Appendix D
HAZUS: Earthquake Event Report

Hazus-MH: Earthquake Event Report

Region Name: Elizabeth_FHE

Earthquake Scenario: Probabilistic-100yr-Mag5

Print Date: April 16, 2015

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

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General Description of the Region

Hazus is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

New Jersey

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 12.43 square miles and contains 26 census tracts. There are over 41 thousand households in the region which has a total population of 124,969 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 19 thousand buildings in the region with a total building replacement value (excluding contents) of 11,808 (millions of dollars). Approximately 95.00 % of the buildings (and 67.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 3,845 and 158 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 19 thousand buildings in the region which have an aggregate total replacement value of 11,808 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 73% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 886 beds. There are 41 schools, 7 fire stations, 4 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 0 dams identified within the region. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 17 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 4,003.00 (millions of dollars). This inventory includes over 60 kilometers of highways, 114 bridges, 9,495 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	114	3,235.60
	Segments	65	460.10
	Tunnels	0	0.00
		Subtotal	**3,695.70**
Railways	Bridges	6	1.20
	Facilities	9	24.00
	Segments	51	42.20
	Tunnels	0	0.00
		Subtotal	**67.30**
Light Rail	Bridges	0	0.00
	Facilities	2	5.30
	Segments	3	6.90
	Tunnels	0	0.00
		Subtotal	**12.20**
Bus	Facilities	3	3.90
		Subtotal	**3.90**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	14	28.00
		Subtotal	**28.00**
Airport	Facilities	0	0.00
	Runways	1	38.00
		Subtotal	**38.00**
		Total	**3,845.10**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	95.00
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**95.00**
Waste Water	Distribution Lines	NA	57.00
	Facilities	2	158.50
	Pipelines	0	0.00
		Subtotal	**215.50**
Natural Gas	Distribution Lines	NA	38.00
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**38.00**
Oil Systems	Facilities	2	0.20
	Pipelines	0	0.00
		Subtotal	**0.20**
Electrical Power	Facilities	0	0.00
		Subtotal	**0.00**
Communication	Facilities	0	0.00
		Subtotal	**0.00**
		Total	**348.70**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Probabilistic-100yr-Mag5
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	100.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	5.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	696	3.57	0	0.00	0	0.00	0	0.00	0	0.00
Education	9	0.05	0	0.00	0	0.00	0	0.00	0	0.00
Government	30	0.15	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	126	0.65	0	0.00	0	0.00	0	0.00	0	0.00
Other Residential	9,710	49.74	0	0.00	0	0.00	0	0.00	0	0.00
Religion	63	0.32	0	0.00	0	0.00	0	0.00	0	0.00
Single Family	8,888	45.53	0	0.00	0	0.00	0	0.00	0	0.00
Total	**19,522**		**0**		**0**		**0**		**0**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	14,175	72.61	0	0.00	0	0.00	0	0.00	0	0.00
Steel	722	3.70	0	0.00	0	0.00	0	0.00	0	0.00
Concrete	458	2.35	0	0.00	0	0.00	0	0.00	0	0.00
Precast	38	0.20	0	0.00	0	0.00	0	0.00	0	0.00
RM	969	4.96	0	0.00	0	0.00	0	0.00	0	0.00
URM	3,082	15.79	0	0.00	0	0.00	0	0.00	0	0.00
MH	77	0.39	0	0.00	0	0.00	0	0.00	0	0.00
Total	**19,522**		**0**		**0**		**0**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 886 hospital beds available for use. On the day of the earthquake, the model estimates that only 874 hospital beds (99.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	3	0	0	3
Schools	41	0	0	41
EOCs	0	0	0	0
PoliceStations	4	0	0	4
FireStations	7	0	0	7

Transportation and Utility Lifeline Damage

Table 6 provides damage estimates for the transportation system.

Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	65	0	0	65	65
	Bridges	114	0	0	114	114
	Tunnels	0	0	0	0	0
Railways	Segments	51	0	0	51	51
	Bridges	6	0	0	6	6
	Tunnels	0	0	0	0	0
	Facilities	9	0	0	9	9
Light Rail	Segments	3	0	0	3	3
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Bus	Facilities	3	0	0	3	3
Ferry	Facilities	0	0	0	0	0
Port	Facilities	14	0	0	14	14
Airport	Facilities	0	0	0	0	0
	Runways	1	0	0	1	1

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	2	0	0	2	2
Natural Gas	0	0	0	0	0
Oil Systems	2	0	0	2	2
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	4,748	0	0
Waste Water	2,849	0	0
Natural Gas	1,899	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	41,596	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 0.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 124,969) will seek temporary shelter in public shelters.

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**
5 PM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**

Economic Loss

The total economic loss estimated for the earthquake is 0.03 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.00 (millions of dollars); 0 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.00	0.00	0.00	0.00	0.00
	Capital-Related	0.00	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Capital Stock Losses							
	Structural	0.00	0.00	0.00	0.00	0.00	0.00
	Non_Structural	0.00	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Hazus estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 14 presents the results of the region for the given earthquake.

Table 12: Transportation System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	460.10	$0.00	0.00
	Bridges	3,235.63	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Subtotal	**3695.70**	**0.00**	
Railways	Segments	42.19	$0.00	0.00
	Bridges	1.18	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	23.97	$0.01	0.04
	Subtotal	**67.30**	**0.00**	
Light Rail	Segments	6.86	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	5.33	$0.00	0.04
	Subtotal	**12.20**	**0.00**	
Bus	Facilities	3.89	$0.00	0.04
	Subtotal	**3.90**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	27.96	$0.01	0.04
	Subtotal	**28.00**	**0.00**	
Airport	Facilities	0.00	$0.00	0.00
	Runways	37.96	$0.00	0.00
	Subtotal	**38.00**	**0.00**	
	Total	**3845.10**	**0.00**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	95.00	$0.00	0.00
	Subtotal	**94.95**	**$0.00**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	158.50	$0.00	0.00
	Distribution Lines	57.00	$0.00	0.00
	Subtotal	**215.48**	**$0.00**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	38.00	$0.00	0.00
	Subtotal	**37.98**	**$0.00**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.20	$0.00	0.00
	Subtotal	**0.24**	**$0.00**	
Electrical Power	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Communication	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
	Total	**348.65**	**$0.00**	

Table 14. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

LOSS		Total	%

Appendix A: County Listing for the Region

Union,NJ

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
New Jersey					
	Union	124,969	7,946	3,861	11,808
Total State		**124,969**	**7,946**	**3,861**	**11,808**
Total Region		**124,969**	**7,946**	**3,861**	**11,808**

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For essential facilities, there are 3 hospitals in the region with a total bed capacity of 886 beds. There are 41 schools, 7 fire stations, 4 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 0 dams identified within the region. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 17 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

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	Segments	65	460.10
	Tunnels	0	0.00
		Subtotal	**3,695.70**
Railways	Bridges	6	1.20
	Facilities	9	24.00
	Segments	51	42.20
	Tunnels	0	0.00
		Subtotal	**67.30**
Light Rail	Bridges	0	0.00
	Facilities	2	5.30
	Segments	3	6.90
	Tunnels	0	0.00
		Subtotal	**12.20**
Bus	Facilities	3	3.90
		Subtotal	**3.90**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	14	28.00
		Subtotal	**28.00**
Airport	Facilities	0	0.00
	Runways	1	38.00
		Subtotal	**38.00**
		Total	**3,845.10**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	95.00
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**95.00**
Waste Water	Distribution Lines	NA	57.00
	Facilities	2	158.50
	Pipelines	0	0.00
		Subtotal	**215.50**
Natural Gas	Distribution Lines	NA	38.00
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**38.00**
Oil Systems	Facilities	2	0.20
	Pipelines	0	0.00
		Subtotal	**0.20**
Electrical Power	Facilities	0	0.00
		Subtotal	**0.00**
Communication	Facilities	0	0.00
		Subtotal	**0.00**
		Total	**348.70**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Probabilistic-500yr-Mag5
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	500.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	5.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Hazus estimates that about 113 buildings will be at least moderately damaged. This is over 1.00 % of the buildings in the region. There are an estimated 1 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	667	3.50	21	5.73	7	6.84	1	7.15	0	4.58
Education	9	0.05	0	0.07	0	0.08	0	0.08	0	0.06
Government	29	0.15	1	0.21	0	0.24	0	0.23	0	0.13
Industrial	121	0.64	3	0.93	1	1.09	0	1.06	0	0.57
Other Residential	9,431	49.52	207	56.86	63	63.04	8	63.44	1	62.06
Religion	60	0.32	2	0.50	1	0.66	0	0.74	0	0.68
Single Family	8,726	45.82	130	35.69	28	28.05	3	27.31	0	31.91
Total	**19,044**		**364**		**100**		**12**		**1**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	14,024	73.64	140	38.46	12	11.58	0	0.00	0	0.00
Steel	703	3.69	15	4.03	4	4.10	0	2.52	0	0.00
Concrete	444	2.33	11	3.13	3	2.82	0	1.28	0	0.00
Precast	36	0.19	1	0.39	1	0.82	0	1.11	0	0.00
RM	937	4.92	21	5.83	10	9.85	1	9.58	0	0.00
URM	2,830	14.86	171	46.89	69	69.20	11	85.23	1	100.00
MH	71	0.37	5	1.27	2	1.62	0	0.27	0	0.00
Total	**19,044**		**364**		**100**		**12**		**1**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 886 hospital beds available for use. On the day of the earthquake, the model estimates that only 770 hospital beds (87.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 95.00% of the beds will be back in service. By 30 days, 99.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	3	0	0	3
Schools	41	0	0	41
EOCs	0	0	0	0
PoliceStations	4	0	0	4
FireStations	7	0	0	7

Transportation and Utility Lifeline Damage

Table 6 provides damage estimates for the transportation system.

Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	65	0	0	65	65
	Bridges	114	0	0	114	114
	Tunnels	0	0	0	0	0
Railways	Segments	51	0	0	51	51
	Bridges	6	0	0	6	6
	Tunnels	0	0	0	0	0
	Facilities	9	0	0	9	9
Light Rail	Segments	3	0	0	3	3
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Bus	Facilities	3	0	0	3	3
Ferry	Facilities	0	0	0	0	0
Port	Facilities	14	0	0	14	14
Airport	Facilities	0	0	0	0	0
	Runways	1	0	0	1	1

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	2	0	0	2	2
Natural Gas	0	0	0	0	0
Oil Systems	2	0	0	2	2
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	4,748	3	1
Waste Water	2,849	2	1
Natural Gas	1,899	1	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	41,596	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.01 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 75.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 320 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 28 households to be displaced due to the earthquake. Of these, 25 people (out of a total population of 124,969) will seek temporary shelter in public shelters.

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	5	1	0	0
	Single Family	1	0	0	0
	Total	**6**	**1**	**0**	**0**
2 PM	Commercial	3	0	0	0
	Commuting	0	0	0	0
	Educational	1	0	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	1	0	0	0
	Single Family	0	0	0	0
	Total	**6**	**1**	**0**	**0**
5 PM	Commercial	2	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	2	0	0	0
	Single Family	0	0	0	0
	Total	**5**	**1**	**0**	**0**

Economic Loss

The total economic loss estimated for the earthquake is 23.30 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 19.71 (millions of dollars); 21 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 54 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.07	0.59	0.02	0.04	0.72
	Capital-Related	0.00	0.03	0.47	0.01	0.01	0.52
	Rental	0.04	0.77	0.47	0.01	0.01	1.30
	Relocation	0.14	0.56	0.64	0.06	0.12	1.52
	Subtotal	**0.18**	**1.42**	**2.17**	**0.11**	**0.18**	**4.06**
Capital Stock Losses							
	Structural	0.36	1.41	1.24	0.24	0.17	3.42
	Non_Structural	1.01	4.94	2.19	0.61	0.36	9.12
	Content	0.28	1.08	1.09	0.41	0.16	3.02
	Inventory	0.00	0.00	0.03	0.06	0.00	0.09
	Subtotal	**1.65**	**7.43**	**4.55**	**1.32**	**0.69**	**15.65**
	Total	**1.83**	**8.85**	**6.72**	**1.43**	**0.88**	**19.71**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Hazus estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 14 presents the results of the region for the given earthquake.

Table 12: Transportation System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	460.10	$0.00	0.00
	Bridges	3,235.63	$0.28	0.01
	Tunnels	0.00	$0.00	0.00
	Subtotal	**3695.70**	**0.30**	
Railways	Segments	42.19	$0.00	0.00
	Bridges	1.18	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	23.97	$0.85	3.56
	Subtotal	**67.30**	**0.90**	
Light Rail	Segments	6.86	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	5.33	$0.19	3.59
	Subtotal	**12.20**	**0.20**	
Bus	Facilities	3.89	$0.14	3.58
	Subtotal	**3.90**	**0.10**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	27.96	$1.00	3.58
	Subtotal	**28.00**	**1.00**	
Airport	Facilities	0.00	$0.00	0.00
	Runways	37.96	$0.00	0.00
	Subtotal	**38.00**	**0.00**	
	Total	**3845.10**	**2.50**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	95.00	$0.02	0.02
	Subtotal	**94.95**	**$0.02**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	158.50	$1.10	0.69
	Distribution Lines	57.00	$0.01	0.02
	Subtotal	**215.48**	**$1.11**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	38.00	$0.00	0.01
	Subtotal	**37.98**	**$0.00**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.20	$0.00	0.67
	Subtotal	**0.24**	**$0.00**	
Electrical Power	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Communication	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
	Total	**348.65**	**$1.13**	

Table 14. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

LOSS		Total	%

Appendix A: County Listing for the Region

Union,NJ

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
New Jersey					
	Union	124,969	7,946	3,861	11,808
Total State		**124,969**	**7,946**	**3,861**	**11,808**
Total Region		**124,969**	**7,946**	**3,861**	**11,808**

Appendix E
HAZUS: Riverine/Coastal Flood Event Report

Hazus-MH: Flood Event Report

Region Name: Elizabeth_F_CoastalRiverine

Flood Scenario: ElizabethRiverineCoastal100yr

Print Date: Monday, April 27, 2015

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- New Jersey

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 12 square miles and contains 1,003 census blocks. The region contains over 42 thousand households and has a total population of 124,969 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 19,522 buildings in the region with a total building replacement value (excluding contents) of 11,808 million dollars (2010 dollars). Approximately 95.27% of the buildings (and 67.30% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 19,522 buildings in the region which have an aggregate total replacement value of 11,808 million (2010 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	7,946,754	67.3%
Commercial	2,692,590	22.8%
Industrial	754,202	6.4%
Agricultural	3,758	0.0%
Religion	202,432	1.7%
Government	55,870	0.5%
Education	152,533	1.3%
Total	**11,808,139**	**100.00%**

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,032,482	53.6%
Commercial	1,263,420	33.3%
Industrial	365,319	9.6%
Agricultural	1,747	0.0%
Religion	51,564	1.4%
Government	33,288	0.9%
Education	43,603	1.2%
Total	**3,791,423**	**100.00%**

Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 886 beds.
There are 41 schools, 7 fire stations, 4 police stations and no emergency operation centers.

Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Elizabeth_F_CoastalRiverine
Scenario Name:	ElizabethRiverineCoastal100yr
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Building Damage

General Building Stock Damage

Hazus estimates that about 43 buildings will be at least moderately damaged. This is over 4% of the total number of buildings in the scenario. There are an estimated 2 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	2	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	4	10.00	10	25.00	11	27.50	13	32.50	2	5.00
Total	**0**		**7**		**10**		**11**		**13**		**2**	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	0	0.00	1	33.33	0	0.00	1	33.33	1	33.33	0	0.00
Steel	0	0.00	2	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	3	8.11	10	27.03	10	27.03	12	32.43	2	5.41

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 886 hospital beds available for use. On the day of the scenario flood event, the model estimates that 886 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	7	2	0	2
Hospitals	3	0	0	0
Police Stations	4	0	0	0
Schools	41	1	0	1

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 3,360 tons of debris will be generated. Of the total amount, Finishes comprises 99% of the total, Structure comprises 1% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 134 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 2,182 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 5,895 people (out of a total population of 124,969) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 213.23 million dollars, which represents 5.62 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 211.89 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 31.63% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	39.08	25.15	7.22	2.88	74.33
	Content	28.29	68.95	20.97	15.63	133.83
	Inventory	0.00	1.76	1.97	0.00	3.73
	Subtotal	**67.37**	**95.86**	**30.15**	**18.51**	**211.89**
Business Interruption						
	Income	0.01	0.30	0.00	0.02	0.33
	Relocation	0.02	0.11	0.00	0.02	0.14
	Rental Income	0.04	0.07	0.00	0.00	0.11
	Wage	0.02	0.32	0.00	0.42	0.76
	Subtotal	**0.07**	**0.80**	**0.01**	**0.46**	**1.34**
ALL	**Total**	**67.45**	**96.66**	**30.16**	**18.97**	**213.23**

Appendix A: County Listing for the Region

New Jersey

- Union

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
New Jersey				
Union	124,969	7,946,754	3,861,385	11,808,139
Total	**124,969**	**7,946,754**	**3,861,385**	**11,808,139**
Total Study Region	**124,969**	**7,946,754**	**3,861,385**	**11,808,139**

Hazus-MH: Flood Event Report

Region Name: Elizabeth_F_CoastalRiverine

Flood Scenario: ElizabethRiverineCoastal500yr

Print Date: Monday, April 27, 2015

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- New Jersey

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 12 square miles and contains 1,003 census blocks. The region contains over 42 thousand households and has a total population of 124,969 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 19,522 buildings in the region with a total building replacement value (excluding contents) of 11,808 million dollars (2010 dollars). Approximately 95.27% of the buildings (and 67.30% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 19,522 buildings in the region which have an aggregate total replacement value of 11,808 million (2010 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	7,946,754	67.3%
Commercial	2,692,590	22.8%
Industrial	754,202	6.4%
Agricultural	3,758	0.0%
Religion	202,432	1.7%
Government	55,870	0.5%
Education	152,533	1.3%
Total	**11,808,139**	**100.00%**

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,097,339	52.3%
Commercial	1,332,647	33.2%
Industrial	428,925	10.7%
Agricultural	1,802	0.0%
Religion	71,856	1.8%
Government	34,784	0.9%
Education	43,441	1.1%
Total	**4,010,794**	**100.00%**

Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 886 beds.
There are 41 schools, 7 fire stations, 4 police stations and no emergency operation centers.

Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Elizabeth_F_CoastalRiverine
Scenario Name:	ElizabethRiverineCoastal500yr
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

General Building Stock Damage

Hazus estimates that about 83 buildings will be at least moderately damaged. This is over 7% of the total number of buildings in the scenario. There are an estimated 5 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	1	11.11	8	88.89	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	2	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	10	13.70	26	35.62	14	19.18	18	24.66	5	6.85
Total	**1**		**20**		**26**		**14**		**18**		**5**	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	0	0.00	1	12.50	5	62.50	1	12.50	1	12.50	0	0.00
Steel	1	14.29	6	85.71	0	0.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	8	12.90	20	32.26	13	20.97	16	25.81	5	8.06

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 886 hospital beds available for use. On the day of the scenario flood event, the model estimates that 886 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	7	2	0	2
Hospitals	3	0	0	0
Police Stations	4	0	0	0
Schools	41	1	0	1

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 5,190 tons of debris will be generated. Of the total amount, Finishes comprises 91% of the total, Structure comprises 7% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 208 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 2,878 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 7,977 people (out of a total population of 124,969) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 323.48 million dollars, which represents 8.07 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 321.10 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 28.20% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	53.22	44.97	10.91	3.85	112.95
	Content	37.91	112.25	31.79	20.45	202.40
	Inventory	0.00	2.81	2.94	0.00	5.75
	Subtotal	**91.13**	**160.03**	**45.64**	**24.31**	**321.10**
Business Interruption						
	Income	0.01	0.71	0.00	0.03	0.75
	Relocation	0.03	0.24	0.01	0.02	0.29
	Rental Income	0.05	0.17	0.00	0.00	0.22
	Wage	0.02	0.57	0.00	0.53	1.13
	Subtotal	**0.10**	**1.69**	**0.01**	**0.59**	**2.39**
ALL	**Total**	**91.22**	**161.72**	**45.65**	**24.89**	**323.48**

Appendix A: County Listing for the Region

New Jersey

- Union

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
New Jersey				
Union	124,969	7,946,754	3,861,385	11,808,139
Total	**124,969**	**7,946,754**	**3,861,385**	**11,808,139**
Total Study Region	**124,969**	**7,946,754**	**3,861,385**	**11,808,139**

Appendix F
HAZUS: Hurricane (Wind) Event Report

Hazus-MH: Hurricane Event Report

Region Name: Elizabeth_FHE

Hurricane Scenario: Probabilistic 100-year Return Period

Print Date: Thursday, April 16, 2015

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- New Jersey

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 12.43 square miles and contains 26 census tracts. There are over 41 thousand households in the region and has a total population of 124,969 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 19 thousand buildings in the region with a total building replacement value (excluding contents) of 11,808 million dollars (2010 dollars). Approximately 95% of the buildings (and 67% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 19,522 buildings in the region which have an aggregate total replacement value of 11,808 million (2006 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	7,946,754	67.3%
Commercial	2,692,590	22.8%
Industrial	754,202	6.4%
Agricultural	3,758	0.0%
Religious	202,432	1.7%
Government	55,870	0.5%
Education	152,533	1.3%
Total	**11,808,139**	**100.0%**

Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 886 beds. There are 41 schools, 7 fire stations, 4 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 12 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

Table 2: Expected Building Damage by Occupancy : 100 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	691	99.28	5	0.68	0	0.04	0	0.00	0	0.00
Education	9	99.31	0	0.69	0	0.00	0	0.00	0	0.00
Government	30	99.27	0	0.73	0	0.00	0	0.00	0	0.00
Industrial	125	99.12	1	0.87	0	0.01	0	0.00	0	0.00
Religion	63	99.47	0	0.53	0	0.00	0	0.00	0	0.00
Residential	18,472	99.32	114	0.61	11	0.06	1	0.00	0	0.00
Total	**19,390**		**120**		**11**		**1**		**0**	

Table 3: Expected Building Damage by Building Type : 100 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	389	99.06	4	0.94	0	0.01	0	0.00	0	0.00
Masonry	3,765	98.32	56	1.45	8	0.21	1	0.01	0	0.00
MH	70	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	654	99.16	5	0.81	0	0.03	0	0.00	0	0.00
Wood	14,095	99.76	33	0.24	0	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had 886 hospital beds available for use. On the day of the hurricane, the model estimates that 886 hospital beds (only 100.00%) are available for use. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	7	0	0	7
Hospitals	3	3	0	3
Police Stations	4	0	0	4
Schools	41	0	0	41

Induced Hurricane Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 1,686 tons of debris will be generated. Of the total amount, 110 tons (7%) is Other Tree Debris. Of the remaining 1,576 tons, Brick/Wood comprises 83% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 52 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 275 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 124,969) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 8.6 million dollars, which represents 0.07 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 9 million dollars. 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 92% of the total loss. Table 4 below provides a summary of the losses associated with the building damage.

Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	6,829.17	437.49	139.45	67.37	7,473.48
	Content	677.52	0.00	0.00	0.00	677.52
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**7,506.69**	**437.49**	**139.45**	**67.37**	**8,151.00**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	177.66	8.13	0.04	0.01	185.83
	Rental	254.93	0.00	0.00	0.00	254.93
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**432.58**	**8.13**	**0.04**	**0.01**	**440.76**
Total						
	Total	**7,939.28**	**445.62**	**139.48**	**67.37**	**8,591.75**

Appendix A: County Listing for the Region

New Jersey
- Union

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
New Jersey				
Union	124,969	7,946,754	3,861,385	11,808,139
Total	**124,969**	**7,946,754**	**3,861,385**	**11,808,139**
Study Region Total	**124,969**	**7,946,754**	**3,861,385**	**11,808,139**

Hazus-MH: Hurricane Event Report

Region Name: Elizabeth_FHE

Hurricane Scenario: Probabilistic 500-year Return Period

Print Date: Thursday, April 16, 2015

Disclaimer:
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Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

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General Description of the Region

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The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- New Jersey

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 12.43 square miles and contains 26 census tracts. There are over 41 thousand households in the region and has a total population of 124,969 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 19 thousand buildings in the region with a total building replacement value (excluding contents) of 11,808 million dollars (2010 dollars). Approximately 95% of the buildings (and 67% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 19,522 buildings in the region which have an aggregate total replacement value of 11,808 million (2006 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	7,946,754	67.3%
Commercial	2,692,590	22.8%
Industrial	754,202	6.4%
Agricultural	3,758	0.0%
Religious	202,432	1.7%
Government	55,870	0.5%
Education	152,533	1.3%
Total	**11,808,139**	**100.0%**

Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 886 beds. There are 41 schools, 7 fire stations, 4 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 217 buildings will be at least moderately damaged. This is over 1% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

Table 2: Expected Building Damage by Occupancy : 500 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	652	93.73	36	5.10	7	1.00	1	0.17	0	0.00
Education	9	95.06	0	4.60	0	0.33	0	0.00	0	0.00
Government	29	95.15	1	4.52	0	0.32	0	0.00	0	0.00
Industrial	117	93.13	7	5.70	1	0.91	0	0.24	0	0.01
Religion	60	94.87	3	4.85	0	0.27	0	0.00	0	0.00
Residential	17,132	92.12	1,259	6.77	201	1.08	6	0.03	0	0.00
Total	**17,998**		**1,307**		**209**		**7**		**0**	

Table 3: Expected Building Damage by Building Type : 500 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	368	93.73	22	5.69	2	0.57	0	0.01	0	0.00
Masonry	3,427	89.51	279	7.29	118	3.08	5	0.12	0	0.00
MH	70	99.79	0	0.17	0	0.04	0	0.00	0	0.00
Steel	620	93.87	33	4.95	7	1.01	1	0.17	0	0.00
Wood	13,184	93.31	911	6.45	34	0.24	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had 886 hospital beds available for use. On the day of the hurricane, the model estimates that 886 hospital beds (only 100.00%) are available for use. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	7	0	0	7
Hospitals	3	3	0	3
Police Stations	4	0	0	4
Schools	41	0	0	38

Induced Hurricane Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 12,026 tons of debris will be generated. Of the total amount, 442 tons (4%) is Other Tree Debris. Of the remaining 11,584 tons, Brick/Wood comprises 91% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 420 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 1,087 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 124,969) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 73.4 million dollars, which represents 0.62 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 73 million dollars. 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 87% of the total loss. Table 4 below provides a summary of the losses associated with the building damage.

Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	53,881.96	4,297.03	1,393.44	471.43	60,043.86
	Content	4,984.46	830.83	613.39	32.20	6,460.88
	Inventory	0.00	29.36	86.52	0.35	116.23
	Subtotal	**58,866.42**	**5,157.22**	**2,093.35**	**503.98**	**66,620.96**
Business Interruption Loss						
	Income	0.00	428.46	12.14	33.61	474.21
	Relocation	2,400.06	530.98	46.58	31.69	3,009.31
	Rental	2,775.52	226.43	8.54	2.59	3,013.08
	Wage	0.00	220.75	17.29	84.32	322.37
	Subtotal	**5,175.57**	**1,406.62**	**84.55**	**152.22**	**6,818.96**
Total						
	Total	**64,041.99**	**6,563.84**	**2,177.90**	**656.20**	**73,439.93**

Appendix A: County Listing for the Region

New Jersey
- Union

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
New Jersey				
Union	124,969	7,946,754	3,861,385	11,808,139
Total	**124,969**	**7,946,754**	**3,861,385**	**11,808,139**
Study Region Total	**124,969**	**7,946,754**	**3,861,385**	**11,808,139**

Appendix G
Capability Assessment Worksheets

CITY OF ELIZABETH
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Name of Department:	
Description of Department Functions in Respect to Hazard Mitigation (e.g., flooding)	The fundamental objective of the Elizabeth Police Department in respect to hazard mitigation is to protect and serve the citizens of the community and ensuring a high quality of life. This is accomplished by ensuring continued access to all services i.e., police, medical, food, shelter, utilities, communications, etc., are still available, and that all avenues of ingress and egress are operable and accessible in order to carry out the aforementioned objectives.
Point of Contact	Name/Title: Deputy Chief Alexander Sofianakos Email:asofianakos@elizabethnj.org Phone:908 558-2022 Address:1 Police Plaza, Elizabeth, N.J. 07201 Website link to Department if available:
Effectiveness and/or function before, during and after a disaster event	The Elizabeth Police Department mitigates hazards with the coordination and partnership of FEMA and its programs, and also through working relationships with the County and State Emergency Management Offices.
Contribution to Loss Reduction Y/N (If Yes, please describe how or what contributes to Loss Reduction)	The City of Elizabeth through its engineering department has examined and addressed mitigation issues due to natural disasters, while the police department Emergency Management Division and Emergency Services Division have addressed human caused issues such as terrorism and the like.
Available Funding? Y/N (If Yes, please describe the types of funding available to Department)	The Elizabeth Police Department through the City of Elizabeth applies and receives grants and funding from FEMA.
Provides Technical Assistance to public and private sectors? Y/N (If yes, describe type of assistance)	The Elizabeth Police Department generates risk/vulnerability and mitigation/action data only for its own use. It does not participate or assist other bordering territories or agencies.
Mitigation Integration in existing Plans/Policies/ Documents? (If yes, describe	Police Emergency Management Manual and Engineering Department data.

type of integration)	
Mitigation Training (e.g., seminars/ conferences and internal training)	Internal training, seminars and conferences
NJOEM/FEMA Mitigation partnership/coordination? Y/N	Y
Funding Offered? Y/N (If yes, please provide description)	Y / FEMA
Hazards addressed by your organization (e.g. Multiple hazards, natural hazards, flooding, etc.)	Flooding, power failures, terrorism and other man caused disasters.
New capabilities? (e.g. responsibilities, programs, initiatives in near future) Y/N (If yes, please describe).	N

1. Description of Department Functions in Respect to Hazard Mitigation:

- The Department of Administration is responsible for the daily municipal operations of the City .This includes personnel, employee benefits and city-wide purchasing. The Business Administrator oversees the Directors of each City Department and meets twice a month to discuss programs and activities occurring throughout the municipality. The Business Administrator also responds to requests for information from City Council as they pertain to initiatives, opportunities and projects submitted for consideration and approval.

- According to the Emergency Operations Plan (EOP), the Division of Purchasing located in the Department of Administration is tasked with the development and operation of a viable resource management program during any emergency or disaster situation. This effort is to ensure completion of required emergency actions.

- According to the EOP, the City of Elizabeth routinely maintains a stock of the following items: generators, blankets, cots, medical supplies, construction supplies and equipment, printing and sign-making supplies, automobiles and larger vehicles, self contained breathing apparatus and oxygen.

- Resource Management empowers the Police Department, Fire Department, Department of Public Works and various other departments involved in an emergency to make necessary emergency purchases on a 24-hour basis.

- The Resource Management representative will be the Purchasing Agent, who reports to the Emergency Operations Committee during an emergency.

- Emergency purchases may be specifically authorized when a situation affects the public health, safety or welfare requiring the immediate delivery of the article or the performance of the service, provided that the awarding or making of such purchases, contracts or agreements are made in accordance with the guidelines outlined within the EOP.

2. Point of Contact:

Name/Title: Marie T. Krupinski, Assistant Business Administrator

E-mail: mkrupinski@elizabethnj.org

Phone: (908) 820-4277

Address: City Hall, 50 Winfield Scott Plaza, Elizabeth, NJ 07201

Website link to Department: www.elizabethnj.org

3. Effectiveness and/or function before/during and after a disaster event:

As indicated above, the Department of Administration contains the Division of Purchasing, which would act as the Resource Management Center during an event. The Business Administrator would remain in constant contact with all Department Directors and be provided with status updates in regard to activities and progress.

Name of Department:	
Description of Department Functions in Respect to Hazard Mitigation (e.g., flooding)	N/A , ETOWN SERVICES HANDLE SEWER AND STORM WATER
Point of Contact	Name/Title: CARLOS CARVALHO / SUPT. PUBLIC WORKS Email: CCARVALHO@ELIZABETHNJ.ORG Phone: 9088204173 Address: 400 ATLANTIC STREET Website link to Department if available:
Effectiveness and/or function before, during and after a disaster event	TEMPORARY ROAD CLOSURES SAFETY OF ROADWAY
Contribution to Loss Reduction Y/N (If Yes, please describe how or what contributes to Loss Reduction)	NO
Available Funding? Y/N (If Yes, please describe the types of funding available to Department)	N/A
Provides Technical Assistance to public and private sectors? Y/N (If yes, describe type of assistance)	NO
Mitigation Integration in existing Plans/Policies/ Documents? (If yes, describe	POLICY AND MITIGATION THROUGH ENGINEERING DEPT.

type of integration)	
Mitigation Training (e.g., seminars/ conferences and internal training)	NO
NJOEM/FEMA Mitigation partnership/coordination? Y/N	NO
Funding Offered? Y/N (If yes, please provide description)	N/A
Hazards addressed by your organization (e.g. Multiple hazards, natural hazards, flooding, etc.)	LIST AVAILABLE THROUGH ENGINEERING DEPT.
New capabilities? (e.g. responsibilities, programs, initiatives in near future) Y/N (If yes, please describe).	N/A