

**Strategy for Reducing Risks
From Natural Hazards in
Lincoln, Rhode Island**

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Strategy for Reducing Risks From Natural Hazards in Lincoln, Rhode Island

Created by: The Lincoln Natural Hazard Mitigation Committee

ACKNOWLEDGMENTS

Members of the Lincoln Natural Hazard Mitigation Committee

John McCaughey – Lincoln Rescue Director
John MacQueen – Public Works Director
Brian Sullivan – Lincoln Deputy Police Chief
David Almond – Lincoln Fire Chiefs' Association
Ernest Lacombe – Lincoln EMA Director
Albert V. Ranaldi, Jr. – Lincoln Town Planner
Margaret V. Weigner – Lincoln Town Planner's Assistant
N. Kim Wiegand – Lincoln Town Engineer
Henri Thibaudeau – Lincoln Building Inspector
Leo Tellier – Retired Real Estate Agent
William C. Sloyer – Amica Insurance Company

Consultant:
Resource Specialists, Inc., Cumberland, RI

Map Assistance:
Environmental Data Center, University of Rhode Island

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ADDITIONAL ACKNOWLEDGMENTS

Donald L. Carcieri,
Governor

MG Reginald A. Centracchio
Director
Rhode Island Emergency Management Agency

Albert A. Scappaticci
Executive Director
Rhode Island Emergency Management Agency

Rhode Island State Hazard Mitigation Committee

Joseph Almedia, Jr.
State Hazard Mitigation Chairman
Rhode Island Emergency Management Agency

David J. Cluley
Senior Engineer
Rhode Island Department of Transportation

Joseph Cirillo
Building Code Commissioner
State of RI Building Commissioner's Office

Paula Pallozzi
Chief Property and Casualty Insurance Rate Analyst
Rhode Island Department of Business Regulations

Peter S. Kent
Peter S. Kent Construction Co.

Raymond A. Allen
Administration & Operations Officer
Division of Public Utilities and Carriers

Michael DiMascolo
Deputy Chief
State Fire Marshal's Office

Eva Zito
State Hazard Mitigation Secretary
Rhode Island Emergency Management Agency

Chris Der Vartanian
Supervisor of Examinations
Rhode Island Dept. of Business Regulations

Richard Snow, P.E.
Chief Civil Engineer
Rhode Island Dept. of Transportation
Bridge Engineering

Grover Fugate
Rhode Island Coastal Resources Mgt. Council

Janet Freedman
Coastal Geologist
Rhode Island Coastal Resources Mgt. Council

Steven Wright
Superintendent
Rhode Island Dept. of Environmental Mgt.

Pamela Pogue
Flood Plain Management Coordinator
Rhode Island Emergency Management Agency

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Section 1.0 Introduction

Natural Hazard Mitigation is any sustained action taken to reduce or eliminate long-term risk to people and their property from the effects of natural hazards (e.g. wind, fire, floods, nor'easters, hurricanes, earthquakes, etc.).

Section 1.1 What Natural Hazard Mitigation Can Do for Lincoln

A primary benefit of natural hazard mitigation is that preventative measures can significantly reduce the cost of post-disaster cleanup. In addition, mitigation actions conducted before hazards occur greatly reduces the impact and costs associated with the aftermath of a natural hazard event. By planning ahead, Lincoln will minimize the economic and social disruption that can result from floods, snowstorms, hurricanes and other natural disasters (destruction of property, loss or interruption of jobs and the loss of businesses).

The adoption and implementation of this natural hazard mitigation plan will assist Lincoln in receiving assistance from the Federal Emergency Management Agency (FEMA) in pre- and post-disaster assistance such as: FEMA's Community Rating System (CRS), FEMA's Pre-Disaster Flood Mitigation Assistance (FMA) Program, and FEMA's Post-Disaster Hazard Mitigation Grant Program (HMGP).

The Town of Lincoln currently does not participate in FEMA's Community Rating System (CRS) Program. FEMA's Community Rating System (CRS) Program would allow residents of the Town of Lincoln to gain credit points that would result in discounts on National Flood Insurance Program (NFIP) premiums. FEMA's Pre-Disaster Flood Mitigation Assistance Program makes grants available for communities to implement flood mitigation planning and activities such as acquisition, relocation, and retrofitting of structures. This program is made available only to communities having a pre-existing approved hazard mitigation plan. FEMA's Post-Disaster Hazard Mitigation Grant Program is made available only to communities after a federally declared disaster. Having an approved mitigation plan expedites the application process for pre- and post-federal mitigation funding, and ensures a funded project is eligible and feasible.

Section 1.2 Lincoln's Mission Statement

The mission statement of the Town of Lincoln is to preserve and enhance the quality of life, property, and resources by identifying areas at risk from natural hazards and implementing priority hazard mitigation actions in order to protect the Blackstone Valley's infrastructure, population, and historical, cultural, and natural resources.

Section 1.3 Planning Process

Beginning in early 2004, members of the Town of Lincoln Natural Hazard Mitigation Committee (which includes Town employees, citizens and a representative from the business community) began to meet to formulate the Town's first Natural Hazard

Mitigation Plan for the Town. A consulting firm was hired to help the Committee research natural hazards that are a risk to the community. Over the next several months research was conducted on the natural hazards that have and could occur within the Town as well as the impact to the Town. Meetings were held by the committee throughout the summer and fall to review the history of events in Town and formulate mitigation actions that can reduce or eliminate the damaging affects of these natural hazards. A public meeting was held on October 27, 2004 (see public notice in Appendix C) to receive public comments on the final plan before Council approval. Finally, on November 16, 2004, after approval from the Committee, the Plan was presented to the Town Council for approval then forwarded to RIEMA and FEMA for approval; which was granted in March 2005. The final approved plan was presented to the Town Council on April 19, 2005.

Section 2.0 Historical Review of Hazardous Events for Lincoln

The following hazards have been identified for the Town of Lincoln: Hurricanes, Heavy Rains/Flooding, Nor'easters/Snowstorms, Hailstorms, Wind Events, Lightning Storms, Earthquakes and Forest Fires. Due to the demographics of the Town, any event that was to occur would affect the entire town in the same general manner.

To profile the history of these events in Lincoln, the National Climatic Data Center's on-line database was utilized since this is the most comprehensive source for past weather events.

Section 2.1 Hurricanes

Although Rhode Island has not been hit by extremely intense hurricanes (Category 4 or 5) as seen in other parts of the East Coast, we have had our share of major hurricanes that have caused extensive damage to our State. In the sixteen year period from 1938 to 1954, Rhode Island experienced three major hurricanes that caused a tremendous amount of damage and resulted in almost 300 deaths across the State. The great un-named hurricane of 1938 devastated Rhode Island and caused \$100 million dollars in property damage and took 262 lives. Hurricane Carol in August of 1954 caused similar damage dollar-wise, but thankfully only resulted in the loss of 19 lives. Even though Rhode Island has not had hurricanes as severe as this in the last 50 years, we have had several that have resulted in millions of dollars in property damage, mostly due to the fact that people like to live near the water and are naïve to the fact that even a small hurricane can wreak havoc on lives and property. The wind and rain that precede a hurricane can cause severe damage even to those communities that are further inland, such as Lincoln. Therefore, the threat of a hurricane to this community and the resulting wind and rain damage need to be considered.

Table 1 – Significant Hurricanes in Rhode Island

Date	Name	Category ¹	Winds (mph)	Property Damage (\$million)	Deaths
September 21, 1938	N/A	3	95	100	262
September 14, 1944	N/A	3	82	2	0
August 31, 1954	Carol	3	110	90	19
September 11, 1954	Edna	3	40	0.1	0
September 12, 1960	Donna	2	58	2.4	0
September 27, 1985	Gloria	2	81	19.8	1
August 19, 1991	Bob	2	63	115	0

Source: National Climate Data Center

Section 2.2 Heavy Rains and Floods

Lincoln is a flood-prone community in which cultural, historical and economic resources are at risk. There are several high hazard dams along the Blackstone River in Lincoln, as well as upstream from the Town that pose risks to the Town. The Blackstone River flows south along the eastern border of Lincoln, and eventually into Narragansett Bay. The Blackstone River contains both 'A' and 'V' flood zones. An A-zone is an area that would be inundated by a 100-year flood event, but not subject to velocity wave impact. A V-zone is a velocity zone that is subject to breaking wave action. There are also several streams and brooks that run through the town that are susceptible to flooding during periods of heavy rain.

Table 2 – Significant Heavy Rain/Flooding for Providence County

Date	Rainfall (inches)	Comments
January 28, 1996	1-2"	Minor river flooding along the Blackstone River
November 1, 1997	2-3"	No damage reported
February 18, 1998	2-3.5"	Flooding in poor drainage areas
February 23, 1998	2"	Flooding in poor drainage areas
March 8, 1998	2-4"	Scattered power outages, Flood-prone properties flooded, Flooding in poor drainage areas, Blackstone River reached 10.3' at Woonsocket.
June 13, 1998	7-8"	Minor flooding along Blackstone River reaching 9.17', numerous small streams flooded their banks
October 8, 1998	3-4"	No reports of flooding
January 3, 1999	2-3"	No reports of flooding
September 10, 1999	3-5"	Flooding in poor drainage areas, no property damage reported
September 16, 1999	2-5"	Trees downed, Scattered power outages, flooding in low-lying areas
May 26, 2003	2.15"	Flooding in poor drainage areas
April 14, 2004	2-4"	Minor flooding along the Blackstone River, roads in low lying areas were closed due to flooding, no significant damage reported.

Source: National Climate Data Center

¹ Category 1 74-95 mph winds, 4'-5' storm surge; Category 2 96-110 mph winds, 6'-8' storm surge; Category 3 111-130 mph winds, 9'-12' storm surge; Category 4 131-155 mph winds, 13'-18' storm surge; Category 5 winds greater than 155 mph, with a storm surge of greater than 18' source: Saffir-Simpson Hurricane Scale.

Section 2.3 Nor'easters/Snowstorms

Historically, Nor'easters/Snowstorms have resulted in hazardous road conditions, power outages, the closing of schools/businesses, minor accidents and highway travel disruptions. One of the more recent severe snowstorms recorded for Lincoln occurred on April 1, 1997. Lincoln experienced approximately 24" in accumulation of heavy, wet snow that made removal difficult and highway travel just about impossible during the height of the storm. Tree limbs fell, scattered power outage occurred, transportation systems were disrupted, and schools closed for two days. Another storm that produced snowfall totals of 20+ inches in Lincoln, but had less of an effect, occurred on February 17, 2003. Since this storm fell on Presidents Day, most schools were already closed which also resulted in less traffic on the roadways. However, there were still numerous reports of minor accidents. This storm was also a light fluffy snow which resulted in less damage to trees and power lines.

Table 3 – Significant Nor'easters/Snowstorms for Providence County

Date	Snowfall (inches)	Comments
March 13, 1993	12"	Blizzard conditions for several hours, roads nearly impassable, most businesses closed early
March 3, 1994	4.8"	Blowing/drifted snow, schools closed, businesses affected and highway travel disrupted.
December 14, 1995	4-6"	Schools & businesses closed early, evening commute adversely affected
December 19, 1995	6-10"	Most schools and some businesses closed the day after the storm
January 2, 1996	10-12"	Snowfall at the rate of .5" to 2" per hr., most schools closed the next day
January 7, 1996	12-24"	Heavy snow disrupted transportation systems, closed schools, stores and businesses. Most significant storm to hit southern NE in past 20 years.
February 2, 1996	6-8"	Travel conditions were difficult, no damage reported
February 16, 1996	5-7"	Highway travel seriously disrupted for the afternoon rush hour, no damage reported
March 7, 1996	7.5"	Numerous minor skidding accidents
April 7, 1996	6-8"	Heavy, wet snow, no significant travel problems
April 9, 1996	12-20"	Heavy, wet snow on trees/power lines causing scattered power outages, less snow accumulated on pavements
December 6, 1996	6"	Scattered power outages and poor road conditions
December 7, 1996	4"	No reports of significant damage
January 11, 1997	6"	Rates up to two inches per hr., minimal effects on travel
April 1, 1997	24"	Heavy snow/strong winds caused blizzard conditions, travel just about impossible at height of storm, tree limbs/wires downed, schools closed for 2 days, power outages
December 23, 1997	6-8"	Slick driving conditions, schools closed early, minor accidents
February 25, 1999	8-12"	Schools closed early, hazardous road conditions
March 15, 1999	7-12"	Poor traveling conditions, schools and businesses closed
January 25, 2000	4-8"	Minor accidents reported
February 18, 2000	6-8"	Snarled traffic on major highways and created treacherous driving conditions
December 30, 2000	6-8"	Storm fell on a Saturday so no major traffic problems
January 20, 2001	6-8"	Storm fell on the weekend so no major traffic problems
February 5, 2001	7-15"	Traffic snarled as commuters tried to leave work early, 1,300 customers were left without power
February 7, 2003	6-12"	No significant storm damage, main impact was to travel
February 17, 2003	12-24"	Storm fell on Presidents Day so travel impact was minimal, some minor accidents due to slippery roads
March 6, 2003	6-10"	Dozens of minor accidents due to poor visibility and slippery roads
December 5, 2003	12-24"	Major disruption to transportation systems, dozens of minor accidents
March 16, 2004	4-8"	No major damage reported

Source: National Climate Data Center

Section 2.4 Significant Hailstorms

Hailstorms are associated with severe thunderstorms accompanied by high winds. The National Climate Data Center reports several hailstorms that have affected Lincoln in the past with hail ranging in size from 1.00" to 1.75". Hail of this magnitude can cause various forms of damage anywhere in the community including damage to vehicles and structures. Most hail does tend to occur in the higher elevations of Town which includes Manville and Limerock.

Table 4 – Significant Hailstorms for Providence County

Date	Magnitude (size in inches)	Comments
May 25, 1994	1"	Marble-size hail fell during a thunderstorm
August 6, 1997	1.5"	Dime size to ping-pong size hail fell
August 10, 2000	1.75"	Golf ball sized hail fell

Source: National Climate Data Center

Section 2.5 Significant Wind Events

National climatic events such as high gale winds, tropical storms, thunderstorms, nor'easters, hurricanes, and low-pressure systems produce wind events in Rhode Island. Damages from wind events range from power outages, property damage to vehicles and buildings and fallen trees/limbs. Wind events in Lincoln have resulted primarily in power outages and downed tree limbs with minimal property damage.

Table 5 – Significant Wind Events for Providence County

Date	Magnitude (kts or mph)	Comments
January 7, 1995	Gusts + 50 mph	No reports of wind damage
July 13, 1996	Gusts to 60 mph	Tropical Storm Bertha-high winds-no damage reported
March 6, 1997	50-62 mph	Property damaged by trees/limbs, scattered power outages
March 31, 1997	30-40 mph gusts	Widespread power outages
August 21, 1997	40 mph gusts	Tree limbs downed, isolated power outages
December 2, 1997	40-50 mph gusts	No damage reported
December 14, 1997	40-55 mph gusts	No damage reported
February 4, 1998	40 mph gusts	No damage reported
February 24, 1998	40-56 mph gusts	Strong winds associated with nor'easter, no damage reported
March 9, 1998	40-55 mph gusts	Scattered power outages reported
May 31, 1998	50 mph gusts	Winds associated with sever thunderstorm downed tree limbs and wires reported downed
July 19, 1999	50 mph gusts	Thunderstorm winds downed power lines
September 16, 1999	50 mph gusts	Tropical Storm Floyd brought high winds that downed branches, trees and wires
February 14, 2000	50 mph gusts	No wind damage was reported
April 9, 2000	Gusts to 60 mph	High winds associated with a severe thunderstorm downed branches
December 12, 2000	60 mph gusts	Downed trees, limbs and wires, scattered power outages
December 17, 2000	60 mph gusts	Downed trees, limbs and power lines, scattered power outages
February 17, 2001	45-55 mph gusts	No reports of wind damage
October 15, 2003	45-55 mph gusts	Downed trees and large limbs resulted in scattered power outages
November 13, 2003	50-60 mph gusts	Brought down trees and power lines

Source: National Climate Data Center

Section 2.6 Significant Lightning Storms

The National Climate Data Center does not list any significant lightning storms for Lincoln. However, this does not mean that Lincoln is not at risk from the effects of lightning. Thunderstorms are a common occurrence in this community and the results of lightning strikes can be scattered power outages, house fires, forest fires and damage from trees being struck by lightning.

Section 2.7 Earthquakes and Forest Fires

Although Rhode Island is not prone to major earthquakes, we do have our share of them. Thankfully most quakes in and around Rhode Island are usually only felt as a slight rumble lasting several seconds or less. The most recent earthquake centered in Rhode Island was on October 6, 2003 in West Warwick. This quake had a magnitude of 1.8 on the Richter Scale of 1 to 10 (10 being most severe). Most quakes that are felt in Rhode Island are not centered in the State, but in surrounding States (see Table 7). Therefore, earthquakes do need to be considered as a hazard to our community but with low priority. Buildings most at risk from earthquakes are old masonry buildings and high-rise structures.

Table 6 – History of Earthquakes in Rhode Island

Date	Point of Origin	Impact on Rhode Island
February 28, 1925	St. Lawrence River region	Intensity V affects felt on Block Island and in Providence. Intensity IV effects felt in Charlestown
November 19, 1929	Grand Banks of Newfoundland	Moderate vibrations felt on Block Island, and in Chepachet, Newport, Providence and Westerly
November 1, 1935	Quebec, Canada	A magnitude of 6.25 with intensity IV felt on Block Island and in Providence and Woonsocket
December 20 & 24, 1940	Lake Ossipee, NH	Intensity V affects knocked pictures off walls in Newport. Intensity IV effects were felt at Central Falls, Pascoag, Providence and Woonsocket. Intensity I-III effects in Kingston, New Shoreham, Wakefield.
September 4, 1944	Massena, NY	Intensity I-III was reported in Kingston, Lonsdale, Providence, Wakefield and Woonsocket
October 16, 1963	Coast of Massachusetts	A magnitude 4.5 quake caused Intensity V to be felt in Chepachet with reports of some cracked plaster. There were also reports of rattling windows and dishes and rumbling earth sounds. Other Northern Rhode Island locations felt the tremor, but with less intensity.
December 7, 1965	Unknown	Windows and doors shook in Warwick and furniture and small objects moved in Bristol.
February 2, 1967	Unknown	A magnitude 2.4 created intensity V effects in Middletown, Newport, North Kingstown and Jamestown. No damage reported.
February 3, 1973	Unknown	Explosion like or sonic boom noises were heard throughout Rhode Island and houses and windows shook, but nothing was reported by seismographs.
June 14, 1973	Western Maine	Intensity IV effects felt at Charlestown and Intensity I-III felt at Bristol, E. Providence, Harmony and Prov.
October 6, 2003	West Warwick	A magnitude of 1.8 caused minor shaking in the community, no damage reported

Source: US Geological Survey; Earthquake History of Rhode Island

Forest Fires are another risk in parts of Lincoln, especially considering that Lincoln Woods State Park is located in this community. This is a dense forested area (approximately 700 acres) with lots of underbrush and only one main road throughout the Park. Another area of concern would be approximately 60 acres of wooded land on Cobble Hill Road, and approximately 200 acres on Old River Road, surrounding Handy Pond. There have been no major fires in Lincoln Woods or the other areas of concern.

Section 2.8 Natural Hazard Profile Summary

This Natural Hazard Profile Summary lists the specific hazards that can affect Lincoln along with specifics regarding frequency of occurrence, magnitude (% of community affected), speed of onset (warning time available), seasonal pattern, possible affects to the community and risk priority.

Table 7 – Hazard Profile Summary

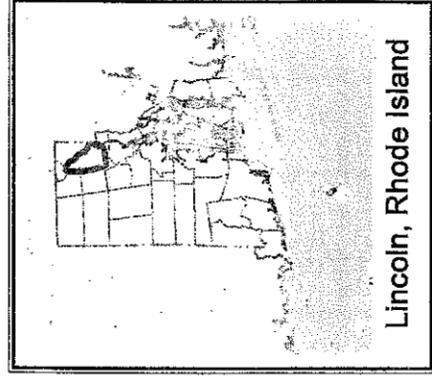
Hazard	Frequency ²	Magnitude ³	Speed of Onset	Seasonal Pattern	Possible Affects	Risk Priority
Hurricane	Likely	Limited	24+ hrs.	June-Nov. with Aug. & Sept. most likely	Flooding, downed trees, power outages, property damage, loss of life	Medium
Heavy Rains Flooding	Highly likely	Limited	12-24 hrs.	Spring and Summer	Flooding, property damage, roads closed, dams breached	Medium
Nor'easter Snowstorm	Highly likely	Critical	12-24 hrs.	Winter	Power outages, poor travel conditions, schools/businesses closed	High
Hail	Possible	Negligible	Minimal	Summer	Property damage	Low
Wind event	Highly likely	Critical	12-24 hrs.	Any Season	Property damage, power outages, downed trees and limbs	High
Lightning	Highly likely	Negligible	6-12 hrs.	Spring, Summer, Fall	Property damage, fire	Low
Earthquake	Possible	Critical	Minimal	Any Season	Loss of life, property damage, power outages	Low
Wildfire	Possible	Limited to Negligible	Minimal	Any Season	Property damage, environmental damage	Medium

² Highly likely=near 100% probability within the next year; Likely=between 10% and 100% probability within the next year or at least one chance in next 10 years; Possible=between 1% and 10% probability within the next year or at least one chance in next 100 years; Unlikely=less than 1% probability in next 100 years

³ Catastrophic=more than 50% of community affected; Critical=25% to 50% affected; Limited= 10% to 25% affected; Negligible=Less than 10% affected.

Risks In Lincoln

Map 1



Social/Economic Risks

- Extended Care Facilities
- † Assisted Living
- Day Care Center
- 1 Dot = 1 Building Location

Public Infrastructure

- ▾ Dams
- ▾ Bridges
- ✚ Major Roads
- ✚ Other Roads

Land Use / Land Cover

- Commercial/Industrial
- Forest
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Other

- ▭ Municipal Boundary

Flood Zones

- ▨ A - Zone (100 Year)
- ▨ V - Zone (100 Year)
- ▨ X - Zone (500 Year)
- ▨ Rivers and Streams
- ▨ Open Water

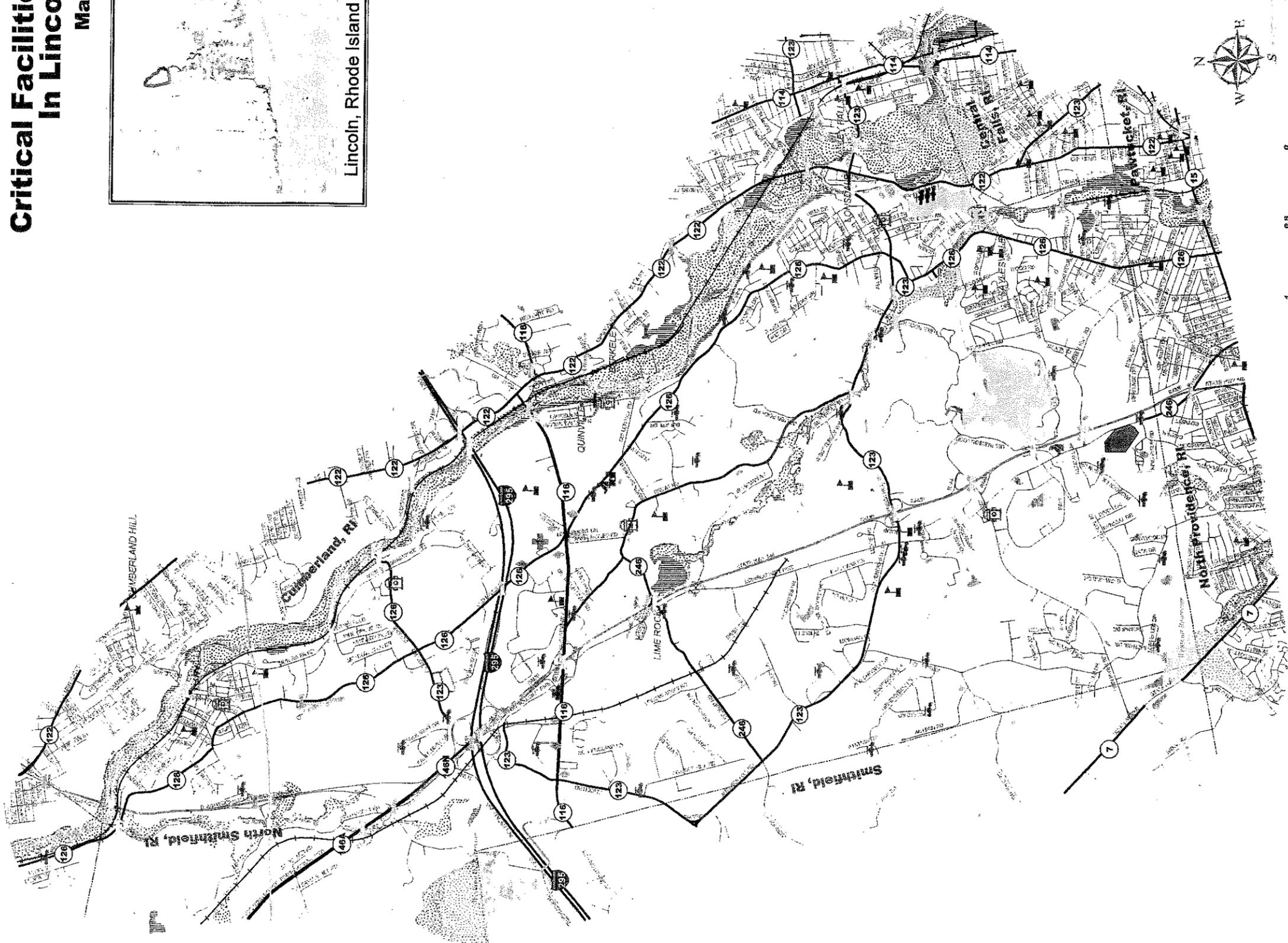
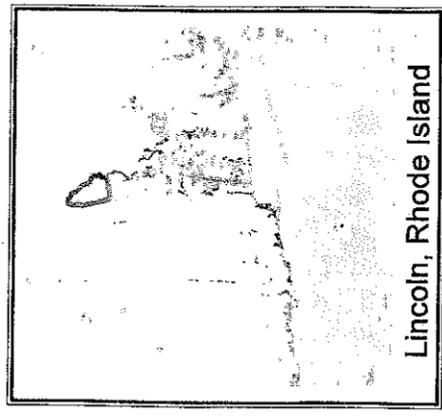


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Note: Map information has been extended 1 kilometer around the Lincoln border. This extension is intended to aid administrators in hazard mitigation. This map confers no legal status to anything hereon.

Critical Facilities In Lincoln

Map 2



- Public Infrastructure**
- Town Hall
 - Fire Stations
 - Police Stations
 - Schools
 - Major Roads
 - Other Roads
 - Railway
 - Bridges
 - Trailer Park
 - Municipal Boundary

- Preparedness**
- Red Cross Approved Shelters
 - Lincoln Jr./Sr. High School
 - Traffic Control Points

- Flood Zones**
- A - Zone (100 Year)
 - V - Zone (100 Year)
 - X - 500 Year
 - Rivers and Streams
 - Water

- Utilities**
- Water Pump stations
 - Sewer Pump stations
 - Major Gas Mains

Note: Rhode Island information has been extended 1 kilometer around the Lincoln border. This extension is intended to aid administrators in hazard mitigation. However, shelters located within this 1 kilometer buffer have been removed. This map confers no legal status to anything hereon.



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Section 3.0 Vulnerability/Risk Assessment

This section focuses on assessing the community's risk and vulnerability. It will identify what areas are at risk, how vulnerable those areas (e.g., structures, population or natural resources) are and what the impacts (loss of life, environmental damage or inconvenience to residents) will be if those areas are affected by a natural disaster. The risk assessment matrix (Table 9) summarizes the major risks to Lincoln.

With the help of the University of Rhode Island (URI) Environmental Data Center, Lincoln mapped high-risk areas in the Town. Map 1: Risks in Lincoln, indicates public infrastructure (dams, bridges, major roads), social/economic risks, land use/land cover, flood zones, repetitive loss areas and areas of historic flooding (not marked on the FEMA Flood Insurance Rate Map). Map 2: Critical Facilities in Lincoln, indicates public infrastructure (Town Hall, Fire Stations, Police Station and schools), utilities, critical facilities, evacuation routes and American Red Cross-approved shelters.

Section 3.1 Population at Risk

The use of mass care facilities during an emergency is dependent on a variety of variables. These variables include warning time, public awareness of the hazard, levels of encouragement from public officials, and the availability of shelters. There is one approved mass care facility located within the Town, which is the Junior/Senior High School located at the intersection of Routes 116 (George Washington Highway) and 126 (Old River Road). This is an approved shelter by the American Red Cross that can operate as a mass care facility and it is not located in a flood zone. Total shelter capacity is 1700. If required for a large scale disaster, additional shelters at the Community College of Rhode Island on Louisquisset Pike have been identified.

Section 3.2 Property at Risk

The 100-year flood (base flood) is an event that has a one-percent probability of happening in any given year and is the storm event used to identify the flood zones which impact zoning and building requirements throughout the Town. Flood ordinances have regulated development in flood plains and mandated that a proposed structure's lowest floor elevation be above the 100-year base flood elevation. Portions of the Town west of the Blackstone River experience frequent street and basement flooding during heavy rains. In addition, businesses along the Blackstone River have experienced considerable flood damage as a result of their close proximity to the river. The businesses have done nothing to alleviate this problem.

FEMA lists 189 properties in Lincoln that are insured by the National Flood Insurance Program (NFIP) with a total value of over \$16.6 million as of December 31, 2003. From 1978 through 2003, there were 36 losses in Lincoln through the NFIP with over \$297 thousand in total payments to policyholders.

The majority of flooding problems within the Town of Lincoln stems from street flooding in poor drainage areas and flooded parking lots in low-lying areas. This is due to a

combination of factors, including the inability of combined sewer overflow (CSO) system to handle the runoff during heavy rainfall.

In addition to flood hazards, property in Lincoln is also at risk from wind. Wind events are generally normal for Rhode Island and regularly occur each year. Winter storms and Nor'easters cause high winds in the winter months and severe thunderstorms are prevalent in the spring and summer seasons. Tropical events or hurricanes provide high winds in late summer and fall. Most damage that occurs to property from this hazard are due mainly to fallen trees and limbs.

Section 3.3 The Economy at Risk

According to the 2003 Comprehensive Plan, just over 64% of Lincoln's tax base is comprised of residential property. If the Town were to lose a portion of these properties to a natural hazard, the impact on the tax base could be severe and would be felt by taxpayers town wide. Furthermore, Lincoln has several large employers as well as smaller businesses which contribute to a large day time population that also patronize the local businesses. A natural disaster that caused the closure of these businesses for any length of time could potentially destroy the smaller businesses and put them out of business permanently and the larger ones may choose to relocate. Business accounts for approximately 23% of Lincoln's tax base, which could also have detrimental effects on the Town as a whole if businesses were lost.

Section 3.4 Identifying the Issues

The town's vulnerability to natural disasters must be measured in terms of the population, property and natural and economic resources at risk, as well as the probability and magnitude of the event.

There were three major areas that the committee chose to address: Local Dams Subject to Flooding, Public Utilities, and Local Bridges. Actions that will be taken to address these areas are listed in Section 4 of this plan.

Section 3.5 Capability Assessment

This capability assessment refers to the existing plans, programs and policies that have incorporated natural hazard mitigation or other proactive tools.

In 1970, the Town developed its first Comprehensive Plan, which was most recently updated in 2003. Lincoln's Comprehensive Plan identifies actions that can be taken to address increased development pressures, economic stability, open space and recreation issues, and public infrastructure and facilities. It outlines goals, policies, issues, and actions to provide a framework for everyday operations within the Town. Lincoln has recognized the importance of incorporating mitigation initiatives (both Pre- and Post-Disaster) into the Comprehensive Plan and has adopted the mitigation strategy and planning process into its publicized Town-planning initiatives. Further revisions of the Comprehensive Plan will reflect the mitigation actions set forth in this plan, as well as

revisions of such, when setting goals for the Town, which will allow all Town plans to incorporate comprehensive mitigation planning for the Town.

The Town implements and enforces the State Building Code; however, it does not currently participate in FEMA's Community Rating System (CRS) Program. Participation in FEMA's Community Rating System Program would allow flood insurance policy holders a 10% discount on their premiums, and is suggested in the mitigation actions section of this plan. The Town works regularly with other communities along the Blackstone River Valley, such as Cumberland, Pawtucket, Central Falls and Woonsocket, via mutual aid agreements, to protect valuable natural resources and preserve open space along the river which has helped to reduce flooding and pollution risks. Future revisions of this Plan will incorporate mitigation actions that can be jointly undertaken with other communities, such as those listed above, to further protect life and property along the Blackstone River.

The Town recently updated its Emergency Operations Plan (EOP). This plan addresses the response to extraordinary emergency situations associated with natural, man-made, and technological disasters. The Town's Emergency Operations Plan further addresses pre- and post-disaster strategies to affectively deal with the hazards addressed in this plan such as hurricane and flooding evacuation, public warning and sheltering during natural disasters. Future revisions of the EOP will continue to incorporate mitigation activities; including those listed in the Plan.

Section 3.6 Future Development Trends

As with all the other communities in Rhode Island, Lincoln continues to grow in terms of new residential development. In the period from 1990 to 2000, there was an increase of 1,227 housing units in the community. This type of growth not only consumes more land, it also lends itself to more school age children being brought into the Town which can cause a strain on the already crowded schools. Commercial/Industrial development is also on the rise in Lincoln which brings with it more employment opportunities, but also increases the daytime population that along with the residential population may need to be evacuated and sheltered during a natural disaster.

According to the 2003 Comprehensive Plan Update, there are approximately 4,700 acres of available land in Lincoln for residential and business development. Lincoln would like to see their business community continue to grow while maintaining residential growth. Along with this, the Town has stated a goal of 30% of its total land being left for open space. What needs to be addressed, however, is what portions of these available acres are in hazard areas and should be potential open space purchases.

Preservation of Wetlands

The environmental and economic values of wetlands are endless and becoming more realized over time. Wetlands play an important role in flood control. Wetlands collect and detain flood waters, reducing their force and destructiveness. These benefits are readily apparent in southern states where over fifty percent of wetlands have been eliminated. Wetlands also provide a valuable, natural service regarding water quality. Wetlands absorb and filtrate pollutants that could otherwise degrade the quality of water

in rivers, lakes, and ponds. Wetlands provide necessary spawning/rearing habitat and food supply for freshwater fish. Wetlands also provide the critical habitat for most waterfowl, as well as an enormous diversity of plants and animals. Additional benefits of wetlands include: groundwater recharge, erosion control, land formation, and recreation.

Currently, Lincoln has approximately 2,200 acres of wetlands within the Town. Large concentrations of wetlands can be found in the Lonsdale and Albion sections of Lincoln and include: the old Lonsdale Drive-in and Handy Pond. There are also isolated wetlands and 39 detention basins throughout the Town.

Section 3.7 Risk Assessment Matrix

The Town of Lincoln Natural Hazard Mitigation Committee in reviewing the natural hazards that can impact the town completed the following Risk Assessment Matrix (Table 9). While completing the matrix, the committee identified areas in town that are at risk and are vulnerable to costly damage and loss of life. Each vulnerable area has been classified by a risk area and is ranked by which mitigation strategies would produce the most benefit for the community.

Table 10.0 Risk Assessment Matrix

Rank	Vulnerable Area	Risk Area	Location	Ownership	Natural Hazard	Primary Problem or Effect	Mitigation Benefits	Risk Historic = H Potential = P
1	Local Dams Subject to Flooding Barney's Dam Manville Dam Albion Dam Ashton Dam Butterfly Dam Prait Dam Manton Dam Sayles Dam *Thundermist Dam (Woonsocket)	1	Smithfield Ave. Main Street, Manville School Street, Albion Route 116, North Side Great Road Lonsdale Avenue Wake Robin Road (Riverside Dr) Walker Street Blackstone Canal area		*Flood *Wind Event *Earthquake *Heavy Rain	*Loss of life and infrastructure *Damage to property downstream	*Decrease potential for dam failure *Reduce liability for damage to private property *Public safety	P
2	Utilities Sewer Pumping Stations Electric Company Gas Pipeline Water Dept. Sanitary sewer lines Narragansett Bay Commission	2	Town-wide	Public and Private	*Earthquake *Flood *Fire *Nor'easters *Hurricane *Ice Storm *Heavy Rain	*Hazardous waste contamination *Public safety *Loss/ damage of lives and property	*Minimize contamination to residential areas *Decrease costs of cleanup *Public safety	H
3	Local Bridges Martin Street Lonsdale Ave & John Street Smithfield Ave @ Barney's Pond	3		Public Public Public	*Hurricane *Wind Event *Ice Storm *Nor'easters *Snow Storm *Earthquake *Flood *Fire *Heavy Rain	*Loss of life and infrastructure *Disruption of arterial traffic flow *Economic disruption *Disruption of evacuation routes	*Protection of life and infrastructure *Maintain evacuation routes *Public safety	P
4	Local Roads Subject to Flooding Ballou Avenue Arnold Street Pond Avenue	4	Ballou Avenue Arnold Street Pond Avenue	Public Public Public	*Flooding *Hurricane *Heavy Rain	*Disruption of arterial traffic flow *Disruption of evacuation routes *Damage to private property *Cost of cleanup	*Public safety *Maintain evacuation routes *Reduce liability for damage to private property *Decrease costs of cleanup	H
5	Tree Damage	5	Town-wide	Public and Private	*Hurricane *Windstorm *Ice Storm *Nor'easters	*Loss of drinking water, heat, communication *Power outages	*Maintain communication systems *Protection of essential services	H
6	Residential Homes	6	Town-wide	Private	*Hurricane *Wind Event *Ice Storm *Nor'easters *Snow Storm *Earthquake *Heavy Rain *Flood/ Fire	*Economic and social hardship	*Public safety *Prevent/ minimize economic and social damage	P
7	Schools Fairlawn Early Learning Saylesville Elem Lonsdale Elem Central Elem Lincoln Jr. Sr. High Northern Elem Spurwink School	7	Fairlawn Way Woodland Street River Road Great Road Old River Road New River Road River Road	Public Public Public Public Public Public Private	*Hurricane *Wind Event *Ice Storm *Nor'easters *Snow Storm *Earthquake *Flood *Fire *Heavy Rains	*Loss/ damage of lives and property *Loss of shelter *Economic/ social hardship	*Public safety *Maintain shelters *Protect economic and social well-being	P
8	Public Infrastructure Town Hall/Police Department Fire Stations - 7 Lonsdale Fire Limerock Fire Albion Fire Quinnville Fire Manville Fire Saylesville Fire Limerock Sub Station Lincoln School Dept.	7	Old River Road Front Street Twin River Road School St., Albion Lower River Road, Quinnville Main Street, Manville Walker Street Great Road Lonsdale Avenue	Public Public Public Public Public Public Public	*Hurricane *Wind Event *Ice Storm *Nor'easters *Snow Storm *Earthquake *Flood *Fire *Heavy Rain	*Damage to infrastructure *Disruption of emergency services *Loss/ damage of lives and property	*Minimize disruption to emergency services *Public safety *Protection of essential services	P

Table 10.0 Risk Assessment Matrix

Risk Area	Vulnerable Area	Rank	Location	Ownership	Natural Hazard	Primary Problem or Effect	Mitigation Benefits	Historic = H Potential = P
9	Extended Care Facilities	7	Old River Road, Manville Route 116	Private Private	*Hurricane *Wind Event *Ice Storm *Nor'easters *Snow Storm *Earthquake *Flood *Fire *Heavy Rain	*Loss/ damage of lives and property *Economic/ social hardship	*Protect economic and social well-being *Protection of life and property	P
	The Holiday Nursing Home Lincoln Place Assisted Living							
10	Medical Facilities	7	Wake Robin Road	Private	*Hurricane *Wind Event *Ice Storm *Nor'easters *Snow Storm *Earthquake *Flood *Fire *Heavy Rain	*Loss/ damage of lives and property *Economic/ social hardship	*Protect economic and social well-being *Protection of life and property	P
	Lincoln Primary/Urgent Care							
11	Industries in the Floodplain	4	Saylesville Lonsdale Manville	Private Private Private	*Earthquake *Heavy Rain *Flood *Nor'easters	*Hazardous waste contamination *Public safety *Loss/ damage of lives and property	*Minimize contamination to residential areas *Decrease costs of cleanup *Public safety	H
	Saylesville							
	Lonsdale							
	Manville							

Section 4.0 Mitigation Actions

In completing the risk and vulnerability analysis, the Lincoln Natural Hazard Mitigation Committee considered projects and actions that would reduce the town's vulnerability to the identified hazards. The Risk Assessment Matrix presented in Table 9 is the basis for the Mitigation Actions presented in Section 4.1. The Committee considered the goals of this plan and prioritized the matrix and the associated actions based on historical damage, safety of the population, property protection and consistency with Town-wide goals and objectives presented with the Comprehensive Plan. Since there were no detailed records of past damage in the Town, the Committee used the Hazard Profile Summary to determine what natural event poses the greatest danger to the community and what areas would be affected. Once this was determined, the Committee created the Risk Assessment Matrix and assigned priority to each risk area and associated action. The criteria used to prioritize each Action was based on which area was most vulnerable with regards to public health risks, evacuation and mass care considerations, disruption of essential services and potential economic losses to the Town.

The Lincoln Hazard Mitigation Committee determined that the identified objectives could be met by considering actions aligned to the following:

- Planning and Regulations
- Property Protection, Structural Projects and Maintenance (acquisition, elevation, flood gates, sewers, repairs)
- Public Information and Outreach, Incentive Programs
- Emergency Services (Protection of Critical Facilities)
- Post Disaster Opportunities

This Committee has worked to set goals and objectives, as defined in the Action Plan (Section 4.1), that are bounded by a time frame and are compatible and consistent with State Hazard Mitigation Goals. Upon submittal of this plan to RIEMA, the State Hazard Mitigation Committee (SHMC) is expected to review and approve these goals and objectives to ensure consistency with the statewide goals and objectives. The time frame used for this strategy is as follows:

- Short Term = 0 to 6 Months
- Medium Term = 6 to 18 Months
- Long Term = 18 Months to 5 Years

Section 4.1 Action Plan

The following actions use the Risk Assessment Matrix (Table 9) to identify areas at risk, offer mitigation strategies and consider benefits. Each action offers a discussion of the project and if applicable, includes the options considered. Multiple actions associated with a vulnerable area reflect Town priorities and are simply prioritized high, medium, or low. If known, the actions include cost estimations and assign responsible parties to lead the efforts to complete the action. Other relevant departments/agencies that can offer support to the project are also identified, as well as funding options. The benefit of each

action is also listed, which was used to determine the cost vs. benefit when prioritizing each action.

Risk Area # 1 – Goal: Protect the community from failure of all dams located within the Town.

Existing conditions - Although there are several dams throughout town, several of them exhibit visual signs that they may not be structurally sound and need to be evaluated further to determine the impact to the community if they were to fail.

Action 1 – Evaluation of Structural Integrity

- a) Conduct an evaluation of each identified dam in town to determine its structural integrity – High priority. The appearance of some of the dams leads us to believe they are in poor condition and susceptible to failure. Therefore a structural evaluation needs to be conducted.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works, Army Corps of Engineers, Rhode Island Department of Environmental Management (RIDEM)

When: Short term

Resources available: Army Corps of Engineers, RIDEM

Benefit: Decrease potential for dam failure, liability from damage to private property and increased public safety

Estimated Cost: \$60,000-80,000

Action 2 – Research Use of Computer Based Models to Simulate Dam Failure

- a) In order to properly prioritize a dam's vulnerability to failure and to mitigate a potential dam failure, a simulation of where the water is projected to flow needs to be conducted – High priority.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works

When: Short term

Benefit: Protection of life and property

Estimated Cost: No additional costs

Action 3 – Establish a Priority List

- a) Evaluate results of structural integrity valuation and rate dams accordingly – High priority.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works

When: Short term

Benefit: The most vulnerable areas to a dam failure will be ranked

Estimated Cost: No additional costs

Action 4 – Public Education and Outreach

- a) In the event that the dam is found to be structurally compromised, educate those individuals within the path of the water flow on how they can protect themselves and seek shelter.

Responsible Party: Emergency Management Director

In Coordination With: Hazard Mitigation Committee, Lincoln Emergency Management Agency (LEMA)

When: After results of dam evaluation

Resources available: FEMA

Benefit: Protection of life and property

Estimated Cost: \$5,000

Action 5 – Improve Existing Conditions of Dams

- a) Based on evaluations and subsequent rankings, secure necessary funding through Federal, State, and Local resources to improve structural integrity of each dam.

Responsible Party: Emergency Management Director

In Coordination With: Hazard Mitigation Committee, Lincoln Emergency Management Agency (LEMA), Public Works

When: After results of dam evaluation

Resources available: FEMA, Army Corps of Engineers, Rhode Island Department of Environmental Management (RIDEM), RIEMA

Benefit: Protection of life and property, reduce liability, increase public safety

Estimated Cost: unknown

Risk Area # 2 – Goal: Protect the community from a failure of Town-wide public utilities.

Existing conditions – The entire Town of Lincoln is serviced by public water, sewer, gas, and electric. The Town of Lincoln currently has 39 sewer pumping stations, four public water storage tanks, and regional electric, gas, and sewer mains throughout the town. While regional gas, electric, and sewer utilities are regularly maintained, the Town's utilities' infrastructure is maintained as needed. The public utilities have the potential to adversely impact several neighborhoods if they were to fail. Potentially millions of dollars in property damages and risks to lives would result from a failure.

Action 6 – Evaluation of Functionality of Local Utilities

- a) Conduct an evaluation of local utilities to determine functionality – High priority. Due to age, it is suspect that their potential to fail is high.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works/Engineering

When: Short term and on-going

Resources: Town

Benefit: Ensure continued use of essential utilities during an event

Estimated costs: To be determined

Action 7 – Establish a Priority List

- a) Evaluate results of public utilities study and rate public utilities accordingly.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works/Engineering

When: Short term and on-going

Benefit: Ensure continued use of essential utilities during an event

Estimated costs: No additional costs.

Action 8 – Improve Existing Conditions of Local Public Utilities Structures.

- a) Based on the results of the public utilities study and subsequent ranking, secure necessary funding through Federal, State, and Local resources to improve functionality of public utilities structures.

Responsible Party: Emergency Management Director

In Coordination With: Hazard Mitigation Committee, Lincoln Emergency Management Agency (LEMA), Public Works

When: After results of local public utilities evaluation

Resources available: FEMA, Army Corps of Engineers, Rhode Island Department of Environmental Management (RIDEM), RIEMA

Benefit: Ensure continued use of essential utilities during an event

Estimated Cost: unknown

Risk Area # 3 – Goal: Protect the community from failure of all bridges located within the Town.

Existing conditions - Although there are several bridges throughout town, most of them would not directly impact property or critical facilities/infrastructure if they were to be fail for any reason. However, some of the bridges over the Blackstone River have the potential to jeopardize transportation routes to safety.

Action 9 – Evaluation of Structural Integrity

- a) Conduct an evaluation of each identified bridge in town to determine its structural integrity – Medium priority. The evaluation of structural integrity should begin with bridges that cross the Blackstone River and other bridges identified as key transportation routes in case of emergency.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works, Army Corp of Engineers, Rhode Island Department of Environmental Management (RIDEM), and Rhode Island Department of Transportation (RIDOT)

When: Medium term

Resources available: Army Corps of Engineers, RIDEM, RIDOT, RIEMA, FEMA

Benefit: Ensure continued use of critical infrastructure/evacuation routes during an event

Estimated Cost: unknown

Action 10 – Establish a Priority List

- a) Evaluate results of structural integrity valuation and rate bridges accordingly – Medium Priority.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works

When: Medium term

Benefit: Ensure continued use of critical infrastructure/evacuation routes during an event

Estimated Cost: No additional costs

Action 11 – Public Education and Outreach

- a) In the event that a bridge is found to be structurally compromised, provide all individuals alternate routes to emergency facilities.

Responsible Party: Emergency Management Director

In Coordination With: Hazard Mitigation Committee, Lincoln Emergency Management Agency (LEMA)

When: After results of bridge evaluation

Resources available: FEMA, RIEMA

Benefit: Protection of Life, designation of alternate evacuation route

Estimated Cost: \$5,000

Action 12– Improve Existing Conditions of Bridges

- a) Based on evaluations and subsequent rankings, secure necessary funding through Federal, State, and Local resources to improve structural integrity of each bridge.

Responsible Party: Emergency Management Director

In Coordination With: Hazard Mitigation Committee, Lincoln Emergency Management Agency (LEMA), Public Works

When: After results of bridge evaluation

Resources available: FEMA, Army Corps of Engineers, Rhode Island Department of Environmental Management (RIDEM), RIEMA

Benefit: Ensure continued use of critical infrastructure/evacuation routes during an event

Estimated Cost: unknown

Risk Area # 4– Goal: Protect present and future residential and commercial structures and infrastructure subject to flooding.

Existing conditions –Several properties and businesses along the Blackstone River experience minor flooding when the river rises after heavy rain. Some individuals have taken steps to alleviate this problem, but others have not. There are also several areas where basements and streets flood on a regular basis that need to be evaluated to see what can be done to mitigate the situation.

Action 13 – Establish a List of Properties and Streets Subject to Flooding From Poor Drainage and Run-Off

- a) A priority list of streets that are subject to repetitive flooding should be created – Medium priority. Once list is compiled, evaluate what steps can be taken (berms, culverts, drainage, etc.) to alleviate the problem. The list should designate those streets that are part of the Town evacuation route or main transportation routes as priority streets.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works/Engineering

When: Short term and on-going

Benefit: Ensure continued use of evacuation routes, reduce/eliminate street flooding and clean-up costs

Estimated costs: no additional costs

- b) New developments/projects need to be reviewed with respect to drainage and run-off issues to surrounding areas– High priority. Establish a standard to review not just the proposed development, but the entire surrounding area to evaluate how the development will affect drainage and run-off in surrounding areas when new developments are proposed.

Responsible Party: Director of Public Works

In Coordination With: Department of Public Works/Engineering

When: Medium term

Benefit: Protection of property, minimize the creation of new hazard areas

Estimated costs: no additional costs

Action 14 – Public Education and Outreach

- a) Provide property owners along the Blackstone River with literature that illustrates the steps they can take to eliminate the damage caused by rising water from the River. Medium priority.

Responsible Party: Emergency Management Director

In Coordination With: LEMA, Dept. of Public Works/Engineering

When: Medium term and on-going

Resources available: State EMA and FEMA

Benefit: Protection of life and property
Estimated costs: unknown

- b) Evaluate which properties are subject to reoccurring basement flooding and educate owners as to what measures they can take to eliminate the damage that is caused (installing sump-pumps, elevating furnishings, etc.)

Responsible Party: Emergency Management Director
In Coordination With: LEMA and Fire Districts
When: Short term and on-going
Resources available: RIEMA and FEMA
Benefit: Protection of property, reduce/eliminate repetitive damage claims
Estimated costs: \$1,000

- c) Explore possibility of acquiring property that is subject to repetitive loss under the NFIP.

Responsible Party: Emergency Management Director
In Coordination With: Tax Assessor, Planner
When: Long term and on-going
Resources available: FEMA
Benefit: Protection of life and property, reduction of claims
Estimated costs: To be determined depending on number of properties

Action 15 – Improve Existing Conditions of Properties and Streets Subject to Flooding From Poor Drainage and Run-Off

- a) Based on evaluations and subsequent rankings, secure necessary funding through Federal, State, and Local resources to improve structural integrity of identified properties and streets subject to flooding from poor drainage and run-off.

Responsible Party: Emergency Management Director
In Coordination With: Hazard Mitigation Committee, Lincoln Emergency Management Agency (LEMA), Public Works
When: After results of evaluation
Resources available: FEMA, Army Corps of Engineers, Rhode Island Department of Environmental Management (RIDEM), RIEMA, RIDOT
Benefit: Protection of life and property, continued use of evacuation routes
Estimated Cost: unknown

Action 16 – Join Community Rating System (CRS)

- a) Investigate the actions that are necessary for the Town to join the CRS in order to save residents money on their NFIP premiums. The Town can utilize its GIS for floodplain mapping.

Responsible Party: Emergency Management Director
In Coordination With: Planning Department
When: Short term
Resources available: FEMA, RIEMA

Benefit: Better floodplain management, helps residents save money
Estimated Cost: Minimal to non-existent

Risk Area # 5 – Goal: Protect all transportation routes from downed trees caused by natural hazards.

Existing conditions – The Town of Lincoln has continually inspected and maintained trees on public properties. Currently, the Town retains two local companies to remove and maintain damaged trees throughout the year. In the event of a natural hazard, these companies will respond accordingly. This is the main responsibility of the Town's tree warden.

Action 17 – Continue the Town's Working Relationship with Tree Companies

- a) This contact information should be incorporated and maintained within the Town of Lincoln's Emergency Operations Plan.

Responsible Party: Emergency Management Director
In Coordination With: Hazard Mitigation Committee, Lincoln Emergency Management Agency (LEMA), Public Works
When: On-going
Benefit: Reduce loss of electricity/telephones during an event
Estimated Cost: no additional costs

Risk Area # 6 – Goal: Educate entire community regarding the natural hazards that can affect our town and how they can protect themselves.

Existing conditions – Due to the lack on interest on the community's behalf while creating this document, the committee realized that more needed to be done to engage and prepare the public. It seems that many residents as well as the business community are complacent in regards to what actions they can take to protect themselves in the event of a natural disaster. Although the Town is preparing to install evacuation route signs, other neighboring towns have indicated that their citizens have no idea what they are for and that they lead to our shelter.

Action 18 – Public Education and Outreach

- a) Design a questionnaire to be posted on the Town website for members of the community to fill in that will evaluate just how prepared our community is and what further education is needed.

Responsible Party: Emergency Management Director
In Coordination With: LEMA, Hazard Mitigation Committee
When: Short term
Resources available: Town funding, RIEMA, FEMA
Benefit: Protection of life and property, public safety

Estimated costs: \$5,000

- b) From the results of the questionnaire, develop a pamphlet to be distributed to all residents and business owners that describes the natural hazards that threaten our community and steps they can take for each hazard to protect themselves and their property. Evacuation routes and shelter information should be included.

Responsible Party: Emergency Management Director

In Coordination With: LEMA, Hazard Mitigation Committee

When: Medium term and on-going

Resources available: Town funding, RIEMA and FEMA

Benefit: Protection of life and property, public safety

Estimated costs: \$15,000

- c) Establish area on the Town web-site to post the daily fire hazard rating (e.g. if very dry it's a high hazard condition for fire) and encourage residents to check it regularly.

Responsible Party: Emergency Management Director

In Coordination With: Fire Departments, DEM

When: Short term

Resources available: DEM

Benefit: Help educate residents to forest fire hazard

Estimated costs: No additional costs

Risk Area # 7 – Goal: Strengthen the participation in the Lincoln Emergency Management Agency.

Existing conditions - Currently, the Town of Lincoln and the School Department each have separate emergency operation plans. A working relationship needs to be developed so the Town and the School Department can capitalize on each others resources during a natural hazard. Fortunately the Town's Public Safety Agencies participate together on the emergency operation plans and have good working relationships and by continuing these relationships, the Town as a whole will be well prepared for an emergency situation. Finally, privately owned medical facilities and extended care facilities operate independently and in case of a natural hazard, the role of these facilities is unknown.

Action 19 – Develop a working relationship with the School Department to incorporate emergency procedures during a natural hazard.

- a) Invite School Department Representatives to our LEMA Meetings.

Responsible Party: Emergency Management Director

In Coordination With: LEMA, Hazard Mitigation Committee

When: Short term

Benefit: Protection of economic/social well-being, protection of life

Estimated costs: No additional costs

Action 20 – Continue Working with the Police and All Seven Fire Districts on Natural Hazard Planning.

- a) Currently, there is no formal training manual outlining emergency procedures. The Town needs to establish a formal training manual for all emergency responders.

Responsible Party: Emergency Management Director
In Coordination With: LEMA, Hazard Mitigation Committee, Police Department and All Seven Fire Districts
When: On-going
Benefit: Continued public safety communication/coordination
Estimated costs: No additional costs

Action 21 – Develop a working relationship with privately owned medical facilities and extended care facilities located within Town.

- a) Lincoln's Emergency Management Agency and Hazard Mitigation Committee should establish contact with these facilities and develop their coordinated responsibilities.

Responsible Party: Emergency Management Director
In Coordination With: LEMA, Hazard Mitigation Committee
When: Short Term
Benefit: Protection of life and economic/social well-being
Estimated costs: No additional costs

Section 4.2 – Strategy Adoption

The Lincoln Natural Hazard Mitigation Committee approved the adoption of this plan and recommended it be forwarded to the Town Council for their review and approval. The Lincoln Town Council approved the Plan on November 16, 2004; a copy of the resolution is attached in Appendix C. The Plan will next be forwarded to the RIEMA for approval by the State Hazard Mitigation Committee, the executive director of the RIEMA and then FEMA Region I.

Section 4.3 – Implementation, Evaluation and Revision of Strategy

Each agency or department that is responsible for a specific action will begin their tasked assignments after Town Council approval. The Emergency Management Director will also seek other funding sources to help each agency/department implement their strategies; even if funding is an issue.

The Committee decided that since the Public Works Department has the lead on most of the actions associated with the Plan that they will also be the coordinating agency that will track the progress of each action utilizing the Mitigation Action Progress Form

(located in Appendix D). The agencies will report all progress to the Public Works Director who will maintain all documentation.

The Mitigation Action Progress Form will be the main tool used by the Committee when they meet quarterly to review progress and evaluate the effectiveness of the Plan. This tool will also be the basis for the review and revision of the Plan annually. Each meeting will be open to the public and their input will be encouraged to insure any comments or concerns of the community are addressed. Any action that has been completed will be removed from the Plan and if an action needs to be readjusted, this will also be reflected in the revision. If the Committee determines that additional actions can and should be taken, as a result of the quarterly evaluation meetings, they will be added to the Plan as well.

Also, as previously mentioned the mitigation actions stated in this Plan and any updates will be incorporated into further revisions of the Town's Comprehensive Plan. Elements of this Plan will also be addressed in revisions of the Emergency Operations Plan. By incorporating mitigation strategies into all planning efforts, the Town will ensure consistency and continuity in all future planning.

The local strategy will be reviewed annually or after each disaster and will undergo a full update every 5 years. Furthermore, future revisions will use a well-defined method of prioritizing the mitigation actions since more detailed records of events will be able to be utilized. Any revisions and/or updates that are made will be forwarded to the RIEMA to insure that the State Hazard Mitigation Strategy remains current.

REFERENCES

Earthquake: Needs Assessment. Rhode Island Emergency Management Agency, October 1994.

Flood Hazard Mitigation Planning: A Community Guide. Massachusetts Department of Environmental Management Flood Hazard Management Program. June 1997.

Flood Insurance Rate Maps for the Town of Lincoln, Rhode Island.

National Climatic Data Center. National Oceanic and Atmospheric Administration.
National Climatic Data Website -- www.ncdc.noaa.gov .

State and Local Mitigation Planning How-To Guides. FEMA. FEMA 386-2, August 2001. FEMA 386-3, April 2003. FEMA 386-4, April 2003.

Town of Lincoln Comprehensive Plan.

Town of Lincoln Emergency Operations Plan.

APPENDIX A – Technical and Financial Assistance for Mitigation

State Resources

Coastal Resources Center

University of Rhode Island
Narragansett Bay Campus
Narragansett, RI 02882
(401) 874-6224

Coastal Resources Management Council

Steadman Government Center
4808 Tower Hill Road
Wakefield, RI 02879
(401) 222-2476

Department of Administration

Division Of Planning
One Capitol Hill
Providence, RI 02908
(401) 222-6478

Department of Environmental Management

Division of Parks and Recreation
2321 Hartford Avenue
Johnston, RI 02919
(401) 222-2635

Department of Transportation-Design Section/Bridges

2 Capitol Hill, Room 231D
Providence, RI 02903
(401) 222-2053

Rhode Island Banking Commission/ Associate Director

233 Richmond Street
Providence, RI 02903
(401) 222-2405

Rhode Island Builders Association

The Terry Lane Corporation
Terry Lane
Glocester, RI 02814
(401) 568-8006

Rhode Island Department of Business Regulations

233 Richmond Street
Providence, RI 02903
(401) 222-2246

Rhode Island Emergency Management Agency

645 New London Avenue
Cranston, RI 02920
(401) 946-9996

Public Utilities Commission

100 Orange Street
Providence, RI 02903
(401) 222-3500 ext. 153

State Fire Marshal's Office

272 West Exchange Street
Providence, RI 02903
(401) 222-2335

State of Rhode Island Building Committee Office

Building Commissioner's Office
One Capitol Hill
Providence, RI 02903
(401) 222-3529

Federal Resources

Economic Development Administration

143 North Main Street, Suite 209
Concord, NH 03301
(603) 225-1624

Federal Emergency Management Agency

Mitigation Division
Region I Office
J.W. McCormack POCH, Room 462
Boston, MA 02109
(617) 223-9561

Small Business Administration

360 Rainbow Blvd., South, 3rd Floor
Niagra Falls, NY 14303
(716) 282-4612 or (800) 659-2955

U.S. Army Corps of Engineers

New England District
424 Trapelo Road
Waltham, MA 02254
(617) 647-8505

U.S. Department of Agriculture

Natural Resources Conservation Service
(formerly Soil Conservation Service)
451 West Street
Amherst, MA 01002
(413) 253-4362

U.S. Fish and Wildlife Service

New England Field Office
22 Bridge Street, Unit #1
Concord, NH 03301-4986

U.S. Department of Commerce

National Weather Service
Forecast Office
445 Myles Standish Boulevard
Taunton, MA 02780
(508) 823-2262

U.S. Department of Housing and Urban Development

Comm. Development Block Grants
Region I-O'Neill Federal Building
10 Causeway Street
Boston, MA 02222
(617) 656-5354

U.S. Department of the Interior National Park Service

River & Trail Conservation Program
Regional Office
15 State Street
Boston, MA 02109
(617) 223-5203

U.S. Environmental Protection Agency – Region I

JFK Federal Building
Government Center
Boston, MA 02203
(617) 565-3400

Other Resources

The Association of State Floodplain Managers (ASFPM)

Professional association with a membership of almost 1,000 state employees that assists communities with the NFIP. ASFPM has developed a series of technical and topical research papers and a series of proceedings from their annual conferences. Many mitigation “success stories” have been documented through these resources and provide a good starting point for planning.

Floodplain Management Resources Center

Free library and referral service of the ASFPM for floodplain management publication. Co-located with the Natural Hazards Center at the University of Colorado in Boulder, staff can use keywords to identify useful publications from the more than 900 flood-related documents in the library.

Institute for Business and Home Safety (IBHS) (formerly Insurance Institute for Property Loss Reduction)

An insurance industry sponsored, nonprofit organization dedicated to reducing losses – deaths, injuries and property damage – resulting from natural hazards. IBHS efforts are directed at five specific hazards: flood, windstorm, hail, earthquake and wildfire. Through its public education efforts and information center, IBHS communicates the results of its research and statistical gathering, as well as mitigation information, to a broad audience.

Volunteer Organizations

Organization, such as the American Red Cross, the Salvation Army, Habitat for Humanity, Interfaith and the Mennonite Disaster Service are often available to help after disasters. Service organization, such as the Lions, Elks and VFW are also available. These organizations have helped others with food, shelter, clothing, money, etc. Habitat for Humanity and the Mennonite Disaster Service provide skilled labor to help rebuild damaged buildings incorporating mitigation or flood proofing concepts. The offices of individual organizations can be contacted directly or the FEMA Regional office may be able to assist.

Flood Relief Funds

After a disaster, local businesses, residents and out-of-town groups often donate money to local relief funds. They may be managed by the local government, one or more local churches or an ad hoc committee. No government disaster declaration is needed. Local officials should recommend that the funds be held until an applicant exhausts all sources of public disaster assistance. Doing so allows the funds to be used for mitigation and other projects that cannot be funded elsewhere.

New England States Emergency Consortium (NESEC) – Lakeside Office Park

NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Brochures and videotapes are available on such topics as earthquake preparedness, mitigation and hurricane safety tips. NESEC maintains a world wide web home page that is accessible at <http://www.serve.com/NESEC>.

The New England Floodplain and Stormwater Managers Association (NEFSMA)

Professional organization for New England floodplain and stormwater managers. Provides workshops, conferences and a newsletter to membership and interested individuals and companies. NEFSMA home page is accessible at <http://www.seacoast.com/~nefsma>.

APPENDIX B – Existing Protection Systems – State and Federal

State

Earthquakes and Hurricanes:

A certain amount of funding is allotted to each state per year based on a risk formula for earthquakes. Coastal states are allocated funds based on a risk formula for hurricanes. Each state receiving such funds has the ability to grant project funds to a community. There is not a match requirement on the part of the community, but the funds are limited and are generally only available once a year. The projects or products proposed for such funding must demonstrate that earthquake or hurricane risk will be reduced or eliminated and that the proposed projects or product is a cost-effective measure (a stringent cost/benefit analysis need not be performed). Information about the amount of funding available per year and the state requirements for eligibility and performance may be obtained from the RIEMA at (401) 946-9996.

Economic/Community Development

There may be programs existing to help flood proof homes using Community Development Block Grant funds. There may be housing assistance programs in the community that can be used following a major flood, achieving both the objectives of reducing flood damage and improving the community's housing stock (see Appendix A, "Federal Resources", for more information).

Evacuation Plans and Systems

The community's emergency operations center should have evacuation plans in place. For communities near a nuclear power plant, evacuation plans are required and may also be used for flood evacuation. The RIEMA may have additional evacuation plan information.

Land Use Restrictions

There are several federal and state regulations that serve to restrict land use in certain areas that may help reduce flood hazard vulnerability. If the community has open land owned by the state or federal government, examine what restrictions are placed on its development. In addition, the state Wetlands Protection Act regulates the development of all lands identified as significant to the protection of resources identified in the act.

Septic Systems

If there are areas in the community not served by a public sewer system, state septic system regulation influence development and may be a consideration for mitigation alternatives that include rebuilding and elevation of structures. Specific design requirements must be met for any construction in coastal velocity zones or river floodways. Generally, an inspection of a septic system is required if there is a change in use of the structure, an increase in flow or failed system. Limited inspections are required if the footprint of the structure is being changed. Upgrades are required by the state if an inspection reveals a failed system. However, local regulations may be more restrictive than state requirements, requiring inspections or upgrades in other cases.

Warning Systems and Emergency Operations Plans:

The community may have a flood warning system in place and should have a plan for response to flooding.

Federal

Community Rating System (CRS)

A voluntary initiative of the NFIP, the CRS was developed to encourage communities to perform activities that exceed the minimum NFIP floodplain management standards. If a community participating in the CRS performs activities that include maintaining records for floodplain development, publicizing the flood hazard, improving flood data and conducting floodplain management planning, then the flood insurance premiums paid by policy holders in the community will be reduced by 5 to 45 percent. Developing a flood mitigation plan will help communities gain additional credit under the CRS.

Hazard Mitigation Grant Program

Also known as the 404 Program or HMGP, this program is available only after a federally declared disaster occurs. It represents an additional 15 percent of all the infrastructure and individual assistance funds that are provided to states to repair damages and recover from losses and is administered by the state in partnership with FEMA. Having a plan or completed mitigation action matrix prior to a disaster event is required by FEMA and is extremely helpful in meeting the states' deadlines for applications and ensuring the project is eligible and technically feasible. It provides 75/25 matching grants on a competitive basis to state, local and tribal governments, as well as to certain nonprofit organizations that can be matched by either cash or in-kind services. The grants are specifically directed toward reducing future hazard losses and can be used for projects protecting property and resources against the damaging effects of floods, earthquakes, wind and other hazards. Specific activities encouraged under the HMGP include acquiring damaged structures to turn the land over to the community for open space or recreational use, relocating damaged or damage-prone structures out of the hazard area and retrofitting properties to resist the damaging effects of disasters. Retrofitting can include wet- or dry-flood proofing, elevation of the structure above flood level, elevation of utilities or proper anchoring of the structure.

Two programs that have been authorized under the National Flood Insurance Reform Act of 1994 include the Flood Mitigation Assistance (FMA) program and a provision for increased cost of compliance (ICC) coverage. FMA makes grants available on a pre-disaster basis for flood mitigation planning and activities, including acquisition, relocation and retrofitting of structures. FMA grants for mitigation projects will be available only to those communities with approved hazard mitigation plans. ICC coverage has recently been implemented for all new NFIP policies and renewals and is intended to be "mitigation insurance" to allow homeowners whose structures have been repeatedly or substantially damaged to cover the cost of elevation and design requirements for rebuilding with their flood insurance claim up to a maximum of \$15,000. A certain amount of funding is allotted to each state per year based on a risk formula for floods. Each state has the discretion to award funds to communities or to state government agencies. States may use whatever criteria or method they choose to award the funds as long as the applicant and the proposal are eligible. The program may fund up to 75 percent of the total cost of the proposed project, with a minimum of 25

percent of the cost coming from the community. A minimum of half the community share must be cash or "hard match". Funds can also be granted to communities to help them prepare local flood mitigation plans. The same match requirements apply. Once a community receives a planning grant, however, it is not eligible to receive additional planning grants for another five years. For further information on the FMA program or ICC coverage, contact the RIEMA at (401) 946-9996.

National Flood Insurance Program (NFIP)

All of Rhode Island's 39 municipalities participate in the NFIP. This program is a direct agreement between the federal government and the local community that flood insurance will be made available to residents in exchange for community compliance with minimum floodplain management regulations. Communities participating in the NFIP must:

1. Adopt the flood insurance rate maps as an overlay regulatory district
2. Require that all new construction or substantial improvement to existing structures in the flood hazard area be elevated or (if nonresidential) flood proofed to the identified flood level on the maps
3. Require design techniques to minimize flood damage for structures being built in high hazard areas, such as floodways or velocity zones

In return for community adoption of these standards, any structure in that community is eligible for protection by flood insurance, which covers property owners from losses due to inundation from surface water of any source. Coverage for land subsidence, sewer backup and water seepage is also available subject to the conditions outlined in the NFIP standard policy (see Appendix A, "Federal Resources" for contacts regarding insurance coverage and purchase). Since homeowners insurance does not cover flooding, a community's participation in the NFIP is vital to protecting property in the floodplain as well as being essential to ensure that federally backed mortgages and loans can be used to finance flood prone property.

APPENDIX C – Resolution and Miscellaneous Information



100 Old River Road
P. O. Box 100
Lincoln, Rhode Island 02865
(401) 333-8433

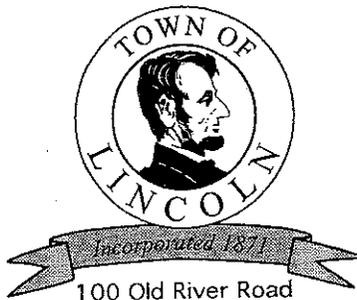
Office of the
Town Planner

NOTICE OF PUBLIC MEETING

**TOWN OF LINCOLN'S NATURAL HAZARD
MITIGATION COMMITTEE**

**will hold a public meeting to review and receive comments of
the 2004 Strategy for Reducing Risks from Natural Hazards in
Lincoln, Rhode Island**

**Wednesday, October 27, 2004 at 4:00 p.m.
Lincoln Town Hall – Town Council Committee Room
100 Old River Road
Lincoln, RI 02865**



100 Old River Road
P.O. Box 100
Lincoln, Rhode Island 02865

RESOLUTION 04-39

OFFICE OF THE TOWN CLERK
KAREN D. ALLEN
333-8451

BE IT RESOLVED BY THE TOWN COUNCIL OF LINCOLN AS FOLLOWS:

WHEREAS: the Town of Lincoln is required to create a local Natural Hazard Mitigation Plan, "Strategy for Reducing Risks from Natural Hazards in Lincoln, RI; and

WHEREAS: the Town Council created and approved an advisory committee to formulate the plan; and

WHEREAS: the committee composed a Natural Hazard Mitigation Plan, and forwarded a draft plan until approved by FEMA to the Town Council for their review and consideration; and

WHEREAS: the Town Council is desirous of complying with the requirement to create a Natural Hazard Mitigation Plan prior to November 30, 2004; and

WHEREAS: the Town Council believes it would be desirable and advantageous to accept this Hazard Mitigation Plan as the official Natural Hazard Mitigation Plan for the Town of Lincoln.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF LINCOLN, RHODE ISLAND, AS FOLLOWS:

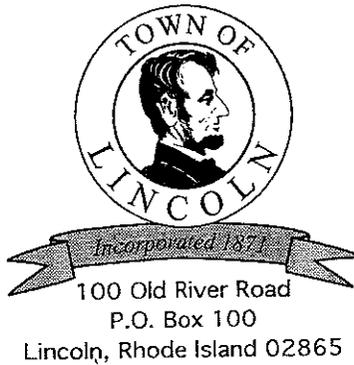
SECTION 1: The Town Council hereby acknowledges and accepts the "Strategy for Reducing Risks from Natural Hazards in Lincoln, RI" submitted by the Committee and directs all agents, employees, commissions and boards to undertake the necessary actions to implement the Plan.

SECTION 2: THAT THIS RESOLUTION SHALL BECOME EFFECTIVE IMMEDIATELY UPON ITS PASSAGE.

Adopted this 16th day of November, 2004.



Karen D. Allen, Town Clerk



OFFICE OF THE TOWN CLERK
KAREN D. ALLEN
333-8451

RESOLUTION 05-04A

BE IT RESOLVED BY THE TOWN COUNCIL OF LINCOLN, RHODE ISLAND AS FOLLOWS:

WHEREAS: the Town of Lincoln is required to create a local Natural Hazard Mitigation Plan, "Strategy for Reducing Risks from Natural Hazards in Lincoln, RI"; and

WHEREAS: the Town Council created and approved an advisory committee to formulate the plan; and

WHEREAS: the committee developed and composed a Natural Hazard Mitigation Plan, and forwarded a draft plan until approved by FEMA to the Town Council for their review and consideration; and

WHEREAS: the draft plan has been reviewed by FEMA and revisions and changes have been incorporated in the final version of the plan which has been approved by FEMA; and

WHEREAS: the Town Council is desirous of complying with the requirement to create a Natural Hazard Mitigation Plan prior to November 30, 2004; and

WHEREAS: the Town Council believes it would be desirable and advantageous to accept the final version of the Hazard Mitigation Plan as the official Natural Hazard Mitigation Plan for the Town of Lincoln.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF LINCOLN, RHODE ISLAND, AS FOLLOWS:

SECTION 1: The Town Council hereby acknowledges and accepts the final version of the "Strategy for Reducing Risks from Natural Hazards in Lincoln, RI" submitted by the Committee and directs all agents, employees, commissions and boards to undertake the necessary actions to implement the Plan.

SECTION 2: THAT THIS RESOLUTION SHALL BECOME EFFECTIVE IMMEDIATELY UPON ITS PASSAGE.

Adopted this 19th day of April, 2005.

Karen D. Allen, Town Clerk

