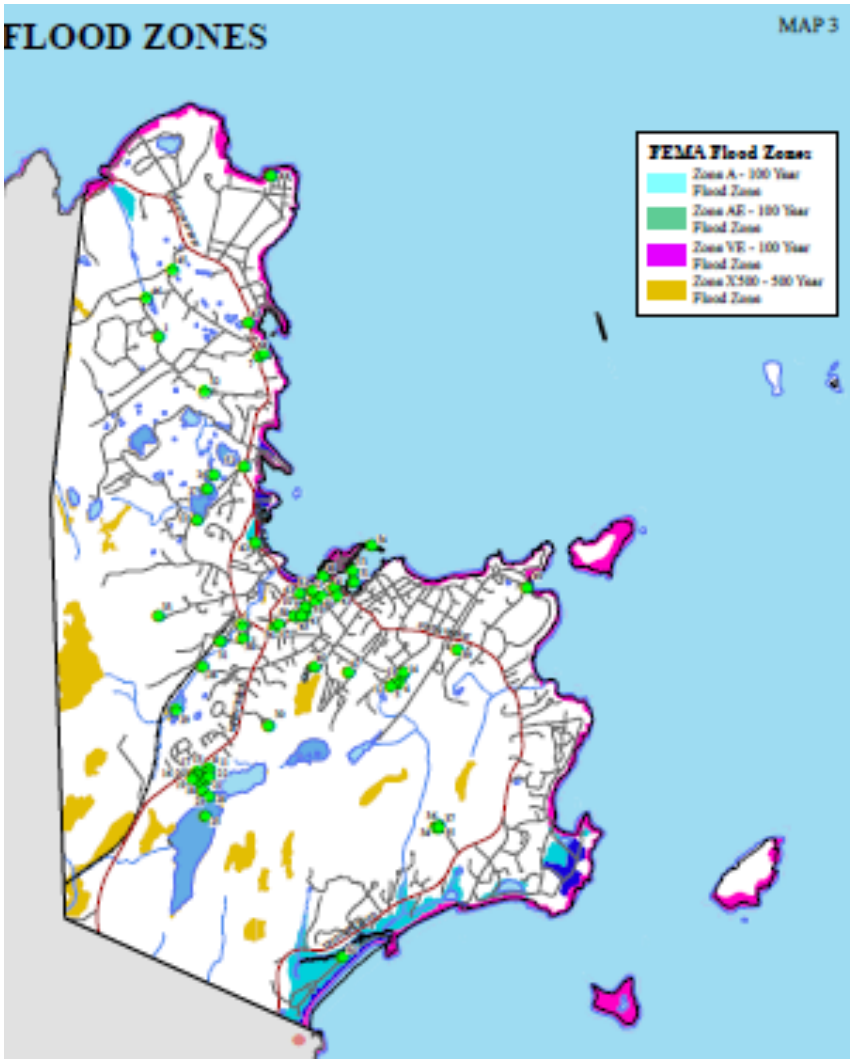
TOWN OF ROCKPORT
HAZARD MITIGATION PLAN



Metropolitan Area Planning Council

October 20, 2011
Revised DRAFT for MEMA and FEMA Review

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This plan was prepared for the Town of Rockport by the Metropolitan Area Planning Council (MAPC) under the direction of the Massachusetts Emergency Management Agency (MEMA) and the Massachusetts Department of Conservation and Recreation (DCR). The plan was funded by the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation (PDM) Grant Program.

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ROCKPORT HAZARD MITIGATION PLAN

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I. INTRODUCTION

Planning Requirements under the Federal Disaster Mitigation Act

The Federal Disaster Mitigation Act, passed in 2000, requires that after November 1 2004, all municipalities that wish to continue to be eligible to receive FEMA funding for hazard mitigation grants, must adopt a local multi-hazard mitigation plan. This planning requirement does not affect disaster assistance funding.

Massachusetts has taken a regional approach and has encouraged the regional planning agencies to apply for grants to prepare plans for groups of their member communities. The Metropolitan Area Planning Council (MAPC) received a grant from the Federal Emergency Management Agency (FEMA) under the Pre-Disaster Mitigation (PDM) Program, to assist the Town of Rockport and 16 other communities to develop their local Hazard Mitigation Plans. The local Hazard Mitigation Plans produced under this grant are designed to meet the requirements of the Disaster Mitigation Act for each community.

What is Hazard Mitigation?

Natural hazard mitigation planning is the process of figuring out how to reduce or eliminate the loss of life and property damage resulting from natural hazards such as floods, earthquakes and hurricanes. Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries and property resulting from natural hazards through long-term strategies. These long-term strategies include planning, policy changes, programs, projects and other activities.

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II. COMMUNITY PROFILE

Overview

Residents affirm that the Town of Rockport is a visitors' mecca located at the tip of Cape Ann. The town is surrounded by the Atlantic Ocean on three sides with the City of Gloucester on the fourth side and is about 40 miles from Boston. The major industry is tourism and Rockport supports an active Chamber of Commerce. The population is 7,500 year round, but during the summer months that can escalate to as high as 20,000.

Rockport has a five-member board of selectmen which meets bi-weekly, a full-time police department and a volunteer fire department. The Department of Public Works is headed by a director and the town continues to work on improving its water supply. Rockport also maintains its own wastewater treatment plant.

The Rockport Art Association is very active and there are a number of fine artists' studios and galleries about town. Bearskin Neck draws thousands of visitors to the many and varied shops. There are many hotels, motels, inns and restaurants, and visitors soon learn that Rockport allows alcoholic beverages with meals only. Other attractions include the sandy and rocky beaches, the Paper House, the Old Castle, the Historical Society Museum and the Babson Museum. Recreation is promoted by Halibut Point State Park, Millbrook Meadow and various playing fields used by school as well as community leagues. A nationally known point of interest is Motif #1, a picturesque fishing shack on Bradley Wharf at the entrance to Rockport's main harbor which for decades has been painted, sketched and photographed by generations of artists. Rockport has three other harbors where pleasure boats and fishing vessels moor.

The town has one school complex which includes K-12, a library and a number of churches.

(Narrative based on information provided by the Massachusetts Historical Commission and is taken from the Community Profile on the website maintained by the Department of Housing and Community Development).

The 2000 population was 7,767 people and there were 4,202 housing units.

The town maintains a website at http://www.town.rockport.ma.us/

Existing Land Use

The most recent land use statistics available from the state are based on aerial photography done in 1999. Table 1 shows the acreage and percentage of land in 21 categories. The predominant land use in the town is forest. Residential uses constitute 27.8% of the town.

Table 1
1999 Land Use

Land Use Type	**Acres**	**%**
Cropland	46.38	1.01
Pasture	31.63	0.69
Forest	2,381.37	51.95
Non-forested wetlands	107.75	2.35
Mining	15.02	0.33
Open land	279.11	6.09
Participatory recreation	108.79	2.37
Spectator recreation	0	0
Water recreation	56.98	1.24
Multi-family residential	28.34	0.62
High density residential (less than ¼ acre lots)	290.18	6.33
Medium density residential (¼ - ½ acre lots)	535.36	11.68
Low density residential (larger than ½ acre lot)	421.31	9.19
Salt water wetlands	44.32	0.97
Commercial	64.02	1.40
Industrial	4.49	0.10
Urban open	40.85	0.89
Transportation	17.08	0.37
Waste disposal	17.63	0.38
Water	93.42	2.04
Woody perennials	0	0
Total	***4,584.02***	

For more information on how the land use statistics were developed and the definitions of the categories, please go to http://www.mass.gov/mgis/lus.htm.

Potential Future Land Uses

MAPC consulted with town staff to determine areas that were likely to be developed in the future. Only one area was identified. This area is shown on Map 2, "Potential Development" and is described below.

A. Cape Ann Tool Company

Across Pigeon Cove Harbor are the remains of the Cape Ann Tool Company with its signature smokestack long noted as a navigation aid on boating navigation charts. Plans have been approved to replace the old Tool Company with condominiums, maintaining public access with a shorefront park and retaining the smokestack.

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III. PUBLIC PARTICIPATION

Public participation occurred at two levels; the Upper North Shore Multiple Hazard Community Planning Team (regional committee) and the Rockport Multiple Hazard Community Planning Team (local committee). In addition, the town held one meeting open to the general public to present the plan and hear citizen input.

Rockport's Participation in the Regional Committee

On March 14, 2008 a letter was sent notifying the communities of the grant award and announcing the first meeting of the Upper North Shore Regional Committee. The letter also requested that the Chief Elected Official designate two municipal employees and/or officials to represent the community. The following individuals were appointed to represent Rockport on the regional committee:

Michael Racicot	Town Administrator
George Robertson[1]	Senior Field Coordinator, DPW

Following several personnel changes, the following individuals now represent Rockport:

Linda Sanders	Town Administrator
Joseph Parisi	Department of Public Works

The regional committee serves as an opportunity for neighboring communities to discuss hazard mitigation issues of shared concern. In addition, as the same group of MAPC staff is working on each community's plan, these issues of shared concern, and other issues that may arise between neighboring communities, are discussed in greater detail in local committee meetings. Resulting actions are reflected in the identified mitigation measures, as noted in Chapter VIII.

The Greater Boston Upper North Shore Regional Hazard Mitigation Team met on April 15, 2008 and September 30, 2008.

The Local Multiple Hazard Community Planning Team

In addition to the regional committee meetings, MAPC worked with the local community representatives to organize a local Multiple Hazard Community Planning Team (local committee) for Rockport. MAPC briefed the local representatives as to the desired composition of that team as well as the need for representation from the business community and citizens at large.

[1] George Robertson retired in July 2009 but he graciously made himself available to continue to work on the project.

On September 11, 2008 MAPC conducted the first meeting of the Rockport Local Multiple Hazard Community Planning Team. Table 2 lists the attendees at each meeting of the team. The agendas for these meetings are included in Appendix B.

Table 2
Attendance at the Rockport Local Committee Meetings

Name	**Representing**
October 30, 2008	
Mike Fronterro	Fire Warden
George Robertson	DPW
Geralyn Falco	Conservation Agent
February 2, 2009	
Gary LeBlanc	Field Coordinator, DPW
George A. Robertson	Senior Field Coordinator, DPW
May 5, 2009	
Gary LeBlanc	Field Coordinator, DPW
George A. Robertson	Senior Field Coordinator, DPW
January 21, 2010	
Gary LeBlanc	Field Coordinator, DPW
George A. Robertson	Retired Senior Field Coordinator, DPW
April 20, 2010	
Gary LeBlanc	Field Coordinator, DPW
George A. Robertson	Retired Senior Field Coordinator, DPW
Linda Sanders	Town Administrator
Tim Olson	Assistant Director of Public Works
Barbara Sparks	Planning Board

The Public Meeting – The hazard mitigation plan was presented to the public at a meeting of the Board of Selectmen held on June 1, 2010 at Rockport Town Hall. The meeting was broadcast on cable television. The plan was made available on the Town's website for public review and comment. During this time that the plan was available online, the meeting and presentation were shown daily on the local cable access channel, Cape Ann Community Cable, beginning one week after the meeting date and running two weeks.

Local Stakeholder Involvement

Town Staff were encouraged to reach out to local stakeholders that might have an interest in the Hazard Mitigation Plan including neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties. These stakeholders had an opportunity to participate in the public meeting, which was subject to the requirements of the Open Meeting Law requiring that the agenda for the meeting be advertised in a local paper of general circulation and posted in a public location. Rockport Board of Selectmen agendas are also posted on the Town's website and in advance of the public meeting. The plan was also available on the web and the presentation form the public meeting shown on community cable, both easily accessible to the various local stakeholders that would have an interest in the plan.

Planning Timeline

March 14, 2008	Letter to the participating communities initiating the project.
APRIL 15, 2008	First meeting of the Regional Committee
September 30, 2008	Second meeting of the Regional Committee
OCTOBER 30, 2008	First meeting of the Local Committee
February 2, 2019	Second meeting of the Local Committee
May 5, 2019	Third meeting of the Local Committee
January 21, 2010	Fourth meeting of the Local Committee
April 20, 2010	Fifth meeting of the Local Committee
June 1, 2010	Public meeting with the Board of Selectmen (shown daily over a two week period following the meeting on local cable)
September 27, 2010	Plan submitted to MEMA

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IV. OVERVIEW OF HAZARDS AND VULNERABILITIES

Overview of Hazards and Impacts

The Massachusetts Hazard Mitigation Plan 2007 (state plan) provides an in-depth overview of natural hazards in Massachusetts. The state plan indicates that Massachusetts is subject to the following natural hazards (listed in order of frequency); floods, heavy rainstorms, nor'easters, coastal erosion, hurricanes, tornadoes, urban and wildfires, drought and earthquakes.

Table 3 summarizes the hazard risks for Rockport. This evaluation takes into account the frequency of the hazard, historical records and variations in land use. This analysis uses the same vulnerability assessment methodology used in the Commonwealth of Massachusetts State Hazard Mitigation Plan, 2007.

Table 3
Hazard Risks Summary

Hazard	Frequency	Severity
Flooding	High	Serious
Winter storms	High	Serious
Hurricanes	Medium	Serious - extensive
Earthquakes	Low	Catastrophic
Tornadoes	Low	Extensive
Landslides	Low	Minor
Brush fires	Medium	Minor
Dam failures	Low	Serious

Definitions used in the Commonwealth of Massachusetts State Hazard Mitigation Plan

Frequency
Very low frequency: events that occur less frequently than once in 1,000 years (less than 0.1% per year)

Low frequency: events that occur from once in 100 years to once in 1,000 years (0.1% to 1% per year);

Medium frequency: events that occur from once in 10 years to once in 100 years (1% to 10% per year);

High frequency: events that occur more frequently than once in 10 years (greater than 10% per year).

Severity
Minor: Limited and scattered property damage; no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e.one or two communities); essential services (utilities, hospitals, schools, etc) not interrupted; no injuries or fatalities.

Serious: Scattered major property damage (more than 50% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services are briefly interrupted; some injuries and/or fatalities.

Extensive: Consistent major property damage; major damage public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and fatalities.

Catastrophic: Property and public infrastructure destroyed; essential services stopped, thousands of injuries and fatalities.

Flood Hazards

The state plan indicates that Massachusetts is one of the 10 states that account for 76% of all repetitive loss buildings in the United States. Flooding was the most prevalent serious natural hazard identified by local officials in Rockport. Flooding is caused by hurricanes, nor'easters, severe rainstorms and thunderstorms.

Regionally Significant Storms

There have been a number of major rain storms that have resulted in significant flooding in northeastern Massachusetts over the last fifty years. Significant storms include:

- August 1954
- March 1968
- The Blizzard of 1978
- January 1979
- April 1987
- October 1991 ("The Perfect Storm")
- October 1996
- June 1998
- March 2001
- April 2004
- May 2006
- April 2007
- January 2009
- March 2010

Flood-Related Hazards

The Rockport Open Space and Recreation Plan includes a section entitled "Flood Protection and Watershed Management". This section, included below, addresses the complexity of mitigating flood hazards in a coastal community.

> "There are a vast number of regulatory and non-regulatory management and protection tools, actions, committees and plans involving fresh and tidal water resources in Rockport. From a regulatory standpoint, construction oriented activities in close proximity to water resources in Rockport may come under the authority of any or all of the following: Conservation Commission, Planning Board, Zoning Board of Appeals, Board of Health, Department of Public Works, Massachusetts Department of Environmental Protection, Environmental Protection Agency and the Army Corps of Engineers. Rockport waterways come under many regulatory authorities because so much of the Town is located in coastal flood zones or in close proximity to streams, reservoirs, wetlands and other wetland resource areas.

Rockport is bordered by the sea and is subject to flooding in severe storms. FEMA indicates that the Old Harbor, Bearskin Neck and some properties seaward of Mount Pleasant Street on Rockport Harbor are areas that fall within the coastal floodplain and would be inundated by 100 year flooding with additional hazards associated with storm waves. The land along Main Street and Beach Street between Old Harbor and Rowe Point falls within the floodplain, with the properties seaward of Main Street in the Old Harbor having the potential to be flooded to a depth of 1-3 feet.

In addition to the regulatory approaches to water resource management, Rockport has a number of non-regulatory boards and committees that manage or provide advice on water related activities. These include the Watershed Protection Committee, Granite Pier Committee, Harbor Committee, and Rights of Way Committee as well as non-profit organizations such as The Trustees of Reservations, Essex County Greenbelt Association and Massachusetts Audubon Society, all of whom own and manage land in Rockport.

Wetlands Issues[2] - Wetland resource areas are important to safeguard because they help prevent storm damage, reduce flooding, protect ground and surface water, prevent pollution, support fish and shellfish, and provide wildlife habitat and recreational opportunities. The Rockport Conservation Commission helps to identify key parcels that should be protected, works for acquisition by the town or other forms of protection, and manages local lands dedicated to conservation and passive recreation. The Commission helps organize Rockport's Annual Earth Day Clean-up, participates on Rockport's Watershed Protection Committee and Citizens' Advisory Committee on Water and Wastewater, participates on the regional Eight Towns and the Bay Committee, made up of representatives from eight communities dedicated to preserving the quality and integrity of Ipswich Bay, and helps in other efforts to enhance the local environment.

The Conservation Commission also has a seat on the 5-member Community Preservation Committee dedicated to making recommendations on the spending of Community Preservation Act funds for open space protection, historic preservation, and affordable housing.

The Conservation Commission is responsible for administering the **Wetlands Protection Act** (G.L. Ch. 131 sec. 40) and the **Rockport Wetlands Protection By-law** (Rockport Code of Bylaws, Chapter 14). It reviews proposed development projects in or near wetlands and other resource areas or within the 100-foot buffer zone of these resource areas. The Conservation Commission reviews plans, holds public hearings, conducts site visits and issues Determinations of Applicability and Orders of Conditions for proposed projects to ensure that these projects don't impact resource areas protected by the Act or By-law.

[2] This discussion of wetlands issues is taken from the Town of Rockport Conservation Commission web page.

Wetland resource areas protected by the Wetlands Protection Act, "the Act", cover both inland and coastal wetlands. Resource areas protected by the Rockport Wetlands By-law, "the By-law", include freshwater and coastal wetlands, marshes, wet meadows, bogs, swamps, vernal pools, banks, reservoirs, lakes, ponds of any size, quarry pits and motions, rivers, streams, creeks, beaches, dunes, estuaries, the ocean, lands under water bodies, lands subject to flooding or inundation by groundwater or surface water, lands subject to tidal action, lands within 100-feet of above cited resource areas, lands subject to coastal storm flowage or flooding.

Areas of Flooding - Information on flood hazard areas was taken from several sources. The first was the National Flood Insurance Rate Maps. The FIRM flood zones are shown on Map 3 in Appendix B. The second was discussions with local officials. The locally identified areas of flooding described below were identified by town staff as areas where flooding occurs. These areas do not necessarily coincide with the flood zones from the FIRM maps. They may be areas that flood due to inadequate drainage systems or other local conditions rather than location within a flood zone. The numbers correspond to the numbers on Map 8, "Hazard Areas". The numbers do not reflect priority order. The flood hazard areas in Rockport can be divided into two categories: inland/freshwater flooding and coastal flood hazard areas.

Inland/freshwater flooding

1. *Lowest Lane & Summit Avenue* (Flooding)

Priority: High. This is the highest priority for inland flooding.

In large storms, the area around the Lowest Lane and Summit Avenue intersection is prone to flooding. The flooding ranges as far west as Reilly's Lane, and to Granite Street (Route 127) on the east. Flooding results in damages to about a doze

, have sustained reoccurring flood damages. Flooding is the result of several factors: low laying and level gradients throughout the system; an undersized culvert at the Lowest Lane and Summit Avenue intersection; undersized downstream drainage pipes; and two locations with inadequate drainage basins on Railroad Avenue and Granite Street. Mitigation should begin with the enlargement of the culvert at Lowest Lane and Summit Avenue.

2. *Folly Cove* (Flooding)

Priority: Medium

During an annual spring event or during large rain storms, the fresh water marshes flowing toward Folly Cove exceed their floodplains and cause damages to about 5 condo units as well as 3-6 single family homes. Some of these homes also sustain flooding damages to their septic systems. Damages usually include severe basement flooding. In addition to floodplain proximity, an undersized drainage pipe (36 inches) was cited as

contributing to the backups. The DPW suggested enlarging the drainage pipe and potentially adding a second pipe to alleviate the overburdened system. The appropriate mitigation measure would be to install a second 36 inch pipe on an easement that the town has.

3. Penryn Way (Flooding)

Priority: Low

Several homes along Penryn Way are prone to frequent flooding. Flooding is due to a level pitch and inadequate roadway drainage. This inland flood area is also further exacerbated by wave action and tidal surge on Penzance Road, and less so on Penryn Way. The town is currently seeking funding to install storm drains that run from Penryn Way and Penzance to Loblolly Cove. Obtaining the necessary easements from property owners is an additional step that would need to happen before the pipes could be installed.

4. *High Street Court & Pleasant Street* (Flooding)

Priority: Low

The natural water storage area just south of High Street Court flows north along Pleasant Street in a granite walled brook to the ocean. Flooding occurs throughout this route due to inconsistent culvert sizes and siltation of the waterway. This system causes flooding to about 50 homes. This area sustained flooding in the 2006 Mother's Day Storm. Potential mitigation measures include enlarging all the culverts, each to an equal size, and stream restoration. This area experiences mostly backyard flooding with some basement flooding and minimal flooding on Pleasant Street.

5. *Main Street/Route 127 (Nugent Stretch)* (Flooding)

Priority: Medium.

There is an undersized granite culvert under Main Street (Route 127) that backs up and floods the roadway. Main Street (Route 127) is the primary artery in and out of Rockport. While there have been no road closures to date, if the culvert were to become clogged with debris to the extent that the road would flood out, this would be a problem. The potential closure of this road would pose a severe public health threat in terms of evacuation and emergency response. This section of road is owned and maintained by the Massachusetts Department of Transportation. A potential mitigation measure would be to increase the size of the culvert.

6. *Brook's Road & Arens Road* (Flooding)

Priority: Low

There is a small lowland stream that runs along Brook's Road and Arens Road that exceeds its banks in large rain storms and floods the roadways and houses as far as Country Club Road. There are about seven or eight homes susceptible to this flooding. Most damages are limited to basement flooding; however there is a risk of more severe damages. The Local Committee suggests improving drainage by rerouting flood waters to nearby wetlands. However, this kind of mitigation may be limited by potential conservation restrictions and would require approval by the Conservation Commission. Any mitigation in this area would need to be done by private parties.

7. Squam Hill (Flooding)

Priority: High

Stormwater runoff collects and runs off onto Granite Avenue. Granite Avenue does not have sufficient drainage structures to handle the flow. At times Granite Avenue is flooded out to the extent that it has to be partially closed. To mitigate this flooding, the town would need to expend approximately $20,000 to install additional drainage capacity.

Coastal Flood Hazard Areas

***8. Bearskin Neck* (Flooding)**
Priority: Highest priority because it is the primary tourist area and therefore, critical to the economic health of the community.

Bearskin Neck has been subject to severe reoccurring flooding. Bearskin Neck is surrounded on two sides by water and subsequently is at risk by wave action and high tidal surges. All the properties and roadways in Bearskin Neck are at a high risk for flooding. This area is in the V2 zone (velocity zone) which is the most severe classification on the FIRM maps. In the Blizzard of 78' and in the Perfect Storm of 91' the properties on Bearskin Neck were under 2-3 feet of water. There are three wharfs in Bearskin Neck; Tuna Wharf (privately owned); Bradley Wharf and White Wharf. Bradley Wharf is owned by the town and it is the site of the famous "Motif #1". The town replaced about 20 feet of granite block on the Bradley Wharf. Whites Wharf is also town-owned and has been partially rebuilt in recent years and currently sustains some damage during storms. Rockport Harbor, which is mostly protected by an Army Corps breakwater, protects most of eastern Bearskin Neck from wave action, but a direct line of current ends at the Sandy Bay Yacht Club deck on T Wharf causing reoccurring damages. The breakwater itself has not been repaired since 1978, and the town would like to see upgrades to the structure. A potential mitigation measure for the properties on Bearskin Neck would be to raise the structures.

***9. T Wharf* (Flooding)**
Priority: High.

The Sandy Bay Yacht Club is a privately owned club located at the end of T Wharf. While the Club is responsible for its buildings, the Club's deck is held up by wooden pilings that are under the jurisdiction of the DPW and are subject to regulation by the town Conservation Commission. The Yacht Club deck is in an unprotected area where it is vulnerable to being directly exposed to waves. In the event of large storms, surge, or wave action, the deck is routinely damaged, and in an extreme event, completely washed away, which creates a cycle of constant repair and replacement. In the past 40 years, the public deck of T Wharf has been partially damaged at least 6 times. The decking is designed to breakaway, which limits the damage to the wooden decking in large storms. Rockport Harbor is mostly protected by an Army Corps breakwater, but it is subject to storm surge and velocity waves because of the unobstructed line of fetch. The breakwater itself has not been repaired since 1978, and the town would like to see upgrades to the structure. The pilings need to be redone.

***10. Long Beach* (Flooding)**

Priority: High.

Long Beach, located on the southeast coast of Rockport is susceptible to wave action and storm surge. It is a barrier beach and therefore, subject to regulation by the Conservation Commission. Wave action has resulted in damages to the concrete seawall, beach erosion, damage and washing out of portions of Old County Road, which runs in back of the cottages, and damage/loss of the temporary wooden stair structures that lead to the beach. The town maintains 13 sets of wooden stairs to provide access to the beach. The DPW pulls up most of the stairs at the end of the summer season but leaves three sets of stairs to provide emergency access. In the absence of natural dunes, the Army Corps of Engineers and the State Division of Waterways built a concrete sea wall to protect the 146 cottages, roadway and wetlands behind it. The seasonal cottages are privately owned but are located on town owned land which is leased to the owners. In major storms, such as the Hurricane of 59' and Blizzard of 78', the seawall has sustained major damages resulting in subsequent damages to the roadway (being partially washed out), and damage to some cottages. The Saratoga Creek foot bridge on the northern most portion of the beach was totally rebuilt in 1979 following the 1978 storm and needed repairs in 1992.

The original Long Beach Sea Wall was constructed in the 1930s and was severely damaged and repaired in the mid 1950s. The condition of the sea wall has been a concern to the town for some time now and has been the subject of several engineering studies done in the last few years. While there are numerous concerns about the structural integrity of the wall and a wide range of recommendations, the towns' immediate concern is about the unsafe conditions of the sidewalks and railings along the sea wall. Oak Engineers found that several sections of the handrail are in poor condition and presents a

moderately high risk of injury to pedestrians. The railing is not ADA compliant nor in compliance with the Massachusetts Building Code. Many areas of the sidewalk have collapsed and emergency repairs have been done by the DPW. The town is developing cost estimates for sidewalk repairs. In the long term, engineering consultants have suggested to the town that catastrophic failure of the sections of the wall that were built in 1938 is likely within the next five years.

Potential mitigation measures for the stairways include the construction of 3 permanent concrete or steel stairway structures, and upgrades to the sea wall. Permanent stairways would serve as a long term solution and although costly (six figures), would likely be cost effective for two reasons; one, the town would not have to replace the wooden stairways every time they were damaged, and two, the town would not have to spend money on pulling in and bringing out the stairways before and after every storm. This is a high priority for the town because of the impact on tourism.

***11. Cape Hedge Beach* (Flooding)**
Priority: High.

Cape Hedge Beach is located just north of Long Beach. Saratoga Creek divides the two beaches and they are connected by the Saratoga Creek footbridge. Cape Hedge Beach is a barrier beach which is protected by a popple dune piled into a popple revetment. During large storms portions of the revetment sustain damages. The popple stone revetment stands 16 feet above sea level and protects the 100 plus car public parking lot. Being a dune, the ocean constantly reshapes it. The town reconfigures the dune after major storms. Making the matter more complex, there are special conservation regulations pertaining to barrier beaches which prohibit the town from reinforcing the revetment with concrete. The town has rebuilt the parking lot section of the wall 6 or 7 times in recent years. Storms have also damaged the 40 foot concrete ramp at the furthest northern point of the beach.

This is a high priority because it's the only parking access for the two largest beaches.

***12. Pebble Beach* (Flooding)**
Priority: High because a portion of Penzance Road washes out.

Pebble Beach is another barrier beach which is located north of Cape Hedge Beach. It is a long beach with low popple dunes approximately 5-6 feet high, serving in place of a concrete wall or dunes but this affords little protection. Penzance Road is located adjacent to the beach and is paved. The northern half of the road is gravel and cannot be repaved because storm action regularly breaks up any asphalt that is placed on the road in this area. The southern section of the roadway is protected by popple dunes which overtop the road but do not destroy the pavement. During large storms, wave action tends to partially overtop the stones and partially washes out part of the roadway. During especially large storms such as the storm of 1978, the stones and roadway are completely washed out. There are several single family homes at both ends of the beach that are potentially at risk of wave action damage during large storms.

In 2003 the Daylor Consulting Group prepared a report for the town on options for performing repairs and improvements to the coastal storm damaged section of Penzance Road. The DPW requested that Daylor evaluate three options:

1. Repairing the damaged section of the roadway to the current level of improvement.
2. Performing additional repairs and improvements to the roadway to protect the road from storms up to and including the 10-year frequency coastal storm, and
3. Identifying improvements that would substantially improve the roadway and its protection system to withstand a 50 year frequency coastal storm.

The Daylor Report has been submitted to the Conservation Commission and the recommendations have been denied because paving the roadway or armoring the dune would be in conflict with the Wetlands Protection Act and the Town of Rockport Wetlands Protection Bylaw.

***13. Loblolly Cove* (Flooding)**
Priority: Low.

Several single family homes along Loblolly Cove and Penzance Road are affected by coastal flooding. Flooding from Loblolly Cove is tidal related. Additionally, beach erosion is another issue tied to this flooding. Inland flooding, related to the issues around Penryn Way complicate the problem, as water looking to empty into the Cove could back up with nowhere to go.

14. Penzance Road (Flooding)
Priority: Low

There has been damage to private residences in this area which is within the V2 zone. The damage is caused by waves and the tides. This area is known as the "Gold Coast" and is an area of expensive homes. Damage is limited to about 10-12 homes and no mitigation measures have been identified. There is minor flooding on Penzance Road.

***15. Old Garden Beach* (Flooding)**
Priority: Medium.

Old Garden Beach is a small neighborhood beach mostly used by town residents. The beach has suffered from sand erosion and debris deposit behind the granite seawall. There are two seawalls; one public and one private. Also, the concrete beach ramp and iron beachside railing sustains frequent damages in large storm events. The beach acts as a natural drainage outfall and has a storm drainage pipe that extends about 150 feet into Sandy Bay. The town is looking to remove the debris and repair the walkway railing and ramp. There is the Old Garden Sewer Pump Station underground here and some erosion adjacent to the beach.

***16. Front Beach* (Flooding)**

Priority: This area is a high priority because it is the main downtown beach.

Front Beach is the main beach in downtown Rockport. It is a 300 foot long sandy beach. Front Beach is vulnerable to yearly Nor'easters. During large storms, the granite beach wall and iron railings sustain damages. Also, there the restrooms (connected to sewer) that are at risk during these storms.

***17. Back Beach* (Flooding)**

Priority: Medium.

This is a primarily rocky beach that is popular with scuba divers. The beach is also used by locals, tourists and kayakers. There are some sandy areas at the far ends of the beach. In a 2007 storm the rip rap wall at Back Beach sustained major damages. The beach is still susceptible to damages from wave action. There are several single family homes behind the beach that are vulnerable to tidal surge and wave action. In 1978, one single family home was flooded with 6 feet of ocean water. The northern end of Beach Street, which runs along the beach has also been undermined in recent storms and has been repaired.

Following the 2007 storm, the town applied for and was granted a FEMA grant to replace the armoring. The town has received an extension on this grant but no work has been done yet.

***18. Granite Pier* (Flooding)**

Priority: This is a medium to high priority for the town because the harbor houses many boats that could be damaged.

Granite Pier is a town-owned facility. Its purpose is to provide a place where residents and others can have a boating experience without paying the high cost of marina or boat yard fees. It provides a ramp to launch boats as well as summer and winter storage for local residents' boats.

Granite Pier has an armored topside and cut stone underbelly. The structure protects Granite Pier Harbor. However, in April 2007, a section of the granite armored slope was washed out. It has not yet been repaired. The town has been promised FEMA funding and recently obtained the required 10% match. This is the same grant that was approved for Back Beach. Granite Pier is town-owned. It is a popular tourist spot because of the views of the harbor.

***19. Pigeon Cove Harbor* (Flooding)**

Priority: High

The breakwater and wall mound protecting Pigeon Cove Harbor were rebuilt after the Blizzard of 78'. In recent years, large storms have toppled some granite capstones on the pier, but the structure itself remains intact. This harbor houses a major portion of Rockport's fishing & boating industry; therefore, protection of the harbor and the inland properties is a high priority for the town. The harbor includes lobstermen shacks that are leased from the town. According to the DPW, in the case of a hurricane, there is still a significant risk of damages to the boats and properties in this harbor. Also, there is a tool company along the harbor that sustains flooding during large storms. This factory is being converted by a developer into 25 condos. Construction has yet to begin.

20. Gap Cove (Flooding)

Priority: Medium.

Most of the flooding at Gap Cove is caused by coastal storms with high tides resulting in strong isolated tidal surges. This generally deposits sand, popples, rocks and debris which contribute to the damage in the roadway. The aftermath leaves the townwith major street cleanup and pothole repairs. There is no protection in that area from high tides and strong winds, therefore it is unlikely that the impacts from coastal storm activity can be mitigated. The DPW has worked with the Conservation Commission to develop a maintenance plan for future storm cleanup. The DPW has made progress improving drainage structures and rebuilt a stone headwall with outlet to deflect the oncoming tidal surges in that area.

Repetitive Loss Structures

There are 17 repetitive loss structures in Rockport. These properties have experienced a total of 48 losses totaling $1,433,185.05 from 1978 to 2010 (based on the FEMA repetitive loss database as of August 31, 2011).

As defined by the Community Rating System (CRS) of the National Flood Insurance Program (NFIP), a repetitive loss property is any property which the NFIP has paid two or more flood claims of $1,000 or more in any given 10-year period since 1978. For more information on repetitive losses see http://www.fema.gov/business/nfip/replps.shtm.

Table 4
Repetitive Loss Properties Summary

Structure Type	FEMA Flood Zone	Locally Identified Flooding Area
Residential	V	Yes
Residential	No	Yes
Residential	A	Yes
Commercial	V	Yes
Residential	A	Yes
Residential	No	No
Residential	No	No
Residential	A	Yes
Commercial	No	Yes
Commercial	No	No
Commercial	No	No
Commercial	No	No
Residential	No	Yes
Commercial	V	Yes
Residential	No	Yes
Residential	A	Yes
Residential	No	Yes

Dam Failures – In the 2006 Mother's Day Storm, about a third of Mill Pond Dam gave way and emptied into the downstream pond (Frog Pond) and meadows. Also, during the same storm, water overtopped the dam at Carlson Quarry. There are two other dams and each of the dams has the potential to fail under certain circumstances due to their age and state of repair. Therefore, this plan addresses dam failures in order to prevent future occurrences.

There are four dams in Rockport. According to the Rockport Open Space and Recreation Plan (2009) the town has been investigating the possibility of constructing a large concrete dam at the eastern end of Flat Ledge Quarry to expand the storage capacity of the quarry. No final decision has been made on this project.

21. Mill Pond Dam (Dam Failure)

Priority: High

In the 2006 Mother's Day Storm, about a third of Mill Pond Dam gave way and emptied into the downstream pond (Frog Pond) and meadows. This breach further exacerbated existing siltation issues in the downstream Frog Pond. It is estimated that siltation has reduced the water body between up to one half since the 2006 storm. The town has received a permit from the Conservation Commission to remove the silt

in Frog Pond. The dam, built in 1702, is in need of immediate reconstruction. GEI Consultants, a consultant firm, has been hired to design plans for the reconstruction of the Millbrook Dam. The dam is of an aesthetic interest to local residents. Residents are seeking a design that fits the time period in which it was originally constructed and the town has hired an architect to work on this project.

Funding for the reconstruction of the dam will be provided by MEMA and FEMA. However, the money only applies to repairs, and does not cover restoration of the entire Millbrook Meadow Recreation area or dredging work.

FEMA will only replace the damaged part of the dam. The project is 100% funded by FEMA because of a legislative appropriation. The project should be ready to go out to bid in the fall and construction should begin in the winter of 2010. There is a small number of structures downstream, including an inn, a restaurant and several residences.

22. *Carlson Quarry Dam* (Dam Failure)

Priority: Medium

This water supply dam was built in 1953. The dam is made of reinforced concrete. There are only two houses downstream but there is also the possibility of damage to cradled boats in the off-season.
The town had an inspection and evaluation done in August 2009. The inspection was done by GEI Consultants Inc. The dam is classified as a low hazard dam with an inspection frequency of every 10 years. There is no formal emergency action plan for the dam. The inspection rated the overall physical condition of the dam as fair meaning that there are significant operational and maintenance deficiencies but no structural deficiencies. The potential deficiencies exist under unusual loading conditions that may realistically occur. The deficiencies that were found include:

- Surficial cracking and spalling of the concrete on the downstream face of the dam.
- Efflorescence on the downstream face of the dam.
- Vegetation growing in the cracks on the downstream face of the dam.
- There is no low-level outlet.
- There is vegetation in the area upstream and downstream of the spillway.

GEI Consultants Inc. made five recommendations.

1. The town should hire a structural engineer to perform a structural evaluation of the dam, the downstream face of the dam and the abutment contacts.
2. The town should hire a mechanical engineer to perform an evaluation of the procedures and materials used to cap the low-level outlet pipe.
3. The town should prepare a contingency plan that details how the reservoir will be lowered in the event of an emergency because the low-level outlet has been capped.

4. The town should perform regular maintenance to control and prevent growth of unwanted vegetation on the dam and spillways.
5. The town should remove vegetation on the downstream face of the dam being careful that the removal process does not accelerate cracking and spalling of the concrete.

The report states that the estimated repair cost would be $16,000-$25,000. The town has identified a structural assessment of the east end concrete dam as a high priority task to be included in the future Water Needs Assessment.

23. Cape Pond Dam – Cape Pond Dam is an earthen dam. The dam is owned by the town. If it were to fail it could cut off rail access and flood Route 127 and possibly the Babson Museum. The town is concerned about the possibility of water overtopping the dam. The town has identified a structural assessment of the south end revetment of the dam as one task to be included in the future Water Needs Assessment.

24: Loop Pond Dyke – The dyke was partially overtopped during the 2006 storm.

The town has identified a structural assessment of the east end of the earthen dam as one task to be included in the future Water Needs Assessment.

Wind-related hazards

Wind-related hazards include hurricanes and tornadoes as well as high winds during severe rainstorms and thunderstorms.

Between 1858 and 2000, Massachusetts has experienced approximately 32 tropical storms, nine Category 1 hurricanes, five Category 2 hurricanes and one Category 3 hurricane. This equates to a frequency of once every six years. A hurricane or storm track is the line that delineates the path of the eye of a hurricane or tropical storm.

There have been three tropical storm tracks recorded in Rockport. A tropical storm tracked just off the coast of Rockport in 1896. Another tropical storm tracked the very eastern edge of Rockport in 1916 and a third tropical storm in 2004 tracked across the eastern half of the town.

The town also experiences the impacts of the wind and rain of hurricanes and tropical storms regardless of whether the storm track passed through the town. The hazard mapping indicates that the 100 year wind speed is 120 miles per hour. There have been no tornadoes recorded within the Town limits.

Winter Storms

In Massachusetts, northeast coastal storms known as nor'easters occur 1-2 times per year. Winter storms are a combination hazard because they often involve wind, ice and heavy snow fall. The average annual snowfall throughout the town is 48.1-72.0 inches.

Winter hazards include regular snowfalls and blizzards. The average annual snowfall for the entire town is 48.1 – 72 inches. The most severe winter storm was the blizzard of 1978.

Fire Related Hazards

The town identified five areas where brush fires are a problem. Most brush fires occur during dry periods and are caused by dirt bikers, discarded cigarettes and small campfires. Rockport is one of only three communities in Massachusetts that has a Fire Department and a separate Forest Fire Department which is headed by Warden Michael Frontiero. The Forest Fire Department is staffed by twelve full time volunteer members who are on call 24 hours a day, seven days a week.

Most brush fires occur during dry periods and are caused by dirt bikers, discarded cigarettes and small campfires.

Areas where fires have historically been a problem and continue to occur are:

25. South End Woods –The largest forested area in Rockport is called the South End. It encompasses the majority of the southern portion of the town between Route 127 and Route 127A. The MBTA Commuter Rail runs north/south through Rockport with the majority of the route running through the South End Woods.

26. Country Club Road – This is a wooded area in the eastern part of the town which is adjacent to a golf course.

27. Briar Swamp – This is another large wooded area which includes the Poole Hill Town Forest. It is located on the border with Gloucester. On the Gloucester side is the historic area known as Dogtown Common. This is an area of regional concern.

28. Pigeon Cove Woods– This is an area which is primarily single family residences. There is a water stand pipe in this area. The area occasionally experiences small brush fires.

29. Halibut Point State Park – This is a state park owned by the Department of Conservation and Recreation. The primary issue is brush fires in the low lying brush found in this area.

Geologic Hazards

Most town officials admitted that earthquakes were the hazard for which their community was least prepared. Although new construction under the most recent building codes generally will be built to seismic standards, there are still many structures which pre-date the most recent building code. According to the 2009 Rockport Open Space and Recreation Plan, Cape Ann is considered the third most active geological area

in the United States. The largest earthquake known to have taken place in New England happened on Cape Ann in 1755.

Regional Overview

According to the State Hazard Mitigation Plan, New England experiences an average of five earthquakes per year. From 1627 to 1989, 316 earthquakes were recorded in Massachusetts. Most have originated from the La Malbaie fault in Quebec or from the Cape Anne fault located off the coast of Rockport. The region has experienced larger earthquakes, of magnitude 6.0 to 6.5 in 1727 and 1755. Other notable earthquakes occurred here in 1638 and 1663. (Tufts).

Earthquake Impacts – Earthquakes are a hazard with multiple impacts beyond the obvious building collapse. Buildings may suffer structural damage which may or may not be readily apparent. Earthquakes can cause major damage to roadways, making emergency response difficult. Water lines and gas lines can break, causing flooding and fires. Another potential vulnerability is equipment within structures. For example, a hospital may be structurally engineered to withstand an earthquake, but if the equipment inside the building is not properly secured, the operations at the hospital could be severely impacted during an earthquake. Earthquakes can also trigger landslides.

Landslides

The entire town has been classified as having a low risk for landslides. There have been no recorded past occurrences of landslides in Rockport.

Potential Future Issues: Sea-level rise

Over the past five years, almost all communities in the Boston metropolitan region have prepared multi-hazard mitigation plans or are in the process of doing so. The vast majority of these plans have focused on a common set of natural hazards including flooding, brush fires, winter storms, dam failures, geologic hazards (landslides, earthquakes, sinkholes), tornadoes and hurricanes. Sea level rise has not specifically been identified as a separate hazard for a number of reasons. The first is that sea level rise compounds flooding and may eventually impact the areas subject to flooding but it is essentially a cause of flooding, not a separate hazard. The second reason is that its effects can be mitigated by the same measures already used to mitigate flooding.

There is a program called The StormSmart Coasts program which was developed by the Massachusetts Office of Coastal Zone Management to help communities prepare for and protect themselves from coastal storms and flooding. Whenever possible, the program taps into existing resources and aims to provide Massachusetts communities with tried-and-true actions that they can take to reduce their risks. A review of the resources available on the web site indicates that the techniques suggested are essentially the same ones that are discussed elsewhere in this plan.

This hazard mitigation plan, once adopted, is good for five years. When the plan is updated, it is suggested that the town review the latest scientific data including any new mapping as well as any new regulations that may be put into place for dealing with coastal flooding.

Critical Facilities Infrastructure in Hazard Areas

Critical infrastructure includes facilities that are important for disaster response and evacuation (such as emergency operations centers, fire stations, hospitals, etc.) and facilities where additional assistance might be needed during an emergency (such as nursing homes, elderly housing, day care centers, etc.). It also includes facilities that might pose a particular danger during a natural disaster such as a sewage treatment plant or chemical facility. These facilities are listed in Table 4 and are shown on all of the maps in Appendix B. The purpose of mapping the natural hazards and critical infrastructure is to present an overview of hazards in the community and how they relate to critical infrastructure. There are 70 critical infrastructure sites in Rockport.

Flooding –Sixteen critical infrastructure sites are located within FEMA flood zones and another eight are located within locally identified flood zones.

Landslides - The entire town is considered to have a low risk for landslides and therefore, all critical infrastructures sites are at low risk for landslides.

Earthquakes – All areas of the town have a low risk for earthquakes.

Hurricane surge areas - Critical infrastructure was also mapped relative to hurricane surge areas. The following explanation of hurricane surge areas was taken from the US Army Corps of Engineers web site:

> "Hurricane storm surge is an abnormal rise in sea level accompanying a hurricane or other intense storm. Along a coastline a hurricane will cause waves on top of the surge. Hurricane Surge is estimated with the use of a computer model called SLOSH. SLOSH stands for Sea Lake and Overland Surge from Hurricanes. The SLOSH models are created and run by the National Hurricane Center. There are about 40 SLOSH models from Maine to Texas.
>
> The SLOSH model results are merged with ground elevation data to determine areas that will be subject to flooding from various categories of hurricanes. Hurricane categories are defined by the Saffir-Simpson Scale."

According to the Saffir-Simpson Scale, the least damaging storm is a Category 1 (winds of 74-95 miles per hour) and the most damaging storm is a Category 5 (winds greater than 155 miles per hour).

There are five critical infrastructure sites within the hurricane surge zone.

Table 5 : Relationship of Critical Infrastructure to Hazard Areas

ID	NAME	TYPE	Within FEMA Flood Zone	Within Locally Identified Area of Flooding	Hurricane Surge Areas (Category#)
1	Rainbow Day School	DayCare	No	No	0
2	Sandy Bay Preschool	DayCare	No	No	0
3	Rockport Early Childhood Center	DayCare	No	No	0
4	Rockport Head Start	DayCare	No	No	0
5	Rockport Afterschool Program	DayCare	No	No	0
6	Rockport Fire Department	Fire Station	No	No	0
7	Pigeon Cove Fire Station	Sub	No	No	0
8	Rockport Police Headquarters	Police Station	No	No	0
9	Rockport Town Office Building	Municipal	No	No	0
10	EOC-Secondary	EOC	No	No	0
11	EOC-Primary	EOC	No	No	0
12	Rockport Elementary School	School	No	No	0
13	Rockport Middle School	School	No	No	0
14	Rockport High School	School	No	No	0
15	Rockport DPW Garage	DPW	No	No	0
16	DPW Sand Shed	DPW	No	No	0
17	Rockport Fuel Depot	Fuel Depot	No	No	0
18	Rockport Forest Fire Station	Municipal	No	No	0
19	DPW Salt Shed	DPW	No	No	0

Table 5 : Relationship of Critical Infrastructure to Hazard Areas

ID	NAME	TYPE	Within FEMA Flood Zone	Within Locally Identified Area of Flooding	Hurricane Surge Areas (Category#)
20	Rockport Water Treatment Facility	Water Treatment Plant	No	No	0
21	Rockport Water Treatment Facility	Water Treatment Plant	No	No	0
22	Rockport Water Treatment Facility	Water Treatment Plant	No	No	0
23	Cell Tower	Communication	No	No	0
24	Rockport Water Low Lift Pump Station	Water Pumping Station	No	No	0
25	Cape Pond Reservoir	Water Supply	X500	No	0
26	Carlson Quarry Reservoir Dam	Dam	No	No	0
27	Carlson Quarry Reservoir	Water Supply	X500	No	0
28	Millbrook Well Pump Station	Water Supply	No	No	0
29	Loop Pond	Emergency Water Supply	X500	No	0
30	Rockport Transfer Facility	LF	No	No	0
31	Electric Sub Station	Sub	No	No	0
32	Pigeon Hill Water Standpipe	Water Tank	No	No	0
33	Summit Avenue Water Standpipe	Water Tank	No	No	0
34	South End Water Standpipe	Water Tank	No	No	0
35	Cell Tower	Communication	No	No	0
36	Cell Tower	Communication	No	No	0
37	Cell Tower	Communication	No	No	0
38	Millbrook Elderly Housing Complex	Elderly Housing	No	No	0
39	Den Mar Nursing Home	Nursing Home	No	No	0
40	Rockport Wastewater Treatment Facility	Waste Water Treatment Plant	No	No	0
41	Dock Square Pump Station	Sewer Pumping Station	No	T Wharf	0

Table 5 : Relationship of Critical Infrastructure to Hazard Areas

ID	NAME	TYPE	Within FEMA Flood Zone	Within Locally Identified Area of Flooding	Hurricane Surge Areas (Category#)
42	Back Beach Sewer Pump Station	Sewer Pumping Station	AE	No	0
43	Pigeon Cove Sewer Pump Station	Sewer Pumping Station	No	No	0
44	Long Branch Avenue Sewer Pump Station	Sewer Pumping Station	VE	No	0
45	Curtis Street Sewer Pump Station	Sewer Pumping Station	No	No	0
46	Stockholm Avenue Sewer Pump Station	Sewer Pumping Station	No	No	0
47	Summer Street Court Sewer Pump Station	Sewer Pumping Station	No	No	0
48	Pier Avenue Sewer Pump Station	Sewer Pumping Station	VE	Bearskin Neck	3
49	Marmion Way Sewer Pump Station	Sewer Pumping Station	VE	Gap Cove	0
50	Old County Road Sewer Pump Station	Sewer Pumping Station	VE	Long Beach	1
51	Sandy Bay Yacht Club	Marine	VE	T Wharf	4
52	Granite Street Arch Bridge	Bridge	No	No	0
53	Motif #1	Marine	VE	Bearskin Neck	2
54	Sandy Bay Breakwater	Breakwater	VE	Bearskin Neck	2
55	Carlson Quarry Pump Station	Water Pumping Station	No	No	0
56	Community House	Place of Assembly	No	No	0
57	Holy Name Parish/Saint Joachim Church	Place of Worship	No	No	0
58	Rockport United Methodist Church	Place of Worship	No	No	0
59	Saint Mary's Episcopal Church	Place of Worship	No	No	0

Table 5 : Relationship of Critical Infrastructure to Hazard Areas

ID	NAME	TYPE	Within FEMA Flood Zone	Within Locally Identified Area of Flooding	Hurricane Surge Areas (Category#)
60	Denghausen Library	Municipal	No	No	0
61	First Baptist Church of Rockport	Place of Worship	No	No	0
62	First United Congregational Church	Place of Worship	No	No	0
63	Unitarian Universalist Church	Place of Worship	No	No	0
64	Pigeon Cove Chapel	Place of Worship	No	No	0
65	U.S. Post Office	Post Office	No	No	0
66	Long Beach Seawall	Seawall	VE	Long Beach	0
67	Loop Pond Dyke	Dyke	X500	No	0
68	Cape Pond Dam	Dam	X500	No	0
69	Old Garden Beach Pump Station	Pump Station	No	No	0
70	Flat Ledge Reservoir	Water Supply	X500	No	0

Explanation of Columns in Table 4.

Column 1: ID #: The first column in Table 6 is an ID number which appears on the maps that are part of this plan. See Appendix B.

Column 2: Site Name: The second column is the name of the site. If no name appears in this column, this information was not provided to MAPC by the community.

Column 3: Site Type: The third column indicates what type of site it is.

Column 4: FEMA Flood Zone: The fifth column addresses the risk of flooding. A "No" entry in this column means that the site is not within any of the mapped risk zones on the Flood Insurance Rate Maps (FIRM maps). If there is an entry in this column, it indicates the type of flood zone as follows:

Column 5: Locally Identified Areas of Flooding: The locally identified areas of flooding were identified by town staff as areas where flooding occurs. These areas do not necessarily coincide with the flood zones from the FIRM maps. They may be areas that flood due to inadequate drainage systems or other local conditions rather than location within a flood zone. The numbers correspond to the numbers on Map 8, "Hazard Areas".

Column 6: Hurricane surge area: This column indicates whether the site is located within a hurricane surge area and the potential degree of inundation in the event of a hurricane. A "1" in this column indicates the lowest potential for inundation and a "5" indicates the highest potential for inundation.

Potential Damages to Existing Development

Introduction to HAZUS -MH

HAZUS- MH (multiple-hazards) is a computer program developed by FEMA to estimate losses due to a variety of natural hazards. The following overview of HAZUS-MH is taken from the FEMA website. For more information on the HAZUS-MH software, go to http://www.fema.gov/plan/prevent/hazus/index.shtm

> "HAZUS-MH is a nationally applicable standardized methodology and software program that contains models for estimating potential losses from earthquakes, floods, and hurricane winds. HAZUS-MH was developed by the Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS). Loss estimates produced by HAZUS-MH are based on current scientific and engineering knowledge of the effects of hurricane winds, floods and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing and evaluating mitigation plans and policies as well as emergency preparedness, response and recovery planning.
>
> HAZUS-MH uses state-of-the-art geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods and earthquakes on populations."

There are three modules included with the HAZUS-MH software: hurricane wind, flooding, and earthquakes. There are also three levels at which HAZUS-MH can be run. Level 1 uses national baseline data and is the quickest way to begin the risk assessment process. The analysis that follows was completed using Level 1 data.

Level 1 relies upon default data on building types, utilities, transportation, etc. from national databases as well as census data. While the databases include a wealth of information on the communities that are a part of this study, it does not capture all relevant information. In fact, the HAZUS training manual notes that the default data is "subject to a great deal of uncertainty."

However, for the purposes of this plan, the analysis is useful. This plan is attempting to only generally indicate the possible extent of damages due to certain types of natural disasters and to allow for a comparison between different types of disasters. Therefore, this analysis should be considered to be a starting point for understanding potential damages from the hazards. If interested, communities can build a more accurate database and further test disaster scenarios.

HAZUS-MH Results for Hurricanes

According to the State Hazard Mitigation Plan, between 1858 and 2000, there were 15 hurricanes. 60% were Category 1, 33% were Category 2 and 7% were Category 3. For the purposes of this plan, a Category 3 and a Category 4 storm was chosen to illustrate damages. The reason is to present more of a "worst case scenario" that would help planners and emergency personnel evaluate the impacts of storms that might be more likely in the future, as we enter into a period of more intense and frequent storms.

Table 6[3]
Estimated Damages from Hurricanes

	Category 3	**Category 4**
Building Characteristics		
Estimated total number of buildings	3,364	3,364
Estimated total building replacement value (Year 2002 $) (Millions of Dollars)	$809	$809
Building Damages		
# of buildings sustaining minor damage	6	421
# of buildings sustaining moderate damage	0	60
# of buildings sustaining severe damage	0	2
# of buildings destroyed	0	1
Population Needs		
# of households displaced	0	12
# of people seeking public shelter	0	3
Debris		
Building debris generated (tons)	32	1,420
Tree debris generated (tons)	0	2,527
# of truckloads to clear building debris	1	57
Value of Damages (Thousands of dollars)		
Total property damage	$331.12	$8,248.78
Total losses due to business interruption	$5.56	$1,164.93

[3] The town believes that these numbers are low based on comparisons with recent wind storms that did not approach hurricane force. As stated previously, these numbers were generated with default data in the HAZUS program which are subject to a great deal of uncertainty. MAPC used the HAZUS program to ensure uniformity throughout all hazard mitigation plans.

HAZUS-MH Results for Earthquakes

The HAZUS earthquake module allows users to define a number of different types of earthquakes and to input a number of different parameters. The module is more useful where there is a great deal of data available on earthquakes. In New England, defining the parameters of a potential earthquake is much more difficult because there is little historical data. The earthquake module does offer the user the opportunity to select a number of historical earthquakes that occurred in Massachusetts. For the purposes of this plan two earthquakes were selected: a 1963 earthquake with a magnitude of 5.0 and an earthquake with a magnitude of 7.0.

Table 7
Estimated Damages from Earthquakes

	Magnitude 5.0	**Magnitude 7.0**
Building Characteristics		
Estimated total number of buildings	3,364	3,364
Estimated total building replacement value (Year 2002 $)(Millions of dollars)	$809	$809
Building Damages		
# of buildings sustaining slight damage	136	1,074
# of buildings sustaining moderate damage	26	1,169
# of buildings sustaining extensive damage	3	435
# of buildings completely damaged	0	147
Population Needs		
# of households displaced	3	430
# of people seeking public shelter	0	96
Debris		
Building debris generated (tons)	NA	NA
# of truckloads to clear building debris	NA	NA
Value of Damages (Millions of dollars)		
Total property damage	$13.08	$206.80
Total losses due to business interruption	$0.58	$36.72

Vulnerability Assessment for Flooding

MAPC did not use HAZUS-MH to estimate flood damages in Rockport. In addition to technical difficulties with the software, the riverine module is not a reliable indicator of flooding in areas where inadequate drainage systems contribute to flooding even when those structures are not within a mapped flood zone. In Rockport, much of the flooding is due to deficiencies in the drainage system. In lieu of using HAZUS, MAPC developed a methodology to give a rough approximation of flood damages.

Rockport is 7.14 square miles or 4,569 acres. Approximately 185 acres have been identified by local officials as areas of flooding. This amounts to 4.0% of the land area in Rockport. The number of structures in each flood area was estimated by applying the percentage of the total land area to the number of structures (3,364) in Rockport; the same number of structures used by HAZUS for the hurricane and earthquake calculations. HAZUS uses a value of $240,487 per structure for the building replacement value. This was used to calculate the total building replacement value in each of the flood areas. The calculations were done for a low estimate of 10% building damages and a high estimate of 50% as suggested in the FEMA September 2002 publication, "State and Local Mitigation Planning how-to guides". (Page 4-13). The range of estimates for flood damages is $3,487,060 - $17,435,308. These calculations are not based on location within the floodplain or a particular type of storm (i.e. 100 year flood).

Table 8
Summary of Flood Damages

	Acres	**Structures**	**Low Estimate**	**High Estimate**
Inland areas	46.15	37	$889,801	$4,449,010
Coastal areas	136.08	108	$2,597,259	$12,986,298
Total	*182.23*	*145*	*$3,487,060*	*$17,435,308*

Potential Impacts to Future Development

The town has identified one parcel where development is expected to occur in the future. This parcel is within the Pigeon Cove Harbor flood hazard area.

Table 9: Estimated Damages from Flooding

Flood Hazard Area	Approximate Area in Acres	% of Total Land Area	Approximate # of structures	Replacement value	Low Estimate of Damages	High Estimate of Damages
Inland/freshwater flooding						
Lowest Lane and Summit Avenue	6.95	0.15	6	$1,442,922	$144,292	$721,461
Folly Cove	3.43	0.07	3	$721,461	$72,146	$360,731
Penryn Way	6.56	0.14	5	$1,202,435	$120,244	$601,218
High Street Court and Pleasant Street	7.97	0.17	6	$1,442,922	$144,292	$721,461
Main Street/Route 127 (Nugent Stretch)	12.81	0.28	10	$2,404,870	$240,487	$1,202,435
Brook's Road and Arens Road	3.81	0.08	3	$721,461	$72,146	$360,731
Squam Hill	4.62	0.10	4	$961,948	$96,194	$480,974
Coastal flooding						
Bearskin Neck	3.70	0.08	3	$721,461	$72,146	$360,731
T Wharf	3.31	0.07	3	$721,461	$72,146	$360,731
Long Beach	47.36	1.04	35	$8,417,045	$841,705	$4,208,523
Cape Hedge Beach	24.75	0.54	19	$4,569,253	$456,925	$2,284,627
Pebble Beach	15.21	0.33	12	$2,885,844	$288,584	$1,442,922
Loblolly Cove	1.98	0.04	2	$480,974	$48,097	$240,487
Penzance Road	10.91	0.24	9	$2,164,383	$216,438	$1,082,192
Old Garden Cove Beach	1.91	0.04	2	$480,974	$48,097	$240,487
Front Beach	5.77	0.13	5	$1,202,435	$120,244	$601,218
Back Beach	4.26	0.09	4	$961,948	$96,195	$480,974
Granite Pier	7.96	0.17	6	$1,442,922	$144,292	$721,461
Pigeon Cove Harbor	3.18	0.07	3	$721,461	$72,146	$360,731
Gap Cove	5.78	0.13	5	$1,202,435	$120,243	$601,217

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V. EXISTING MITIGATION MEASURES

Existing Multi-Hazard Mitigation Measures

There are several mitigation measures that impact more than one hazard. These include the Comprehensive Emergency Management Plan (CEMP), the Massachusetts State Building Code and participation in a local Emergency Planning Committee.

Comprehensive Emergency Management Plan (CEMP) – Every community in Massachusetts is required to have a Comprehensive Emergency Management Plan. These plans address mitigation, preparedness, response and recovery from a variety of natural and man-made emergencies. These plans contain important information regarding flooding, dam failures and winter storms. Therefore, the CEMP is a mitigation measure that is relevant to many of the hazards discussed in this plan.

Enforcement of the State Building Code – The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing and snow loads.

Local Emergency Planning Committee (LEPC) –Rockport is a member of the Southern Essex Regional Emergency Planning Committee along with Beverly, Danvers, Essex, Gloucester, Lynn, Manchester-by-the-Sea, Marblehead, Nahant, Peabody, Salem and Swampscott.

Existing Flood Hazard Mitigation Measures

Participation in the National Flood Insurance Program (NFIP) – FEMA maintains a database on flood insurance policies and claims. This database can be found on the FEMA website at http://www.fema.gov/business/nfip/statistics/pcstat.shtm. Statistics are available through July 31, 2009. The following information is provided for the Town of Rockport.

Table 10
Flood Insurance Policies and Premiums

Flood insurance policies in force (as of July 31, 2009)	297
Coverage amount of flood insurance policies	$63,615,300
Premiums paid	$480,014
Total losses (all losses submitted regardless of the status)	
Closed losses (Losses that have been paid)	3
Open losses (Losses that have not been paid in full)	0
CWOP losses (Losses that have been closed without payment)	3
Total payments (Total amount paid on losses)	$9,714

Source: http://www.fema.gov/business/nfip/statistics/pcstat.shtm

The Town complies with the NFIP by enforcing floodplain regulations, maintaining up-to-date floodplain maps, and providing information to property owners and builders regarding floodplains and building requirements.

Street sweeping – The town sweeps all streets in the downtown area weekly in the summer. The streets in residential areas are swept twice a year. This street sweeping effort is required under the Phase II NPDES permit. The town does all street sweeping in-house which is difficult due to the manpower requirements. The DPW is down to a staff of 25. All of the street sweeping vehicles are old and should be replaced. The town recently purchased a new vac truck.

Catch basin cleaning – Under the Phase II NPDES permit, all catch basins are cleaned once a year. None of the outfalls have screens or grates that would need to be cleaned. There are approximately 300 catch basins and all cleaning work is done in house. The DPW has worked with the Conservation Commission to implement a management program for keeping clear all outfalls, culverts, ditches and roadways where they come in contact with or drain into any wetland resource area (both inland or coastal). This program is working very well to help keep flooding to a minimum in town. However, there are still areas where more frequent cleaning of catch basins would be desirable.

Roadway Treatments – The town usually uses a mixture of sand and salt although straight salt is used occasionally. Despite the towns' street sweeping program it is difficult to clean all catch basins as frequently as may be needed and sand treatments will collect in catch basins. There is a problem with sedimentation at Mill Pond. The town would like to install several Vortechnics units at Mill Pond to catch sediment. These units separate out sand and gravel and cost approximately $10,000 each. They work well as long as they are maintained.

Zoning Bylaw – Section VIII of the Town of Rockport Zoning Bylaw (2008) establishes a coastal flood overlay district. The purpose of the district is to ensure that land subject to seasonal or periodic flooding will not be used in such a way as to endanger the health or safety of the public, to burden the public with costs resulting from the unwise use of land and to minimize the impact of coastal storms. The district includes all special flood hazard areas designated on the FIRM maps dated June 19, 1985 and revised July 2, 1992. The bylaw further states that all development must be in compliance with M.G.L chapter 131 s. 40 and with the requirements of the State Building Code pertaining to construction in the flood plain. Development must also be in compliance with the Inland Wetland Restriction requirements and the Coastal Wetland Restriction requirements as well as the minimum requirements for subsurface disposal of sanitary sewage. The bylaw further states that areas determined to be outside the Flood Plain District shall be exempt.

The bylaw encourages uses that have a low potential for flood damage. The bylaw also states that within Zone AH and AO, adequate drainage paths around structures on slopes, must be provided to guide flood waters away from structures. Within zones VI-30, VE and V there shall be no alteration of sand dunes which would increase potential flood

damage and all new construction within zones VI-30, VE and V must be located landward of the reach of mean high tide.

Water main breaks – The water system is in relatively good shape and there are not a lot of old water mains. There are approximately 2-3 water main breaks annually. Hydrants are flushed once a year although the town would prefer to be able to do it twice a year.

Use of Vortechnics Units – The town has installed two Vortechnics units on Thatcher Road to prevent silt from entering the storm drain system. These were paid for by a grant obtained by the Conservation Commission. These units separate out sand and gravel and work well as long as they are maintained.

Participation in the Eight Towns and the Bay Committee - Rockport is a member of the Eight Towns and the Bay Committee (Committee) of the Massachusetts Bays Program. This regional committee includes Salisbury, Amesbury, Newburyport, Newbury, Rowley, Ipswich, Essex, Gloucester and Rockport. The committee was established in 1992 to promote local and regional coastal water quality initiatives and is comprised of citizens appointed by the chief elected officials in each of the nine member communities. The committee works with communities and the general public to foster stewardship of coastal resources.

Existing Dam Failure Mitigation Measures

The Comprehensive Emergency Management Plan – The CEMP addresses dam safety.

Permits required for construction – State law requires a permit for the construction of any dam.

DCR dam safety regulations – All dams are subject to the Division of Conservation and Recreation's dam safety regulations.

Existing Wind Hazard Mitigation Measures

Massachusetts State Building Code – The Town enforces the Massachusetts State Building Code whose provisions are generally adequate to mitigate against most wind damage. The code's provisions are the most cost-effective mitigation measure against tornados given the extremely low probability of occurrence. If a tornado were to occur in Everett, damages would be extremely high due to the prevalence of older construction and the density of development.

Tree-trimming – Rockport follows M.G.L. 87, the most important law governing the protection of trees. M.G.L 87 includes a definition of shade trees, defines the powers of municipal tree wardens, regulates the cutting and removal of public shade trees and regulates tree planting on state highways. The town monitors the health of its trees, pruning when necessary, and cutting down and discarding old and diseased trees which

pose a hazard. The town contracts out all tree work because it no longer has a tree warden. The budget for tree work is $2,000 per year. The town does not have a chipper for trees. National Grid has done a lot of tree trimming work in Pigeon Cove.

Existing Winter Hazard Mitigation Measures

There are no specific measures beyond regular salting and sanding of the roads and local plowing.

Snow disposal – The town removes snow only from the downtown and from sidewalks. The snow is disposed of on top of Granite Pier. This method of snow disposal has been working well. EPA prohibits snow from being dumped directly into the harbor. Most of the plowing is done by the town but the town does contract with some private plow companies.

Existing Fire Hazard Mitigation Measures

Permits required for outdoor burning - The Fire Department requires permits for outdoor burning. There is an application process which includes a fee and a site inspection. The applicant is also given written rules.

Subdivision review - The Fire Department is involved in reviewing site plans for subdivisions to ensure that there is adequate access for fire trucks and an adequate water supply. The Fire Department then makes recommendations to the Planning Board.

Equipment - The Forest Fire Department maintains the following equipment:

- Three pickup trucks converted to fire trucks carrying 200-400 gallons of water.
- 41 Ford Engine
- Portable pumps

Potential Fire Hazard Mitigation Measures

The most important fire hazard mitigation measure is access to fight fires.

Refurbish the fire roads in the Nugent Stretch – The fire roads that provide access to the Nugent Stretch need to be refurbished.

Geologic Hazards

Most town officials acknowledged that earthquakes were the hazard for which their community was least prepared. Although new construction under the most recent building codes generally will be built to seismic standards, much of the development in the town pre-dates the most recent building code. Massachusetts in general has a low risk for earthquakes.

Existing Geologic Hazard Mitigation Measures

Massachusetts State Building Code – The State Building Code contains a section on designing for earthquake loads (780 CMR 1612.0). Section 1612.1 states that the purpose of these provisions is "to minimize the hazard to life to occupants of all buildings and non-building structures, to increase the expected performance of higher occupancy structures as compared to ordinary structures, and to improve the capability of essential facilities to function during and after an earthquake". This section goes on to state that due to the complexity of seismic design, the criteria presented are the minimum considered to be "prudent and economically justified" for the protection of life safety. The code also states that absolute safety and prevention of damage, even in an earthquake event with a reasonable probability of occurrence, cannot be achieved economically for most buildings.

Section 1612.2.5 sets up seismic hazard exposure groups and assigns all buildings to one of these groups according to a Table 1612.2.5. Group II includes buildings which have a substantial public hazard due to occupancy or use and Group III are those buildings having essential facilities which are required for post-earthquake recovery, including fire, rescue and police stations, emergency rooms, power-generating facilities, and communications facilities.

Table 11
Existing Mitigation Measures

Type of Existing Protection	Description		Area Covered		Effectiveness /Enforcement		Improvements/ Changes Needed
MITIGATION MEASURES RELATING TO MULTIPLE HAZARDS							
Comprehensive Emergency Management Plan (CEMP)	Every community in Massachusetts is required to have a CEMP. These plans address mitigation, preparedness, response and recovery from a variety of natural and man-made emergencies.		Town-wide.		Emphasis is on emergency response.		None.
Massachusetts State Building Code	The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing and snow loads.		Town-wide.		Most effective for new construction.		None.
Participation in the Southern Essex Regional Emergency Planning Committee	Includes Beverly, Danvers, Essex, Gloucester, Lynn, Manchester-by-the-Sea, Marblehead, Nahant, Peabody, Rockport, Salem, Swampscott		Regional.		a forum for regional cooperation on natural and man-made disasters.		None.

Table 11
Existing Mitigation Measures

Type of Existing Protection	Description	Area Covered	Effectiveness /Enforcement	Improvements/ Changes Needed
FLOOD RELATED HAZARDS				
Participation in the National Flood Insurance Program	The town participates in the National Flood Insurance Program and has adopted the effective FIRM maps. The town actively enforces the floodplain regulations.	Areas identified on the FIRM maps.	Effective for homeowners who have policies.	Encourage all eligible homeowners to obtain insurance.
Street sweeping	The town sweeps all street in downtown weekly in the summer and all residential streets twice a year.	Town-wide.	Effective.	Equipment is aging and needs to be replaced.
Catch basin cleaning	All 300 catch basins are cleaned once a year.	Town-wide.	Ensures that all basins are cleaned at least once yearly.	Additional manpower would be required to clean selected catch basins where siltation is a problem on a more regular basis.
FLOOD RELATED HAZARDS (Continued)				

Table 11
Existing Mitigation Measures

Type of Existing Protection	Description		Area Covered		Effectiveness /Enforcement		Improvements/ Changes Needed
Roadway treatments	The town treats the roads with a mixture of sand and salt.		Town-wide.		Effective.		There is some sedimentation at Mill Pond and the town would like to install Vortechnics Units.
Coastal flood overlay zoning district	The coastal flood overlay district imposes certain restrictions on development within designated flood hazard areas and requires compliance with the portions of the state building code related to construction in the flood plain.		All special flood hazard areas designated on the FIRM maps for Rockport.		Effective primarily for new construction since much development in Rockport pre-dates the bylaw.		None.
Water main system	Hydrants are flushed once a year. The town experiences 2-3 water main breaks annually.		Town-wide.		Effective.		Town would like to be able to flush the hydrants twice a year.
FLOOD RELATED HAZARDS (Continued)							

Table 11
Existing Mitigation Measures

Type of Existing Protection	Description	Area Covered	Effectiveness /Enforcement	Improvements/ Changes Needed
Use of Vortechnics units	The town has installed two Vortechnics units on Thatcher Road to prevent silt from entering the storm drain system. These units separate sand and gravel.	Thatcher Road	Effective if they are properly maintained.	Funding for installation of additional units.
Participation in the Eight Towns and the Bay Committee.	This is a regional committee whose goal is to foster stewardship of coastal resources.	Salisbury, Amesbury, Newburyport, Newbury, Rowley, Ipswich, Essex, Gloucester and Rockport	Effective forum for a regional perspective on coastal issues.	No.
Dam Failures				
Comprehensive Emergency Management Plan	The CEMP addresses dam safety issues.	Plan is town-wide.	Emphasis is on emergency response	None.
FLOOD RELATED HAZARDS (Continued)				

Table 11
Existing Mitigation Measures

Type of Existing Protection	Description		Area Covered		Effectiveness /Enforcement		Improvements/ Changes Needed
State permits required for dam construction.	State law requires a permit for the construction of any dam.		State-wide.		Most effective for ensuring initial construction meets the code.		None.
DCR dam safety regulations	The state has enacted dam safety regulations mandating inspections and emergency action plans.		State-wide.		Enforcement is an issue.		Staffing and budgeting needs to be addressed.
WIND-RELATED HAZARDS							
Comprehensive Emergency Management Plan (CEMP)	The Town has developed a CEMP that addresses hurricane/tornado concerns.		Town-wide.		Effective primarily for emergency response; less geared towards mitigation.		None.
The Massachusetts State Building Code	The Town enforces the Massachusetts State Building Code.		Town-wide.		Effective for most situations except severe storms.		None.
WINTER-RELATED HAZARDS							

Table 11
Existing Mitigation Measures

Type of Existing Protection	Description		Area Covered		Effectiveness /Enforcement		Improvements/ Changes Needed
Snow disposal	The town removes snow only from the downtown and from sidewalks. Snow is disposed of on top of Granite Pier. Plowing is done by the town with some contracted labor.		Town-wide for roads and downtown for sidewalks.		The town effectively plows and removes snow to facilitate drainage.		None.
FIRE RELATED HAZARDS							
Permits required for outdoor burning	The Fire Department requires permits for outdoor burning. There is an application process. The department charges a fee, does a site inspection and distributes written rules.		Town-wide.		Effective.		None.
Subdivision review	The Fired Department is involved in reviewing site plans for subdivisions to ensure that there is adequate access for fire trucks and an adequate water supply.		Town-wide.		Effective.		None.
GEOLOGIC HAZARDS							

Table 11
Existing Mitigation Measures

Type of Existing Protection	Description		Area Covered		Effectiveness /Enforcement		Improvements/ Changes Needed
The Massachusetts State Building Code	The Town enforces the Massachusetts State Building Code.		Town-wide.		Effective for most situations.		None.

VI. HAZARD MITIGATION GOALS AND OBJECTIVES

The Rockport Local Multiple Hazard Community Planning Team met on January 21, 2010. At that meeting, the members were given two options for developing hazard mitigation goals: brainstorming without the benefit of a draft set of goals or reviewing a draft set of goals developed by the planning team at MAPC. The community chose to review the draft set of goals. The set of goals as presented was approved by the community planning team.

1. Prevent and reduce the loss of life, injury and property damages resulting from all major natural hazards.

2. Identify and seek funding for measures to mitigate or eliminate each known significant flood hazard area.

3. Integrate hazard mitigation planning as an integral factor in all relevant municipal departments, committees and boards.

    - Ensure that the Planning Department considers hazard mitigation in its review and permitting of new development.
    - Review zoning regulations to ensure that the ordinance incorporates all reasonable hazard mitigation provisions.
    - Ensure that all relevant municipal departments have the resources to continue to enforce codes and regulations related to hazard mitigation.

4. Prevent and reduce the damage to public infrastructure resulting from all hazards.

    - Begin to assess the vulnerability of municipal buildings and infrastructure to damage from an earthquake.
    - Maintain existing mitigation infrastructure in good condition.

5. Encourage the business community, major institutions and non-profits to work with the town to develop, review and implement the hazard mitigation plan.

6. Work with surrounding communities, state, regional and federal agencies to ensure regional cooperation and solutions for hazards affecting multiple communities.

    - Continue to participate in the Southern Essex Regional Emergency Planning Committee.

7. Ensure that future development meets federal, state and local standards for preventing and reducing the impacts of natural hazards.

8. Educate the public about natural hazards and mitigation measures that can be undertaken by property-owners.

9. Take maximum advantage of resources from FEMA and MEMA to educate town staff and the public about hazard mitigation.

VII. POTENTIAL MITIGATION MEASURES

What is hazard mitigation?

Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries and property resulting from natural and human-made hazards through long-term strategies. These long-term strategies include planning, policy changes, programs, projects and other activities. FEMA currently has three mitigation grant programs: the Hazards Mitigation Grant Program (HGMP), the Pre-Disaster Mitigation program (PDM), and the Flood Mitigation Assistance (FMA) program. The three links below provide additional information on these programs.

http://www.fema.gov/government/grant/hmgp/index.shtm

http://www.fema.gov/government/grant/pdm/index.shtm

http://www.fema.gov/government/grant/fma/index.shtm

Identification and Prioritization of Potential Mitigation Measures

The local committee considered potential mitigation measures at the January 21, 2010 meeting. These were later refined as cost estimates became available.

Process for Setting Priorities

The designation of high, medium or low priority was made over the course of several meetings of the Local Multiple Hazard Community Planning Team. The method used was to reach consensus through discussion, rather than taking a vote. Priority setting was based on local knowledge of the hazard areas. In determining project priorities, the local team considered potential benefits and project costs. Prior to discussing priorities, the local committee reviewed the STAPLE/E criteria. These criteria were also used to evaluate the high priority projects. The designations reflect discussion and a general consensus at the meeting but could change as conditions in the community change.

The breakdown of high and medium priority measures, along with measures to ensure ongoing compliance with NFIP and other possible measures is provided in the discussions below and summarized in Table 11.

Potential Flood Hazard Mitigation Measures

There are no feasible mitigation measures for many of the coastal flood hazard areas. Coastal areas have always been considered attractive locations for residential development and much of the coastline in Rockport has been developed in ways that likely would not be permitted under existing regulations. The cycle of storm damage to

residences and to the beaches themselves is inevitable when construction is allowed in areas subject to wave action and storm surges.

Mitigation is further limited because a number of the beaches are barrier beaches which are subject to federal and local regulations regarding changes to the environment. There are a number of beaches where armoring the stone revetments would decrease the need to repair and replace these structures after storms but regulations prohibit this activity. As it is, the town spends a great deal of time and money on repairing structures and removing debris after storms. The town has recurring costs to clean sand from the roads, replace gravel and in some cases, repave roads damaged by erosion and reconstruct structures. Costs for cleanup and reconstruction after a major storm range from $2,000 - $50,000 per beach.

For the reasons cited above, the following section on mitigation measures is limited to those flood hazard areas where the town had identified a feasible mitigation measure that can be accomplished within the existing regulatory framework.

High Priority Mitigation Measures: Current FEMA Grants

A number of flood hazard areas that were previously identified are due to be mitigated under FEMA grants which have been approved but on which the work has not yet been started. The town has requested and been granted time extensions on these grants in order to secure the local match necessary. These mitigation measures are all high priorities. These are listed below.

Back Beach Stone Revetment (Project Worksheet #460) – The cost of this project is $249,662. The work involves removing and resetting 300 feet of granite stone revetment.

Old Wharf Road, granite pier and stone revetment (Project Worksheet #465) – This grant application was submitted to FEMA after the April 2007 Nor'easter. The estimated cost for this project is $525,648. The Town received approval of the match at the April 2010 Town Meeting.

Mill Pond Dam (Project Worksheet #92) – This grant application was submitted to FEMA based on the May 2006 flood. The design of the proposed dam has been reviewed by FEMA and revisions have been made. The town has submitted a Notice of Intent to the Conservation Commission and is awaiting an order of conditions. The town is also in the process of obtaining a permit from the Army Corps of Engineers. The design has been forwarded to the MA Historical Commission for review. The estimated cost of this project is $719,000.

Recent Applications to FEMA

There were a number of storms during the period from March 12, 2010 – April 26, 2010. As a result of those storms the town has submitted applications to FEMA for storm-

related damage. FEMA conducted a site visit on June 17, 2010 to inspect damages to Bearskin Neck, Back Beach Road, Old Granite Pier and Pigeon Cove. Following this visit, the town submitted the following applications for assistance:

Pigeon Cove Sea Wall and Harbor Entrance (Disaster 1895: Project No. RSKG26) – Strong storm surge and pounding waves damaged the Pigeon Cove Sea Wall and harbor entrance. This project will cost $116,217 and does not include hazard mitigation. Due to historic and coastal concerns it was determined that the footprint of the Pigeon Cove Sea Wall and Harbor Entrance should not be changed in any form and should be repaired to pre-disaster conditions only.

Old Granite Pier Road (Disaster 1895: Project No. RSKG27) – Strong storm surge and pounding waves damaged the stone revetments on the granite pier. The project cost is $117,002 and does not include hazard mitigation. Due to historic and coastal environmental concerns it was determined that the footprint of the granite pier should not be changed in any form and should be repaired to pre-disaster condition only.

Future Potential Mitigation Measures

Improvements to White Wharf at Bearskin Neck– The town has completed the engineering work for improvements to White Wharf. The plans include re-arranging and armoring the granite blocks at a cost of approximately $100,000. This task requires the use of heavy equipment and is slow work.

Drainage improvements at Lowest Lane and Summit Avenue – This is the highest priority for mitigation of inland flooding. The town has estimated the cost of engineering for a new drainage system from Lowest Lane and Summit Avenue to Railroad Avenue to be approximately $15,000. The cost of construction for a new drainage system would be approximately $50,000. A portion of the cost is due to the presence of existing utilities in Railroad Avenue.

Upgrade pilings at T Wharf – The town would like to upgrade the public section of T Wharf which would include re-doing the pilings. This would cost approximately $150,000 and would need to be done in sections in the off-season to avoid disruption to heavy tourist traffic during the summer.

Replace staircases at Long Beach- The town would like to replace three of the wooden staircases with three permanent concrete or steel staircases. Each staircase is estimated to cost approximately $5,000 a piece for a total cost of $15,000.

Emergency sidewalk improvements to the Long Beach Sea Wall – Although the town is still deciding on the best long term approach to rehabilitating the Long Beach Sea Wall, short-term repairs related directly to public safety of pedestrians would require at a minimum $15,000.

Long Beach Sea Wall Improvements – The Long Beach Improvement Association prepared a summary of structural conditions and proposed repairs, which was compiled from eleven

different sources. Oak Engineering prepared cost estimates for several alternatives. Alternative #1 involves demolishing and replacing the sections constructed in 1931 and repairing the sections constructed in 1959. This estimate is for $1,845,000. A second alternative would be to install a rubble-mound breakwater ($925,000). Replacement of the entire sea wall is estimated to cost greater than $3 million.

Improvements to Penzance Road at Pebble Beach – The Daylor Consulting Group recommended Option 1 from their 2003 study as the most cost-effective solution to flooding in this area. This option consists of constructing a new pavement surface 18 feet in width and 564 feet long. The proposed pavement surface includes an asphalt overlay fabric sandwiched between a 2 inch binder course and a 1 1.5 binder course. This asphalt overlay fabric is an impervious membrane that fuses to the two layers of asphalt and forms a barrier to protect the subgrade from saturation. It also will retain the compacted soil layers from erosion by storm waves. Daylor stated that this level of protection should protect the road from yearly coastal storms up to the 5 year frequency.

Squam Hill Drainage Improvements- It would require approximately $20,000 worth of drainage improvements to correct the flooding issues from Squam Hill runoff.

Medium Priority Mitigation Measures

Culvert replacement on Route 127/Nugent Stretch – This project involves replacing the existing granite culvert with an adequately sized pipe culvert. The approximate cost would be $20,000. This stretch of Route 127 is a state highway and therefore, the Mass. DOT would be the responsible party.

Folly Cove drainage improvements – This project would require approximately $5,000 in engineering design costs and $10,000 to install a second 36 inch pipe alongside the existing pipe.

Other Potential Mitigation Measures

Drainage improvements at Penryn Way – This project would require approximately $3,000 in engineering design costs. The installation of new pipes, catch basins and manholes would be approximately $20,000.

Drainage improvements at High Street Court and Pleasant Street – The potential mitigation for this area would be enlarging the culverts, each to an equal size and stream restoration. The structural improvements would require $10,000 to add basins and increase pipe sizes as needed.

Sedimentation reduction at Mill Pond- There is a problem with sedimentation at Mill Pond. The town would like to install several Vortechnics units that discharge to Mill Pond to catch sediment. These units separate out sand and gravel and cost approximately $10,000 each. They work well as long as they are maintained.

Refurbish the fire roads in the Nugent Stretch – The Forest Fire Department has sufficient equipment for fighting fires but is limited by inadequate access. The fire roads that provide access to the Nugent Stretch need to be refurbished.

Purchase new street sweeping equipment– The Town does all street sweeping in-house. All of the street sweeping vehicles are old and should be replaced. The town also needs a new vacuum truck.

Make recommended repairs at the Carlson Quarry Dam- The town had an inspection and evaluation done in August 2009. GEI Consultants Inc. made five recommendations. The structural repairs to the dam would cost $16,000 - $25,000.

Measures to ensure continued compliance with National Flood Insurance Program requirements

A) Continuation of Open Space Protection and Land Acquisition

Although Rockport already has a significant amount of protected land, further protection of open space in the wake of development is important in order to ensure future development does not increase vulnerability to natural hazards, such as flooding. The town should continue its efforts for open space protection and purchases as prioritized in the Open Space Plan.

B) Regulatory Revisions for Stormwater Management

The current subdivision and site plan requirements do have basic standards for stormwater management, but they could be updated to reflect more current trends to help prevent flooding from new development and redevelopment. In particular, the regulations should include:

- Requirements for aggressive and legally-binding operation and maintenance agreements, with enforcement mechanisms, for private drainage facilities.
- Regulatory controls to encourage Low-Impact Development (LID) practices.

C) Become Fully "*Storm Ready"*

The town can take additional measures to become "storm ready" with respect to its alerting systems. One possible method that is available is a television notification system. By subscribing to a service, the town would have the ability to overwrite any TV programming to alert residents of an impending emergency or bad weather.

D) Provide Information on NFIP Compliance

The city can distribute and make available information on the National Flood Insurance Program including information on insurance and building code requirements through explanatory pamphlets, booklets and on-line resources.

Introduction to Potential Mitigation Measures (Table 11)

Description of the Mitigation Measure – The description of each mitigation measure is brief and cost information is given only if cost data were already available from the community. The cost data represent a point in time and would need to be adjusted for inflation and for any changes or refinements in the design of a particular mitigation measure.

Priority – The designation of high, medium or low priority was done at the meeting of the Local Multiple Hazard Community Planning Team meeting. The designations reflect discussion and a general consensus developed at the meeting but could change as conditions in the community change. In determining project priorities, the local team considered potential benefits and project costs.

Implementation Responsibility – The designation of implementation responsibility was done by MAPC based on a general knowledge of what each municipal department is responsible for. It is likely that most mitigation measures will require that several departments work together and assigning staff is the sole responsibility of the governing body of each community.

Time Frame – The time frame was based on a combination of the priority for that measure, the complexity of the measure and whether or not the measure is conceptual, in design, or already designed and awaiting funding. Because the time frame for this plan is five years, the timing for all mitigation measures has been kept within this framework. The identification of a likely time frame is not meant to constrain a community from taking advantage of funding opportunities as they arise. Where a single year is shown it indicates the projected start date of the measure. Where a range of years is shown, it indicates a multi-year effort.

Potential Funding Sources – This column attempts to identify the most likely sources of funding for a specific measure. The information on potential funding sources in this table is preliminary and varies depending on a number of factors. These factors include whether or not a mitigation measure has been studied, evaluated or designed or are still in the conceptual stages. MEMA and DCR assisted MAPC in reviewing the potential eligibility for hazard mitigation funding. Each grant program and agency has specific eligibility requirements that would need to be taken into consideration. In most instances, the measure will require a number of different funding sources. Identification of a potential funding source in this table does not guarantee that a project will be eligible for, or selected for funding. Upon adoption of this plan, the local committee responsible for its implementation should begin to explore the funding sources in more detail.

Additional information on funding sources – The best way to determine eligibility for a particular funding source is to review the project with a staff person at the funding agency. The following websites provide an overview of programs and funding sources.

Army Corps of Engineers (ACOE) – The website for the North Atlantic district office is http://www.nae.usace.army.mil/. The ACOE provides assistance in a number of types of projects including shoreline/streambank protection, flood damage reduction, flood plain management services and planning services.

Massachusetts Emergency Management Agency (MEMA) – The grants page http://www.mass.gov/dem/programs/mitigate/grants.htm has a useful table that compares eligible projects for the Hazard Mitigation Grant Program and the Flood Mitigation Assistance Program.

United States Department of Agriculture – The USDA has programs by which communities can get grants for fire fighting needs.

Table 12
Potential Mitigation Measures

Mitigation Measure	Priority	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
High Priority Mitigation Measures for which there is a FEMA grant					
Old Wharf Road, Granite Pier, Stone Revetment (Project Worksheet 465)	High	DPW	2012	$525,648	FEMA
Mill Pond Dam (Project Worksheet 92)	High	DPW	2012	$719,000	FEMA
Back Beach Stone Revetment (Project Worksheet 460)	High	DPW	2012	$249,662	FEMA
Future Potential Mitigation Measures – High Priority					
Improvements to Whites Wharf at Bearskin Neck	High	DPW	2012	$100,000	FEMA
Drainage improvements at Lowest Lane and Summit Avenue	High	DPW	2013	$15,000 for engineering and $50,000 for structure	Town
Upgrade pilings at T Wharf	High	DPW	2013	$150,000	Town
Replace staircases at Long Beach	High	DPW	2013	$15,000	Town

Table 12
Potential Mitigation Measures

Mitigation Measure	Priority	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
Improvements to Penzance Road at Pebble Beach	High	DPW	2013	TBD	FEMA, Town
Squam Hill Drainage Improvements	High	DPW	2013	$20,000	Town
Emergency sidewalk improvements to the Long Beach Sea Wall	High	DPW	2013	$15,000	Town
Long Beach Sea Wall Improvements	High	DPW	2013	$925,000 - $3,000,000.	FEMA, Town
Future Potential Mitigation Measures: Medium Priority					
Culvert replacement on Route 127/Nugent Stretch	Medium	Mass DOT	2014	$20,000	Mass DOT
Folly Cove drainage improvements-install 36 inch pipe	Medium	DPW	2014	$5,000 engineering and $10,000 for structures	Town
Install Vortechnics units at Mill Pond to reduce sedimentation	Medium	DPW	2015	$20,000 for two units	Town
Make recommended repairs at the Carlson Quarry Dam	Medium	DPW	2015	$16,000 - $25,000	Town

Table 12
Potential Mitigation Measures

Mitigation Measure	Priority	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
Conduct a structural assessment of the south end revetment of the Cape Pond dam.	Medium	DPW	2013	Likely to be included as part of a town-funded Water Needs Assessment Study	Town
Conduct a structural assessment of the east end of the Loop Pond dyke.	Medium	DPW	2013	Likely to be included as part of a town-funded Water Needs Assessment Study	Town
Other Potential Mitigation Measures					
Drainage improvements at Penryn Way- new pipes, catch basins and manholes	Low	DPW	2015	$3,000 engineering and $20,000 for structures	Town
Drainage improvements at High Street Court and Pleasant Street	Low	DPW	2015	$3,000 engineering and $10,000 for structures.	Town
Refurbish fire roads in the Nugent Stretch	Low	DPW/Fire Dept.	2015	TBD	Town
Purchase new street sweeping	Low	DPW	2015	TBD	Town

Table 12 Potential Mitigation Measures					
Mitigation Measure	Priority	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
equipment					
Mitigation Measures Related to the National Flood Insurance Program					
Regulatory revisions for stormwater management	NFIP	Conservation Commission, Planning Board	2012	Town staff	Town, state grants
Become fully “Storm Ready”/TV alert notification	NFIP	Fire Dept.	2012 - 2014	$5-$15,000	Town and/or public safety grants.
Provide information on NFIP compliance	NFIP	Building Dept.	2012- 2017	Cost of materials	City, state grants
Continuation of open space protection and land acquisition	NFIP	Conservation Commission, Board of Selectmen	2012 - 2017	Varies from town staff time to purchase price of selected parcels	Town, Community Preservation Act, gifts, grants.

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VIII. REGIONAL AND INTER-COMMUNITY CONSIDERATIONS

Some hazard mitigation issues are strictly local. The problem originates primarily within the municipality and can be solved at the municipal level. Other issues are inter-community issues that involve cooperation between two or more municipalities. There is a third level of mitigation which is regional; involving a state, regional or federal agency or an issue that involves three or more municipalities.

Regional Partners

In many communities, mitigating natural hazards, particularly flooding, is more than a local issue. The drainage systems that serve these communities are a complex system of storm drains, roadway drainage structures, pump stations and other facilities owned and operated by a wide array of agencies including but not limited to the Town of Rockport, Massachusetts Department of Transportation (MASS DOT) and the Massachusetts Bay Transportation Authority (MBTA). The planning, construction, operations and maintenance of these structures are integral to the flood hazard mitigation efforts of communities. These agencies must be considered the communities regional partners in hazard mitigation. These agencies also operate under the same constraints as communities do including budgetary and staffing constraints and numerous competing priorities. In the sections that follow, the plan includes recommendations for activities to be undertaken by these other agencies. Implementation of these recommendations will require that all parties work together to develop solutions.

Inter-Community Considerations

Because Rockport has only one border (with Gloucester) there are few immediate inter-community issues. Rockport is part of the Cape Ann Emergency Planning Team which includes Gloucester, Manchester and Essex. This organization works closely together and includes: Fire, Police, Public Works, Schools, Emergency Management Services, Hospitals, Public Health and Administration function.

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IX. PLAN ADOPTION AND MAINTENANCE

Plan Adoption

The Rockport Hazard Mitigation Plan was adopted by the Board of Selectmen on [ADD DATE]. See Appendix D for documentation. The plan was approved by FEMA on [ADD DATE] for a five-year period that will expire on [ADD DATE].

Plan Maintenance

MAPC worked with the Rockport Hazard Mitigation Planning Team to prepare this plan This group will continue to meet on an as-needed basis to function as the Local Hazard Mitigation Implementation Group, with one town official designated as the coordinator. Additional members could be added to the local implementation group from businesses, non-profits and institutions.

Implementation Schedule

Bi-Annual Survey on Progress – The coordinator of the Hazard Mitigation Implementation Team will prepare and distribute a biannual survey in years two and four of the plan. The survey will be distributed to all of the local implementation group members and other interested local stakeholders. The survey will poll the members on any changes or revisions to the plan that may be needed, progress and accomplishments for implementation, and any new hazards or problem areas that have been identified.

This information will be used to prepare a report or addendum to the local hazard mitigation plan. The Hazard Mitigation Implementation Team will have primary responsibility for tracking progress and updating the plan.

Develop a Year Four Update – During the fourth year after initial plan adoption, the coordinator of the Hazard Mitigation Implementation Team will convene the team to begin to prepare for an update of the plan, which will be required by the end of year five in order to maintain approved plan status with FEMA. The team will use the information from the year four biannual review to identify the needs and priorities for the plan update.

Prepare and Adopt an Updated Local Hazard Mitigation Plan – FEMA's approval of this plan is valid for five years, by which time an updated plan must be approved by FEMA in order to maintain the town's approved plan status and its eligibility for FEMA mitigation grants. Because of the time required to secure a planning grant, prepare an updated plan, and complete the approval and adoption of an updated plan, the local Hazard Mitigation Planning Team should begin the process by the end of Year 3. This will help the town avoid a lapse in its approved plan status and grant eligibility when the current plan expires.

At this point, the Hazard Mitigation Implementation Team may decide to undertake the update themselves, contract with the Metropolitan Area Planning Council to update the plan or to hire another consultant. However the Hazard Mitigation Implementation Team decides to update the plan, the group will need to review the current FEMA hazard

mitigation plan guidelines for any changes. The update of the Rockport Hazard Mitigation Plan will be forwarded to MEMA and DCR for review and to FEMA for approval.

Integration of the Plans with Other Planning Initiatives

Upon approval of the Rockport Hazard Mitigation Plan by FEMA, the Local Hazard Mitigation Implementation Team will provide all interested parties and implementing departments with a copy of the plan and will initiate a discussion regarding how the plan can be integrated into that department's ongoing work. At a minimum, the plan will be reviewed and discussed with the following departments:

- Fire / Emergency Management
- Police
- Public Works / Highway
- Engineering
- Planning and Community Development
- Conservation
- Parks and Recreation
- Health
- Building

Other groups that will be coordinated with include large institutions, Chambers of Commerce, land conservation organizations and watershed groups. The plans will also be posted on a community's website with the caveat that local team coordinator will review the plan for sensitive information that would be inappropriate for public posting. The posting of the plan on a web site will include a mechanism for citizen feedback such as an e-mail address to send comments.

X. RESOURCES

In addition to the specific reports listed below, much of the technical information for this plan came from meetings with Town department heads and staff.

Carlson Quarry Reservoir Dam, Phase I Inspection/Evaluation Report, GEI Consultants, Inc., August 2009.

Long Beach Seawall Summary of Structural Conditions and Proposed Repairs; prepared by the Long Beach Improvement Association.

Mill Pond Dam Repair Alternatives, April 2008 prepared by GEI Consultants, Inc.

Open Space and Recreation Plan for the Town of Rockport 2009.

Zoning By-Law, Town of Rockport, Updated August 2007

Commonwealth of Massachusetts, MacConnell Land Use Statistics, 1999.

Federal Emergency Management Agency, Flood Insurance Rate Maps for Rockport, MA

Metropolitan Area Planning Council, Geographic Information Systems Lab

Metropolitan Area Planning Council, Regional Plans and Data

U.S. Army Corps of Engineers, SLOSH Modeling and Maps

HAZUS-MH: Hurricane Event Report.

HAZUS-MH: Earthquake Event Report.

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APPENDIX A:
NATURAL HAZARDS MAPS

The MAPC GIS (Geographic Information Systems) Lab produced a series of maps for each community. Some of the data came from the Northeast States Emergency Consortium (NESEC). More information on NESEC can be found at http://www.serve.com/NESEC/. Due to the various sources for the data and varying levels of accuracy, the identification of an area as being in one of the hazard categories must be considered as a general classification that should always be supplemented with more local knowledge. The documentation for some of the hazard maps was incomplete as well.

The map series consists of four panels with two maps each plus one map taken from the State Hazard Mitigation Plan.

Map 1.	Population Density
Map 2.	Potential Development
Map 3.	Flood Zones
Map 4.	Earthquakes and Landslides
Map 5.	Hurricanes and Tornadoes
Map 6.	Average Snowfall
Map 7.	Composite Natural Hazards
Map 8.	Hazard Areas

Map1: Population Density – This map uses the US Census block data for 2000 and shows population density as the number of people per acre in seven categories with 60 or more people per acre representing the highest density areas.

Map 2: Potential Development – This map shows potential future developments, and critical infrastructure sites. MAPC consulted with town staff to determine areas that were likely to be developed or redeveloped in the future.

Map 3: Flood Zones – The map of flood zones used the FEMA Q3 Flood Zones as its source. For more information, refer to http://www.fema.gov/fhm/fq_q3.shtm.
The definitions of the flood zones are described in more detail at http://www.fema.gov/fhm/fq_term.shtm. The flood zone map for each community also shows repetitive loss sites, critical infrastructure and municipally owned and protected open space. As defined by the Community Rating System (CRS) of the National Flood Insurance Program (NFIP), a repetitive loss property is any property, which the NFIP has paid two or more flood claims of $1,000 or more in any given 10-year period since 1978. For more information on repetitive losses see http://www.fema.gov/nfip/replps.shtm.

Map 4: Earthquakes and Landslides – This information came from NESEC. For most communities, there was no data for earthquakes because only the epicenters of an earthquake are mapped.

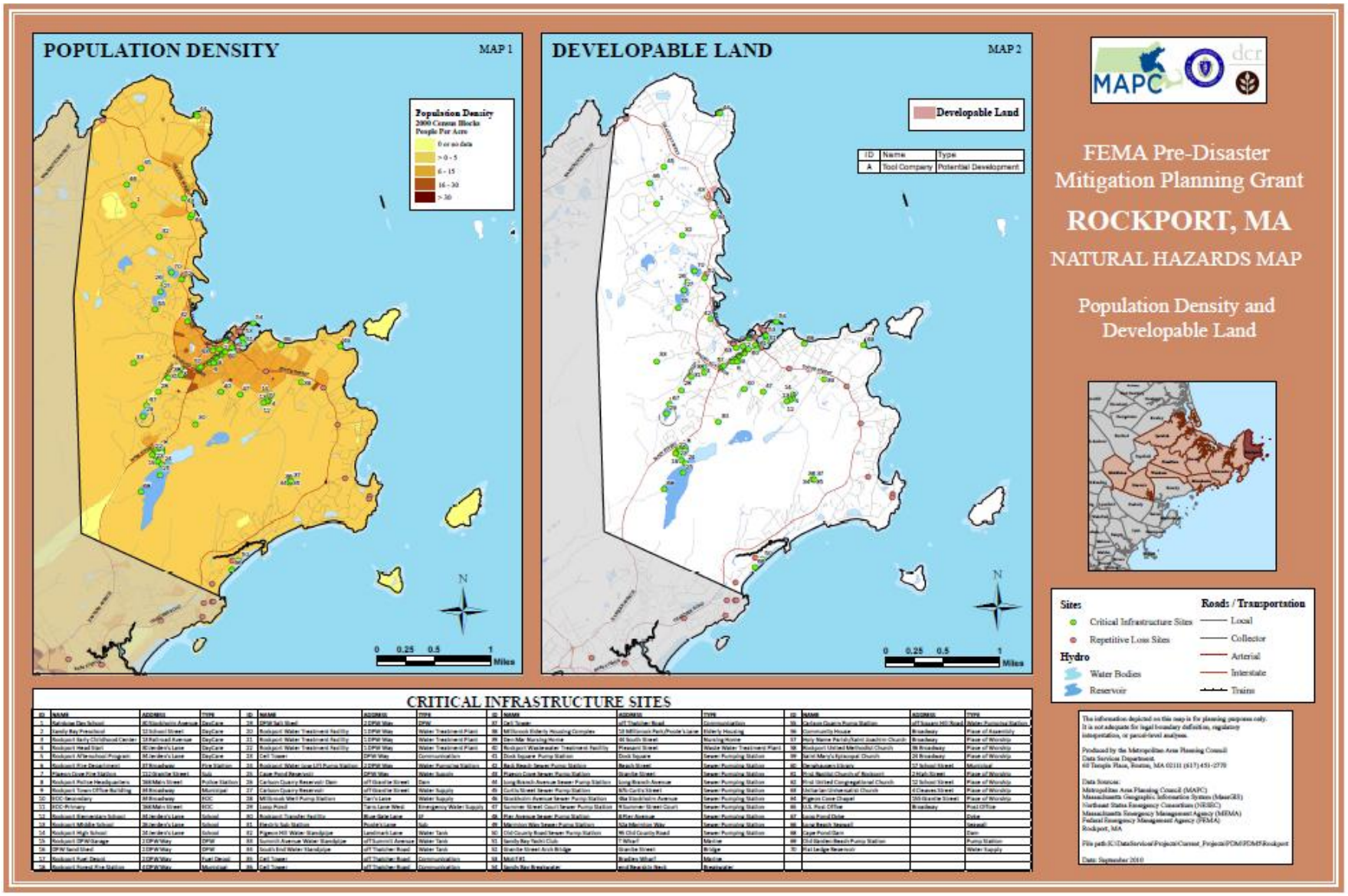
The landslide information shows areas with either a low susceptibility or a moderate susceptibility to landslides based on mapping of geological formations. This mapping is highly general in nature. For more information on how landslide susceptibility was mapped, refer to http://pubs.usgs.gov/pp/p1183/pp1183.html.

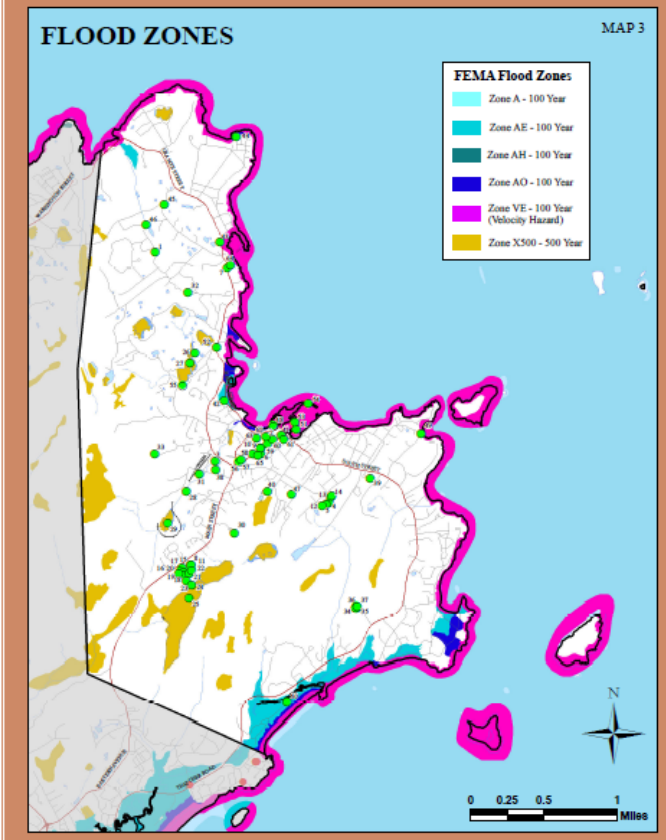
Map 5: Hurricanes and Tornadoes – This map shows a number of different items. The map includes the storm tracks for both hurricanes and tropical storms. This information must be viewed in context. A storm track only shows where the eye of the storm passed through. In most cases, the effects of the wind and rain from these storms were felt in other communities even if the track was not within that community. This map also shows the location of tornadoes with a classification as to the level of damages. What appears on the map varies by community since not all communities experience the same wind-related events. These maps also show the 100 year wind speed.

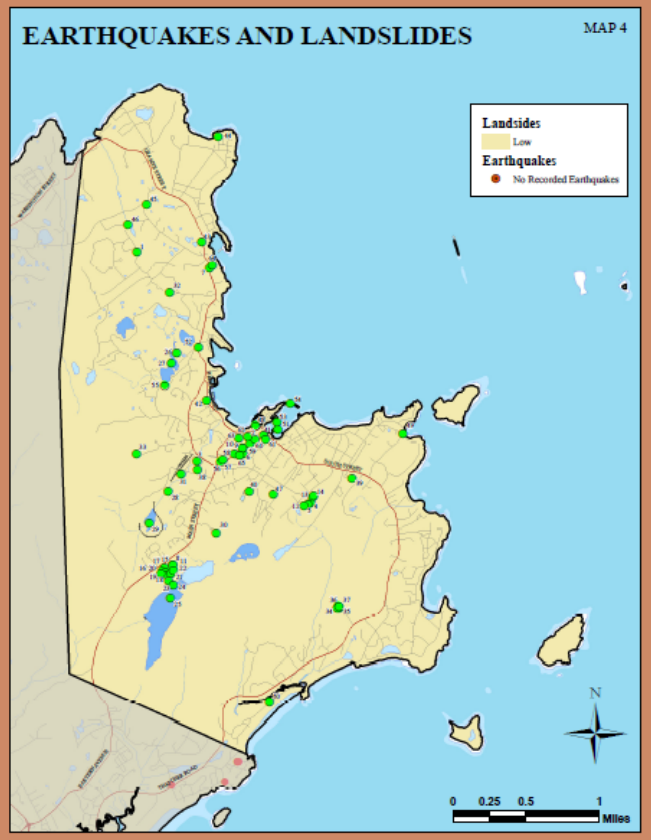
Map 6: Average Snowfall – This map shows the average snowfall, repetitive loss structures and open space. It also shows storm tracks for nor'easters, if any storms tracked through the community.

Map 7: Composite Natural Hazards - This map shows four categories of composite natural hazards for areas of existing development. The hazards included in this map are 100 year wind speeds of 110 mph or higher, low and moderate landslide risk, FEMA Q3 flood zones (100 year and 500 year) and hurricane surge inundation areas. Areas with only one hazard were considered to be low hazard areas. Moderate areas have two of the hazards present. High hazard areas have three hazards present and severe hazard areas have four hazards present.

Map 8: Hazard Areas – For each community, locally identified hazard areas are overlaid on an aerial photograph dated April 2005. The critical infrastructure sites and repetitive loss sites are also shown. The source of the aerial photograph is Mass GIS.


POPULATION DENSITY
MAP 1
Population Density
2000 Census Blocks
People Per Acre
0 or no data
> 0 - 5
6 - 15
16 - 30
> 30
N
0 0.25 0.5 1
Miles
DEVELOPABLE LAND
MAP 2
Developable Land
ID Name Type
A Tool Company Potential Development
N
0 0.25 0.5 1
Miles
MAPC
dcr
FEMA Pre-Disaster
Mitigation Planning Grant
ROCKPORT, MA
NATURAL HAZARDS MAP
Population Density and
Developable Land
Sites
Critical Infrastructure Sites
Repetitive Loss Sites
Hydro
Water Bodies
Reservoir
Roads / Transportation
Local
Collector
Arterial
Interstate
Trains
CRITICAL INFRASTRUCTURE SITES





FEMA Pre-Disaster Mitigation Planning Grant

ROCKPORT, MA

NATURAL HAZARDS MAP

Flood Zones and Earthquakes / Landslides Multi-Hazards View

Sites
- Critical Infrastructure Sites
- Repetitive Loss Sites

Hydro
- Water Bodies
- Reservoir

Roads / Transportation
- Local
- Collector
- Arterial
- Interstate
- Trains

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Produced by the Metropolitan Area Planning Council
Data Services Department.
60 Temple Place, Boston, MA 02111 (617) 451-2770

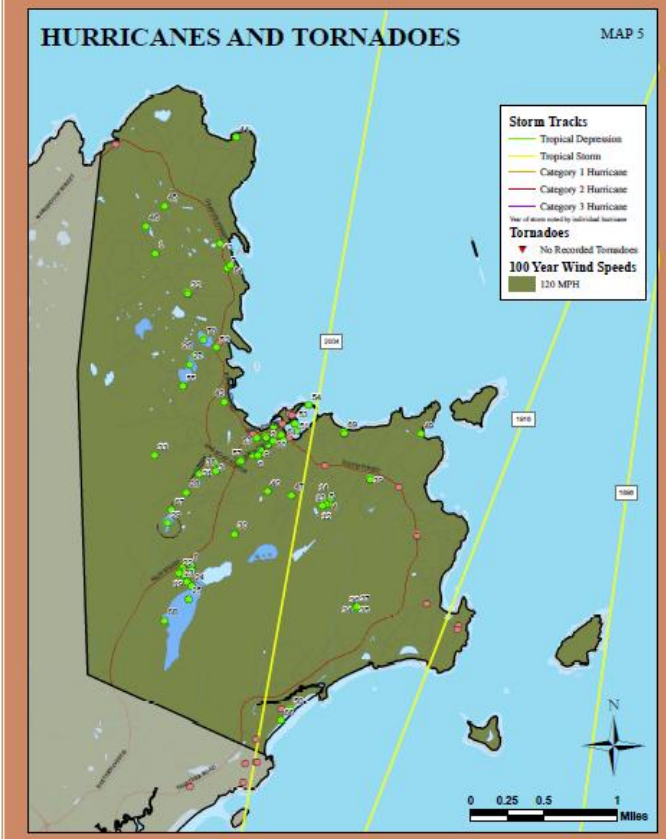
Data Sources:
Metropolitan Area Planning Council (MAPC)
Massachusetts Geographic Information System (MassGIS)
Northeast States Emergency Consortium (NESEC)
Massachusetts Emergency Management Agency (MEMA)
Federal Emergency Management Agency (FEMA)
Rockport, MA

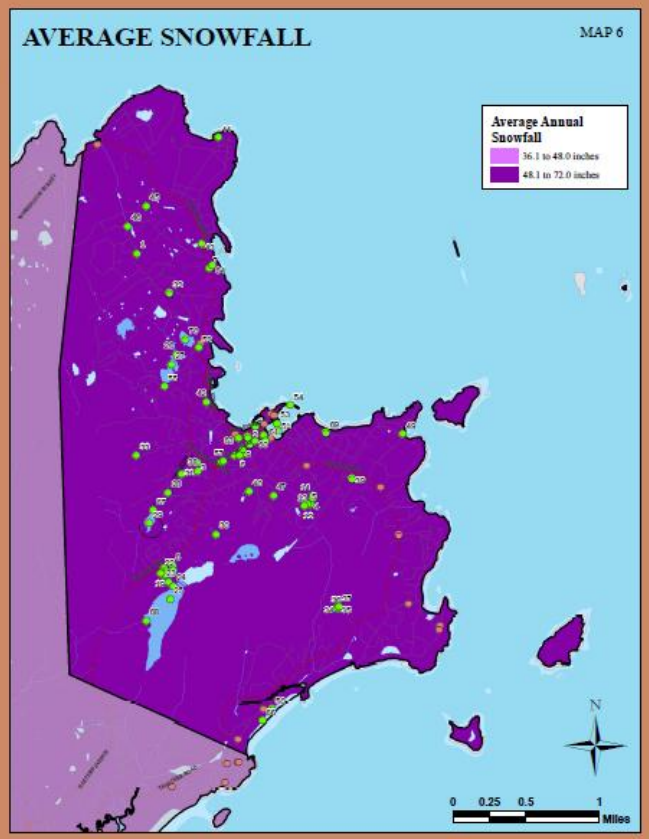
File path: K:\DataServices\Projects\Current_Projects\PDM\PDM5\Rockport

Date: September 2010

CRITICAL INFRASTRUCTURE SITES

ID	NAME	ADDRESS	TYPE	ID	NAME	ADDRESS	TYPE	ID	NAME	ADDRESS	TYPE	ID	NAME	ADDRESS	TYPE
1	Rainbow Day School	30 Stockholm Avenue	DayCare	19	DPW Salt Shed	2 DPW Way	DPW	37	Cell Tower	off Thatcher Road	Communication	55	Carlson Quarry Pump Station	off Squam Mill Road	Water Pumping Station
2	Sandy Bay Preschool	12 School Street	DayCare	20	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant	38	Millbrook Elderly Housing Complex	13 Millbrook Park/Poole's Lane	Elderly Housing	56	Community House	Broadway	Place of Assembly
3	Rockport Early Childhood Center	13 Railroad Avenue	DayCare	21	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant	39	Dan Mar Nursing Home	44 South Street	Nursing Home	57	Holy Name Parish/Saint Joachim Church	Broadway	Place of Worship
4	Rockport Head Start	30 Jerden's Lane	DayCare	22	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant	40	Rockport Wastewater Treatment Facility	Pleasant Street	Waste Water Treatment Plant	58	Rockport United Methodist Church	36 Broadway	Place of Worship
5	Rockport Afterschool Program	24 Jerden's Lane	DayCare	23	Cell Tower	DPW Way	Communication	41	Dock Square Pump Station	Dock Square	Sewer Pumping Station	59	Saint Mary's Episcopal Church	24 Broadway	Place of Worship
6	Rockport Fire Department	37 Broadway	Fire Station	24	Rockport Water Low Lift Pump Station	2 DPW Way	Water Pumping Station	42	Back Beach Sewer Pump Station	Beach Street	Sewer Pumping Station	60	Denghausen Library	17 School Street	Municipal
7	Pigeon Cove Fire Station	112 Granite Street	Sub	25	Cape Pond Reservoir	DPW Way	Water Supply	43	Pigeon Cove Sewer Pump Station	Granite Street	Sewer Pumping Station	61	First Baptist Church of Rockport	2 High Street	Place of Worship
8	Rockport Police Headquarters	168 Main Street	Police Station	26	Carlson Quarry Reservoir Dam	off Granite Street	Dam	44	Long Branch Avenue Sewer Pump Station	Long Branch Avenue	Sewer Pumping Station	62	First United Congregational Church	12 School Street	Place of Worship
9	Rockport Town Office Building	34 Broadway	Municipal	27	Carlson Quarry Reservoir	off Granite Street	Water Supply	45	Curtis Street Sewer Pump Station	67b Curtis Street	Sewer Pumping Station	63	Unitarian Universalist Church	4 Cleaves Street	Place of Worship
10	EOC-Secondary	34 Broadway	EOC	28	Millbrook Well Pump Station	Tarr's Lane	Water Supply	46	Stockholm Avenue Sewer Pump Station	46a Stockholm Avenue	Sewer Pumping Station	64	Pigeon Cove Chapel	155 Granite Street	Place of Worship
11	EOC-Primary	168 Main Street	EOC	29	Loop Pond	Tarrs Lane West	Emergency Water Supply	47	Summer Street Court Sewer Pump Station	9 Summer Street Court	Sewer Pumping Station	65	U.S. Post Office	Broadway	Post Office
12	Rockport Elementary School	34 Jerden's Lane	School	30	Rockport Transfer Facility	Blue Gate Lane	LF	48	Pier Avenue Sewer Pump Station	8 Pier Avenue	Sewer Pumping Station	67	Loop Pond Dyke		Dyke
13	Rockport Middle School	36 Jerden's Lane	School	31	Electric Sub Station	Poole's Lane	Sub	49	Merrion Way Sewer Pump Station	32a Merrion Way	Sewer Pumping Station	68	Long Beach Seawall		Seawall
14	Rockport High School	24 Jerden's Lane	School	32	Pigeon Hill Water Standpipe	Landmark Lane	Water Tank	50	Old County Road Sewer Pump Station	95 Old County Road	Sewer Pumping Station	69	Cape Pond Dam		Dam
15	Rockport DPW Garage	2 DPW Way	DPW	33	Summit Avenue Water Standpipe	off Summit Avenue	Water Tank	51	Sandy Bay Yacht Club	T Wharf	Marine	69	Old Garden Beach Pump Station		Pump Station
16	DPW Sand Shed	2 DPW Way	DPW	34	South End Water Standpipe	off Thatcher Road	Water Tank	52	Granite Street Arch Bridge	Granite Street	Bridge	70	Flat Ledge Reservoir		Water Supply
17	Rockport Fuel Depot	2 DPW Way	Fuel Depot	35	Cell Tower	off Thatcher Road	Communication	53	Motif #1	Bradley Wharf	Marine				
18	Rockport Forest Fire Station	4 DPW Way	Municipal	36	Cell Tower	off Thatcher Road	Communication	54	Sandy Bay Breakwater	end Bearskin Neck	Breakwater				





FEMA Pre-Disaster Mitigation Planning Grant

ROCKPORT, MA

NATURAL HAZARDS MAP

Hurricanes / Tornadoes and Average Snowfall Multi-Hazards View

Sites
- Critical Infrastructure Sites
- Repetitive Loss Sites

Hydro
- Water Bodies
- Reservoir

Roads / Transportation
- Local
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- Arterial
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Rockport, MA

File path: K:\DataServices\Projects\Current_Projects\PDM\PDM5\Rockport

Date: September 2010

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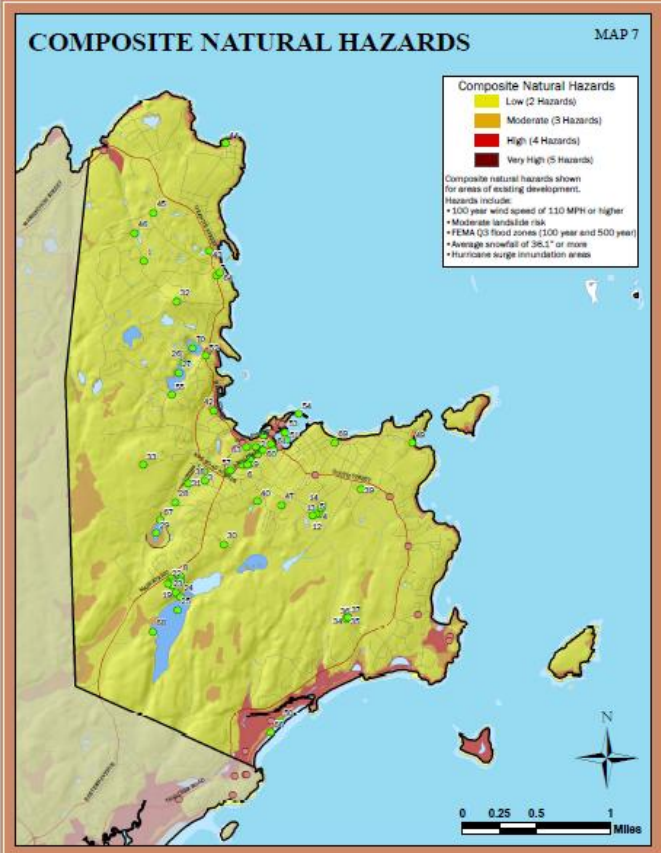
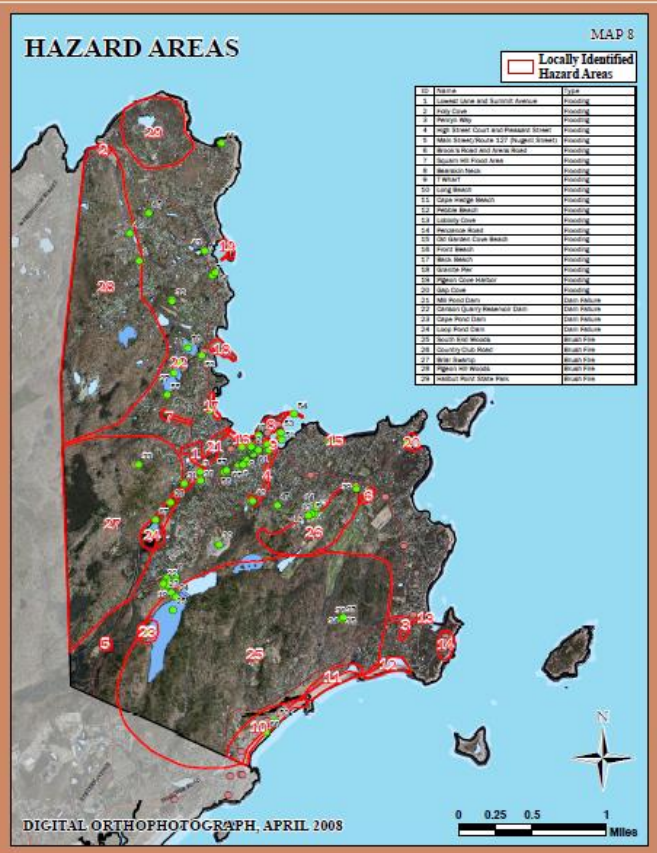
4	Rockport Head Start	30 Jerden's Lane	DayCare
5	Rockport Afterschool Program	34 Jerden's Lane	DayCare
6	Rockport Fire Department	37 Broadway	Fire Station
7	Pigeon Cove Fire Station	112 Granite Street	Sub
8	Rockport Police Headquarters	168 Main Street	Police Station
9	Rockport Town Office Building	34 Broadway	Municipal
10	EOC-Secondary	34 Broadway	EOC
11	EOC-Primary	168 Main Street	EOC
12	Rockport Elementary School	34 Jerden's Lane	School
13	Rockport Middle School	26 Jerden's Lane	School
14	Rockport High School	24 Jerden's Lane	School
15	Rockport DPW Garage	1 DPW Way	DPW
16	DPW Sand Shed	2 DPW Way	DPW
17	Rockport Fuel Depot	2 DPW Way	Fuel Depot
18	Rockport Forest Fire Station	4 DPW Way	Municipal
19	DPW Salt Shed	2 DPW Way	DPW
20	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant
21	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant
22	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant
23	Cell Tower	DPW Way	Communication
24	Rockport Water Low Lift Pump Station	2 DPW Way	Water Pumping Station
25	Cape Pond Reservoir	DPW Way	Water Supply
26	Carlson Quarry Reservoir Dam	off Granite Street	Dam
27	Carlson Quarry Reservoir	off Granite Street	Water Supply
28	Millbrook Well Pump Station	Tan's Lane	Water Supply
29	Loop Pond	Tarn Lane West	Emergency Water Supply
30	Rockport Transfer Facility	Blue Gate Lane	LF
31	Electric Sub Station	Poole's Lane	Sub
32	Pigeon Hill Water Standpipe	landmark Lane	Water Tank
33	Summit Avenue Water Standpipe	off Summit Avenue	Water Tank
34	South End Water Standpipe	off Thatcher Road	Water Tank
35	Cell Tower	off Thatcher Road	Communication
36	Cell Tower	off Thatcher Road	Communication
37	Cell Tower	off Thatcher Road	Communication
38	Millbrook Elderly Housing Complex	13 Millbrook Park/Poole's Lane	Elderly Housing
39	Den Mar Nursing Home	44 South Street	Nursing Home
40	Rockport Wastewater Treatment Facility	Pleasant Street	Waste Water Treatment Plant
41	Dock Square Pump Station	Dock Square	Sewer Pumping Station
42	Back Beach Sewer Pump Station	Beach Street	Sewer Pumping Station
43	Pigeon Cove Sewer Pump Station	Granite Street	Sewer Pumping Station
44	Long Branch Avenue Sewer Pump Station	Long Branch Avenue	Sewer Pumping Station
45	Curtis Street Sewer Pump Station	67b Curtis Street	Sewer Pumping Station
46	Stockholm Avenue Sewer Pump Station	46a Stockholm Avenue	Sewer Pumping Station
47	Summer Street Court Sewer Pump Station	9 Summer Street Court	Sewer Pumping Station
48	Pier Avenue Sewer Pump Station	8 Pier Avenue	Sewer Pumping Station
49	Marmion Way Sewer Pump Station	52a Marmion Way	Sewer Pumping Station
50	Old County Road Sewer Pump Station	95 Old County Road	Sewer Pumping Station
51	Sandy Bay Yacht Club	T Wharf	Marina
52	Granite Street Arch Bridge	Granite Street	Bridge
53	Motif #1	Bradley Wharf	Marina
54	Sandy Bay Breakwater	and Beaniklin Neck	Breakwater
55	Carlson Quarry Pump Station	off Squam Hill Road	Water Pumping Station
56	Community House	Broadway	Place of Assembly
57	Holy Name Parish/Saint Joachim Church	Broadway	Place of Worship
58	Rockport United Methodist Church	36 Broadway	Place of Worship
59	Saint Mary's Episcopal Church	24 Broadway	Place of Worship
60	Denghausen Library	17 School Street	Municipal
61	First Baptist Church of Rockport	2 High Street	Place of Worship
62	First United Congregational Church	12 School Street	Place of Worship
63	Unitarian Universalist Church	4 Cleaves Street	Place of Worship
64	Pigeon Cove Chapel	155 Granite Street	Place of Worship
65	U.S. Post Office	Broadway	Post Office
67	Loop Pond Dyke		Dyke
68	Long Beach Seawall		Seawall
69	Old Garden Beach Pump Station		Pump Station
70	Flat Ledge Reservoir		Water Supply





ID	Name	Type
1	Lowell Lane and Summit Avenue	Flooding
2	Folly Cove	Flooding
3	Penzys Way	Flooding
4	High Street Court and Pleasant Street	Flooding
5	Main Street/Route 127 (Nugent Street)	Flooding
6	Brook Road and Annis Road	Flooding
7	Squam Hill Flood Area	Flooding
8	Bearskin Neck	Flooding
9	T Wharf	Flooding
10	Long Beach	Flooding
11	Cape Hedge Beach	Flooding
12	Pebble Beach	Flooding
13	Loblolly Cove	Flooding
14	Pecksnuck Road	Flooding
15	Old Garden Cove Beach	Flooding
16	Front Beach	Flooding
17	Back Beach	Flooding
18	Granite Pier	Flooding
19	Pigeon Cove Harbor	Flooding
20	Gap Cove	Flooding
21	Mill Pond Dam	Dam Failure
22	Carlson Quarry Reservoir Dam	Dam Failure
23	Cape Pond Dam	Dam Failure
24	Loop Pond Dam	Dam Failure
25	South End Woods	Brush Fire
26	Country Club Road	Brush Fire
27	Bear Swamp	Brush Fire
28	Pigeon Hill Woods	Brush Fire
29	Halibut Point State Park	Brush Fire

FEMA Pre-Disaster Mitigation Planning Grant

ROCKPORT, MA

NATURAL HAZARDS MAP

Composite Natural Hazards and Hazard Areas

Sites
- Critical Infrastructure Sites
- Repetitive Loss Sites

Hydro
- Water Bodies
- Reservoir

Roads / Transportation
- Local
- Collector
- Arterial
- Interstate
- Trains

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Produced by the Metropolitan Area Planning Council
Data Services Department.
60 Temple Place, Boston, MA (02111 (617) 451-2770

Data Sources:
Metropolitan Area Planning Council (MAPC)
Massachusetts Geographic Information System (MassGIS)
Northeast States Emergency Consortium (NESEC)
Massachusetts Emergency Management Agency (MEMA)
Federal Emergency Management Agency (FEMA)
Rockport, MA

File path:K:\DataServices\Projects\Current_Projects\FDM\FDM5\Rockport

Date: September 2010

CRITICAL INFRASTRUCTURE SITES

ID	NAME	ADDRESS	TYPE	ID	NAME	ADDRESS	TYPE	ID	NAME	ADDRESS	TYPE	ID	NAME	ADDRESS	TYPE
1	Rainbow Day School	30 Stockholm Avenue	DayCare	19	DPW Salt Shed	1 DPW Way	DPW	37	Cell Tower	off Thatcher Road	Communication	55	Carlson Quarry Pump Station	off Squam Hill Road	Water Pumping Station
2	Sandy Bay Preschool	12 School Street	DayCare	20	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant	38	Millbrook Elderly Housing Complex	13 Millbrook Farly/Pooler's Lane	Elderly Housing	56	Community House	Broadway	Place of Assembly
3	Rockport Early Chl School Center	13 Railroad Avenue	DayCare	21	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant	39	Dan Mar Nursing Home	44 South Street	Nursing Home	57	Holy Name Parish/Saint Joachim Church	Broadway	Place of Worship
4	Rockport Head Start	30 Jerden's Lane	DayCare	22	Rockport Water Treatment Facility	1 DPW Way	Water Treatment Plant	40	Rockport Wastewater Treatment Facility	Pleasant Street	Waste Water Treatment Plant	58	Rockport United Methodist Church	36 Broadway	Place of Worship
5	Rockport Afterschool Program	34 Jerden's Lane	DayCare	23	Cell Tower	DPW Way	Communication	41	Dock Square Pump Station	Dock Square	Sewer Pumping Station	59	Saint Mary's Episcopal Church	24 Broadway	Place of Worship
6	Rockport Fire Department	37 Broadway	Fire Station	24	Rockport Water Low Lift Pump Station	2 DPW Way	Water Pumping Station	42	Back Beach Sewer Pump Station	Beach Street	Sewer Pumping Station	60	Dewghausen Library	17 School Street	Municipal
7	Pigeon Cove Fire Station	112 Granite Street	Sub	25	Cape Pond Reservoir	DPW Way	Water Supply	43	Pigeon Cove Sewer Pump Station	Granite Street	Sewer Pumping Station	61	First Baptist Church of Rockport	3 High Street	Place of Worship
8	Rockport Police Headquarters	108 Main Street	Police Station	26	Carlson Quarry Reservoir Dam	off Granite Street	Dam	44	Long Branch Avenue Sewer Pump Station	Long Branch Avenue	Sewer Pumping Station	62	First United Congregational Church	12 School Street	Place of Worship
9	Rockport Town Office Building	34 Broadway	Municipal	27	Carlson Quarry Reservoir	off Granite Street	Water Supply	45	Curtis Street Sewer Pump Station	67b Curtis Street	Sewer Pumping Station	63	Unitarian Universalist Church	4 Cleaves Street	Place of Worship
10	EOC-Secondary	34 Broadway	EOC	28	Millbrook Well Pump Station	Terr's Lane	Water Supply	46	Stockholm Avenue Sewer Pump Station	46a Stockholm Avenue	Sewer Pumping Station	64	Pigeon Cove Chapel	155 Granite Street	Place of Worship
11	EOC-Primary	108 Main Street	EOC	29	Loop Pond	Terrs Lane West	Emergency Water Supply	47	Summer Street Court Sewer Pump Station	9 Summer Street Court	Sewer Pumping Station	65	U.S. Post Office	Broadway	Post Office
12	Rockport Elementary School	34 Jerden's Lane	School	30	Rockport Transfer Facility	Blue Gate Lane	LF	48	Pier Avenue Sewer Pump Station	9 Pier Avenue	Sewer Pumping Station	67	Loop Pond Dyke		Dyke
13	Rockport Middle School	26 Jerden's Lane	School	31	Electric Sub Station	Pooler's Lane	Sub	49	Mermion Way Sewer Pump Station	52a Mermion Way	Sewer Pumping Station	68	Long Beach Seawall		Seawall
14	Rockport High School	24 Jerden's Lane	School	32	Pigeon Hill Water Standpipe	Landmark Lane	Water Tank	50	Old County Road Sewer Pump Station	95 Old County Road	Sewer Pumping Station	69	Cape Pond Dam		Dam
15	Rockport DPW Garage	2 DPW Way	DPW	33	Summit Avenue Water Standpipe	off Summit Avenue	Water Tank	51	Sandy Bay Yacht Club	T Wharf	Marine	69	Old Garden Beach Pump Station		Pump Station
16	DPW Sand Shed	2 DPW Way	DPW	34	South End Water Standpipe	off Thatcher Road	Water Tank	52	Granite Street Arch Bridge	Granite Street	Bridge	70	Flat Ledge Reservoir		Water Supply
17	Rockport Fuel Depot	2 DPW Way	Fuel Depot	35	Cell Tower	off Thatcher Road	Communication	53	Motif #1	Bradley Wharf	Marine				
18	Rockport Forest Fire Station	4 DPW Way	Municipal	36	Cell Tower	off Thatcher Road	Communication	54	Sandy Bay Breakwater	end Bearskin Neck	Breakwater				

APPENDIX B:

MEETING AGENDAS FOR:

REGIONAL AND LOCAL MULTIPLE HAZARD COMMUNITY PLANNING TEAMS

THE COMMONWEALTH OF MASSACHUSETTS

Deval Patrick, Governor

Don Boyce
DIRECTOR

MASSACHUSETTS EMERGENCY MANAGEMENT AGENCY
400 WORCESTER ROAD, FRAMINGHAM, MA 01702-5399 508-820-2000 FAX 508-820-1404

dcr

Richard Sullivan
COMMISSIONER

DEPARTMENT OF CONSERVATION AND RECREATION
251 CAUSEWAY STREET, SUITE 600-900, BOSTON, MA 02114-2104 617-626-1250 FAX 617-626-1351

MAPC

Marc D. Draisen
EXECUTIVE DIRECTOR

METROPOLITAN AREA PLANNING COUNCIL
60 TEMPLE PLACE, 6TH FLOOR, BOSTON, MA 02111 617-451-2770 FAX 617-482-7185

GREATER BOSTON PRE-DISASTER MTITGATION PLAN

UPPER NORTH SHORE REGIONAL HAZARD MITIGATION TEAM
Danvers
Essex
Gloucester
Hamilton
Ipswich
Manchester
Middleton
Rockport
Wenham

INNER CORE-WEST REGIONAL HAZARD MITIGATION TEAM
Arlington
Belmont
Newton
Waltham
Watertown
Wellesley

SOUTH SHORE REGIONAL HAZARD MITIGATION TEAM
Duxbury
Norwell

Hazard Mitigation Community Planning Team
Greater Boston / Upper North Shore

First Meeting

Tuesday, April 15, 10:00 AM
Hamilton Public Safety Building
265 Bay Road (Rt. 1A), Hamilton

AGENDA

10:00 WELCOME & INTRODUCTIONS *(Please sign contact sheet)*

10:10 OVERVIEW OF FEDERAL DISASTER MITIGATION ACT & PRE-DISASTER MITIGATION PLANNING

- Presentation, Questions & Discussion
  --Martin Pillsbury, Manager of Regional Planning, MAPC

10:30 GETTING STARTED: THE HAZARD MITIGATION PLAN FOR THE UPPER NORTH SHORE COMMUNTIES

- Review of Scope of Work & Schedule
- Questions & Discussion - Local Issues & Priorities

10:50 PREVIEW OF MAPPING AND DATABASES FOR THE PLAN

- Examples from the North Shore & Metro Boston PDM Plans
  --Alan Bishop, GIS Manager, MAPC

11:20 NEXT STEPS / MEETING SCHEDULE

11:30 ADJOURN

Please contact Martin Pillsbury at MAPC if you have any questions:
617-451-2770, ext. 2012 or mpillsbury@mapc.org

THE COMMONWEALTH OF MASSACHUSETTS

Deval Patrick, Governor

Don Boyce
DIRECTOR

MASSACHUSETTS EMERGENCY MANAGEMENT AGENCY
400 WORCESTER ROAD, FRAMINGHAM, MA 01702-5399 508-820-2000 FAX 508-820-1404

Richard Sullivan
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Marc D. Draisen
EXECUTIVE DIRECTOR

METROPOLITAN AREA PLANNING COUNCIL
60 TEMPLE PLACE, 6TH FLOOR, BOSTON, MA 02111 617-451-2770 FAX 617-482-7185

GREATER BOSTON
PRE-DISASTER
MTITGATION PLAN

UPPER NORTH SHORE
REGIONAL HAZARD
MITIGATION TEAM
Danvers
Essex
Gloucester
Hamilton
Ipswich
Manchester
Middleton
Rockport
Wenham

INNER CORE-WEST
REGIONAL HAZARD
MITIGATION TEAM
Arlington
Belmont
Newton
Waltham
Watertown
Wellesley

SOUTH SHORE
REGIONAL HAZARD
MITIGATION TEAM
Duxbury
Norwell

Hazard Mitigation Community Planning Team
Upper North Shore

Second Meeting

Tuesday, September 30, 10:00 AM
Hamilton Public Safety Building
265 Bay Road (Rt. 1A), Hamilton

AGENDA

10:00 WELCOME, INTRODUCTIONS & OVERVIEW OF AGENDA
- *Martin Pillsbury, Project Manager*

10:05 REVIEW OF HAZARD MAPPING AND CRITICAL INFRASTRUCTURE DATA COLLECTION
- *Allan Bishop, GIS Manager, will present an overview of the draft Critical Facilities database and community hazard maps*

10:45 UPDATE ON LOCAL PLANS
- *Sam Cleaves and Brad Stoler will review progress and next steps for developing the local PDM Plan Annexes for each community*

11:00 SETTING GOALS AND OBJECTIVES FOR THE REGIONAL PDM PLAN
- *Martin Pillsbury will in review goals and objectives and ask the team to discuss priorities for the North Shore communities (see attachment)*

11:20 NEXT STEPS / MEETING SCHEDULE

Please contact Martin Pillsbury at MAPC if you have any questions:
617-451-2770, ext. 2012 or mpillsbury@mapc.org

The Rockport Multi-Hazard Mitigation Planning Team

February 2, 2009

1. Welcome and introductions
2. Review scope of work
3. Maps and critical infrastructure
4. Identify natural hazard areas and future development
5. Next steps

The Rockport Multi-Hazard Mitigation Planning Team

May 5, 2009

1. Welcome and introductions
2. Review progress to date
3. Review aerial photograph showing natural hazard areas and future development
4. Review description of natural hazard areas
5. Develop goals and objectives
6. Discuss potential mitigation measures
7. Next steps

The Rockport Multi-Hazard Mitigation Planning Team

January 21, 2010

1. Welcome and introductions

2. Review aerial photograph showing natural hazard areas and future development

3. Discuss potential mitigation measures

4. Next steps

The Rockport Multi-Hazard Mitigation Planning Team

April 20, 2010

1. Welcome and introductions

2. Final review of natural hazard areas and draft plan

3. Final review of potential mitigation measures

4. Discuss and prepare for public presentation to the Board of Selectmen

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APPENDIX C

DOCUMENTATION OF PUBLIC MEETING

TOWN OF ROCKPORT
Board of Selectmen's Meeting
June 1, 2010

The Board of Selectmen held a Meeting on Tuesday, June 1, 2010 in Conference Room A with three Selectmen and the Town Administrator. Selectman Canavan was absent. Selectman Wilkinson arrived late.

- Public Information Presentation of Rockport Hazard Mitigation Plan
  Joan Blaustein, Land Resources Planner for MAPC (Metropolitan Area Planning Council) presented an Executive Summary and scope of the Town of Rockport Hazard Mitigation Plan; the purpose being to prevent or minimize damages from natural hazards only. Mitigation Planning was mandated in 2000 in order for municipalities to be eligible to receive grants. This planning requirement does not affect ongoing disaster assistance that businesses can apply for.

  With the assistance and input from the DPW, the MAPC has identified 41 inland acres and approximately 138 acres of coastal zone flooding areas in Rockport. Critical areas were found to be Bearskin Neck, Cape Hedge Beach, Pebble Beach and Front Beach. They also found 5 areas prone to brush fires, as indicated on the display map.

  The public will be given an opportunity to review this plan and to make comments. Once comments are received the plan will be submitted to FEMA/MEMA. The Town has one year to officially adopt it. Pre-disaster and flood mitigation grants will then become available. Once adopted the plan is good for 5 years.

  Ted Tarr, 154 Main Street stated our economy depends on fishing and tourism and this plan should include harbors. Ms. Blaustein replied the harbors are included in the full detailed report. George Robertson added he has been working with Ms. Blaustein and MEMA since March 2008. The inner harbor and breakwater is owned by the Army Corps of Engineers and is not under local jurisdiction.

  Eric Hutchins, 13 Applecart Road, said this is a super plan but that the 2-3 week comment period is not adequate. The Town needs a more proper amount of time such as 4 to 6 weeks. He asked if anything will incorporate existing rates of sea level rise and/or projected levels of sea rise and also requested that Penzance Road be made a high priority. He further stated Loop Pond is a threat to the downstream of Millbrook.

(8:40 pm - recess)
(8:45 pm - reconvene)

Selectmen Fleming stated she feels that 30 days is not enough time to give the Town time to respond to this project. She has asked Joan Blaustein to look into extending the deadline for comments.

APPENDIX D

DOCUMENTATION OF PLAN ADOPTION

[To be added to final plan]