Watershed Improvement Plan
Phase 1: Watershed Inventory Report

BARNEGAT TOWNSHIP
OCEAN COUNTY, NEW JERSEY

NJPDES: NJG0141852 / PI ID #: 1501

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LIST OF ABBREVIATIONS

BMP	Best Management Practice
DEM	Digital Elevation Model
DO	Dissolved Oxygen
DPW	Department of Public Works
EDPA	Effective Date of Permit Authorization
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information System
HDPE	High Density Polyethylene
HOA	Homeowners' Association
HUC	Hydrologic Unit Code
LULC	Land Use / Land Cover
MS4	Municipal Separate Storm Sewer System
MTD	Manufactured Treatment Device
NHD	National Hydrography Dataset
NJDEP	New Jersey Department of Environmental Protection
NJAC	New Jersey Administrative Code
NJGIN	New Jersey Geographic Information Network
NJPDES	New Jersey Pollutant Discharge Elimination System
N.J.S.A.	New Jersey Statutes Annotated
NJ-WET	New Jersey Watershed Evaluation Tool
OBC	Overburdened Community
RCP	Reinforced Concrete Pipe
PCBs	Polychlorinated Biphenyls
SPC	Stormwater Program Coordinator
SWM	Stormwater Management
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UNT	Unnamed Tributary
USGS	U.S. Geological Survey
VOCs	Volatile Organic Compounds
WIP	Watershed Improvement Plan
WMA	Watershed Management Area

LIST OF DEFINITIONS

"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. (N.J.A.C. 7:9B)

"Municipal separate storm sewer" (or MS4 conveyance) means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) as defined in more detail at N.J.A.C. 7:14A-1.2.

"Outfall" means any point source which discharges directly to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.

"Storm drain inlet" means the point of entry into the storm sewer system.

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

"Stormwater facility" means stormwater infrastructure including, but not limited to, catch basins, infiltration basins, detention basins, green infrastructure (GI), filter strips, riparian buffers, infiltration trenches, sand filters, constructed wetlands, wet basins, bioretention systems, low flow bypasses, Manufactured Treatment Devices (MTDs), and stormwater conveyances.

"Stormwater management basin" means a stormwater management basin as defined in N.J.A.C. 7:8.

"Stormwater management measure" means a stormwater management measure as defined in N.J.A.C. 7:8.

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

"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. §§12512 et seq. A TMDL is the sum of individual waste load 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.

"Waters of the State" means the ocean and its estuaries, all springs, streams 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" (see N.J.A.C. 7:9B-1.4).

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ACKNOWLEDGEMENTS

The Barnegat Township Watershed Improvement Plan Phase 1 Watershed Inventory Report has been prepared by Van Cleef Engineering Associates. The following individuals and organizations contributed to its preparation.

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PENDING

1 INTRODUCTION

The Watershed Improvement Plan (WIP) is a forward-looking program to address water quality improvement and stormwater flooding reduction goals at the municipal level. The WIP will utilize data and analytics regarding Barnegat Township's existing MS4 to generate specific programs and actions the Township will implement to meet the following goals: [1]

1. Improve water quality by reducing the contribution of pollutant parameters for all receiving waters within and bordering the town that have percent reductions listed for stormwater in the Total Maximum Daily Loads.
2. Improve water quality by reducing the contribution of pollutant parameters for all receiving waters within and bordering the town that have water quality impairments as per the Department's Integrated Report.
3. Reduce and/or eliminate stormwater flooding in the municipality, prioritizing the areas of flooding for corrective actions based on threat to human health and safety, environmental impacts, and frequency of occurrence.

Preparation of the WIP is a new requirement under the NJPDES Tier A MS4 Stormwater Discharge General Permit renewal, which became effective January 1, 2023. Requirements of the WIP are divided into three phases, each due at intervals throughout the five-year permit cycle as shown in Table 1.

Table 1. Watershed Improvement Plan Phase Requirements and Due Dates

Phase	Requirement	Due Date
1	Watershed Inventory Report	EDPA + 36 months *January 1, 2026*
2	Watershed Assessment Report	EDPA + 48 months *January 1, 2027*
3	Watershed Improvement Plan Report	EDPA + 59 months *December 1, 2027*

This Watershed Inventory Report is the first step, Phase 1, of the Watershed Improvement Plan. It is developed in conjunction with the municipal MS4 Inventory Map, a database of all stormwater management features (inlets, outfalls, conveyance pipes, etc.). In accordance with Part H.1.d of the Tier A MS4 permit, the Watershed Inventory Report must locate and summarize components of the MS4 Inventory Map along with the following: [1]

i. All stormwater outfalls owned/operated by the permittee;
ii. The drainage area for each outfall(s);
iii. The receiving waterbodies of those outfalls;
iv. The water quality classification of all receiving waterbody segments;

v. All stormwater interconnections from the municipality into another entities' storm or sanitary sewer system;
vi. The drainage area for each interconnection into another entities' storm or sanitary sewer system;
vii. All stormwater connection points into the municipality from another entities' storm sewer system;
viii. All storm drain inlets owned/operated by the permittee;
ix. Area associated with each TMDL for waters that lie within or bordering the municipality;
x. Area associated with each water quality impairment for waters that lie within or bordering the municipality;
xi. Overburdened communities;
xii. Impervious areas; and
xiii. The location and ownership of all stormwater outfalls and basins/infrastructure not owned/operated by the permittee.

The data and analytics presented in this Watershed Inventory Report will form the basis for Phases 2 and 3 of Barnegat Township's Watershed Improvement Plan. The information presented herein will allow the Township to develop a rational, data-based action plan for municipal water quality improvement and stormwater flooding reduction.

1.1 Location

Barnegat Township is situated within Ocean County, in the southeastern section of New Jersey. The total land area within the municipal boundary is approximately 34 square miles. [2]

The Township is located within the NJ Pinelands Region, which is governed by the NJ Pinelands Protection Act. The western half of the Township is within the Pinelands Area, and the remainder of the municipality is within the Pinelands National Reserve. A map showing Barnegat Township is provided in Appendix E, Map 1.

The Township Municipal Office is located at 900 West Bay Avenue. Contact information for the Municipal Office is as follows:

Barnegat Township
900 West Bay Avenue
Barnegat, NJ 08005
609-698-0080
https://www.barnegat.net/

1.2 Population and Demographics

The population in Barnegat Township according to the 2020 U.S. Census is 24,296. [2] The Township's population grew rapidly during the 1970s and has continued at a slightly slower pace in following decades. A graphic representation of the Barnegat Township population is provided in Appendix E, Map 2.

Additional demographic information for the municipality is provided in Table 2. A full report of demographic information, as available from the U.S. Census Bureau, is provided in the Appendix.

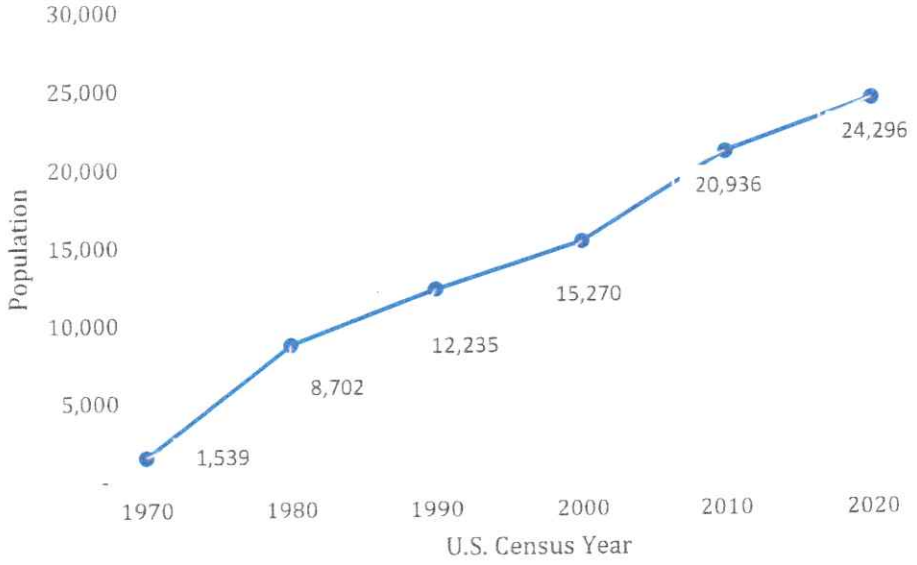

Figure 1. Barnegat Township Population Data by Census Year [2] [4]

Table 2. Barnegat Township Demographic Information, 2020 Census Data [2]

Category	Barnegat Township	Ocean County
Total Population	24,296	637,229
Median Age	51.6	40.8
Median Household Income	$89,301	$96,430
Poverty Rate	7.7%	9.1%
Education / Bachelor's Degree or Higher	32.7%	36.2%
Employment Rate	49.6%	56.9%
Total Households	9,987	247,985
Total Housing Units	10,985	298,735

1.3 Land Use Data

The Land Use/Land Cover of New Jersey 2020 data set from the NJ Geographic Information Network (NJGIN) open data resources was utilized to map and analyze land use categories in Barnegat Township. [3] Land use categories are presented in Table 3 and Appendix E, Map 3.

According to the 2020 version of the NJ Land Use/Land Cover (LULC) data, Barnegat Township consists primarily of land classified as forest uses (44% total). The urban use designation comprises just over 16% of land cover. Wetlands, water, and barren land comprise just under 38% of land cover.

The 2020 LULC dataset includes previous land cover designations (2015), which allows for analysis of land use changes over time. Barnegat Township land use classifications remained relatively steady between the 2015 and 2020 data points, with slight increases in area of land designated in the agriculture, urban, and barren land categories, and a decrease in the forest area classification.

Table 3. Land Use in Barnegat Township

	2020 LULC		2015 LULC	
Land Use Category	**Area (acres)**	**Percent of Total Land Area**	**Area (acres)**	**Percent of Total Land Area**
Agriculture	91.9	0.4%	64.3	0.2%
Forest	11,360.6	44.1%	11,738.1	45.5%
Urban	4,162.8	16.1%	3,886.0	15.1%
Barren Land	474.8	1.8%	397.3	1.5%
Wetlands	5,224.0	20.3%	5,231.7	20.3%
Water	4,462.0	17.3%	4,458.7	17.3%

1.4 Subwatersheds within or bordering Barnegat Township

1.4.1 Water Regions and Watershed Management Areas

There are five (5) major water regions in New Jersey; Barnegat Township is situated entirely within water region 3 – Atlantic Coast. Approximately two thirds of the township, comprising the portions closest to the coastline, are in Watershed Management Area (WMA) 13 – Barnegat Bay. The inland portions of the Township are located in WMA 14 – Mullica.

1.4.2 HUC-14 Subwatersheds

Watershed boundary data from the NJDEP Bureau of GIS "14 Digit Hydrologic Unit Code Delineations for New Jersey" open data file was utilized in this analysis. [3] There are Twelve (12) HUC-14 subwatersheds within or bordering Barnegat Township. The information provided in Table 4 includes HUC-14 identification codes, common names for each subwatershed, and land area within Barnegat Township. A map showing the HUC-14 subwatersheds within and bordering the municipality is provided in Appendix E, Map 4.

Major waterways in Barnegat Township include the Oswego River, Gunning River, Double Creek, Mill Creek, and Oyster Creek, with the following named tributaries:

- Draining to Oswego River: Yellowdam Branch, Plains Branch
- Draining to Mill Creek: Four Mile Branch

Table 4. Barnegat Township HUC-14 Subwatersheds

HUC-14 Subwatershed	Land Area Within Municipality (acres)	Water Region	Watershed Management Area
02040301110010 *Forked River NB (above old RR grade)*	42.3	3 – Atlantic Coast	13 – Barnegat Bay
02040301110040 Oyster Creek (above Rt 532)	504.3	3 – Atlantic Coast	13 – Barnegat Bay
02040301120010 Waretown Creek / Lochiel Creek	1,543.3	3 – Atlantic Coast	13 – Barnegat Bay
02040301120020 Barnegat South tribs (below Lochiel Ck)	6,239.7	3 – Atlantic Coast	13 – Barnegat Bay
02040301120030 Barnegat Bay So (Brngt Inlet-Surf City)	3,392.2	3 – Atlantic Coast	13 – Barnegat Bay
02040301120040 *Barnegat Bay (Barnegat to Surf City)*	234.9	3 – Atlantic Coast	13 – Barnegat Bay
02040301130010 *Four Mile Branch (Mill Creek)*	3,048.0	3 – Atlantic Coast	13 – Barnegat Bay
02040301130020 *Mill Ck (above GS Parkway)*	1,016.1	3 – Atlantic Coast	13 – Barnegat Bay
02040301180010 Yellow Dam Branch	2,595.4	3 – Atlantic Coast	14 - Mullica
02040301180020 Oswego River (above Rt 539)	3,964.0	3 – Atlantic Coast	14 - Mullica
02040301180030 *Plains Branch (Oswego River)*	381.2	3 – Atlantic Coast	14 - Mullica
02040301180040 Oswego River (Sim Place Resv to Rt 539)	2,814.5	3 – Atlantic Coast	14 - Mullica

1.5 Areas prone to flooding

At the time of this report, FEMA has determined base flood elevations for all coastal areas of the Township, which reach inland up to just east of US Route 9. Zone A floodways have been estimated (but no base flood elevations determined) for lands adjacent to the Oswego River and Four Mile Run.

1.6 Goals for the Watershed Improvement Plan

The overall goal of the Barnegat Township WIP is to identify specific implementable strategies to improve water quality and reduce stormwater flooding in the municipality. These strategies will be based on specific pollutant reduction parameters for known impairments in municipal waterbodies. Point and non-point source load reductions will be considered. To address alleviation of stormwater flooding, strategies will consider impervious cover and potential for stormwater volumetric reduction. Specific improvement projects, best management practices, and action items will be identified in subsequent phases of the WIP. Public engagement throughout Phases 2 and 3 will ensure broad understanding and awareness of pollution prevention and stormwater management in Barnegat Township.

The goal for this Phase 1 Watershed Inventory Report is to document all relevant information and data pertaining to MS4 infrastructure and water quality. This record will inform subsequent phases of the Watershed Improvement Plan.

2 PUBLIC PARTICIPATION

Engaging with stakeholders opens a channel of communication and collaboration. Connecting with stakeholders early and often will lead to the identification of diverse perspectives, build trust and credibility within the community, and allow communities to make informed decisions.

2.1 List of stakeholders

Barnegat Township will engage with a variety of stakeholders to provide input for development of the WIP. Initial public information sessions regarding this Phase 1 Watershed Inventory Report will be held in conjunction with regularly scheduled Township Committee meetings. Notice for Township Committee meetings is provided in accordance with the Open Public Meetings Act (N.J.S.A. 10:4-6 et seq.) and the Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.). Information regarding the WIP will be presented as a regular Committee Meeting agenda item, and a public comment session will be scheduled to hear stakeholder feedback. Additional Special Committee Meetings or Town Hall style meetings may be scheduled as needed.

A list of relevant stakeholders is provided in Table 5.

Table 5. Watershed Improvement Plan Stakeholders

Stakeholder	Engagement Details
Residents	Residents are invited to provide feedback on topics related to water quality, stormwater management, and other WIP subjects during public comment sessions at regularly scheduled Township Committee meetings.
Business Owners	
Owners of Private Stormwater Facilities	Most private stormwater management (SWM) facilities are located in residential subdivision developments and are managed by homeowners associations (HOAs). The Township maintains a database of owner information and will utilize this database to distribute information regarding public information sessions.
Neighboring Municipalities	The Stormwater Program Coordinators (SPCs) in neighboring municipalities will be notified of public WIP information sessions hosted by Barnegat Township. Neighboring municipalities include Lacey Township, Ocean Township, Woodland Township, Stafford Township, Long Beach Township, and Harvey Cedars Borough
Ocean County	The Ocean County SPC will be notified of public WIP information sessions hosted by Barnegat Township.
Regional Watershed Associations	*Save Barnegat Bay operates in region*
Others	

Stakeholder	Engagement Details

2.2 Future scheduled meetings

Notice of public information sessions regarding the municipal WIP are posted on the Township's webpage: https://www.barnegat.net/

The Township posts information relating to stormwater management at its dedicated municipal stormwater webpage: https://barnegatwatersewer.com/storm-water-management-plan/

3 STORMWATER OUTFALLS

3.1 Stormwater outfalls owned/operated by Barnegat Township

Historically, municipally-operated outfall inventory was conducted by the Barnegat Township Department of Public Works (DPW) and Water and Sewer Department using paper- and computer-based documentation. Electronic map-based location identification of municipally-operated outfalls began pre-2020, using the Barnegat Township's ArcGIS Enterprise Account. GIS Consultants (Remington & Vernick Engineers & Van Cleef Engineering Associates) utilized GNSS Satellite Receiver devices to inventory outfall feature data. Outfall inventory features collected using the NJDEP Data Dictionary are listed in Table 6.

Following DEP recommended workflows, outfall data collection was completed by Van Cleef utilizing Barnegat Township's ESRI ArcGIS Enterprise Account. Each outfall feature was reviewed for location and feature description accuracy. Revisions and additions were made as needed. Tools utilized for the accuracy review included survey data, as-built plans, construction plans, development plans, historic and current aerial imagery, NJ GeoWeb, and field confirmation studies. To create a complete and useful inventory, additional outfall features were collected as listed in Table 6.

Table 6. Outfall Inventory Feature Attributes

NJDEP Required Attributes	Notes	Additional Attributes
Local ID		Elevation Data, Invert
Road Name		HUC-14
Owner Type	*Municipality, Private, etc.*	Construction Date
Outfall Type	*Pipe, Open Channel*	Inspection Date
Pipe Material	*RCP, HDPE, etc.*	Inspector Name
Pipe Shape	*Circular, Elliptical, etc.*	
Pipe Size	*Height, Width (inches)*	
Headwall Structure	*Abutment, Concrete, etc.*	
BMP Structure	*Rip-rap, Gabion Basket, etc.*	
Contributing Drainage Area	*Residential, Agricultural, etc.*	
Type Area Receiving	*Swale, Stream, Wetland, etc.*	
Data Collection Method	*Desktop, Mobile Device, GPS, etc.*	

Barnegat Township operates approximately 276 outfalls. A summary of municipally-operated outfalls in Barnegat Township discharging within each HUC-14 sub-watershed is provided in Table 7. A map showing municipally-operated outfall locations is provided in Appendix E, Map 5.

Table 7. Barnegat Township Municipally-Operated Outfalls Listed by Sub-Watershed

HUC-14 Sub-Watershed	Municipal Outfalls	
02040301110010 *Forked River NB (above old RR grade)*	0	0%
02040301110040 Oyster Creek (above Rt 532)	3	1.1%
02040301120010 Waretown Creek / Lochiel Creek	71	25.7%
02040301120020 Barnegat South tribs (below Lochiel Ck)	72	26.1%
02040301120030 Barnegat Bay So (Brngt Inlet-Surf City)	0	0%
02040301120040 *Barnegat Bay (Barnegat to Surf City)*	0	0%
02040301130010 *Four Mile Branch (Mill Creek)*	116	42.0%
02040301130020 *Mill Ck (above GS Parkway)*	14	5.1%
02040301180010 Yellow Dam Branch	0	0%
02040301180020 Oswego River (above Rt 539)	0	0%
02040301180030 *Plains Branch (Oswego River)*	0	0%
02040301180040 Oswego River (Sim Place Resv to Rt 539)	0	0%
TOTAL, MUNICIPALLY-OPERATED OUTFALLS	276	100%

An outfall may discharge to a variety of locations, including a field, stream, ditch, or directly to a stream or waterbody. The outfall's discharge area impacts the potential pollutant load and runoff quantity received by a waterbody. Receiving discharge areas for Barnegat Township's municipally operated outfalls are listed in Table 8. Approximately 4.1% of outfalls discharge directly to a stream or wetland area.

Table 8. Barnegat Township Municipally-Operated Outfalls Listed by Receiving Discharge Area

Receiving Discharge Area	Municipal Outfalls	
Stream/River	12	4.3%
Wetlands	0	0%
Woodlands	74	26.8%
Ditch	10	3.6%
Swale	1	0.4%
Field	5	1.8%
Other	174	63.0%
TOTAL, MUNICIPALLY-OPERATED OUTFALLS	276	100%

3.2 Receiving Surface Waters and Water Quality Classifications

NJ Geographic Information Network (NJGIN) open data resources were utilized to map and analyze receiving surface waters in Barnegat Township. Datasets accessed include the National Hydrography Dataset (NHD) Streams and Waterbodies 2015 for NJ, and the Surface Water Quality Classification of NJ. The latter resource is also available by accessing the NJ-WET tool provided by the Department. [6, 7, 8]

Major surface waters in or bordering Barnegat Township include the Barnegat Bay, Oswego River, Gunning River, Double Creek, Mill Creek, and Oyster Creek, and their tributaries. The ultimate receiving waterbody was identified for each municipally-operated outfall based on each outfall's location within its drainage area. It is important to note that only a certain number of outfalls discharge directly to a surface water, as listed in Table 8.

The number and percentage of municipally-operated outfalls categorized by receiving surface water is presented in Table 9. Water quality classifications are also provided in this table. Full details for municipally-operated outfalls are provided in the Appendix. A map depicting this information is presented in Appendix E, Map 6.

Abbreviations used in the water quality classifications are as follows: [9]

- C1 – Category One waters. These waterways have the highest resource value classification in NJ. A C1 water has additional antidegradation policies at NJAC 7:9b based on exceptional ecological, recreational, water supply and/or fisheries resource(s).
- FW1 – Fresh waters 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 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).
- PL – Pinelands Waters. All waters within the boundaries of the Pinelands Area, except those waters designated as FW1, 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.
- SE – General surface water classification applied to saline waters of estuaries. Saline waters means waters having salinities generally greater than 3.5 parts per thousand at mean high tide. Three categories exist (SE1, SE2, SE3) depending on designated use as defined in N.J.A.C. 7:9b.

Table 9. Barnegat Township Municipally-Operated Outfalls Listed by Receiving Surface Water and Water Quality Classification

HUC-14 Subwatershed	Receiving Surface Water	Water Quality Classification	All Outfalls		Outfalls Discharging Directly to Stream	
02040301110010	Cave Cabin Branch	PL	0	0%	0	0%
02040301110040	Oyster Creek UNT	PL	3	1.1%	0	0%
02040301120010	Barnegat Bay	SE1C1	71	25.7%	7	2.5%
02040301120020	Barnegat Bay	SE1C1	72	26.1%	5	1.8%
02040301120030	Barnegat Bay	SE1C1	0	0%	0	0%
02040301120040	Barnegat Bay	SE1C1	0	0%	0	0%
02040301130010	Four Mile Branch	PL	116	42.0%	0	0%
02040301130020	Mill Creek	PL	14	5.1%	0	0%
02040301180010	Yellodam Branch	PL	0	0%	0	0%
02040301180020	Oswego River	PL	0	0%	0	0%
	Oswego River UNT	FW1	0	0%	0	0%
02040301180030	Plains Branch UNT	PL	0	0%	0	0%
02040301180040	Oswego River	PL	0	0%	0	0%
		TOTAL, MUNICIPALLY-OPERATED OUTFALLS	276	100%	12	4.3%

4 MUNICIPAL CONVEYANCE NETWORK

The structural conveyance system in the Barnegat Township MS4 consists of a network of inlets, manholes, stormwater pipes, and culverts. This network conveys stormwater and ultimately discharges via outfalls. In addition to these structural components, roadside ditches, and grass swales direct stormwater overland or into the structural conveyance network.

Historically, municipal inlet inventory was conducted by the Barnegat Township Department of Public Works (DPW) and Water Department using paper- and computer-based documentation. Electronic map-based location identification of municipally-operated inlets began pre-2020, using the Township's ArcGIS Enterprise Account. The preliminary efforts of the MS4 Inventory were completed by Remington & Vernick Engineers and the responsibilities of finishing was given to Van Cleef. The remaining areas of interest highlighted by the municipality were completed by Van Cleef utilizing an Arrow Gold GNSS and RTK resulting int survey-grade accuracy of features collected by VCEA.

Following completion of field efforts, all data remains hosted on Barnegat Township's ArcGIS Enterprise account. Each inlet feature was reviewed for location and feature description accuracy. Revisions and additions were made, as necessary. Additional stormwater conveyance network information (manholes, pipes, swales, etc.) was added to the municipal stormwater GIS database. Location of privately-operated features were mapped if known, and where it was critical for depiction of a complete municipal system. Tools utilized for the accuracy review and conveyance network delineation included survey data, as-built plans, construction plans, development plans, historic and current aerial imagery, NJ GeoWeb, and field confirmation studies. To create a complete and useful inventory, additional features were collected as listed in Table 10.

Barnegat Township operates approximately 2,825 inlets and 470 manholes. These assets are shown on the map provided in Appendix E, Map 7. The pipe conveyance network consists of 3,122 pipe segments, totaling approximately 57.76 miles of pipe. A detailed map showing the MS4 conveyance network can be accessed via the Barnegat Township website.

Table 10. MS4 Conveyance Network Inventory Feature Attributes

NJDEP Required Attributes	Notes	Additional Attributes
Inlets and Manholes		
Local ID		Elevation Data, Invert
Road Name		Receiving Outfall ID
Owner Type	*Municipality, Private, etc.*	
Inlet Type	*Grate, combination, etc.*	
Curb Opening Retrofitted	*To meet WQ design standards*	
Bicycle Safe Grate	*To meet safety standards*	
Inlet Labeled	*"Drains to waterway" label*	
BMP Type	*Berm, trash rack, etc.*	
Contributing Drainage Area	*Residential, Agricultural, etc.*	
Data Collection Method	*Desktop, Mobile Device, GPS, etc.*	
Stormwater Pipes, Swales		
Local ID		Pipe Material
Road Name		Pipe Size
Owner Type	*Municipality, Private, etc.*	Receiving Outfall ID
Conveyance Type		
Direction of Flow		

5 STORMWATER INTERCONNECTIONS

The NJDEP Tier A Stormwater Discharge General Permit defines an "MS4 Interconnection" as follows: [1]

> *Any point at which an MS4 flows into or from another MS4.*

In accordance with Part G.1.a.iii of the Tier A MS4 Permit, interconnections between the Barnegat Township MS4 and other MS4 entities were mapped. Other MS4 entities include the Ocean County MS4 and neighboring municipal MS4s.

Requirements of the Watershed Inventory Report include mapping of additional stormwater interconnections, including to and from other jurisdictions' conveyance networks such as sanitary sewers, other combined sewers, and private stormwater management facilities.

Location of all interconnection points between the Barnegat Township MS4 and other entities' conveyance networks are shown in Appendix E, Map 8.

5.1 Interconnections from Barnegat Township's MS4 into another entity

A summary of stormwater interconnections from the Barnegat Township MS4 into other entities' drainage networks is provided in Table 11.

- The Barnegat Township MS4 flows into other MS4s (municipal, County, and State) at twenty-three (23) locations.
- Five (5) points were identified where the Barnegat Township MS4 flows into a private stormwater management facility. These are locations where municipal stormwater conveyance pipes within the Township right-of-way flow into privately operated stormwater management (SWM) facilities such as detention basins. These points typically provide roadway drainage for local residential developments, which manage stormwater via SWM facilities that are privately operated (for example, through a residential homeowner's association). This drainage is typically routed through extended detention or infiltration basins and discharged overland or directly to State open waters.
- The Barnegat Township MS4 does not connect to any sanitary sewer systems or combined sewer (sanitary and stormwater) networks.

Table 11. Stormwater Interconnections from Barnegat Township's MS4 To Another Entity

Connecting To	Number of Interconnections
Other Municipal MS4	7
Ocean County MS4	13
Private Stormwater Management Facility	5
State MS4	3
Total Interconnections	**28**

5.2 Interconnections into Barnegat Township's MS4 from another entity

A summary of stormwater interconnections into the Barnegat Township MS4 from other entities' drainage networks is provided in Table 12.

- Other MS4s (municipal, County, and State) flow into the Barnegat Township MS4 at twenty-one (21) locations.
- There are thirteen (13) locations where privately operated SWM facilities discharge directly to the Barnegat Township MS4. At these locations, private stormwater conveyance networks flow through detention basins and discharge to the municipal stormwater network at a road inlet.
- No points were identified where sanitary sewer systems or combined sewer (sanitary and stormwater) networks connect to the Barnegat Township MS4.

Table 12. Stormwater Interconnections to Barnegat Township's MS4 From Another Entity

Connecting From	Number of Interconnections
Other Municipal MS4	7
Ocean County MS4	13
Private Stormwater Management Facility	13
State MS4	1
Total Interconnections	**34**

6 Drainage Areas for Stormwater Outfalls and Stormwater Interconnections

Outfall and interconnection drainage areas were delineated using NJDEP recommendations for the usage of ArcHydro, a stormwater specific extension utilized in ESRI ArcGIS Pro. Utilizing field collected stormwater feature data as well as the NJOGIS South Jersey 2-ft Digital Elevation Model (DEM) most recently updated by the state December 2025. The remaining intermediary data layers were a bi-product of the ArcHydro toolset workflow. Results were checked utilizing known and accepted watershed boundary delineations, including Watershed Management Areas, HUC-11 boundaries, and HUC-14 boundaries. [3]

6.1 MS4 outfall drainage areas

Barnegat Township MS4 outfall drainage areas are shown in Appendix E, Map 9.

6.2 Interconnection drainage areas

Drainage areas for interconnections from Barnegat Township to another entity are shown in Appendix E, Map 9.

7 TMDLS AND WATER QUALITY IMPAIRMENTS

In accordance with the Clean Water Act, the State of New Jersey measures and reports a variety of water quality assessment metrics for streams, lakes, and coastal waterbodies. A statewide assessment is conducted every two years, and results are published in the New Jersey Integrated Water Quality Assessment Report (NJ Integrated Report). A detailed evaluation of one of New Jersey's five water regions is conducted during each biennial assessment, such that each water region is analyzed on a rotating basis every ten years.

Information presented in the NJ Integrated Report is organized in a way that "*identifies and prioritizes waters for protection, restoration, and additional monitoring or research,*" with the goal of "*enhancing, maintaining, and restoring water quality in all surface waters of the State to support their use for aquatic life, recreation, water supply, fish consumption, and shellfish harvest for consumption.*" Water quality data is collected from a variety of organizations, including utilities, watershed associations, and state, county, and federal agencies. [13]

Waterbodies are monitored for impairments that threaten the waterbody's designated use.

- Impairments may include specific pollutants (such as phosphorus, lead, PCBs, e. coli, total suspended solids, etc.), and other conditions that degrade water quality (such as temperature, dissolved oxygen levels, pH, turbidity, etc.).
- Designated uses in NJ include public water supply, aquatic life, fish consumption, shellfish, and recreation.

If an impairment is measured at a level that threatens (i.e., does not support) the waterbody's designated use, the impairment is reported. The resulting statewide "303(d)" list, so named for the corresponding section of the Clean Water Act which requires it, details the waterbodies where designated uses are not supported and require development of a Total Maximum Daily Load (TMDL). TMDLs are developed for priority impairments on the 303(d) list. [14]

Water Quality Impairment and TMDL information for Barnegat Township is provided in Sections 7.1 and 7.2. Information is reported by HUC-14 subwatershed in Table 13 and Table 14 and is shown visually in the map provided in Appendix E, Map 10. This information was compiled using data published in the 2022 NJ Integrated Report, and data posted in the NJ-WET database.

7.1 Water Quality Impairments

Water quality impairments reported for Barnegat Township waterbodies in the 2022 NJ Integrated Report are listed in Table 13. The designated use threatened by the impairment is noted, as well as the year in which the impairment was first listed. The final column indicates the State priority ranking for TMDL development for that waterbody and associated impairment.

Table 13. Water Quality Impairments in Barnegat Township [8, 14]

HUC-14	Impairments	Year First Listed on 303(d)	Designated Use	Priority Ranking for TMDL
02040301110010 *Forked River NB (above old RR grade)*	Dissolved Oxygen	2006	Aquatic Life	Medium
	Biological – Cause Uknown	2016	Aquatic Life	Low
02040301110040 Oyster Creek (above Rt 532)	*None Listed*			
02040301120010 Waretown Creek / Lochiel Creek	Arsenic	2014	Public Water Supply	Low
	E. Coli	2018	Recreation Primary	Medium
	Mercury	2014	Public Water Supply	Low
02040301120020 Barnegat South tribs (below Lochiel Ck)	*None Listed*			
02040301120030 Barnegat Bay So (Brngt Inlet-Surf City)	*None Listed*			
02040301120040 *Barnegat Bay (Barnegat to Surf City)*	*None Listed*			
02040301130010 *Four Mile Branch (Mill Creek)*	Biological – Cause Uknown	2014	Aquatic Life	Low
02040301130020 *Mill Ck (above GS Parkway)*	pH	2006	Aquatic Life	Medium
	Arsenic	2012	Public Water Supply	Low
02040301180010 Yellow Dam Branch	Dissolved Oxygen	2008	Aquatic Life	Medium
	Total Suspended Solids	2012	Aquatic Life	Medium
	Arsenic	2012	Public Water Supply	Low
02040301180020 Oswego River (above Rt 539)	Dissolved Oxygen	2008	Aquatic Life	Medium
	Total Suspended Solids	2012	Aquatic Life	Medium
02040301180030 *Plains Branch (Oswego River)*	Arsenic	2016	Public Water Supply	Low
	Arsenic	2012	Public Water Supply	Low
02040301180040 Oswego River (Sim Place Resv to Rt 539)	Dissolved Oxygen	2008	Aquatic Life	Medium
	Total Suspended Solids	2012	Aquatic Life	Medium

7.2 Total Maximum Daily Load (TMDL)

TMDLs developed for waterbodies in Barnegat Township are listed for each HUC-14 subwatershed in Table 14. This information was gathered using the "NJDEP TMDL Look-Up Tool" [15] and verified using the NJ-WET database and the 2022 NJ Integrated Report.

All TMDLs in Barnegat Township are for Lakesheds; there are no applicable Streamshed or Shellfish TMDLs in Barnegat Township.

Table 14. Stream TMDLs in Barnegat Township [8, 15, 16]

HUC-14	Lakeshed TMDL	TMDL Report Date
02040301110010 *Forked River NB (above old RR grade)*	Fecal Coliform	2007
02040301110040 Oyster Creek (above Rt 532)	*None Listed*	
02040301120010 Waretown Creek / Lochiel Creek	Fecal Coliform	2007
02040301120020 Barnegat South tribs (below Lochiel Ck)	*None Listed*	
02040301120030 Barnegat Bay So (Brngt Inlet-Surf City)	*None Listed*	
02040301120040 *Barnegat Bay (Barnegat to Surf City)*	*None Listed*	
02040301130010 *Four Mile Branch (Mill Creek)*	Fecal Coliform	*2007*
02040301130020 *Mill Ck (above GS Parkway)*	Fecal Coliform	2007
02040301180010 Yellow Dam Branch	*None Listed*	
02040301180020 Oswego River (above Rt 539)	*None Listed*	
02040301180030 *Plains Branch (Oswego River)*	*None Listed*	
02040301180040 Oswego River (Sim Place Resv to Rt 539)	*None Listed*	

7.3 Pollutants of Concern

NJDEP published a "Pollutants of Concern" document, which is posted on the NJDEP website as a Watershed Improvement Plan resource. [17] The document is undated and lists the following pollutants of concern: benzo(a)pyrene, cadmium, chloride, chromium, copper, dissolved oxygen, lead, nickel, nitrate, pathogens (enterococcus, E. coli, fecal coliform, total coliform), pH, phosphorous/total phosphorus, PCBs, temperature, total dissolved solids, total suspended solids, turbidity, and VOCs.

Several of the preceding listed pollutants/impairments are found in Barnegat Township waterbodies; these pollutants/impairments are summarized in Table 15. The environmental impacts of the pollutants/impairments are summarized in the following sections.

Table 15. Pollutants/Impairments of Concern in Barnegat Township

HUC-14 Subwatershed	Water Region, WMA	Benzo(a)pyrene	Heavy Metals	Dissolved O^2	Pathogens	pH	Phosphorous	PCBs	Temperature	TSS/TDS	Turbidity	VOCs
02040301110010 *Forked River NB (above old RR grade)*	3 – Atlantic Coast 13 – Barnegat Bay			X	TMDL							
02040301110040 Oyster Creek (above Rt 532)	3 – Atlantic Coast 13 – Barnegat Bay											
02040301120010 Waretown Creek / Lochiel Creek	3 – Atlantic Coast 13 – Barnegat Bay				TMDL							
02040301120020 Barnegat South tribs (below Lochiel Ck)	3 – Atlantic Coast 13 – Barnegat Bay											
02040301120030 Barnegat Bay So (Brngt Inlet-Surf City)	3 – Atlantic Coast 13 – Barnegat Bay											
02040301120040 *Barnegat Bay (Barnegat to Surf City)*	3 – Atlantic Coast 13 – Barnegat Bay											
02040301130010 *Four Mile Branch (Mill Creek)*	3 – Atlantic Coast 13 – Barnegat Bay				TMDL	X						
02040301130020 *Mill Ck (above GS Parkway)*	3 – Atlantic Coast 13 – Barnegat Bay				TMDL							
02040301180010 Yellow Dam Branch	3 – Atlantic Coast 14 – Mullica			X						X		
02040301180020 Oswego River (above Rt 539)	3 – Atlantic Coast 14 – Mullica			X						X		
02040301180030 *Plains Branch (Oswego River)*	3 – Atlantic Coast 14 – Mullica											
02040301180040 Oswego River (Sim Place Resv to Rt 539)	3 – Atlantic Coast 14 – Mullica			X						X		

X – Pollutant/Impairment appears on 2022 303(d) list
TMDL – TMDL established for pollutant/impairment

7.3.1 Dissolved Oxygen

Cause: Sufficient dissolved oxygen concentrations are necessary to support aquatic life. Stormwater runoff containing excessive nutrients causes a decrease dissolved oxygen concentration in receiving surface waters.

General Impact: Surface waters with decreased dissolved oxygen concentration may not be capable of supporting aquatic life and may become devoid of life.

Barnegat Township Impact: Three (3) subwatersheds include dissolved oxygen as a listed impairment. Refer to Table 15.

7.3.2 Pathogens

Cause: Bacterial pathogens may be present in surface water due to contaminated stormwater runoff. Contamination occurs when runoff comes into contact with pathogen sources, which include pet and wildlife waste, certain farming activities, illicit discharges, and failing septic systems.

General Impact: Certain strains of pathogens such as E. Coli and fecal coliform cause intestinal disease when ingested by humans.

Barnegat Township Impact: TMDLs are in place in four (4) subwatersheds for fecal coliform. One (1) subwatersheds includes E. Coli as a listed impairment. Refer to Table 15.

7.3.3 pH

Cause: pH is a measure of a substance's acidity or alkalinity. Pure water is neutral, with a pH equal to 7.0. A waterbody's pH value fluctuates if chemicals or pollutants are present in the water. Contamination can occur if pollutants are discharged directly into a waterbody, when air pollutants precipitate with rain, or when stormwater runoff comes into contact with pollutant sources. Runoff sources may include battery acids, cement, fertilizers, compost, and other pollutants.

General Impact: Fluctuations of pH, and acidic or basic conditions outside certain pH thresholds, negatively impact aquatic life and habitat.

Barnegat Township Impact: One (1) subwatersheds include pH as a listed impairment. Refer to Table 15.

7.3.4 Total Suspended Solids (TSS)

Cause: Stormwater runoff picks up particulate matter as it travels overland and carries the suspended particulates to waterbodies.

General Impact: High total suspended solids (TSS) levels inhibit the ability of aquatic life to thrive. Organic TSS contributes to elevated levels of pathogenetic microorganisms and the potential for waterborne disease.

Barnegat Township Impact: Three (3) subwatersheds include TSS as a listed impairment. Refer to Table 15.

7.3.5 Mitigation

As part of its Tier A MS4 permit, Barnegat Township has several regulations to reduce the potential impact of degradation due to the pollutants and impairments described above. These regulations and measures include:

- Community-Wide Measures:
    1. Herbicide application management
    2. Roadside vegetative waste management
    3. Roadside erosion control
    4. Inspection and maintenance of stormwater management facilities
    5. BMPs at the municipal maintenance yard
    6. Stream scouring program
    7. Illicit discharge Detection and elimination program
    8. Street sweeping program
- Community-Wide Ordinances:
    1. Pet Waste Ordinance
    2. Wildlife Feeding Ordinance
    3. Litter Control Ordinance
    4. Improper Disposal of Waste Ordinance
    5. Yard Waste Ordinance
    6. Illicit Connections Ordinance
    7. Green infrastructure requirements of stormwater control ordinance

8 OVERBURDENED COMMUNITIES

The NJ Environmental Justice Law (N.J.S.A. 13:1D-157 et seq.) requires NJDEP to assess the impact of development on environmental and public health stressors in overburdened communities. [**18**]

As defined in the law, overburdened community (OBC) means:

> *Any census block group, as determined in accordance with the most recent United States Census, in which:*
>
> 1. At least 35 percent of the households qualify as low-income households;
> 2. At least 40 percent of the residents identify as minority or as members of a State recognized tribal community; or
> 3. At least 40 percent of the households have limited English proficiency (according to the U.S. census bureau, without an adult that speaks English "very well").

According to the overburdened communities (OBC) dataset presented in both the NJ-WET database and the NJ Environmental Justice, Mapping, Assessment, and Protection Tool (EJMAP), there are two (2) areas defined in Barnegat Township that meets the overburdened community criteria. [8, 19] A map of Barnegat Township showing the OBC area is provided in Appendix E, Map 11. [19] This information is accurate as of the date of this report.

The NJ-WET and EJMAP databases show that the OBC areas in Barnegat Township meet the regulatory criteria for Low-Income Household. The OBC areas are adjacent to each other in eastern Barnegat Township, which is zoned primarily for commercial and light industrial uses, and is developed primarily with warehouse construction. The NJ-WET and EJMAP databases indicate that the population in these OBC areas are 1,817 and 2,121, containing 626 and 572 households, with 38% and 51% of households qualifying as low-income, respectively. [8, 19]

9 Impervious Area

Impervious surfaces impede the infiltration of stormwater into the ground. Impervious areas are associated with nearly all types of development, and include paved surfaces such as roadways, parking lots, and driveways; rooftops; gravel drives; sidewalks; and swimming pools. Impervious areas impede the natural drainage patterns that occur in undisturbed areas, which can significantly impact the quantity and quality of stormwater runoff. Groundwater recharge is also reduced when impervious areas are created, impacting aquifer replenishment and local soil conditions.

Impervious cover data for Barnegat Township was obtained from the NJDEP NJ-WET tool provided by the Department, accessed September 10, 2024. The data is referenced from the NJDEP Bureau of GIS Impervious Surface of New Jersey (2015) open data file. This data was developed for NJ using geographic object-oriented image analysis of source datasets including digital imagery, LiDAR information, and additional NJDEP GIS datasets (land use/land cover, road centerlines, hydrographic features, etc.). [20] The data allows for regional analysis such as that presented below but does not represent precise delineations of impervious surface.

The Impervious Surface of New Jersey (2015) dataset provides area and surface classification information for 7,988 individual impervious surface records in Barnegat Township. Surface classifications are as follows:

- Road – federal, state, and local roadway surfaces
- Building – rooftops
- Other – paved surfaces such as private drives, patios, swimming pools, parking lots, airport runways, etc.

A map depicting impervious area in Barnegat Township is provided in Appendix E, Map 14. Impervious cover areas and percentages, separated by subwatershed area and surface classifications, are provided in Table 16. Graphical representations for surface classification and subwatershed impervious area are provided in Figure 2 and Figure 3, respectively.

There are approximately 2,223.4 acres of total impervious surface in Barnegat Township, which accounts for 31.1% of the total area within the municipal boundary. Impervious cover follows a typical urban coastal development pattern. Coverage is highly concentrated along the corridors established by the Garden State Parkway, US Route 9, and their connecting arterials.

As shown in Figure 2 public road surfaces account for 775.8 acres, or 34.9%, of total impervious area in the municipality. Public and private development sites account for the remaining impervious areas: rooftops, private drives, and parking lots, etc. Development contributing to these impervious areas is primarily for residential and retail uses.

Table 16. Impervious Area in Barnegat Township Listed by Sub-Watershed

HUC-14 Sub-Watershed	Sub-watershed Area* (acres)	Impervious Area				Imp. Cover in Subwatershed Area*	Proportion of Total Impervious Area
		Roads (acres)	Buildings (acres)	Other (acres)	Total (acres)		
02040301110010 *Forked River NB (above old RR grade)*	42.3	1.1	0	0	1.1	2.6%	0.0%
02040301110040 Oyster Creek (above Rt 532)	504.3	8.1	1.0	8.1	17.2	3.4%	0.8%
02040301120010 Waretown Creek / Lochiel Creek	1,543.3	160.4	125.6	195.2	481.2	31.2%	21.6%
02040301120020 Barnegat South tribs (below Lochiel Ck)	6,239.7	210.4	129.7	362.8	702.9	11.3%	31.6%
02040301120030 Barnegat Bay So (Brngt Inlet-Surf City)	3,392.2	0.1	0.1	1.0	1.2	0.0%	0.1%
02040301120040 *Barnegat Bay (Barnegat to Surf City)*	234.9	0	0	0.0	0	0.0%	0.0%
02040301130010 *Four Mile Branch (Mill Creek)*	3,048.0	255.8	184.7	278.1	718.6	23.6%	32.3%
02040301130020 *Mill Ck (above GS Parkway)*	1,016.1	41.7	23.4	52.9	118	11.6%	5.3%
02040301180010 Yellow Dam Branch	2,595.4	41.2	1.4	39.0	81.6	3.1%	3.7%
02040301180020 Oswego River (above Rt 539)	3,964.0	30.1	1.3	15.0	46.4	1.2%	2.1%
02040301180030 *Plains Branch (Oswego River)*	381.2	3.0	0	1.1	4.1	1.1%	0.2%
02040301180040 Oswego River (Sim Place Resv to Rt 539)	2,814.5	23.9	2.1	25.1	51.1	1.8%	2.3%
MUNICIPAL TOTALS	7,159.7	775.8	469.3	978.3	2,223.4	31.1%	

*Area within the Barnegat Township municipal boundary, including areas of land and water

^ Outlier: disproportionately small subwatershed area

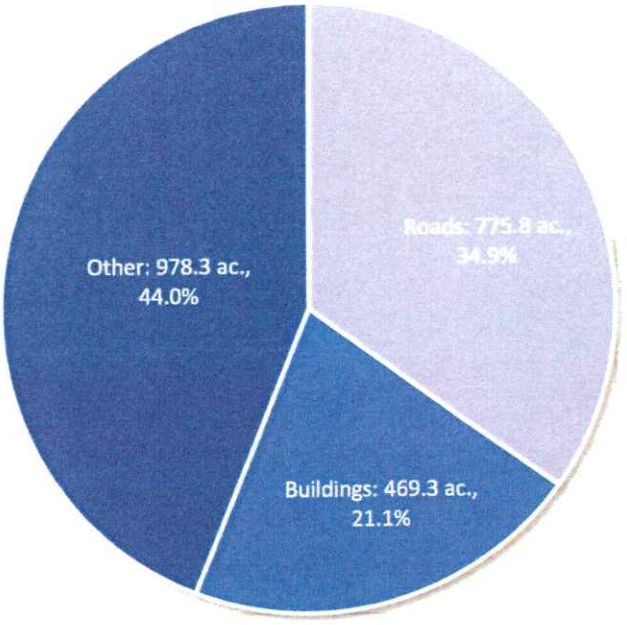

Figure 2. Impervious Surface Classifications

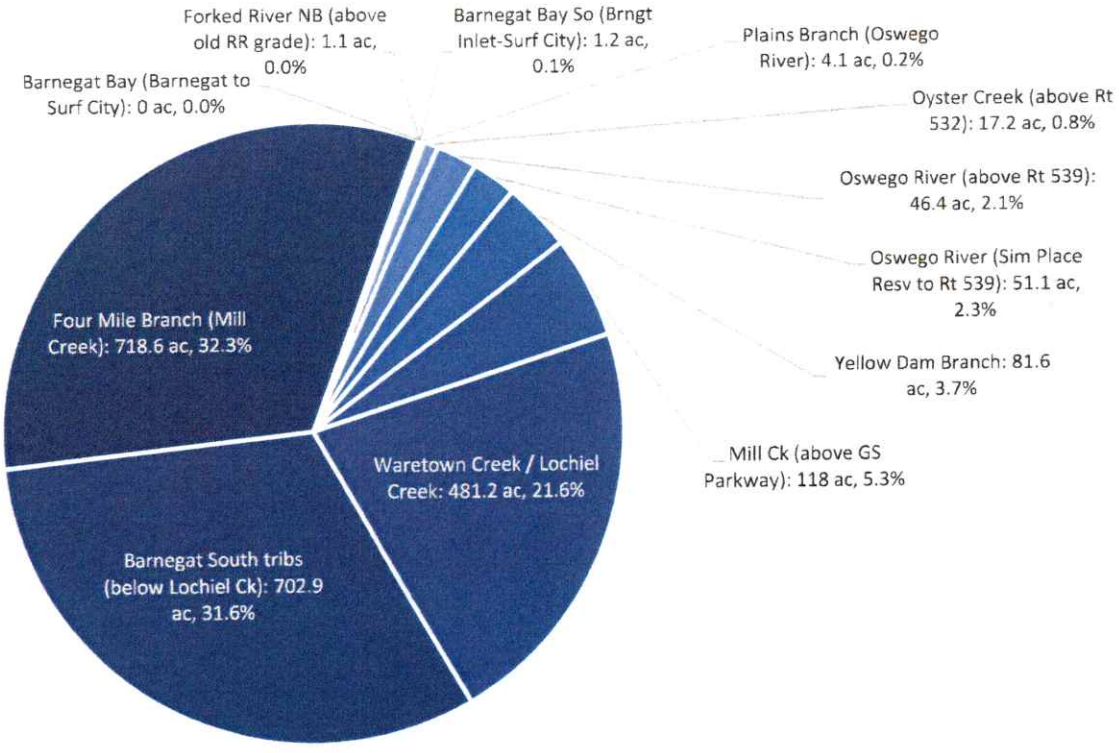

Figure 3. Impervious Area in Each Subwatershed

10 Non-Municipally Owned or Operated Stormwater Facilities

Background info for small rural community/Barnegat:

The Development of this database is in-progress and the report and map figures will be updated accordingly.

Non-municipally owned stormwater management (SWM) facilities in Barnegat Township typically serve residential housing developments and are operated by private property owners or homeowners' associations (HOAs). Types of privately owned SWM facilities in the municipality include:

- Basins: detention, wet pond (retention), infiltration, bioretention
- Green Infrastructure: Grass swales, Manufactured treatment devices (MTDs)
- Culverts

Background info for larger urban or suburban community/Barnegat:

There are a variety of non-municipally owned stormwater management (SWM) facilities in Barnegat Township. The type of SWM facility depends on the size and type of development served. Examples of existing privately operated SWM facilities in Barnegat Township are provided in Table 17.

Table 17. Types of Non-Municipally Operated SWM Facilities in Barnegat Township

Development Category	Owner Type	SWM Facility Types
Residential	Private property owner or homeowners' association (HOA)	Small- to Medium-Scale SWM • Extended detention and infiltration basins • Biorentention (rain gardens) • Grass swales • MTDs
Small Commercial	Private property owner	Small- to Medium-Scale SWM • Extended detention and infiltration basins • Sub-surface detention systems • MTDs • Drywells • Vegetative filter strips • Pervious paving systems
Large Commercial / Light Industrial	Private property owner	Large-Scale SWM • Extended detention and infiltration basins • Retention basins (wet ponds) • Sub-surface detention systems • MTDs • Stormwater cisterns • Constructed wetlands • Culverts

A summary of the type and number of privately owned SWM facilities located in each subwatershed is provided in Table 18 and in Appendix E, Map 15. This information was collected from municipal records including development plans, stormwater facility maintenance plans, Planning Board records, and DPW inventory lists. The data reflects information available at the time of this report. If/as additional privately owned SWM facilities are constructed in Barnegat Township, they are added to the municipal inventory.

Additional details for each non-municipally operated SWM facility are provided in the Appendix.

Table 18. Non-Municipally Operated SWM Facilities in Barnegat Township by HUC-14

HUC-14 Subwatershed	Detention Basin	Wet Pond (Retention)	Infiltration Basin	Bioretention Basin	Culvert	MTD
02040301110010 *Forked River NB (above old RR grade)*	-	-	-	-	-	-
02040301110040 *Oyster Creek (above Rt 532)*	-	-	-	-	-	-
02040301120010 *Waretown Creek / Lochiel Creek*	-	-	-	-	-	-
02040301120020 *Barnegat South tribs (below Lochiel Ck)*	-	-	-	-	-	-
02040301120030 *Barnegat Bay So (Brngt Inlet-Surf City)*	-	-	-	-	-	-
02040301120040 *Barnegat Bay (Barnegat to Surf City)*	-	-	-	-	-	-
02040301130010 *Four Mile Branch (Mill Creek)*	-	-	-	-	-	-
02040301130020 *Mill Ck (above GS Parkway)*	-	-	-	-	-	-
02040301180010 Yellow Dam Branch	-	-	-	-	-	-
02040301180020 Oswego River (above Rt 539)	-	-	-	-	-	-
02040301180030 *Plains Branch (Oswego River)*	-	-	-	-	-	-
02040301180040 Oswego River (Sim Place Resv to Rt 539)	-	-	-	-	-	-
TOTAL	-	-	-	-	-	-

11 CONCLUSIONS

This Watershed Inventory Report represents Phase 1 of the Barnegat Township Watershed Improvement Plan. The purpose of this report is to identify:

- Municipally-operated stormwater infrastructure components, inventoried in accordance with the Tier A MS4 General Stormwater Permit.
- Interconnections to and from other stormwater networks.
- Drainage areas for municipally-operated outfalls and stormwater interconnections.
- Relevant water quality data, including stream classifications, TMDLs, and water quality impairments.
- Overburdened communities.
- Impervious areas.
- Non-municipally operated stormwater management facilities.

The municipal data that accompanies this inventory report has been compiled as an electronic map and submitted to the NJDEP through the NJDEP Online Portal via the Document Submittal Service.

The information from this Watershed Inventory Report will be used to make informed decisions during the creation of the Watershed Assessment Report, which represents Phase 2 of the Barnegat Township Watershed Improvement Plan. Phase 2 assessment efforts will identify areas of concern and will propose potential improvement projects to improve water quality and quantity issues in Barnegat Township.

12 REFERENCES

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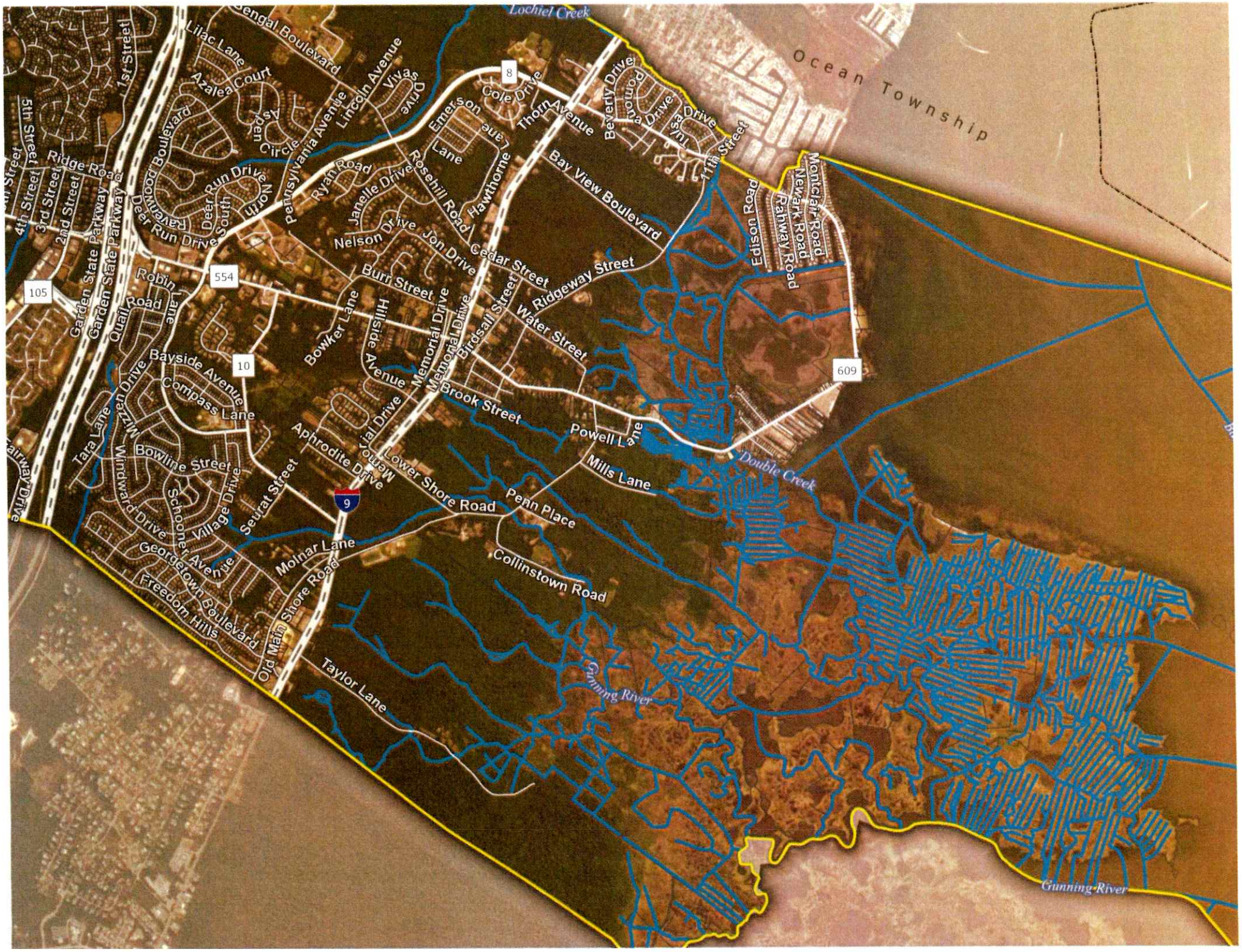
Jones Road
532
Oyster
Dry Branch
610
Old Cedar Bridge Road
72
Old Halfway Road
Oswego River
Howardsville Road
Clayton Road
539
Yellow Dam Branch
OCEAN COUNTY
BURLINGTON COUNTY
Woodland Township

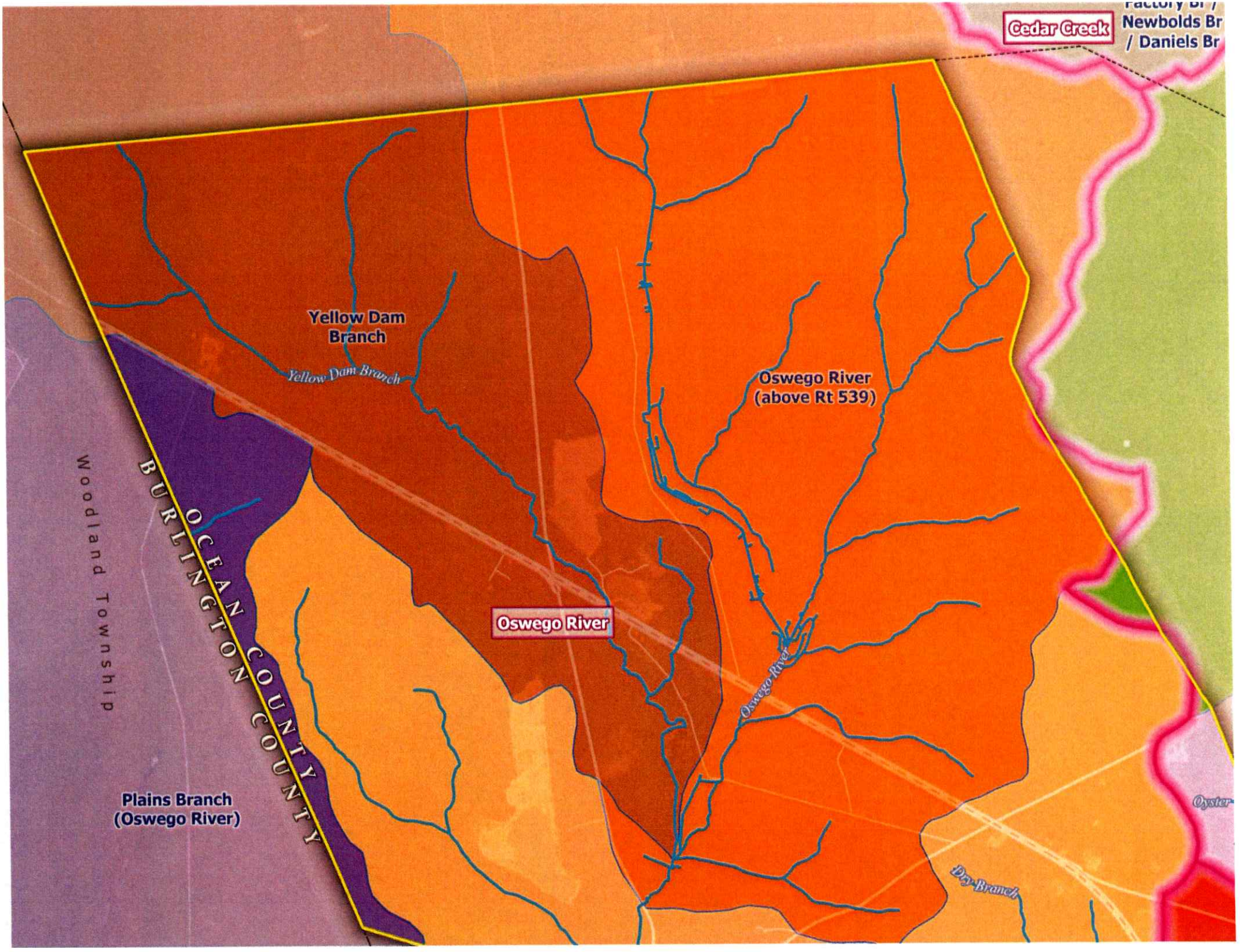

Ocean Township
Mission Way
Heritage Point Boulevard
Rockland Street
Vine Street
Carriage Way
Pine Oak Boulevard
Dogwood Drive
Highland Drive
Ridge Road
Pulaski Drive
1st Street
2nd Street
3rd Street
4th Street
5th Street
6th Street
7th Street
10th Street
Hatteras Way
Newport Street
Westport Drive
Cloverdale Road
Ocean Avenue
Chance Drive
Catalina Avenue
Cascade Avenue
Fourmile Branch
Eighteenmile Branch
Wright Road
Cox Road
Fawcett Boulevard
Tina Way
Watt Avenue
111
105
554
Garden State Parkway
Quail Road
Robin Lane
Bayside Avenue
Compass Lane
Windward Drive
Mizzen Drive
Bowline Street
Village Drive
Schooner Avenue
Starboard Avenue
Georgetown Boulevard
Freedom Hills
Cove Street
Freeboard
Mutineer Avenue
Four Mile Avenue
Viking Drive
Fairway Drive
Periwinkle Drive
Bengal Boulevard
Lilac Lane
Spaen Circle
Pennsylvania Avenue
Lincoln Avenue
Vivas Drive
Deer Run Drive North
Deer Run Drive South
Ryan Road
Janelle Drive
Nelson Drive
Jon Drive
Rosehill Road
Hawthorne Lane
Emerson Lane
Cole Drive
Thorn Avenue
Cedar Street
Burt Street
Bowker Lane
Hillside Avenue
Memorial Drive
Birdsall Street
Water Street
Brook Street
Aphrodite Drive
Mercury Drive
Tiller Drive
Seutral Street
Lower Shore Road
Penn Place
Collinstown Road
Old Main Shore Road
Taylor
Gunning River
8
10
9
Lochiel Creek

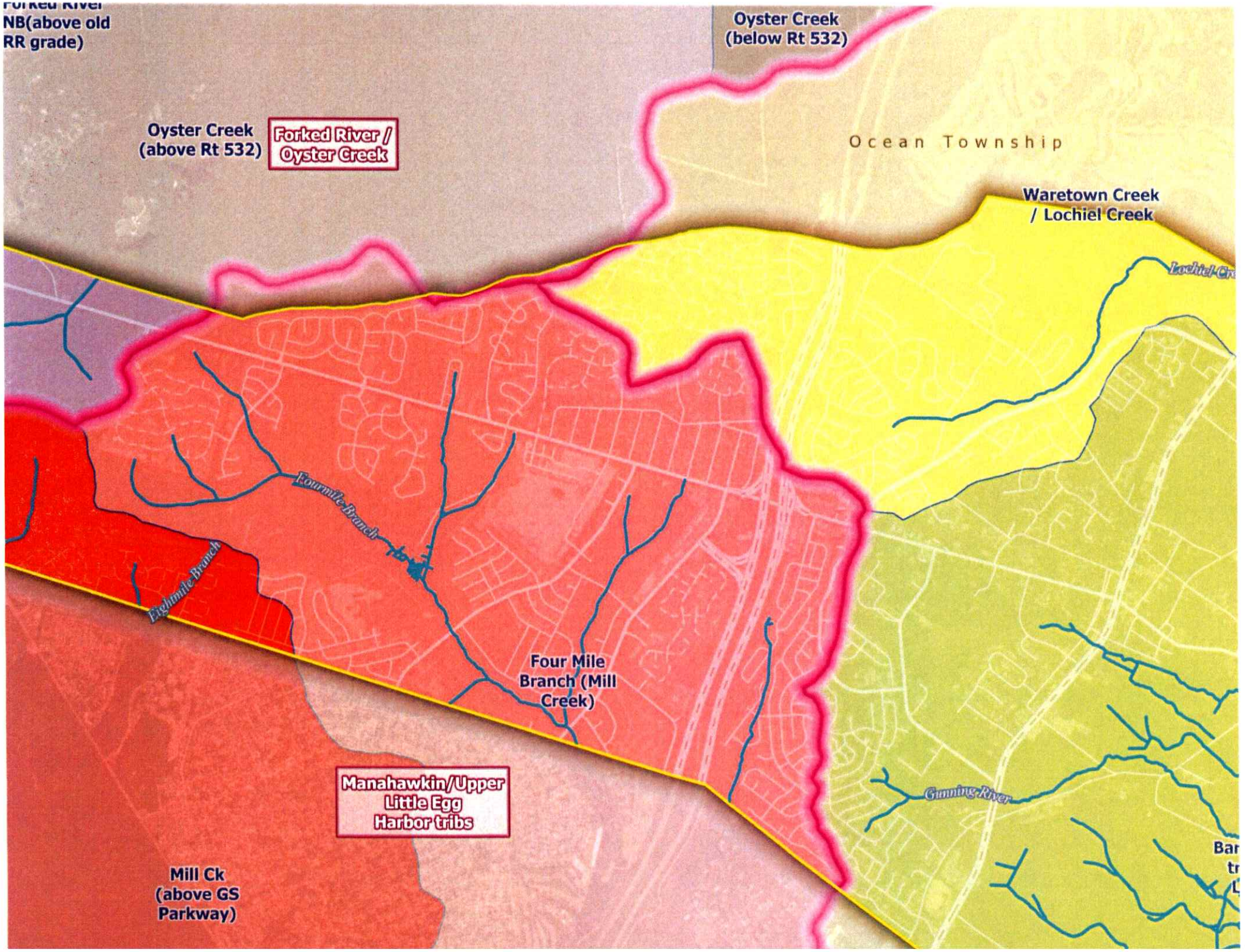

Lochiel Creek
Ocean Township
Bengal Boulevard
Lilac Lane
1st Street
Azalea Court
Lincoln Avenue
Vivas Drive
Cole Drive
8
Thorn Avenue
Beverly Drive
Pomona Drive
Tuscan Drive
11th Street
Emerson Lane
Hawthorne Lane
Bay View Boulevard
Pennsylvania Avenue
Ryan Road
Rosehill Road
Janelle Drive
Nelson Drive
Jon Drive
Cedar Street
Ridgeway Street
Edison Road
Montclair Road
Newark Road
Rahway Road
Ridge Road
Deer Run Drive North
Deer Run Drive South
Ravenswood Boulevard
5th Street
4th Street
3rd Street
2nd Street
Garden State Parkway
105
554
Robin Lane
Quail Road
Burt Street
Water Street
Bowker Lane
Hillside Avenue
Memorial Drive
Birdsall Street
609
Bayside Avenue
10
Compass Lane
Brook Street
Powell Lane
Double Creek
Jare Lane
Mizzen Drive
Windward Drive
Bowline Street
Aphrodite Drive
Venus Trail Drive
Lower Shore Road
Mills Lane
Penn Place
Schooner Avenue
Village Drive
Seurat Street
9
Molnar Lane
Collinstown Road
Georgetown Boulevard
Freedom Hills
Old Main Shore Road
Taylor Lane
Gunning River
Gunning River

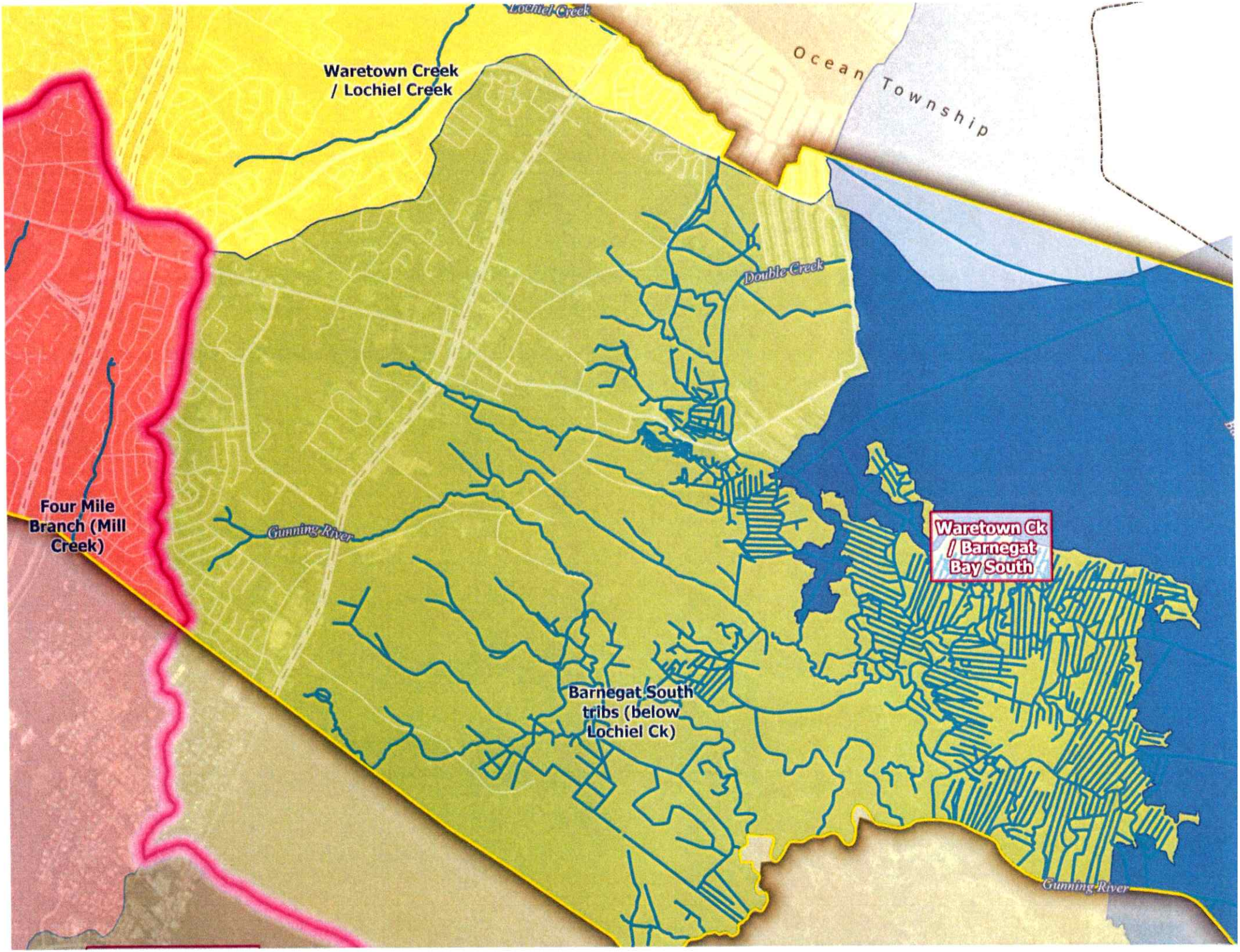

Woodland Township
OCEAN COUNTY
BURLINGTON COUNTY
Yellow Dam Branch
Howardsville Road
Jones Road
539
Clayton Road
Old Halfway Road
72
532
Old Cedar Bridge Road
Oyster
Oswego River
Dry Branch
610

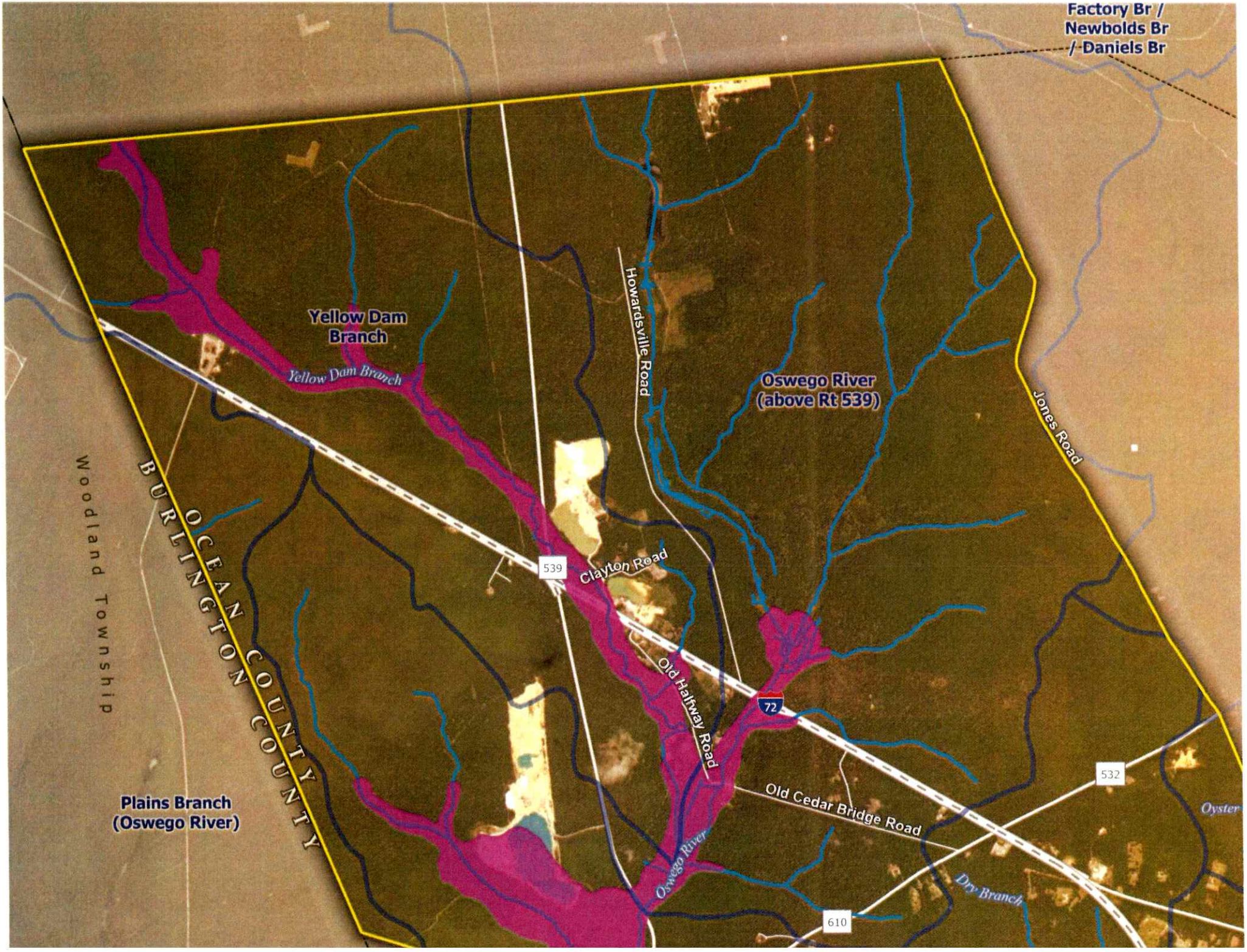

Ocean Township
Mission Way
Heritage Point Boulevard
Rockland Street
Vine Street
Carriage Way
Pine Oak Boulevard
Wood Drive
Pulaski Drive
Highland Drive
10th Street
7th Street
6th Street
5th Street
4th Street
3rd Street
2nd Street
1st Street
Ridge Road
Westport Drive
Hatteras Way
Newport Street
Fourmile Branch
Cloverdale Road
Joan Avenue
Chance Drive
Catalina Avenue
Cascade Avenue
Eighmile Branch
Wright Road
Cox Road
Fawcett Boulevard
Tina Way
Watt Avenue
Freeboard
Mutineer Avenue
Viking Drive
Four Mile Avenue
Tairway Drive
111
105
554
Garden State Parkway
Periwinkle Drive
Bengal Boulevard
Lilac Lane
Aspen Circle
Pennsylvania Avenue
Lincoln Avenue
Viva Drive
Deer Run Drive
Deer Run Drive South
Deer Run Drive North
Ryan Road
Janelle Drive
Nelson Drive
Jon Drive
Roseshill Road
Emerson Lane
Hawthorne Lane
Cole Drive
Thorn Ave
8
Cedar Street
Burri Street
Quail Road
Robin Lane
Bowker Lane
Hillside Avenue
Memorial Drive
Birdsall Street
Water Street
Ridgew
Bayside Avenue
Compass Lane
10
Brook Street
Lower Shore Road
Penn Place
Collinstown R
Aphrodite Drive
Venus Drive
Mercury Drive
Bowline Street
Tiller Drive
Seurat Street
Starboard Avenue
Schooner Avenue
Village Drive
Mizzen Drive
Forward Drive
Cove Street
Georgetown Boulevard
Freedom Hills
Old Main Shore Road
Taylor
9
Gunning River
Lochiel Cr


Lochiel Creek
Ocean Township
Bengal Boulevard
Lilac Lane
1st Street
Azalea Court
Lincoln Avenue
Viva Drive
8
Cole Drive
Thorn Avenue
Beverly Drive
Pontoon Drive
Tug Drive
11th Street
Emerson Lane
Pennsylvania Avenue
Ryan Road
Rosehill Road
Hawthorne Lane
Bay View Boulevard
Montclair Road
Newark Road
Rahway Road
Edison Road
5th Street
4th Street
3rd Street
2nd Street
Ridge Road
Deer Run Drive North
Deer Run Drive South
Janelle Drive
Nelson Drive
Jon Drive
Cedar Street
Ridgeway Street
Garden State Parkway
105
554
Robin Lane
Quail Road
Burr Street
Hillside Avenue
Memorial Drive
Birdsall Street
Water Street
Bowker Lane
10
609
Bayside Avenue
Compass Lane
Brook Street
Powell Lane
Tara Lane
Bowline Street
Aphrodite Drive
Lower Shore Road
Mills Lane
Double Creek
Penn Place
Seurat Street
Village Drive
Schooner Avenue
Georgetown Boulevard
Freedom Hills
Molnar Lane
Old Main Shore Road
Collinstown Road
Taylor Lane
Gunning River

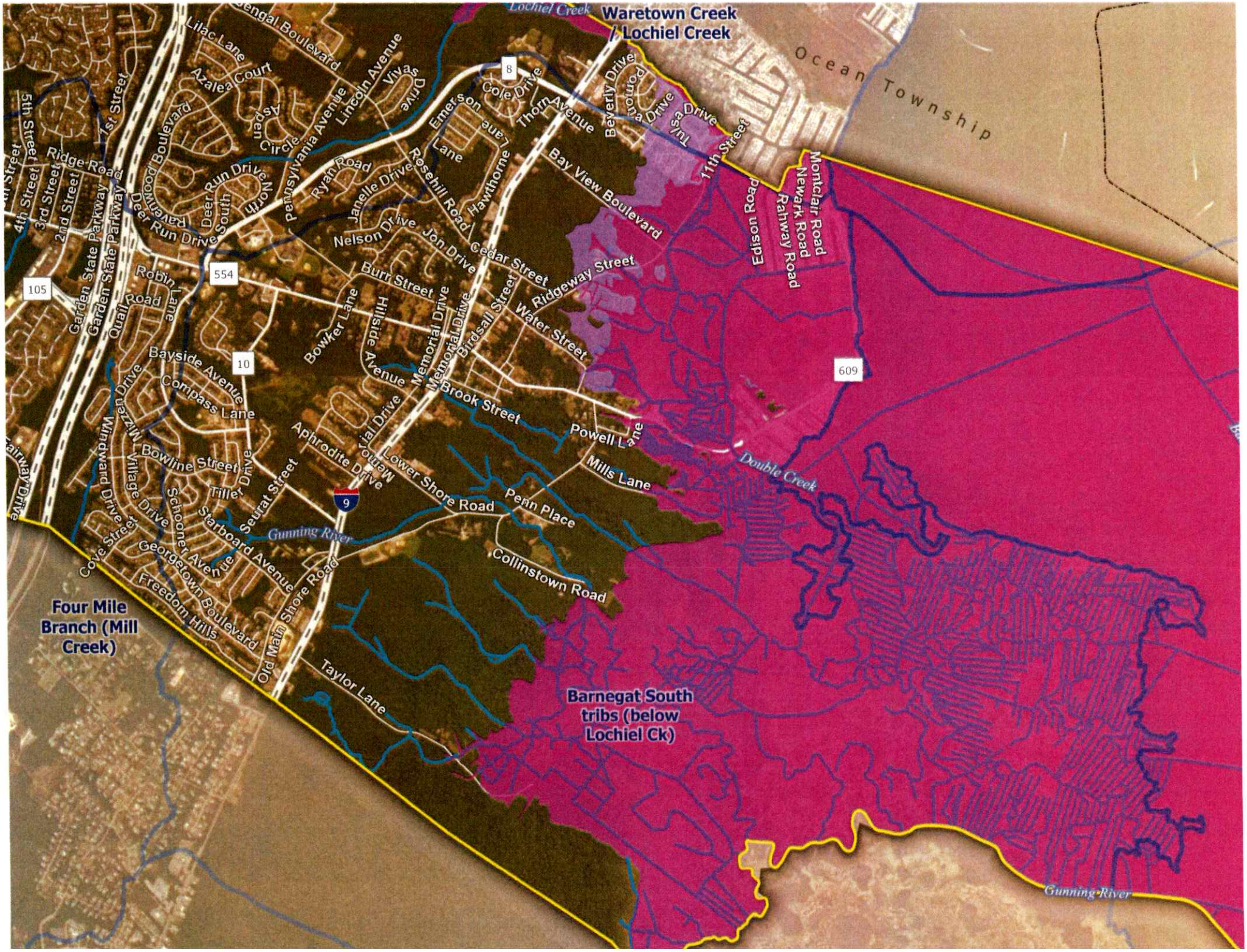

Cedar Creek
Newbolds Br
/ Daniels Br
Yellow Dam
Branch
Yellow Dam Branch
Oswego River
(above Rt 539)
Oswego River
Oswego River
Woodland Township
BURLINGTON COUNTY
OCEAN COUNTY
Plains Branch
(Oswego River)
Dry Branch

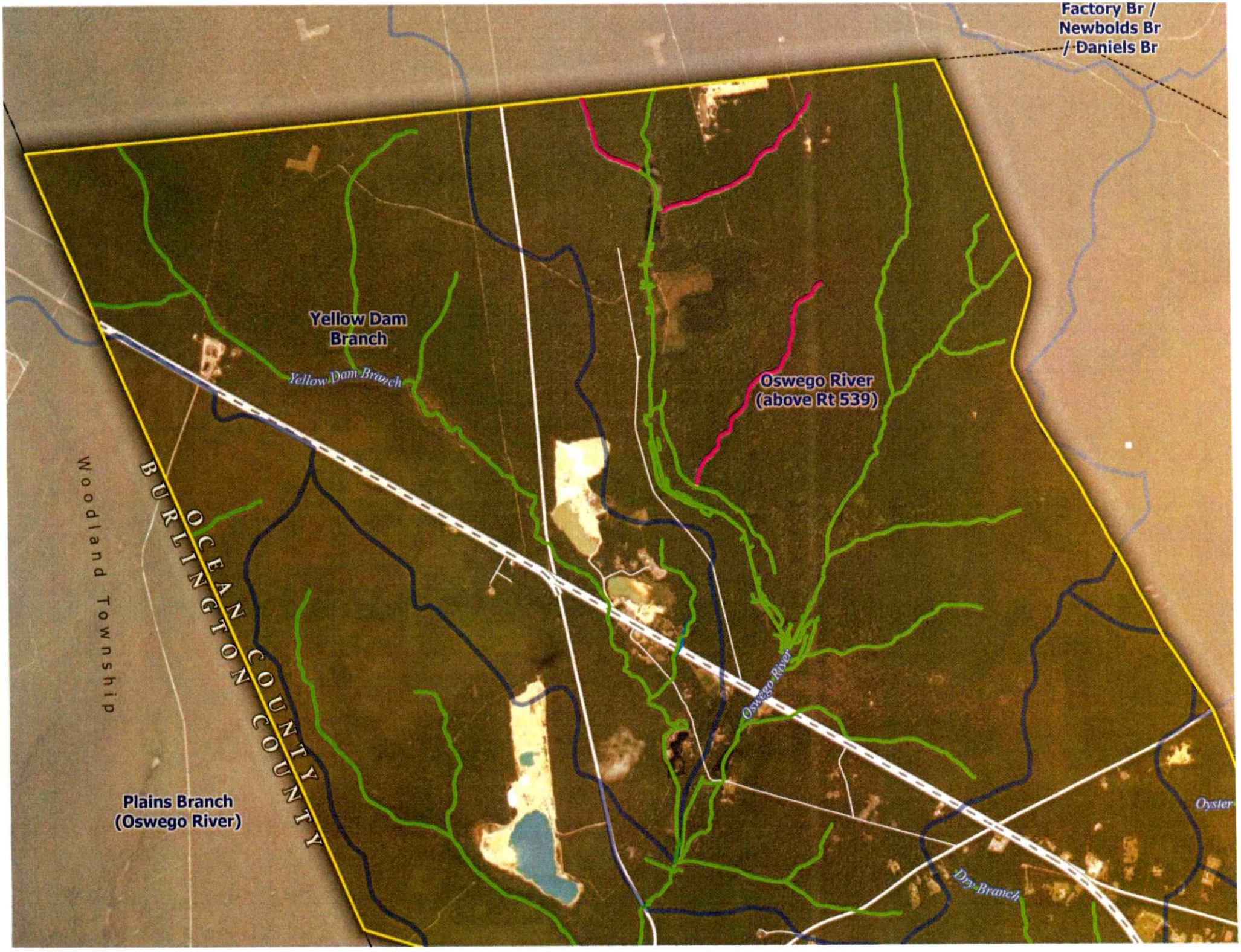

NB(above old
RR grade)
Oyster Creek
(below Rt 532)
Oyster Creek
(above Rt 532)
Forked River /
Oyster Creek
Ocean Township
Waretown Creek
/ Lochiel Creek
Fourmile Branch
Eightmile Branch
Four Mile
Branch (Mill
Creek)
Manahawkin/Upper
Little Egg
Harbor tribs
Gunning River
Mill Ck
(above GS
Parkway)


Waretown Creek
/ Lochiel Creek
Lochiel Creek
Ocean Township
Double Creek
Four Mile
Branch (Mill
Creek)
Gunning River
Waretown Ck
/ Barnegat
Bay South
Barnegat South
tribs (below
Lochiel Ck)
Gunning River

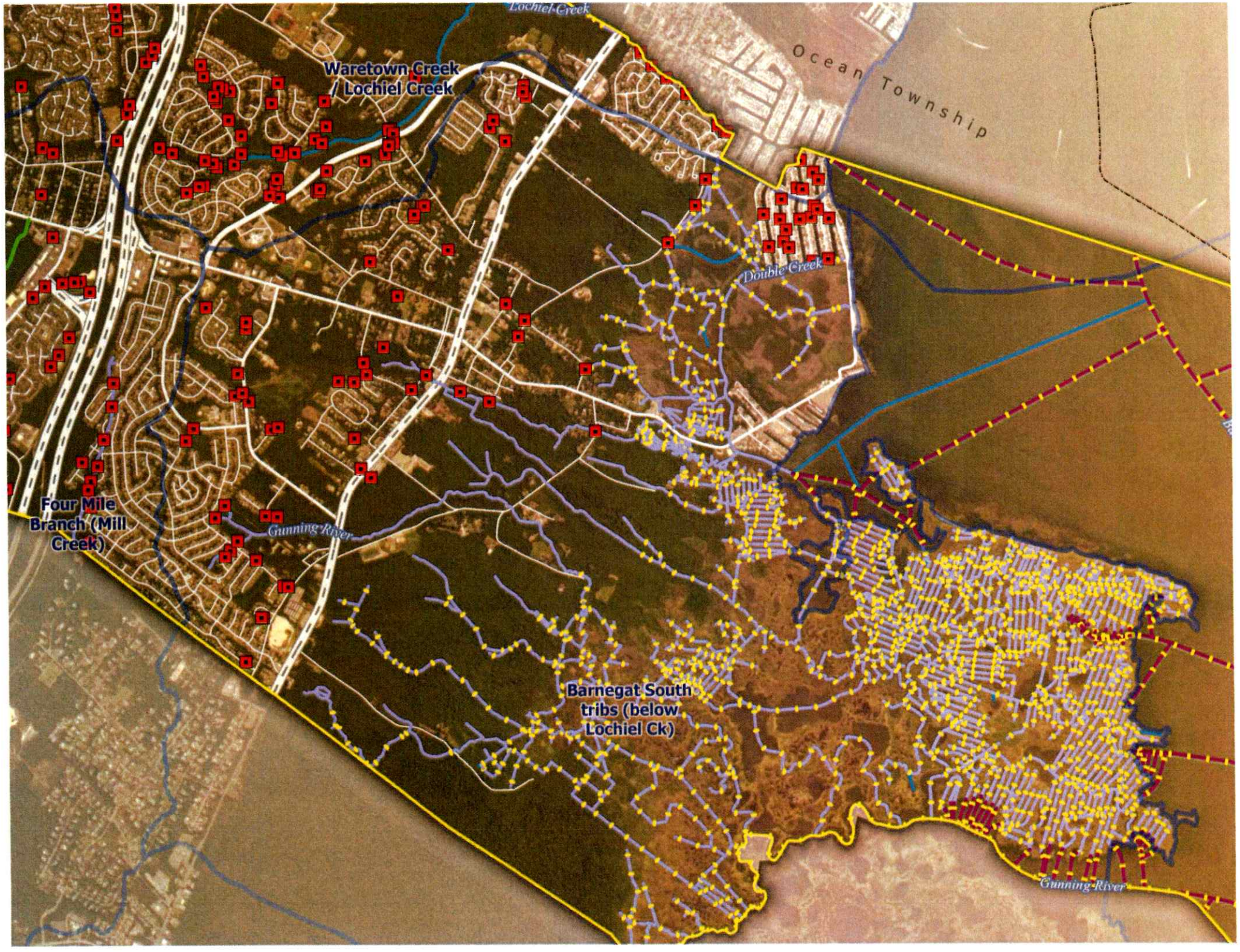

Factory Br /
Newbolds Br
/ Daniels Br
Yellow Dam
Branch
Yellow Dam Branch
Howardsville Road
Oswego River
(above Rt 539)
Jones Road
Woodland Township
BURLINGTON COUNTY
OCEAN COUNTY
539
Clayton Road
Old Halfway Road
72
532
Old Cedar Bridge Road
Plains Branch
(Oswego River)
Oswego River
Dry Branch
610
Oyster


Forked River NB(above old RR grade)
Oyster Creek (below Rt 532)
Oyster Creek (above Rt 532)
Ocean Township
Waretown Creek / Lochiel Creek
Four Mile Branch (Mill Creek)
Mill Ck (above GS Parkway)
Mission Way
Heritage Point Boulevard
Rockland Street
Vine Street
Carriage Way
Pine Oak Boulevard
Dogwood Drive
Hatteras Way
Newport Street
Westport Drive
Fourmile Branch
Cloverdale Road
Chance Drive
Catalina Avenue
Cascade Avenue
Ocean Avenue
10th Street
7th Street
6th Street
5th Street
4th Street
3rd Street
2nd Street
1st Street
Highland Drive
Ridge Road
Pulaski Drive
Periwinkle Drive
Bengal Boulevard
Lilac Lane
Lincoln Avenue
Vivas Drive
Aspen Circle
Pennsylvania Avenue
Deer Run Drive North
Deer Run Drive South
Ryan Road
Janelle Drive
Rosehill Road
Hawthorne Lane
Emerson Lane
Cole Drive
Thorn Ave
Nelson Drive
Jon Drive
Cedar Street
Burr Street
Garden State Parkway
Quail Road
Robin Lane
Bowker Lane
Hillside Avenue
Memorial Drive
Birdsall Street
Water Street
Ridgew
Bayside Avenue
Compass Lane
Brook Street
Wright Road
Cox Road
Fawcett Boulevard
Tina Way
Watt Avenue
Eightmile Branch
Viking Drive
Freeboard
Mutineer Avenue
Four Mile Avenue
Fairway Drive
Mizzenward Drive
Village Drive
Bowline Street
Tiller Drive
Schooner Avenue
Starboard Avenue
Seurat Street
Aphrodite Drive
Venus Drive
Lower Shore Road
Penn Place
Gunning River
Cove Street
Georgetown Boulevard
Freedom Hills
Old Main Shore Road
Collinstown Road
Taylor
554
111
105
10
9
8

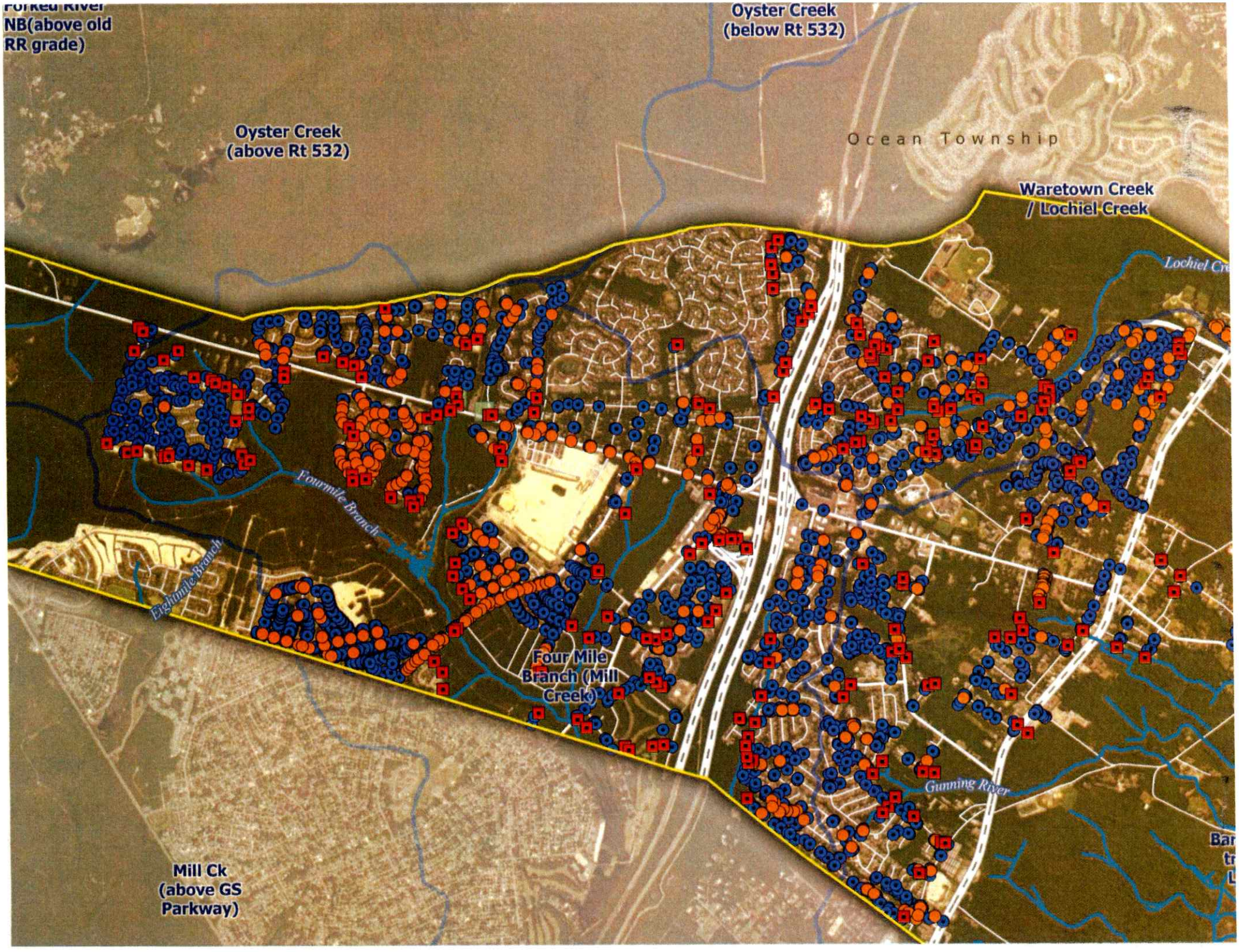

Waretown Creek / Lochiel Creek
Lochiel Creek
Ocean Township
Four Mile Branch (Mill Creek)
Barnegat South tribs (below Lochiel Ck)
Gunning River
Double Creek
Bengal Boulevard
Lilac Lane
Azalea Court
Aspen Circle
Lincoln Avenue
Viva Drive
Cole Drive
Thorn Avenue
Beverly Drive
Pomona Drive
Tuscan Drive
11th Street
Montclair Road
Newark Road
Rahway Road
Edison Road
Bay View Boulevard
Emerson Lane
Hawthorne Lane
Rosehill Road
Pennsylvania Avenue
Ryan Road
Janelle Drive
Deer Run Drive North
Deer Run Drive South
Deerswood Boulevard
1st Street
2nd Street
3rd Street
4th Street
5th Street
Ridge Road
Garden State Parkway
Nelson Drive
Jon Drive
Cedar Street
Ridgeway Street
Burr Street
Water Street
Robin Lane
Quail Road
Bowker Lane
Hillside Avenue
Memorial Drive
Birdsall Street
Bayside Avenue
Compass Lane
Windward Drive
Mizzen Drive
Brook Street
Powell Lane
Mills Lane
Penn Place
Lower Shore Road
Aphrodite Drive
Venus Drive
Bowline Street
Village Drive
Schooner Avenue
Starboard Avenue
Cove Street
Georgetown Boulevard
Freedom Hills
Seurat Street
Tillet Drive
Old Main Shore Road
Collinstown Road
Taylor Lane
105
554
10
8
609
9

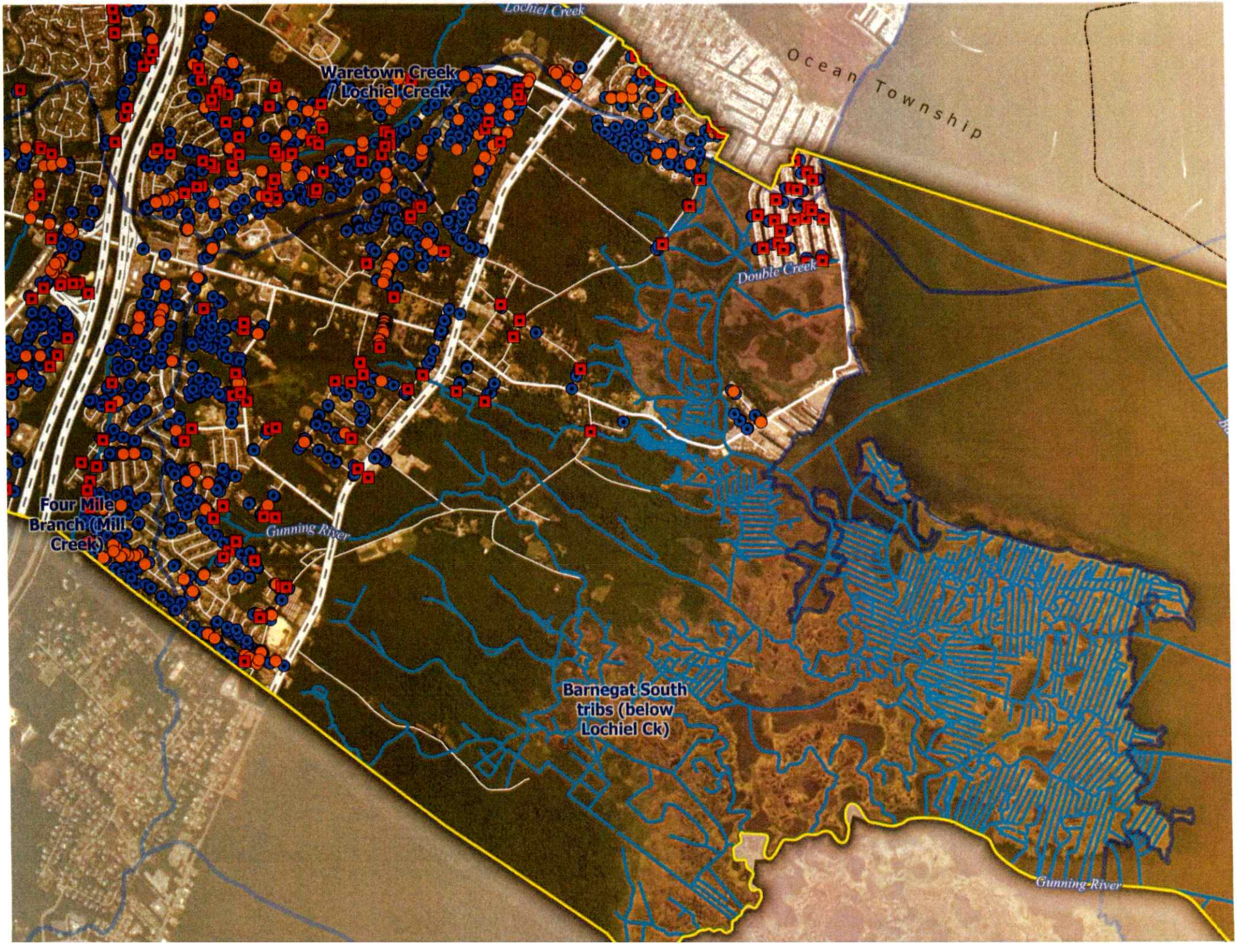

Factory Br /
Newbolds Br
/ Daniels Br
Yellow Dam
Branch
Yellow Dam Branch
Oswego River
(above Rt 539)
Woodland Township
BURLINGTON COUNTY
OCEAN COUNTY
Oswego River
Plains Branch
(Oswego River)
Oyster
Dry Branch


Forked River
NB(above old
RR grade)
Oyster Creek
(below Rt 532)
Oyster Creek
(above Rt 532)
Ocean Township
Waretown Creek
/ Lochiel Creek
Lochiel Cr
Fourmile Branch
Eighmile Branch
Four Mile
Branch (Mill
Creek)
Gunning River
Mill Ck
(above GS
Parkway)

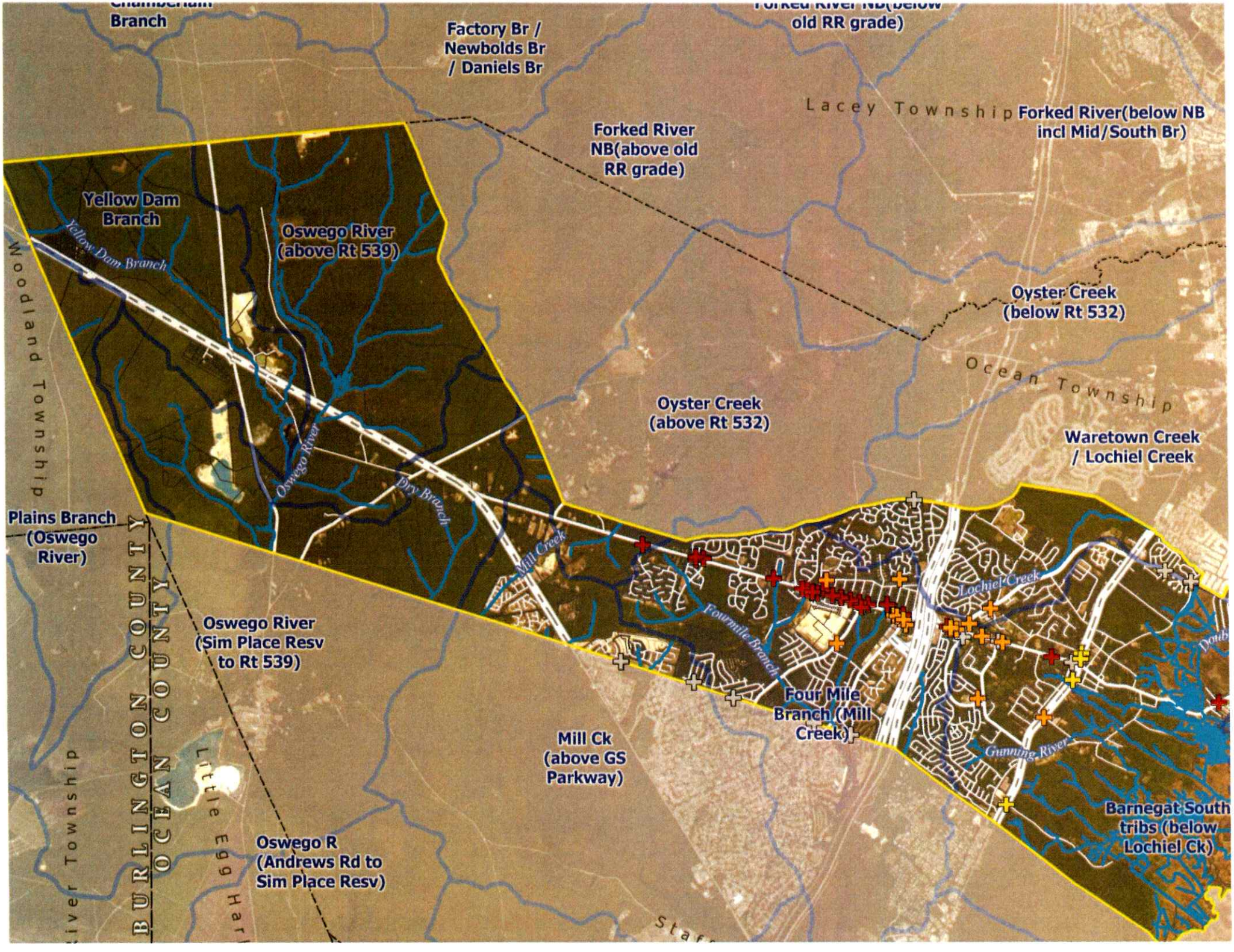

Waretown Creek / Lochiel Creek
Lochiel Creek
Ocean Township
Double Creek
Four Mile Branch (Mill Creek)
Gunning River
Barnegat South tribs (below Lochiel Ck)
Gunning River

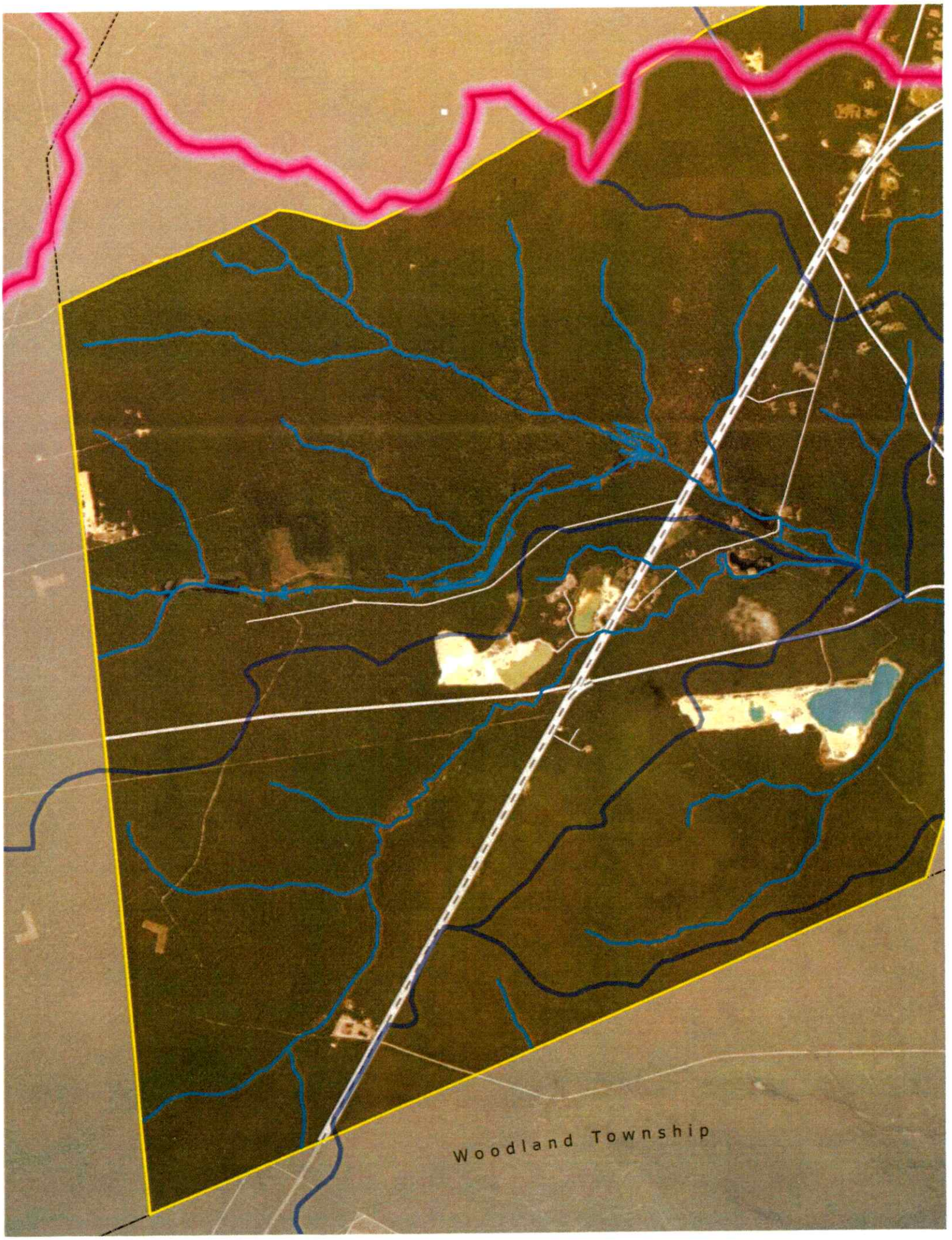

Factory Br /
Newbolds Br
/ Daniels Br
Yellow Dam
Branch
Yellow Dam Branch
Oswego River
(above Rt 539)
Woodland Township
BURLINGTON COUNTY
OCEAN COUNTY
Oswego River
Plains Branch
(Oswego River)
Oyster
Dry Branch

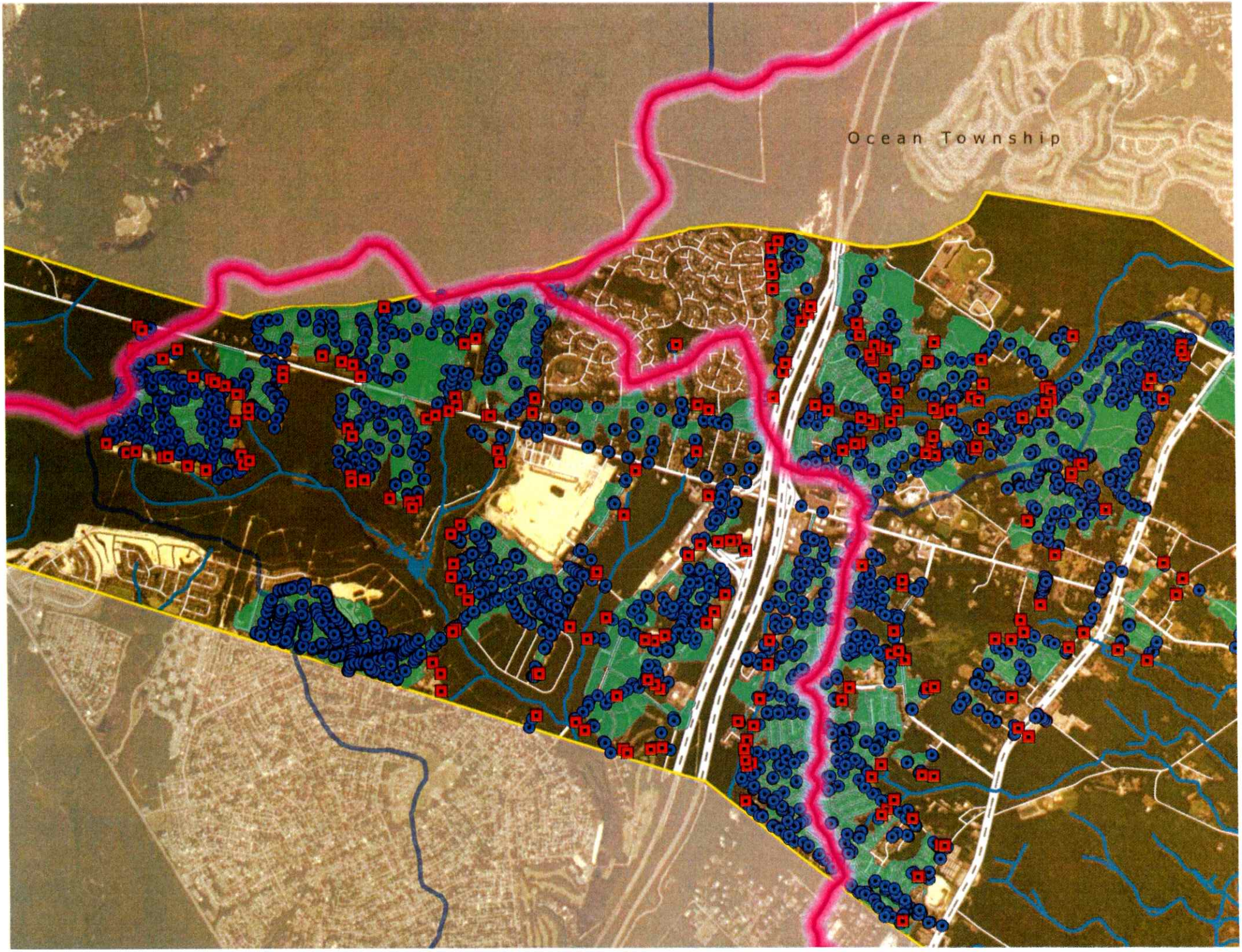

Forked River
NB(above old
RR grade)
Oyster Creek
(below Rt 532)
Oyster Creek
(above Rt 532)
Ocean Township
Waretown Creek
/ Lochiel Creek
Lochiel Cr
Fourmile Branch
Eightmile Branch
Four Mile
Branch (Mill
Creek)
Gunning River
Mill Ck
(above GS
Parkway)


Lochiel Creek
Waretown Creek / Lochiel Creek
Ocean Township
Double Creek
Four Mile Branch (Mill Creek)
Gunning River
Barnegat South tribs (below Lochiel Ck)
Gunning River


Forked River
NB(above old
RR grade)
Oyster Creek
(below Rt 532)
Oyster Creek
(above Rt 532)
Ocean Township
Waretown Creek
/ Lochiel Creek
Lochiel Cr
Fourmile Branch
Eightmile Branch
Four Mile
Branch (Mill
Creek)
Gunning River
Mill Ck
(above GS
Parkway)

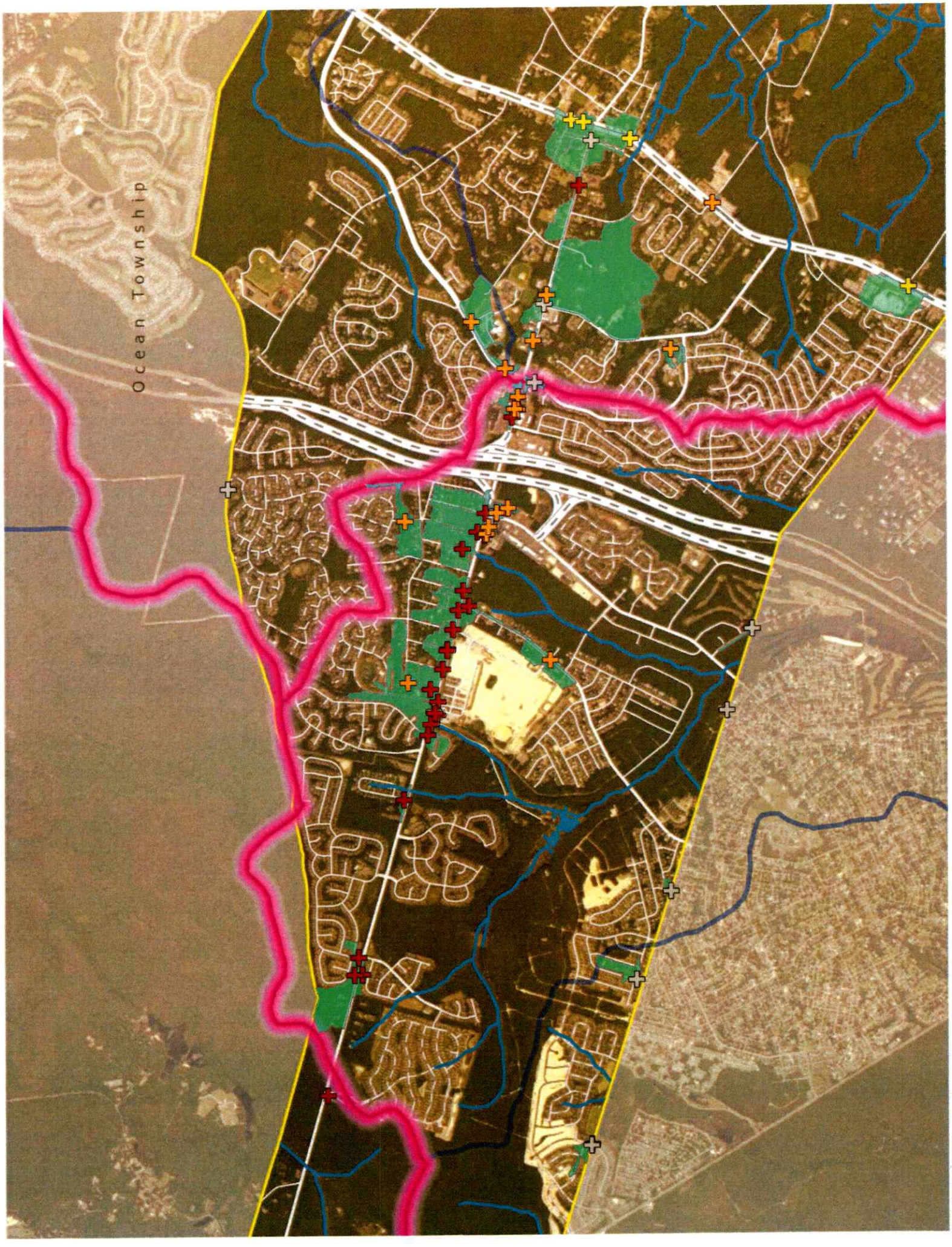

Chamberlain Branch
Factory Br / Newbolds Br / Daniels Br
Forked River NB(below old RR grade)
Lacey Township
Forked River(below NB incl Mid/South Br)
Forked River NB(above old RR grade)
Yellow Dam Branch
Yellow Dam Branch
Oswego River (above Rt 539)
Oyster Creek (below Rt 532)
Ocean Township
Oyster Creek (above Rt 532)
Waretown Creek / Lochiel Creek
Woodland Township
Oswego River
Dry Branch
Mill Creek
Plains Branch (Oswego River)
BURLINGTON COUNTY
OCEAN COUNTY
Oswego River (Sim Place Resv to Rt 539)
Fourmile Branch
Lochiel Creek
Four Mile Branch (Mill Creek)
Gunning River
Mill Ck (above GS Parkway)
Little Egg Harbor Township
Barnegat South tribs (below Lochiel Ck)
Oswego R (Andrews Rd to Sim Place Resv)


Woodland Township

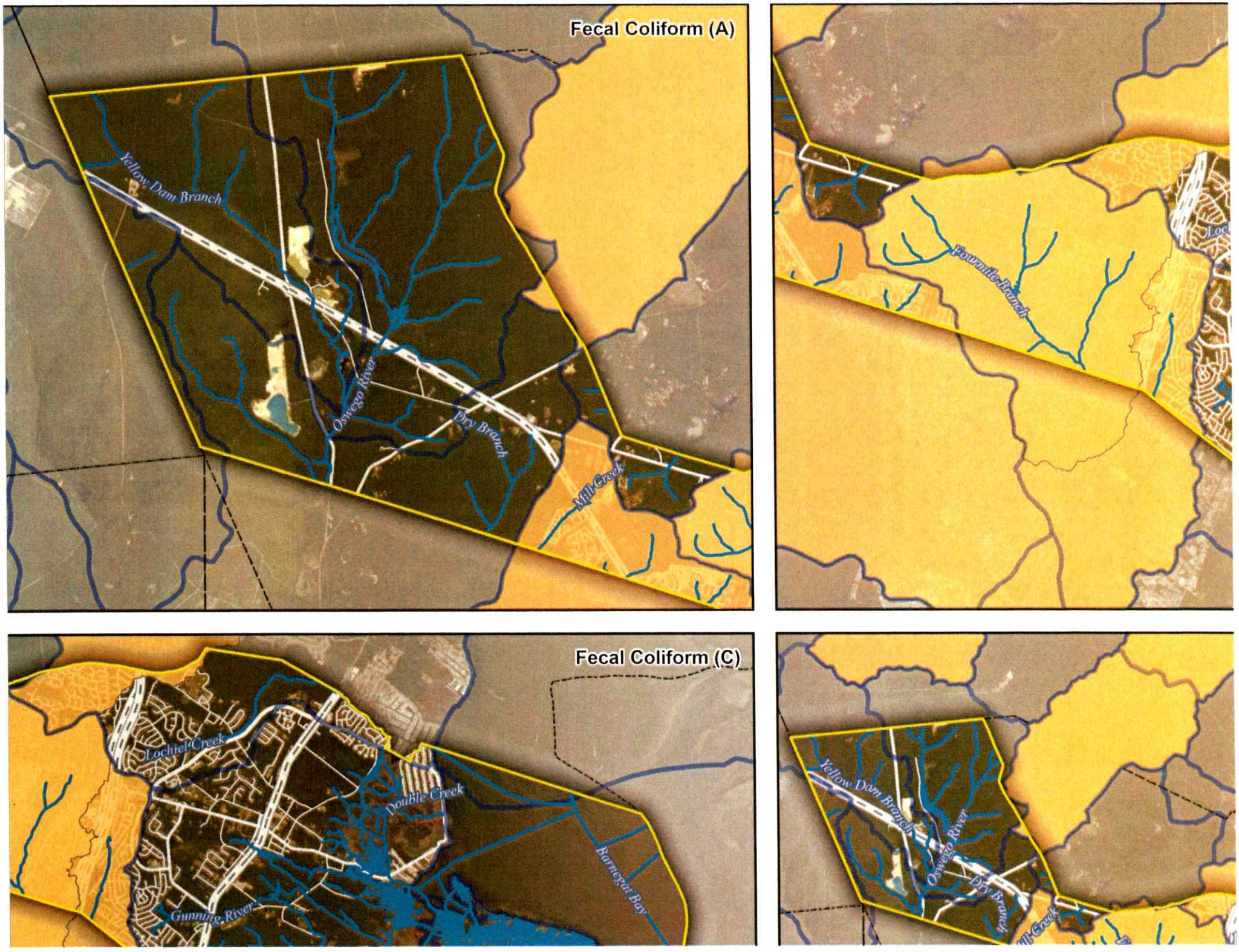

Ocean Township

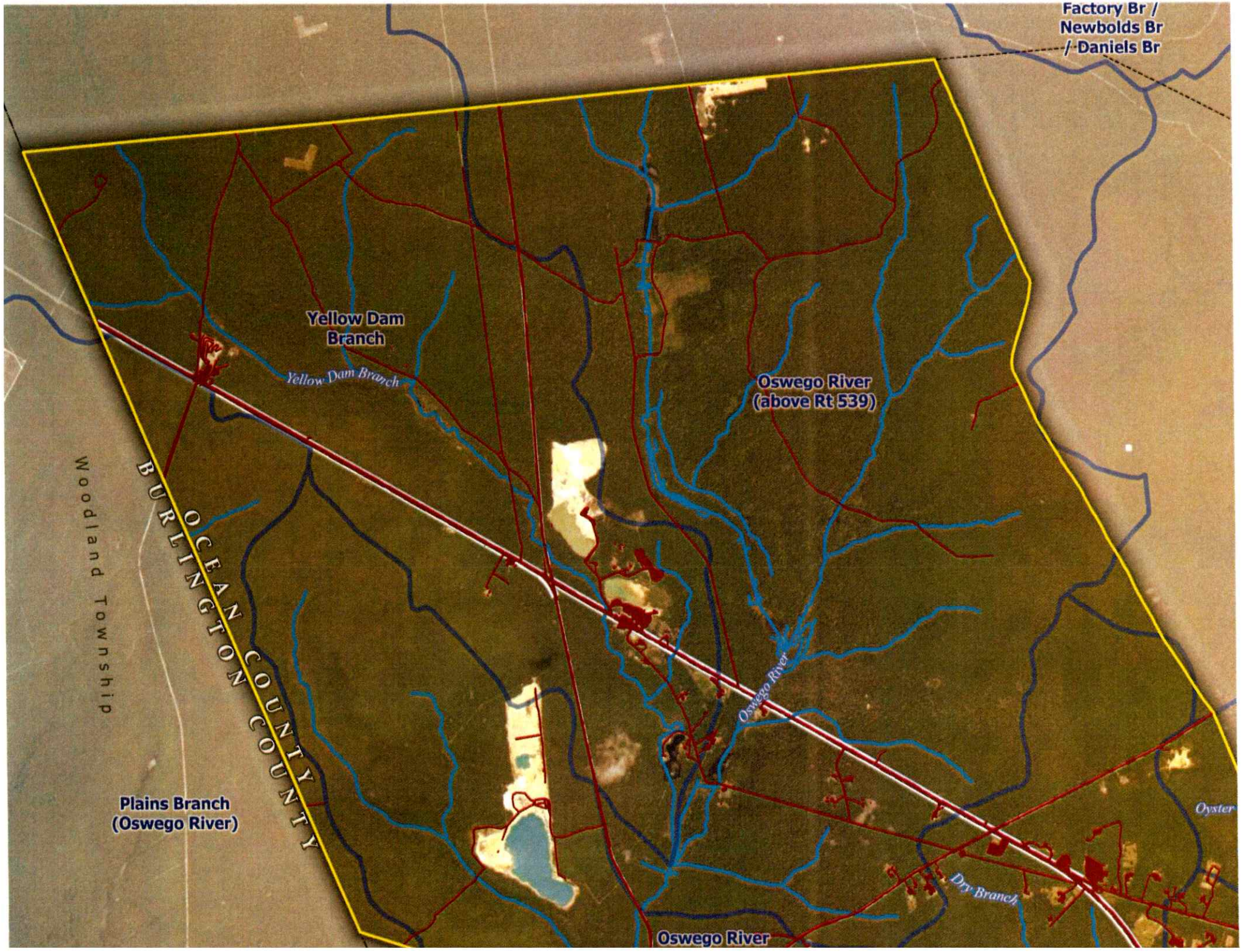

Ocean Township

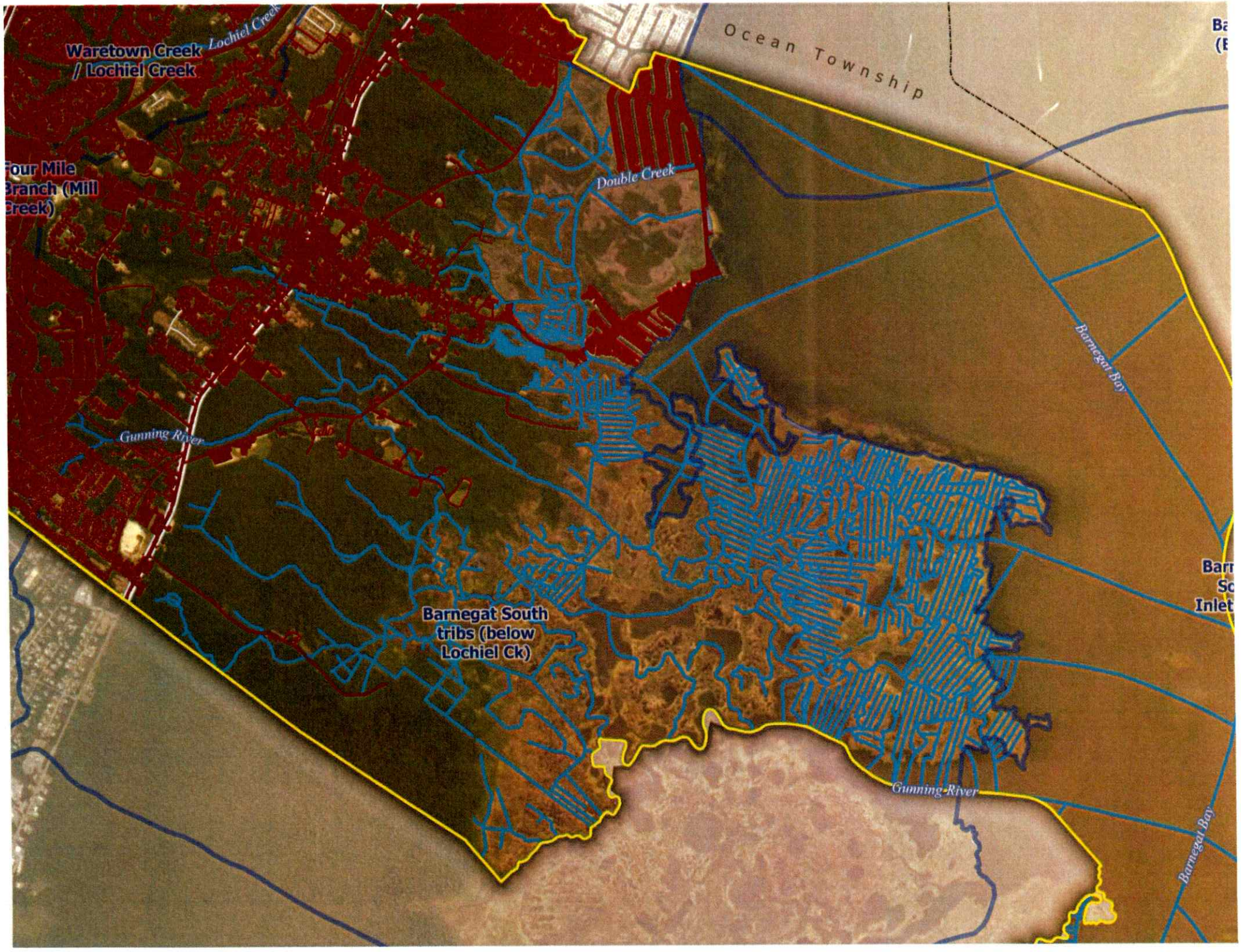

Woodland Township


Ocean Township


Ocean Township

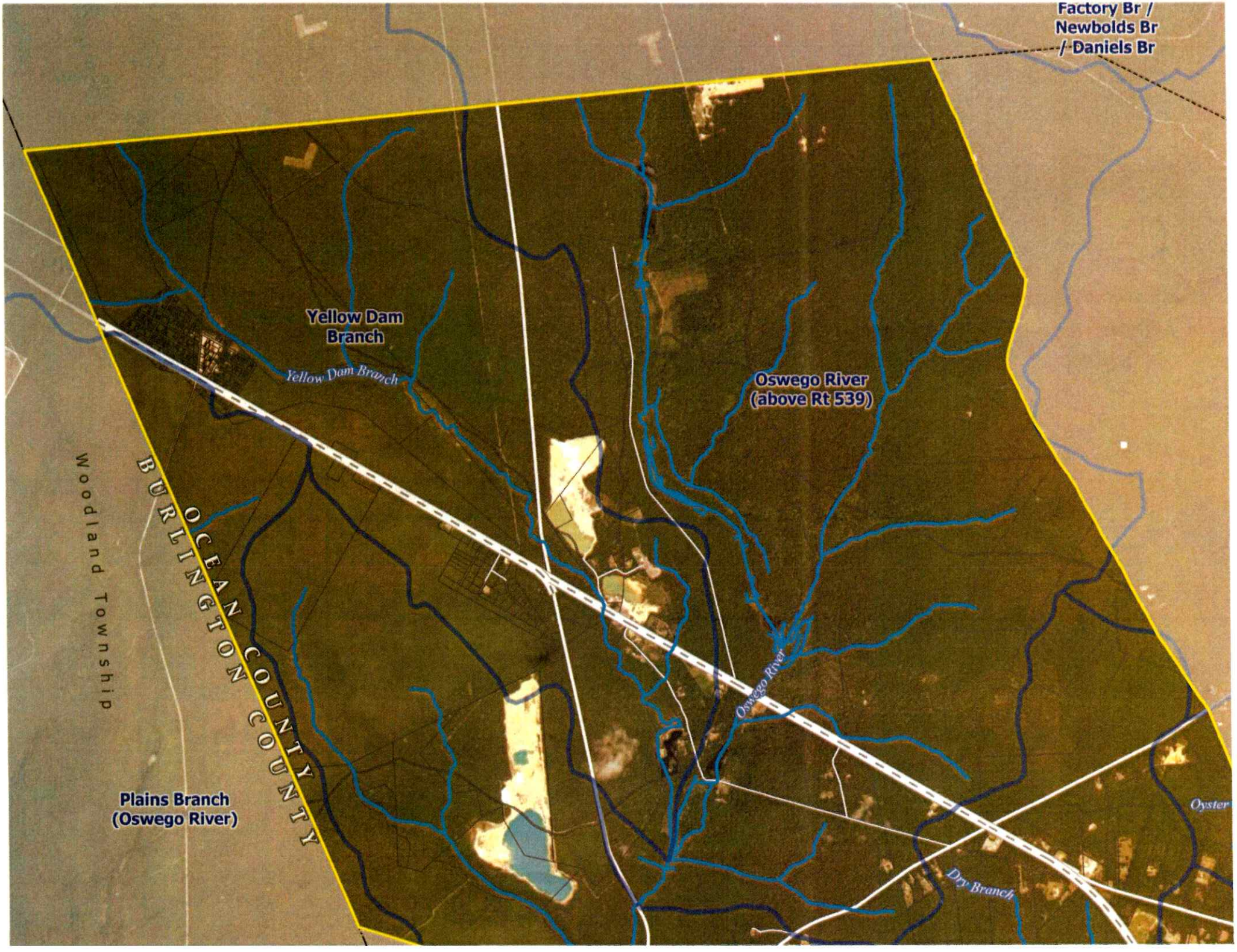

Fecal Coliform (A)
Yellow Dam Branch
Oswego River
Dry Branch
Mill Creek
Fecal Coliform (C)
Lochiel Creek
Double Creek
Gunning River
Barnegat Bay
Yellow Dam Branch
Oswego River
Dry Branch

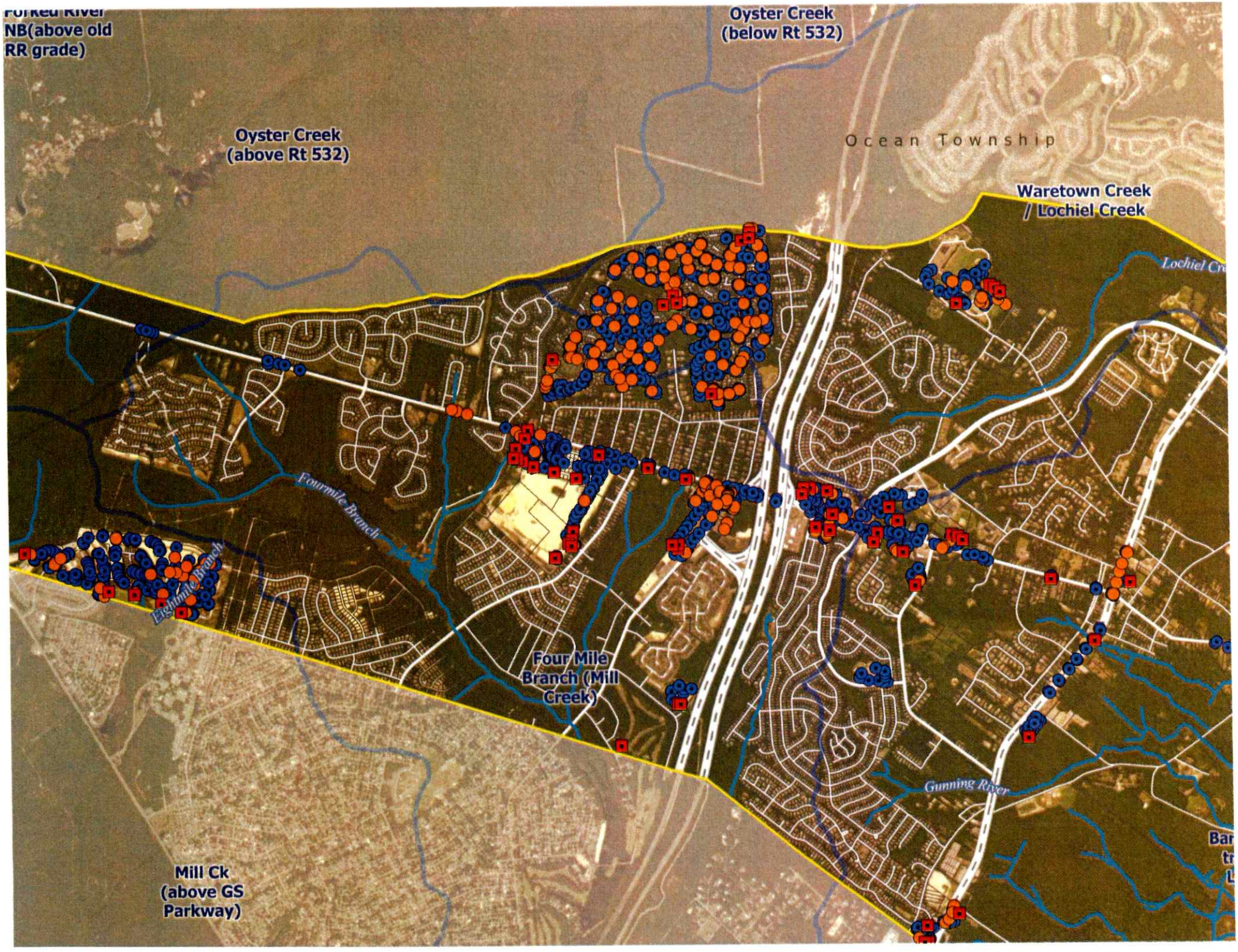

Factory Br /
Newbolds Br
/ Daniels Br
Yellow Dam
Branch
Yellow Dam Branch
Oswego River
(above Rt 539)
Woodland Township
BURLINGTON COUNTY
OCEAN COUNTY
Oswego River
Plains Branch
(Oswego River)
Oyster
Dry Branch
Oswego River

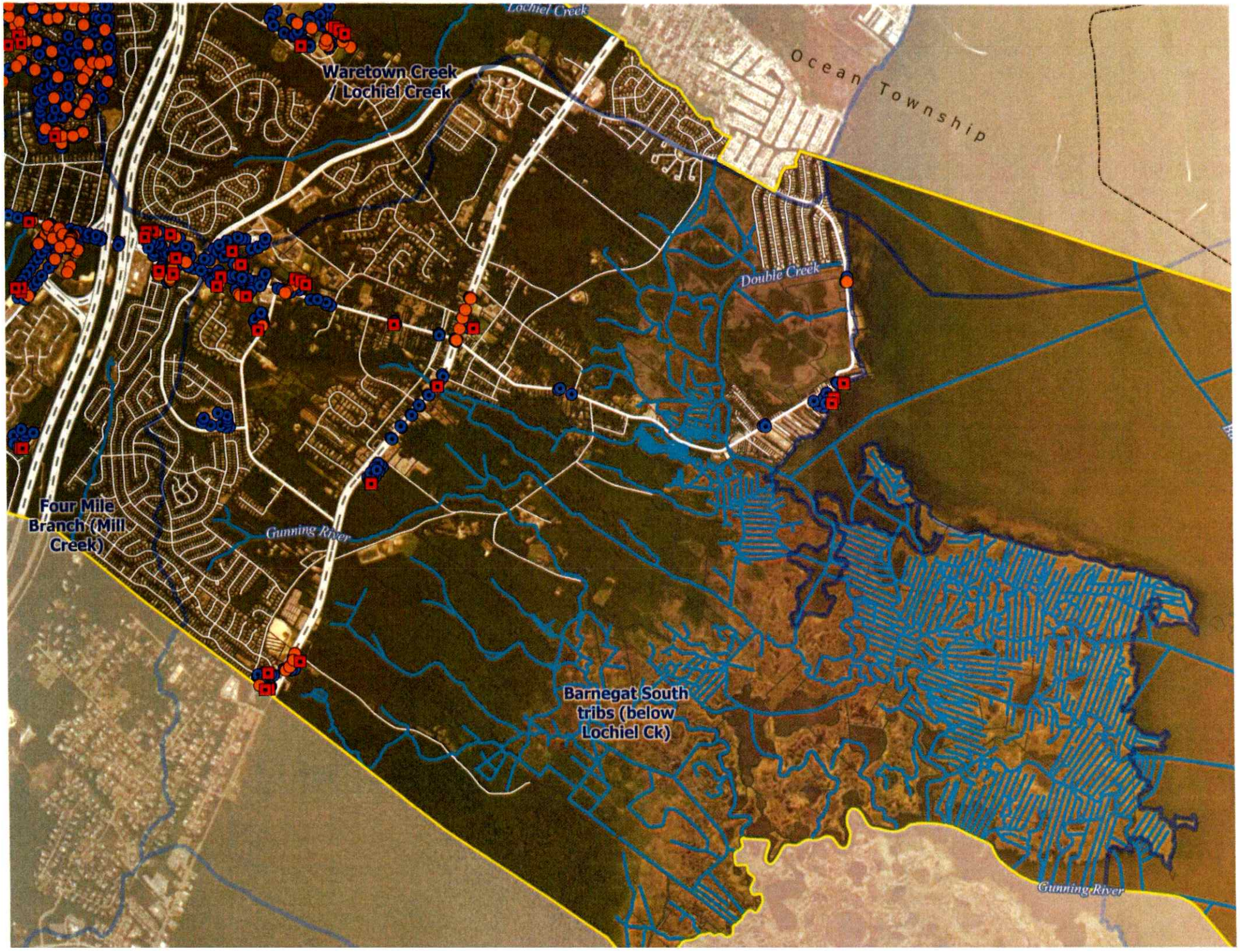

Waretown Creek / Lochiel Creek
Lochiel Creek
Four Mile Branch (Mill Creek)
Ocean Township
Double Creek
Barnegat Bay
Gunning River
Barnegat South tribs (below Lochiel Ck)
Gunning River
Barnegat Bay

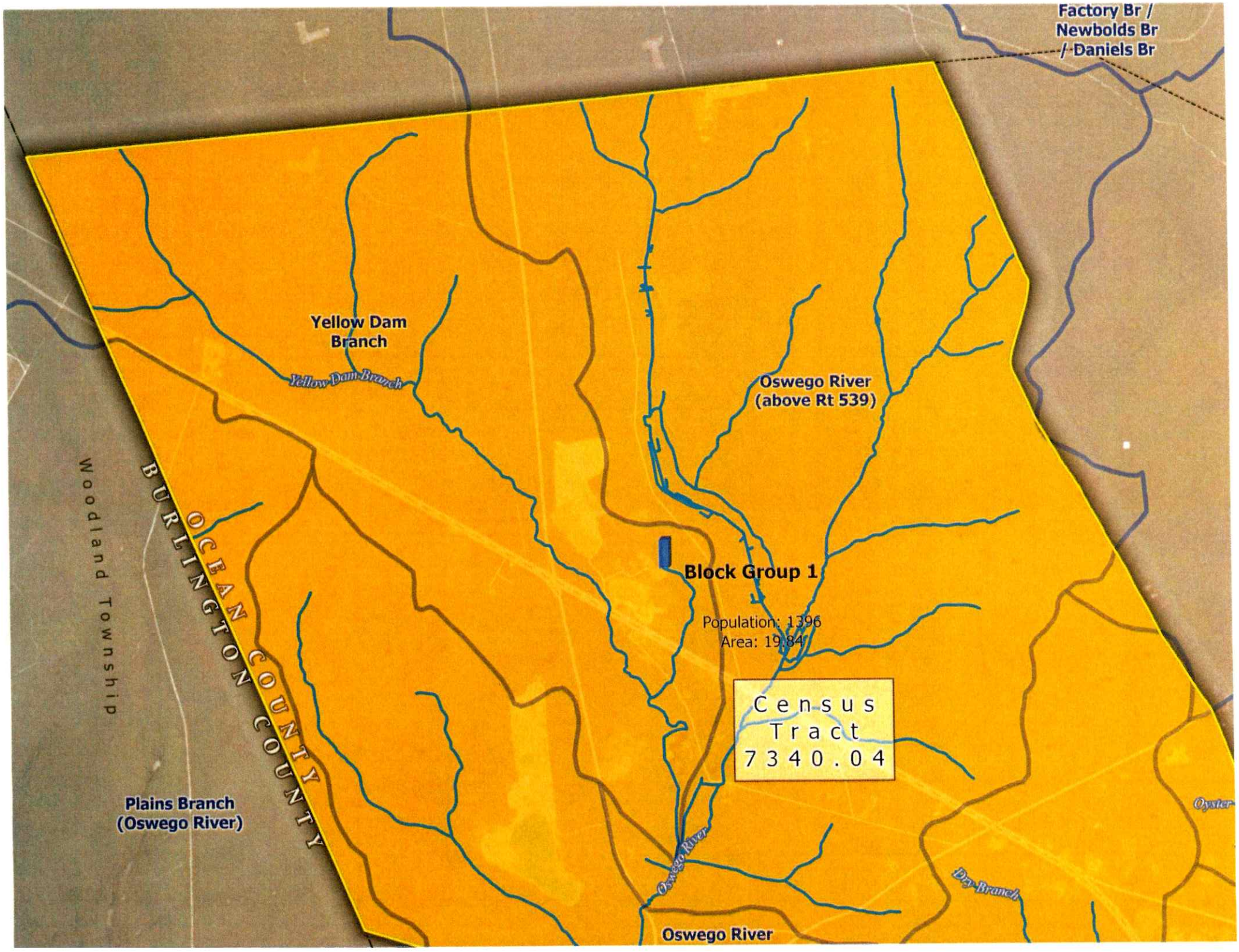
Woodland Township
iver Township
BURLINGTON COUNTY
OCEAN COUNTY
Little Egg Har
Yellow Dam Branch
539
Howardsville Road
Old Cedar Bridge Road
72
Oswego River
610
Jones Road
532
611
Mill Creek
554
Cox Road
Mission Way
Cloverdale Road
Highland Drive
Viking Drive
111
105
2nd Street
1st Street
Robin Lane
Bowline Street
Village Drive
Georgetown Boulevard
Ravenwood Boulevard
10
8
9
Taylor Lane
Memorial Drive
Rosehill Road
Burr Street
Lochiel Creek
Lower Shore Road
Ridgeway Street
Beverly Drive
Lacey Township
Ocean Township

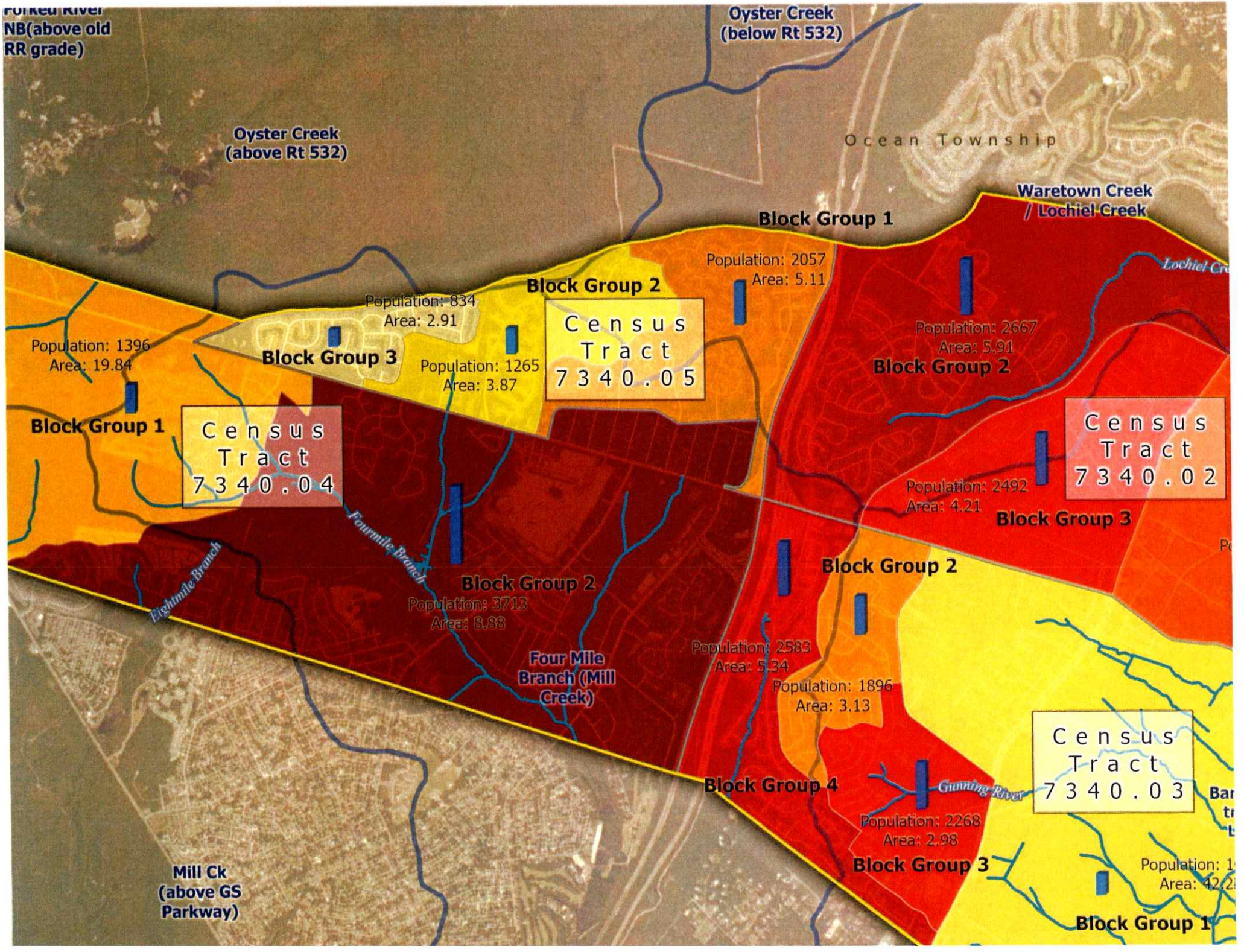

Ocean Township
Mission Way
Heritage Point Boulevard
Rockland Street
Vine Street
Carriage Way
Pine Oak Boulevard
Wood Drive
Hatteras Way
Newport Street
Westport Drive
Highland Drive
10th Street
7th Street
6th Street
5th Street
4th Street
3rd Street
2nd Street
1st Street
Ridge Road
Pulaski Drive
Periwinkle Drive
Bengal Boulevard
Lilac Lane
Lincoln Avenue
Vivas Drive
Pennsylvania Avenue
Deer Run Boulevard
Deer Run Drive South
Deer Run Drive North
Garden State Parkway
Ryan Road
Janelle Drive
Nelson Drive
Rosehill Road
Emerson Lane
Hawthorne Lane
Cole Drive
Jon Drive
Cedar Street
Burri Street
Quail Road
Robin Lane
Bowker Lane
Hillside Avenue
Memorial Drive
Birdsall Street
Water Street
Ridgewood
Brook Street
Bayside Avenue
Compass Lane
Windward Drive
Mizzen Drive
Bowline Street
Village Drive
Tiller Drive
Schooner Avenue
Starboard Avenue
Seurat Street
Aphrodite Drive
Venus Drive
Lower Shore Road
Penn Place
Gunning River
Collinstown Road
Georgetown Boulevard
Freedom Hills
Old Main Shore Road
Taylor
Cove Street
Fourmile Branch
Eightmile Branch
Cloverdale Road
Chance Drive
Catalina Avenue
Cascade Avenue
Ocean Avenue
Four Mile Avenue
Fairway Drive
Mariner Avenue
Freeboard
Viking Drive
Watt Avenue
Tina Way
Fawcett Boulevard
Cox Road
Wright Road
554
105
111
10
9
8

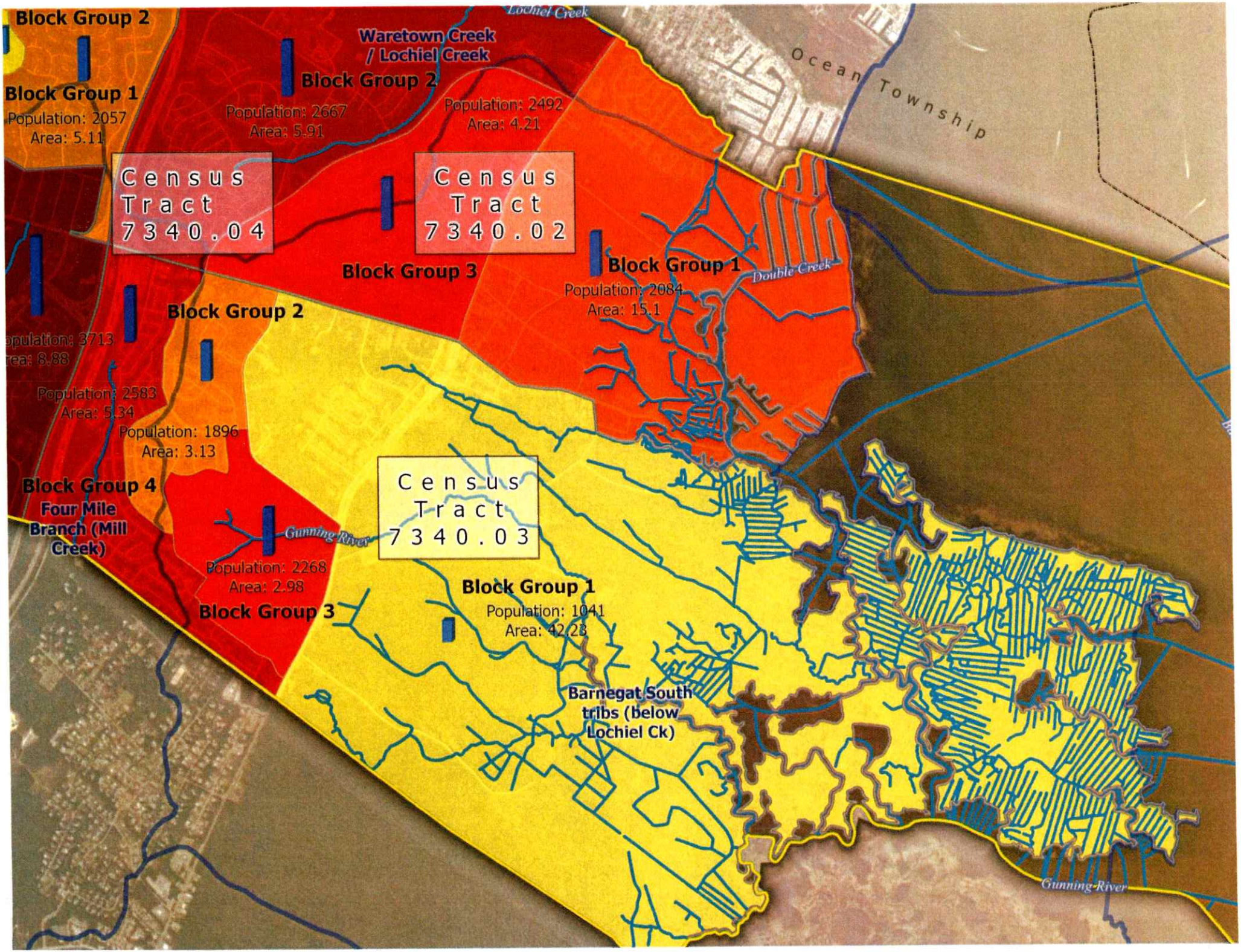

Factory Br /
Newbolds Br
/ Daniels Br
Yellow Dam
Branch
Yellow Dam Branch
Oswego River
(above Rt 539)
Woodland Township
BURLINGTON COUNTY
OCEAN COUNTY
Oswego River
Plains Branch
(Oswego River)
Oyster
Dry Branch


Forked River
NB(above old
RR grade)
Oyster Creek
(below Rt 532)
Oyster Creek
(above Rt 532)
Ocean Township
Waretown Creek
/ Lochiel Creek
Lochiel Cr
Fourmile Branch
Eightmile Branch
Four Mile
Branch (Mill
Creek)
Gunning River
Mill Ck
(above GS
Parkway)


Lochiel Creek
Waretown Creek / Lochiel Creek
Ocean Township
Double Creek
Four Mile Branch (Mill Creek)
Gunning River
Barnegat South tribs (below Lochiel Ck)
Gunning River


Factory Br /
Newbolds Br
/ Daniels Br
Yellow Dam
Branch
Yellow Dam Branch
Oswego River
(above Rt 539)
Woodland Township
BURLINGTON COUNTY
OCEAN COUNTY
Block Group 1
Population: 1396
Area: 19.84
Census
Tract
7340.04
Plains Branch
(Oswego River)
Oswego River
Dry Branch
Oswego River
Oyster


Forked River NB(above old RR grade)
Oyster Creek (below Rt 532)
Oyster Creek (above Rt 532)
Ocean Township
Waretown Creek / Lochiel Creek
Block Group 1
Population: 2057
Area: 5.11
Block Group 2
Population: 834
Area: 2.91
Census Tract 7340.05
Block Group 3
Population: 1265
Area: 3.87
Population: 1396
Area: 19.84
Block Group 1
Census Tract 7340.04
Population: 2667
Area: 5.91
Block Group 2
Census Tract 7340.02
Population: 2492
Area: 4.21
Block Group 3
Fourmile Branch
Eightmile Branch
Block Group 2
Population: 3713
Area: 8.88
Four Mile Branch (Mill Creek)
Block Group 2
Population: 2583
Area: 5.34
Population: 1896
Area: 3.13
Census Tract 7340.03
Block Group 4
Gunning River
Population: 2268
Area: 2.98
Block Group 3
Mill Ck (above GS Parkway)
Block Group 1


Block Group 2
Block Group 1
Population: 2057
Area: 5.11
Waretown Creek / Lochiel Creek
Block Group 2
Population: 2667
Area: 5.91
Population: 2492
Area: 4.21
Ocean Township
Census Tract 7340.04
Census Tract 7340.02
Block Group 3
Block Group 1
Population: 2084
Area: 15.1
Double Creek
Block Group 2
Population: 3713
Area: 8.88
Population: 2583
Area: 5.34
Population: 1896
Area: 3.13
Block Group 4
Four Mile Branch (Mill Creek)
Gunning River
Census Tract 7340.03
Population: 2268
Area: 2.98
Block Group 3
Block Group 1
Population: 1041
Area: 42.23
Barnegat South tribs (below Lochiel Ck)
Gunning River