



City of Ocean City
Cape May County

Post-Sandy Planning Assistance Grant
Floodplain Management Plan

A handwritten signature in black ink, reading "Randall E. Scheule", is positioned above a horizontal line.

Randall E. Scheule, PP/ AICP

The original of this document has been signed
and sealed as required by NJS 45:14A-12.



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Purpose

Floodplain management is the operation of a community program of preventive and corrective measures to reduce the risk of current and future flooding, resulting in a more resilient community. These measures take a variety of forms, are carried out by multiple stakeholders with a vested interest in responsible floodplain management and generally include requirements for zoning, subdivision or building, building codes and special-purpose floodplain ordinances.

This Floodplain Management Plan (FMP) identifies the flood risk within the City and proposes a prioritized Action Plan to reduce that risk. Additionally, the City intends to submit this FMP to improve their overall CRS classification. The expected outcomes of this FMP are as follows:

- Identify the City's flood hazard areas and address the community's flood hazards more effectively
- Produce a prioritized action plan of activities that will help mitigate the community's vulnerability to the hazard of flooding
- Ensure that recommended activities provide appropriate solutions addressing the hazards of flooding faced by existing and new development
- Ensure that recommended activities do not create conflicts with other flood hazard solutions and can be implemented in a cost effective manner
- Educate residents about flooding hazards, loss reduction measures, and the natural and beneficial functions of floodplains
- Build public and political support for projects that prevent new problems, reduce losses, and protect the natural and beneficial functions of floodplains
- Build a constituency that will implement the recommendations made for preventing and preparing for flood hazards

This Plan is based on the consensus of the Floodplain Management Committee, and contains recommendations in the Action Plan for consideration and adoption by City Council.

Completion of this Plan will help the City increase its Community Rating System (CRS) score. Upon adoption, this Floodplain Management Plan will be submitted to the CRS program as required.

This Plan has been prepared in accord with recommendations contained in the Ocean City Strategic Recovery Planning Report (October 7, 2015). Preparation of this "Floodplain Management Plan" has been made possible with funding provided by a Post-Sandy Planning Assistance Grant (FMP-CRP-2016-0508-678) administered by the New Jersey Department of Community Affairs.



Location

The City of Ocean City is located on the northernmost and easternmost corner of Cape May County in New Jersey. The City occupies the entire 7-mile long Peck's Beach Island, a coastal barrier island with Corson's Inlet State Park at the southern end. The municipality also includes a large portion of the Great Egg Harbor Bay and Intracoastal Waterway to the west, bay islands and coastal saltmarsh wetlands and the tidal waterways through them. The total municipal area including all land and water is 10.9 sq. miles, about 7,000 acres. Ocean City is bounded on the north by Atlantic County and the Great Egg Harbor Bay, on the east by the Atlantic Ocean, on the south-southwest by the Township of Upper and the City of Sea Isle City and the west by the Township of Upper.

Organize (1)

The first step in the FMP development process is to organize to prepare the plan. Organization includes gathering and assessing the City's existing resources and relevant data to be incorporated into the plan.

This step also involves coordination with the Floodplain Management Committee to assist in the development of the plan.

Incorporation of Existing Data

During the planning and development of the plan, various existing plans, studies, reports and technical information were reviewed and incorporated into the FMP, as shown in more detail in Table 1.

Table 1
Review and Incorporation of Existing Resources

Existing Resource	How Resource Was Used in the FMP
National Flood Insurance Program Community Rating System Coordinator's Manual (FEMA 2017)	Used the ten steps of floodplain management (Section 510) as a guide to create the main body of this document and to guide the planning process.
Hazard Mitigation Action Plan (HazMap) (Cape May County last updated May 2016)	Used for background information and in Step 4 to identify known flood hazards
CIP and Studies List (City of Ocean City)	Steps 4 and 7 to identify which areas have completed or planned studies and/or capital improvement projects
Flood Insurance Claims (City of Ocean City)	Step 5 to identify flood problem areas
GIS Data from City of Ocean City:	Steps 4 and 5 to perform analyses, create



1. Repetitive Loss Areas/Properties 2. Most Recent SFHA Layer 3. Zoning 6. Building Footprints 8. Parcel Data 9. Flood Warning System 10. Areas of Potential High Water 11. Drainage Complaints Database 12. Finished Floor Elevations where available 13. Flood Elevation Certificates	exhibits, and conduct hazard assessment
Ocean City Stormwater Management and Flood Smart website http://www.ocnj.us/Drainage-System-Maintenance/ , http://www.ocnj.us/Flood-Smart/	Steps 2 and 4 for public outreach and identifying problem areas
City of Ocean City Floodplain Ordinance	Step 7 for review of possible activities

Floodplain Management Committee

The Floodplain Management Committee has participated in the planning process of the FMP in order to provide input into the plan's content. The Committee members represent comprehensive and diverse organizations and perspectives for the FMP planning process. Members of the Floodplain Management Committee represent various departments within the City and a variety of public interests, and consist of seven City staff members and eight members from the public sector including residents, landowners, developers, insurance agents, finance agents, and real estate professionals.

The a Floodplain Management Committee played a crucial role in making decisions regarding the selection of FMP goals and hazards, developing mitigation goals and actions, and reviewing the document to provide comments. The Floodplain Management Committee held multiple meetings to discuss the information regarding each of the steps involved in the FMP. Meeting notices were posted on the City website, and the meetings were open to the public. Table 2 lists the Floodplain Management Plan Committee members who accepted invitations to participate in the FMP planning process.

Table 2

Floodplain Management Plan Committee Members

Name	Department/Representation	Public/City Staff
Dean Adams	Builder	Public
Paul S. Anselm	Resident	Public



Michael G. Contino	Realtor	Public
Thomas Heist IV	Insurance Agent	Public
Joe Leonard	Finance	Public
Bill McMahon III	Insurance/Finance	Public
Marty Mozzo	Resident	Public
Joe Somerville	Resident	Public
Arthur Chew, PE	City Engineer, CRS Coordinator	City Staff
Robert Penrose	Floodplain Manager	City Staff
Frank Donato	Office of Emergency Management	City Staff
Doug Bergen	Public Information Officer	City Staff
Mike Rossbach	Field Operations	City Staff
Roger Rinck	Engineering Manager	City Staff
Benny Tafoya	CFM, GIS Specialist	City Staff

Planning Process

The planning process has been conducted through a Committee established by Resolution 12 adopted by the City of Ocean City Council. (See Appendix B). Half of the Committee's members are public officials and the other half are from the public. Staff support has been provided by Arthur Chew and Benny Tafoya of the City's Engineering Office.

The planning process has been conducted through a committee comprised of staff from the City's Engineering office, and Construction office, Office of Emergency Management, and Public Works.

These departments are and will be responsible for implementing the majority of the planning recommendations described in this Plan.

The planning process was conducted through a 15-member planning Floodplain Management Committee that included 8 members of the public. Public representatives on the committee have backgrounds in commercial business, construction, flood insurance, and knowledge of past flooding and are property owners within the City's flood prone areas.

Three advertised meetings were held during the planning process. The following is a summary of the meeting dates held and general agenda topics discussed:

- Introduction, organization, discussion of key steps of the planning process, general flood issues in Cape May and public input.
- Discussion to assess the hazard, assess problems, set goals, review possible activities, draft an action plan, presentation of an initial draft plan. Public comment was also invited.



- Review draft plan, public comment period and recommend plan for adoption.

All meetings were publicly advertised in the City's official newspaper and public comment was invited for all meetings. Notice was also posted on the City's website (See Appendix C for website notice.)

The Draft Plan will be reviewed at a meeting to receive public comment at least two weeks before submittal of the recommended Plan to the City Council for adoption.

As part of the planning process, a review of existing studies, reports, and technical information, community needs, and goals was completed. The following action plans have been reviewed: September 1997, September 1998, September 1999, September 2000, September 2001, September 2002, September 2003, September 2004, September 2005, September 2006, September 2007, September 2008, September 2009, September 2010, August 2, 2011, September 5, 2012, February 6, 2013, April 2, 2014. A complete listing of resources is provided in the Appendix.

Public notice to the groups, commissions, municipalities, and agencies were sent by mail soliciting written comments and invitation to attend the public meeting held November 2, 2016. The complete mailing list and sample letter is included in the Appendix.

Public Involvement (2)

Several additional public outreach projects were completed to provide residents a chance to voice their concerns about flooding and provide suggestions on how to reduce flood risk in the City. Every resident with the desire to participate has had ample opportunity to participate and learn about flood prevention and protection through the public meetings or public outreach projects. Multiple outreach methods were utilized to promote public participation in the preparation of this Plan.

In 2016, the Floodplain Management Plan Committee and Program for Public Information Committee for Ocean City convened on April 6, May 4, June 1, July 6, August 3, September 7, and October 5 to review flooding issues and implementation of the Action Plan. Meetings were open to the public and held in the affected areas in accordance with section 330, 332.c And section 514(d) of the CRS manual, requiring an annual evaluation and a report be submitted to the governing body, the media, and be made available to the public. The plans are to be monitored for implementation and progress, and recommendations are to be made for revisions to the plans, if needed. The original plans may be reviewed at the City Clerk's Office, in City Hall, 861 Asbury Avenue in Ocean City.



The most recent City-wide use of the outdoor “Federal” siren system was on November 28, 2016. Tests of the Siren System are advertised by local media to the Ocean City public prior to the test. The system also conducts its own diagnostics daily by poling each siren. Maintenance is conducted year around and monitored constantly by a computer system located in the Ocean City Police Dispatch Center.

The importance of the Community Rating System (CRS) to the citizens of Ocean City lies in several areas including flood safety, hazard mitigation and the fact that every CRS Point the City attains is worth over one thousand dollars in savings on insurance premiums. This translates to individual homeowners that each level change equates to a \$30 savings per policy. Ocean City pays the most flood insurance premiums of all the communities in the state of New Jersey. With this knowledge along with many in the community calling for improvements to flooding conditions within the community, Mayor Gillian asked that the Flood Damage Committee meet monthly and to dedicate more time to improving floodplain management within the community. The Committee has made it a goal to gain a CRS Class 3 from our current level of CRS Class 5, and continue to be the highest rated community in the state. Class 3 can be attained subject to completion of several prerequisites including evaluation of future conditions related to projected sea level rise.

In an effort to educate citizens about the importance of purchasing flood insurance to protect their homes and businesses, FEMA created FloodSmart, a national marketing campaign to promote the NFIP. Ocean City’s website contains a wealth of flood-related information available to residents, businesses and visitors. <http://www.ocnj.us/Flood-Smart-Program/>

The following links provide access to the resources noted.

- ☐ [Elevation Certificates](#)
- ☐ [Benchmark Elevation Disc Set](#)
- ☐ [Flood Hazards & Maps](#)
- ☐ [Flood Warning Systems](#)
- ☐ [Flood Safety](#)
- ☐ [Flood Insurance](#)
- ☐ [Property Protection Measures](#)
- ☐ [Substantial Improvement Requirements](#)
- ☐ [Floodplain Development Permit Requirements](#)
- ☐ [Natural and Beneficial Functions](#)
- ☐ [Drainage System Maintenance](#)

Flood-related education and outreach is administered through a program for public information. The City has worked with local community groups, citizens and the local office of Emergency



Management by increasing public outreach programs for the year 2015-16. The City has updated its website to www.ocnj.us/flood-smart which also has become more user-friendly. The website averages over one million hits during the peak summer season. The site also focuses on Flood Hazard information and links directly to FEMA's Flood Smart website. Beginning in 2009, the City has provided more information on its website to help inform residents of the dangers associated with flooding. Additional information such as information on warning systems, zoning and flood resources (e.g. FEMA FIRM maps) is also available on the site.

This information (in English and Spanish) includes registration forms for electronic mail warnings, Reverse 911 and the protocol for the new seven-siren system. The site also includes the current Ocean City Zoning Map. These new programs enable the City to reach many more residents and vacationers. A direct mailing of flood-related information is sent to all property owners annually.

Documents related to floodplain management are also available in the Ocean City Public Library. The City also distributes an annual outreach brochure and has a flood warning programs consisting of several elements such as the development of a "key communicator" chain to pass accurate flood and storm information, bay water heights are reported on the City website, and posting and maintaining evacuation signs.

Coordinate with Other Agencies (3)

There is a possibility that neighboring communities have already conducted studies which address flooding problems. In addition of existing plans and reports on flooding, there also may be flood protection activities being considered or implemented by other agencies. 'Other agencies' includes neighboring communities; local, regional, state and federal agencies; businesses, colleges and other private and non-profit organizations affected by the hazards, involved in hazard mitigation and floodplain management.

In an effort to glean additional information that could benefit the City, the Ocean City Regional Chamber of Commerce, Ocean City Board of Realtors and Cape May County were invited to participate in the planning process and to provide input pertinent to the City's FMP.

The City participated in a mitigation action workshop in May 2016 and received guidance to assist their comprehensive review of all possible activities and mitigation measures to address known hazards. The comprehensive-range of specific mitigation initiatives the City would like to pursue in the future to reduce the effects of hazards are as follows: **Acquisitions and Elevations, Drainage/Stormwater, Education and Awareness, Natural Systems Protection, Structure and Infrastructure, Local Plans and Regulations.** These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any



time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

Hazard Assessment (4)

This hazard assessment is composed of three parts: a discussion of past floods in the City, known flood hazards, and an assessment of the less-frequent flood hazards. The past floods are described based on historical records documented in the Flood Insurance Study (FIS) and recent events represented in the FIS and with data provided by the City. The known flood hazards were identified through various sources.

In order to guide the hazard assessment process, a CRS Self-Assessment was completed. Topics and answers to questions in the CRS Self-Assessment provided content included within this hazard assessment. Data and GIS information included in this Plan were created while completing the CRS Self-Assessment.

As a coastal barrier island Ocean City is particularly vulnerable to flooding from tropical storms, extratropical cyclones, and to a lesser extent, severe thunderstorm activity. Most serious tidal flooding problems are attributed to hurricanes which in addition to heavy precipitation produce high tides and strong waves and storm surge.

The history of flooding within Ocean City indicates that major flooding can occur during any season of the year, particularly during the late summer and fall, when high tides are generated in Great Egg Harbor Bay and along the Atlantic Ocean coastline. Flooding occurs from tropical storms, extratropical cyclones, and to a lesser extent severe thunderstorm activity. Most serious tidal flooding problems are attributed to hurricanes; which occur during the late summer and early autumn. In addition to heavy participation, hurricanes produce high tides and strong waves which can result in severe damage to coastal areas. Although extratropical cyclones referred to as northeasters can develop at almost any time of the year, they are more likely to occur during the winter and spring. Thunderstorms are a common occurrence during the summer months. Table 3 summarizes past flood events and their severity in terms of flood level that have affected the City.



Table 3
Historic Flood Events

Ocean City Record Flood Levels					
Date	Storm Name	NAVD1988	MLW	NGVD1929	Notes
10/29/12	Superstorm Sandy	7.25	10.02	8.50	Hybrid Cat 1 hurricane/winter storm makes landfall 12 miles north of O.C. on full-moon tide. 6.72 inches of rain in Beasley's Point. Top O.C. wind gust 70.2 mph. But calm winds in eye of storm spare O.C. during highest tide.
9/15/44	1944 Hurricane	6.65	9.42	7.90	Cat 2 hurricane destroys Jersey Shore on way to landfall on Long Island.
3/6/62 to 3/8/62	Storm of '62	6.35	9.12	7.60	Three-day nor'easter batters Ocean City with 25-foot seas and 80+ mph winds.
12/11/92	December '92 Nor'easter	6.23	9.00	7.48	Slow-moving nor'easter with 80 mph winds caused the most flooding since the Storm of '62.
10/31/91	The Perfect Storm	6.00	8.77	7.25	Author Sebastian Junger dubbed the merger of Hurricane Grace and a massive nor'easter "The Perfect Storm." It destroyed parts of the boardwalk in Ocean City.
9/27/85	Hurricane Gloria	5.75	8.52	7.00	Cat 1 hurricane hits the Outer Banks then Long Island.
1/23/16	Nor'easter 'Jonas'	5.69	8.46	6.94	Powerful coastal storm coincides with full moon. Winds top out at 66 mph. The 8.46 tide was followed by two more at 7.7 feet and 7.34 feet. Storm erodes newly replenished beaches at Ocean City's northern end.
11/11/09 to 11/14/09	November 2009 Nor'easter	5.25	8.02	6.50	Three-day nor'easter levels dunes at the north end of the island.

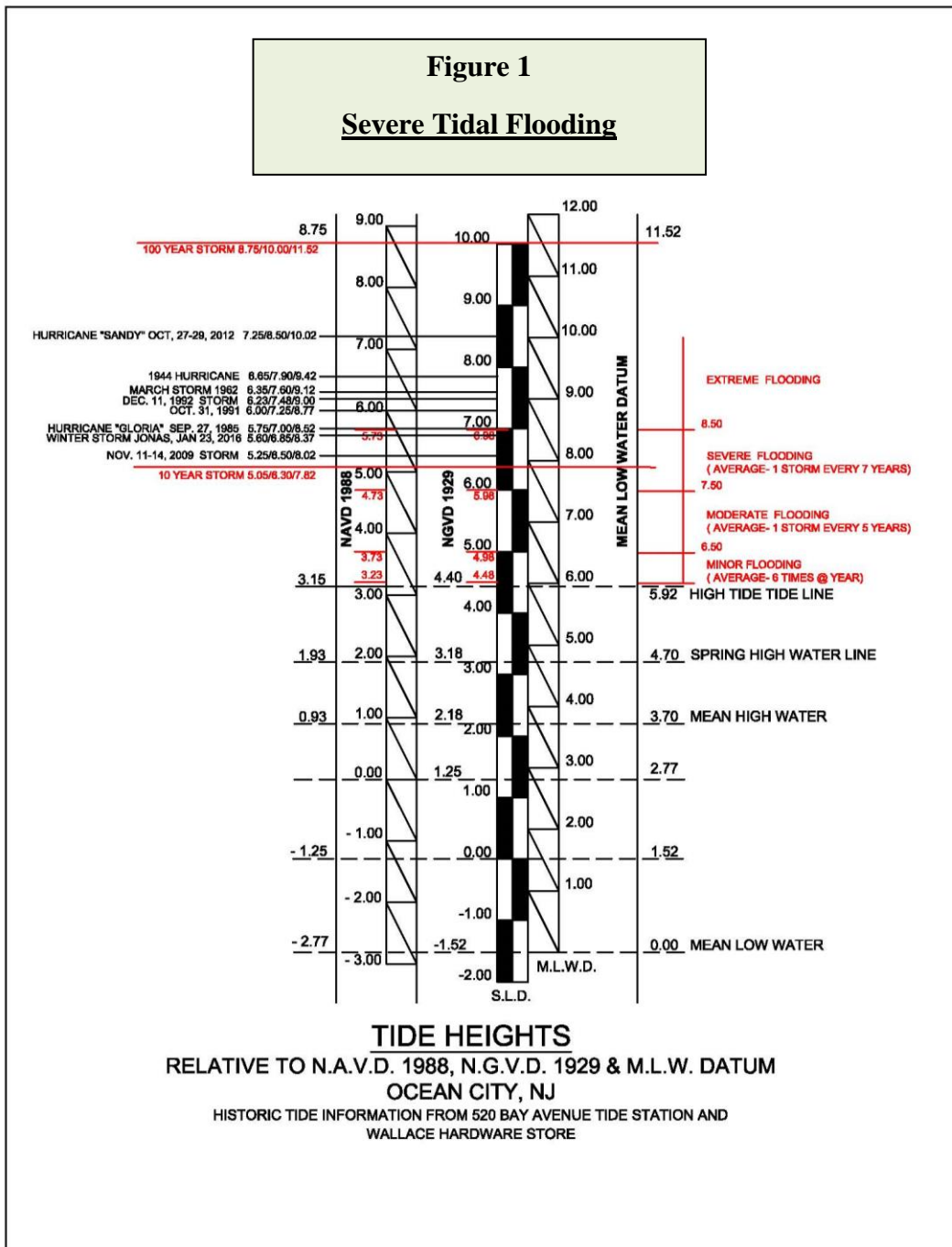


Ocean City Record Flood Levels					
Date	Storm Name	NAVD1988	MLW	NGVD1929	Notes
MAJOR FLOODING THRESHOLD: 8 FEET (MLW)					
2/8/16	Super Bowl Flood 2016	4.67	7.44	5.92	Ocean City wakes up after Super Bowl 50 to flooding that came with no warning from the National Weather Service.
3/14/17	Coastal Storm	4.61	7.38	5.86	Heavy rain falls two days after a full moon as a fast-moving coastal storm brings northeast winds with gusts up to 50 mph.
10/2/15	Nor'easter	4.58	7.35	5.83	Northeast gale pushes water into the back bays over the course of several days. Five high-tide cycles flood streets.
12/9/14	December 2014 Nor'easter	4.52	7.29	5.77	Flooding from a winter nor'easter closed Ocean City schools — but heavy overnight rain stopped before morning high tide.
1/23/17	Coastal Storm	4.45	7.22	5.70	Heavy rain and powerful northeast winds combine.
MODERATE FLOODING THRESHOLD: 7 FEET (MLW)					
1/27/15	Winter Storm Juno	3.81	6.58	5.06	Much-hyped winter storm passed farther out to sea than originally predicted.
4/25/17	Flooding	3.70	6.47	4.95	Rain and strong northeast winds coincide with a new moon.
4/6/17	Flooding	3.04	5.81	4.29	Merging storm systems create strong onshore winds and minor street flooding.
7/5/16	T'storm	2.92	5.69	4.17	Fourth of July celebrators wake up to a thunderstorm with heavy rain and a rising new-moon tide.



MINOR FLOODING THRESHOLD: 6 FEET (MLW)			
Typical High Tide	0.23-2.23	3-5	With no contributing factors other than the normal astronomical tide cycle, high tide levels range from about 3 feet to 5 feet. The highest predicted tides coincide with full or new moons.

Figure 1 provides a history and shows the relationship of tidal flooding events in Ocean City from the 1944 hurricane thru Jonas in 2016.





Hazard Risk/Vulnerability Risk Ranking

Table 4 summarizes the hazard risk/vulnerability rankings of potential hazards for the City of Ocean City.

Table 4
Hazard Risk/Vulnerability Risk Ranking

Hazard Type	Estimate of Potential Dollar Losses to Vulnerable Structures (a, c)	Probability of Occurrence	Risk Ranking Score	Hazard Ranking (b)
Climate Change & Sea Level Rise	RCV in +3 feet: \$2,284,080,731	Frequent	42	High
Coastal Erosion	RCV in CEHA: \$92,951,394	Frequent	18	Medium
Flood	1% Annual Chance: \$8,930,311,486	Frequent	54	High
Hurricanes & Tropical Storms	Category 1 SLOSH: \$8,270,361,393 Category 2 SLOSH: \$10,079,876,734 Category 3 SLOSH: \$10,079,876,734 Category 4 SLOSH: \$10,079,876,734	Frequent	54	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$64,821,855 500-year MRP: \$488,660,324 Annualized:	Frequent	48	High



	\$3,130,152			
Severe Winter Weather	1% GBS: \$65,940,756 5% GBS: \$329,703,780	Frequent	51	High
Tsunami	Damage estimate not available	Rare	6	Low
Wildfire	Estimated Value Exposed to Extreme, Very High and High: \$935,211	Frequent	18	Medium

Notes:

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the County utilizing improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 20-30+

Low = Total hazard risk ranking below 20

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH and the 2015 FEMA DFIRM for the 1-percent annual chance event. For the wildfire hazard, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

Of the hazards identified in this chapter, it can be seen that problems related to flooding include, hurricanes and tropical storms, nor'easters, and coastal erosion. Thunder storms have the potential to cause localized flooding issues. Flooding is the predominant natural hazard that can be a problem in Ocean City.

Flooding creates a hazard to the community in several ways, the most serious due to drowning in flood waters. The aftermath of a storm could lead to unsanitary conditions and the development of moldy conditions from saturated building materials and furnishings. The City's Office of Emergency Management has procedures in place to notify residents via loudspeaker and Reverse



911. Since there is generally adequate warning that a coastal storm is approaching there is sufficient time to evacuate should that be necessary.

National Flood Insurance Program

The Mitigation Directorate, which is a part of the Federal Emergency Management Agency (FEMA), controls the National Flood Insurance Program (NFIP). The NFIP is divided into three parts: Flood Insurance, Floodplain Management, and Flood Hazard Mapping.

To minimize future flood damage, numerous communities across the United States are participating in the NFIP by adopting and enforcing floodplain management ordinances. In exchange for their efforts, federally backed flood insurance is made available to homeowners, renters, and business owners in these communities. Participation is not required for members of the community.

The cost of repairing damage to buildings caused by floods is increasing. To lower this cost, flood insurance was designed as an alternative to disaster assistance. Through the efforts of communities implementing floodplain management requirements and property owners buying flood insurance, the cost of flood damage is reduced nationwide by almost \$1 billion dollars a year. Also, buildings constructed in compliance with NFIP requirements have significantly less damage in floods than building that are not built in compliance.

The NFIP maps the United States' floodplains and flood hazards which creates awareness, provides data for floodplain management programs, and rates new construction for flood insurance.

The Community Rating System or CRS is a part of the National Flood Insurance Program (NFIP) it provides reductions to flood insurance premiums in participating communities. Insurance premium reductions are based upon a community's level in the CRS Program. The reductions take into account the community floodplain management programs, including public information activities. In order to increase the Flood Insurance discount levels the community must continue to Promote the necessity that citizens of Ocean City purchase Flood Insurance and to continue to implement CRS programs and report status to the NFIP each year.

Ocean City entered the National Flood Insurance Program in 1970 and has been recertified each year since 1991. The entire island has been determined to be in the Special Flood Hazard Area for the 100-year storm as determined in 1984 by the National Flood Insurance Program (NFIP) with an A-zone Base Flood Elevation (BFE) of either 9' or 10' NGVD and a V-zone BFE of 11-14' on the beach. All properties are required to be newly constructed or substantially repaired in accordance with NFIP rules in effect since 1970 and updated from time to time. The Construction Official is responsible for compliance with the NFIP rules.



At the present time Ocean City has 17,019 policies in force, with a combined collection of \$11,251,325.00 a year in total premiums. This includes the 25% discount level that represents a savings of \$2,812,831.25 on collected annual premiums. The total insurance in force equals \$4,007,686,600. Ocean City has a BCEGS rating of 4/4 which satisfies a prerequisite of CRS to be a Class 4 community.

Flood insurance is required as a condition of Federal aid or a mortgage or loan that is federally insured for a building located in a high hazard A or V Zone. Therefore, one would expect most policies to be in the AE, A and VE Zones. Since the entire community of Ocean City is currently in a SFHA all properties that have a federally backed mortgage are required to carry flood insurance. Property owners with no mortgage on their home or business are not required to carry flood insurance, however, they are encouraged to do so, given the propensity for flooding in the community.

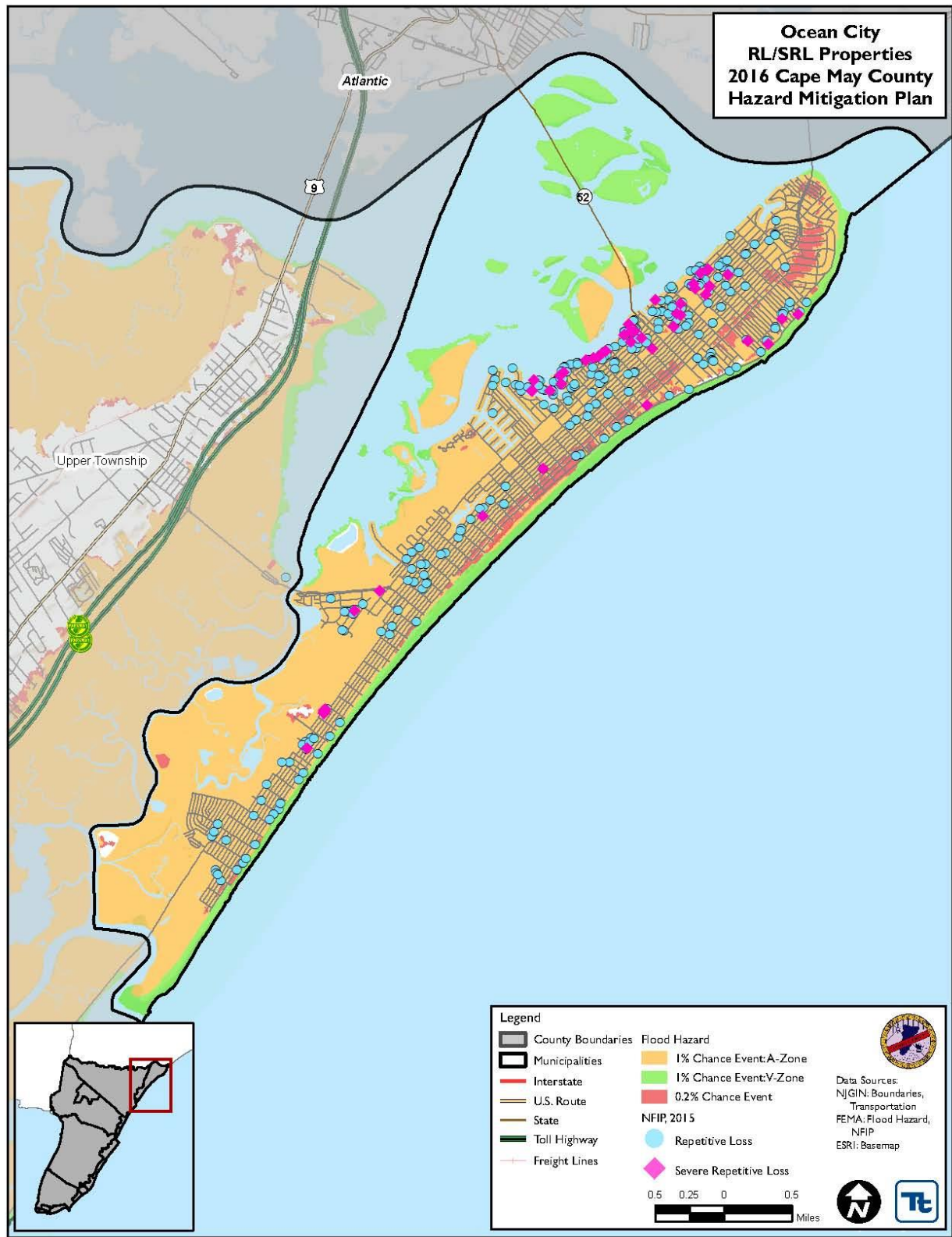
Repetitive Loss Properties

Repetitive Loss Areas (RLPs) also assist the City in identifying known flood hazards inside and outside of the existing FEMA floodplains. A Repetitive Loss Property is any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling ten-year period, since 1978. A severe repetitive loss property is a property that received four or more claim payments of at least \$5,000 or has received two or more claim payments where the total of the payments exceeds the total property value.

The initial Repetitive Loss Analysis for Ocean City identified 318 Severe Repetitive Loss Properties. A variety of mitigation measures have reduced this number to the point where there are currently 89 listed properties in Ocean City consisting of 24 repetitive loss and 65 severe repetitive loss. These 89 properties account for a total of 434 paid losses. Mapping of the affected properties indicates a concentration of repetitive losses in areas of lowest land elevation on the bay-side of the island. Mapping of repetitive loss structures and individual flood hazard areas is provided in the Appendix. The Appendix also contains a list of repetitive loss structures.

A major factor in these repetitive losses is that most of these properties have structures that were built prior to establishment of a base flood elevation requirement which is in effect currently.

Figure 2





Flood Area Maps

Flood hazard area extent and location maps have been generated by the City of Ocean City that illustrate the probable areas impacted by flooding within the municipality. These maps are based upon the best available data at the time of the preparation of this Plan, and are considered to be adequate for area analysis purposes. Maps have only been generated for purposes of RLP and SRLP area analysis and for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Ocean City has significant exposure.

Map information service is provided on the Ocean City Website under the banner Citizens Services and all maps may be viewed by selecting the FloodSmart banner. The website <http://ocnj.us/Flood-Smart> contains Flood Maps, Historic Flood Studies, Flood Hazards & Maps, Flood Warning Systems, Elevation Certificates and Flood Insurance Information, Flood Safety, CRS (Community Rating System), What does El Niño mean to you and your community and Natural and Beneficial Functions.

Known Flood Hazards

The first step in mitigating flood concerns is knowing where those flood hazards exist, including the source, depth, velocity, and warning times. Flooding is one of the most common hazards affecting communities across the country. Flooding can impact area that range in size from small communities to large regions. Regardless of whether a flood occurs over a period of minutes or days, floods have significant probability of causing extensive property damage, disabling critical facilities, and also threatening the safety of the public.

Since all of Ocean City lies within a Special Flood Hazard Area, the entire island is subject to flooding. The history of flooding within Ocean City indicates that major flooding can occur during any season of the year, particularly during the late summer and fall, when high tides are generated in Great Egg Harbor Bay and along the Atlantic Ocean coastline. Flooding occurs from tropical storms, extratropical cyclones, and to a lesser extent severe thunderstorm activity. Existing data, including FEMA Special Hazard Flood Zone areas, drainage complaints, and studies were used to assess the flood hazard within the City. Exhibit x in Appendix x summarizes the known flood hazard areas on a map. The data in this map are also recorded in ArcGIS format.

Flood Insurance Rate Maps (FIRM)

The first reference for known flood hazards is the Special Flood Hazard Areas (SFHA) as identified by the FEMA FIRM. The SFHA shows the potential extents of the flood during a 100-year and 500-year storm event. Appendix x shows the 100-year and 500-year FEMA floodplains within Ocean City.



Structures in the Floodplain

The January 31, 2017 CRS insurance report indicates the following distribution of the 17,090 total structures per flood zone.

Table 5
Insurance Zone

Insurance (Flood) Zone	Number of Structures
A01-30 & AE Zones	16,973
V01-30 & VE Zones	113
B, C & X Zone	4
Total	17,090

Flood Warning System

Warning residents prior to a flood hazard is an important part of public safety during a storm event. Emergency advisories and weather information can be obtained by tuning to Ocean City's Local Emergency Management station 1620 AM or go to www.ocemergency.com, Comcast Cable Channel 97 or a weather radio. You may also check the City website www.OCNJ.us. Emergency flood warnings will be disseminated through the use of the emergency information system any time the National Weather Service issues a flood warning.

The "Global Connect" system combined with other emergency alert methods is designed to get emergency messages to the public, quickly and effectively. Additional information on the City's flood warning system is available at the OC Emergency Management website and following the "Global Connect" link.

Flood Damage Prevention Ordinance

The Legislature of the State of New Jersey has, in N.J.S.A. 40:48-1 et seq., delegated the responsibility to local governmental units to adopt regulations designed to promote public health, safety, and general welfare of its citizenry.

The flood hazard areas of the City of Ocean City are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazard which increase flood heights and velocities, and when inadequately anchored, causes



damage in other areas. Uses that are inadequately floodproofed, elevated or otherwise protected from flood damage also contribute to the flood loss.

The purpose of the City's Flood Damage Prevention ordinance is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- a. Protect human life and health;
- b. Minimize expenditure of public money for costly flood control projects;
- c. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- d. Minimize prolonged business interruptions;
- e. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, bridges located in areas of special flood hazard;
- f. Help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
- g. Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- h. Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

The Flood Damage Prevention Ordinance (FDPO) identifies the Construction Official as the NFIP Floodplain Administrator. The floodplain administrator, assisted by four certified floodplain managers, assumes responsibilities for floodplain administration including, Permit review, inspections, damage assessments, record-keeping, GIS, education and outreach.

Ocean City is in the process of revising its FDPO to conform to the New Jersey Department of Environmental Protection's model ordinance and to continue its participation in the National Flood Insurance Program. The City's existing and revised ordinance meet and/or will exceed the minimum requirements accepted by FEMA and the State of New Jersey.

Sea Level Rise

The CRS incorporates the consideration of sea level rise into a number of elements, including Higher study standards under (Flood Hazard Mapping); Coastal A Zone (CAZ) credit under (Higher Regulatory Standards); and Watershed master plan under (Stormwater Management).



Including sea level rise in WMP is required for coastal communities to meet the Class 4 prerequisite, and HSS credit for future-conditions hydrology is a Class 1 prerequisite.

Recognizing that there is uncertainty inherent in estimating future sea levels, the CRS has adopted a base minimum projection for sea level rise for the purposes of CRS credit and meeting CRS prerequisites. The “intermediate-high” projection for 2100, as included in the report *Global Sea Level Rise Scenarios for the United States National Climate Assessment* (National Oceanic and Atmospheric Administration, 2012, https://scenarios.globalchange.gov/sites/default/files/NOAA_SLR_r3_0.pdf), is the minimum projection that must be used for CRS purposes. Communities may use other projections provided that they are equal to or greater to NOAA’s “intermediate-high” projection for 2100.

The City of Ocean City has evaluated future conditions including the projected impacts associated with sea level rise in accord with CRS requirements as a component of its 2017 Community Resilience Plan.

Problem Assessment (5)

Summary of Overall Hazard Vulnerability

As a coastal barrier island Ocean City is particularly vulnerable to flooding from tropical storms, extratropical cyclones, and to a lesser extent, severe thunderstorm activity. Most serious tidal flooding problems are attributed to hurricanes which in addition to heavy precipitation produce high tides and strong waves and storm surge.

Of the hazards identified in Chapter 4, it can be seen that problems related to flooding in Ocean City include hurricanes and tropical storms, nor’easters, and coastal erosion. Thunder storms have the potential to cause localized flooding issues. Flooding is the predominant natural hazard that can be a problem in the developed portion of the community.

Flooding creates a hazard to the community in several ways with the most serious due to drowning. When roads are flooded there is risk that residents could be stuck in their vehicles, or walk through flowing water that could take them off their feet. The aftermath of a storm could lead to unsanitary conditions and the development of unhealthy conditions due to saturated building materials and furnishings. The Ocean City Office of Emergency Management utilizes a 7-siren warning system and reverse 911 system to notify residents of an emergency. These protocols in advance of an approaching coastal storm are generally effective in providing sufficient time to evacuate should that be necessary.



Table 6 provides damage assessments associated with hazard events in Ocean City.

Table 6
Damage Assessments

Type of Event	FEMA Disaster #	Date	Preliminary Damage Assessment
Coastal Storm, Flooding	DR-124	March, 1962	\$3,000,000 (countywide)
Snowstorm	Not applicable	December, 1973	\$24,000 (countywide)
Flood	Not applicable	November, 1977	\$2,400,000 (countywide)
Flood	Not applicable	March, 1984	\$500,000 (countywide)
Hurricane Gloria	Not applicable	September, 1985	\$300,000 (City of Ocean City)
Coastal Storm	Not applicable	October, 1991	\$90,000,000 (statewide) \$1,700,000-\$4,000,000 (countywide)
Tidal Flood	Not applicable	November, 1991	\$167,000 (countywide)
Severe Coastal Storm	DR-936	January, 1992	\$16,000 (countywide)
Coastal Storm, High Tides, Heavy Rain, Flooding	DR-973	December, 1992	\$16,800,000 (countywide)
Severe Winter Storm	EM-3106	March-01-1993	\$2,600,000 (statewide)
Coastal Flood	Not applicable	March, 1994	\$167,000 (countywide)
Severe Winter Storm, Coastal Storm	DR-1088	January-01-1996	\$800,000 (countywide)
Coastal Flood, Coastal Erosion	Not applicable	January, 1996	\$3,600,000 (countywide)



Coastal Flood	Not applicable	January, 1998	\$3,800,000 (countywide)
Coastal Storm	DR-1206	February, 1998	\$3,600,000-\$4,200,000 (countywide)
Hurricane Floyd	EM-3148	September-01-1999	\$492,000 (countywide)
Lightning	Not applicable	June, 2002	\$50,000 (City of Ocean City)
Snowstorm	EM-3181	February-01-2003	\$1,400,000 (countywide)
Strong Winds	Not applicable	March, 2003	\$5,000 (countywide)
Thunderstorm, Wind	Not applicable	October, 2003	\$32,000 (countywide)
Severe Winter Storm, Coastal Flooding	Not applicable	February, 2006	\$225,000 (countywide)
Thunderstorm, Wind	Not applicable	March, 2008	\$10,000 (multi-jurisdictional)
Thunderstorm, Funnel Cloud	Not applicable	May, 2008	\$1,000 (City of Ocean City)
Coastal Storm and Flooding (Nor'Easter - 5" in 12 hours)	Not applicable	Sept. 11, 2009	Significant street flooding, a number of cars were damaged. GeoTube at Waverly Beach damaged/destroyed and beach erosion was severe.
Severe Storm, Flooding (Tropical Storm Ida and Nor'Easter)	DR-1867	November, 2009	\$1,710,223.32
Storm/snowstorm	DR-1889	February, 2010	\$118,313.48 (City of Ocean City)
Storm/Floods	DR-1897	March/April, 2010	No amount listed
Storm/Snowstorm	DR-1954	December, 2010	\$77,482.81 (City of Ocean City)
Hurricane Irene	DR-4021	August/Sept.,	\$138,291.12 (City of Ocean City)



		2011	
Severe Storm	DR-4048	October, 2011	No amount listed
Hurricane Sandy	DR-4086	Oct. 29, 2012	\$22.4 million (City of Ocean City)

As of January 31, 2017 there are a total of 19,530 structures within Ocean City's Special Flood Hazard Areas (SFHA), and a total of 17,019 flood insurance policies in effect with a combined annual premium (adjusted by 25% discount) of approximately \$11.2 million. Total insurance in force is in excess of \$4 billion.

The January 2017 CRS report indicates 5,068 total paid losses since the start of the program, totaling about \$140 million to pre-FIRM structures, while on post FIRM structures there are 2,690 losses totaling approximately \$38 million. So while pre-FIRM structures represent 39.8% of policies they represent 91% of claims and almost 97% of claims paid. There are 4,802 Policies in force in Pre-FIRM Buildings and there have been 5,068 Paid Losses on Pre-FIRM Buildings. Pre-FIRM or Post-FIRM refers to buildings constructed before 1980 or after 1980, respectively.

The Post FIRM Insurance Document shows that there are 12,241 Flood Insurance Policies in the SFHA of Ocean City with there being 45 Policies in the V and VE Zones the balance are located in A and E Zones. There have been 54 Paid Losses in the V Zones and 2,638 Paid Losses in the A & E Zones.

In total and including policies outside the SFHA (generally Zone X) there are 681 pre-FIRM policies (65.2%) with 160 total claims (91.4%) and \$1.75 million claims paid (96%). It can be seen from the above that floodplain management standards have a dramatic effect on reducing flood loss in the community.

There are currently 24 Repetitive Loss properties and 65 Severe Repetitive Loss properties listed in Ocean City.

Table 7 provides a breakdown of the improved property within the City of Ocean City. As previously noted, the City's entire population and all structures are within the SFHA.



Table 7
Population and Structures within SFHA

Type of Structure	Number of Structures			Value of Structures			Number of People		
	Total Number	Number is SFHA	Percent (%) in SFHA	Total Dollar Value (\$)	Total Dollar Value (\$) in SFHA	Percent Dollar Value in SFHA	Total Number	Number in SFHA	Percent in SFHA
Residential	18, 165	18,165	100	4,089,166,700	4,089,166,700	100	11,701	11,701	100
Commercial	583	583	100	137,096,900	137,096,900	100	-	-	-
Industrial	2	2	100	21,700	21,700	100	-	-	-
Church, Charitable	46	46	100	56,363,900	56,363,900	100	-	-	-
Government	905	905	100	34,726,800	34,726,800	100	-	-	-
Education	9	9	100	43,160,600	43,160,600	100	-	-	-
Exempt	33	33	100	3,598,800	3,598,800	100	-	-	-
Total	19,743	19,743	100	4,364,135,400	4,364,135,400	100	11,701	11,701	100

Source: Ocean City Tax Assessor, May 31, 2017

Life Safety and Public Health

Flood hazards can have an impact on life safety and public health. Life safety is of primary concern to the City when determining flood risk. Roadway flooding can create hazards for drivers and potential loss of life. Public outreach and education of the dangers of high water as well as effective warning systems are paramount to protecting individuals.

Flooded areas and buildings can also create a risk to public health including mold that can form when buildings remain damp for an extended period of time. Black mold can especially create health hazards sometimes leading to hospitalization. This is why it is important to provide shelter for displaced residents so they do not have to stay in their flooded property. If a large storm event occurred in Ocean City, the Emergency Management Office (EMO) and the City would coordinate with neighboring communities and the county to shelter displaced individuals.



Critical Facilities and Infrastructure

It is important that critical facilities remain operational and that access is not eliminated when a storm occurs. The City developed an inventory of its critical facilities as part of the County's Hazard Mitigation Action Plan. Critical facilities include fire stations, police stations, medical buildings, schools, and other important buildings. These facilities are identified in Table 8 and were analyzed along with the facilities identified with the general building stock to determine if they are vulnerable to flooding and the potential damage that may be expected should a 100-year flood occur.

The building damage, content damage, and days before 100% functionality are determined as a function of the flooding depth. This data could be used by the City to make emergency plans regarding where displaced students could attend school while waiting for their own school to be renovated or reconstructed. This information could also be used similarly to make contingency plans for the other damaged facilities.

Possible damage to evacuation routes and roads leading to critical facilities is also of concern. Limited access to hospitals, fire stations and police stations can be potentially life threatening. Mold and other damage resulting from flooding can also impact these facilities financially and close them for extended periods of time placing a larger burden on facilities in neighboring communities.

Damage to utilities, including electric, potable water, and sewer could displace residents and create a financial burden on the City and rate payers to repair the damaged facilities. Losing electrical power and water during the summer months could also increase the possibility of heat related illnesses for the elderly and infants.

Cape May County has a Hurricane Evacuation Plan in place to provide guidance for the development and operation of an evacuation program while the threat of a hurricane or flooding is imminent. The main purpose is to evacuate low lying coastal areas in the County especially before there are tropical storm force winds (≥ 39 mph). Ocean City is responsible for local evacuation and ensuring that traffic moves onto the major evacuation routes. The New Jersey State Police and the New Jersey Department of Transportation are responsible for coordinating traffic on the major evacuation routes.



Table 8
Number of Critical Facilities Located in the 1-Percent Annual Chance Flood Zone

<u>Facility Type</u>												
<u>Airport</u>	<u>Communications</u>	<u>Emergency Operations</u>	<u>Fire Station</u>	<u>Library</u>	<u>Marina</u>	<u>City Hall</u>	<u>Place of Interest</u>	<u>School</u>	<u>Senior Facility</u>	<u>Wastewater Pump</u>	<u>Wastewater Treatment</u>	<u>Well</u>
<u>1</u>	<u>1</u>	<u>1</u>	<u>3</u>	<u>1</u>	<u>6</u>	<u>1</u>	<u>3</u>	<u>3</u>	<u>5</u>	<u>4</u>	<u>1</u>	<u>3</u>

Source: Cape May County

Local Economy and Employers

Data from the Census indicates that in 2015 there were 579 business establishments in Ocean City and 3,525 employees with an annual payroll of \$128.5 million.¹ A 100-year flood event would seriously impact the City's economy since all these businesses are within a Special Flood Hazard Area.

The HAZUS program has the ability to estimate the total economic loss for different flooding scenarios. HAZUS breaks down the results into two categories: direct building losses and business interruption losses. According to HAZUS, the direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents, and the building interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood.

Historical Damage to Buildings

Ocean City joined the NFIP in 1970 and has been recertified every year since 1991. The City is currently in good standing with the NFIP. The date of the most recent Community Assistance Visit is May 2015.

¹ American Factfinder, Zip Code Business Statistics (2015 Business Patterns)



As of January 31, 2017 Ocean City has 17,019 policies in force, with a combined collection of \$11,251,325.00 a year in total premiums. This includes the 25% discount level that represents a savings of \$2,812,831.25 on collected annual premiums. The total insurance in force equals \$4,007,686,600. Ocean City has a BCEGS rating of 4/4 which satisfies a prerequisite of CRS to be a Class 4 community.

Table 9 summarizes NFIP loss and payment statistics for the City of Ocean City.

Table 9
NFIP Summary for Ocean City

Number of Policies (1)	Number of Claims (Losses) (1)	Total Loss Payments (2)	Number Repetitive Loss Properties (1)	Number of Severe Repetitive Loss Properties (1)	Number of Policies in 1% Flood Boundary (3)
17,090	7,787	\$9,955,130	24	65	17,090

Source: FEMA, 2017

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of July 31, 2015 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 7/31/2015.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Note (5) A zero percentage denotes less than 1/100th percentage and not zero damages or vulnerability as may be the case.

As of January 31, 2017, FEMA insurance documents identify four classes of occupancy which comprise the buildings (17,090) covered by Flood Insurance. Table 10 shows the number of paid claims since 1978 and the dollar amount paid based on building type.



Table 10
Insurance Information by Type of Building

Type of Building	Number of Policies	Paid Claims	Paid Losses
Single Family	4,515	3,815	\$83,391,709
2 – 4 Family	9,211	2,978	\$2,983,287
All other residential	2,986	456	\$771,713
Non-residential	378	539	\$808,421
Total	17,090	7,787	\$9,955,130

FEMA insurance documents show the number of Pre-FIRM Flood Insurance Policies in the City. This document also indicates the number of Pre-FIRM Policies and the number of Paid Losses in each flood zone. There are 4,802 Policies in force in Pre-FIRM Buildings and there have been 5,068 Paid Losses on Pre-FIRM Buildings.

The post FIRM insurance document indicates that there are 12,241 Flood Insurance Policies in the SFHA of Ocean City with there being 45 Policies in the V and VE Zones the balance are located in A and E Zones. There have been 54 Paid Losses in the V Zones and 2,636 Paid Losses in the A & E Zones.

Table 11
Pre-FIRM and Post/FIRM Insurance Data

	Number of Policies	Paid Claims	Paid Losses
Pre-FIRM	4,802	5,068 (65%)	\$140,361,968 (79%)
Post-FIRM	12,241	2,690 (35%)	\$38,308,198 (21%)
Totals	17,043	7,758	\$178,670,166

The difference between the total number of existing structures (19,743) and the number of flood insurance policies in effect (17,090), results an estimated 2,653 improved properties currently without flood insurance.

Pre-FIRM refers to buildings constructed in or before 1980. Table 11 shows that 65% of paid claims and 79% of paid losses have been on Pre-FIRM structures. This suggests that the City's ordinances and policies concerning building in the floodplain have been effective in reducing the number and cost of insurance claims.



Floodplain features providing natural functions: wetlands, beaches and sand dunes

Floodplains

Floodplains allow for gradual absorption and dissipation of flood waters. Although a large portion of Ocean City is developed, the beach, coastal wetlands, bay islands and freshwater wetlands still provide floodplain functions and wildlife habitat, while the dune system buffers the uplands from storm waters and prevents flooding. Disturbing, filling and paving interrupt these functions and may increase flooding in nearby areas. For this reason, development of the floodplain is very closely controlled by City codes and ordinances.

Protecting the adjacent water from land-based pollution is another function of the floodplains. It is important to keep litter and pollutants out of the streets to prevent them from being washed into the bay and ocean through stormwater outfalls. Pollutants from streets include pet waste, cigarette butts, automotive oils, antifreeze, lawn fertilizers and pesticides. In the same way, keeping litter from the beaches prevents it from washing into the ocean. Water quality is highly dependent on the activities on the land.

Beachfront

The beachfront runs the entire length of the east side of the island. The configuration of the shoreline has shifted over the years, reflecting the dynamic nature of the barrier island shoreline. The varying shorelines have been mapped and in 1991 the outline of the north end in different years was sketched by the former Coastal Conservation Commission.

The beachfront is backed by a stone sea wall in the far north end and in most areas by a bulkhead at varying elevations at or about 11' NGVD1929. South of 34th Street there are two or more bulkheads, with the most recent timber bulkhead with stone revetment having been put in place after the March 1962 storm. Eleven stone jetties are in place from the northern end of the island to 9th Street. A boardwalk at approximate elevation 14' NGVD stretches 2.5 miles from St. James Place south to 23rd Street.

In 1992, after years of eroding beaches and local efforts to renourish the beachfront using back bay dredging, the Federal Government, through the Army Corps of Engineers, and the State of New Jersey began a 50-year beach renourishment program on the beaches from the northernmost groin to 36th Street. The beach renourishment program was extended south to Corson's Inlet in 2016.

Easements and some City ownership of beach properties were obtained and a dune system was constructed from the Great Egg Harbor inlet to 59th Street, a distance of almost seven miles,



starting in 1993. The official City-owned beach acreage as shown on the City tax maps is about 260 acres, but the actual size changes with the status of the beach renourishment projects. The dune system has grown from low-lying sand piles with fencing in 1993 into well-vegetated substantial dune system in many areas. Access to the beach is through or over the dune system at every street end and at other locations between street ends in the area from 6th Street to 12th Street. The City's "Beach Management Plan" provides guidance regarding maintenance of the beach and dune system.

In addition to providing protection during coastal storms, the beach is the backbone of the recreational and tourist economy in Ocean City. The on-going beach fill, a commitment by the city, the state and the federal government is a critical to protecting properties, and the local economy. Projections of sea level rise suggest that the beachfront may become more vulnerable to storm damage. Pursuit of methods to reduce wave impact and associated wave damage to the beachfront will allow the beach to function for years longer than might otherwise be expected.

There have been several beach nourishment projects completed in the City through federal, state and local programs. For details regarding these projects, refer to the NJBPN annual reports for Cape May County: <http://intraweb.stockton.edu/eyos/page.cfm?siteID=149&pageID=9> and <http://www.ocnj.us/Capital-Projects-Beach/>.

Bayfront and Harbors

The bay front, including a number of manmade lagoons in both private and city or state ownership, is bulkheaded from the north end of the island to 36th Street by the property owners.

The elevations of the bulkheads vary, allowing storm tide water to enter the city and produce flooding. A 1999 ordinance requires that the top of any new non-oceanfront bulkhead be at elevation 8.2'NGVD in order to prevent flooding in storms less than the 100-year storm and to prepare for rising sea level. All City street end bulkheads are built to this elevation.

The Intracoastal Waterway runs the length of the island and is maintained by dredging by the Army Corps of Engineers. The lagoons are maintained by dredging by the City of Ocean City in conjunction with the waterfront property owners and were last dredged in 2004-2005. The challenge of finding areas to collect and de-water dredge materials since the elimination of their use on the beach for beach fill has been met in several ways. The city has purchased a private spoils area in Block 3350, west of Roosevelt Boulevard, and also uses other private sites under contract. The northeast portion of the Route 52 causeway right-of-way has been used for dredge materials, and when the new causeway-bridge is complete, an area will continue to be available for materials. The Great Egg Harbor Inlet is not maintained by the Army Corps of Engineers since it is not considered "navigable".



Development along the bay front and lagoons is heavily residential, with private and public marina operations located on the bay at Tennessee Avenue, from 2nd Street to 9th Street, at 10th Street, and at 34th Street. Most bay front and lagoon-front property owners have boat slips and docks. The use of the water is regulated by the State of New Jersey under the CAFRA regulations, including marina operations. The use of adjoining uplands is regulated by both CAFRA and local zoning, including the 2008 revisions to the Marine Harbor Village Zone allowing only commercial uses. The only publicly-owned bay front access is at the Marina and Waterfront Park, Bayside Center, 520 Bay Avenue; Tennessee Avenue boat launch and parking lot; under the bridge at 34th Street; and along the Route 52 causeway. Street ends are public and are used for fishing. All bay front street ends are publicly owned and open.

Wetlands and Marshes

Tidal wetlands are areas of high nutrient and biological productivity which improve water quality by trapping sediments and nutrients, reducing turbidity, restricting the passage of toxins and heavy metals, decreasing biological oxygen demand, and buffering storm and wave energy. Due to their transitional location between upland areas and coastal waters, tidal wetlands are sensitive to disturbance. These marshes, more broadly known as tidal wetlands, are undergoing a transformation as sea level rise, erosion, altered tidal flushing, invasive species, and sudden marsh dieback collectively work toward degrading the marshes from all sides.

The western portion, bayside, of the island is coastal tidal wetlands cut by creeks and channels created by the Cape May County Mosquito Commission. A total of 1,210 acres of this coastal wetlands area, including the bay islands, are owned by the City of Ocean City. Several hundred more acres are owned by the State of New Jersey, and the remainder is in private hands. The property is subdivided on the tax map, but it is most likely unbuildable due to its wetland status. A few lots along West Avenue from 40th Street south are vacant wetlands lots, in private ownership, and are the subject of periodic efforts to get state permits to fill for development.

One of the primary threats facing tidal wetlands is the invasion of *Phragmites australis*, also known as the Common Reed. *Phragmites* is an invasive species that often colonizes salt marshes upon human development or alteration of the landscape at or surrounding the site. Undersized culverts, tide gates, and other factors may effectively limit tidal flow, allowing for the invasion of *Phragmites* to take place as the decrease in salinities and tidal flooding duration allows for the low-saline tolerant plant to survive.

Ultimately, tide gate management must be accomplished case-by-case with the priority objective in mind, whether it is flood control, *Phragmites* removal, water quality improvement, etc.

Significant erosion of tidal wetland salt marshes is occurring. Additionally, the marshes may be sinking/collapsing in some locations. Erosion events in a coastal setting are dependent upon



many factors including sea level rise, surrounding conditions, storm events, and human alteration of drainage and currents. "Natural erosion," calls for solutions such as soft armoring and beach nourishment which may slow erosion. However, depending upon the location, implementation of any given solution may reduce erosion at one location but increase erosion at another.

Another ramification of sea level rise is the tendency for marsh systems to migrate landward. As sea level rises, marshes which are able to stay above the rising water level will tend to move inland. For developed areas where seawalls, lawns and other structures or fill material are at the edge of the marsh, landward movement is limited.

Freshwater wetland areas are scattered around the City, with the largest being the 16-acre city-owned Howard Stainton Wildlife Refuge, a wetlands mitigation site between 26th Street and 30th Street for the associated residential development. This property was a part of a 1960s residential development planned for filled lots that was stopped from further development by the Freshwater Wetlands Regulations in 1990. A wetlands mitigation site established as part of a court settlement allowed the Stoeco Company to continue development of a portion of the remaining lots. The Refuge was determined to be functioning and was turned over to the City in 2004 as part of a larger land transfer.

The freshwater wetlands maps from NJDEP show that the City airport, golf course, and associated properties are filled wetlands and as such are subject to regulation by NJDEP. The City of Ocean City works with NJDEP to assure that changes to these properties are planned with the filled wetland status in mind. Coastal wetlands can be viewed at www.state.nj.us/dep/gis/newmapping.htm, click on I-Map NJ DEP and then launch I-Map. The layers are listed on the left side and the key is on the right. Select Landscape Project (emergent wetlands) to see the extent of wetlands.

Land Elevation

Information on the at-grade elevations of the streets and properties in Ocean City has been gathered in various ways. A street-by-street survey of curb height elevations was done in the 1930s, and the information from that chart has been transferred to a computer program on a scanned tax map. The map is printed out on a large format and is available to view in City Hall.

Elevations on the island range from Mean Sea Level of about 1.5'NGVD along the beach to 4'NGVD along Haven Avenue to about 11'NGVD, with the higher elevations occurring in the north end of the city and parallel to the beach in the areas where the original dune system was located. Elevations of the streets are low in some locations and street flooding occurs during high tides or heavy rainstorms due to a backup of tidal waters from the bay. Elevations of the curbs on almost all of Haven Avenue and Simpson Avenue and on the majority of West Avenue are lower than 6'NGVD. The height of a 10-year storm is calculated as being 6.2'NGVD and the 5-year



storm as 5.7'NGVD; thus, the likelihood of bay water entering the streets is great in the lower areas. As sea level rises, the frequency of the higher-level storms will increase and the water will flood a larger area.

A second set of information about at-grade elevations is being accumulated from Flood Elevation Certificates that come in with final building approvals and are collected by the Construction Office for the Community Rating System program of the National Flood Insurance Program. This information, which numbers in the thousands of records, is a lot-by-lot snapshot of topography and could be transferred to a GIS layer and used in conjunction with the curb height information for flood predictions. The current library of flood elevation certificates can be accessed here: **Elevation Certificates**

Orientation

The island is oriented in a northeast to southwest line. The Great Egg Harbor Inlet at the north end of the island is open to the ocean from the northeast, and winds from that direction, frequently during storms, tend to push tidal water into the Great Egg Harbor Bay, causing high tides in the bay that do not evacuate well until the wind shifts. Winds from the east and southeast hit the beachfront of the island with full force. Winds from the west and north can batter the bay side of the island, causing damage to docks and boats.

Watershed

All of New Jersey has been divided into watersheds and subwatersheds for planning purposes. Ocean City is located in two watersheds, with the dividing line at 34th Street. The northern half of the island is in Management Area 15, Great Egg Harbor River Watershed. The river empties into the Great Egg Harbor Bay along with the Tuckahoe, Patcong and Middle Rivers, and all of their tributaries. The south end of the island is the Cape May Watershed Area 16. The tidal areas south of 34th Street empty into the tidal creeks and then into Corson's Inlet at the south end of the island. City representatives worked with watershed planning agencies when work was underway to actively plan on this basis. Watershed Management Areas can be viewed at www.state.nj.us/dep/gis/newmapping.htm, click on I-Map NJ DEP and then launch I-Map. The layers are listed on the left side and the key is on the right. Select Watershed Management Areas.

Information from NOAA indicates that the mean annual precipitation in Ocean City, as measured in Atlantic City, is about 38 inches, most in the form of rain and often in the form of downpours. All runoff from the city's roofs, sidewalks, parking lots and streets goes to the ocean or the bay through an "over and under" storm water collection system. Most of the system takes storm water to the bay, but along the beachfront from the north end to 29th Street, large storm water pipes take water from the underground system across the beach and into the ocean. A survey of the Storm Water System in accordance with the Sewage Infrastructure Improvement Act was done in the early 1990s and 221 outfalls to the ocean, bay and wetlands were identified and



mapped on large maps that are available in the Public Works department or on a disk. These are mapped symbolically at www.cape-may-county-nj.com/yims.net, Maps, Shellfish. Zoom to see the legend on the right side that includes storm drain inlets and outfalls. These represent a large potential for land-based water pollution.

The City in its zoning ordinance requires a limit on impermeable surface in all zones, and enforcement of this requirement is active. In addition, there is a requirement for vegetation in the curb strip, which serves as a buffer for runoff that may carry pollutants such as pet waste, fertilizers and pesticides.

An updated Stormwater Management Ordinance is pending adoption in accordance with NJAC 7:8, and addresses reduced water pollution from runoff and land-based activities.

Coastal Zone Management

Ocean City is in the CAFRA (Coastal Area Facilities Review Act) zone, and all waterfront areas are subject to CAFRA rules and permits, including beach and dune maintenance. CAFRA rules are also in effect since 1994 for land development within 150' of the waterside of the bulkhead or the back of the dune. Development of commercial facilities, large residential projects or increased parking spaces triggers CAFRA review on the remainder of the island.

All development in the tidal areas is also subject to CAFRA rules. The Tidelands maps of 1998 show a large amount of tidelands that are now or were formerly flowed by high tide, in the City. The coastal wetland areas are regulated by the Federal Government through the Army Corps of Engineers and development is severely limited in those areas. Freshwater wetlands, located in several interior areas around 28th Street are regulated by the State of New Jersey.

The Coastal Zone Management rules NJAC 7:7E-5B.3 indicate that Ocean City is a *Coastal Regional Center*.

State Development and Redevelopment Plan

A key component of the State Plan is the Policy Map. This Map – created by the NJ Office of State Planning – identifies Ocean City as an *Environmentally Sensitive/Barrier Island Planning Area* with a *Planned Regional Center* overlay. The bay islands are shown as *Environmentally Sensitive Planning Area*. In order to be designated as a regional center, the City must continue with the Plan Endorsement process.

Ocean City was an active participant in the Cross-Acceptance III process and contributed significantly to the final report submitted to the State by Cape May County in February 2005. A City Council resolution adopted in June marked the City's formal involvement in Plan



Endorsement. The City's Petition for Plan Endorsement was approved by the Office of State Planning in 2009.

The City's primary objective regarding Plan Endorsement was to formalize the Regional Center designation for the urbanized areas of the island. The Regional Center designation is consistent with the City's Master Plan, as well as the existing built and natural environments, and will enable the City to properly plan for the future consistent with the goals, policies and strategies contained in the State Plan. The City's master plan, development regulations and Action Plan recognize and respond to the following State Plan objectives for barrier islands:

- accommodating growth in Centers;
- protecting and enhancing the existing character of barrier island communities;
- minimizing the risks from natural hazards;
- providing access to coastal resources for public use and enjoyment;
- maintaining and improving coastal resource quality; and
- revitalizing cities and towns.

Growth/Development Trends

Land Use

According to the Master Plan, approximately 2,578 acres or 37 percent of the incorporated area of Ocean City consists of water. Of the remaining 4,422 acres, 36.7% or 1,622 acres are coastal wetlands. The oceanfront beach outside the state park is about 260 acres. The remainder is developed primarily in a grid pattern with curvilinear streets in the north end Gardens area, mid-island Merion Park and south end Ocean City Homes areas.

Residential development predominates in single and duplex homes with neighborhood zoning implemented based on the 2001 Land Use Plan. Commercial development is located on Asbury Avenue between 6th Street and 14th Street, several blocks north and south of 9th Street, within the 34th Street corridor, and along 55th Street. Seasonal commercial development is located on the boardwalk. A mixed-use zone adjacent to the boardwalk between encourages commercial and accommodation uses.

Table 12 summarizes recent residential/commercial development since 2010 and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to Figure 2 which illustrates the hazard areas.



Table 12
Growth and Redevelopment

Property or Development Name	Type (Res., Comm.)	No. of Units or Structures	Street Address	Block and Lot	Known Hazard Zone	Notes
Wawa – 4 th & West	Residential	6 Units	4 th St. and West Ave.		Floodplain	Complete
Peter Lumber	Residential	8 Units	1500 Block Haven Ave.		Floodplain	Complete
Costeria Cottages	Residential	18	1200 Block Haven Ave.		Floodplain	Ongoing
Palermo's Market	Residential	7 Structures	400 Block Asbury Ave.		Floodplain	Ongoing
Perry Egan	Residential	44 Units	1600 Block Simpson Ave.		Floodplain	Major Subdivision pending approval
Bookers	Residential	5 Structures	800 Block Wesley Ave.		Floodplain	2 structures complete
North End Pump Station	Public	NA	1 st to 8 th Streets, Bay to West Aves.		Floodplain	Major infrastructure improvement
Merion Park Pump Station	Public	NA	36 th and Bay Ave.		Floodplain	Complete

Population and Housing

As of the 2010 United States Census, there were 11,701 people, 5,890 households, and 3,086 families residing in the city. There were 20,871 housing units, In the city, the population was



spread out with 14.4% under the age of 18, 6.4% from 18 to 24, 16.7% from 25 to 44, 32.9% from 45 to 64, and 29.7% who were 65 years of age or older. The median age was 53.6 years.

The Census Bureau's 2006-2010 American Community Survey showed that (in 2010 inflation-adjusted dollars) median household income was \$55,202 and the median family income was \$79,196. The per capita income for the city was \$40,864. About 5.1% of families and 6.4% of the population were below the poverty line, including 4.3% of those under age 18 and 5.8% of those age 65 or over.

Approximately 28% of the residential dwelling units are occupied year-round, with the other 72% being rented or owner-occupied seasonally. As a summer resort, the population of the island can increase by a factor of 10 on a hot, busy summer weekend when all the seasonal rentals, hotels and guest houses are full and visitors are in town for a day at the beach. The decrease occurring in the year-round population can be explained in part by the redevelopment occurring in the housing stock, which combined with the increase in investment and seasonal use, reduces the availability of lower cost year-round housing.

The economy of the City of Ocean City is tourist-based, relying on the business of visitors frequenting the various bed and breakfasts, hotels, restaurants and shops. Even though it is seen as a year-round resort, summer is the busiest tourist season as the City of Ocean City is a beachfront community.

Goals (6)

The Floodplain Management Plan Committee discussed possible goals during their November 2, 2016 meeting. As a result of this discussion, a proposed goal list was created. Each member of the committee was asked to provide goals and comment on each goal. The final list of goals by category is described in Table 13.



Table 13
Summary of Goals

	Mitigation Initiative (Goal)	2016 Update
OC-1a	Where appropriate, support retrofitting of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Identify facilities that are viable candidates for retrofitting based on cost-effectiveness versus relocation. Where retrofitting is determined to be a viable option, consider implementation of that action based on available funding.	Efforts are ongoing. 92 repetitive loss properties were demolished and 74 have been reconstructed to current standards. 40 homes on a list requesting to be elevated through a state run grant program to elevate homes.
OC-1b	Where appropriate, support purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Identify facilities that are viable candidates for relocation based on cost-effectiveness versus retrofitting. Where relocation is determined to be a viable option, consider implementation of that action based on available funding.	Entire City is within a floodplain so relocation is not a viable alternative. City promotes efforts outlined in OC-1a.
OC-5	Continue to develop, enhance, and implement existing emergency plans.	A modified version of this initiative is being included in the 2016 HMP update, specifically identifying that a Strategic Recovery Plan is in the process of being developed.
OC-6	Create/enhance/ maintain mutual aid agreements with neighboring communities.	Mutual aid agreements for fire service are in place
OC-7	Support County-wide initiatives identified in Section 9.1 of the County Annex.	Ongoing
OC-8	Establish an ordinance to require bringing property grades (including driveways and garages) above the BFE for new construction.	BFE+2 ordinance was passed on January 10 th , 2013. Ordinance # 12-19. Recommend that the minimum elevation of garages is set at 7.00 NAVD and



		minimum elevations of yards is set at 6.00 NAVD.
OC-9	Develop and implement a COOP/COG for municipal government facilities (e.g. city hall records which are now kept on first floor). COOP/COG plan to be an annex to the OC EOP.	Documents less than 10 years old are all electronic. Plans have been developed to put older documents on microfilm. COOP/COG in progress.
OC-11	Consider putting expanded information on the website about more flood vulnerable sections of the City (e.g. low elevation areas) – affects CRS credits.	Completed and working to improve. ongoing
OC-12	Promote public awareness of local flood risk (e.g. put BFE's on telephone poles using yellow spikes or painted bands; identify flood levels at all critical facilities)	111 completed, list on website (www.ocnj.us/elev), continue to add as additional survey work is completed, ongoing. Look to install historic markers around town
OC-13	Upgrade existing revetment wall (needs to be extended to the south and existing sections upgraded) and provide additional road protection to CR-619 in Strathmere to Ocean City, and elevate sections of road as needed.	Portions destroyed during Sandy. County installed bulkhead and additional road protection for CR 619 for portions. Continue to support County to complete project.
OC-14	Upgrade storm drainage in Ocean City, which are currently designed to handle only a 2-year storm event.	City continues works to increase drainage capacity to 10 year storm. Recent improvements include upgrades at 11 th Street, 15 th Street, West 17 th Street, 46 th Street, Surf Road, Seaspray Road,
OC-15	Elevate Bay Avenue (CR-659) in flood prone areas (33 rd to 28 th , 20 th to 18 th , 9 th to 2 nd). This is an evacuation route, and was generally impassable during the recent (Sept. 2009) Nor'Easter.	County completed reconstructing Bay Avenue from 6 th Street to 18 th Street. Still floods but is better, adjacent properties limit ability to elevate roads
OC-17	Retrofit police department (location of EOC) with wind resistant glazing and/or storm shutters.	City currently evaluating construction of a new police



		station and demolition of existing facility or renovation to existing facility.
OC-20	Beach Replenishment of Waverly Beach	Entire beach was replenished in the fall of 2015
OC-21	Continue program to upgrade bulkheads to 9.45'. They are currently working on permitting for Revere Place, Bayberry Street, Tennessee Avenue (3), and 520 Bay (Bayside Center, boat ramp).	Error in elevation in goal, elevation should be 7.00 NAVD. Work on bulkheads noted have been completed. 11 th Street, West 17 th Street, Future work on Tennessee Avenue 3 rd Street and West 18 th Street bulkheads
OC-25	Install new emergency broadcast/communications equipment on new ATT/Verizon lighthouse tower at OC Airport.	Lighthouse cell tower was never constructed by ATT/Verizon. Repeaters installed on top of utility poles.
OC-26	Consolidation of the Drainage Systems and Construction of a Pump Station to service drainage areas from 1st St. and 8 th St. between West Ave, and the bayfront.	City obtained FEMA hazard mitigation grant for project. Design in progress. Construction anticipated for 2016-17 offseason. Still waiting on permits
OC-27	Construction of a protective floodwall with stone reinforcement around the historic Music Pier. Location is on the beachfront at Moorlyn Terrace.	No progress due to lack of funding.
OC-28	Construction of a Pump Station to service drainage areas from 26 th St. and 34 th St. between West Ave. and the bayfront.	City completed drainage study and proposes to install 4 pump stations in the 2016-17 off season to handle rain events. Tidal flooding will still occur
OC-29	Road elevation of Haven Ave. between 26th St. and 34th St.; and Simpson Ave. between 31 st Street and 34 th Street (this is an alternative to OC-28 above).	City funding allocated to pump station and road elevation will occur as possible.
OC-32	Work directly with residents of the community located in a classic wildland-urban interface next to Corson's Inlet State Park to become a National Fire	The city has acquired a vehicle for the purpose of fighting fires in Corson's Inlet



	Protection Association (NFPA) “Firewise” community. Participation in the NFPA “Firewise” program shall be supported by countywide and regional resources including the Cape May County Fire Chiefs Association and the New Jersey State Forest Fire Service (Firewise Community Liaison) by providing information on the “Firewise” program, facilitating public outreach and awareness programs, and supporting community fire risk reduction activities as appropriate.	State Park. There will be a Public Outreach by October of 2014 in conjunction with National Fire Prevention Week at which time the Corson’s Inlet Firewise program will be presented.
OC-33	South End Ocean Front Bulkhead Replacement – Bulkhead was installed after the 1962 storm from 58 th Street to 29 th Street. Bulkhead is nearing the end of its usable life.	No funding available at this time.
OC-35	Standards for Construction Adjacent to Bulkheads – FEMA recommends that all construction within 30 feet of a bulkhead should be built to V-zone standards.	No progress as ordinance lacks public support. Need to send to planning board for review.
OC-36	Route 157 Shore Protection and Elevation – Hurricane Sandy destroyed the dunes seaward of Route 157 leaving this evacuation route exposed to ocean waves. Support Atlantic and Cape May Counties in efforts to elevate Route 157 to the base flood elevation and install shore protection for this area.	No funding has been allocated to the projects and therefore no progress has been made.
OC-37	Elevation of Roosevelt Boulevard from Bay Avenue to the Garden State Parkway– Support Cape May County in efforts to elevate Roosevelt Boulevard to the base flood elevation.	No funding has been allocated to the projects and therefore no progress has been made.
OC-38	Bulkhead Merion Park and Install Pump Station – Install a bulkhead around Merion Park at the base flood elevation. Then install a pump station to discharge storm water when sea level elevations do not permit gravity flow.	No funding available at this time for bulkheads but drainage improvements and small pump stations installed in summer of 2014.
OC-39	Elevate Merion Park – elevate the roads, yards, and homes in this section of town to reduce flooding.	Project for summer of 2014 will provide minor elevation changes to the roads but large scale elevations of the roads lacks public support.



OC-40	Bulkhead Ocean City Homes and Install Pump Station – Install a bulkhead around the Ocean City Homes section of town at the base flood elevation. Then install a pump station to discharge storm water when sea level elevations do not permit gravity flow.	No funding available at this time.
OC-41	Elevate Ocean City Homes – elevate the roads, yards, and homes in this section of town to reduce flooding.	No funding available at this time.
OC-42	Beach nourishment and dune reconstruction for beaches south of 36 th Street.	Army Corp of Engineers filled beach for this area in the fall of 2015.
OC-43	Adopt Coastal A construction standards	Once new flood maps are finalized, City will be able to discuss this ordinance intelligently.
OC-44	Review and revise zoning standards to promote construction standards that embrace new higher base flood elevations.	Once new flood maps are finalized, City will be able to discuss this ordinance intelligently.
OC-45	Require installation of placards in commercial buildings alerting shop owners of flood insurance coverage and not covered items.	No progress as ordinance lacks public support.
OC-46	Utilize dredge spoils to protect island from tidal impacts where permitted by regulatory agencies. Including repairs to the existing railroad berm.	City exploring options as well as regulatory requirements.
OC-47	Elevate all fuel storage tanks above ground and set all ports above base flood elevation requirements	No funding allocated

The following goal statements are specific to the subject headings as noted.

Zoning and Other Regulatory Controls

- Continue to enforce Flood Damage Prevention Code and Building Codes. Evaluation of current standards should be ongoing to assure that regulations are adequate.
- Ensure compliance with current NJDEP stormwater management regulations.
- Evaluation of current regulatory programs and standards to determine effectiveness.

Structural Projects

- Ensure continuation of beach nourishment project to protect and maintain the dune and beach system from erosion and flood hazards.



- Ensure dune stabilization and maintenance is continued.
- Maintain existing flood prevention infrastructure including pump stations, bulkheads, seawalls and stormwater collection systems.
- Upgrade roadways to deter flooding when road improvements are proposed.
- Seek funding from State and Federal sources to facilitate improvements.

Damage Prevention and Property Protection

- Ensure zoning and construction controls are implemented and/or enforced for new development applications to protect properties from flooding.
- Plan future infrastructure improvements consistent with the structural projects identified above so that potential damage is minimized.
- Strive for acquisition of environmentally sensitive areas subject to flooding to limit new development in flood prone areas.
- Encourage Flood Insurance participation within the city.
- Ensure publicly-owned buildings are adequately protected against the 100-year flood.
- Maximize the points available under the CRS program to obtain Federal flood insurance rate reductions and make flood insurance more affordable, thus making flood insurance more readily available to property owners.

Natural and Beneficial Functions of the Floodplain

- Preserve floodplain and environmentally critical areas
- Protect open space and maintain dunes and wetlands
- Attempt to acquire available lands, if feasible.

Emergency Services

- Ensure Warning System provides adequate notification.
- Provide adequate emergency response services and direct people to safe shelters.
- Ensure Critical facilities are not interrupted by flooding.
- Provide for continued coordination with State, County and adjoining municipalities to provide safe and efficient evacuation.

Public Information

- Provide Flood Awareness Education and Publications



- Ensure property owners and visitors are aware of potential hazards of flooding
- Ensure property owners and potential owners are aware of availability and benefits of Federal Flood Insurance
- Ensure citizens are made aware of how to protect themselves and property from flooding and that Federal/state grant monies available to elevate their structures.
- Maintain accurate public information system with maps/info.
- Provide flood information for distribution to Real Estate Professionals.
- Provide flood and Emergency information and maintain it on City's Website

Review of Current Flood Damage Prevention Activities (7)

Elevation Certificates

Ocean City maintains a copy of all Elevation Certificates provided to the Construction Code Office by a variety of sources. These certificates are available below as a public service. Reasonable efforts have been made to assure the accuracy of the certificates posted on the City's website. However, these certificates are only as accurate as the document source. All elevation certificates are listed by Block and Lot. The Block and Lot are listed from the lowest to the highest block and lot in the city.

The City of Ocean City makes no warranty, representation or guarantee of any kind regarding the elevation certificates or the information contained therein. The City specifically disclaims all representations or warranties, express or implied, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose.

This activity has been effective and shall remain as an activity to ensure compliance with regulations and codes. The Construction office and CRS Coordinator shall remain responsible for this activity and funding shall be addressed as permitted by building permit fees.

Map Determination

The City of Ocean City Construction Office staff provides verbal and written map determinations for anyone requesting verification of the location of a parcel of property within the flood hazard areas. A separate log is kept for all inquiries. The community panel number of the Flood Insurance Rate Map (FIRM) is also provided to the public for insurance purposes.

This activity has been utilized by the public and shall remain as an activity to promote education and assist interested parties in obtaining flood insurance. The Construction office and CRS Coordinator shall remain responsible for this activity and funding shall be addressed as currently



provided. Information regarding base flood information for individual properties can be accessed at “What’s my BFE Lookup Tool” website <http://www.region2coastal.com/view-flood-maps-data/what-is-my-bfe-address-lookup-tool/> .

Outreach Projects

The City of Ocean City distributes information with the annual tax bills regarding flood hazard areas, flood warning systems, flood safety, flood insurance protection measures, flood plain requirements and drainage system maintenance. This includes the availability of additional information and publications located at the city library and construction office. The emergency management coordinator and CRS coordinator meet once a month to discuss public awareness measures in regard to on-going projects and public notification of evacuation procedures in the event of flooding.

This activity has been utilized by the public and shall remain as an activity to promote education. It is recommended to expand this program consistent with other recommendations contained in this document to maximize information available to the public. The Construction Office and CRS Coordinator shall remain responsible for this activity and funding shall be addressed as currently provided.

Flood Protection Library

The City of Ocean City library has established a collection of books and publications which are available for the public. Items include the Flood Insurance Rate Map (FIRM) for the City and information about flood insurance, coastal construction, hurricane safety, and flood hazard mitigation. Many residents and prospective property owners have used this service.

The City continues to make these publications available to the public at the library, construction office and on the website. Property owners have found this information helpful both for new construction and substantial renovations.

This activity has been utilized by the public and shall remain as an activity to promote education. It is recommended to expand this program consistent with other recommendations contained in this document to maximize information available to the public. The Construction office and CRS Coordinator shall remain responsible for this activity and funding shall be addressed as currently provided.

Flood Protection Assistance

The City of Ocean City’s Construction Office provides property owners with guidance and assistance with elevation data on file. Citizens have become more aware of flood proofing procedures through outreach mailings and information from the City.

This activity has been utilized by the public and shall remain as an activity to promote education and assist interested parties in obtaining flood insurance. The Construction Official, and CRS



Coordinator shall remain responsible for this activity and funding shall be addressed as currently provided.

Open Space Preservation

The area of the regulatory flood plain in the City of Ocean City is 7,104 acres, with 29 percent of the City's total open space lands (1,557 acres) being within the special flood hazard area. The City of Ocean City has adopted the Master Plan Conservation Plan in 2009 and an Open Space and Recreation Plan in 2014 which encourage the preservation of open space. Implementation of open space preservation continues.

This activity has been effective in restricting development within flood prone areas. This activity shall remain as an activity in the plan. The City's governing body shall remain responsible for this activity and funding shall be addressed as available through city funding, grants or other available resources.

Higher Regulatory Standards

The City's Flood Damage Prevention Ordinance meets or exceeds the minimum state and FEMA requirements. The City has recently updated the FDPO to comply with the NJDEP's Model Ordinance. This activity has been effective in reducing the frequency and severity of flood damage associated with coastal storms and shall remain in the plan. The FDPO will be revised and updated as necessary to address changing conditions.

Stormwater Management

The City of Ocean City, through the Soil Erosion Control Act, CHP.251 PL1975, reviews development applications and regulates stormwater management. RSIS standards are implemented. The City has a stormwater management ordinance in effect. Developing properties must submit a stormwater plan that is reviewed by the Board Engineer and other jurisdictional agencies.

This activity has been effective in ensuring development that provides stormwater improvements that enhance the control of stormwater discharges. This activity shall remain as an activity in the plan. The Planning Board and Zoning Board shall be responsible for compliance with all regulations during the application review and approval process. No funding is required as the reviews are funded by application fees and escrow accounts.

Ocean City updated its Stormwater Management Plan with recommendations for ordinance revisions in 2017 with funding provided from a NJDCA Post Sandy Planning Assistance Grant.

Drainage System Maintenance

The City of Ocean City's Public Works Department maintains storm drains annually and as may be required. Additionally, the City of Ocean City will make the public aware of regulations that prohibit dumping into storm drains. Construction sites are also regulated by State regulations



administered by Cape Atlantic Soil District. All storm drains were marked with tags to make the public aware of the importance on not dumping debris into the drains. Storm drains are cleaned more often than twice a year, when needed. A log is kept and an annual report is filed (MS4 Tier A Permit Annual Report) to document the storm drainage system maintenance activities. Certificates of Occupancy cannot be obtained without compliance.

This activity shall remain as an activity in the plan. The City's Public Works Department shall remain responsible for drainage system maintenance and funding is provided under operating budget.

Flood Plain Management

The repetitive loss areas in the City of Ocean City are located within areas that are regulated by the New Jersey Department of Environmental Protection. The City's Flood Damage Prevention Ordinance contains additional development constraints for these areas. Development in the repetitive loss areas are subject to the following terms of the ordinance:

- a) All new construction must comply with the base flood elevation plus two (2) feet; and
- b) All heating and air-conditioning must be located at minimum elevation of base flood elevation plus two (2) feet; and
- c) New and substantially-improved commercial construction shall have the lowest floor elevated to or above the base flood elevation plus two (2) feet or be flood-proofed.

The Flood Damage Prevention Ordinance also provides methods of reducing flood losses including the following methods:

- a) Restrict or prohibit uses, which are dangerous to health, safety and property due to water or erosion or in flood heights or velocities;
- b) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- c) Control the alteration of natural flood plains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters;
- d) Control filling, grading, dredging and other development which may increase flood damage; and
- e) Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

Enforcement of the Flood Plain Management Ordinance shall remain an activity in the plan and remain the responsibility of the Construction Official, Planning Board and Zoning Board as jurisdictionally appropriate. Effectiveness of regulations should be evaluated moving forward.



Beachfill Project

In 1992, after years of eroding beaches and local efforts to renourish the beachfront using back bay dredging, the Federal Government, through the Army Corps of Engineers, and the State of New Jersey began a 50-year beach renourishment program on the beaches from the northernmost groin to 36th Street. The beach renourishment program was extended south to Corson's Inlet in 2016.

Both the north and south ends of Ocean City are now part of a three-year cycle for Army Corps of Engineers beach renourishment projects to restore eroded beaches and dunes. The next projects are due in 2018. City officials have requested an earlier date to restore beaches on the north end.

This activity has been effective in ensuring beach and dune measures are in place to protect the City and property owners from flooding. This activity shall remain as an activity in the plan.

Responsibility of this program shall remain with City Council to ensure compliance with the City's Beach Management Plan and continuation of the program provided by the US Army Corps of Engineer, provided funding from Federal and State sources is available.

Emergency Management

The Emergency management coordinator and team consisting of elected officials, community groups, police, fire, and public works staff have quarterly meetings, along with Cape May County Emergency management teams to plan and discuss procedures for emergency evacuations. Drills are also performed each year. Emergency Management Coordinators from the City of Ocean City and Cape May County have meet with citizens and public officials to review evacuation plans and related issues.

This activity has been effective in ensuring emergency procedures are in place to protect the citizens from disasters. This activity shall remain as an activity in the plan. The City's OEM Coordinator shall remain responsible for this activity and funding shall be addressed as currently provided.

Review of Possible Flood Damage Prevention Activities

In addition to the current activities recommended to continue, the following activities were reviewed to evaluate their effectiveness and feasibility for inclusion in this Plan.

Zoning & Other Regulatory Controls

- ***Minimum building elevations.*** Continue to enforce minimum building elevations required by the City Code through the Construction Department's review of building permits. Evaluation of minimum required building elevation should be completed to determine if current standard is adequate or if higher elevation is necessary.



- ***Stormwater management regulations.*** The Planning and Zoning Boards through application review shall continue to require and enforce current local and state regulated stormwater requirements on all regulated development within the City.
- ***Building codes.*** Continued enforcement of codes remains a priority for all construction on both new and existing structures. The Construction Official shall remain responsible.
- ***Preservation of open space.*** Preservation of Environmentally Sensitive Lands /Floodplain/Wetlands shall be encouraged and is recognized as a goal of the City's Master Plan. The Planning and Zoning Boards through application review shall ensure regulations are enforced. The Environmental Commission shall be consulted for recommendations.
- ***Monitoring of effectiveness of current regulatory and preventive standards and programs.***
Evaluation of current programs and standards shall occur on an annual basis and shall be reviewed by the Floodplain Management Committee and the City's CRS Coordinator.

Structural Projects

- ***Beach nourishment, dune stabilization and maintenance.*** These projects are essential in protecting the City from coastal flooding and shall remain a priority activity as indicated in the previous section detailing current activities. Dune enhancement with dune grass plantings and dune fence maintenance should be completed as required by the Beach Management Plan. Volunteer groups such as schools, civic groups, etc. with the Public Works department have been involved in performing this work in the past. Dune grass plantings should consider species with thickness over height to preserve views.
- ***Bulkheads/Seawalls*** – The beachfront is backed by a stone sea wall in the far north end and in most areas by a bulkhead at varying elevations at or about 11'NGVD1929. South of 34th Street there are two or more bulkheads, with the most recent timber bulkhead with stone revetment having been put in place after the March 1962 storm. The seawall should be extended to the south and existing sections upgraded to provide additional protection to CR 619 coastal evacuation route.
- ***Groins*** – Eleven stone jetties are in place from the northern end of the island to 9th Street.
- ***GeoTubes*** – The GeoTube at the Waverly Road beach was replaced after being damaged during the September 11, 2009 nor'easter.
- ***Elevation of roadways.*** Segments of some roads are subject to flooding due to their low elevation. When street paving and reconstruction are proposed, design should include raising street elevations and improving stormwater collection systems where feasible.



- ***Stormwater pumping facilities.*** Three stormwater pumping facilities have been constructed to address flooding in Merion Park. The City plans to install a pump station to reduce the effects of flooding in the 37-acre area between 1st Street and 7th Street. Continued maintenance is required to ensure these facilities are operational at all times. Since these pump systems require electrical power, backup power generators should be tested regularly to ensure continued pumping in the event of power loss.

- ***Stormwater outfall pipes.*** The City maintains a detailed inventory of bulkhead and stormwater facilities. Outfalls are subject to erosion and damage from the surf and require maintenance on an ongoing basis. Possible elimination or reduction in number of outfalls should be studied and completed where feasible. Outfall retro-fitting and upgrades to prevent seawater backing into outfalls are recommended.

- ***Funding of structural projects.*** Project completion is often limited by the City's available funding. Funds from the City's capital improvement program should be provided to supplement state and federal grants.

Damage Prevention & Property Protection

- ***Zoning & Construction Controls.*** Continue to maintain and enforce zoning and construction controls including stormwater runoff and minimum building elevations for new development and all other flood related codes to protect property from flooding. The Construction Official, Planning and Zoning Boards shall continue to ensure compliance with all applicable regulations.

- ***Infrastructure Planning.*** Plan all future infrastructure improvements consistent with the structural projects identified above so that potential damage from future floods is minimized. The City Council and City Engineer shall ensure all infrastructure is designed and constructed to limit flood damage.

- ***Flood Insurance Participation.*** Encourage flood insurance participation within the City through education and efforts to reduce flood insurance costs through the CRS process.

- ***Private Land Acquisition.*** Acquisition of private developed lands so as to reduce flood damage was considered and was determined not feasible due to the high cost of land and negligible benefits that would result.

- ***Retrofitting.*** Retrofitting of private property subject to flooding is dependent on owner participation and is not likely achievable by City resources or regulations.

- ***Hazard Vulnerability Assessment.*** A Hazard Vulnerability Assessment to identify potential retrofitting and structural mitigation actions is recommended, subject to available funding for this purpose.



- ***Repetitive Loss Survey.*** Repetitive loss surveys and analyses to derive specific flood prevention measures for structures subject to repetitive flooding are recommended, subject to available funding for this purpose.

Natural and Beneficial Functions of the Floodplain

- ***Floodplain Preservation.*** The City Council should continue to preserve open space, the floodplain and environmentally critical areas where opportunities are available and funding allows.

- ***Consistency with Master Plan.*** All flood-related activities should be completed consistent with the City's Environmental Resource Inventory Conservation Plan (2009), and Open Space and Recreation Plan (2014), and as otherwise amended.

Emergency Services

- ***Warning Systems.*** The City's 7-siren flood warning system provides an early warning alert to residents and visitors of forecasted coastal storms and flooding. Emergency advisories and weather information can be obtained by tuning to Ocean City's Local Emergency Management station, 1620 AM, www.ocemergency.com, Comcast Cable Channel 97 or a weather radio. Emergency flood warnings are disseminated through the use of the emergency information system any time the National Weather Service issues a flood warning. The "Global Connect" system combined with the City's other emergency alert methods are designed to get emergency messages to the public quickly and effectively.

- ***Critical Facilities.*** Existing primary critical facilities have been floodproofed to minimize damage from flooding. Any new critical facility locations should be located and/or designed to minimize impacts from flooding.

- ***Coordination with other Jurisdictional Agencies.*** It is recommended that coordination with State and County and adjoining municipalities to provide safe and efficient evacuation be continued. This Plan should also be submitted to Cape May County and coordinated with the County's Hazard Mitigation Plan. Revisions to this Plan may be appropriate in the future to provide consistency with the County Hazard Mitigation Plan.

Higher Standards

States, as well as FEMA and other federal agencies, can provide participating communities with tools and resources to help support adoption of higher standards and, in turn, become more resilient. For example, FEMA's Community Assistance Program-State Support Services Element (CAP-SSSE) is a grant program whereby states receive funding to provide technical assistance to local communities. The CAP-SSSE is intended to help states proactively identify, prevent and resolve floodplain management issues in participating communities before a flood event even occurs.



Federal grants and other programs, such as FEMA's Hazard Mitigation Assistance (HMA) grants, may be available to communities to help pay for mitigation projects that reduce flooding impacts.

FEMA publishes the Floodplain Management Requirements Study Guide and Desk Reference for local officials who are responsible for administering their community's floodplain management regulations. The reference has guidance on handling specific issues and explains requirements to community members.

Additional floodplain management resources are available for download. They can also be ordered by phone through the FEMA Publication Distribution Center at 1-800-480-2520. (Publications may be requested by their FEMA number.)

Floodplain managers are encouraged to take related training courses offered by the Emergency Management Institute, the Association of State Floodplain Managers, their state chapters and other organizations.

Public Information

- **Flood Awareness Education**. The City should continue to provide flood awareness education and publications, information and resources.

- **Public Information**. The City should continue to update and maintain its public information system through the Program for Public Information (PPI) and other means with maps and information. This information should:

- Ensure citizens are made aware of how to protect themselves and property from flooding and that Federal/state grant monies available to elevate their structures;
- Ensure current and potential property owners are aware of availability and benefits of Federal Flood Insurance;
- Ensure property owners and visitors are aware of potential hazards of flooding;
- Provide flood information packets for distribution to real estate professionals;
- Continue to explore opportunities to disseminate public information via traditional and social media.

- **City Website**. Continue to provide and maintain flood and emergency information on the City's Website. Update and revise the information under the *Flood Smart Program* banner as new information becomes available.



Action Plan (8)

Throughout the preparation of this Plan, all possible activities that were considered were reviewed and reasons why they were or were not recommended have been provided. The recommended projects have been determined to address the goals listed in the previous section.

This chapter includes flood-related recommendations for activities discussed in the previous planning phases. The action plan identifies the recommendations, their priority, timeline for completion, benefits, costs and responsible party.

This Floodplain Management Plan does not identify expensive or massive structural flood control projects. The Plan recommends only activities that the community can be assured will be implemented through identified resources. It is understood that the City's financial resources are limited and that outside funding support may be necessary. It is also recognized that outside funding support may not be readily available in the future.

The action plan has been prepared with the understanding that actions must be affordable, implementable, and permitted by local, state, and federal regulations. The actions have been prioritized as noted in the following section.

Ocean City's 2017 Action Plan.

Activity 300 Public Information Activities

310 - Elevation Certificates Maximum Possible Points **116**: The construction office maintains elevation certificates for new and substantially improved buildings. Copies of elevation certificates are made available on request. All elevation certificates on file are available online for review by anyone. Current Ocean City point total for this activity is **28 Points**. The breakdown of points awarded for this activity:

	<u>Points</u>
Maintaining Elevation Certificates (EC)(38):	23
Maintaining Elevation Certificates for <u>post</u> -FIRM buildings (ECPO)(48):	4
Maintaining Elevation Certificates for pre-FIRM buildings: (ECPR)(30):	<u>1</u>
	28/116

Engineering office has been reviewing and continues to review and notify surveyors of incorrect flood certificates so that additional points can be obtained for EC. We are working with construction office and IT to utilize new SD Client software to help us better identify, organize and track properties that require elevation certificates.

Potential Points: 10



320 – Mapping Information Services: Maximum Possible Points **90**: Credit is provided for furnishing inquirers with information from the community's latest Flood Insurance Rate Maps (FIRM), publicizing the service annually and maintaining records. Ocean City obtains the maximum number of points in this category (**90**):

- Engineering has installed elevation 10 NGVD bench marks on utility poles at the southwest corner of intersections throughout the City. Engineering will continue to expand this network as additional survey work is performed for capital projects.
- City Council will support funds to collect and put elevation data into a GIS format for use with flooding studies as well as extending GIS technology to the Public Works and Fire and Police Departments.

Points

Basic FIRM Information (MI 1): for providing basic information found on a FIRM that is needed to accurately rate a flood insurance policy. (30)

30

Additional FIRM Information (MI 2): for providing information that shown on most FIRMs, such as protected costal barriers, floodways, or lines demarcating wave action. (20)

20

Problems not shown on the FIRM (MI 3): for providing information about flood problems other than those shown on the FIRM. (20)

15

Flood depth data (MI 4): for providing information about flood depths. (20)

15

Special Flood Related Hazards (MI 5): for providing information about special flood-related hazards, such as erosion, ice dams, or tsunamis. (20)

20

Historical Flood Information (MI 6): for providing information about past flooding at or near the site in question. (20)

20

Natural floodplain functions (MI 7): for providing Information about area that should be protected because of their natural floodplain functions. (20)

20

140/90

Maximum 90 points in category



330 – Outreach Projects: Maximum possible points for this activity are **350 points**.

The Floodplain Management Committee also serves as the Program for Public Information (PPI) Committee. Members have been added to this committee in order to have a dual purpose committee as well as creating stakeholders to help deliver the outreach projects See attached PPI spreadsheet for a detailed listing of the City outreach projects. The Ocean City point total for this activity is **200 points**.

	<u>Points</u>
Outreach Projects (OP) (200):	200
Flood Response Preparations (FRP) (50):	0
Program for Public Information (PPI) (100):	0
Stakeholder Delivery (STK) (50):	<u>0</u>
	200/350

The City has developed a PPI but CRS reviewers did not accept our plan. The City also utilizes stakeholders to deliver the outreach messages. The PPI will be revised so that these points can be captured.

Potential Points: 130

340 – Hazard Disclosure: Maximum Possible Points **80**: Disclosure language included in all real estate transaction documents that alert potential buyers of flood hazards. Credit is provided for state regulations requiring disclosure of flood hazards. The Ocean City point total for this activity is **18 points**

	<u>Points</u>
Disclosure of the Flood Hazard (DFH) (35):	0
Other Disclosure Requirements (ODR) (25):	6
Real Estate Agents' Brochure (REB) (12):	12
Disclosure of Other Hazards (DOH) (8):	<u>0</u>
	18/80

Committee recommends that real estate agents include the required language in the offer sheets for real estate sales as home buyers are alerted to the required flood insurance at closing anyway (DFH 35 points). Arthur Chew and Doug Bergen will visit board of realtors to educate realtors on flood insurance, City services, as well as adjustments to contract. We are working with Board of Realtors Attorney, Dan Young, on potential changes.

Potential Points: 35



350 – Flood Protection Information: Maximum Possible Points **125:** Documents relating to floodplain management are currently available in the Ocean City Public Library. CRS Office will continue library materials selection improvements. The City will continue to maintain the City’s Flood Smart webpage. The Ocean City point total for this activity is **89 points**

	<u>Points</u>
Flood Protection Library (LIB)(10):	10
Locally Pertinent Documents (LPD)(10):	0
Flood Protection Website (WEB)(105):	<u>79</u>
	89/125

360 – Flood Protection Assistance: Maximum Possible Points **110:** Points are provided for talking to residents about flood hazards, performing site visits to review flood hazards, and provide direction on gaining financial assistance. City personnel currently perform these tasks with its service to the citizens. The Ocean City point total for this activity is **65 points**

	<u>Points</u>
Property Protection Advice (PPA)(40):	25
Protection Advice Provided After a Site Visit (PPV)(45):	25
Financial Assistance Advice (FAA)(15):	15
Advisor Training (TNG)(10):	<u>0</u>
	65/110

370 – Flood Insurance Promotion: Maximum Possible Points **110:** This is a new category with the 2013 manual. Points are provided for reviewing all the flood insurance policies in the City and developing a plan to increase coverage within the City. The Ocean City point total for this activity is **0 points**

	<u>Points</u>
Flood Insurance Coverage Assessment (FIA)(15):	0
Coverage Improvement Plan (CP)(15):	0
Coverage Improvement Plan Implementation (CPI)(60):	0
Technical Assistance (TA)(20):	<u>0</u>
	0/110

City shall request a review of the points attributed to TA (20) but likely cannot obtain these points since the work for this item is included in Activity 330. Committee recommends developing a Flood Insurance Coverage Assessment in 2016 so points can be obtained in this category in 2017.

Potential Points: 75



Activity 400 Public Information Activities (PPI)

410 – Additional Flood Data: Maximum Possible Points **802**: Credit is provided for providing additional flood data in addition to the information provided by FEMA. The State of New Jersey has a review process (CAFRA) which gives coastal communities partial credit. Ocean City has a total of **17** CRS points for this activity which is above average.

	<u>Points</u>
New Study (NS)(290):	0
State Review (SR)(60):	17
Higher Study Standards (HSS)(160):	0
More Restrictive Floodway Standard (FWS)(110):	0
Floodplain Mapping of Special Flood-Related Hazards (MAPSH)(160):	0
Cooperating Technical Partner (CTP)(132):	<u>0</u>
	17/802

The City has no plans to conduct a new study since the maps were just revised with a recent FEMA study.

Potential Points: 0

420 – Open Space Preservation: Maximum Possible Points **2,020**: Credit is provided for open space land. Credit is provided to Ocean City for preserving approximately 28% of the SFHA as open space. Additional credit is provided for deed restricted open space as well as preserved in a natural state. Ocean City has a total of **439** CRS points for this activity which is above average.

	<u>Points</u>
Open Space Preservation (OSP)(1450):	406
Deed Restriction (DR)(50):	7
Natural Functions Open Space (NFOS)(350):	26
Special Flood-Related Hazards Open Space (SHOS)(50):	0
Open Space Incentives (OSI)(250):	0
Low-Density Zoning (LZ)(600):	0
Natural Shoreline Protection (NSP)(120):	<u>0</u>
	439/2020

430 – Higher Regulatory Standards: Maximum Possible Points **2,042**. Credit is provided for enforcing regulations that require freeboard for new and substantial improvement construction, protection of natural and beneficial functions and state mandated regulatory standards. Credit is also provided for a BCEGS Classification of 4/4



the adoption and implementation of the international Series of Building Codes and for staff education and certification as a floodplain manager. Ocean City has a total of **965** CRS points for this activity.

	<u>Points</u>
Development Limitations (DL)(1330):	399
Freeboard (FRB)(500):	225
Foundation Protection (FDN)(80):	0
Cumulative Substantial Improvements (CSI)(90):	40
Lower Substantial Improvements (LSI)(20):	0
Protection of Critical Facilities (PCF)(80):	0
Enclosure Limits (EL)(240):	90
Building Code (BC)(100):	100
Local Drainage Protection (LDP)(120):	40
Manufactured Home Parks (PCF)(80):	0
Coastal A Zones (CAZ)(650):	0
Special Flood-Related Hazards Regulations (SHR)(100):	0
Other Higher Standards (OHS)(100):	0
State Mandated Regulatory Standards (SMS)(20):	20
Regulations Administration (RA)(67):	<u>51</u>
	965/2042

440 – Flood Data Maintenance: Maximum Possible Points **222**. The objective of this activity is to make community floodplain data more accessible, current useful, and/or accurate so that it contributes to the improvement of local regulations, insurance rating, planning, disclosure, and property appraisals. Ocean City has a total of **62** CRS points for this activity. The average number of CRS points for this activity is **54** CRS points.

	<u>Points</u>
Additional Map Data (AMD)(160):	37
FIRM Maintenance (FM)(15):	15
Benchmark Maintenance (BMM)(27):	10
Erosion Data Maintenance (EDM)(20):	<u>0</u>
	10/222

450 – Stormwater Management: Maximum Possible Points **755**. The city enforces regulations requiring positive drainage away from a building site, soil and erosion control, and water quality. Ocean City currently has **279** CRS points for this activity

	<u>Points</u>
Stormwater Management Regulations (SMR):	
Size of Development Regulated (SZ)(110):	60



Design Storms Used in Regulations (DS)(225):	134
Low Impact Development (LID)(25):	25
Public Maintenance of Required Facilities (PUB)(20):	0
Watershed Master Plan (WMP)(315):	0
Erosion and Sedimentation Control Regulations (ESC)(40):	40
Water Quality Regulations (WQ)(20):	<u>20</u>
	279/755

Activity 500 Public Information Activities (PPI)

510 – Floodplain Management Planning: Maximum Possible Points **622**. Based on the updates made to the NFIP Report of Repetitive Losses as of January 31, 2011, the City of Ocean City has 391 repetitive loss properties and is a category C community for CRS purposes. All requirements for the 2014 cycle have been met. Credit is provided for the adoption and implementation of the Floodplain Management Plan. This plan was developed by Cape May County. The associated hazard mitigation plan is updated annually by this committee and the update is attached to this report. Ocean City has attained **146** CRS points for this activity. The breakdown for the actions by the City for this activity is detailed below:

- City Council established a Local Emergency Planning Committee (LEPC) in 2004. The LEPC will continue to keep up to date on technology and procedures for flooding emergencies along with other duties.
- Floodplain Management Plan Committee will support efforts to identify uses of dredge materials. The City along with the NJDEP is researching this too. City and State draft report was issued in August 2009. Reuse of dredge materials should be studied as a flood mitigation technique.
- Engineering will continue to analyze all municipal projects for compliance with the Floodplain Management plan. Engineering has been and will continue to make every effort to reduce the amount of impervious surface coverage in existing or future Municipal projects.
- City Council will continue funding and support for beach replenishment and dune programs to prevent wave wash over and for laws preserving beach, dunes, and wetlands. The City has entered into an agreement with the State of New Jersey's department of Environmental Protection. Beach replenishment is planned to occur from Northern inlet to 18th Street in the 2012-13 offseason. Dune replenishment program will continue in needed areas. The City is in the process of getting easements for the south end beaches; for potential south end project from 40th Street to Southern inlet.
- City Council will support action to urge Army Corps of Engineers and DEP to participate in studies on beach erosion.



- The City will work with State and Federal elected officials to locate funding for future of beach replenishment project to help protect our local properties from flooding.
- City Administration worked with the NJDOT in the planning for Route 52 rebuilding to assure a dry access from 9th Street and intersecting avenues.
- Floodplain Management Plan Committee will support studies to identify areas that could be isolated by elevating rights of way to be used as emergency access/egress and then pumped if necessary.

	<u>Points</u>
Floodplain Management Planning (FMP)(382):	146
Repetitive Loss Area Analysis (RLAA)(140):	0
Natural Floodplain Functions Plan (NFP)(100):	<u>0</u>
	157/622

Committee is developing a RLAA and should submit in the first half of 2017.

Potential Points: 140

530 Flood Protection: Maximum Possible Points **1600:** Credit is provided for applying various flood control techniques to protect structures within the City. City gains points every time a repetitive loss property is elevated or replaced with a new structure above the base flood elevation. 52 buildings from the repetitive loss list have been demolished and replaced with code compliant structures. Ocean City has **160** points in the activity.

	<u>Points</u>
Flood Protection Project Technique Used (TU_)():	160
Flood Protection Improvement (FPI)(140):	0
Protected Buildings (PB)(100):	<u>0</u>
	160/1600

The City continues to map repetitive loss properties that have been demolished or elevated to continue to obtain points in this category. As more properties are improved, the City will gain more points.

Potential Points: 80

540 – Drainage System Maintenance: Maximum Possible Points **570:** Credit is provided for maintaining drainage systems within the City as well as continuing a capital improvement program to improve flooding within the City. City receives 70% of the credit for maintaining the drainage system. Ocean City point total for this activity is **225** points. A summary of actions by the City for this activity are detailed below:



- All of Ocean City's drainage system is inspected regularly throughout the year and maintenance is performed as needed by the Ocean City Public Works Department. Records are being maintained for both inspections and required maintenance.
- Ocean City also enforces a regulation prohibiting dumping in the drainage system.
- Council will support studies of projects, which may lead to reduction of flooding from wetlands south of 24th Street, including use of the railroad right-of-way and pumping. Engineering study will continue in this area and review Hazard Mitigation Grants.
- Engineering will continue the program to replace 40 Type B inlets per year with Type A inlets. All new drainage structures will be designed to eliminate trash from the storm drainage system. The number of Inlet replacements this year will be over 64 due to roadway and drainage work.
- Public works will continue to provide proper street and drainage system cleanliness with sufficient number of machines (street sweepers and catch basin cleaners) with trained personnel to operate, upgraded and replaced as needed. A replacement drain cleaner has been purchased. The drain cleaner has been operating without incident. Public Works has provided an up-to-date progress report for 2012 for the CRS file.
- A study of road elevations will be made to determine where increased elevation will assist evacuation. In addition a Road Ratings Map and an explanation of the Road Ratings had been posted to the city web site. This is being done as part of the roads and drainage work.
- Drainage improvements for Haven Avenue from 24th to 29th Streets will be studied.

	<u>Points</u>
Channel Debris Removal (CDR)(200):	140
Problem Site Maintenance (PSM)(50):	35
Capital Improvement Program (CIP)(70):	50
Stream Dumping Regulations (SDR)(30):	0
Storage Basin Maintenance (SBM)(120):	0
Coastal Erosion Protection Maintenance (EPM)(100):	<u>0</u>
	225/570

Committee recommends that the City review drainage records regularly so that the percentage of points is increased to 100% instead of 70%.

Potential Points: 125



Activity 600 Public Information Activities (PPI)

610 – Flood Warning Program: Maximum Possible Points **395** : Credit is provided for a program that provides timely identification of impending flood threats, disseminates warnings to appropriate floodplain residents, and coordinates flood response activities. Ocean City currently has **0** CRS points for this activity. A summary of actions by the City for this activity are detailed below:

- Credit is provided for the designation as a storm ready community by the National Weather Service. Ocean City has been designated as a Storm Ready Community by the National Weather Service. Ocean City Emergency Management will continue publicize evacuation routes on www.ocemergency.com and other publications. The evacuation route is available on local cable and by link on the city website.
- Emergency Management has developed "key communicator" chain to pass accurate flooding and storm information. Emergency Management has installed a Link to the City website, emergency management website and Reverse 911 also radio and TV. Upgrade of 1620 AM emergency Alert System (digitalized and remote access capabilities)
 - Global Connect ENS Broadcasts to our community: (2011/2012)
 - 8/23/2011 – Earthquake / Tsunami all clear
 - 8/25/2011 – Hurricane Irene (3 separate broadcasts)
 - 10/28/2011 – Nor Easter
 - 6/4/2012 -- Costal Flooding
 - 6/5/2012 -- Costal Flooding
 - 10/29/2012 – Hurricane Sandy warnings and Evacuation, shelters provided for hurricane victims.
- City Council supported purchase of equipment for a direct link to telemetry information from the buoys on the bay recording bay water heights. Station was installed at 540 Bay Avenue (Bayside Center). Information is available on the City web site. Weather station was installed at 59th Street and Central Avenue parking lot.
- Identify evacuation routes with signs. Inspection of evacuation route signs is performed on a continuing basis by the County Traffic Maintenance Supervisor.

	<u>Points</u>
Flood Threat Recognition System (FTR)(75):	0
Emergency Warning Dissemination (EWD)(75):	0
Flood Response Operations (FRO)(115):	0
Critical Facilities Planning (CFP)(75):	0
Storm Ready Community (SRC)(25):	0
Tsunami Ready Community (TRC)(30):	<u>0</u>
	0/395



Other Funds: The City has City Capital Plan that may be used to fiscally support hazard mitigation projects.

Operational and Administration

Land Use Planning: The City has a municipal planner. The Planning Board and Zoning Board of Appeals review applications to determine compliance with natural risk reduction requirements.

Program for Public Information (PPI): The City has a PPI committee that guides the public outreach efforts regarding flood hazards.

Stormwater Management: Stormwater Management functions in the community are performed by Michael Rossbach (Director of Public Works) and Arthur Chew (Assistant City Engineer).

Floodplain Management: Pat Newton, the Construction Official and Floodplain Manager, performs the NFIP Floodplain Management functions.

Technical Resources: The City has staff that has experience with benefit-cost analysis, substantial damage estimates, and grant application preparation. City staff receive training and education in support of natural hazard risk reduction.

Administration: Staff participate in associations and organizations that support natural hazard risk reduction capabilities: Certified Floodplain Managers (5), New Jersey Association of Floodplain Managers and Association of State of Floodplain Managers.

Planning

Land Use Planning: The City of Ocean City has a Master Plan that was most recently revised in 2012. The

Master Plan considers areas of natural hazard risk and refers to the hazard mitigation plan.

Stormwater Management: The stormwater management plan is included as an element in the Master Plan.

Open Space: The City has an Open Space plan, which has many goals and objectives consistent with the hazard mitigation planning. The acquisition criterion for new open space includes recommendations addressing protection from natural hazards.

Re-Development Plan: The City has a redevelopment plan for the Flanders and 10th Street Marina owned properties.

Comprehensive Emergency Management Plan: The City has a Comprehensive Emergency Management Plan that refers to the HMP.

Post-Disaster Recovery Plan: At the time of the development of this annex, the City's Strategic Recovery Planning Report was completed and approved in October 2015.

Regulatory and Enforcement (Ordinances)

The City has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Building Code, Bulkhead Ordinance, Beach and Dune Zone Ordinance and others.



The Planning Board and Zoning Board of Adjustments use these ordinances to guide their decisions regarding natural hazard risk management. Developers in the City are required to take additional actions to mitigate natural hazard risk including building to the BFE+2 elevation and directing the stormwater to street and City drainage systems.

Post Disaster Plan.

In the event of a disaster, post-disaster mitigation strategies have been provided. Ocean City is most susceptible to flooding disasters generated by hurricanes or other coastal storms. It can be expected that all four critical areas identified in this report will have severe flooding. The most severe damage would likely occur to properties closest to the beachfront due to storm surge and damage from velocity --driven wave action once the dune and sea wall protection are breeched.

Flooding from rainfall runoff would occur in low-lying areas including as high tides and storm surge would prevent positive discharge of runoff via the stormwater system. Damage from other possible hazards including coastal storms, and blizzards is anticipated to have similar damage characteristics to hurricanes.

If substantially damaged, there are no alternate areas which buildings or infrastructure could be relocated or areas from which rebuilding could be eliminated since the entirety of Ocean City is within a special flood hazard area. Should severe damage be incurred, re-establishment of adequate flood control measures and critical facilities should be a priority. Reconstruction of structures should occur thereafter.

It is anticipated that structures built prior to flood elevation requirements (and not subsequently elevated or floodproofed) will be most substantially damaged but future flood events. Rebuilding of substantially damaged structure should comply with current code requirements.

Responsibilities for post-disaster mitigation procedures including public information, code enforcement, planning, and other efforts that encourage, mandate, and/or fund loss reduction activities shall be in accordance with the responsible parties identifies in this Plan for the various projects, initiatives and activities.

Plan Maintenance

Implementation and Evaluation

The recommendations in this plan should be implemented as per the implementation schedule as funding and resources become available. It may be necessary to skip recommendations to provide flexibility in the Plan and accommodate funding or grants scheduling. As implementation proceeds, hazard conditions, goals and objectives may change. Necessary revisions may be warranted and changes will be required.



The City shall provide its annual evaluation report with its recertification each year and update the Plan at least every five years. The City will evaluate and update the implementation plan as follows:

- The City's CRS Monitor shall be responsible for monitoring the plan. The Floodplain Management Committee shall meet at least once per year to assist the CRS Monitor prepare the evaluation report to accompany the annual recertification materials.
- The plan will be evaluated by the Committee on an annual basis to evaluate changes to hazard conditions, goals and objectives, progress made toward objectives and identify any changes or revisions to the plan that are necessary.
- Membership of the Committee may change per appointment by the City Council. Membership composition should provide for at least 50% of the committee are public members.
- The action plan should be revised as needed to add new activities or complete some items ahead of schedule. The plan should also be revised if it is found that some activities cannot be completed within the original timetable. All revisions must be adopted by the City Council as required.

Failure to submit the evaluation report with the annual recertification will result in loss of the planning credit.

References

The following documents and resources have been reviewed and utilized in the preparation of this Plan:

Plans, Ordinances, and Codes	Adoption Year
Ocean City Master Plan	1988
Master Plan Reexamination Report	2012
All Hazards Mitigation Plan	2010
Floodplain Management Plan	2016
Emergency Response Plan	2013
Continuity of Operations Plan	2013
Capital Improvements Plan	2017
Economic Development Plan/Strategy	2017
Open Space Plan	2014
Stormwater Management Plan	
Historic Preservation Plan	1988
Zoning Ordinance	1988



Flood Damage Prevention Ordinance	1985
Subdivision Ordinance	1988
Building Code	NA
Zoning Map	2016
Land Development Ordinance	1989
CRS Repetitive Loss Plan	2017
Beach Management Plan	2009
Environmental Resource Inventory/Conservation Plan	2009
State of New Jersey Hazard Mitigation Plan	2007
Redevelopment Area Plan Blocks 1001 & 1101	2005
Redevelopment Plan (Palen Avenue)	2013
Master Drainage Plan	2015
Outfall Inventory	

FEMA P-1037, Reducing Flood Risk to Residential Buildings That Cannot Be Elevated (2015)

https://www.fema.gov/media-library-data/1443014398612-a4dfc0f86711bc72434b82c4b100a677/revFEMA_HMA_Grants_4pg_2015_508.pdf

510: Floodplain Management Planning

510 CRS Credit for Planning Committees

510 Floodplain Management Plan (FMP Credit) Checklist

510 Changes to the 10-step Floodplain Management Planning Process

510 FEMA Mitigation Planning Guides

510 *Using Multi-Objective Management to Reduce Flood Losses in Your Watershed*

530: Flood Protection

530 Flood Protection Worksheets

CC-530 Retrofitted Buildings

CC-530EHP Flood Protection

530 Engineering Principles and Practices of Retrofitting Flood prone Residential Structures, FEMA 259

530 Floodproofing Non-Residential Structures (Full Document), FEMA 102



530 Non-Residential Floodproofing — Requirements and Certification (Technical Bulletin), FIA-TB-3

530 Flood Damage-Resistant Materials Requirements, (Technical Bulletin 2) (2008)

530 Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding, FEMA 312

530 Mitigation of Flood and Erosion Damage to Residential Buildings in Coastal Areas, FEMA 257

530 Protecting Building Utilities from Flood Damage, FEMA 348

530 Reducing Damage from Localized Flooding, FEMA 511

530 Selecting Appropriate Mitigation Measures for Flood prone Structures, FEMA 551

540: Drainage System Maintenance

540: CRS Credit for Drainage System Maintenance

CC-540EHP Drainage System Maintenance



Appendix A – Public Notice Mailing List

Public notice to the groups, commissions, municipalities, and agencies were sent by mail soliciting written comments and invitation to attend the public meeting.

- City of Ocean City County Planning Board
- City of Ocean City Environmental Commission
- City of Ocean City Historic Preservation Commission
- U.S. Army Corps of Engineers, Philadelphia District
- United States Coast Guard
- FEMA CRS Specialist and Program Coordinator
- NJDEP – NFIP State Coordinator
- New Jersey Coastal Management Program – NJDEP
- FEMA Region II, Federal Emergency Management Office
- Cape May County Planning Department
- Cape May County OEM
- Chamber of Commerce of Greater Cape May



Appendix B. Resolution No. 12

CITY OF OCEAN CITY
CAPE MAY COUNTY, NEW JERSEY

RESOLUTION

#12

**ADOPTING THE CITY OF OCEAN CITY'S FLOODPLAIN MANAGEMENT COMMITTEE &
PROGRAM FOR PUBLIC INFORMATION COMMITTEE**

WHEREAS, the City of Ocean City participates in the Community Rating System (CRS) program of the National Flood Insurance Program (NFIP); and

WHEREAS, the CRS program requires that a Floodplain Management Committee be formed in order to participate in the program, and further requires that a Program for Public Information Committee (PPI) be formed in order to reach citizens with messages that the community determines are most important to its flood safety and the protection of its floodplains' natural functions; and

WHEREAS, it is also a requirement that the committee observe and follow all NJDEP Stormwater Regulations, the committee is so tasked; and

WHEREAS, it is a requirement of the CRS and PPI programs for the community to accomplish these efforts by establishing a committee of city staff and floodplain residents; and

NOW THEREFORE BE IT RESOLVED, by the City Council of the City of Ocean City, that the following persons be appointed to the CRS and PPI Committees:

City Staff:

1. Arthur Chew, P.E., City Engineer, CRS Coordinator
2. Patrick W. Newton, Floodplain Manager
3. Frank Donato, Office of Emergency Management/Resident
4. Doug Bergen, Public Information Officer
5. Mike Rossbach, Field Operations
6. Roger Rink, Engineering Manager
7. Benny R. Tafoya, CFM, CMfgE,

Residents and Business Community:

1. Dean Adams, Local Builder
2. Paul S. Anselm, Resident
3. Michael G. Contino Realtor/Resident
4. Thomas Heist IV, Insurance/Resident
5. Joe Leonard, Banking/Resident
6. Bill McMahon III, Insurance/Finance
7. Marty Mozzo, Resident
8. Joe Somerville, Resident

BE IT FURTHER RESOLVED that Arthur Chew, P.E., City Engineer shall serve as Committee Chairman and Benny R. Tafoya, CFM, CMfgE will serve as staff responsible for the day to day committee work. The CRS and PPI Committees will meet monthly on the first Wednesday of the month.

Keith P. Hartzell
Council President

File: RES 2016 Floodplain Management committee & PPI.doc

Offered by Seconded by

The above resolution was duly adopted by the City Council of the City of Ocean City, New Jersey, at a meeting of said Council duly held on the day of 2016

NAME	AYE	NAY	ABSENT	ABSTAINED
Bergman				
DeVries				
Gunn				
Hartzell				
McCliffan				
Madden				
Wilson				

Melissa G. Bovera, City Clerk



Appendix C. Floodplain Management Committee Public Meeting Notice

CITY OF OCEAN CITY FLOODPLAIN MANAGEMENT PLAN COMMITTEE PUBLIC MEETING NOTICE

Please be advised that the City of Ocean City Floodplain Management Plan Committee will conduct a public hearing to receive comments on the “Floodplain Management Plan” as follows:

Date: TBD

Location: City Council Chambers

3rd Floor City Hall

861 Asbury Avenue, Ocean City, New Jersey

The “Floodplain Management Plan” is available for review during normal business hours, Monday through Friday 8:30 AM – 4:30 PM at the Henry Knight Building, 115 12th Street. The Floodplain Management Plan is also available for review on the City’s website at <http://www.ocnj.us/Planning-Zoning/>