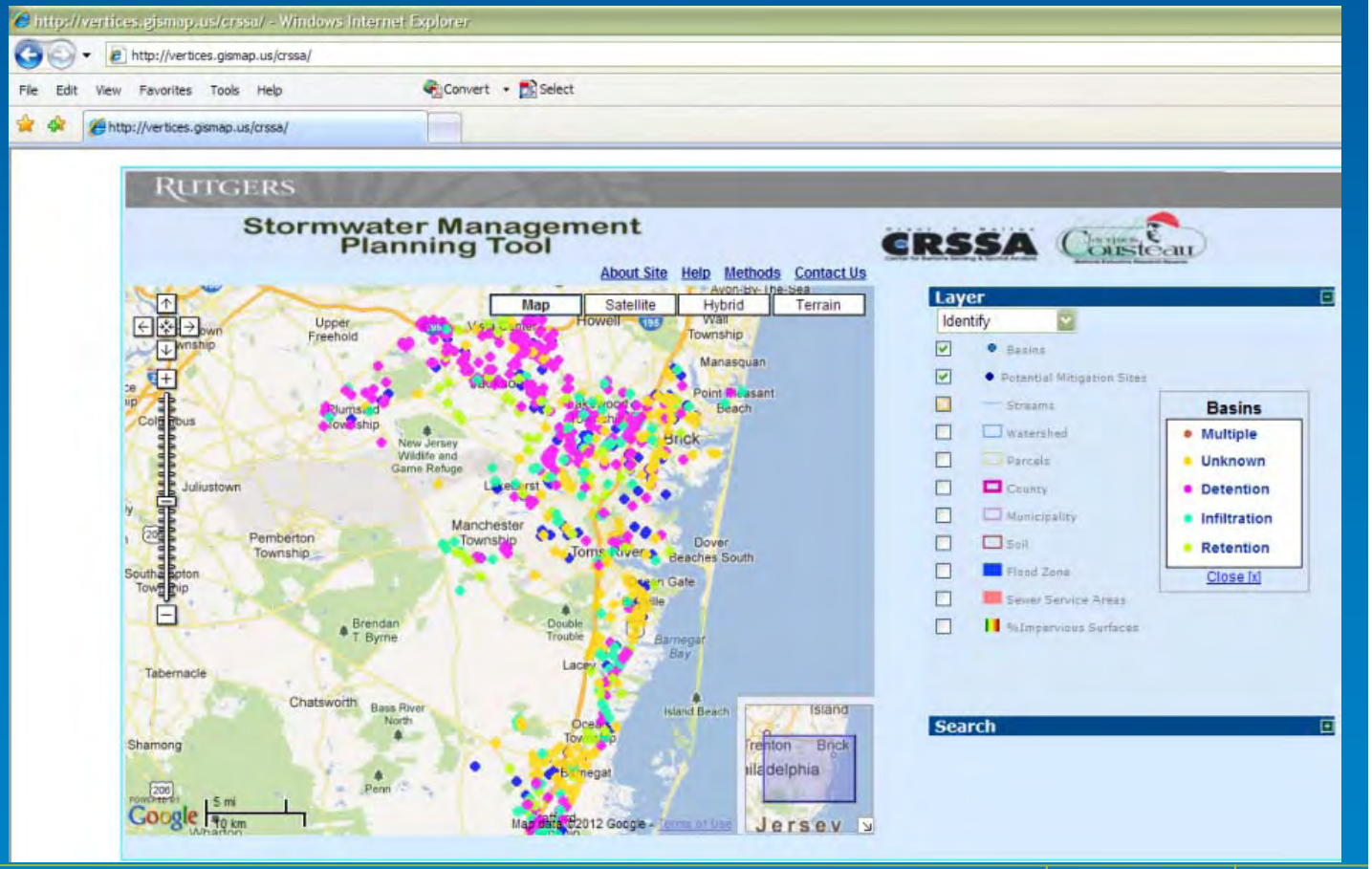
Sub-Basin	Priority Ranking Based on 303(d)	Rank Based on Impervious Cover	Rank Based on Urban Acres	Priority Ranking Based on Runoff Reduction	Average	Overall Priority Ranking
NB2	1	5	3	4	2.50	1
NB5	3	3	1	2	2.50	2
SB5	3	1	4	2.5	2.75	3
CFL1	6	2	5	3.5	4.75	4
NB4	3	8	8	8	5.50	5
NB1	2	10	10	10	6.00	6
NB3	7	6	6	6	6.50	7
SB4	10	4	2	3	6.50	8
SB2	7	9	9	9	8.00	9
SB3	10	7	7	7	8.50	10
SB1	7	11	11	11	9.00	11




Legend
Priority SVA Site
Stormwater Outfalls
Municipal Boundaries
HUC14 Subbasin Boundary
Lake
Wetlands
Stormwater Basins
Stormwater Miitigation Area
UMASS Report
Restoration Priority Area
UMASS Report
Protection Priority Parcel
Barnegat Bay
Restoration Priority Parcel
Barnegat Bay
Stream
North Branch and South Branch
Metedeconk River
USDA APFO 2010 Orthophotography
OSDS Management
for Low Density Residential
Agricultural BMPs
for Horse Farms
Existing Detention Basin Retrofits
for Medium Density Residential
Subdivisions
OSDS Management
for Low Density Residential
Wall Township
Howell Township
Brick Township
Lakewood Township
MUDDY FORD BROOK
MUDDY FORD BROOK UNT
WOODCOCK BROOK
CROUSE BROOK
TARKILN BROOK
SANDYHILL BROOK
QUAIL CREEK
HAYSTACK BROOK
GRAVELLY RUN
PINE CREEK
DICKS BROOK
POLYPOD BROOK
NORTH BRANCH METEDECONK RIVER
NB3
NB4
NB5
SHB2
GR4

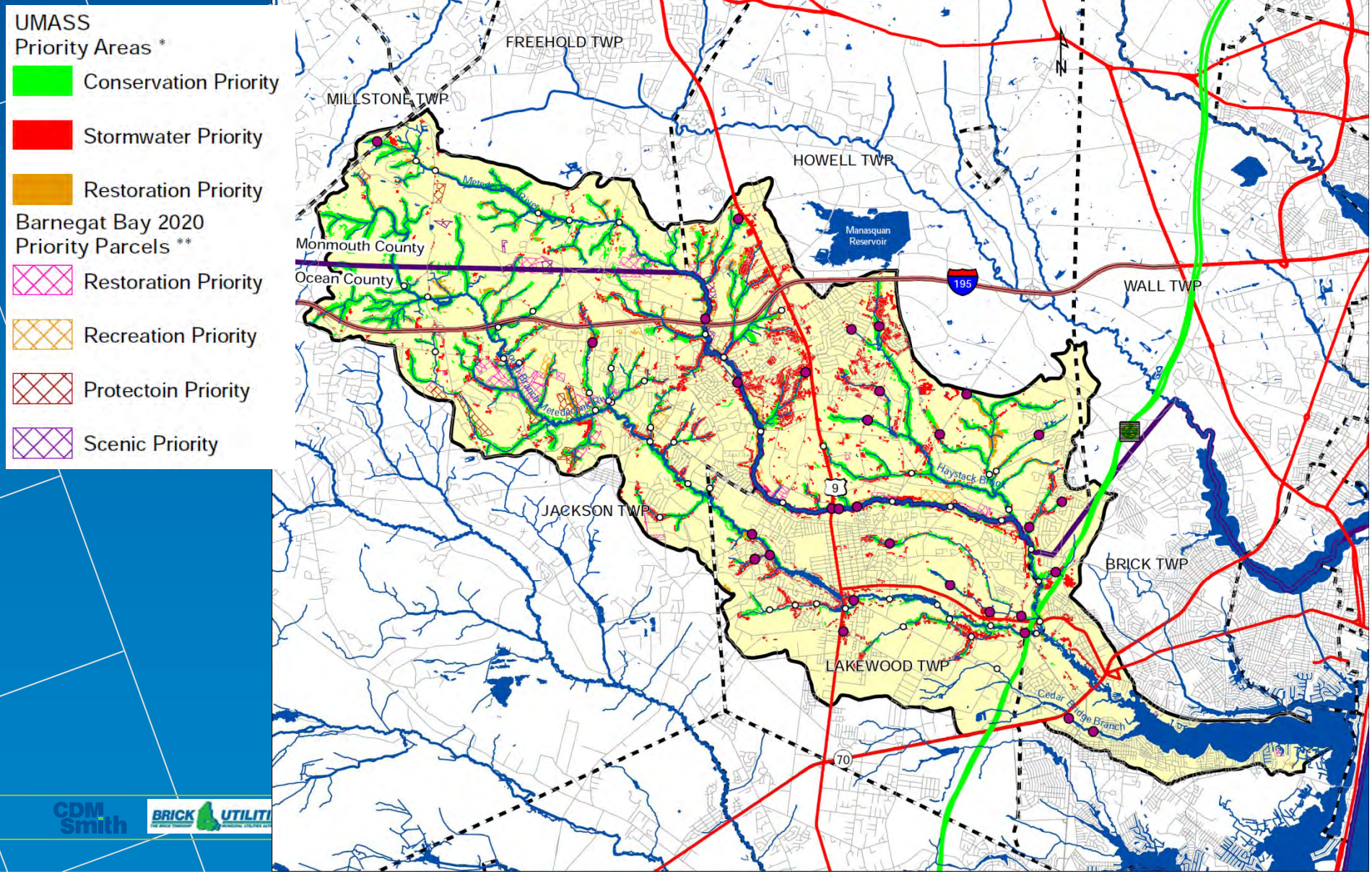
Stormwater Basins

- Utilize previous work to the fullest extent possible
  - SWMPT



CDM Smith BRICK UTILITIES

Resource Conservation



Key Watershed Management Plan Actions

- Metedeconk watershed education and outreach
  - Build awareness and stewardship for local water resources
  - Initiate action and/or behavior change
  - Target audiences: municipalities, residents, businesses, civic groups, etc.

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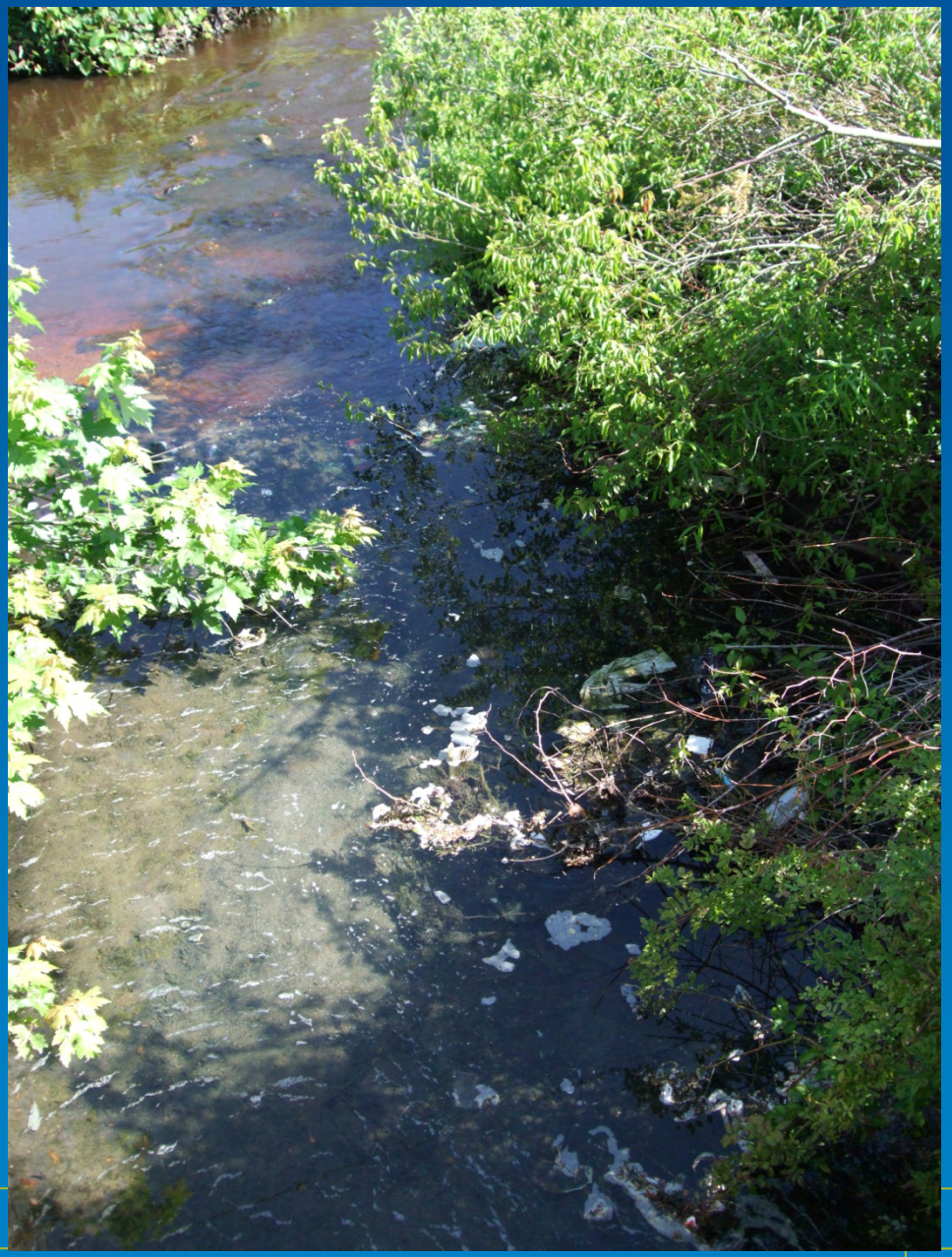
CDM Smith

BRICK UTILITIES



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BRICK UTILITIES


2
NO DUMPING
DRAINS TO WATERWAYS
1
1
3
NF14
W Kennedy Blvd
E Kennedy Blvd
W County Line Rd
E County Line Rd
County Line Rd
Madison Ave
Lexington Ave
Clifton Ave
Princeton Ave
Monmouth Ave
Washington Pl
15th St
14th St
14th St
13th St
12th St
11th St
10th St
9th St
8th St
7th St
6th St
5th St
Courtney Pl
Carey St
Harvard St
Coventry Dr
Princeton Ave
Forest Ave
Ardenwood Ave
Pinemere Ave

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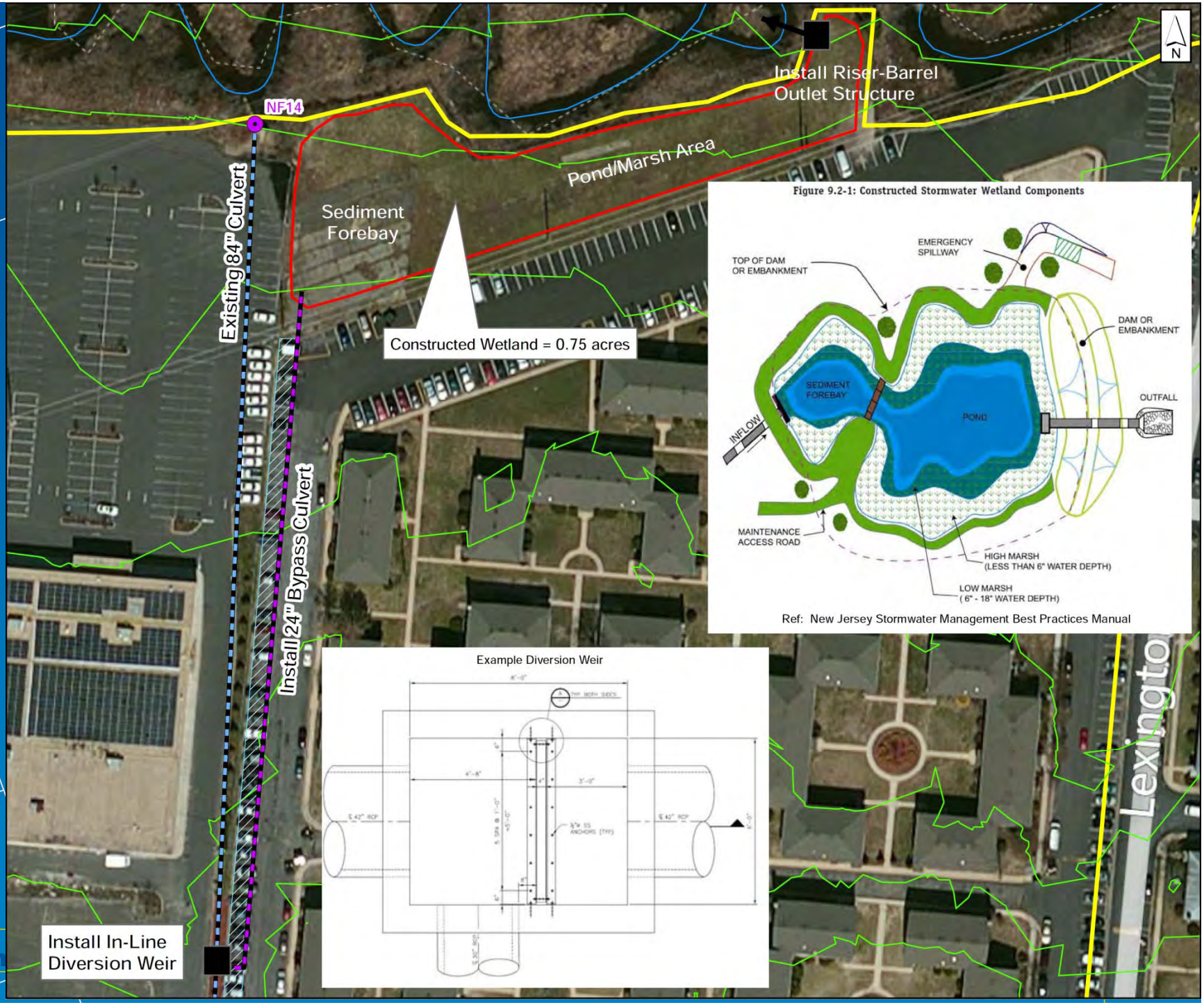
Install Riser-Barrel
Outlet Structure
NF14
Pond/Marsh Area
Sediment
Forebay
Existing 84" Culvert
Constructed Wetland = 0.75 acres
Install 24" Bypass Culvert
Install In-Line
Diversion Weir
N
Figure 9.2-1: Constructed Stormwater Wetland Components
TOP OF DAM
OR EMBANKMENT
EMERGENCY
SPILLWAY
DAM OR
EMBANKMENT
SEDIMENT
FOREBAY
POND
OUTFALL
INFLOW
MAINTENANCE
ACCESS ROAD
HIGH MARSH
(LESS THAN 6" WATER DEPTH)
LOW MARSH
(6" - 18" WATER DEPTH)
Ref: New Jersey Stormwater Management Best Practices Manual
Example Diversion Weir
Lexingto

Summary & The Path Forward…

- Reduce stormwater runoff to the Metedeconk River
  - Treatment Train Approach
  - Retrofit existing infrastructure
  - Green stormwater infrastructure
  - Private property BMPs / education and outreach
- BTMUA to continue to serve leadership role through plan implementation
- Preserve Stakeholder Advisory Committee over long term (implementation will be a long process)
- Maintain strong working relationship with NJDEP and BBP towards common watershed management goals
- Leverage funding and partnership opportunities

Project Contacts

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