



## Appendix 10: Borough of Middlesex

The Borough of Middlesex participated in the 2015 Middlesex County Hazard Mitigation Plan (HMP) update. This appendix includes the locally-specific information about the Borough. The following sections detail the planning process and participants; the current population, building stock, and land development trends; hazards that specific to the Borough and corresponding risk assessments; the Borough’s mitigation strategy, and a local capability assessment.

### 1. Plan Development

On March 12, 2015, Mayor Dobies signed an “Intent to Participate” letter and assigned himself as point of contact for the HMP update. He worked with other municipal employees, Council Members, and volunteers through the formation of a Local Planning Committee, as listed below. The local planning committee used the municipal worksheets included in Appendix E and worked to gather the necessary information to support the plan update. Additionally, the Middlesex Master Plan and Re-examination report from 2012, the Codified ordinances, and the Green Brook Flood Commission September 2015 draft minutes were used for the development of this plan. On August 13, 2015, members of the LPC met with the Planning Consultant to review the information needed for the plan and discuss the mitigation strategy for the Borough. The LPC has reviewed all plan drafts for this appendix.

**Table 10-1: Borough of Middlesex Local Planning Committee Members**

Name	Title	Organization
Ronald Dobies	Mayor	Borough of Middlesex
Kathleen Anello	Borough Clerk	Borough of Middlesex
Jack Costa	OEM Coordinator	Borough of Middlesex
Matt Giest	Chief of Police	Borough of Middlesex
Anthony Alfano	Construction Official	Borough of Middlesex
Dave Burd	Fire Chief	Borough of Middlesex
Bob Teutsch	Director of Public Works	Borough of Middlesex
Sean Kaplan	President	Borough of Middlesex Council



## 2. Community Profile

### 2.1 Physical Location

The Borough of Middlesex has a total area of 3.54 square miles and is located in the northwest corner of Middlesex County, New Jersey. Middlesex Borough is bordered by Piscataway Township and Dunellen borough in Middlesex County, and the Somerset County towns of Bound Brook, South Bound Brook, Bridgewater and Green Brook.

#### 2.1.1 Hydrography and Hydrology

The Borough of Middlesex is located at the confluence between the Bound Brook and the Green Brook within the Raritan Basin. The Green Brook defines the Borough's north/east border with Somerset County. The Green Brook flows into the Raritan River at the southwestern edge of the Borough. The Raritan runs along the southern border, separating the Borough from South Bound Brook. Also within the Borough is the Ambrose Brook subwatershed. The Brook crosses into Middlesex Borough from Piscataway Township and flows through Lake Creighton into the Green Brook.

### 2.2 History and Governance

The Borough of Middlesex was formally incorporated on April 9, 1913 from portions of Piscataway Township. The Borough is governed under the Borough form of government, and has an elected Mayor and six Council members. The Mayor is elected directly to a four-year term of office. Town Council members are elected to serve three-year terms on a staggered basis, with two seats coming up for election every year. The Borough Council holds monthly meetings open to the public where it discusses legislation under consideration.

### 2.3 Demographics

#### 2.3.1 Population Trends

According to the U.S. Census Bureau, the population in 2010 was 13,635.<sup>1</sup> This is a 0.6% decrease from 2000. The Borough of Middlesex has a population density of 3876.2 persons per square mile. It is the 12<sup>th</sup> densest municipality within the County. A summary of major population and household characteristics may be found in the following tables.

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<sup>1</sup> U.S. Bureau of the Census. American Fact Finder "Middlesex Borough, NJ". <http://factfinder.census.gov/>. Retrieved 9/8/15.



**Table 10-2: Borough of Middlesex Population Summary Estimates (2010 Census) <sup>2</sup>**

Population	Quantity	Percent of Municipal Population
Total Population	13,635	100
Median Age	40.7	N/A
17 years and under	3,067	22.5
65 years and over	1,883	13.8
<b>Race</b>		
White	11,077	81.2
Black/African-American	699	5.1
Native American/Alaskan Native	24	0.2
Asian	818	6.0
Native Hawaiian/Pacific Islander	10	0.1
Other Race (unspecified)	732	5.4
Two or More Races	275	2.0
Hispanic or Latino	2,246	16.5

Population statistics may further reveal potential vulnerabilities in the community. The following table details the distribution of two groups included in vulnerable population analyses (children and the elderly) according to household description. Residents living alone, particularly the elderly, may have fewer coping mechanisms and resource than those in household groups, therefore may constitute a demographic that could require assistance in mitigating their vulnerability.

**Table 10-3: Borough of Middlesex Household Characteristics Summary Estimates (2010 Census) <sup>3</sup>**

Households	Quantity	Percent of Total
Total Households	4,984	100
Family Households (related)	3,631	72.9
Family Households w children under 18	1,594	32.0
Non-Family Households (unrelated)	1,353	27.1
Non-Family Households, living alone	1,107	22.2
Non-Family Households, living alone Male over 65 years	130	2.6
Non-Family Households, living alone Female over 65 years	408	8.2

### 2.3.2 Vulnerable Populations

Vulnerable populations include those groups that may require special assistance, considerations, accommodation or other needs during emergency events to facilitate their effective and safe compliance with emergency instructions. This includes, but is not limited to, those individuals needing mobility assistance (strollers, wheelchairs, etc.), those with financial needs (cannot afford hotel rooms, food, necessities, during evacuation periods, etc.), those requiring translation or interpretation services to understand emergency information (non-English-speaking populations, Deaf and hard of hearing),

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.



persons considered legal minors, those persons with cognitive impairments, persons with specialized medical needs (electric dependent equipment, refrigerated medications, use of Personal Assistants for routine and basic care, medical transportation needs, etc.), and populations with social disadvantages other needs that may require unique considerations during emergency events.

Identifiable vulnerable populations in Middlesex include (but may not be limited to) the following:

**Table 10-4: Borough of Middlesex Vulnerable Population Estimates (2010)**

Population Type	Population Estimate (2010 Census) <sup>4</sup>
Under 5 years of age	754
Under 18 years of age	3,067
Over 65 years of age	1,883
Limited English Proficiency (LEP)	1,194 (equals 9.3% of population over 5 years old)
Institutionalized	0
Living in Group Quarters	18

In addition to these statistics, approximately 1.9% of the population lives below the poverty line. The mean household income is \$92,885, with the per capita income at approximately \$33,458 (2013 estimates).<sup>5</sup>

## 2.4 Land Use and Development

The Borough of Middlesex is an established developed community with over 80 percent of its land classified by NJDEP as “Urban” land. These lands are predominately residents, though there are commercial and industrial areas of the Borough. Over 84 percent of the assessed parcels classified as residential based on the 2014 Tax Assessment data from the County. Based on this data and the Land Use/Land Cover summary below, it is likely that there are some underutilized parcels, which may suggest redevelopment opportunities in the future.

**Table 10-5: Borough of Middlesex Land Cover Summary**

Land Cover Class	Percent of Total Land <sup>6</sup>	2002 (acres)	2007 (acres)	2012 (acres)	Percent Change <sup>7</sup>
Agriculture	0.19%	5.53	4.22	4.22	-23.66%
Barren Land	1.29%	24.94	33.82	29.07	16.55%
Forest	3.25%	81.30	69.13	73.04	-10.17%
Urban	80.64%	1783.53	1806.34	1813.79	1.70%
Water	1.98%	43.73	44.60	44.62	2.03%
Wetlands	12.65%	310.22	291.14	284.51	-8.29%

<sup>4</sup> Ibid.

<sup>5</sup> U.S. Bureau of the Census. American Fact Finder “Middlesex Borough, NJ”. <http://factfinder.census.gov/>. Retrieved 9/8/15.

<sup>6</sup> Percent based on acres of land in 2012

<sup>7</sup> Change is calculated between 2002 and 2012



### 2.4.1 Open Space

The Borough has approximately 200 acres of open space and preserved land. Of this land, over 75 percent is located within the Special Flood Hazard Area. This is in part because of the Borough’s concerted effort to buy-out floodprone properties along Raritan Avenue. This calculation does not account for homes in the acquisition process at the time of this update. According to existing data, just over 26 percent of the Special Flood Hazard Area in the Borough is preserved.

### 2.4.2 Buildings and Development

The building stock in the Borough is older, with over 83 percent of the homes estimated to have been built before 1979. Given the Borough’s considerable flood risk, this is particularly significant for the potential of pre-FIRM properties within the jurisdiction. The Borough is about 77 percent owner-occupied, which is higher than the County median of 69 percent.

**Table 10-6: Borough of Middlesex Housing Statistics**

Housing Characteristics	Estimate
Total Occupied Housing Units	5,044
Percent Owner-occupied	77.5
Percent Renter-occupied	22.5
Percent built after 2000	.02
Percent built before 1979	83.5

### 2.4.3 Recent and Expected Development

The Borough reported only one major development since the 2011 HMP adoption.

Project Name	Type	Number of Structures	Locations	Known Hazards	Description/Status
Urban Renewal LLC	Res	106	105 Lincoln Blvd	None	In process



## 2.5 Critical Facilities and Infrastructure

### 2.5.1 Essential Facilities

The Borough maintains a Municipal Building, Rescue Building, Police Headquarters, a senior housing facility, a recreation center, and four Firehouses. The four firehouses are located in separate areas of the Borough, which allows emergency response to all four quadrants of the jurisdiction during a storm event. However, one firehouse on Beechwood Ave is subject to flooding, which can render that building inoperable during severe events. Because of the topography, road network, and flood risk, this quadrant is then effectively cut-off from the rest of the Borough without access to emergency response. Additionally, aside from the Police Department and Municipal Building, the critical facilities in the Borough do not have generators. The High Schools is also located within the flood hazard area, but has not flooded since Hurricane Floyd.

### 2.5.2 Transportation

There are no major transportation routes through Middlesex Borough, however, Route 22 passes north of the Borough and I-287 passes to its south in the neighboring jurisdictions. New Jersey Transit provides bus service, and there are no commuter rails in Middlesex Borough.

### 2.5.3 Critical Utilities and Infrastructure

The Borough is serviced by both JCP&L and PSE&G. The Borough reports that electrical service is usually reliable, except for severe storm events. The water supply for the Borough is delivered by NJ American Water. The Borough manages and cleans out its own sewer infrastructure, though wastewater treatment is handled by the Middlesex County Utility Authority. The sewer infrastructure in the community is older and subject to infiltration and backflow problems. Additionally, the pump station on Route 28 will get overwhelmed during storm events and backs up into the street.



### 3. Hazard Identification and Risk Assessment

This section describes the natural hazards and risks that can affect the Borough of Middlesex. Like all the other municipalities in Middlesex County, Middlesex is potentially subject to the effects of all the hazards that are considered in this mitigation plan. However, only a few of these hazards have significant impacts that are unique to the community. The remaining hazards are discussed in detail in the County part of this mitigation plan. FEMA mitigation planning guidance requires that County mitigation plans include a risk assessment section that “assess[es] each jurisdiction’s risks where there vary from the risks facing the entire planning area” (44CFR 201.6 (c) (2) (iii)). Because the Middlesex County HMP update includes separate appendices for each municipality, this requirement is met in the appendices, while risks that affect the entire County uniformly are discussed in the County part of the HMP.

#### 3.1 Background and Hazard Rankings

One of the first steps in developing jurisdictional appendices was for participating municipalities to review and prioritize the hazards that can affect them. This was done based on how often a hazard has occurred, how significant effects have been in the past, the difficulty and cost of recovering from such events. Municipalities ranked the list of hazards as high, medium, low, or no concern.

Table 10-7 shows community hazard rankings. To the extent possible, the level of discussion and detail about specific hazards in this section are based on these rankings. However, in many cases there is insufficient hazard information available at the level of the jurisdiction to allow detailed discussion or risk estimates. For some hazards there is limited jurisdiction-level tabular data included in the County portion of the HMP, and users should refer to those subsections for more detail. The hazards marked with asterisks in the table above are included in this appendix; the others are included in the County portion of this HMP, but not discussed in detail here.

**Table 10-7**  
**Borough of Middlesex**  
**Hazard Identification and Prioritization**

<b>Hazard</b>	<b>Priority</b>
Coastal Erosion	NA
Dam/Levee Failure	H
Drought	L
Earthquakes	L
Extremely High Temps	L
Extremely Low Temps	M
Floods	H
Hurricanes/Tropical Storms	H
Nor’easters	H
Power Outages	H
Severe Weather	M to L
Hazardous Substances	H
Wildfire	L
Winter Storm	M

The Borough is highly vulnerable to floods and considers all hazards that would result in high riverine flows or intense rain events to be of high concern. Additionally, the Borough does have fixed site hazardous facilities, as well as a rail line for transporting hazardous materials. These risks have not been quantified in this document due to its public nature. The Borough addresses the risks to residents from



fixed sites through zoning and land use controls, where possible.

## 3.2 Flood Hazard

### 3.2.1 Type, Location, and Extent

The Borough of Middlesex is located in northwestern Middlesex County. The entire north and west boundaries of the community are formed by Bound Brook and Green Brook. Green Brook is a tributary to Bound Brook, which drains into the Raritan River at the south end of Middlesex. The third major source of flooding in the community is Ambrose Brook, which meanders across the southern end of Middlesex, merging with Green Brook very close to where Green Brook drains to the Raritan River

One of the best resources for determining flood risk in a jurisdiction is Flood Insurance Rate Maps (FIRMs), which are produced by FEMA. The FIRM is the official map of a community on which FEMA has delineated both the special flood hazard areas (1% annual chance of flooding) and the risk premium zones applicable to the jurisdiction. At the time the Middlesex County HMP was being updated, the effective FIRM for the Borough of Middlesex is dated July 6, 2010. While the effective FIRM is the approved map and is used for regulatory purposes, the Middlesex County hazard mitigation plan update was developed in 2015, and the best available flood mapping at that time was the FEMA revised Preliminary Flood Map (released on January 30, 2015). This map is shown below in Figure 10-1. It shows that the floodplain in Middlesex is related to Bound Brook, Green Brook and Ambrose Brook to the south.

As shown in the next table, a relatively large percentage of the land area in Middlesex is comprised of 100-year floodplain, and a significant number (and percentage) of parcels have their centroids in the floodplain.

**Table 10-8**  
**Floodplain and Parcel Data for the Borough of Middlesex**  
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, January 2015)

Data Type	Value
Jurisdiction area in square miles	3.51
Square miles within 100-year floodplain	0.96
Jurisdiction area within 100-year floodplain	27.35%
Number of parcels in jurisdiction	5,016
Number of parcels with centroids within 100-year floodplain	703
Parcels with centroids within 100-year floodplain	14.02%

[Note: the table refers to centroids, which are the geographic center of a parcel. This is a better indicator of flood exposure than simple intersection with the floodplain, although it does not necessarily mean that any structures or infrastructure are within the boundaries of the Special Flood Hazard Area].

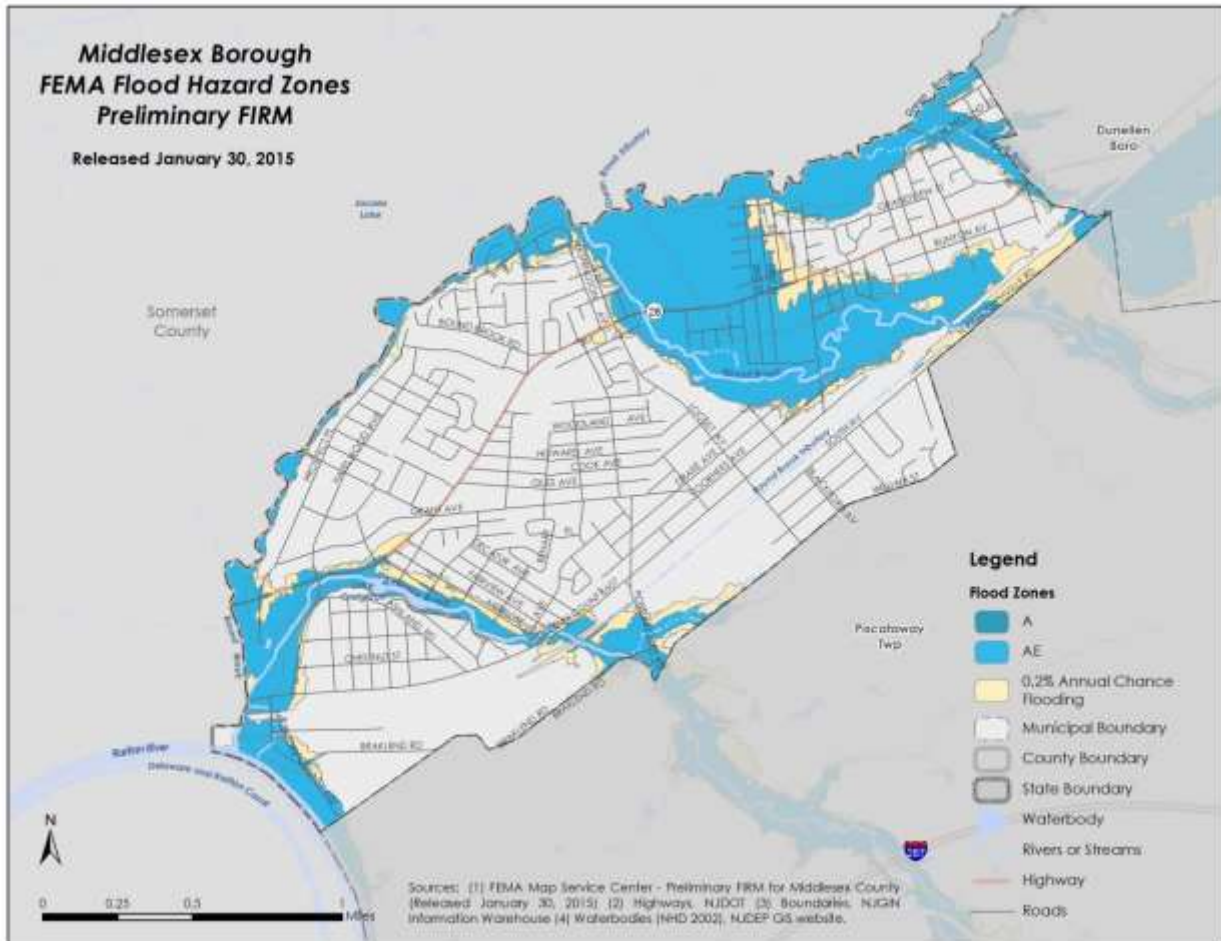
Current FEMA guidance uses the term *extent* as analogous to potential severity. In more significant events along Bound Brook (especially north of the stream), the extent of flooding is on the order of 3-4





feet in many locations, although the overall extent of flooding in the jurisdiction is less than that.

**Figure 10-1**  
**Middlesex portion of FEMA Revised Preliminary Flood Insurance Rate Map**  
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, January 2015)





### 3.2.2 Previous Occurrences and the Probability of Future Floods

Although flood insurance claims in Middlesex extend back to the late 1970s, most of the significant damages have come from four events: Hurricane Floyd (September 1999); storms originating in Texas with heavy rain (April 2007); a late winter nor'easter (March 2010) and Tropical Storm Irene (August 2011). Notably, Superstorm Sandy caused relatively little flooding in the Borough of Middlesex.

**Table 10-9**  
**NFIP Policies and Claims**

<b>Number of Parcels:</b>	
Middlesex:	5,015
Middlesex County:	283,276
<b>Number of Policies In-Force:</b>	
Middlesex:	411
Middlesex County:	4,489
<b>Number of Claims:</b>	
Middlesex:	774
Middlesex County:	3,478
<b>Total Paid Claims</b>	
Middlesex:	\$20,039,465
Middlesex County:	\$109,727,837

Analysis of floodplain maps and insurance claims suggests very little history of flooding from any sources other than the river.

### 3.2.3 Flood Impacts and Vulnerabilities to Flooding

The impacts from past floods in this jurisdiction have been very significant. As noted above, four events account for the majority of flood losses in this jurisdiction. Discreet areas immediately north of a wide bow in Bound Brook have experienced by far the most flooding in the community, have sustained the most damage, and remain highly vulnerable to overbank flooding from this source. The Ambrose Brook by Creighton is also an area of significant flooding in the Borough. The Borough reports that at least three dozen streets routinely flood during storm events.

### 3.2.4 National Flood Insurance Program and Repetitive Loss Properties

To provide a sense of the flood risk in a community it is also beneficial to summarize the policies in force and claims statistics from the National Flood Insurance Program (NFIP). There is a discussion of the NFIP in the County section of this hazard mitigation plan. The Borough of Middlesex has been a member of the NFIP since 1979.

FEMA NFIP statistics indicate that as of February 2015, federal flood insurance policies were in-force on 411 properties in Middlesex Borough. Between 1978 and 2015, there have been a total of 774 NFIP insurance claims in the Borough of Middlesex, with a total claims value of \$20,039,465.<sup>8</sup> Table 10-9 compares the number of policies in-force and paid claims in the jurisdiction. The Table shows that the Borough of Middlesex comprises 9.2% of the NFIP policies in-force in Middlesex County. The average claim in Middlesex is \$25,891 versus the County average of \$31,549.

The Borough of Middlesex is not presently a member of the Community Rating System (CRS), a voluntary program for communities participating in the NFIP. The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the

<sup>8</sup> FEMA – Policy and Claim Statistics for Flood Insurance



minimum NFIP requirements. For CRS participating communities, flood insurance premium rates are discounted in increments of 5% based on creditable activities.<sup>9</sup> CRS communities are ranked between 1 and 10, with Class 1 communities receiving a 45% premium discount.

It should be noted that NFIP claims are not a direct or completely accurate proxy for flood risk in a community. The data does not include flood damages to structures that had no flood insurance. Also, in some cases, structures or contents may have been underinsured. The NFIP claims data also does not include any damages to public facilities, which may be insured via other means (such as self-insurance or non-FEMA policies); such damages may also be addressed through other federal programs such as FEMA's Public Assistance Program.

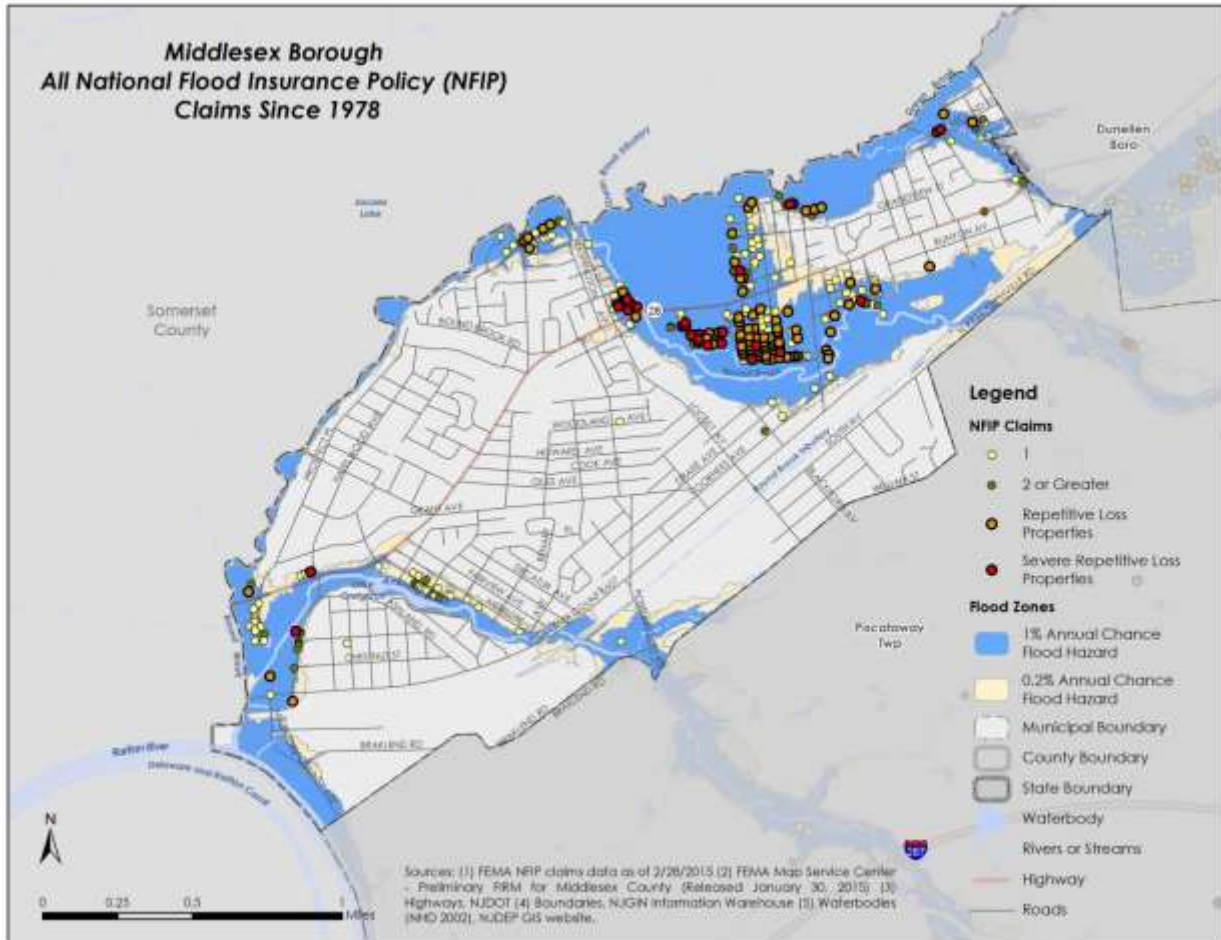
Figure 10-10 shows all NFIP claims in Middlesex between 1978 and 2015. Note the very dense concentration of claims (including a high number of repetitive and severe repetitive loss properties immediately north of Bound Brook. These account for the large majority of claims in the Borough. Four events predominate flood insurance claims in this jurisdiction: Hurricane Floyd (September 1999 – 153 claims); storms originating in Texas with heavy rain (April 2007 – 84 claims); a late winter nor'easter (March 2010 – 141 claims) and Tropical Storm Irene (August 2011 – 232 claims). Superstorm Sandy resulted in only five flood insurance claims.

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<sup>9</sup> FEMA – Community Rating System (CRS).



**Figure 10-2**  
**Map of NFIP Claims in the Borough of Middlesex (1978 to 2015),**  
**Including Repetitive Loss and Severe Repetitive Loss Properties**  
**(Source: FEMA National Flood Insurance Program, February 2015)**





**Table 10-10  
NFIP Policies and Claims**

**Repetitive Loss (RL) Properties:**

Middlesex:	127
Middlesex County:	429

**Total Building (RL)**

Middlesex:	\$8,905,177
Middlesex County:	\$44,015,885

**Total Contents (RL)**

Middlesex:	\$2,684,797
Middlesex County:	\$5,106,609

**Number of Claims (RL)**

Middlesex:	427
Middlesex County:	1,322

**Average Claim (RL)**

Middlesex:	\$27,143
Middlesex County:	\$37,158

**Severe Repetitive Loss (SRL)**

**Properties:**

Middlesex:	29
Middlesex County:	77

**Total Building (SRL)**

Middlesex:	\$3,081,556
Middlesex County:	\$14,512,761

**Total Contents (SRL)**

Middlesex:	\$373,759
Middlesex County:	\$910,122

**Number of Claims (SRL)**

Middlesex:	143
Middlesex County:	385

**Average Claim (SRL)**

Middlesex:	\$24,163
Middlesex County:	\$40,059

### 3.2.5 Flood Risk to Repetitive Loss Properties in Middlesex

FEMA requires a discussion of NFIP Repetitive Loss and Severe Repetitive flood loss statistics in hazard mitigation plans. A repetitive loss property is a structure covered by a contract for flood insurance made available under the NFIP that has incurred flood-related damage on two occasions, in which the cost of the repair, on average, equaled or exceeded 25% of market value of the structure at the time of each such flood event. (Note that the data about Repetitive Loss properties in this subsection are based on the previous definition. Under the revised definition, Middlesex County has 47 RL properties, and Middlesex has 19.) Under this revised definition, the Borough has more repetitive loss properties than other municipality in the County.

The flood risk assessment in this section is based in part on analysis of NFIP data on repetitive flood loss properties. As of February 2014, Middlesex County had 429 such properties based on a query of the FEMA BureauNet NFIP interface. Of this total, 127 properties were located within Middlesex. This comprises 29.6 percent of the County total. Table 10-11 provides a comparison of the residential repetitive loss claims for Middlesex County and Middlesex. The tables below include the number of repetitive loss properties, building and contents damages, the total number of claims, and the average claim amounts.

The 127 repetitive loss properties in Middlesex were responsible for a total of 427 insurance claims, totaling \$8,905,177. Table 10-12 provides summary repetitive loss statistics for the community. Although Middlesex accounts for slightly less than 18 percent of the parcels (and 11 percent of the land area) in Middlesex County, the number of RL claims is 32 percent of the County total, and dollar amount of losses are 23.5 percent of the County's total.



**Table 10-11**  
**Repetitive Loss Statistics in the Borough of Middlesex and Middlesex County**  
**(Source: FEMA National Flood Insurance Program, February 2015)**

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
Borough of Middlesex	127	\$8,905,177	\$2,684,797	\$11,589,974	427	\$27,143
Middlesex County	429	\$44,015,885	\$5,106,609	\$49,122,494	1,322	\$37,158

The next table shows the streets in Middlesex with the most insurance claims. For reasons of confidentiality, this mitigation plan does not show specific addresses.

**Table 10-12**  
**Streets in the Borough of Middlesex with Highest Numbers and Amounts of NFIP Claims**  
**(Repetitive Loss Properties)**  
**(Source: FEMA National Flood Insurance Program, February 2015)**

Street Name	Building	Contents	Total	# Claims	Average
Bound Brook Road	\$689,402	\$72,319	\$761,720	25	\$30,469
Cap Lane	\$619,816	\$73,561	\$693,377	29	\$23,910
Lee Drive	\$139,084	\$18,404	\$157,488	9	\$17,499
South Lincoln Avenue	\$166,334	\$6,446	\$172,779	21	\$8,228
Lincoln Boulevard	\$835,225	\$1,869,372	\$2,704,597	6	\$450,766
Marshall Place	\$500,361	\$4,213	\$504,574	35	\$14,416
Pearl Place	\$65,528	\$7,368	\$72,896	9	\$8,100
Rock Lane	\$498,347	\$63,495	\$561,842	28	\$20,066
Starlit Drive	\$173,936	\$777	\$174,713	14	\$12,480
1st Street	\$658,194	\$47,897	\$706,091	39	\$18,105
2nd Street	\$954,702	\$51,577	\$1,006,278	49	\$20,536
3rd Street	\$1,169,490	\$132,906	\$1,302,396	42	\$31,009
6th Street	\$459,305	\$84,757	\$544,062	18	\$30,226
7th Street	\$219,209	\$26,207	\$245,416	15	\$16,361

The next table provides the results of a simple risk projection for repetitive loss properties. This is done by annualizing past insurance claims and using this as the basis for estimating future losses. This method employs standard FEMA statistical techniques, and may be used for developing a sense of flood risk, i.e. total future losses over the 100-year planning horizon. The results below should be considered general and preliminary. It is possible to complete more accurate risk assessments for specific projects using FEMA software and methodologies, combined with information about sites and facilities.





**Table 10-13**  
**100-Year Risk Projection for NFIP Repetitive Loss Properties in the Borough of Middlesex**

Data	Value
Period in years	19
Number of claims	427
Average claims per year	22.47
Total value of claims	\$11,589,974
Average value of claims per year	\$609,999
<b>Projected risk, 100-year horizon</b>	<b>\$8,704,680</b>

### 3.2.6 Flood Risk to Severe Repetitive Loss Properties in Middlesex

The definition of Severe Repetitive Flood Loss is included in the County portion of this mitigation plan. As of February 2014, Middlesex had 48 properties that fall under this definition, and all of Middlesex County had 112. (Note that under the revised definition of Severe Repetitive Loss, the County now has 106 such properties, and Middlesex, 37.) Table 10-14 provides basic information about the SRL properties in this jurisdiction. SRL properties are also shown graphically in Figure 10-2 above.

**Table 10-14**  
**Statistics on NFIP Severe Repetitive Loss Properties in the Borough of Middlesex**  
(Source: FEMA National Flood Insurance Program, February 2015)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
Borough of Middlesex	29	\$3,081,556	\$373,759	\$3,455,315	143	\$24,163
Middlesex County	77	\$14,512,761	\$910,122	\$15,422,883	385	\$40,059

The next table shows the streets in Middlesex with the most severe repetitive loss insurance claims. For reasons of confidentiality, this mitigation plan does not show specific addresses.

**Table 10-15**  
**Streets in the Borough of Middlesex with Highest Numbers and Amounts of NFIP Claims**  
**(Severe Repetitive Loss Properties)**  
(Source: FEMA National Flood Insurance Program, February 2015)

Street Name	Building	Contents	Total	# of Claims	Average
Marshall Place	\$264,167	\$4,213	\$268,380	17	\$15,787
Rock Lane	\$379,992	\$63,495	\$443,487	19	\$23,341
6th Street	\$350,721	\$61,139	\$411,860	15	\$27,457
7th Street	\$219,209	\$26,207	\$245,416	15	\$16,361

The next table shows the results of a simple risk (future losses) projection for severe repetitive loss properties. This is done by annualizing past losses and using this as the basis for estimating future losses. This method uses standard FEMA techniques, and may be used for developing a sense of flood risk. The



results below should be considered general and preliminary. It is possible to complete more accurate risk assessments for specific projects using FEMA software and methodologies.

**Table 10-16**  
**100-Year Risk Projection for NFIP Severe Repetitive Loss Properties in the Borough of Middlesex**

Data	Value
Period in years	19
Number of claims	143
Average claims per year	7.53
Total value of claims	\$3,455,315
Average value of claims per year	\$181,859
<b>Projected risk, 100-year horizon</b>	<b>\$2,595,123</b>

### 3.3 Hurricanes and Tropical Storms

Based on input from the hazard ranking process, Middlesex considers hurricanes and tropical storms significant hazards, and thus there is a short discussion in the present subsection.

#### 3.3.1 Wind Risk Estimates

There are three significant hazards related to hurricanes, tropical storms, and to a lesser extent, nor'easters. These are: floods, storm surge, and high winds. Both floods and storm surge are addressed in the flood section of the present municipal appendix, as well as the County section of the hazard mitigation plan update. This subsection provides a preliminary quantification of hurricane wind risk based that was generated by FEMA’s HAZUS-MH software (version 2.1, 2014). The calculations in Table 10-17 show a range of loss categories across the top row versus “occupancy classes” on the first column. The occupancy classes are various land uses that are represented in HAZUS. The last two columns indicate the projected 50-year and 100-year risks, i.e. the total amount of damage over those planning horizons. The figures are based on annualizing losses, then discounting them to present value using the software. There is more detailed information about the calculations and County-wide results in the main section of this HMP update.

#### 3.3.2 FEMA Project Worksheets from Tropical Storm Irene and Hurricane Sandy

Following many natural disasters, FEMA engineers and field teams complete formal assessments of damage to community assets, and document these in project worksheets (PWs). The PWs are the basis of FEMA Public Assistance grants for repairs. There are seven categories of damage, indicated by the letters A through G. These are: A – debris removal; B – emergency protective measures; C – roads and bridges; D – water control facilities; E – public buildings; F – utilities, and; G – recreational facilities/other. The categories and amounts of the PWs are listed in Table 10-19 below for Tropical Storm Irene and Hurricane Sandy. Note that in some cases there are multiple different organizations in a community that are applicants for FEMA Public Assistance. In order to simplify the table, the PW amounts for all applicants in a community are combined.





**Table 10-17**  
**Probabilistic Wind Risk in Middlesex Borough, 50- and 100-year Planning Horizons**  
(Source: FEMA, HAZUS-MH version 2.1)

Occupancy Class	Total SF	Building Damages	Contents Damages	Inventory Loss	Relocation Cost	Business Income Loss	Rental Loss	Lost Wages
Residential	6,837,688	\$112,119	\$35,490	\$0	\$6,555	\$1	\$3,093	\$3
Commercial	1,871,359	\$9,639	\$3,916	\$128	\$1,624	\$887	\$927	\$987
Industrial	1,424,890	\$7,177	\$4,904	\$759	\$454	\$89	\$81	\$148
Agricultural	47,530	\$249	\$122	\$15	\$38	\$2	\$2	\$1
Religious	166,393	\$1,060	\$341	\$0	\$144	\$86	\$13	\$201
Government	24,852	\$136	\$73	\$0	\$28	\$1	\$4	\$229
Education	124,771	\$605	\$233	\$0	\$105	\$27	\$4	\$65
<b>Totals</b>	<b>10,497,483</b>	<b>\$130,985</b>	<b>\$45,078</b>	<b>\$902</b>	<b>\$8,949</b>	<b>\$1,093</b>	<b>\$4,124</b>	<b>\$1,633</b>

**Table 10-18**  
**Probabilistic Wind Risk in Middlesex Borough, 50- and 100-year Planning Horizons**  
(Source: FEMA, HAZUS-MH version 2.1)

Occupancy Class	Total Annualized Loss	50-year Risk	100-year Risk
Residential	\$157,261	\$2,170,358	\$2,243,956
Commercial	\$18,109	\$249,916	\$258,391
Industrial	\$13,613	\$187,869	\$194,240
Agricultural	\$428	\$5,911	\$6,112
Religious	\$1,845	\$25,469	\$26,333
Government	\$470	\$6,490	\$6,710
Education	\$1,039	\$14,340	\$14,826
<b>Totals</b>	<b>\$192,765</b>	<b>\$2,660,354</b>	<b>\$2,750,568</b>

**Table 10-19**  
**FEMA Public Assistance Expenditures in Tropical Storm Irene and Hurricane Sandy, by Category**  
(Source: FEMA Region II, Public Assistance)

Event Name/Public Assistance Category	A	B	C	D	E	F	G	Total
Tropical Storm Irene	\$164,181	\$72,297	\$0	\$14,823	\$5,072	\$3,109	\$37,100	\$296,582
Hurricane Sandy	\$341,672	\$41,140	\$0		\$33,007	\$0	\$0	\$415,818
<b>Total</b>	<b>\$505,852</b>	<b>\$113,437</b>	<b>\$0</b>	<b>\$14,823</b>	<b>\$38,079</b>	<b>\$3,109</b>	<b>\$37,100</b>	<b>\$712,400</b>



## 4. Capability Assessment

Each community within the planning area has a unique set of capabilities and priorities that affect its mitigation strategy. The following tables detail the capabilities assessed for the Borough of Middlesex during this plan update.

### 4.1.1 Planning and Regulatory

Tool / Program (code, ordinance, plan)	( Yes/No)	Code Citation and Comments
Master Plan	Y	Last update 2012
Capital Improvements Plan	Y	Budgeting process
Floodplain Management / Basin Plan	Y	
Stormwater Management Plan	Y	
Open Space Plan	Y	
Stream Corridor Management Plan	Y	
Watershed Management or Protection Plan	N	
Economic Development Plan	N	
Comprehensive Emergency Management Plan	Y	
Emergency Operation Plan	Y	
Post-Disaster Recovery Plan	N	
Transportation Plan	N	
Strategic Recovery Planning Report	N	
Zoning Ordinance	Y	
Subdivision Ordinance	Y	
NFIP: Cumulative Substantial Damages	Y	
Growth Management Ordinances	N	
Site Plan Review Requirements	Y	
Stormwater Management Ordinance	Y	
Municipal Separate Storm Sewer System (MS4)	Y	
Combined Sewer Overflows (CSO)	N	
Natural Hazard Ordinance	N	
Post-Disaster Recovery Ordinance	N	
Real Estate Disclosure Requirement	N	
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	N	

### 4.1.2 Staff/Personnel

Resources	Is this in place? (Y/N)	Department/ Agency/Position
Planning Board	Y	
Mitigation Planning Committee	N	
Environmental Board/Commission	N	
Open Space Board/Committee	N	
Economic Development Commission/Committee	N	
Maintenance Programs to Reduce Risk	N/A	
Mutual Aid Agreements	Y	Piscataway, Dunelle, MCOEM
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Consultant



Resources	Is this in place? (Y/N)	Department/ Agency/Position
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Consultant
Planners or engineers on staff with a strong understanding of natural hazards	N	
NFIP Floodplain Administrator	Y	CO
Surveyors	N	
GIS layers and maps	Y	
Personnel trained in GIS	N	
Personnel trained in HAZUS	N	
Emergency Manager	Y	Volunteer
Grant Writer	N	
Staff with expertise in cost/benefit analysis	N	
Professionals trained in conducting damage assessments	N	

#### 4.1.3 Education/Outreach and Community Classifications

Program	Do you Participate in/Use this Program (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	N		
Building Code Effectiveness Grading Schedule (BCEGS)			
Public Protection (ISO Fire Protection Classes 1 to 10)	N		
Storm Ready	N		
Firewise	N		
Disaster/Safety Programs in/for Schools	N		
Organizations with Mitigation Focus (advocacy group, non-government)	Y		
Public Education Program/Outreach (through website, social media)	Y		
Public-Private Partnerships	N		

#### 4.1.4 Fiscal Capabilities

	Yes/No
Do you have a line item in your operating budget for mitigation project funding?	Y
If no, will you look at mitigation actions when allocating funding in the future?	NA
Do you have a line item in the Capital Improvement Budget for mitigation project funding?	Y
Have you provided funding for mitigation projects identified in the hazard mitigation plan?	Y
Does your town have the authority to Levy Taxes for specific purposes?	Y
Does your town have user fees for water, sewer, gas or electric service?	N
Do you impose impact Fees for homebuyers or developers of new development/homes?	N
Does your community have an open space acquisition fund?	Y
Do you use bonds to finance projects (general obligation bonds, special tax bonds, private activity bonds)	Y



## 5. Mitigation Strategy

This section describes what projects, initiatives, and other actions the Borough has undertaken or plans to implement to reduce risk and loss within its jurisdiction. This includes the status of previously identified actions and any other projects that have been completed since the 2010 Plan was adopted. The additional actions were determined by the LPC based on self-determined priorities and experience.

### 5.1 Past Mitigation Actions

The table below lists the mitigation projects and actions that were included in the original 2010 Plan.

Mitigation Action	Responsible Party	Status	Review Comments
Middlesex 1: Property acquisition/elevation of 1 Severe Repetitive loss property and 5 Repetitive Loss properties located on Marshall Place.	Municipal OEM	Awaiting funding	The Borough has received funding for 7 of the 15 requested acquisitions. Offers have been sent to homeowners.
Middlesex 2: Property acquisition/elevation of 4 Repetitive Loss properties located on Rock Lane.	Municipal OEM	Awaiting funding	The Borough has received funding for 7 of the 15 requested acquisitions. Offers have been sent to homeowners.
Middlesex 3: Property acquisition/elevation of 5 Repetitive Loss properties located on 1 <sup>st</sup> Street.	Municipal OEM	Awaiting funding	The Borough has received funding for 7 of the 15 requested acquisitions. Offers have been sent to homeowners.
Middlesex 4: Property acquisition/elevation of 9 Repetitive Loss properties located on 2 <sup>nd</sup> Street.	Municipal OEM	Awaiting funding	The Borough has received funding for 7 of the 15 requested acquisitions. Offers have been sent to homeowners. One property elevated
Middlesex 5: Property acquisition/elevation of 6 Repetitive Loss properties located on 3 <sup>rd</sup> Street.	Municipal OEM	Awaiting funding	The Borough has received funding for 7 of the 15 requested acquisitions. Offers have been sent to homeowners.



## 5.2 Other Mitigation Activities

Since 2010 the Borough has been actively maintaining the Bound Brook stream channel through a stream corridor management program. Additionally, the Borough has conducted numerous outreach efforts focused on flood risk, including the preparation of a pamphlet on preparing for floods for homeowners. The Borough has been an active participant in the Green Brook Flood Control Commission, which is moving along with plans to raise the bridge on Raritan Ave and flood protection along the Green Brook in the Borough.

## 5.3 Proposed Mitigation Actions

The table below details the mitigation initiatives the Borough of Middlesex would like to pursue to minimize future effects of hazard events. These actions have been determined through a local assessment of current risk and needs. The LPC met with the Plan Consultant to review all hazard and risk assessment data and evaluate the strategy. These initiatives are dependent upon funding and may change based on municipal priorities and future hazard events.

For each new mitigation action, the Borough has ranked as ‘High’, ‘Medium’, or ‘Low’, based on the evaluation criteria outlined in Section 5.

Proposed Action	Anticipated Benefits	Responsible Party	Funding or Implementation Mechanism	Estimated Costs	Timeline	Priority
Upgrade mobile communications center	Improved capacity to respond during emergency events	OEM	Capital		1-3 years	High
Relocate firehouse or work with adjacent communities for MUA	Increased capacity to respond to all areas of the community during a flood event	OEM	Capital		2-5 years	High



Secure generators for firehouses, recreation center/rescue squad building	Ensure power duplicity for maintaining critical operations during a hazard event	OEM	Grants/Capital		1-3 years	High
Training for swiftwater rescue	Increased capacity to respond to residents in emergency events	OEM	Grants	Staff time	1-2 years	High
Training on Flood Hazard and response	Increased capacity to respond to residents in emergency events	OEM	Grants/Existing resources		1-3 years	High
Continue public outreach and education campaign	Improved awareness in residents about how to prepare and handle storm events	Administration/ OEM	Existing resources	Staff time	Ongoing	High
Pursue CRS application	Reduction in premiums for NFIP policyholders	Administration/ OEM	Existing resources/County CRS Support	Staff time	1-2 years	Medium
Replace manhole covers in floodprone areas	Reduce infiltration in sewer system	DPW	Capital		1-3 years	High
Increase outreach to residents on backflow prevention and ICC	Improve residents awareness about protection measures	Administration/ OEM	Existing Resources	Staff time	1-2 years	High



Elevation or acquisition of repetitive loss properties	Reduce property loss to flood events	OEM				High
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## 6. Plan Implementation

The LPC shall document, as needed and appropriate:

- Hazard events and losses in Middlesex and the effects that mitigation actions have had on impacts and losses,
- Progress on the implementation of mitigation actions, including efforts to obtain outside funding for projects,
- Any obstacles or impediments to the implementation of actions,
- Additional mitigation actions believed to be appropriate and feasible,
- All public and stakeholder input and comment on the Plan that has been received by the Borough.
- Copies of any grant applications filed on behalf of the Borough

### Continued Public Input

The Borough of Middlesex is committed to incorporating public input into its ongoing hazard mitigation planning. The public will have an opportunity to comment on the Plan prior to any changes and during the 5-year plan update. The annual progress reports will be posted on the County mitigation website in addition to the adopted Plan.

All public comments and input on the plan will be recorded and addressed, as appropriate. Opportunity to comment on the plan will be provided directly through the County's website. Public comments can also be submitted in writing to the County's HMP Coordinator. All public comments shall be addressed to: Middlesex County Office of Emergency Management c/o All Hazards Pre-disaster Mitigation Plan Coordinator, 1001 Fire Academy Drive, Sayreville, NJ 08872.

The Borough of Middlesex's LPC shall ensure that:

- Copies of the latest approved Plan are available for review at Borough Hall along with instructions to facilitate public input and comment on the Plan.
- Public notices are made as appropriate to inform the public of the availability of the Plan, particularly during Plan update cycles.
- For minor changes to this appendix, the Borough of Middlesex will post a notice on the Borough's website and invite the public to review and comment.
- For major changes involving Borough Council approval, the Borough will use its standard public notice procedures inviting the public to review the document and provide feedback.

### Plan Adoption

On [insert date] Middlesex County submitted the initial draft of the 2015 Plan Update to NJOEM for review and comment. After addressing NJOEM comments in the document, the HMP was resubmitted





for final consideration and approval by NJOEM and FEMA. FEMA approved the plan on [insert date], and the Plan update was forwarded to the Middlesex County Board of Chosen Freeholders for adoption, which occurred on [insert date].

The Borough Council approved the plan on [insert date]. The Borough resolution for adoption is provided below, the County's adoption resolution is provided as Appendix F of the 2014 HMP update. Following adoption, the plan update was resubmitted to FEMA for final approval, which occurred on [insert date]. The FEMA approval letter is included as Appendix G.

## Plan Maintenance

The Borough of Middlesex will review this Appendix of the County's hazard mitigation plan appendix each year and give the County's HMP Coordinator an annual progress report. OEM Coordinator is responsible for convening the LPC, initiating the plan review, and submitting the annual progress report. The LPC may use worksheets #1 and #3 in the FEMA 386-4 guidance document, to facilitate the review and progress report. FEMA guidance worksheets are provided in Appendix H. Local progress reports shall be provided to the County HMP Coordinator at least two weeks prior to the annual plan review meeting.

Additionally, the LPC will convene and review the plan when major hazard events impact the jurisdiction, potentially yielding opportunities for mitigation grant funding, or when new information suggests that plan elements do not accurately reflect the community's risk or its mitigation priorities.

If necessary, the OEM Coordinator will convene a meeting of the LPC to review and approve all changes. The Borough retains the discretion to implement minor changes to the document without formal procedures involving the Borough Council subject to local policies and regulations.

In addition to the annual progress report, the Borough of Middlesex will provide Middlesex County with a copy of the written notice of any changes to the jurisdictional appendix at the time such changes are implemented.