



# Strategic Recovery Planning Report

**Prepared For:**  
**City of Brigantine**  
**Brigantine, New Jersey**

**Prepared By:**  
**Rutala Associates**  
**Linwood, New Jersey**

**Mayor**

Phillip J. Guenther

**City Manager**

Jennifer Blumenthal

**City Clerk**

Lynn Sweeney

**City Engineer**

Edward Stinson

**Steering Committee**

Phillip J. Guenther, Mayor  
Jennifer Blumenthal, City Manager  
Lisa McClay, City Council  
Edward Stinson, City Engineer  
Barbara Saccoccia, Tax Assessor  
John Doring, Public Works Supervisor  
Richard Stevens, Building Inspector  
Lynn Sweeney, City Clerk  
Mark Coyne, Planning Board Chair  
Daniel Howard, Public Safety Director  
Joseph Picardi, City Council  
Reverend John R. Scotland, BrigStrong  
Mike Brennan, Chamber of Commerce

**City Council**

Frank Kern  
Andrew Simpson  
Lisa McClay  
Joseph Picardi  
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Tony Pullella

**City Solicitor**

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Dorie Herndon  
Mike Dattalo  
Tim Donahue  
Frank Alberti (Alternative #1)  
Gary Paul (Alternative #2)  
Marie Sacco Handle (Alternative #3)  
Denise Tamagnini (Alternative #4)

Original signed and sealed in accordance with N.J.A.C. 13:41

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**James M. Rutala, Licensed Professional Planner #2704**  
**Rutala Associates, LLC**

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## **1.0 Introduction**

The Strategic Recovery Planning Report is a comprehensive planning document that will enable the City of Brigantine to respond to Superstorm Sandy (DR-4086). This report contains actionable recommendations both for rebuilding the community and increasing the resilience of infrastructure and buildings. It will also outline multi-year investments to increase economic development and make recommendations to protect neighborhoods and infrastructure from future natural disasters.

To ensure the plan's success, a series of public meetings was held to gather input from the people who live and work in the City. A Steering Committee was also established consisting of public officials, business leaders and local residents to guide development of this report. Interactive meetings were held with the Steering Committee on January 7, 2014 and March 11, 2014.

In addition, the Brigantine Planning Board played an important role in the formulation of this report. A meeting with a committee of the Planning Board was held on February 4, 2014. During the course of preparing this report, meetings were also held with the New Jersey Office of Emergency Management (NJOEM), New Jersey Department of Environmental Protection, (NJDEP) New Jersey Department of Community Affairs (NJCA) and the U.S. Army Corps of Engineers (USACE).

This Strategic Recovery Planning Report was fully funded by a grant provided by NJCA. NJCA has allocated Community Development Block Grant – Disaster Recovery funds for this program.

## **2.0 Existing Conditions**

The City of Brigantine is located on Brigantine Beach Island with a population of 9,450, according to the 2010 U.S. Census. The population trend of this community has been in decline since 2000 when the population peaked at 12,594, a 25 percent decline in a decade. The population balloons to 30,000 in the summer months. New Jersey Monthly magazine ranked Brigantine as its 36<sup>th</sup> best place to live in its 2008 ranking of the “Best Places to Live in New Jersey.” The City provides a wide variety of recreational opportunities because of its pristine beaches, abundance of water access and parking facilities, and its open space along the back-bay area.

There were 9,222 housing units in the City as of the 2010 U.S. Census. With an average household size of 2.2, approximately 4,295 units are occupied on a year-round basis and the remaining 4,926 units are seasonal – second homes and seasonal rentals.

The total area of the City is 10.364 square miles with 38.37 percent of that area or 3.977 square miles consisting of water. The total land area in Brigantine is 6.387 square miles, resulting in a population density of 1,479.5 per square mile.

The only road to and from Brigantine is New Jersey Route 87 via the Justice Vincent S. Haneman Memorial Bridge. The original bridge to the island was built in 1924 and was destroyed in the Great Atlantic Hurricane of 1944. The current bridge was constructed in 1972. The bridge provides emergency access via the Brigantine Connector to the Atlantic City Expressway.

The City of Brigantine is exposed to flooding from two sources – storm events (e.g. coastal flooding, ponding, urban drainage, etc.) and sea level rise. The highest street elevation on the island is 10 feet above sea level. The bayside street elevations are five to six feet above sea level, which leaves the City’s low-lying residential areas vulnerable to flooding during coastal storms. In an attempt to reduce the flooding, the City installed nine-foot bulkheads in some critical areas along the bay side. However, a seven-foot tide still caused backflow from the bays to flood streets, threaten homes, inhibit the safe passage of first responders and block the only evacuation route available to residents.

The initial Flood Hazard Boundary Maps (FHBM) for Brigantine were issued on December 28, 1973 by the Federal Emergency Management Agency (FEMA). Almost a decade later, the Flood Insurance Rate Maps (FIRM) were released. The FIRMs are based on historic, meteorologic, hydrologic and hydraulic data, as well as open-space conditions, flood-control works, and development.

The 2010 Atlantic County Hazard Mitigation Plan reports that the current (pre-Sandy) FIRMs already show 100 percent of the City lying in high-risk areas or zones identified as V, commonly known as Velocity, and A or AE, commonly known as the 100-year flood zone, putting more than \$513 million of improvements at risk of damage or destruction from flooding. FEMA is in the process of updating flood mapping in New Jersey, and in mid-2013 released preliminary work maps as a form of “best available data” for municipalities to use for guidance during the current stage of post-Sandy recovery. These maps reflect some modifications of zone boundaries and also identify a few areas in the City that may change to a 500-year flood hazard zone designation.

**Table 3a.16**  
**Summary of FEMA Q3 Flood Data by Municipality: Land in Hazard Areas**

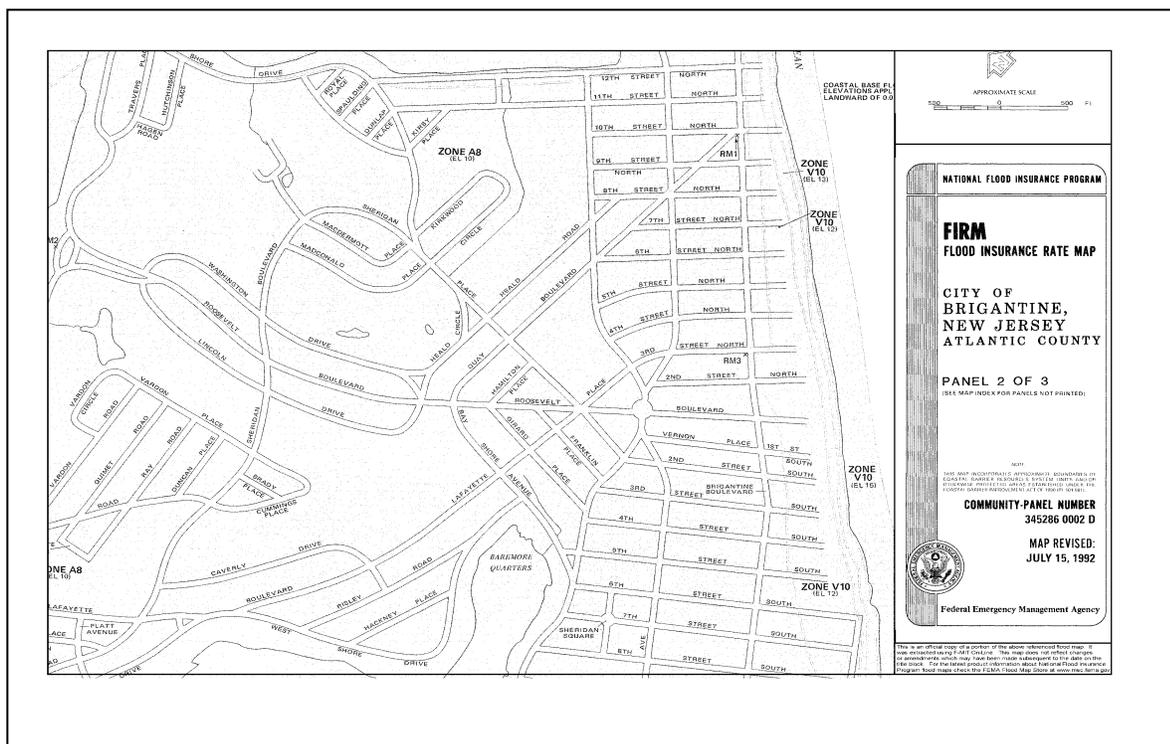
| Municipality               | Total Land Area (Acres) | High Flood Risk (Acres) |              | Moderate Flood Risk (Acres) | Low Flood Risk (Acres) | Possible But Undetermined Risk (Acres) | Land in High Flood Risk % |              | Land in Moderate Flood Risk % |
|----------------------------|-------------------------|-------------------------|--------------|-----------------------------|------------------------|--|---------------------------|--------------|-------------------------------|
|                            |                         | VE                      | A, AE        | X500                        | X                      | D                                      | VE                        | A, AE        | X500                          |
| Absecon, City of           | 3,728                   | 0                       | 1,912        | 389                         | 1,382                  | 45                                     | 0.0%                      | 51.3%        | 10.4%                         |
| Atlantic City, City of     | 7,232                   | 3,407*                  | 3,686        | 139                         | 0                      | 0                                      | 47.1%                     | 51.0%        | 1.9%                          |
| <b>Brigantine, City of</b> | <b>2,077</b>            | <b>495*</b>             | <b>1,582</b> | <b>0</b>                    | <b>0</b>               | <b>0</b>                               | <b>23.8%</b>              | <b>76.2%</b> | <b>0.0%</b>                   |
| Buena, Borough of          | 4,855                   | 0                       | 95           | 0                           | 4,760                  | 0                                      | 0.0%                      | 2.0%         | 0.0%                          |
| Buena Vista, Township of   | 26,631                  | 0                       | 1,554        | 1                           | 25,076                 | 0                                      | 0.0%                      | 5.8%         | 0.0%                          |
| Corbin City, City of       | 5,130                   | 0                       | 712          | 309                         | 973                    | 3136                                   | 0.0%                      | 13.9%        | 6.0%                          |
| Egg Harbor City, City of   | 7,124                   | 0                       | 3,004        | 639                         | 3,481                  | 0                                      | 0.0%                      | 42.7%        | 0.0%                          |

**Table 3a.17  
Summary of FEMA Q3 Flood Data by Municipality: Improved Values in Hazard Areas**

| Municipality               | Total Improved Value | Improved Value in High Flood Risk Areas |                      | Improved Value in Moderate Flood Risk Areas | Improved Value in Low Flood Risk Areas | Improved Value in High Flood Risk Areas % |              | Improved Value in Moderate Flood Risk Areas % |
|----------------------------|----------------------|---|----------------------|---|--|---|--------------|---|
|                            |                      | VE                                      | A, AE                | X500  | X                                      | VE  | A, AE        | X500  |
| Absecon, City of           | \$263,139,927        | \$0                                     | \$29,724,892         | \$30,013,100                                | \$203,401,935                          | 0%  | 11.3%        | 11.4%   |
| Atlantic City, City of     | \$5,847,037,300      | \$77,986,239                            | \$5,560,144,493      | \$208,906,487                               | \$0                                    | 1.3%                                      | 95.1%        | 3.6%  |
| <b>Brigantine, City of</b> | <b>\$513,295,303</b> | <b>\$23,405,230</b>                     | <b>\$489,890,073</b> | <b>\$0</b>                                  | <b>\$0</b>                             | <b>4.6%</b>                               | <b>95.4%</b> | <b>0%</b>                                     |
| Buena, Borough of          | \$132,115,107        | \$0                                     | \$566,522            | \$0   | \$131,179,439                          | 0%  | 0.4%         | 0%  |
| Buena Vista, Township of   | \$479,119,804        | \$0                                     | \$15,307,091         | \$14,019                                    | \$463,567,116                          | 0%  | 3.2%         | 0%  |
| Corbin City, City of       | \$28,703,022         | \$0                                     | \$0,166,217          | \$4,002,570                                 | \$14,635,126                           | 0%  | 31.0%        | 17.3%   |

**Figure 1 – Excerpts from the Atlantic County All Hazard Mitigation Plan showing that all of the land area and improved values in Brigantine are in high-risk areas**

Since 1978, when FEMA first began to computerize their records, the City of Brigantine has registered 4,163 insurance losses with total payouts of \$88,006,272.

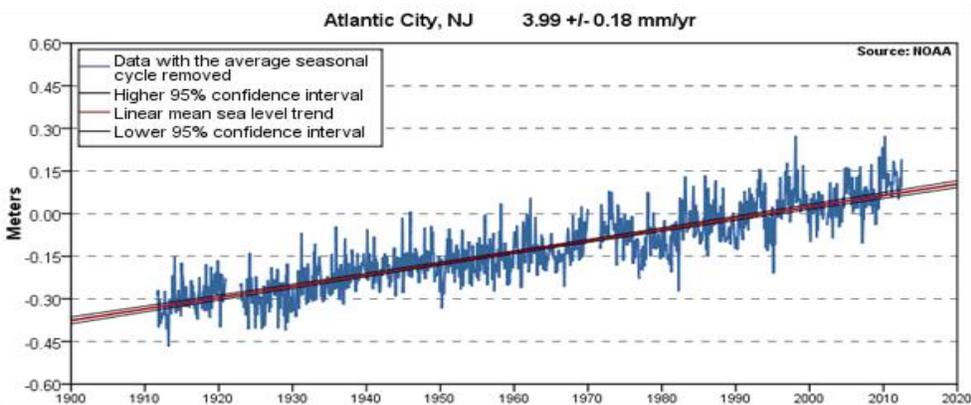


**Figure 2a (above) is from the current FIRM. Figure 2b (below) from the Preliminary Work Map**



In addition to storm impacts, the City must also be aware of potential impacts from rising sea levels.

The historical rate of sea level rise along the New Jersey coast over the past half-century was 0.14 inches/year, while predicted future rates are expected to increase to 0.5 inches/year. This means that by 2050, sea level is expected to rise by approximately 1 foot, and by 2100, sea level is projected to rise about 3 feet along the Jersey Shore (Figure 3).

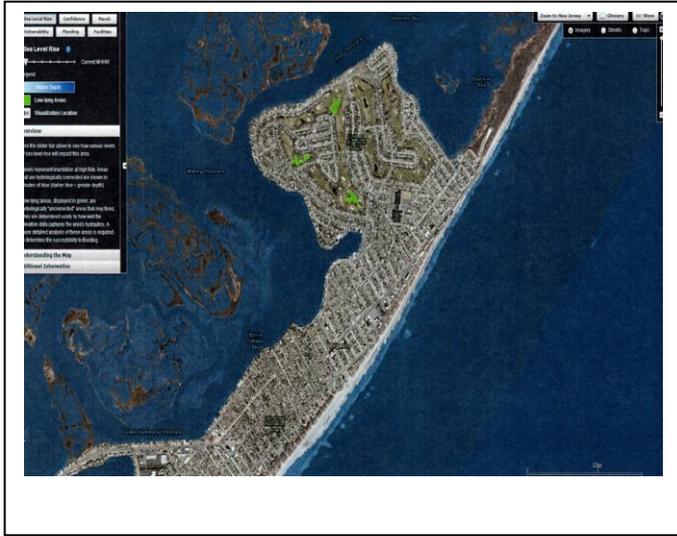


**Figure 3 - Historic Rate of Sea Level Rise along the New Jersey Coast**  
 Source: [www.njfloodmapper.com](http://www.njfloodmapper.com)

The 2007 report from the Intergovernmental Panel on Climate Change projects that the world's oceans will rise from 8 inches to 2 feet by the end of the century. Examples of current sea level and the impacts that a 1-foot and a 2-foot increase in sea level may have on the most vulnerable areas of Brigantine, the North End/Golf Course area and the Lagoon/Lighthouse area, are shown on the following screen shots from njfloodmapper.com, which are identified as figures 4 through 9.

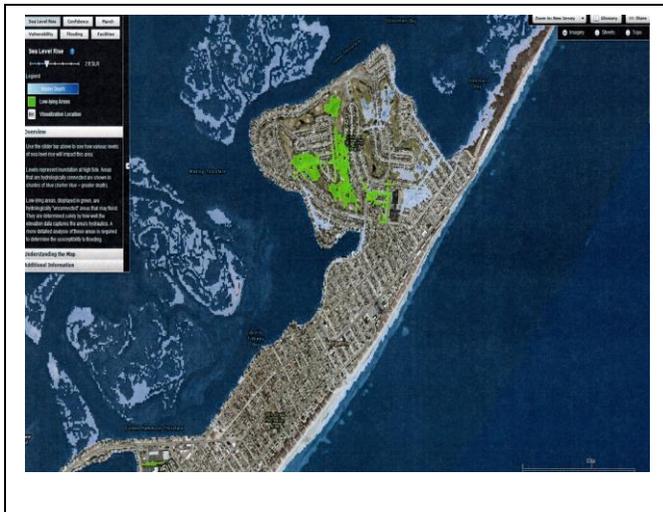
The City of Brigantine has experienced many natural-hazard events that received a federal declaration, including the most recent events listed below:

|                               |                     |         |
|-------------------------------|---------------------|---------|
| April 14 – 20, 2007           | Nor'easter          | DR-1694 |
| November 11 – 15, 2009        | Nor'easter          | DR-1967 |
| December 19 – 20, 2009        | Snowstorm           | DR-1873 |
| February 5 – 6, 2010          | Severe Winter Storm | DR-1889 |
| December 26 – 27, 2010        | Severe Winter Storm | DR-1897 |
| August 26 – September 5, 2011 | Hurricane Irene     | DR-4021 |
| June 29 – 30, 2012            | Derecho             | DR-4070 |
| October 26 - November 8, 2012 | Superstorm Sandy    | DR-4086 |



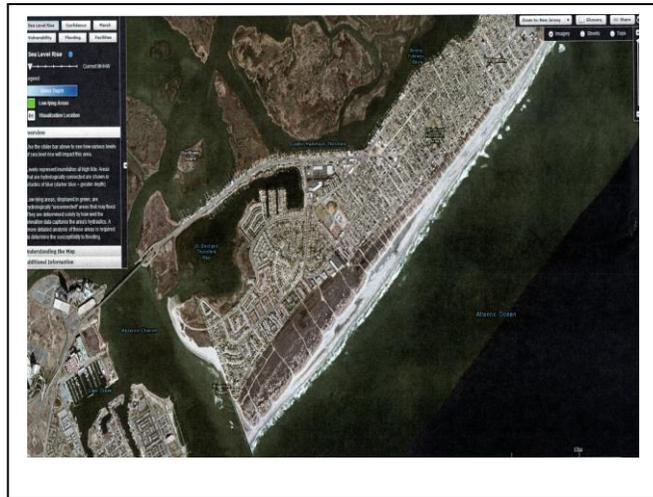
**Figure 4 – Current sea levels at the North End/Golf Course area. Isolated low-lying areas (shown in green) where water may pond are shown on the golf course.**

**Figure 5: Impact of a 1-foot rise in sea level on the North End/Golf Course area. An area adjacent to the school complex, in addition to more of the golf course, is identified as a low-lying area.**

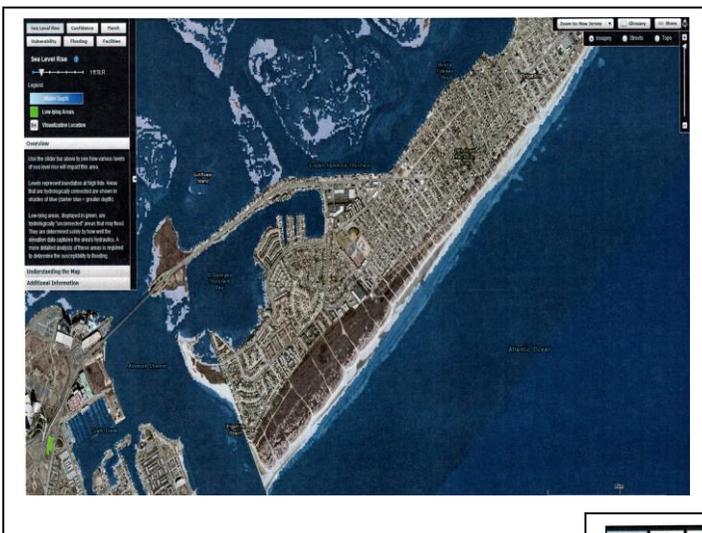


**Figure 6: Impact of a 2-foot rise in sea level on the North End/Golf Course area. In addition to low-lying areas, there are several areas that may be subject to tidal inundation (shown in blue).**

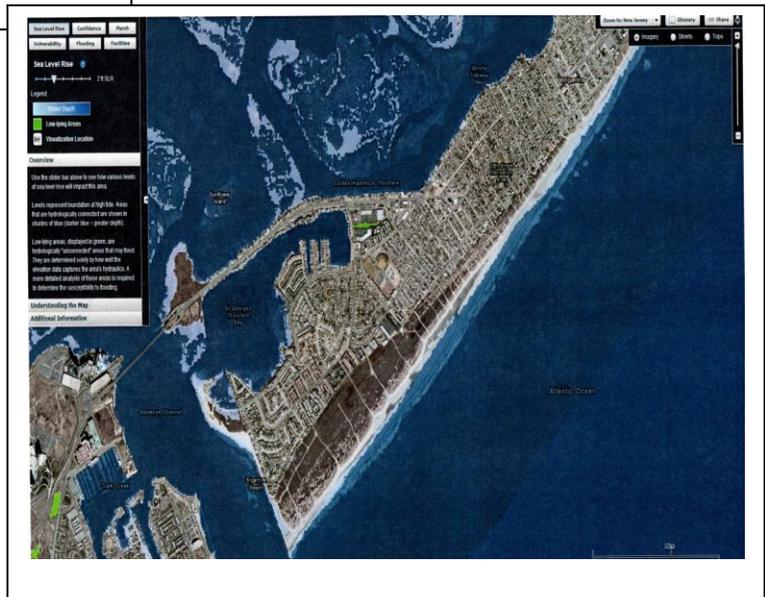
**Figure 7: Current sea level conditions in the Lagoon Lighthouse area.**



**Figure 8: Impact of a 1-foot increase in sea level on the Lagoon Lighthouse area. The lands around the base of the bridge and at the mouth of the lagoon would be subject to tidal inundation.**



**Figure 9: Impact of a 2-foot rise in sea level on the Lagoon Lighthouse area. Several areas in the lagoon would be subject to tidal inundation in addition to more land at the base of the bridge and mouth of the lagoon.**



## 2.1 Documented Damage from Superstorm Sandy

The NJDCA reported in March 2013 that a total of 923 residential claims, 45 business claims and 395 automobile claims have been paid for a total of \$14,195,401 claims paid. The New Jersey Department of Banking and Insurance reported that as of September 15, 2013 a total of 2,172 insurance claims were paid \$10,346,192.

### Figure 10 – Total Superstorm Sandy Related Insurance Claims, September 15, 2013

Claims filed: 1,931  
Percent paid: 74.9 percent  
Closed, no payment: 443  
Losses paid: \$14,195,401  
Average paid: \$9,817  
Losses incurred: \$15,426,010  
Average loss: \$7,989

The ratable base of the City was reduced by more than \$11,360,900 as of March 1, 2013, the largest decrease in ratables caused by Superstorm Sandy in Atlantic County.

A total of 264 structures were deemed substantially damaged as of January 1, 2014 by the City's Building Official. A substantially damaged structure as defined in 59.1 of the National Flood Insurance Program (NFIP) regulations is when:

*“damage of any origin is sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.”*

A substantially damaged structure must be brought into compliance with NJIP regulation for new construction; that is, the structure must be elevated (or flood-proofed if it is a non-residential or historic structure) to or above the level of the base flood elevation.

If a substantially damaged structure is located in a velocity zone (V-Zone), it not only must be elevated but it also must comply with additional requirements contained in the NFIP regulations. These regulations call for the elevation to be on pilings or columns so that the bottom of the lowest horizontal structural member of the lowest floor is elevated to or above the base flood elevation.

The total taxable value of real property and personal property used in business in Brigantine has declined since they stabilized during the recession of 2007-2010 and has declined since Superstorm Sandy with a \$1 billion dollar drop in 2014 a 24 percent decrease in the ratable base almost entirely attributable to Superstorm Sandy.

**Figure 11 – Total Taxable Value, 2007 to 2014**

| <b>Year</b> | <b>Total Taxable Value</b>    |
|-------------|-------------------------------|
| 2007        | \$4,667,422,755               |
| 2008        | \$4,699,840,568               |
| 2009        | \$4,607,119,300               |
| 2010        | \$4,663,523,292               |
| 2011        | \$4,590,686,364               |
| 2012        | \$4,446,203,020               |
| 2013        | \$4,254,101,962               |
| 2014        | \$3,230,790,362 (uncertified) |

The National Flood Insurance Program (NFIP) records show that there are over 200 repetitive-loss properties in Brigantine. A property is considered a repetitive-loss property when there are two or more losses reported that were paid more than \$1,000 for each loss. The two losses must be within 10 years of each other and be at least 10 days apart. Only losses from January 1, 1978 that are closed are considered.

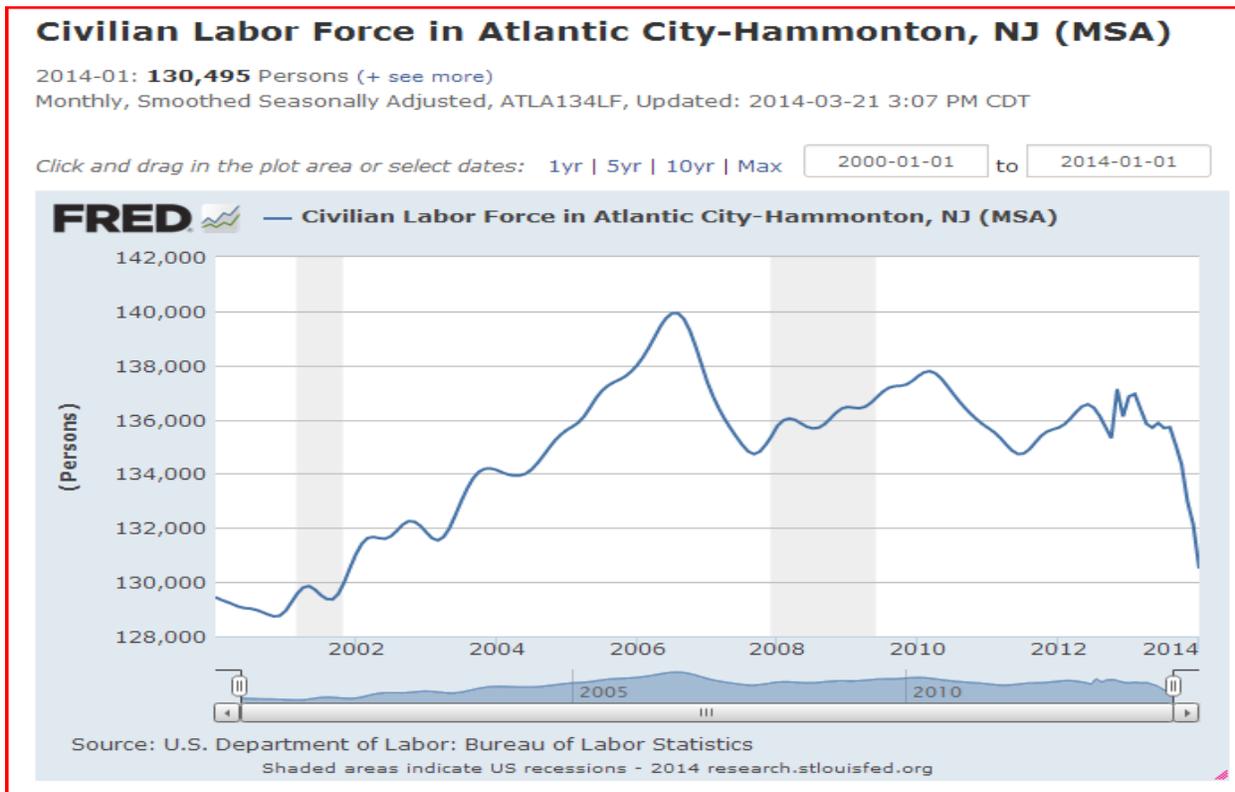
Severe repetitive losses are properties with at least four losses, each exceeding \$5,000, and properties with two or more losses where the building payments exceed the property value.

As of October 31, 2013, there were 7,606 NFIP Flood Insurance Policies in effect in the City of Brigantine, insuring property valued at \$1,690,839,800. The total cost of premiums in 2012 was \$5,396,852. Between January 1, 1978 and September 30, 2013 there were total NFIP payments of \$87,500,733. Listed below are the insurance claims resulting from Superstorm Sandy.

In addition, as of March 20, 2013 the U.S. Small Business Administration (SBA) had issued 133 loans to Brigantine homeowners totaling \$7,054,500. The average loan was \$53,041, and loans to homeowners ranged from \$2,900 to \$240,000. The SBA also provided loans to six businesses totaling \$396,600 with the loans ranging from \$7,300 to \$164,300. Due to the disaster declaration, homeowners were eligible to receive a loan of up to \$200,000 for real estate, and homeowners and renters could get as much as \$40,000 to repair or replace personal items. Businesses and nonprofits could get up to \$2 million for damaged or destroyed buildings and equipment. Owners could receive a loan of up to 20 percent more than the value of a loss to make improvements that lessen the risk of the property being damaged in the future -- for instance, for raising a home above flood level. Small businesses also are eligible for economic-injury disaster loans to help meet working-capital needs. Interest rates on SBA Sandy loans, available at terms of up to 30 years, are as low as 1.7 percent for homeowners and renters, 3 percent for nonprofits and 4 percent for businesses.

The Jersey Shore economy has not fully recovered since Superstorm Sandy. The civilian labor force is the smallest it has been since 2003. Civilian labor force is a term used by the U.S. Bureau of Labor Statistics to describe the subset of Americans who have jobs or are seeking a job. The civilian labor force for Atlantic County was starting to recover before Superstorm Sandy, but it has rapidly declined since the storm, from 137,000 to 130,349 as of March 2014. This includes the closing of the Atlantic Club Casino Hotel in January 2014, which resulted in the loss of 1,600 direct jobs and 800 indirect jobs. The rapidly decreasing labor force has had a significant impact on the regional housing market, commercial growth and the overall ratable base. The county ratable base is expected to fall for the sixth consecutive year, this year by more than \$2 billion.

**Figure 12 – Civilian Labor Force in the Atlantic City-Hammonton, NJ MSA**



The Atlantic City-Hammonton, NJ Metropolitan Statistical Area (MSA) is listed as 358 out of the country's 372 metropolitan areas in unemployment. The U.S. Bureau of Labor Statistics data shows that for January 2014, the Atlantic City-Hammonton MSA is one of only 21 metropolitan areas that have jobless rates of at least 10 percent. This lack of employment opportunities indicates that the impact of Superstorm Sandy has had a continued economic impact on the region.

**Figure 13 - Atlantic City Demographics Information**

|                           | Atlantic City   | Atlantic Co.    | NJ              | United States                |
|---------------------------|-----------------|-----------------|-----------------|------------------------------|
| Population:               | 39,558          | 274,549         | 8,791,894       | 308,745,538 <sup>1</sup>     |
| <b>Unemployment:</b>      | <b>12.5%</b>    | <b>12.5%</b>    | <b>7.1%</b>     | <b>6.6%<sup>2</sup></b>      |
| Poverty Rate:             | 23.8%           | 10.6%           | 9.4%            | 14.3% <sup>3</sup>           |
| Percent Minority:         | 73.3%           | 33.6%           | 29.8%           | 26.7% <sup>1</sup>           |
| <b>Per Capita Income:</b> | <b>\$20,760</b> | <b>\$27,634</b> | <b>\$34,566</b> | <b>\$ 26,530<sup>3</sup></b> |
| Median Hhld Income        | \$30,237        | \$54,766        | \$69,811        | \$51,914                     |
| Persons Below Poverty     | 25.3%           | 11.8%           | 9.1%            | 13.8%                        |
| Renter Occupied:          | 67.7%           | 30.4%           | 32.9%           | 33.1%                        |
| High School Grads         | 74.3%           | 84.7%           | 87.3%           | 85.0%                        |
| Bachelor's Degrees        | 16.6%           | 23.6%           | 34.6%           | 27.9%                        |

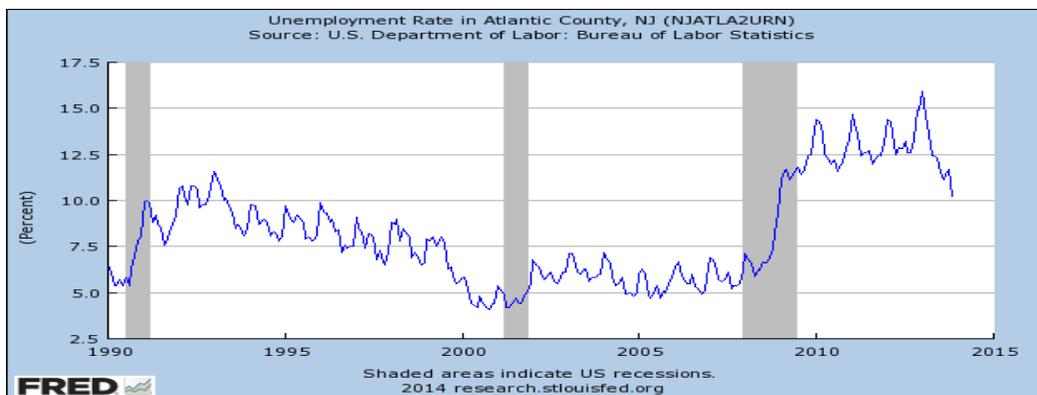
<sup>1</sup>Data is from the 2010 U.S. Census data and is available at <http://www.census.gov/>

<sup>2</sup>Data is from the Bureau of Labor Statistics and is available at [www.bls.gov](http://www.bls.gov)

<sup>3</sup>Data is from the 2009 American Community Survey and is available at [http://www.census.gov/newsroom/releases/archives/income\\_wealth/cb10-144.html](http://www.census.gov/newsroom/releases/archives/income_wealth/cb10-144.html)

The Atlantic City-Hammonton MSA had the nation’s largest over-the-year unemployment rate decrease in November 2013 (-4.7 percentage points), from 14.9 percent in November 2012, days after Superstorm Sandy, to 10.2 percent in November 2013. In January 2014, the Atlantic City unemployment rate was 12.5 percent compared to 7.1 for the State of New Jersey and 6.6 percent for the nation. The Atlantic City data does not include the closing of the Atlantic Club Casino Hotel. When the unemployment rate and the civilian labor force decrease, generally it is because for various reasons people have opted out of the labor market.

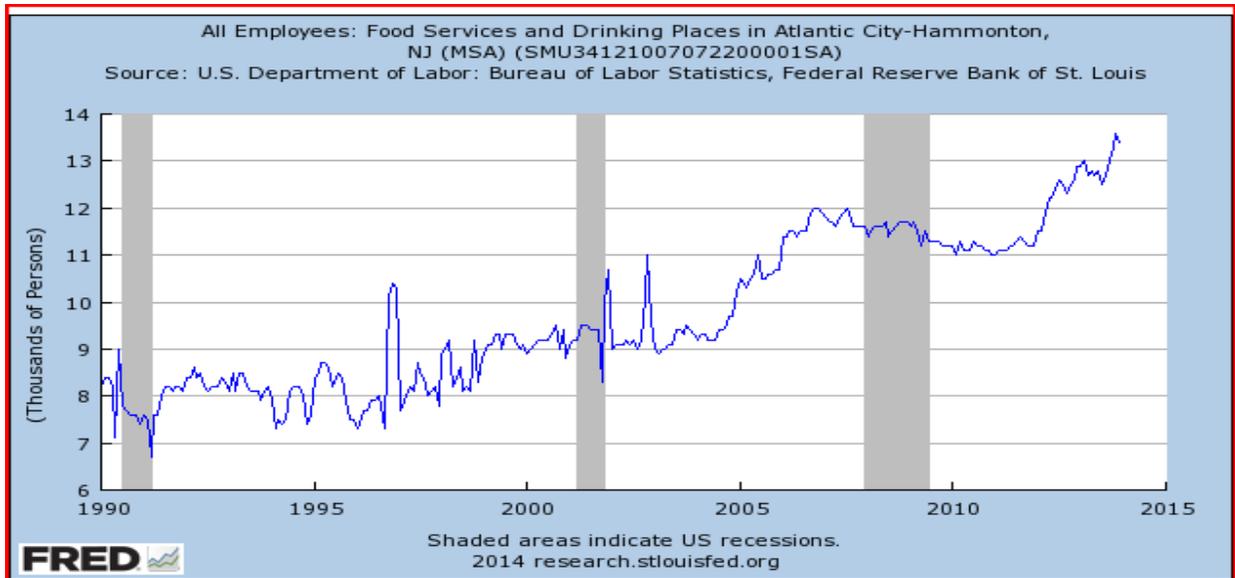
**Figure 14 – Unemployment Rate in Atlantic County, NJ**



The data provided (Figure 13) above shows that the unemployment rate for the Atlantic City-Hammonton MSA peaked after Superstorm Sandy at more than 15 percent.

On a positive note, a segment of the Atlantic County economy that is growing is the Food Services and Drinking Places sector. As shown in Figure 14, this sector peaked at more than 13,000 employees in 2014, by far the highest level ever achieved in our region.

**Figure 15 – Employment Trends in the Food and Beverage Sector in Atlantic County**



According to data released by the Federal Reserve Bank of Philadelphia, housing prices in the Atlantic City-Hammonton MSA have continued to drop. The data for the third quarter showed a decrease of 0.4 percent, while all other sections of the State of New Jersey, except for Cumberland and Cape May counties, witnessed an increase in values. The decrease in value may be a result of Superstorm Sandy and flood insurance changes.

Data from the New Jersey Association of Realtors indicates that in 2013 the island communities in Atlantic County, including Brigantine, witnessed an 11 percent decrease in home sales. The data indicates that the City of Brigantine had a 27 percent decrease in home sales in 2013 compared to 2012. This includes single-family homes and condos. This compares to national home sales that are up 9 percent over 2012, the strongest recovery since the housing boom ended in 2006.

## 2.2 Funding Assistance Provided

The State allowed \$710 million from the first tranche of Community Development Block Grant – Disaster Recovery (CDBG-DR) funds to the Reconstruction, Rehabilitation, Elevation and Mitigation (RREM) Program. These RREM funds only addressed 41 percent of the need. To address the unmet need, the second tranche of CDBG-DR funds allocates another \$390 million to the RREM Program. Even with these additional funds it is not

expected that all of the wait-listed owners will receive funding. Additional funding sources for home elevation will be discussed later in this Report.

As of January 20, 2014, \$1,139,294 in RREM funds were paid to 25 Brigantine homeowners. A total of 511 homeowners applied for the RREM a grants of up to \$150,000 and 48 owners were awarded grants of the 132 applicants were found eligible in addition 276 were wait-listed, 39 were in intake, 60 were rejected and 4 are on appeal.

A total of 730 homeowners in the City of Brigantine applied for New Jersey Resettlement Grants and 613 grants were awarded. These grants provided \$10,000 to encourage homeowners to stay in their existing home or in the same county. This grant can be used for many expenses, including payment of flood insurance premiums. A total of \$215 million in Resettlement Grants were paid by January 20, 2014.

**Figure 16 - Home Being Elevated in the Golf Course Section of Brigantine**



According to the New Jersey Office of State Comptroller, as of January 1, 2014 the residents of the City of Brigantine had received \$4.93 million in FEMA Individual Assistance, which can include grants, rental assistance and/or funds for temporary or more permanent home repair. The City has received \$2.62 million in FEMA Public Assistance to respond and recover from the disaster, which can include grants for both emergency and permanent restorative work. The majority of these funds were for debris removal with some

additional funds for road repairs, bulkhead repairs, damage to City facilities and emergency protective measures.

The City has also received approval from the FEMA Community Disaster Loans Program for up to \$5 million. This is a low-interest loan provided to local governments affected by disaster to reduce impacts on the municipal budget.

### **2.3 National Flood Insurance Program**

The NFIP was established with the passage of the National Flood Insurance Act of 1968. The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. More than 21,000 communities participate in this program.

There are currently 238,738 flood insurance policies in place for the residents of New Jersey. Nationally, that number has risen well beyond 5.6 million. Significant changes have also been made over the years to the NFIP, most notably the establishment of the Community Rating System (CRS) during the 1990s and a grant program for mitigation projects and plans.

Nearly 100 private companies now offer nationwide flood insurance backed by the federal government. Because of the NFIP, millions of taxpayer dollars are saved every year when it comes to disaster recovery.

The program's CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Through the CRS a community can lower flood insurance premiums up to 45 percent. There are 18 activities in the CRS program under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction and Flood Preparedness.

The Biggert-Waters Reform Act of 2012 required the NFIP to raise insurance rates for some pre-FIRM properties to reflect the actual cost without subsidies. There are 88,601 pre-FIRM properties in New Jersey, or 37 percent of the housing stock. Pre-FIRM for the City of Brigantine is prior to January 1, 1975. Many of the pre-FIRM properties in high-risk areas do not meet current standards for construction and elevation, and they have been receiving subsidized rates that do not reflect their actual risk. The subsidized rates are being eliminated in some cases, as noted in the chart below. Some current policyholders and all future policyholders owning pre-FIRM properties in high-risk areas will pay rates based on their full risk of flood damage. However, most NFIP-insured properties are not affected by the changes.

FEMA is currently producing new flood-risk data for the State of New Jersey. Last year, FEMA provided the City of Brigantine and all coastal communities with a working Flood Insurance Base Map (FIRM). These maps have been reviewed and various changes have

been agreed to based on scientific evidence that indicated errors in the mapping. These maps are available at [www.region2coastal.com](http://www.region2coastal.com). The remainder of the process for adoption of these maps is as follows:

|                     |   |
|---------------------|---|
| April 2014          | Preliminary FIRM and Flood Insurance Study (FIS) Released |
| June 2014 or later  | 60-day review period ends                                 |
| Sept 2014 or later  | 90-day appeal period ends                                 |
| March 2015 or later | Six-month adoption period ends                            |
| Mid 2015 or later   | Letter of Final Determination issued by FEMA              |

With the new flood maps comes a new starting point for measuring mean sea level (MSL). The current method called NGVD29 is being replaced with a more accurate method called NGVD88. The conversion varies from community to community and the best source of an accurate conversion is a professional land surveyor. In Brigantine, the NGVD88 is roughly 1.3 feet higher than the same measurement in NGVD29 datum. With this in mind, a measurement of 10 feet in NGVD29 datum in Brigantine would equal 8.7 feet in NAVD88 datum.

The FIRM and FIS become effective at the end of the six-month period. The effective date is also the date when flood insurance rates will be based on the new flood data for new construction built after this date. The effective FIRM will be used by federally insured or regulated lenders to determine if flood insurance is required as a condition of a loan.

**Figure 17 – Projected NFIP Annual Flood Insurance Premiums for V Zone and A Zone Properties With \$250,000 Residential Building Coverage**

**V Zone**

| <b>Lowest Floor Elevation</b> | <b>No Contents Covered</b> | <b>\$100,000 Contents Covered</b> |
|-------------------------------|----------------------------|-----------------------------------|
| 3 Feet Above                  | \$2,403                    | \$2,923                           |
| 2 Feet Above                  | \$3,278                    | \$4,048                           |
| 1 Feet Above                  | \$4,728                    | \$5,918                           |
| At BFE                        | \$6,803                    | \$8,603                           |
| 1 Foot Below                  | \$9,003                    | \$11,583                          |
| 2 Feet Below                  | \$12,074                   | \$15,764                          |
| 3 Feet Below                  | \$15,524                   | \$20,474                          |
| 4 Feet Below                  | \$17,334                   | \$23,304                          |
| 6 Feet Below                  | \$23,449                   | \$32,019                          |

**A Zone**

| <b>Lowest Floor Elevation</b> | <b>No Contents Covered</b> | <b>\$100,000 Contents Covered</b> |
|-------------------------------|----------------------------|-----------------------------------|
| 3 Feet Above                  | \$376                      | \$561                             |
| 2 Feet Above                  | \$448                      | \$633                             |

|              |          |          |
|--------------|----------|----------|
| 1 Foot Above | \$660    | \$845    |
| At BFE       | \$1,359  | \$1,724  |
| 1 Foot Below | \$4,527  | \$5,255  |
| 2 Feet Below | \$5,924  | \$8,308  |
| 3 Feet Below | \$7,204  | \$10,554 |
| 4 Feet Below | \$9,551  | \$14,370 |
| 6 Feet Below | \$18,830 | \$28,535 |

In April 2014 the Homeowner’s Flood Insurance Affordability Act was signed by President Obama to address rate hikes associated with FEMA’s National Flood Insurance Program, bringing relief to homeowners while not significantly impacting the program’s solvency.

The changes implements the following measures:

1. Creates a firewall on annual rate increases

Prevents FEMA from raising the average rates for a class of properties above 15 percent and from raising rates on individual policies above 18 percent per year for virtually all properties.

2. Repeals the property sales trigger

Repeals the provision in Biggert-Waters that required homebuyers to pay the full-risk rate for pre-FIRM properties at the time of purchase. This provision caused property values to steeply decline and made many homes unsellable, hurting the real estate market. Under the Menendez/Grimm Bill, homebuyers will receive the same treatment as the home seller.

3. Repeals the new policy sales trigger

Repeals the provision in Biggert-Waters that required pre-FIRM property owners to pay the full-risk rate if they voluntarily purchase a new policy. This provision dis-incentivizes property owners from making responsible decisions and could hurt program participation. The Menendez/Grimm Bill allows pre-FIRM property owners to voluntarily purchase a policy under pre-FIRM conditions.

4. Reinstates grandfathering

Repeals the provision in Biggert-Waters that would have terminated grandfathering. If grandfathering was terminated, property owners mapped into higher risk would have to either elevate their structure or have higher rates phased in over 5 years. The Menendez/Grimm Bill allows grandfathering to continue and sets hard caps on how high premiums can increase annually.

5. Refunds homeowners who overpaid

Requires FEMA to refund policyholders for overpaid premiums.

#### 6. Affordability goal

Requires FEMA to minimize the number of policies with annual premiums that exceed one percent of the total coverage provided by the policy. The Homeowner Flood Insurance Affordability Act of 2014 also establishes the following requirements to enhance FEMA transparency and outreach:

#### 7. Reimburse successful appeals

Allows FEMA to utilize the National Flood Insurance Fund to reimburse policyholders and communities who successfully appeal a map determination. FEMA currently has the authority to reimburse successful appeals of map findings, but Congress has never appropriated funding for this purpose. Making appeal reimbursement an eligible expense of the NFIF would give FEMA the incentive to “get it right the first time” and repay homeowners and communities for contributing to the body of flood risk knowledge.

#### 8. Flood insurance advocate

Establishes a flood insurance advocate within FEMA to answer current and prospective policyholder questions about the flood mapping process and flood insurance rates. The flood insurance advocate will be responsible for educating policyholders about their individual flood risks, their options in choosing a policy, assisting property owners through the map appeals process, and improve outreach and coordination with local officials, community leaders, and Congress.

#### 9. Urban mitigation fairness

Requires FEMA to establish guidelines on alternative mitigation methods for urban structures where traditional mitigation efforts such as elevation are impractical, i.e. rowhouses in Hoboken. This section makes clear that such alternative forms of mitigation shall be taken into account in the calculation of risk premium rates.

#### 10. Clear communication

Requires FEMA to clearly communicate full flood risk determinations to policyholders even if their premium rates are less than full risk. This helps to inform policyholders as to their true flood risk.

#### 11. Fairness for small businesses, houses of worship, nonprofits and low-income homes

Requires FEMA to report to Congress on the impacts of rate increases on small businesses, nonprofit entities, houses of worship, and residences with a value equal to less than 25

percent of the area median home value. If FEMA determines there is an effect on affordability for these properties, it must provide recommendations to Congress within three months after making the determination.

### 12. Mapping accuracy

Requires FEMA to certify its mapping process is technologically advanced and to notify and justify to communities that the mapping model it plans to use to create the community’s new flood map are appropriate. Also requires FEMA to send communities being remapped the data being used in the mapping process.

### 13. Notification

Requires FEMA, at least six months prior to implementation of rate increases as a result of this Act to make publicly available the rate tables and underwriting guidelines that provide the basis for the change, providing consumers with greater transparency.

## 3.0 Review of Plans and Regulations

The purpose of this review is to present the findings of a review of the City’s planning reports and appropriate development ordinances to identify what Brigantine either has done or proposes to do to address flood hazards. The materials reviewed were:

- City of Brigantine 2010 Master Plan (adopted February 2011)
- Brigantine Beach Bicycle and Pedestrian Master Plan (October 2013)
- Floodplain Damage Prevention (Chapter 181 of the Code of the City of Brigantine)
- Land Use Regulations (Chapter 198 of Code of the City of Brigantine)
- Stormwater Control (Chapter 258 of the Code of the City of Brigantine)
- NFIP Community Rating System
- Atlantic County Multi-Hazard Mitigation Plan
- The Community Plan Checklist includes a list of municipal documents that may be helpful in developing a Strategic Recovery Planning Report.

**Figure 18 – Summary of Plans and Ordinances for the City of Brigantine**

| Plans, Ordinances, and Codes | Yes | No | Adopted Year | Update Frequency |
|------------------------------|-----|----|--------------|------------------|
| Municipal Master Plan        | x   |    | 2011         | 6 to 10 years    |
| Vision Plan                  |     | x  |              |                  |
| All-Hazard Mitigation Plan   | x   |    |              | County           |

|  |   |   |      |  |
|--|---|---|------|--|
| Floodplain Management Plan             | x |   | 1988 |  |
| Evacuation Plan                        |   |   |      |  |
| Emergency Response Plan                | x |   | 1981 |  |
| Capital Improvements Plan              |   | x |      |  |
| Post-Disaster Recovery Plan            |   | x |      |  |
| Economic Development Plan              |   | x |      |  |
| Open Space Plan                        |   | x |      |  |
| Stormwater Management Plan             | x |   |      |  |
| Historic Preservation Plan             |   | x |      |  |
| Zoning Ordinance                       | x |   | 1999 |  |
| Subdivision Ordinance                  | x |   | 2011 |  |
| Building Code                          | x |   | 1980 |  |
| NFIP Flood Damage Prevention Ordinance | x |   | 1988 |  |
| Cumulative Substantial Damage          |   | x |      |  |
| Greater than One Foot Freeboard        |   | x |      |  |

The purpose of the Post Sandy Planning Assistance Grant Program is to support long-range planning for community redevelopment in the municipalities and counties sustaining damage from Superstorm Sandy. Due to the damage caused by the storm, many New Jersey municipalities and counties face a myriad of recovery challenges. Among them is the need for planning support to develop community recovery plans that strategically address the issues that now confront them. In furtherance of its mission to provide local government officials with the tools needed to efficiently manage municipal operations, the NJDCA has created a local planning-assistance program that will supplement the ongoing efforts of storm-impacted local and county governments to rebuild and revitalize. The program will offer grants to the counties of Atlantic, Bergen, Cape May, Essex, Hudson, Middlesex, Monmouth, Ocean and Union and all municipalities within those counties that have sustained a ratable loss attributable to Superstorm Sandy of at least 1 percent or \$1 million and demonstrate how assistance will lead to greater community resilience.

### 3.1 Master Plan Reexamination/Development Plan 2010

The 2010 Master Plan for the City of Brigantine was adopted on February 23, 2011. Section II of the 2010 Master Plan is a brief reexamination report that summarized actions taken by the City to achieve goals and objectives from the 1992 and 2001 Master Plans. This section notes the following actions that, directly or indirectly, contribute towards addressing flood hazards:

- 1992 Master Plan Goals
  - Environment – This goal expresses the City’s commitment to the preservation and protection of natural resources of the island (beaches, dunes and wetlands). The actions cited include maintenance and enforcement of the Development Restriction Line along the beach and dune system; keeping the Land Use Ordinance in compliance with NJDEP and state plans; support of dredging of the inter-coastal waterway; and encouraging environmentally sensitive and appropriate access to the north and south ends of the island.
  - Flood Protection – This goal expresses the desire to ensure continued implementation of programs to minimize property damage and protect the safety and welfare of residents. Cited as accomplishments are the adoption of bulkhead and seawall ordinances to improve protection.
- 2001 Master Plan Goals
  - Environment – This goal remains unchanged from 1992.
  - Flood Protection – This goal remains unchanged from 1992, however the City has added the provision encouraging homeowners to purchase federal flood insurance. The Master Plan also recommended the review and possible implementation of additional measures to prevent flood damage in the Land Use Ordinance.

The 2010 Goals and Objectives are found in section III of the Master Plan and include the following goals contributing to reduction of flood hazards:

- Environment – Recommends that subdivisions include legal descriptions and references to the Development Restriction Line and that no development shall be permitted beyond that limit.
- Flood Protection – Continued to recommend the review and possible implementation of additional measures in the Land Use Ordinance.

In addition to the goals identified above, Section IV of the 2010 Master Plan also adopted the general goals of planning as outlined in the Municipal Land Use Law (NJSA 40:55D-1 et.seq.) including the following, which require the City to address flood hazards:

1. *“To encourage municipal action to guide the appropriate use or development of all lands in a manner which will promote the public health, safety morals and general welfare.”*
2. *“To secure safety from fire, flood, panic and other natural and manmade disasters.”*

Section VII of the Master Plan, Land Use Inventory, breaks the City down into seven planning areas and both analyzes historical land use patterns and sets forth recommendations for each area. This section does not include any recommendations for addressing any flood hazards or conditions that may be currently found in any of the planning areas.

The Circulation Plan element of the Master Plan (section VIII.B.) notes that Brigantine Boulevard is the only means of vehicular access to the City and the hazard of coastal storms is one of many factors that could limit accessibility. Flooding and/or coastal storm hazards are not discussed in any other plan elements.

### **3.2 Brigantine Bicycle and Pedestrian Master Plan 2013**

The Bicycle and Pedestrian Master Plan does not address flood hazard or flood protection measures.

### **3.3 Development Regulations**

The Code of the City of Brigantine includes several chapters that contribute to the control and regulation of flood hazards. These include Land Use Regulation (LUR) (Chapter 198), Flooding Damage Protection (Chapter 181) and Stormwater Control (Chapter 258).

The common methods typically found in development regulations to address and/or minimize flood hazards include how building height is defined, building/lot coverage and stormwater management requirements.

The Land Use Regulations define “building height” as being measured from a point two feet above the base flood elevation applicable to the property. While the City has taken the step to create a significant freeboard area, this needs to be coordinated with the Flood Damage Protection ordinance as that chapter of the Code sets the lowest finished floor elevation for residential structures at six-tenths of a foot (0.6 foot) above base flood elevation.

The amount of impervious coverage (both building and lot coverage) allowed in the LUR varies depending on the zoning district and type of development. In one- and two-family residential districts, up to 60 percent impervious coverage is permitted, while a maximum 75 percent impervious coverage is allowed in non-residential zones. The Land Use Regulation does not require stormwater review for residential development on existing lots.

In addition to establishing the minimum floor elevation for structures, the Flood Damage Protection ordinance also incorporates regulations requiring structures to be brought into

compliance if they are subject to substantial damage or undergo substantial improvement. Substantial damage is defined as the cost for restoring a structure to pre-damage condition being equal to or greater than 50 percent of the pre-damage market value. Substantial improvement is defined as any improvement the cost of which exceeds 50 percent of the pre-improvement market value of the structure. The substantial improvement definition is limited in that it requires consideration only of an application that is currently submitted to the Construction Official and does not take into consideration the cumulative value of a series of improvements made to a structure over a period of years.

The development regulations include design requirements for stormwater control and stormwater management systems, which are intended to avoid increases in stormwater runoff from new development. It should be noted that stormwater management systems requirements do not apply to single- and two-family residential construction that is not part of a major subdivision. The following recommendations should be considered:

- Reduction of the amount of impervious surface that is permitted on development sites, particularly for individual one- and two family dwellings, in order to lessen stormwater runoff and help reduce ponding and urban flooding.
- Amending the Flood Damage Prevention ordinance so that the minimum finished floor elevation in residential structures is at least two feet above BFE and is consistent with the building height definition in the Land Use Regulations.
- Amending the Flood Damage Prevention ordinance by:
  - Changing the definition of substantial damage to reduce the threshold percentage to 40 percent of the pre-damage market value.
  - Changing the definition of substantial improvement to reduce the threshold improvement value to 40 percent of the pre-improvement market value and required the consideration of all improvements undertaken during a “look back” period (e.g. 5 years).

### **3.4 NFIP Community Rating System**

The City has been actively involved in the NFIP’s Community Rating System and is a statewide leader. The City currently has a Class 6 rating, which provides for a 20 percent discount on flood insurance. More than 1,200 communities nationwide, including 61 in New Jersey, participate in the CRS. Only a dozen communities are in Class 5, the highest ranking for any community in the State of New Jersey. Currently only Roseville, California is in Class 1 which receives a 45 percent insurance discount.

The CRS recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. In addition to the benefit of reduced insurance rates, CRS floodplain management activities enhance public safety, reduce damage to property and public infrastructure, avoid economic disruption and losses, reduce human suffering and protect the environment. Participating in the CRS provides an incentive to maintain

and improve a community's floodplain management program over the years. Implementing some CRS activities can help projects qualify for certain other federal assistance programs.

For example, one recommendation is a Drainage System Maintenance Program which would include annual inspections and cleaning of debris from the drainage system. The City would have to adopt written procedure for maintenance, system inventory, inspection procedures, and records of inspections and removal projects.

Participating communities can earn credit for undertaking a variety of flood-reduction measures, including preserving open space, mandating that buildings in flood zones be elevated higher than FEMA requires, and incorporating predictions of future sea-level rise into their regulatory maps. Overall, creditable activities are grouped into four categories: public information, mapping and regulations, flood damage reduction, and warning and response. Different amounts of points are awarded for different measures, as explained in the FEMA manual.

### 3.5 Atlantic County Multi-Hazard Mitigation Plan 2005

Mitigation plans form the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction and repeated damage. The planning process is as important as the plan itself. It creates a framework for risk-based decision making to reduce damage to lives, property and the economy from future disasters. Hazard mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards.

### 3.6 Atlantic County Flood Control Study 2007

The Atlantic County Flood Hazard Inventory identifies recurring flooded roadways. Each flood hazard mitigation project identified in this study is given a score of up to 100 points based on three major criteria: emergency travel factors – whether it is a major evacuation route (45 possible points); daily travel factors – traffic counts, population served, etc.; and cost-effectiveness feasibility–estimated cost/traffic volumes.

**Figure 19 - Brigantine Projects Identified in the Atlantic County Flood Control Study**

| <u>Road</u>       | <u>Score</u> | <u>Cost</u>  | <u>Description</u>                                     |
|-------------------|--------------|--------------|--|
| Brigantine Blvd.  | 75           | \$22,000,000 | Raise road elevation                                   |
| Hackney Place     | 64           | \$3,750      | Install check valve                                    |
| Bayshore Avenue   | 55           | \$439,717    | Raise road elevation                                   |
| Twelfth Street N. | 54           | \$1,195,430  | Raise road elevation                                   |
| Sheridan Avenue   | 54           | \$300,000    | Pump at Caverly Dr. /Sheridan Boulevard                |
| Evans Boulevard W | 47           | \$1,080,000  | 1800 LF to bay at 12 <sup>th</sup> Street North        |
| Lafayette Blvd.   | 46           | \$1,140,000  | 1900 LF to bay at 6 <sup>th</sup> St. South street end |
| Sarazan Drive     | 43           | \$480,000    | Connect to pump section on Sheridan Ave.               |

### 3.7 Local Government Energy Audit Report 2012

The City received grant funding from the New Jersey Board of Public Utilities to complete a comprehensive energy audit of all public buildings including the public schools. The audit identified the annual energy cost of each building and a variety of energy conservation measures, their costs and annual savings. The annual budget of all public buildings in 2011 is summarized in Table 17.

**Table 20 - Annual Energy Budget for Public Buildings in Brigantine, 2011**

| <b>Building</b>                         | <b>Electric Budget</b> | <b>Gas Budget</b> | <b>Total Budget</b> |
|---|------------------------|-------------------|---------------------|
| Public School                           | \$334,143              | \$124,643         | \$458,786           |
| Municipal Building                      | \$99,839               | \$44,240          | \$144,079           |
| Public Works                            | \$33,130               | \$19,983          | \$53,113            |
| Civics Center                           | \$9,278                | \$3,360           | \$12,638            |
| Water Pump Building                     | \$29,417               | \$317             | \$29,734            |
| Bayside Rowing Club                     | \$13,337               | \$2,103           | \$15,440            |
| Museum                                  | \$2,605                | \$2,338           | \$4,943             |
| Recreation Complex                      | \$11,591               | \$1,579           | \$13,170            |
| 26 <sup>th</sup> St. Recreation Complex | \$11,703               | \$0               | \$11,703            |
| Community Center                        | \$44,919               | \$8,917           | \$53,836            |
| Street Lights                           | 175,000                | 0                 | \$175,000           |
| <b>Total</b>                            | <b>\$764,962</b>       | <b>\$207,470</b>  | <b>\$972,442</b>    |

The recommended energy conservation measures (ECMs), net installation costs and annual savings are provided in Table 21.

**Table 21 - Net Installation Cost of ECMs, Projected Annual Savings and Simple Payback for Public Buildings in Brigantine**

| <b>Building</b> | <b>ECMs</b> | <b>Annual Savings</b> | <b>Simple Payback</b> |
|-----------------|-------------|-----------------------|-----------------------|
| Public School   | \$1,307,938 | \$103,244             | 12.7 years            |

|   |                    |                  |                   |
|---|--------------------|------------------|-------------------|
| Municipal Building                      | \$375,380          | \$41,250         | 9.1 years         |
| Public Works                            | \$7,060            | \$1,589          | 4.4 years         |
| Civics Center                           | \$200              | \$105            | 1.9 years         |
| Water Pump Building                     | \$12,510           | \$1,697          | 7.4 years         |
| Bayside Rowing Club                     | \$2,785            | \$682            | 4.1 years         |
| Museum                                  | \$338              | \$288            | 1.2 years         |
| Recreation Complex                      | \$13,000           | \$9,923          | 1.3 years         |
| 26 <sup>th</sup> St. Recreation Complex | \$2,890            | \$2,038          | 1.4 years         |
| <b>Total</b>                            | <b>\$1,722,101</b> | <b>\$160,816</b> | <b>10.9 years</b> |

#### 4.0 Zoning and Regulatory Recommendations

Based on review of the current planning and development documents, the following are recommended actions for the City to consider to reduce the effects of rising sea level and flooding:

- Amend zoning regulations to reduce the amount of impervious surface permitted on development sites in order to lessen stormwater runoff and help reduce ponding.
- Amend zoning and development regulation to require all new or expanded single-family dwellings that do not otherwise require site plan or subdivision approval to undergo a stormwater review process.
- Amend the floodplain and/or construction regulations to reduce the substantial damage threshold from 50 percent to 40 percent.

#### 4.1 Reduce Impervious Surface Requirements

In order to lessen storm water runoff and help reduce ponding and urban flooding, the City will consider reducing the amount of impervious surface permitted on development sites and review placing restrictions on one- and two-family dwellings.

#### 4.2 Adopt greater freeboard (e.g. exceeding the state-mandated one foot of freeboard).

The standards of the NFIP are minimum nationwide standards. Each community should understand that current standards are the absolute minimum. They should review their hazards and risk in light of recent events, the uncertainty in mapping methodology and the variation in storm intensities and impacts. Only then can they determine if higher standards and best practices that require elevation, relocation or floodproofing that exceed the minimums are necessary to protect their citizens, properties and infrastructure. Many communities throughout the nation have adopted higher standards, including:

- Require freeboard above the 100-year flood level for structures. Freeboard is a safety factor requiring buildings to be constructed higher than the calculated flood level to provide better protection and reduce damages. About half the 21,000 flood-prone communities in the NFIP require 1 to 3 feet of freeboard for buildings. Based on the current premium rates for NFIP flood insurance, premiums can generally be reduced 50 percent or more if buildings use 2 feet of freeboard. Given the impact of sea level rise, subsidence of some areas of the coast and changing flood conditions, a 3- to 4-foot freeboard in coastal areas is not unreasonable. The State of New York requires a minimum 2-foot freeboard statewide for one- and two-family homes.
- Adopt V-Zone development and construction standards in coastal A Zones, where areas are subject to moderate wave action that can still cause significant damage. This was a recommendation of the 2006 comprehensive evaluation of the NFIP.
- Adopt the standard of a 500-year-flood risk-reduction level or the flood of record, whichever is greater, for all critical facilities. What is a critical facility? ASCE 24 indicates critical facilities are buildings and structures that contain essential facilities and services necessary for emergency response and recovery, or that pose a substantial risk to the community at large in the event of failure, disruption of function, or damage by flooding. Among others, this would include health-care facilities, fire, rescue and police facilities, power-generating and substation facilities, key communication facilities, and facilities containing hazardous materials. If federal funding is used for rebuilding critical facilities, this will be required because this standard is the same in Federal Executive Order 11988.
- Carefully design and plan floodproofing to prevent or reduce losses in large buildings from urban flooding. Careful planning and design is necessary so that the vulnerability of existing buildings to structural damage is investigated and the impacts on building use are considered. It is important to know what will happen if nothing is done and flood water is allowed to infiltrate into building lower levels and into critical operational equipment such as electrical panels, heating and emergency power generating systems.

### **4.3 Develop and adopt a cumulative substantial damage/improvement ordinance**

Some communities have adopted ordinances that contain substantial damage/improvement definitions that require all improvements to be added in a cumulative manner over the life of the structure or a set period. When the combined total of all previous improvements or repairs made during the specified time equals or exceeds 50 percent of a structure's market value, that structure is considered a substantial improvement. For example, a structure with a market value of \$200,000 that has previously accumulated \$60,000 of improvements would only have to incur \$40,000 in damage to become a substantial damaged.

### **4.4 Exceed NFIP Criteria for Substantial Damage**

The NFIP criteria, including the 50 percent substantial-improvement threshold, are minimum standards for the adoption of floodplain management regulations by communities. Any community may exceed the minimum criteria by adopting more restrictive regulations such as a lower substantial-improvement threshold. Any floodplain management regulations adopted by a community that are more restrictive than NFIP minimum criteria are encouraged by FEMA and shall take precedence. Thus, if Brigantine, of its own volition adopts a more restrictive threshold (i.e. 40 percent) in its floodplain management ordinance, then that threshold takes precedence and must be adhered to by the community.

### **4.5 Become a Silver Level Sustainable Jersey Community**

Sustainable Jersey is a certification program for municipalities in New Jersey that want to go green, save money and take steps to sustain their quality of life over the long term. There are many Sustainable Jersey actions that will strengthen the City's efforts to develop into a resilient community. For example, the Climate Adaptation: Flood Risk Action requires that a team be assembled, which could be the Green Team, and meets to visually assess the City using the *NJ Flood Mapper Tool* to understand the community's vulnerability. This assessment is included in Section 2.0 of this Report. The team is then required to complete the on-line *Getting to Resilience: Community Planning Evaluation Tool*, which assesses the community's readiness to deal with flooding situations. This action is a priority for communities that want to achieve bronze or silver status.

### **4.6 Consider Requiring Underground Utilities for All New Development**

Consider amending the zoning code to require the placement of all utilities for new major development underground.

#### **4.7 Increase CRS Insurance Discount**

Brigantine is a leader in the CRS program, but that does not mean that a higher level of insurance discount cannot be achieved. Implementing higher bulkhead standards, securing key open-space parcels, exceeding the NFIP criteria for substantial damage/improvements, and developing and adopting a cumulative substantial damage/improvement ordinance are all ways to achieve a higher CRS rating.

#### **4.8 Encourage Green Infrastructure**

Green infrastructure or blue-green infrastructure is a network providing the “ingredients” for solving urban and climatic challenges by building with nature. The main components of this approach include stormwater management, climate adaptation, less heat stress, more biodiversity, food production, better air quality, sustainable energy production, clean water and healthy soils, as well as the more anthropocentric functions such as increased quality of life through recreation and providing shade and shelter in and around towns and cities.

Green infrastructure decreases pollution to local waterways by treating rain where it falls and keeping polluted stormwater from entering sewer systems. Green infrastructure tools and techniques include green roofs, downspout disconnection, planter boxes, bioswales, green parking, living shorelines, urban tree canopies, land conservation, permeable pavement, alternative designs for streets and buildings, trees, rain gardens and rain harvesting systems.

Green infrastructure is also a critical tool for addressing climate change and mitigating its impacts by making communities more resilient. Green infrastructure can increase the capacity of sewer systems by reducing the flow into them, making the systems more resilient.

Green infrastructure programs managed by the U.S. Environmental Protection Agency and partner organizations are intended to improve water quality generally through more extensive management of stormwater runoff. The practices are expected to reduce stress on traditional water drainage infrastructure, which are typically extensive networks of underground pipes and/or surface water channels. Improved stormwater management is expected to reduce the frequency of system overflows, reduce the impacts of flooding and provide other environmental benefits.

For example, the City of Philadelphia has installed or supported a variety of retrofit projects in neighborhoods throughout the city. Installed improvements include:

- Permeable pavements in parks, basketball courts and parking lots.
- Rain gardens and bioretention systems at schools and other public facilities.
- Construction of wetlands for management of stormwater runoff.

Some of these facilities reduce the volume of runoff entering the city's aging combined sewer system and thereby reduce the extent of system overflows during rainstorms.



Shorelines are often stabilized with hardened structures, such as bulkheads, revetment and concrete seawalls. Ironically, these structures often increase the rate of coastal erosion, remove the ability of the shoreline to carry out natural processes, and provide little habitat for estuarine species. Living shorelines use plants, sand and limited use of rock to provide shoreline protection and maintain valuable habitat.

**Figure 22 – Photography of Living Shoreline**

Living-shoreline projects utilize a variety of structural and organic materials, such as wetland plants, submerged aquatic vegetation, oyster reefs, coir fiber logs, sand fill and stone. The benefits of living shorelines include:

- Stabilization of the shoreline.
- Protection of surrounding riparian and intertidal environment.
- Improvement of water quality via filtration of upland runoff.
- Creation of habitat for aquatic and terrestrial species.



**Figure 23 – Coastal Shoreline Protection Options**

## 5.0 Post Sandy Planning Recommendations

### 5.1 Design Standards and Environmental Design of the Bayfront - \$50,000

The majority of the City's homes that have been impacted by storm damage are located along the bayfront. It is recommended that a NJDCA Post Sandy Planning Grant be secured to fund a planning initiative to determine infrastructure needs, complete a bathymetric survey of the bayfront waters, a terrestrial survey of existing infrastructure and environmental design as well as to consider economic development tools that can be used to protect and enhance this important district. The scope of work will include:

Task 1: Inspecting the entire bayfront to identify where bulkheads do not exist and to determine where bulkhead replacement is needed. A complete inventory of private and public bulkheads will be completed. (\$25,000)

Task 2: Determining the ideal height of the bulkheads to make the island more resilient. The City is currently in the process of raising the bulkhead height by changing from NGVD 1929 datum to NGVD 1988 datum, thereby raising the bulkhead height by 1.3 feet. The new bulkhead requirement will be required of all new development and for substantially improved property. However, surveys, an engineering evaluation and a surrounding land-use analysis are needed to determine the ideal height. (\$10,000)

Task 3: Providing revised land use guidance taking into account the new bulkheads heights. (\$15,000)

Task 4: Developing a Capital Plan for implementation of recommended changes to public bulkheads and a strategy for the improvements of private bulkheads where needed. (\$5,000)

Timetable:

|        |          |
|--------|----------|
| Task 1 | 2 months |
| Task 2 | 4 months |
| Task 3 | 2 months |
| Task 4 | 2 months |

### 5.2 Community Development Plan for Business Districts - \$50,000

Superstorm Sandy has had a continued economic impact on the Atlantic City region. The region continues to struggle with a 10.4 percent unemployment rate. To help address this issue, an Economic Development Element/Community Development Plan for the City's three commercial business districts is recommended.

The City Hall Commercial Business District (CBD) extends from 16<sup>th</sup> Street South to 6<sup>th</sup> Street South on Brigantine Avenue. This district contains 36 retail shops and offices and

one hotel located on Brigantine Avenue. The municipal building is also located along this spine, forming the westerly boundary of the CBD.

The Lighthouse CBD extends from Harbor Beach Boulevard to 30th Street South along Atlantic Brigantine Boulevard. This district is bounded by the Brigantine Town Center to the west and the commercial retail center located to the east of the Brigantine Lighthouse.

The North End Community Spine consists of a commercial/retail strip extending from Roosevelt Boulevard north to 15<sup>th</sup> Street North along Brigantine Avenue.

The Master Plan recommends that a design concept be developed for each business district. It is recommended that a NJDCA Post Sandy Planning Grant be secured to fund an Economic Development Element/Community Development Plan for the City's three commercial business districts. The tasks include:

Task 1: CBD Development Plan – develop a design concept for each business district. The theme should be able to survive the test of time and be built of materials that can survive in a shore environment. (\$22,500)

Task 2: Planning and Economic Incentives - The Plan will also explore and develop ideas such as the expansion of commercial business districts, economic incentives for new businesses, joint marketing, implementation of wayfinding signage, design standards to brand the economic districts, and the use of many other tools to jump-start economic growth. This study would be designed to leverage additional public improvements (streetscapes, sidewalks, pedestrian safety, etc.) and to determine an incentive package to attract new businesses to the area. (\$19,500)

Task 3: Plan Preparation – (\$8,000) – The final Plan will be adopted as the Economic Development Element of the Master Plan.

Timetable:

|                                  |          |
|----------------------------------|----------|
| CBD Development Plan             | 6 months |
| Planning and Economic Incentives | 4 months |
| Plan Preparation                 | 2 months |

### **5.3 Recreation and Open Space Element/Municipal Public Access Plan - \$30,000**

This Plan will guide the expansion of the City's open space holdings and provide a template for the design, improvement and maintenance of all the City's new and existing recreational facilities. It will also include a Municipal Public Access Plan (MPAP) to enhance public access to tidal waterways within the municipality. Brigantine is unique in that it has public beaches, recreational facilities along the back-bay and strategically located open spaces. The Recreation and Open Space Element will include the following minimum sections, consistent with the Coastal Zone Management Rules.

#### **1. Recreation and Open Space/MPAP Goals and Administrative Mechanisms**

2. Municipal Master Plan Consistency
3. Public Access Needs Assessment
4. Digital Mapping and Inventory
5. Implementation Strategy
6. Addressing potential and existing coastal hazards and the resiliency of public access locations and municipal facilities in order to assure sustainability.

The followings tasks will be included in this process:

Task 1: Preparation of the Plan - includes the preparation of the Open Space and Recreation Element. This Element will include municipal goals and administrative mechanisms, determine Master Plan consistency, complete a public needs access assessment, provide digital mapping and inventory, and complete an implementation strategy. (\$13,000)

Task 2: Designing Public Access with Resiliency - includes the review of potential and existing coastal hazards and the resiliency of public access locations and municipal facilities in order to assure long-term access and availability. Existing infrastructure including the Boardwalk, all accessible access ramps, bathroom facilities and similar improvements will be included in this assessment. Incorporation of planned access and improvements would also be included. This assessment would be completed in accordance with the Sustainable Jersey Program action. (\$7,000)

Task 3: Inclusion in Municipal Master Plan - Upon completion of the approved report, it will be presented to the Planning Board at a public meeting for adoption of the Element and inclusion in the Master Plan. (\$3,000)

Task 4: Project Implementation Schedule - A project implementation schedule that lists the tasks and their associated outputs or deliverables for each project will be provided. The schedule will also identify the party responsible for each task and the duration of time associated with completing each task. (\$7,000)

Timetable:

|        |          |
|--------|----------|
| Task 1 | 2 months |
| Task 2 | 4 months |
| Task 3 | 2 months |
| Task 4 | 2 months |

## 5.4 Environmental Design for Brigantine Boulevard Improvements - \$50,000



Brigantine Boulevard is the only access road to and from the City of Brigantine. It is one of the highest ranked Flood Hazard Mitigation Projects in the Atlantic County Flood Control Study. It is recommended that a scoping study be funded to consider surrounding land uses and determine options for protecting this access highway to Brigantine.

**Figure 23 – Brigantine Boulevard During Superstorm Sandy**

It is recommended that an NJDCA Post Sandy Planning Grant be secured to complete a scoping study for the elevation of Brigantine Boulevard. Since this highway is a county road, it is recommended that this grant application be made jointly. The study would include the following tasks:

Task 1: Existing Conditions – Survey and map existing elevations, utilities, signage, drainage facilities and other physical features that will help to determine alternative solutions. (\$20,000)

Task 2: Traffic Analysis – Conduct traffic counts, turning movement counts and other data collection to gain insight into traffic conditions in and around the study area. (\$10,000)

Task 3: Alternatives Analysis – Develop various alternatives to provide for emergency access to Vincent Haneman Bridge (\$10,000)

Task 4: Recommended Alternative – Select a recommended alternative and complete the written scoping study. (\$10,000)

Timetable:

|                         |          |
|-------------------------|----------|
| Existing Conditions     | 4 months |
| Traffic Analysis        | 4 months |
| Alternatives Analysis   | 2 months |
| Recommended Alternative | 2 months |

## 5.5 Master Plan Development - \$50,000

The Master Plan Reexamination was completed in 2010, but it does not integrate resiliency as a driving factor for all planning guidance. It is suggested that a comprehensive master plan be developed including the following critical elements:

- Land Use Element – which takes into account the new FIRM maps and associated requirements and discourages property owners from building in high-risk areas.
- Circulation Element – incorporating the many roads identified in the Atlantic County Flood Control Study
- Utility Service Element – to develop an action plan for water, sewer and stormwater improvement
- Community Facility Element – to ensure that critical facilities and public properties are properly sited and adequately protected
- Conservation Element – to identify and create an implementation plan for the acquisition and management of critical open-space areas
- Historic Preservation Element – to preserve historic areas and buildings and develop a plan for strategically utilizing funding that is available through the RREM program

The Master Planning effort provides an opportunity for the City to reexamine many of its goals and objectives and focus on strategies to address the impacts from Hurricane Sandy. It is recommended that a NJDCA Post Sandy Planning Grant be secured to fund the new Master Plan.

The Master Plan Reexamination will ensure that:

- The future land use map clearly identifies natural-hazard areas;
- Land use policies discourage development and redevelopment within the natural-hazard areas;
- Environmental systems that protect development from hazards are identified and mapped;
- Green infrastructure techniques are incorporated into the long-term infrastructure planning;
- Transportation systems are designed to function under disaster conditions; and
- The goals and policies of the Plan are related to the All-Hazards Mitigation Plan.

Tasks:

Task 1: Existing Conditions Analysis – Provide updated land-use, economic, demographic, environmental, housing and other needed data for use in preparing a Master Plan. This first task proposes the preparation of a comprehensive inventory and assessment of existing

conditions in the study area to identify the primary needs, challenges and opportunities. (\$10,000)

Task 2: Plan Preparation – This task will entail a significant public involvement process to develop, articulate and visualize future scenarios for the downtown and waterfront, and develop a consensus around priorities and objectives. The public process will be divided into four or more charrettes/workshops centered on topics including Urban Form and Design; Civic Life and Cultural Facilities; Streetscape and Transportation; and Land Use and Environment. Information and analysis collected under Task 1 will be used to inform participants about needs, limitations and opportunities to be considered in order to ground the planning process in a real-world, present-day context. (\$25,000)

Task 3: Implementation Plan - Building upon each of the previous tasks, specific actions and recommendations will be developed regarding how to best achieve the vision and plan articulated in Task 2. Examples will include: mechanisms for funding new development, redevelopment and supporting infrastructure; regulatory mechanisms including a Form-Based Code; non-regulatory tools such as capital improvement planning, city operations and maintenance, development assistance/support, special events and marketing; and a monitoring process and performances measures to allow the City to closely evaluate the progress and impacts of the Master Plan. (\$10,000)

Task 4: Final Plan Preparation - This task will include bringing together all of the information and recommendations into a single document for final presentation. Developing a document format that will be reader-friendly, accessible, and include visualization of the information conveyed will be essential. (\$5,000)

Timetable:

|                              |          |
|------------------------------|----------|
| Existing Conditions Analysis | 3 months |
| Plan Preparation             | 4 months |
| Implementation Plan          | 3 months |
| Final Plan Preparation       | 2 months |

The new Land Use Element will also review current zoning versus existing development to determine what if any revisions are required. One such area is the R-4 zone in the neighborhood generally bounded by 44<sup>th</sup> Street South, West Brigantine Avenue, 40<sup>th</sup> Street and the beach. While zoned single family, this area has developed with predominately duplex structures.

The Brigantine Planning Board has also identified a number of planning issues that will be addressed in the Land Use Element.

## 5.6 Zoning Ordinance Revisions – Design Standards - \$50,000

Once the Master Plan is complete, zoning ordinance revisions will be required. The Brigantine Planning Board has also identified a number of planning issues that will be addressed in the zoning ordinance revisions.

Additional revisions may be needed to comply with the CRS. For example, the Planning Board supports in concept the inclusion of additional freeboard to protect properties and to enhance the City’s insurance discounts through the Community Rating System. Design standards will be considered to ensure that the higher structures are aesthetically pleasing and are harmonious with the existing neighborhood. The City zoning ordinance requires that buildings be constructed at a maximum height of 37.6 feet, which assumes 1 foot of freeboard. The City intends to consider raising the maximum heights to 39.6 feet and requiring 3 feet of freeboard. Of course, such a change will need to be studied in light of the impacts on surrounding land uses.

### Tasks:

Task 1: Design Code Development - This task is the development of a revised zoning to implement the new Master Plan. The code will include: a regulating plan, public space standards and building form standards. Additional elements that the City may consider are: architectural, landscaping, signage and environmental resource standards. (\$40,000)

Task 2: Public Meetings – A series of public meetings will be held with the Planning Board Committee, Planning Board and City Council to review and discuss recommended changes. (\$10,000)

Green infrastructure strategies will be incorporated into the zoning ordinance to the greatest extent possible to encourage renewable energy, green roofs, permeable pavement and rain gardens, among other strategies.

### Timetable:

|                         |           |
|-------------------------|-----------|
| Design Code Development | 12 months |
| Public Outreach         | Ongoing   |

## 5.7 Capital Improvement Plan - \$30,000

This Strategic Recovery Planning Report identifies many capital improvements needed to make Brigantine more resilient. It will not be possible for the City to fund these improvements immediately. The improvements will have to be paid for over a period of time in a planned fashion so to avoid a significant impact on municipal government and the local tax rate.

The development of this plan will involve the City’s Administration, Engineer, Chief Financial Officer, Financial Advisor, Bond Counsel and City Council.

Tasks:

Task 1: Facility Inspections - inspection of stormwater and sanitary sewer systems, local roads and sidewalks and developing a priority ranking for needed improvements. (\$16,500)

Task 2: Design and Cost Estimates – Designing and surveying will be included for various priority projects. Projects will be identified along with the associated costs and alternative sources of funding (i.e. grants, low-interest loans, private/public partnerships, etc.). A portion of the Plan will be dedicated to capital improvements that enhance the safety of children walking to school and the preparation of a School Travel Plan. (\$6,500)

Task 3: Plan Completion (\$7,000)

Timetable:

|                                |          |
|--------------------------------|----------|
| Facility Inspections           | 6 months |
| Engineering and Cost Estimates | 4 months |
| Plan Completion                | 2 months |

### **5.8 Capital Improvement Plan for Regionalization and Shared Services - \$30,000**

Brigantine is a unique community when it comes to regionalization and shared services because the City is geographically isolated from other communities. Atlantic City is the closest neighboring community but is separated from Brigantine by the Absecon Inlet. The City does participate in shared dispatch services and regional trash and recycling collection services. In order to maintain a stable tax rate during a time when additional capital investment is needed to address the impacts of Superstorm Sandy, the City must explore ways to reduce the costs of service delivery while maintaining high service quality. A NJDCA Post Sandy Planning Grant is requested to fund an in-depth capital plan for Regionalization and Shared Services.

Task 1: Identify service candidates for shared and regional services – evaluate City services and determine which provide the best opportunity for cost reduction. (\$12,000)

Task 2: In-depth analysis of defined services – evaluate operating costs, capital costs and secondary costs associated with specific services that have the most likelihood to be regionalized or shared. This Plan will identify capital and operating costs associated with implementing regionalization and shared services. (\$18,000)

Timetable:

|  |          |
|--|----------|
| Identify service candidates for shared and regional services | 4 months |
| In-depth analysis of defined services                        | 4 months |

## 5.9 Energy Audit/Energy Savings Improvement Plan

The State plans to invest \$210 million to create the New Jersey Energy Resilience Bank to continue to pursue innovation and build energy resilience. The bank should help to leverage the development of distributed power generation projects, microgrids and other resilient technology designs at critical facilities.

The City has started to build a more resilient energy system by securing grants for emergency generators for the municipal building and applying for New Jersey Environmental Infrastructure Trust (NJEIT) funding for emergency generators for water, sewer and stormwater facilities.

The public school supports solar arrays and wind turbines that could be made more resilient with a dynamic inverter that would allow the school building to receive electric directly from this alternative energy infrastructure.

As noted earlier, the City and School District have completed a Local Government Energy Audit of all their buildings, which is a prerequisite to pursuing a joint Energy Savings Improvement Program (ESIP). ESIP's were recently created by the State Legislature as a means for public agencies to make energy-savings and resiliency improvements without expending public funds. The ESIP requires that the cost of the improvements be totally offset by energy savings over a 15- or 20-year period. It is recommended that the City and School District jointly consider pursuing an ESIP.

Another option would be to consider a regional ESIP with surrounding communities to create a larger project that is more attractive to the pre-certified vendors. Such a regional option could be managed by the Atlantic County Improvement Authority.

## 5.10 Groin Evaluation

As with many coastal communities along the Atlantic Coast, Brigantine's beaches are subject to a variety of erosive processes. The north end of the developed portion of Brigantine has existing groins and shore parallel protective structures. During the U.S. Army Corps of Engineers' Feasibility Study, the construction of groins in combination with beachfill was considered.

The City plans to request proposals for coastal engineering services to analyze coastal processes contributing to the high rate of erosion of the city's northerly beaches and recommend improvements needed to maintain a moderate recreational and protective beach within the project area despite the influences of severe episodic Northeast storm events. To this end, the selected coastal engineering expert would complete an overall review of the project area coastal processes, which would result in a report and design

memorandum for the conceptual design of recommended improvements and potentially the construction of a groin field and/or other hard-structure improvements. The design memorandum/report would provide all metrics related to the design of the project, such as, but not limited to length, crest height, spacing, configurations (orientation), materials of the recommended improvements, and the economics of the project. The final design memorandum is intended to solicit USACE funding and inclusion of groins or other recommended improvements to the federally authorized project.

The previously authorized USACE project for Brigantine was focused on the northern third of the developed shoreline. A feeder beach was designed into the project at the southern 1,600 feet of the natural area north of development. The project extends south to 5th Street South in the City. In 2006, the initial federal beach restoration was completed within the footprint of two prior state and local projects from 1997 and 2001. In 2011, an emergency maintenance was completed under the Flood Control and Coastal Emergencies funding program using trucked-in sand.

## **6.0 Infrastructure Recommendations**

A study conducted a Loyola Marymount University finds that a \$1 increase in preparedness spending is associated with a reduction of about \$15 in future damage in new present-value terms.

The City is pursuing NJEIT funding for project identified below in sections 6.1 to 6.8. These projects were developed in conjunction with City officials and City Council. Full engineering of each project has been completed and permitting is underway. Detailed cost estimates for each of these capital improvements are provided in Appendix A.

### **6.1 Replacement of Well #4 - \$1,490,000**

Well #4 is located at 42<sup>nd</sup> Street and Bayshore Avenue and serves the entire south section of the island of Brigantine. The system is old and must be replaced. This water-supply system was close to being impacted by Superstorm Sandy, since flood waters reached the top of the well system due to the existing low elevation. State regulations require that the well head be 18 inches above the flood elevation. Well #4 does not meet this requirement. The new system will be designed at a higher elevation to ensure that future storms will not jeopardize the City's water system.



**Figure 24 - Well #4 to be replaced, serving the South End of the Island**

## **6.2 Installation of Emergency Generators - \$2,742,500**

The City of Brigantine is served by three sanitary sewer lift stations, three potable wells and two stormwater pumps, which all require emergency generators. In addition, the police/fire/Emergency Management Office does not have an emergency generator. Finally, City Hall is used for emergency purposes during storms, hurricanes, electric outages and other natural disasters, and a generator is required for this building as well. All of these facilities require emergency generators so that service can be provided during emergency situations.

Emergency generators are planned for the following locations:

1. South End Sewer Lift Station, Harbor Beach Boulevard and Ocean Dr. East
2. A Station Sewer Lift Station, 100 Bayshore Avenue
3. Jenkins Parkway Sewer Pump Station, Jenkins Parkway and 11<sup>th</sup> Street North
4. Potable Well #4, 4201 Bayshore Avenue
5. Potable Well #5, 217 14<sup>th</sup> Street South
6. Potable Well #7, 203 Vernon Place
7. Evans Boulevard Stormwater Lift Station, Harbor Beach Boulevard at Ocean Dr. East
8. Caverly Drive Stormwater Pump Station, Sheridan Boulevard at Caverly Drive
9. Lincoln Drive Stormwater Pump Station, Lincoln Drive at Caverly Drive
10. Police/Fire/Emergency Medical Services, 1417 West Brigantine Avenue

11. City Hall, 1417 West Brigantine Avenue

### **6.3 South End Flood Control Improvements - \$783,400**

Currently the outlet structure that serves the Ocean Drive and Lagoon Boulevard section of the Inlet area of the City is totally clogged and non-functional. The current 60-inch outfall pipe is buried, and the system no longer functions as designed. It is estimated that the current system operates at or near 25 percent capacity, resulting in localized flooding. This project calls for a new outlet system to be designed that will reroute stormwater within the Seaport Area Drainage Basin to a new outfall.

### **6.4 Pump Stations at Hackney Place, 34<sup>th</sup> Street South, Jenkins Parkway - \$1,423,050**

The city installed a stormwater pump station in 1980 and alleviated the flooding in one area. Two additional stormwater pump stations were installed in 2007 with funding support from FEMA.

Three additional stormwater management projects are proposed in this application. Each of the pump stations described below will include an emergency generator to ensure operation during electric power outages:

1. New Lighthouse Circle Stormwater Pump Station – 34<sup>th</sup> Street and Bayshore Avenue. This pump will serve a drainage area that includes portions of Brigantine Boulevard, the only access route off of the island.
2. New Hackney Place Stormwater Pump Station – to be located off of West Shore Drive in the Golf Course Section of the City.
3. New Pump Station at Jenkins Parkway, 12<sup>th</sup> Street North.

This project is designed to improve and protect groundwater, as well as provide for a functional stormwater system.

### **6.5 Pump Stations and Flood Gates at Boat Ramp at 5<sup>th</sup> Street South - \$701,115**

The Boat Ramp is located at 5th Street South and Bayshore Avenues. This project includes a pump station and emergency generator to service the stormwater needs of this area along with waterproofing the boat ramp, which is at 7-foot elevation. Floodgates will provide this protection. Also planned is the elevation of the boat ramp apron and Bayshore Avenue to reduce flooding.



10/29/12 - 5th Street South in Brigantine, NJ

CLOSE X

### **Figure 25 – 5<sup>th</sup> Street South During Superstorm Sandy**

#### **6.6 Elevate 12 Street North and East Evans Boulevard - \$646,333**

This project includes:

12<sup>th</sup> Street North Stormwater Project – Located on the far northern section of the City. The plan includes raising 12<sup>th</sup> Street North. The elevation of 12<sup>th</sup> Street North is specifically included in the County AHMP.

Evans Boulevard Stormwater Project – East Evans Boulevard intersects 12<sup>th</sup> Street North at a 90-degree angle. The improvements on this street include installing 1,800 LF of piping along East Evans Boulevard to 12 Street North. The planned pipe system is specifically included in the County AHMP.

#### **6.7 Golf Course Neighborhood Improvements - \$688,250**

This project will provide for the removal of accumulated sand from municipal drainage basins in the Golf Course Section of the City of Brigantine. The Golf Course Section of the City was significantly flooded by Superstorm Sandy, and silts and sand washed into the underground drainage system. This project is designed to improve and protect groundwater, as well as provide for a functional stormwater system.

The entire Golf Course Section of the City was under water during and after Superstorm Sandy. More than 32,000 cubic yards of sand and silts washed into the drainage system, making it inoperable. The planned improvements will help to prevent future damage caused by natural disasters. By making these improvements, the need for emergency protective and public-works services in this area will be reduced. Damage to roads and structures in the area will be reduced, and property owners will suffer fewer instances of being denied access/egress to their properties. In addition, this project will provide adequate environmental infrastructure to improve resiliency of Sandy-damaged systems in future natural disasters.



**Figure 27 – Golf Course Area During Superstorm Sandy**

### **6.8 Bulkheads at Nine Street Ends - \$710,360**

This project will include replacement of various deteriorated timber bulkheads with vinyl bulkheads and raising the elevation to 9 feet. New vinyl bulkheads at elevation 9 ft. are proposed at:

1. 13th Street South
2. Cherokee Boulevard
3. Unnamed Street End adjacent to 4104 Atlantic Boulevard
4. Unnamed Street End adjacent to 4200 Atlantic Boulevard
5. Poinsettia Way adjacent to 4701 Atlantic Brigantine Boulevard
6. Lilac Way adjacent to 4801 Atlantic Brigantine Boulevard

Replacement of existing bulkheads that are in disrepair with new vinyl bulkheads at elevation 9 ft. are proposed at:

1. 14<sup>th</sup> Street South
2. 24<sup>th</sup> Street South

### 3. Pepper Cove

There many repetitive-loss properties located near the proposed street ends. These properties will be afforded additional protection from street-end flooding in addition to protecting the public infrastructure in the area.

## **6.9 Private Bulkhead Improvements - \$3,859,333**

This project includes:

1. Replacement of Inlet beach bulkhead adjacent to Ocean Drive West - The entire project will occur on public property. The public benefits of this project are to protect critical public infrastructure, including City streets, reduce flooding in this low-lying area, and improve access for needed services to residents and visitors. - \$2,133,735
2. Bulkhead Installation, 13<sup>th</sup> Street North to 14<sup>th</sup> Street North - \$403,117.50
3. Replacement of Ocean Front Bulkhead, 9<sup>th</sup> Street North to 5<sup>th</sup> Street North - \$1,222,480

## **6.10 Seawall Improvements - Northward Extension - \$1,359,625**

The existing Brigantine Seawall was constructed in the early 1990s as a result of a joint shore-protection effort by the City of Brigantine, County of Atlantic and the State of New Jersey. The seawall extends along the easterly right-of-way of Brigantine Avenue from 9<sup>th</sup> Street North to 15<sup>th</sup> Street North. It has protected the adjacent properties from coastal storms while the promenade on the seawall provides for passive recreation year-round.

The City requested that the Corps consider extending the seawall northward approximately 275 feet. This area was subject to extensive erosion during coastal storms and severely impacted during Superstorm Sandy. In fact, several homes in this area were severely damaged during Superstorm Sandy as waves from the Atlantic Ocean breached the area north of the seawall.

The requested extension of the seawall will serve to protect public infrastructure and 12 single-family homes between 14<sup>th</sup> Street North and 15<sup>th</sup> Street North, and will also protect nine single-family homes approved for construction on the vacant tract between 14<sup>th</sup> Street North and 15<sup>th</sup> Street North west of the existing homes.



**Figure 28 - Storm waves and surge eroded the beach and exposed the seawall during Superstorm Sandy. Overwash of the seawall is indicated by sand deposited on the street. Low dunes on the eastern flank of the seawall were eroded. The yellow arrow in each image points to the same feature.**



**Figure 29 – North End of Brigantine Island During Superstorm Sandy**

**6.11 Bulkhead Reconstruction at City Dock located at 26<sup>th</sup> Street South - \$396,000**

The City Dock is located at 26<sup>th</sup> Street South and provides for kayaking, boating, swimming and other water sports. The City Dock was severely damaged by Superstorm Sandy and has not been operational since the storm.

The project includes replacing the bulkhead that is severely damaged and raising it from 7 feet to 9 feet along the park water frontage. The entire project will occur on public property. The public benefits of this project are to protect critical public infrastructure, Brigantine Strategic Recovery Planning Report

namely the City Dock and Bayshore Avenue, reduce flooding in this low-lying area and improve access for emergency services to residents and visitors.



**Figure 30 – City Dock Damage Caused by Superstorm Sandy**

## **6.12 Open Space Acquisitions**

The State has allocated \$100 million from the first tranche of CDBG-DR funds and plans to direct an additional \$100 million to convert land to open space. Converting land to open space creates more open spaces that can help to absorb flood waters, making the area more resilient to future storms.

This report has identified four opportunities to expand open space in the City of Brigantine. These recommendations include well-located sites that can be used to expand recreational opportunities in the City and to ensure that additional development does not occur.

### **1. Jersey State Marina Site – 7<sup>th</sup> Street South and Bayshore Avenue**

The site is located immediately adjacent to the City’s Boathouse. The marina was impacted by Superstorm Sandy and it currently is not operating. The site provides bayfront access and has a recently improved bulkhead. If the City purchased this property, it would be used to provide additional convenience parking for the Boathouse, and a private vendor could operate the marina.



**Figure 31 – Jersey State Marina Site**

2. Planned Boat Launch – Harbor Beach Boulevard

This site is located on Harbor Beach Boulevard directly across the street from the City’s only shopping center. Many boats moor in the St. Georges Thorofare Bay because of the deep water and protection that it provides. The plan would include a mooring site with a few benches and landscaping to beautify this area and provide a location for transient boaters to dock so that they can shop and dine in the City.

3. Lighthouse Park – Brigantine Boulevard

This parcel is located adjacent to the Brigantine Historic Museum and the Marine Mammal Stranding Center. This parcel was the site of an abandoned convenience store and service station. The site has been cleared of any contamination and would provide an extension of City-owned open space along Golden Hammock Thorofare. This location is ideal for a small boat and kayak launch and passive recreational activities. The site is planned for duplex development, which would be avoided if the property was purchased for open space. The City has received a N.J. Green Acres Grant for \$187,500 toward the purchase of this property.

4. 3601 Atlantic Brigantine Boulevard

This site is located at the base of the Brigantine Bridge on the west side. Approved for 24 units, the owner of this parcel has applied for Blue Acres funding.



**Figure 32 – 3601 Atlantic Brigantine Boulevard Site**

5. 402 East Evans Boulevard

The owner has submitted this property to the state for Blue Acres funding.

### **6.13 Back Passing Operation for Beach Replenishment**

The City would like to institute a back passing operation to truck sand from the south end of the island to provide added protection on the northern tip of the island, the most vulnerable oceanfront area of the island. A funding request from the U.S. Department of the Interior and the National Fish and Wildlife Foundation’s 2013 Hurricane Sandy Coastal Resiliency Competitive Grant Program has been submitted.

### **6.14 Living Shoreline Improvements to Protect Back Bay Areas**

The City would like to explore the cost and impacts of living shoreline improvements to protect the bay areas. A funding request from the U.S. Department of the Interior and the National Fish and Wildlife Foundation’s 2013 Hurricane Sandy Coastal Resiliency Competitive Grant Program has been submitted.

## 6.15 Elevate Repetitively Damaged Structures

A number of the City's repetitively damaged structures (those with repeated losses or flood-insurance claims) are in the areas hit by Superstorm Sandy. Now is the time to mitigate those structures. Many property owners will have problems finding the resources to rebuild, let alone mitigate their structures. The 2004 and 2012 NFIP Reform Act provides authority for added funding in the flood insurance policy to help property owners mitigate repetitive-loss structures through a variety of generally non-structural means, including voluntary buyouts and relocations, elevation of buildings and floodproofing. Appropriately implementing these provisions will help reduce this drain on the Flood Insurance Fund over time. While repetitive-loss properties constitute only 1.3 percent of the policies in the NFIP, they represent about 25 percent of the claims. This matter should be of concern to everyone in or near a flood zone. Repetitive claims and large numbers of claims will drive up the cost of flood insurance for everyone.

## 7.0 Funding Options

### 7.1 U.S. Department of Interior

The U.S. Department of Interior is investing \$100 million in grant funding under the Superstorm Sandy Coastal Resiliency Competitive Grant Program. The grants are provided to better protect Atlantic Coast communities from future powerful storms by restoring marshes, wetlands and beaches, rebuilding shorelines, and researching the impacts and modeling mitigation of storm surge impacts.



**Figure 33 – Storm Surge at the Brigantine Seawall**

With more than 47,000 acres of wetlands spanning from Brick Township to Brigantine, the Forsythe National Wildlife Refuge absorbed much of Sandy's energy and storm surge, protecting some of the local communities in the path of the storm.

The Forsythe Wildlife Refuge is a resiliency hub, which is a priority use for this funding. Resiliency hubs are coastal or inland areas characterized by preserved public or private open lands that contain an intact complex of ecosystems, habitats and "nature based infrastructure," and that are in close proximity or connected to population centers or communities.

## **7.2 Alternative Funding Sources for Elevating Structures**

Given the fact that more than 1,000 homeowners have provided the City with letters of intent to elevate their homes, it is important to summarize the various funding sources for elevating structures.

### **7.2.1 National Flood Insurance Program – Increased Cost of Compliance (ICC) Coverage**

ICC funding is not a loan and does not have to be repaid. It is managed by the National Flood Insurance Program and is available to property owners who carry new and renewed standard flood insurance policies. It helps homeowners meet the costs of repairing or rebuilding their property in order to comply with building requirements of their community and reduce future flood damage. The maximum amount a homeowner can receive is \$30,000 and is based on a proof of loss, a detailed repair estimate and a substantial damage declaration from the community. ICC funding can be used to pay for:

- The elevation of a home above the flood elevation level adopted by the community
- The relocation of a home out of harm's way
- The demolition and removal of a damaged home

Eligibility requirements include:

- Location in a flood plain
- Property has suffered substantial damage from a flood
- Property has had repeated damage by floods

A single-family dwelling is available for a maximum combined amount of \$250,000 from both the ICC and flood insurance.

### **7.2.2 Reconstruction, Rehabilitation, Elevation and Mitigation (RREM) Program**

The RREM program was offered through the State of New Jersey and provided up to \$150,000 for eligible homeowners to repair, elevate or rebuild their primary residences in

the affected communities. Based on information provided by the NJDCA as of January 20, 2014, 511 homeowners in the City of Brigantine applied for RREM funding. At that time, 132 were found to be eligible and 276 were on the waiting list.

### **7.2.3 Hazard Mitigation Grant Program (HMGP)**

HMGP is only offered during a presidentially declared disaster. This reimbursement program provides up to \$30,000 to assist homeowners with the elevation of their primary single-family residences in line with the Flood Insurance Risk Maps in affected communities. The HMGP provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

### **7.2.4 Additional FEMA Programs**

In addition to the Hazard Mitigation Grant Program, FEMA provided four additional programs that can be used to elevate structures, including: the Pre-Disaster Mitigation (PDM) Program; Flood Mitigation Assistance (FMA) Program; Severe Repetitive Loss (SRL) Program and Repetitive Flood Claims (RFC) Program. In 2013, the annual grants were trimmed down to just the PDM and FMA Programs. Any municipal applicant must submit to the NJOEM during the application period, and they are put into one state-wide application and submitted to FEMA. The PDM and FMA grants are offered each year, and each applicant competes nationally.

**7.2.4.1 Flood Mitigation Assistance (FMA) Program** - The Flood Mitigation Assistance (FMA) program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to help states and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other structures insured under NFIP. Eligible properties must maintain flood insurance for the life of the structure. In order to receive an increased federal cost share, properties must be a severe repetitive-loss property or a repetitive-loss property.

Cost-share availability under the FMA program depends on the type of properties included in the grant. For example, severe repetitive-loss properties may receive up to 100 percent federal funding and repetitive-loss properties may receive up to 90 percent.

- In the case of mitigation activities to severe repetitive-loss structures:
  - FEMA may contribute up to 100 percent federal funding of all eligible costs, if the activities are technically feasible and cost-effective; or

- FEMA may contribute an amount equaling the expected savings to the NFIP from expected avoided damages through acquisition or relocation activities, if the activities will eliminate future payments from the NFIP for severe repetitive-loss structures through an acquisition or relocation activity.
- In the case of mitigation activities to repetitive-loss structures, FEMA may contribute up to 90 percent federal funding of all eligible costs.
- In the case of all other mitigation activities, FEMA may contribute up to 75 percent federal funding of all eligible costs.

Structures with varying cost-share requirements can be submitted in one application. Applicants must provide documentation in the project application showing how the final cost share was derived.

FEMA will identify applications for further review based on a number of criteria, including but not limited to: savings to the NFIP, applicant rank and property status (e.g., repetitive-loss property, severe repetitive-loss property). FEMA also may identify an application for further review out of rank order based on considerations such as program priorities, available funds, and other factors.

**7.2.4.2 Severe Repetitive Loss (SRL) Grants** - The SRL grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive-loss structures insured under the National Flood Insurance Program. Proposed projects must be cost effective with a benefit-cost ratio greater than 1.0. The homeowner's application must include an elevation certificate and signed, detailed contractor's estimate.

**7.2.4.3 Pre-Disaster Mitigation (PDM) Grants** - The PDM program used to provide funds to states, territories, Indian tribal governments, communities and universities for hazard-mitigation planning and the implementation of mitigation projects prior to a disaster event. This program should be restored. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas or other formula-based allocation of funds.

**7.2.4.4 Repetitive Flood Claims (RFC) Grants** - The RFC grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968. RFC provides funding to reduce or eliminate the long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP) that have had one or more claim payments for flood damages.

### 7.3 Historic Preservation Funding

Municipalities that have RREM recipients who have homes that are considered historic will be receiving funding from the state for historic presentation. The state is putting aside \$3,000 to \$6,000 per property to mitigate any adverse impacts of the RREM Program on potential historic structures. These mitigation funds will be used to complete projects in the communities that document the historic significance of these properties or provide for public interpretation. The specific scope of these mitigation treatments will be developed through additional consultation between the DCA, DEP and Historic Preservation Office (HPO).

It appears that the Programmatic Agreement covers how to complete Section 106 (SHPO review) for Sandy-impacted properties. It is suggested that this funding be used for:

- updated historic property inventories
- documentation of any structures if slated for demolition
- public interpretation plans of historic structures and their fragility
- mapping of historic areas, both current and historical.



Figure 34 - President Obama Tours Brigantine after Superstorm Sandy

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