

DRAFT

FLOODPLAIN MANAGEMENT PLAN

OCEAN TOWNSHIP
OCEAN COUNTY
NEW JERSEY

2012

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Laurie Clune
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Scott Murphy
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OTWP-00340

Introduction

On October 13, 2011 the Township Committee adopted a resolution authorizing the preparation of a Floodplain Management Plan (Resolution No. 2011-296) on November 1, 2011 the Township Committee adopted the resolution appointing members of the Floodplain Management Plan Committee. (Resolution No. 2011-298) The Committee consisted of officials responsible for implementing the plan, a local resident for the bay front flood hazard area and a professional planner. The Resolution are contained in Appendix A. The members are:

Edward Alvare – Construction Official
Laurie Clune – Zoning Officer
Scott Murphy – Emergency Management Official
John Petrosilli – Resident
Raymond Savacool – Professional Planner

The objective of floodplain management planning is to produce a program of activities that will best tackle the community's vulnerability to the hazards(s) and meet other community needs. A well-prepared plan will:

- Ensure that a comprehensive review of possible activities and mitigation measures is conducted so that the most appropriate solutions are used to address the hazard.
- Ensure that the recommended activities meet the goals and objectives of the community, do not create conflicts with other activities, and are coordinated to reduce the costs of implementing individual activities.
- Educate residents about the 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 wants to see the plan's recommendation implemented.

As part of the preliminary planning process and in order to involve the public, a public meeting was held at the Ocean Township Municipal Building to obtain public input on the natural hazards, problems and possible solutions to the Township's flood hazard. Notice was advertised in the local paper, local public access channel, and email blast and the notice was specifically sent to various stakeholder, including local marinas, homeowner associations (HOA's), condominiums and various government organizations. A listing of the mailing is contained in Appendix B and the public notice, agenda and minutes of the meeting are also included. The letter includes a request for written comments and recommendations from organizations that represent the public in affected areas. In addition questionnaires were sent to 1300 residents within the SFHA. 275 responses were returned and the data is presented in Appendix C.

History

Ocean Township is located on the eastern bayshore of Barnegat Bay in the middle of Ocean County, New Jersey and contains approximately 20 square miles. Geologically the Township is located in the Outer Coastal Plain on unconsolidated sediments laid down since the Cretaceous period and extending to the continental shelf. Easterly across Barnegat Bay is Barnegat Inlet dividing the northerly barrier island, Island Beach from Long Beach Island to the south. The Township was incorporated in 1876. The 2000 census indicates there are 6,450 people residing in the Township.

West from the low laying bay areas the Township extends into Pinelands and is minimally developed west of the Garden State Parkway.

Ocean Township is subject to flooding from tropical storms, extratropical cyclones (northeasters) and to some degree severe thunderstorm activity. Serious tidal flooding is mostly attributable to the effects of hurricanes and northeasters which bring heavy precipitation, higher tides and strong wave activity. Storms of note include the hurricane of September 1944, November 1950 and the March 6-8, 1960 northeaster where successive high tides elevated backwater stormwater heights.

Two storms produced the majority of repetitive losses in Ocean Township. The Halloween Storm of October 31, 1991 and the winter storm of December 11, 1992. Both storms were nor'easters which produced strong seas and on shore winds that yielded extreme high tides which caused extensive flooding in low laying areas.

Most recently Hurricane Irene passed over New Jersey in August 2011. The storm was the first hurricane to make direct landfall in New Jersey in recent memory.

Tidal flooding from coastal storms is the predominant loss risk in Ocean Township. While there are several streams that border or are within the Township, Oyster Creek on the northern township boundary, Waretown Creek in the middle of the Township and Lochiel Creek on the southern border on the township, these streams are generally tidally influenced where development is within the floodplain. Their free flowing stretches generally traverse scarcely populated areas.

Tidal flooding as stated is therefore of greatest concern to the municipality.

Repetitive Losses

There are 13 properties listed as repetitive losses in Ocean Township. Two of those properties have been elevated to raise the first floor above the base flood elevation. A repetitive loss property is defined as a one in which an NFIP claim of \$1000 has been at least twice in the last 10 years. The repetitive losses are located in the various lagoon lot sections with 3 being in Sands Point and 5 within the Barnegat Beach area. The NFIP has recorded losses of \$258,641.75 through 2010. Actual losses are certainly higher since some homeowners do not have flood insurance and some do not submit for all losses incurred. There is no records of any commercial loss as a result of flooding.

Risk Assessment

In the context of flood hazard mitigation planning “risk” is defined as the expected future losses from the effects of flooding events combining the probability, severity, and vulnerability. Risk is often expressed in terms of future monetary losses because this provides a common measure of the effects of the hazard. Risk is cumulative. Although natural hazards may not affect a place in any particular year, the probability of one or more events occurring “adds up” over time.

Probability: Probability is the likelihood that a hazard will impact a particular place. Flood studies provide reasonably accurate estimates of how often water will reach particular places and elevations.

Severity: Severity is the measure of “how bad” a hazard event is. Floods are measured in terms of depth, velocity and duration.

Vulnerability: Vulnerability is the degree to which something may be damaged by a hazard, such as flood waters.

Value: Value is how much it would cost to replace an asset that may be damaged or lost due to the impact of a natural hazard.

Assess the Hazard

Flood hazard in Ocean Township is from two sources; 1) coastal flooding due the Borough’s location on the Barnegat Bay.

This includes backwater flooding in the intertidal areas of the Township streams including Oyster Creek on its northern border, Lochiel Creek on the southern border, Waretown Creek, Warrens Creek and several other smaller, unnamed waterways that meander through the mostly flat marshy areas east of Route 9. All of the repetitive losses occur as a result of this coastal and backwater flooding and it is the predominant flooding concern within the community.

The second source of potential flooding is from the townships borders, including Oyster Creek, Waretown Creek, Warrens Creek and Lochiel Creek. Many of these areas are mapped as Zone A, areas of 100-year flooding with no base flood elevation determined. These areas also tend to be in locations of very limited development and have a limited probability that a hazard will impact a particular place. The headwaters of the watersheds of Oyster Creek and Waretown have limited prestormwater regulation development and therefore their floodwaters tend not to be aggravated by overdevelopment.

A third source of flooding is localized flooding due to the stormwater management system being overwhelmed by excessive rainfall being undersized, or clogged. It is unusual for this type of sporadic flooding to cause loss within the Township and this generally causes highly localized, minor flooding.

In the coastal zone the 100-year flood elevation is AE6 as listed on the Flood Insurance Rate Maps for Ocean County effective September 29, 2006. The FIRM maps for Ocean Township are reproduced in Appendix D. Zone AE6 signifies that the base flood elevation is determined as elevation 6 for the 1% annual flood, known as the base flood elevation. The elevation is based on the North American Vertical Datum of 1988 (NAVD88). The source of flood water is the Barnegat Bay through the Atlantic Ocean at Barnegat Inlet located due east from Ocean Township.

Other Hazards

The State of New Jersey 2011 State Hazard Mitigation Plan lists the following natural hazards that impact New Jersey.

	Hazard	Rationale	Sources
1	Flooding (Riverine, Coastal Flood, Storm Surge, Tsunami)	Widespread impacts, long history of occurrences in the State, significant annual damages.	FEMA Flood Insurance Studies, numerous other studies for nearly all major flood sources, FEMA Flood Insurance Rates Maps, US Army Corps of Engineers, and National Oceanographic and Atmospheric Administration (NOAA), studies and records.
2	Hurricanes and Tropical Storms	Relatively low historic probability; potential for widespread impacts.	NOAA and National Climatic Data Center (NCDC records, various studies of hurricane strike probability.
3	Nor'easters	Moderate probability of more extreme events, potential for moderately widespread impacts.	National Weather Service (NWS), NOAA, NCDC, New Jersey State Climatologist.
4	Winter Storms (Snow, Ice storms, Cold Waves and cold chills)	High annual probability, widespread impacts, but losses generally limited except in most extreme events.	National Weather Service (NWS), NOAA, NCDC, New Jersey State Climatologist.
5	Tornadoes, High Winds and Thunderstorms	High Annual probability, widespread impacts, but losses generally limited except in most extreme events.	National Weather Service (NWS), NOAA, NCDC, New Jersey State Climatologist, ASCE and USACE wind maps.
6	Earthquakes	Relatively low annual probability, but potential for significant consequences.	United States Geologic Survey (USGS), New Jersey Geologic Survey (NJGS).

7	Drought	High annual probability, but impacts generally limited	National Weather Service (NWS), NOAA, NCDC, New Jersey Climatologist, New Jersey Department of Agriculture
8	Wildfire	High annual probability of site-specific events, but impacts generally limited.	New Jersey Fire Service, New Jersey State Climatologist
9	Geological Hazards (Landslide, Subsidence, Sinkholes)	High annual probability when all hazards are included in this grouping, impacts generally limited to northern part of the State, but potential for high level of damages under some scenarios.	United States Geological Survey (USGS), New Jersey Geologic Survey (NJGS).
10	Hail	High annual probability but impacts are limited in severity and area	National Weather Service (NWS), NOAA, NCDC, New Jersey State Climatologist.
11	Extreme Heat	Relatively high annual probability, but impacts limited.	National Weather Service (NWS), NOAA, NCDC, New Jersey State Climatologist
12	Coastal Erosion	Relatively high annual probability, but impacts are limited to coastal areas.	NOAA, USACE

Source 2011 State of New Jersey Hazard Mitigation Plan

Hazards 1 through 3 generally derive their risk from flooding while 2 and 3 include the risk of high winds accompanying rains and flooding. Flooding in Ocean Township is described above. Hurricanes, Tropical storms and Nor'easters have more remote possibility of striking the central coast of New Jersey where Ocean Township is located but have higher hazard potential. Winter storms (snow and ice, cold waves, etc) are generally ameliorated by warmer ocean waters in coastal Ocean County. However Ocean County ranks 13th by county in the number of snow and ice storm events. The sparsely populated areas of the Pinelands within Ocean Township are more susceptible to cold waves due to the flat sandy soils that readily release heat.

Tornadoes tend to be less common and much weaker in New Jersey than the devastating twisters shown on the nightly news. High winds from tropical storms and thunder storms are more common and can aggravate flooding conditions by floodwater onshore. Tropical storm and thunder storms can also bring intense rainfall that can overwhelm stormwater systems. There is an average of 43 thunderstorms days per year in Ocean County (NJ OEM 1984).

New Jersey experienced an earthquake in 2011 but it was relatively mild and earthquakes overall are rare within the coastal plain of New Jersey.

Drought can occur at any time but as the Township is not largely agricultural and does not rely on reservoirs for public water, drought is not considered a critical problem. Wildfires are a concern in the community since the western portion of the Township is in an extreme hazard area for wildfire. However there is not high density housing proximate to these areas as there is in some communities in Ocean County. Of some higher risk are the coastal forests and marshes that are more closely associated with housing along the bay areas. Drought can aggravate the condition that can cause wildfire. The New Jersey Forest Fire Service has generally applied a series of prevention, preparedness and suppression program to mitigate the potential for wildfire.

Located in the coastal plain Ocean Township has limited exposure to geological hazards. Hail and extreme heat both have high probability but have limited impacts to the Township.

The Township has no oceanfront property but does enjoy many miles of bay front along Barnegat Bay. There are also several sedge islands adjacent to Barnegat Inlet within the jurisdiction of the Township. These island areas are all completely uninhabited and undeveloped and are owned by the State of New Jersey as part of the Island Beach State Park. The bay front of the Township (the western shore of the Barnegat Bay) is a combination of improved lagoon lots, bay front lots and natural marsh areas. Where there are improvements adjacent to the bay they are generally protected by bulkheads. The undeveloped portion are typified by small beach heads backed by spartina, phragmites and low laying marsh.

The majority of the undeveloped lands are controlled by Federal, State and local governments as natural wildlife areas. The major concern for erosion is therefore flanking around protected areas through unprotected areas and aggravation of erosion along natural areas due to any adjacent hardscape. Protected upland improvements would only be in danger from erosion should the adjacent protection fail.

Assess the Problem

Of the hazards identified in Assessing the Hazard, it can be seen that problems related to flooding will 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 within the developed portion of the community.

Flooding creates a hazard to the community in several ways, the most serious due to drowning in flood waters. When otherwise familiar areas become inundated 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 moldy conditions from saturated building materials and furnishings. The Ocean Township Office of Emergency Management has procedures in place to notify residents via loudspeaker on a street by street basis and there is also a reverse 911 in place. Since there is generally adequate warning that a coastal storm is approaching there is sufficient time to evacuate should that be necessary.

There are a total of 2947 structures estimated within the Special Flood Hazard Areas (SFHA) of the Township. There are a total of 1045 flood insurance policies in effect within the Township and as those 845 policies are for structures within the SFHA providing insurance coverage in the

amount of approximately 248 million dollars. Of the policies in force 561 are for structures built or substantially improved prior to the initial FIRM becoming effective. Therefore a substantial amount of the covered structures, about 2/3 were constructed without the benefit of floodplain management standards and may or may not be below the base flood elevation.

There are 138 paid losses since the start of the program, totaling about 1.55 million dollars to pre-FIRM structures while on post FIRM structures there are 13 losses totaling approximately \$55,000.00. So while pre-FIRM structures represent 2/3 of policies (66.4%) they represent 91% of claims and almost 97% of claims paid.

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 13 properties listed as repetitive losses in Ocean Township. Two of those properties have been elevated to raise the first floor above the base flood elevation. The repetitive losses are located in the various lagoon lots sections with 3 being in Sands Point Park and 5 within the Barnegat Beach area.

The following table provides a breakdown of the improved property within the Township of Ocean. As can be seen the vast majority of residents and a majority of the property value in Ocean Township is within the SFHA.

Ocean Township, Ocean County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	Total Number in Municipality	Number in Hazard Area	Per Cent of Number in Hazard Area	Total Dollar Value in Municipality	Total Dollar Value in Hazard Area	Per Cent of Dollar Value in Hazard Area	Total Number in Municipality	Number in Hazard Area	Per Cent of Number in Hazard Area
Residential	3863	2807	73%	\$557,704,000	\$304,046,900	55%	8,500	7,367	87%
Commercial	189	134	71%	\$106,184,600	\$64,880,225	61%	-	-	-
Industrial	1	1	100%	\$574,600.00	\$574,600.00	100%	-	-	-
Agricultural	88	0	0%	\$2,325,500		0%	-	-	-
Religious or Non-Profit	5	4	80%	\$4,733,000	\$4,608,500	97%	-	-	-
Government	1	0	0%	\$1,923,900		0%	-	-	-
Education	3	0	0%	\$14,001,100		0%	-	-	-
Utilities	1	1	100%	\$37,144,400	\$37,144,400	100%	-	-	-
Total	4,151	2,947	53%	\$724,591,100	\$411,254,625		8,500	7,367	87%

Flood Insurance Claims

As described above there have been approximately 150 claims paid for loss in the Community. All are in the bay front area.

While the majority of the population resides within the SFHA there are also large tract of open space as well. All of the sedge islands within Ocean Township on the east side of Barnegat Bay

are protected open space, providing a nursery for bay marine life as well as secluded area for shore birds. They include 700 acres of low laying salt marsh and tidal shallows.

On the mainland along the western shore of Barnegat Bay there are extensive open space holdings within SFHA including National Wildlife Refuge lands owned by the US Department of Interior. Other open space lands are administered by Ocean County, the New Jersey Department of Environmental Protection, and the New Jersey Natural Lands Trust. Public open space holdings within these lands total more than 450 acres. These lands include intertidal wetlands, low laying forests, tide pools and beachheads which provide stopover for migrating birds, nesting site for various birds including peregrine falcons and horse shoe crab hatchery. The shore is an important buffer from coastal flooding and the low laying area absorb and filter storm water, thereby filtering out pollutants prior to the water reaching the bay. The undisturbed land allows stormwater to permeate the soil, soaking up excess stormwater and reducing runoff.

Development Trends

The areas east of Route 9 within the SFHA are dominated by single family residential housing.

In 1950 the estimated population of Ocean Township was 520 people between 1950 and 1960 the Garden State Parkway was constructed allowing rapid access to Ocean County from northern New Jersey. The population grew from 921 people in 1960 to 2,222 in 1970 and has shown steady increase as follows:

Year	Population	% Increase from previous
1960	921	77%
1970	2,222	141%
1980	3,731	68%
1990	5,416	45%
2000	6,450	19%
2010	8,332	29%

As shown, and in keeping with the balance of Ocean County, Ocean Township has shown rapid growth from census to census. The next 10 years will likely see continued growth within the Town Center area, construction of infill housing within existing platted subdivisions and some new development between Route 9 west to the Garden State Parkway. The western portion of the Township, west of the Garden State Parkway lies within the Pinelands area and is zoned Pinelands Forest Area with very limited development potential.

Likewise the most extensive open tract along the bay, generally held by the public are zoned Bay front Conservation and would be subject to very limited development. New development of tract housing will be required to conform to Stormwater Management Regulation for stormwater runoff quantity, quality and ground water recharge. Individual property development will conform to the Flood Damage Prevention Ordinance. The Flood hazard predominately caused by flooding due to coastal storms will not significantly be altered by future development trends.

As older individual houses are modernized and updated they will be subject to compliance with the Flood Damage Prevention Ordinance slowly bringing a percentage of pre-FIRM housing into Flood Damage Prevention compliance.

Zoning east of the Route 9 consists primarily of the residential zones R-1A, WD, R-1, R-1B, and BC allowing for lot sizes of 12,500 SF for R-1A and WD, 1 acre for R-1 and R-1B and 10 acres for BC. The minimum lot size of Zone R-1a was increased from 8,000 SF minimum to 12,500 SF and R-1 was increased from 12,500 SF minimum to 1 acre. This has the effect of reducing the amount of structures that can be constructed within the floodplain by limiting subdivision by limiting subdivision potential of larger lots.

Set Goals

The Floodplain Management Committee met on February 1, 2012 to discuss goals for the communities' floodplain management goal (See Appendix E for agenda and minutes of the Floodplain Management Committee meetings). The Committee formulated the following goals.

- Reduce loss from flood damage through codes and standards.
- Educate decision makers and the public about stormwater management and floodplain management.
- Coordinate and prioritize maintenance of the stormwater management system.

Protecting property was discussed as a goal but it was felt that the Township maintains significant public land holdings, and while acquisitions were not discounted, purchase of new property was not as one of the primary goals.

Preventing development in the flood plain was discussed but is not listed as a primary goal since current zoning is considered adequate and new construction will comply with the Flood Damage Prevention ordinance.

Structural protection is not considered a primary goal since the nonlinear waterfront consists of primarily of houses very close to the water and most structural measures could not insulate these properties from the coastal flood threat.

Review Possible Activities

The Floodplain Management Committee met on February 22 to review possible activities. The Committee reviewed all the basic activity classifications and subsets to discuss activities that are already in place, modified activities, and activities to consider.

Preventative Activities

Planning and Zoning

Significant zoning amendment was made to zones within the FHA in 2005. Residential zone R-1A formerly allowed lot sizes of 8,000 SF and was amended to 12,500 SF. Zone R-1 was 12,500 SF and amended to 1 acre. Zone R-2 was changed from 1 acre to 2 acre minimum lot size. The BC Zone (Bay front Conservation) has a minimum required lot size 10 acres. No change was considered necessary to these requirements.

Open Space Preservation

Open space preservation was discussed. There are significant open space holdings within the FHA including holdings owed by the U.S. Government as part of the Barnegat National Wildlife Refuge. There are other large tracts owned by the New Jersey Department of Environmental Protection and Ocean County for natural land preservations. While additional public land purchases were not ruled out they were not considered integral to the Floodplain Management Plan.

Floodplain Regulations

Stormwater Management Ordinance is in place in accordance with the Stormwater permit requirements and Pinelands requirements.

State regulation for coastal areas (CAFRA) freshwater wetlands, coastal wetlands, waterfront development and dam safety as well as Flood Hazard regulations (formerly Stream Encroachment) are all in place.

Stormwater Management Plan as required by the Township's general stormwater discharge permit.

Building Codes

Flood Damage Prevention Ordinance is in place in accordance with the FEMA requirements. The Committee recommends consideration of a Free board Elevation Requirement. Currently the flood damage prevention ordinance requires that the lowest floor be elevated to or above base flood elevation. A freeboard elevation would require it to be higher. Since all materials below the base flood are required to be flood resistant many buildings are likely elevating above base flood already. New additions on compliant homes could maintain the existing elevation to preserve a common first floor height.

Flood Resistant Construction code is utilized from the International Residential Code (IRC) for reviewing construction of single family houses in the FHA

The Committee would like the governing body to consider grading plan requirement for building permits, with additional requirement for recharge for new lots that are not part of a subdivision that has an approved stormwater management plan. There is an existing ordinance but it is limited in scope. Many towns have fees for the review of grading plans. If the construction office reviewed the plan then an additional fee would not be required.

Stormwater Management

Stormwater Management Ordinance

Recharge requirement for other than major developments. It was felt that it would be beneficial to have a recharge requirement for development not associated with site plans or subdivisions. This would reduce the incremental increase in runoff brought about by the development of infill lots. This item was also mentioned at the public hearing.

Drainage System Maintenance

The public works department maintains the Townships storm sewers, ditches and outfalls in accordance with the stormwater pollution prevention plan.

Dune and Beach Maintenance

There are a couple small bay beaches both public and private along the bay shore. There are no dunes associated with those beaches and most are less than 30 feet wide. Ocean Township extends to the mouth of Barnegat Bay and there are some islands that have small beach heads associated with them. These are uninhabited and controlled by the state of New Jersey as open space.

Property Protection

Including relocation, acquisition, elevation, retrofitting, sewer back up protection and insurance done on a building by building basis or individual parcel basis.

There is no program currently in place to provide for relocation, acquisition and elevation. Since Ocean County does not have an all hazards plan in place there is no funding available from FEMA for these activities. Only severe repetitive loss properties are generally considered for these types of funding.

Relocation and Acquisition

Relocation and acquisition were discussed as property protection options but were determined not to be viable alternatives. The main flood area of concern is along the bay front where dozens of homes may exist in a given neighborhood. To selectively remove or relocate houses would only further isolate the remaining properties which would still require the normal municipal services. Wholesale acquisition of properties within flood prone areas is not practical.

Building Elevation

Raising buildings is considered to be the best option for reducing the loss due to flood damage. The cost can be prohibitive for some property owners and there is currently no funding source available.

Retrofitting

Flood proofing. Because of the many inlets, lagoons and back bay areas of the bay front and because of the predominant small lot size, levees and floodwalls are not considered a feasible method of protection. Dry flood proofing is most applicable to commercial structures which already have a substantial structural design. Most flood prone houses within Ocean Township are of frame design with open crawl space making flood proofing a difficult operation.

Wet flood proofing is currently recommended where a building is below the base flood elevation. This could involve permanently elevating fixtures and furniture to having materials on hand to elevate costly items in the event of a flood.

Installation of flood vents is required for additions and is strongly recommended on the existing portions of houses not undergoing renovation.

Flood certifications are required prior to starting construction and after completing the work.

Sewer Backup Protection

Sewer back up protection. Ocean Township is equipped with separate storm and sanitary sewers. There are no known sewer overflow points or locations of excessive infiltration. Sewer backup is not considered a problem since most houses within the floodplain do not have basements with deep sewers. The construction official was not aware of any problems with sanitary sewer backups.

Insurance

Ocean Township participates in the National Flood Insurance Program. Homeowners are encouraged to maintain flood insurance to protect against loss of structure and contents in case of flooding.

Natural Resource Protection

Wetlands Protection

Wetland protection through NJDEP freshwater and coastal wetland permit programs is in place and are state regulations.

Erosion and Sediment Control

Soil Erosion and Sediment Control regulation through New Jersey's Soil Erosion and Sediment Control Act are in place and are state regulations administered through the county extension office. Approval is required for all disturbances over 5000 SF.

Best Management Practices

Best Management Practices are techniques that have been developed to address the adverse impacts that result from unmanaged land development. These methods serve to control not only the storm water quantity but also the quality and groundwater recharge in order to mitigate the adverse effects on the hydraulic system and to replicate the natural run off patterns. Best management practices are mandated through the Township's Stormwater Management Ordinance. These are in place.

Coastal Barrier Protection

Ocean Township has no coastal barrier islands. There are lands within Ocean Township that extend to near the mouth of the Barnegat Bay. These are owned by the State of New Jersey. These do not receive wave action directly from the ocean.

Emergency Services

Hazard Warning

There is a reverse 911 in place. The committee discussed getting the word out to encourage residents to sign up for the reverse 911 which is easily found on the Township's web site. Encourage residents to provide mobile phone numbers so they can receive emergency updates at any location. Encourage residents to provide email address so they can receive emergency notices via email. All these can be through the sign up on the Township's web site under Swift 911.

Police and fire department notify residents of emergencies via loudspeakers.

The Emergency Broadcast System is utilized in Ocean County. Storm notifications are sent by the National Weather Service to the State Office of Emergency Management then forwarded to the County Office of Emergency Management (OCOEM) for dissemination to the local offices. Warnings are placed on television and radio stations as well as on cable TV. In Ocean Township, the local Cable Access Channel through the cable television provider is Channel 22. Should flooding be imminent to the local area, the local OEM Coordinator can then utilize various broadcast communication methods including siren system, mobile public address system and even door-to-door notification. The township's Emergency Management Plan provides for the methods of notification to the residents. Currently Ocean Township utilizes the Police and Fire Department for notification of flooding.

Critical Facilities Protection

The municipal building, police department, fire and first aid and both Township schools are located outside of the 100 year flood plain

Health and Safety Maintenance

The Police Department is primarily responsible, after the flood, to patrol evacuated areas to prevent looting. Clearing streets and removing debris is performed through the Township Departments of Public Works. Vaccinating of the residents would be handled by the Ocean County Health Department.

Structural Projects

Reservoirs/Levees/Diversions/Channel Modifications/Beach Nourishment

Because of the many inlets, lagoons and back bay areas of the bay front and because of the predominant small lot size with residences close to the water, levees and floodwalls are not considered a feasible method of protection. Tidal flooding is the main cause of losses within Ocean Township and the non-linear nature of its bay front coastline render most structural projects not feasible. Detention basins or some other stormwater control are required for all development other than those along the coast which do not have an effect on the base flood elevation. Water quality measures are required. The Township does not maintain any Ocean beachfront and the bay front is generally not considered beachfront that would be appropriate for beach fill or beach replenishment. Bulkheads were discussed as structural projects. Generally

only the street end bulkheads are maintained by the Township though there are exceptions. Most bulkheaded areas are maintained by private property owners. There is a bulkhead ordinance in place in the Township that provides for the construction and maintenance of same. Residents who do not maintain their bulkhead may be cited and have to provide a corrective action plan to the satisfaction of the building inspector.

The Committee discussed providing for a minimum and maximum finished elevation for new and reconstructed bulkheads to meet the needs for flood damage prevention while also limiting the exposed elevation of same and providing for uniformity with adjoining lots as bulkheads are replaced.

Storm sewers

It was felt by the Committee that the Township should try to be more proactive in cleaning, repairing and upgrading storm sewer and other conveyance types such as ditches. Be cognizant of ponding and problem areas. Seek grant funds for the upgrade of storm water structures where possible.

Public Information Activities

Map information

Flood Insurance rate maps are available for review in the Construction Office for residents who want to determine whether their property is in a flood zone. A log is kept of information provided to residents who come in to view maps or who call with questions. Mapping can also be obtained from the FEMA web site at www.fema.gov by inputting the address of the property of interest.

Outreach Projects

The committee will look to add a public event to distribute FEMA and flood information pamphlets such as at the haunted hayride held in the fall or at cleanup day in June.

Real Estate Disclosure

Form is provided to local realtors approximately twice per year. See Appendix E

Library

FEMA pamphlets are provided to the library twice per year or as needed. There was a discussion to add to the information placed at the library.

Technical Assistance

The Construction office has several pamphlets and booklets concerning flood preparedness and the National Flood Insurance Program, flood venting, etc. It was discussed as a way to improve the dissemination of information that an additional information rack be placed at the Committee Room so the public would have enhanced access to the information available.

Environmental Education

The committee discussed obtaining pamphlets about environmental stewardship geared to children and distributing at the local elementary school. This could be coordinated by the Environmental Commission.

Action Plan

The committee met on February 29, 2012 to develop an action plan for the implementation of items discussed from the review of possible activities. Given the nature of the hazard, coastal tidal flooding, there are few if any larger scale structural projects that can be undertaken to alleviate the problem. Likewise acquiring properties was not seen as necessary or cost effective. The Committee focused on enhanced codes and standards, emergency services and public information as the best way to promote flood hazard safety and preparedness.

1. A number of the recommended activities involve revisions to existing ordinances or new ordinances. These can be pulled together and submitted to the governing body for consideration. These were considered to be the most important items for consideration.
 - a. Grading Plan Ordinance
 - b. Free Board Ordinance
 - c. Requirement for recharge
 - d. Bulkhead elevation restrictions

The cost for implementation of the above items would be borne by those seeking the improvement. Model ordinances will be gathered by the Construction Office and compiled in a letter to the Mayor and Committee for consideration. These should be completed in one month.

2. Increase public information. Since it was felt that most flood improvements and flood preparedness would be undertaken by individual homeowners on a parcel by parcel basis the Committee felt hazard warning and other outreach would have a valuable impact for little cost.
 - a. Encourage interested parties to sign up for Swift 911 the automated reverse 911 system.
 - b. Add an outreach event to distribute information regarding flood hazards, preparedness and insurance.
 - c. Place additional literature at the library and set up a display outside the Committee Room in the municipal building.
 - d. Obtain natural resource protection information and distribute to the local elementary school.

These items are considered to be of little cost to implement but are beneficial to the recipients. These items will be implemented on an ongoing basis.

3. Stormwater improvements. Be more proactive regarding cleaning, upgrading and seeking funding for stormwater improvements. Include stormwater improvements as part of road improvement programs.

Plan Maintenance

A public hearing to review the plan was held March XX, 2012 and the plan was adopted by the Township Committee at its meeting of April XX, 2012.

On an annual basis the Floodplain Management Plan Committee shall meet and prepare an evaluation report regarding implementation of the plan. The members of the Committee shall be those designated by the Township Committee to serve on the panel. The Construction Official as the designated floodplain management official shall submit the annual report detailing the monitoring and implementation. The report will be submitted to the governing body, released to the media and posted on the Township web site.