



Cumberland County Multi-Hazard Mitigation Plan Update
Participating Jurisdiction Appendices

Appendix 7
Greenwich Township, New Jersey

Preliminary Draft

September 7, 2021

Notes to Preliminary Draft Reviewers

This Preliminary Draft of the Greenwich Township Appendix to the Cumberland County Multi-Hazard Mitigation Plan Update (CC HMPU) includes:

Updated tables containing information available as of September 7th for the community's:

- Working Group
- Critical Facilities
- Mitigation Measures included in the 2016 Mitigation Plan for Four New Jersey Counties (NJ4 HMP)
- Plan Review and Integration document status

In addition, the Preliminary Draft contains:

- Preliminary Hazard Identification and Risk Assessment (HIRA) Update – including mapping and data tabulations regarding vulnerability to natural hazards and social vulnerability considerations
- Hazard Priorities – as determined by the Working Group
- Goals and Strategies

Finally, the Preliminary Draft includes initial lists of proposed Municipal and Multi-Jurisdictional Mitigation Measures to be included in the CC HMPU.

Text highlighted in **yellow** indicates information requested of the community's Working Group as part of this review.

Text highlighted in **blue** indicates information to be provided and/or actions to be taken at a later date.

Please provide any questions, input, or comments to your community's Emergency Management Coordinator:

Timothy Hunter
greenwichtownshipoem@yahoo.com

This review period will close on Friday, October 1st. However, there will be additional opportunities to participate in the development of the CC HMPU. These opportunities will be identified on the project website (<https://cchmpu21.com>).

Table of Contents

Table of Contents	7-i
Part 1 Overview	7-1
1.1: Cumberland County Multi-Hazard Mitigation Plan Update	7-1
1.2: Greenwich Township Municipal Appendix	7-1
Part 2 Participation	7-2
2.1: Municipal Working Group Participation	7-2
2.2: Public Participation	7-5
Part 3 Hazard Identification and Risk Assessment	7-6
3.1: Profile	7-6
3.2: General Building Stock	7-8
3.3: Critical Facilities	7-9
3.4: Hazard Exposure Assessment	7-12
3.5: Demographic Considerations	7-15
3.6: Observations	7-16
3.7: Hazard Priorities	7-17
Part 4 Mitigation Measures	7-18
4.1: Mitigation Goals and Strategy	7-18
4.2: NJ4 HMP Mitigation Measures	7-19
4.3: Municipal Mitigation Measures – Identification	7-22
4.4: Municipal Mitigation Measures – Implementation	7-23
4.5: Multi-Jurisdictional Mitigation Measures	7-24
4.6: Authorities, Policies, Programs, Resources, and Plan Integration	7-26

Table of Contents

List of Figures

Figure 7-1: Greenwich Township Location Map	7-6
Figure 7-2: Greenwich Township Base Map	7-7
Figure 7-3: Greenwich Township Building Footprints	7-8
Figure 7-4: Greenwich Township Critical Facilities	7-12
Figure 7-5: Greenwich Township Critical Facilities & 1% Annual Chance Flood Zone	7-13
Figure 7-6: Greenwich Township Social Vulnerability Index: Overall Scores	7-15
Figure 7-7: Greenwich Township Mitigation Project Locations	7-25

List of Tables

Table 7-1: Greenwich Township Working Group	7-2
Table 7-2: Public Participation	7-5
Table 7-3: Greenwich Township Buildings per Land Use Type	7-8
Table 7-4: Greenwich Township Critical Facilities Inventory	7-9
Table 7-5: Greenwich Township General Building Stock Hazard Exposure	7-14
Table 7-6: Greenwich Township Critical Facilities Hazard Exposure	7-14
Table 7-7: Greenwich Township General Population Demographics	7-15
Table 7-8: Greenwich Township Social Vulnerability Considerations	7-16
Table 7-9: Status of Greenwich Township NJ4 HMP Mitigation Measures	7-19
Table 7-10: Greenwich Township Municipal Mitigation Measures Identification	7-22
Table 7-11: Greenwich Township Municipal Mitigation Measures Implementation	7-23
Table 7-12: Greenwich Township Multi-Jurisdictional Mitigation Measures	7-24

Attachments

Attachment 7.A: Public Review Comments	7.A-1
Attachment 7.B: Adoption Resolution	7.B-1
Attachment 7.C: Approval Letter	7.C-1

Part 1: Overview

Part 1.1: Cumberland County Multi-Hazard Mitigation Plan Update

The Cumberland County Multi-Hazard Mitigation Plan Update (CC HMPU) incorporates input from all 15 participating jurisdictions in Cumberland County, including Cumberland County and 14 separate municipalities.

The CC HMPU is an update of the Mitigation Plan for Four New Jersey Counties (NJ4 HMP) that was completed by all fifteen jurisdictions in Cumberland County along with over 70 additional jurisdictions from Camden, Gloucester, and Salem Counties. The Cumberland County portions of the NJ4 HMP were adopted by the participating jurisdictions and approved by the Federal Emergency Management Agency in 2016.

The CC HMPU has two main parts:

- Cumberland County Multi-Hazard Mitigation Plan Update, or the “Base Plan”.
- County and Municipal Appendices.

The Base Plan [will include] descriptions and information that is common to all 15 participating jurisdictions organized according to the following three focus areas:

- Planning Process
- Hazard Identification and Risk Assessment
- Mitigation Measures

The County and Municipal Appendices include specific information for these same three focus areas for each of the 15 participating jurisdictions. Detailed tabulations are included in these Municipal Appendices for critical facilities, the status of past mitigation activities, and proposed mitigation measures for each municipality.

Part 1.2: Greenwich Township Municipal Appendix

This Municipal Appendix is focused on Greenwich Township in Cumberland County, New Jersey.

The Greenwich Township Municipal Working Group [will recommend] the Greenwich Township Municipal Appendix for adoption to the Greenwich Township Committee.

The Greenwich Township Committee [will adopt] the Municipal Appendix by resolution (see Attachment B: Adoption Resolution).

Region II of the Federal Emergency Management Agency [will approve] the Municipal Appendix (see Attachment C: Approval Letter).

Part 2: Participation

Part 2.1: Municipal Working Group Participation

Part 2.1 includes:

- *Municipal Working Group members including positions in the community, meetings and work sessions attended, and specific contributions to the Municipal Appendix*
- *Municipal positions and organizations that were invited but were not able to participate in the plan update process*
- *Municipal positions and organizations that have been recommended by the Federal Emergency Management Agency (FEMA) as candidates for participation on Municipal Working Groups but do not exist in the municipality*

Table 7-1 identifies the Municipal Working Group members. As [will be] detailed in *Section 2: Planning Process* of the Base Plan, the Municipal Working Groups are comprised of community representatives who worked to make sure mitigation measures included in the Municipal Appendix addressed the risks faced by residents, businesses, and property owners and reflected the priorities of the community.

Municipal Working Group members reviewed briefing materials and contributed during Work Sessions and Meetings and [will review] the Preliminary Draft and Draft versions of the CC HMPU Base Plan and Appendices. The Working Group will also continue to stay involved during the implementation and maintenance of the CC HMPU.

Due to the on-going COVID-19 pandemic during the plan update process, Working Group meetings were conducted in a variety of ways including virtual meetings. However, when local conditions permitted, in-person meetings were conducted.

Note: Eight members of the Working Group also participated in the development of the 2016 NJ4 HMP. These members are indicated with an () following their last names.*

Table 7-1: Greenwich Township Working Group

First Name	Last Name	Department	Position	Project Kick-off Meeting ¹	Round 1 Work Session ²	Round 2 Work Session ³	Working Group Meeting ⁴	Contribution ⁵
Timothy	Hunter	Office of Emergency Management (OEM) / School Board	Emergency Management Coordinator / Member	☑	☑			Organized Working Group and Work Sessions.
Dan	Orr *	Township Committee	Committeeman					
Mark	Werley	Township Committee	Committeeman					
William	Reinhart *	Township Committee	Committeeman					

¹ Project Kickoff Meeting was held on May 20, 2021.

² Round 1 Work Session was held on August 26, 2021.

³ Round 2 Work Session [will be] held on [to be determined].

⁴ Working Group Meeting [will be] held on [to be determined (if applicable)].

⁵ Additional or unusual contributions are noted in the far-right hand column.

Part 2: Participation

First Name	Last Name	Department	Position	Project Kick-off Meeting ¹	Round 1 Work Session ²	Round 2 Work Session ³	Working Group Meeting ⁴	Contribution ⁵
[provide name]		Zoning Department	Zoning Officer / Floodplain Administrator					
Teresa	Warburton	Construction Office	Construction Official					
Penelope	Watson *	Land Use Board ⁶	Chair		<input checked="" type="checkbox"/>			
Renee	Brecht *	Land Use Board	Secretary					
Michael	Henry *	Land Use Board	Member					
Richard	Demarco *	Cumberland County Historical Society	Member / Trustee					
James	Carluzzo *	N/A	Resident					
Marvin	Hitchner, III *	Greenwich Marina, Inc.	Owner/Operator					

⁶ Land Use Board covers planning, zoning, and historic district issues.

Part 2: Participation

The following lists candidate positions and organizations within the community that were extended invitations but could not participate during the development of the Municipal Appendix. These positions and organizations will continue to be extended invitations to participate during subsequent plan implementation and maintenance activities.⁷

- [to be completed pending Working Group participation throughout the plan update process]

The following lists positions and organizations that are generally recommended for consideration as members of the Municipal Working Groups by FEMA but do not currently exist within the community. An invitation to participate will be extended if positions are created or filled and as organizations are formed.

- GIS/IT Specialist (services provided by Cumberland County)
- Engineering Department (services provided by Cumberland County or consultants on a project-by-project basis)
- Public Works Department (services provided by Hopewell Township)
- Police (services provided by New Jersey State Police)
- Community / Faith-Based Organizations
- Business Associations
- Major Employers and Businesses
- Healthcare Institutions

⁷ Plan implementation and maintenance activities [will be] described in *Section 4: Mitigation Measures* of the CC HMPU Base Plan.

Part 2: Participation

Part 2.2: Public Participation

Part 2.2 **[will include]** all opportunities provided to the public and interested parties in the municipality to participate during the plan update process.

Table 7-2 **[will identify]** the date, type of involvement, and location (where applicable) for all opportunities provided to the public and interested parties to participate in the development of the plan update.

Table 7-2: Public Participation

Date	Type of Involvement	Location
[insert date link was established]	Link to Project Website ⁸ established and maintained.	[insert municipal website URL]
[insert date meeting was held (if applicable)]	Public meeting conducted with presentation and open discussion.	[insert location]
September 8, 2021	Preliminary Municipal Appendix available for public comment.	Project Website
[insert date link was established]	Notice posted re: Preliminary Municipal Appendix review period with link to Project Website.	[insert municipal website URL]
[date(s) to be determined]	Public outreach via [insert audience(s) and outreach method(s)] .	[insert location(s)]
[date to be determined]	Draft Municipal Appendix [will be] available for public comment.	Project Website
[date to be determined]	Public hearing [will be] conducted regarding the Draft Municipal Appendix providing for open discussion and public comment.	[insert location]

Public comments and input received for the Preliminary Draft and Draft versions of the Municipal Appendix **[will be]**:

- Considered by the Municipal Working Group and **[will be]** incorporated into the Municipal Appendix where appropriate.
- Included in Attachment A to the Municipal Appendix along with a brief explanation of if and how the comments were addressed in the Municipal Appendix.

In addition, the Municipal Appendix **[will be]** adopted as part of a regularly scheduled public meeting (see Attachment B: Adoption Resolution).

Public education and outreach is an on-going mitigation measure included in the Municipal Appendix.⁹ In addition, public participation will continue to be encouraged during subsequent plan implementation and maintenance activities.¹⁰

⁸ <https://cchmpu21.com/documents>

⁹ See Mitigation Measure M-1 in Part 4 of the Municipal Appendix.

¹⁰ Public education and outreach **[will be]** described in *Section 4: Mitigation Measures* of the CC HMPU Base Plan.

Part 2: Participation

Part 3: Hazard Identification and Risk Assessment

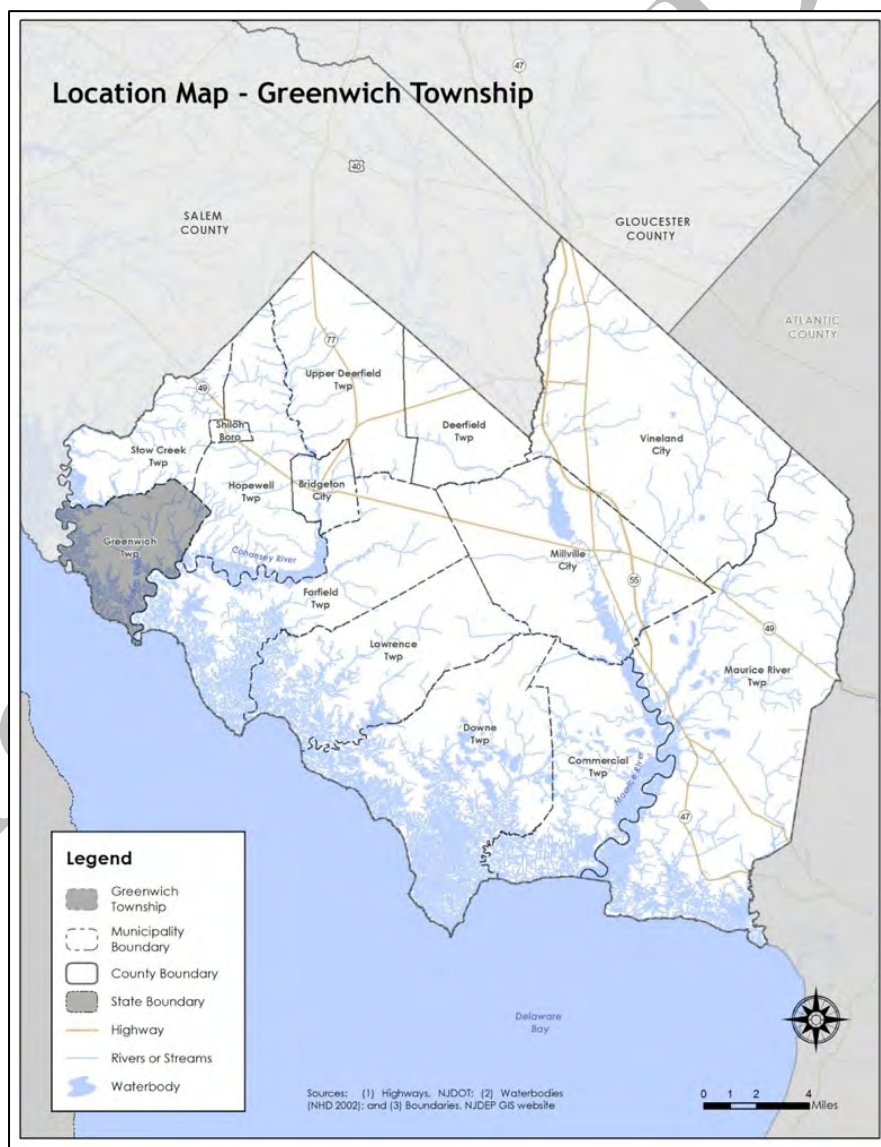
Part 3 includes seven subparts:

- Part 3.1: Profile
- Part 3.2: General Building Stock
- Part 3.3: Critical Facilities
- Part 3.4: Hazard Exposure Assessment
- Part 3.5: Demographic Considerations
- Part 3.6: Observations
- Part 3.7: Hazard Priorities

Part 3.1: Municipal Profile

Greenwich Township is located in the western corner of Cumberland County (See Figure 7-1).

Figure 7-1: Greenwich Township Location Map



Part 2: Participation

Greenwich Township is a bay shore, rural residential community. A key component of the Township is the National Register of Historic Places District focused on Ye Greate Street with numerous structures dating to the 18th and 19th centuries. The Township also includes large areas of preserved farmlands and lowlands and has a relatively low population density. The Township has experienced declining population per recent census data. About half of the housing stock was built before 1940.

Per Figure 7-2, major water courses include the Delaware River, Stow Creek, the Cohanse River, Mill Creek and Pine Mount Creek. Major transportation routes include Cumberland County Routes 642 and 703. The land is predominantly flat with large areas of farmland and wetlands.

Figure 7-2: Greenwich Township Base Map



Part 2: Participation

Part 3.2: General Building Stock

As of 2015, there are 726 buildings in Greenwich Township with a total assessed value of improvements of \$63,302,700. Figure 7-3 shows the footprints of these buildings.

Figure 7-3: Greenwich Township Building Footprints¹¹

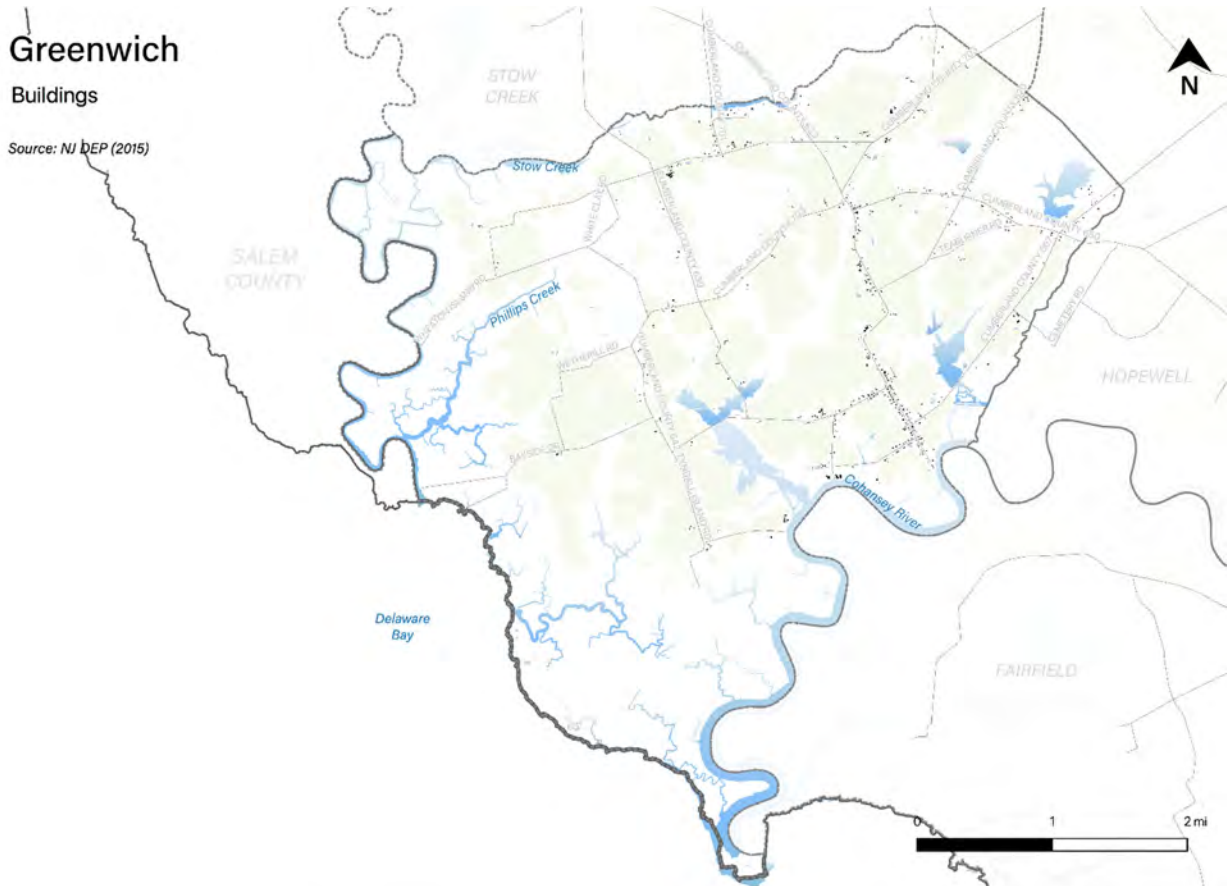


Table 7-3 [will show] the distribution of these structures according to land use distinctions.

Table 7-3: Greenwich Township Buildings per Land Use Type¹²

Land Use Type	Number of Buildings
Residential	[TBD]
Commercial	[TBD]
Industrial	[TBD]

¹¹ Building footprint data was isolated from “Impervious Surfaces” data (2015) per <https://gisdata-njdep.opendata.arcgis.com/>. Note: This (map/publication/report) was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized or endorsed.

¹² Land use types [will be] isolated from MOD-IV Parcels and Tax Assessor data composite (2021) per <https://njogis-newjersey.opendata.arcgis.com/documents/parcels-and-mod-iv-of-cumberland-county-nj-shp-download/about> from the New Jersey Office of GIS

Part 2: Participation

Part 3.3: Critical Facilities¹³

As of August 2021, there are thirty-six (36) critical facilities in Greenwich Township, of which 32 were identified as historic sites¹⁴.

Critical facilities are prime candidates for mitigation measures due to important functions staged from these facilities prior to, during, and after natural hazards including emergency services and housing vulnerable populations.

Table 7-4 includes current inventory information for municipal critical facilities **and will include** cross-references to related mitigation measures **to be** identified in Part 4 of the Municipal Appendix. Figure 7.4 shows the location of these critical facilities.

Table 7-4: Greenwich Township Critical Facilities Inventory

CF #	Name	Type	Sub-Type	Address	Co-located CF #	Shelter (Y/N)	Generator (Y/N)	Comments	Mitigation Measure #
CF-1	Township Hall	Municipal	Administrative Offices	1000 Ye Greate Street, Greenwich	CF-2	N	Y		[TBD]
CF-2	Emergency Operations Center	EOC	Co-located Facilities	1000 Ye Greate Street, Greenwich	CF-1	N	Y		[TBD]
CF-3	Fire Hall	FireStations	Stations	991 Ye Greate Street, Greenwich		N	Y		[TBD]
CF-4	Morris Goodwin Elementary School	Schools	Public Schools	839 Ye Greate Street, Greenwich		Y ¹⁵	Y		[TBD]
CF-5	Gibbon House	Historic Site	Public Site within NRHD	960 Ye Greate Street, Greenwich	CF-5	N/A	N/A	Building and collection	[TBD]
CF-6	Swedish Granary	Historic Site	Public Site within NRHD	960 Ye Greate Street, Greenwich	CF-6	N/A	N/A	Building	[TBD]
CF-7	Lecture Room (John DuBois Maritime Museum)	Historic Site	Public Site within NRHD	949 Ye Greate Street, Greenwich		N/A	N/A	Building and collection	[TBD]
CF-8	Old Stone School	Historic Site	Public Site within NRHD	775 Ye Greate Street, Greenwich		N/A	N/A	Building	[TBD]
CF-9	Prehistoric Museum	Historic Site	Public Site within NRHD	1461 Bridgeton Road, Greenwich		N/A	N/A	Collection	[TBD]
CF-10	Lummis Genealogical Library	Historic Site	Public Site within NRHD	981 Ye Greate Street, Greenwich		N/A	N/A	Collection	[TBD]

¹³ Critical facility definitions and considerations **will be** described in *Section 3: Hazard Identification and Risk Assessment* of the CC HMPU Base Plan.

¹⁴ As of August 2021, the Township is in the process of updating National Registry documentation for historic district, currently under review by the State. Making slight revision to boundary description (to include full tax parcels) and seeking designation as "significance at national level".

¹⁵ Not Red Cross-certified

Part 2: Participation

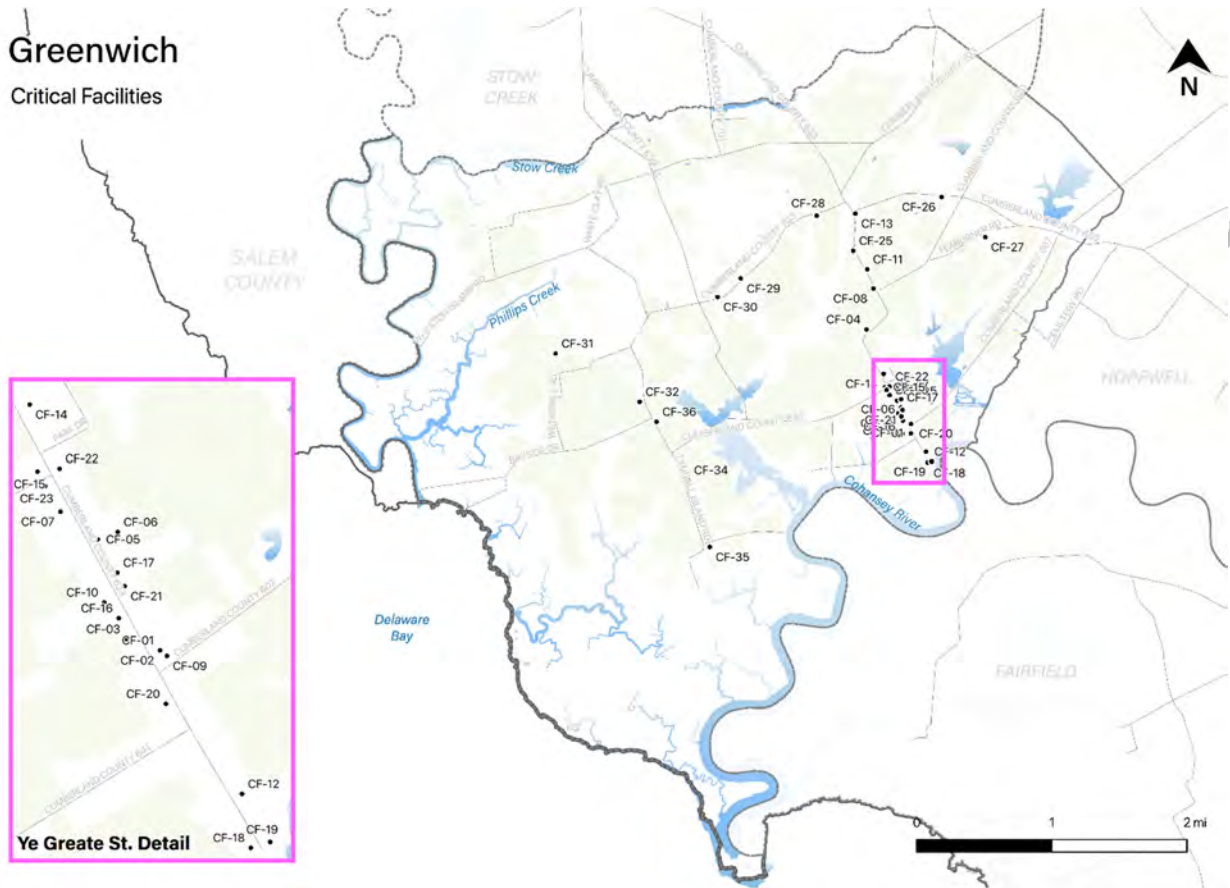
CF #	Name	Type	Sub-Type	Address	Co-located CF #	Shelter (Y/N)	Generator (Y/N)	Comments	Mitigation Measure #
CF-11	Upper Friends Meeting House	Historic Site	Public Site within NRHD	720 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-12	Lower Friends Meeting House	Historic Site	Public Site within NRHD	1062 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-13	Presbyterian Church	Historic Site	Public Site within NRHD	630 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-14	Baptist Church	Historic Site	Public Site within NRHD	928 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-15	Wood Mansion	Historic Site	Private Site within NRHD	937 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-16	Benjamin Harding House	Historic Site	Private Site within NRHD	989 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-17	Constant and Lydia Waithman House	Historic Site	Private Site within NRHD	976 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-18	William Watson's Tavern	Historic Site	Private Site within NRHD	1075 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-19	Reeve Sheppard House	Historic Site	Private Site within NRHD	1080 Ye Greate Street, Greenwich		N/A	N/A	Recorded on the Historic American Buildings Survey (HABS)	[TBD]
CF-20	Dr. Thomas Ewing House	Historic Site	Private Site within NRHD	1025 Ye Greate Street, Greenwich		N/A	N/A	HABS	[TBD]
CF-21	Bull's Eye House	Historic Site	Private Site within NRHD	980 Ye Greate Street, Greenwich		N/A	N/A	HABS	[TBD]
CF-22	Old Stone Tavern	Historic Site	Private Site within NRHD	938 Ye Greate Street, Greenwich		N/A	N/A		[TBD]
CF-23	Wood's Store	Historic Site	Private Site within NRHD	941 Ye Greate Street, Greenwich		N/A	N/A	HABS	[TBD]
CF-24	Maskell Store (Griffin)	Historic Site	Private Site within NRHD	Corner of Sheppards Mill Road and Ye Greate Street, Greenwich		N/A	N/A	HABS	[TBD]
CF-25	Haggerty House	Historic Site	Private Site within NRHD	681 Ye Greate Street, Greenwich		N/A	N/A	HABS	[TBD]
CF-26	Bethel AME Church	Historic Site	Public Site outside NRHD	1092 Sheppards Mill Road, Greenwich		N/A	N/A	Individually listed on the National Register of Historic Buildings	[TBD]
CF-27	Teaburner Farm	Historic Site	Private Site outside NRHD	112 Teaburner Road, Greenwich		N/A	N/A		[TBD]

Part 2: Participation

CF #	Name	Type	Sub-Type	Address	Co-located CF #	Shelter (Y/N)	Generator (Y/N)	Comments	Mitigation Measure #
CF-28	Lewis and Mary Mulford House	Historic Site	Private Site outside NRHD	48 Old Mill Road, Greenwich		N/A	N/A		[TBD]
CF-29	Gibbon Tenant House (White House Farm)	Historic Site	Private Site outside NRHD	220 Old Mill Road, Greenwich		N/A	N/A		[TBD]
CF-30	Thomas and Mary Maskell House	Historic Site	Private Site outside NRHD	225 Old Mill Road, Greenwich		N/A	N/A	Individually listed on the National Register of Historic Buildings; HABS	[TBD]
CF-31	Buttonwood Farm	Historic Site	Private Site outside NRHD	19 Wetherill-Goodwin Lane, Greenwich		N/A	N/A		[TBD]
CF-32	Gabriel Davis House	Historic Site	Private Site outside NRHD	159 Tindall Island Road, Greenwich		N/A	N/A	HABS	[TBD]
CF-33	Bacon-Sheppard-Hancock House	Historic Site	Private Site outside NRHD	[identify house number] Tindall Island Road, Greenwich		N/A	N/A		[TBD]
CF-34	Bacon's Adventure	Historic Site	Private Site outside NRHD	384 Tindall Island Road, Greenwich		N/A	N/A		[TBD]
CF-35	John and Elizabeth Bacon House	Historic Site	Private Site outside NRHD	16 Hancock's Harbor Road, Greenwich		N/A	N/A		[TBD]
CF-36	William and Mary Bacon House	Historic Site	Private Site outside NRHD	348 Tindall Island Road, Greenwich		N/A	N/A		[TBD]

Part 3: Hazard Identification and Risk Assessment

Figure 7-4: Greenwich Township Critical Facilities



Note: All mapping corresponding to results described in Parts 3.3 through 3.5 can be viewed in .pdf format at: <https://www.dropbox.com/sh/mymxbax34mgemt0/AAC0UEoQtmygriWDZBebEirFa?dl=0>

Part 3.4: Hazard Exposure Assessment

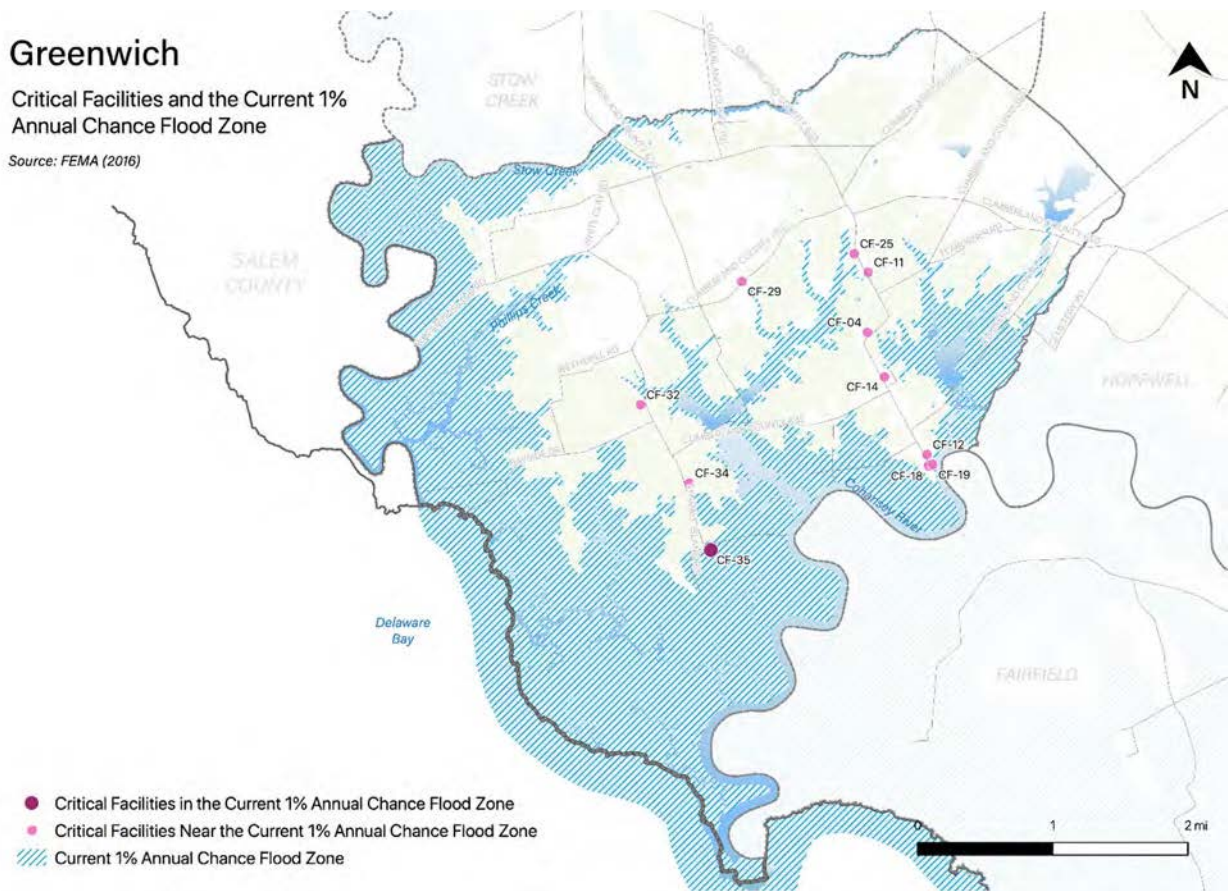
Hazard exposure assessments **will be completed** for the twelve (12) natural hazards identified in the CC HMPU Base Plan¹⁶.

Key results for Greenwich Township are depicted in the following.

Mapping: Figure 7-5 is illustrative of the type of mapping available as a result of the hazard exposure assessment. This figure shows critical facilities that are located in or near (i.e., within 500 feet) the 1% annual flood zone on FEMA's Flood Insurance Rate Maps (FIRMs) or within a potential future 1% annual chance flood zone (i.e., within 1,000 feet).

¹⁶ Hazard profiles **will be** included for all twelve natural hazards in *Section 3: Hazard Identification and Risk Assessment* of the CC HMPU Base Plan.

Figure 7-5: Greenwich Township Critical Facilities and 1% Annual Chance Flood Zone



Mapping results are available for the following hazards (where applicable for individual jurisdictions):

- Coastal Erosion & Sea Level Rise
- Dam Failure [pending data from NJDEP]
- Earthquake
- Extreme High Temperature
- Flood – per FEMA FIRM mapping
- Flood - per National Flood Insurance Program data [pending data from FEMA Region II]
- Geologic Hazards
- High Wind and Severe Weather (heavy summer rains and winter snow loads)
- Levee Failure [pending data from NJDEP]
- Wildfire

Tabulations: Selected data culled from the hazard exposure assessment process is displayed in the following tables:

- Table 7-5 indicates hazard exposure for general building stock
- Table 7-6 indicates hazard exposure for critical facilities

Part 3: Hazard Identification and Risk Assessment

Table 7-5: Greenwich Township General Building Stock Hazard Exposure

Hazard	Number of Exposed Buildings	Percent of Total Buildings in the Jurisdiction	Value of Exposed Buildings	Percent of Total Value in the Jurisdiction
Coastal Erosion ¹⁷	0	N/A	0	N/A
Sea Level Rise - 3 feet increase	36	4.96%	\$2,091,800	3.30%
Flood - Within 1 % Annual Chance Zone	56	8%	\$3,547,500	6%
Flood - Near (within 500 feet) of 1% Annual Chance Zone	304	42%	\$28,404,650	45%
Earthquake – Structure built before 1927 ¹⁸	257	54%	\$36,047,200	61%
High Winds / Severe Weather – Structure built before 1975	412	87%	\$50,305,100	84%
Wildfire – Composite score > 2.5 ¹⁹	3	-	\$145,550	0.23%

Table 7-6: Greenwich Township Critical Facilities Hazard Exposure²⁰

Hazard	Number of Critical Facilities	CF #s
Coastal Erosion	None	N/A
Sea Level Rise	None	N/A
Flood - Within 1 % Annual Chance Zone	1	CF-35
Flood - Near (within 500 feet) of 1% Annual Chance Zone	10	CF-04, CF-11, CF-12, CF-14, CF-18, CF-19, CF-25, CF-29, CF-32, CF-34
Flood – Future potential (within 1,000 feet) 1% Annual Chance Zone	20	CF-01, CF-02, CF-03, CF-05, CF-06, CF-07, CF-08, CF-09, CF-10, CF-13, CF-15, CF-16, CF-17, CF-20, CF-21, CF-22, CF-23, CF-27, CF-28, CF-36
Wildfire	17	CF-01, CF-02, CF-03, CF-05, CF-06, CF-07, CF-10, CF-16, CF-17, CF-21, CF-22, CF-23, CF-27, CF-30, CF-31, CF-32, CF-35

In addition, all critical facilities in Cumberland County are exposed to the following hazards and potentially subject to power outages, and structural and/or contents damage:

- Earthquake
- Extreme Temperatures
- Severe Weather – Summer (including heavy rains)
- Severe Weather – Winter (including heavy snow loads)

¹⁷ All supporting data for Coastal Erosion, Sea Level Rise (3-foot rise), Flood (all) can be viewed at https://docs.google.com/spreadsheets/d/1fcN5hL3Jz4X7mldFyKs6wol6J6IAR9bSsvJPiQe_A0Q/edit?usp=sharing

¹⁸ All supporting data for Earthquake, High Winds, and Severe Weather can be viewed at <https://docs.google.com/spreadsheets/d/1Zx1LZwKQ8esqdv4c9hbbSZurtMjH4UITQWJY1LrZezc/edit?usp=sharing>

¹⁹ All supporting data for Wildfire can be viewed at https://docs.google.com/spreadsheets/d/1JAbfd3A-eCHI93pZFaPVuM_H2yvuUzeHCmoijv-oxsw/edit?usp=sharing

²⁰ All supporting data for critical facility hazard exposure can be viewed at <https://docs.google.com/spreadsheets/d/1MPLiOANm7fHoyKuxyWqyangq26LTSPayTxJvLmK5IGPg/edit?usp=sharing>

Part 3: Hazard Identification and Risk Assessment

For Greenwich Township, Table 7-8 includes selected metrics where social vulnerability considerations are notably higher when compared with all national census tracts:

Table 7-8: Greenwich Township Social Vulnerability Considerations²³

Metric	Percentile
Percentage of persons: Older than 65 years of age	88 th
Percentage of persons: With a disability	81 st

In addition, the percentage of residents earning below poverty level = 8.5% (compared with the average in New Jersey of 10.4%).

Part 3.6: Observations

- Outreach and guidance should be provided for residents, business owners, and property owners for:
 - Properties in or near sea level rise, flood zones, or wildfire hazard areas.
 - Older buildings to help evaluate potential risk of damage due to hazards such as Earthquake, High Winds, and Severe Winter Weather (i.e., heavy snow loads).
- All critical facilities are potentially vulnerable to Earthquake, High Winds, and Severe Weather (heavy rains in summer and snow loads in winter).
- Several critical facilities are potentially vulnerable to Flood and Wildfire and will be identified as priorities for follow-up critical facility field evaluations.
- Priority for follow-up should also be focused on identifying and addressing critical facilities housing vulnerable populations related to Extreme Temperature and Severe Weather hazards. For example, determining and documenting (cross referencing EOP) how residents will be moved to facilities providing shelter including cooling and warming centers (all of which would need adequate back-up power and hardening).

²³ All supporting data for SVI can be viewed at https://docs.google.com/spreadsheets/d/10zb_Qlg2CqGxb45_fcKiP46swaC16-fORxYTIOiAKP0/edit#gid=1481479799

Part 3: Hazard Identification and Risk Assessment

Part 3.7: Hazard Priorities [review / confirm or revise highlighted entries]

As a key step in the Hazard Identification and Risk Assessment (HIRA) process, the twelve (12) natural hazards identified in the CC HMPU Base Plan were discussed during the Municipal Working Group Work Sessions and the relative priority of these hazards was identified.

Based on their personal experience as well as the results of the HIRA, the Municipal Working Group rated the hazards as follows:

High Priority

- Coastal Erosion and Sea Level Rise (including saltwater intrusions into drinking and irrigation wells)
- Dam Failure (due to Shepherd Mills Pond potential impact on evacuation route)
- Flood
- High Wind
- Levee Failure

Moderate Priority

- None

Low Priority

- Drought
- Earthquake
- Extreme Temperature: Cold & Hot
- Severe Weather – Summer
- Severe Weather – Winter [consider changing to low priority to reflect weather trends]
- Wildfire

One additional hazard was considered but was not considered applicable to the municipality:

- Geologic Hazards

Part 4: Mitigation Measures

Part 4: Mitigation Measures

Part 4 includes six subparts:

- *Part 4.1: Mitigation Goals and Strategy*
- *Part 4.2: NJ4 HMP Mitigation Measures*
- *Part 4.3: Municipal Mitigation Measures – Identification*
- *Part 4.4: Municipal Mitigation Measures – Implementation*
- *Part 4.5: Multi-Jurisdictional Mitigation Measures*
- *Part 4.6: Authorities, Policies, Programs, Resources, and Plan Integration*

Part 4.1: Mitigation Goals and Strategy [review / confirm or revise highlighted entries]

Goals were originally established by the SDVR Hazard Mitigation Steering Committee and validated by the four County Hazard Mitigation Working Groups in response to risk and capability assessment results.

As part of the NJ4 HMP plan update process, these goals were reviewed and edited by the Municipal Working Groups for use in the Municipal Appendices. In addition, the Municipal Working Groups for the CC HMPU reviewed and [reaffirmed/edited] these goals for continued use in the Appendices.

All mitigation measures in the Municipal Appendix are related to at least one of these four goal statements.

- **Goal 1: Improve education and outreach efforts** regarding potential risk of natural hazards and appropriate mitigation measures that can be used to reduce risk (including programs, activities, and projects)
- **Goal 2: Improve data collection, use, and sharing** to reduce the risk of natural hazards
- **Goal 3: Improve capabilities and coordination** at municipal, county, and state levels to plan and implement hazard mitigation measures
- **Goal 4: Plan and implement projects** to mitigate identified natural hazards, known problems, and areas of concern

Based on these goals, the results of the HIRA, and experience of participants in the plan update process, the Municipal Working Group identified an overarching strategy for mitigation:

- Identify and address known problems or areas of concern for critical facilities and vulnerable populations
- Provide opportunities for residents and property owners to access available information about risk reduction and mitigation measures, in particular for Repetitive Flood Loss properties
- Institutionalize hazard mitigation into municipal activities and programs through regular interactions of the Municipal Working Group and integration of related regulatory programs and planning initiatives
- Stay informed regarding changing conditions and related improvements in hazard and risk data due to future natural hazard events and increasing understanding of the effects of climate change and use the information as part of periodic evaluations of and refinements or additions to the municipality's mitigation program

The mitigation measures [to be] described in Parts 4.3 through 4.5 of the Municipal Appendix reflect this strategy.

Part 4: Mitigation Measures

Part 4.2: NJ4 HMP Mitigation Measures

Known problems and areas of concern were the basis for mitigation measures identified in the NJ4 HMP. In cases where these problems and concerns still exist at the time of the CC HMPU, the related NJ4 HMP mitigation measures **[will be]** candidates for inclusion in the Municipal Appendix.

Table 7-9 identifies the status of mitigation measures included in the NJ4 HMP. These entries were based on information provided by the Municipal Working Group. In some cases, the NJ4 HMP mitigation measures **[will be]** carried over as part of the Municipal Appendix as **[will be]** indicated in the “Comments” column and the far right-hand column of Table 7-9.

In addition to reviewing all entries for accuracy, need to provide confirmation and/or information for all highlighted entries.

Table 7-9: Status of Greenwich Township NJ4 HMP Mitigation Measures

Mitigation Action, Program, or Project	Status	Comments	Mitigation Measure # 2425
M-1: Identify and pursue outreach and education opportunities to inform municipal residents, businesses, and property owners.	Work-in-progress	Work-in-progress included: <ul style="list-style-type: none"> ▪ Township increasing use of website including making FEMA FIRMs available to residents ▪ On-going renovation of [identify referenced property] (contributing structure) includes elevating structure 	To be carried over as part of M-1
M-2: Prioritize critical facilities and complete site and facility surveys to identify vulnerabilities and potential mitigation measures.			
M-3: Prioritize recurrent drainage problem areas and initiate data collection to track unreimbursed damages and related response and recovery expenses.			
M-4: Conduct regular Municipal Working Group meetings.			
M-5: Install backup emergency power generator at Morris Goodwin Elementary School (shelter) located at 839 Ye Greate Street (CF-4).	Completed	Completed in 2018 using HMGP from Superstorm Sandy ²⁶ .	
M-6: Address communications problems due to lack of adequate cellular and land line connections.	Work-in-progress	Cell phone tower installed at school but may not have significantly improved service.	To be carried over as [# TBD]
M-7: Elevate Swedish Granary (CF-6) to reduce flood risk.	No progress (funding)		To be carried over as [# TBD]

²⁴ Detailed information for identification and implementation of municipal (M-#) mitigation measures **[will be included]** in Tables 7-10 and 8-11.

²⁵ Detailed information for identification and implementation of multi-jurisdictional (MJ-#) mitigation measures **[will be included]** in Table 7-12.

²⁶ Cumberland County Round 1 Generator Program.

Part 4: Mitigation Measures

Mitigation Action, Program, or Project	Status	Comments	Mitigation Measure # 2425
M-8: Prepare and implement Disaster Preparedness Plan for Lummis Genealogical Library (CF-10) to reduce flood risk.	[identify status]		To be carried over as [# TBD]
M-9: Repair and/or construct a new levee at Delaware Avenue to eliminate acute flooding to residences and businesses.	[follow-up with Delaware Avenue residents regarding current situation / continued need for mitigation measure]		To be carried over as [# TBD]
M-10: Comprehensive technical analysis of the Township's flood (storm surge) protection needs and options for response. <i>Note: This study would be precedent to several of the multi-jurisdictional measures.</i>	[identify status]		To be carried over as [# TBD]
MJ-1: Potential impacts to evacuation route at Sheppard's Mill Pond.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-2: Construct a new levee parallel to and between Mounce Creek and County Route 607 (Bridgeton-Greenwich Road).	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-3: Short-term repairs and renovations to Mill Creek Levee ²⁷	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-4: Short-term repairs and renovations to Market Lane Levee ²⁸	Work-in-progress	County made some modifications. However, problems persist at high tide events	To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-5: Greenwich Township Levees Project proposal to elevate and armor Mill Creek Levee and install new flood gates.	Work-in-progress	Gates were repaired at County dike parallel to Bridgeton – Greenwich Road.	To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-6: Greenwich Township Levees Project proposal to construct the new Pine Mount Creek Levee and flood gates.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-7: Greenwich Township Levees Project proposal to improve Market Lane Levee.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]

²⁷ Short-term repairs and renovations to Mill Creek Levee will be integrated to the extent possible with long-term solution to problem identified in MJ-5.

²⁸ Short-term repairs and renovations to Market Lane Levee will be integrated to the extent possible with long-term solution to problem identified in MJ-7.

Part 4: Mitigation Measures

Mitigation Action, Program, or Project	Status	Comments	Mitigation Measure # 2425
MJ-8: Alleviate flooding at Greenwich Road (County Route 607) at Mill Creek.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-9: Alleviate flooding at Ye Greate Street (County Route 623) just north of Township Fire Hall.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-10: Alleviate flooding at Ye Greate Street (County Route 623) at Pine Mount Run.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-11: Alleviate flooding at Gum Tree Corner Road (County Route 639) at Pine Mount Run.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-12: Alleviate flooding at Market Lane (County Route 641) at levee.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-13: Alleviate flooding at Bacon Neck Road (County Route 642) at Pine Mount Run.	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]
MJ-14: Conduct tree survey and develop tree trimming and removal program ²⁹ .	[identify status]		To be carried over as multi-jurisdictional mitigation measure [# TBD]

²⁹ Per funding available under the New Jersey Shade Tree and Community Forestry Act administered by the New Jersey Department of Environmental Protection – Division of State Forestry Services.

Part 4: Mitigation Measures

Part 4.3: Municipal Mitigation Measures – Identification

Table 7-10 [will include] the list of mitigation measures that are considered the responsibility of the municipality. These mitigation measures:

- Reflect the goals and strategy identified in Part 4.1
- Include projects carried over from NJ4 HMP as detailed in Part 4.2
- Include new projects, programs or activities identified by the Municipal Working Groups including measures to address known problems or areas of concern for critical facilities and vulnerable populations
- Address Repetitive Flood Loss (RL) and Severe Repetitive Flood Loss Properties (SRL)³⁰ if applicable

Table 7-10 [will include]:

- Brief description of the mitigation action, program, or project
- Hazard(s) addressed by the measure
- Relevant goal(s) addressed by the measure
- Whether the measure pertains to existing or new structures or both

Note: Mitigation measures with discrete locations [will be] shown in Figure 7-7.

Table 7-10: Greenwich Township Municipal Mitigation Measures Identification

#	Mitigation Action, Program, or Project	Hazard(s)	Goal (s)	Existing or New Structures
M-1	<p><u>Municipal Mitigation Program</u> – including sustained efforts in cooperation with Cumberland County Office of Emergency Management (CC OEM) to:</p> <ul style="list-style-type: none"> ▪ Conduct outreach and education for residents, businesses, and property owners ▪ Complete critical facility field evaluations to identify potential vulnerabilities and mitigation measures ▪ Compile relevant data regarding hazard impacts ▪ Support regular interactions of the Municipal Working Group ▪ Seek integration of hazard mitigation with other parallel planning initiatives 	All	All	All

³⁰ Section 3: Hazard Identification and Risk Assessment of the CC HMPU Base Plan [will include] a description of RL and SRL properties.

Part 4: Mitigation Measures

Part 4.4: Municipal Mitigation Measures – Implementation

Table 7-11 [will include] information identified by the Municipal Working Group:

- Part(ies) responsible for following up with implementation of the measure
- Priority for implementation considering a range of criteria³¹
- Project Type to help determine funding options and implementation mechanisms at the municipal level³²
- Estimated Cost, including estimates provided by the Municipal Working Group or approximate ranges for projects that are in early stages of development
- Target Date, indicating desired completion dates assuming availability of funding
- Next step(s) anticipated to implement the identified mitigation measures at the municipal level

Table 7-11: Greenwich Township Municipal Mitigation Measures Implementation

#	Mitigation Action, Program, or Project	Responsible Part(ies)	Priority	Project Type	Estimated Cost (\$)	Target Date	Next Step(s)
M-1	Municipal Mitigation Program	Office of Emergency Management	High	Program	Staff Time	On-going, sustained effort	<ul style="list-style-type: none"> ▪ Identify outreach and education objectives and methods (working with CC OEM) ▪ Set priorities (if necessary) and initiate critical facility field assessments ▪ Identify schedule for plan updates (for plan integration efforts)

³¹ Section 4: Mitigation Measures of the CC HMPU Base Plan [will include] a description of evaluation criteria considered by the Municipal Working Group.

³² Section 4: Mitigation Measures of the CC HMPU Base Plan [will include] a description of project types and related information regarding funding options and implementation mechanisms.

Part 4: Mitigation Measures

Part 4.5: Multi-Jurisdictional Mitigation Measures

During the Municipal Working Group Work Sessions, the Municipal Working Group **[will identify]** some NJ4 HMP mitigation measures that need to be carried over, as well as new areas of concern, as mitigation measures where implementation requires participation or leadership from other levels of government, including county, state, and federal agencies. These multi-jurisdictional mitigation measures **[will be]** included in Table 7-12.

Section 4: Mitigation Measures of the CC HMPU Base Plan **[will describe]** multi-jurisdictional implementation strategies in detail. Section 4 **[will identify]** multi-jurisdictional mitigation measures that Municipal Working Groups believe are partly or wholly the responsibility of County agencies. These measures **[will be]** referred to the County Working Group for consideration. As part of the mitigation measures in the County Appendix to the NJ4 HMP Regional Hazard Mitigation Plan, the County Working Group will be working with the municipalities to identify:

- Specific responsibilities amongst different level(s) of government to address these problem areas
- Mitigation measures or related projects which may address the described problem areas that are already acknowledged as County responsibilities including identifying the appropriate County agency or department taking the lead role and status of implementing these mitigation measures
- Which, if any, additional mitigation measures the member agencies of the County Working Group will assume responsibility to implement

Note: Multi-jurisdictional mitigation measures with discrete locations **[will be]** shown in Figure 7-7.

Table 7-12: Greenwich Township Multi-Jurisdictional Mitigation Measures

#	Problem Description	Hazard(s) Addressed	Goal Addressed	Applies to Existing or New Structures	Potential Partners	Priority

Figure 7-7: Greenwich Township Mitigation Project Locations

Preliminary Draft

Part 4: Mitigation Measures

Part 4.6: Authorities, Policies, Programs, Resources, and Plan Integration

Part 4.6 includes three (3) subparts:

- Authorities, Policies, and Programs - Cross referencing relevant information and recommendations in the CC HMPU Base Plan regarding existing authorities, policies, and programs in the region and specific information about the jurisdiction's participation and continued compliance in the National Flood Insurance Program (NFIP)
- Capabilities and Coordination - Cross referencing relevant information and recommendations in the CC HMPU Base Plan regarding improving capabilities and coordination at the municipal level and specific information about the jurisdiction's available resources
- Plan Review and Integration – Identifying plans and programs included in the development of Plan Integration recommendations in the CC HMPU Base Plan

Authorities, Policies, and Programs

Section 1.3: Existing Authorities, Policies, Programs, and Resources of the CC HMPU Base Plan **will summarize** relevant authorities, policies, and programs related to hazard mitigation in the County including the NFIP.

Continuing municipal participation in the NFIP as part of the implementation of the CC HMPU by the municipality, includes:

- Involvement of Floodplain Manager / Administrator during the CC HMPU implementation process
- Commitment to adopt updated FIRMs and evaluate / update the municipality's Flood Management Plan and/or Ordinance as appropriate per recommendations **to be included** in Section 4.6 of the CC HMPU Base Plan

Capabilities and Coordination

The update of the NJ4 HMP **will include** reexamining municipal hazard mitigation capabilities; potential for improving capabilities and coordination within and between jurisdictions; and plan integration considerations, including:

- *Section 1.3: Existing Authorities, Policies, Programs, and Resources* of the CC HMPU Base Plan **will include** summary statements regarding county and municipal resources and the impact of resource limitations on the overall approach to the CC HMPU mitigation strategies.
- *Section 4: Mitigation Measures* of the CC HMPU Base Plan **will include** summary observations and recommendations concerning:
 - Hazard mitigation planning and mitigation measure implementation capabilities and coordination at the county and municipal levels
 - Coordination within municipal governments, between municipal governments and their communities, and between municipal, county, and state agencies responsible for hazard mitigation

Part 4: Mitigation Measures

Plan Review and Integration

Specific documents obtained during the plan update process from the Municipal Working Group include:

- Greenwich Township Emergency Operations Plan (2021)
- Greenwich Township Master Plan (1995)³³
- Greenwich Township Master Plan Reexamination Report (2010)³⁴
- Greenwich Township Zoning Ordinance including Floodplain Management³⁵
- Greenwich Township Zoning Map³⁶
- Greenwich Township Environmental Resource Inventory (2010)³⁷
- Coastal Community Vulnerability & Resilience Assessment (2011)³⁸
- Greenwich Township 2014 Capital Improvement Budget and Capital Improvement Program³⁹

Need to identify for *highlighted* entries:

- ✓ Current status of all plans?
- ✓ For plans that have been “updated”, when was the update completed?
- ✓ For plans where “no update” has occurred, is an updated scheduled, and if so, when and who is the responsible party?

Table BP.4-4 in *Section 4.6: Plan Review and Integration* of the CC HMPU Base Plan:

- **Will identify** the primary plans and documents collected from each of the participating municipalities.
- **Will include** the results of reviewing the primary plans and documents to determine the extent to which these documents reflect up-to-date hazard risk and mitigation.
- **Will include** recommendations for integrating the results of the CC HMPU, including hazard mitigation data, goals, measures, and/or recommendations with existing plans and programs at the municipal level that are relevant to all participating municipalities and incorporated by reference in each of the jurisdiction-specific Appendices including:
 - Hazard Assessments
 - Emergency Operations Plans
 - Floodplain Management Ordinances
 - Master Plans and Reexamination Reports
 - Other plans and documents

The plan maintenance process **will articulate and specify** a commitment to review and follow these recommendations during future scheduled updates of these various documents as considered appropriate by the Working Group and the governing body of the municipality.

³³ http://www.historicgreenwichnj.org/uploads/5/8/6/5/5865733/greenwich_1995_master_plan.pdf

³⁴ http://www.historicgreenwichnj.org/uploads/5/8/6/5/5865733/greenwich_master_plan_re-exam_2010.pdf

³⁵ http://www.historicgreenwichnj.org/uploads/5/8/6/5/5865733/greenwich_zoning_ordinance.pdf

³⁶ http://www.historicgreenwichnj.org/uploads/5/8/6/5/5865733/greenwich_zoning_map.pdf

³⁷ <http://www.co.cumberland.nj.us/content/173/211/8970.aspx>

³⁸ <http://www.nj.gov/dep/cmp/docs/ccvap-greenwich.pdf>

³⁹ http://www.historicgreenwichnj.org/uploads/5/8/6/5/5865733/m-gr_budget_2014.pdf

Attachment A: Public Review Comments

Public review comments [will be] recorded during the public review of the Greenwich Township Preliminary Draft and Draft versions of the Municipal Appendix on [dates to be determined]:

Table 7.A-1: Public Review Comments

Comment Date and Time	Comment	Response

Preliminary Draft

Attachment B: Adoption Resolution

Following this page [will be] the Adoption Resolution for the Greenwich Township Municipal Appendix as approved by the Greenwich Township Committee.

Preliminary Draft

Attachment C: Approval Letter

Following this page [will be] the Approval Letter for the Greenwich Township Municipal Appendix.

Preliminary Draft