

THE BOROUGH OF OCEANPORT

# Strategic Recovery Planning Report

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OCTOBER 28, 2014

**Clarke Caton Hintz**

Architecture

Planning

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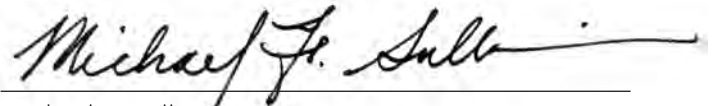
# Strategic Recovery Planning Report

**Borough of Oceanport,  
Monmouth County, New Jersey**

*Prepared for:  
The Borough of Oceanport*

October 28, 2014

Prepared by:



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# Strategic Recovery Planning Report

**Borough of Oceanport,  
Monmouth County, New Jersey**

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Jerry Bertekap  
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# Introduction

Hurricane Sandy was the deadliest hurricane of the 2012 Atlantic Hurricane season, as well as one of the costliest storms to impact the United States. It made landfall on October 29, 2012 along the southern coast of New Jersey near Atlantic City. Fortunately, it was downgraded to a post-tropical cyclone with hurricane force winds prior to landfall. Even with the downgraded status, the damage in New Jersey was unprecedented with approximately 346,000 New Jersey homes damaged, of which 22,000 were uninhabitable and nearly 19,000 businesses sustained damage of \$250,000 or more.<sup>5</sup>

The Borough of Oceanport has a history of flooding from the Shrewsbury River and its tributaries, including the Branchport Creek. At only 3.9 square miles, nearly 25% of the Borough is located in the Special Flood Hazard Area (defined as having a 1% annual chance of flooding).

Superstorm Sandy resulted in extensive flooding in the Borough across lands along Shrewsbury River (a tidal strait), Branchport Creek, Turtle Mill Brook, Oceanport Creek and Parkers Creek, as well as properties further inland. Water levels in the Borough reached six feet in the neighborhood between Blackberry Bay Park and Sommers Boy Scout Park, as well as parts of Gooseneck Point, Horseneck Point and along many parts of the Borough's water bodies. Lesser water levels of one to four feet were present in much of the Borough's inland areas. Additionally, the flooding caused significant damage to the Borough's municipal building, Old Wharf House community center, police department, department of public works and the non-profit-owned first aid building.

In response to the storm's impacts, the federal government allocated more than \$50 billion to 19 federal agencies as part of the Disaster Relief Appropriations act of 2013. Of that allocation, \$15.2 billion was appropriated for the HUD Community



*A satellite image of the storm on October 29, with most of the U.S. coastline artificially highlighted.*

<sup>1</sup> Blake, Eric S.; Kimberlain, Todd B.; Berg, Robert J.; Cangialosi, John P. and Beven, John L., II. Tropical Cyclone Report, Hurricane Sandy. National Hurricane Center. February 12, 2013.

Development Block Grant Disaster Recovery (CDBG-DR) program and, of this, \$3.3 billion was allocated for New Jersey and will be awarded in two rounds. New Jersey received \$1.8 billion in the first round (2013) and \$1.5 billion in the second round (2014). This Strategic Recovery Planning Report (SRPR) is prepared for the Borough of

Oceanport with funding provided by the New Jersey Department of Community Affairs through its Post Sandy Planning Assistance Grant Program. This State grant program is funded by the Federal CDBG-DR program allocation. Completion of a Strategic Recovery Planning Report is prerequisite for additional funding from the Post Sandy Planning Assistance Grant Program; subsequent applications may request funding for master planning, ordinances, capital facilities planning and similar projects.



*Residence in the process of being lifted above the flood elevation*

The Borough, as well as the State and Monmouth County, are now conducting post-disaster planning, which is defined as creating a vision for the community's recovery that addresses reconstruction, economic recovery and land use regulations. The immediate safety issues during and after a disaster are not addressed in this topic and are better addressed in emergency response planning. There are three broad categories which municipalities should address in their post-disaster planning:

*Hazard Mitigation* – The lessening of the potential adverse impacts of physical hazards (including those that are human-induced) through actions that reduce hazard, exposure, and vulnerability.

*Resilience* – The ability of a system and its component parts to anticipate, absorb, accommodate or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration or improvement of its essential basic structures and functions

*Adaptation* – The process of adjustment to actual or expected climates and their effects in order to moderate harm or exploit beneficial opportunities.

This Strategic Recovery Planning Report addresses each of these categories and provides action steps for how Oceanport can perform hazard mitigation, increase its resilience and adapt to a changing climate and weather events.

## Existing Conditions

The Borough floods approximately half a dozen times a year, primarily due to rain events. Flooding in the Borough can be extensive, given that 24.7% the Borough is within the Special Flood Hazard Area with a 1% annual chance of flooding (also referred to as the 100 year flood hazard area) and an additional 9.9% of land has a 0.2% annual chance of flooding (also referred to as the 500-year flood hazard area).

The Special Flood Hazard Area, as discussed herein, is sourced from the Preliminary Work Maps for Monmouth County. These maps report a lower base flood elevation in many parts of Oceanport as compared to previous flood hazard area mapping. The Borough expressed concern about these base flood elevations but recognizes that it may address the problem by requiring, in its Borough Code, additional elevation for buildings in the Special Flood Hazard Area.

The extent of flooding varies significantly depending on whether precipitation occurs during low tide or high tide. Minor flooding, which generally occurs during low tide, is largely considered a nuisance, with flood waters reaching streets and open spaces rather than public or privately-owned buildings. More severe flooding is generally limited to storms having significant levels of precipitation that occur during high tide. For example, flooded homes have occurred when a nor'easter arrives during high tide. In addition to 2012's Superstorm Sandy, the Borough experienced significant flood events in 1999, 2005, 2006, 2007, 2010 and 2011<sup>5</sup>. The most commonly flooded streets include Gooseneck Point Road, Bridgewaters Drive, Port-au-peck Avenue and those streets between Blackberry Bay Park and Sommers Boy Scout Park.

### Existing Flood Hazard Areas

FEMA's Preliminary Work Maps for Monmouth County place about one-quarter of the Borough's land area in the Special Flood Hazard Area. Within this area are base flood elevations ranging from 9 to 10 feet immediately adjacent to the waterbodies to as much as 8 feet at more inland properties. This generally includes: Horseneck Point, Gooseneck Point, the commercial area along East Main Street and lands along all of the Borough's waterways. See the *Environmental Constraints* and *Base Flood Elevation* maps on the following pages for additional information.

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3 New Jersey Coastal Community Resilience Demonstration Project. NJ Sea Grant Consortium. December 2010

Another 10% of the Borough has a .2% chance of flooding annually (also referred to as the 500 year flood hazard area). This area is generally only covers the land adjacent to the Special Flood Hazard Area, but there are larger areas including: between Monmouth Boulevard, Branchport Avenue, Port Au Peck Avenue, and Myrtle Avenue; the neighborhood north of Avon Avenue; and additional areas of Fort Monmouth near Horseneck Point and Oceanport Creek.

## **Borough Flood Control Strategy & Infrastructure**

The Borough's flood control strategy is primarily composed of a series of 44 outfalls and open ditches that convey storm and flood waters to the surrounding waterways such as Blackberry Bay and the Shrewsbury River. Example ditches in the Borough include that which runs along Blackberry Bay Park, behind homes facing Cayuga Avenue, and empties to the Blackberry Bay; a ditch which runs along the rear of homes on the south side of Genessee Avenue and empties to the Blackberry Bay; and a ditch which runs perpendicular to Seneca Avenue and empties into the Branchport Creek. Additionally, the Turtle Mill Brook at Oceanport's southern boundary conveys water from Borough lands to the Branchport Creek.

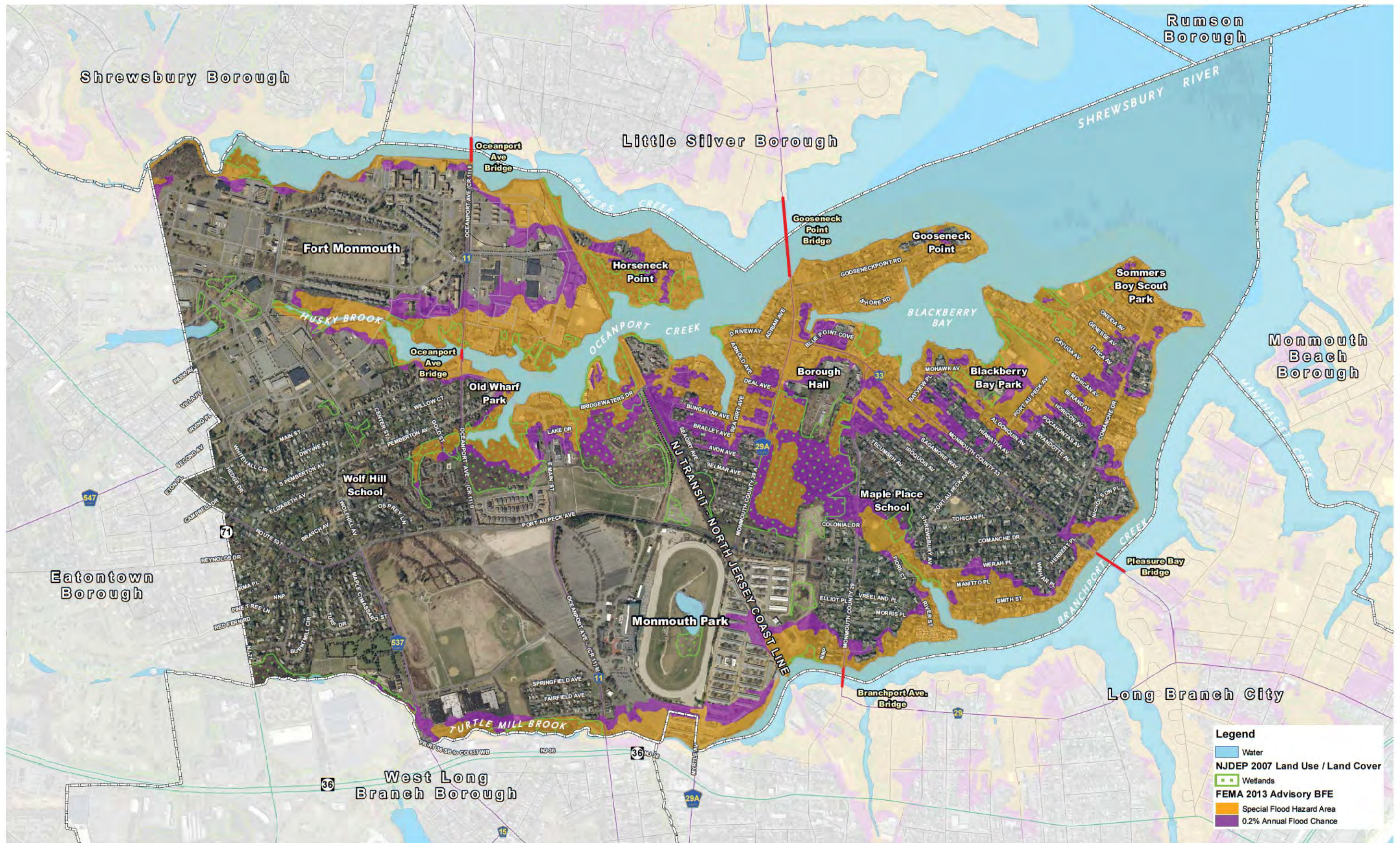
Only a small portion of the 44 outfalls have backflow preventers. However, while they are a useful mitigation strategy, backflow preventers have limited utility during high tide or other times of high water levels as the water can overtop not only the outfalls but the land itself. Notwithstanding, additional backflow preventers should be installed so as to reduce flooding during moderate or storm events and to extend time for residents to safely evacuate during major flooding.

Bulkheads serve as the primary protection from riverine flooding and are also subject to regulations in the Coastal Area Facilities Review Act (CAFRA). However, the height, and therefore the level of protection, of the bulkheads vary by property. The vast majority of bulkheads in Oceanport are installed on private property and maintained by the owners of the property where they are located. As such, there is no consistency in the level of protection or construction materials. Additionally, the benefits are questionable for an individual property owner to install a higher and more protective bulkhead since flood water could come through any adjacent and lower bulkhead.

## **Public Water & Sewer Utilities**

Oceanport's potable water supply is provided by New Jersey American Water Co. and sanitary service is provided by the Two Rivers Water Reclamation Authority. The treatment plant is located on Raccoon Island in Monmouth Beach and serves member communities: Fair Haven, Little Silver, Monmouth Beach, Oceanport, Shrewsbury, and West Long Branch, as well as Fort Monmouth. Additionally, Eatontown, Red Bank, Rumson, Sea Bright, Shrewsbury Township, and Tinton Falls are customers, sending some sanitary sewer flows to TRWRA.



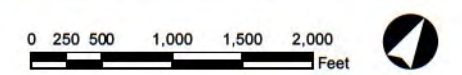


Aerial Orthophotography Source: NJGIN - New Jersey 2012 High Resolution Orthophotography  
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP, and is not state authorized.

STRATEGIC RECOVERY PLANNING REPORT

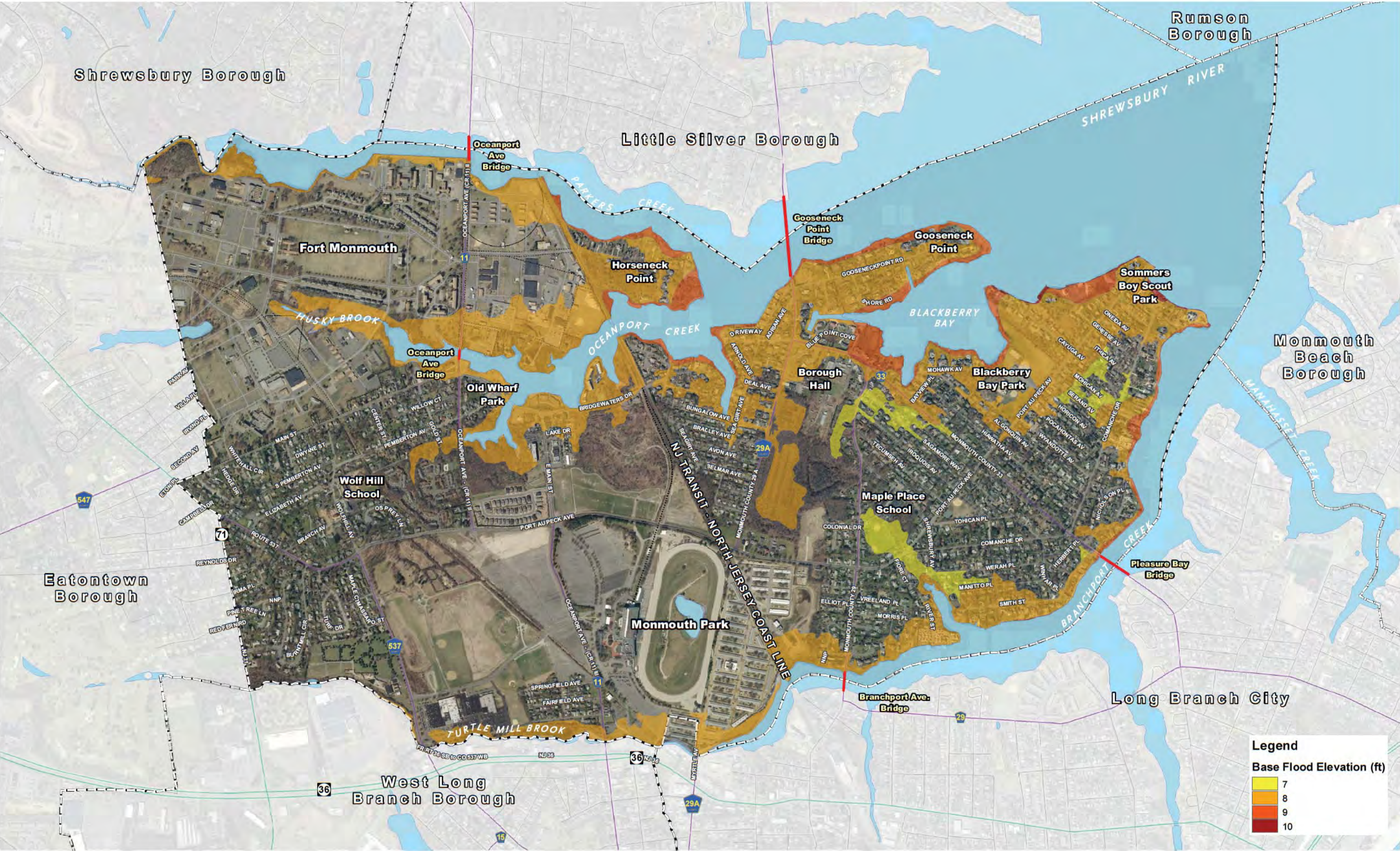
# Flood Hazard Areas

Oceanport Borough, Monmouth County, NJ | October 2014



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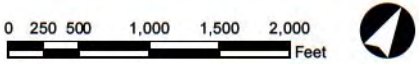
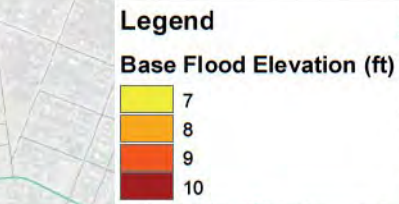


Aerial Orthophotography Source: NJGIN - New Jersey 2012 High Resolution Orthophotography  
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# Base Flood Elevation

Oceanport Borough, Monmouth County, NJ | October 2014



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## Emergency Alert

The Oceanport Police Department oversees mobile route (vehicle) and door-to-door alerts. The alert staff includes bilingual participants. System activation requires the Emergency Management Coordinator (EMC) to contact the County first. The next in line to activate the system are (in descending order) the Deputy EMCs, Mayor, Police Chief, and Captain of Police. The Police Coordinator directs the response and maintains records and reports pertaining to emergency alerts. Emergency alerts (without the siren) occur monthly.

Oceanport has an emergency alert system composed of six electric outdoor warning devices, with battery backup, to inform voluntary services of a call and residents of evacuations and extraordinary security issues. It provides a siren and audible announcements, with some of the latter pre-recorded. In the event of a power outage, the batteries will last for two days. After power is lost, mobile alerts are necessary. Notwithstanding the system's sound capabilities, it can be difficult for area residents to hear the warnings during windy conditions.

Installed in 2010, the Shrewsbury River Early Flood Warning System monitors water levels in the river and provides river flooding alerts to the county and local Offices of Emergency. There are five gauges, including one in Oceanport on the bridge between Gooseneck Point and Little Silver, that monitor river levels for potential flooding from tropical systems, nor'easters, tides, and rainfall upriver. The system also collects data as a benchmark for future analysis. Oceanport's designation as a National Weather Service StormReady community catalyzed this collaborative effort among jurisdictions affected by Shrewsbury River flooding, Monmouth University, and the Stevens Institute of Technology.



*Oceanport Volunteer First Aid and Rescue Squad*

## Federal Emergency Management Agency (FEMA) Community Rating System

The FEMA Community Rating System (CRS) is a voluntary program where municipalities in the National Flood Insurance Program (NFIP) enact up to 18 flood prevention measures intended to reduce damage to flood-prone properties. The number and effectiveness of these measures determine the discount level of standard flood insurance premiums to NFIP-enrolled properties in the municipality. The discount does not apply to Preferred Risk Policies.

Oceanport originally enrolled in the program in 1977 and thereon began implementing measures supporting the CRS's objective. In 2010, the Borough became a Class 8 community where NFIP properties in Zone AE receive a 10% discount on their flood

insurance premiums and properties in Zone X (which is not considered a SFHA) receive a 5% discount. If the Borough implements additional measures such that it is a Class 1 community, properties can receive up to a 45% discount.

The Borough implemented 13 measures worth a total of 1,333 credit points. The projects worth the most points are: regularly inspecting and maintaining the drainage system (253), enforcing floodplain storage capacity and adopting the International Building Code (180), providing flood zone information and an updated Flood Insurance Rate Map to interested parties (140), implementing a floodplain management plan (139), and annually disseminating a flood-related newsletter to residents in flood zones (116).



## Damage from Superstorm Sandy

Superstorm Sandy made landfall near Atlantic City on October 29, 2012 with 80 mph winds and record-breaking low pressure for many cities hit by the storm. If Sandy was a hurricane at landfall, it would have been a Category 1 storm; fortunately it was downgraded to a post-tropical cyclone with hurricane force winds prior to landfall. The storm hit New Jersey during an exceptional high tide and caused extensive flooding in Oceanport, with many areas inundated in over three feet of water and some places experiencing flood levels of five plus feet.

Similar water levels were seen across much of the neighborhood north of Monmouth Boulevard, as well as Gooseneck Point, Horseneck Point and along Branchport and Oceanport Creeks. Of the Borough's 2,390 homes reported in the 2010 US Census, approximately 1200 (50%) sustained damage from flooding, wind and/or fallen trees. Approximately 800 homes (33%) experienced flood damage and 118 homes were substantially damaged, defined as damage that exceeds 50% of the home's market value. Since Superstorm Sandy, approximately 70 homes have been elevated and several more are on the waiting list for funds to do so. Additionally, 28 homes have been demolished; however, 23 new homes have been built in place of the demolished homes.



*Residence that suffered substantial damage during Superstorm Sandy*

As shown on the *Superstorm Sandy Inundation & Property Loss* map, the Borough has 44 properties identified as severe repetitive loss properties, which are summarily defined as any NFIP-insured residential property that has met at least one of the following for paid flood loss criteria since 1978: 1) four or more separate claim payments of more than \$5,000 each (including building and contents payments); or 2) two or more separate claim payments (building payments only) where the total of the payments exceeds the current value of the property.

Flooding in Borough Hall from Superstorm Sandy was extensive, even reaching the library and office that remained dry in a 1992 flood. Ultimately, Borough Hall will not be repaired due to ongoing flood threats and due to the structural and water damage sustained during and after the storm. The majority of the building and surrounding area were flooded with one or two feet of water; however, the lower level Council chambers / public meeting room was flooded with four to five feet of water. A damage

report found many cracks in the foundation and settling slabs. The Borough is seeking funds for relocation of the facilities on the municipal site.

Additionally, the Borough's other critical facilities – police department, department of public works, Old Wharf House community center and first aid building on Pemberton Avenue– experienced flooding<sup>5</sup>. Fortunately, the firehouses on Main Street and Port-au-peck Avenue and the Maple Place and Wolf Hill Schools were largely spared from flooding. The lack of flooding in the western portion of the Borough allowed for Wolf Hill School to serve as a temporary shelter and headquarters for Police and Department of Public Works operations. Maple Place School was also used as a temporary shelter. To date, the Borough continues to conduct much of its operations from temporary locations – for example, public meetings are held at Maple Place School and the municipal offices are located in the now-renovated Old Wharf House community center. See the *Critical Facilities* map on the following page for the location of these facilities in the Borough.



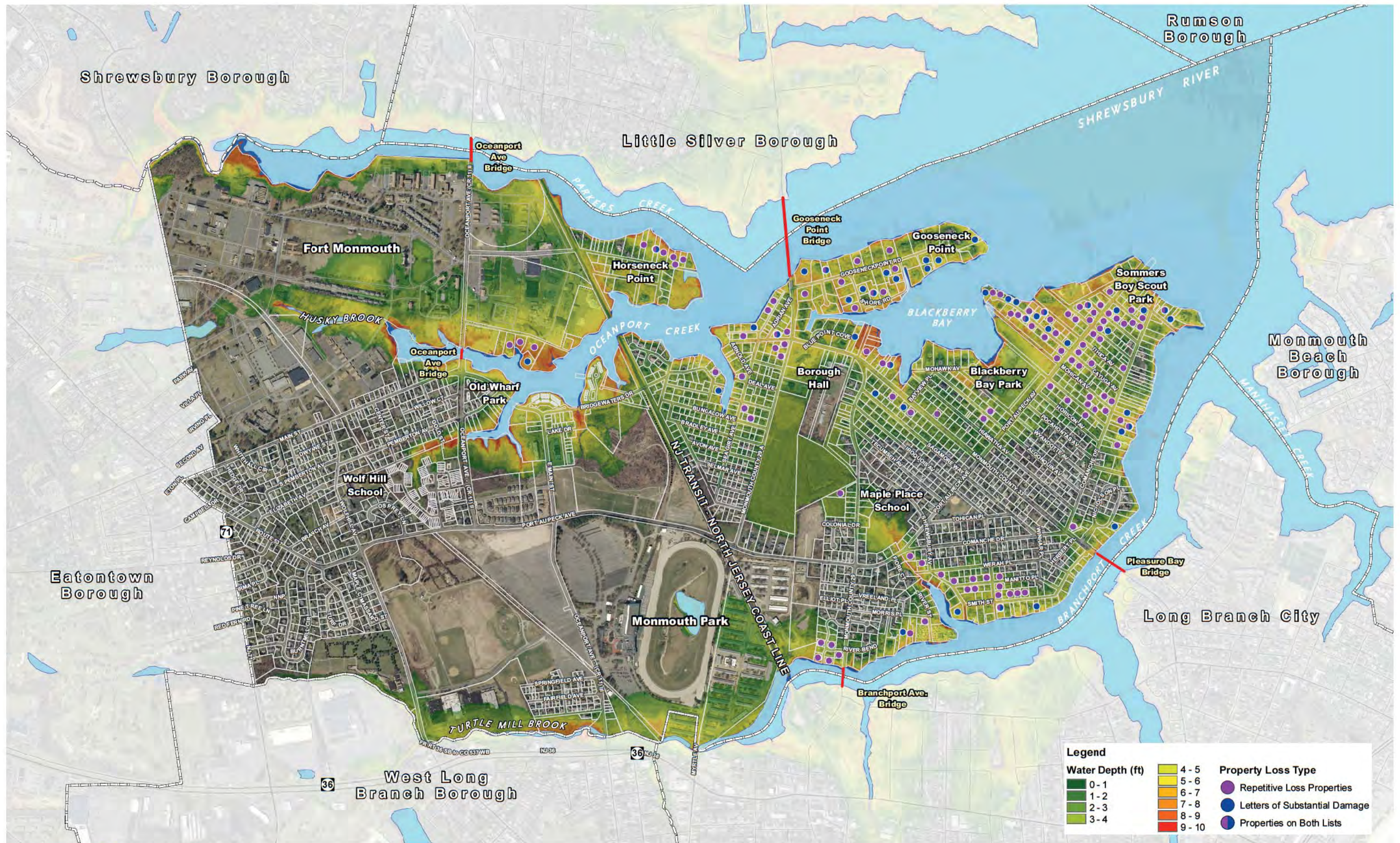
Existing Municipal Building that suffered substantial damage from Superstorm Sandy

Consistent with extensive damage to public and private properties, many of the Borough's streets were flooded. Additionally, all of the Borough's bridges were closed and/or inaccessible. The Borough was able to close the Pleasure Bay Bridge, Branchport Avenue Bridge and Gooseneck Point Bridge. The Oceanport Avenue Bridge was also not safe to traverse due to flood waters at the Oceanport end of the bridge; however, the Borough was unable to close this bridge due to lack of access. The Branchport Avenue Bridge sustained the most damage since flood waters overtopped the bridge. Pleasure Bay and Gooseneck Bridges, while traversable, were closed for security purposes – to prevent motorists from entering Oceanport while streets were flooded and dangerous to traverse. Notwithstanding the closing of bridges and streets with barricades and signs, motorists circumnavigated these warnings to access closed streets and bridges. Gates that lock, or otherwise prevent motorists from going through or around them, should be installed on these bridges in order for emergency management personnel to adequately prevent motorist from accessing the bridges and putting themselves in harm's way.

In addition to flooding, much of the Borough experienced significant power outages, including those that lasted more than a week. The lack of power contributed to damage in Borough by hampering clean-up. Additionally, the lack of power made communication difficult between emergency service personnel and Borough residents. Most notably, the lack of power limited the usefulness of the Borough's emergency alert system. The system is equipped with a battery; however, the battery was drained shortly thereafter and was therefore unable to provide alerts. Additionally, the alert system was unable to be put back in service upon power restoration due to lighting damage to two of the six electric outdoor warning devices.

4 The first aid building is not a Borough-owned facility. Instead, it is owned and operated by nonprofit organization, Oceanport Volunteer First Aid and Rescue Squad.





Aerial Orthophotography Source: NJGIN - New Jersey 2012 High Resolution Orthophotography  
 Source: FEMA Modeling Task Force (MOTF)-Hurricane Sandy Impact Analysis - Hurricane Sandy storm surge data (Interim High Resolution - Field-Verified).  
 All products are created from field-verified High Water Marks (HWMs) and Storm Surge Sensor data from the USGS through 14-February 2013.

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP, and is not state authorized.

STRATEGIC RECOVERY PLANNING REPORT

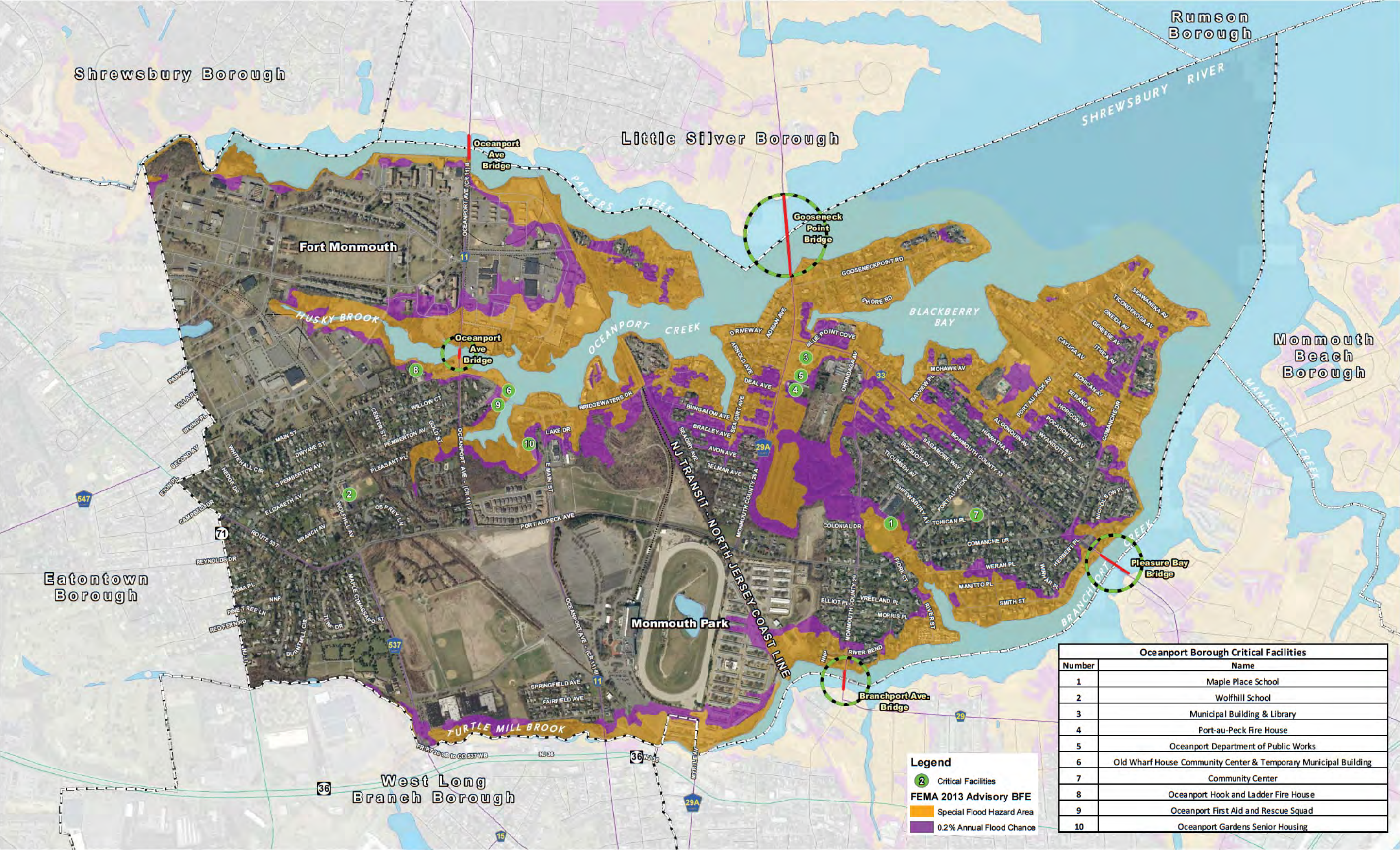
# Superstorm Sandy Inundation & Property Loss

Oceanport Borough, Monmouth County, NJ October 2014



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Aerial Orthophotography Source: NJGIN - New Jersey 2012 High Resolution Orthophotography  
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# Critical Facilities

Oceanport Borough, Monmouth County, NJ | October 2014

0 250 500 1,000 1,500 2,000 Feet

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# Vulnerabilities & Opportunities Highlighted by Superstorm Sandy

There were few opportunities highlighted by Superstorm Sandy, but it did create the opportunity to evaluate the flood control infrastructure and to renew advancement of proposals for flood protection.

## Lack of Flood Capacity

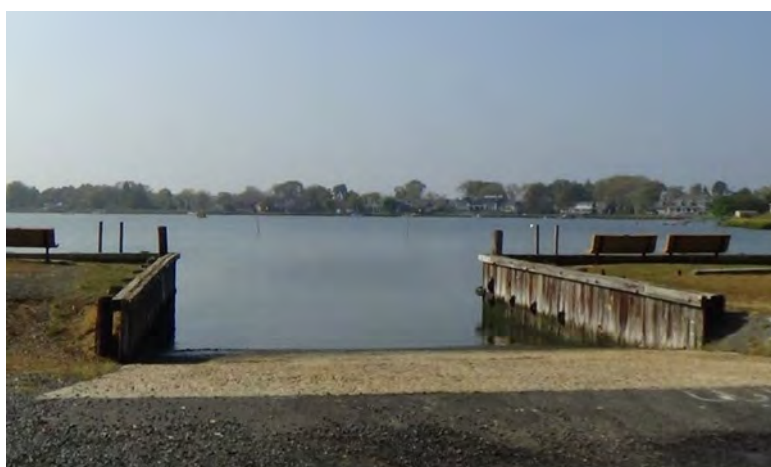
The Borough is nearly fully developed with no additional large areas of undeveloped land within the floodplain to use for flood storage capacity. State acquisition of flood-prone land through the Blue Acres Program has focused on large areas that can make a significant contribution toward flood storage. However, in Oceanport nearly all waterfront land consists of residential properties. As such, the Borough does not have the opportunity to develop flood storage without acquisition of privately-owned and developed land and subsequent conversion to open space. Doing so would not only be a very costly process, but would erode the Borough's tax base since a significant number of high-value homes are located in these areas. As such, acquisition for private property for open space purposes must be carefully considered.

## Flood & Stormwater Infrastructure

The Borough's flood and stormwater infrastructure, which is largely composed of ditches and 44 outfalls, are not capable of moving water out of the Borough fast enough during heavy rain events that occur when the levels of surrounding water bodies are high – most notably during high tide. As a result, there is localized flooding approximately six times a year. As a result of the Borough's largely built-out nature, there are very limited opportunities to utilize land for flood storage without the need for acquisition of private property. Due to the limitations on such a major component of green infrastructure – open space in flood prone areas – the Borough will need to continue to rely heavily on gray infrastructure – its system of pipes and outfalls.

The following identifies the vulnerabilities and necessary improvements to much of the Borough's flood and stormwater infrastructure – both green and gray infrastructure.

- Green Infrastructure. Remove debris and sediment from stormwater conveyance routes believed to be impeding flood flows and causing flooding of adjacent properties. This should include, but not be limited to Turtle Mill Brook.
- Gray Infrastructure. Examine and repair the stormwater drain system. This should include assessment of the Borough 44 outfalls to determine if installation of backflow preventers would provide additional protection or time for evacuation. Note that while backflow preventers may prove to be a critical improvement to the Borough's system, they cannot prevent flooding when water overtops the outfalls and bulkheads; they can only prevent water from flowing back into the pipes. Notwithstanding, this improvement could prevent moderate flooding and extend the time for residents to safely evacuate.



*Blackberry Bay Park boat ramp and bulkheads*

In addition to this storm and flood water conveyance and storage, the Borough also relies on its system of bulkheads as the primary protection from riverine flooding. Nearly all bulkheads in Oceanport are installed on private property and maintained by the owners of the property where they are located. However, the Borough owns and maintains a small portion of bulkheads, such as those along public lands and those at street ends adjacent to the water. As such, there is no consistency in the level of protection or construction materials. Additionally, there is no incentive for a property owner

to install a higher and more protective bulkhead since water will come through any adjacent and lower bulkhead.

## **Critical Facilities**

The majority of the Borough's critical facilities are located within the Special Flood Hazard Area because of a shortage of developable land outside this area. See the *Critical Facilities* map earlier in this Report for the locations of critical facilities in the Borough. The location of the Borough's critical facilities in the Special Flood Hazard Area led to not only necessary repairs subsequent to Sandy, but also difficulties in conducting emergency operations during and after the storm. As discussed previously, flooding in Borough Hall from Superstorm Sandy was so extensive that the building will not be repaired and a new facility will be created elsewhere. Additionally, the Borough's other critical facilities –department of public works, police department, Old Wharf House community center and first aid building– experienced flooding. Fortunately,

the firehouses on Main Street and Port-au-peck Avenue and the Maple Place and Wolf Hill Schools were largely spared from flooding. Note that the first aid building is not a Borough-owned facility. Instead, it is owned and operated by nonprofit organization, Oceanport Volunteer First Aid and Rescue Squad.

The Borough is in the process and should continue seeking an alternative location for the municipal facilities that were substantially damaged, particularly the municipal building, police department and department of public works. Location out of flood prone areas, or at a minimum above the flood elevation should be priorities for all new municipal facilities. Additionally, new and improved facilities should include back-up generators to support emergency service and municipal personnel, as well as displaced residents, during flood events when a loss of power has also occurred.

### **Limited Evacuation Options**

Oceanport is a peninsula, or series of peninsulas, largely enveloped by the Shrewsbury River. During the flooding generated by Superstorm Sandy, none of the Borough's bridges were safe to traverse. Consequently, the only evacuation routes not involving a water crossing were westward toward Eatontown. However, there are limited streets that run east-west out of the Borough, with the primary street being Port-Au-Peck Avenue. There are no County evacuation routes in Oceanport so residents must travel south to Route 36 or west to reach a designated evacuation route. There is adequate signage posted on Port-Au-Peck Avenue to alert residents on the best route away from flood prone areas. However, this road has a history of flooding itself and, as such, evacuation efforts can be complicated as residents and emergency vehicles seek alternative routes around flooded roads.

Roadway elevations and evacuation routes should be studied to determine if raising the road elevations will limit or prevent roadway flooding in a way that not only prevents roadway damage and extends time for evacuation but also does so in a way that is not detrimental to community character. As such, the evaluation should include flood elevation and evacuation routes, but also land uses and setback of buildings to the roadway.

### **Sea Level Rise**

Planning for the future should consider sea level rise. Doing so leads to policies and improvements that will guide development out of harm's way not only now but in the future and will ensure that policies remain relevant for decades to come. The *Predicted Impacts of Sea Level Rise In 2050* and *Potential Future Sea Level Rise In 2100* maps on the following pages depict changes to the Special Flood Hazard Areas and the base flood elevation in 2050 and 2100 under four sea level rise scenarios.

Rising sea levels will exacerbate the risks to the Borough's population and economic activity from flooding. Global sea levels rose an average rate of 0.6 inches per decade during the 20th century with the average rate increasing to 1.2 inches per decade since the 1990's<sup>5</sup>. Since 1870, global sea levels have risen about 8 inches<sup>6</sup>. While rates of sea level rise have been and will continue to vary globally; those along the New Jersey coast have risen faster than the global average due to land subsidence. Atlantic City, for example, has seen a sea level rise of 1.5 inches per decade since the earliest record keeping in 1912<sup>7</sup>. Global sea levels are projected to increase between .85 feet and 2.95 feet above the 2005 sea level by 2100<sup>8</sup>. While conditions in Atlantic City are different than those in Oceanport, the example illustrates the varying nature of global sea level rise and the particular impact to the New Jersey coast. It further indicates that storm surges from the Atlantic Ocean may be exacerbated in the future.



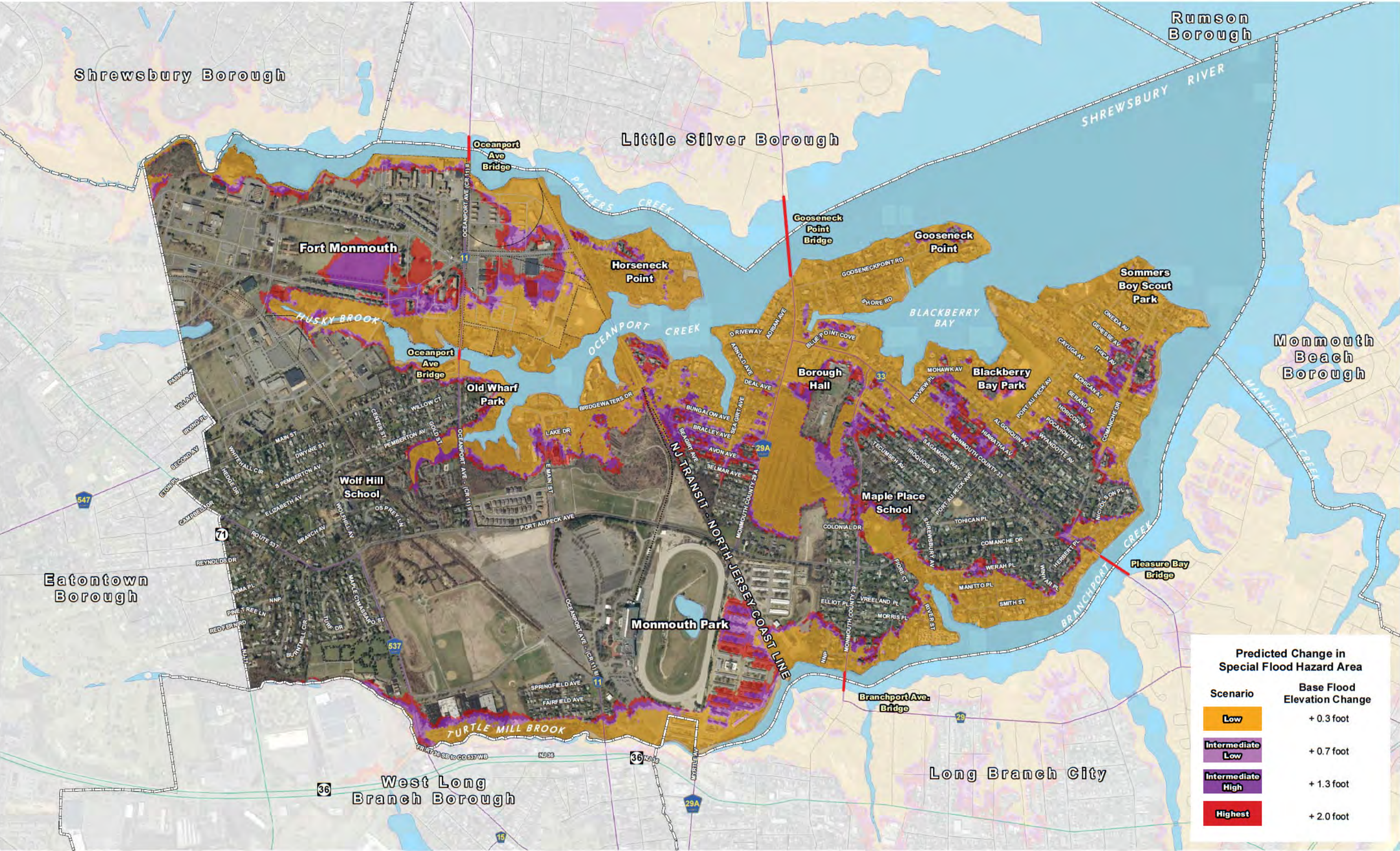
*Residence with living space above the flood elevation*

Sea level rise will cause flooding to occur more frequently and to last for longer periods of time. In Oceanport this means that tidal flood waters along the Shrewsbury River, Branchport Creek, Blackberry Bay, Oceanport Creek, Parkers Creek and smaller waterways will occur more frequently and will last longer. The effects of sea level rise on Oceanport will not be uniform across the Borough but will vary by topography, with properties at the lowest elevations serving as a water collection points and experiencing the largest impacts. See maps on the following pages for 2050 and 2100 sea level rise scenarios, as published by the United States.

The National Oceanic and Atmospheric Administration collaborated with scientists, FEMA, the Army Corps of Engineers, United States Global Change Research Program, and White House Council on Environmental Quality to produce the *National Climate Assessment*. Among other data sets, this Report includes four scenarios of sea level rise by 2050 and 2100 using FEMA's special flood hazard data. All of the scenarios account for warming oceans, but only the two highest risk scenarios account for melting ice sheets<sup>9</sup>. Direct sea level rise impacts to Oceanport include more extensive and damaging temporary flooding and expanded Special Flood Hazard Areas.

- 5 New Jersey Climate Adaptation Alliance (NJCAA). 2013. Resilience. Preparing New Jersey for Climate Change: A Gap Analysis from the New Jersey Climate Adaptation Alliance. Edited by Matt Campo, Marjorie Kaplan, Jeanne Herb. New Brunswick, New Jersey: Rutgers University.
- 6 Future Climate Change. United States Environmental Protection Agency. <http://www.epa.gov/climatechange/science/future.html#sealevel>. Accessed March 12, 2014
- 7 New Jersey Climate Adaptation Alliance (NJCAA). 2013. Resilience. Preparing New Jersey for Climate Change: A Gap Analysis from the New Jersey Climate Adaptation Alliance. Edited by Matt Campo, Marjorie Kaplan, Jeanne Herb. New Brunswick, New Jersey: Rutgers University.
- 8 IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
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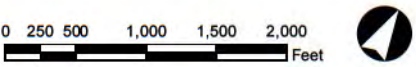
Aerial Orthophotography Source: NJGIN - New Jersey 2012 High Resolution Orthophotography  
Source: NJNY Most Recent SFHA + National Climate Report SLR Scenarios for 2050 by NOAA, Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), Coastal Services Center (CSC) - 2012  
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP, and is not state authorized.

STRATEGIC RECOVERY PLANNING REPORT

# Predicted Impacts of Sea Level Rise in 2050

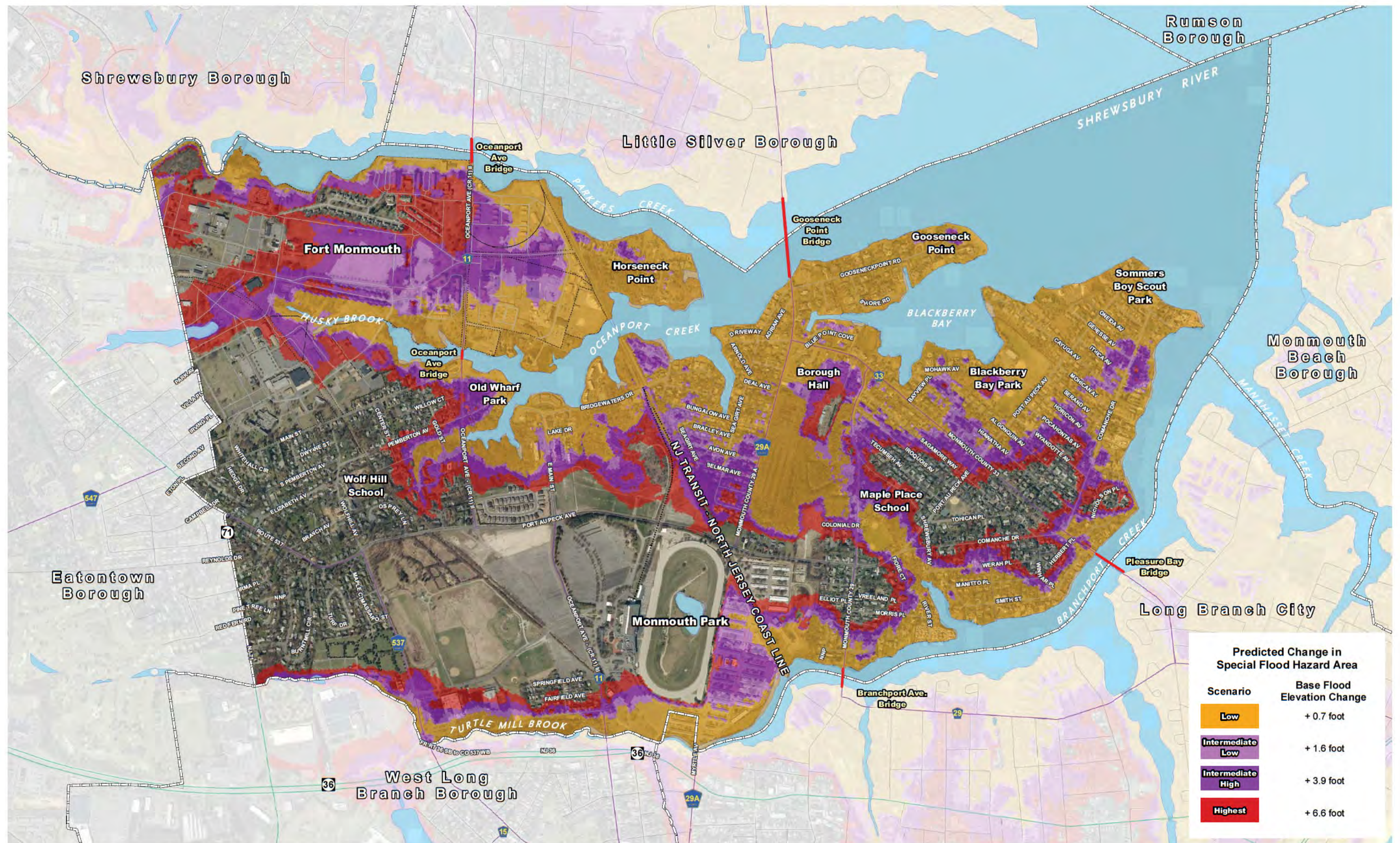
Oceanport Borough, Monmouth County, NJ    October 2014

Predicted Change in Special Flood Hazard Area	
Scenario	Base Flood Elevation Change
Low	+ 0.3 foot
Intermediate Low	+ 0.7 foot
Intermediate High	+ 1.3 foot
Highest	+ 2.0 foot



Clarke Caton Hintz ●●●  
Architecture  
Planning  
Landscape Architecture





Aerial Orthophotography Source: NJGIN - New Jersey 2012 High Resolution Orthophotography  
 Source: NJ/NY Most Recent SFHA + National Climate Report SLR Scenarios for 2100 by NOAA, Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), Coastal Services Center (CSC) - 2012  
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP, and is not state authorized.



STRATEGIC RECOVERY PLANNING REPORT

# Predicted Impacts of Sea Level Rise in 2100

Oceanport Borough, Monmouth County, NJ October 2014

Clarke Caton Hintz ● ● ●  
 Architecture  
 Planning  
 Landscape Architecture



The four scenarios can be summarized as follows.

Sea Level Rise Scenarios		
Scenario	Scenario Basis	Base Flood Elevation Change
Lowest	Historic rates of observed sea level change	2050: +0.3 feet 2100: +0.7 feet
Intermediate-Low	Projected ocean warming	2050: +0.7 feet 2100: +1.6 feet
Intermediate-High	Projected ocean warming and recent ice sheet loss	2050: +1.3 feet 2100: +3.9 feet
Highest	Ocean warming and the maximum plausible contribution of ice sheet loss and glacial melting	2050: +2.0 feet 2100: +6.6 feet

The *National Climate Assessment* recommends that the Lowest scenario be considered where there is a high tolerance for risk (e.g. projects with a short lifespan or flexibility to adapt within the near-term) and that the Highest scenario be considered in situations where there is little tolerance for risk.

As shown on the *Predicted Impacts of Sea Level Rise In 2050* map, those areas impacted by the Lowest scenario are the same areas in the current Special Flood Hazard Area and many areas that currently have a .2% annual chance of flooding (also referred to as the 500 year flood zone). In sum, the Special Flood Hazard Area under the 2050 Lowest scenario will have a modest increase in size. Notwithstanding the modest change in area, the base flood elevation will increase by 0.3 feet in this Lowest scenario. While only a modest amount of additional land will be located in the Special Flood Hazard Area under the Intermediate-Low, Intermediate-High, and Highest scenarios, these scenarios increase the base flood elevations more dramatically at 0.7 feet, 1.3 feet and 2.0 feet respectively.

Similarly, the *Predicted Impacts of Sea Level Rise In 2100* map depicts the Lowest sea level rise scenario by 2100 with an expanded Special Flood Hazard Area that includes the existing area, areas that currently have a .2% annual chance of flooding (also referred to as the 500 year flood zone) as well as properties more inland. As in those scenarios for 2050, the 2100 scenarios predict an expanded Special Flood Hazard Area. The 2100 Lowest scenario predicts a 0.7 foot increase in the base flood elevation. The Intermediate-Low predicts a 1.6 foot increase in the current base flood elevation, the Intermediate-High scenario predicts a 3.9 foot increase in current base flood elevation and the Highest scenario predicts a 6.6 foot increase in the current base flood elevation.

In summary, the *National Climate Assessment* predicts that sea level rise will cause an increase in the size of the Borough's Special Flood Hazard Area and corresponding increases in the base flood elevation. The 2050 scenarios predict an increase in the base flood elevation that ranges from that ranges from 0.3 to 2.0 feet above the current. The 2100 scenarios depict an even larger Special Flood Hazard Area and a corresponding increase in the base flood elevation that ranges from 0.7 to 6.6 feet above the current.

## **Demographics and Communication**

The Borough did not experience any significant challenges during or after Superstorm Sandy related to the Borough's population demographics, including those related to age, income or non-English speaking residents. This should be considered in light of the fact that 24% of the Borough's population is aged 65 years or older<sup>10</sup>.

Due to extensive damage at municipal facilities and the loss of power, the Borough largely relied on social media to distribute information about the storm and emergency provisions. This communication strategy worked well, but some residents without computer or "smart phone" access found it difficult to obtain needed information. The Borough also relies on the Code Red alert system. The system alerts approximately 3,900 phone numbers. However, it is unclear how many households this represents as multiple numbers could pertain to single households. Greater participation in the Borough's Code Red alert system, or a more effective alternative, would allow residents to better prepare for flooding and evacuate safely when necessary. Additionally, the Borough has an audible alert system. However, its usability is limited because it can be difficult for residents to hear the alert in windy conditions and in the event of power loss and no generator, the back-up provides power for only two days.

## **Population and Economic Activity at Risk**

The Monmouth County 2009 Multi-Jurisdiction Natural Hazard Mitigation Plan, which is based on information which is at least five years old, states that there are 4,623 persons in Oceanport at risk from riverine flooding and 5,582 persons at risk from a storm surge. Additionally, the Plan estimates that 55% of the assessed value is located within flood zones (A/AE) and is therefore at risk. Similarly 87% of the Borough's assessed value at that time was at risk of damage from a storm surge. The damage to Oceanport and beyond may have been significantly worse if Sandy made landfall as a hurricane. Furthermore, the 2009 Plan notes that \$119 million in improvement values (87% of the Borough's total building value) are exposed to a Category 4 hurricane storm surge and over \$17.5 million in improvement values are exposed to coastal erosion (5.52% of the Borough's total building value). In addition, nearly the entire population is exposed to storm surges and 55% of buildings are located within a FEMA Special Flood Hazard Area (SFHA) flood zone (A, AE, or VE).

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<sup>10</sup> 2008-2012 American Community Survey 5-Year Estimates, Table S0101 Age and Sex

## Change In Value

The Borough experienced a 2.85% decrease in property values between 2012 and 2013, as measured by the total assessed value of land in Oceanport<sup>11</sup>. The change signifies, not only the damage that occurred from Superstorm Sandy, but also some of the investment necessary for full recovery.

This overall reduction of 2.85% was driven by a more significant reduction in residential value of 8.95% over the same time period; there were no corresponding reductions for the Borough's other land uses. As further detailed in the following tables, the loss in value was relatively insignificant considering that 25% of Borough lands are within the Special Flood Hazard Area. Consequently, Superstorm Sandy had little impact on the total assessed value in the Borough. The significant changes in value from 2009 to 2010 reflect a reassessment rather than an event, such as a storm. The following tables present data on the assessed value of property in the Borough. Note that there are no properties classified as industrial in the Borough.

Annual Assessed Value		
Year	Assessed Value	Change in Value
2006	\$1,331,283,400	-
2007	\$1,335,556,300	\$4,272,900 / 0.30%
2008	\$1,342,461,900	\$6,905,600 / 0.50%
2009	\$1,355,326,400	\$12,864,500 / 0.95%
2010	\$1,044,570,900	-\$310,755,500 / -23.0%
2011	\$1,047,727,700	\$3,156,800 / 0.30%
2012	\$1,049,553,400	\$1,825,700 / 0.20%
2013	\$1,019,494,800	-\$30,058,600 / -2.85%

Single Family				
Year	Number of Properties	Average Value	Total Value	Change in Value
2006	1,976	\$579,621.96	\$1,145,333,000	-
2007	1,974	\$582,519.96	\$1,149,894,400	0.40%
2008	1,975	\$584,321.11	\$1,154,034,200	0.35%
2009	1,998	\$587,700.70	\$1,174,226,000	1.75%

<sup>11</sup> Monmouth County Board of Taxation, Assessed Value by Property Class

Single Family				
Year	Number of Properties	Average Value	Total Value	Change in Value
2010	2,009	\$449,199.20	\$902,441,200	-23%
2011	2,018	\$449,492.22	\$907,075,300	0.50%
2012	2,022	\$450,223.64	\$910,352,200	0.35%
2013	2,029	\$408,510.00	\$828,866,800	-8.95%

Multi-family				
Year	Number of Properties	Average Value	Total Value	Change in Value
2006	1	\$669,800	\$669,800	-
2007	1	\$669,800	\$669,800	0%
2008	1	\$669,800	\$669,800	0%
2009	1	\$669,800	\$669,800	0%
2010-2013	0	n/a*	n/a*	n/a
*Information not available				

Commercial				
Year	Number of Properties	Average Value	Total Value	Change in Value
2006	30	\$5,203,253.33	\$156,097,600	-
2007	30	\$5,200,100.00	\$156,003,000	-0.05%
2008	30	\$5,182,816.67	\$155,484,500	-0.35%
2009	29	\$5,354,579.31	\$155,282,800	-0.15%
2010	28	\$4,341,860.71	\$121,572,100	-21.75%
2011	28	\$4,341,860.71	\$121,572,100	0%
2012	28	\$4,341,860.71	\$121,572,100	0%
2013	28	\$4,336,078.57	\$121,410,200	-0.15%

## Policy Review

While Oceanport does not have any substantial or comprehensive policies on flood mitigation, resiliency or adaptation in its Master Plan or Land Use Code, the Borough addresses flood mitigation and resilience through its flood damage prevention ordinance in Chapter 229 of the municipal code, stormwater management regulations in Chapter 328 of the municipal code, stormwater infrastructure maintenance policies and 2009 *Stormwater Management Plan*. Additionally, the open space policies in the 2008 *From Fort to Village: A Vision for Oceanport's Fort Monmouth* will contribute toward fulfilling flood mitigation goals; however, this participation is not emphasized in its policy documents. Climate adaptation, however, has not been addressed by the Borough. The Borough participates in the FEMA Community Rating System (CRS) which directly addresses flood mitigation and resilience.

A significant portion of the Borough – 419 acres or 17% of the Borough's land area – is located within the former Fort Monmouth Army Base. Closed on September 15, 2011, these lands are under the jurisdiction of the Fort Monmouth Economic Revitalization Authority (FMERA). This entity was created through Federal and State statute to “provide investment, continuity and economic growth to the communities impacted by the federal government's decision to close Fort Monmouth.” FMERA is now facilitating redevelopment and reuse of the site consistent with the 2008 Fort Monmouth Reuse and Redevelopment Plan. Similar to Borough documents, while this Plan does not directly address flood mitigation or resilience, the Plan's open space policies will contribute toward flood mitigation goals. Climate Adaptation is not addressed by FMERA's planning documents.

Additionally, another significant portion of the Borough – 13% of the Borough's land area – constitutes the Monmouth Park Race Track. This land is under the jurisdiction of the New Jersey Sports and Exposition Authority (NJSEA). The NJSEA does not have policies in place relevant to hazard mitigation, resilience or adaptation. Similar to FMERA, the Borough does not control the zoning or regulations in this area.

Monmouth County finalized a *Multi-Jurisdictional Natural Hazard Mitigation Plan* in 2009. This 2009 Plan is outdated in that it was prepared before two recent and very destructive storms: Hurricane Irene and Superstorm Sandy. Like most New Jersey municipalities, this County plan is the Borough's primary document addressing hazard mitigation.

It recognizes both coastal and riverine flooding as one of the natural hazards facing the County and provides mitigation measures for addressing the hazards. This plan is currently being updated. The plan's recommendation for Oceanport to mitigate possible environmental damage from weather events includes relocating the Borough Hall and the department of public works (high priority), cleaning the Turtle Mill Floodway (medium priority), improving stormwater systems especially in Port-au-Peck (medium priority), and elevating roads (low priority).

## **Borough Flood and Storm Policies**

The following documents were reviewed for flood and storm mitigation, resiliency and emergency response: 2012 *Open Space and Recreation Plan*, 2009 *Stormwater Management Plan*, 2008 *From Fort to Village: A Vision for Oceanport's Fort Monmouth*, 2008 *Master Plan Amendment*, 2004 *Master Plan Reexamination Report*, 1997 *Master Plan Reexamination Report*, and the Code of the Borough of Oceanport. The below identifies relevant Borough policies in each of these documents.

## **Protection / Conservation of Flood Hazard Areas and Storm Damage Prone Areas**

The From Fort to Village Plan calls for public open space to be created in the environmentally-sensitive lands along Oceanport and Parkers Creeks. While the purpose for the open space is identified as flood mitigation, or similar, open space in these areas will also fulfill the purpose of protection / conservation of flood hazard areas and storm damage prone areas. Page 28 of the Plan states the following:

*Fort Monmouth is a peninsula at a fork in the Shrewsbury River. The plan will incorporate the wetlands and coastal fringe areas as the open space within the network of green infrastructure. The edges of the Fort that abut the two arms of the Shrewsbury-Oceanport and Parkers Creeks- will form strong open space elements that will serve multiple functions. Within these meadows, the vision plan is able to promote several of the objectives of sustainability. The coastal meadows will be located adjacent to the village center district as dramatic community open space. Pedestrian paths will be woven through the edges of this open space, connecting to the larger path system, the street network and engaging the water's edge. The plan envisions the incorporation of stormwater management elements within the meadows to capture runoff from adjacent streets and development sites.*

The 2008 Master Plan Amendment complements the From Fort to Village report. The Amendment does not directly address protection/conservation of flood hazard areas and areas prone to storm damage. However, it does address green infrastructure and open space in the following way on page 9:

*Green infrastructure within Fort Monmouth includes open space, recreation, stormwater management and wildlife habitat areas. The objectives include the*



*creation of a series of public spaces that integrate all of these elements together in order to produce a community framework that embodies sustainable principles of community development.*

## **Flood Resilient Building**

The Borough Code's Flood Hazard Reduction standards in Section 229-16 sets forth construction standards for buildings within the flood hazard area, including but not limited to the first floor elevation of all new structures, anchoring and floodproofing. The Borough's standards for construction within the Special Flood Hazard Area exceed the minimum and they have done so since the mid 1990's. The Borough Code, §229-17, generally requires new construction to be elevated to or above the base flood elevation plus two feet.



*Residence whose ground elevation was raised in response to flooding*

## **Maintenance and/or Expansion of Flood Protection Infrastructure**

The 2009 Stormwater Management Plan recommends several changes to the Borough zoning ordinance to emphasize nonstructural stormwater management techniques such as swales and the disconnection of impervious surfaces. It also recommended the Borough institute maximum impervious cover limitations in its zoning districts. The Plan also recommended several ordinance changes specifically relevant to stormwater management. To date, these changes have not been adopted.

## **Emergency Response**

The Borough code does not address emergency response. Notwithstanding the lack of regulations regarding emergency response, Oceanport has a Municipal Emergency Response Plan that includes policies and procedures to disseminate information and protect public safety during storm events.

Oceanport has six electric outdoor warning devices with battery backup to inform voluntary services of a call and residents of evacuations and extraordinary security issues. It provides a siren and audible announcements with some of the latter pre-recorded. In the event of a power outage, the batteries will last for two days. After this point, mobile route alerts are necessary.

The Oceanport Police Department oversees mobile route (vehicle) and door-to-door alerts. The alert staff includes bilingual participants. System activation requires the Emergency Management Coordinator (EMC) to contact the County first. The next in line to activate the system are (in descending order) the Deputy EMCs, Mayor, Police

Chief and Captain of Police. The Police Coordinator directs the response and maintains records and reports pertaining to emergency alerts. Emergency alerts (without the siren) occur monthly.

Additionally, the Borough participates in the Shrewsbury River Early Flood Warning System. Installed in 2010, this System monitors water levels in the river and provides alerts to the County and local Offices of Emergency Management of river flooding. The system also collects data as a benchmark for future analysis. Oceanport's designation as a National Weather Service StormReady community catalyzed this collaborative effort among jurisdictions affected by Shrewsbury River flooding, Monmouth University, and the Stevens Institute of Technology. There are five gauges, including one in Oceanport on the bridge between Gooseneck Point and Little Silver that monitor river levels for potential flooding from tropical systems, Nor'easters, tides and rainfall upriver.

## **Water Quality**

The 2009 Stormwater Management Plan recommended stormwater quality measures including implementing improper waste disposal and pet waste ordinances. However, these measures are relevant to stormwater quality rather than quality concerns that resulted from Superstorm Sandy or other flood events.

## **County Flood and Storm Policies**

All County policies for flood and storm mitigation, resiliency and adaptation are addressed in the 2009 Multi-Jurisdictional Natural Hazard Mitigation Plan. The Plan does not address flood resilient building, water quality or climate change.

Page 3a-13 of the Monmouth County 2009 Multi-Jurisdictional Natural Hazard Mitigation Plan provides an overview of the history of hurricanes and tropical storms:

*Monmouth County has an active history of hurricanes and tropical storms. According to NOAA historical records, 34 hurricane or tropical storm tracks have passed within 75 miles of Monmouth County since 1850. This includes six Category 2 hurricanes; five Category 1 hurricanes; and 23 tropical storms. Of the 34 recorded storm events, nine tropical storm tracks traversed directly through Monmouth County....[A]lmost all hurricane and tropical storm tracks traverse northward through the area....*

Given the history of 34 hurricanes and tropical storms between 1850 and 2009, as well as Hurricane Irene in 2011 and Superstorm Sandy in 2012, Oceanport needs to continue being prepared for storms and resilient to their impacts. This is supported on pages 3a.-16 and 3a-17, which state the following:

*The probability of future hurricane and tropical storm events for Monmouth County is high. According to NOAA statistical data, Monmouth County is located in an*

area with an annual probability of a named storm between 18 and 24 percent. This empirical probability is fairly consistent with other scientific studies and observed historical data made available through a variety of federal, state and local sources. According to the NOAA data on historical storm tracks, the annual probability of a hurricane or tropical storm coming within 75 miles of Monmouth County is 22 percent. Also, a recent study headed by Colorado State University's Dr. William Gray concluded that the probability of a named storm making landfall in the vicinity of Monmouth County is 13.2 percent.

*The probability of storm occurrences will vary significantly based on the return interval for different categories of magnitude. The probability of less intense storms (lower return periods) is higher than more intense storms (higher return periods)....*

## **Protection / Conservation of Flood Hazard Areas and Storm Damage Prone Areas**

Goal 4 of the Plan, Reduce the possibility of damage and losses due to flooding caused by floods, hurricanes and nor'easters, includes these relevant actions:

*4.B. Limit uses in floodways to those tolerant of occasional flooding, including but not limited to agriculture, outdoor recreation, and natural resource areas*

*4.E. Identify and document repetitively flooded properties. Explore mitigation opportunities for repetitively flooded properties, and if necessary, carry out acquisition, relocation, elevation, and floodproofing measures to protect these properties.*



*Residence with living space above the flood elevation*

Additionally, the Plan includes as an action item, the relocation of Oceanport municipal facilities that were damaged or destroyed by Superstorm Sandy. This recommendation, which had a high priority, was on-point as the municipal building, department of public works, police department and Old Wharf House community center were damaged by Superstorm Sandy four years after the Plan was completed.

## **Maintenance and/or Expansion of Flood Protection Infrastructure**

Goal 4 of the Plan includes the following relevant actions:

*4.F. Conduct a routine stream maintenance program (for currently nonparticipating communities) and seek financial assistance to clean-out [sic] stream segments with heavy sediment deposits. (i.e., this could be through participating in the Monmouth County/ Bridge Commission routine stream maintenance program)*

*4.G. Develop specific mitigation solutions for flood-prone roadways and intersections in conjunction with State DOT. Develop a work plan for when sites will be surveyed and what role can the local government play in selection and implementation of mitigation activities (e.g. any monetary or contextual support through the local capital improvement plan).*

*4.H. Implement identified stormwater recharge, rate or volume projects identified in Regional Stormwater Management Plans to decrease “flash” in streams during/after storm events.*

Consistent with Goal 4.F., the Plan recommended remediation of the Turtle Mill floodway and stream cleaning. Additionally, consistent with Goal 4.G., the Plan recommended remediation of the Port-au-Peck stormwater system and addressing roadway flooding.

## **Emergency Response**

Goal 4 of the Plan includes the following relevant actions:

*Develop a Countywide gauging and warning system for flash and riverine flooding.*

## Recovery, Mitigation, Resilience & Adaptation Steps to Date

Immediately after the storm the Borough cleared debris from road and public properties, assisted residents in safely returning to their homes and conducted emergency operations in alternative locations as was necessary due to flooding of Borough facilities. Since addressing the immediate concerns subsequent to the storm, the Borough has focused on long term recovery and has sought outside sources of funding to do so. For example, the Borough sought and received \$100,000 from the Hazard Mitigation Grant program for the purchase and installation of generators; these funds are most likely to be applied to Maple Place School. However, it is anticipated that the funds will provide about 85% of the cost to purchase and install the generator.

The Borough requested funding from FEMA to repair damage from Superstorm Sandy and from the New Jersey Hazard Mitigation Grant Program to enhance resilience to future weather events. Through the Borough's participation in the upcoming revised Monmouth County Multi-jurisdictional Hazard Mitigation Plan, the Borough is identifying actions necessary to promote recovery, mitigation and resilience within its boundaries. Those items identified thus far include the following:

- Action #1: Elevate 188 residential homes that had been flooded or are in danger of being flooded
  - Description: Some of the approximately 800 homes in the Borough with flood damage from Hurricane Sandy will be elevated to prevent future flood loss
  - Cost: Less than \$49 million
  - Timeline: Within 2016
- Action #2: Acquire property to relocate municipal facilities away from flood-prone areas
  - Description: This is the first phase in a two phase process to relocate Borough Hall (offices, police department, library, and Council Hall), which was seriously damaged during Hurricane Sandy
    - This will prevent future necessary relocations of municipal operations during major floods

- Cost: Approximately \$1 million but may be less depending on location
- Timeline: Within 2014
- Action #3: Construct municipal facilities away from flood-prone areas
  - Description: This is the second phase in a two phase process to relocate Borough Hall (offices, police department, library, and Council Hall)
    - Once constructed, the old Borough Hall property will be demolished and become open space
  - Cost: Approximately \$6 million
  - Timeline: Within 2016
- Action #4: Install emergency generators
  - Description: Two schools will receive generators and used to support police and public works operations during weather emergencies
  - Cost: Approximately \$450,000
  - Timeline: Within 2016
- Action #5: Investigate problems with storm drain system
  - Description: This is the first phase in a two phase process to improve the storm drain system
    - Investigation will involve in-person and video explorations
    - System cleaning after Hurricane Sandy was inadequate
  - Cost: Approximately \$150,000
  - Timeline: Within 2015
- Action #6: Repair storm drain system
  - Description: This is the second phase in a two phase process to improve the storm drain system
    - Make improvements identified in phase one of project
    - Install backflow preventers on 44 outfalls
    - Once completed, this will reduce area flooding
  - Cost: Approximately \$950,000 for backflow preventers
    - Other repair costs depend on improvements identified in phase one of project

- Timeline: Within 2016
- Action #7: Dredge Turtle Mill Brook
  - Description: Remove debris and sediment to facilitate flood flows and prevent flooding
  - Cost: Approximately \$1 million
  - Timeline: Within 2016
- Action #8: Improve streets vulnerable to flooding
  - Description: Elevate, grade, curb, and/or repair streets vulnerable to flooding
  - Cost: Approximately \$3-5 million
  - Timeline: Within 2016





# Community Input

There were two public participation opportunities in 2014 that were about Superstorm Sandy. Historically the Borough has seen low rates of public participation in its planning processes; however, in both cases the surveys reached out to residents directly in order to encourage participation and the participation results were better than those seen for past planning projects.

## Summer's End Festival – September 2014

The Borough conducted a survey of homeowners' Superstorm Sandy-related flooding. The survey was open online from September 10-26, 2014. There were 28 online responses and volunteers completed 10 in-person surveys at the September 7, 2014 Summer's End Festival. While the respondents lived across the Borough and typically not in waterfront homes, there were concentrations of respondents in the neighborhood along Branchport Creek between Monmouth Boulevard and Port Au Peck Avenue and north of Blackberry Bay Park.

All but one respondent lost power and nearly half experienced home and/or lot flooding. Approximately 46% could not leave Oceanport because of road and bridge closures and 31% had uninhabitable homes for some period. Of those that were displaced due to their home being uninhabitable, two have not yet returned.

Raising homes is the predominant strategy of Oceanport homeowners to combat flooding. Sixty-six percent of respondents reported that already raised their homes and another 14% respondents reported that they intend to raise their homes.

When asked what the Borough should do to prepare residents for the next storm, just over half of respondents (54%) stated a desire for municipal support to elevate homes in the form of advertising available funds and permissive zoning and building code provisions. Just over half the respondents (54%) also reported that the Borough



*Summer's End Festival Booths*



*Flood Recovery Booth at the Summer's End Festival*

should improve the early warning system. Further supporting this request were multiple comments that stated concern with the early warning system's lack of use (as noted earlier, the system ceased working quickly after power was lost). Slightly less than half of respondents, 46%, would like general education about storm preparedness and 38% would like evacuation route roads to be elevated. The other responses include 31% supporting new or improved emergency facilities, 23% supporting creation of open space along the water's edge through acquisition of land and/or support acquisition of land by others (including existing commercial and residential uses), 19% supported additional emergency shelters and 19% supported raising bulkheads along the water's edge.

### **Monmouth University - January 2014**

Additionally, in summer 2014, Monmouth University released a Sandy Recovery Survey for Oceanport and Long Branch. Fifty Oceanport and 11 Long Branch residents were surveyed in January 2014 using a non-randomized method, so the results cannot be extrapolated to characterize other residents. The survey results indicated Oceanport respondents were very happy with the municipal response to Sandy, with 70% easily able to access municipal information, 83% finding the municipal information helpful, and 76% finding municipal government assistance helpful. These approval rates are higher than the average for Monmouth County coastal communities and 13-20% higher than Long Branch's.

A sizeable majority of all respondents, 40%, were displaced from their homes as of January 2014, including 12% who are permanently displaced. Of these respondents, 38% currently live in their respective town of residence and 79% say their homes are repairable. Twenty-two percent of respondents were never displaced or only were for less than a month. Most respondents have a temporary and permanent place to live (89% and 93%, respectively). All respondents had flood damage to their properties and half also had wind damage. Nearly one quarter of residents had over \$250,000 in damage and one-quarter had damage under \$50,000.

Almost every respondent from Oceanport and Long Branch registered for federal assistance and three quarters registered for state assistance. Sixty percent of them were denied some form of federal assistance and 40% denied some type of state assistance. The largest continuing need for respondents is the replacement of durable goods (39%) followed by mortgage and rent payments (28% and 27%, respectively).

## Recommended Action Steps

The following table presents post-disaster planning Action Steps for Oceanport. Each Action Step includes a time frame indicating the length of time needed for fulfillment. A short time frame is defined as one year or less, a medium time frame is defined as one to five years and a long time frame is defined as more than five years. The priority column ranks the potential positive impact of each action step. Those items with a high priority have the largest potential positive impact, medium priority have a lesser potential positive impact and low priority has less impact. The responsible party(s) for completing each Action Step is also identified, as well as potential partners who the Borough should consider engaging in order to complete the Action Step.

Action Step	Time Frame	Priority	Responsible Party(s)	Partner	Potential Funding Source(s)*
<b><i>Enhance stormwater and flood infrastructure &amp; strategies</i></b>					
Advocate, and coordinate to the extent possible, for Monmouth County to develop enhanced regional stormwater management and flood strategies for implementation across all jurisdictions.	Medium	High	Council, Borough Administration	Monmouth County, Monmouth County Municipalities	
Study and prepare an action plan for improving capacity of those ditches and creeks that cannot move water fast enough due to an inherent lack of capacity, reduced capacity due to a lack of maintenance, ineffective pump stations or other concerns.	Short	Medium	Council, Borough Administration	Monmouth County	HMGP, NJEIT
Remediate the Turtle Mill floodway with removal of debris and sediment to facilitate flood flows and prevent flooding	Short	High	Council, Borough Administration	Long Branch, West Long Branch	HMGP, NJEIT
Investigate problems with the storm drain system using in-person and video explorations. This should include a survey of outfalls (as-built) to determine if backflow preventers would be appropriate.	Short	Medium	Council, Borough Administration	Two Rivers Water Reclamation Authority	HMGP
Install generators at all Borough public facilities which provide emergency operations or shelter during or subsequent to storm events.	Short	High	Council, Borough Administration		HMGP

Action Step	Time Frame	Priority	Responsible Party(s)	Partner	Potential Funding Source(s)*
Install backflow preventers on those Borough outfalls that are without. Each outfall will have to be assessed to determine if installation of a backflow preventer will provide additional protection or time for evacuation.	Short	High	Council, Borough Administration		HMGP
Study and prepare an action plan for improving bulkheads in the Borough. This should include, at a minimum, improvements to the bulkhead at Blackberry Bay Park, as well as identifying actions improving the utility of bulkheads on public and private property.	Medium	High	Council, Borough Administration		HMGP, NJEIT
<b><i>Adopt Enhanced Borough Policies To Facilitate Mitigation, Resilience &amp; Adaptation</i></b>					
Prepare new and revised master plan elements that provide the investigation and policy foundation for creating a more resilient Oceanport. At a minimum, these master plan elements should address the following:	Medium	High	Planning Board	None	PSPAGP
<p>General</p> <ul style="list-style-type: none"> <li>• Increase prominence and elevate the priority of goals, objectives and policies related to a mitigation, resilience and adaptation across all relevant master plan elements and provide coordinating policies across all master plan elements</li> <li>• Provide greater opportunity for public and stakeholder participation in hazard mitigation, resilience and adaptation planning.</li> </ul>	Medium	High	Planning Board	None	PSPAGP

Action Step	Time Frame	Priority	Responsible Party(s)	Partner	Potential Funding Source(s)**
<p>Community Facilities</p> <ul style="list-style-type: none"> <li>Address the need for a new Borough Hall, police department, first aid and the department of public works that are resilient to flooding and other impacts by future storms.</li> <li>Consider shared municipal service centers with surrounding municipalities. Examples may include, but are not limited to, a Joint Emergency Operations Center with nearby municipalities, such as Sea Bright and Monmouth Beach, and shared fire department and first aid with Little Silver and Fair Haven.</li> </ul>	Medium	High	Planning Board	None	PSPAGP
<p>Conservation</p> <ul style="list-style-type: none"> <li>Identify natural resources in the Borough that can provide environmental services (such as providing flood capacity) and currently provide or could provide enhanced resilience to storm events.</li> </ul>	Medium	High	Planning Board	None	PSPAGP
<p>Open Space and Recreation</p> <ul style="list-style-type: none"> <li>Determine how the Borough's public lands can not only provide environmental services but also recreation to Borough residents.</li> <li>Identify any lands in flood prone areas that should be considered for acquisition.</li> </ul>	Medium	High	Planning Board	None	PSPAGP

Action Step	Time Frame	Priority	Responsible Party(s)	Partner	Potential Funding Source(s)*
<p>Land Use</p> <ul style="list-style-type: none"> <li>Addresses how redevelopment in flood prone areas can reduce risk from weather events. This may include investigation of appropriate building and site design standards – building elevation, avoidance of clearing or construction practices that exacerbate risk and utilizing green infrastructure.</li> <li>Consider how zoning can be adjusted to encourage location of critical facilities in areas which have the lowest flood risk.</li> <li>Prepare neighborhood plans that target specific areas of the Borough such as but not limited to the neighborhood north of Blackberry Bay Park, Gooseneck Point and the East Main Street commercial district. These plans should address how mitigation, resiliency and adaptation strategies can be incorporated in ways that contribute to the character of the area.</li> </ul>	Medium	High	Planning Board	None	PSPAGP
<p>Circulation</p> <ul style="list-style-type: none"> <li>Address safe evacuation of residents in response to flood events and road improvements that would enhance mitigation and resiliency to flooding.</li> <li>Identify opportunities to raise roadway elevations so as to reduce roadway flooding during storm events.</li> </ul>	Medium	High	Planning Board	None	PSPAGP

Action Step	Time Frame	Priority	Responsible Party(s)	Partner	Potential Funding Source(s)*
Utilities <ul style="list-style-type: none"> <li>Identify infrastructure which may be at risk during natural disasters and plan for its protection, resilience and adaptation through relocation or other means.</li> </ul>	Medium	High	Planning Board	None	PSPAGP
Stormwater Management <ul style="list-style-type: none"> <li>Provide an analysis, and redesign if necessary, of the Borough's stormwater management facilities to ensure they continue to function during flood events.</li> </ul>	Medium	High	Planning Board	None	PSPAGP
<b><i>Adopt Ordinances Which Enhance Mitigation, Resilience &amp; Adaptation In The Borough</i></b>					
Update the Borough's general, Flood Prevention and Protection and Land Use ordinances to reflect the most recent flood hazard data and implement the relevant recommendations called for in the new and revised master plan elements.	Medium	High	Council, Planning Board		PSPAGP
Prepare design and zoning standards specific to flood hazard areas for the land use ordinance that will not only foster a sense of place in Oceanport but will set standards for flood resilience at the street level for public, residential, commercial and mixed use buildings.	Medium	High	Council, Planning Board		PSPAGP



Action Step	Time Frame	Priority	Responsible Party(s)	Partner	Potential Funding Source(s)*
<b><i>Improve The Borough's Permit And Application Process</i></b>					
Analyze the Borough enforcement procedures for the Construction office, Planning Board and Zoning Board to better enforce receipt of proper permits and approval for improvements to buildings and lands.	Medium	Medium	Council, Borough Administration		PSPAGP
Install a GIS-based system to track permits, approvals, determination of substantial damage, etc. in order to best track flood mitigation, resilience and adaptation efforts.	Medium	Medium	Council, Borough Administration		PSPAGP
<b><i>Prepare A Capital Facilities Plan</i></b>					
Prepare an updated five year Capital Facilities Plan to identify municipal capital investment necessary to implement the recommendations in the revised Borough policies (such as, but not limited to, those found in the utilities plan and community facilities plan) and those for enhancing Borough Flood Infrastructure.	Medium	Medium	Borough Council, Administration		PSPAGP
<b><i>Miscellaneous</i></b>					
Install gates at bridge locations so as to prevent through traffic during flood events or other hazardous conditions.	Short	Medium	Council, Borough Administration	Monmouth County	HMGP

Action Step	Time Frame	Priority	Responsible Party(s)	Partner	Potential Funding Source(s)*
Acquire property to relocate municipal facilities away from flood-prone areas.	Medium	High	Borough Council, Administration		

\* Glossary of Abbreviations

PSPAG: New Jersey Department of Community Affairs (NJ DCA) Post Sandy Planning Assistance Grant Program

HMGP: Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program

NJEIT: New Jersey Environmental Infrastructure Trust (loan program)



