Egg Harbor Township

Resolution No. 324

2022

Resolution authorizing the adoption of Township of Egg Harbor Watershed Management Plan

WHEREAS, the National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum National Flood Insurance Program requirements; and

WHEREAS by participating in the CRS program City property owners will receive a discount on their flood insurance premiums to reflect the reduced flood risks resulting from community actions; and

WHEREAS, the CRS provides credit for a full range of public information activities that inform people about flooding and ways to address potential flood damage to their property, including map information, outreach projects, real estate disclosure, libraries, websites, and providing technical advice and assistance; and

WHEREAS, the Township of Egg Harbor achieved a Class 5 rating in the Community Rating System, resulting in a twenty-five percent (25%) discount on flood insurance for property owners; and

WHEREAS, the Township has continued to pursue an even higher discount on flood insurance for its property owners; and

WHEREAS, to this end, the Township has developed a Watershed Management Plan that analyzes the combined effects of existing and expected development and redevelopment on drainage throughout the Township and also includes a plan of action to address current and expected issues; and

WHEREAS, the adoption of this Plan is a required activity of the Township for its Community Rating System participation.

NOW, THEREFORE, BE IT RESOLVED by the Township Committee of the Township of Egg Harbor, County of Atlantic and State of New Jersey as follows:

1. The Township Committee adopts the Township of Egg Harbor Watershed Plan.

2. The Township Officials are instructed to implement this plan and update it on a regular basis pursuant to the most recent Community Rating System Coordinator's Manual.

Dated: June 29, 2022

Eileen M. Tedesco, RMC
Township Clerk

I certify that this a true copy of a Resolution adopted by the Township Committee of Egg Harbor Township, Atlantic County, NJ on June 29, 2022

Janice F. Hughes, RMC, Deputy Township Clerk

A Watershed Management Plan for Egg Harbor Township, Atlantic County, New Jersey

Presented to Fulfill FEMA Activity 452b Requirements

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May 20, 2022

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Introduction

Egg Harbor Township is located in Atlantic County, New Jersey. The Township area comprises the southern Atlantic County mainland margin with the lagoonal tide waters, but also extends onto the bayshore wetlands east of Northfield, Linwood and Somers Point. These constitute separate sections of the Township with the most highly developed of these parcels lying along US Route 40/322 highway between Pleasantville and Atlantic City, NJ. Historical records mention Egg Harbor Township as part of Gloucester County as of 1603 prior to the establishment of Atlantic County. The Township was established formally on May 13, 1761 but called Great Egg Harbour Township. On February 21, 1798 the area was incorporated as Egg Harbour Township. Over many decades other municipalities were carved out of the Egg Harbour Township to form Hamilton Township (1813); Atlantic City (1854); Absecon (1854); Margate City (1885); Pleasantville (1889); Linwood (1889); Somers Point (1886); Longport (1898); Ventnor City (1903) and Northfield (1905). The name evolved from earliest Dutch explorer Cornelius Mey who in 1614 came into Great Egg Harbor Inlet and named it Eleren Haven (Egg Harbor due to the vast number of nesting shorebirds observed). These extractions of new municipal entities have resulted in the disjointed array of remaining township land areas.

In 1837 Atlantic County was separated from Gloucester County with only four municipal entities, Egg Harbor, Galloway, Hamilton, and Weymouth Townships incorporated. Since then, ten new municipal units have been created from the original area encompassed by Egg Harbor Township. The present area is 75.47 square miles with 67.05 square miles as land and 8.43 square miles as water areas. Part of the Township is included in the NJ State designated area called the New Jersey Pinelands National Reserve established by Congress in 1978. There are multiple unincorporated communities in the township each with individual character and development directions.

There are three wildlife management areas (WMA) in Egg Harbor Township with two located in the separated segments between the mainland and Absecon Island communities. Malibu Beach WMA is 95.7 acres, Pork Island WMA (867.2 acres) located on the Margate City access boulevard and 1,039 acres near the Great Egg Harbor River as part of the Lester G. MacNamara WMA.

The population counted 43,323 people in 2010 (650.5 per square mile) all governed by the Township form of NJ municipal government, one of 141 such municipalities in NJ. Five committee members are elected directly in partisan elections for 3-year terms on a staggered basis. The mayor and deputy mayor are selected from among the committee members each January at the reorganization meeting. The Township is located in the 2nd Congressional District and is part of the 2nd NJ legislative district.

There are 297.22 miles of roadways of which 206.73 miles are municipally maintained, 65.46 maintained by Atlantic County, 10.1 miles maintained by the State of NJ and 14.93 miles maintained by the NJ Turnpike Authority (Garden State Parkway). Bus service is available along major routes, but there is no passenger rail service any longer. The majority of the Atlantic City Airport is located in the northern mainland area of the township and represents 3,595 acres of open space not subject to residential or extensive commercial development as a result of federal ownership and the association with the airport and the US Air Force Reserve 175th Air Wing Fighter Squadron base.

Climate

Table 1. Climate data for Egg Harbor Township, NJ (1981-2010 Averages)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °F (°C)	42.3 (5.7)	44.3 (6.8)	51.4 (10.8)	60.8 (16.0)	70.4 (21.3)	79.4 (26.3)	84.5 (29.2)	83.4 (28.6)	77.8 (25.4)	67.1 (19.5)	56.8 (13.8)	46.8 (8.2)	63.7 (17.6)

Daily mean °F (°C)	35.1 (1.7)	36.8 (2.7)	43.3 (6.3)	52.3 (11.3)	61.5 (16.4)	71 (22)	76.1 (24.5)	75.1 (23.9)	69.2 (20.7)	58.5 (14.7)	49.0 (9.4)	39.4 (4.1)	55.6 (13.1)
Average low °F (°C)	27.9 (−2.3)	29.2 (−1.6)	35.2 (1.8)	43.8 (6.6)	52.7 (11.5)	62.5 (16.9)	67.7 (19.8)	66.8 (19.3)	60.7 (15.9)	49.9 (9.9)	41.1 (5.1)	31.9 (−0.1)	47.4 (8.6)
Average precipitation inches (mm)	3.32 (84)	2.82 (72)	4.26 (108)	3.53 (90)	3.53 (90)	3.37 (86)	3.70 (94)	3.62 (92)	3.27 (83)	3.70 (94)	3.29 (84)	3.47 (88)	41.88 (1,064)

Source: NWS

Climate data for Atlantic County, NJ Ocean Water Temperature (Lake's Bay)

Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Daily mean °F (°C)	42 (6)	40 (4)	45 (7)	52 (11)	59 (15)	68 (20)	73 (23)	76 (24)	72 (22)	61 (16)	52 (11)	42 (6)	57 (14)

Source: NOAA (average climatic conditions for Egg Harbor Township, NJ between 1981 and 2010)

The pattern of rainfall is relatively uniform across the entire year without a specific rainy season and dry season. The "cloudburst" type of storm is far more likely to occur in the summer months due to strong thunder storms passing through. The worst event occurred in August 1997 when 13.65 inches of rain fell in 24 hours as a result of a training event where downpour conditions prevailed across the Township into eastern Atlantic County for hours. Great Egg Harbor River was at flood stage and several US Route 40 bridges were washed out in Mays Landing, NJ on the river.

Storm surge has impacts on the detached segment of Egg Harbor Township located on the tidal lagoons (Malibu Beach and Seaview Harbor) and along the Great Egg Harbor River tidal reaches up to Mays Landing. The Great Egg Harbor River margin in Egg Harbor Township is developed with individual single-family homes with a great variety of proximity to tidal surge flooding and subsequent exposure to sea level rise impacts.

Previous Storm Events Affecting Egg Harbor Township.

The most recent assessment of storm impacts on Atlantic County was done in 2016 by Atlantic County. They include a table of benchmark elevations for past storms and the inclusion of assigned elevations for stormwater levels reached by the annual expected storm up to the 1 percent chance occurrence event.

Table 1. Benchmark Elevations for past storms

Benchmark Level	NAVD88 feet
1 Percent Chance	6.79
Hurricane Sept 1944	6.40
Superstorm Sandy	6.14
Great Atlantic Storm March 62, Dec 1992	6.00
Hurricane Belle August 1976	6.00
November 1950 Storm	5.80
1944 Storm	5.63
March 1984 Storm	5.60
January 4, 1992 and Oct 31, 1991 (Halloween Nor'easter)	5.40
10 Year Storm	5.10
October 2018 Storm	4.96
Hurricane Donna (Sept 1960)	4.80
January 1987 Storm	4.70
10 Percent	5.35
50 Percent	4.36
99 Percent	3.58
Hurricane Bob	2.60
MHHW	2.00
MHW	1.57
NAVD88	0.00
MSL	-0.40
MLW	-2.43
MLLW	-2.62

From Rutala Associates 2020

Storm inundation since 1944 has achieved the 6.0-foot NAVD 1988 elevation four times over 77 years with another four events that exceeded the 5.0-foot elevation. Storm surges over the 4.0-foot elevation act to block low lying roadways leading to Atlantic City including the roadways connecting the southern access route from Somers Point to the Anchorage Point and Seaview Harbor developments in the eastern portion of Egg Harbor Township. Route 322/40 into Atlantic City through Pleasantville crosses another detached section of the Township which floods to the point of road closures at 3.5 feet elevation, a foot and a half above Mean Higher High Water elevation.

Flooding along the banks of the Great Egg Harbor River at higher storm surge values will impact both marina businesses and single family homes closest to the river banks. There are wide variations in individual potential property damage because there is no widespread property elevaton mandates and some yards are cleared right to the marsh vegetation line. SFHA properties are built to the elevation required by the 100-year base flood elevation for the region.

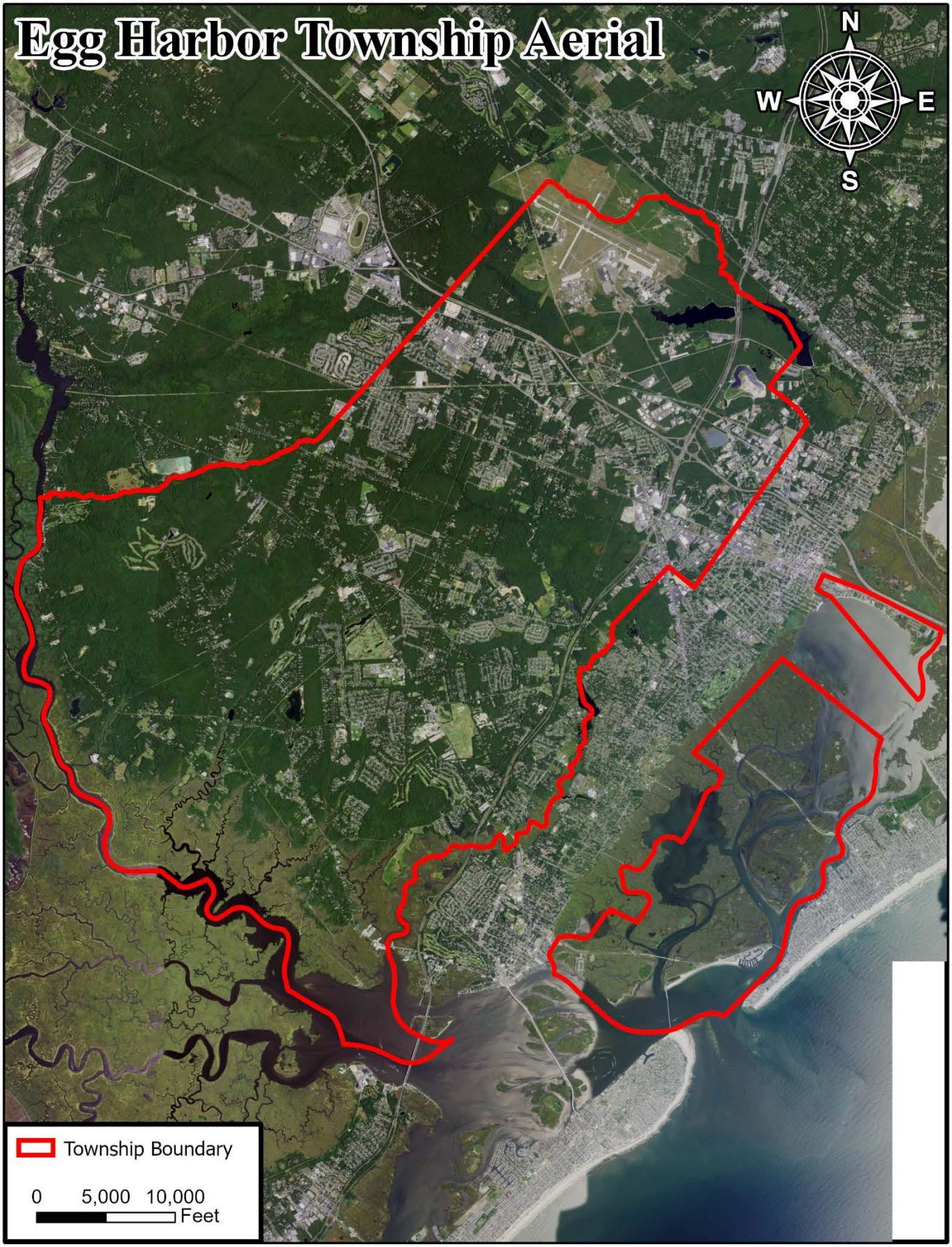

Figure 1. Aerial photograph of the Atlantic County region occupied by Egg Harbor Township. There is a large mainland area in the southeastern part of the county and a smaller segment largely consisting of bayshore development (Seaview Harbor and Anchorage Point) and NJ State-owned tidal marshes. Another small segment lies along US Route 322/40.

Land Use and Zoning

Egg Harbor Township lists the municipal land use and other codes at https://ecode360.com/EG0915 where the following provisions germane to the conditions required by the watershed management criteria are found. Egg Harbor Township established measures and instituted controls to mitigate future flood events per Ordinance #25-2018 as amended on 6/20/2018 § 113-7. The zoning map (Figure 3) includes multiple residential districts with a variety of zoning regulations, an industrial zone, and multiple commercial zones.

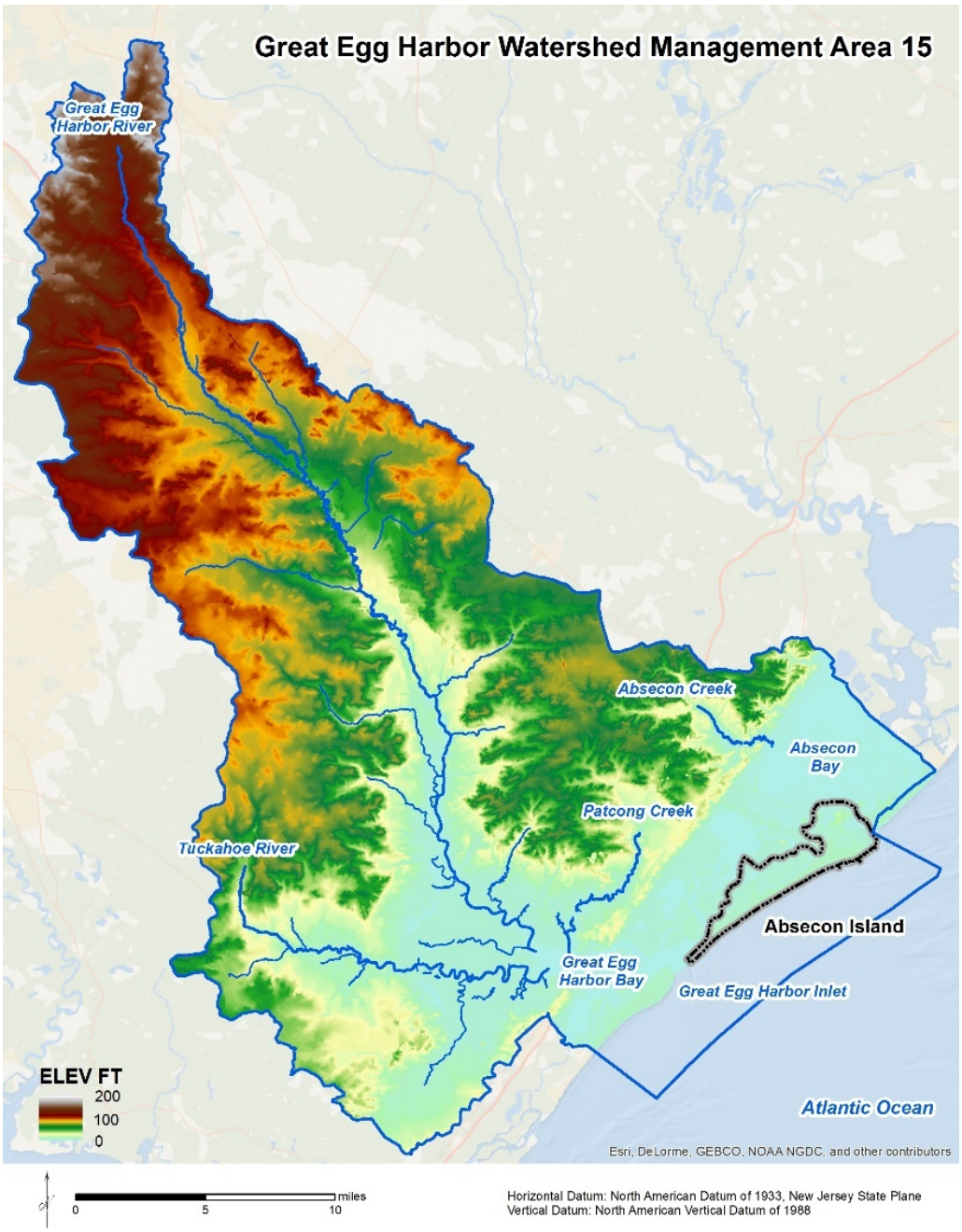

Figure 2. Map of the Great Egg Harbor Watershed Management Area 15 that includes all of Egg Harbor Township northeast of the Great Egg Harbor River including the Patcong Creek drainage basin, NJ.

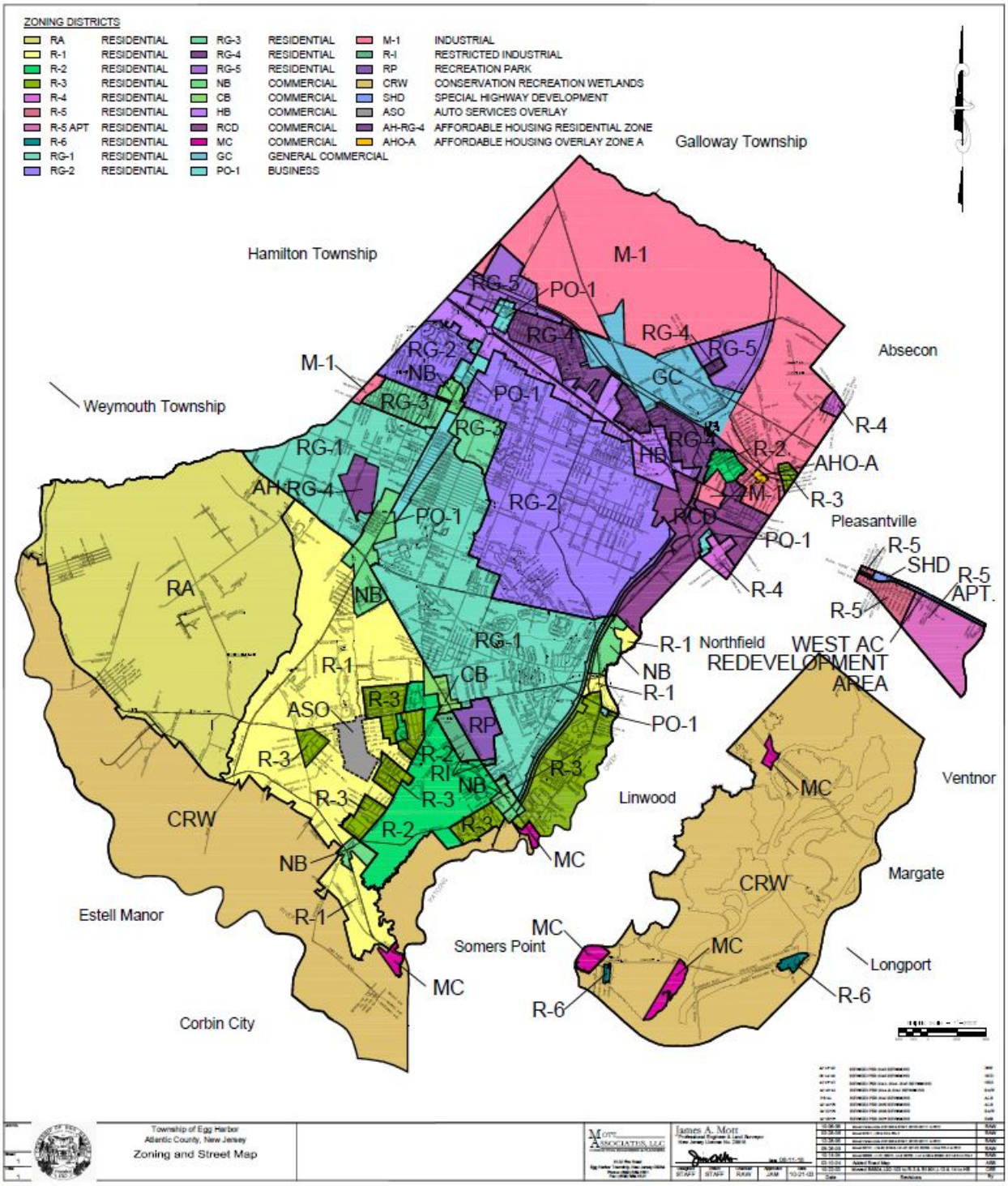

Figure 3. Egg Harbor Township Zoning map last updated Dec. 17, 2019 showing the 13 different residential zones, seven commercial districts, two industrial zones and several special districts such as the CRW zone (Conservation, Recreation, and Wetlands). The M-1 zone is open space associated with the Atlantic City International Airport and Air Force Fighter Wing.

§ 113-7 A (1) & (2) define the special flood hazard areas in Egg Harbor Township based on FEMA documents below:

(1)

A scientific and engineering report "Flood Insurance Study, Atlantic County, New Jersey (All Jurisdictions)" dated August 28, 2018.

(2)

"Flood Insurance Rate Map for Atlantic County, New Jersey (All Jurisdictions)" as shown on Index and panels 34001C0288F, 34001C0289F, 34001C0293F, 34001C0294F, 34001C0295F, 34001C0305F, 34001C0308F, 34001C0309F, 34001C0311F, 34001C0312F, 34001C0313F, 34001C0314F, 34001C0316F, 34001C0317F, 34001C0318F, 34001C0319F, 34001C0338F, 34001C0401F, 34001C0402F, 34001C0404F, 34001C0406F, 34001C0407F, 34001C0408F, 34001C0409F, 34001C0417F,

34001C0426F, 34001C0427F, 34001C0428F, 34001C0429F, 34001C0431F, 34001C0432F, 34001C0433F, 34001C0434F, 34001C0436F, 34001C0437F, 34001C0441F, 34001C0442F, 34001C0451F, whose effective date is August 28, 2018.

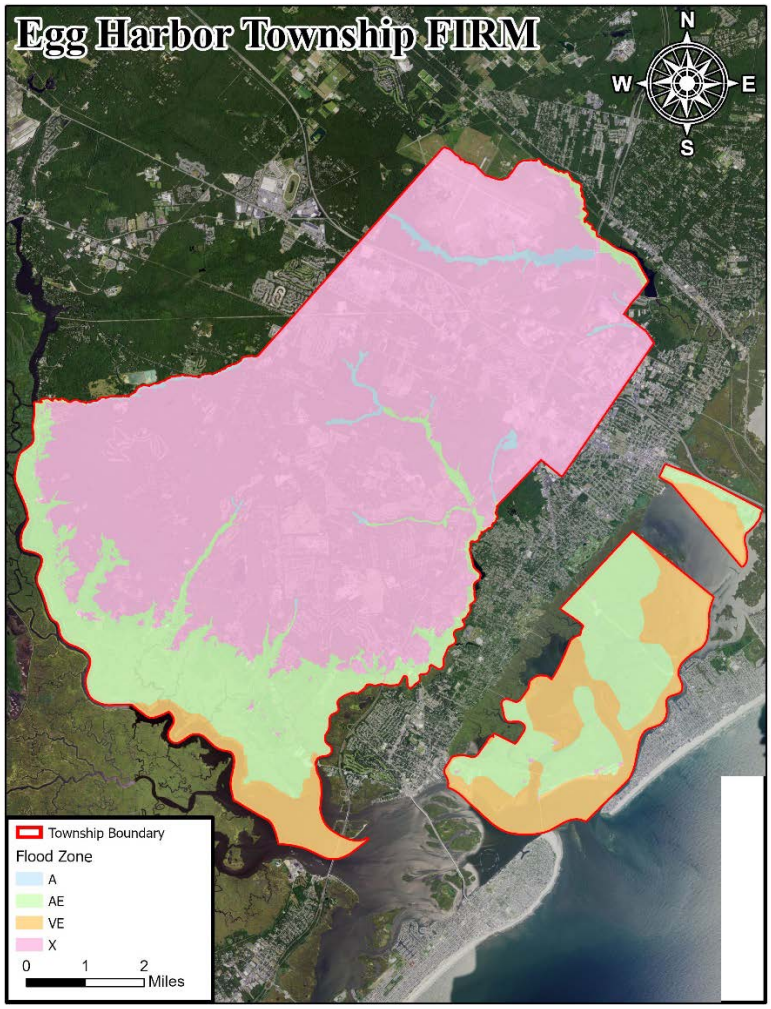

Figure 4. Generalized map showing Flood Hazard Areas in Egg Harbor Township where either tidewater or stream valley elevations are significant in flood mitigation efforts.

The codes specifically refer to standard NFIP provisions established for the special flood hazard areas in § 113-17 (A through E). Section § 113-17 D provides the regulations pertaining to floodways located within a special flood hazard area. Section § 113-17 D (1) refers to floodways:

D (1): Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless a technical evaluation demonstrates that encroachment shall not result in any increase in flood levels during the occurrence of the base flood discharge.

The New Jersey Pinelands Commission exercises developmental controls over a large portion of mainland Egg Harbor Township and has restrictive policies on development density and stormwater management policies that foster low density development across wide areas. Cluster village development is encouraged in specific places. The NJ Pinelands Commission oversees 17,665.32 acres of land within the Township (Figure 4).

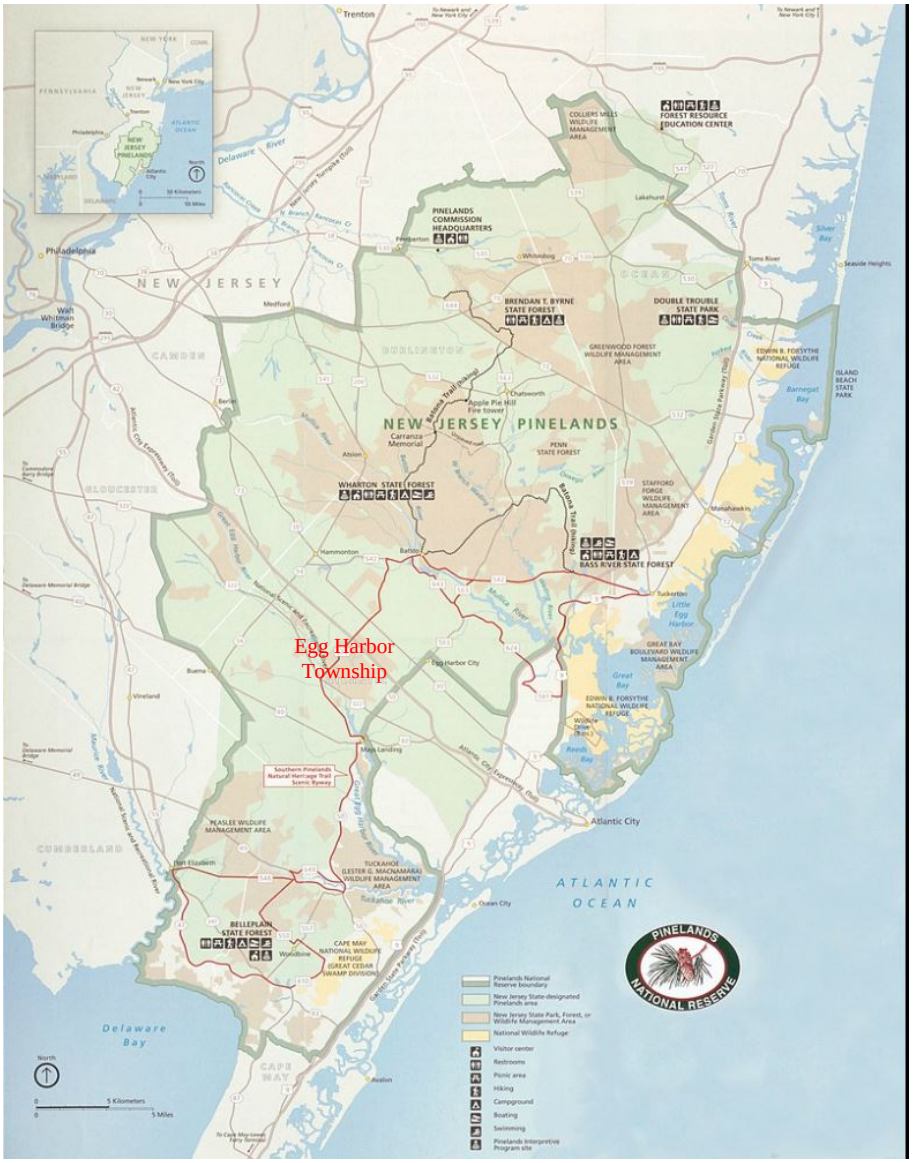

Figure 5. Extent of the NJ Pinelands Commission jurisdiction including over 17,000 acres of Egg Harbor Township.

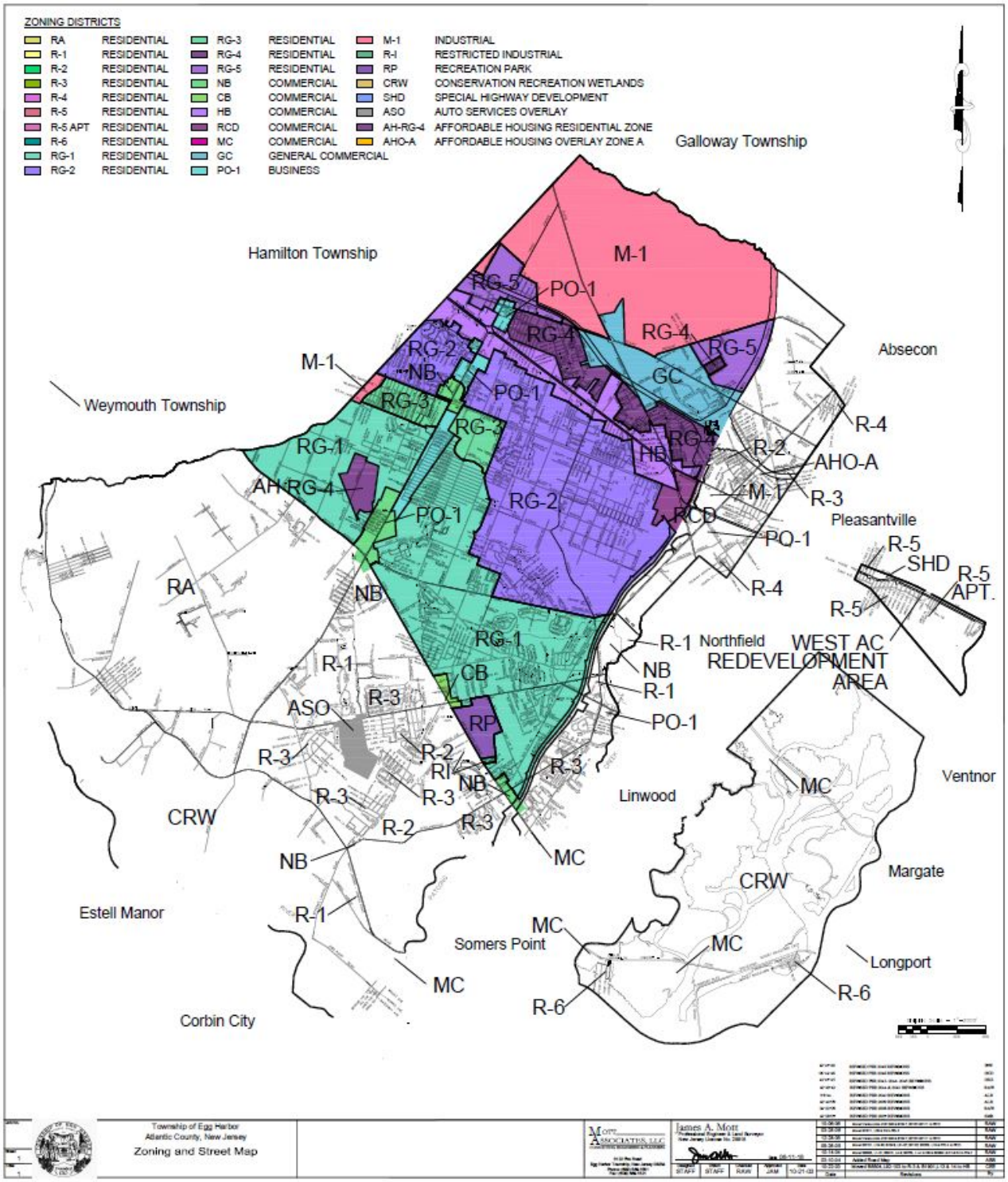

Figure 6. The Egg Harbor Township zoning map with the extent of the NJ Pinelands Reserve overlain on the zoning districts. The Garden State Parkway is the boundary of this restricted development area to the east with the northern and western boundaries defined by the Township boundaries. Ocean Heights Avenue is the southern boundary. The M-1 district is the Atlantic City and 175th Fighter Wing airport property and is 95% open space, cleared land. The zones without any color are outside the NJ Pinelands Reserve jurisdiction.

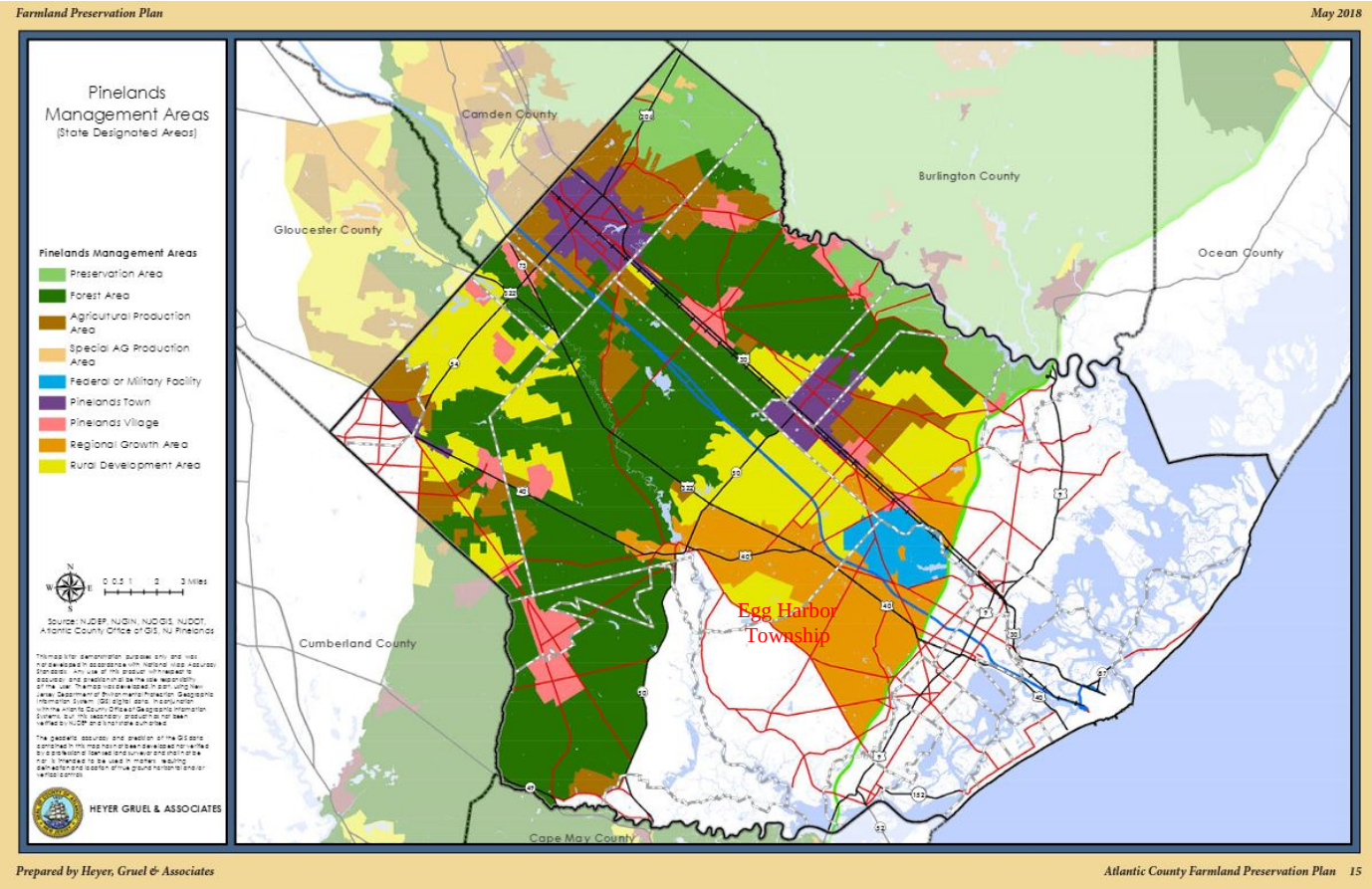

Figure 7. Pinelands Management Areas showing the extent of forest and farmland. Most of Egg Harbor Township lies outside the Pinelands jurisdiction and those portions of the township in Pinelands are categorized as either Regional Growth or Rural Development Areas. The development restrictions here focus on leaving forested areas, building walking/bicycle paths and other recreational facilities in proportion to development density.

Egg Harbor Township established an Open Space Fund (Chapter § 161) under N.J.S.A. 40:12-15.7 on Dec. 12, 2001 by Ordinance # 43-2001. This municipal land preservation fund presently oversees 194 acres of land in the Township (Figure 8).

§ 161-4 A states: *A special tax levy shall be added to the total Township tax rate in the amount of $0.02 per $100 of the annual assessed valuations. The revenue from the levy shall be deposited into the Open Space Fund. A separate bank account shall be opened and maintained for this purpose.*

§ 161-5 A states: *No property or interest in land acquired with funds from the Open Space Fund shall be leased, sold or otherwise disposed of by the Township unless it is needed for another public use or otherwise furthers the purposes of the Open Space Fund. If such a sale, lease or conveyance is made, the Township Committee shall be required to:*

(1) *Place the monies received into the Open Space fund; and*

(2) *In due course, replace such property or interest with property or an interest of at least equal fair market value and of reasonably equivalent usefulness, size, quality and location.*

Egg Harbor Township Open Space Inventory:

Egg Harbor Township covers cc acres of the landscape separated into two segments. The vast majority of the area is on the Atlantic County mainland (42,912 acres) while 5,395 acres are located as part of the tidal water lagoons of Atlantic County. Among the multiple land preservation methods found in Egg Harbor Township, the US Wildlife management areas cover both mainland forest and tidal marshes.

1. NJDEP Wildlife management; total of 2,001.9 acres (4.7% of the Township)
    a. Malibu Beach WMA is 95.7 acres,
    b. Pork Island WMA (867.2 acres) located on the Margate City access boulevard,

c. 1,039 acres near the Great Egg Harbor River as part of the Lester G. MacNamara WMA.

2. New Jersey-owned salt marsh tidal lands; total of 5,103 acres (11.9% of the Township)
3. ROSI municipal parcels; total of 766.71 acres (1.8% of the Township)
4. Egg Harbor Township Open Space Fund; total of 550. acres (1.28% of the Township)
5. Atlantic City airport open space; 3,595 acres (8.4% of the Township)
6. NJ Pinelands Commission regulated lands: 6,000 acres (14.0% of the Township) Development is allowed in designated Regional Growth Zone areas of the Pinelands portion of the Township with open space requirements greater than traditionally allowed by most municipal building codes. This area is bounded by Galloway Township to the north, Garden State Parkway to the east, Ocean Heights Avenue to the south, and Hamilton Township to the west. The remainder of the Township is in the NJ DEP, Coastal Area Facilities Review Act (CAFRA) area.
7. The 1981 State of New Jersey Agriculture Retention and Development Act was passed to allow state funds to purchase either 8-year deed restrictions at $600/acre, up to 50 acres, $200/acres up to 100 acres, then $100/acres over 100 acres OR purchase easements upon application to the County Agricultural Development Board (CADB) to preserve farmland in perpetuity. Currently 193.98 acres of the 3,510 acres of Egg Harbor Township farmland (Heyer & Gruel, 2018) are preserved in this program. (0.5% of the Township).

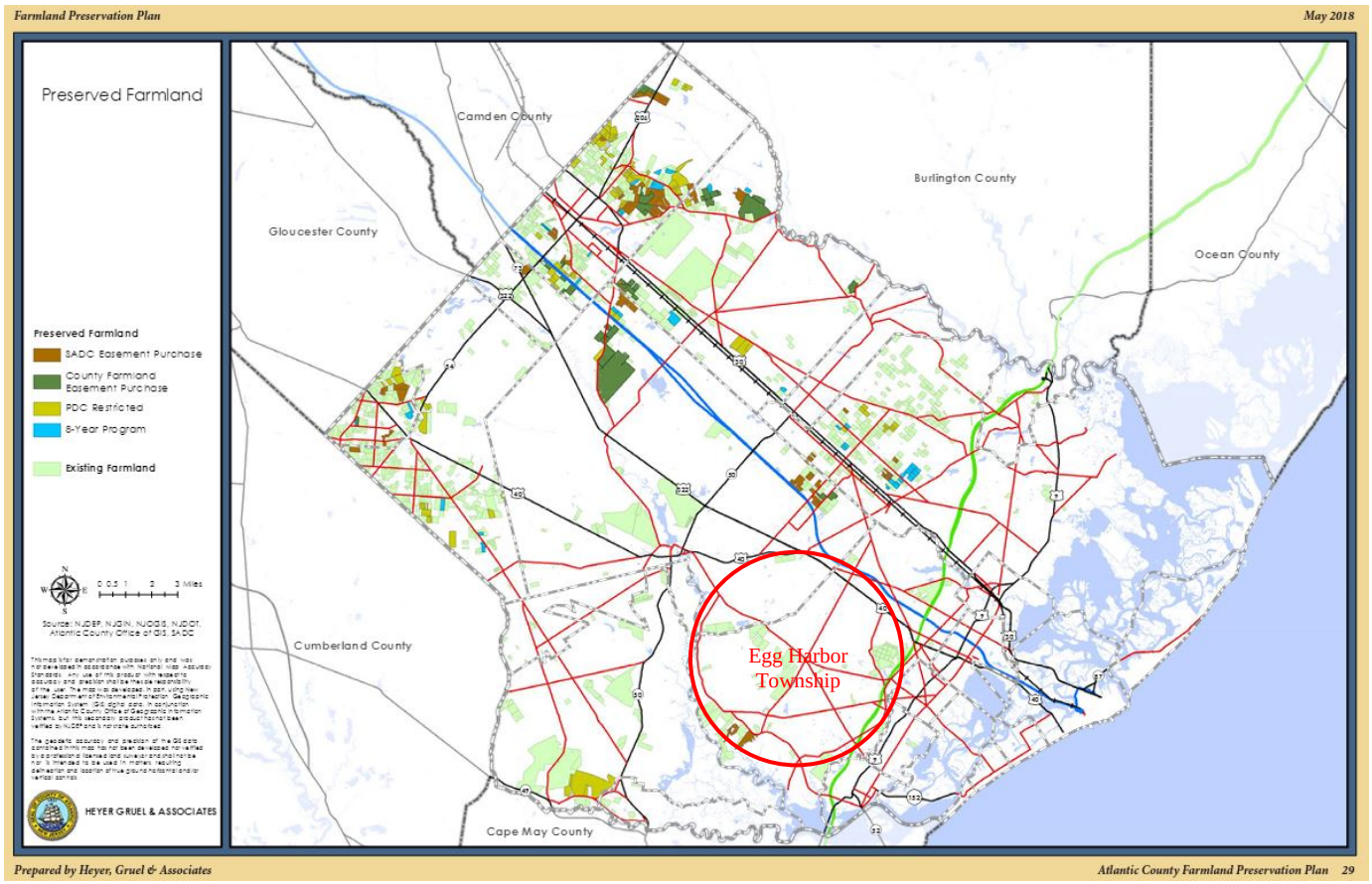

Figure 8. The Heyer & Gruel map shows the preserved farmland in Atlantic County as of 2018. The two preserved Egg Harbor Township properties total 194 acres, and the easements were purchased in 2010 and 2011.

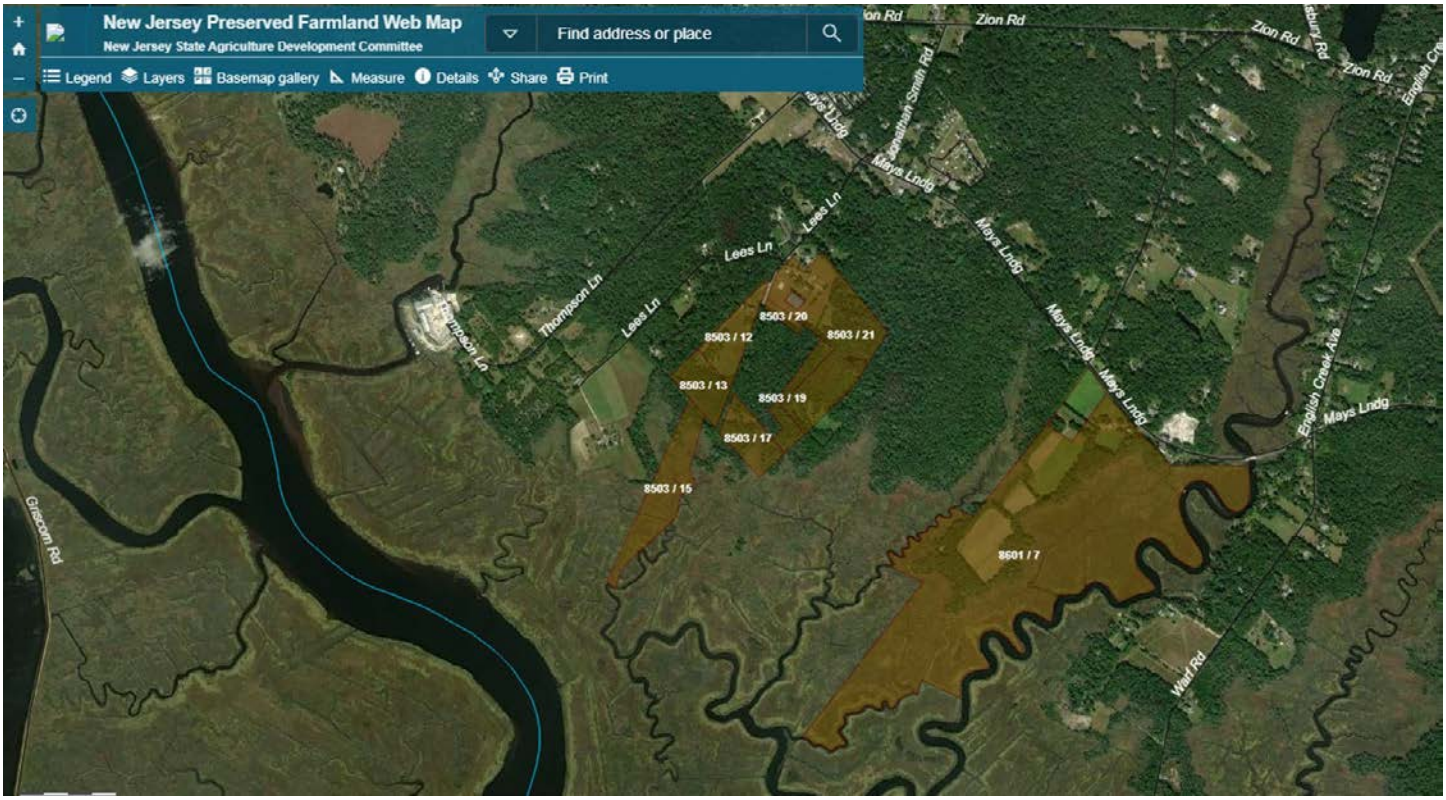

Figure 9. NJ Preserved Farmland map for Egg Harbor Township showing the parcels currently preserved totaling 193.98 acres including both tidal wetlands and upland portions adjacent to the Great Egg Harbor River.

The Open Space Special Tax Levy;

In 2001 the Township instituted a percentage of the municipal property tax rate dedicated to acquisition of individual parcels through a direct owner negotiation for purchase and has resulted in the acquisition of 550.4 acres of land within Egg Harbor Township (Figure 10). To date 33 parcels have been acquired and placed in the NJ State Green Acres program where development is not permitted other than for passive recreational activities.

Municipal Location per Tax Records	Name of Park / Facility	Block No.	Lot No.	Total Lot Acres	Partial Lot? (Y / N) Note 1	GA Encumbered Acres Note 2	Co-Owners? (Y / N) Note 3	Green Acres Funded? (F / U) Note 4	EIFP Funded? (Y / N) Note 5	Notes
EGG HARBOR TOWNSHIP	EGG HARBOR TOWNSHIP NATURE RESERVE	7301	11	181.73	N	181.73	N	F	N	
EGG HARBOR TOWNSHIP	BARGAINTOWN PARK (300 DELAWARE AVENUE)	5302	19.01	23.74	N	23.74	N	U	N	
EGG HARBOR TOWNSHIP	ARBORETUM - EGG HARBOR TOWNSHIP NATURE RESERVE	7502	35	78.84	N	78.84	N	U	N	
EGG HARBOR TOWNSHIP	TOBABEN FARM	5813	28	41.45	N	41.45	N	U	N	
EGG HARBOR TOWNSHIP	FERNWOOD/TREMONT	5902	2	1.55	N	1.55	N	U	N	
EGG HARBOR TOWNSHIP	FERNWOOD/TREMONT	5903	1	2.29		2.29				
EGG HARBOR TOWNSHIP	FERNWOOD/TREMONT	5905	2	1.60		1.60				
EGG HARBOR TOWNSHIP	FERNWOOD/TREMONT	5915	1	1.14	N	1.14	N	U	N	
EGG HARBOR TOWNSHIP	FERNWOOD/TREMONT	5906	1	7.07	N	7.07	N	U	N	5906/1 includes 5909/1 (previously listed) and 5912/1 & 2
EGG HARBOR TOWNSHIP	FERNWOOD/TREMONT	5908	4	1.03	N	1.03	N	U	N	
EGG HARBOR TOWNSHIP	BROADWAY PARK	2417	6	72.8	Y	7.80	N	U	N	Note: Former Block 2417 Lots 20 and 21 (7.80 acres) were funded by Green Acres. The rest of the acreage in this consolidated Block and Lot was not funded by Green Acres and is not Green Acres land. The balance of the acres, or 65 acres, that are not included as Green Acres may be used for a future school in the Township. Refer to 2007 Tax Map to see the 7.80 acres compared to the current tax map in 2019.
EGG HARBOR TOWNSHIP	AVENUE A	1807	9	0.45	N	0.45	N	U	N	
EGG HARBOR TOWNSHIP	AVENUE A	1807	14	0.51		0.51				
EGG HARBOR TOWNSHIP	ELM AVENUE	1211	1	2.29	N	2.29	N	F	N	
EGG HARBOR TOWNSHIP	ENGLISH CREEK AVENUE	5101	191	1.18	N	1.18	N	F	N	
EGG HARBOR TOWNSHIP	LANDGRAF AVENUE	6001	1.81	52.74	N	52.74	N	U	N	
EGG HARBOR TOWNSHIP	BROADWAY AVENUE	2419	2	47.42	N	47.42	N	F	N	
EGG HARBOR TOWNSHIP	M. K. BETTERMENT	2912	2	1.00	N	1.00	N	U	N	open space
EGG HARBOR TOWNSHIP	M. K. BETTERMENT	2910	1	0.22	N	0.22	N	U	N	
EGG HARBOR TOWNSHIP	M. K. BETTERMENT	2910	4	0.57	N	0.57	N	U	N	
EGG HARBOR TOWNSHIP	M. K. BETTERMENT	2914	5	0.45	N	0.45	N	U	N	
EGG HARBOR TOWNSHIP	M. K. BETTERMENT	2914	10	0.8	N	0.80	N	U	N	
EGG HARBOR TOWNSHIP	M. K. BETTERMENT	2911	1	1.83	N	1.83	N	U	N	previously listed as block 2911 lots 4 and 5
EGG HARBOR TOWNSHIP	EGG HARBOR TOWNSHIP PAL	1129	31	4.9		4.90				Includes additional lot 32. Lease agreement with Egg Harbor Twp PAL for its use. Lease agreement expires 12/31/25
EGG HARBOR TOWNSHIP	EGG HARBOR TOWNSHIP PAL	1305	27	2.43		2.43				Lease includes additional lots 2,3,4 & 33., Lot 3 is owned by PAL.Lease agreement with Egg Harbor Twp PAL for its use. Lease agreement expires 8/7/21
EGG HARBOR TOWNSHIP	EGG HARBOR TOWNSHIP PAL	5925	1	22.86		22.86		F		[illegible] 025-2, also includes lots 2-4. Lease agreement with Egg Harbor Twp PAL for its use. Lease agreement expires 9/30/23
EGG HARBOR TOWNSHIP	M.K. BETTERMENT	2913	2	4.07		4.07				Lots 1,3 & 13 were consolidated into lot 2. Lease agreement with M.K. Betterment for its use. Lease agreement expires 3/31/22
EGG HARBOR TOWNSHIP	SPRUCE AVENUE	3801	1	13.92		13.92				open space
EGG HARBOR TOWNSHIP	DELILAH OAKS	1303	57	2.09		2.09				additional lot 1303/58, playground
EGG HARBOR TOWNSHIP	Scarborough Drive	1602	103	6.47		6.47				Park
EGG HARBOR TOWNSHIP	TREMONT AVENUE	4102	1	0.75		0.75				Park
EGG HARBOR TOWNSHIP	OCEAN HTS AVENUE	6201	66	29.91		29.91				Golf Course
EGG HARBOR TOWNSHIP	South MT Airy Avenue	5701	97	5.3		5.3				Golf Course
	Total of all fee simple Green Acres-encumbered acres on this page only:					**550.40**				

Figure 10. The municipal property tax levy acquisition list for parcels purchased and permanently preserved.

Egg Harbor Township has preserved 28.6% of the land area as open space in perpetuity with additions planned each municipal calendar year utilizing their tax levy as the funding source, together with all other funding options available.

Egg Harbor Township Soil Types and Impervious Surfaces

Egg Harbor Township is generally moderate to low density development with the western sub-basin districts largely forested. Soils are relatively permeable making infiltration fairly rapid. The higher elevations on the mainland provide ground water storage for heavy rains.

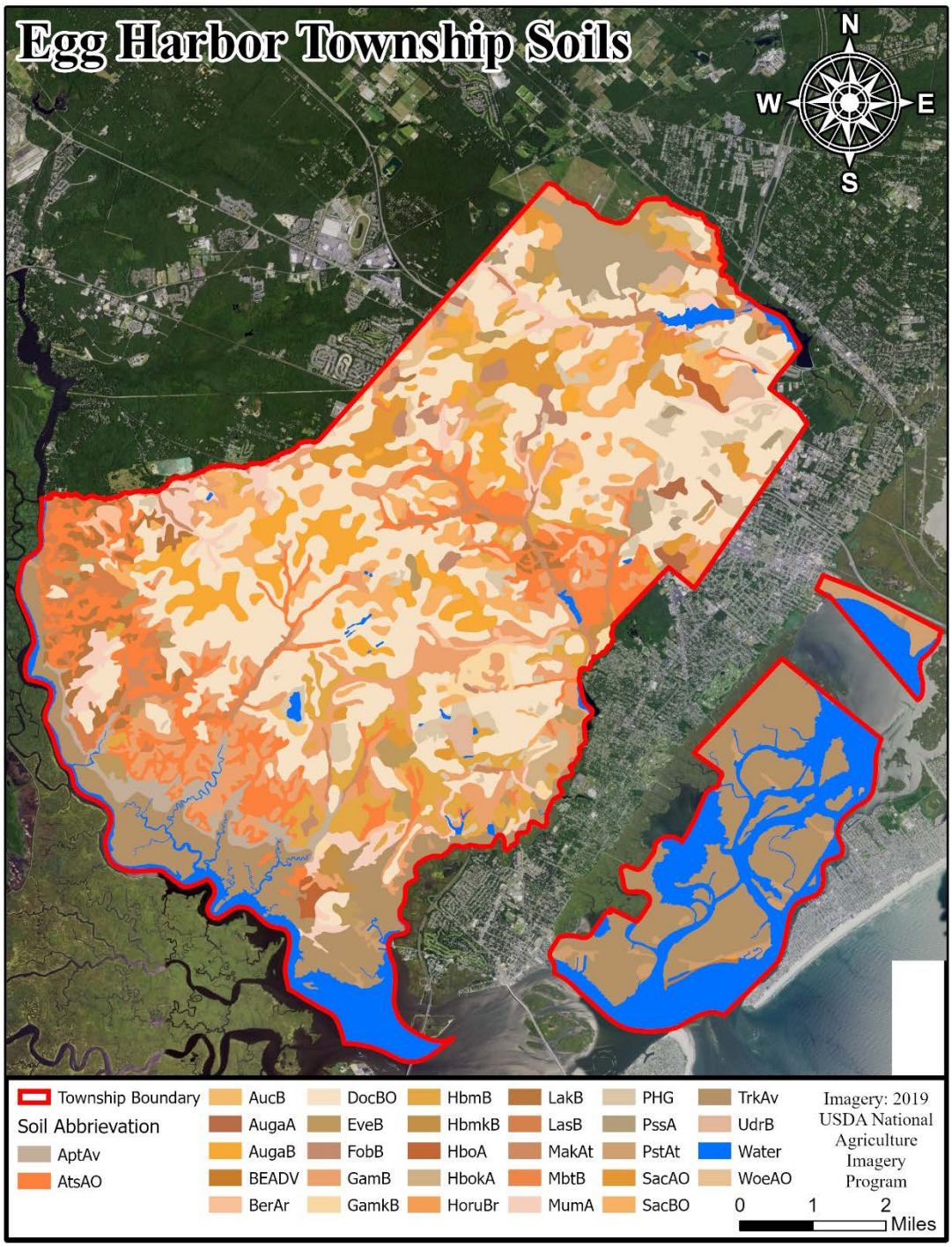

Figure 11. USDA Soils map for Egg Harbor Township showing good permeability for the inland, higher elevation soils.

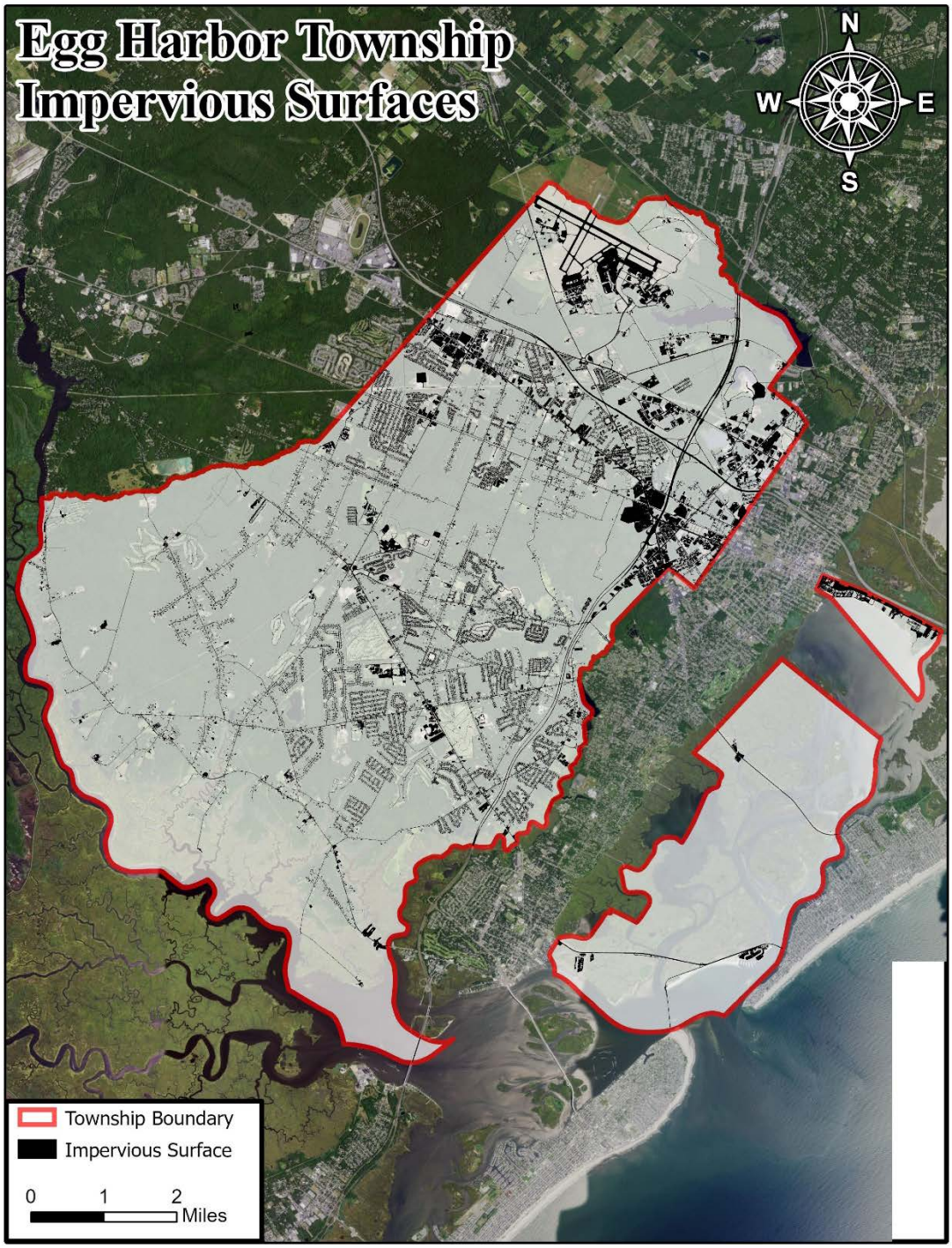

Figure 12. Map showing the impervious surface areas in Egg Harbor Township concentrated along major roadways and scattered throughout in recent planned unit developments.

Areas of impermeable surfaces are associated with the major highways where large parking areas surround major stores. Each of the planned unit developments in the interior parts of the township show up as concentrated home sites with impermeable roofs and driveways. The majority of the township is open land without restrictions on infiltration.

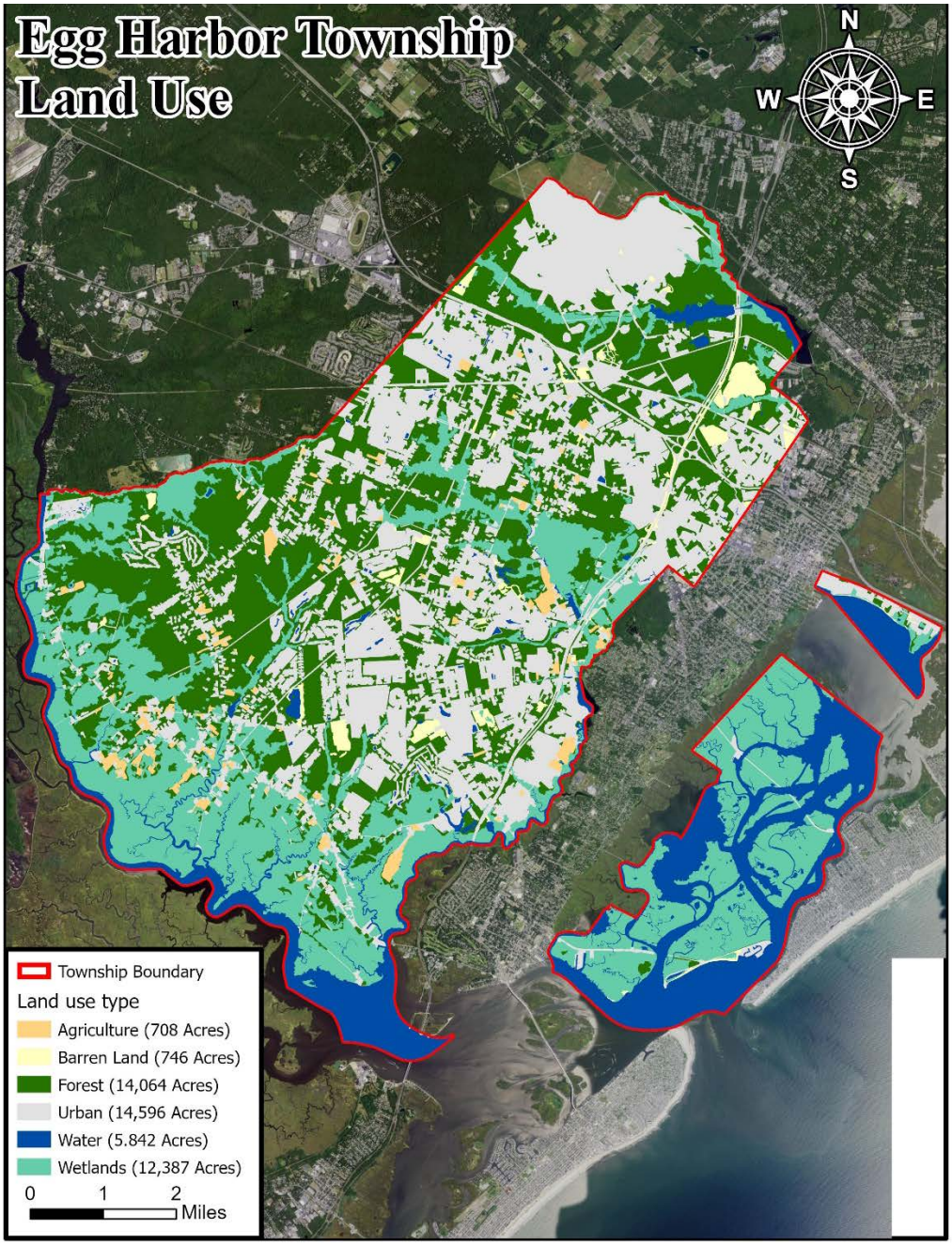

Figure 13. The Egg Harbor land use map shows wide areas of tidal marshes (12,387 acres) and over 14,000 acres of forest. These land use types dominate the entire township area with 14,596 acres listed as urban development. The urban percentage of the township land area is 30.19%.

CRS Activity 452b.

Impact Adjustment Ratio

The entirety of Egg Harbor Township lies within NJ State Great Egg Harbor Watershed Management area WMA 15, consisting of 194,560 acres and is entirely encompassed within this management plan. Therefore, the Impact Adjustment Ratio is determined to be 1.0.

Watershed Master Plan

WMP1

(1) A copy of the ordinance adopting a watershed management plan affecting the community that identifies the natural drainage system and constructed channels.
(2) A copy of the ordinance adopting regulatory standards based on the plan

(3) The regulatory standards must require future peak flows to be no more than current peak flows
(4) The standards must address at least the 25-year event
(5) If more than five years old the community must determine if the plan is still current and provide documentation.
(6) WMP1 credit is required in order to receive credit for any additional items.

Ord. No. § 113-1 through 17: Flood Damage Prevention:

Ord. No. § 193-1 through 12: Stormwater: both promote the purpose-

(a) *"To reduce flood damage, including damage to life and property;*
(b) *To minimize any increase in stormwater runoff from new development;*
(c) *To reduce soil erosion from any development or construction project;*
(d) *To assure the adequacy of existing and proposed culverts and bridges, and other instream structures;*
(e) *To maintain groundwater recharge;*
(f) *To minimize any increase in nonpoint pollution;*
(g) *To maintain the integrity of stream channels for their biological functions, as well as for drainage;*
(h) *To restore, protect, maintain and enhance the quality of the streams and water resources of Egg Harbor Township and the ecological character and quality of the Pinelands Area;*
(i) *To minimize pollutants in stormwater runoff from new and existing development in order to restore, protect, enhance and maintain the chemical, physical and biological integrity of the surface and groundwaters of Egg Harbor Township, to protect public health and to enhance the domestic, municipal, recreational, industrial and other uses of water; and*
(j) *To protect public safety through the proper design and operation of stormwater management basins"*

A storm water model was run for the current conditions of Egg Harbor Township as well as future conditions. These future conditions are found by determining the sea level rise impacts on the drainage system or by determining the allowable impervious coverage percentage. Sea level rise was determined using the Army Corps of Engineers online tool, Sea-Level Change Curve Calculator (Version 2021.12), under the NOAA et. al. 2017 scenario. The impervious coverage that is allowed by each basin is used as proxy to determine what new development may occur in each basin. This number is calculated using the average of zoning districts within each area according to township ordinance.

The Flood Hazard Reduction Standards found in § 113-1 through 17 repeatedly refer to a required construction freeboard of 3.0 feet above the base flood elevation specified for the special flood hazard area in question. This freeboard value increases to 4.0 feet in a V-zone.

Drainage basin, for the purposes of the modeling analysis, is defined as the natural infiltration rates of the soils and the outfall discharge rate. The infiltration rate of the soils is defined by the NRCS classifications associated with the soils hydrologic soil group.

Also, to note, the model evaluates the impacts of the 50-year storm rather than the 25-year storm. This information provides the community with data for more severe impact storm events and will help guide management that will inevitably reduce or eliminate impacts from a 25-year storm event.

WMP2

The plan and the community's regulations manage the runoff from all storms up to and including the 100-year event. These must include the 10-year storm, a storm larger than the 10-year, but less than the 100-year and the 100-year storm.

This watershed plan discusses the impacts from the 10-year, 50-year and 100-year storm events. The community regulations do not convey similar regulations regarding storm runoff.

WMP3

The plan manages peak flows and volumes to not increase over the existing values.

Section 113-1 through 17 does not discuss management of peak flows and volumes. Words are given to the effect that no watercourse shall be subject to excessive discharges.

WMP4

The plan manages runoff from all storms up to and including the 5-day event.

This plan examines and evaluates the management of the 10-year, 50-year and 100-year, 3-day plus local maximum duration event of historical record. There is no 5-day, 100-year event to model since the historical record only has one 3.5-day event recorded.

WMP5

The plan identifies existing natural open space to be preserved from development so that natural storage of runoff is maintained.

Egg Harbor Township employs multiple means to preserve land from development so natural storage of runoff is maintained:

1. Has three separate NJ Division of Fish and Wildlife Management areas preserved
2. Is host to NJ State owned tidal marsh wetlands
3. Has an Open Space tax levy set to purchase property to preserve as open space since 2001.
4. Participates in the Atlantic County farmland preservation and deed restriction program since 2008.
5. Participates in the NJ Pinelands Commission open space management program since inception.

WMP6

The plan prohibits development, alteration, or modification of existing natural channels.

Section § 113-14 D (1) & (2) Require that the township only notify the adjacent communities and the NJDEP prior to any alteration or relocation of a watercourse. Section (2) states that the township "*Require that maintenance is provided within the altered or relocated portion of said watercourse, so the flood-carrying capacity is not diminished."*

Section § 113-17 D (1) states that within floodways: *"Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless a technical evaluation demonstrates that encroachment shall not result in any increase in flood levels during the occurrence of the base flood discharge."*

Section § 94-28 A (7) states that for planned unit developments within the Township: "*The common open space shall be easily accessible from all parts of the development and shall include, at a minimum, all floodplain and wetland areas; provided, however, that in no case shall areas of floodplain or wetland be counted for more than 75% of the required open space."*

WMP7

The plan requires channel improvement projects use natural approaches rather than hard techniques.

Section § 113 does not opine as to use of natural approaches rather than hard techniques.

Does the municipal budget have a line item calling for the implementation of, or management for this Watershed Management plan going forward?

Egg Harbor Township does not have a budgetary line item to fund the implementation or management of this watershed management at this time.

Egg Harbor Township Stormwater Modeling & Sea Level Rise

Since Egg Harbor Township consists of two separate regions separated by other communities, the issues developed during the evaluation of the entire Township for potential sea level rise issues by year 2100 fall into different categories of intensity expected. The much larger mainland section has issues along the Great Egg Harbor River floodplain margins where single family homes and several marina businesses are exposed to the effects of sea level increases, but these are quite minor in comparison to the wholesale inundation possible along the tidal marshes represented by the easterly portions of the Township in Anchorage Point and Seaview Harbor developments.

The Township was subdivided into sub-drainage basins using 2018 NJ State LiDAR data to show local elevation differences. Each sub-basin was subjected to evaluation based on multiple criteria:

- Surface elevation from LiDAR data
- US Dept. of Agriculture surface soil type information focused of permeability and infiltration rates.
- Overland discharge during the array of storm events and their durations.
- Percentage impervious versus pervious surface in sub-basin.
- Residual surface water accumulation in inches.
- Residual surface water at the end of the storm event in gallons.
- A computed flood depth in the sub-basin at the end of the storm event in inches.

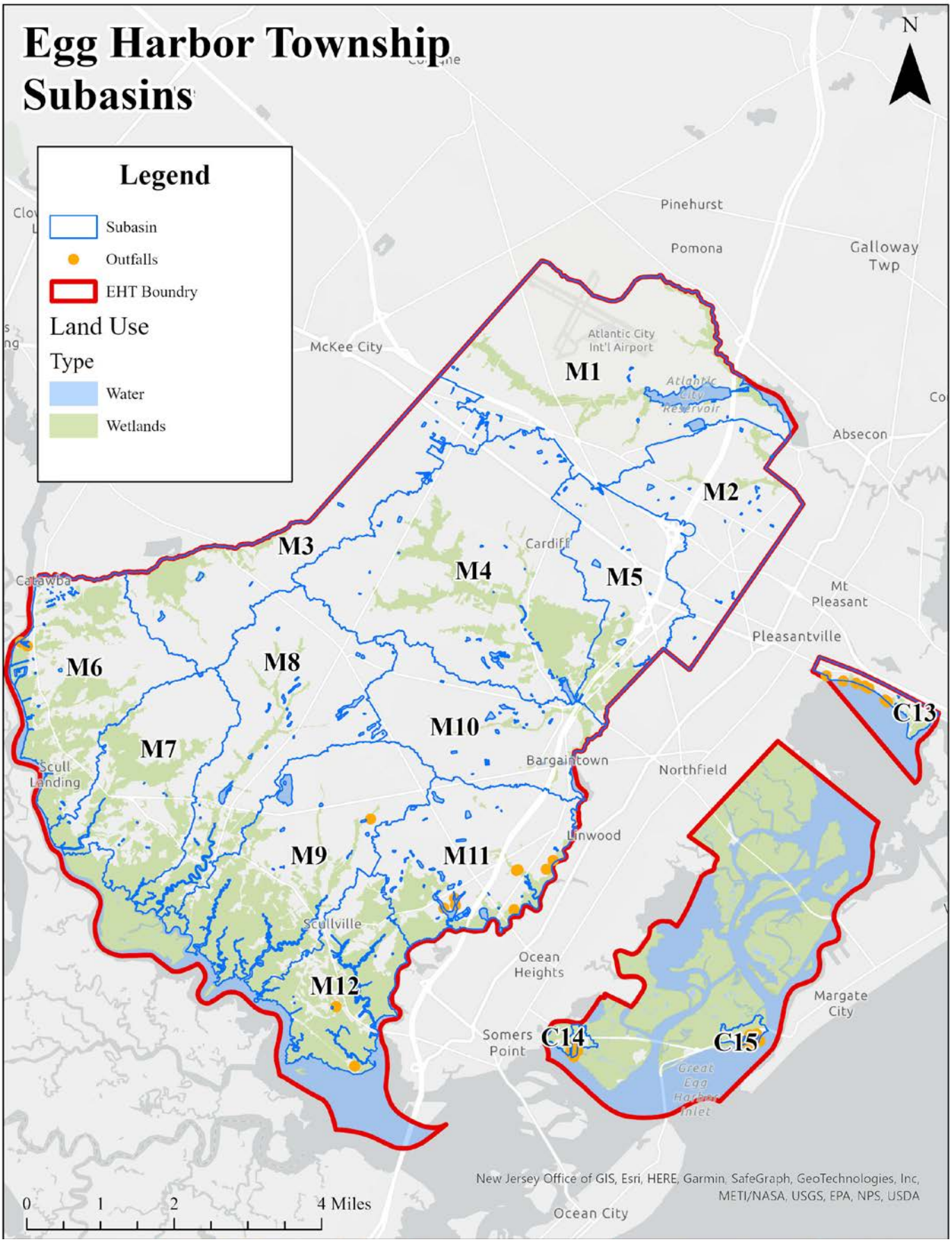

Figure 14. LiDAR-based sub-basin map for Egg Harbor Township, NJ. Sub-basins C-13, -14 and -15 are the most problematic but issues exist in sub-basins M-6, -7, -9 and -12 as well. All other sub-basins are above potential sea level rise elevations as of 2100.

The Township sub-basin map provides a means of segregation of the areas subject to either storm event flooding or impacts due to projected year 2100 sea level rise potentials. Sub-basins M-1 through M-5 and M-10 and M-11 do not suffer impacts from possible sea level rise by year 2100 because their surface elevations exceed the projected elevations projected. High rainfall events do produce minor to moderate street flooding where drainage slopes are low, but permeable surfaces dominate in these lower development areas and storm water management efforts seem adequate for the future conditions expected. Sub-basin M-1 is entirely open space because it is the site of the Atlantic City International Airport and home to the US Airforce fighter wing. All development is concentrated at the runways and stormwater runoff is directed to the marginal grass lands.

Sea Level Rise Projected for Year 2100 by NOAA

In addition to the sub-basin maps, digital imagery from 2019 and LiDAR data were utilized Township wide to show the projected impact from a 6.46-foot sea level rise within the Township boundaries under the NOAA Intermediate High scenario. This mapping confirms the flooding potential for all the easterly districts labeled "C" on the sub-basin map (Figure 14). The tidal marsh lands associated with the Great Egg Harbor River all are submerged and water moves into the southwesterly sub-basins up each of the small tributary streams such as English Creek or Mill Branch (Figure 15). This represents the NOAA prediction superimposed on the existing land surface elevations and is further illustrated by Figure 16 showing increased sea levels in 1-foot increments to 5.0 feet.

These projections will require focused attention adjusted to the actual rate of sea level increase documented as time passes. Planning cannot wait until the 3.0-foot elevation is reached because by then the storm surge generated by minor northeast storms will have far reaching damaging impacts.

1. Utilize the existing LiDAR elevation data to outline regions of gradational concern:
    a. Bulkheads surrounding individual properties adjacent to the Great Egg Harbor River.
    b. Potential for moving individual homes to higher lot elevations if they exist.
    c. Possible purchase and removal of most critical structures.
2. Evaluate the possibilities facing the "C" districts on the tidal marshes.
    a. US Route 322/40 into Atlantic City is a priority needing raising and drainage improvements.
    b. Planning already exists to acquire Route 322/40 properties and remove the lower value structures.
    c. Seaview Harbor will need review because inundation occurs with the NOAA 2100 intermediate high tide level.
    d. Anchorage Point floods at the 4.0-foot elevation and will need raising, diking and pumping of rainfall if it is to survive.

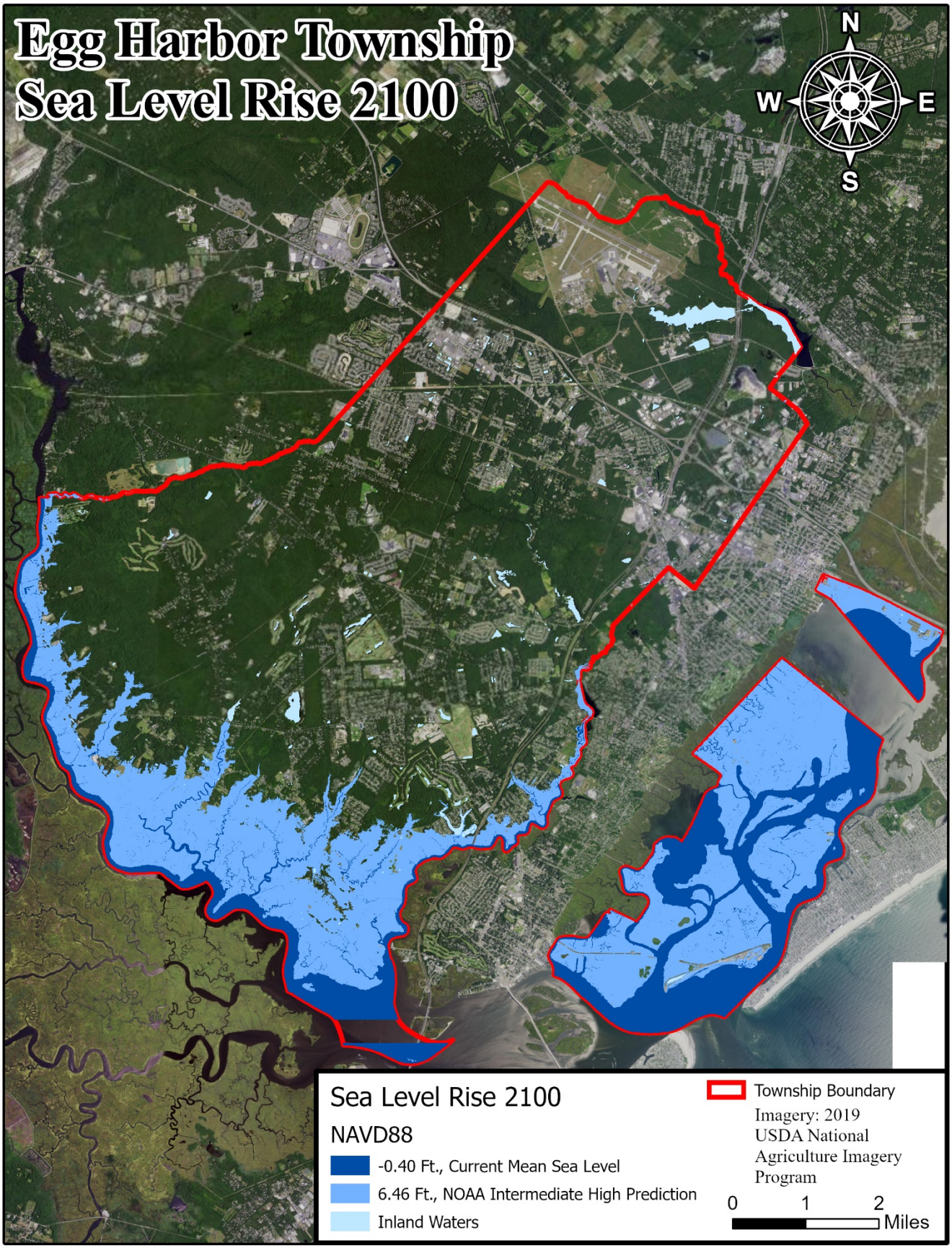

Figure 15. Projected year 2100 sea level rise of 6.46 feet as defined by the NOAA Intermediate High Prediction for the region. The easterly districts developed on the lagoonal salt marsh surfaces are inundated unless diked or raised. Increased tide levels migrate up each of the small tributary streams along the Great Egg Harbor River along the southwest municipal boundary impacting several marina business and multiple single-family homes. The remainder of the Township is above flood levels.

The stepwise inundation by projected sea level increments is displayed on Figure 16 that shows one foot increments up to 5.0 feet as separate colors.

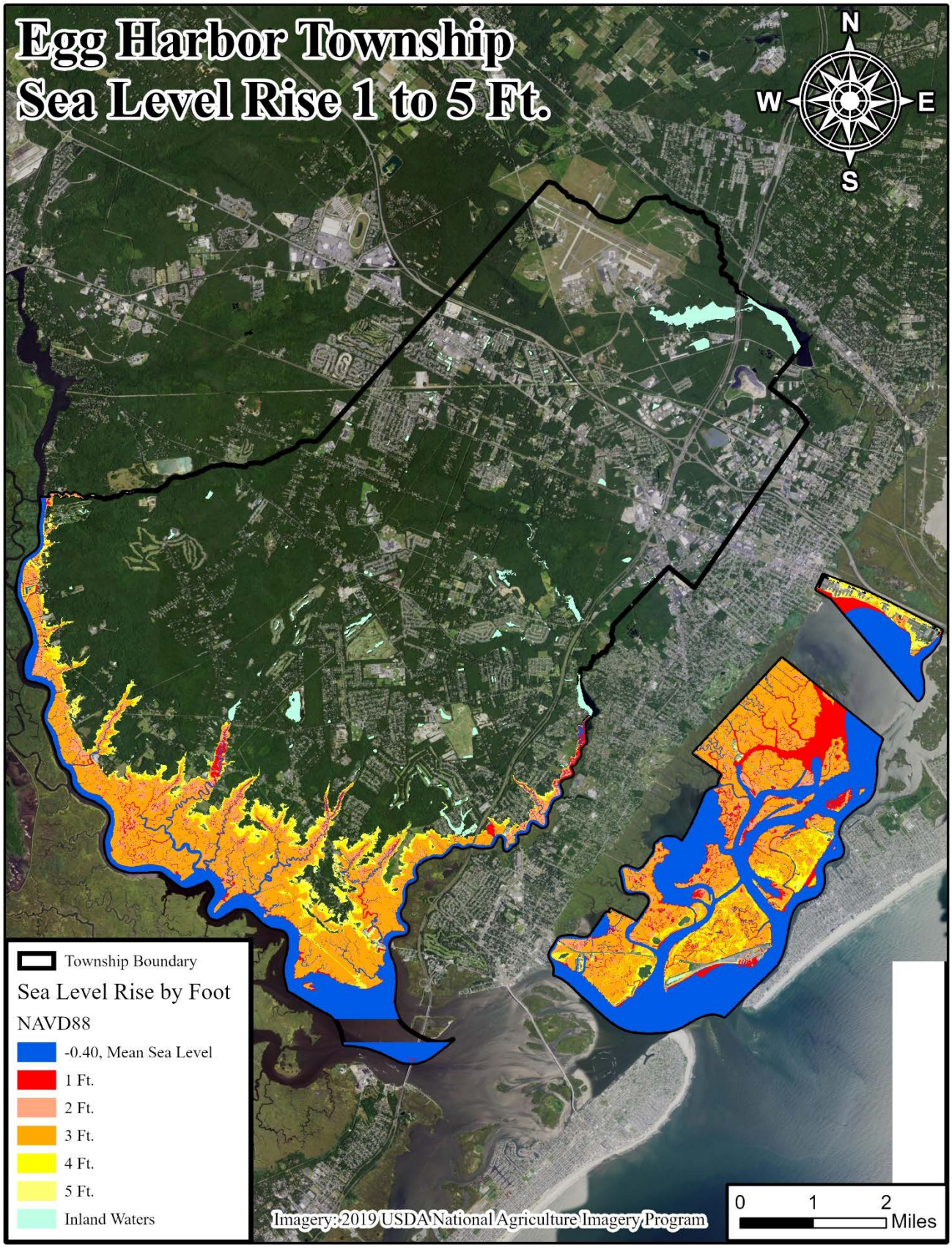

Figure 16. Increments in sea levels by one foot to 5.0 feet for Egg Harbor Township.

This incremental stepwise increase in predicted high tide elevations show that between 0 and 2.0 feet there is little impact other than making any storm surge generated more invasive on existing low elevation properties. The 3.0-foot level submerges the existing salt marsh and brings high tide to the doorsteps of the "C" districts on the sub-basin map (Figure 14). Clearly, it is the final two plus feet of potential sea level rise that generates the need for serious and expensive solutions to emerge particularly in the "C" districts and immediately adjacent to the existing marsh edge along the Great Egg Harbor River or its tributaries where tidal conditions presently exist.

Egg Harbor Township Sub-Basin Residual Stormwater Flooding Modeling Results

Sub Basin M-1: No residual flooding and no sea level rise impacts.

Basin M1, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	-	0.00	-	0.00
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	-	0.00	-	0.00
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	-	0.00	-	0.00
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin M1, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	-	0.00	-	0.00
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	-	0.00	-	0.00
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	-	0.00	-	0.00
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M1, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	-	0.00	-	0.00
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	-	0.00	-	0.00
	24	7.57	2.12	-	0.00	-	0.00
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	-	0.00	-	0.00
	24	8.85	2.48	-	0.00	-	0.00
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin M-2: This sub-basin is adjacent to the Atlantic City Airport and with extensions east of the Garden State Parkway. There are no sea level rise impacts.

Sub-basin M-2 has areas where residual water occurs with residual flood depths maximum at 5.43 inches of water during a hypothetical 24-hour 100-year storm event. Long duration storms do not produce nearly as great flood residuals. The flooding is local to specific streets and of short duration from deluge-style storms.

Basin M2, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	131,750,866	1.92	131,956,929	1.93
	24	5.13	0.98	95,917,721	1.40	149,617,058	2.19
	72	6.09	1.16	-	0.00	4,777,239	0.07
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	178,770,715	2.61	178,770,715	2.61
	24	7.57	1.45	251,730,378	3.68	294,240,596	4.30
	72	8.86	1.69	-	0.00	104,674,310	1.53
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	200,672,587	2.93	200,672,587	2.93
	24	8.85	1.69	334,378,672	4.89	371,929,695	5.43
	72	10.30	1.97	-	0.00	171,891,156	2.51
100	120	11.42	2.18	-	0.00	41,087,196	0.60

Basin M2, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	131,544,803	1.92	131,544,803	1.92
	24	5.13	0.43	42,218,384	0.62	42,218,384	0.62
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	178,770,715	2.61	178,770,715	2.61
	24	7.57	0.63	209,220,159	3.06	209,220,159	3.06
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	200,672,587	2.93	200,672,587	2.93
	24	8.85	0.74	296,827,648	4.34	296,827,648	4.34
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M2, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	131,544,803	1.92	131,544,803	1.92
	24	5.13	1.44	58,589,612	0.86	145,162,555	2.12
	72	6.09	1.71	-	0.00	39,485,600	0.58
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	178,770,715	2.61	178,770,715	2.61
	24	7.57	2.12	214,236,847	3.13	280,769,576	4.10
	72	8.86	2.48	-	0.00	124,499,717	1.82
50	120	9.77	2.74	-	0.00	58,505,643	0.85
	1	3.12	0.87	200,672,587	2.93	200,672,587	2.93
	24	8.85	2.48	298,340,036	4.36	354,359,867	5.18
	72	10.30	2.88	-	0.00	184,580,553	2.70
100	120	11.42	3.20	-	0.00	102,037,567	1.49

Sub Basin M-3: This sub-basin lies along the western Township boundary and is sparsely populated with permeable soils. There are no sea level rise impacts.

Neither modeled storm events nor sea level rise has any substantial impact on this sub-basin. Low rates of development, inclusion in the NJ Pinelands National Reserve all serve to make this area of low concern.

Basin M3, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	-	0.00	-	0.00
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	-	0.00	-	0.00
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	-	0.00	-	0.00
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin M3, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	-	0.00	-	0.00
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	-	0.00	-	0.00
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	-	0.00	-	0.00
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M3, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	-	0.00	-	0.00
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	-	0.00	-	0.00
	24	7.57	2.12	-	0.00	-	0.00
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	-	0.00	-	0.00
	24	8.85	2.48	-	0.00	-	0.00
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin M-4: This sub-basin is centrally located in Egg Harbor Township and consists of Planned Unit Developments associated with major roadways. There is commercial development along US Route 322/40, but major tracts are open space

High values of infiltration and limited zones of high-density development create a large sub-basin with limited storm-induced residual flooding. Elevations preclude risk for projected sea level rise problems by year 2100. The commercial large box stores along US Route 322/40 all discharge stormwater into detention basins on the properties where local infiltration takes place. Street and curb flooding appears to be minimal and focused on the deluge-style storm events where concentrated rainfall occurs.

Basin M4, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	-	0.00	-	0.00
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	-	0.00	-	0.00
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	-	0.00	-	0.00
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin M4, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	-	0.00	-	0.00
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	-	0.00	-	0.00
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	-	0.00	-	0.00
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M4, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	-	0.00	-	0.00
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	-	0.00	-	0.00
	24	7.57	2.12	-	0.00	-	0.00
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	-	0.00	-	0.00
	24	8.85	2.48	-	0.00	-	0.00
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin M-5: This sub-basin is east of M-4 and includes the Garden State Parkway east to the Pleasantville and Northfield municipal boundaries.

Commercial development exists along the US Route 322/40 corridor and the easternmost portion which includes US Route 9. Local drainage appears sufficient to handle all but the deluge type downpours where local short-duration street flooding exists. There are no sea level rise impacts in this sub-basin.

Basin M5, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	-	0.00	-	0.00
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	-	0.00	-	0.00
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	-	0.00	-	0.00
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin M5, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	-	0.00	-	0.00
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	-	0.00	-	0.00
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	-	0.00	-	0.00
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M5, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	-	0.00	-	0.00
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	-	0.00	-	0.00
	24	7.57	2.12	-	0.00	-	0.00
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	-	0.00	-	0.00
	24	8.85	2.48	-	0.00	-	0.00
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin M-6: This sub-basin occupies the southwest corner of Egg Harbor Township and has the Great Egg Harbor River as its southwestern border.

Short-duration, high intensity storm events produce residual flooding of minor to moderate levels in all three categories of storm style. The deluge model is the most extensive in residual flood depths with 4.30 inches of water during the 100-year event lasting 24 hours. Storm surge and river runoff flood causes would be concentrated along the Great Egg Harbor River floodplain margin and affect a number of single-family homes and several marina businesses. Sea level rise projections will impact these same properties by year 2100.

Basin M6, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	48,032,988	1.86	48,268,643	1.87
	24	5.13	0.98	3,454,012	0.13	36,410,699	1.41
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	65,765,561	2.54	65,894,178	2.55
	24	7.57	1.45	61,003,251	2.36	88,424,179	3.42
	72	8.86	1.69	-	0.00	6,436,949	0.25
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	73,989,363	2.86	74,068,339	2.86
	24	8.85	1.69	91,879,739	3.55	117,083,384	4.53
	72	10.30	1.97	-	0.00	20,658,996	0.80
100	120	11.42	2.18	-	0.00	-	0.00

Basin M6, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	47,797,333	1.85	47,797,333	1.85
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	65,636,943	2.54	65,636,943	2.54
	24	7.57	0.63	33,582,324	1.30	33,582,324	1.30
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	73,910,386	2.86	73,910,386	2.86
	24	8.85	0.74	66,676,094	2.58	66,676,094	2.58
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M6, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	47,797,333	1.85	47,814,776	1.85
	24	5.13	1.44	-	0.00	38,798,104	1.50
	72	6.09	1.71	-	0.00	3,553,032	0.14
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	65,636,943	2.54	65,636,943	2.54
	24	7.57	2.12	41,033,178	1.59	85,103,736	3.29
	72	8.86	2.48	-	0.00	24,304,482	0.94
50	120	9.77	2.74	-	0.00	3,162,747	0.12
	1	3.12	0.87	73,910,386	2.86	73,910,386	2.86
	24	8.85	2.48	71,034,957	2.75	111,134,262	4.30
	72	10.30	2.88	-	0.00	41,430,508	1.60
100	120	11.42	3.20	-	0.00	15,093,576	0.58

Sub Basin M-7: This sub-basin lies on the Great Egg Harbor River on the southwest margin of the Township

This sub-basin is also rural in nature with mostly single-family homes along county roadways with some marginal to the Great Egg Harbor River floodplain and its associated salt marshes. A couple of marina businesses are involved as well. The short duration 50- and 100-year storm events produce residual flooding for 24-hour events. All short duration events generate street flooding and storm surge flooding will impact a number of single-family homes bordering the Great Egg Harbor River where some are built close to the water's edge under 5 feet NAVD 1988. Longer term events do not generate residual flooding from rainfall alone because the water has permeable ground areas to infiltrate or run off in ephemeral streams. Sea level rise projections will impact those homes and marina businesses closest to the river. By 2100, bulkheads and building raising will be required.

Basin M7, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	73,115,037	1.86	73,474,122	1.87
	24	5.13	0.98	5,189,654	0.13	55,392,608	1.41
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	100,108,716	2.54	100,304,862	2.55
	24	7.57	1.45	92,786,327	2.36	134,553,853	3.42
	72	8.86	1.69	-	0.00	9,747,542	0.25
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	112,627,524	2.86	112,748,103	2.86
	24	8.85	1.69	139,788,532	3.55	178,180,765	4.53
	72	10.30	1.97	-	0.00	31,397,271	0.80
100	120	11.42	2.18	-	0.00	-	0.00

Basin M7, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	72,755,952	1.85	72,755,952	1.85
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	99,912,571	2.54	99,912,571	2.54
	24	7.57	0.63	51,018,802	1.30	51,018,802	1.30
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	112,506,945	2.86	112,506,945	2.86
	24	8.85	0.74	101,396,298	2.58	101,396,298	2.58
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M7, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	72,755,952	1.85	72,782,860	1.85
	24	5.13	1.44	-	0.00	59,026,872	1.50
	72	6.09	1.71	-	0.00	5,383,056	0.14
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	99,912,571	2.54	99,912,571	2.54
	24	7.57	2.12	62,378,046	1.58	129,507,791	3.29
	72	8.86	2.48	-	0.00	36,946,667	0.94
50	120	9.77	2.74	-	0.00	4,771,872	0.12
	1	3.12	0.87	112,506,945	2.86	112,506,945	2.86
	24	8.85	2.48	108,040,177	2.75	169,124,623	4.30
	72	10.30	2.88	-	0.00	63,017,021	1.60
100	120	11.42	3.20	-	0.00	22,933,759	0.58

Sub Basin M-8: This sub-basin lies on the Great Egg Harbor River with a relatively short extent on the river but reaches well inland to the northeast into the Township.

Sub-basin M-8 lies along a tributary stream basin to the Great Egg Harbor River called English Creek. This small stream lies entirely within Egg Harbor Township rising in the interior beginning at elevations in the 50-foot NAVD 1988 range. It crosses Somers Point Road as a tidal creek that ends at a small dam on Zion Road holding back a lake at elevation 22 feet NAVD 1988. Most of this sub-basin is very rural without any network of roads leading to development. There is one marina (Thompson Marine) on an un-named very small tributary stream in the zone of potential year 2100 sea level rise impact. Short-duration, high intensity rain events generate 4.92 inches of residual flood depths for a 24-hour, 100-year storm. Long-duration events do not lead to residual floods. Sea level rise impacts seem limited to the Thompson Marine facility where filling, bulkheading and raising the critical buildings will be necessary by year 2100. No other development exists in the zone of predicted sea level advances.

Basin M8, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	129,312,801	1.89	129,750,316	1.89
	24	5.13	0.98	46,037,126	0.67	116,432,309	1.70
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	176,293,154	2.57	176,447,086	2.58
	24	7.57	1.45	201,975,240	2.95	261,172,295	3.81
	72	8.86	1.69	-	0.00	43,956,829	0.64
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	198,081,145	2.89	198,103,559	2.89
	24	8.85	1.69	283,778,841	4.14	337,101,468	4.92
	72	10.30	1.97	-	0.00	105,419,124	1.54
100	120	11.42	2.18	-	0.00	-	0.00

Basin M8, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	128,875,286	1.88	128,875,286	1.88
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	176,139,223	2.57	176,139,223	2.57
	24	7.57	0.63	142,778,184	2.08	142,778,184	2.08
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	198,058,730	2.89	198,058,730	2.89
	24	8.85	0.74	230,456,213	3.36	230,456,213	3.36
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M8, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	128,875,286	1.88	128,875,286	1.88
	24	5.13	1.44	3,128,091	0.05	120,726,251	1.76
	72	6.09	1.71	-	0.00	22,864,784	0.33
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	176,139,223	2.57	176,139,223	2.57
	24	7.57	2.12	153,550,710	2.24	247,891,358	3.62
	72	8.86	2.48	-	0.00	91,294,745	1.33
50	120	9.77	2.74	-	0.00	30,798,402	0.45
	1	3.12	0.87	198,058,730	2.89	198,058,730	2.89
	24	8.85	2.48	237,520,688	3.47	321,339,973	4.69
	72	10.30	2.88	-	0.00	136,668,124	2.00
100	120	11.42	3.20	-	0.00	62,407,724	0.91

Sub Basin M-9: This sub-basin lies on the Great Egg Harbor River with the widest area of marshland associated with the river.

This sub-basin has its southwestern border on the Great Egg Harbor River with two minor tributary streams defining the drainage. This is a very rural section of the Township with single-family homes along county roadways and very few structures at or below the projected 2100 sea level rise situation. There are no businesses south of Somers Point Road where bridge crossings of the two tributaries are at elevation 7.0 NAVD 1988. By 2100 a few homes may need bulkheads for major storm events at that time, but are all above the projected sea level expected.

Basin M9, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	-	0.00	-	0.00
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	-	0.00	-	0.00
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	-	0.00	-	0.00
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin M9, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	-	0.00	-	0.00
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	-	0.00	-	0.00
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	-	0.00	-	0.00
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M9, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	-	0.00	-	0.00
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	-	0.00	-	0.00
	24	7.57	2.12	-	0.00	-	0.00
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	-	0.00	-	0.00
	24	8.85	2.48	-	0.00	-	0.00
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin M-10: This sub-basin is centrally located in the Township with its eastern boundary bordering Northfield.

The sub-basin lies above potential year 2100 sea level rise impacts. The drainage is along a small stream that ends in Bargaintown Lake which outflows across Central Avenue into Patcong Creek, a tide water creek not in the Township. Development is largely in the form of planned unit housing where internal drainage is either infiltrated in detention basins or directed to Mill Branch which drains this sub-basin via Patcong Lake and Bargaintown Lake. While the model does not exclude minor street flooding during high intensity rainfall events, no storm event produced residual flood waters in the basin. Large areas have been left natural associated with the pathway of Mill Branch.

Basin M10, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	-	0.00	-	0.00
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	-	0.00	-	0.00
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	-	0.00	-	0.00
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin M10, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	-	0.00	-	0.00
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	-	0.00	-	0.00
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	-	0.00	-	0.00
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M10, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	-	0.00	-	0.00
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	-	0.00	-	0.00
	24	7.57	2.12	-	0.00	-	0.00
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	-	0.00	-	0.00
	24	8.85	2.48	-	0.00	-	0.00
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin M-11: This sub-basin lies along the axis of Patcong Creek, is bisected by the Garden State Parkway and extends into the rural interior of the Township.

Planned unit single family housing and golf courses dominate the landscape with open space strips between developments. The elevation of the sub-basin means that just the individual homes fronting on the marshes of Patcong Creek would be subject to year 2100 sea level rise scenarios. These properties will either need to be bulkheaded and raised in elevation to avoid potential storm damage because they appear to be just above elevation 7.0 NAVD 1988 today. The Ocean Heights Marina will be impacted by sea level rise. There were very few rainfall events producing any residual flooding in the sub-basin because run-off is directed to the Patcong Creek or infiltrating detention basins associated with the units of single family homes.

Basin M11, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	-	0.00	-	0.00
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	-	0.00	-	0.00
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	-	0.00	-	0.00
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin M11, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	-	0.00	-	0.00
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	-	0.00	-	0.00
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	-	0.00	-	0.00
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M11, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	-	0.00	-	0.00
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	-	0.00	-	0.00
	24	7.57	2.12	-	0.00	-	0.00
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	-	0.00	-	0.00
	24	8.85	2.48	-	0.00	-	0.00
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin M-12: This sub-basin lies along Patcong Creek and is in the southeast corner of the Township.

Here there are significant impacts due to year 2100 projected sea level rise situation because there are developments on Patcong Creek where Somers Point Road crosses the marshes into Somers Point, NJ. Bay Breeze Village (including the Hook-Up Bait & Tackle business) and homes on the Great Egg Harbor at the end of Morris Avenue will all be in need of elevation, infill to raise the regional elevation or abandonment by 2100. Storm events, however, have minimal impact on the sub-basin because the developments provide individual detention basins to retain storm water or discharge it directly into Patcong Creek. The modeling found no residual flood water retained on the land surface. Minor street flooding may occur.

Basin M12, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	-	0.00	-	0.00
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	-	0.00	-	0.00
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	-	0.00	-	0.00
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin M12, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	-	0.00	-	0.00
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	-	0.00	-	0.00
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	-	0.00	-	0.00
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin M12, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	-	0.00	-	0.00
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	-	0.00	-	0.00
	24	7.57	2.12	-	0.00	-	0.00
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	-	0.00	-	0.00
	24	8.85	2.48	-	0.00	-	0.00
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin C-13: This section of Egg Harbor Township includes US Route 322/40 between Pleasantville and Atlantic City, NJ

This region is entirely built on formal salt marshes as part of the connection between the New Jersey mainland and Atlantic City. Once Pleasantville was the departure point for boats taking early visitors to Atlantic City prior to the advent of the railroad. Highways followed with US Route 322/40 built between Pleasantville and the city with subsequent business development parallel to the highway. Since this roadway routinely floods with any type of mild northeast storm further development is being discouraged by purchase and removal of older motels and homes. Sea level rise will claim the remainder of development by 2100 accompanied by increasing frequency of storm surge events impacting the existing situation. Route 322/40 can remain functional if raised by fill or constructing a viaduct across the marshland by mid-century. Rainfall amounts also flood the roadway during deluge and short-term events for each of the three storm intensities. Flood durations depend on coexisting coastal storm events combining with rainfall to prolong the flooding due to storm surge elevations.

Basin C13, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	7,570,207	1.54	7,841,327	1.60
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	10,878,481	2.22	11,071,720	2.26
	24	7.57	1.45	-	0.00	1,968,418	0.40
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	12,418,405	2.53	12,581,177	2.56
	24	8.85	1.69	-	0.00	5,174,599	1.05
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin C13, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	7,299,087	1.49	7,299,087	1.49
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	10,685,242	2.18	10,685,242	2.18
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	12,255,633	2.50	12,255,633	2.50
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin C13, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	7,299,087	1.49	7,549,497	1.54
	24	5.13	1.44	-	0.00	937,735	0.19
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	10,685,242	2.18	10,850,999	2.21
	24	7.57	2.12	-	0.00	4,866,084	0.99
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	12,255,633	2.50	12,382,130	2.52
	24	8.85	2.48	-	0.00	7,755,603	1.58
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Sub Basin C-14: Anchorage Point community is represented by this sub-basin.

The community is built on filled salt marsh served by a highway crossing to Longport, NJ from Somers Point. This tidal marshland is subject to storm surge flooding today with a high potential for inundation with modest sea level rise scenarios by year 2100. Residual flooding is severe under the 24-hour duration events even with a 10-year storm and rise to 6.93 inches of residual water during the 24-hour 100-year event. Since the entire region is flat at low elevations, gravity discharge of rainwater is slowed by tidal water levels with any type of storm surge. Egg Harbor Township recently improved area drainage with multiple projects and will have to implement pumping stations relatively soon if sea level rise continues. Eventual abandonment is not out of the question by year 2100.

Basin C14, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	1,415,281	2.02	1,415,281	2.02
	24	5.13	0.98	2,193,868	3.12	2,376,089	3.38
	72	6.09	1.16	415,401	0.59	1,325,908	1.89
10	120	6.63	1.27	-	0.00	522,950	0.74
	1	2.80	0.53	1,899,768	2.71	1,899,768	2.71
	24	7.57	1.45	3,867,722	5.51	4,010,538	5.71
	72	8.86	1.69	2,225,859	3.17	3,001,854	4.28
50	120	9.77	1.87	467,283	0.67	2,027,343	2.89
	1	3.12	0.60	2,124,458	3.03	2,124,458	3.03
	24	8.85	1.69	4,745,810	6.76	4,867,955	6.93
	72	10.30	1.97	3,169,219	4.51	3,877,470	5.52
100	120	11.42	2.18	1,515,336	2.16	2,966,245	4.22

Basin C14, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	1,415,281	2.02	1,415,281	2.02
	24	5.13	0.43	2,011,647	2.86	2,011,647	2.86
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	1,899,768	2.71	1,899,768	2.71
	24	7.57	0.63	3,724,906	5.30	3,724,906	5.30
	72	8.86	0.74	1,449,864	2.06	1,449,864	2.06
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	2,124,458	3.03	2,124,458	3.03
	24	8.85	0.74	4,623,665	6.58	4,623,665	6.58
	72	10.30	0.86	2,460,968	3.50	2,460,968	3.50
100	120	11.42	0.95	64,426	0.09	64,426	0.09

Basin C14, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	1,415,281	2.02	1,415,281	2.02
	24	5.13	1.44	2,011,647	2.86	2,253,619	3.21
	72	6.09	1.71	-	0.00	1,402,878	2.00
10	120	6.63	1.86	-	0.00	815,233	1.16
	1	2.80	0.78	1,899,768	2.71	1,899,768	2.71
	24	7.57	2.12	3,724,906	5.30	3,857,092	5.49
	72	8.86	2.48	1,622,960	2.31	2,864,442	4.08
50	120	9.77	2.74	-	0.00	2,150,810	3.06
	1	3.12	0.87	2,124,458	3.03	2,124,458	3.03
	24	8.85	2.48	4,623,665	6.58	4,733,382	6.74
	72	10.30	2.88	2,569,283	3.66	3,689,433	5.25
100	120	11.42	3.20	-	0.00	2,960,852	4.22

Sub Basin C-15: Seaview Harbor community is represented by this sub-basin.

Seaview Harbor is built on filled salt marsh and since its inception almost half has eroded away, replaced by the Seaview Harbor Marina in the 1990's. The residual flooding is limited to very short duration events where a 10-year through 100-year storm event is crammed into one hour. Rainfall drainage is directly into Beach Thorofare from the streets, so gravity discharge is quite rapid. Should tidal storm surge be present, however, drainage could be greatly impeded because the water elevation in Beach Thorofare is higher than the street elevation. Sea level rise situations in the 5 to 6-foot range will inundate this entire community by 2100 if it occurs. Community diking, raising or abandonment are alternatives with high expenses attached. The Township also has a floating home community (Sea Village) on Margate Boulevard between Northfield and Margate City located on Dock Thorofare together with Gifford Marine Inc. and Hackney's Boat Yard. These establishments are all built on filled salt marsh lands at minimal elevations subject to sea level rise conditions. Similar responses to the year 2100 sea level rise situation can be expected.

Basin C15, Gaussian							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.40	1,277,558	1.33	1,372,112	1.43
	24	5.13	0.98	-	0.00	-	0.00
	72	6.09	1.16	-	0.00	-	0.00
10	120	6.63	1.27	-	0.00	-	0.00
	1	2.80	0.53	1,926,301	2.00	2,005,582	2.08
	24	7.57	1.45	-	0.00	-	0.00
	72	8.86	1.69	-	0.00	-	0.00
50	120	9.77	1.87	-	0.00	-	0.00
	1	3.12	0.60	2,227,168	2.31	2,299,366	2.39
	24	8.85	1.69	-	0.00	-	0.00
	72	10.30	1.97	-	0.00	-	0.00
100	120	11.42	2.18	-	0.00	-	0.00

Basin C15, Steady State							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.18	1,183,004	1.23	1,183,004	1.23
	24	5.13	0.43	-	0.00	-	0.00
	72	6.09	0.51	-	0.00	-	0.00
10	120	6.63	0.55	-	0.00	-	0.00
	1	2.80	0.23	1,847,020	1.92	1,847,020	1.92
	24	7.57	0.63	-	0.00	-	0.00
	72	8.86	0.74	-	0.00	-	0.00
50	120	9.77	0.81	-	0.00	-	0.00
	1	3.12	0.26	2,154,969	2.24	2,154,969	2.24
	24	8.85	0.74	-	0.00	-	0.00
	72	10.30	0.86	-	0.00	-	0.00
100	120	11.42	0.95	-	0.00	-	0.00

Basin C15, Deluge							
Storm Interval (Years)	Storm Length (Hours)	Total Rainfall (In.)	Maximum Rainfall per Time Interval (In.)	Residual Water at the End of Rain Event (Gallons)	Flood Depth at the End of Rain Event (In.)	Maximum Residual Water (Gallons)	Maximum Flood Depth (In.)
	1	2.11	0.59	1,183,004	1.23	1,303,073	1.35
	24	5.13	1.44	-	0.00	-	0.00
	72	6.09	1.71	-	0.00	-	0.00
10	120	6.63	1.86	-	0.00	-	0.00
	1	2.80	0.78	1,847,020	1.92	1,924,176	2.00
	24	7.57	2.12	-	0.00	344,707	0.36
	72	8.86	2.48	-	0.00	-	0.00
50	120	9.77	2.74	-	0.00	-	0.00
	1	3.12	0.87	2,154,969	2.24	2,221,163	2.31
	24	8.85	2.48	-	0.00	689,610	0.72
	72	10.30	2.88	-	0.00	-	0.00
100	120	11.42	3.20	-	0.00	-	0.00

Recommendations

Egg Harbor Township consists of a fair number of critical areas subject to either river flooding or coastal storm surge that may see the consequence of future rises in sea levels. The easternmost areas are located in the coastal tidal lagoons of Atlantic County with significant developments located on filled areas of salt marsh.

1. An area known as West Atlantic City with development parallel with US Route 322/40 going to Atlantic City from Pleasantville, NJ. Lake's Bay lies to the south as an open water lagoon and the Atlantic City Expressway forms the northern margin as essentially an earth levee on the marshlands preventing most inflow from storm surge coming south across Absecon Bay. The development is largely commercial hotel, older motel and some non-hotel commercial establishments with a scattering of single-family homes.
2. Anchorage Point is mostly a marine oriented development with four rows of single-family homes on filled marshland highly subject to storm surge flooding and potential sea level rise problems.
3. Seaview Harbor is another similar marine oriented development of single-family home on Beach Thorofare with an attached major marina facility included. This site faces the same array of flood hazards along with Great Egg Inlet storm wave damage during severe storms.
4. Sea Village and the two major marinas on Margate Boulevard are also highly vulnerable to sea level rise and present day storm surge effects.

Egg Harbor Township also borders the Great Egg Harbor River with tidewater extending to Mays Landing, NJ and is a tidal creek bordered by salt marshes that extend broadly across Great Egg Harbor to Cape May County. The Great Egg Harbor River drains central Atlantic County and parts of eastern Gloucester County, none of the freshwater course runs at a downhill gradient within Egg Harbor Township. Any freshwater flooding would need to raise water levels throughout Great Egg Harbor Bay to produce river flood problems. However, the tidal surge flooding remains an issue up the tidal creek all the way to Mays Landing Harbor. The impact is limited to individual single-family homes and a few commercial marina operations with some flood impacts up small tributary streams flowing into Great Egg Harbor River. Both NJ State holdings dedicated to wildlife preservation and the State program for farmland preservation have set aside considerable acreage as off limits to future development within this river's tidal floodplain and potential sea level rise footprint in elevation.

Mainland Egg Harbor Township does have several small streams with a potential for extreme events to produce very localized stream flooding. Mill Branch originates near English Creek Road in the Township and discharges into Bargaintown Pond which drains over a small dam to Patcong Creek a tributary tidal creek to Great Egg Harbor Bay. There is very little development adjacent to the stream course until Patcong Lake, a small, dammed water body at Mill Road and the Garden State Parkway. From the Patcong Lake dam the stream flows about 5,560 feet to Bargaintown Pond through the forest well away from development. The dam for the Bargaintown Pond is at Central Avenue and tide water begins on the south side of the road.

English Creek is another tributary stream to Great Egg Harbor River with some tidal marsh length including the Somers Point Road crossing bridge. There is limited development associated with this stream at present.

The Township flooding concerns are largely focused on the developments located on filled marsh lands described in (1, 2, 3 and 4) above with some focus on Great Egg Harbor River tidal effects. Minimal attention is dedicated to the small inland freshwater streams many of which are ephemeral.

(Improvement Projects from Brandon Riggs EHT)
Existing:

1. Improved stormwater management in moderate to high flood risk areas
    a. Replaced inlets and failing pipes
2. Raised roads as needed to collect runoff
3. Installed a gabion wall in West Atlantic City between Oxford and Fox Place off US Route 322/40
4. Continue current stormwater basin maintenance measures such as quarterly cleanings and surface scarifying.
5. Anchorage Drive (ALL in the site off Longport - Somers Pt. Rd), Obyrne Drive, Point Drive, and Stern Drive had extensive work completed.
6. Bay Drive section of West Atlantic City was completed in 2010 with a road-parallel sloped revetment protecting the Drive.

Planning:

1. Continue finding necessary roads to raise and install better flood mitigation infrastructure
2. Bulkhead replacement and maintenance
    a. Seaview Harbor
    b. West Atlantic City
    c. Anchorage Point

Future:

1. Pump stations in the communities just above
2. New inlets, piping and new technology to prevent flooding
3. A future suggestion would be to focus the Open Space parcel tax levy funds on the array of single-family sites most proximal to Great Egg Harbor tidal surge flooding today and eventual sea level rise impacts in the future to maximize the acreage purchased this way to mitigate future flooding issues.
4. Buy-outs for Anchorage Drive or Seaview Harbor properties will become more pressing in the future and will require either massive investment for their preservation as sea level rises or 100% acquired and converted back to open space.

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