Village of Larchmont Hazard Mitigation Plan

September 2013*(revised)*

Prepared for:
Village of Larchmont
Village Hall
120 Larchmont Avenue
Larchmont, NY 10538
Anne McAndrews, Mayor | 914.834.6230

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EXECUTIVE SUMMARY

The Village of Larchmont, New York prepared this Hazard Mitigation Plan with the overarching purpose of reducing loss of life and property in the future that results from natural hazards. The Village has been impacted by natural hazards in the past and through the development of this plan, has focused on evaluating these impacts, engaging the public to understand their concerns and understanding of mitigation planning and detailing action items that can be completed.

Larchmont will utilize this document moving forward as guidance in reducing its current and future risk from natural hazards by having resources, risk reduction strategies, responsible entities and historical information located in one place. The Village received funding from the Federal Emergency Management Agency (FEMA) that was administered by the New York State Office of Emergency Management (NYSOEM) for the development of this plan. Local contributions to the effort were made through in-kind labor contributions of staff members.

Public Participation

The Village of Larchmont established a planning process for this project that included reaching out to local, state and federal stakeholders as well as local citizens and key stakeholders from neighboring communities. The effort was led by the Village Mayor, Anne McAndrews and hired consultant, Woodard & Curran. The core planning team included:

- Anne McAndrews, Mayor, Village of Larchmont
- Rick Vetere, Public Works General Foreman, Village of Larchmont
- Frank Blasi, Building Inspector, Village of Larchmont
- John Caparelli, Fire Captain, Village of Larchmont
- John Poleway, Chief of Police, Village of Larchmont
- Antontino Rigano, Captain of Police, Village of Larchmont

The Core Hazard Mitigation Planning Team met on a regular basis and was responsible for the following planning activities:

- Providing relevant information, plans, documents and data that was utilized during the preparation of the plan,
- Identifying natural hazards and assessing their past and potential future impact,
- Reviewing and evaluating the hazard ranking and assessment,
- Evaluating goals and objectives for mitigation activities,
- Developing potential projects that would help the Village demonstrate progress in meeting goals and objectives,
- Participating during public meeting events,
- Reviewing and commenting on the plan drafts, and
- Revising, adopting and maintaining the Village of Larchmont Hazard Mitigation Plan.

Hazard Identification

For the purposes of this Hazard Mitigation plan, identifying hazards included detailing geographically where an event has occurred historically, where is likely to occur in the future,

and how substantial the event may be. The natural hazards that are identified and included in this plan received their initial consideration from FEMA Guidance documentation. The hazards were then filtered by utilizing current and historical data points from various sources including but not limited to NOAA, US Census and Westchester County. Finally, the Village of Larchmont analyzed the findings of each natural hazard and cross referenced the information with anecdotal data points and then developing a final list of natural hazards that have and will continue to impact the Village of Larchmont, they include:

- Coastal Erosion
- Coastal Storm/Nor'Easter
- Dam Failure
- Drought
- Earthquake
- Extreme Heat or Heatwave
- Flood
- Hailstorm
- Hurricane
- Ice Storm
- Severe Winter Storm
- Thunderstorm & Lightning
- Tornado
- Tsunami
- Urban Fire
- Windstorm

Each hazard has been thoroughly profiled and discussed within the plan.

Main Goals

Prior to developing goals for this project, the planning team took the time to thoroughly understand what hazards were identified as impacting the community, what the risks associated with each hazard is and where vulnerabilities exist. Five main goals were developed, they include:

1) Engage and educate the public regarding preparing for, responding to and recovering from natural disasters and continue to include them in mitigation discussions.
2) Continue to prepare for climate change and sea level rise impacts on the Village of Larchmont.
3) Encourage disaster-resistant development and promote restoration and protection of coastal zones and natural areas.
4) Investigate and understand flooding occurrences and reduce its impact on the community.
5) Further enhance the Village's ability to respond and react to a natural hazard event and reduce the possibility of damage and losses due to their occurrence.

Contact Information
To request additional information about this project or to provide comments, please contact:

Anne McAndrews, Mayor
Village of Larchmont
120 Larchmont Avenue
Larchmont, NY 10538
Phone: 914-834-6230
Email: mayor@villageoflarchmont.org

The Village of Larchmont's **Floodplain Administrator** contact information is below:

Rick Vetere, General Foreman
Public Works Department
2015 Boston Post Road
Larchmont, New York 10538
Phone: 914-834-6965
Email: publicworks@villageoflarchmont.org

1. INTRODUCTION

The Village of Larchmont, NY has prepared a local hazard mitigation plan to provide a better understanding of where and how the residents and property of the Village can be protected from the impacts of natural hazard events. The Village is committed to reducing risks from hazards and will utilize this plan to inform and guide decision makers with regarding to mitigation actions and resources in the future. The plan has been prepared to meet the requirements of the Stafford Act and Title 44 Code of Federal Regulations (CFR) §201.6. The New York State Office of Emergency Management (NYSOEM) has also released Hazard Mitigation Planning Standards that include required actions for any hazard mitigation plan developed with funds administered by OEM. Though the contract for this project was signed before October 15, 2012, the Village of Larchmont has included the necessary information to comply with these state requirements throughout this document.

1.1 PLAN COMPLIANCE WITH FEDERAL AND STATE CRITERIA

The table below indicates the Federal and State criteria that must be included in a local mitigation plan for review:

Table 1: Federal and State Hazard Mitigation Plan Criteria

Plan Criteria	State or Federal Requirement	Section # in Plan
Formal Plan Adoption by Village of Larchmont - 44CFR 201.6(c)(5)	Federal	9.4
Documentation of Planning Process, Preparation, Who Was Involved (Including During Drafting Stage) – 44CFR 201.6(b)(1); 44CFR 201.6(c)(1)	Federal	2.0
Documentation of Participation of Neighboring Community, Local and Regional Agencies, Regulatory Agencies - 44CFR 201.6(b)(2)	Federal	3.0
Documentation of Review of Existing Plans, Studies, Reports and Technical Information - 44CFR 201.6(b)(3)	Federal	4.0
Future Community Public Participation in Plan Maintenance Process - 44CFR 201.6(c)(4)iii	Federal	9.1
Plan Monitoring and Maintenance Schedule (5 Year Cycle) - 44CFR 201.6(c)(4)i	Federal	9.1
Type, Location, Extent of Natural Hazards to Impact Village 44 CFR 201.6(c)(2)(i) and 44	Federal	5.3

Plan Criteria	State or Federal Requirement	Section # in Plan
CFR 201.6 (c)(2) iii		
Previous Hazard Occurrences and Probability of Future Events - 44 CFR 201.6(c)(2)(i)	Federal	5.3
Description of Hazard Impact on Village and Village Vulnerability - 44 CFR 201.6(c)(2)(ii)	Federal	5.3
Discussion of NFIP Insured Structures in Village Repetitively Damaged by Floods - 44 CFR 201.6(c)(2)(ii)	Federal	4.4, 8.1, 5.3.7
Discussion of Existing Village Authorities, Policies, Programs and Resources and Ability to Expand - 44 CFR 201.6(c)(3)	Federal	4.0
Discussion of Village Participation in NFIP and Continued Compliance with NFIP Requirements - 44 CFR 201.6(c)(3)(ii)	Federal	4.4, 8.1
Goals to Reduce/Avoid Long-Term Vulnerabilities to Identified Hazards - 44 CFR 201.6(c)(3)(i)	Federal	7.0
Specific Mitigation Actions and Projects for the Village (emphasize new and existing buildings and infrastructure) - 44 CFR 201.6(c)(3)(i); 44 CFR 201.6(c)(3)(iv)	Federal	8.0
Action Plan Including Priorities, Implementation and Administration - 44 CFR 201.6(c)(3)(i); 44 CFR 201.6(c)(3)(iv)	Federal	8.0
Description of Process for Local Governments to Integrate Components of Plan When Appropriate - 44 CFR 201.6(c)(4)(ii)	Federal	9.3
Documentation of Stakeholder Participation as Noted on the NYSOEM Hazard Mitigation Planning Standards Memo (1)	State	3.0
Documentation of Critical Facilities Analysis Including Prior Flooding Damages and Mitigation Projects (proposed or future)	State	6.1
Identified Sites for Temporary Housing Units	State	6.3

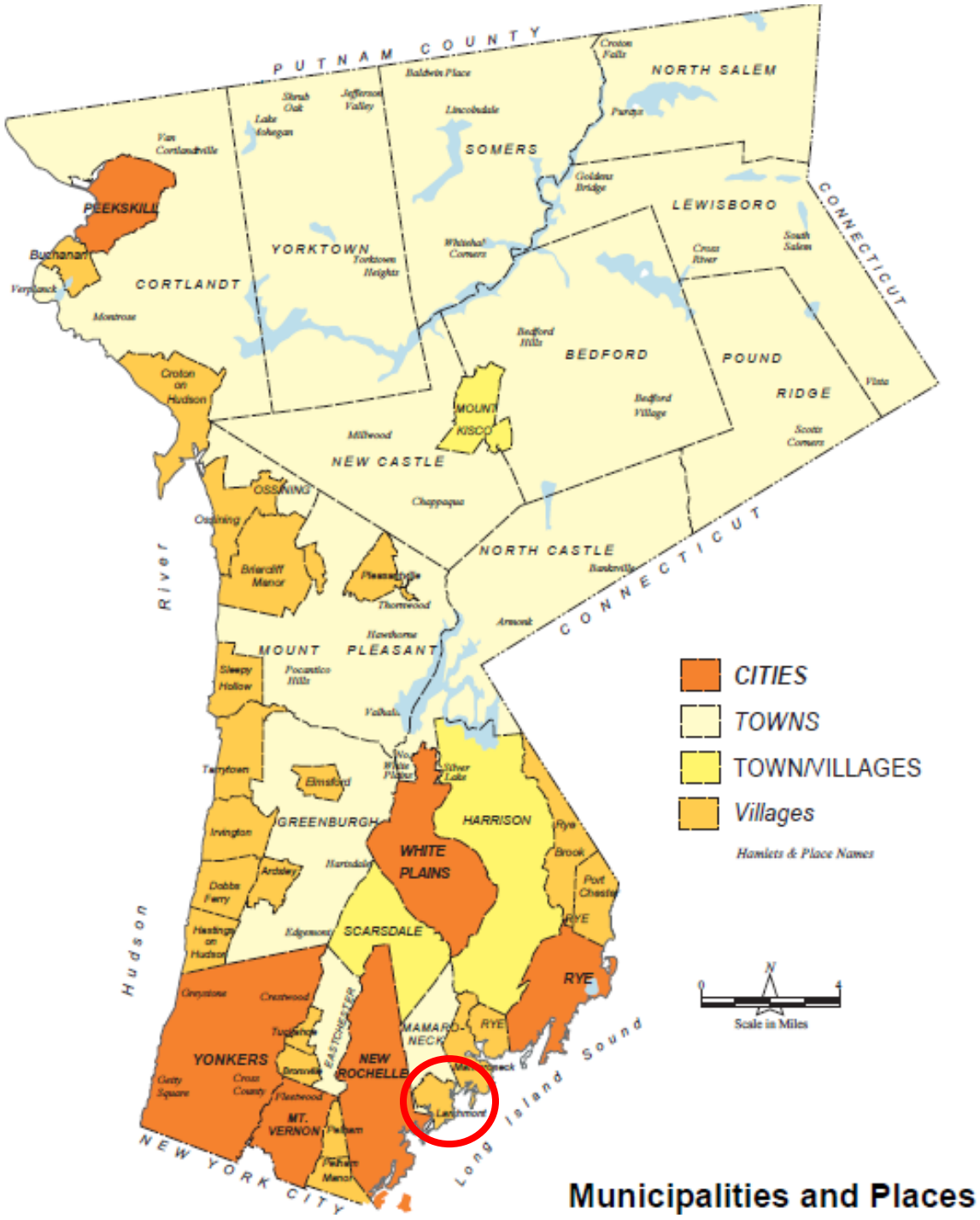
Plan Criteria	State or Federal Requirement	Section # in Plan
Potential Sites Suitable for Relocating Houses from Floodplain (Include Letter from Floodplain Administrator)	State	6.4
Evacuation Route Identification, Shelter Identification	State	6.5
List of Future Mitigation Projects Using Template	State	8.3
List of State, Federal Funding Sources	State	8.5
List of Already Completed Mitigation Projects Using Template	State	6.2
Climate Change Discussion and Vulnerability to Sea Level Rise	State	5.3.17
Discussion of Plan Being Posted for 30 Days	State	3.2

1.2 VILLAGE OF LARCHMONT LOCATION, HISTORY AND CLIMATE

The Village of Larchmont is one square mile in size and is located in the lower portion of Westchester County, New York. The Village is bounded on the north by the Railroad Station and on the south and east by Long Island Sound. New York City is approximately 20 miles to the south.

The Village of Larchmont was discovered in 1614 by Dutch settlers and during the late 19th century, became a resort community for wealthy New York City residents. Many of the large Victorian "cottages" and a few of the grand hotels of that era still exist in Larchmont today. The Village became incorporated as a municipality in 1891, and today, Larchmont is a one-mile square village within the Town of Mamaroneck and is served by the Metro-North Railroad and several major highways. Larchmont has a current population of 5,864 (US Census 2010) and approximately 2,215 housing units. The median household income is $177,250 and there are over 1,800 businesses in the community.

Larchmont has the characteristics that are similar to other coastal communities in the surrounding area. Average annual rainfall and snowfall amounts are 46 and 33 inches respectively. An average high temperature in July is 86 degrees and an average low temperature in January is 20 degrees. The Village has two distinct areas of the community – Larchmont Manor and Larchmont Village. Larchmont Manor is the section of town that is close to the water and generally has larger homes. Larchmont Village has more modest homes on smaller lots and is walkable to town and the train station.



Source: Westchester County Databook, 2010

1.3 VILLAGE GOVERNMENT AND SERVICES

Larchmont is governed by an elected Board of Trustees that consists of a Mayor and four Trustees. The Board is responsible for the budget, public safety, sanitation, water, public works and community services.

1.3.1 School System

Larchmont is a part of the Mamaroneck UFSD educational system which is made up of the following schools:

Table 2: Mamaroneck UFSD School System Buildings

Name	Address	Town
Central School	1100 Palmer Avenue	Larchmont
Chatsworth Avenue School	34 Chatsworth Avenue	Larchmont
Mamaroneck Avenue School	850 Mamaroneck Avenue	Mamaroneck
Murray Avenue School	250 Murray Avenue	Larchmont
Hommocks School	10 Hommocks Road	Larchmont
Mamaroneck High School	1000 W. Boston Post Road	Mamaroneck

1.3.2 Fire and Police Departments

The Larchmont Fire Department was incorporated in 1891 and has served the residents of Larchmont for over 100 years. The fire department is comprised of both career and volunteer firefighters. There is one firehouse located in the municipal building at 120 Larchmont Avenue. Assets of the fire department include three engines, one tower ladder, a rescue unit and two department utility vehicles. On an annual basis, the fire department responds to over one thousand calls for assistance including car accidents, emergency medical calls, water conditions, lockouts and working structure fires.

The mission of the Larchmont Police Department is to protect life and property and to preserve the public peace. They are led by a Chief of Police who oversees specialized units (including bike patrol), and police officer staff. In addition, they are responsible for responding to calls for assistance 24/7.

1.3.3 Water & Sewer

The Village of Larchmont Water Department is a public utility that supplies water to the incorporated area of the Village of Larchmont. It purchases its water supply from Westchester Joint Water Works on a wholesale basis. The water is purchased through four interconnections. The overall water supply source is obtained from the Catskill and Delaware watersheds of the New York City water system through a connection at Shaft 22 of the Delaware Aqueduct in

Yonkers. Sewer service is provided to the Village of Larchmont through the New Rochelle Sewer Treatment Facility which has 7 pumping stations and serves 9 square miles including the communities of New Rochelle, Rye City, Scarsdale and North Castle.

2. PLANNING PROCESS

In 2012, the Village of Larchmont received funding from the New York State Office of Emergency Management (NYSOEM) for generator installation at Larchmont Village Hall. As a requirement for receipt of funding for the generator installation, the Village was required to prepare a Multi-Hazard Mitigation Plan. The Village of Larchmont had already recognized the importance of preparing a Multi-Hazard Mitigation Plan and with the support and guidance of NYSOEM and FEMA, initiated the development of a single-jurisdictional plan to be prepared in accordance with 44 CFR Part 201. The Village partnered with Woodard & Curran to assist with the facilitation and development of the plan. Woodard & Curran supported the Village with the following activities:

- Assisted in identifying and establishing a stakeholder group in accordance with regulations in the Disaster Management Act of 2000 and the NYSOEM Hazard Mitigation Planning Standards,
- Followed requirements and standards defined by FEMA and NYSOEM guidance for the preparation of Hazard Mitigation Plans,
- Facilitated stakeholder group meetings and public participation events,
- Assisted with outreach materials and information gathering during the public participation process,
- Fostered the data collection effort to obtain information from key stakeholders and conducted research,
- Utilized HAZUS for vulnerability and risk assessment information, and
- Produced draft and final presentations and Hazard Mitigation Plan document and coordinated State and Federal Review efforts.

The main objective of preparing and adopting a Hazard Mitigation Plan in the Village of Larchmont is to prevent or mitigate natural hazards that have occurred in the past and may happen again in the future.

2.1 PLAN TEAM

The Village of Larchmont Hazard Mitigation Planning effort was led by the Village Mayor, Anne McAndrews. Anthony Catalano and Hugh Greechan from Woodard & Curran managed the consultant planning activities and MaryKristin Ivanovich also from Woodard & Curran supervised the technical aspects of the planning efforts. The plan was prepared with a tremendous amount of time and effort from the Village staff and key stakeholders who participated in various meetings and planning sessions. The core planning team included:

Table 3: Core Hazard Mitigation Planning Team

Name	Title
Anne McAndrews	Mayor, Village of Larchmont
Rick Vetere	Public Works General Foreman, Village of Larchmont
Frank Blasi	Building Inspector, Village of Larchmont
John Caparelli	Fire Captain, Village of Larchmont

John Poleway	Chief of Police, Village of Larchmont
Antontino Rigano	Captain of Police, Village of Larchmont
Anthony Catalano	Woodard & Curran
Hugh Greechan	Woodard & Curran
MaryKristin Ivanovich	Woodard & Curran

The Core Hazard Mitigation Planning Team met on a regular basis and was responsible for the following planning activities:

- Providing relevant information, plans, documents and data that was utilized during the preparation of the plan,
- Identifying natural hazards and assessing their past and potential future impact,
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- Developing potential projects that would help the Village demonstrate progress in meeting goals and objectives,
- Participating during public meeting events,
- Reviewing and commenting on the plan drafts, and
- Revising, adopting and maintaining the Village of Larchmont Hazard Mitigation Plan

A larger Hazard Mitigation Plan stakeholder group was identified to provide input, guidance, feedback and review during the planning process. Participants included local and county staff, the consulting team and members of neighboring communities. **Table 4** illustrates who was initially invited to participate and in what meetings they actually participated.

Table 4: Stakeholder Involvement Tracking – Village of Larchmont Hazard Mitigation Plan

Table: Stakeholder Involvement Tracking - Village of Larchmont Hazard Mitigation Plan												
	Title	Entity	Local Official	County Official	State Official	Consultant	Attended March 1, 2013 Kick-Off Meeting	Sent Letter Dated March 6th Requesting a Department Contact	1st Stakeholder Engagement Workshop - April 25, 2013	Hazard Ranking Meeting June 5, 2013	Public Meeting #1 June 17, 2013
Anne McAndrews	Mayor	Larchmont	X				X			X	X
Rick Vetere	Public Works General Foreman	Larchmont	X				X		X	X	
Frank Blasi	Building Inspector	Larchmont	X						X	X	
John Caparelli	Fire Captain	Larchmont	X				X		X	X	
John Poleway	Chief of Police	Larchmont	X				X		X	X	
Antontino Rigano	Captain of Police	Larchmont	X				X				
Joyce Callahan	Recreation Director	Larchmont	X								
Henry Oswald	Foreman - Water Department	Larchmont	X								
Denis Brucciani	Village Treasurer	Larchmont	X						X	X	
Noam Bramson	Mayor	New Rochelle	X								
Charles B. Strome	City Manager	New Rochelle	X								
Alexander Tergis	Commissioner of Public Works	New Rochelle	X								
Richard Slingerland	Manager	Village Mamaroneck	X								
Tony Iacovelli	Foreman - Public Works	Village Mamaroneck	X								
Anthony Carr	Engineer	Village Mamaroneck	X						X		
Stephen Altieri	Town Administrator	Town Mamaroneck	X								
Dan Sareoff	Assistant Village Manager	Village Mamaroneck	X						X		
Brendan Collins	Fire Chief	Town Mamaroneck	X								
Edward Buroughs	Commissioner of Planning	Westchester County Soil and Water Conservation District		X				X			
Jay Pisco	Commissioner	Westchester County Department of Public Works		X				X			
John Cullen	Commissioner	Westchester County Department of Emergency Services		X				X			
John McCaffrey	Chief Information Officer	Westchester County Department of Information Technology		X				X			
Anthony Catalano	Client Manager	Woodard & Curran				X	X				X
Hugh Greechan	Project Manager	Woodard & Curran				X	X		X	X	X
MaryKristin Ivanovich	Technical Leader	Woodard & Curran				X	X		X	X	X
Robert Wasp	Engineer	Woodard & Curran							X	X	
David Kvinge	Director of Environmental Planning	Westchester County		X							
Jeff Dean	Head of Stream Control Section	Westchester County		X					X		
Dennis Delborgo	Director - Office of Emergency Management	Westchester County		X							
Robert Doscher	Director- Soil and Water Conservation District	Westchester County		X							
Kevin Roseman	Traffic Engineer	Westchester County		X					X		
Debra Dunbrook		NYS Office of Emergency Management			X						
Harry Bartik		NYS Office of Emergency Management			X						
Ilie Tota	Software Architect (GIS)	Westchester County		X					X		

2.2 SCHEDULE AND TIMEFRAME OF PLAN RELATED EVENTS

The preparation of the Village of Larchmont Hazard Mitigation Plan occurred between January 2013 and September 2013. The table below illustrates the project schedule and timeframe of plan related events:

Table 5: Project Schedule and Timeframe of Plan Events

Date	Event
March 1, 2013	Kick-Off Meeting – Core Team
April 25, 2013	Stakeholder Meeting #1
May 31, 2013	Hazard Mitigation Plan Survey Posted online and made available as a hard copy at Village Hall
May 31, 2013	Press Release sent out to online and print news outlets
May 31, 2013	Hazard Mitigation Plan email address made available on village website to receive comments
June 5, 2013	Hazard Assessment Meeting – Core Team
June 17, 2013	Public Participation Meeting #1
July 2, 2013	Stakeholder Meeting #2 - Goals & Objectives/Project Discussion
July – August 2013	30 Day Public Review Period of DRAFT Plan
August 8, 2013	Public Participation Meeting #2

Throughout the project, numerous one on one interviews either in person or via phone were conducted to gather information and discuss more detailed project components. The table below is a sample of how the project team tracked communication during the planning process.

Table 6: Communication Log – Village of Larchmont Hazard Mitigation Plan

Timestamp		Party Contacted			
Date	**Time**	**Name/Title**	**Department/Agency**	**Reason for Contact**	**Comments**
3/5/2013	10:44 AM	Anne McAndrews/Mayor	Village of Larchmont	Stakeholder Letters addressed to the required County Departments	(See Emai)
4/9/2013	9:30-11:00	(Phone) Westchester County Stakeholders	All County Stakeholders	Availability for all Stateholders Hazard Mitgation Mtg.	Checking Availbilty of Stakeholders 4/25 meeting
4/15/2013	5:00 PM	(Email) Kevin Roseman/Traffic Engineer	Westchester County/Public Works	Availability for Larchmont Hazard Mtg	(See Email)
4/15/2013	5:38 PM	(Email) David Kvinge/ Chief Planner	Westchester County Planning Department	Larchmont Multi-Hazard Plan Mtg for week of 22nd	David Kvinge responded that he is free that week
4/19/2013	11:02 AM	DenisDelborgo/ Director OEM	Westchester County /OEM	Larchmont Multi-Hazard Plan Mtg 4/25	(See Email)
4/19/2013	3:07 PM	(Email) Sam Wear/Assistant CIO	Westchester County /GIS	Larchmont Multi-Hazard Plan Mtg 4/25	(See Email)
4/23/2013	3:46 PM	(Email)Jeff Dean/Stream Control Engineer	Westchester County /Public Works	Larchmont Multi-Hazard Plan Mtg 4/25	(See Email)
4/23/2013	4:15 PM	(EMAIL) Sam Wear/Assitant CIO	Westchestwer County/GIS	Information regarding Stakeholders	(See Email)
4/24/2013	10:58 AM	(Email) Anthony Carr/Village Engineer	Village Engineer /Village of Mamaroneck	Larchmont Multi-Hazard Plan Mtg for 25th	(See Email)
4/24/2013	3:47 PM	(EMAIL) Sam Wear/Assistant CIO	Westchester County/GIS	MHMP Larchmont MTG	(See Email)
5/8/2013	3:00 PM	Eileen Finn, Village Clerk	Clerk's Office	Discuss Village Flood Insurance Records, claims, VOL Organizational Chart, list of critical facilities, parcal/assessos data, capital improvement plan, annual report	Referred to Building Department, PD, Tax Assessors Office. Will provide copy of 2020 Report
5/8/2013	3:45 PM	Sandy Gironda, Secretary	Building Department	Discuss Flood Insurance Claims, floodplain development permits, impacts of hurricane sandy, annual report	No floodplain development permits issued, Village does not keep record of private floodplain permits, no capital improvement plan or annual report available.

Timestamp		Party Contacted			
Date	**Time**	**Name/Title**	**Department/Agency**	**Reason for Contact**	**Comments**
					Followed up with email request
5/8/2013	4:30 PM	(EMAIL) Chief Poleway	Larchmont PD	Historical Impacts of natural diasters, list of critical village facilities, evacuation routes	(See Email)
5/9/2013	12:00 PM	(EMAIL) Captain Caparelli	Larchmont FD	Historical Impacts of natural diasters, damages to equipment, list of critical village facilities, evacuation routes, annual department statistics	(See Email)
5/10/2013	1:00 PM	Rick Vetere, General Foreman	DPW	Storm Sewer problem areas, winter storm management info, info on larchmont dams, DPW projects list	Storm sewer problem areas already identified on documents previously provided, larchmont dam maintenance/NYSDEC report to be provided, no centralized list of DPW projects
5/24/2013	9:50 AM	(EMAIL) Lt. Kenny Olsen	Larchmont PD	Department Statistics (Hurricane Irene, Sandy), Sandy Flood Map	(See Email)
5/29/2013	3:19 PM	(EMAIL) Daniel Whittemore, Assessor	Assessors Office	Village Flood Insurance Policy Info, history of claims, zoning map/additional parcel data	(See Email)
5/29/2013	3:49 PM	(EMAIL) Captain Caparelli	Larchmont FD	Historic Fires in Larchmont, Average annual number of working fires	(See Email)
5/30/2013	9:30 AM	(PHONE) Eileen Finn	Clerks Office	Communication about Hazard Mitigation in general; public survey, public meeting	Eileen noted that during Hurricane Sandy, there were issues with ConEdison and lengthy power outages; also noted that the Pine Brook area "floods constantly"
5/30/2013	10:18 AM	(EMAIL) Captain Caparelli	Larchmont FD	Follow Up on 5/29 Email	Larchmont typically incurs 2-3 significant fires per year. Historical list of notable fires provided
6/3/2013	3:05 PM	(PHONE) Daniel Whittemore,	Assessors Office	Follow Up on 5/29 Email	Assessors office does not have any record of Village

Timestamp		Party Contacted			
Date	**Time**	**Name/Title**	**Department/Agency**	**Reason for Contact**	**Comments**
		Assessor			Flood Insurance Policy, Private Policies. Hardcopy zoning map is available from the Building Dept. Mayors office or Treasurer may have access to Capital Improvement Plan Mentioned extensive seawall damage on Cedar Island from Hurricane Sandy
6/3/2013	3:50 PM	(PHONE/EMAIL) Dennis Brucciani, Treasurer	Treasurer's Office	Request info related to Village Flood Insurance Policy, Organizational Chart and Capital Improvement Plan	(See Email)
6/11/2013	10:00AM-11:30AM	(PHONE) All County Stakeholders	Westchester County	Checked on Availbility for 2nd Stateholders Meeting	David Kvinge - County Planning was going to Cover for most of the Stakeholders and report back to them
6/14/2013	10:00 AM	(PHONE) Rick Vetere, General Foreman	Larchmont DPW	Request location of critical facilities, updates to projects list	Locations described for Larchmont Water and Sewer pump stations, larchmont ave garage is at Village Hall. Village previously received $3.5M grant for pine brook drainage study and improvements
6/21/2013	1:02 PM	(EMAIL) Multiple contacts from Westchester Stakeholders	Westchester County	Larchmont LHMP - 2nd Stakeholders Meeting July 2nd	(See Email)
7/22/2013	11:45 AM	(PHONE) Rick Vetere, General Foreman	Larchmont DPW	Obtain list of previous/ongoing mitigation projects in the Village	Received word file of recent projects and additional comments to draft plan. Collected additional info on project cost, additional project timeframes.

3. PUBLIC PARTICIPATION AND OUTREACH

3.1 COMMUNITY VALUES

The Village of Larchmont is a community that takes particular pride in its efforts to preserve a small-town community atmosphere. The Village staff is small and responsive, and the Village government makes a point of sponsoring a calendar of community events intended to bring people together.

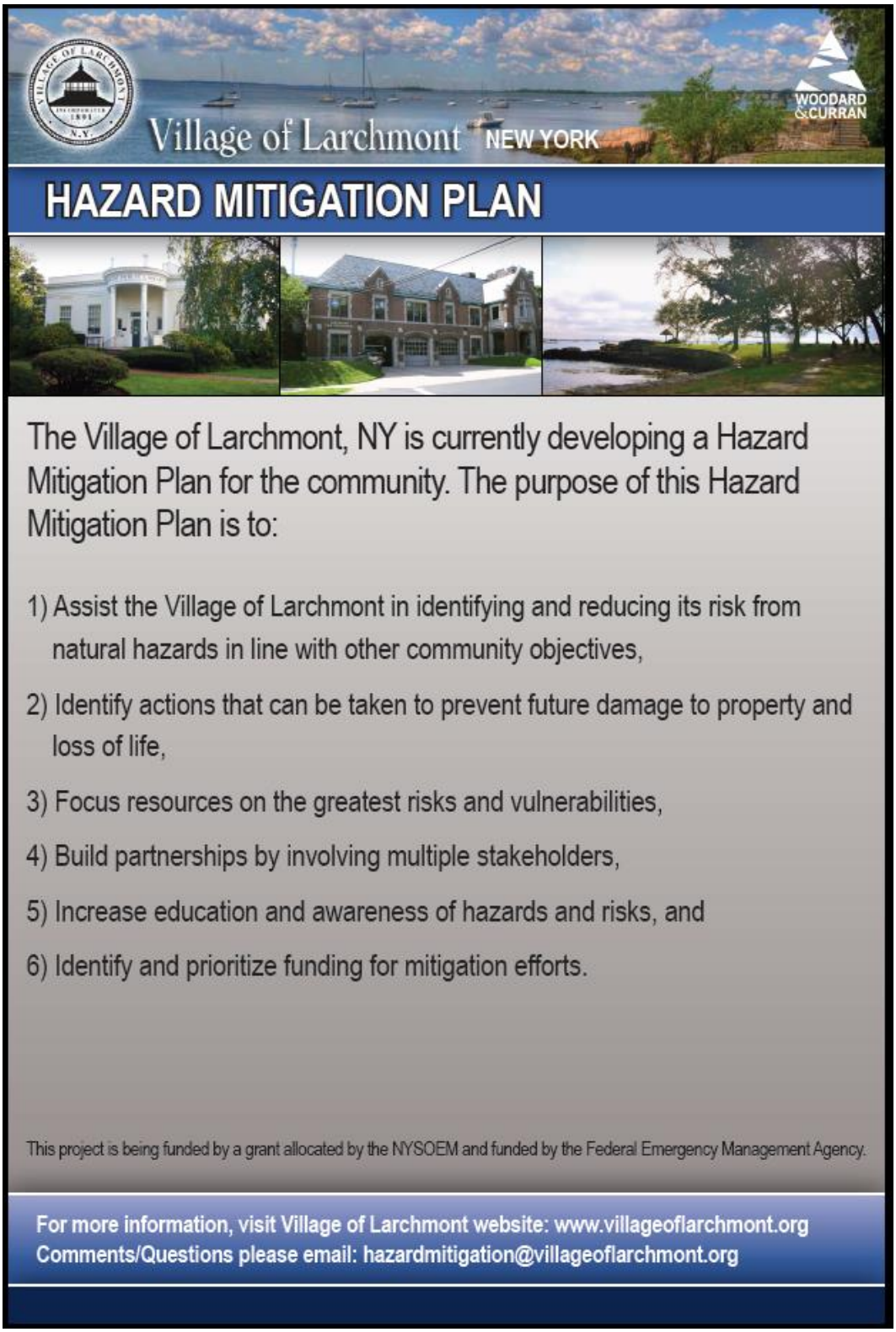
The Village of Larchmont makes an effort to promote economic development and environmental protection, and provides essential public services to the community. The Village has incorporated Hazard Mitigation Planning as a strategy to bring stakeholders to the planning table by fostering partnerships among local departments, between agencies, and between communities; and recognizes importance of hazard mitigation in supporting the values shared by the community.

3.2 STAKEHOLDER ENGAGEMENT, EDUCATION AND OUTREACH

The Village of Larchmont took the initiative to reach out to and engage the public on a frequent basis during the preparation of this plan. Section 2.2 details the schedule and timeframe for the project and where the opportunities were for the public to attend meetings and provide feedback. In addition, the Village of Larchmont utilized various forms of education and outreach in the community that could also be implemented to communication information about mitigation activities and hazard-related information. Methods include:

- Posting information on the Village of Larchmont website (www.villageoflarchmont.org),
- Televising local meetings for residents who can't attend in person,
- Utilizing local media to print information about activities occurring in the village (both print and online),
- Sharing announcements of Village news via email to residents who wish to subscribe to receive the information, and
- Preparing posters that were available for viewing during the public participation meeting in June and also available at Village Hall following the meeting.
- Obtaining feedback from the public on the DRAFT Hazard Mitigation Plan during July – August 2013 when the plan was posted on the Village of Larchmont website for review. (Note: this was a requirement of the NYSOEM Hazard Mitigation Planning Standards).

Figure 1: Example of Hazard Mitigation Plan Poster Available During Public Participation



During the development of the Hazard Mitigation Plan, the Village of Larchmont conducted the following outreach activities:

- Developed a core group of key stakeholders to guide and participate in the development of the plan,
- Prepared and posted a survey for residents to fill out and submit to share their thoughts regarding Hazard Mitigation Planning,
- Created a special email address where residents could submit their comments, questions and concerns (hazardmitigation@villageoflarchmont.org),
- Conducted 2 public participation meetings,
- Issued press releases to local news outlets (both online and print),
- Prepared posters regarding the project that were utilized during the public meeting and placed in Village Hall, and
- Posted information about the planning process on the Village of Larchmont website.

Please see **Appendix B** for more information regarding the Village of Larchmont's efforts to encourage public participation during the development of this plan. The information includes a press release, project summary for the Village of Larchmont website, posters that were utilized during the public forum, copies of the presentations that were prepared during the project, survey questions that were posted and analyzed with Survey Monkey and screenshots of any newspaper articles/postings or discussions that were had about the project online.

3.3 PUBLIC FEEDBACK

The Village of Larchmont recognizes the importance of public participation and feedback and toward that end, received the following information during the development of the Hazard Mitigation Plan.

3.3.1 Hazard Mitigation Plan Survey

The Village of Larchmont prepared and posted a Hazard Mitigation Plan Survey to its website as a way for the public to participate in the development of the planning effort. Please see **Appendix B** for a summary of the questions that were asked during the survey. Approximately 31 responses were received and key information is provided below:

- Over 60% of respondents have lived in Larchmont for 10 or more years.
- 82% of survey respondents own their primary place of residence.
- Over 70% of survey respondents feel somewhat to very prepared to respond to impacts from a natural hazard event.
- Most survey respondents were familiar with how to receive emergency notifications and information during severe weather events or another type of emergency.
- Many survey respondents feel that they have adequate insurance coverage in place.
- Natural hazards that survey respondents are most concerned with include: hurricane, coastal storm/nor'easter and flooding.

- Survey respondents showed a preference to receive emergency information via phone, text, email or door to door notification.
- Approximately 60% of respondents knew whether or not their home was located in a floodplain while 56% did not take that into consideration when purchasing or renting their primary residence.
- The majority of respondents felt that the following types of projects should receive priority consideration:
    - Retrofit infrastructure such as elevate roadways, improve drainage systems,
    - Work on improving the damage resistance of utilities (electricity, etc.), and
    - Provide more public information about hazard risks and high hazard areas of the Village.

The table below summarizes the comments that were received from survey respondents:

Table 7: Hazard Mitigation Plan Survey Respondent Comments

Category	Comment
Pets/Shelters	Pets should be allowed in shelters.
Flooding/Pine Brook	The public in the Pine Brook neighborhood should be informed by the Village as to specific steps that will be taken to eliminate the flood hazard to their homes.
Drainage/Flooding/Nassau Road	The drainage problem on Nassau Rd. creates a hazard. The flooding could be harmful to my three small children. It is a high-traffic street with fast traffic - when you add that to the flooding the entire situation becomes very dangerous. In addition, I believe my property value has decreased because of the problem.
Flooding/Drainage System	When we think of 'hazards', it most often means a severe, short-lived, infrequent occurrence. The long-standing inadequacy of our storm drainage system is causing flooding that is hazardous due to less frequent events like Noreasters and hurricanes and more frequent ones like flash rain storms. Before we try to solve for all hazards, can we keep our priorities sensible and fix the flooding please.
Drainage/Utility Lines	We need more adequate drainage on Forest Park Avenue, and power lines that are either buried or not threatened by falling trees and limbs.
Emergency Services	Additional utilization of amateur volunteers in disaster/emergency services.
Drainage	Let rain water from Nassau Road flow across the Post Road and into the brook... just as mother

Category	Comment
	nature intended. Also many more storm drains on the streets higher up than Nassau Road.
Drainage	Nassau Road becomes a river when town is hit with heavy rain. Drainage in badly need of improvement.
Flooding/Drainage	Living on Nassau Road, it's pretty obvious the drainage system needs to be improved. Multiple times we have witnessed massive amounts of water rush down our street from Forest Park. Unfortunately, Nassau is improperly pitched because the water does not drain off to Boston Post Road Instead it collects in the middle of the street and eventually floods the neighbors house. So at the bare minimum it appears the storm drains need to be improved to manage the storm water coming from Forest Park.
Flooding/Drainage	Flooding on Nassau Rd has happened no less than 10 times in the last 7 years. The flooding occurs because Nassau Rd is taking on water from Chatsworth, Bonnet, Hall and Forest Park Avenue due to the inferior catch basins placed on the corner of each of these roads. Nassau Road flooding can and needs to be resolved by the following measures: 1) Re-grade Nassau Rd so that it continues towards Boston Post Road away from 10 Nassau 2) Place open grated catch basins at the corners of Chatsworth and Forest Park Ave. 3 Place Open grated catch basin at the corner of Bonnet and Forest Park Ave 4) Place Open grated catch basin at the corners of Hall and Forest Park Ave 5) Place open grated catch basin at the end of Forest Park Ave, before it turns right on to Nassau Rd. 6) Place an open grated catch basin at the top on Nassau Road.

4. LARCHMONT CAPABILITY ASSESSMENT

Each community has a unique set of capabilities, including authorities, policies, programs, staff, funding, and other resources available to accomplish mitigation and reduce long term vulnerability. The purpose of this section is to detail the support structures that Larchmont has in place.

4.1 PLANNING & REGULATORY

The Village of Larchmont has a variety of ordinances, policies, plans and programs in place that relate to guiding and managing growth and development and natural hazard mitigation. The table below summarizes this information for the Village and details its relationship to Hazard Mitigation Planning where applicable.

Table 8: Existing Plans, Studies, Reports & Technical Information Utilized

Name of Document	Author	Description	Relationship to Hazard Mitigation Planning
LOCAL - Climate Action Plan - Local Action to Reduce Energy Consumption and Greenhouse Gas Emissions, Village of Larchmont, NY	Village of Larchmont	The VoL Climate Action Plan (CAP or "the Plan") is an outline of actual Green House Gas reduction measures the Village has already taken and recommended measures that the Village is encouraged to take. The goal is to reduce emissions by 20 percent below 2005 levels by 2015. To achieve this goal, the Village continues to implement a multi-part strategy to achieve greenhouse gas reduction targets: ▪ Increased energy efficiency and reduced emissions in municipal building operations, vehicle fleet, and infrastructure. ▪ Implement non-energy related actions. ▪ Develop and lead a long-term public education program. The Plan outlines sources of energy consumption and greenhouse gas emissions in municipal operations and identifies specific projects for	The Climate Action Plan specifically addresses the following: "Among the most significant effects of climate change is sea level rise caused by a combination of the thermal expansion of ocean water as it warms and the melting of land-based ice. Even the most conservative projections have global sea level rising by the end of the century. The possible consequences of this rise are the increases in the extent and frequency of coastal flooding, increased risk of storm damage, permanently inundated shoreline areas, shoreline erosion and wetland loss. VoL, as a shoreline community, may be vulnerable to all of these impacts."

Name of Document	Author	Description	Relationship to Hazard Mitigation Planning
		implementation related to electricity, building facilities, and transportation. Other areas of ecological improvement are also discussed that include waste minimization and recycling, tree planting, greening the Village Code, and public education. The volunteer-staffed Committee on the Environment (CoE) drafted the Plan under the direction of the Board of Trustees and with municipal staff input.	
LOCAL/STATE - Town of Mamaroneck and Village of Larchmont Local Waterfront Revitalization Plan (Adopted 1986, Updated1996)	Coastal Zone Management Committee	Plan was developed to be consistent with the NY Waterfront Revitalization and Coastal Resources act which provides the Department of State (DOS), through the Division of Coastal Resources with the authority to establish a coastal program called the Local Waterfront Revitalization Program (LWRP), develop coastal policies, define the coastal boundaries, and establish state consistency requirements.	The LWRP extends the coastal boundary to include the entire Village of Larchmont allowing the Village to apply New York State coastal policy throughout their jurisdictions. This enables the Village to exert more effective control over a major natural hazard in this coastal area – flooding and associated erosion.
STATE - New York State Sea Level Rise Task Force: Report to the Legislature (November 2010)	Task Force Created by NY State Legislature	The Sea Level Rise Task Force (Task Force) was established by statute in 2007. It was charged with summarizing what is known about the impact of sea level rise and recommending actions that will both protect coastal ecosystems and help human coastal communities to increase resilience and adapt to rising sea levels.	The report focuses on how "A powerful coastal storm occurring today poses great danger to the region, and this threat will intensify as sea level continues to rise. New York State must initiate action to safeguard its natural resources, human communities and economic assets. We must work to increase community resilience–the capacity to withstand or recover from loss or damage–while embracing a long- term commitment to understand evolving threats and adjust responses into the future."

Name of Document	Author	Description	Relationship to Hazard Mitigation Planning
STATE - New York State Standard Hazard Mitigation Plan (2011)	NYSOEM	The New York State Multi-Hazard Mitigation Plan represents the State's approach to mitigating the adverse impacts of natural disasters within its borders and fulfilling its Federal obligations to mitigate the risks resulting from natural hazards.	State level hazard mitigation plan that details state goals, objectives, risks, vulnerabilities and actions.
COUNTY - Westchester County Comprehensive Emergency Plan (November 2005)	Westchester County	This plan was developed to enhance Westchester County's ability to manage the range of emergency/disaster situations to which it is exposed.	A comprehensive approach that details "all hazard" response functions needed to respond to any disaster in Westchester County Accordingly, this plan is divided into four basic sections that include: mitigation, preparedness, response, and recovery operations.
LOCAL - Larchmont Dam Inspection and Maintenance Plan (August 2010)	Consultant	A plan to satisfy NYSDEC Dam Safety requirements to operate, monitor, inspect, maintain the 2 dams owned by the Village of Larchmont.	Dam failure is a hazard that is considered by this Hazard Mitigation Planning effort.
LOCAL - Village of Larchmont Hurricane/Coastal Storm Emergency Response Plan (April 2008)	Village of Larchmont	The plan defines emergency activities, roles and responsibilities and resources available during a hurricane/coastal storm emergency.	Hurricanes and coastal storms are natural hazards that are being considered as a part of this Hazard Mitigation Planning effort.
COUNTY - Westchester County Fire Mutual Aid Plan	Westchester County	Established procedures for uninterrupted delivery of fire/emergency service during situations that require service that exceeds the capacity of any individual department in the case of fire or other emergencies.	Fire/emergency services are an integral part of responding to any natural hazard/emergency that may impact the Village of Larchmont.
LOCAL - Village of Larchmont Coordinated Emergency	Village of Larchmont	The Village drafted this plan to be able to respond to a multitude of emergency situations including natural	The plan would be utilized during a natural disaster or hazard event to ensure that a well-planned, coordinated response to the situation occurs. It details response

Name of Document	Author	Description	Relationship to Hazard Mitigation Planning
Response Plan		disasters.	strategy.

As a part of the Hazard Mitigation Planning process, the following additional documents, requirements and plans were reviewed and incorporated into the planning effort to the extent possible.

- New York State Hazard Mitigation Plan, 2011
- Village of Larchmont Code of Ordinances
- Village of Larchmont Master Plan Update – December 2001
- NYSDEC Larchmont Dam and Larchmont Water Company Dam Inspection Report, 2012
- Village of Larchmont Hurricane Sandy Damage List, 2012
- Fire Department 2010 Nor'Easter, Irene and Sandy Damage Reports
- Fire Department Alarm Response SOP
- Flint Park Day Camp Written Plan, 2011
- Mutual Aid and Rapid Response Plan
- Water Department Emergency Response Plan, 2009
- Water Department Security Vulnerability Assessment
- USGS National Shoreline Assessment, 2011

4.1.1 Summary of Existing Mitigation Measures in Place

The Larchmont Village Code[1] includes local regulations that directly or indirectly address natural hazards that include coastal erosion, coastal storms, and flooding. The table below summarizes applicable code chapters, primary local agency that administers the chapter, description, and how the chapter is related or supports hazard mitigation planning.

Table 9: Larchmont Village Code Chapters Related to Hazard Mitigation Planning

Code Chapter	Primary Local Agency	Chapter Description	Relationship to Hazard Mitigation Planning
Chapter 315: Coastal Zone Management Commission	Coastal Zone Management Commission	Authorizes Coastal Zone Management Commission to monitor and coordinate with related municipal agents the implementation of the Local Waterfront Revitalization Program (LWRP) for	▪ The LWRP supports efforts to mitigate impacts to coastal waters and coastal areas. Primary impacts include pollution, siltation, and flooding. Chapter addresses key natural hazards that include

[1] Village of Larchmont Code: http://villageoflarchmont.org/village-code

Code Chapter	Primary Local Agency	Chapter Description	Relationship to Hazard Mitigation Planning
		the Village of Larchmont.	coastal erosion and flooding.
Chapter 321: Critical Environmental Areas	Various	Authorizes protection for critical environmental areas referenced in the LWRP: ▪ Pine Brook – Premium Border: diverse complex of tidal river, tidal flats, shallows, salt marsh, and freshwater wetlands tributary to Long Island Sound. ▪ Hommocks: salt marsh complex located in and near the head of Little Harbor Sound that mostly consists of tidal wetlands. ▪ East Creek: important open area upstream of Hommocks Marsh. Environmental disturbance increases siltation and pollution to Hommocks.	▪ Chapter supports protection of critical environmental areas as part of implementation of the LWRP. ▪ The LWRP addresses key natural hazards that include coastal erosion and flooding.
Chapter 331: Environmental Quality Review	Planning Commission	Authorizes review of actions* to assess if an environmental impact statement is required. *Actions - Defined in the State Environmental Quality Review Act (Section 617.6 of Title 6 of the New York Codes) [2]. Includes projects or activities undertaken by a Village agency or involving the issuance of a lease, permit, license, or certificate to a person. Actions also include policies, regulations, and procedure making.	▪ Chapter supports protection from large expansion projects that can cause significant environmental effects (for example, large expansion construction of dams). ▪ Actions that require environmental impact statements must prepare such statements in accordance with Section 617.6 of Title 6 of the New York Codes. These Codes require consideration of impacts from erosion and flooding. ▪ Chapter addresses key natural hazards that include coastal erosion and flooding. Dam failure is addressed indirectly.
Chapter 337: Flood Damage Prevention	Building Inspector	Authorizes floodplain development in accordance with construction standards for coastal high-hazard areas to minimize public and private losses due to flood conditions. Coastal high-hazard areas are defined as areas of special flood hazard extending offshore to the inland limit of a frontal dune subject to high-velocity wave action from	▪ Chapter supports protection from increased flood hazards and ensures new development is constructed in a manner to minimize effects to coastal high-hazard areas. ▪ Chapter addresses key natural hazards that include coastal erosion, coastal storms, and flooding.

[2] State Environmental Quality Review Act: http://www.dec.ny.gov/regs/4490.html

Code Chapter	Primary Local Agency	Chapter Description	Relationship to Hazard Mitigation Planning
		storms. Areas are designated on FEMA Flood Insurance Rate Maps (FIRMs) [3]. Includes provisions designed to protect against flood damage, control the alteration of floodplains, control filling, grading, and dredging; regulate flood barrier construction, and qualify and maintain participation in the National Flood Insurance Program (NFIP).	
Chapter 375: Waterfront Revitalization	Coastal Zone Management Commission	Authorizes Village agencies to review proposed actions (defined under Chapter 331: Environmental Quality Review above) for consistency with the LWRP. Intention is to enhance and utilize the coastal area resources to ensure a balance between natural resources and the need to accommodate population growth and economic development. Natural resources include living marine resources and wildlife, diminution of open space areas or public access to waterfront, erosion of shoreline, losses due to flooding, erosion, and sedimentation.	Chapter supports protection in the coastal area to minimize the effects from key natural hazards that include coastal erosion and flooding.
Chapter 361: Site Plan Review	Planning Commission	Site Plan Review – During SPR, the Planning Commission considers "Natural and other significant features. All water bodies, wetlands, steep slopes, hilltops, ridgelines, trees, outstanding natural topography, significant geological features and other areas of scenic, ecological and historic value are preserved insofar as possible, and flood hazard is minimized." There is also a specific drainage section that has detailed standards that must be met.	Site Plan Review requirements take into consideration natural features, flooding and drainage conditions during projects that qualify for review.
Chapter 341: Freshwater	Wetlands	Section details a permitting procedure for various projects	Natural habitat areas, particularly wetlands are critical with regard to

[3] FEMA FIRM Panels for Village of Larchmont: https://msc.fema.gov/webapp/wcs/stores/

Code Chapter	Primary Local Agency	Chapter Description	Relationship to Hazard Mitigation Planning
Wetlands	Commission	related to building, dredging/excavation/fill, drainage, wells and their impacts to wetland areas.	the role they play in natural hazard occurrences. During storm events, they often act as an absorber of excess water/storm surge and as a buffer from developed areas.
Chapter 335: Stormwater, Drainage and Water Pollution Control	Various	Regulates discharge, MS4, stormwater and erosion and sediment control.	Stormwater management is a critical piece of local drainage control, particularly during storm events.

4.1.2 Key Existing Mitigation Measures in Detail

Chapter 315: Coastal Zone Management Commission - authorizes a Coastal Zone Management Commission to monitor and coordinate the implementation of the local waterfront revitalization program for the Towns of Mamaroneck and Larchmont. Specific powers and duties include the following:

- Advise two municipalities on priorities, projects, schedules and budgetary requirements.
- Consult with appropriate town boards, commissions, and departments for opinions on proposed actions.
- Monitor recommended actions with regard to planned actions by state and federal agencies within the coastal zone to ensure consistency with the local waterfront revitalization program.
- Complete funding applications.
- Develop and maintain liaison with neighboring municipalities, state, and county governments with a view towards strengthening cooperation and management of shared drainage basins for flood control and other purposes.
- Complete an annual report on progress achieved, problems encountered, and recommendations.
- Complete reports and communications concerning the program to the Department of State and other agencies of the State of New York and County of Westchester.
- Perform other functions with regard to the local waterfront revitalization program and the coastal zone assigned by the Town and Village Boards.

Chapter 375: Waterfront Revitalization - was adopted on June 30, 1986 pursuant to the Waterfront Revitalization and Coastal Resources Act of the State of New York. This Chapter provides a framework for Village agencies to consider the local waterfront revitalization program when reviewing application for actions to make sure actions are consistent with the program. The intention is to enhance and utilize the coastal area resources of the Village of Larchmont to ensure a balance between natural resources and the need to accommodate population growth and economic development. Natural resources include living marine resources and wildlife, diminution of open space areas or public access to waterfront, erosion of shoreline, losses due to

flooding, erosion, and sedimentation. The Coastal Zone Management Commission reviews proposed actions with consistency of the Local Waterfront Revitalization Program and makes an opinion to the given Village agency that has jurisdiction to approve or directly undertake a given action. The Coastal Zone Management Commission monitors and coordinates the implementation of the Local Waterfront Revitalization Program.

Chapter 321: Critical Environmental Areas - The following critical environmental areas are designed in this Chapter and identified in the Larchmont Local Waterfront Revitalization Program.

Article I – Pine Brook – Premium Border and Hommocks Border – These two areas contain important tidal or freshwater wetlands and an abundance of fish and wildlife. Benefits include:

- Absorption of stormwater and mitigation of pollution
- Fish and wildlife habitat
- Open space

Article II – East Creek – This area is an important open area. Environmental disturbance increases siltation and pollution downstream in the Hommocks Marsh, an environmentally sensitive tidal salt marsh shared between the Village and Town of Mamaroneck.

Chapter 331: Environmental Quality Review - The purpose of this chapter is to simplify the task of determining if a proposed action may have a significant effect on the environment. Actions are defined as project or activities undertaken by a Village agency or involving the issuance of a lease, permit, license, or certificate to a person. Actions also include policies, regulations, and procedure making. Actions are divided into Type I and Type II. Type I are likely to require an environmental impact statement because they will have significant effect on the environment. These include large facility and infrastructure development projects. Type II do have a significant effect on the environment and do not require an environmental impact statement. These include single or two-family homes, restoration, and reconstruction projects. Commissions involved….

Chapter 337: Flood Damage Prevention - The purpose of this chapter is to promote public health and safety to minimize public and private losses due to flood conditions with provisions designed to protect against flood damage, control the alteration of floodplains, control filling, grading, and dredging; regulate flood barrier construction, and qualify and maintain participation in the National Flood Insurance Program (NFIP).

Objectives of this chapter include:

- Minimize public money expenditure for costly flood-control projects.
- Minimize the need for rescue and relief associated with flooding.
- Minimize business interruptions.
- Minimize damage to public facilities and utilities.

- Provide for sound use and development of areas of special flood hazard to minimize future flood-blight areas.
- Notify developers of properties in an area of special flood hazard. These areas include land in the floodplain subject to a one-percent or greater chance of flooding in a given year. Also referred to as the "base floodplain" or "one-hundred-year floodplain".
- Ensure those that occupy areas of special flood hazard assume responsibility for their actions.

This chapter applies to all areas of special flood hazard within the jurisdiction of the Village. These areas are defined on Flood Insurance Rate Map Panel Numbers 36119C0342F and 36119C0361F, effective September 28, 2007, and any subsequent revisions to these map panels that do not affect areas under our community's jurisdiction. Areas also based on a scientific and engineering report entitled "Flood Insurance Study, Westchester County, New York, All Jurisdictions," dated September 28, 2007. The Building Inspector administers this chapter by granting or denying floodplain development in accordance with provisions that include construction standards for coastal high-hazard areas.

In addition, this chapter requires a floodplain development permit for all construction in areas of special flood hazard to protect citizens from increased flood hazards and ensuring new development is constructed in a manner to minimize the impacts of flooding.

4.2 ADMINISTRATIVE AND TECHNICAL SUPPORT

The Village of Larchmont is served by an elected Board of Trustees that is composed of a Mayor and four Trustees which governs the Village. The Board is responsible for budget, public safety, sanitation, water, public works and community services. The Board meets once a month at Village Hall which is the municipal building.

Local Officials include:

- Anne McAndrews, Mayor
- John Komar, Trustee
- Marlene Kolbert, Trustee
- Lorraine Walsh, Trustee
- Peter Fanelli, Trustee

Other Village Officials:

- Assessor: Daniel T. Whittemore
- Attorney: James Staudt
- Building Inspector: Frank Blasi
- Court Clerk: Nancy Pagliaro
- Village Clerk: Eileen A. Finn
- Deputy Clerk & Deputy Registrar: Brian E. Rilley
- Fire Captain: John Caparelli

- Historian: None at this time
- Licensing Officer: Eileen A. Finn
- Chief of Police: John G. Poleway
- Police Surgeon: Dr. Zoovia Hamid
- Prosecutors: James Cinque and Richard Levy
- Public Works General Foreman: Rick Vetere
- Recreation Director: Joyce Callahan
- Treasurer: Denis J. Brucciani
- Deputy Treasurer: Joanne J. Lanza

The Village Mayor, Public Works General Foreman, Chief of Police, Fire Captain, Building Inspector and Treasurer are the main community staff who will be utilized for mitigation planning and to implement specific mitigation actions. The Village has used a private consulting firm in the past for assistance and may continue to do so in the future.

4.3 FINANCIAL

The Village Board of Trustees is the legislative body responsible for the overall operation of the Village, with the Village Mayor servicing as Chief Operating Officer and the Village Treasurer servicing as the Chief Financial Officer. The Mayor and Treasurer, along with the Board, have the responsibility and authority to approve and implement most of the mitigation actions described within this plan.

To the extent possible and practical, the Village will incorporate migration activities into the annual operating budgets of appropriate municipal departments (e.g., Building Department, Public Works, Fire, Police), and will provide funding support as recommended, necessary, and feasible for hazard mitigation projects. In many cases, the Village may not have the financial or human resources to complete all aspects of a mitigation project, therefore additional external funding may be needed to successfully implement this Plan. Potential Sources of external funds are identified in Section 8.2.

4.4 NATIONAL FLOOD INSURANCE PROGRAM

The National Flood Insurance Program (NFIP) allows property owners to purchase federally backed flood insurance within their community if the community is participating in the program. This allows property owners to be enabled to reduce flood loss on residential structures. The NFIP tracks information about flood policy claims and below is a summary of claims in Larchmont, NY from 1978 – May 31, 2013.

Table 10: Flood Policy Claims & Policies in Force

Flood Policy Claims					
	Total Losses	**Closed Losses**	**Open Losses**	**CWOP Losses**	**Total Payments**
Larchmont	377	311	0	66	$4,905,045
Westchester County	9,784	7,902	56	1,826	$134,336,056
Percent of County	4%	4%	11%	4%	4%
Actual Policy Information					
	Policies In Force	**Insurance In Force**	**Written Premium In Force**		
Larchmont	274	$83,344,700	$494,148		
Westchester County	7,603	$2,126,311,600	$8,808,373		
Percent of County	4%	4%	6%		

Source: FEMA Loss Statistics (1978 – May 31, 2013) http://bsa.nfipstat.fema.gov/reports/1040.htm

5. HAZARD IDENTIFICATION AND RISK ASSESSMENT

5.1 INTRODUCTION AND BACKGROUND

5.1.1 Key Definitions

Some key definitions that will be used throughout this section for common terminology associated with a disaster and emergency declaration include:

- **Major Disaster** can be a result of hurricanes, earthquakes, flood, tornados or major fires; the President then determines warrants supplemental federal aid. The event must be clearly more than state or local governments can handle alone. If declared, funding comes from the President's Disaster Relief Fund, managed by FEMA and disaster aid programs of other participating federal agencies.
- **Presidential Major Disaster Declaration** puts into motion long-term federal recovery programs, some of which are matched by state programs and designed to help disaster victims, businesses and public entities.
- **Emergency Declaration** is more limited in scope and without the long-term federal recovery programs of a Major Disaster Declaration. Generally, federal assistance and funding are provided to meet a specific emergency need or to help prevent a major disaster from occurring.

From 1956 through the present, all but five of the disasters or emergencies that were declared major disasters or emergencies in the State of New York have been the result of damages from severe floods, hurricanes, coastal storms, and severe winter storms. The five disaster declarations that do not fall into those categories are: the Love Canal, the World Trade Center Bombing in 1993, the Long Island Wildfires in 1995, the September 11, 2001 Terrorist Attacks, and the April 2002 Earthquake.

5.2 HAZARD IDENTIFICATION

For the purposes of this Hazard Mitigation plan, the term hazard is defined as an extreme natural event that poses a risk to people, infrastructure or resources. Identifying hazards means detailing geographically where an event has occurred historically, where is likely to occur in the future, and how substantial the event may be. The natural hazards that have been identified and included in this section received their initial consideration from FEMA Guidance documentation. The hazards were then filtered by utilizing current and historical data points from various sources including but not limited to NOAA, US Census and Westchester County. Finally, the Village of Larchmont analyzed the findings of each natural hazard and cross referenced the information with anecdotal data points and then developing a final list of natural hazards that have and will continue to impact the Village of Larchmont.

Since 1965, there have been 65 Major Presidential Disaster Declarations that have impacted New York State. Of those declarations, 17 have impacted Westchester County (see **Table 11** below).

Table 11: Presidential Disaster Declarations to Impact Westchester County New York

Name	Type	Incident Period	Date Disaster Declared	Major Disaster Declaration Number
Winter Storm and Snow Storm	Winter Storm	February 8-9, 2013	4/23/2013	DR-4111
Hurricane Sandy	Hurricane	October 27, 2012 - November 8, 2012	10/30/2012	DR-4085
Hurricane Irene	Hurricane	August 26, 2011 - September 5, 2011	8/31/2011	DR-4020
Severe Storms and Flooding	Severe Storm	March 13, 2010 - March 31, 2010	16-Apr-10	DR-1899
Sever Storms and Inland Coastal Flooding	Severe Storm	April 14, 2007 - April 18, 2007	4/24/2007	DR-1692
Severe Storms and Flooding	Severe Storm	June 26, 2006 - July 10, 2006	7/1/2006	DR-1650
Severe Storms and Flooding	Severe Storm	April 2, 2005 - April 4, 2005	4/19/2005	DR-1589
New York Terrorist Attack	Terrorist Attack	11-Sep-01	9/11/2001	DR-1391
Hurricane Floyd	Hurricane	September 16, 1999 - September 18, 1999	9/19/1999	DR-1296
Severe Storms and Flooding	Severe Storm	October 19, 1996 - October 20, 1996	11/19/1996	DR-1146
New York Blizzard	Winter Storm	January 6, 1996 - January 12, 1996	1/12/1996	DR-1083
Coastal Storm, High Tides, Heavy Rain, Flooding	Severe Storm	December 10, 1992 - December 14, 1992	12/21/1992	DR-974
Coastal Storms, Flooding	Severe Storm	March 28, 1984 - April 8, 1984	4/17/1984	DR-702
Severe Storms, Heavy Rain, Landslides, Flooding	Severe Storm	October 2, 1975	10/2/1975	DR-487
Tropical Storm Agnes	Hurricane	June 23, 1972	6/23/1972	DR-338
Severe Storms, Flooding	Severe Storm	September 13, 1971	9/13/1971	DR-311
New York Water Shortage	Water Shortage	August 18, 1965	8/18/1965	DR-204

Source: FEMA Disaster Declarations, www.fema.gov

Each natural hazard in this section is profiled and vulnerability has been assessed. The profile includes a description of the hazard, its location and extent, previous occurrences of the hazard, probability of future events, risk assessment and future development considerations.

According to the 2011 New York State Hazard Mitigation Plan, flood (including flooding due to dam failure), hurricanes, tornado, winter storm, hail storm, wildfire, drought, extreme temperatures, earthquake, landslide, subsidence and power failure have been identified as hazards of concern for New York State and its citizens. The list of natural hazards being evaluated for this plan stems initially from the State of New York Hazard Mitigation Plan which was prepared in 2011. The list was then expanded to consider specific natural hazards that would be of concern to the Village of Larchmont. The table below details natural hazards that may impact the Village of Larchmont, how susceptibility was determined and why.

Table 12: Natural Hazards That May Impact Village of Larchmont, New York

	Hazard Description	How Susceptibility Was Determined	Why?
Coastal Erosion	Coastal erosion is the wearing away of land and the removal of beach or dune sediments by wave action, tidal currents, wave currents, or	▪ New York State Standard Multi-Hazard Mitigation Plan - 2011 ▪ New York State Sea Level Rise	▪ New York is losing tidal marshes at a rapid pace and with them the natural infrastructure that protects the shore from floods, wave attack and erosion. ▪ Westchester County was noted specifically as vulnerable to sea level

	Hazard Description	How Susceptibility Was Determined	Why?
	drainage.	Task Force – Report to the Legislature (December 31, 2010) ▪ Climate Action Plan – Village of Larchmont, NY	rise which can attribute to coastal erosion. ▪ Coastal erosion has been identified as a problem for the area of Larchmont that is adjacent to Long Island Sound (NY State Standard Multi-Hazard Mitigation Plan – 2011). Larchmont is a community that is managed by DEC under the Coastal Erosion Hazard Area permit program. ▪ Among the most significant effects of climate change is sea level rise. The Village of Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding.
Coastal Storm or Nor'easter	A nor'easter is a macro-scale storm along the East Coast of the United States and Atlantic Canada that gets its name from the direction the wind is coming from. The storm has characteristics similar to that of a hurricane and can cause severe coastal flooding, erosion, winds and blizzard conditions.	▪ New York State Sea Level Rise Task Force – Report to the Legislature (December 31, 2010) ▪ Climate Action Plan – Village of Larchmont, NY ▪ Larchmont-Mamaroneck Patch Newspaper Article, December 2010 *"How Will Rising Sea Levels Affect Local Communities?"*	▪ Westchester County was noted specifically as vulnerable to sea level rise which can be attributed in part to increased and severity of coastal storms. ▪ Among the most significant effects of climate change is sea level rise. The Village of Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding. ▪ New York Harbor has seen a 15-inch increase since 1860 and a 6-inch rise since 1960, according to the DEC, and the story is the same for the Long Island Sound, where consequences could be grave for the low-lying communities that make up the Sound's 600 miles of coastline.
Dam Failure	A "dam" is an artificial barrier that has the ability to impound water, wastewater, or any liquid material for the purpose of storage or control of water. In general, a dam serves to retain water. Dam failure can be defined as a catastrophic type of failure characterized by the sudden, rapid, and uncontrolled release of impounded water or the likelihood of such an	• Larchmont Dam Inspection and Maintenance Plan (August 2010) • Westchester County Comprehensive Emergency Management Plan, November 2005	• Due to highly and densely developed areas downstream of the two dams located in Larchmont, a catastrophic event would have an impact and could endanger human life and property. • Floods are the most significant natural hazard that can impact the two dams in Larchmont. • Dam Failure was identified in the Westchester CEMP as a moderately high hazard for Westchester County.

	Hazard Description	How Susceptibility Was Determined	Why?
	uncontrolled release. Dam failure can also result from other natural events like hurricanes and earthquakes.		
Drought	**Drought** is an extended period of months or years when a region notes a deficiency in its water supply whether surface or underground water.	• New York DEC website • Westchester County Drought Emergency Plan • New York times, "Drought Emergency Over," November 2002	• The New York DEC has defined state Drought Management Regions which are based on county lines and drainage basins. The Village of Larchmont is located in the NYC/Westchester County Drought Management Region known as IIA. • Westchester County has experienced several major droughts which have significantly affected its residents and businesses. The county has developed a drought emergency contingency plan using information, data and experience compiled from past events. • A drought emergency was declared for Westchester County in 2002.
Earthquake	An earthquake (also known as a quake, tremor or temblor) is the result of a release of energy in the Earth's crust that creates seismic waves. Earthquakes have the potential to impact hundreds of thousands of miles causing property damage, loss of life and a general disruption to economic functions of an area.	• Larchmont Dam Inspection and Maintenance Plan (August 2010) • Westchester County Comprehensive Emergency Management Plan, November 2005 • New York State Standard Multi-Hazard Mitigation Plan, 2011	• The two dams in Larchmont could be damaged by ground motions caused by seismic activity. • Earthquake was identified in the Westchester CEMP as a moderately high hazard for Westchester County. • The potential for earthquake exists across the entire State of New York and Northeastern U.S.
Extreme Heat or Heatwave	Heat waves are long periods of abnormally high temperatures (usually ten degrees or more above the average) that is typically accompanied by high levels of humidity for an extended period of time.	• New York State Standard Multi-Hazard Mitigation Plan, 2011	• The entire State of New York is susceptible to extreme heat events.
Flood	Flooding can be defined as a rising and overflowing of a body of	▪ New York State Standard Multi-Hazard Mitigation	• Sea level rise and coastal flooding from storm surge are already affecting and will increasingly affect New

	Hazard Description	How Susceptibility Was Determined	Why?
	water onto normally dry land. Flood related hazards most likely to affect Massachusetts are inland/riverine, dam failure, ice jams, snow melt	Plan - 2011 ▪ New York State Sea Level Rise Task Force – Report to the Legislature (December 31, 2010) ▪ Westchester County Flood Mitigation Program Data Collection 2012 ▪ Larchmont Dam Inspection and Maintenance Plan (August 2010) ▪ Westchester County Comprehensive Emergency Management Plan, November 2005 ▪ Climate Action Plan – Village of Larchmont	York's entire ocean and estuarine coastline from Montauk Point to the Battery and up the Hudson River to the federal dam at Troy. • The likelihood that powerful storms will hit New York State's coastline is very high, as is the associated threat to human life and coastal infrastructure. This vulnerability will increase in area and magnitude overtime. • Substantial flood impacts from various storms at areas including: Pine Brook Road, Kilmer Road, Flint Park off Birch Road, Nassau Road, Pryer Manor Road, Magnolia Avenue, Ocean Avenue, Cedar Island, Pine Brook Drainage Basin, Park Avenue at Manor Beach, Spanish Cove Road, Lindsay Drive, North Avenue, Coolidge Street, Monroe Avenue and Larchmont Reservoir. • Floods are the most significant natural hazard that can impact the two dams in Larchmont. • NY State Hazard Mitigation Plan notes that land adjacent to the various water resources throughout the state, including Long Island Sound is often a source of flooding (Larchmont is directly adjacent to Long Island Sound). • Flooding was identified in the Westchester CEMP as a moderately high hazard for Westchester County. • Among the most significant effects of climate change is sea level rise. The Village of Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding.
Hailstorm	Any thunderstorm which produces hail that reaches the ground is known as a hailstorm.	• New York State Standard Multi-Hazard Mitigation Plan - 2011	• Hail storms can occur anywhere within New York State and they are typically part of a larger storm system such as a Severe Thunderstorm or Tornado event.
Hurricane	A storm with a violent wind that may have a force of 12 on the Beaufort scale (equal to or exceeding 64 knots or 74	• New York State Sea Level Rise Task Force – Presentation • Westchester	• Four Category 3 hurricanes have hit New York since 1900. • Hurricane was identified in the Westchester CEMP as a moderately high hazard for Westchester County.

	Hazard Description	How Susceptibility Was Determined	Why?
	mph). Hurricanes often cause damage due to winds and heavy precipitation. In coastal areas, storm surge, waves and tidal flooding typically can cause additional destruction.	County Comprehensive Emergency Management Plan, November 2005	• Since 1954, there have been 12 Major Disaster Declarations made for Hurricane/Tropical Storm in New York. Westchester County has been specifically designated a "declared disaster area" in 4 of these events.
Ice Storm	A type of winter storm that is characterized by freezing rain. Freezing rain from these storms can cover everything with a thick, heavy glaze which causes secondary impacts such as downed trees and power lines.	• Westchester County Comprehensive Emergency Management Plan, November 2005	• Ice storm was identified in the Westchester CEMP as a moderately high hazard for Westchester County. • Potential for future winter storm and ice events due to the local climate is certain.
Severe Winter Storm	A winter storm is an event in which the varieties of precipitation are formed that only occur at low temperatures, such as snow or sleet, or a rainstorm where ground temperatures are low enough to allow ice to form. Substantial amounts of snow are typical. Downed trees, utilities, property damage and injuries to human life are common.	• Westchester County Comprehensive Emergency Management Plan, November 2005 • New York State Standard Multi-Hazard Mitigation Plan - 2011	• Winter storm was identified in the Westchester CEMP as a moderately low hazard for Westchester County. • Potential for future winter storms due to the local climate is certain. • The easternmost and west-central portions of the State are more likely to suffer under winter storm occurrences than are other locations.
Thunderstorm & Lightning	A storm with thunder and lightning and typically also heavy rain or hail. Lightning is a discharge of electrical energy that can cause damage when it impacts objects or humans in the environment.	• NYC OEM, Hazards	• New York State is considered to have a "moderate" occurrence of lightning, with 3.8 strikes occurring per square mile each year. This compares to 20 per square mile in Florida, and two in California.
Tornado	A tornado is a violently rotating column of air that is in contact with both the surface of the earth and a cumulonimbus cloud or,	• Westchester County Comprehensive Emergency Management Plan,	• Tornado was identified in the Westchester CEMP as a moderately high hazard for Westchester County. • Between 1971 – 2006, there have been 9 tornados in Westchester County and

	Hazard Description	How Susceptibility Was Determined	Why?
	in rare cases, the base of a cumulus cloud. Most tornadoes have wind speeds less than 110 miles per hour, are about 250 feet across, and travel a few miles before dissipating. They are often generated by thunderstorms.	November 2005 • The Tornado History Project, New York • New York State Standard Multi-Hazard Mitigation Plan - 2011	ranging from a 0 to a 2 on the Fujita scale. • State Hazard Mitigation Plan notes that NY has a definite vulnerability to tornadoes and they can occur in any area of the state.
Tsunami	A series of water waves caused by the displacement of a large volume of a body of water, typically an ocean or a large lake. Earthquakes, volcanic eruptions and other underwater explosions all have the potential to generate a tsunami. Unlike a typical wave which crashes at the shore, a tsunami's key characteristic is the wall of water that it brings which has the potential to cause devastating damage in coastal areas located immediately along the shore.	• Discover News Article, August 2012 • Washington Post Article, March 2011	• Risk is small, but Tsunamis on the East Coast are possible. • Tsunami's impacting the East Coast are most likely to be caused by an earthquake.
Urban Fire	**Urban Fire:** An uncontrolled fire in an urban area affecting residential or commercial properties.	• Email from Captain John Caparelli, Fire Chief	• Larchmont typically has 1-3 structure fires involving the entire structure causing severe damage on an annual basis.
Windstorm	A storm with high winds or violent gusts but little or no rain. Extreme winds can cause a threat to human life, property and infrastructure due to downed trees, power lines and flying objects/debris.	• New York State Standard Multi-Hazard Mitigation Plan - 2011	• New York is susceptible to high wind from several types of weather events: before and after frontal systems, hurricanes and tropical storms, severe thunderstorms, tornados, and Nor'easters.

Table 13: Natural Hazards Not Impacting Village of Larchmont

	Hazard Description	How Susceptibility Was Determined	Why?
Landslide	The sliding down of a mass of earth or rock from a mountain or cliff. When a slope is greater than 10 degrees and/or vegetative cover is low and soil water is high, a slide is more likely.	• New York State Standard Multi-Hazard Mitigation Plan - 2011	• New York State is vulnerable to landslides. • Westchester County has a low susceptibility to a landslide hazard. • Westchester County has experienced 11 landslide events between 1837-2007.
Avalanche	A rapid fall or slide of a large mass of snow down a mountainside.	▪ Review of NY State Hazard Mitigation Plan	▪ Avalanches are not included in the NY State Hazard Mitigation Plan
Volcano	A mountain that opens downward to a reservoir of molten rock below the surface of the earth. Volcanoes erupt when pressure from gases and the molten rock beneath becomes strong enough to cause an explosion.	▪ Review of NY State Hazard Mitigation Plan	▪ No volcanoes are located within the vicinity of the Village of Larchmont
Ice Jam	Formation of ice over a body of water that limits the flow of the water due to freezing. Ice jam flooding occurs when warm temperatures and heavy rain cause the snow to melt rapidly, causing frozen rivers or lakes to overflow. The ice that's formed on top of the body of water breaks into small pieces of varying sizes.	▪ Review of NY State Hazard Mitigation Plan	▪ Ice jams are mentioned as a significant cause of flooding in the state plan but are more common in other areas of the State.

5.2.1 Natural Hazard Ranking

Once the Village of Larchmont had an understanding of each natural hazard and how it has or may impact the community in the future, the Core Team evaluated them individually and developed a ranking system to determine which hazards were low, medium, high or severe. The Village utilized the hazard ranking methodology presented in FEMA 386-2 for the purposes of this exercise. Core team members assigned a rank between 0-5 for frequency, duration, severity and intensity. The probability of the hazard occurrence was weighted at 50% and determined by averaging the sum of frequency, duration and intensity. The consequence was also weighted at 50% and utilized the severity numerical value. The Village of Larchmont assigned a qualitative ranking for each hazard in reference to the following numerical ranges:

- Low - < 2.0
- Medium 2.0 - 2.5
- High 2.5 – 3.0
- Severe > 3.0

Table 14: Natural Hazard Ranking Village of Larchmont

HAZARD	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F, D, I), 50%	Consequence (S), 50%	Total	Ranking L, M, H, S
Dam Failure	0	2	4	4	2.00	4.00	3.00	H
Earthquake	1	1	3	3	1.67	3.00	2.33	M
Coastal Erosion	2	2	3	3	2.33	3.00	2.67	H
Coastal Storm	3	2	3	3	2.67	3.00	2.83	H
Hurricane	2	4	4	4	3.33	4.00	3.67	S
Tornado	1	1	4	4	2.00	4.00	3.00	H
Tsunami	1	1	3	2	1.33	3.00	2.17	L
Flood	3	3	4	4	3.33	4.00	3.67	S
Drought	1	3	3	2	2.00	3.00	2.50	M
Winter Storm	4	2	3	3	3.00	3.00	3.00	H
Thunderstorm/Lightn	5	1	2	1	2.33	2.00	2.17	L
Hailstorm	2	1	1	1	1.33	1.00	1.17	L
Urban Fire	2	2	3	3	2.33	3.00	2.67	M
Extreme Heat	3	4	2	2	3.00	2.00	2.50	M
Windstorm	3	2	3	3	2.67	3.00	2.83	M
Ice Storm	3	2	3	4	3.00	3.00	3.00	H

5.3 HAZARD PROFILES

5.3.1 Coastal Erosion

5.3.1.1 Description of the Hazard

Coastal Erosion is often associated with some type of Coastal Storm/Nor'Easter or Hurricane. In general, it is the wearing away of land that may result in the removal of beaches, dunes or other shoreline vegetation by substantial wave action, tidal currents or drainage. Coastal erosion may result in long term sediment, rock and sand loss or the redistribution of these features. In severe cases, the shoreline can be temporarily displaced landward and cause damage to personal

property. Shoreline structures are a method of mitigation but while they may protect some structures and assets, they can also cause more damage in other areas as a result.

5.3.1.2 Location of the Hazard

The New York Department of Environmental Conservation (NY DEC) has two programs in place that are focused on coastal erosion. The programs include the Coastal Erosion Hazard Area (CEHA) permit program and the US Army Corps of Engineers Civil Works Program. According to the NY DEC, the CEHA program both regulates and issues permits for projects and activities that are within a coastal erosion hazard area. The US Army Corps of Engineers Civil Works Program works with NY DEC to study erosion problems along coastlines and then to help develop appropriate solutions.

According to the Local Waterfront Revitalization Program (initially drafted in 1986), Coastal Erosion Hazard Areas were originally designated in the Town of Manaroneck and Village of Larchmont in January 1989 pursuant to Article 34 of the New York State Environmental Conservation Law (Coastal Erosion Hazard Areas Act). The general location of the CEHA area in Larchmont is from west to east, Premium Point to Horsehoe Harbor and ending at Umbrella Point. A substantial portion of the Town/Village coastline did not receive CEHA designation, but according to this report, those areas not designated should be equally well protected.

5.3.1.3 Severity and Extent of the Hazard

According to the 2000 Evaluation of Erosion Hazards study conducted by the Heinz Center, *"Coastal erosion is a continuing problem along the shores of northern New Jersey and New York, which are among the most urbanized in the country."* The study also notes that the Atlantic Coast is at a substantial risk from storm-related erosion because it is vulnerable to both hurricanes, coastal storms and winter storm events. The study also noted that the average annual erosion rate on the Atlantic Coast is roughly two to three feet per year.

5.3.1.4 Impact of Hazard on Life, Property and Operations

Coastal Erosion has and can substantially impact coastal areas in the Village of Larchmont. Generally, the shoreline of a community is an active area where nature and the built environment frequently interact. Coastal storms generate heavy rain, sustained winds and wave action that are forceful and impactful to the shoreline. Secondary impacts of these storms such as flooding, erosion and storm surge further complicate the lasting effects. Coastal erosion in general does not necessarily have an immediate impact on life, property or operations. The impacts of this hazard are a result of repeated occurrences over time of coastal storms that can result in property loss or severe consequences that often require hard infrastructure solutions to protect the built environment. According to NYDEC, *"where coastal storms do not create risk to life and property, these hazards are natural events with positive effects on the coastal environment."*

5.3.1.5 Previous Occurrences of the Hazard

The Village of Larchmont has been impacted directly by coastal erosion and specific areas of the community have been identified on the local CEHA maps. Coastal erosion hazard areas are prone to coastal erosion.

Table 15: Coastal Erosion Susceptibility

How Susceptibility Was Determined	Why?
▪ New York State Standard Multi-Hazard Mitigation Plan - 2011 ▪ New York State Sea Level Rise Task Force – Report to the Legislature (December 31, 2010) ▪ Climate Action Plan – Village of Larchmont, NY	▪ New York is losing tidal marshes at a rapid pace and with them the natural infrastructure that protects the shore from floods, wave attack and erosion. ▪ Westchester County was noted specifically as vulnerable to sea level rise which can attribute to coastal erosion. ▪ Coastal erosion has been identified as a problem for the area of Larchmont that is adjacent to Long Island Sound (NY State Standard Multi-Hazard Mitigation Plan – 2011). Larchmont is a community that is managed by DEC under the Coastal Erosion Hazard Area permit program. ▪ Among the most significant effects of climate change is sea level rise. The Village of Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding.

5.3.1.6 Probability of Future Occurrence of the Hazard

High rates of coastal erosion occur most frequently along long sections of shoreline which are consistently subjected to high wave energy and coastal storms. The factors that determine whether or not a community or area may exhibit greater probability for long term coastal erosion include:

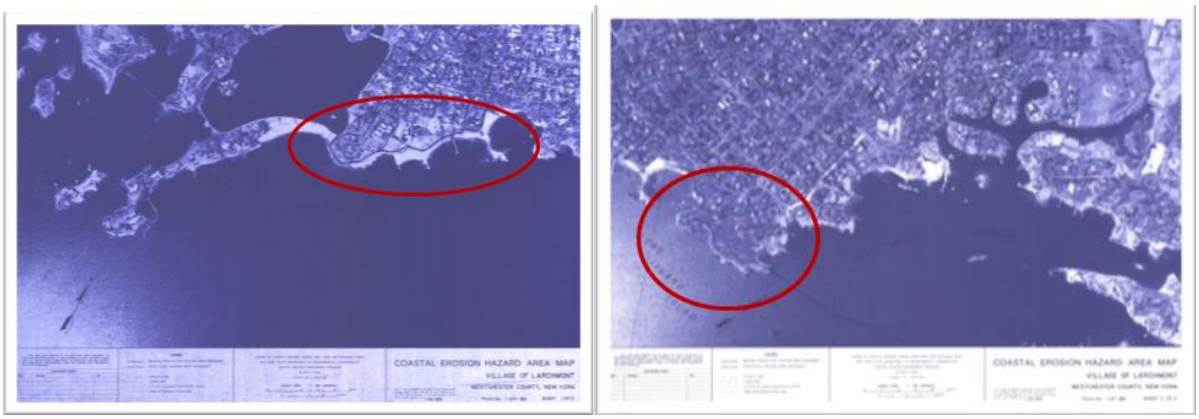
- Exposure to high-energy storms,
- Exposure to high-energy storm waves,
- Sediment size and composition of eroding coastal landforms adjacent to shorelines,
- Relative sea level rise, and
- Human interference with sediment supply (seawalls, jetties).

The Village of Larchmont, due to its location adjacent to Long Island Sound, is frequently exposed to high-energy storms and waves. The probability of future coastal erosion impacting the Village is certain.

5.3.1.7 Vulnerability to the Hazard

New York State's Coastal Erosion Hazards Area (CEHA) program was developed to protect lives and property from the threat of coastal erosion and also to protect natural protective features that may either mitigation or slow down coastal erosion occurrences. CEHA maps for the Village of Larchmont were developed and are in the process of being updated. While these

maps highlight specific areas of the community, they were prepared in 1993 and the impact may be more widespread in Larchmont than is shown on the graphics.



5.3.1.8 Risk Assessment Methodology, Limitations and Results

After consideration of the data available for a coastal erosion hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a coastal erosion hazard scenario. The Village of Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of an earthquake utilizing a low, medium, high and severe ranking system. The ranking given for the community was based on background research, knowledge of the Village and infrastructure and past occurrences.

Table 16: Risk Assessment – Coastal Erosion Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Coastal Erosion	3	3	3	3	3.00	3.00	3.00	H

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in Larchmont.

Table 17: Qualitative Risk Assessment – Coastal Erosion Hazard

	Coastal Erosion Hazard Qualitative Ranking
Residents	Medium
Buildings	Medium
Businesses	Low
Critical Infrastructure	High

Overall Qualitative Hazard Ranking: HIGH

5.3.1.9 Future Development Considerations

Coastal erosion is of concern in the Village of Larchmont. The NYDEC recommends considering some of the following approaches to further protect waterfronts from flooding and erosion and to less the impacts of coastal storms. According to NYDEC, *"Nonstructural approaches maximize protection afforded by natural processes and features. They offer the best opportunity for dependable long term risk reduction. They require the least long term maintenance. They have the least detrimental effects on other coastal and waterfront resources and uses. Structural measures may be the only viable option for highly developed urban areas and water-dependent uses. However, they require repeated maintenance and additional management measures."*

- Evaluate nonstructural approaches to maximize protection of the shoreline,
- Strengthen local regulatory requirements for inappropriate siting of structures in hazard areas (regularly review nonstructural measures like setbacks in flood hazard zones and CEHAs),
- Focus on protecting and maintaining natural habitats, wetlands and other features that protect against erosion and flooding,
- Formalize a maintenance and improvement program of natural features and resources in the Village of Larchmont that protect against flooding and erosion,
- Conduct stabilization efforts where necessary such as planting native vegetation such as beach grass,
- Limit use of hard structural erosion protection measures for control of erosion,
- Strengthen mitigation requirements to ensure no adverse impact from installing hard structures where it is unavoidable,
- Evaluate coastal erosion impacts after storm events and plan for recovery and redevelopment once existing conditions are known.

5.3.2 Coastal Storm

5.3.2.1 Description of the Hazard

A coastal storm is a non-tropical storm that produces gale-force winds and precipitation in the form of heavy rain or snow. Coastal Storms, sometimes called Nor'Easters are common occurrences in the eastern United States and New York. They are capable of causing substantial damage to coastal (and at times, inland) areas due to strong winds (can be hurricane force), storm surge and substantial rainfall or snow amounts. A storm is specifically a Nor'Easter when the wind blows in from the northeast and pushes the storm up the east coast of the United States. Due to the slow movement of these weather events, storm surge can be in excess of 2 feet above normal high tide and impact the coastline over multiple high tide cycles making coastal erosion and flooding a common secondary effect of these storm events. These types of storms can occur anytime of the year, but are more common in the winter months.

5.3.2.2 Location of the Hazard

New York falls within the designated area known as the North Atlantic Coast which is generally considered to be the coastal area from Long Island, NY to northern Maine. The North Atlantic Coast is most vulnerable to nor'easters, tropical storms and reduced strength hurricanes because the flooding, erosion and wind damage can be substantial to physical property and natural surroundings. One or two nor'easters typically impact the New York coastline per year between October and April.

5.3.2.3 Severity and Extent of the Hazard

Coastal storm events can have a range of impacts on communities located along the shoreline. Heavy sustained winds and rainfall coupled with a high tide and wind driven storm surge can cause more of an impact than just a regular storm event. Since 1860, New York Harbor has seen a 15-inch increase since and a 6-inch rise since 1960 in sea level rise, according to NYDEC. The story is the same for the Long Island Sound, where consequences could be grave for the low-lying communities that make up the Sound's 600 miles of coastline.

5.3.2.4 Impact of Hazard on Life, Property and Operations

In the Village of Larchmont, coastal storms are regular events and they generally cover a large area of Westchester County, New York City, Long Island and southern New England. Depending on the length and strength of the storm, they may cause death or serious injury, property damage and inhibit operations of local government and businesses. A common secondary impact of a coastal storm is short and long term electrical power outages.

5.3.2.5 Previous Occurrences of the Hazard

According to the FEMA, there have been three Presidential Disaster Declarations made for "coastal storms" in the State of New York. In the Village of Larchmont, there have been a varying degree of impacts from these storms and others felt in the community.

Table 18: Table: New York Coastal Storm Major Disaster Declarations (1954 – Present)

	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?
Coastal Storm, High Tides, Heavy Rain, Flooding	DR-974	12/10/1992 – 12/14/1992	12/21/1992	Yes
High Winds, Wave Action, Flooding	DR-367	3/21/1973	3/21/1973	No
Severe Storm, High Tides, Flooding	DR-129	3/16/1962	3/16/1962	Unknown
Source: FEMA Disaster Declarations 1954 - Present				

The NCDC tracks storm events and the information below was available for Westchester County regarding Coastal Storm/Nor'easter occurrences.

- **August 8, 2011 –** Tropical storm Irene moved through the area bringing winds and 3-5 foot storm surge along Long Island Sound and the bays of New York City. The result was moderate to major coastal flooding, wave damage and erosion along the coast with heavy damage to public beaches and other public and private facilities.
- **April 15, 2007 –** Nor'easter caused over 8 inches of rain to fall on southern Westchester County in 24 hours. Communities were substantially impacted from serious flooding including downed power lines and rising waters in homes and businesses.
- **September 2, 2006 –** Tropical storm Ernesto brought heavy rain and winds across Long Island Sound and Southeast New York which resulted in downed trees and power lines and power outages.
- **October 19-20, 1996 –** Nor'easter caused widespread flooding to the southern Westchester County area. Nearly 5 inches of rain fell and there were sustained winds of 30-40 mph.

5.3.2.6 Probability of Future Occurrence of the Hazard

Coastal storms are certain to occur in the future and they will continue to impact the Village of Larchmont. In addition to impacts from rain and heavy winds, Larchmont will continue to see storm surge impacts as well. According to an article by Live Science *"Hurricane Sandy: A Glimpse at New York's Scary Future"* the authors note that two main factors contribute to surge flooding that results from coastal storms/hurricanes and they are sea level rise and changes in hurricanes. The article notes that climate change's impact on sea level rise (melting ice and

expansion of seawater when it warms) is obvious in that higher sea levels result automatically in higher storm tides.

Interestingly, USGS recently reported that globally, sea level rise between 1950 and 2009 has averaged .02 inches per year while between Cape Hatteras, NY and north of Boston, it has increased on average .08 inches per year.

5.3.2.7 Vulnerability to the Hazard

The Village of Larchmont is extremely vulnerable to future coastal storm events. A secondary impact to the community is utility failure during these events which can include downed power lines. The Village experienced this situation during Hurricane Sandy in the fall of 2012 with electric utility provider ConEdison.

Table 19: Coastal Storm Susceptibility

How Susceptibility Was Determined	Why?
▪ New York State Sea Level Rise Task Force – Report to the Legislature (December 31, 2010) ▪ Climate Action Plan – Village of Larchmont, NY ▪ Larchmont-Mamaroneck Patch Newspaper Article, December 2010 *"How Will Rising Sea Levels Affect Local Communities?"*	▪ Westchester County was noted specifically as vulnerable to sea level rise which can be attributed in part to increased and severity of coastal storms. ▪ Among the most significant effects of climate change is sea level rise. The Village of Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding. ▪ New York Harbor has seen a 15-inch increase since 1860 and a 6-inch rise since 1960, according to the DEC, and the story is the same for the Long Island Sound, where consequences could be grave for the low-lying communities that make up the Sound's 600 miles of coastline.

5.3.2.8 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a coastal storm hazard event and its impact to Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a coastal storm hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a drought utilizing a low, medium, high and severe ranking system. The ranking given for Larchmont was based on background research, knowledge of the Larchmont and past occurrences.

Table 20: Risk Assessment Prepared by Village Team – Coastal Storm Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Coastal Storm	3	2	3	3	2.67	3.00	2.83	H

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in Larchmont.

Table 21: Qualitative Risk Assessment – Coastal Storm Hazard

	Coastal Storm Hazard Qualitative Ranking
Residents	High
Buildings	High
Businesses	High
Critical Infrastructure	High

Overall Qualitative Hazard Ranking: HIGH

5.3.2.9 Future Development Considerations

Coastal storms are of high concern to the Village of Larchmont. For future development or redevelopment in the community, the Village may want to consider the following:

- Consider whether or not to require the elevation of homes in high impact coastal areas to minimize their vulnerability to coastal storms and associated flooding,
- Consider the further development or redevelopment of high hazard coastal areas,
- Evaluate nonstructural approaches to maximize protection of the shoreline,
- Strengthen local regulatory requirements for inappropriate siting of structures in hazard areas (regularly review nonstructural measures like setbacks in flood hazard zones and CEHAs),
- Focus on protecting and maintaining natural habitats, wetlands and other features that protect against erosion and flooding during coastal storms,
- Evaluate coastal storm impacts after storm events and plan for recovery and redevelopment once existing conditions are known.

5.3.3 Dam Failure

5.3.3.1 Description & Location of the Hazard

The Village of Larchmont, NY owns the Larchmont Dam and the Larchmont Water Company Dam No. 2 located in the community. Both facilities are regulated by the New York State Department of Environmental Conservation (NYSDEC). Each dam has an inspection and maintenance plan in place which is regularly updated. Although the Village of Larchmont has responsibility for the two dams, both are not technically located within Village municipal limits. The dams are located within the Larchmont Reservoir/James G. Johnson Conservancy, a 60 acre park owned by the Village of Larchmont that is located within the Town of Mamaroneck. The Village is responsible for dam maintenance. A dam failure would pose risk to the downstream parkland and surrounding municipality of Mamaroneck.

Larchmont Dam
According to the Larchmont Dam Inspection and Maintenance Plan (August 2010), the Larchmont Dam and the Larchmont Water Company Dam No. 2 are two masonry dams that were completed in 1876 and 1903. The Larchmont Dam is a 210 foot small masonry structure that has been extensively repaired and reconstructed over time. It is a Class-B (designation means that the dam is required to safely pass storm events up to 150% of a 100 year storm event) intermediate-hazard dam and the spillway associated with this dam is a 50 foot uncontrolled overflow crest that discharges to the Sheldrake River. The Sheldrake and Goodliffe Reservoirs are formed by the Sheldrake River that originates 4.5 miles upstream. The watersheds associated with this area are highly developed with high density residential areas. Historically, the Larchmont Dam was used to provide ice to the surrounding population. Today, the dam is used for conservation and recreation purposes.

Larchmont Water Company Dam No. 2
The Larchmont Water Company Dam No. 2 is considered a Class-C high hazard dam based on NYSDEC dam safety guidelines. The Class-C designation is given because of the potential to loss of life, serious damage to homes, industrial or commercial buildings and public utilities if the dam were to fail. Historically, the Larchmont Water Company Dam No. 2 was constructed to provide drinking water to the Village of Larchmont. Today, the dam is used for conservation and recreation purposes.

5.3.3.2 Severity and Extent of the Hazard

According to the NY State Hazard Mitigation plan, dam failures can occur as a result of structural failures, such as progressive erosion of an embankment or overtopping and breaching by a severe flood. Earthquakes may weaken dams. Disastrous floods caused by dam failures, although not in the category of natural hazards, have caused great loss of life and property damage, primarily due to their unexpected nature and high velocity floodwater.

5.3.3.3 Impact of Hazard on Life, Property and Operations

The impact of dam failure in the Village of Larchmont would be significant and the impact would also extend to the Town of Mamaroneck which is adjacent to the Village. According to

the 2010 Dam Inspection and Maintenance report, due to the highly developed nature of the area, a catastrophic event would have an important impact and may endanger human life and property.

5.3.3.4 Previous Occurrences of the Hazard

To date, the Village of Larchmont has not experienced or suffered from a dam failure at either the Larchmont Dam or the Larchmont Water Company Dam No. 2.

5.3.3.5 Probability of Future Occurrence of Dam Failure

Neither the Larchmont Water Company Dam No. 2 nor the Larchmont Dam has experienced failure in the past, so the probability of future occurrence is unknown. Likelihood would increase if the following events did occur:

- Natural hazards like an earthquake/flood,
- Sabotage, terrorism,
- Dam structures are overtopped or about to be overtopped (An overtopping situation could result in dam damage, damage to the surrounding park property and its three bridges),
- Earth embankments to be breached by erosion or slope failure, and
- Spillways are blocked or seepage exists downstream.

5.3.3.6 Vulnerability to the Hazard

The 2010 Inspection and Maintenance plan for Larchmont Dam and Larchmont Water Company Dam No. 2 indicates that:

- Larchmont Water Company Dam No. 2 has a Class C designation which means high hazard because of potential loss of life, serious damage to homes, industrial or commercial buildings and public utilities if the dam were to fail.

- Larchmont Dam has a Class B designation which means it is an intermediate-hazard dam that is required to pass storm events up to 150% of a 100 year storm event.

5.3.3.7 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a dam failure event and its impact to Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a dam failure scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a drought utilizing a low, medium, high and severe ranking system. The ranking given for Larchmont was based on background research, knowledge of the Larchmont and past occurrences.

Table 22: Risk Assessment Prepared by Village Team Dam Failure Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Dam Failure	0	2	4	4	2.00	4.00	3.00	H

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in Larchmont.

Table 23: Qualitative Risk Assessment – Dam Failure Hazard

	Coastal Storm Hazard Qualitative Ranking
Residents	Medium
Buildings	Medium
Businesses	Medium
Critical Infrastructure	Medium

Overall Qualitative Hazard Ranking: HIGH

5.3.4 Drought

5.3.4.1 Description of the Hazard

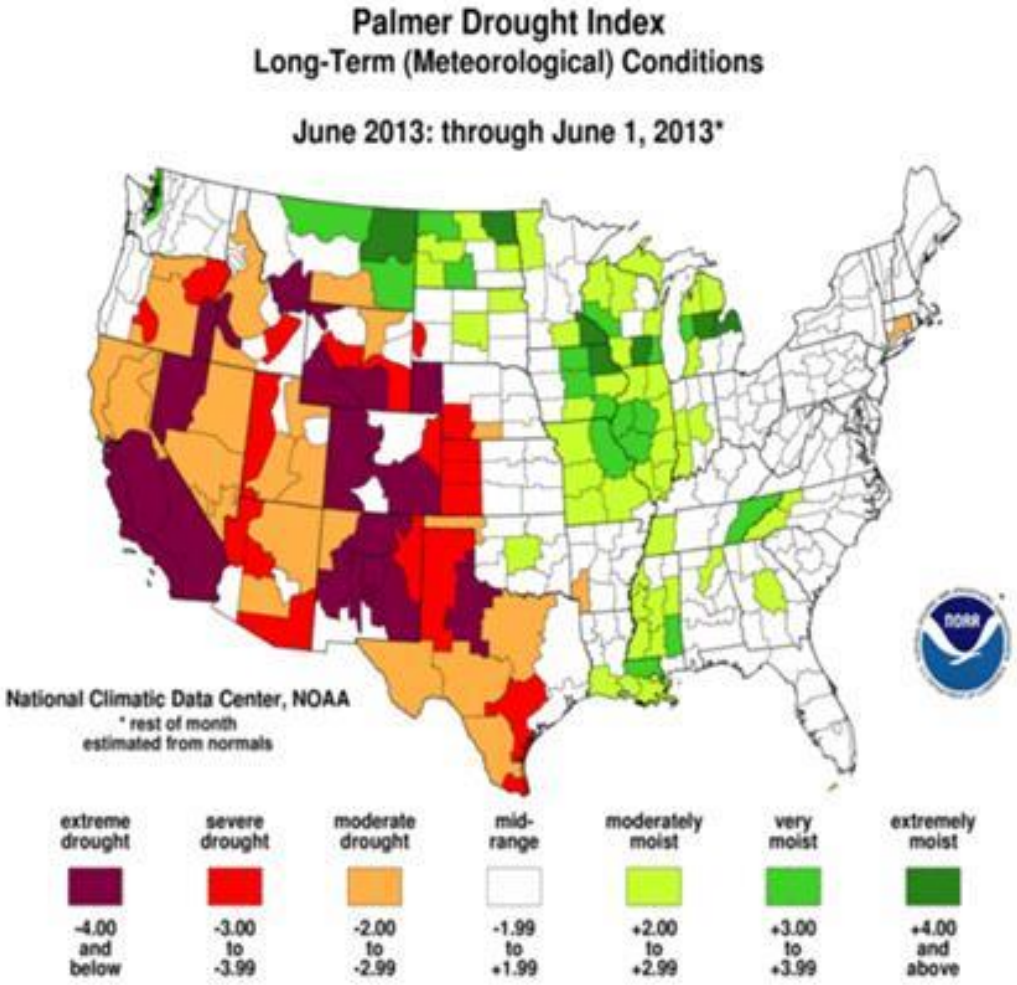
Drought occurs when there is an insufficient amount of moisture that has adverse impacts on people, animals or vegetation over a geographic area. Drought can occur over a prolonged period of time where the lack of precipitation directly impacts the hydrologic balance of the environment. Examples of impact include water supply shortages, dry soils which may result in crop failure and changed fish and wildlife behavior including death. Other weather characteristics like consistently high temperatures and low humidity can exacerbate the problem. Results of prolonged drought periods can also have a disastrous economic impact on communities and regions that rely upon water for agriculture and tourism type activities.

5.3.4.2 Location of the Hazard

New York is often considered to be a "water-rich" state and regions throughout the state generally receive approximately 40 to 50 inches of precipitation on an annual basis. New York is not immune from experiencing drought conditions that most often occur when there has been a dry winter. The Palmer Index reflects soil moisture and weather conditions; available from the

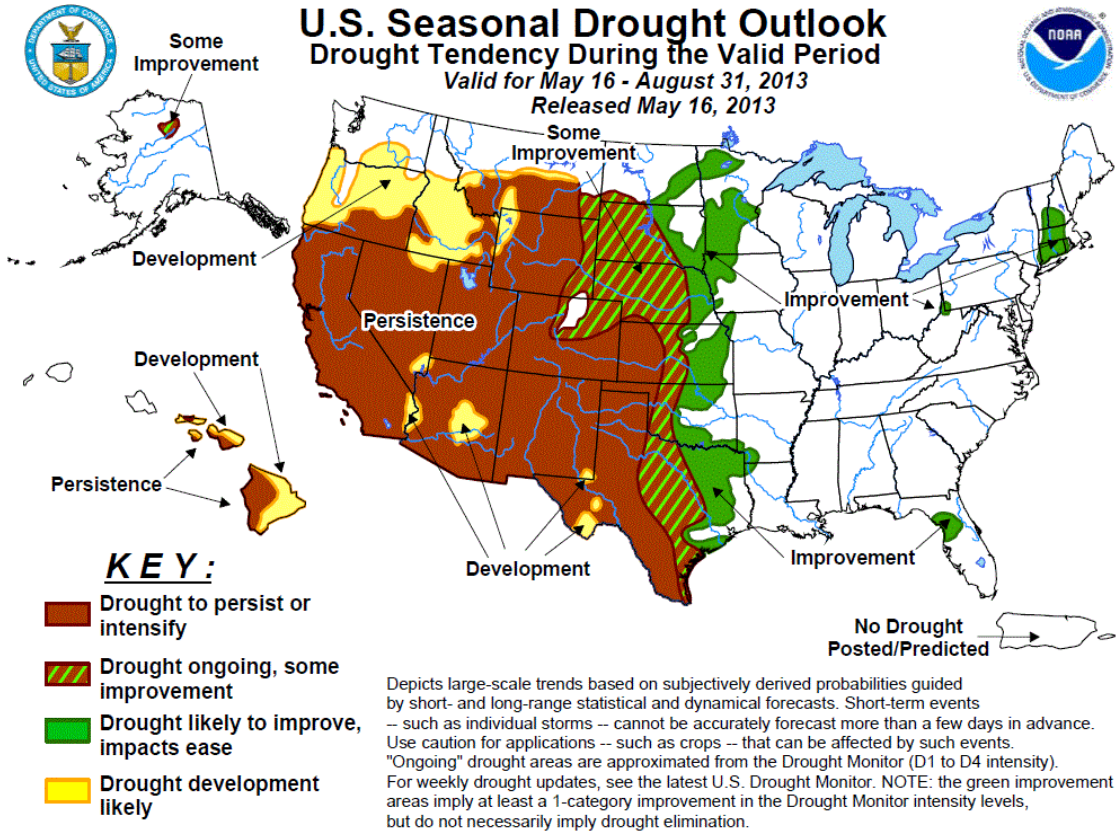
National Weather Service (NWS) or NOAA National Climate Data Center (NCDC). According to Figure 2, New York is not experiencing drought conditions as of June 2013. The Index is updated on a monthly basis.

Figure 2: Palmer Drought Index, June 2013



NOAA produces a seasonal drought outlook which depicts large, long term trends for the United States. According to Figure 3, no drought is posted or predicted for New York.

Figure 3: U.S. Seasonal Drought Outlook, May 16-August 31, 2013



5.3.4.3 Severity and Extent of the Hazard

According to the New York Department of Environmental Conservation (DEC), New York is divided into nine drought management regions based on watershed boundaries. Larchmont is located in Drought Region IIA (New York City/Westchester). Within the region, DEC monitors for drought conditions. Developed and implemented by the New York Drought Management Task Force, the New York State Drought Plan focuses on monitoring and mitigating impacts from droughts. The United States Geological Survey (USGS) monitors streamflow and groundwater conditions throughout New York to assist the DEC.

Drought Indices[4]

The New York State Drought Plan uses the Palmer Drought Index and the State Drought Index values unique to each of the nine drought regions to monitor for drought conditions. The Palmer Drought Index developed in 1965 is a long-term meteorological index that compares the actual amount of precipitation received in an area during a specified time period with the normal or average amount expected during that same time. The range is between -4.00 or less for extreme drought and +4.00 or greater for extreme moisture. The index responds to weather conditions that have been abnormally dry or wet and does not take into account lake and reservoir level and river and stream flow. The State Drought Index[5] is calculated as a function of precipitation, reservoir/lake level, streamflow, and groundwater level and consists of a weighted point system varying between 0 and 150 points used to categorize drought conditions summarized below:

- **Normal Conditions (100-150)** – No drought conditions.
- **Drought Watch (75-100)** – Least severe of drought stages. Drought watch is declared when a drought is developing. Public water suppliers conserve water and urge customers to reduce water use.
- **Drought Warning (50-75)** – Voluntary water conservation is intensified. Public water suppliers implement local drought contingency plans. Local agencies make plans in case of emergency declaration.
- **Drought Emergency (25-50)** – Mandatory local/county water restrictions are imposed, regulated under Westchester County Code, Local Law 9, titled Chapter 693 – Water Conservation[6]. Communities may need to tap alternative water sources to avoid depleting water supplies.
- **Drought Disaster (0-25)** – Disaster plans are implemented. The Governor may declare disaster and request federal disaster assistance.

5.3.4.4 Impact of Hazard on Life, Property and Operations

Drought can substantially impact varying sectors like agriculture, wildfire and recreation, energy, municipal and fish and wildlife. Decreasing flow of streams and rivers due to lack of precipitation can secondarily impact drinking water supplies, wildlife and recreational activities. It can also impact other users like power generation and water and wastewater utilities. In a Town setting, drought conditions would immediately impact landscaping and potable water for

[4] DEC, website: http://www.dec.ny.gov/lands/5011.html; New York State Division of Homeland Security and Emergency Services, website: http://www.dhses.ny.gov/oem/mitigation/plan.cfm

[5] New York State Drought Plan, December 1988.

[6] Westchester County Code, website: http://planning.westchestergov.com/county-water-agency/drought-emergency-plan

homeowner and business use. Long term affects include impacts to the local economy and environment that have social implications.

5.3.4.5 Previous Occurrences of the Hazard

According to the FEMA, there has been one Presidential Disaster Declaration made for a drought in the State of New York. In August of 1965, a declaration was made due to a water shortage for 14 counties, inclusive of Westchester County.

Table 19 summarizes historic drought occurrences in Westchester County identified in the New York State Standard Multi-Hazard Mitigation Plan. Consistent with Table 21, NOAA[7] also identified drought occurrences from November 2001 to October 2002 in Westchester County. A drought watch was issued on November 5, 2001 and became a drought warning in December 2001. The drought warning remained in effect until October 31, 2002 when significant rainfall from the remnants of Tropical Storm Kyle produced 2 to 4 inches of rainfall and a Nor'Easter produced an additional 2 inches of rainfall. Death, injury, and property damage were not reported by NOAA.

Table 24: Historic Drought Occurrences in Westchester County

Date	Types of Damages	Dollar Amount of Damages
1979-1981	Precipitation levels declined and drought-related impacts started to become evidence in the southern part of New York State, including the New York City metropolitan area. This drought sparked development of the State's Drought Task Force.	Unknown
October 1994	October 1994 tied for the 7th driest month on record.	Unknown
November 2001 – January 2002	Combined storage in New York City water supply reservoir system was 41% of capacity (normal for this time of year is 71%).	Unknown
April – October 2002	Ground water and water storage facilities were below normal. The New York City reservoir system reached a low of 64.5%, which was 34% below normal.	Unknown

Source: *2011 New York State Standard Multi-Hazard Mitigation Plan*

[7] NOAA National Climatic Data Center (NCDC) storm event data available from January 1, 1996 through February 28, 2013, website: http://www.ncdc.noaa.gov/stormevents

5.3.4.6 Probability of Future Occurrence of Drought

Drought is noted in the State Hazard Mitigation Plan as a hazard of concern for New York State and its citizens. One of the most severe drought events occurred between 1979 and 1981 when precipitation levels declined and drought-related impacts started to become evident. Of particular concern were water shortages in the southern part of the State, including the New York City metropolitan area near Larchmont. As a result, the State's Drought Task Force was formed and drought management regions identified. This Task Force was convened at the height of the 1984-1985 drought in New York City to recommend long-term priorities and actions. Major mitigation activities for water conservation were subsequently enacted.

5.3.4.7 Vulnerability to the Hazard

The Village of Larchmont receives 100 percent of its water from the Westchester Joint Water Works that includes the New York City water supply system. Specifically, the water source consists of rivers, lakes, streams, reservoirs, springs, and wells from the Catskill and Delaware watersheds west of the Hudson River. Monitoring drought conditions for the state of New York is important to Larchmont not only directly, but indirectly as a result of where their water source is actually located. The table below summarizes drought information reviewed for the geographic areas (local, regional, state) associated with drought conditions and Larchmont's location.

Table 25: Drought Susceptibility

How Susceptibility Was Determined	Why?
• New York DEC website • Westchester County Drought Emergency Plan • New York times, "Drought Emergency Over," November 2002	• The New York DEC has defined state Drought Management Regions which are based on county lines and drainage basins. The Village of Larchmont is located in the NYC/Westchester County Drought Management Region known as IIA. • Westchester County has experienced several major droughts which have significantly affected its residents and businesses. The county has developed a drought emergency contingency plan using information, data and experience compiled from past events. • A drought emergency was declared for Westchester County in 2001-2002.

5.3.4.8 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a drought hazard event and its impact to Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a drought hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a drought utilizing a low, medium, high and severe ranking system. The ranking given for Larchmont was based on background research, knowledge of the Larchmont and past occurrences.

Table 26: Risk Assessment Prepared by Village of Larchmont Team – Drought Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Drought	1	3	3	2	2.00	3.00	2.50	M

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in Larchmont.

Table 27: Qualitative Risk Assessment – Drought Hazard

	Drought Hazard Qualitative Ranking
Residents	Medium
Buildings	Low
Businesses	Medium
Critical Infrastructure	Medium

Overall Qualitative Hazard Ranking: MEDIUM

5.3.4.9 Future Development Considerations

Larchmont should include drought hazard scenario planning during their future development endeavors and continue to implement conservation measures to mitigate potential drought occurrences. Measures should be in place to position the Village in a favorable way should a drought scenario occur that would impact the water supply and in turn the local residents and businesses.

Within the framework of the Village of Larchmont Water Department, the following considerations should be made:

- Adequate fire suppression ability for emergency response activities in Town,
- Delivery of water in all new buildings,
- Continued water infrastructure maintenance to check for leaks, and
- Conservation programs to educate residents on water consumption reduction, particularly for lawn irrigation.

The Water Department's emergency procedures should be consistent with the policies of the Westchester Joint Water Works procedures for back up or interim water supply options and connections in the event of water service disruption served by the Catskill and Delaware watersheds.

5.3.5 Earthquake

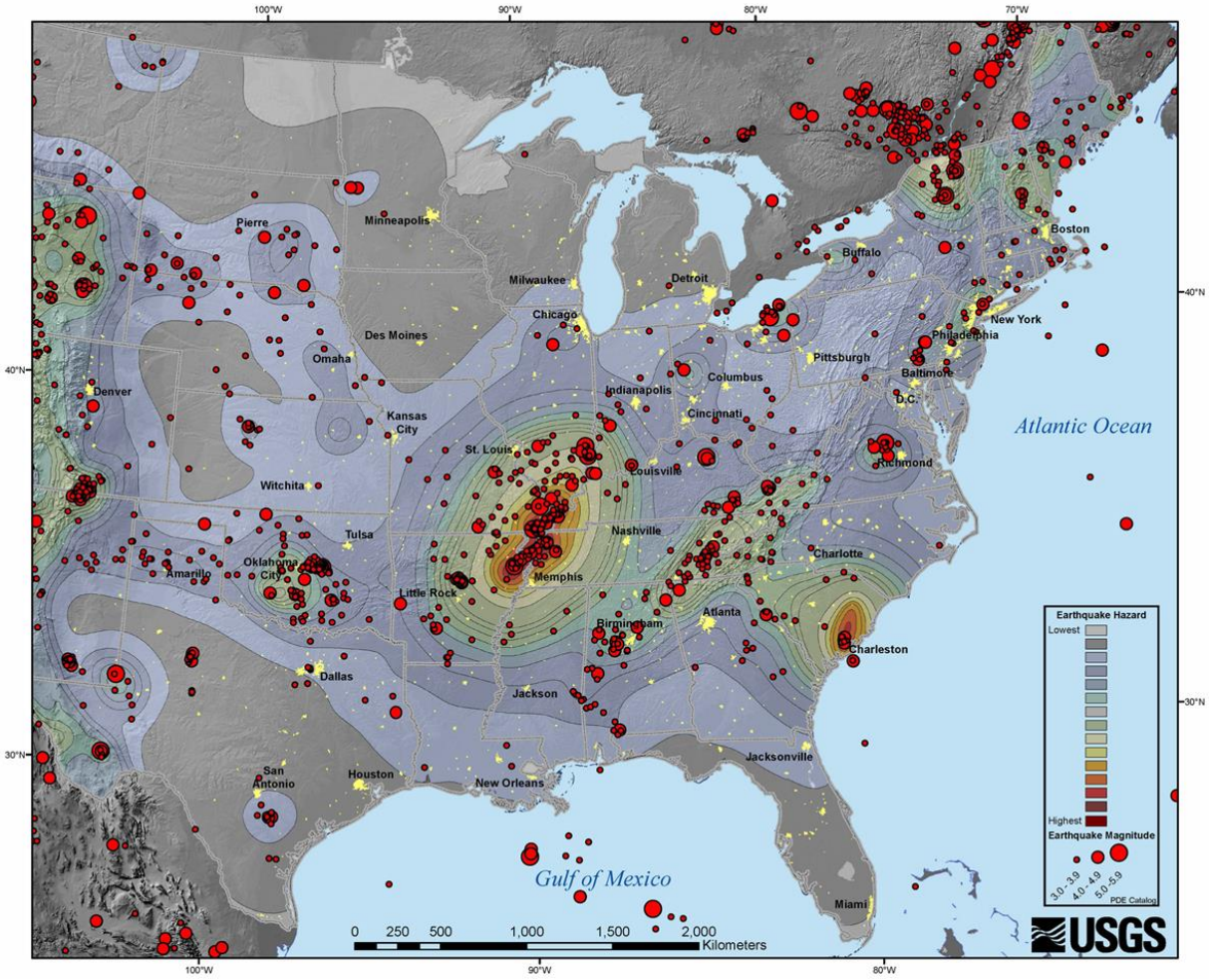
5.3.5.1 Description of the Hazard

Earthquakes are the result of a release of energy (which can be observed by shifting and fracturing of rock materials beneath the surface) in the Earth's crust that creates seismic activity. Seismic activity is defined by the frequency, type and size of earthquakes that occur. Earthquakes are measured by the Richter magnitude scale or the Maximum Modified Mercalli Intensity scale (MMI) that assign a value number to each earthquake event as a form of measuring the energy released. Unfortunately, earthquakes can be large in magnitude, impact thousands of square miles and cause billions of dollars in damage to property.

5.3.5.2 Location of the Hazard

Earthquakes have been detected all over New England and New York. The USGS map (prepared by the Earthquake hazard program) below indicates where Earthquake hazard areas are in the central and eastern portion of the country and where specific events have occurred in the past.

Figure 4: USGS Earthquake Hazard Map



The 2011 New York State Standard Multi-Hazard Mitigation Plan identifies three regions of New York State with greater seismic risk: the upper northeast (Adirondack and Greater Albany-Saratoga Regions), the northwest corner (vicinity of Buffalo), and the southeast corner (New York City and western Long Island).

Earthquake impacts are measured by how much energy releases from the epicenter of the event and how far any given location is from the epicenter. Severity can be expressed for an earthquake by comparing the acceleration of the event to normal acceleration due to gravity. Peak ground acceleration (PGA) is how the strength of the ground movements can be measured is expressed as a percent of the established rate of acceleration due to gravity. Magnitude (measure of total energy released) and intensity (measure of earthquake effects at a specific place) are the terms used to commonly describe severity of an earthquake.

A common method used to describe the severity of an earthquake is the Modified Mercalli Intensity (MMI) Scale. The Modified Mercalli Intensity Scale has preceded the Richter Scale (used until 1970) to measure the size of earthquakes in terms of how much energy is released. The scale presented in Table 27 identifies 12 increasing levels of intensity which are designated

by a Roman numeral; there is not a mathematical basis and scale is more arbitrary in defining the impact of an earthquake.

Table 28: Modified Mercalli Intensity Scale – Earthquake Intensity

MMI Scale Number	Typical Earthquake Impacts
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Earthquakes are also often referred to on a magnitude scale, which is noted in Table 28 below.

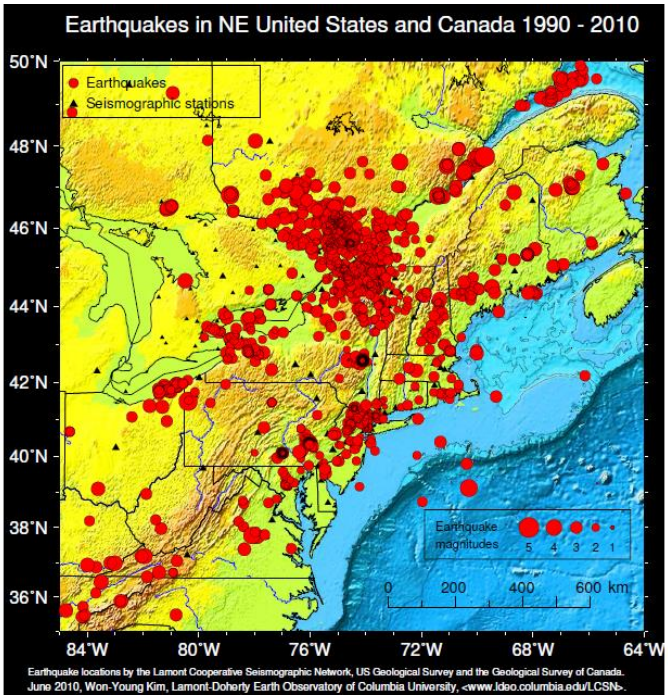
Table 29: Earthquake Magnitude Scale

Magnitude	Earthquake Effects	Estimated Number Each Year
2.5 or less	Usually not felt, but can be recorded by seismograph.	900,000
2.5 to 5.4	Often felt, but only causes minor damage.	30,000
5.5 to 6.0	Slight damage to buildings and other structures.	500
6.1 to 6.9	May cause a lot of damage in very populated areas.	100
7.0 to 7.9	Major earthquake. Serious damage.	20
8.0 or greater	Great earthquake. Can totally destroy communities near the epicenter.	One every 5 to 10 years

5.3.5.3 Impact on Life, Property, and Operations from the Hazard

The impacts from an earthquake, depending on its magnitude and intensity can vary widely from no change to devastating losses. The main effect of an earthquake is ground shaking that can cause severe damage to buildings, utilities and other structures (bridges, roads, etc). Other impacts may include:

- Landslide or avalanche due to slope instability,
- Fire due to damaged electrical or gas infrastructure,
- Rupture of water supply tanks, pipelines or aqueducts,
- Hazardous material spills,
- Soil liquefaction due to water saturated ground material,
- Tsunami which can be the result of large earthquakes (they are usually not seen unless the earthquake is a 7.5 or higher),
- Flood which is often a secondary impact of an earthquake, and
- Human injury and loss of life.



5.3.5.4 Previous Occurrences of the Hazard

According to the FEMA, there has been a Presidential Disaster Declaration for an earthquake in upstate New York. Federal and state disaster assistance to those affected by the April 20, 2002 Sable Forks earthquake in six counties (Clinton, Essex, Franklin, Hamilton, Warren, and Washington) reached more than $3M.

From 1668 to 2007, New York has experienced 755 earthquakes of varying magnitudes out of 2,403 in the Northeast.[8] According to the USGS, the largest major earthquake to affect New York occurred on September 5, 1944 between Massena, New York and Cornwall, Ontario. This earthquake had a 5.8 magnitude and was felt from Canada to Maryland and from Maine to Indiana. Residents of St. Lawrence County reported that many water wells went dry and 90 percent of the chimneys were destroyed or damaged and house foundations, plumbing, and masonry were severely damaged. Earthquake events relevant to the vicinity of Larchmont are summarized in Table 29 below:

Table 30: Earthquake Events Near Larchmont (1737-2005)[9]

Date	Magnitude	Location	Damage Estimates
March 10, 1992	4.1	East Hampton	No damage reported
October 19, 1985	4.0	White Plains/Ardsley	Windows broken, walls damaged
August 10, 1884	5.2	New York City	Chimneys fell, walls cracked
December 11, 1874	3.4	New York City/Tarrytown	No damage reported
September 2, 1847	3.5	Offshore New York City	No damage reported
December 18, 1737	5.2	New York City	Bells rang, chimneys fell

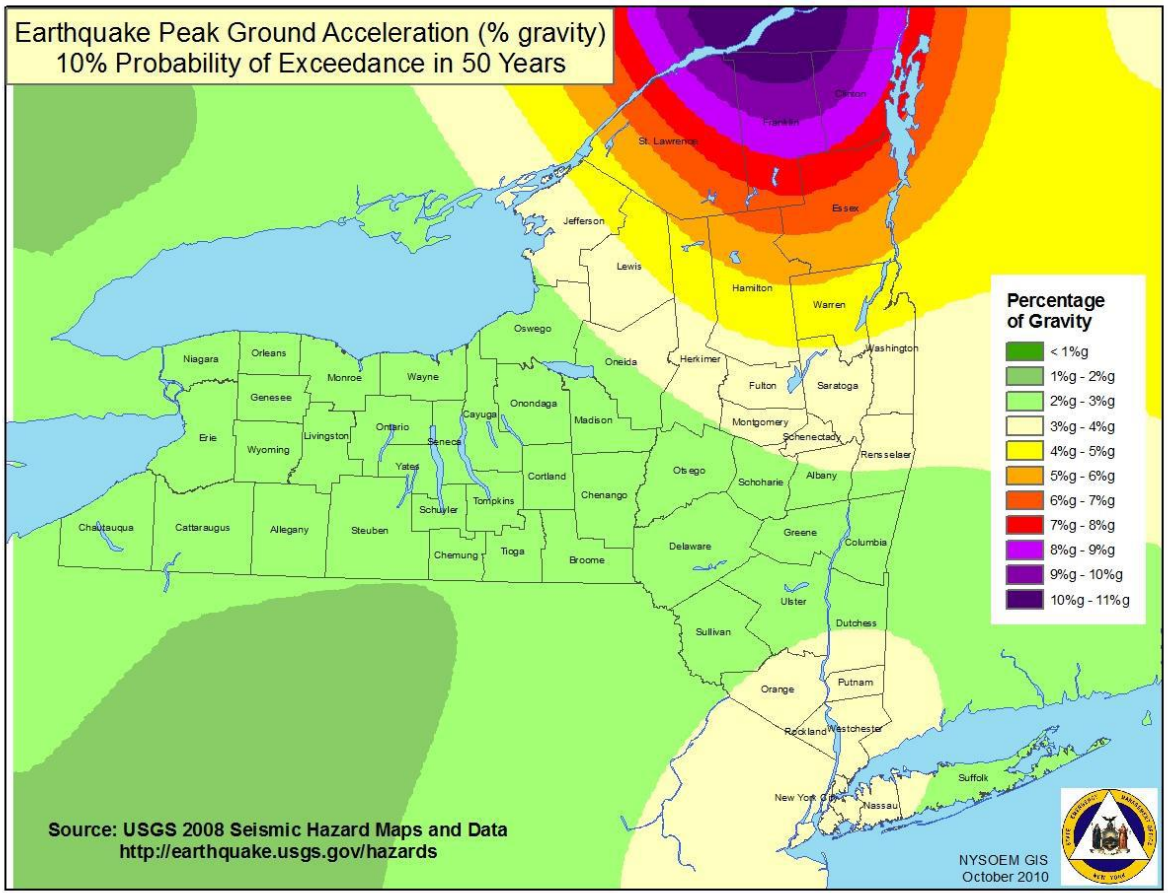
5.3.5.5 Probability of Future Occurrence of the Hazard[10]

Figure 4 is an earthquake hazard map, commonly referred to as a Percent Peak Ground Acceleration (%PGA) map, for New York State that shows ground motion values (peak ground acceleration) with a 10 percent probability of exceedance in 50 years. For moderate earthquakes, PGA is the best determinate of damage. According to Figure 4, Westchester County has a 10

[8] The Northeast States Emergency Consortium, "Earthquakes," May 2013, website: http://www.nesec.org/hazards/earthquakes.cfm.html#history
[9] 2011 New York State Standard Multi-Hazard Mitigation Plan, website: http://www.dhses.ny.gov/oem/mitigation/plan.cfm
[10] 2011 New York State Standard Multi-Hazard Mitigation Plan, website: http://www.dhses.ny.gov/oem/mitigation/plan.cfm

percent probability of having ground movement with a severity of 3 to 4%g, equivalent to a IV on the Modified Mercalli Intensity (MMI) scale.

Figure 5: USGS %PGA Seismic Hazard Map, 2008 & NYSOEM GIS, 2010



Using historical frequency to predict future occurrences, it has been determined that New York State can expected damaging earthquake events once every 22 years on average. These earthquake events are likely to occur within one of the three regional areas mentioned above that include New York City in close proximity to Larchmont. The NYS GS study by W. Mitronovas, "Earthquake Hazard in New York State" describes the probability in the following terms,

"*…at present an earthquake of magnitude 3.5 to 4 occurs, on the average every 3 years somewhere in the State. Such earthquakes do not cause any appreciable damage (except for cracks in plaster, perhaps) but are large enough to be felt strongly by many people near the epicenter."*

The frequency of damaging earthquakes within and adjacent to New York State has been relatively low. However, due to damaging earthquake occurrences in the past, high population density, and deteriorating buildings suggest that people are still at risk for damaging earthquakes in New York State. Also, the Westchester County Comprehensive Emergency

Management Plan (November 2005) identified earthquake as a moderately high hazard using HAZNY, the Hazards New York software program provided by New York State Emergency Management Office (NYSEMO).

5.3.5.6 Vulnerability to the Hazard

According to the 2011 New York State Standard Multi-Hazard Mitigation Plan, it appears that the New York City and western Long Island areas have a greater vulnerability to potential earthquake activity than other parts of the state. The Village of Larchmont, due to its proximity to New York City, dense population and older structures that may not be designed to withstand the impacts of an earthquake is vulnerable.

The susceptibility of earthquakes for the Village of Larchmont is summarized in **Table 30** below.

Table 31: Earthquake Susceptibility

How Susceptibility Was Determined	Why?
• Westchester County Comprehensive Emergency Management Plan (CEMP) • 2011 New York State Standard Multi-Hazard Mitigation Plan	• Westchester County is more susceptible than other areas of New York State. • Two dams owned by Larchmont could be damaged by ground motions caused by seismic activity. • Earthquake was identified in the Westchester CEMP as a moderate hazard.

In general, earthquake vulnerability is based on cross referencing the built environment with the population for an area. Urban areas in high hazard zones are the most vulnerable due to their densely developed nature, age of structures and infrastructure and number of people. The ability to accurate timing, location and severity of an earthquake that could impact the Village of Larchmont is limited due to lack of historical information and the infrequent occurrence of earthquake events in the past that have generated documentable damage. Structures that are newer construction are more resistant to earthquakes than older construction due to updated building codes and enforcement. Common impacts of an earthquake may include building and infrastructure damage or failure, rupture of underground utilities, fire, landslides and other disruptions. Secondary impacts of earthquakes can be just as serious and may include dam failure or explosions.

5.3.5.7 Risk Assessment Methodology, Limitations and Results

The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of an earthquake utilizing a low, medium, high and severe ranking system. The ranking given for the Village was based on background research, knowledge of the Village and facilities and past occurrences.

Table 32: Risk Assessment Prepared by Larchmont Team – Earthquake Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Earthquake	1	1	3	3	1.67	3.00	2.33	M

Overall Qualitative Hazard Ranking: MEDIUM

5.3.5.8 HAZUS-MH Analysis 500 Year - Earthquake[11]

Consistent with FEMA's methodology, the Village of Larchmont used HAZUS-MH software to measure local level earthquake loss estimates. The probabilistic HAZUS-MH earthquake loss estimation runs include total losses for 250, 500, 1,000 and 2,500 years. According to the State Hazard Mitigation Plan, due to population and build-out, Westchester County is one of the highest ranking for exposure and loss. Using the software, scenarios were run specifically for the Village of Larchmont to evaluate potential economic and social losses should an earthquake occur.

Assessments for the Village of Larchmont were conducted for three Mean Return Periods of 500, 1,000 and 2,500 years which provides a range for loss estimates. A 500 year Mean Return Period (MRP) indicates that there is a .2% chance that the Peak Ground Acceleration (PGA) will be exceeded in any given year and this has been discussed in detail below. The analysis for Larchmont selected and utilized an Earthquake Magnitude of 7.0 to analyze the potential events. Probabilistic events are modeled and they review the damage caused by an event that is likely to occur over a period of time.

For the purposes of this evaluation, HAZUS reported the use of the following information based on the data included in the program:

- Over 2,000 households in the region with a total population of 6,485 people (2002 Census Bureau data).
- Estimated 2,000 buildings in the region with a total building replacement value (excluding contents) of $780M,
- Approximately 80% of the buildings are associated with residential housing, and
- The replacement value of the transportation and utility lifeline systems is estimated to be $39M.

[11] 2010 Census Data was not utilized for this analysis as it is not currently loaded into the HAZUS model. The Village of Larchmont population for 2010 is 5,864.

5.3.5.9 Life, Health, Safety Impacts

Should an earthquake occur in the Village of Larchmont, there would be an impact on life, health and safety that would vary based on the severity of the event, where people were located and time when the event occurred. Based on past earthquake occurrences, risk during any similar event in the future would be minimal. However, if a higher magnitude earthquake did occur, there would be substantial damage and displacement of residents. A summary of the HAZUS-MH 500 Year Earthquake probabilistic analysis can be found below with the full content located in Appendix C.

HAZUS estimates that approximately 11 buildings would be moderately damaged which is not a substantial number of buildings in the community. It does not estimate that any buildings would be damaged beyond repair.

Table 33: Earthquake Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	7	0.30	0	0.34	0	0.40	0	0.43	0	0.23
Commercial	236	10.48	6	12.62	2	17.25	0	19.31	0	13.60
Education	10	0.43	0	0.48	0	0.61	0	0.64	0	0.58
Government	4	0.17	0	0.19	0	0.25	0	0.26	0	0.17
Industrial	50	2.24	1	2.56	0	3.57	0	3.69	0	2.15
Other Residential	369	16.41	8	17.51	2	20.09	0	21.41	0	22.27
Religion	14	0.64	0	0.80	0	1.11	0	1.32	0	1.34
Single Family	1,560	69.32	32	65.51	6	56.72	1	52.95	0	59.66
Total	2,250		48		11		1		0	

Table 34: Earthquake Expected Building Damage by Type

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1,629	72.40	26	54.78	3	27.56	0	9.10	0	0.00
Steel	152	6.74	3	6.75	1	8.87	0	7.32	0	0.00
Concrete	50	2.21	1	2.09	0	2.13	0	0.76	0	0.00
Precast	9	0.42	0	0.53	0	1.38	0	2.27	0	0.00
RM	58	2.59	1	2.35	1	4.88	0	5.31	0	0.00
URM	352	15.65	16	33.50	6	55.17	1	75.24	0	100.00
MH	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	2,250		48		11		1		0	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

The HAZUS model does not anticipate substantial damage to essential facilities such as schools, police and fire stations. Expected damage to transportation systems would also be minimal damage and is noted in the table below.

Table 35: Earthquake Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	2	0	0	2	2
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
Railways	Segments	1	0	0	1	1
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

There was no utility system facility damage identified and no utility system pipeline damage identified through the HAZUS model.

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	39	0	0
Waste Water	23	0	0
Natural Gas	16	0	0
Oil	0	0	0

5.3.5.10 Future Development Considerations

Larchmont should include earthquake hazard scenario planning during their future development endeavors and continue to implement measures to mitigate the impact of earthquake occurrences. Future considerations include the following measures:

- Update local building codes for consistency with the International Code Council (ICC) building, residential, and existing building codes. The ICC publishes new editions to of the International Codes every three years.
- Coordinate outreach to public with consistent messaging, information, and instructions via public broadcast, websites, email, and social media for emergency information including safety information, the location of shelters, and additional information.
- Coordinate emergency information with Westchester County.
- Identify critical facilities in Larchmont that include fire, police, and emergency response locations, schools, and emergency shelters in the event emergency service locations are needed or to identify such locations that may be affected by the hazard.

5.3.6 Extreme Heat

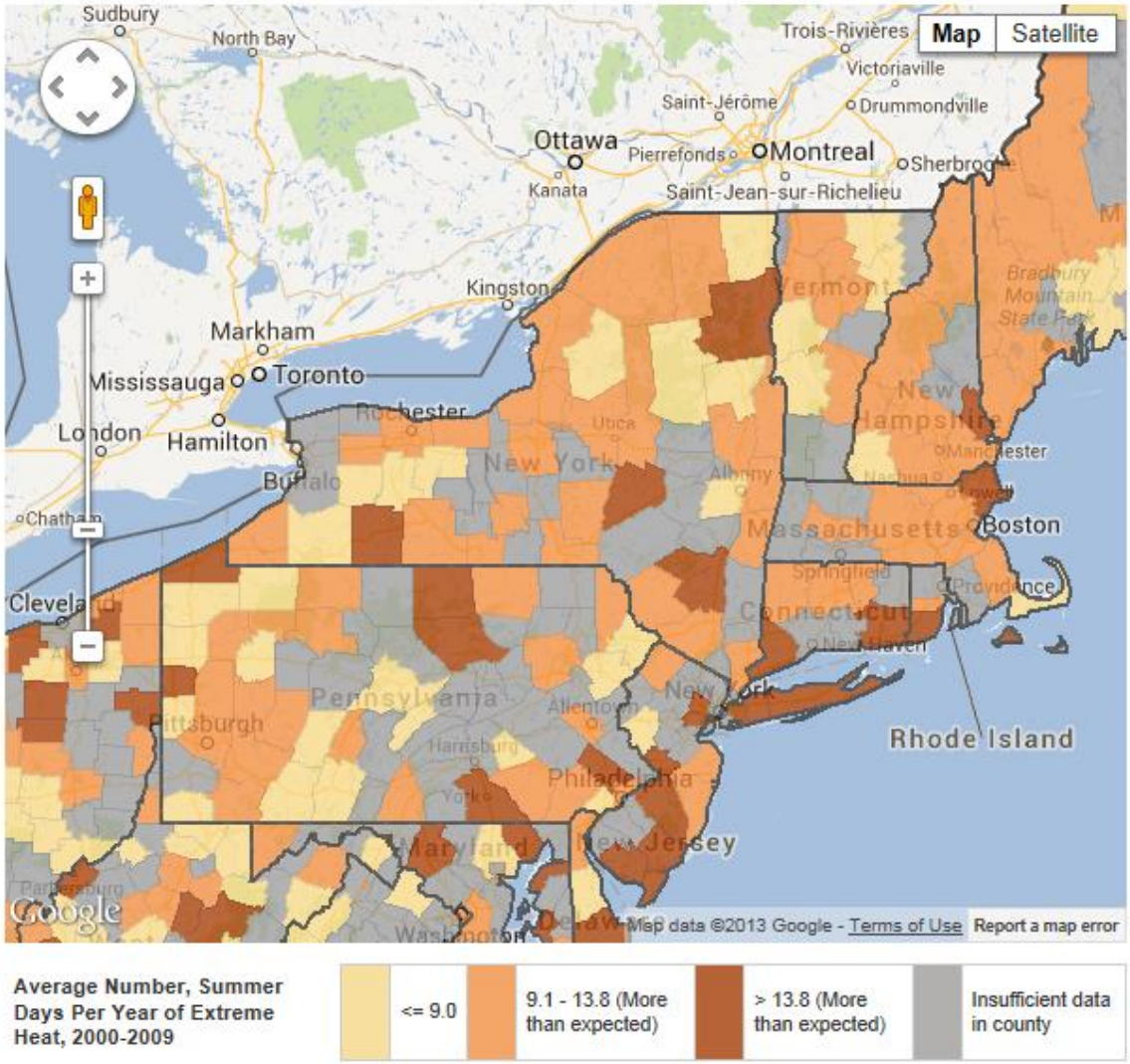
5.3.6.1 Description of the Hazard

Extreme heat conditions vary throughout the United States. In general, an extreme heat event is recognized when temperatures are ten degrees or more about the average high temperature in a given region for an extended period of time. In New York State, high temperatures coupled with high humidity increase the likelihood for extreme heat events, also known as heat waves that can cause negative impacts to human health.

5.3.6.2 Location of the Hazard

Extreme heat can occur anywhere in New York State. Figure 6 illustrates the average number of extreme heat days by county for New York State from 2000 to 2009. For this figure, extreme heat days are defined as days with daily maximum temperatures above the 90^{th} percentile June, July, and August temperatures relative to a 1961 to 1990 reference period. Westchester County averaged 9.1 to 13.8 days of extreme heat.

Figure 6: Extreme Heat Vulnerability in the US, 2000-2009 Average Number of Extreme Heat Days for New York State[12]

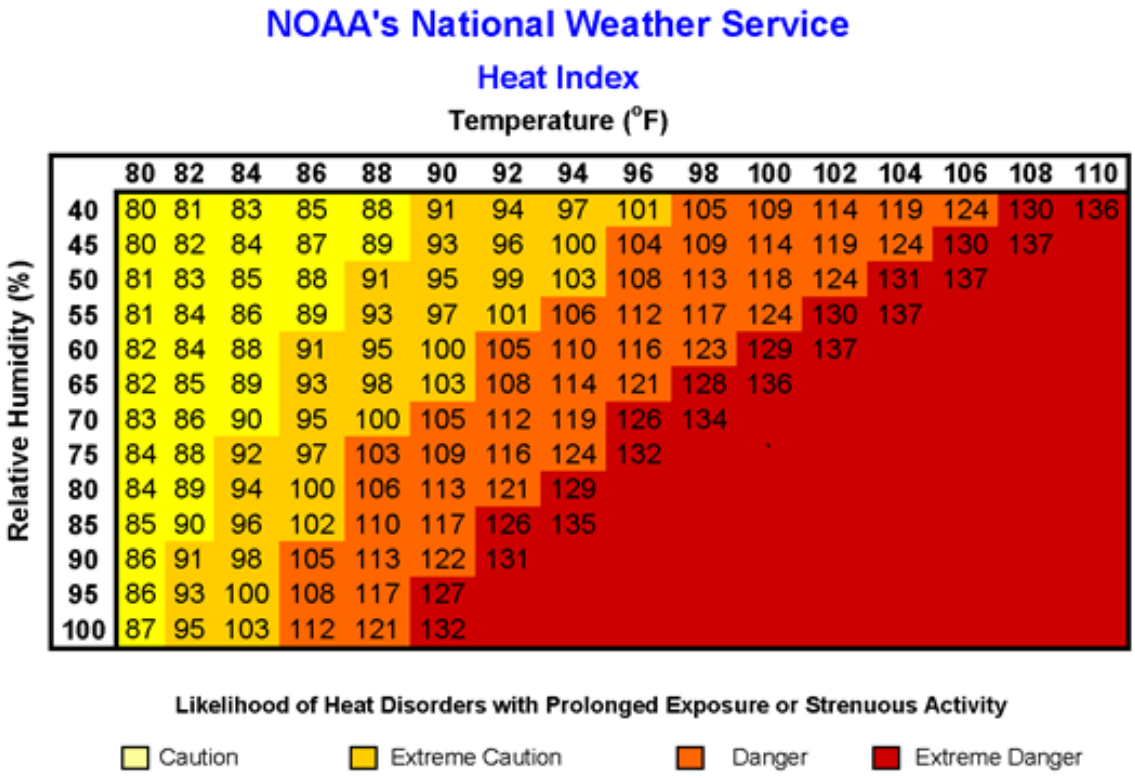


5.3.6.3 Severity and Extent of the Hazard

The National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service Heat Index provided as Figure 7 assigns indices of caution, extreme caution, danger, and extreme danger based on relative humidity and temperatures. The Heat Index is derived for shady, light wind conditions. Exposure to full sunshine can increase the index values by up to 15 degrees. Also, strong winds, especially those with very hot, dry air, can be extremely hazardous. Extreme heat is most likely June through August in New York State.

[12] Natural Resources Defense Council (NRDC), website: http://www.nrdc.org/health/climate/heat.asp

Figure 7: National Weather Service Heat Index Chart



The National Weather Forecast Office issues the following alert procedures used by Westchester County:

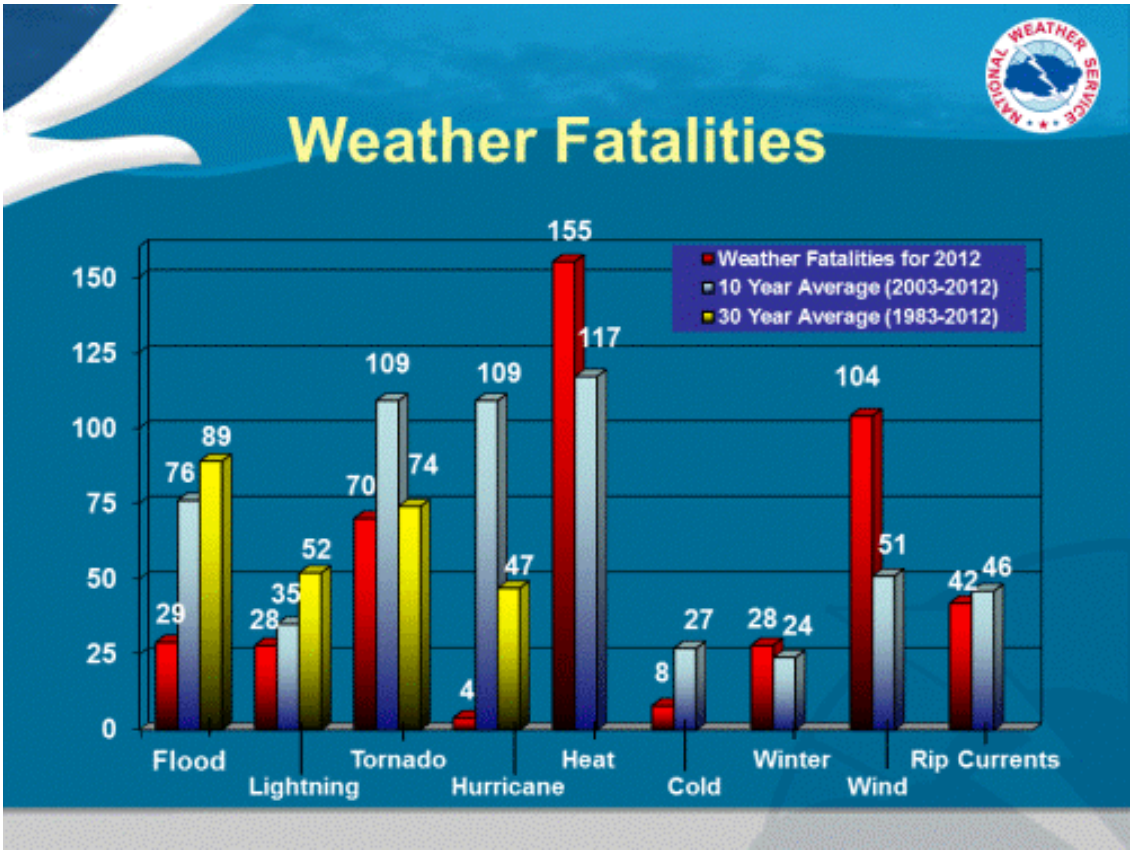
- **Excessive Heat Outlooks:** issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to those who need considerable lead time to prepare for the event, such as public utility staff, emergency managers and public health officials. See the mean heat index and probability forecasts maps.
- **Excessive Heat Watches:** issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain. A Watch provides enough lead time so that those who need to prepare can do so, such as cities officials who have excessive heat event mitigation plans.
- **Excessive Heat Warning/Advisories:** issued when an excessive heat event is expected in the next 36 hours. A Warning is issued when an excessive heat event is occurring, is imminent, or has a very high probability of occurring. The Warning is used for conditions posing a threat to life. An Advisory is for less serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life.

5.3.6.4 Impact of Hazard on Life, Property and Operations

The most prominent impact of extreme heat is on human health. The impacts of heat waves include heat-related illnesses that can range from heat cramps to heat exhaustion to heat stroke. Older adults, young children and adults with obesity, fever, heart disease, mental illness, poor circulation, and sunburn are more susceptible.

Extreme heat as a natural hazard is not as notable as others that affect New York State, but it has had devastating consequences on public health. In a 40-year period from 1936 to 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. For New York State, from 1994 to 2006 there have been 86 fatalities as a result of extreme heat; 79 within a 7-year period from 1999 to 2006[13]. As shown in Figure 8, heat has resulted in the most fatalities in the United States with 155 documented cases in 2012 and 117 average cases from 2003 to 2012.

Figure 8: U.S. Weather Fatalities[14]



[13] New York State Standard Multi-Hazard Mitigation Plan, website: http://www.dhses.ny.gov/oem/mitigation/plan.cfm

[14] NOAA, website: http://www.nws.noaa.gov/om/hazstats.shtml

Extreme high temperatures have also resulted in power failures due to high demand for air conditioning. Power outages during heat waves have become more common over recent years in both New York City and Westchester County. During extended power outages, the lack of refrigeration results in food spoilage, transportation problems, closure of schools and businesses, and places the sick at greater risk. Extended power failures associated with blackouts can result in significant property damage.

5.3.6.5 Previous Occurrences of the Hazard

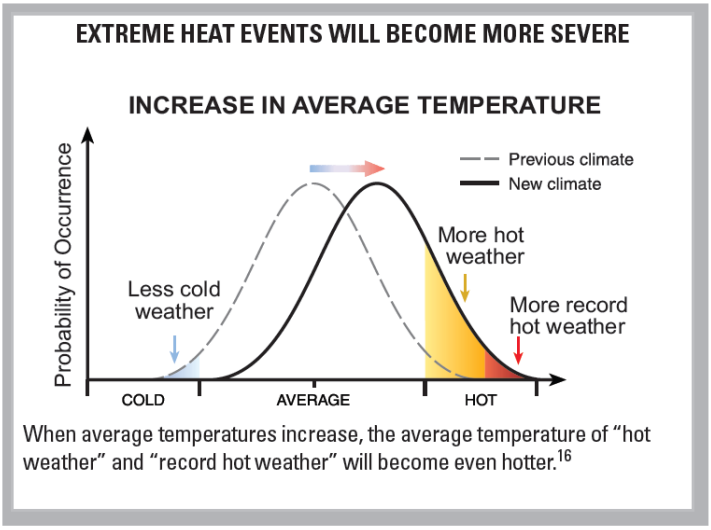
According to the FEMA, a Presidential Disaster Declaration has not been issued for extreme temperatures in New York and the National Climatic Data Center (NCDC) Storm Events Database does not list excessive heat events based on data available from January 1, 1996 through February 28, 2013 for the State of New York. The New York State Standard Multi-Hazard Mitigation Plan references the following extreme heat events for Westchester County:

- **August 1 through 3, 2006** – Heat indices ranged from 105 to 115 degrees resulting in 42 deaths and scattered power outages throughout the New York City Metropolitan area; no fatalities were reported for Westchester County.
- **July 2 through 4, 2002** – High humidity and high temperatures produced heat indices of 100 to 105 degrees. Small power failures throughout Westchester and nearby counties left approximately 20,000 homes without electricity.
- **August 3 through 10, 2001** – A Bermuda high pressure pumped hot temperatures and humidity into Westchester and other areas of New York State causing heat indices to reach between 105 and 110 degrees. As the temperature rose, the demand for electricity increased. A power outage occurred between August 7 and 10 throughout Westchester and nearby counties. A total of four deaths were attributed to the heat wave; no fatalities were reported for Westchester County.
- **July 4 through 6, 1999** – The combination of high temperatures and moderate humidity caused most heat indices to range from 100 to 105 degrees causing a widespread blackout to occur on July 5th. The heat wave was directly responsible for killing 33 people in the New York Metro Area, including two in Westchester County.

5.3.6.6 Probability of Future Occurrence of the Hazard

The Center for Disease Control (CDC) indicates that climate change will result in longer, more severe, and more frequent extreme heat events. Studies have shown that by the end of this century, the number of days with temperatures reaching 100 degrees Fahrenheit or more is projected to increase dramatically in the United States. Figure 9 shows the effect of climate change on heat events. Climate change is predicted to increase the frequency and intensity of heat waves, with significant increases in heat-related deaths.

Figure 9: Effect of Climate Change on Heat Events, CDC



5.3.6.7 Vulnerability to the Hazard

According to the 2011 New York State Standard Multi-Hazard Mitigation Plan, the entire state of New York is susceptible to extreme heat events. With the effects of climate change, the susceptibility to extreme heat is expected to increase.

Local vulnerability for Larchmont will most likely be seen by those population sectors impacted by extreme heat events that include senior citizens, children under five years old, and those with physical and mental disabilities. Based on U.S. Census Data from 2008 population estimates, Westchester has approximately 13 percent of individuals 65 years old and older and 5 percent of children under the age of five. Based on this data, at least 18 percent of Westchester's population is within a population group vulnerable to the effects of extreme heat.

Table 36: Extreme Heat Susceptibility

How Susceptibility Was Determined	Why?
• New York State Standard Multi-Hazard Mitigation Plan, 2011	• The entire State of New York is susceptible to extreme heat events. • According to 2008 U.S. Census Data, at least 18 percent of the population for Westchester County is within a group vulnerable to the effects of extreme heat.

5.3.6.8 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for an extreme heat hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for an extreme heat hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration,

severity, intensity, probability and consequence of an extreme heat hazard utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of the community and past occurrences.

Table 37: Risk Assessment Prepared by Village Team – Extreme Heat Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Extreme Heat	3	4	2	2	3.00	2.00	2.50	M

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont:

Table 38: Qualitative Risk Assessment – Extreme Heat Hazard

	Extreme Heat Qualitative Ranking
Residents	High
Buildings	Medium
Businesses	Low
Critical Infrastructure	Medium

Overall Qualitative Hazard Ranking: MEDIUM

5.3.6.9 Future Development Considerations

The Village of Larchmont should include extreme heat hazard scenario planning during their future development endeavors and continue to implement measures to mitigate the impact of extreme heat occurrences. Such planning should be focused on protecting lives and preventing injuries from extreme heat events. Preventing an extreme heat event is not plausible, but limiting the effects on the general population is. Future considerations include the following mitigation measures:

- Identify locations of vulnerable population groups that include seniors, small children, and those with health impairments.
- Identify locations of existing cooling centers such as senior centers and public pool areas. The need for additional cooling centers should be assessed. During extreme heat conditions, cooling center locations should be conveyed to the public.
- Convey National Weather Forecast outlooks, watches, warnings, and advisories to the public.
- Coordinate outreach to public with consistent messaging, information, and instructions via public broadcast, websites, email, and social media prior and during extreme heat conditions.
- Coordinate outreach on extreme heat preparedness for residents prior to the June through August time period when the occurrence of extreme heat is most likely.

5.3.7 Flood

5.3.7.1 Description of the Hazard

A flood is when there is a high flow or inundation of water that submerges land which is normally dry and causes or threatens damage. The most frequently flooded type of area is land adjacent to a water body and in a defined floodplain. Flooding can either be coastal, riverine or shallow flooding (associated with ponding or urban drainage). Flooding situations can develop slowly or very quickly in a situation known as a flash flood. Floods can be dangerous because the flow of water can be rapid and either impact a neighborhood, community or the larger watershed area.

Varying types of flood can exist including[15]:

- **Coastal Flood:** Flooding of coastal areas due to the vertical rise above normal water level caused by strong, persistent onshore wind, high astronomical tide, and/or low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Coastal areas are defined as those portions of coastal land zones (coastal county/parish) adjacent to the waters and bays of the oceans. Farther inland, flood events are defined as Flash Flood or Flood. Terrain (elevation) features determine how far inland the coastal flooding extends.
- **Flash Flood:** Rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam-related), on a widespread or localized basis. Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters. Flash floods do not exist for two or three consecutive days.

[15] National Weather Service Instruction 10-1605 (August 17, 2007), Operations and Services Performance, NWSPD 10-16 Storm Data Preparation document (http://www.nws.noaa.gov/directives)

- **Riverine Flooding:** Generally means the flooding of rivers and streams over their pre-defined banks. In coastal regions, the riverine floodplain is generally a flat area along a larger river or in low-lying coastal areas. The volume that is manageable depends on the watershed, and climate and land use characteristics.
- **Urban Flooding:** In densely developed areas, heavy rains/precipitation can produce flooding when groundwater levels are high and there is insufficient drainage infrastructure in place.

According to the State Hazard Mitigation Plan, areas of New York that include characteristics lending to poor drainage type flooding include the Long Island communities, western New York and, in general, the more urbanized areas.

Other terminology frequently used to describe flooding conditions includes:

- **Base Flood (100 Year Flood)** – Flood that has a 1% chance of being equaled or exceeded in any given year. A 100 Year flood can occur more than once in a short period of time. The term measures the size of the flood, not frequency of occurrence. The Village of Larchmont has a number of areas that are designated to be in a 100 Year Flood Zone.

- **500 Year Flood** – Flood that has a .2% chance of being equaled or exceeded in any given year. The 500-Year flood is an infrequent event and it can occur between once in eight years to once in fifty years. The term does not mean a flood occurs once in 500 years. The Village of Larchmont has a number of areas that are designated to be in a 500 Year Flood Zone.

5.3.7.2 Location of the Hazard

Included in **Appendix A** of this plan is a Floodplain Map (Map 3) of the Village of Larchmont which illustrates both the 100 Year Flood zone and the 500 Year Flood zone.

In the Village of Larchmont, there are a number of areas that have experienced high frequency occurrences or severe flooding. As a part of a countywide effort to locate and describe areas of flood or stormwater management problems, the Village identified potential improvements that could reduce flooding and flood damage, the areas of improvement are:

- Pine Brook Drive and Kilmor Road
- Flint Park (including northwest side off Birch Lane)
- Nassau Road (there is a ConEd substation located in proximity to the flood prone area)
- Pryor Manor Lane at Red Bridge
- Magnolia Avenue
- Ocean Avenue
- Cedar Island
- Pine Brook
- Park Avenue at Manor Park

- Park Avenue at Manor Beach
- Spanish Cove Road and Lindsley Drive
- North Avenue
- Coolidge Street
- Monroe Avenue
- Weaver Street
- Larchmont Reservoir

A Flood Insurance Study (FIS) was prepared for Westchester County in 2007 and included the Village of Larchmont. The study indicates that substantial flooding conditions were recorded in July 1889, October 1903, November 1927, March 1936, September 1938, September 1944, May 1946, March 1953, August 1955, October 1955, March 1962, May 1968, August 1971, June 1972, September 1975 and September 1999.

The National Flood Insurance Program (NFIP) tracks information about repetitive loss occurrences in communities that participate in the program. For the purposes of this plan, information was obtained directly from the NFIP for the Village of Larchmont who has had various claims filed in the past which is summarized in **Table 39** and up to date as of June 30, 2013.[16]

Table 39: National Flood Insurance Program Repetitive Loss Occurrences

Category	Details
Repetitive Loss Buildings Insured	28
Repetitive Losses Total	113
Repetitive Losses Insured	94
Losses Total	$2,422,523
Losses Insured	$2,195,797
Buildings With 4 Losses Total	10
Buildings With 4 Losses Insured	10
Post FIRM A-V Total	1
Building Payments Paid	$204,433
Contents Payments Paid	$10,527
Total Payments Paid	$214,959
Average Payment	$15,354
Total Losses	14
Total Properties	3

[16] The Village understands that NYSOEM would like noted type of property that has suffered repetitive loss. During August 2013, direct communication was made with the NFIP via email and they indicated *"…I am not able to provide you with addresses due to privacy laws and our database does not say if it is residential, commercial or industrial. Our database for repetitive loss is not broken down like that."*

More specifically, the Village of Larchmont has 37 structures (as of June 30, 2012) that have been impacted by repetitive or severe repetitive damage from flooding. Of those structures, just over 10% are condos, 1% is non-residential and 89% are single family homes. [17] **Table 40** summarizes the streets in the Village of Larchmont, the flood zone and how many repetitive loss or severe repetitive loss claims have been made in the past on that street. (Specific address numbers have intentionally not been included.)

Table 40: NFIP Claims for Repetitive Loss/Severe Repetitive Loss for Village of Larchmont, NY by Street

Street Name	Flood Zone & # of RL/SRL in that Zone on Each Street	Total Number of Repetitive Loss or Severe Repetitive Loss Claims
Mayhew	A – 4 X - 1	5
Flint	AO8-1 AE – 2 C - 1	4
Pine Brook	A – 2 AO8-1	3
Cedar	B - 2	2
Chestnut	AE-2	2
Shore	AO8-2	2
Spanish Cove	AO8-1 AE-1	2
Woodbine	VO8-2	2
Bay	AO7-1	1
Beverly	A-1	1
Boston Post	VO8-1	1
Dogwood	AE-1	1
Douglas	AE-1	1
Howard	C-1	1
Kilmer	X-1	1
Lindsley	A-1	1
Nassau	C-1	1
Ocean	B-1	1
Shadow	C-1	1
Sherwood	C-1	1
Valley Stream	X-1	1
Walnut	VE-1	1
Wendt	C-1	1

[17] NFIP Legacy System Services, RLS/SRLS as of June 30, 2012 (data provided by FEMA, August 2013)

For reference, FEMA defines flood hazard areas on the Flood Insurance Rate Maps (FIRMs) as Special Flood Hazard Areas (SFHA). A SFHA is an area that will be inundated or impacted by the flood event that has a 1% change of happening during the year. At times, the 1% annual change of flood is called the base flood or 100 year flood.

- Special Flood Hazard Areas
    - Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, Zone V1-V30
- Moderate Flood Hazard Areas
    - Zone B, Zone X (areas between the base flood and the .2% annual chance (or 500 year flood)
- Areas of Minimal Flood Hazard
    - Zone C, Zone X (areas of minimal flood hazard, outside the SFHA and higher than the elevation of the .2% annual chance of flood)

The Village of Larchmont has seen several repetitive loss claims for not only properties located in SFHAs, but also those located in moderate or minimal flood hazard areas.

5.3.7.3 Severity and Extent of the Hazard

In the Village of Larchmont, as a coastal community, it is prone to various forms of flooding from coastal storms to urban flooding due to undersized or poorly maintained drainage systems.

5.3.7.4 Impact of Hazard on Life, Property and Operations

Flooding occurrences can have devastating impacts on life, property and operations in a community – particularly if the proper flood insurance is not in place. Cleaning up homes, businesses and government operations, replacing belongings and recovering from the damage can be expensive and extensive. Flooding can also alter the natural landscape and habitat areas and in the Village of Larchmont, a coastal community, depending on the size and nature of the flooding, this can be substantial as well.

5.3.7.5 Previous Occurrences of the Hazard

According to the FEMA, there have been 39 Presidential Disaster Declarations made for some type of flooding incident in the State of New York and at least 8 of those events impacted Westchester County. In the Village of Larchmont, there has been a varying degree of impacts from flooding felt in the community.

Table 41: New York Flooding Major Disaster Declarations (1954 – Present)

	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?

	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?
Severe Storms, Flooding, Tornadoes, Straightline Winds	DR-1993	4/26/2011 – 5/8/2011	6/10/2011	No
Severe Storms and Flooding	DR-1899	3/13/2010 – 3/31/2010	4/16/2010	Yes
Severe Winter Storm and Flooding	DR-1813	12/11/2008 – 12/18/2008	1/5/2009	No
Severe Storms and Flooding (Ida)	DR-1869	11/12/2009 – 11/14/2009	12/31/2009	No
Severe Storms and Flooding	DR-1857	8/8/2009 – 9/1/2009	9/1/2009	No
Severe Storms, Tornadoes and Flooding	DR-1724	8/8/2007	8/31/2007	No
Severe Storms and Flooding	DR-1710	6/19/2007	7/2/2007	No
Severe Storms and Flooding	DR-1692	4/14/2007 – 4/18/2007	4/24/2007	Yes
Severe Storms and Flooding	DR-1670	11/16/2006 – 11/17/2006	12/12/2006	No
Severe Storms and Flooding	DR-1665	10/12/2006 – 10/25/2006	10/24/2006	No
Severe Storms and Flooding	DR-1650	6/26/2006 – 7/10/2006	7/1/2006	Yes
Severe Storms and Flooding	DR-1589	4/2/2005 – 4/4/2005	4/19/2005	Yes
Severe Storms, Flooding	DR-1564	8/13/2004 – 9/16/2004	10/1/2004	No
Severe Storms, Flooding	DR-1534	5/13/2004 – 6/17/2004	8/3/2004	No
Severe Storms, Tornadoes, Flooding	DR-1486	7/21/2003 – 8/13/2003	8/29/2003	No

	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?
Severe Storms, Flooding	DR-1233	6/25/1998 – 7/10/1998	7/7/1998	No
Severe Storms, Flooding	DR-1148	11/8/1996 – 11/15/1996	12/9/1996	No
Severe Storms, Flooding	DR-1146	10/19/1996-10/20/1996	11/19/1996	Yes
Severe Storms, Flooding	DR-1095	1/19/1996 – 1/30/1996	1/24/1996	No
Coastal Storm, Heavy Rain, Flooding	DR-974	12/10/1992 – 12/14/1992	12/21/1992	Yes
Flooding	DR-792	4/3/1987 – 4/7/1987	5/15/1987	No
Flooding	DR-733	3/20/1985	3/20/1985	No
Severe Storms, Flooding	DR-725	9/25/1984	9/25/1984	No
Coastal Storms, Flooding	DR-702	3/28/1984 – 4/8/1984	4/17/1984	Yes
Severe Storms, Flooding	DR-515	7/21/1976	7/21/1976	No
Flash Flooding	DR-512	6/29/1976	6/29/1976	No
Severe Storms, Flooding	DR-494	3/19/1976	3/19/1976	No
Severe Storms, Flooding	DR-487	10/2/1975	10/2/1975	Yes
Flooding	DR-447	7/23/1974	7/23/1974	No
Severe Storms, Flooding	DR-401	7/20/1973	7/20/1973	No
High Winds, Waves, Flooding	DR-367	3/21/1973	3/21/1973	No
Severe Storms, Flooding	DR-311	9/13/1971	9/13/1971	No
Heavy Rains, Flooding	DR-290	7/22/1970	7/22/1970	No

	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?
Heavy Rains, Flooding	DR-275	8/26/1969	8/26/1969	No
Severe Storms, Flooding	DR-233	10/30/1967	10/30/1967	No
Heavy Rains, Flooding	DR-158	8/23/1963	8/23/1963	Unknown
Severe Storm, High Tides, Flooding	DR-129	3/16/1962	3/16/1962	Unknown
Flood	DR-52	3/29/1956	3/29/1956	Unknown
Hurricane, Floods	DR-45	8/22/1955	8/22/1955	Unknown

The NCDC tracks flooding events and they have recorded over 125 occurrences between January 1, 1996 and March 31, 2013 for Westchester County. Some of the more significant flood events (coastal, flash and other) that have impacted Larchmont include:

- **December 26, 2012** – A low pressure system developed into a Nor'Easter, passing south of Long Island. The system included high winds, 3-5 foot storm surge and widespread minor to moderate coastal flooding.
- **October 29-30, 2012** – Coastal communities along southern Westchester County experienced two successive tidal cycles with moderate coastal flooding. Record breaking high tides and wave action occurred with sustained winds of 40 to 60 mph and wind gusts of 80 to 90 mph.
- **March 30, 2010** – A Nor'Easter produced an extended period of heavy rainfall as it tracked slowly across the area which caused widespread flooding across the Lower Hudson Valley, New York City and Long Island. Total rainfall amounts received in Westchester County ranged from 3 to 4 inches.
- **September 2, 2002** – Due to heavy rains, Larchmont Park was reported to have been impacted by a flash flood.

5.3.7.6 Probability of Future Occurrences of the Hazard

According to the State Hazard Mitigation plan, due to flooding occurrences in New York in the past, it is certain that future flooding will occur. New York State has experienced 39 major disaster flood occurrences since 1954. On average, that is approximately 1.5 flood events meeting disaster criteria occurring every year. In Larchmont, due to its coastal nature as a community, proximity to two dams and historic flooding occurrences, the elements are in place for flooding to exist which will result in future damages. The densely developed community is in a position where many people and properties are exposed to the risk of flooding.

Areas of Larchmont in the designated 100 year flood zone have a 1% probability of occurring in any given year which does not necessarily mean that it could only recur once every 100 years. It can occur more than once in 100 years or not at all for that period of time. The areas of Larchmont located in the 500 year floodplain have a .2% chance of experiencing a flood, but it is not as likely to occur.

According to FEMA's NFIP Floodplain Management Requirements (FEMA 480), thinking of flood risk in terms of a 30 year mortgage may make the probability easier to understand.

WHAT ARE THE ODDS OF BEING FLOODED?

The term "100-year flood" has caused much confusion for people not familiar with statistics. Another way to look at flood risk is to think of the odds that a 100-year flood will happen sometime during the life of a 30-year mortgage—a 26% chance for a structure located in the SFHA.

Chance of Flooding over a Period of Years

Time Period	Flood Size 10-year	25-year	50-year	100-year
1 year	10%	4%	2%	1%
10 years	65%	34%	18%	10%
20 years	88%	56%	33%	18%
30 years	96%	71%	45%	26%
50 years	99%	87%	64%	39%

Even these numbers do not convey the true flood risk because they focus on the larger, less frequent, floods. If a house is low enough, it may be subject to the 10- or 25-year flood. During a 30-year mortgage, it may have a 26% chance of being hit by the 100-year flood, but the odds are 96% (nearly guaranteed) that it will be hit by a 10-year flood. Compare those odds to the only 1-2% chance that the house will catch fire during the same 30-year mortgage.

5.3.7.7 Vulnerability to the Hazard

According to the 2011 New York State Standard Multi-Hazard Mitigation Plan, flooding is a statewide concern and there is no area that is exempt from flooding. While flooding is most often associated with rivers, streams and coastal area, the state plan specifically mentions "urban flooding" as an issue which is the result of undersized or poorly maintained drainage systems. The state plan also notes that in general, the more urbanized areas have characteristics that lend to flooding due to poor drainage. A FEMA Flood Insurance study completed in 2007 that included the Village of Larchmont notes that Long Island Sound is the community's primary source of flooding and vulnerability.

Table 42: Flood Susceptibility

How Susceptibility Was Determined	Why?
▪ New York State Standard Multi-Hazard Mitigation Plan - 2011 ▪ New York State Sea Level Rise Task Force – Report to the Legislature (December 31, 2010) ▪ Westchester County Flood Mitigation Program Data Collection 2012 ▪ Larchmont Dam Inspection and Maintenance Plan	• Sea level rise and coastal flooding from storm surge are already affecting and will increasingly affect New York's entire ocean and estuarine coastline from Montauk Point to the Battery and up the Hudson River to the federal dam at Troy. • The likelihood that powerful storms will hit New York State's coastline is very high, as is the associated threat to human life and coastal infrastructure. This vulnerability will increase in area and magnitude overtime. • Substantial flood impacts from various storms at areas including: Pine Brook Road, Kilmer Road, Flint Park off Birch Road, Nassau Road, Pryer Manor Road, Magnolia Avenue, Ocean Avenue, Cedar Island, Pine Brook Drainage Basin, Park Avenue at Manor Beach, Spanish Cove Road, Lindsay Drive, North Avenue, Coolidge Street, Monroe Avenue and Larchmont Reservoir.

(August 2010) ▪ Westchester County Comprehensive Emergency Management Plan, November 2005 ▪ Climate Action Plan – Village of Larchmont	• Floods are the most significant natural hazard that can impact the two dams in Larchmont. • NY State Hazard Mitigation Plan notes that land adjacent to the various water resources throughout the state, including Long Island Sound is often a source of flooding (Larchmont is directly adjacent to Long Island Sound). • Flooding was identified in the Westchester CEMP as a moderately high hazard for Westchester County. • Among the most significant effects of climate change is sea level rise. The Village of Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding.

5.3.7.8 Risk Assessment Methodology, Limitations and Results

The Larchmont team prepared a quantitative assessment of the frequency, duration, severity, intensity, probability and consequence of a flood utilizing a low, medium, high and severe ranking system. The ranking given for the Village was based on background research, knowledge of the Village and facilities and past occurrences.

Table 43: Risk Assessment Prepared by Larchmont Team – Flood Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Earthquake	3	3	4	4	3.33	4.00	3.67	S

Overall Qualitative Hazard Ranking: SEVERE

5.3.7.9 HAZUS-MH Analysis 100 Year - Flood

Consistent with FEMA's methodology, the Village of Larchmont used HAZUS-MH software to measure local level flood loss estimates for the 100 Year storm. The HAZUS-MH flood loss estimation runs include total losses for 100 and 500 years. The 100 year flood estimate is detailed below and the 500 year flood information can be found in **Appendix C.** Using the software, scenarios were run specifically for the Village of Larchmont to evaluate potential economic and social losses should a flood occur.

For the purposes of this evaluation, HAZUS reported the use of the following information based on the data included in the program:

- Over 2,000 households in the region with a total population of 6,485 people (2002 Census Bureau data).
- Estimated 2,000 buildings in the region with a total building replacement value (excluding contents) of $780M, and

- Approximately 80% of the buildings are associated with residential housing.

During a 100 year flood, HAZUS-MH estimated that approximately 101 buildings would be moderately damaged with 10 buildings being completely destroyed.

Table 44: Expected Building Damage by Occupancy - Flood

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	1	33.33	1	33.33	1	33.33	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	15	15.31	34	34.69	13	13.27	26	26.53	10	10.20
Total	0		16		35		14		26		10	

Table 45: Expected Building Damage by Type – Flood

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	0	0.00	1	11.11	4	44.44	1	11.11	3	33.33	0	0.00
Steel	0	0.00	1	33.33	1	33.33	1	33.33	0	0.00	0	0.00
Wood	0	0.00	14	15.73	30	33.71	12	13.48	23	25.84	10	11.24

Building losses that were totaled by the model were in two categories, direct building losses and building interruption losses. Direct building losses are estimated costs to repair or replace damage caused to the building and its contents while the business interruption losses are those associated with the inability to operate a business because of damage sustained during the flood event. Business interruption losses include the temporary living expenses for those people displaced from their homes due to the flood. Total building losses were estimated to be $40.85M.

Table 46: Building Related Economic Loss Estimates – Flood

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	15.73	3.53	0.17	0.28	19.70
	Content	10.18	9.50	0.33	0.93	20.94
	Inventory	0.00	0.18	0.03	0.00	0.20
	Subtotal	**25.91**	**13.20**	**0.52**	**1.21**	**40.85**
Business Interruption						
	Income	0.00	0.06	0.00	0.00	0.06
	Relocation	0.01	0.01	0.00	0.00	0.02
	Rental Income	0.00	0.01	0.00	0.00	0.01
	Wage	0.00	0.06	0.00	0.01	0.06
	Subtotal	**0.01**	**0.13**	**0.00**	**0.01**	**0.15**
ALL	**Total**	**25.93**	**13.33**	**0.52**	**1.22**	**41.00**

5.3.7.10 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a flood hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a quantitative analysis by using HAZUS-MH. The Larchmont team also prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a hailstorm utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of Town facilities and past occurrences.

Table 47: Risk Assessment Prepared by Village of Larchmont Team – Hailstorm Hazard

	Frequency 0-5	**Duration 0-5**	**Severity 0-5**	**Intensity 0-5**	**Probability (F,D,I) 40%**	**Consequence (S) 60%**	**Total**	**Ranking L,M,H,S**
Flood	3	3	4	4	3.33	4.00	3.67	S

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont:

Table 48: Qualitative Risk Assessment – Flood Hazard

	Hailstorm Hazard Qualitative Ranking
Residents	High
Buildings	High
Businesses	High
Critical Infrastructure	High

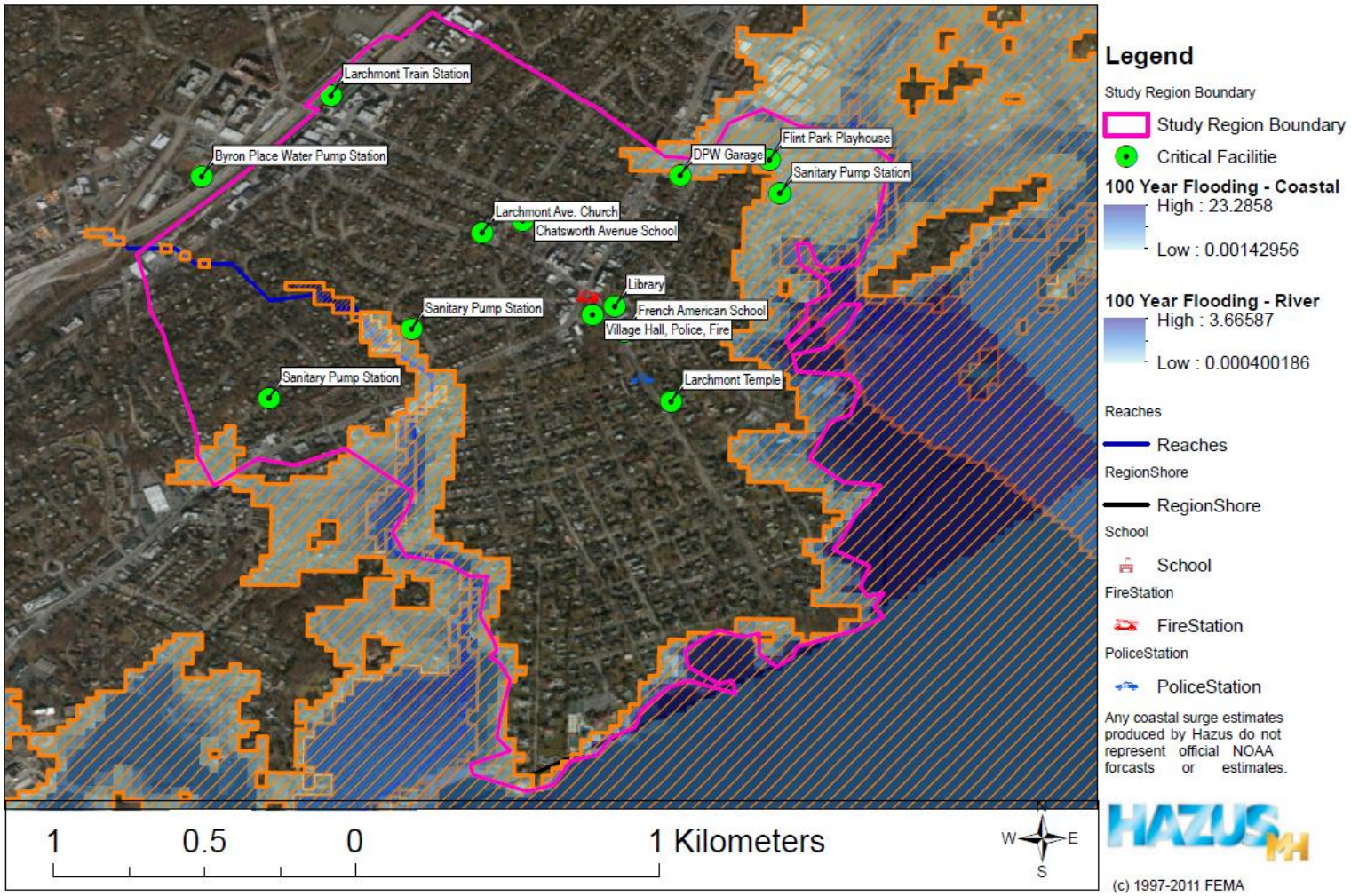
Overall Qualitative Hazard Ranking: SEVERE

5.3.7.11 Future Development Considerations

Flooding is of the highest concern to the Village of Larchmont. For future development or redevelopment in the community, the Village may want to consider the following:

- Consider whether or not to require the elevation of homes in high impact coastal areas to minimize their vulnerability to coastal storms and associated flooding,
- Consider the further development or redevelopment of high hazard coastal areas and putting regulatory measures in place to discourage it,
- Evaluate structural and nonstructural approaches to maximize flood control,
- Evaluate green infrastructure techniques that can be implemented to minimize flood occurrences,
- Focus on protecting and maintaining natural habitats, wetlands and other features that protect against flooding during coastal storms,
- Track, evaluate and plan for areas of the community frequently impacted by flooding and consider drainage/engineering solutions that would minimize future occurrences, and
- Evaluate flooding impacts after storm events and plan for recovery and redevelopment once impacts are known.

Study Region: Village of Larchmont, NY Description: FEMA Multi-Hazard Assessment
Scenario: 100 Year Flood - Larchmont



5.3.8 Hailstorm

5.3.8.1 Description of the Hazard

A storm is considered to be associated with hail when irregular pellets or balls of ice more than 5 millimeter (mm) in size are present. Hail is formed when an updraft in a thunderstorm carries rain into parts of the atmosphere where the temperature is below freezing. Any thunderstorm that produces hail that reaches the ground is known as a hailstorm.

5.3.8.2 Location of the Hazard

Hail can occur anywhere in New York State and are typically part of a larger storm system such as severe thunderstorms and tornado events.

5.3.8.3 Severity and Extent of the Hazard

In general, there are some common descriptive terms to describe hail and the associated diameter size which are noted in the table below.

Table 49: Hail Size Chart, NOAA

Description	Diameter (inches)
Pea	0.25
Marble or Mothball	0.50
Penny or Dime	0.75
Nickel	0.88
Quarter	1.00
Half Dollar	1.25
Walnut or Ping Pong Ball	1.50
Golfball	1.75
Hen's Egg	2.00
Tennis Ball	2.50
Baseball	2.75
Tea Cup	3.00
Grapefruit	4.00
Softball	4.5

The presence of large hail indicates very strong updrafts and downdrafts within a thunderstorm, which can also be a possible indicator for tornado activity. The National Weather Service classifies a thunderstorm as severe is if the storm produces hail greater or equal to 0.75 inch in diameter. When hail does occur, it typical lasts for several minutes.

5.3.8.4 Impact of Hazard on Life, Property and Operations

According to NOAA, hail causes $1 Billion in damage to crops and property each year in the United States. Agriculture is most affected due to crop damage, even from small size hail. Damage to vehicles, roofs, and landscaping are also common. The impact of hail on public safety is usually minimal unless large diameter hail occurs. Within New York State, agricultural regions are most likely to be impacted by hail.

5.3.8.5 Previous Occurrences of the Hazard

According to the FEMA, a Presidential Disaster Declaration has not been issued for hailstorms in the State of New York. The National Climatic Data Center (NCDC) Storm Events Database lists 28 hail event occurrences from January 1, 2000 through February 28, 2013 for Westchester County. Some of the more significant events include the following:

- **August 1, 2011** – A severe thunderstorm caused 3-inch hail in White Plains, New York. Golfball size hail (1.75-inch diameter) was also observed in Greenburgh, New York.
- **August 15, 2008** – Crop and property damage were recorded for Dunwoodie, New York where 2-inch hail destroyed a garden in South Yonkers causing an estimated $25,000 in damage.
- **July 7, 2009** – Severe thunderstorms caused 1.75-inch hail observed in Dunwoodie, New York.
- **August 20, 2001** – A severe thunderstorm caused 1.75-inch hail in Somers, New York.

5.3.8.6 Probability of Future Occurrence of the Hazard

Based on data from the 2011 New York State Standard Multi-Hazard Mitigation Plan, the maximum probability of a hail event on any given day for New York State is less than one percent based on storm event data available from 1980 to 1990. New York State can expect to receive a minimum of two damaging hail storms per year. This data is consistent with NOAA's National Severe Storms Laboratory (NSSL) data from 1995 to 1999 that predicts two to three hail storms per year for areas of New York that include Larchmont[18].

5.3.8.7 Vulnerability to the Hazard

Although not a frequent occurrence, hail can occur in any location of New York State.

Table 50: Hailstorm Susceptibility

How Susceptibility Was Determined	Why?
• New York State	• Hail storms can occur anywhere within New York State and they are

[18] Source: NOAA's NSSL Severe Thunderstorm Climatology, http://www.nssl.noaa.gov

Standard Multi-Hazard Mitigation Plan - 2011	typically part of a larger storm system such as a Severe Thunderstorm or Tornado event.

5.3.8.8 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a hailstorm hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a hailstorm hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a hailstorm utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of Town facilities and past occurrences.

Table 51: Risk Assessment Prepared by Village of Larchmont Team – Hailstorm Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Hailstorm	2	1	1	1	1.33	1.00	1.17	L

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont:

Table 52: Qualitative Risk Assessment – Hailstorm Hazard

	Hailstorm Hazard Qualitative Ranking
Residents	Low
Buildings	Low
Businesses	Low
Critical Infrastructure	Low

Overall Qualitative Hazard Ranking: LOW

5.3.8.9 Future Development Considerations

Larchmont should consider hailstorm hazard scenario planning during their future development endeavors and continue to implement measures to mitigate the impact of hail occurrences.

Preventing a hail event is not plausible, but limiting the effects on the general population is feasible. Future considerations include the following:

- Coordinate communication and tracking of weather and emergency information with Westchester County officials, and
- Coordinate outreach to public with consistent messaging, information, and instructions via public broadcast, websites, email, and social media for watches and warnings issued by the National Weather Service.

5.3.9 Severe Winter Storm

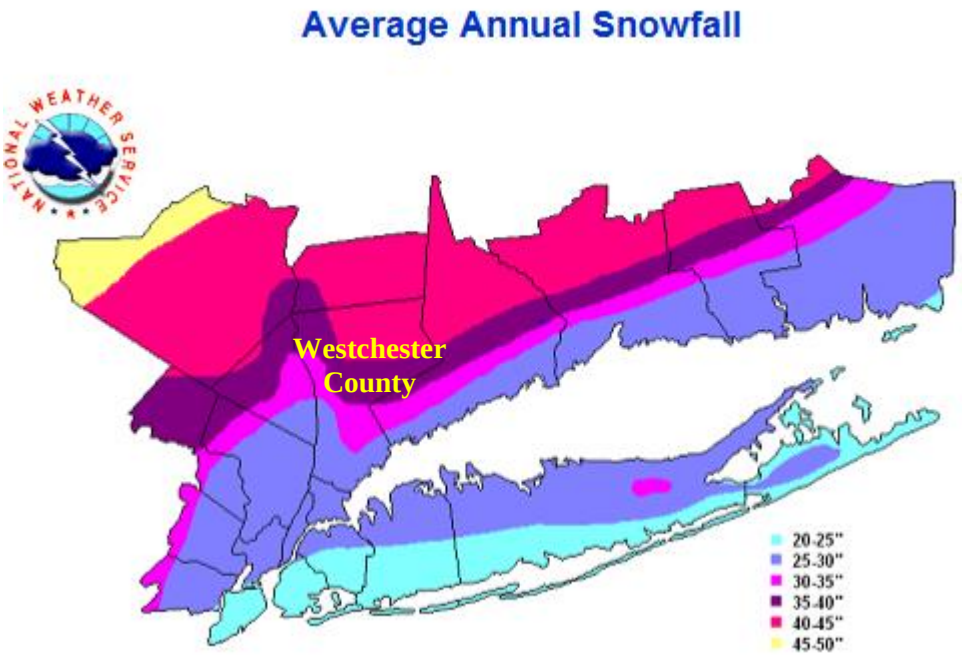
5.3.9.1 Description of the Hazard

Winter storms typically consist of varying forms of precipitation including snow, sleet, freezing rain or a mix of these wintry conditions. Blizzards are the most dangerous and severe type of winter storm and are characterized by strong, sustained winds of at least 35 mph that last for a prolonged period of time – typically 3 hours or more. An ice storm is another form of winter storm that is defined as an event which results in the accumulation of at least 0.25-inch of ice on exposed surfaces caused when moisture falls and immediately freezes upon impact on trees, power lines, roads, structures and other surfaces. These types of storms can down trees, cause lengthy widespread power outages, damage property and cause fatalities.

5.3.9.2 Location of the Hazard

Winter storms are common on an annual basis throughout New York State. According to NOAA's 2012 snowfall climatology for the tri-state region (New York, New Jersey, and Connecticut) that includes data from approximately 1950 through 2012, the average annual snowfall for Westchester County varies from 25 to 45 inches with greater accumulations seen further inland. The coastal area of Westchester County that includes Larchmont receives approximately 25 to 30 inches.

Figure 10: Tri-State Average Annual Snowfall (NOAA)



5.3.10 Severity and Extent of the Hazard

Winter storms can include snow storms with strong winds (often referred to as blizzards), extreme cold spells that can cause rivers to freeze resulting in ice jams that can lead to flooding, ice storms that produce heavy accumulations of ice, and heavy snow storms that result in above average snow accumulations. A nor'easter includes a cyclonic storm that moves along the east coast that most often includes snow accumulations over nine inches, gale force winds, and storm surge that can cause severe flooding near the coastline.

NOAA's National Climatic Data Center (NCDC) has recently implemented the Regional Snowfall Index (RSI) to categorize significant snowstorms that impact the eastern two thirds of the United States. RSI includes a regional index for the northeast that includes New York State and replaced with the Northeast Snowfall Impact Scale (NESIS) to account for snowfall accumulations, population data, and area affected. The index is similar to the Fujita scale for tornadoes or the Saffir-Simpson scale for hurricanes.

Table 53: NOAA's NCDC Regional Snowfall Index (RSI)

Category	RSI Value	Description
1	1–3	Notable
2	3–6	Significant
3	6–10	Major
4	10–18	Crippling
5	18.0+	Extreme

5.3.10.1 Impact of Hazard on Life, Property and Operations

Winter Storms can result in fatalities that are most often not directly related to the storm itself. Fatalities due to traffic accidents on icy roads, heart attacks from excessive shoveling, and hypothermia from prolonged exposure to the cold are typical. Risks related to snow and ice are most often associated with automobile accidents followed by individuals caught outside in the storm. Fatalities due to cold exposure are most often associated with infants and the elderly that are most susceptible.

Impacts to property and operations are usually temporary and include snow removal. However, heavy snow can lead to significant snow removal costs, infrastructure damages, and loss of business that can financially impact communities. Other potential impacts include knocked down trees, power lines, and utility poles. Freezing temperatures can result in downed trees, power lines, utility poles, ice jams that can cause flooding, and building pipe bursts due to poor insulation or lack of heat.

5.3.10.2 Previous Occurrences of the Hazard

Since 1954, there have been 11 Major Disaster Declarations in the State of New York due to some form of winter storm and one of those have resulted in Westchester County receiving a designated area status from FEMA.

Table 54: New York Winter Storm Major Disaster Declarations (1954 – Present)

Disaster Type	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?
Winter Storm	4111	2/8/2013 – 2/9/2013	4/23/2013	No
Severe Storm Snow Storm	1957	12/26/2010 – 12/27/2010	2/18/2011	No
Severe Storm Ice Storm	1827	12/11/2008 – 12/31/2008	3/4/2009	No

Disaster Type	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?
Severe Storm Ice Storm	1467	4/3/2003 – 4/5/2003	5/12/2003	No
Winter Storm	1404	12/24/2001 – 12/29/2001	3/1/2002	No
Severe Storm Ice Storm	1196	1/5/1998 – 1/17/1998	1/6/1998	No
Severe Storm Flooding	1095	1/19/1996 – 1/30/1996	1/24/1996	No
Severe Storm Blizzard	1083	1/6/1996 – 1/12/1996	1/12/1996	Yes
Severe Storm Ice Storm	898	3/3/1990 – 3/4/1990	3/21/1991	No
Winter Storm	801	10/4/1987	11/101987	No
Winter Storm	527	2/5/1977	2/5/1977	No
Source: FEMA Disaster Declarations 1954 - Present				

The NCDC tracks storm events. The information below was available for Southern Westchester County that includes Larchmont regarding winter storm and blizzard occurrences.

Table 55: Winter Storm/Blizzard Data for Southern Westchester County (January 1, 2000 through February 28, 2013)

Location (County)	Date	Type	Death	Injury	Property Damage
SOUTHERN WESTCHESTER	2/8/2013	Winter Storm	0	0	0.00K
SOUTHERN WESTCHESTER	12/26/2010	Blizzard	0	0	0.00K
SOUTHERN	3/16/2007	Winter Storm	0	0	0.00K

WESTCHESTER					
SOUTHERN WESTCHESTER	2/13/2007	Winter Storm	0	0	0.00K
SOUTHERN WESTCHESTER	1/28/2004	Winter Storm	0	0	0.00K
SOUTHERN WESTCHESTER	1/18/2004	Winter Storm	0	0	0.00K
SOUTHERN WESTCHESTER	1/3/2003	Winter Storm	0	0	0.00K
SOUTHERN WESTCHESTER	3/6/2001	Winter Storm	0	0	0.00K
SOUTHERN WESTCHESTER	1/21/2001	Winter Storm	0	0	0.00K
SOUTHERN WESTCHESTER	2/18/2000	Winter Storm	0	0	0.00K
SOUTHERN WESTCHESTER	1/25/2000	Winter Storm	0	0	0.00K
Totals:			**0**	**0**	**0.00K**

Source: NCDC Storm Events Database http://www.ncdc.noaa.gov/stormevents/

Specific details from the more significant events noted in the table above that have impacted Larchmont include:

- **February 8, 2013** – A historic winter storm deposited large amounts of snow all over southern New England February 8 to 9, 2013. Snowfall accumulations ranged from 17.2 inches in Mount Vernon to 23.3 inches in Port Chester in Westchester County. Blizzard conditions were reported across central and eastern Long Island and winter storm conditions across the rest of southeast New York.
- **December 26, 2010** – The blizzard brought 20 to 30 inches of snow across the New York City metro area and Long Island. 8,000 customers lost power in New York City and southern Westchester County.

5.3.10.3 Probability of Future Occurrence of the Hazard[19]

The probability of future winter storms is virtually certain on an annual basis for Westchester County. New York State can expect a disaster declaration an average of three to five years for snow storms and an average of seven to 10 years for ice storms. The probability of a disaster declaration occurring in Westchester County is significantly less based on past declarations. Also, Westchester County received a ranking of 13 out of 25 maximum for New York Counties most threatened by snow. Westchester County was not indicated as an extreme snowfall potential area due to the lack of lake effect snow observed near Lake Erie and Ontario and lower elevations.

5.3.10.4 Vulnerability to the Hazard

All of New York State is vulnerable to winter storm on an annual basis.

Table 56: Severe Winter Storm

How Susceptibility Was Determined	Why?
• Westchester County Comprehensive Emergency Management Plan (CEMP), November 2005 • New York State Standard Multi-Hazard Mitigation Plan - 2011	• Winter storm was identified in the Westchester CEMP as a moderately low hazard for Westchester County. • Potential for future winter storms due to the local climate is certain. • The easternmost and west-central portions of the State are more likely to suffer under winter storm occurrences than are other locations.

5.3.10.5 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a winter storm hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a winter storm hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a winter storm utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of Town facilities and past occurrences.

[19] Source: New York State Standard Multi-Hazard Mitigation Plan (2011).

Table 57: Risk Assessment Prepared by Village Team – Winter Storm Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Winter Storm	4	2	3	3	3.00	3.00	3.00	H

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont:

Table 58: Qualitative Risk Assessment – Winter Storm Hazard

	Hailstorm Hazard Qualitative Ranking
Residents	High
Buildings	High
Businesses	High
Critical Infrastructure	High

Overall Qualitative Hazard Ranking: HIGH

5.3.10.6 Future Development Considerations

Larchmont should include winter storm hazard scenario planning during their future development endeavors and continue to mitigate the impact of winter storm occurrences. This includes the following mitigation measures:

- Coordinate weather and emergency information with Westchester County officials.
- Coordinate outreach to public with consistent messaging, information, and instructions via public broadcast, websites, email, and social media for watches and warnings issued by the National Weather Service.
- Coordinate outreach to homeowners for winter storm guidance preparation.
- Identify critical facilities in Larchmont that include fire, police, and emergency response locations, schools, and emergency shelters in the event emergency service locations are needed.

5.3.11 Thunderstorm and Lightning

5.3.11.1 Description of the Hazard

According to NOAA, a thunderstorm is *"a local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder."* Lightning is defined as *"a visible electrical discharge produced by a thunderstorm. The discharge may occur within or between clouds, between the cloud and air, between a cloud and the ground or between the ground and a cloud."* Thunderstorm hazards include hail, damaging winds, tornadoes, and flash floods discussed in other sections.

5.3.11.2 Location of the Hazard

Thunderstorms and lightning can occur in any part of New York. Figure 11 shows the average number of thunderstorm days in the United States. Southern New York that includes Westchester County averages approximately 20 thunderstorm days. Figure 12 shows cloud-to-ground flash density (lightning) from 2005 to 2012 in the northeast states. For New York State, less thunderstorm and lightning frequency are observed than in other parts of the United States.

Figure 11: Average Number of Thunder Storm Days in the U.S., NOAA

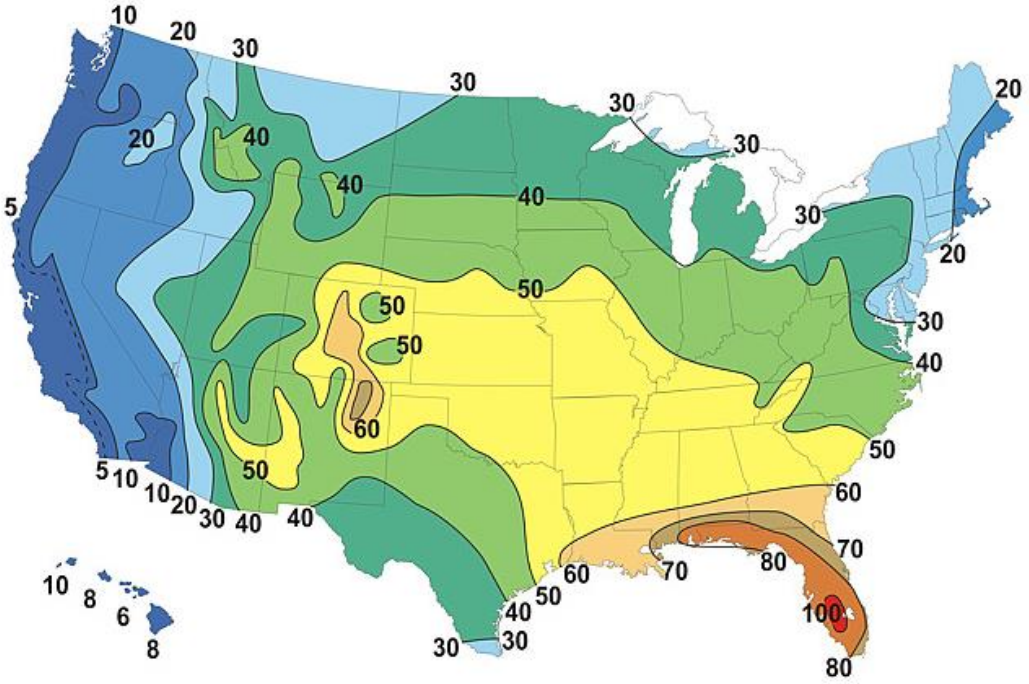
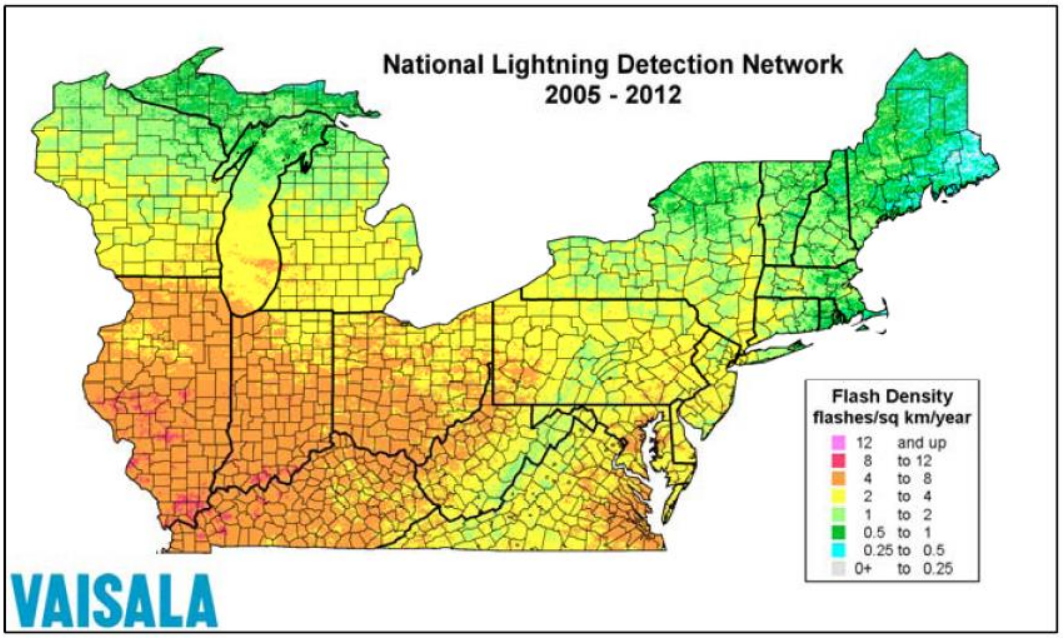


Figure 12: Cloud to Ground Lightning Incidence in the U.S., Vaisala NLDN



5.3.11.3 Severity and Extent of the Hazard

Most thunderstorms and lightning occur during June, July, and August. NOAA uses wind speed and hail size to define severe thunderstorms. A thunderstorm with (1) wind gusts of 57.5 mph faster or (2) hail that is one inch or greater in diameter is defined as a severe thunderstorm. Non-severe thunderstorms include those will heavy rainfall that can cause flash flooding and those that produce lightning.

NOAA issues a severe thunderstorm watch if conditions are favorable for the development of a severe thunderstorm. A warning is issued if a storm spotter or radar data indicates a severe thunderstorm is occurring. Severe thunderstorms also have the potential to produce tornadoes that may warrant tornado watches and warnings.

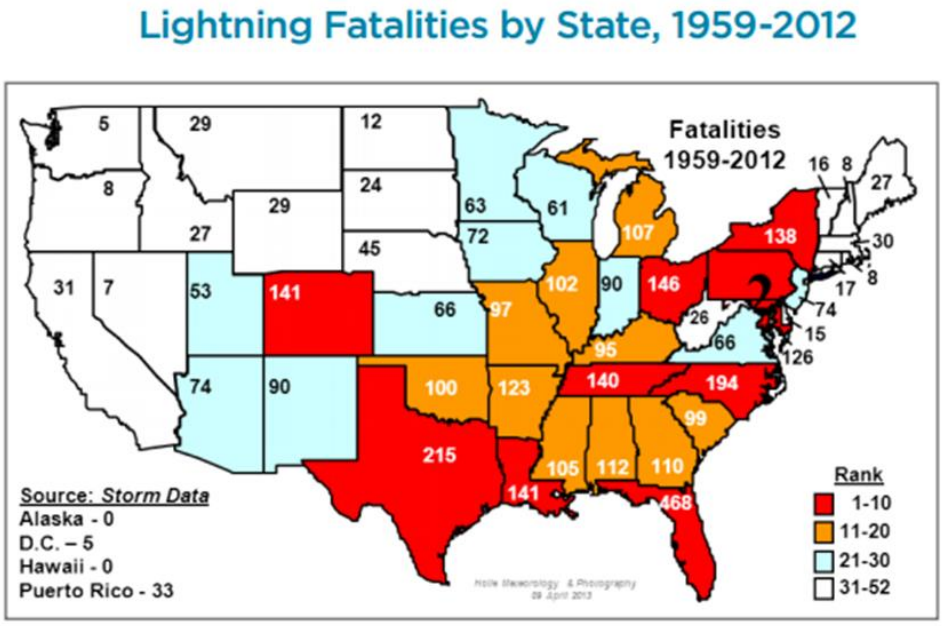
5.3.11.4 Impact of Hazard on Life, Property and Operations

The largest hazard associated with thunderstorms is wind damage that can have impacts on human life and outside structures. Thunderstorm can cause other hazards such as hail, winds, tornadoes, or flash floods discussed in other hazard profile sections.

One hazard specifically associated with thunderstorms is lighting. Fatalities, although rare, can occur from lightning. In the United States, 99 percent of fatalities have occurred outside of a large substantial building or fully-enclosed metal-topped vehicle. For all of the United States, approximately 34 people were killed by lightning per year from 2003 to 2012 or 345 total fatalities where New York accounted for two out of the 345 total fatalities. As another form of

comparison, Figure 13 shows that 138 fatalities have occurred in New York State from 1959 to 2012.

Figure 13: Lightning Fatalities by State, 1959 – 2012, National Lightning Safety Institute



Lightning causes less property damage than other hazards due to the affected area being greatly isolated to a particular building or structure. However, when lightning does strike an outside structure, fire is a primary concern.

5.3.11.5 Previous Occurrences of the Hazard and Impact

Table 55 summarizes lightning occurrences provided by NOAA's National Climatic Data Center (NRDC) for towns and cities in Westchester County.

Table 59: Lightning Event Data for Westchester County (January 1, 2000 through February 28, 2013)

Location	Date	Type	Death	Injury	Property Damage
QUARRY HGTS	7/19/2010	Lightning	0	0	15.00K
RYE	7/19/2010	Lightning	0	0	1.00K
TUCKAHOE	7/29/2009	Lightning	0	1	0.00K
NEW ROCHELLE	8/15/2008	Lightning	0	0	15.00K
TUCKAHOE	8/6/2008	Lightning	0	0	0.75K

PLEASANTVILLE	6/22/2008	Lightning	0	0	200.00K
MT VERNON	8/20/2001	Lightning	0	0	65.00K
RYE	4/9/2001	Lightning	0	0	0.00K
VALHALLA	5/13/2000	Lightning	0	0	0.00K
PEEKSKILL	5/13/2000	Lightning	0	0	0.00K
Totals:			**0**	**1**	**296.75K**

Source: NCDC Storm Events Database http://www.ncdc.noaa.gov/stormevents/

Specific details from the more significant events noted in the figure above that have occurred in Westchester County include:

- **July 29, 2009** – Lightning struck and injured a female standing by a third floor window in Tuckahoe, New York.
- **June 22, 2008** – Lightning struck the upper portion of a condo complex, ignited fire, and displaced at least eight families in Pleasantville, New York.
- **August 20, 2001** – Lightning struck a house in Mount Vernon, New York resulting in house damage.

The NRDC also summarizes thunderstorm wind event for Westchester County. From January 1, 2000 through February 28, 2013, 67 such storm events with $1.575M in property damage were identified. **Table 57:** summarizes those events that reference Larchmont or had property damage.

Table 60: Thunderstorm Wind Event Data for Westchester County (January 1, 2000 through February 28, 2013)

Location	Date	Type	Death	Injury	Property Damage
PLEASANTVILLE	8/21/2011	Thunderstorm Wind	0	0	50.00K
LARCHMONT	8/1/2011	Thunderstorm Wind	0	0	3.00K
CROTONVILLE	7/29/2011	Thunderstorm Wind	0	0	150.00K
CROTON ON	7/29/2011	Thunderstorm	0	0	75.00K

HUDSON		Wind			
KATONAH	7/21/2010	Thunderstorm Wind	0	0	20.00K
TUCKAHOE	7/19/2010	Thunderstorm Wind	0	0	20.00K
LARCHMONT NORTH	7/7/2009	Thunderstorm Wind	0	0	5.00K
EAST CHESTER	7/7/2009	Thunderstorm Wind	0	0	1.000M
MT VERNON	6/10/2008	Thunderstorm Wind	0	0	30.00K
LARCHMONT	6/23/2001	Thunderstorm Wind	0	0	0.00K
Totals:			**0**	**1**	**1.575M**[(1)]

Source: NCDC Storm Events Database http://www.ncdc.noaa.gov/stormevents/

(1) Table does not include all 67 storm events that total $1.575M in property damage. Refer to NCDC Storm Event Database for complete listing.

Specific details from the more significant events noted in the figure above that have occurred in Westchester County include:

- **August 1, 2011** – A few trees were downed in Larchmont due to severe thunderstorms resulting in reports of large hail and wind.
- **July 29, 2011** – A microburst with estimated maximum gusts of 80 mph caused downed trees and power lines in Crotonville and Ossining.
- **July 7, 2009** – A thunderstorm across Connecticut, Long Island, and the Lower Hudson Valley of New York caused downed trees in Larchmont. Numerous downed trees were also located at Trevor Park around the Hudson River, East Chester, Mount Vernon, Bronxville, and Tuckahoe. Some of the downed trees fell on power lines causing damage.
- **June 23, 2001** – A severe thunderstorm produced high winds and torrential rain as it passed over Larchmont. Downed trees and power lines were reported in Mamaroneck.

5.3.11.6 Probability of Future Occurrence of the Hazard

The probability of a future thunderstorm or lightning occurrence in any part of New York is certain. Future events will continue to cause minor property damage and threaten human life.

5.3.11.7 Vulnerability to the Hazard

Larchmont is located in a region that is vulnerable to thunderstorm and lightning events, however they are not as susceptible as other areas of the United States as shown in the previous figures in this section.

Table 61: Thunderstorm & Lightning Susceptibility

How Susceptibility Was Determined	Why?
• NYC OEM, Hazards	• New York State is considered to have a "moderate" occurrence of lightning, with 3.8 strikes occurring per square mile each year. This compares to 20 per square mile in Florida, and two in California.

5.3.11.8 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a thunderstorm/ lightning hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a thunderstorm /lightning hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a thunderstorm/ lightning event utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of Town facilities and past occurrences.

Table 62: Risk Assessment Prepared by Village of Larchmont Team – Thunderstorm/ Lightning

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Thunder-storm/ Lightning	5	1	2	1	2.33	2.00	2.17	L

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont:

Table 63: Qualitative Risk Assessment – Thunderstorm/Lightning Hazard

	Thunderstorm/Lightning Hazard Qualitative Ranking
Residents	Low
Buildings	Low
Businesses	Low
Critical Infrastructure	Low

Overall Qualitative Hazard Ranking: LOW

5.3.11.9 Future Development Considerations

Larchmont should include thunderstorm/ lightning hazard scenario planning during their future development endeavors and continue to mitigate the impact of thunderstorm/ lightning occurrences. This includes the following mitigation measures:

- Coordinate weather and emergency information with Westchester County officials.
- Coordinate outreach to public with consistent messaging, information, and instructions via public broadcast, websites, email, and social media for watches and warnings issued by the National Weather Service.
- Coordinate outreach to homeowners for the dangers of thunderstorm and lightning.
- Identify critical facilities in Larchmont that include fire, police, and emergency response locations, schools, and emergency shelters in the event emergency service locations are needed.

5.3.12 Tsunami

A tsunami occurrence is typically characterized by a series of waves that are generated by an undersea disturbance such as an earthquake. According to NOAA, the speed of a tsunami can range from 500 miles per hour to 20-30 miles per hour in shallower coastline conditions. A tsunami is different from a regular ocean wave because it is associated with a current that travels from the water surface down to the ocean floor. As tsunami waves approach shore, they slow down and cause a "wave pile-up" which causes wave heights to increase along with a continuously flowing "wall of water" which can cause devastating damage in coastal areas.

Tsunamis are rare, but not unprecedented in the Atlantic Ocean. In order for a tsunami to cause major damage, there needs to be an earthquake of a magnitude of at least 7 which is rare on the East Coast and the earthquake also has to occur in the ocean. According to the FEMA, there have been zero Presidential Disaster Declarations made for tsunamis in the State of New York since 1954. In the Village of Larchmont, there have been no tsunami instances impacting the community.

5.3.12.1 Location of the Hazard

The largest source region for tsunamis is the Pacific Ocean with approximately 70 percent of all world occurrences. Within the continental United States, the most vulnerable states are those located near the Pacific Ocean. Figure 14 shows seven earthquake events that have caused tsunamis in the United States, with some of these affecting the East Coast described below.

Figure 14: Earthquake-Generated Tsunamis in the United States from 900 to 1964, USGS

Although tsunamis on the East Coast of the United States are rare, with about seven percent of all tsunami occurrences in the Atlantic Ocean and Caribbean, the threat still exists. The primary source of tsunamis for the East Coast is from landslides that occur along the continental slop in the Atlantic Ocean. Depending on the proximity of the slide, a tsunami could reach the coastline within one to four hours[20]. Another source is due to weather conditions and referred to as a meteotsunami.

[20] "East Coast Tsunami Threats" Presentation, National Weather Service, http://www.tsunami.noaa.gov/education.html

5.3.12.2 Severity and Extent of the Hazard

A tsunami is classified according to its intensity; often characterized by one of the following types:

- **Microtsunami** – tsunami with a small amplitude that must be observed with instruments but is not observed visually.
- **Local tsunami** – tsunami with destructive effects confined to the coast, usually caused from a nearby source less than 200 km (124 miles) away. Tsunami is usually generated by a small earthquake or landslide.
- **Regional tsunami** – tsunami capable of destruction in a geographic region, generally within 1,000 km (621 miles) of its source.
- **Pacific-wide tsunami** – tsunami capable of widespread destruction in an immediate region or across the Pacific Ocean.

Most destructive tsunamis are classified as local or regional and caused by earthquakes. For the United States, NOAA monitors sea height with a network of buoys and tide gauges to identify the height of a tsunami wave and when it will come onshore. This information is used by the National Weather Service to issue watches and warnings for locations along the coast and potential impacts inland.

5.3.12.3 Impact of Hazard on Life, Property and Operations

Tsunamis can have varying impacts on life, property, and local infrastructure. Approximately 255,000 fatalities and 50,000 injuries have been caused by tsunamis from 1900 to 2009, with 98 percent attributed to the 2004 Indian Ocean tsunami[21]. The primary cause of deaths is drowning. Other impacts can include minor damage to boats and docks along the coast to complete destruction of buildings, infrastructure, and land erosion with significant, long-term social and economic impacts.

5.3.12.4 Previous Occurrences of the Hazard

According to the FEMA, there have been zero Presidential Disaster Declarations made for tsunamis in the State of New York since 1954. The NCDC Storm Events Database does not report a tsunami occurring in any part of New York from January 1, 1996 through March 31, 2013. Tsunamis have occurred on the East Coast of the United States. Some waves have been caused by earthquakes in other countries that have crossed the Atlantic Ocean. Known or possible tsunamis along the East Coast include the following:

- **June 13, 2013** – Tsunami-like conditions were observed at more than 30 gauges along the East Coast, Bermuda and Puerto Rico. The highest peak amplitude was recorded in Newport, Rhode Island, where it reached just under a foot above sea level[22].

[21] Public Library of Science (PLOS), "The Human Impact of Tsunamis: a Historical Review of Events 1900-2009 and Systemic Literature Review", April 16, 2013.

[22] Associated Press, "NOAA: Tsunami May Have Hit East Coast Earlier in June", June 26, 2013.

- **May 19, 1964** – A disturbance that most likely originated near the northeastern end of Long Island was recorded on tide gates near Providence, Rhode Island to New Jersey. Waves of about 0.28 meter and 0.11 meter maximum amplitude began impulsively at Plum Island and Montauk, New York, respectively.
- **August 4 & 8, 1946** – An 8.1 magnitude earthquake off the northeast Coast of the Dominican Republic caused small tsunamis at Atlantic City, New Jersey.
- **November 18, 1929** – A 7.2 magnitude earthquake caused a tsunami in Newfoundland resulting in 29 to 50 deaths, depending on sources, destruction to homes, and cutting of transatlantic communication lines. The effects were felt in Nova Scotia.
- **October 11, 1918** – A 7.5 magnitude earthquake off the northwest coast of Puerto Rico caused small tsunamis at Atlantic City, New Jersey and most likely the entire shoreline of New Jersey.
- **November 17, 1872** – Small tsunami was reported on tide gauges at North Haven and Fox Islands in Maine.
- **November 14, 1840** – An earthquake struck Philadelphia causing "The Great Swell on the Delaware River".

5.3.12.5 Probability of Future Occurrence

Tsunamis are extremely rare, but not unprecedented in the Atlantic Ocean. John Ebel, seismologist at Boston College, indicated that tectonic conditions in the Pacific and Indian Oceans make tsunamis more likely in those regions where recent tsunamis in Japan and Indonesia killed thousands. However, a tsunami to the East Coast of the United States is still possible with the biggest risk from eruptions or underwater landslides at volcanic islands on the other side of the Atlantic Ocean, such as the Canary Islands.

Ebel indicates for a tsunami to cause major damage, an earthquake must occur in the ocean with a magnitude of at least 7, which is rare on the east coast. Some seismologists believe the earthquake has to be powerful enough to cause what is known as a "submarine landslide," which pushes sediment off the continental shelf and into the deep ocean.

5.3.12.6 Vulnerability to the Hazard

Larchmont is located in a region that is not as vulnerable to tsunamis as the West Coast. However, tsunamis are possible in the Atlantic Ocean, with one most recently believed to have occurred June 2013.

Table 64: Tsunami Susceptibility

How Susceptibility Was Determined	Why?
• Discover News Article, August 2012 • Washington Post Article, March 2011	• Risk is small, but Tsunamis on the east Coast are possible. • Tsunamis impacting the East Coast are most likely to be caused by an earthquake.

• Live Science Article, April 2013 • Associated Press Article, June 2013	

5.3.12.7 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a tsunami hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a tsunami hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a tsunami utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of Town facilities and past occurrences.

Table 65: Risk Assessment Prepared by Village of Larchmont Team – Tsunami

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Tsunami	1	1	3	2	1.33	3.00	2.17	L

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont:

Table 66: Qualitative Risk Assessment – Tsunami Hazard

	Tsunami Hazard Qualitative Ranking
Residents	Low
Buildings	Low
Businesses	Low
Critical Infrastructure	Low

Overall Qualitative Hazard Ranking: Low

5.3.12.8 Future Development Considerations

Larchmont should include tsunami hazard scenario planning during their future development endeavors and continue to mitigate the impact of tsunami occurrences. This includes the following mitigation measures:

- Coordinate weather and emergency information with Westchester County and State officials. Due to a potential wide spread effect on the East Coast, State and local resources may need to be involved.
- Coordinate outreach to public with consistent messaging, information, and instructions via public broadcast, websites, email, and social media for watches and warnings issued by the National Weather Service.
- Coordinate outreach to homeowners for the dangers of tsunamis and necessary preparedness in the event one is predicted.
- Identify critical facilities in Larchmont that include fire, police, and emergency response locations, schools, and emergency shelters in the event emergency service locations are needed.

5.3.13 Urban Fire

A wildfire is an uncontrolled fire in an area of combustible vegetation that occurs in the countryside or a wilderness area. An urban fire is an uncontrolled fire in an urban area affecting residential or commercial properties, which due to the dense nature of some areas, age of buildings and construction material of the buildings can spread quickly.

5.3.13.1 Location of the Hazard

An urban fire could occur anywhere in the Village of Larchmont and more substantial impacts would be realized depending on how densely developed the area is. In general, a wildfire could occur in the more open, vegetated areas of the community such as parks or woodsy areas.

5.3.13.2 Previous Occurrences of the Hazard

In the Village of Larchmont, there have been several substantial fires to occur in the community. They include:

- 1975 American Legion Hall, Flint Park - Caused by lightning strike and totally destroyed.
- 1978 76 Wendt Avenue - Caused by electrical malfunction. Top 3 floors severely damaged.
- 1980 Hunan Restaurant Palmer Avenue - Caused by arson. Totally destroyed the entire block south up to Larchmont Cinema.
- 1986 Monahan's Restaurant Palmer Avenue - Caused by grease fire. Totally destroyed top of entire block north.
- 1994 Horseshoe Harbor Yacht Club - Caused by accident. Totally destroyed entire structure.

5.3.13.3 Probability of Future Occurrence of Urban Fire

The probability of a future occurrence of a wildfire in the Village of Larchmont is likely while the probability of an urban fire is certain.

5.3.13.4 Vulnerability to the Hazard

Wildfire was identified in the Westchester CEMP as a moderately high hazard for Westchester County. For urban fires, according to the Fire Chief, Larchmont typically has 1-3 structure fires involving the entire structure that causes severe damage on an annual basis.

5.3.13.5 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for an urban fire hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for an urban fire hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a thunderstorm/ lightning event utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of Town facilities and past occurrences.

Table 67: Risk Assessment Prepared by Village of Larchmont Team – Urban Fire

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Urban Fire	2	1	3	3	2.00	3.00	2.50	M

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont:

Table 68: Qualitative Risk Assessment – Urban Fire Hazard

	Urban Fire Hazard Qualitative Ranking
Residents	Medium
Buildings	Medium
Businesses	Medium
Critical Infrastructure	Low

Overall Qualitative Hazard Ranking: Medium

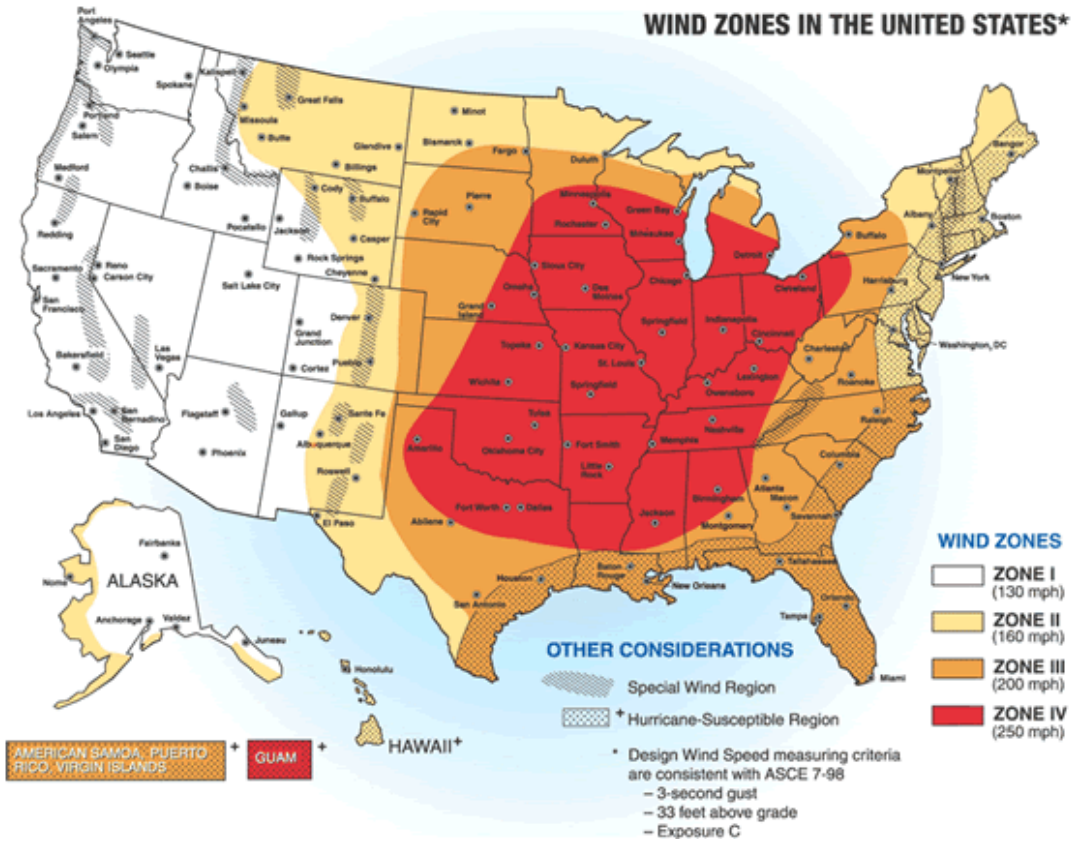
5.3.13.6 Future Development Considerations

Future development in the Village of Larchmont should be constructed, updated and redeveloped with regard to the most up to date building and fire codes. According to the US Census, approximately 77% of Larchmont's housing stock was built prior to 1940.

5.3.14 Extreme Wind Events

FEMA maintains a Winds Zone map that indicates various areas of the United States and their susceptibility to wind speeds in addition to highlighting Special Wind and Hurricane-Susceptible regions. New York encompasses several zones with the Village of Larchmont located in a Zone II area susceptible to winds of up to 160mph. More information on extreme wind hazard is provided in the Hurricane and Tornado hazard sections below.

Figure 15: Wind Zones in the United States, NOAA



5.3.15 Hurricane

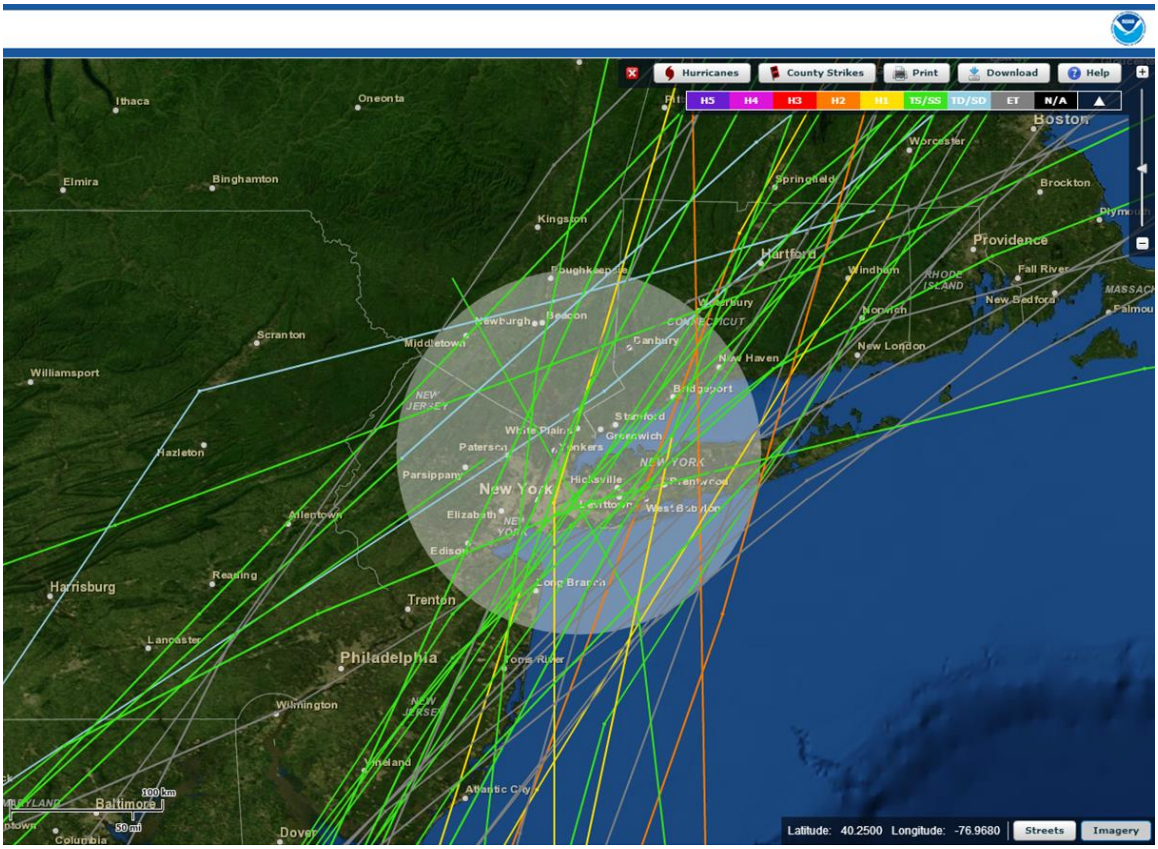
5.3.15.1 Description of the Hazard

Hurricanes are characterized by a constant speed of 74 miles per hour or more, wind that blows in a large spiral motion around a rotating "eye" (calm center of the storm) and an expansive reach that can extend for hundreds of miles. Powerful in nature, hurricanes can be short in duration or last for several days impacting numerous states, counties and towns along the coastline. The aftermath of a hurricane frequently causes additional damage due to lasting high winds, storm surge, and flooding. Storms that have lesser wind speeds within the range of 39 mph to 73 mph are classified as tropical storms.

5.3.15.2 Location of the Hazard

The eastern section of New York State that includes Larchmont is more susceptible to hurricanes due to close proximity to the Atlantic Ocean. Figure 15 shows the historical hurricane tracks in the vicinity of Larchmont through 2011. Out of the 40 storms identified by NOAA, 21 storms were classified as tropical and the remaining as Categories 1 through 4. Hurricane categories are described below.

Figure 16: Historical Hurricane Tracks for Larchmont area (1861 to 2011), NOAA



5.3.15.3 Severity and Extent of the Hazard

For reference and tracking purposes, hurricanes are categorized by class in accordance with the Saffir-Simpson Hurricane Wind Scale (SSHWS) summarized in Table 64. The SSHWS uses a 1-minute sustained wind speed at a height of 33 feet over open water as the sole parameter to categorize storm damage potential.[23] A storm with organized circulation and sustained winds below a Category 1 Hurricane threshold (winds range from 39 to 73 mph) is categorized as a tropical storm.

Table 69: Saffir-Simpson Hurricane Wind Scale (SSHWS)

Category	Wind Speed	Storm Surge (feet above normal sea level)	Expected Damage
1	74-95 mph	4-5 feet	**Minimal:** Damage is done primarily to shrubbery and trees, unanchored mobile homes are damaged, some signs are damaged, damage to structures is minimal or none.
2	96-110 mph	6-8 feet	**Moderate:** Some trees are toppled, some roof coverings are damaged, and mobile homes may have major damage.
3	111-130 mph	9-12 feet	**Extensive:** Large trees are toppled, some structural roof damage occurs, mobile homes are destroyed, structural damage to small homes and utility buildings is possible.
4	131-155 mph	13-18 feet	**Extreme:** Extensive damage is done to roofs, windows and doors; roof systems on small buildings completely fail; some curtain walls fail.
5	> 155 mph	> 18 feet	**Catastrophic:** Roof damage is considerable and widespread, window and door damage is severe, there are extensive glass failures, and entire buildings could fall.

It is important to note that lower category storms, including tropical storms, can inflict greater damage than higher category storms depending on where and when the storm strikes. Tropical storms have been known to produce significant damage and loss of life, mainly due to flooding.

[23] FEMA Coastal Construction Manual, 2011

NOAA through the National Weather Service's Hurricane Center issues hurricane watches and warnings, forecasts hurricane track and wind field information, and offers locally specific chances of experiencing tropical storm, strong tropical storm, and hurricane force winds out to five days. Effective 2013, NOAA has broadened the definition of hurricane and tropical storm watches and warnings to allow watches and warnings be issued after a tropical cyclone (hurricane) becomes post-tropical. During the post-tropical stage, storms can pose a significant threat to life and property, as observed with Hurricane Sandy.

5.3.15.4 Data and Methodology

For the purposes of this plan, the Village of Larchmont utilized the FEMA HAZUS-MH software and guidance materials to evaluate what the impact would be to the community if a hurricane of various strengths occurred. The project team also utilized research conducted and information gathered from interviews and the general public regarding past impacts of hurricane events. The HAZUS-MH model calculates exposure for a specific area, it characterizes the level of intensity of the hazard affecting the exposed area and it uses the exposed area and the hazard to calculate the potential economic losses and structural damage. HAZUS-MH hurricane and constructed feature data evaluated losses from 100 and 500 year events.

5.3.15.5 Impact of Hazard on Life, Property and Operations

The main hazards associated with hurricanes include storm surge, high winds, heavy rain, flooding, and potential tornadoes.

Hurricanes can have significant impacts on human health due to storm intensity. Drowning in a storm surge is the leading cause of hurricane death. In an average 3-year period, approximately five hurricanes strike the United States coastline, killing approximately 50 to 100 people anywhere from Texas to Maine. Of these, two are typically major hurricanes classified as a Category 3 or greater. Table 65 lists the 10 deadliest hurricanes recorded in the United States from 1980 to 2011. This table does not include the 117 fatalities associated with Hurricane Sandy that occurred in 2012[24].

[24] Source: CDC, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6220a1.htm

Table 70: 10 Deadliest Hurricanes Recorded in the United States

Top 10 Deadliest Hurricanes from 1980-2011

Hurricane	*Persons*
Katrina (2005)	1833
Rita (2005)	119
Ike (2008)	112
Hugo (1989)	86
Floyd (1999)	77
Juan (1985)	63
Andrew (1992)	61
Ivan (2004)	57
Isabel (2003)	55
Gustav (2008)	53

Source: Lott et al., 2012.

The greatest impacts from hurricanes to property and infrastructure includes wind and water damage: flooding, utility failure, building damage, shoreline erosion, natural resource damage; interruptions with emergency, fire, and police services, and economic loss due to business property damage and loss of inventory. A hurricane can have devastating effects on a large area if directly in the path of a hurricane causing long term affects to the local economy and environment.

HAZUS-MH was utilized to estimate the economic losses for buildings and direct property damage losses and for the business interruption losses that would make a business unable to operate due to damage sustained during a hurricane event. As a starting point, the HAZUS model estimates that there are approximately 2,310 buildings in the area selected with a replacement value (2006 dollars which is the data available in the model) of approximately $781M (see Table below).

Table 71: HAZUS – MH Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	564,534	72.3%
Commercial	172,052	22.0%
Industrial	12,891	1.7%
Agricultural	1,067	0.1%
Religious	14,805	1.9%
Government	4,944	0.6%
Education	10,623	1.4%
Total	**780,916**	**100.0%**

The HAZUS-MH model was used to determine loss information associated with Hurricane damage for the 100 year and 500 year events.

Table 72: Expected Building Damage by Occupancy for the 100 Year Hurricane Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	7	97.99	0	1.76	0	0.19	0	0.06	0	0.00
Commercial	239	98.14	4	1.73	0	0.12	0	0.00	0	0.00
Education	10	98.37	0	1.60	0	0.04	0	0.00	0	0.00
Government	4	98.36	0	1.61	0	0.02	0	0.00	0	0.00
Industrial	51	98.28	1	1.64	0	0.07	0	0.01	0	0.00
Religion	15	98.32	0	1.63	0	0.05	0	0.00	0	0.00
Residential	1,920	97.07	51	2.59	7	0.33	0	0.00	0	0.00
Total	**2,246**		**57**		**7**		**0**		**0**	

Table 73: Expected Building Damage by Occupancy for the 500 Year Hurricane Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	5	73.81	1	18.05	0	5.27	0	2.54	0	0.33
Commercial	189	77.54	41	16.70	13	5.15	1	0.61	0	0.00
Education	8	79.68	2	15.84	0	4.18	0	0.30	0	0.00
Government	3	80.04	1	15.44	0	4.22	0	0.30	0	0.00
Industrial	41	79.15	8	15.13	2	4.74	0	0.91	0	0.06
Religion	12	76.79	3	18.36	1	4.47	0	0.37	0	0.00
Residential	1,396	70.57	451	22.79	121	6.09	6	0.32	4	0.22
Total	**1,654**		**506**		**137**		**9**		**4**	

The tables below summarize the estimated building related economic loss results for the 100 and 500 year hurricane events.

Table 74: Building Related Economic Losses for the 100 Year Hurricane Event (in thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	1,958.97	104.69	5.16	16.62	2,085.43
	Content	116.35	7.70	0.45	0.22	124.73
	Inventory	0.00	0.06	0.08	0.01	0.16
	Subtotal	**2,075.31**	**112.45**	**5.69**	**16.86**	**2,210.32**
Business Interruption Loss						
	Income	0.00	1.14	0.00	0.00	1.14
	Relocation	74.12	2.01	0.05	0.10	76.28
	Rental	56.58	0.52	0.00	0.00	57.10
	Wage	0.00	0.40	0.00	0.00	0.40
	Subtotal	**130.70**	**4.07**	**0.05**	**0.10**	**134.92**
Total						
	Total	**2,206.01**	**116.53**	**5.75**	**16.95**	**2,345.24**

Table 75: Building Related Economic Losses for the 500 Year Hurricane Event (in thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	13,853.02	1,390.12	105.16	242.66	15,590.96
	Content	3,047.65	366.61	56.34	58.16	3,528.77
	Inventory	0.00	5.58	7.68	0.80	14.06
	Subtotal	**16,900.67**	**1,762.31**	**169.19**	**301.61**	**19,133.79**
Business Interruption Loss						
	Income	0.00	206.42	1.38	30.52	238.32
	Relocation	791.18	247.68	9.08	43.44	1,091.39
	Rental	443.10	145.52	1.22	3.54	593.38
	Wage	0.00	222.66	2.36	180.34	405.36
	Subtotal	**1,234.28**	**822.28**	**14.04**	**257.84**	**2,328.44**
Total						
	Total	**18,134.95**	**2,584.59**	**183.23**	**559.45**	**21,462.23**

The Village of Larchmont's proximity to Long Island Sound increases the community's vulnerability to hurricanes and their impacts. Since 1954, there have been 12 Major Disaster Declarations in the State of New York due to a hurricane or tropical storm with four of those declarations resulting in Westchester County receiving a designated area status from FEMA. Table 55 summarizes the major disaster declarations for New York State.

Table 76: New York Hurricane/Tropical Storm Major Disaster Declarations (1954 – Present)

Name	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?	Notes
Hurricane Sandy	4085	10/27/2012 – 11/08/2012	12/19/2012	Yes	Second costliest hurricane in U.S. history. Impacted 24 states with severe damage in New York and New Jersey.
Tropical Storm Lee	4031	9/7/2011 – 9/11/2011	9/13/2011	No	New York impacted by heavy rains and flooding.
Hurricane Irene	4020	8/27/2011 – 8/29/2011	9/23/2011	No	Most of east coast impacted; ranked as 6th costliest hurricane in United States history.
Tropical Depression Ida & Nor'Easter	1869	11/12/2009 – 11/14/2009	12/31/2009	No	Coastal damage, flooding, storm surge.
Tropical Depression Ivan	1565	9/16/2004 – 9/24/2004	10/1/2004	No	Sustained rain, wind, flooding.
Hurricane Floyd	1296	9/16/1999 – 9/18/1999	9/19/1999	Yes	Large power outages, heavy rain and flooding.
Hurricane Bob	918	8/19/1991	8/26/1991	No	Heavy rainfall, power outages.
Hurricane	750	9/27/1985	10/28/1985	No	Dramatic coastal impact including

Name	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?	Notes
Gloria					beach erosion and many flooding issues.
Hurricane Belle	520	9/3/1976	9/3/1976	No	Widespread rainfall.
Tropical Storm Agnes	338	6/23/1972	6/23/1972	Yes	Substantial flooding.
Hurricane, Floods	43	8/22/1955	8/22/1955	Yes	Unknown
Hurricane	26	10/7/1954	10/7/1954	Unknown	Unknown
Source: FEMA Major Disaster Declarations 1954 – Present					

Some of the more notable hurricane events include:

- **Hurricane Sandy (2012)** – In the fall of 2012, Hurricane Sandy had a major impact on the New York and New Jersey coastline. The storm broke an all-time record for storm surge height in New York harbor, caused over 100 fatalities, and has reached a cost of over $79 billion for federal aid to cover damages, recovery and mitigation measures.
- **Hurricane Irene (2011) -** On August 28, 2011, hurricane made landfill as a tropical storm along the southeast New Jersey Coast and New York City. Irene brought sustained tropical storm winds, heavy rain, and destructive storm surge along with two confirmed tornadoes.
- **Hurricane Gloria (1985)** – A storm that hit Long Island, NY and New Jersey that cause minor storm surge, erosion damage and substantial wind damage.
- **Long Island Express Hurricane (1938)** – This storm moved up the east coast from New York through New England and cause widespread storm surge and wind damage to buildings. It is used today as a benchmark for predicting worst-case scenario damage in the region.

Hurricane Sandy and Hurricane Irene are the most recent hurricanes to have impacted Larchmont. The Larchmont Police Department call volume identified during these storm events included the following:

- Hurricane Sandy: 181 calls for service from October 29, 2012 through November 1, 2012
- Hurricane Irene: 143 calls for service from August 28, 2012 through August 31, 2012

For both Hurricane Sandy and Hurricane Irene, various roads in Larchmont were closed due to trees or wires being down and flooding. The Figure below shows the areas impacted by flood waters during Hurricane Sandy.

Figure 17: Village of Larchmont – Areas Impacted by Hurricane Sandy

Hurricane Sandy October 29, 2012

The blue shaded areas represent areas impacted by flood waters during the storm.

5.3.15.6 Probability of Future Occurrence of the Hazard

Larchmont's close proximity to the coast line gives it greater exposure to the risk of future hurricanes. A major hurricane, though infrequent, could strike Larchmont. Based on NOAA's Adapting to Climate Change Guide[25], the power and frequency of Atlantic Ocean hurricanes has increased in recent decades and the intensity of Atlantic hurricanes is likely to increase over the extended long term.

Within the short term, NOAA makes predictions on a yearly basis at the start of hurricane season to forecast the number of Atlantic Ocean based hurricanes. For 2013, NOAA is forecasting an active or extremely active season with a 70 percent likelihood of 13 to 20 named storms, of which 7 to 11 could become hurricanes. These ranges are above the seasonal average of 12 named storms, 6 hurricanes, and 3 major hurricanes.

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[25] Source: NOAA's Adapting to Climate Change: A Planning Guide for State Coastal Managers (2010)

5.3.15.7 Vulnerability to the Hazard

The Village of Larchmont is vulnerable to hurricanes due to its close proximity to the Atlantic Coast. The map prepared by Westchester County illustrates the Village's vulnerability to future hurricane events depending on their intensity and associated storm surge.

Figure 18: Village of Larchmont Hurricane Storm Surge Zones

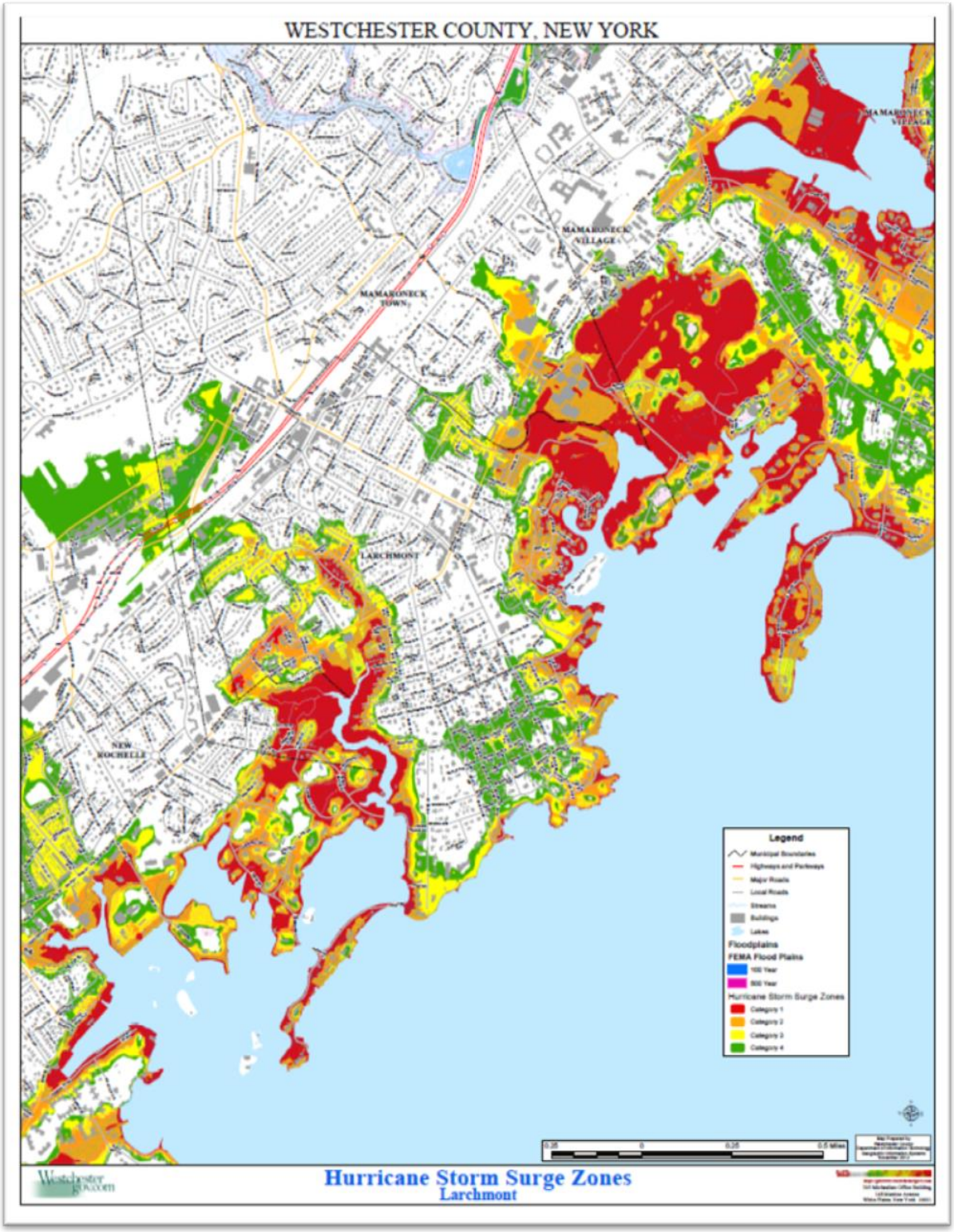


Table 77: Hurricane Susceptibility

How Susceptibility Was Determined	Why?
• New York State Sea Level Rise Task Force – Presentation • Westchester County Comprehensive Emergency Management Plan, November 2005 • Anecdotal information from Village of Larchmont	• Four Category 3 hurricanes have hit New York since 1900. • Hurricane was identified in the Westchester CEMP as a moderately high hazard for Westchester County. • Since 1954, there have been 12 Major Disaster Declarations made for Hurricane/Tropical Storm in New York. Westchester County has been specifically designated a "declared disaster area" in 4 of these events. • Impacts from 2012 Hurricane Sandy in the Village of Larchmont included: opening of emergency shelters, widespread power outages, high tides in coastal areas and storm surge, high winds experienced.

5.3.15.8 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a hurricane hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a hurricane hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a hurricane utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of Town facilities and past occurrences.

Table 78: Risk Assessment Prepared by Village of Larchmont Team – Hurricane Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Hurricane	2	4	4	4	3.33	4.00	3.67	S

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont:

Table 79: Qualitative Risk Assessment – Hurricane Hazard

	Hailstorm Hazard Qualitative Ranking
Residents	Severe
Buildings	High
Businesses	High
Critical Infrastructure	Severe

Overall Qualitative Hazard Ranking: SEVERE

5.3.15.9 Future Development Considerations

Larchmont should include hazard scenario planning during their future development endeavors and continue to implement measures to mitigate the impact of hurricane occurrences. This includes the following mitigation measures:

- Continued enforcement of the following Larchmont Village Code chapters that address coastal erosion, coastal storms, and flooding and considerations:
  - Chapter 315: Coastal Zone Management Commission
  - Chapter 321: Critical Environmental Areas
  - Chapter 331: Environmental Quality Review
  - Chapter 331: Flood Damage Prevention
  - Chapter 375: Waterfront Revitalization
- Revise building code requirements based on updated FEMA policies and guidelines for coastal construction.
- Coordinate weather and emergency information with Westchester County officials.
- Coordinate outreach to public with consistent messaging, information, and instructions via public broadcast, websites, email, and social media for watches and warnings issued by the National Weather Service, hurricane evacuation routes, and homeowner guidance for hurricane preparation.
- Identify critical facilities in Larchmont that include fire, police, and emergency response locations, schools, and emergency shelters in the event emergency service locations are needed.

5.3.16 Tornado

5.3.16.1 Description of the Hazard

Tornadoes are most commonly associated with a violently rotating visible funnel cloud that consists of a rotating air column that has ground contact. Typically, a loud roaring noise,

compared to the sound of a freight train, is associated with a tornado. Speeds of a tornado can range from 40 to 300 mph and are measured on the Fujita scale. Generation of a tornado can be associated with thunderstorm activity where cool, dry air meets warm, humid air. Damage from a tornado can be minimal to completely catastrophic. On a local level, a tornado is the most destructive of all atmospheric conditions.

5.3.16.2 Location of the Hazard

Based on the wind zone map provided earlier in the Extreme Wind Events section, New York State is located in wind zone II that can include winds up to 160 mph that may be associated with tornadoes. Tornadoes can occur in any region of the New York.

5.3.16.3 Severity and Extent of the Hazard

Tornadoes are rated using the commonly known Enhanced Fujita (EF) Scale which provides a rating of the wind speed from the tornado event to a category from EF0 to EF5. The degree of damage helps to define the rating of an individual storm. The Fujita scale below has been updated and in use since 2007.

EF Scale Rating	3-Second Gust Speed (mph)	Type of Damage
EF0	65–85	Light damage
EF1	86–110	Moderate damage
EF2	111–135	Considerable damage
EF3	136–165	Severe damage
EF4	166–200	Devastating damage
EF5	>200	Incredible damage

NOAA Storm Prediction Center issues tornado watches and warnings. A watch means tornadoes are possible and a warning means a tornado has been sighed or indicated by weather radar. The current average lead time for tornado warnings is only 13 minutes that results in greater emphasis being placed on a watch for tornado preparedness compared to other hazards.

5.3.16.4 Impact of Hazard on Life, Property and Operations

Tornadoes can have significant impacts on human health, property, and Town infrastructure. The most prevalent impact is excessive winds and wind damage. Injuries and fatalities most often result from flying debris. Other injuries and fatalities are associated with building damage and collapses, being trapped inside cars or trailers, or being outside without cover. After a tornado has passed, there are additional health hazards associated with downed power lines, damaged buildings that may be unsafe to exit or enter, and the inability to obtain emergency care.

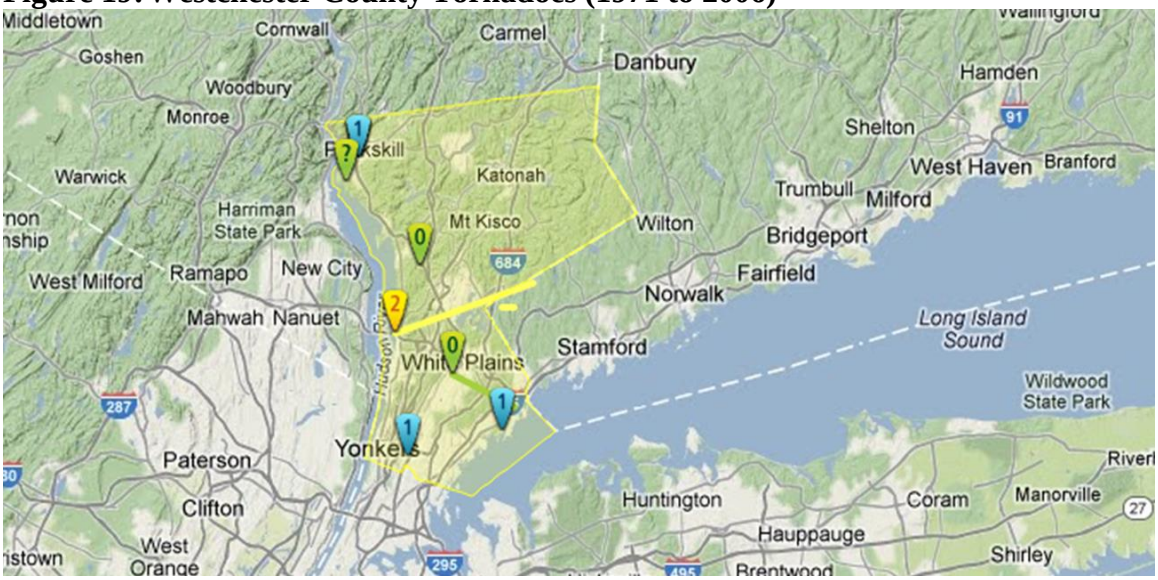
Property and operation impacts include damage to residential and commercial buildings, trees and vegetation, and exposed infrastructure that can be completely destroyed by a tornado.

Damaged bridges and infrastructure may be weakened for use resulting in delays for individuals to move within the community to receive basic services. Although tornadoes are confined to certain areas, the impacts on communities affected can be devastating with damage and destruction.

5.3.16.5 Previous Occurrences of the Hazard

The National Climatic Data Center (NCDC) reports an average of 10 tornadoes on an annual basis have occurred in New York State based on data available from 1991 to 2010. Based on available climatology data, seven tornados in Westchester County were recorded between 1971 and 2006 as shown in Figure 18. These tornadoes resulted in a total of one fatality and eight injuries. The F2 tornado that occurred in 2000 had the longest path of 12 miles and six injuries.

Figure 19: Westchester County Tornadoes (1971 to 2006)



Source: Westchester County Tornadoes, 1971 – 2006, www.tornadohistoryproject.com

Since 1954, there have been 5 Major Disaster Declarations in the State of New York for Tornadoes. None of these instances have impacted Westchester County directly.

Table 80: New York Tornado Major Disaster Declarations (1954 – Present)

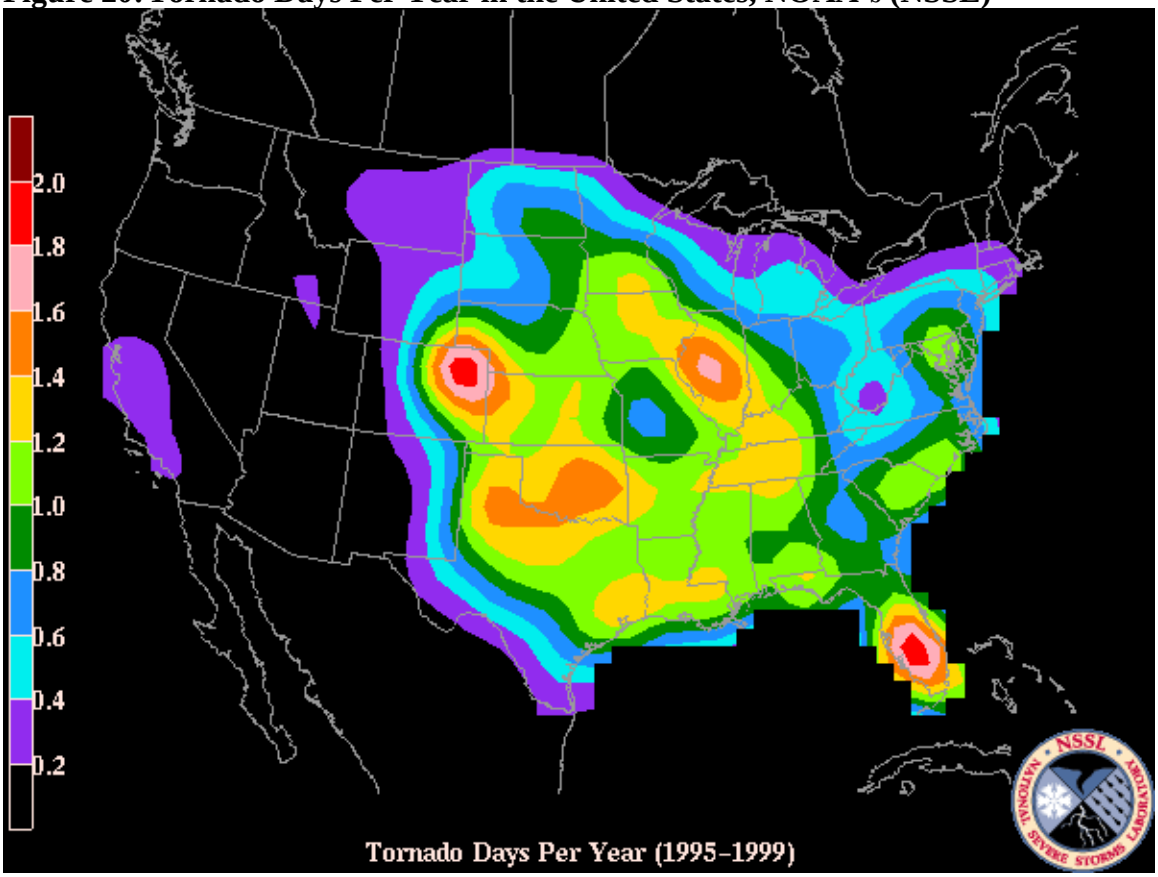
	Disaster No.	Incident Period	Date Disaster Declared	Westchester County a Designated Area?
Severe Storms, Flooding and Tornadoes	1993	4/26/2011 – 5/8/2011	6/10/2011	No
Severe Storms and Tornadoes	1943	9/16/2010	10/14/2010	No

Severe Storms, Flooding, Tornado	1724	8/8/2007	8/31/2007	No
Severe Storms, Flooding, Tornado	1486	7/21/2003 – 8/13/2003	8/29/2003	No
Severe Thunderstorms, Tornado	1222	5/31/1998 – 6/2/1998	6/16/1998	No
Source: FEMA Disaster Declarations 1954 - Present				

5.3.16.6 Probability of Future Occurrence of the Hazard

NOAA's National Severe Storm Laboratory (NSSL) has estimated the likelihood for a tornado on a given day in the United States. Figure 19 shows that the probability for a tornado in southern New York State is 0.4 to 0.6 days per year based on tornado data from 1995 to 1999, consistent with data from 1980 to 1999.

Figure 20: Tornado Days Per Year in the United States, NOAA's (NSSL)



5.3.16.7 Vulnerability to the Hazard

Westchester County is vulnerable to tornadoes based on past occurrences. The NY State Hazard Mitigation Plan notes that New York has a definite vulnerability towards tornadoes.

Table 81: Tornado Susceptibility

How Susceptibility Was Determined	Why?
• Westchester County Comprehensive Emergency Management Plan (CEMP), November 2005 • The Tornado History Project, New York • New York State Standard Multi-Hazard Mitigation Plan - 2011	• Tornado was identified in the Westchester CEMP as a moderately high hazard for Westchester County. • From 1971 to 2006, there have been 7 tornados in Westchester County ranging from a 0 to a 2 on the Fujita scale. • State Hazard Mitigation Plan notes that NY has a definite vulnerability to tornadoes and they can occur in any area of the state. • There have been 5 major disaster declarations for tornado occurrences in New York since 1954; Westchester County was not an impacted area.

5.3.16.8 Risk Assessment Methodology, Limitations and Results

After careful consideration of the data available for a tornado hazard event and its impact to the Village of Larchmont, the risk assessment for this natural hazard has been developed as a qualitative analysis. A quantitative analysis has not been conducted for a tornado hazard scenario. The Larchmont team prepared a qualitative assessment of the frequency, duration, severity, intensity, probability and consequence of a tornado utilizing a low, medium, high and severe ranking system. The ranking given for the Village of Larchmont was based on background research, knowledge of Town facilities and past occurrences.

Table 82: Risk Assessment Prepared by Village of Larchmont Team – Tornado Hazard

	Frequency 0-5	Duration 0-5	Severity 0-5	Intensity 0-5	Probability (F,D,I) 40%	Consequence (S) 60%	Total	Ranking L,M,H,S
Tornado	1	1	4	4	2.00	4.00	3.00	H

After reviewing the initial ranking and conducting further research, specific consideration was given to how an event would impact residents, buildings, businesses and critical infrastructure in the Village of Larchmont.

Table 83: Qualitative Risk Assessment – Tornado Hazard

	Hailstorm Hazard Qualitative Ranking
Residents	High
Buildings	High
Businesses	High
Critical Infrastructure	High

Overall Qualitative Hazard Ranking: HIGH

5.3.16.9 Future Development Considerations

Larchmont should include tornado hazard scenario planning during their future development endeavors and continue to implement measures to mitigate the impact of tornado occurrences. This includes the following mitigation measures:

- Coordinate weather and emergency information with Westchester County officials.
- Coordinate outreach to public with consistent messaging, information, and instructions via public broadcast, websites, email, and social media for watches and warnings issued by the National Weather Service.
- Coordinate outreach to homeowners for tornado guidance preparation.
- Identify critical facilities in Larchmont that include fire, police, and emergency response locations, schools, and emergency shelters in the event emergency service locations are needed.

5.3.17 Climate Change/Sea Level Rise

The New York State Sea Level Rise Task Force (Task Force) was established by statute in 2007. It was charged with summarizing what is known about the impact of SLR and recommending actions that will both protect coastal ecosystems and help human coastal communities to increase resilience and adapt to rising sea levels. In a Report submitted to the State Legislature in November of 2010, the Task Force noted that, "*A powerful coastal storm occurring today poses great danger to the region, and this threat will intensify as sea level continues to rise. New York State must initiate action to safeguard its natural resources, human communities and economic assets. We must work to increase community resilience–the capacity to withstand or recover from loss or damage–while embracing a long-term commitment to understand evolving threats and adjust responses into the future*." According to the New York State Sea Level Rise Task Force Report (December 31, 2010), *"sea level rise will have dramatic implications for New York's coastal communities and their natural resources, affecting the entire ocean and estuarine coastline of the state. Every community along the Hudson River from the Federal Dam at Troy to*

New York Harbor and along Long Island Sound and the Atlantic coastline will be affected." The Village of Larchmont is included as a community that will be impacted due to its location adjacent to Long Island Sound.

The Village of Larchmont has prepared a Climate Action Plan (CAP) that focuses on reducing greenhouse gas emissions from municipal operations. The plan outlines measures that the Village has already taken and then details recommendations to achieve the overall emission reduction target by 2015. The relationship of this plan to climate change is that the recommended actions are designed to increase energy efficiency and reduce emissions while also raising public awareness and educating residents of solutions to global climate change.

5.3.17.1 Village Location

The Village of Larchmont (Village) is bounded on the south and east by Long Island Sound. Long Island Sound has seen a 15-inch increase in sea level since 1860 and a 6-inch rise since 1960, according to the New York Department of Environmental Conservation (NYDEC). In addition to, and in part due to, sea level rise (SLR), coastal storms are becoming more severe and more frequent, exacerbating coastal erosion and making shoreline communities such as the Village more vulnerable to flooding from storm surge, as demonstrated by historic events such as Hurricane Sandy.

Larchmont, New York

Hurricane Sandy pounds Larchmont Credit: Don Sutherland

5.3.17.2 Potential Village Impacts

Increased and more severe flooding events may also put two dams owned by Larchmont, the Larchmont Dam (Class B) and the Larchmont Water Company Dam No. 2 (Class C), at risk of failure, which could have catastrophic implications for the highly and densely developed areas downstream of these two dams, endangering human life and property. The Village currently

recognizes these risks and annually evaluates and develops an Emergency Action Plan, which then gets submitted to the NYDEC, to assist in responding to a potential dam failure.

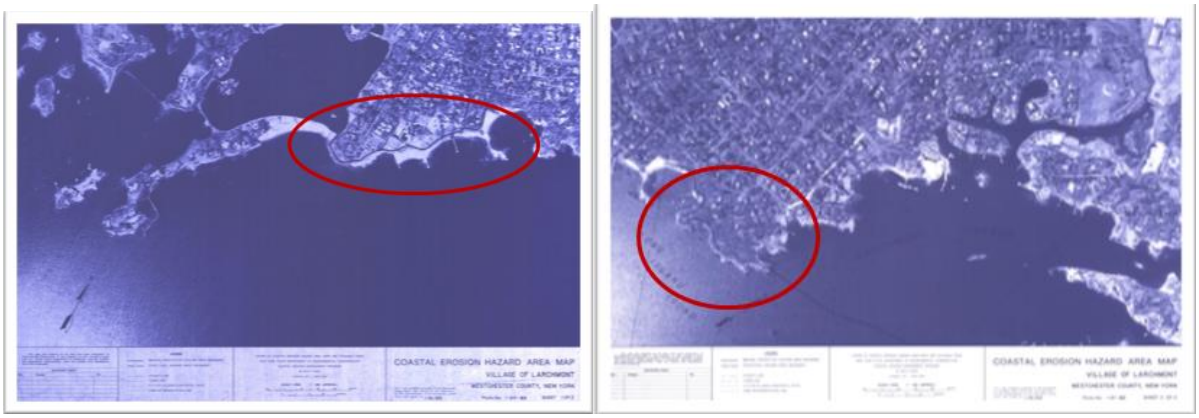
Larchmont has already had substantial flood impacts from various storms at areas including: Pine Brook Road, Kilmer Road, Flint Park off Birch Road, Nassau Road, Pryer Manor Road, Magnolia Avenue, Ocean Avenue, Cedar Island, Pine Brook Drainage Basin, Park Avenue at Manor Beach, Spanish Cove Road, Lindsay Drive, North Avenue, Coolidge Street, Monroe Avenue and Larchmont Reservoir. Hurricane Sandy also impacted the Island Sea Wall.

In addition, the Village could see more substantial impacts during Hurricane events if more intense storms effect the area in the future. The Hurricane Storm Surge Zone map prepared by Westchester County and found in the hazard profile section indicates where the community would be impacted at various storm levels.

Chapter 315 Village of Larchmont Zoning Code

In accordance with Chapter 315 of the Village of Larchmont Zoning Code, the Town of Mamaroneck and the Village of Larchmont established the intermunicipal Coastal Zone Management Commission. The purpose of the Commission is to monitor and coordinate the implementation of the local water revitalization program, to protect the local coastal zone, and to further the common interests of both entities. According to the Local Waterfront Revitalization Program (initially drafted in 1986), CEHAs were originally designated in the Town of Manaroneck and Village of Larchmont in January 1989 pursuant to Article 34 of the New York State Environmental Conservation Law (CEHA Act). The general location of the CEHA area in Larchmont (as depicted in the figures below) is from west to east, Premium Point to Horsehoe Harbor and ending at Umbrella Point. A substantial portion of the Village coastline did not receive CEHA designation, but according to this report, those areas not designated should be equally well protected. Coastal erosion has specifically been identified as a problem for the area of Larchmont.

Figure 21: Village of Larchmont – Coastal Erosion Hazard Area (CEHA) Maps



ICLEI Participation

The Village has already begun evaluating and planning for climate change and SLR impacts. For example, the Village joined the International Council for Local Environmental Initiatives (ICLEI) in 2008, which focuses on locally designed initiatives and spurred the revival of the local Committee on the Environment (CoE). The CoE prepared a local Climate Change Action Plan (CAP) and determined that, "*Among the most significant effects of climate change is sea level rise caused by a combination of the thermal expansion of ocean water as it warms and the melting of land-based ice. Even the most conservative projections have global sea level rising by the end of the century. The possible consequences of this rise are the increases in the extent and frequency of coastal flooding, increased risk of storm damage, permanently inundated shoreline areas, shoreline erosion and wetland loss. The Village of Larchmont as a shoreline community may be vulnerable to all of these impacts*."

5.3.17.3 Potential Mitigation Activities

The Village frequently experiences issues with flooding related to SLR and coastal storm surge, the frequency and severity of which will increase over time. However, the Village can undertake certain activities which would help to mitigate impacts associated with rising base flood elevations, coastal erosion and poor stormwater management infrastructure.

- A secondary impact of sea level is the concurrent increase of the base flood elevation. In Larchmont, the zoning code for the potential storm surge areas could be reassessed to incorporate a higher base flood elevation, requiring that new developments be built higher to avoid flood risks. Existing vulnerable properties and infrastructure which are located too low could be identified and evaluated to be raised or relocated. This effort could benefit from an assessment of SLR and flooding from storm surge of the local area, which could develop more precise estimates of anticipated sea levels over time and under certain conditions.

- Coastal erosion, which is being exacerbated by SLR and more severe storm surge events, is also making coastal structures and areas more vulnerable to these forces, as natural barriers are slowly disappearing over time. The proximity of vital infrastructure and residential areas to the shoreline should be evaluated to determine whether the area can be fortified, by elevating the asset or installing new dune retention systems or seawalls, or if more suitable locations should be identified. Depending on the area, fortification options may be restricted by coastal regulations.

- Existing infrastructure, such as roadways, bridges, dams, and seawalls, have been damaged by prior storm events in Larchmont. These areas should all be assessed for potential repairs such that, instead of merely removing debris and obstructions and restoring the infrastructure to its original condition, additional measures can be incorporated at the time of construction to help mitigate future flooding issues. Additional measures could include:

- New or additional stormwater management infrastructure;
- Improving existing stromwater collection and drainage systems to reduce infiltration and inflow issues and/or increase drainage capacity; and
- Improving the safety and structural integrity of the infrastructure.

- The Village should begin a long term strategic planning effort to assess, prioritize, and coordinate the implementation of the improvements noted above, in conjunction with the local Capital Improvement Plans and the recommendations outlined in the Climate Action Plan related to electricity, building facilities, transportation, and other infrastructure improvements, so that the cost of construction can be maximized to the greatest extent practicable. The CoE also noted the advantage of potential joint efforts with other environmental committees in Westchester County who have common goals.

As discussed in the Village's Climate Action Plan, the Westchester County Climate Change Advisory Committee is responsible for follow-up actions related to the countywide greenhouse gas emission reduction action plan initiated by the Westchester Global Warming Task Force. The Village is part of the ICLEIs Cities for Climate Protection (CCP) Campaign, which will facilitate this goal in measurement, commitment, planning, implementing, and monitoring greenhouse gas emissions. The Village also took the NYDEC Climate Smart Communities Pledge on April 27, 2009, which grants certain privileges with the NYDEC in acquiring resources to help save money and support local goals while protecting the climate. Continuing to participate in these efforts, in addition to following the recommendations of the CAP, will also be a worthwhile long-term investment towards mitigating the impacts of climate change.

6. VULNERABILITY & IMPACT ASSESSMENT

Critical facilities and vulnerabilities in the Village of Larchmont are given in **Table 84** and include government buildings, fire and emergency response facilities, and emergency shelters. The loss of any of these from a catastrophic event would be a major setback for the Village. Critical facilities should be designed to withstand the flood plain elevation caused by a 500-Year storm.

Table 84: Critical Facilities in the Village of Larchmont

Facility Name	Primary Purpose	Address	Vulnerability to Natural Hazards
Village Hall	Administrative Services/Emergency Response	120 Larchmont Avenue	HUB for all Village operations, EOC
Fire House	Administrative Services/Emergency Response	120 Larchmont Avenue	Critical emergency response services
Police Station	Administrative Services/Emergency Response	120 Larchmont Avenue	Critical emergency response services
Library	Administrative Services/Emergency Response	121 Larchmont Avenue	Heating/Cooling/Charging station for residents during emergencies
Storage Room on Boston Post Road	Record storage	2137 Boston Post Road	
Village Yard for DPW on Boston Post Road	Vehicle/Equipment Storage/Emergency Response	2015 Boston Post Road	
Flint Park Playhouse	Theatre Activities	Flint Park	In floodplain, shelter
Larchmont Avenue Garage	Storage of equipment	Behind Village Hall	Access may be limited
Larchmont Avenue Church	Church	Larchmont Avenue	Shelter
Chatsworth Avenue School	School	Chatsworth Avenue	Shelter
Larchmont Ambulance	Emergency Services	Weaver Street	Emergency Services

Facility Name	Primary Purpose	Address	Vulnerability to Natural Hazards
Corps			
Larchmont Dam	Dam/Flood Control	687 Weaver Street	Flood Control
Larchmont Train Station	Train Station	687 Weaver Street	Used for ingress/egress and transportation
Byron Place Water Pump Station	Water Service	Byron Place	Water infrastructure
Sanitary Pump Station Near Flint Park	Sewer Service	82 Shore Drive	Sewer infrastructure
French American School	School	Larchmont Avenue	Shelter
Larchmont Temple	Church	Larchmont Avenue	Shelter
Sanitary Pump Station	Sewer Service	In front of 32 Sherwood Drive	Sewer infrastructure
Sanitary Pump Station	Sewer Service	Corner of Pine Brook Drive and Beverly Place	Sewer infrastructure

6.1 CRITICAL FACILITIES – PROJECT IDENTIFICATION[26]

The NYSOEM Hazard Mitigation Planning standards require the identification of mitigation strategies and projects for any critical facility that has ever sustained flooding (**see Table 85**).The Village of Larchmont will to the extent possible protect critical facilities from the 500 year flood event in the following ways:

- Prohibit any new construction of critical facilities in the 500 year flood plain,
- Relocate critical facilities outside the 500 year flood plain if feasible,
- Avoid and minimize any expansion of critical facilities in the 500 year flood plain,
- Conduct an evaluation of critical building systems (electrical equipment, generators, etc.) that could be elevated and then develop an implementation plan,
- Conduct an evaluation of existing generators at critical facilities (condition, testing, etc) and determine whether or not those that don't have them in place may need one,
- Consider dry floodproofing some equipment and/or buildings which involves constructing flood barriers to prevent floodwater from reaching critical equipment, and

[26] Section consistent with #2 of NYSOEM Hazard Mitigation Planning Standards

- Increase critical facilities stormwater requirements through the use of site planning, design, construction and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume and duration of flow.

Table 85: Critical Facilities Flooding, Mitigation Projects, Cost

Facility Name	Sustained Flooding?	Potential Mitigation Projects	Estimate Cost
Village Hall	Yes	• Storm Window in Engineer's Office • 2nd floor bow window in Court room • Slate roof • Storm Hardening • Install Electric & Communications Underground	• Unknown • $550 (Westchester Architectural Glass) • Underground • Underground
Fire House	No	N/A	N/A
Police Station	No	N/A	N/A
Larchmont Public Library	Yes	• Roof vent flashing • Electronic Doors	• Unknown • Unknown
Storage Room on Boston Post Road	No	N/A	N/A
Village Yard for DPW on Boston Post Road	Yes	• Consider dry floodproofing • Consider elevating critical systems • Drainage infrastructure maintenance • Consider relocation of DPW facility • Dedicated backup power supply	• Unknown
Flint Park Playhouse	Yes	• Consider elevating critical systems • Drainage infrastructure maintenance • Install hurricane proof windows • Structural elevation	• Unknown
Larchmont Avenue Garage	No	N/A	N/A
Larchmont Avenue Church	No	N/A	N/A
Chatsworth Avenue School	No	N/A	N/A
Larchmont Ambulance Corps	No	N/A	N/A
Larchmont Dam	Yes	• Continued regular inspection and maintenance • Evaluation for dam safety and stability • Storm hardening, water level elevation monitor, advanced flood warning system and evacuation notice, rainfall amount monitoring	• Unknown

Facility Name	Sustained Flooding?	Potential Mitigation Projects	Estimate Cost
Larchmont Train Station	No	N/A	N/A
Byron Place Water Pump Station	No	• Purchase tow behind generator, install generator wiring receivers • Storm hardening	• $115,000 for all pump stations
Sanitary Pump Station Near Flint Park	Yes	• Consider dry flood proofing • Consider elevating critical systems • Drainage infrastructure maintenance • Purchase tow behind generator, install generator wiring receivers	• $115,000 for all pump stations
French American School	No	N/A	N/A
Larchmont Temple	No	N/A	N/A
Sanitary Pump Station (near Sherwood Drive)	Yes	• Consider dry flood proofing • Consider elevating critical systems • Drainage infrastructure maintenance • Purchase tow behind generator, install generator wiring receivers	• $115,000 for all pump stations
Sanitary Pump Station (near Iselin Terrace)	Yes	• Consider dry flood proofing • Consider elevating critical systems • Drainage infrastructure maintenance • Purchase tow behind generator, install generator wiring receivers	• $115,000 for all pump stations

6.2 PREVIOUS MITIGATION PROJECTS

The Village of Larchmont has completed some previous mitigation projects at critical facilities in the past, they include:

- Purchase of a tow-behind generator for use during emergencies,
- The Byron pump station has been wired to accept a generator feed, and
- Several drainage studies have been performed for the Pine Brook Drainage Basin.

Other mitigation projects in the community have included sewer emergency power generation, sending out flyers to every single household about what to do in an emergency situation, storm drainage infrastructure maintenance and guide wall repair. In accordance with 5c of the NYSOEM Hazard Mitigation Planning Standards, the Village has prepared a project summary for 16 previous mitigation projects using the suggested template. A summary table of all projects has been included in **Table 86**.

Table 86: Previous Mitigation Projects Summary

No.	Project Name	Risk Finding	Action Description	Cost Estimate
H1	Village Sewer Emergency Power	Emergency Power Retrofits - Village infrastructure including sanitary and potable water pump stations do not have access to backup power during outages. These critical services are vital for community residents, who do not have access to drinking water and sanitary facilities during power outages.	Purchase tow behind generator, install generator wiring receivers at Byrum Water Pump Station and three sanitary sewer pump stations.	$115,000
H2	Surcharge of Storm & Sanitary Sewers	Storm Drainage Infrastructure Maintenance - Storm drainage infrastructure becomes obstructed with leaves and debris, causing flooding.	Purchase Vactor ™ Vacuum truck to clean village drainage infrastructure.	$250,000
H3	Sewer Lining	Lining of Sanitary Sewer System - Infiltration and Inflow (I&I) into sanitary sewer infrastructure contributes to system overflows and backups, causing secondary impacts during heavy rainfall events.	Line existing sewer lines with impermeable material to reduce I&I. The Village of Larchmont has approximately 113,000 linear feet of sanitary sewer pipe.	Unknown
H4	Pryer Manor Road Guide Wall	Pryer Manor Road Guide Wall Rebuild – Existing Guide Wall damaged by storm surge during Hurricane Irene.	Rebuild existing guidewall with greater structural stability to reduce future probability of failure.	$20,000
H5	Ocean & Magnolia Avenue Roadway Damages	Magnolia Ave. & Ocean Ave - Portion of roadway collapse during Hurricane Irene, Roadway and surrounding area is flooded due to drainage system failures.	Rebuild portion of collapsed roadway, reconstruct/reset drainage infrastructure. Assess existing drainage system for further improvements to reduce flooding impacts.	$500 and DPW time, equipment
H6	Parapet Wall Repairs	Dog Beach, Magnolia Avenue and Walnut Avenue Parapet Walls - Hurricane Sandy damaged existing parapet walls at Magnolia & Walnut Avenues, and the Dog Beach.	Repair Existing Parapet Walls.	$7,000
H7	East Creek Improvements	East Creek (Flint Park) Stabilization & Clearing - Existing creek channel is eroded and unstabilized, flooding of park is experienced frequently.	Creek cleared of debris for improved channel flow, native plant species planted for stabilization, drainage weir installed.	Unknown
H8	Flint Park Drainage Pipe	Drainage Pipe Flooding - East Creek at Flint Park - Existing drainage conveyance pipe has become obstructed/collapsed and is unable to meet storm drainage demands, causing flooding.	Replacement of approximately 300 linear feet of 60 inch dia. Drainage pipe.	Unknown
H9	Flint Park Drainage Improvements	Flint Park - Heavy rain and tidal surge causes flooding on park grounds. Existing infrastructure is overwhelmed by storm flow causing damages to park facilities.	Existing drainage conditions evaluated. Existing drainage infrastruture is replaced based upon evaluation findings, sized for appropriate design storms. Porous parking	$4.5M

No.	Project Name	Risk Finding	Action Description	Cost Estimate
			lot installed to replace existing impervious lot.	
H10	Lorenzen Park Drainage Study	Lorenzen Park Drainage Study - Park floods during significant rain events. Existing storm drainage infrastructure is inadequate.	Evaluate existing site drainage conditions, design retrofits and improvements for drainage infrastructure.	$12,000
H11	Kane Park Retaining Wall	Kane Park Retaining Wall Reconstruction - Existing retaining wall collapsed due to storm impacts. Flooding commonly occurs in area.	Reconstruct existing retaining wall. Construct the wall at increased height and strength to reduce probability of future collapse.	$1,000 and DPW time and equipment
H12	GIS Infrastructure Mapping	GIS Map Existing Village Infrastructure - GIS Mapping of municipal infrastructure provides for more efficient maintenance and data colllection of existing structures. GIS data can be manipulated and utilized for accurate system analysis and design.	Map existing water system, sanitary and storm sewer infrastructure into GIS database.	$8k - $10k to date; WIP
H13	DPW Village Yard Backup Power	Village Yard Backup Power Retrofits - Existing structures and equipment at the Village Yard do not have access to backup electrical power. The DPW Yard is a critical facility for the Village of Larchmont.	Install transfer switch to receive backup generator power on critical yard electrical circuits. Install solar panel on garage for backup power use.	$15,000
H14	Village Hall OEM Center Retrofits	Village Hall OEM Retrofits - Office of emergency management does not have secured emergency resources (backup electrical power, communications) at an operations center.	Install services for OEM center at Village Hall, including radio communications, phone and internet connections. Install elevator to provide additional service to center.	Unknown
H15	Village Hall Emergency Power	Village Hall Emergency Power - Village Hall does not have access to emergency electrical power following outages, compromising emergency management and services.	Install emergency generator at Village Hall for circuits use by Village Emergency Services.	$1,000 and DPW time and equipment
H16	Larchmont Dam EAP	Larchmont Dam Emergency Action Plan- Plan for emergency action/procedures during dam failure event has not been studied/prepared. Slow/improper response poses risk to human life and property.	Prepare Emergency Action Plan (EAP) for Larchmont dam in relation to surrounding community, drainage path. Train responsible individuals on EAP procedures.	$64,000

Village Sewer Emergency Power	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H1
Risk	
Hazard(s) Addressed	Multiple
Risk Finding	**Emergency Power Retrofits** - Village infrastructure including sanitatry and potable water pump stations do not have access to backup power during outages. These critical services are vital for community residents, who do not have access to drinking water and sanitary facilities during power outages.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Facilities Retrofits
Action Description	Purchase tow behind generator, install generator wiring recievers at Byrum Water Pump Station and three sanitary sewer pump stations.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future secondary hazard impacts
Technical	N/A
Political	N/A
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works, Emergency Services
Local Champion	Public Works
Other Community Objectives	ok
Critical Facility Involved	Yes
Implementation	
Priority	Completed
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	~$115,000
Potential Funding Sources	N/A
Time Line	Generator Purchase - Completed 2003, Wiring - Completed 2008
Progress	
Action Progress Status	Completed

SURCHARGE OF STORM & SANITARY SEWERS	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H2
Risk	
Hazard(s) Addressed	Flooding
Risk Finding	**Storm Drainage Infrastructure Maintenance** - Storm drainage infrastructure becomes obstructed with leaves and debris, causing flooding.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Purchase Vactor ™ Vacuum truck to clean village drainage infrastructure.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	N/A
Political	N/A
Legal	ok
Environmental	Positive - drainage system improvement
Social	ok
Administrative Capability	Public Works
Local Champion	Public Works
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	~$250,000
Potential Funding Sources	Unknown
Time Line	Complete
Progress	
Action Progress Status	Complete

SEWER LINING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H3
Risk	
Hazard(s) Addressed	Flooding
Risk Finding	**Lining of Sanitary Sewer System** - Infiltration and Inflow (I&I) into sanitary sewer infrastructure contributes to system overflows and backups, causing secondary impacts during heavy rainfall events.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Infrastructure Retrofits
Action Description	Line existing sewer lines with impermiable material to reduce I&I. The Village of Larchmont has approximately 113,000 linear feet of sanitary sewer pipe.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce secondary impacts during flooding
Technical	N/A
Political	N/A
Legal	ok
Environmental	Positive - flooding / water quality improvement (less system overflow)
Social	ok
Administrative Capability	Public Works
Local Champion	Public Works
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	Medium
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Westchester County - (Portion of Funding to date)
Time Line	22,000 linear feet of lining completed to date (approximatey 20 percent of total system)
Progress	
Action Progress Status	New action proposed in 2013

PRYER MANOR ROAD GUIDE WALL	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H4
Risk	
Hazard(s) Addressed	Storm Surge, Coastal Erorsion
Risk Finding	**Pryer Manor Road Guide Wall Rebuild** – Existing Guide Wall damaged by storm surge during Hurricane Irene
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Storm Repairs
Action Description	Rebuild existing guidewall with greater structural stability to reduce future probability of failure
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Reduce future storm surge impact
Technical	N/A
Political	N/A
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	~$20,000
Potential Funding Sources	N/A
Time Line	Completed August 2011
Progress	
Action Progress Status	Complete

OCEAN & MAGNOLIA AVENUE ROADWAY DAMAGES	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H5
Risk	
Hazard(s) Addressed	Storm Surge, Flooding, Coastal Erosion
Risk Finding	**Magnolia Ave. & Ocean Ave** - Portion of roadway collapse during Hurricane Irene, Roadway and surrounding area is flooded due to drainage system failures.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Rebuild portion of collapsed roadway, reconstruct/reset drainage infrastructure. Assess existing drainage system for further improvements to reduce flooding impacts
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Reduce Future Flooding Impacts
Technical	Needs Evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	To date ($500 material, DPW time and equipment)
Potential Funding Sources	Unknown
Time Line	Roadway repairs complete August 2011, Additional drainage study and improvements identified as future project
Progress	
Action Progress Status	New Action Proposed

PARAPET WALL REPAIRS	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H6
Risk	
Hazard(s) Addressed	Storm Surge, Coastal Erosion
Risk Finding	**Dog Beach, Magnolia Avenue and Walnut Avenue Parapet Walls -** Hurricane Sandy damaged existing parapet walls at Magnolia & Walnut Avenues, and the Dog Beach.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Storm Repairs
Action Description	Repair Existing Parapet Walls
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	N/A
Technical	N/A
Political	unknown
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works
Local Champion	Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	$7,000
Potential Funding Sources	Unknown
Time Line	Completed October 2012
Progress	
Action Progress Status	Complete

EAST CREEK IMPROVEMENTS	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H7
Risk	
Hazard(s) Addressed	Flooding, Hurricane
Risk Finding	**East Creek (Flint Park) Stabilization & Clearing -** Existing creek channel is eroded and unstabilized, flooding of park is experienced frequently.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood Mitigation
Action Description	Creek cleared of debris for improved channel flow, native plant species planted for stabilization, drainage weir installed
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Reduced flooding impacts
Technical	N/A
Political	N/A
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works
Local Champion	Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Westchester County Funded
Time Line	Completed ~1996
Progress	
Action Progress Status	Complete

FLINT PARK DRAINAGE PIPE	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H8
Risk	
Hazard(s) Addressed	Flooding
Risk Finding	**Drainage Pipe Flooding - East Creek at Flint Park -** Existing drainage conveyance pipe has become obstructed/collapsed and is unable to meet storm drainage demands, causing flooding.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Infrastructure Repairs / Flood Mitigation
Action Description	Replacement of approximately 300 linear feet of 60 inch dia. Drainage pipe
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Reduction of Flood Impacts
Technical	N/A
Political	N/A
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works with Town of Mamaroneck
Local Champion	Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Town of Mamaroneck
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Completed 1996
Progress	
Action Progress Status	Complete

FLINT PARK DRAINAGE IMPROVEMENTS	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H9
Risk	
Hazard(s) Addressed	Flooding
Risk Finding	**Flint Park** - Heavy rain and tidal surge causes flooding on park grounds. Existing infrasturture is overwhelmed by storm flow causing damages to park facilities.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood Mitigation / Infrastructure Retrofits
Action Description	Existing drainage conditions evaluated. Existing drainage infrastruture is replaced based upon evaluation findings, sized for appropriate design storms. Porous parking lot installed to replace existing impervious lot.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Reduction of future flood impacts
Technical	N/A
Political	N/A
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works, Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	~$4.5M
Potential Funding Sources	Unknown
Time Line	Completed 2008
Progress	
Action Progress Status	Complete

LORENZEN PARK DRAINAGE STUDY	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H10
Risk	
Hazard(s) Addressed	Flooding
Risk Finding	**Lorenzen Park Drainage Study -** Park floods during significant rain events. Existing storm drainage infrastructure is inadequate
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Evaluate existing site drainage conditions, design retrofits and improvements for drainage infrastructure.
Existing, Future &/or N/A	Existing
Action - Evaluation	
Risk Reduction	Reduce Flooding
Technical	Evaluation Completed 2009
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Consulting Assistance
Local Champion	Village Board, Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	Study Completed 2009
Local Planning Mechanism	
Responsible Party & Partners	Village Board, Public Works
Cost Estimate	$12,000 for study, design documents
Potential Funding Sources	Unknown
Time Line	Study Completed 2009
Progress	
Action Progress Status	Construction of design improvements scheduled for 2014.

KANE PARK RETAINING WALL	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H11
Risk	
Hazard(s) Addressed	Hurricane, Storm Surge, Flooding
Risk Finding	**Kane Park Retaining Wall Reconstruction** - Existing retaining wall collapsed due to storm impacts. Flooding commonly occurs in area.
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Storm Repairs
Action Description	Reconstruct existing retaining wall. Construct the wall at increased height and strength to reduce probability of future collapse.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Lower risk of future failure
Technical	N/A
Political	unknown
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works
Local Champion	Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	No
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	$1,000 materials + DPW labor & equipment
Potential Funding Sources	Unknown
Time Line	Completed ~2001
Progress	
Action Progress Status	Complete

GIS INFRASTRUCTURE MAPPING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H12
Risk	
Hazard(s) Addressed	Multiple
Risk Finding	**GIS Map Existing Village Infrastructure** - GIS Mapping of municipal infrastructure provides for more efficient maintenance and data colllection of existing structures. GIS data can be manipulated and utilized for accurate system analysis and design.
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Data Collection
Action Description	Map existing water system, sanitary and storm sewer infrastructure into GIS database.
Existing, Future &/or N/A	Existing
Action - Evaluation	
Risk Reduction	Improved maintenance, analysis for design.
Technical	N/A
Political	N/A
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works, Emergency Services, Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	Yes
Implementation	
Priority	In Progress
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	$8-10k to date. Work is in progress.
Potential Funding Sources	Unknown
Time Line	Start 2009, In Progress
Progress	
Action Progress Status	In Progress, Continued Work Expected in 2013, 2014.

DPW VILLAGE YARD BACKUP POWER	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H13
Risk	
Hazard(s) Addressed	Multiple
Risk Finding	**Village Yard Backup Power Retrofits** - Existing structures and equipment at the Village Yard do not have access to backup electrical power. The DPW Yard is a critical facility for the Village of Larchmont.
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Retrofit
Action Description	Install transfer switch to receive backup generator power on critical yard electrical circuits. Install solar panel on garage for backup power use.
Existing, Future &/or N/A	Existing
Action - Evaluation	
Risk Reduction	Reduction of secondary storm impacts. Improved facility functionallity
Technical	N/A
Political	unknown
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works, Consulting Assistance
Local Champion	Public Works
Other Community Objectives	ok
Critical Facility Involved	Yes
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	~$15,000
Potential Funding Sources	Unknown
Time Line	Completed ~2009
Progress	
Action Progress Status	Complete

VILLAGE HALL OEM CENTER RETROFITS	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H14
Risk	
Hazard(s) Addressed	Multiple
Risk Finding	**Village Hall OEM Retrofits** - Office of emergency management does not have secured emergency resources (backup electrical power, communications) at an operations center.
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Facility Retrofits
Action Description	Install services for OEM center at Village Hall, including radio communications, phone and internet connections. Install elevator to provide additional service to center.
Existing, Future &/or N/A	Existing
Action - Evaluation	
Risk Reduction	Reduced Secondary Impacts
Technical	N/A
Political	N/A
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works, Consultants
Local Champion	Public Works, Emergency Services, Village Board
Other Community Objectives	ok
Critical Facility Involved	Yes
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Public Works & Contractors
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Completed ~1998
Progress	
Action Progress Status	Complete

VILLAGE HALL EMERGENCY POWER	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H15
Risk	
Hazard(s) Addressed	Multiple
Risk Finding	**Village Hall Emergency Power** - Village Hall does not have access to emergency electrical power following outages, compromising emergency management and services.
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Facility Retrofits
Action Description	Install emergency generator at Village Hall for circuits use by Village Emergency Services
Existing, Future &/or N/A	Exisitng
Action - Evaluation	
Risk Reduction	Reduction of Secondary Hazard Impacts
Technical	N/A
Political	N/A
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works
Local Champion	Public Works, Emergency Services
Other Community Objectives	ok
Critical Facility Involved	Yes
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Public Works, Contractors
Cost Estimate	$1,000 materials + DPW labor & equipment
Potential Funding Sources	Unknown
Time Line	Completed 1966.
Progress	
Action Progress Status	Complete** (Village service demands have grown since 1966, Emergency Generator application for Village Hall currently proposed under separate project)

LARCHMONT DAM EAP	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	H16
Risk	
Hazard(s) Addressed	Dam Failure, Flooding
Risk Finding	Larchmont Dam Emergency Action Plan- Plan for emergency action/procedures during dam failure event has not been studied/prepared. Slow/improper response poses risk to human life and property.
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Administrative
Action Description	Prepare Emergency Action Plan (EAP) for Larchmont dam in relation to surrounding community, drainage path. Train responsible indiviudals on EAP procedures
Existing, Future &/or N/A	Existing
Action - Evaluation	
Risk Reduction	Reduced Secondary Impacts, Improved Response
Technical	N/A
Political	N/A
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Public Works, Consultants
Local Champion	Village Board, Emergency Services, Public Works, Residents
Other Community Objectives	ok
Critical Facility Involved	Yes
Implementation	
Priority	Complete
Local Planning Mechanism	
Responsible Party & Partners	Village Board, Emergency Services, Public Works
Cost Estimate	~$64,000
Potential Funding Sources	Unknown
Time Line	Completed 2010
Progress	
Action Progress Status	Complete

6.3 SITES FOR PLACEMENT OF TEMPORARY HOUSING UNITS

The NYSOEM Hazard Mitigation Planning standards require the identification of sites for the placement of temporary housing units to house residents displaced by disaster for communities that contain a 100-year floodplain on a current FEMA FIRM map. The Village of Larchmont FEMA FIRM map has both 100-year and 500-year areas identified on its most recent map.

According to the Village of Larchmont's most recent Master Plan from 2001, "although there are isolated vacant lots dispersed throughout the Village, for all intents and purposes, Larchmont was substantially "built out" by 1950." The Village of Larchmont has noted that the Larchmont Train Station Parking lot would be an available open space in the Village located outside of the floodplain that could serve temporary housing needs. **(See Appendix D for Letter from Local Floodplain Administrator.)**

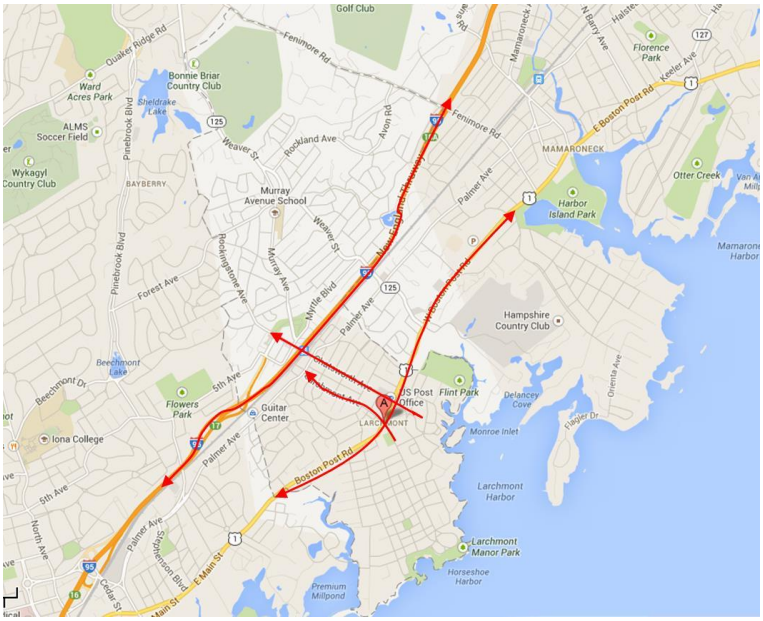
6.4 SITE SUITABLE FOR RELOCATING OR REBUILDING HOUSING UNITS

The NYSOEM Hazard Mitigation Planning standards require the identification of potential sites within the community suitable for relocating houses out of the floodplain or building new house once properties in the floodplain are razed. The Village of Larchmont is a densely developed community and no known sites exist for the relocation of residences outside of the floodplain.

6.5 EVACUATION ROUTES & SHELTERS

The NYSOEM Hazard Mitigation Planning standards require that communities with residential neighborhoods or critical facilities that have been flooded, inundated or isolated by water, should develop evacuation routes and procedures and identify shelters.

- Currently, in the Village of Larchmont, a formal evacuation route does not exist. Major roads such as I-95, Boston Post Road, Chatsworth Avenue, Larchmont Avenue and Beach Avenue serve as evacuation routes during a disaster situation. Due to the coastal nature of the community, the Village is limited with regard to ingress and egress routes.



- Shelters for use during disaster events have been identified in **Table 79.**

7. GOALS & OBJECTIVES

Prior to developing goals and objectives for this plan, the Village of Larchmont wanted to clearly understand the hazards that were identified as having a potential to impact the community, what the risks associated with each hazard is and where vulnerabilities exist. The establishment of goals and objectives was based upon the consideration of all of this information and the Village's commitment to reducing future vulnerability and mitigating risks where possible.

According to the FEMA guidance documentation, a goal serves as a general guideline that explains what a community would like to achieve and an objective defines a specific strategy or implementation step that will help reach a specific goal. A mitigation action is a specific task that the Village can tie back to its goals and objectives and measure what has been achieved.

The Village of Larchmont key stakeholder group, with input from residents and Woodard & Curran developed the following 5 goals and associated objectives for the Hazard Mitigation Plan. They include:

GOAL 1

- Engage and educate the public regarding preparing for, responding to and recovering from natural disasters and continue to include them in mitigation discussions.

  Objectives
  - 1-1: Increase the level of understanding of natural hazards and the risks associated when they occur.
  - 1-2: Work closely with officials, stakeholders and residents of neighboring communities to collaborate on education, response and recovery when possible.
  - 1-3: Continue to communicate effectively through the use of data, maps and other hazard information (which is reviewed and updated regularly) as a way to engage the public.
  - 1-4: Inform the public about existing and changing regulatory requirements that are related to coastal zones, sea level rise and climate change.
  - 1-5: Gather information from stakeholders about repetitive damages from natural hazards and engage them in future mitigation discussions.

GOAL 2

- Continue to prepare for climate change and sea level rise impacts on the Village of Larchmont.

  Objectives
  - 2-1: Consider requiring the use of building materials that would naturally keep buildings cooler during summer months and also reduce electrical demand.
  - 2-2: Refine coastal zone and flood plain regulations to further limit development and redevelopment while also encouraging natural habitat restoration.

- 2-3: Consider requiring climate change and sea level rise during infrastructure (stormwater/wastewater) and building repairs and upgrades.
- 2-4: Engage multiple layers of government, neighboring communities and a wide range of public and private stakeholders to build buy-in and crucial partnerships for coordinated adaptation strategies.
  - Engage the insurance industry to facilitate the use of risk-sharing mechanisms to address climate change impacts.
  - Focus attention on early win–win adaptation strategies, such as those that have near-term benefits or meet multiple goals like greenhouse gas mitigation and continued emergency planning.

GOAL 3

- Encourage disaster-resistant development and promote restoration and protection of coastal zones and natural areas.

Objectives

- 3-1: Continue to review and evaluate existing local standards and codes to ensure that they encourage or require consider climate challenges and sea level rise and enhance them as new information on hazards and risks is available.
- 3-2: Develop new local standards and codes to increase the Village's resilience to climate change and sea level rise.
- 3-3: Develop and encourage the use of design standards and specifications that take climate change into consideration and are proactive in fostering mitigation.
- 3-4: Evaluate and implement mitigation actions that focus on enhancing and preserving the natural environment to reduce impacts created by coastal erosion and coastal storms.

GOAL 4

- Investigate and understand flooding occurrences and reduce its impact on the community.

Objectives

- 4-1: Develop both short and long term action items for responding to current flooding challenges while incorporating mitigation activities that will increase the Village's ability to withstand future events as well.
- 4-2: Implement specific mitigation activities that will reduce recurring flooding impacts in the Village of Larchmont.
- 4-3: Seek out a variety of funding sources that could be used to help the Village reduce existing flooding in the community.
- 4-4: Encourage property owners to take preventative actions especially in repetitive loss areas vulnerable to flooding.

GOAL 5

- Further enhance the Village's ability to respond and react to a natural hazard event and reduce the possibility of damage and losses due to their occurrence.

Objectives

- 5-1: Actively participate in discussions, meetings, conferences and other events that relate pertain to climate change, improved mapping and data and periodic assessments of climate change impacts and adaptation for the continued evolution of climate change adaptation policies and programs.
- 5-2: Educate residents and businesses about insurance coverage for natural hazards.
- 5-3: Identify, pursue and maximize the use of outside sources of funding.
- 5-4: Incorporate mitigation strategies into capital improvement projects and maintenance upgrades.
- 5-5: Identify the need for and acquire any special emergency services, training and equipment.
- 5-6: Integrate new hazard and risk information into emergency operation plans.

The goals and objectives developed for this plan took into consideration the hazard identification and ranking exercise that was detailed in Section 5. Flooding continues to be the primary natural hazard of concern and can occur on its own, or as a secondary impact of other natural hazards such as hurricanes, thunderstorms or heavy rain events. Other goals and objectives were developed around the importance of continuing to engage and educate the public about natural hazards, their impact, how to be prepared and how residents can continue to participate in the discussion in the future.

8. MITIGATION ACTIVITIES & ACTION PLAN

The Village of Larchmont has developed mitigation activities and an action plan to assist the community in the future in its ability to prepare for and manage any future natural hazard events while keeping property and the life of residents as safe as possible.

8.1 COMPLIANCE WITH NFIP REQUIREMENTS

One overarching mitigation activity is the Village's continued participation in the NFIP. Larchmont has been participating in the NFIP since June 1973 and the number of policies in force and claims filed were discussed in **Section 4.4**. The Village currently has Flood Damage Prevention addressed in Chapter 337 of the local Zoning Regulations. The language promotes public health and safety to minimize public and private losses due to flood conditions with provisions to protect against flood damage, control the alteration of floodplains, control filling, grading and dredging, regulate flood barrier construction and qualify and maintain participation in the National Flood Insurance Program.

The Village will continue to comply with NFIP requirements as applicable including:

- Enforcement of Floodplain Management regulations,
- Regular review of Floodplain Management regulations and modifications as needed,
- Regulating new construction in SFHAs,
- Continued floodplain identification and mapping including any local requests for map updates, and
- Continued outreach and communication regarding community assistance about floodplain monitoring and the NFIP, and
- Consideration of implementing a CRS program.

8.2 MITIGATION ACTION PLAN

The action items noted in this section were identified based on the goals and objectives prepared during the planning process, past occurrences and the Village's commitment to work closely with residents and stakeholders to ensure public safety. Most of the action items focus on mitigating flooding, coastal storm, coastal erosion and hurricane impacts. Other projects include regulatory updating/additions and public outreach. The table below is a summary list of projects for the Village of Larchmont. Full project descriptions as required by NYSOEM can be found on the pages following **Table 87**.

Table 87: Mitigation Project List Summary

Project No.	Location (Address)	Title	Description	Objectives Addressed
1	Pine Brook Drive & Kilmer Road	Flooding	Frequent Flooding - Roadway damaged due to surcharged sewers. Drainage system surcharges at 96" drainage pipe under US 1. Project located in 100 year floodplain and is subject to tidal influence during flooding events.	2-3, 3-4, 4-1, 4-2
2	Flint Park IAO Birch Lane	Surcharge of Storm & Sanitary Sewers	Frequent Flooding - flooded fields and surcharged drainage system on Birch Lane. Causes some flooding to local homeowners Located in 100 year floodplain.	2-3, 3-4, 4-1, 4-2
3	Pryer Manor Road at Red Bridge	Flooding of Roadway and Bridge	Frequent Flooding - ~4' depth of water. Makes roadways and bridge impassible. Experienced storm surge during Hurricane Irene	2-3, 3-4, 4-1, 4-2
4	Nassau Road	Frequent Roadway Flooding	Frequent flooding – heavy rains flood the roadway and cause flooding into residential homes.	2-3, 3-4, 4-1, 4-2
5	Magnolia Ave. & Ocean Ave.	Flooding of Roadway	Frequent Flooding - Located in 100 year floodplain. Heavy rains flood roadway and cause closures. Debris frequently deposited onto Roadway. Roadway collapsed during Irene	2-3, 3-4, 4-1, 4-2
6	Cedar Island	Tidal Surge Flooding	During extreme events, bridge to island is impassible. Located in 100 year floodplain.	2-3, 3-4, 4-1, 4-2
7	Pine Brook (BPR to Guion Lane)	Flooding	Frequent Flooding - Runoff from new development floods banks of existing brook, causes flooding to basements. Located in 100 year floodplain. (Reference to Pine Brook Drainage Basin Study)	2-3, 3-4, 4-1, 4-2
8	Park Avenue (Manor Park)	Tidal Surge Flooding	Heavy rain and tidal surge floods park and roadway. Debris frequently deposited in roadway. Damaged seawalls and walkways in previous storms	2-3, 3-4, 4-1, 4-2
9	Park Avenue (Manor Beach)	Tidal Surge Flooding	Heavy rain and tidal surge floods roadway. Located in 100 year floodplain. Debris frequently deposited in roadway	2-3, 3-4, 4-1, 4-2
10	Spanish Cove Road & Lindsley Drive	Flooding	Storm surge floods drainage system, causing minor flooding to nearby residences Located in 100 year floodplain.	2-3, 3-4, 4-1, 4-2
11	North Avenue	Flash Flooding	Frequent Flooding - Lack of drainage infrastructure creates flooding during heavy rains. Some	2-3, 3-4, 4-1, 4-2

Project No.	Location (Address)	Title	Description	Objectives Addressed
			damage to first floors of buildings	
12	Coolidge Street	Flash Flooding	Frequent Flooding - Existing drainage structures flood during heavy rains. Floods some garages and basements.	2-3, 3-4, 4-1, 4-2
13	Monroe Ave (Cherry Ave to Ervilla Dr.)	Flooding	Existing drainage structures flood during heavy rain. Causes street closures, no historical damage to structures reported.	2-3, 3-4, 4-1, 4-2
14	687 Weaver Street - Larchmont Reservoir	Flooding, Erosive Water	Heavy rain overtopped lower embankment of pond during April 2007 rain event. Damages to downstream personal property and bridges were reported	2-3, 3-4, 4-1, 4-2
15	Flint Ave at Cedar Island	Flooding	Flooded garages and basements, sewer backups reported	2-3, 3-4, 4-1, 4-2
16	Turtle Park	Flooding	Poor drainage	2-3, 3-4, 4-1, 4-2
17	Walnut Avenue	Flooding	Storm surge floods yards and basements	2-3, 3-4, 4-1, 4-2
18	Byron Place	Water Tanks at Pump Station	Upgrade existing relay panels, variable head pumps	2-3, 3-4, 4-1, 4-2
19	Shore Drive	Drainage Pipe Replacement	Replace 200 feet of storm drainage pipe	2-3, 3-4, 4-1, 4-2
20	N/A	Zoning Code Review & Update	Conduct a review and update of Zoning Code with the purpose of creating additional alignment and protection abilities in the Village of Larchmont with respect to mitigation activities.	1-4, 2-2, 2-4, 3-1, 3-2, 3-3, 3-4
21	N/A	Emergency Preparedness Planning	Continue to plan for future natural hazard events by continued planning efforts which include updating existing plans and conducting new projects where needed.	1-1, 1-2, 1-3, 1-5, 2-4, 4-1, 5-5, 5-6
22	N/A	Long-Term Coastal and Riverine Residential Area Evaluation	Conduct a long-term evaluation of coastal and riverine residential areas to determine impacts of coastal storms, coastal erosion and sea level rise.	1-1, 1-2, 1-3, 1-5, 2-3, 4-1, 5-1, 5-2, 5-6
23	N/A	Vulnerability of Waterfront Structures	Evaluate the stability of existing waterfront structures and develop long term action plan.	1-1, 1-2, 2-3, 4-1, 4-2, 4-4, 5-4, 5-6
24	N/A	Coordination Plan	Develop a specific coordination plan between Larchmont and neighboring communities regarding natural hazard mitigation and emergency	1-1, 1-2, 1-3, 1-5, 2-4, 5-1, 5-5, 5-6

Project No.	Location (Address)	Title	Description	Objectives Addressed
			preparedness.	
25	N/A	Tree Trimming	Develop a tree-trimming program/plan with the purpose of regularly conducting maintenance activities to limit secondary impacts during storm events.	3-4, 4-1, 4-4
26	N/A	Equipment Relocation	Elevate/relocate key Village equipment that has been damaged by flooding or other natural hazard events.	1-2, 4-1, 4-4, 5-4, 5-5
27	N/A	Public Outreach/Education	Develop educational material to inform residents, businesses and visitors about natural hazard events and preparedness.	1-1, 1-2, 1-4, 1-5, 2-4, 4-1, 4-4, 5-1, 5-2
28	N/A	Inflow and Infiltration Removal	Investigate additional areas where inflow/infiltration problems need to be removed from storm/sanitary sewer overflow.	1-1, 2-3, 3-4, 4-1, 4-2, 5-4
29	N/A	Flooding/Drainage Improvement	Identify and pursue funding sources for flood abatement and drainage improvement projects involving public facilities, equipment and infrastructure.	1-1, 4-3, 4-4, 5-1, 5-2, 5-3
30	N/A	Flood Prevention	Continue to encourage and monitor flood resistant construction measures and practices for new construction and renovations in floodplains and repetitive flood loss areas. Pursue funding for design basis report and/or development of outreach materials.	1-1, 2-1, 2-3, 3-1, 3-2, 3-3, 3-4, 5-1, 5-2, 5-3
31	N/A	Hazard Prevention	Plan for and integrate hazard resistant mitigation measures into the repair and rehabilitation of Village facilities and infrastructure.	1-1, 1-2, 2-1, 2-3, 5-3, 5-4
32	N/A	Preventative Flood Maintenance	Maintain and enhance cleaning of stormwater collection and conveyance system especially in flood prone areas that have not already been specifically mentioned.	1-1, 1-2, 1-5, 2-3, 3-4, 4-1, 4-2
33	N/A	Emergency Personnel Training	Continue to support and provide for training opportunities for emergency	1-1, 1-2, 1-5, 2-4, 5-5

Project No.	Location (Address)	Title	Description	Objectives Addressed
			service personnel in the Village of Larchmont.	
34	N/A	Public Education/Outreach	Prepare and provide informational materials on natural hazard preparation for the City's website, Cable TV access channel, schools, community centers, day care centers, senior centers and other community venues.	1-1, 1-3, 2-4, 5-1

FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	1
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Pine Brook Drive & Kilmor Road** - Area has experienced flooding 5-6 times in the last 10 years. Frequent Flooding - Roadway damaged due to surcharged sewers. Drainage system surcharges at 96" drainage pipe under US 1. Project located in 100 year floodplain and is subject to tidal influence during flooding events.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include both roadway repair and drainage system evaluation.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive - drainage system improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

SURCHARGE OF STORM & SANITARY SEWERS	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	2
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Flint Park IAO Birch Lane Frequent Flooding** - flooded fields and surcharged drainage system on Birch Lane. Causes some flooding to local homeowners Located in 100 year floodplain. Has flooded 3-4 times in the past 10 years.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include drainage infrastructure assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive - drainage system improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING OF ROADWAY AND BRIDGE	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	3
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Pryer Manor Lane at Red Bridge frequent flooding** - 4' depth of water. Makes roadways and bridge impassible. Experienced storm surge during Hurricane Irene. Has occurred 5-6 times in the past 10 years.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FREQUENT ROADWAY FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	4
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Nassau Road Frequent Flooding** – Heavy rains flood the roadway and cause flooding into residential homes. Existing drainage infrastructure is inadequate for peak storm flows. Floods 2-3 times per year.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include drainage infrastructure assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive - drainage system improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING OF ROADWAY	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	5
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Magnolia Ave. & Ocean Ave. Flooding of Roadway** - Heavy rain floods roadway and causes road closures. Project is located with 100 year FEMA floodplain. Debris is frequently deposited into roadway. Portion of roadway collapsed during Hurricane Irene.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

TIDAL SURGE FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	6
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Cedar Island - Tidal Surge Flooding** - During extreme events, flooding causes the bridge to Cedar Island to become impassible. Project is located within the 100 year FEMA floodplain.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	7
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Pine Brook (Boston Post Road to Guion Lane) - Flooding** - Runoff from new development floods banks of existing brook, causes flooding to basements. Project is located within 100 year FEMA floodplain. (Reference to Pine Brook Drainage Basin Study)
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

TIDAL SURGE FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	8
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Park Avenue (Manor Beach) - Tidal Surge Flooding** - Heavy rain and tidal surge floods park and roadway. Debris frequently deposited in roadway. Damaged seawalls and walkways in previous storms.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

TIDAL SURGE FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	9
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Park Avenue (Manor Beach) - Tidal Surge Flooding** - Heavy rain and tidal surge floods beach and surrounding roadways. Project is located in 100 year floodplain. Debris is frequently deposited in roadway.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	10
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Spanish Cove Road & Lindsley Drive - Flooding** - Storm surge floods drainage system, causing minor flooding to nearby residences Located in 100 year floodplain.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLASH FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	11
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**North Avenue - Flash Flooding** - Roadway floods frequently during intense downpours. Existing drainage infrastructure appears unable to accommodate peak storm flows. Flooding causes some damage to the first floor of buildings
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLASH FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	12
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Coolidge Street - Flash Flooding** - Frequent flooding of roadway during intense precipitation. Existing drainage structure appears overwhelmed by peak storm flows. Flooding causes damage to surrounding garages and basements.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include both roadway repair and drainage system evaluation.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive - drainage system improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	13
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Monroe Avenue (Cherry Ave - Ervilla Drive) - Flooding** - Existing drainage system surcharges during heavy rain. Causes street closures. No historical damage to surrounding structures have been reported.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include drainage infrastructure assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive - drainage system improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING, EROSIVE WATER	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	14
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms, Dam Safety
Risk Finding	**687 Weaver Street (Larchmont Reservoir) - Flooding, Erosive Water -** Heavy rain overtopped the lower embankment of pond during April 2007 rain event. Damages to downstream personal property and bridges were reported.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood Mitigation / Dam Safety
Action Description	Needs to be further defined but may include flood study, dam infrastructure improvements, channel stabilization
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts, Increase public safety
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	15
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Flint Avenue at Cedar Island** – Flooded basements and garages during historical precipitation events. Historical sewer backups have been reported.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include drainage infrastructure assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive - drainage system improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	16
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Turtle Park - Flooding -** Poor drainage conditions creates flooding within the park grounds.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Needs to be further defined but would include flood study, potential infrastructure replacement, drainage assessment.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	17
Risk	
Hazard(s) Addressed	Flooding, Coastal Erosion
Risk Finding	**Walnut Avenue - Flooding** - Storm surge experienced during historical events causes flooding to yards and basements.
Action - Description	
Action Category	Flooding, Hurricane, Coastal Storm, Thunderstorms, Coastl Erosion
Action Type	Flood Mitigation, Shoreline Stabilization
Action Description	Needs to be further defined but would include flood study, potential infrastructure improvements
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding, coastal erosion impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

WATER TANKS AT PUMP STATION	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	18
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Byron Place - Water Tanks at Pump Station**- Existing pump station relay panels and pump assemblies are outdated and/or have limited capability during hazard events.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Pump Station upgrades / retrofits
Action Description	Upgrade existing pump station relay panels, replace existing infrastructure with variable head pumps
Existing, Future &/or N/A	Existing - Infrastructure Upgrades
Action - Evaluation	
Risk Reduction	Improved supply capabiltity during natural disasters. Allow for pump station
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

DRAINAGE PIPE REPLACEMENT	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	19
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Shore Drive - Drainage Pipe Replacement** - Existing drainage pipe surcharges during rain events. Pipe requires replacement.
Action - Description	
Action Category	Structure/infrastructure projects
Action Type	Flood mitigation
Action Description	Not Completed - Will require drainage assessment, hydraulic pipe design for replacement
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

ZONING CODE REVIEW & UPDATE	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	20
Risk	
Hazard(s) Addressed	All Hazards
Risk Finding	**Zoning Code Updates** - Update and modernize local zoning codes for construction within flood prone areas, identified flood/storm surge zone.
Action - Description	
Action Category	Administrative
Action Type	Code Updates
Action Description	Assess existing codes for compliance with modern building principles/requirements. Amend codes to reduce impacts of future hazards on new construction
Existing, Future &/or N/A	N/A
Action - Evaluation	
Risk Reduction	Reduced hazard impacts on new construction
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive
Social	ok
Administrative Capability	Village Board, Building Department, Consulting Assistance
Local Champion	Village Board, Building Department
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Building Department
Cost Estimate	Unknown
Potential Funding Sources	FEMA, US Department of State
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

EMERGENCY PREPAREDNESS TRAINING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	21
Risk	
Hazard(s) Addressed	All Hazards
Risk Finding	**Emergency Prepardness Training -** Outdated/Inadequate training of emergency responders, village officials and community groups. Emergency response plans require modernization/review.
Action - Description	
Action Category	Administrative
Action Type	Training/Education
Action Description	Train emergency responders, village officials and community groups on response protocols to natural disasters, emergency management, first aid, etc. Update existing emergency response/contingency plans
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Reduce duration of events, increase public awareness/response
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	N/A
Social	Positive
Administrative Capability	Larchmont PD, Larchmont FD
Local Champion	Unknown
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Village Board, Larchmont PD, Larchmont FD
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

COASTAL & RIVERINE RESIDENTIAL AREA EVALUATION	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	22
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Storm, Thunderstorms
Risk Finding	**Long Term Coastal and Riverine Residential Area Evaluation** - Existing residential areas of Larchmont located along Long Island Sound and watercourses are exposed to repeated flooding/storm surge
Action - Description	
Action Category	Administrative
Action Type	Community Assessment - Flood Mitigation, Coastal Erosion Prevention
Action Description	Conduct a long-term evaluation of coastal and riverine residential areas to determine impacts of coastal storms, coastal erosion and sea level rise.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown
Social	ok
Administrative Capability	Village Board, Building Department, Potentially Consulting Assistance
Local Champion	Village Board
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Village Board, Building Department
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLASH FLOODING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	23
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Coastal Erosion, Coastal Storm
Risk Finding	**Vulnerability of Waterfront Structures** - Numerous properties have direct frontage to Long Island Sound. Moderate to severe damage has been experienced by historical storm events.
Action - Description	
Action Category	Administrative
Action Type	Evaluation/Study
Action Description	Evaluate the stability of existing waterfront structures. Develop a long term action plan based upon evaluation findings.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Reduction of Flood, Coastal Erosion Impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive - drainage system improvement
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

COORDINATION PLAN	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	24
Risk	
Hazard(s) Addressed	All Hazards
Risk Finding	Coordination Plan should be developed between Village of Larchmont and neighboring communities. Plan should address emergency response, emergency municipal operations, shared services, etc.
Action - Description	
Action Category	Administrative
Action Type	Plan Development
Action Description	Develop a specific coordination plan between Larchmont and neighboring communities regarding natural hazard mitigation and emergency preparedness.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Improve response efforts, Increase preparedness
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	N/A
Social	Positive Impact
Administrative Capability	Village Departments
Local Champion	Village Board, Emergency Services
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Village Board, Emergency Services
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

TREE TRIMMING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	25
Risk	
Hazard(s) Addressed	Hurricane, Wind Storms, Winter Storm
Risk Finding	High winds cause significant damage by falling trees to electrical supply infrastructure, village and private owned property. Falling trees have the potential to cause loss of human life
Action - Description	
Action Category	Infrastructure / Maintenance
Action Type	Tree Trimming
Action Description	Develop a tree-trimming program/plan with the purpose of regularly conducting maintenance activities to limit secondary impacts during storm events.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Reduce secondary storm impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown
Social	Unknown, some historical public opposition noted
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

EQUIPMENT RELOCATION	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	26
Risk	
Hazard(s) Addressed	Flood, Hurricane, Coastal Storm, Thunderstorm
Risk Finding	Existing equipment/infrastructure is located within areas prone to historical storm impacts, most notably flooding and hurricane storm surge.
Action - Description	
Action Category	Structure / Infrastructure projects
Action Type	Infrastructure Relocation / Retrofit
Action Description	Relocate and/or elevate key Village equipment that has been damaged by flooding or other natural hazard events.
Existing, Future &/or N/A	Mitigation of existing infrastructure
Action - Evaluation	
Risk Reduction	Reduce future flood/hurricane damage.
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive - Greater system/service reliability
Social	ok
Administrative Capability	Village Board, Public Works, Potentially Consulting Assistance
Local Champion	Village Board, Public Works
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Village Board, Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

PUBLIC OUTREACH / EDUCATION	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	27
Risk	
Hazard(s) Addressed	All Hazards
Risk Finding	Public is unaware of community emergency action plans, protocols and service capabilities during natural disasters.
Action - Description	
Action Category	Administrative
Action Type	Public Education
Action Description	Develop educational material to inform residents, businesses and visitors about natural hazard events and preparedness.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Improved community response
Technical	ok
Political	ok
Legal	ok
Environmental	ok
Social	ok
Administrative Capability	Various Departments
Local Champion	Unknown
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Unknown
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

INFLOW AND INFILTRATION REMOVAL	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	28
Risk	
Hazard(s) Addressed	Flooding, Hurricane, Thunderstorm
Risk Finding	Stormwater inflow and infiltration into existing sanitary sewer infrastructure has the potential to overwhelm system capabilities and cause overflow of untreated sewage flows
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Sewer System Retrofit
Action Description	Investigate additional areas where inflow/infiltration problems need to be removed from storm/sanitary sewer overflow.
Existing, Future &/or N/A	Some retrofits completed, Future additional are anticipated
Action - Evaluation	
Risk Reduction	Reduce secondary hazard impacts, protection of public health
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Positive impact
Social	ok
Administrative Capability	Public Works, Potentially Consulting Assistance
Local Champion	Public Works, Residents
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

RESOURCES FOR FLOODING / DRAINAGE IMPROVEMENTS	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	29
Risk	
Hazard(s) Addressed	Flood, Hurricane, Coastal Storm, Thunderstorm
Risk Finding	Funding opportinities for flood abatement and community drainage improvements are largely unknown.
Action - Description	
Action Category	Administrative
Action Type	Grant/Funding Research
Action Description	Identify and pursue funding sources for flood abatement and drainage improvement projects involving public facilities, equipment and infrastructure.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	N/A
Technical	N/A
Political	ok
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Various Departments
Local Champion	Unknown
Other Community Objectives	ok
Implementation	
Priority	Medium
Local Planning Mechanism	
Responsible Party & Partners	Unknown
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

FLOOD PREVENTION	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	30
Risk	
Hazard(s) Addressed	Flood, Hurricanes, Coastal Storm, Thunderstorm
Risk Finding	Flood resistant construction measures are available but not alwways utilized during construction and renovation projects on community properties. Additional study of flooding in Village has not been completed.
Action - Description	
Action Category	Administrative
Action Type	Enforcement / Policy Development
Action Description	Continue to encourage and monitor flood resistant construction measures and practices for new construction and renovations in floodplains and repetitive flood loss areas. Pursue funding for design basis report and/or development of outreach materials.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Would reduce future flooding impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	Unknown/Positive - flooding improvement
Social	ok
Administrative Capability	Building Department, Public Works, Consultants
Local Champion	unknown
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Building Department, Public Works, Consultants
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

HAZARD PREVENTION	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	31
Risk	
Hazard(s) Addressed	All Hazards
Risk Finding	Existing Village Infrastructure is not adequately protected against hazard impacts
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Preventative Retrofits to Village Infastructure at Hazard Risk
Action Description	Plan for and integrate hazard resistant mitigation measures into the repair and rehabilitation of Village facilities and infrastructure.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Reduced hazard impacts
Technical	Needs evaluation
Political	unknown
Legal	unknown
Environmental	unknown
Social	unknown
Administrative Capability	Village Board, Public Works, Building Department, Consulting Assistance
Local Champion	unknown
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Unknown
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

PREVENTATIVE FLOOD MAINTENANCE	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	32
Risk	
Hazard(s) Addressed	Flood, Hurricane, Coastal Storm, Thunderstorm
Risk Finding	Existing drainage infrastructure is in poor condition, prone to clogging with debris during rain events, causing flooding.
Action - Description	
Action Category	Structure / Infrastructure Projects
Action Type	Maintenance of Infrastructure
Action Description	Maintain and enhance cleaning of stormwater collection and conveyance system especially in flood prone areas that have not already been specifically mentioned.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Reduction of flood impacts
Technical	Needs evaluation
Political	unknown
Legal	ok
Environmental	ok
Social	Positive
Administrative Capability	Public Works
Local Champion	Public Works
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Public Works
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

EMERGENCY PERSONELL TRAINING	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	33
Risk	
Hazard(s) Addressed	All Hazards
Risk Finding	Training updates and refresher courses are routinely required for emergency service personell. Inadequate training risks poor emergency response and management. Reduction of Village service capabilies during natural disasters.
Action - Description	
Action Category	Administrative
Action Type	Training / Education
Action Description	Continue to support and provide for training opportunities for emergency service personnel in the Village of Larchmont.
Existing, Future &/or N/A	Existing, To be continued for future
Action - Evaluation	
Risk Reduction	Reduction of secondary hazard impacts, improved emergency operations
Technical	ok
Political	ok
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Village Emergency Services
Local Champion	unknown
Other Community Objectives	ok
Implementation	
Priority	High
Local Planning Mechanism	
Responsible Party & Partners	Village Emergency Services
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

PUBLIC EDUCATION / OUTREACH	
Plan Name	Village of Larchmont Hazard Mitigation Plan
Community Name	Village of Larchmont
Project Number	34
Risk	
Hazard(s) Addressed	All Hazards
Risk Finding	Public is unaware of community emergency action plans, protocols and service capabilities during natural disasters.
Action - Description	
Action Category	Administrative
Action Type	Community Outreach / Education
Action Description	Prepare and provide informational materials on natural hazard preparation for the City's website, Cable TV access channel, schools, community centers, day care centers, senior centers and other community venues.
Existing, Future &/or N/A	Future
Action - Evaluation	
Risk Reduction	Reduction of secondary hazard impacts
Technical	N/A
Political	unknown
Legal	ok
Environmental	N/A
Social	ok
Administrative Capability	Village Departments
Local Champion	unknown
Other Community Objectives	ok
Implementation	
Priority	Medium
Local Planning Mechanism	
Responsible Party & Partners	Unknown
Cost Estimate	Unknown
Potential Funding Sources	Unknown
Time Line	Unknown
Progress	
Action Progress Status	New action proposed in 2013

8.3 PROJECT PRIORITIZATION

The projects and mitigation activities noted in the previous section that have been proposed meet the FEMA STAPLEE criteria. To meet the STAPLEE criteria, projects and activities must be socially acceptable to the community, technically feasible, protective of or beneficial to the environment and are backed by legal authority and consistent with current laws, consider economic benefits and costs and include environmental considerations. The worksheet that was filled out for each project addresses this criterion. Current community needs were also considered with means the project or activity must be acceptable to decision makers, Village representatives, stakeholders and the public.

Implementation of projects and mitigation activities were prioritized by a qualitative ranking of high, medium or low. STAPLEE criteria was applied to all of the projects and mitigation activities that have been identified in **Table 87** and priorities were evaluated on need, cost-effectiveness, number of hazards addressed, number of objectives met and funding eligibility (see **Table 88**).

Table 88: Project Prioritization

	Hazard Addressed	# of Objectives Met	Benefits of Activity	Cost of Activity	Local Funds Available	Grant Eligibility	Priority Level
1	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	High	High	Medium	High	High
2	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	High	Medium	Medium	Medium	Medium
3	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	High	High	Medium	Medium	High
4	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	High	Medium	Medium	Medium	High
5	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	High	Medium	Medium	Medium	Medium
6	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	High	Medium	Medium	Medium	Medium
7	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Medium	Medium	Low	Medium

	Hazard Addressed	# of Objectives Met	Benefits of Activity	Cost of Activity	Local Funds Available	Grant Eligibility	Priority Level
8	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Medium	Low	Medium	Medium
9	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Medium	Low	Medium	Medium
10	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Medium	Medium	Medium	Medium
11	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Medium	Low	Medium	Medium
12	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Medium	Low	Medium	Medium
13	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Medium	Low	Low	Low
14	Flooding, Hurricane, Coastal Storm, Thunderstorms, Dam Safety	4	Medium	Medium	Low	Medium	Medium
15	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Medium	Low	Medium	Medium
16	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	Medium	Low	Low	Medium	Low
17	Flooding, Hurricane, Coastal Storm, Thunderstorms, Coastal Erosion	4	Medium	Low	Low	Medium	Low
18	Flooding, Hurricane, Coastal Storm, Thunderstorms	4	High	High	Medium	Medium	High
19	Flooding, Hurricane, Coastal Storm,	4	Medium	Medium	Low	Medium	Medium

	Hazard Addressed	# of Objectives Met	Benefits of Activity	Cost of Activity	Local Funds Available	Grant Eligibility	Priority Level
	Thunderstorms						
20	All Hazards	7	High	Low	Medium	Low	High
21	All Hazards	8	High	Low	Medium	Low	High
22	Flooding, Hurricane, Coastal Storm, Thunderstorms	9	Low	Medium	Low	Medium	Medium
23	Flooding, Hurricane, Coastal Erosion, Coastal Storm	8	Medium	High	Low	Medium	Medium
24	All Hazards	8	High	Low	Low	Low	High
25	Hurricane, Wind Storms, Winter Storm	3	High	Low	Low	Low	High
26	Flood, Hurricane, Coastal Storm, Thunderstorm	5	High	Low	Low	Low	High
27	All Hazards	9	High	Low	Low	Low	High
28	Flooding, Hurricane, Thunderstorm	6	Medium	Medium	Low	Low	Medium
29	Flood, Hurricane, Coastal Storm, Thunderstorm	6	High	Low	Low	N/A	High
30	Flood, Hurricane, Coastal Storm, Thunderstorm	10	High	Low	Low	Medium	High
31	All Hazards	6	High	Medium	Low	Medium	Medium
32	Flood, Hurricane, Coastal Storm, Thunderstorm	7	High	Medium	Low	Low	Medium
33	All Hazards	5	High	Low	High	Low	High
34	All Hazards	4	High	Low	Medium	Low	High

The Village of Larchmont chose to utilize a qualitative assessment (high, medium, low) for prioritizing projects and mitigation activities for this plan.

- **High Priority** – Denotes a project or mitigation activity that meets multiple plan objectives, addresses multiple natural hazards, has benefits that outweigh potential costs, has funding secured or is able to be funded through the local budget and may be eligible for grant funding. Projects of high priority have the potential to be completed within the next 5 years.

- **Medium Priority** – Denotes a project or mitigation activity that meets some goals and objectives, addresses some natural hazards, has benefits that outweigh potential costs, funding is not in place but could be through local allocation or grant funding.

- **Low Priority** – Denotes a project that meets at least one goal/objective, addresses at least on natural hazard, costs may outweigh the benefits, funding has not been secured and grant eligibility is unclear and the timeframe for completion is probably long term.

Plan implementation will focus on the projects and mitigation activities that have the highest level priority associated with them. Over time and as the plan is implemented, priorities may change due to new funding sources or information or future hazard events.. During the annual review of this document, the Core Hazard Mitigation Planning Team will review the list of projects and mitigation activities to make sure that the prioritization ranking for each one is still the most appropriate.

8.4 POTENTIAL FUNDING SOURCES

As noted in the New York State Hazard Migration Plan, there may be various funding sources available for the Village of Larchmont to potentially pursue as they consider implementing various action items from this planning effort. The table below details various agencies and programs that may be available.

Table 89: Potential Funding Sources

Agency	Program	Description	More Information
FEDERAL			
National Science Foundation (NSF), Directorate for Engineering, Division of Civil and Mechanical Systems, Hazard Reduction Program	Hazard Reduction Program	Funding for research and related educational activities on hazards.	http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13358
NSF -Directorate for Social, Behavioral Economic Science, Division of Social Behavioral and Economic Research Decision, Risk, and Management	Decision, Risk, and Management Science Program	Funding for research and related educational and activities on risk, perception, communication, and management (primarily, technological hazards).	http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423
Department of Commerce (DOC), Economic Development Administration	Disaster Mitigation Planning and Technical Assistance	Technical and planning assistance grants for capacity building and mitigation project activities focusing on creating disaster resistant jobs and workplaces.	http://www.eda.gov/disasterrecovery.htm
US Department of Agriculture (USDA) - National Resources Conservation (NRCS) Watersheds and Wetlands Division	Watershed Surveys and Planning	Surveys and Planning Studies for appraising water and related resources, and service formulating alternative plans for conservation use and development. Grants and advisory/counseling services to assist with planning and implementation improvement.	http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/landscape/wsp/?cid=stelprdb1042175
FEMA	National Flood Insurance Program	Formula grants to States to assist FEMA communities to comply with NFIP floodplain management requirements (Community Assistance Program).	http://www.fema.gov/national-flood-insurance-program
FEMA	National Dam Safety Program	Technical assistance, training, and grants to help improve State dam safety programs.	http://www.fema.gov/about-national-dam-safety-program

Agency	Program	Description	More Information
FEMA; DOI-USGS USGS	National Earthquake Hazards Reduction	Training, planning and technical Program assistance under grants to States or local jurisdictions.	http://www.fema.gov/national-earthquake-hazards-reduction-program
USDA-NRCS	Watershed Protection and Flood Prevention Program	Technical and financial assistance for installing works of improvement to protect, develop, and utilize land or water resources in small watersheds under 250,000 acres.	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wfpo/
USDA-NRCS	Environmental Quality Incentives Program	Technical, educational and limited financial assistance to encourage environmental enhancement.	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/
DOD-USACE	Beneficial Uses of Dredged Materials	Direct assistance for projects that protect, restore, and create aquatic and ecologically related habitats, including wetlands, in connection with dredging an authorized Federal navigation project.	http://water.epa.gov/type/oceb/oceandumping/dredgedmaterial/beneficial_use.cfm
EPA	Wetlands Protection – Development Grants	Grants to support the development and enhancement of State and tribal wetlands protection programs.	http://water.epa.gov/type/wetlands/initiative_index.cfm
EPA	Clean Water Act Section 319 Grants	Grants to States to implement non-point source programs, including support for non- structural watershed resource restoration activities.	http://water.epa.gov/polwaste/nps/cwact.cfm
Department of Commerce, NOAA	Coastal Zone Management Program	Grants for planning and implementation of nonstructural coastal flood and hurricane hazard mitigation projects and coastal wetlands restoration.	http://coastalmanagement.noaa.gov/funding/welcome.html
USDA-NRCS	Emergency Watershed Protection (EWP)	Provides technical and financial assistance Program for relief from imminent hazards in small watersheds, and to reduce vulnerability of life and property in small watershed areas damaged by severe natural hazard events.	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/
USDA-NRCS	Conservation Reserve	The program reduces soil erosion, improves water quality, and restores wildlife habitat as a result of	http://www.nrcs.usda.gov/wps/portal/nrcs/det

Agency	Program	Description	More Information
	Program	idling cropland in exchange for compensation.	ail/national/technical/?cid=stelprdb1041269
FEMA	Disaster Housing Program	Emergency assistance for housing including; minor repair of home to establish livable conditions, mortgage and rental assistance.	http://www.fema.gov/disaster-assistance-available-fema
FEMA via NYSOEM	Public Assistance Program (Infrastructure)	Grants to States and Communities to repair damaged infrastructure and public facilities and help restore government and government related services following disasters. Mitigation funding is available for work related to damaged components of the eligible building or structure.	http://www.fema.gov/public-assistance-local-state-tribal-and-non-profit
HUD Community Planning and Development Grant Programs, Office of Affordable Housing, HOME Investments Partnership Program	HOME Investments Partnership Program	Grants to local and State government and consortia for permanent and transitional housing,(including financial support for property acquisition and rehabilitation for low income persons).	http://www.hud.gov/offices/cpd/affordablehousing/programs/home/
HUD Community Planning and Development Grant Program	Disaster Recovery Initiative	Grants to fund gaps in available recovery assistance after disasters (including mitigation).	http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/dri
HUD – Community Planning and Development Grant Program	Section 108 Loan Guarantee	Enables states and local governments participating in the Community Development Block Grant (CDBG) Program to obtain federally guaranteed loans for disaster distressed areas.	http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/108
DOD - USACE	Water Resources Development Act-1986, Section 1135, Project Modification for the Improvement of the Environment	Provides resources for ecosystem rehabilitation by modifying structures, operations, and waters resource projects constructed by USACE or restoring areas where a USACE project contributed to a degradation of an area.	http://cw-environment.usace.army.mil/restoration.cfm

Agency	Program	Description	More Information
DOD - USACE	Section 205 of 1948 Flood Control Act	Resources for small flood damage reduction projects.	http://www.nww.usace.army.mil/Portals/28/docs/assistanceprograms/sec205.pdf
USDOE	School Renovation, Idea and Technology Grant, and Emergency Response Grant	Grant funding for eligible school renovation and emergency response measures.	http://www2.ed.gov/programs/dvpemergencyresponse/index.html
Department of the Interior, UDSA, US Fish & Wildlife	North America Wetland Conservation Fund	Cost share grants to stimulate public/private partnerships for the protection, restoration and management of wetland habitats.	http://www.fws.gov/birdhabitat/Grants/NAWCA/Small/index.shtm
USDA – Fish & Wildlife Service	Land Acquisition	Acquires or purchases easements on high quality land and waters for inclusion into the National Wildlife Refuge System	http://www.fws.gov/southeast/planning/landacquisitionhome.html
Department of the Interior/National Park Service	Federal Land Transfer / Federal Land to Parks Program	Identifies federal real property available for open space transfer to states and local governments for development of parks and recreation.	http://www.nps.gov/ncrc/programs/flp/index.htm
DOI and NPS	Land and Water Conservation Fund (LWCF)	Funding to States for outdoor recreational development, renovation, land acquisition and planning.	http://www.nps.gov/lwcf/
NYSOPRHP	Urban Park and Recreation Recovery	Grants to economically distressed urban communities primarily for rehabilitation of critically needed recreation facilities. The program encourages systematic local planning and commitment to continuing operation and maintenance of recreation programs, sites, and facilities.	http://www.nps.gov/uprr/
US DOT Federal Highway Administration Highway Trust Fund	Transportation Equity Act	Funding from the Highway Trust Fund for enhancements such as acquisition, scenic easements, and conversion of abandoned railways to trails.	http://www.fhwa.dot.gov/environment/recreational_trails/overview/benefits/index.cfm

Agency	Program	Description	More Information
USDOT FHWA	Boating Infrastructure Grant (BIG) program	Funding to construct, renovate, or maintain transient tie-up facilities, activity includes replacement of bulkheads, one time dredging to maintain channels or open water for vessels.	http://www.state.nj.us/transportation/airwater/maritime/marine_trades_NBIG.shtm
USDOT FHWA	Bridge Replacement and Rehabilitation	Funding for eligible bridges on any public road.	http://www.fhwa.dot.gov/bridge/hbrrp.cfm
USDOT FHWA	Recreational Trails	Funding for trails used by motorized and nonmotorized recreational vehicles	https://www.fhwa.dot.gov/environment/recreational_trails/
USDA - NRCS	Wetlands Reserve Program	Financial and technical assistance to protect and restore wetlands through easements and restoration agreement.	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands/
NYS Environmental Facilities Corporation	Clean Water State Revolving Funds	Loans at actual or below market interest rates to help build, repair, relocate or replace WWTPs.	http://www.nysefc.org/Default.aspx?tabid=82
EPA National Estuary Program	National Estuary Program Long Island Sound Preservation	Established by Congress in 1987 to improve the quality of estuaries of national importance. The Clean Water Act Section 320 as associated with NEP directs EPA to develop plans for attaining or maintaining water quality in an estuary. For LIS, implementation priorities are habitat restoration, watershed management, disposal of dredged materials, and public education and involvement on Long Island Sound issues.	http://water.epa.gov/type/oceb/nep/index.cfm
USACE	Watershed Environmental Assistance Program	Funding for water quality improvement projects within the "NYC Watershed" that include water supply, storage, treatment, and distribution facilities and surface water resource protection and development	http://www.nan.usace.army.mil/Portals/37/docs/civilworks/projects/ny/ecor/New%20York%20City%20Watershed%20Environmental%20Assistance%20Program,%20New%20York.pdf
STATE			

Agency	Program	Description	More Information
New York State	Appropriation through the Governor's Office	Funding for mitigation planning and project activity through special appropriations through the Governor's Office	http://www.dhses.ny.gov/oem/mitigation/plan.cfm
New York State DOS, DEC, OPRHP	Environmental Protection Fund	Funding administered by NYS Department of State DOS, Department of Environmental Conservation DEC, and Office of Parks Recreation and Historic preservation OPRHP to support many of the State's environmental needs. Results include development and mitigation related planning initiatives and projects such as acquisition projects as identified in Conserving Open Space and other Plans.	http://www.dec.ny.gov/lands/5071.html
New York State DOS, DEC, OPRHP	The Clean Water/Clean Air Bond Act	Provides significant resources for several open space and recreation programs including, open space conservation projects administered by DEC and OPRHP, farm land protection administered by NYS Dept. of Agriculture and Markets.	http://water.epa.gov/polwaste/nps/success319/fund_ny.cfm
NYS DEC	Hudson River Estuary Grants Program	Grants available from Environmental Protection Fund (EPF) through Hudson River Estuary program to: municipalities and not-for-profit corporations located within the geographic boundaries of the Hudson River Estuary and associated shore lands for: community interpretive centers and education projects; open space: planning, inventory and acquisition, scenery or river access; community conservation and river stewardship; watershed planning and Implementation and river access improvements.	http://www.dec.ny.gov/lands/4920.html

In addition, there are five main FEMA sources of mitigation funding. Four of the programs run on an annual basis and are nationally competitive.

- **Hazard Mitigation Grant Program (HMGP)** – the purpose of the program is to significantly reduce or permanently eliminate future risk to lives and property from natural hazards. HMGP funds mitigation planning, as well as projects consistent with priorities identified in State, Tribal, or local hazard mitigation plans. HMGP is tied to disaster and emergency declarations, so there is no prescribed timetable.
- **Pre-Disaster Mitigation (PDM)** – the purpose of the program is to provide funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event, to reduce immediate overall risks to the population and structures, and long-term reliance on funding from disaster declarations. PDM is run annually under the Unified Hazard Mitigation Assistance (HMA) Program and funds are subject to the availability of the program.
- **Flood Mitigation Assistance (FMA)** – the purpose of the program is to reduce or eliminate the long term risk of Flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program (NFIP). FMA is run annually under the Unified HMA Program.
- **Repetitive Flood Claims (RFC)** – the purpose of the program is to reduce or eliminate the long-term risk of flood damage to structures insured under the NFIP that have had one or more claim payments for flood damages. RFC is run annually under the Unified HMA Program.
- **Severe Repetitive Loss (SRL)** – the purpose of the program is to reduce or eliminate the long-term risk of flood damage to severe repetitive loss residential structures insured under the NFIP. SRL is run annually under the Unified HMA Assistance Program.

More information can be found here: http://www.fema.gov/hazard-mitigation-assistance

9. PLAN IMPLEMENTATION, MAINTENANCE & ADOPTION

The implementation of the Hazard Mitigation Plan will be overseen by the Village of Larchmont Mayor, Anne McAndrews. Mayor McAndrews will be responsible for engaging the Core Hazard Mitigation Planning team (Public Works General Foreman, Building Inspector, Fire Captain, Chief of Police and Captain of Police) on a regular basis to discuss how various action items might be implemented and to ensure that they are prioritized in the highest order of importance. The meetings will be documented and summarized including the status of any mitigation project actions, risk assessments or needed plan revisions.

9.1 PLAN MAINTENANCE & REVISION

On an annual basis, the Village will review the Hazard Mitigation plan or upon the occurrence of a substantial natural hazard event at a scheduled "annual plan review meeting" with the Core Hazard Mitigation Planning team. Together, the team will specifically evaluate the progress of the plan and document any mitigation activities. The public will be informed about the annual review of the plan by a "Village News and Announcement" posting on the Village's website (www.villageoflarchmont.org) where they will be offered the opportunity to provide input and comment through the use of the email address set up for this project which is hazardmitigation@villageoflarchmont.org. The public will also have an opportunity to comment on the plan both at the actual annual review meeting which will be open to the public and during the 5-year plan update. After the annual review meeting, the Village will issue a progress report and post it on the Village website.

The Village of Larchmont recognizes the importance of continued public outreach and public participation in this planning effort. Once the plan is finalized, a link will be posted to the Village's website, a press release will be issued and the effort may be discussed at various meetings where the Mayor and Core Hazard Mitigation Planning team members can promote the plan and continue to make the public aware and encourage participation. A hard copy of the plan will be made available at Village Hall, 120 Larchmont Avenue, Larchmont, NY.

9.2 REVISING THE PLAN

The Village of Larchmont is planning to review and update the plan every five years. In January 2018, the Mayor will reconvene the Core Team and set forth a schedule for reviewing the plan, updating any development changes in the community, including a discussion on new/changed regulatory requirements, a discussion of recent hazard events, a re-evaluation of the hazard ranking, updating any loss estimates, discussions new studies and technologies, revisiting potential projects and discussing projects that have been completed. The team will review any State or Federal changes made to plans, funding, policies, plans and will also utilize any updated Census Data that is available. The findings of this research and analysis will be compiled into an updated plan and submitted to NYSOEM and FEMA for review. The team will review existing goals and objectives and update them along with newer action items as needed.

9.3 INTEGRATION INTO OTHER PLANNING MECHANISMS

The Village of Larchmont has a number of local plans that were previously discussed in Section 4.1, Table 8 that are related either directly or indirectly to this Hazard Mitigation Plan. To the extent possible, requirements, actions or principles of these documents have been integrated into the Village Hazard Mitigation Plan. Mitigation planning can be integrated conversely into those documents by making it a regular topic that is discussed through any new or updated document and during the associated planning effort. The Core Hazard Mitigation Planning Committee could specifically designate a person to be assigned to advocate for Hazard Mitigation and specific activities may include:

- Integrate the Hazard Mitigation Plan goals and objectives into any new, amended or updated planning/policy document to the extent possible,

- Formalize and publicize a recognition of hazard mitigation planning and mitigation activities as a part of local and joint emergency management plans, efforts and operations,

- Address sea level rise, climate change and hazard mitigation planning in any future versions of the Waterfront Revitalization Plan, Zoning Regulation updates, Comprehensive Plans, Emergency Response plans, etc.

- Seek out opportunities to participate in other local Hazard Mitigation planning efforts, projects or initiatives to share local knowledge and also learn about other activities occurring in the region,

- Further integrate mitigation planning into the Capital Improvement Planning process by actively and regularly seeking alternative funding sources that have been highlighted in this plan.

9.4 PLAN ADOPTION

OFFICE OF

VILLAGE OF LARCHMONT
MUNICIPAL BUILDING
120 LARCHMONT AVENUE
LARCHMONT, N.Y. 10538
TEL.: (914) 834-6230
FAX: (914) 833-2370

Extract from the minutes of the meeting of the Board of Trustees of the Village of Larchmont, New York, held at the Municipal Building on Monday, August 12, 2013:

"On motion of Trustee Komar, seconded by Trustee Walsh, and unanimously carried, the following resolution was adopted, to wit:

Whereas, the Village of Larchmont, NY recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, an adopted Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre-and post-disaster mitigation grant programs; and

Whereas, the Village of Larchmont, NY fully participated in the FEMA-prescribed mitigation planning process to prepare this Hazard Mitigation Plan; and

Whereas, the New York State Office of Emergency Management officials have reviewed the "Village of Larchmont Hazard Mitigation Plan" (August 2013) and approved it contingent upon this official adoption of the participating government and entities;

Now, therefore, be it resolved, that the Village of Larchmont, NY adopts the " Village of Larchmont Hazard Mitigation Plan" as an official plan; and

Be it further resolved, the Village of Larchmont, NY will submit this Adoption Resolution to the New York State Office of Emergency Services and Federal Emergency Management Agency, Region II officials, to enable the Plan's final approval."

****

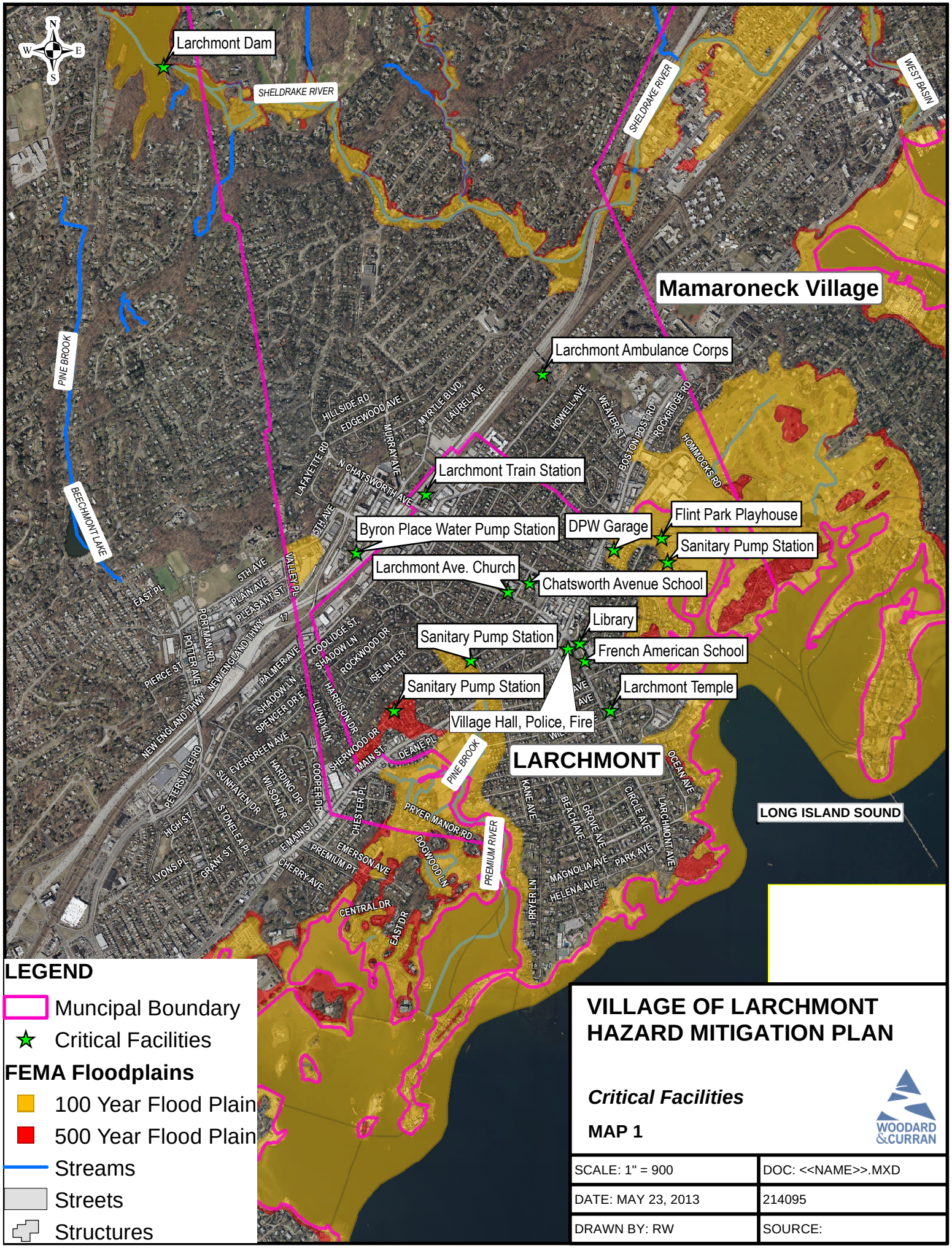
I hereby certify that I have compared the attached resolution with the original on file in my office and the same is a true and correct copy of the resolution which was duly adopted by the Board of Trustees of the Village of Larchmont, New York, a quorum being present, on August 12, 2013.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of said Village of Larchmont this 15th day of August, 2013.

Village Clerk

APPENDIX A: MAPS

Map 1: Critical Facilities
Map 2: Environmental Features
Map 3: Floodplain Map
Map 4: Hazardous Facilities
Map 5: Land Use
Map 6: Hurricane Evacuation Zones
Map 7: Hurricane Storm Surge Zones



LEGEND

- Muncipal Boundary
- Critical Facilities

FEMA Floodplains

- 100 Year Flood Plain
- 500 Year Flood Plain
- Streams
- Streets
- Structures

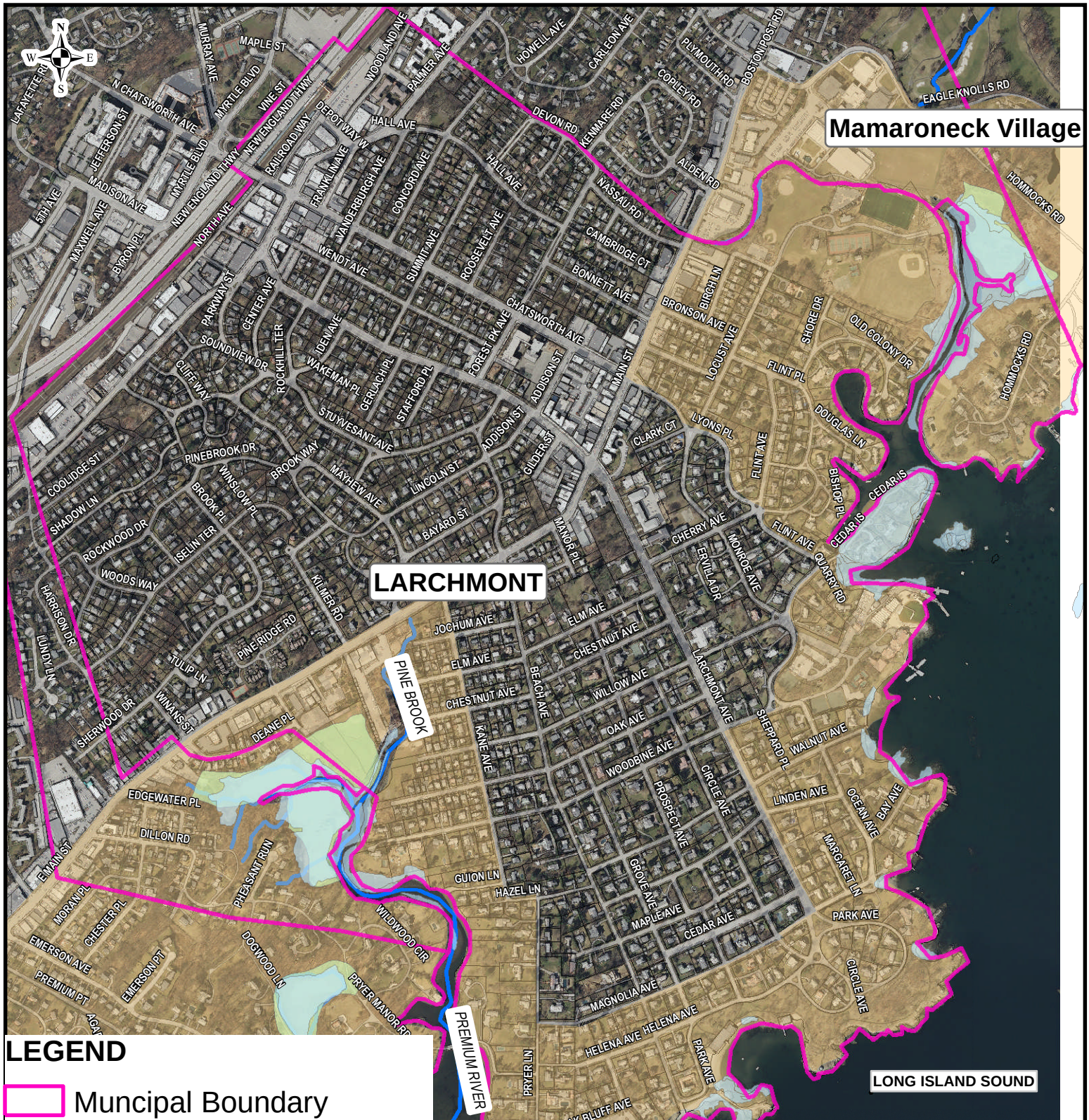
VILLAGE OF LARCHMONT HAZARD MITIGATION PLAN

Critical Facilities

MAP 1

WOODARD &CURRAN

SCALE: 1" = 900	DOC: <<NAME>>.MXD
DATE: MAY 23, 2013	214095
DRAWN BY: RW	SOURCE:



LEGEND

- Muncipal Boundary
- Tidal Wetlands
- Freshwater Wetlands
- Critical Environmental Area
- Streams
- Streets
- Larchmont Parcels
- Structures

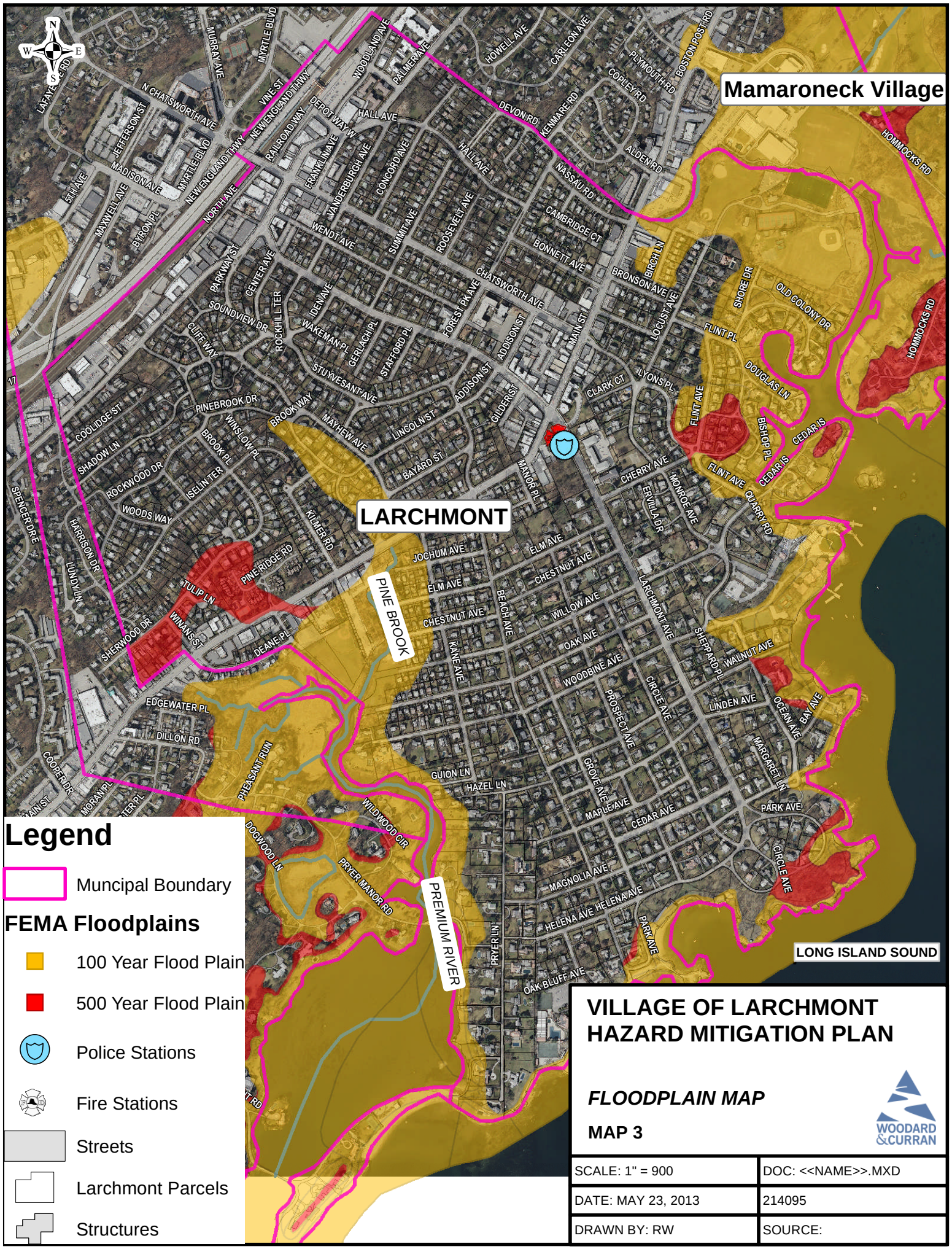
VILLAGE OF LARCHMONT HAZARD MITIGATION PLAN

Environmental Features

MAP 2

WOODARD &CURRAN

SCALE: 1" = 900	DOC: <<NAME>>.MXD
DATE: MAY 23, 2013	214095
DRAWN BY: RW	SOURCE:



VILLAGE OF LARCHMONT HAZARD MITIGATION PLAN

FLOODPLAIN MAP

MAP 3

WOODARD &CURRAN

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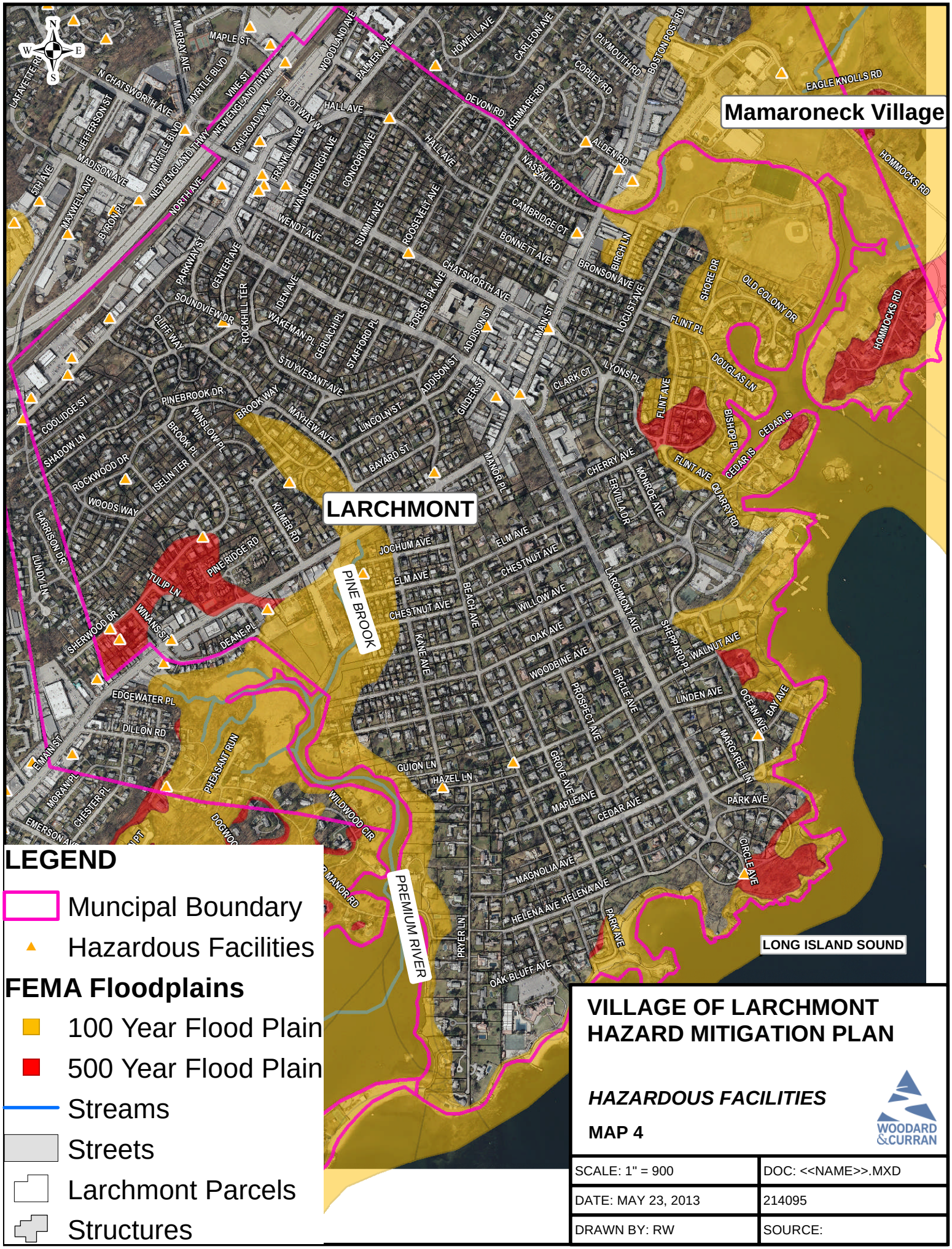

LEGEND

- Muncipal Boundary
- Hazardous Facilities

FEMA Floodplains

- 100 Year Flood Plain
- 500 Year Flood Plain
- Streams
- Streets
- Larchmont Parcels
- Structures

VILLAGE OF LARCHMONT HAZARD MITIGATION PLAN

HAZARDOUS FACILITIES

MAP 4

WOODARD &CURRAN

SCALE: 1" = 900	DOC: <<NAME>>.MXD
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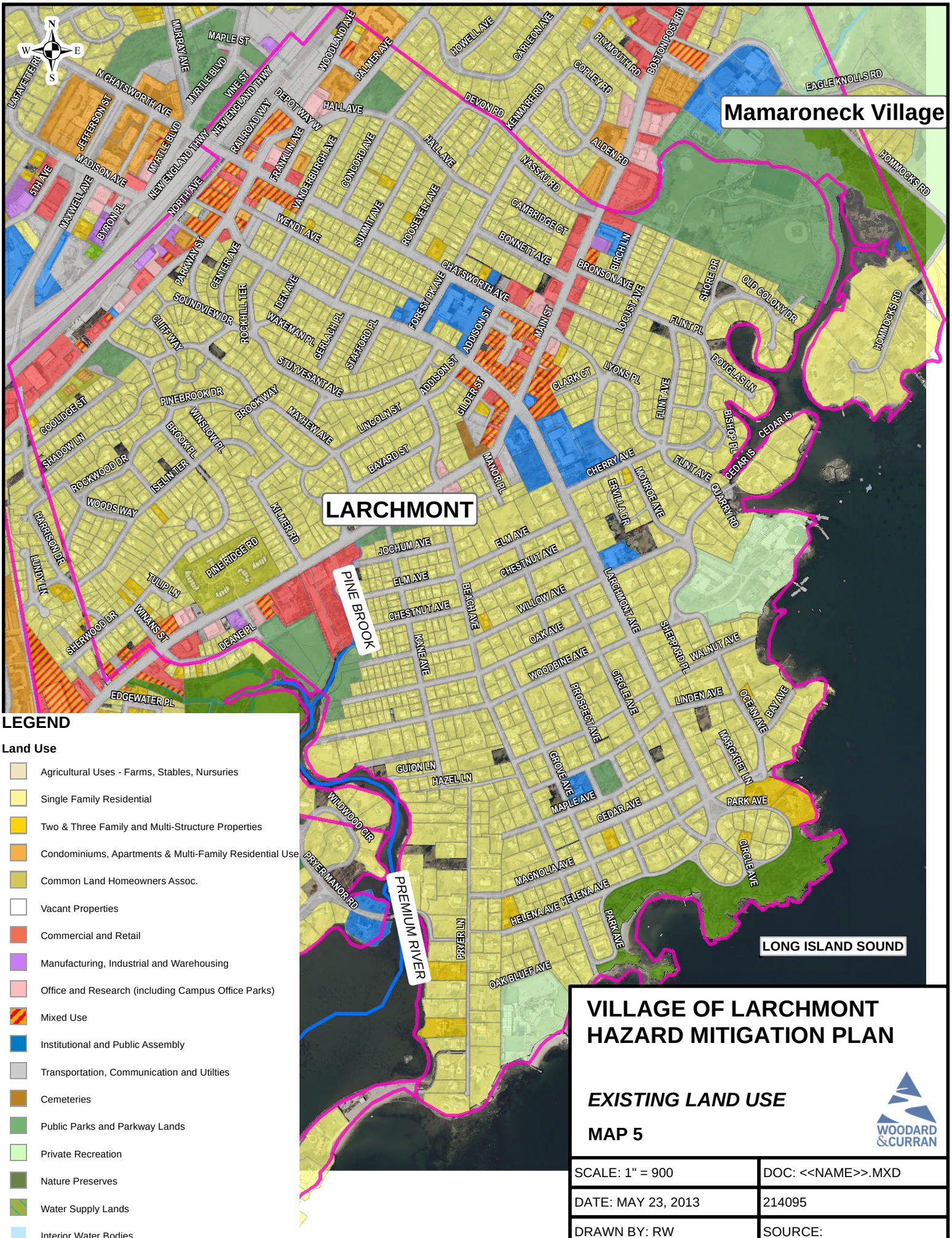

LEGEND

Land Use

- Agricultural Uses - Farms, Stables, Nurseries
- Single Family Residential
- Two & Three Family and Multi-Structure Properties
- Condominiums, Apartments & Multi-Family Residential Use
- Common Land Homeowners Assoc.
- Vacant Properties
- Commercial and Retail
- Manufacturing, Industrial and Warehousing
- Office and Research (including Campus Office Parks)
- Mixed Use
- Institutional and Public Assembly
- Transportation, Communication and Utilties
- Cemeteries
- Public Parks and Parkway Lands
- Private Recreation
- Nature Preserves
- Water Supply Lands
- Interior Water Bodies

VILLAGE OF LARCHMONT HAZARD MITIGATION PLAN

EXISTING LAND USE

MAP 5

WOODARD & CURRAN

SCALE: 1" = 900	DOC: <<NAME>>.MXD
DATE: MAY 23, 2013	214095
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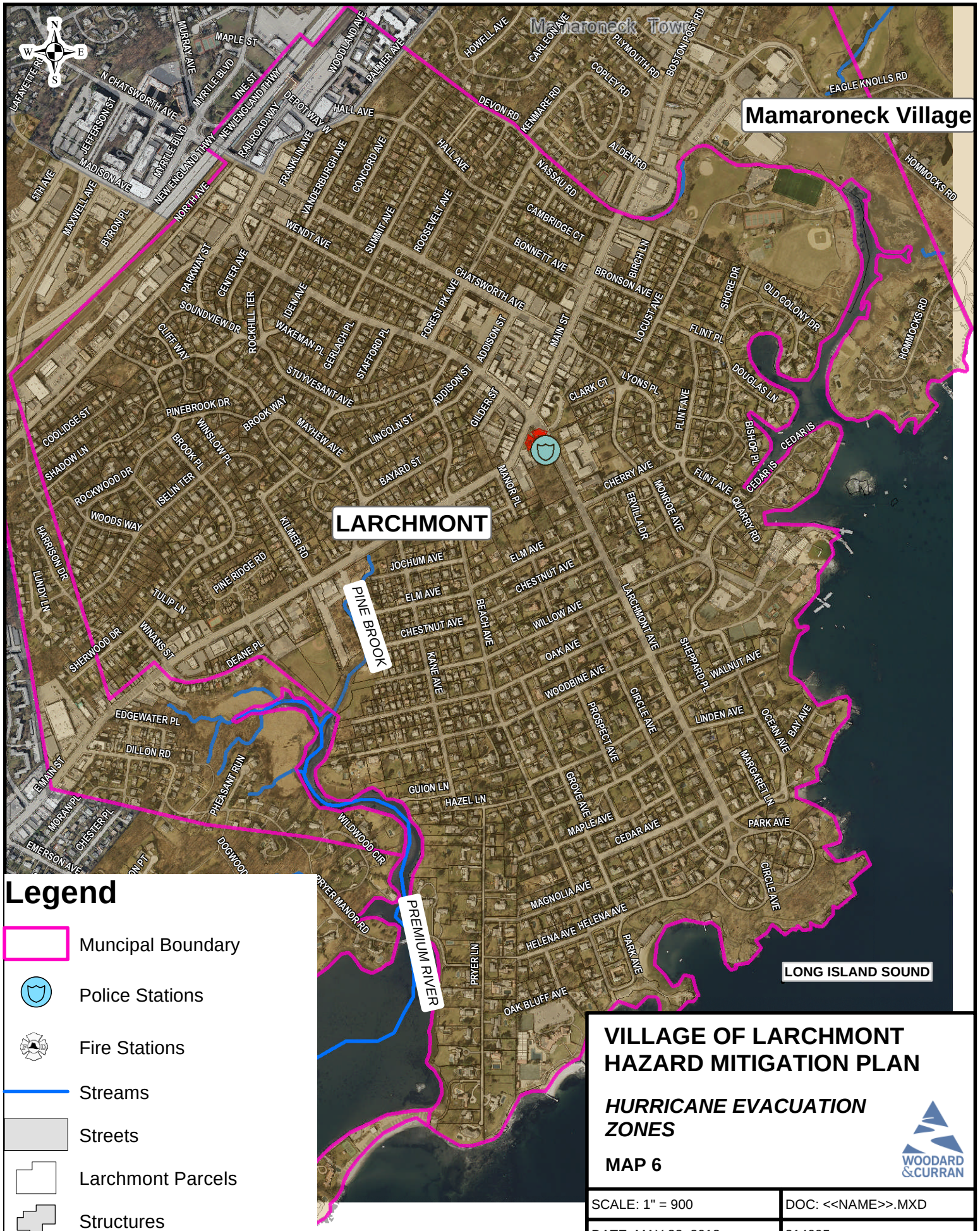

Legend

- Muncipal Boundary
- Police Stations
- Fire Stations
- Streams
- Streets
- Larchmont Parcels
- Structures
- Hurricane Evacuation Zones

VILLAGE OF LARCHMONT HAZARD MITIGATION PLAN

HURRICANE EVACUATION ZONES

MAP 6

WOODARD &CURRAN

SCALE: 1" = 900	DOC: <<NAME>>.MXD
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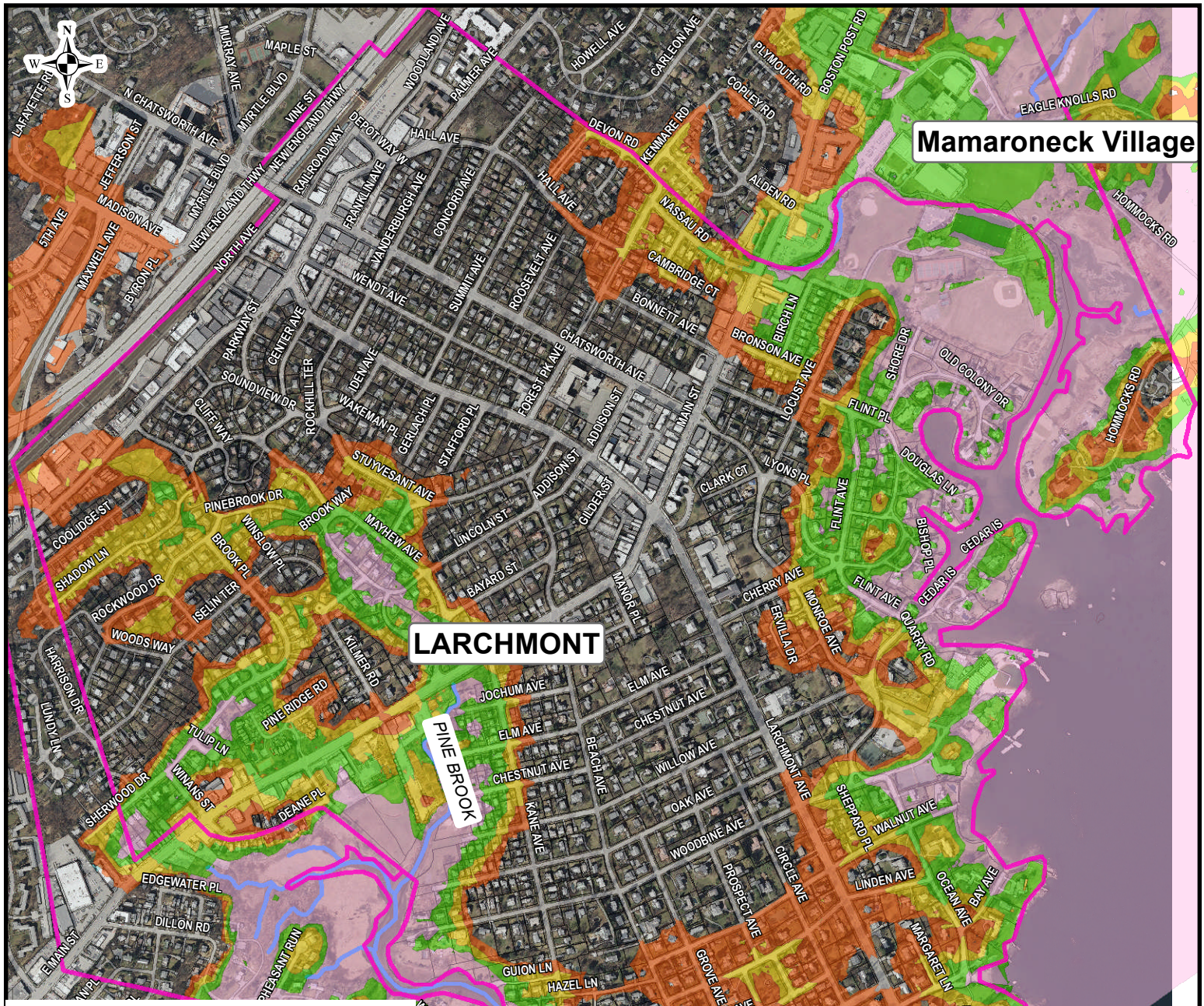

VILLAGE OF LARCHMONT HAZARD MITIGATION PLAN

HURRICANE STORM SURGE ZONES

MAP 7

WOODARD & CURRAN

SCALE: 1" = 900	DOC: <<NAME>>.MXD
DATE: MAY 23, 2013	214095
DRAWN BY: RW	SOURCE:

APPENDIX B: PUBLIC OUTREACH

Village of Larchmont
Multi-Hazard Mitigation Plan

Kick-Off Meeting
March 1, 2013

Meeting Agenda

- Project Overview
  - Background and Goals
  - Roles and Responsibilities
- Requirements of FEMA
  - Strategy, process, engagements
  - Documentation
- Multi-Hazard Mitigation Planning Process
  - Hazard identification and risk assessment
  - Mitigation strategy
- Project Implementation
  - Schedule and communications
  - Review process
- Open Discussion/Questions and Comments

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Project Overview

Phases of Emergency Management

- **Mitigation** – long-term reduction of vulnerability
- **Preparedness** – plans and preparations to save lives and property and facilitate response operations
- **Response** – actions taken to provide emergency assistance, save lives and minimize property damage
- **Recovery** – actions taken to return to normal conditions.

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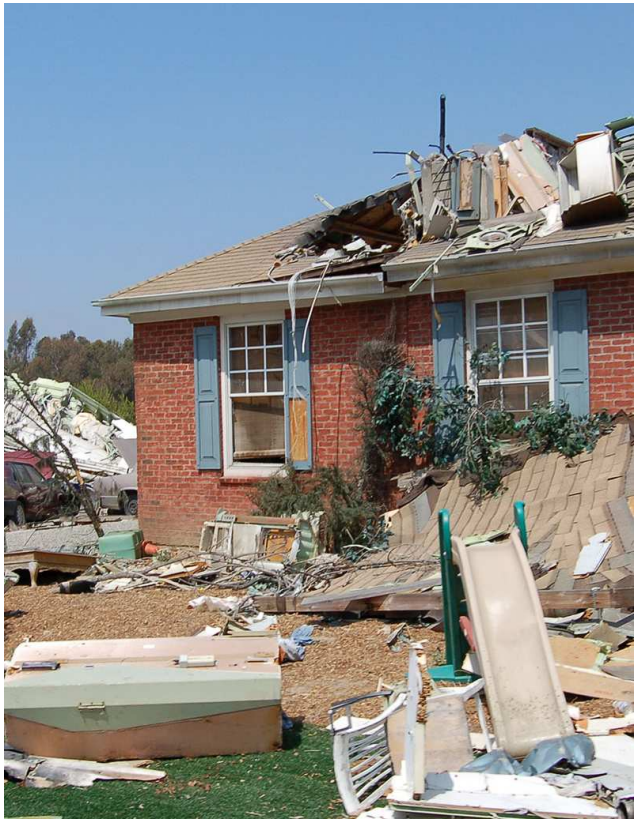
Hazard Mitigation Overview

- Hazard mitigation is defined as “any action taken to reduce or eliminate the long-term risk to human life and property from natural [and/or manmade] hazards.”
- Hazard mitigation activities may be implemented prior to, during, or after an event; however, it is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.
- Hazard mitigation is often focused on reducing repetitive loss, as many damaging events tend to occur in the same locations over time (e.g. flooding).



WOODARD &CURRAN

Benefits of Hazard Mitigation Planning

Communities benefit from Mitigation Planning by:

- Identifying cost effective actions for risk reduction that are agreed upon by stakeholders
- Focusing resources on the greatest risks and vulnerabilities
- Building partnerships by involving multiple stakeholders
- Increasing education and awareness of hazards and risk
- Communicating priorities to local, state and federal officials
- Aligning risk reduction with other community objectives

WOODARD &CURRAN

Project Goals

- Fulfill Federal and State Hazard Mitigation Planning Requirements
- Minimize Hazard Impacts to Physical Assets and Operations
- Reduce or Avoid Long-Term Vulnerabilities from Hazards
- Eligibility for Future Funding

WOODARD &CURRAN

Requirements of FEMA

What is FEMA Interested In?

- **Focus on Mitigation Strategy** – Emphasize Actions and Implementation of the Hazard Mitigation Strategy
- **Review for Intent, as well as Compliance** – Does the Plan Meet the Intent of the law and regulation
- **Process is as Important as the Plan Itself** – Planning Process to be Defined by the Village
- **This is Your Plan** – Must be Reflective of the Village, Stakeholders and Surrounding Community
- **Foster Relationships** – The relationships are as Important as the Words in the Plan

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Documentation is Critically Important

- Meetings
  - Agenda
  - Attendees List
  - Meeting Minutes
- Site Visits
  - Data Gathered and Data Sources
  - Interview Summaries
- Stakeholder Workshops
  - Agenda
  - Attendees List
  - Workshop Summaries

WOODARD &CURRAN

NYS OEM Requirements

Other New York State Requirements

- Counties and communities should invite at a minimum
  - County Hazard Mitigation Coordinators and Floodplain Professionals
  - County Emergency Managers
  - County Planners & GIS staff
  - County Soil & Water Conservation Districts
  - Regional & Metropolitan (Transportation) Planning Organizations
  - Delaware and Susquehanna River Basin Commissions (if applicable)
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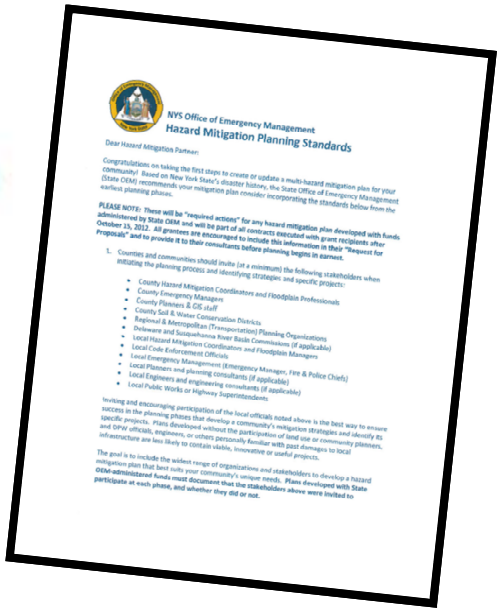

NYS Office of Emergency Management
Hazard Mitigation Planning Standards

Dear Hazard Mitigation Partner:

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WOODARD &CURRAN

Some of New York State's Additional Requirements

- Specific list of community stakeholders
- Document how proposed projects will protect critical facilities to a 500 year flood event or actual worst-damage scenario
- Identify potential sites and any pre-disaster actions required to make them viable for relocating houses out of the floodplain (or building new houses once properties are razed)
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- Identify all past mitigation projects that have been completed
- Discuss how climate change may impact vulnerability to natural hazards

Hazard Mitigation Planning

Hazard Mitigation Planning Process

Comprehensive Methodology

1. Planning Process (Organize Resources)

- Community engagement
- Building upon existing information

2. Hazard Identification and Risk Assessment

- Systematically identifying hazards through the use of GIS and other tools to assess/prioritize risk

3. Mitigation Strategy

- Reach across broad skill sets to identify hazard mitigation goals
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    - Engage the public

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Hazard Mitigation Planning Process

- Phase 2 – Assess risks – identify the hazards that present risks to the community and the assets that are vulnerable to those hazards.
  - Gather historical information, review existing community plans/reports, communicate with local planning experts, NY OEM and FEMA.
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    - Assess vulnerability
    - Create a base map to profile potential hazard events
  - Inventory community assets
    - Show how hazard events could impact the community (physically and operationally)
    - Estimate losses

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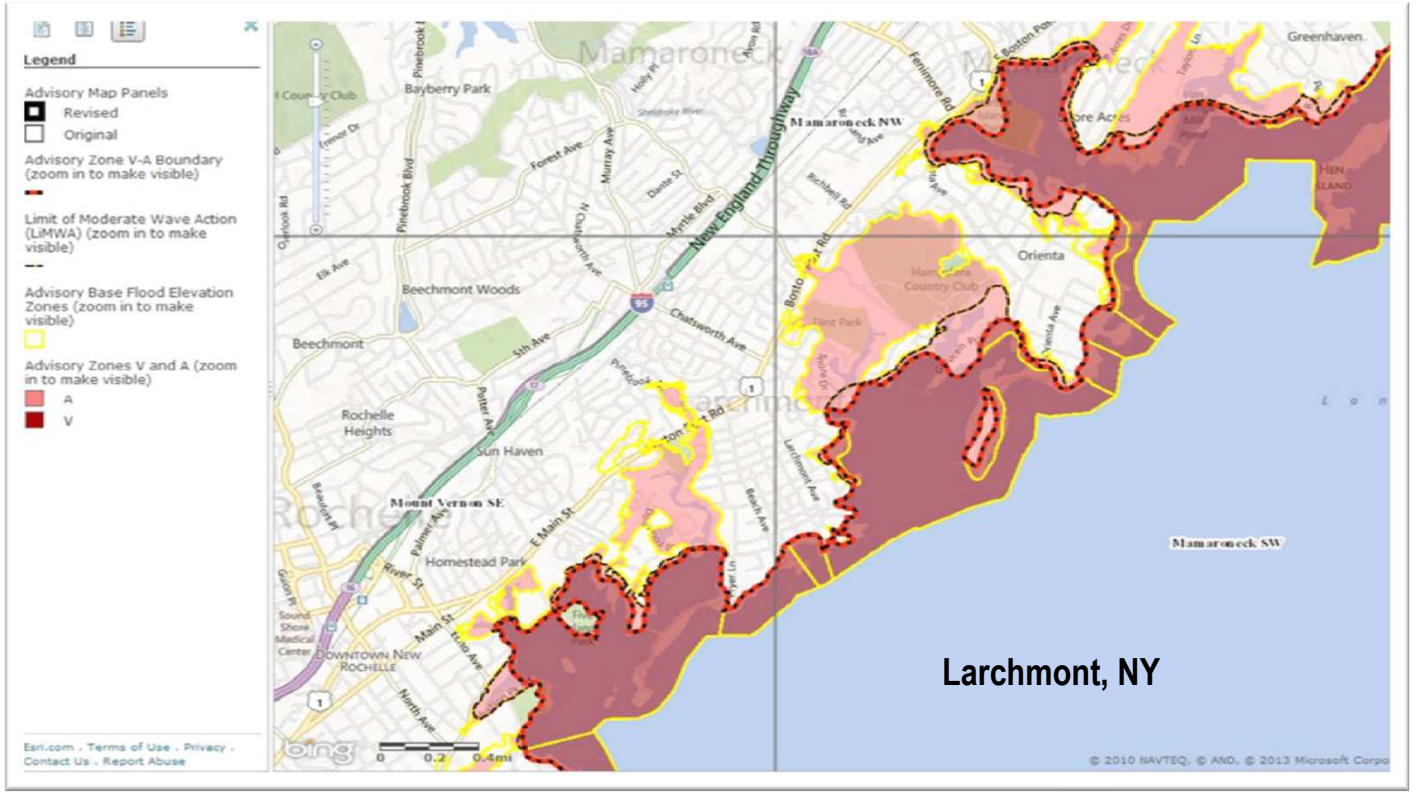
Advisory Based Flood Elevations

- FEMA recently provided Advisory Based Flood Elevations for certain communities in NY and NJ to support reconstruction efforts



Advisory Based Flood Elevations

- ABFEs paint a more accurate picture of a community's current flood risk by reflecting changes in flood risk, development, and availability of better data
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Hazard Mitigation Planning Process

- Phase 3 – Develop the mitigation plan – lays out in detail the proposed mitigation actions.
  - Establish priorities
    - Compare community mission with the results of the hazard identification and risk assessment
  - Develop hazard mitigation goals
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    - Protect research
  - Determine appropriate mitigation actions
  - Prioritize mitigations actions
  - Prepare an implementation strategy

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Hazard Mitigation Plan Contents

- Executive Summary
  - Purpose, Process, Major Recommendations
- Goals and Objectives
- Hazard Identification and Risk Assessment
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  - Identification of Mitigation Actions, Prioritization of Actions and Methodology, Timeline
- Implementation and Plan Maintenance
  - Responsibilities, Integration with Other Plans, Schedule

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Hazard Mitigation Planning Process

- Phase 4 – Implement the plan and monitor progress
  - Formally adopt the Hazard Mitigation Plan
  - Implement mitigation measures
  - Monitor, evaluate and update the plan as needed
  - Continue to engage stakeholders from the community

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Project Implementation

Proposed Timeline

- Project Planning – February 2013
- Kick off Meeting – March 2013
- Hazard Identification and Risk Assessment – April 2013
- Stakeholder Workshops - ASAP
- Submit Draft Plan NY OEM – May 2013
- Review and Finalize Plan – May/June 2013
- Submit Draft to FEMA – May 2013
- Obtain Approval and Complete Final Presentations – September 2013

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Thank You

Questions?

Village of Larchmont
Multi-Hazard Mitigation Plan

Stakeholder Meeting
April 25, 2013

Meeting Agenda

- Project Overview
  - Background and Goals
  - Roles and Responsibilities
- Requirements of FEMA & NYS OEM
  - Strategy, process, engagements
  - Documentation
- Hazard Mitigation Planning Process
  - Hazard identification and risk assessment
  - Mitigation strategy
- Village of Larchmont
- Next Steps
- Open Discussion/Questions and Comments

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Project Overview

Phases of Emergency Management

- **Mitigation** – long-term reduction of vulnerability
- **Preparedness** – plans and preparations to save lives and property and facilitate response operations
- **Response** – actions taken to provide emergency assistance, save lives and minimize property damage
- **Recovery** – actions taken to return to normal conditions.

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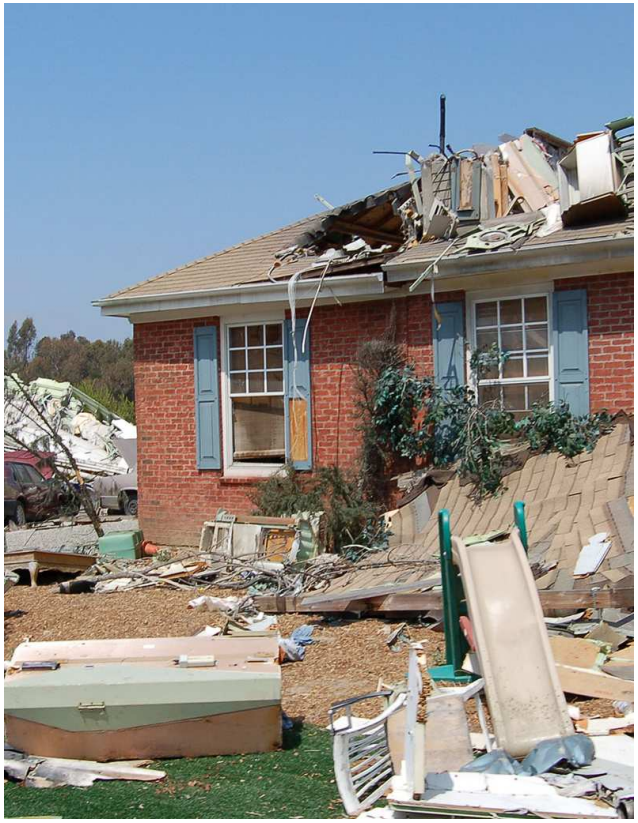
Hazard Mitigation Overview

- Hazard mitigation is defined as “any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.”
- Hazard mitigation activities may be implemented prior to, during, or after an event; however, it is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.
- Hazard mitigation is often focused on reducing repetitive loss, as many damaging events tend to occur in the same locations over time (e.g. flooding).



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Benefits of Hazard Mitigation Planning

Communities benefit from Mitigation Planning by:

- Identifying cost effective actions for risk reduction that are agreed upon by stakeholders
- Focusing resources on the greatest risks and vulnerabilities
- Building partnerships by involving multiple stakeholders
- Increasing education and awareness of hazards and risk
- Communicating priorities to local, state and federal officials
- Aligning risk reduction with other community objectives

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Project Goals

- Fulfill Federal and State Hazard Mitigation Planning Requirements
- Minimize Hazard Impacts to Physical Assets and Operations
- Reduce or Avoid Long-Term Vulnerabilities from Hazards
- Eligibility for Future Funding

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Requirements of FEMA

What is FEMA Interested In?

- **Focus on Mitigation Strategy** – Emphasize Actions and Implementation of the Hazard Mitigation Strategy
- **Review for Intent, as well as Compliance** – Does the Plan Meet the Intent of the law and regulation
- **Process is as Important as the Plan Itself** – Planning Process to be Defined by the Village
- **This is Your Plan** – Must be Reflective of the Village, Stakeholders and Surrounding Community
- **Foster Relationships** – The relationships are as Important as the Words in the Plan

FEMA

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Documentation is Critically Important

- Meetings
  - Agenda
  - Attendees List
  - Meeting Minutes
- Site Visits
  - Data Gathered and Data Sources
  - Interview Summaries
- Stakeholder Workshops
  - Agenda
  - Attendees List
  - Workshop Summaries

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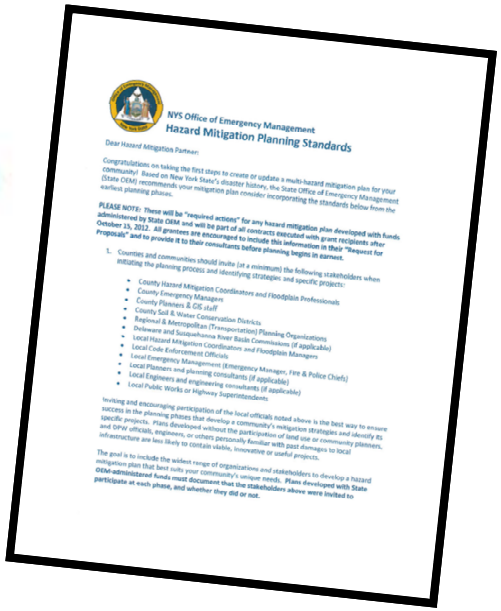

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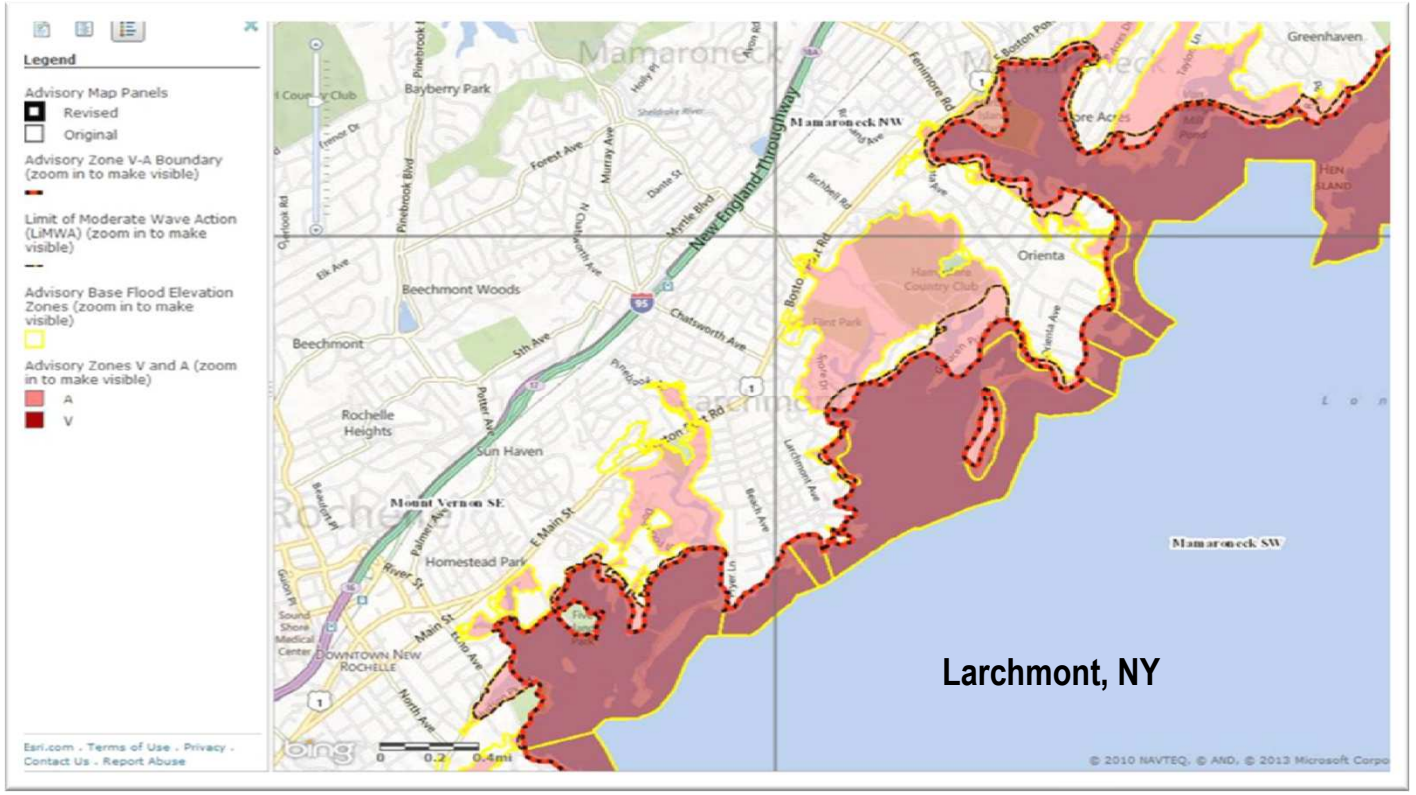

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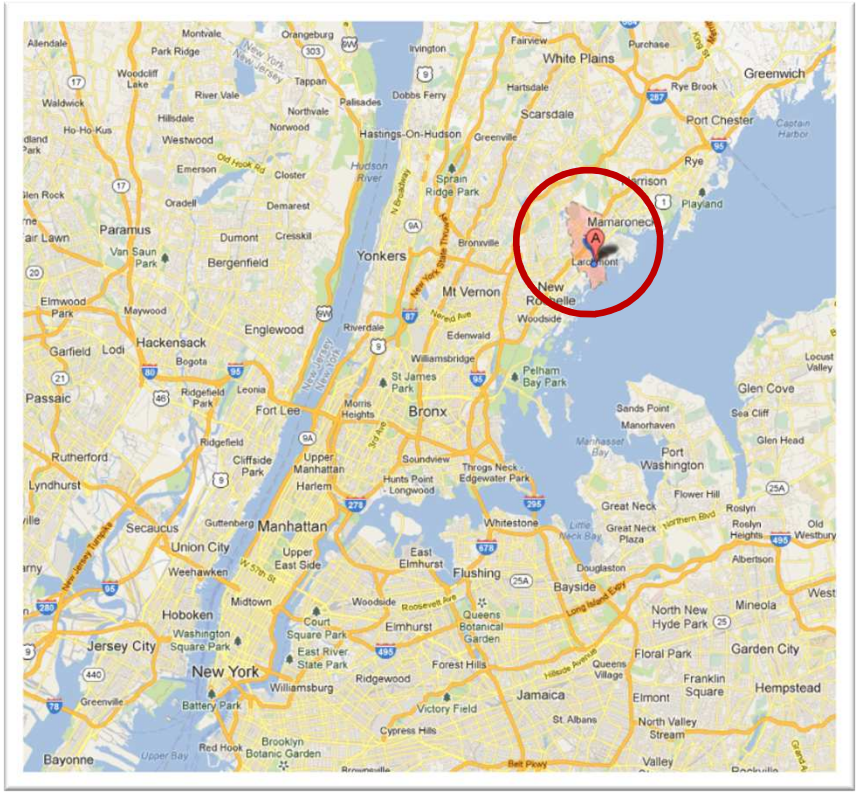
Village of Larchmont

Village of Larchmont Profile

- Village population is 5,864 (2010 Census)
- 1 square mile in size
- Located in lower portion of Westchester County
- Long Island sound is to the East
- New York City is 20 miles South



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Coastal Storms & Coastal Erosion

- Westchester County noted as specifically vulnerable to sea level rise which can attribute to coastal erosion and be attributed in part to an increase in and severity of coastal storms.
- Coastal erosion has been identified as a problem for the area of Larchmont that is adjacent to Long Island Sound.
- Among the most significant effects of climate change is sea level rise. Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding.

Larchmont, New York

Hurricane Sandy pounds Larchmont Credit: Don Sutherland

Sources: NY State Standard Multi-Hazard Mitigation Plan – 2011; Climate Action Plan, Village of Larchmont, DEC

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Coastal Storms & Coastal Erosion

- New York Harbor has seen a 15-inch increase since 1860 and a 6-inch rise since 1960, according to the DEC, and the story is the same for the Long Island Sound, where consequences could be grave for the low-lying communities that make up the Sound's 600 miles of coastline.

Credit: Stefani Kim

Sources: Larchmont-Mamaroneck Patch Article, December 2010

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Coastal Erosion

- Coastal Erosion Hazard Area (CEHA) maps prepared by DEC indicate areas of concern in Larchmont.
  - These maps are being updated by DEC

Sources: NYDEC

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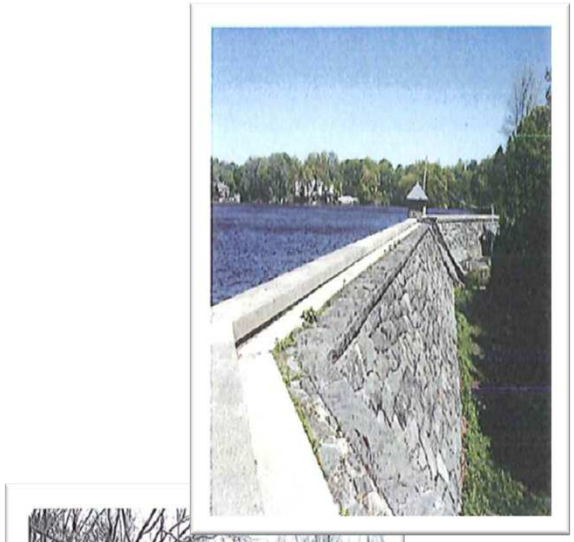
Dam Failure

- Two dams in Larchmont:
  - Larchmont Dam (Class B)
  - Larchmont Water Company Dam No. 2 (Class C)
- Due to highly and densely developed areas downstream of the two dams located in Larchmont, a catastrophic event would have an impact and could endanger human life and property.
- Floods are the most significant natural hazard that can impact the two dams in Larchmont.
- Dam Failure was identified in the Westchester CEMP as a moderately high hazard for Westchester County.
  - The Village develops an Emergency Action Plan to assist in responding to a potential dam failure and submits it to DEC annually



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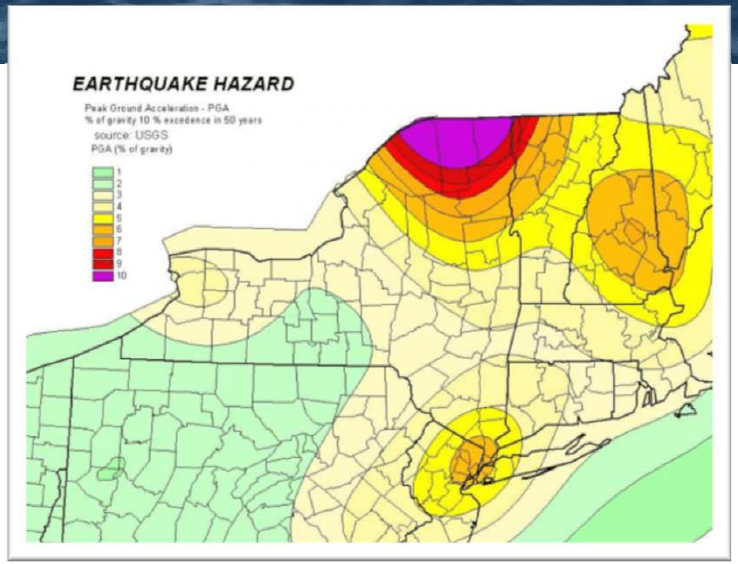
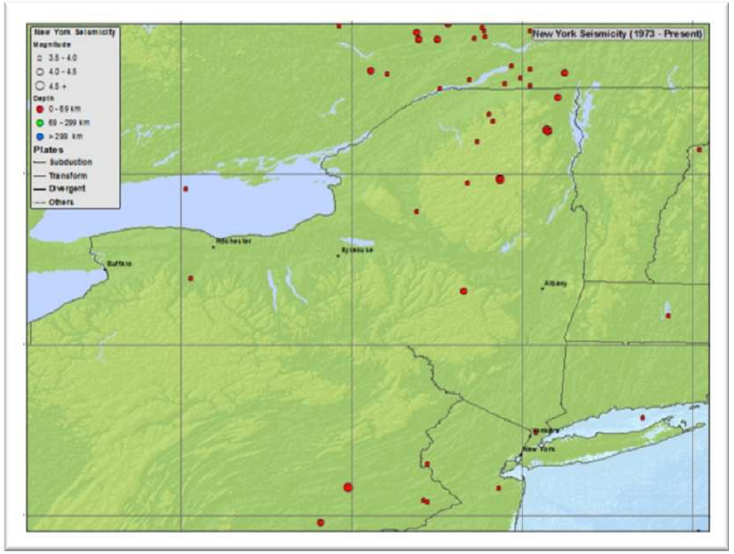
Earthquakes

- PGA is a measure of earthquake acceleration on the ground (how hard the earth shakes)
  - Larchmont is 6-7%
  - PGA is best determinant of damage
- The two dams in Larchmont could be damaged by ground motions caused by seismic activity
- Earthquake was identified in the Westchester CEMP as a moderately high hazard for Westchester County





WOODARD &CURRAN

Flooding

- Floods are the most significant natural hazard that can impact the two dams in Larchmont.
- Sea level rise and coastal flooding from storm surge are already affecting and will increasingly affect New York's entire ocean and estuarine coastline from Montauk Point to the Battery and up the Hudson River to the federal dam at Troy.
- The likelihood that powerful storms will hit New York State's coastline is very high, as is the associated threat to human life and coastal infrastructure. This vulnerability will increase in area and magnitude overtime.
- Larchmont has had substantial flood impacts from various storms at areas including: Pine Brook Road, Kilmer Road, Flint Park off Birch Road, Nassau Road, Pryer Manor Road, Magnolia Avenue, Ocean Avenue, Cedar Island, Pine Brook Drainage Basin, Park Avenue at Manor Beach, Spanish Cove Road, Lindsay Drive, North Avenue, Coolidge Street, Monroe Avenue and Larchmont Reservoir.

Flooding near Flint Park, in back of Hommocks School in Larchmont. Credit: Stefani Kim

Sources: NY State Hazard Mitigation Plan; Larchmont Dam Inspection & Maintenance Plan; Westchester County Flood Mitigation Program 2012

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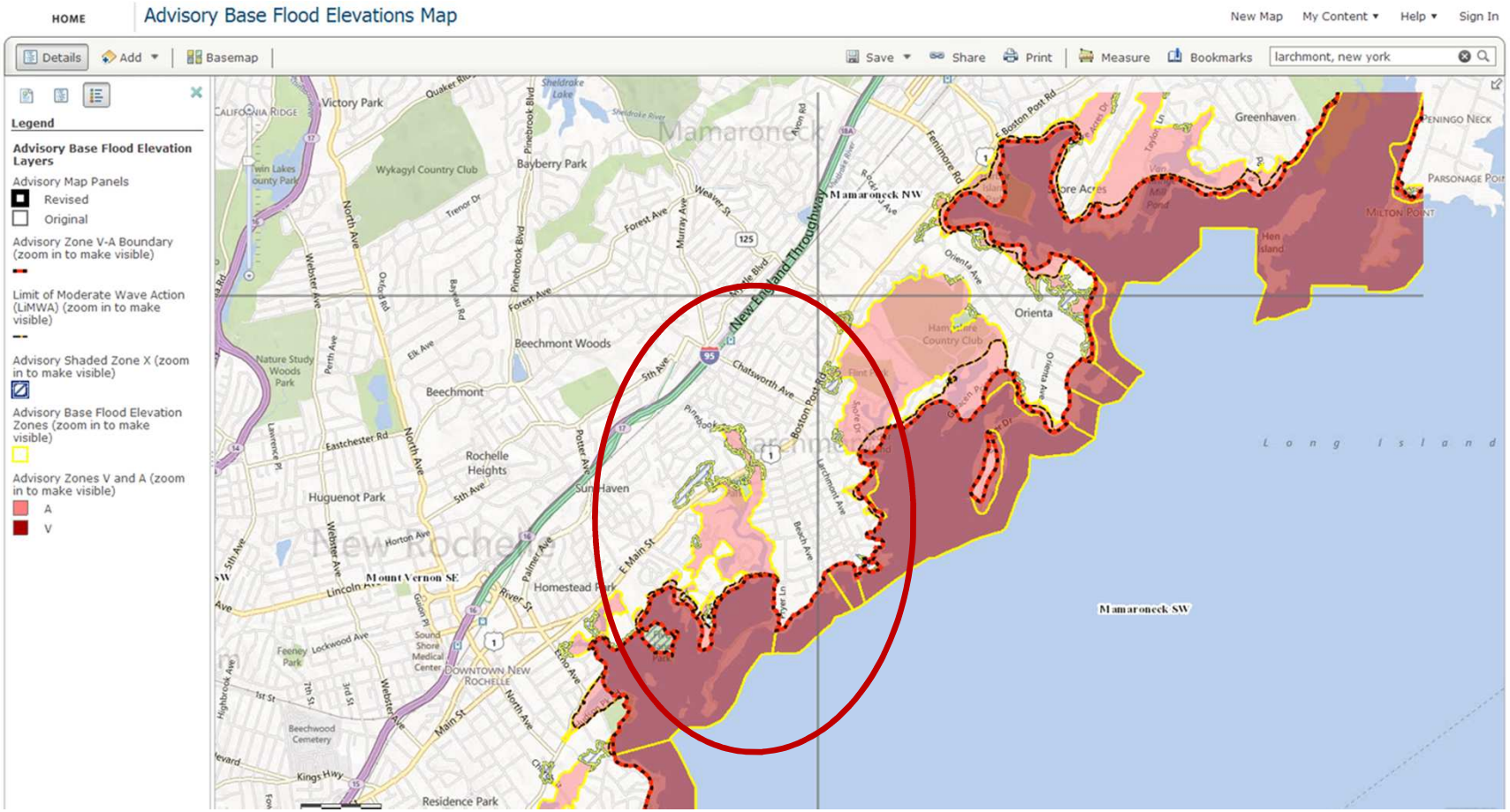
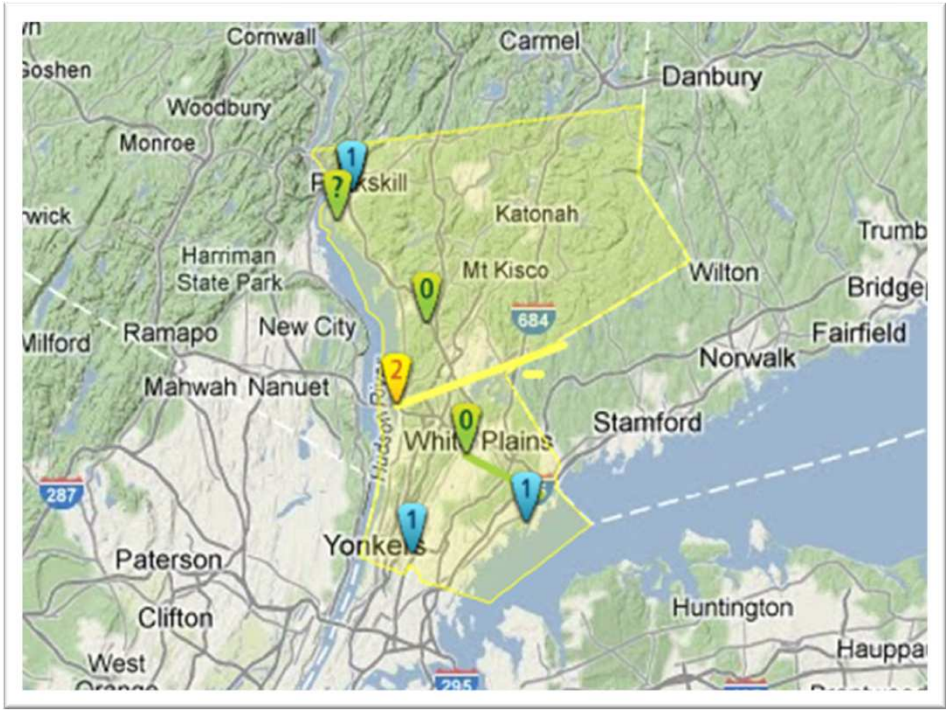
Flooding – FEMA Advisory Base Flood Elevation Map



Tornadoes

- Tornado was identified in the Westchester CEMP as a moderately high hazard for Westchester County.
- Between 1971 – 2006, there have been 9 tornados in Westchester County and ranging from a 0 to a 2 on the Fujita scale.



Source: http://www.tornadohistoryproject.com/

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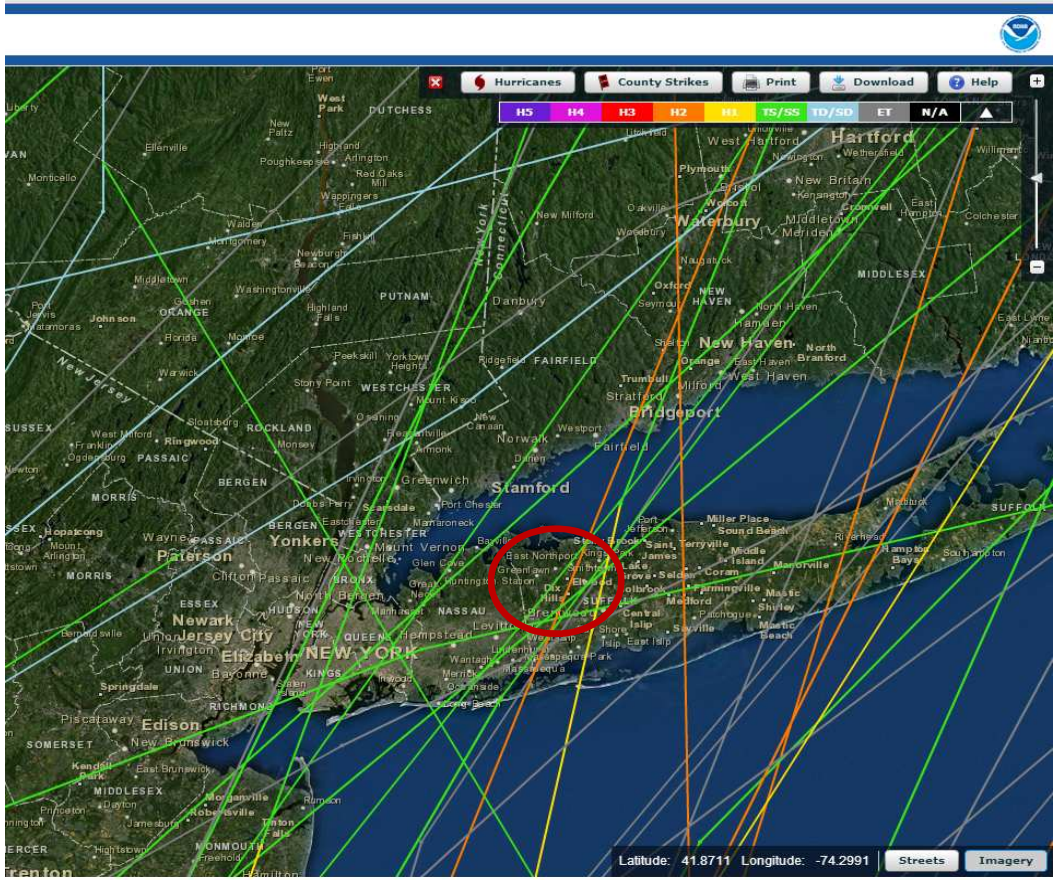
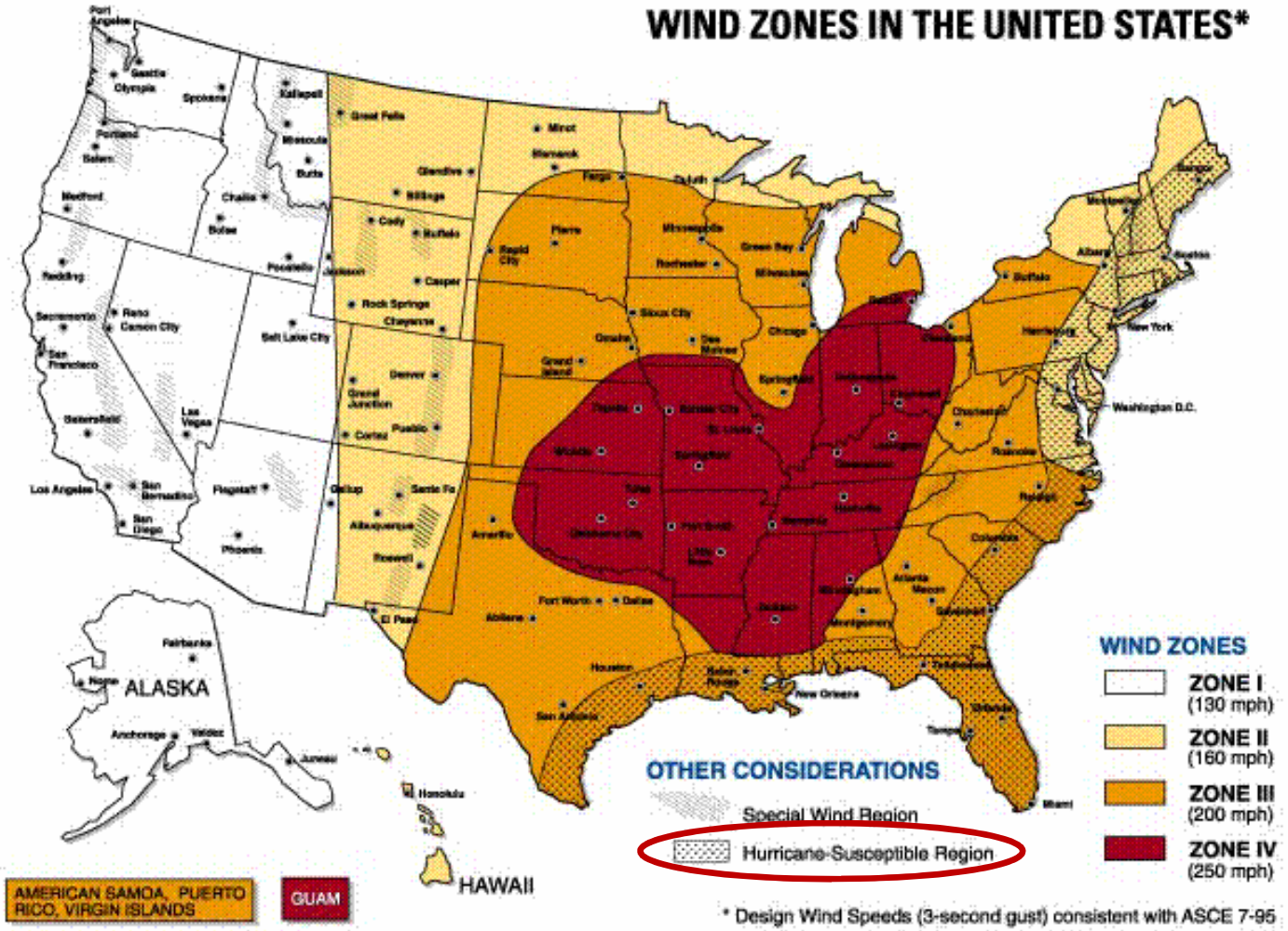
Hurricane/Tropical Storm Tracks 1900 - 2011

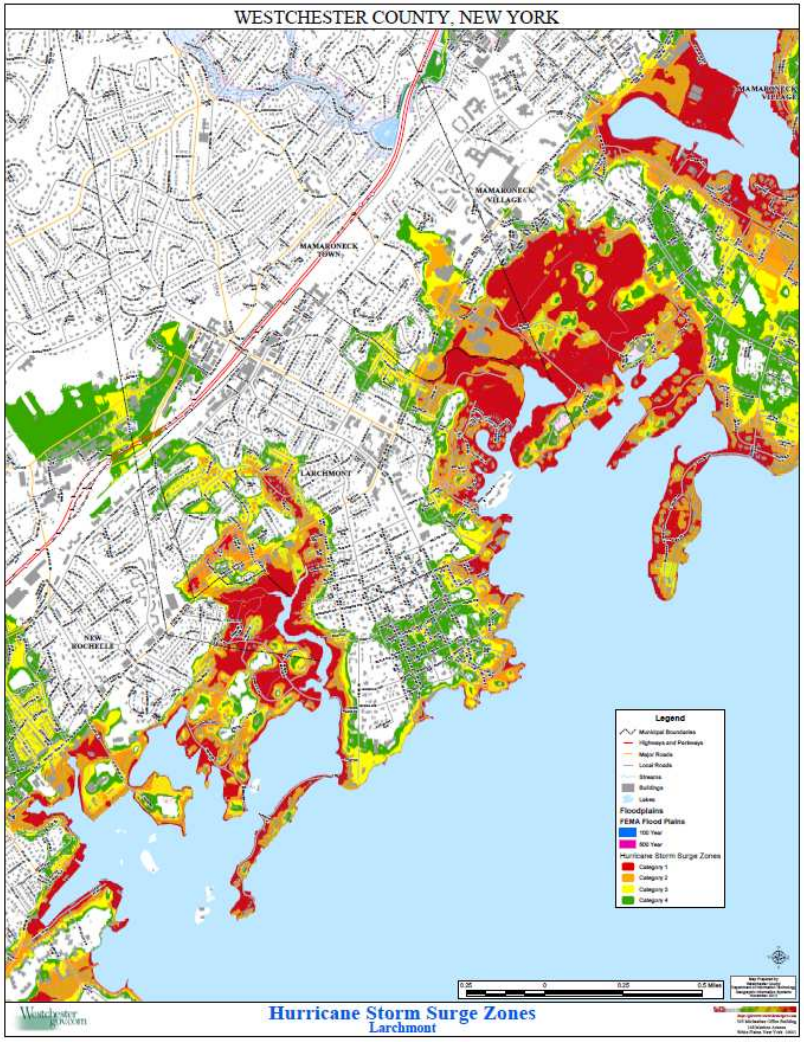
- Four Category 3 hurricanes have hit New York since 1900.
- Hurricane was identified in the Westchester CEMP as a moderately high hazard for Westchester County.



Hurricane Susceptible Regions



Hurricane – Larchmont Storm Surge Zones



Source: Westchester County

How Larchmont Weathered "Superstorm Sandy"

- Emergency Shelters opened at the VFW, Hampshire Country Club and Mamaroneck Public Library
- Widespread power outages (64% of Larchmont)
- High tides in coastal areas and storm surge
- High winds experienced

Photo: *Manor Park, Don Sutherland*

WOODARD &CURRAN

Hazard Identification – Village of Larchmont

- Coastal Erosion
- Coastal Storm
- Dam Failure
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hailstorm
- Hurricane
- Landslide
- Severe Winter Storm
- Thunder & Lightning
- Tornado
- Tsunami
- Urban Fire
- Windstorm

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Next Steps

Key Project Information

- Larchmont is preparing a **single-jurisdiction** plan for approval
  - An exception as the State is currently prioritizing multi-jurisdictional plans
- Hazard Mitigation Planning project is tied to an ongoing generator project for the Village
- Hazard Mitigation Plan must be completed and approved by FEMA by **9/26/2013**
- Close coordination between the Village and NYSOEM is critically important

WOODARD &CURRAN

Next Steps

- Continue to work closely with Village and County to collect key information for the plan and obtain feedback
  - Including more in depth conversations with key stakeholders
- Continue report outline and writing
- Anticipate 1-2 additional stakeholder/public informational meetings
  - May/June timeframe
- Prepare draft report

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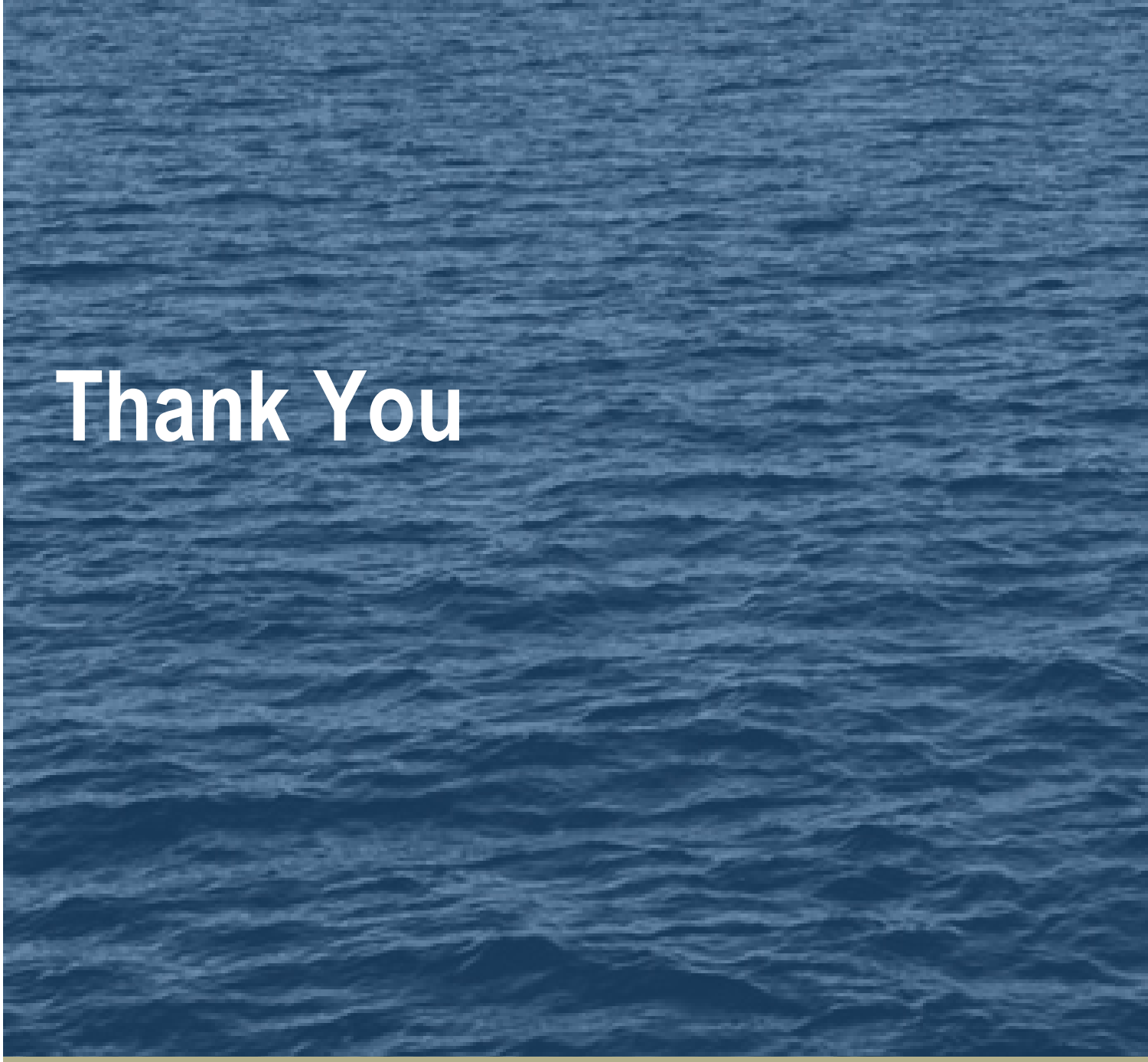

Thank You

Village of Larchmont
Multi-Hazard Mitigation Plan

Hazard Identification & Risk Assessment

June 5, 2013

Meeting Agenda

- Overview of Potential Hazards
- Summary of Information Collected to Date
- Hazard Ranking Methodology
- Group Workshop Hazard Ranking
- Open Discussion

WOODARD &CURRAN

Project Overview

Project Goals

- Fulfill Federal and State Hazard Mitigation Planning Requirements
- Minimize Hazard Impacts to Physical Assets and Operations
- Reduce or Avoid Long-Term Vulnerabilities from Hazards
- Eligibility for Future Funding

WOODARD &CURRAN

Hazard Mitigation Planning Process

Meeting Goal

- To reach consensus on a ranked list of natural hazards that could impact the Village of Larchmont

WOODARD &CURRAN

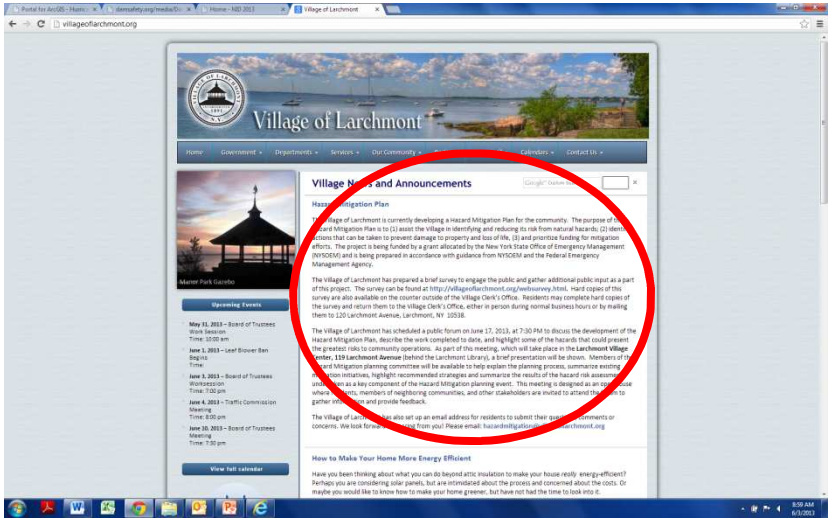
Public Outreach

- Information about the project posted to Village website
- Press releases sent to several local news outlets
  - Brian Donnelly – The Mamaroneck and Larchmont Daily Voice (online)
  - LyndaLarch – Larchmont Dish (local blog)
  - Polly Kreisman – Larchmont Loop (online)
  - Sound and Town Report (weekly paper publication)
  - Steve Lipken – Larchmont Ledger (monthly paper publication)
  - Swapna Venuoppal – The Journal News (daily paper publication)
  - LMC-TV (they're our local cable channel and will be there on the 17th to videotape the public forum for broadcast).
- Email address for public participation created

hazardmitigation@villageoflarchmont.org

- Public Survey available to obtain feedback

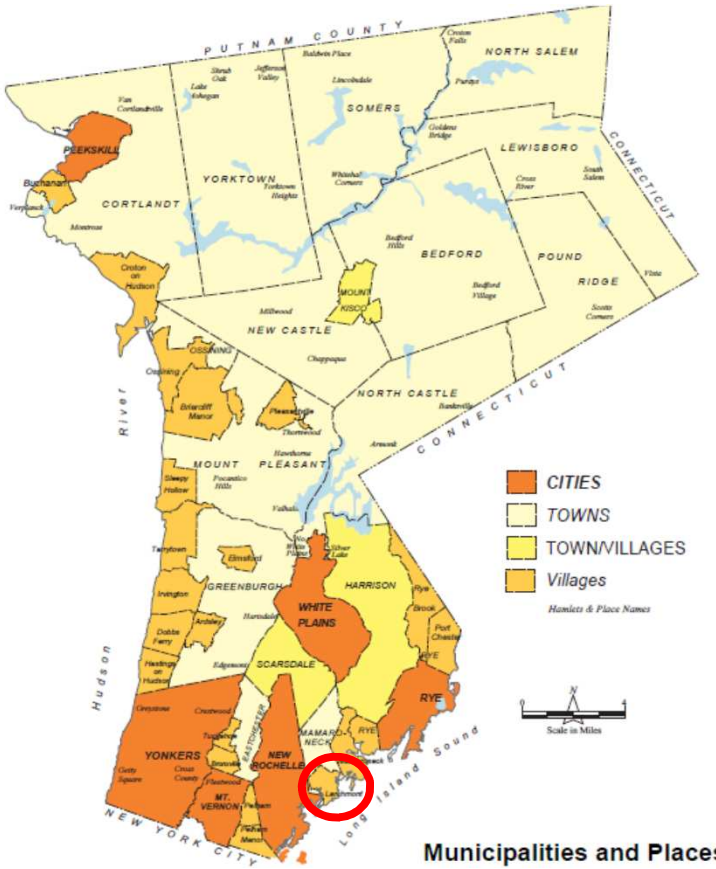
http://villageoflarchmont.org/websurvey.html



Natural Hazards

Village of Larchmont - Characteristics

- One square mile in size, densely developed
- Located in the lower portion of Westchester County, New York
- Bounded on the north by the Railroad Station and on the south and east by Long Island Sound
- New York City approximately 20 miles to the south
- Population – 5,864 *(2010 Census)*



Hazard Mitigation Planning Process

- Phase 2 – Assess risks – identify the hazards that present risks to the community and the assets that are vulnerable to those hazards.
  - Gather historical information, review existing community plans/reports, communicate with local planning experts, NY OEM and FEMA.
  - Determine which hazards present the greatest risk to the community
    - Assess vulnerability
    - Create a base map to profile potential hazard events
  - Inventory community assets
    - Show how hazard events could impact the community (physically and operationally)
    - Estimate losses

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Some of New York State's Additional Requirements

- Specific list of community stakeholders
- Document how proposed projects will protect critical facilities to a 500 year flood event or actual worst-damage scenario
- Identify potential sites and any pre-disaster actions required to make them viable for relocating houses out of the floodplain (or building new houses once properties are razed)
- Identify evacuation routes and shelters and pre-disaster activities to make them viable
- Identify all past mitigation projects that have been completed
- Discuss how climate change may impact vulnerability to natural hazards

Coastal Storms & Coastal Erosion

- Westchester County noted as specifically vulnerable to sea level rise which can attribute to coastal erosion and be attributed in part to an increase in and severity of coastal storms.
- Coastal erosion has been identified as a problem for the area of Larchmont that is adjacent to Long Island Sound.
- Among the most significant effects of climate change is sea level rise. Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding.

Larchmont, New York

Hurricane Sandy pounds Larchmont Credit: Don Sutherland

Sources: NY State Standard Multi-Hazard Mitigation Plan – 2011; Climate Action Plan, Village of Larchmont, DEC

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Coastal Storms & Coastal Erosion

- New York Harbor has seen a 15-inch increase since 1860 and a 6-inch rise since 1960, according to the DEC, and the story is the same for the Long Island Sound, where consequences could be grave for the low-lying communities that make up the Sound's 600 miles of coastline.

Credit: Stefani Kim

Sources: Larchmont-Mamaroneck Patch Article, December 2010

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Coastal Erosion

- Coastal Erosion Hazard Area (CEHA) maps prepared by DEC indicate areas of concern in Larchmont.
  - These maps are being updated by DEC

Sources: NYDEC

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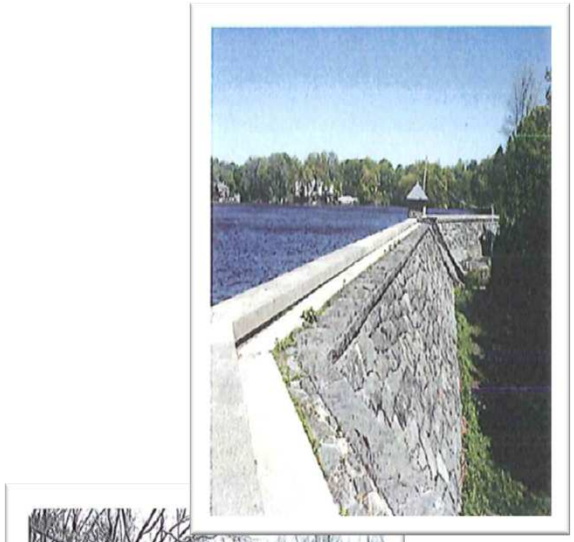
Dam Failure

- Two dams in Larchmont:
  - Larchmont Dam (Class B)
  - Larchmont Water Company Dam No. 2 (Class C)
- Due to highly and densely developed areas downstream of the two dams located in Larchmont, a catastrophic event would have an impact and could endanger human life and property.
- Floods are the most significant natural hazard that can impact the two dams in Larchmont.
- Dam Failure was identified in the Westchester CEMP as a moderately high hazard for Westchester County.
  - The Village develops an Emergency Action Plan to assist in responding to a potential dam failure and submits it to DEC annually



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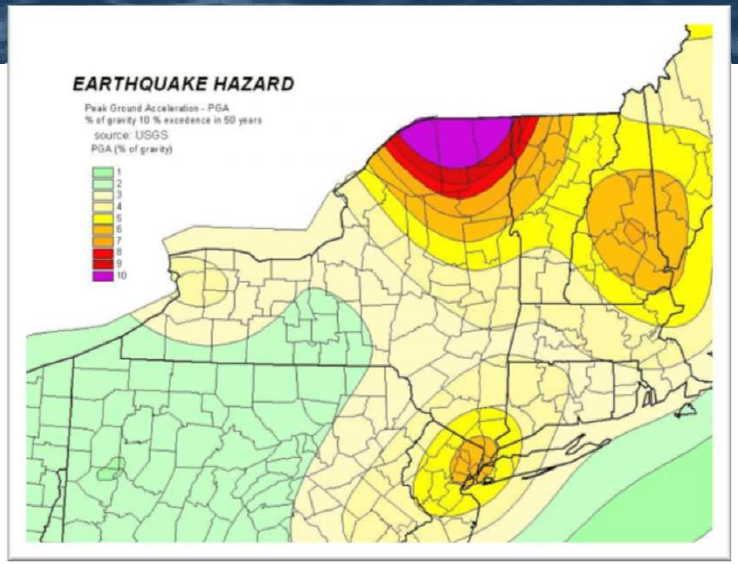
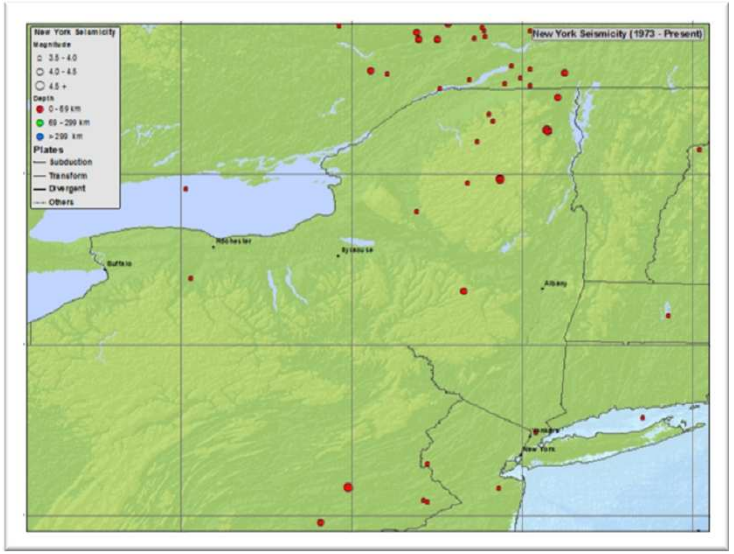
Earthquakes

- PGA is a measure of earthquake acceleration on the ground (how hard the earth shakes)
  - Larchmont is 6-7%
  - PGA is best determinant of damage
- The two dams in Larchmont could be damaged by ground motions caused by seismic activity
- Earthquake was identified in the Westchester CEMP as a moderately high hazard for Westchester County





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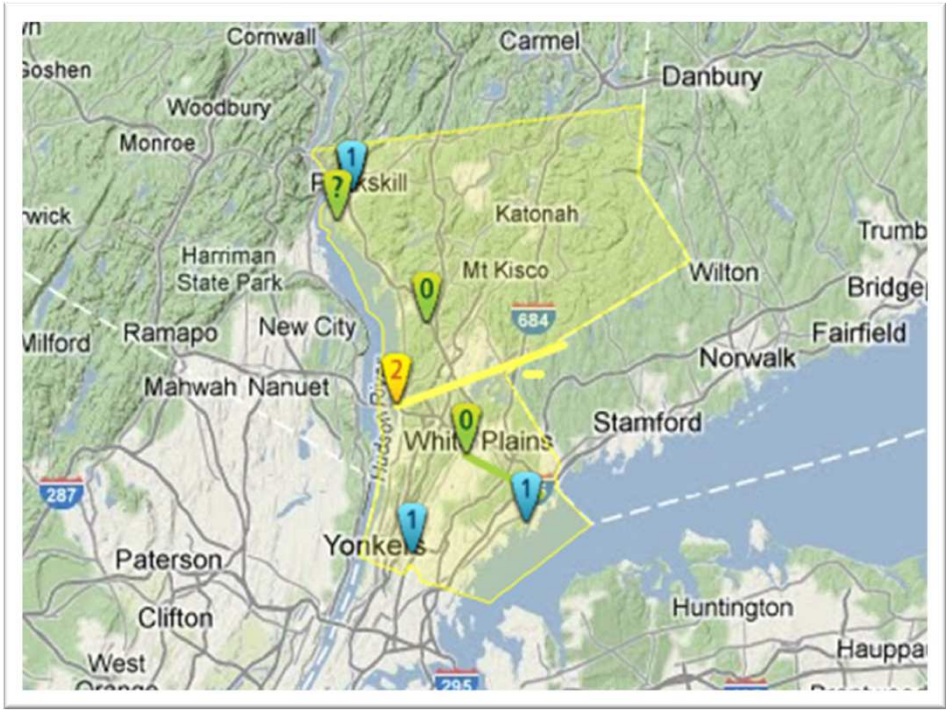
Tornadoes

- Tornado was identified in the Westchester CEMP as a moderately high hazard for Westchester County.
- Between 1971 – 2006, there have been 9 tornados in Westchester County and ranging from a 0 to a 2 on the Fujita scale.



Source: http://www.tornadohistoryproject.com/

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Urban Fire

- Larchmont typically has 1-3 structure fires involving the entire structure causing severe damage on an annual basis.
- Many other incidents are minor fires within a structure with localized damage.
- Historic notable fire occurrences:
  - 1975 - American Legion Hall, Flint Park. Caused by lightening strike and totally destroyed.
  - 1978 - 76 Wendt Avenue. Caused by electrical malfunction. Top 3 floors severely damaged.
  - 1980 - Hunan Restaurant on Palmer Avenue. Caused by arson. Totally destroyed the entire block south up to Larchmont Cinema.
  - 1986 - Monahan's Restaurant on Palmer Ave. Caused by grease fire. Totally destroyed top of entire block north.
  - 1994 Horseshoe Harbor Yacht Club. Caused by accident. Totally destroyed entire structure.

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Flooding

- Floods are the most significant natural hazard that can impact the two dams in Larchmont.
- Sea level rise and coastal flooding from storm surge are already affecting and will increasingly affect New York's entire ocean and estuarine coastline from Montauk Point to the Battery and up the Hudson River to the federal dam at Troy.
- The likelihood that powerful storms will hit New York State's coastline is very high, as is the associated threat to human life and coastal infrastructure. This vulnerability will increase in area and magnitude overtime.
- Larchmont has had substantial flood impacts from various storms at areas including: Pine Brook Road, Kilmer Road, Flint Park off Birch Road, Nassau Road, Pryer Manor Road, Magnolia Avenue, Ocean Avenue, Cedar Island, Pine Brook Drainage Basin, Park Avenue at Manor Beach, Spanish Cove Road, Lindsay Drive, North Avenue, Coolidge Street, Monroe Avenue and Larchmont Reservoir.

Flooding near Flint Park, in back of Hommocks School in Larchmont. Credit: Stefani Kim

Sources: NY State Hazard Mitigation Plan; Larchmont Dam Inspection & Maintenance Plan; Westchester County Flood Mitigation Program 2012

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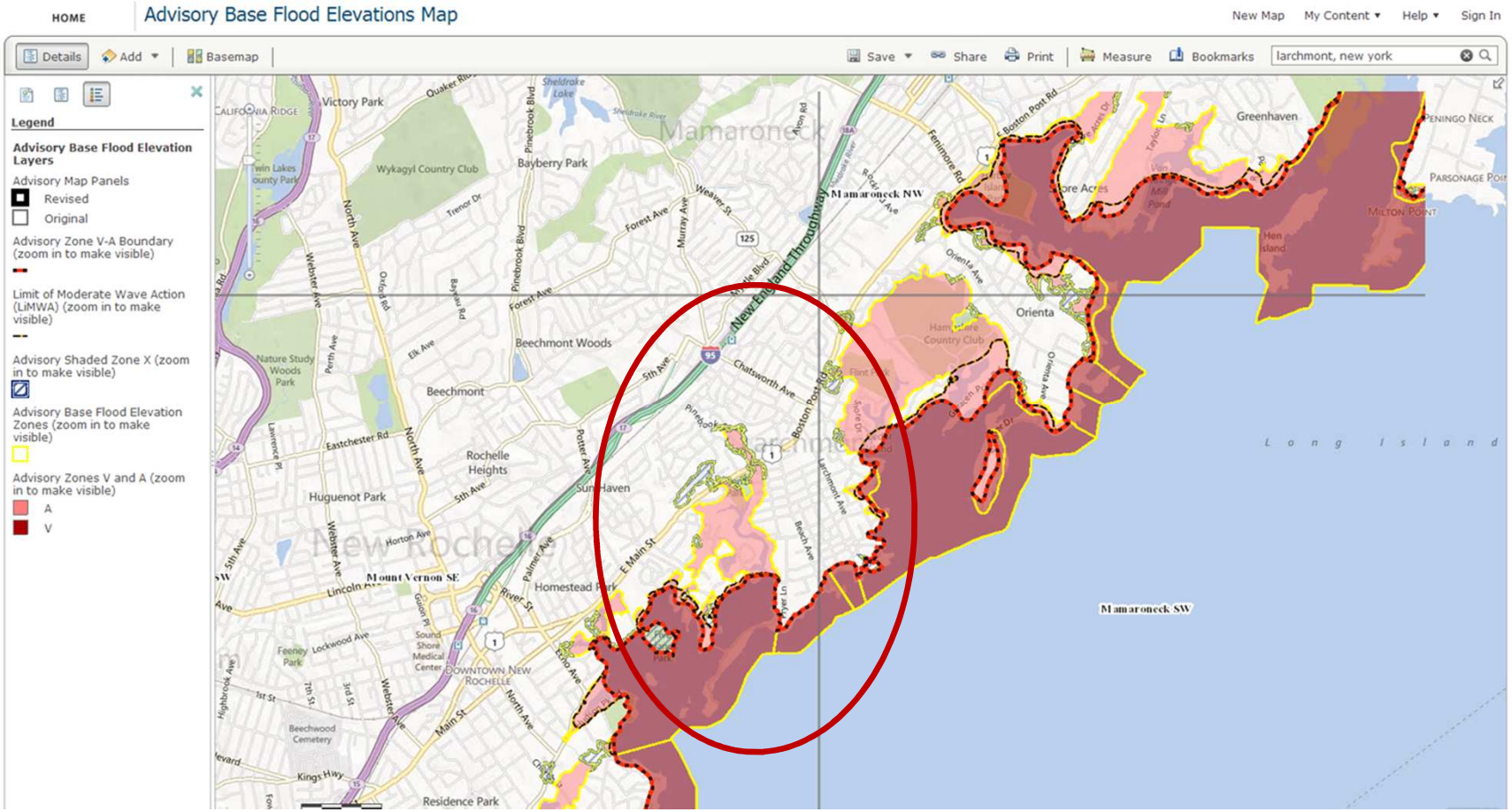
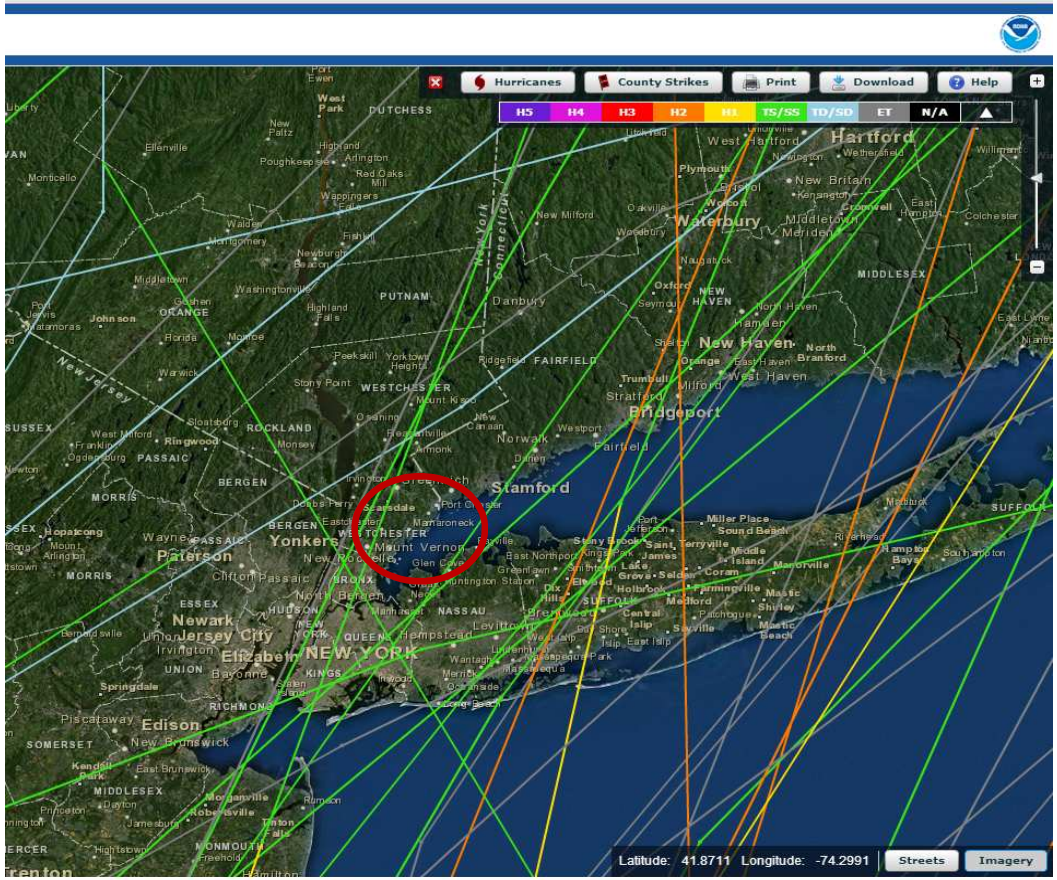
Flooding – FEMA Advisory Base Flood Elevation Map

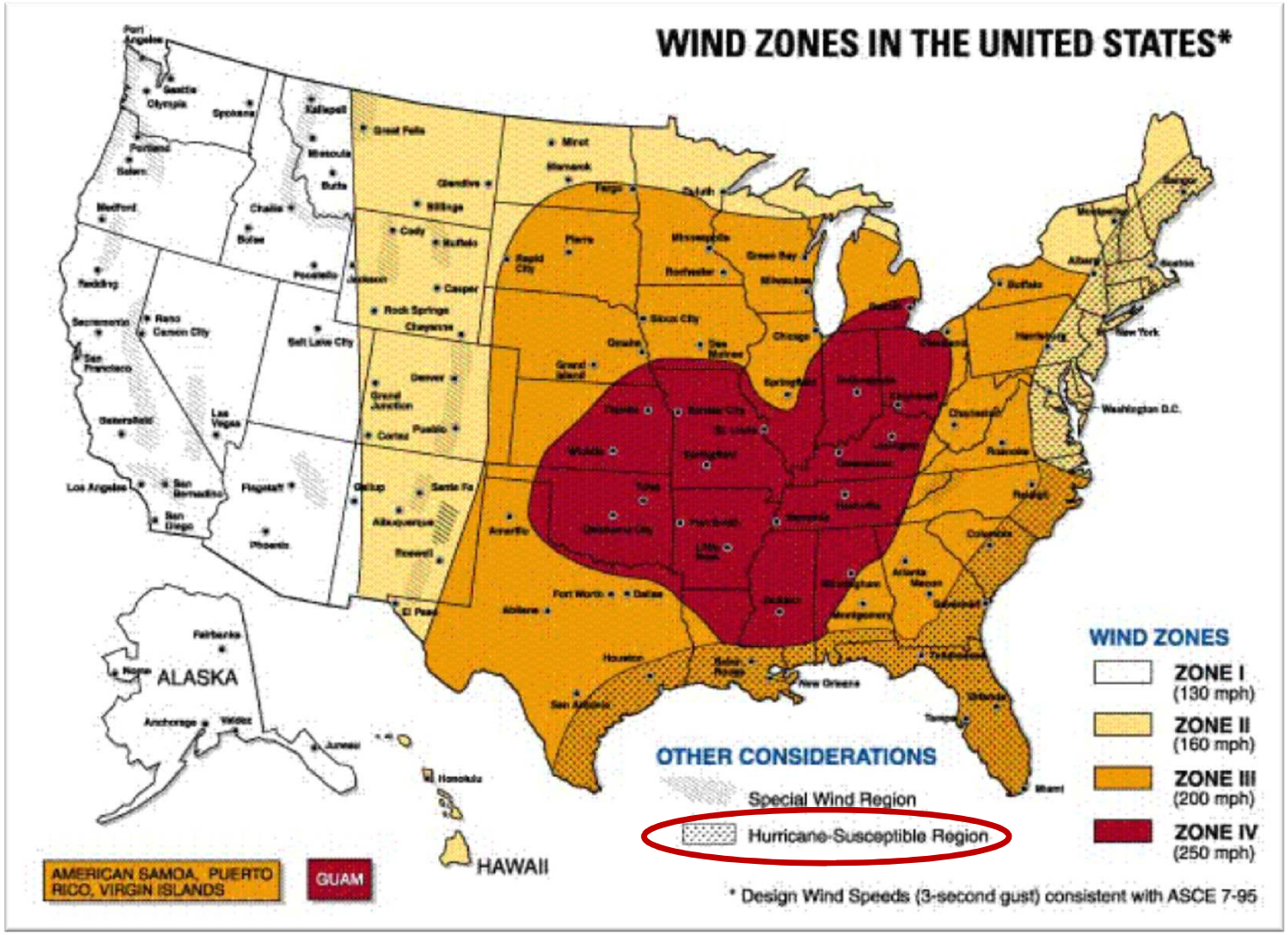


Hurricane/Tropical Storm Tracks 1900 - 2011

- Four Category 3 hurricanes have hit New York since 1900.
- Hurricane was identified in the Westchester CEMP as a moderately high hazard for Westchester County.



Hurricane Susceptible Regions



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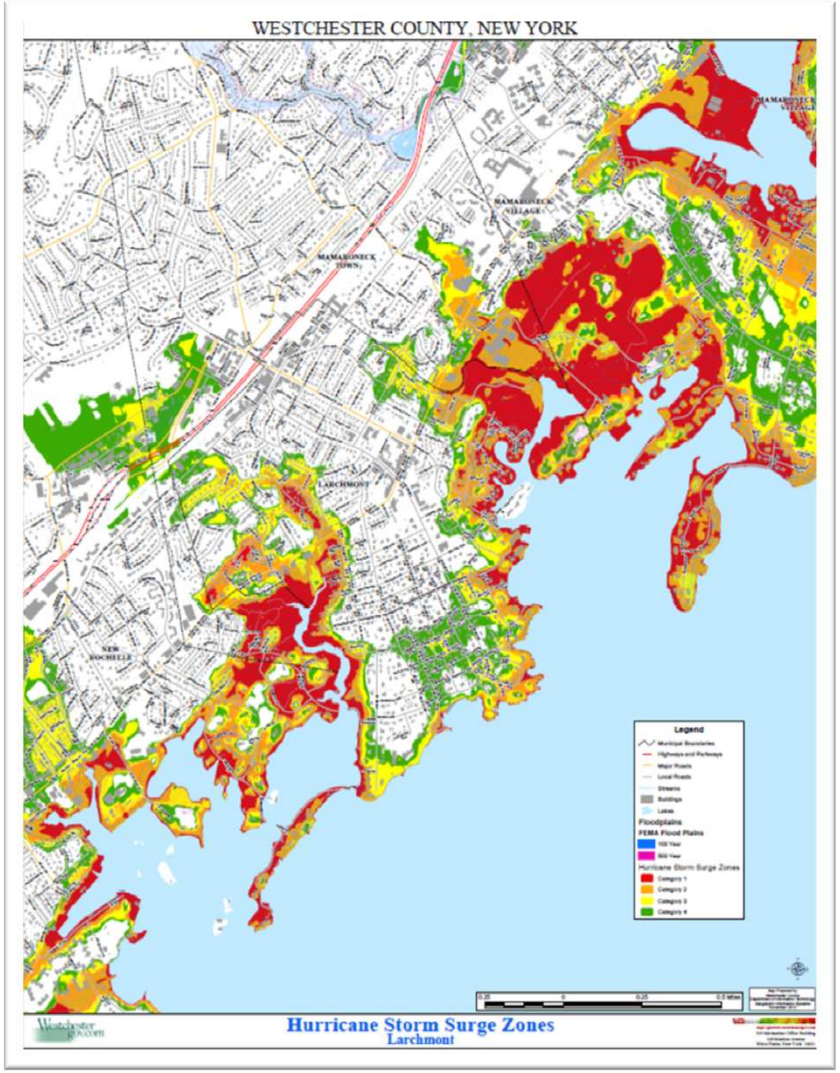
Hurricane
Potential Storm Surge Zones



Source: Westchester County

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Hurricane Sandy
Storm Surge Impacted Areas

Source: Lt. Kenny Olsen, Larchmont Police Department

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How Larchmont Weathered "Superstorm Sandy"

- Emergency Shelters opened at the VFW, Hampshire Country Club and Mamaroneck Public Library
- Widespread power outages (64% of Larchmont)
- High tides in coastal areas and storm surge
- High winds experienced

Photo: *Manor Park, Don Sutherland*

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Hazard Identification – Village of Larchmont

- Coastal Erosion
- Coastal Storm
- Dam Failure
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hailstorm
- Hurricane
- Landslide
- Severe Winter Storm
- Ice Storm
- Thunder & Lightning
- Tornado
- Tsunami
- Urban Fire
- Windstorm

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Summary of Information Gathering

Common Themes

- Flooding a concern
- Power/electricity reliability was a concern during Sandy
- Vulnerability to coastal storms
- Maintenance for Larchmont Dam – ongoing inspection work

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Specific Events

- Hurricane Sandy impacts
  - Cedar Island Sea Wall Damage
- Hurricane Irene impacts
- Storm of 2007
- Pine Brook area floods on consistent basis

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Critical Facilities in Village of Larchmont

- Village Hall
- Fire House
- Police Station
- Library
- Storage Room, Boston Post Road
- Village Yard for DPW, Boston Post Road
- Flint Park Playhouse
- Larchmont Avenue Garage
- Housing at Larchmont Reservoir Conservancy
- Chatsworth Avenue School

OTHERS???

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Possible Mitigation Projects

Pine Brook Drive & Kilmor Road	**Flooding**	**Frequent Flooding - Roadway damaged due to surcharged sewers. Drainage system surcharges at 96" drainage pipe under US 1. Project located in 100 year floodplain and is subject to tidal influence during flooding events.**
Flint Park IAO Birch Lane	Surcharge of Storm & Sanitary Sewers	Frequent Flooding - flooded fields and surcharged drainage system on Birch Lane. Causes some flooding to local homeowners Located in 100 year floodplain.
Pryer Manor Lane at Red Bridge	Flooding of Roadway and Bridge	Frequent Flooding - ~4' depth of water. Makes roadways and bridge impassible. Experienced storm surge during Hurricane Irene
Magnolia Drive & Ocean Ave.	Flooding of Roadway	Frequent Flooding - Located in 100 year floodplain. Heavy rains flood roadway and cause closures. Debris frequently deposited onto Roadway. Roadway collapsed during Irene
Cedar Island	Tidal Surge Flooding	During extreme events, bridge to island is impassible. Located in 100 year floodplain.
Pine Brook (BPR to Guion Lane)	Flooding	Frequent Flooding - Runoff from new development floods banks of existing brook, causes flooding to basements. Located in 100 year floodplain. (Reference to Pine Brook Drainage Basin Study)
Park Avenue (Mamaroneck Park)	Tidal Surge Flooding	Heavy rain and tidal surge floods park and roadway. Debris frequently deposited in roadway. Damaged seawalls in walkways in previous storms
Park Avenue (Manor Beach)	Tidal Surge Flooding	Heavy rain and tidal surge floods roadway. Located in 100 year floodplain. Debris frequently deposited in roadway
Spanish Cove Road & Lindsay Drive	Flooding	Storm surge floods drainage system, causing minor flooding to nearby residences Located in 100 year floodplain.
North Avenue	Flash Flooding	Frequent Flooding - Lack of drainage infrastructure creates flooding during heavy rains. Some damage to first floors of buildings
Coolidge Street	Flash Flooding	Frequent Flooding - Existing drainage structures flood during heavy rains. Floods some garages and basements.
Monroe Ave (Cherry Ave to Eruilla Dr.)	Flooding	Existing drainage structures flood during heavy rain. Causes street closures, no historical damage to structures reported.
687 Weaver Street - Larchmont Reservoir	Flooding, Erosive Water	Heavy rain overtopped lower embankment of pond during April 2007 rain event. Damages to downstream personal property and bridges were reported
Bishop Place & Douglas Ln.	Flooding	No further details provided
Flint Ave at Cedar Island	Flooding	Flooded garages and basements, sewer backups reported
Turtle Park	Flooding	Poor drainage
Walnut Avenue	Flooding	Storm surge floods yards and basements
?	Water Tanks at Sewer Pump Station	Upgrade existing relay panels, variable head pumps
Shore Lane	Drainage Pipe Replacement	Replace 200 feet of storm drainage pipe

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Possible Mitigation Projects

- Debris removal at dam locations
- Other dam projects?
- Generators
- Public address system?
- Tree trimming
- Better storage areas for equipment during flood? Is it located currently in a flood zone? ABFE area?
- Any emergency response equipment needed?
- Improve stormwater collection and drainage system – I/i?
- Removing debris and obstructions in dams and catch basins
- Does zoning code need to be changed for Base Flood Elevation?
- Any zoning code improvements needed?
- Any vulnerable waterfront structures/areas?
- Long term plan to protect coastal residential areas?
- Beach erosion issues?
- bridge safety/damage?
- Raise vulnerable properties
- Coordination plan with neighboring communities

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Next Steps

- Continue to continue to work closely with Village and County to collect key information for the plan and obtain feedback
  - Including public meeting on June 17th
- Continue report writing
- Anticipate 1 additional stakeholder/public informational meetings
  - Late June/Early July timeframe
- Finalize draft report

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Ranking Methodology

Hazard Ranking Methodology

- The primary objective of this meeting is to identify and prioritize risks.
- Hazards will be ranked on a scale of 0 (very low) to 5 (high) in the categories of frequency, severity, duration, and intensity.
- Values will be added for each profile item, so that each hazard will ultimately be given a “rank”.
- Weighting of probability vs. consequence

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Hazard Ranking Worksheet

WORKSHEET 2-3: PRIORITIZE HAZARDS

This worksheet provides an example of how you can qualitatively prioritize hazards. It includes ranking factors that impact the priority of a specific hazard in your area. Note that you can modify this worksheet if needed to include additional factors (e.g., community concern). Or you can weight the factors differently if you feel that is appropriate. To use this worksheet, refer back to the data collection and evaluation that you performed to profile hazard events (completed Worksheet 2-2 documentation). Now assign a rating for each factor shown below from 0 (low) to 5 (high) for each hazard of interest. Use the individual factors to consider and assign an overall preliminary profile ranking for each hazard of interest. You can rank numerically from 1 (most important) to X (least important, with X being the number of relevant hazards of interest for your study region). Alternately, you can rank hazards as N/L, L, M, H, or S (for No/Low, Low, Moderate, High, or Severe) for this preliminary profile ranking. Your risk assessment outcomes may help you re-evaluate your initial rankings over time. If you have a hazard that is not listed, use the blank space below.

Hazard (Italicized text indicates a HAZUS-MH hazard)	Ranking Factors				Ranking (Numerical or N/L, M, H, S)
	Frequency (0-5)	Duration (0-5)	Severity (0-5)	Intensity (0-5)	
Avalanche					
Coastal Erosion					
Dam Failure					
Drought					
Earthquake					
Expansive Soils					
Extreme Heat					
Flood (Coastal)					
Flood (Riverine)					
Hailstorm					
Hurricane					
Landslide					
Land Subsidence					
Severe Winter Storm					
Tornado					
Tsunami					
Volcano					
Wildfire					

Note: Modified from FEMA 386-2. Hazards in bold are discussed in Step 2.

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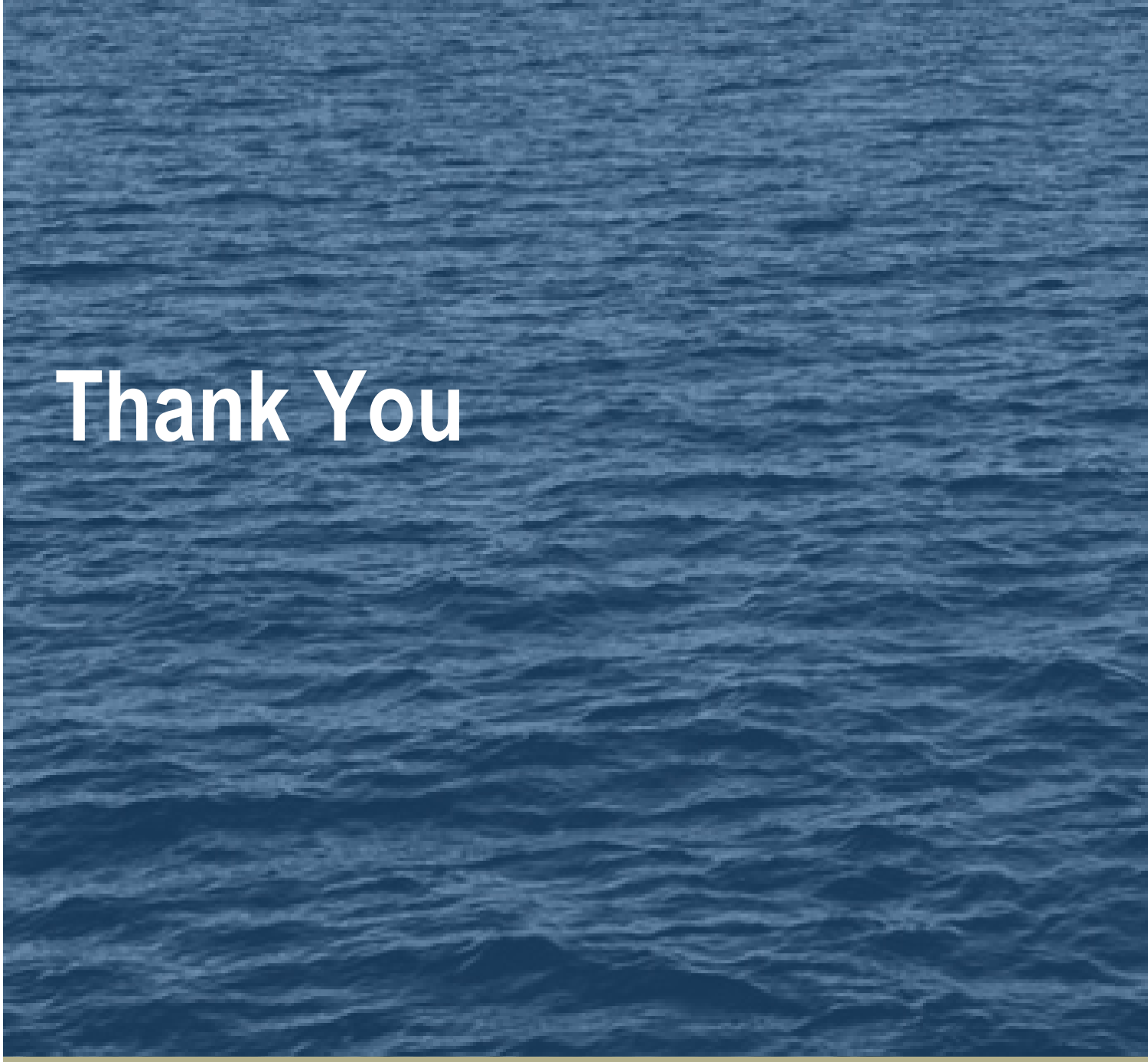
Hazard Ranking Workshop *(handout)*


Thank You

DRAFT SURVEY QUESTIONS

Village of Larchmont Hazard Mitigation Plan - SURVEY

A hazard mitigation plan is currently being prepared by Village of Larchmont staff and other planning team members to better understand and address natural hazards that may occur in the Village of Larchmont and the surrounding area. In order to identify and plan for future natural disasters, we need assistance from local residents. The purpose of this survey is to better understand the level of knowledge that local residents have about natural hazard issues and what areas of the community are vulnerable. Your responses will help coordinate activities to reduce the risk of injury or property damage in the future in the Village of Larchmont.

For reference, a natural hazard may include but not be limited to: coastal erosion, coastal storn/nor'easter, dam failure, drought, earthquake, extreme heat, flood, hailstorm, hurricane, ice jam, ice storm, sever winter storm, thunderstorm and lightning, tornado, tsunami, urban fire and windstorm.

1) How long have you lived in the Village of Larchmont?
2) Do you own or rent your primary residence?
3) Please rank how prepared you feel you and your household are for the probable impacts of natural hazard events likely to occur within the Village of Larchmont.
    - This question will rank on a scale of 1 to 5, with 5 representing the most prepared.

4) How are you personally prepared for a natural hazard?
    - This will be a "check all that apply"
        - Precautionary measures are in place to protect my property (i.e. storm shutters, proper drainage, etc.)
        - There is a preparedness kit assembled at my home that includes essential supplies that would be needed in an emergency.
        - I know where the closest severe weather shelter is.
        - I know what the local evacuation route is.
        - I know how to receive emergency notifications and information during severe weather or another type of emergency situation.
        - I have the appropriate insurance to cover losses from natural hazards/risks (i.e. flood insurance)
5) Which hazard have you experienced in the Village of Larchmont and how concerned are you about it in general?
    - This will be a click all that apply, then respondents can also note their level of concern.
        - coastal erosion, coastal storn/nor'easter, dam failure, drought, earthquake, extreme heat, flood, hailstorm, hurricane, ice jam, ice storm, sever winter storm, thunderstorm and lightning, tornado, tsunami, urban fire and windstorm.

6) Please identify the most effective way to communicate with you personally about an emergency or natural hazard.

- This will be a blank field for them to write in.

7) Do you know if your property is located in a floodplain?
    - Yes or no
8) Did you consider the impact a natural disaster could have on your home before you purchased it or moved in?
    - Yes or no
9) What types of projects do you think the Village of Larchmont should be doing to mitigate and reduce the impacts of natural hazards?
    - This will be a check all that apply
        - Retrofit and strengthen critical facilities (police, fire, shelters)
        - Retrofit infrastructure such as elevate roadways, improve drainage systems
        - Work on improving the damage resistance of utilities (electricity, etc.)
        - Install or improve protective hard and soft infrastructure like seawalls, beach erosion projects, etc.
        - Replace inadequate and frequently impacted infrastructure like bridges or causeways
        - Strengthen local regulations to require higher natural hazard risk management standards over development and redevelopment
        - Acquire vulnerable, repetitive loss properties as open space
        - Provide more public information about hazard risks and high hazard areas of the Village
        - Other (please be specific)

10) Please note any additional thoughts, comments or questions that you may have:

Post for Home Page of Village of Larchmont Website

The Village of Larchmont is currently developing a Hazard Mitigation Plan for the community. The purpose of this Hazard Mitigation Plan is to (1) assist the Village in identifying and reducing its risk from natural hazards; (2) identify actions that can be taken to prevent damage to property and loss of life, (3) and prioritize funding for mitigation efforts. The project is being funded by a grant allocated by the New York State Office of Emergency Management (NYSOEM) and is being prepared in accordance with guidance from NYSOEM and the Federal Emergency Management Agency.

The Village of Larchmont has prepared a brief survey to engage the public and gather additional public input as a part of this project. The survey can be found at **http://villageoflarchmont.org/websurvey.html.** Hard copies of this survey are also available on the counter outside of the Village Clerk's Office. Residents may complete hard copies of the survey and return them to the Village Clerk's Office, either in person during normal business hours or by mailing them to 120 Larchmont Avenue, Larchmont, NY 10538.

The Village of Larchmont has scheduled a public forum on June 17, 2013, at 7:30 PM to discuss the development of the Hazard Mitigation Plan, describe the work completed to date, and highlight some of the hazards that could present the greatest risks to community operations. As part of this meeting, which will take place in the **Larchmont Village Center, 119 Larchmont Avenue** (behind the Larchmont Library), a brief presentation will be shown. Members of the Hazard Mitigation planning committee will be available to help explain the planning process, summarize existing mitigation initiatives, highlight recommended strategies and summarize the results of the hazard risk assessment undertaken as a key component of the Hazard Mitigation planning event. This meeting is designed as an open house where residents, members of neighboring communities, and other stakeholders are invited to attend the forum to gather information and provide feedback.

The Village of Larchmont has also set up an email address for residents to submit their questions, comments or concerns. We look forward to hearing from you! Please email: hazardmitigation@villageoflarchmont.org

PRESS RELEASE
For Immediate Release
May 30, 2013

Contact: Mayor Anne McAndrews
(914) 834-6230

Village of Larchmont Preparing Hazard Mitigation Plan

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Village of Larchmont
Multi-Hazard Mitigation Plan

Public Meeting
June 17, 2013

Hurricane

Meeting Agenda

- Project Overview
  - Background and Goals
  - Roles and Responsibilities
- Hazard Mitigation Planning Process
  - Hazard identification and risk assessment
  - Mitigation strategy
- Next Steps
- Open Discussion/Questions and Comments

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Project Overview

Hurricane

Phases of Emergency Management

- **Mitigation** – long-term reduction of vulnerability
- **Preparedness** – plans and preparations to save lives and property and facilitate response operations
- **Response** – actions taken to provide emergency assistance, save lives and minimize property damage
- **Recovery** – actions taken to return to normal conditions.

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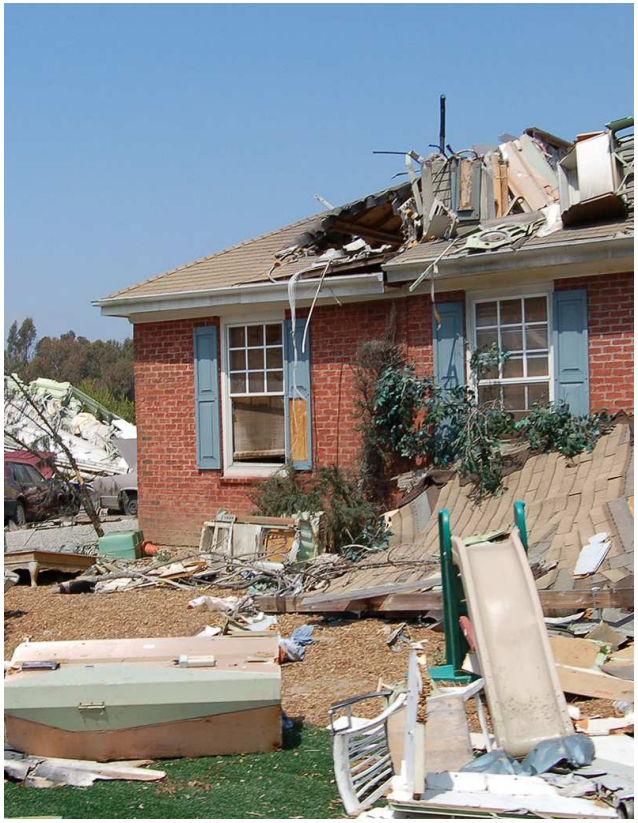
Hazard Mitigation Overview

- Hazard mitigation is defined as “any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.”
- Hazard mitigation activities may be implemented prior to, during, or after an event; however, it is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.
- Hazard mitigation is often focused on reducing repetitive loss, as many damaging events tend to occur in the same locations over time (e.g. flooding).



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Benefits of Hazard Mitigation Planning

Communities benefit from Mitigation Planning by:

- Identifying cost effective actions for risk reduction that are agreed upon by stakeholders
- Focusing resources on the greatest risks and vulnerabilities
- Building partnerships by involving multiple stakeholders
- Increasing education and awareness of hazards and risk
- Communicating priorities to local, state and federal officials
- Aligning risk reduction with other community objectives

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Project Goals

- Fulfill Federal and State Hazard Mitigation Planning Requirements
- Minimize Hazard Impacts to Physical Assets and Operations
- Reduce or Avoid Long-Term Vulnerabilities from Hazards
- Eligibility for Future Funding

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Hazard Mitigation Planning

Hurricane

Hazard Mitigation Planning Process

Comprehensive Methodology

1. Planning Process (Organize Resources)

- Community engagement
- Building upon existing information

2. Hazard Identification and Risk Assessment

- Systematically identifying hazards through the use of GIS and other tools to assess/prioritize risk

3. Mitigation Strategy

- Reach across broad skill sets to identify hazard mitigation goals
- Draw upon broad community experience to develop mitigation strategies

4. Plan Review, Evaluation, and Implementation

- Work collaboratively and proactively with regulators

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Hazard Mitigation Planning Process

- Phase 1 – Organize Resources – identifies the resources available and necessary to complete the process:
  - Assess community support
  - Build the planning team
    - Identify and organize interested members of the community (stakeholders – on and off community)
    - Identify the necessary technical expertise
  - Establish a steering committee
    - Develop a mission statement
    - Hold a project kick-off meeting
    - Establish a meeting schedule and goals
    - Engage the public

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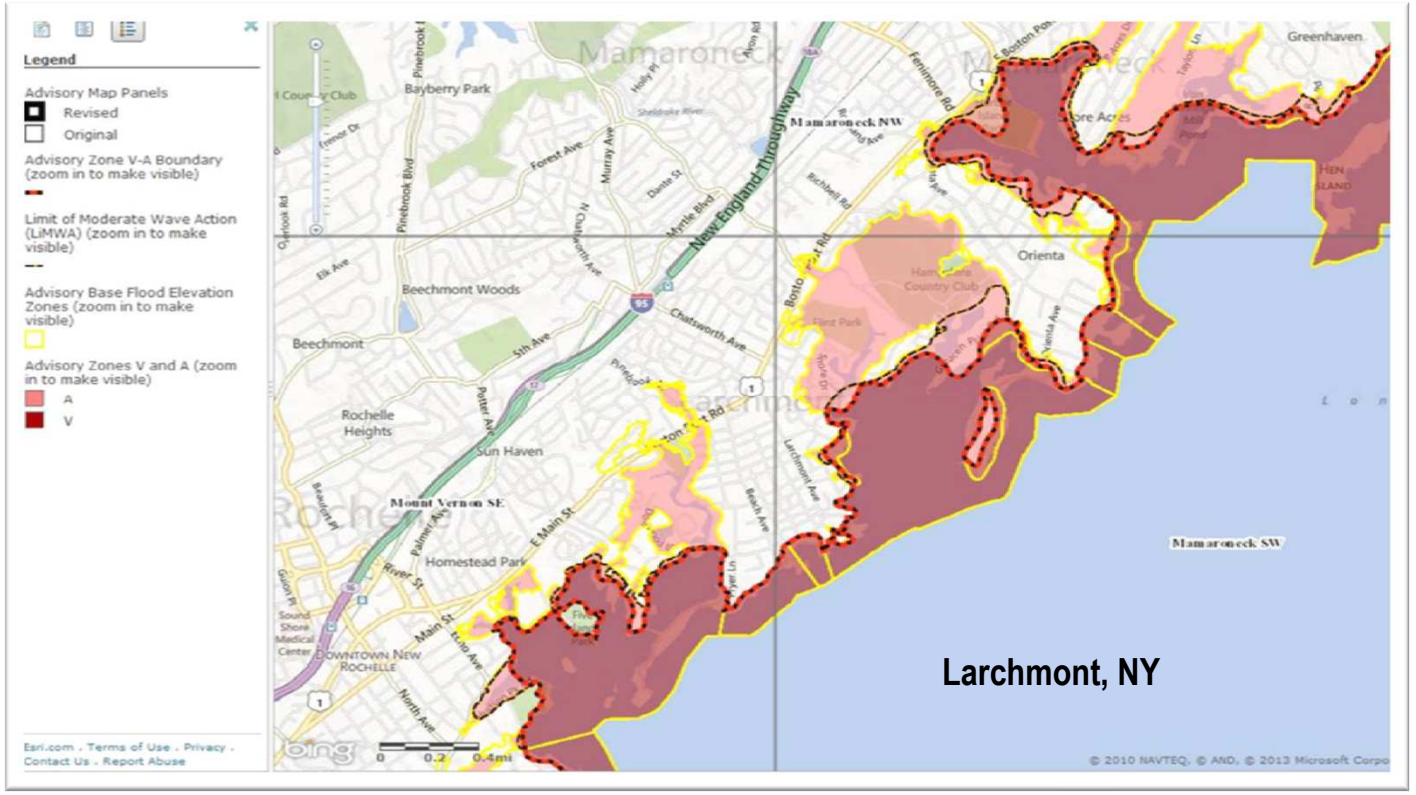
Hazard Mitigation Planning Process

- Phase 2 – Assess risks – identify the hazards that present risks to the community and the assets that are vulnerable to those hazards.
  - Gather historical information, review existing community plans/reports, communicate with local planning experts, NY OEM and FEMA.
  - Determine which hazards present the greatest risk to the community
    - Assess vulnerability
    - Create a base map to profile potential hazard events
  - Inventory community assets
    - Show how hazard events could impact the community (physically and operationally)
    - Estimate losses

Advisory Based Flood Elevations

- FEMA recently provided Advisory Based Flood Elevations for certain communities in NY and NJ to support reconstruction efforts



Advisory Based Flood Elevations

- ABFEs paint a more accurate picture of a community's current flood risk by reflecting changes in flood risk, development, and availability of better data
- Incorporating ABFEs into recovery efforts ensures that homes and businesses are built back safer, higher, and stronger, reducing the impacts of similar events in the future

Hazard Mitigation Planning Process

- Phase 3 – Develop the mitigation plan – lays out in detail the proposed mitigation actions.
  - Establish priorities
    - Compare community mission with the results of the hazard identification and risk assessment
  - Develop hazard mitigation goals
    - Minimize interruption to community operations and mission
    - Protect research
  - Determine appropriate mitigation actions
  - Prioritize mitigations actions
  - Prepare an implementation strategy

WOODARD &CURRAN

Hazard Mitigation Plan Contents

- Executive Summary
  - Purpose, Process, Major Recommendations
- Goals and Objectives
- Hazard Identification and Risk Assessment
  - Hazard Background, Asset Inventory, Loss Estimation
- Mitigation Strategy
  - Identification of Mitigation Actions, Prioritization of Actions and Methodology, Timeline
- Implementation and Plan Maintenance
  - Responsibilities, Integration with Other Plans, Schedule

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Hazard Mitigation Planning Process

- Phase 4 – Implement the plan and monitor progress
  - Formally adopt the Hazard Mitigation Plan
  - Implement mitigation measures
  - Monitor, evaluate and update the plan as needed
  - Continue to engage stakeholders from the community

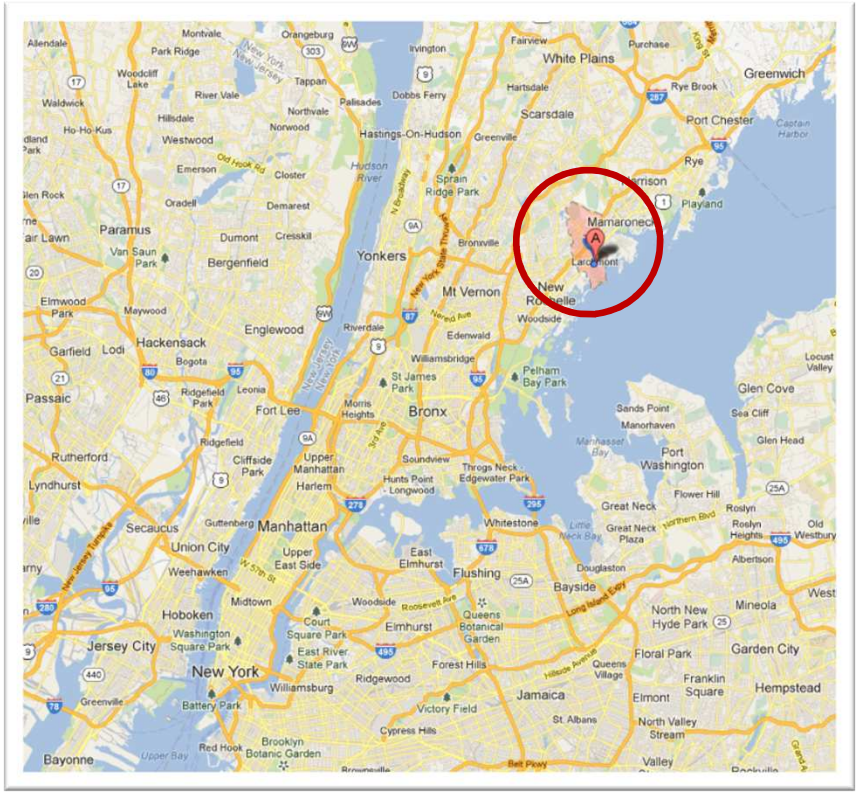
WOODARD &CURRAN

Village of Larchmont

Hurricane

Village of Larchmont Profile

- Village population is 5,864 (2010 Census)
- 1 square mile in size
- Located in lower portion of Westchester County
- Long Island sound is to the East
- New York City is 20 miles South



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Coastal Storms & Coastal Erosion

- Westchester County noted as specifically vulnerable to sea level rise which can attribute to coastal erosion and be attributed in part to an increase in and severity of coastal storms.
- Coastal erosion has been identified as a problem for the area of Larchmont that is adjacent to Long Island Sound.
- Among the most significant effects of climate change is sea level rise. Larchmont as a shoreline community may be vulnerable to coastal storms, erosion and flooding.

Larchmont, New York

Hurricane Sandy pounds Larchmont Credit: Don Sutherland

Sources: NY State Standard Multi-Hazard Mitigation Plan – 2011; Climate Action Plan, Village of Larchmont, DEC

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Coastal Storms & Coastal Erosion

- New York Harbor has seen a 15-inch increase since 1860 and a 6-inch rise since 1960, according to the DEC, and the story is the same for the Long Island Sound, where consequences could be grave for the low-lying communities that make up the Sound's 600 miles of coastline.

Credit: Stefani Kim

Sources: Larchmont-Mamaroneck Patch Article, December 2010

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Coastal Erosion

- Coastal Erosion Hazard Area (CEHA) maps prepared by DEC indicate areas of concern in Larchmont.
  - These maps are being updated by DEC

Sources: NYDEC

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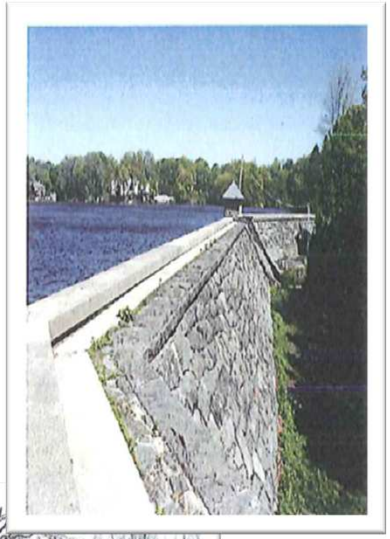
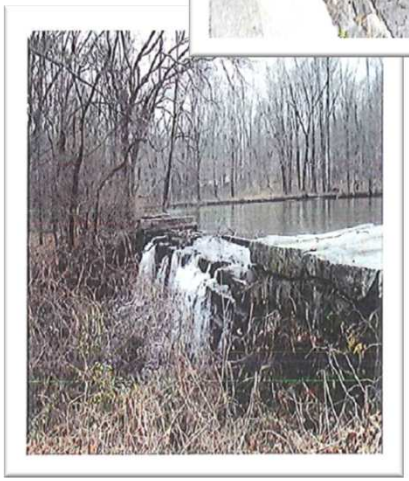
Dam Failure

- Two dams owned by Larchmont:
  - Larchmont Dam (Class B)
  - Larchmont Water Company Dam No. 2 (Class C)
- Due to highly and densely developed areas downstream of the two dams located in Larchmont, a catastrophic event would have an impact and could endanger human life and property.
- Floods are the most significant natural hazard that can impact the two dams owned by Larchmont.
- Dam Failure was identified in the Westchester CEMP as a moderately high hazard for Westchester County.
  - The Village develops an Emergency Action Plan to assist in responding to a potential dam failure and submits it to DEC annually

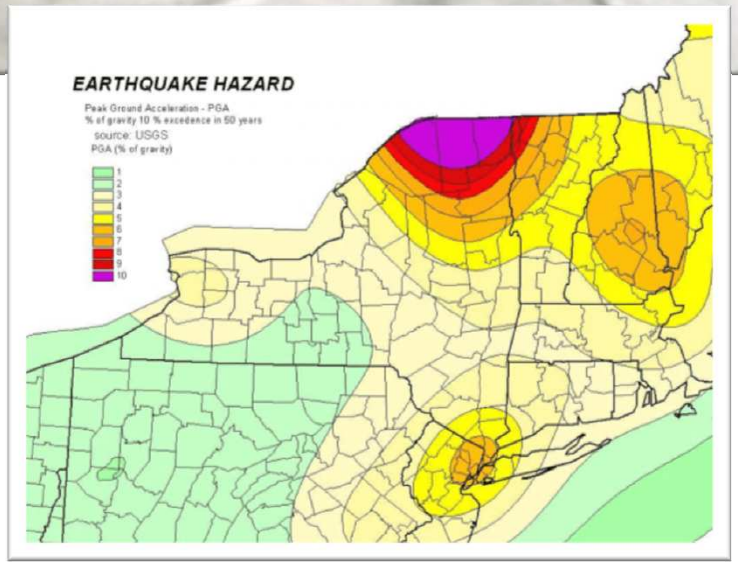


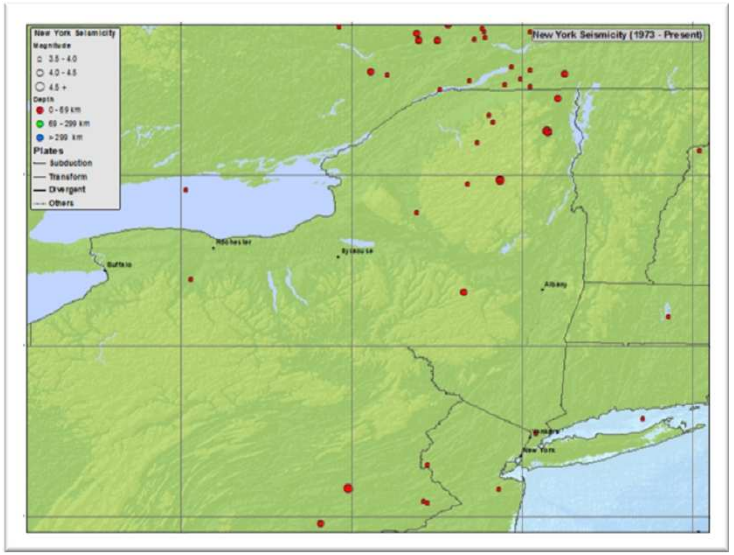


WOODARD &CURRAN

Earthquakes

- PGA is a measure of earthquake acceleration on the ground (how hard the earth shakes)
  - Larchmont is 6-7%
  - PGA is best determinant of damage
- The two dams in Larchmont could be damaged by ground motions caused by seismic activity
- Earthquake was identified in the Westchester CEMP as a moderately high hazard for Westchester County





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Flooding

- Floods are the most significant natural hazard that can impact the two dams in Larchmont.
- Sea level rise and coastal flooding from storm surge are already affecting and will increasingly affect New York's entire ocean and estuarine coastline from Montauk Point to the Battery and up the Hudson River to the federal dam at Troy.
- The likelihood that powerful storms will hit New York State's coastline is very high, as is the associated threat to human life and coastal infrastructure. This vulnerability will increase in area and magnitude overtime.
- Larchmont has had substantial flood impacts from various storms at areas including: Pine Brook Road, Kilmer Road, Flint Park off Birch Road, Nassau Road, Pryer Manor Road, Magnolia Avenue, Ocean Avenue, Cedar Island, Pine Brook Drainage Basin, Park Avenue at Manor Beach, Spanish Cove Road, Lindsay Drive, North Avenue, Coolidge Street, Monroe Avenue and Larchmont Reservoir.

Flooding near Flint Park, in back of Hommocks School in Larchmont. Credit: Stefani Kim

Sources: NY State Hazard Mitigation Plan; Larchmont Dam Inspection & Maintenance Plan; Westchester County Flood Mitigation Program 2012

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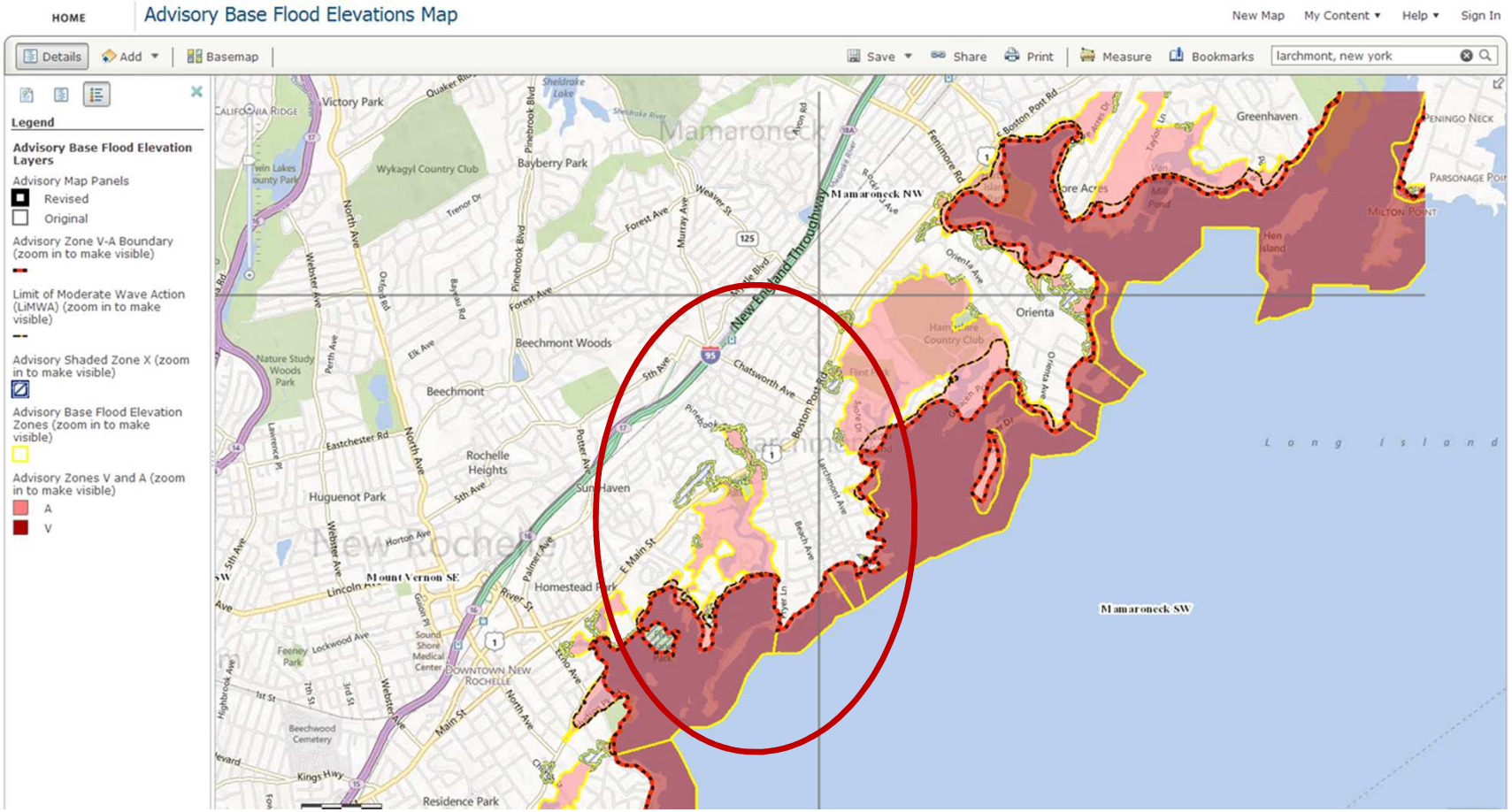
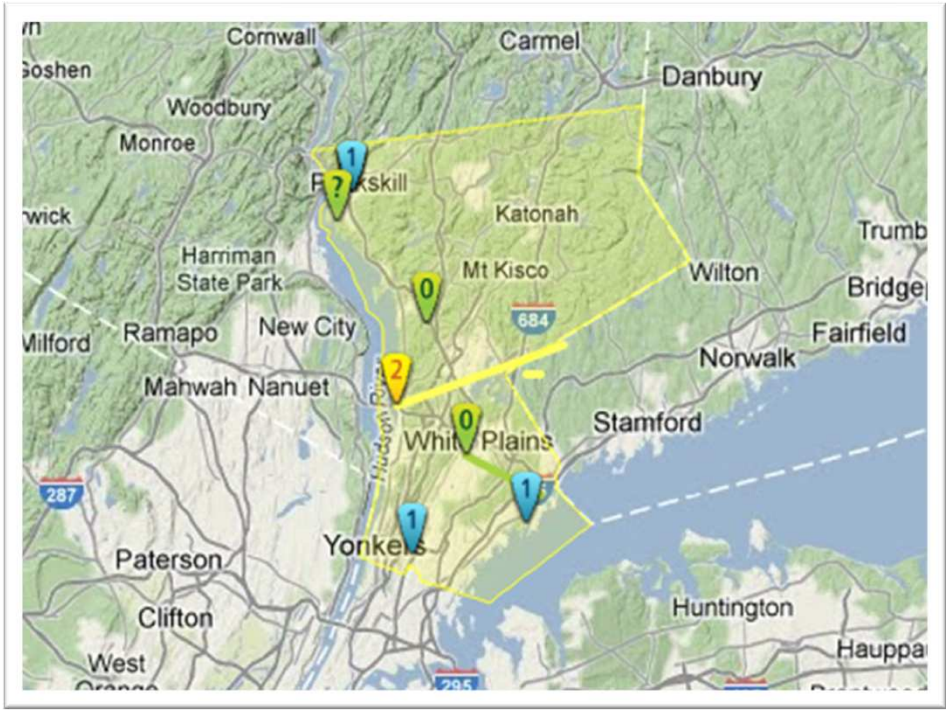
Flooding – FEMA Advisory Base Flood Elevation Map



Tornadoes

- Tornado was identified in the Westchester CEMP as a moderately high hazard for Westchester County.
- Between 1971 – 2006, there have been 9 tornados in Westchester County and ranging from a 0 to a 2 on the Fujita scale.

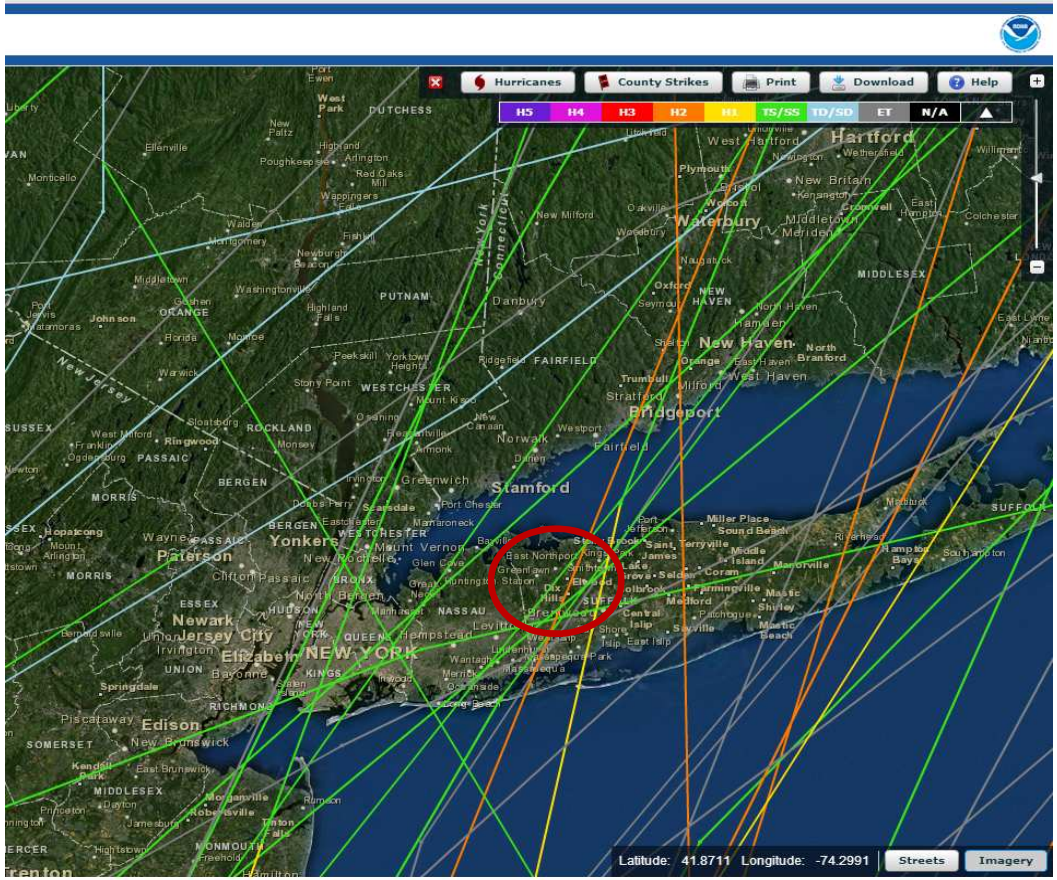


Source: http://www.tornadohistoryproject.com/

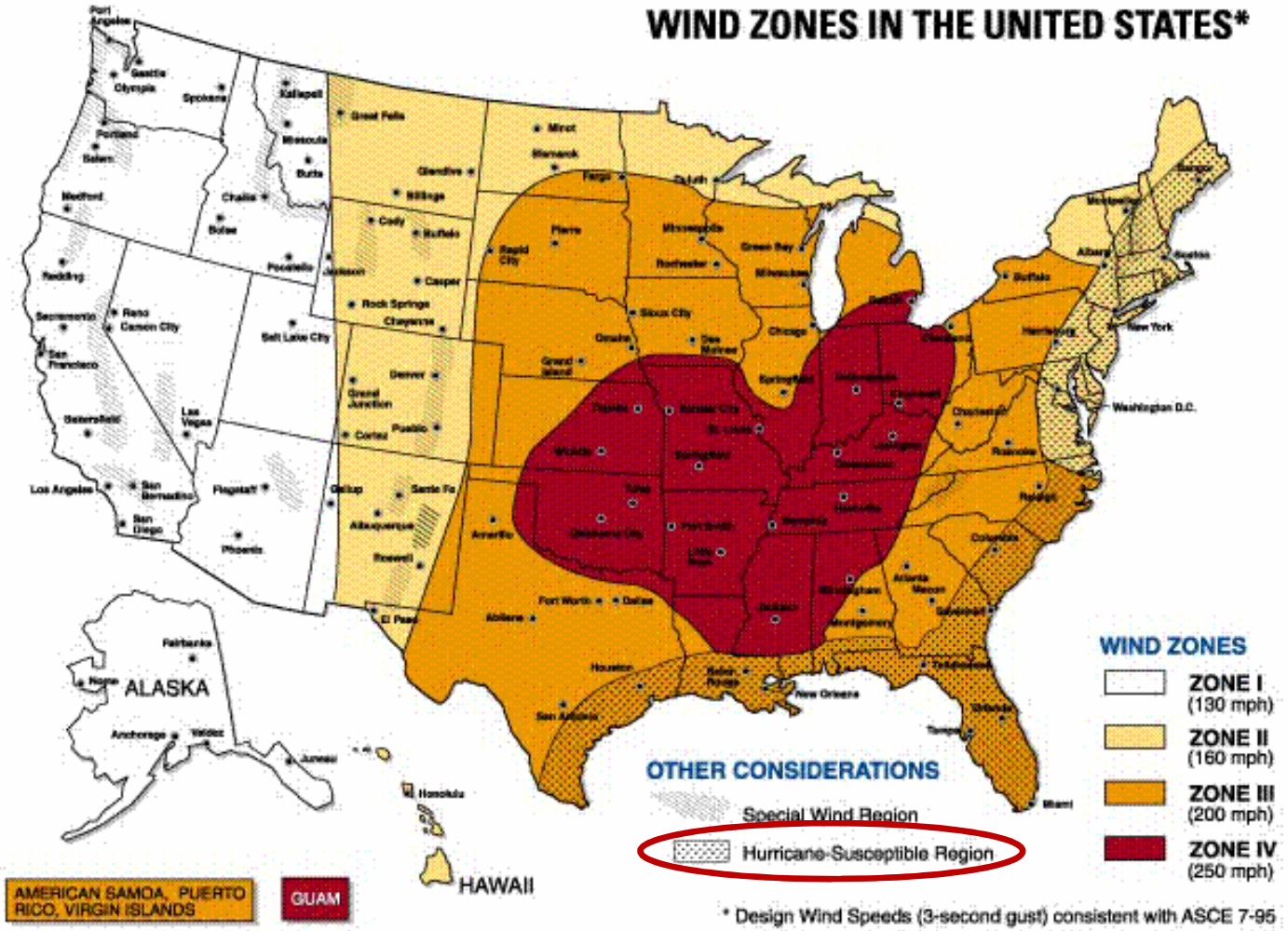
WOODARD &CURRAN

Hurricane/Tropical Storm Tracks 1900 - 2011

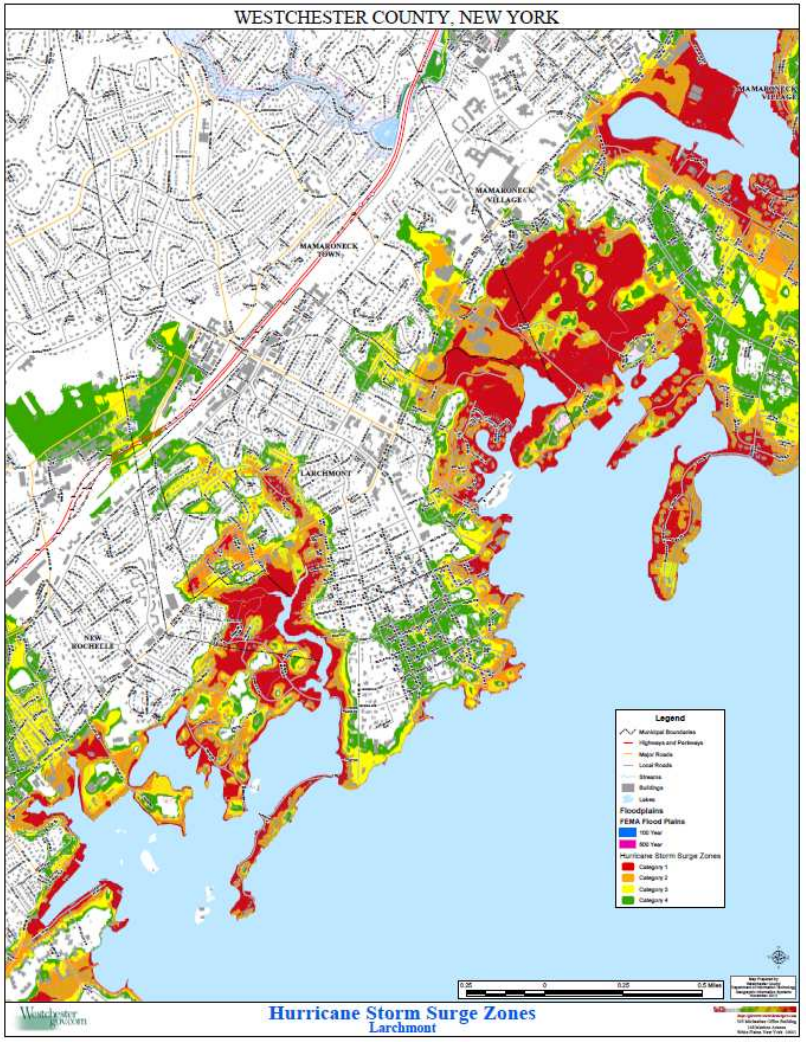
- Four Category 3 hurricanes have hit New York since 1900.
- Hurricane was identified in the Westchester CEMP as a moderately high hazard for Westchester County.



Hurricane Susceptible Regions



Hurricane – Larchmont Storm Surge Zones



Source: Westchester County

How Larchmont Weathered "Superstorm Sandy"

- Emergency Shelters opened at the VFW, Hampshire Country Club and Mamaroneck Public Library
- Widespread power outages (64% of Larchmont)
- High tides in coastal areas and storm surge
- High winds experienced

Photo: *Manor Park, Don Sutherland*

WOODARD &CURRAN

Hazard Identification – Village of Larchmont

- Coastal Erosion
- Coastal Storm
- Dam Failure
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hailstorm
- Hurricane
- Landslide
- Severe Winter Storm
- Thunder & Lightning
- Tornado
- Tsunami
- Urban Fire
- Windstorm

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Next Steps

Hurricane

Key Project Information

- Larchmont is preparing a **single-jurisdiction** plan for approval
  - An exception as the State is currently prioritizing multi-jurisdictional plans
- Hazard Mitigation Planning project is tied to an ongoing generator project for the Village
- Hazard Mitigation Plan must be completed and approved by FEMA by **9/26/2013**
- Close coordination between the Village and NYSOEM is critically important

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What You Can Do!

- Fill out the Hazard Mitigation Plan Survey (will be posted through the end of the week)

  http://villageoflarchmont.org/websurvey.html
- Review the draft plan and provide comment (it will be posted on the Village website)
- Send an email with your questions/concerns to

  hazardmitigation@villageoflarchmont.org

WOODARD &CURRAN

Next Steps

- Continue to work closely with Village residents and staff and the County to collect key information for the plan and obtain feedback
- Continue report outline and writing
- Anticipate 1 additional stakeholder/public informational meetings
  - July/August timeframe
- Prepare draft report

WOODARD &CURRAN

WOODARD &CURRAN

Thank You

Hurricane

Village of Larchmont
Multi-Hazard Mitigation Plan

Public Meeting #2
August 8, 2013

Hurricane

Meeting Goals

- To discuss and answer questions about the Village of Larchmont Hazard Mitigation Plan, which includes
  - An analysis of the natural hazards that could impact the Village of Larchmont and the associated hazard rankings.
  - Hazard mitigation planning goals and objectives.
  - A list of potential hazard mitigation projects.

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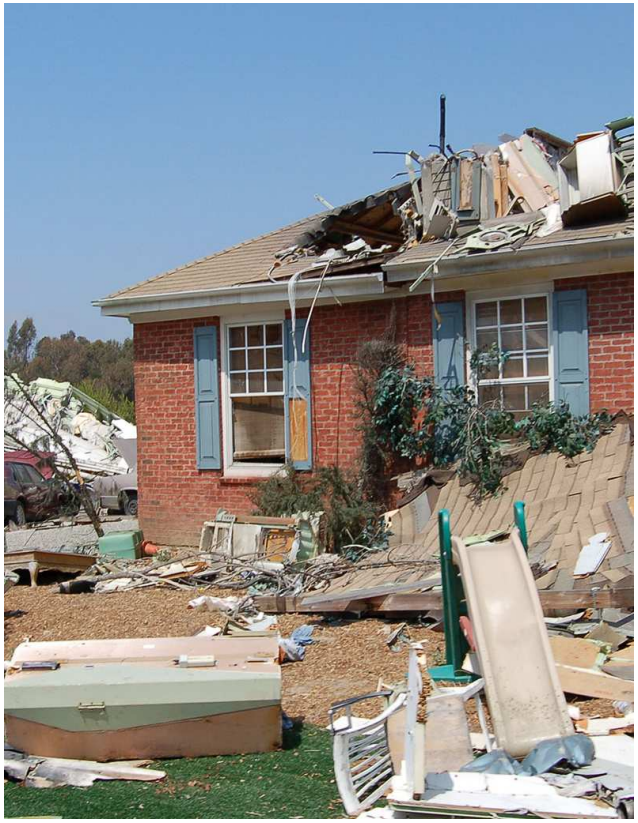
Project Overview

Hurricane

Hazard Mitigation Overview

- Hazard mitigation is defined as “any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.”
- Hazard mitigation activities may be implemented prior to, during, or after an event; however, it is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.
- Hazard mitigation is often focused on reducing repetitive loss, as many damaging events tend to occur in the same locations over time (e.g. flooding).



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Project Goals

- Develop a Hazard Mitigation Plan that Fulfills Federal and State Requirements
- Minimize Hazard Impacts to Physical Assets and Operations
- Reduce or Avoid Long-Term Vulnerabilities from Hazards
- Eligibility for Future Funding

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Hazard Mitigation Planning

Hurricane

Hazard Mitigation Planning Process

Comprehensive Methodology

1. Planning Process (Organize Resources)

- Community engagement
- Building upon existing information

2. Hazard Identification and Risk Assessment

- Systematically identifying hazards through the use of GIS and other tools to assess/prioritize risk

3. Mitigation Strategy

- Reach across broad skill sets to identify hazard mitigation goals
- Draw upon broad community experience to develop mitigation strategies

4. Plan Review, Evaluation, and Implementation

- Work collaboratively and proactively with regulators

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Hazard Mitigation Planning Process

- Currently Completing Phase 3 – Develop the mitigation plan – lays out in detail the proposed mitigation actions.
  - Establish priorities
    - Compare community mission with the results of the hazard identification and risk assessment
  - Develop hazard mitigation goals
    - Minimize interruption to community operations and mission
    - Protect research
  - Determine appropriate mitigation actions
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  - Identification of Mitigation Actions, Prioritization of Actions and Methodology, Timeline
- Implementation and Plan Maintenance
  - Responsibilities, Integration with Other Plans, Schedule

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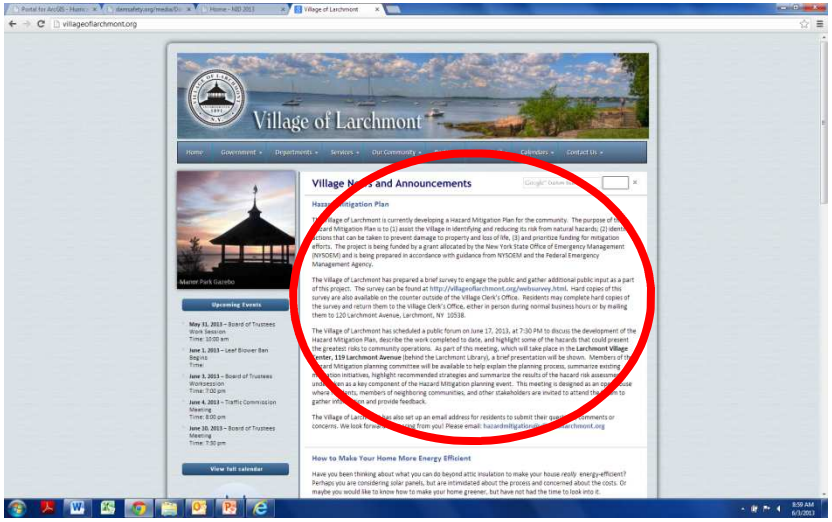
Public Outreach

- Information about the project posted to Village website
- Press releases sent to several local news outlets
- Email address for public participation created

  hazardmitigation@villageoflarchmont.org
- Public Survey developed to obtain feedback

  http://villageoflarchmont.org/websurvey.html
- Public Meetings held on June 17th and August 8th and broadcast on local cable TV.



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Hazard Identification and Ranking

Hurricane

Hazard Identification – Village of Larchmont

- Coastal Erosion
- Coastal Storm
- Dam Failure
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hailstorm
- Hurricane
- Landslide
- Severe Winter Storm
- Thunder & Lightning
- Tornado
- Tsunami
- Urban Fire
- Windstorm

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Hazard Ranking Methodology

- The core project team met to identify and prioritize risks.
- Hazards were ranked on a scale of 0 (very low) to 5 (high) in the categories of frequency, severity, duration, and intensity.
- Values were added for each profile item, so that each hazard was ultimately given a “rank”.
- Weighting of probability vs. consequence

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Natural Hazard Ranking

- Severe
  - Flood
  - Hurricane
- High
  - Coastal Storm
  - Coastal Erosion
  - Winter Storm
  - Ice Storm
  - Dam Failure
  - Tornado
- Medium
  - Earthquake
  - Drought
  - Urban Fire
  - Extreme Heat
  - Windstorm
- Low
  - Hailstorm
  - Thunder/lightning storm
  - Tsunami

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Goals and Objectives

Hurricane

Goals & Objectives

- **GOAL 1**

  Engage and educate the public regarding preparing for, responding to and recovering from natural disasters and continue to include them in mitigation discussions.

Objectives

- Increase the level of understanding of natural hazards and the risks associated when they occur.
- Work closely with officials, stakeholders and residents of neighboring communities to collaborate on education, response and recovery when possible.
- Continue to communicate effectively through the use of data, maps and other hazard information (which is reviewed and updated regularly) as a way to engage the public.
- Inform the public about existing and changing regulatory requirements that are related to coastal zones, sea level rise and climate change.
- Gather information from stakeholders about repetitive damages from natural hazards and engage them in future mitigation discussions.

Goals & Objectives

- **GOAL 2**

  Continue to prepare for climate change and sea level rise impacts on the Village of Larchmont.

Objectives

- Consider requiring the use of building materials that would naturally keep buildings cooler during summer months and also reduce electrical demand.
- Refine coastal zone and flood plain regulations to further limit development and redevelopment while also encouraging natural habitat restoration.
- Consider requiring climate change and sea level rise during infrastructure (stormwater/wastewater) and building repairs and upgrades.
- Engage multiple layers of government, neighboring communities and a wide range of public and private stakeholders to build buy-in and crucial partnerships for coordinated adaptation strategies.
  - Engage the insurance industry to facilitate the use of risk-sharing mechanisms to address climate change impacts.
  - Focus attention on early win–win adaptation strategies, such as those that have near-term benefits or meet multiple goals like greenhouse gas mitigation and continued emergency planning.

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Goals & Objectives

- **GOAL 3**

  Encourage disaster-resistant development and promote restoration and protection of coastal zones and natural areas.

Objectives

- Continue to review and evaluate existing local standards and codes to ensure that they encourage or require consider climate challenges and sea level rise and enhance them as new information on hazards and risks is available.
- Develop new local standards and codes to increase the Village's resilience to climate change and sea level rise.
- Develop and encourage the use of design standards and specifications that take climate change into consideration and are proactive in fostering mitigation.
- Evaluate and implement mitigation actions that focus on enhancing and preserving the natural environment to reduce impacts created by coastal erosion and coastal storms.

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Goals & Objectives

- **GOAL 4**

  Investigate and understand flooding occurrences and reduce its impact on the community.

Objectives

- Develop both short and long term action items for responding to current flooding challenges while incorporating mitigation activities that will increase the Village's ability to withstand future events as well.
- Implement specific mitigation activities that will reduce recurring flooding impacts in the Village of Larchmont.
- Seek out a variety of funding sources that could be used to help the Village reduce existing flooding in the community.
- Encourage property owners to take preventative actions especially in repetitive loss areas vulnerable to flooding.

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Goals & Objectives

- **GOAL 5**

  Further enhance the Village's ability to respond and react to a natural hazard event and reduce the possibility of damage and losses due to their occurrence.

Objectives

- Actively participate in discussions, meetings, conferences and other events that relate pertain to climate change, improved mapping and data and periodic assessments of climate change impacts and adaptation for the continued evolution of climate change adaptation policies and programs.
- Educate residents and businesses about insurance coverage for natural hazards.
- Identify, pursue and maximize the use of outside sources of funding.
- Incorporate mitigation strategies into capital improvement projects and maintenance upgrades.
- Identify the need for and acquire any special emergency services, training and equipment.
- Integrate new hazard and risk information into emergency operation plans.

Potential Mitigation Projects

Hurricane

Mitigation Activities & Action Plan

- The Village of Larchmont has developed mitigation strategies and an action plan to assist the community in the future in its ability to prepare for and manage any future natural hazard events while keeping property and the life of residents as safe as possible.
- Action items were identified based on the goals and objectives prepared during the planning process. Most focus on mitigating flooding, coastal storm, coastal erosion and hurricane impacts. Other projects include regulatory updating/additions and public outreach.
- Potential Projects will be prioritized based on number of goals/objectives met, eligibility for funding, short and long term impact, etc.

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Next Steps

Hurricane

Next Steps

- Complete Phase 3 of Planning Process:
  - Submit final draft Hazard Mitigation Plan to NY Office of Emergency Management (OEM).
  - Incorporate comments from OEM.
  - FEMA review/approval of final Hazard Mitigation Plan.
  - Village formally adopts Plan.

Once the plan is finalized, a link will be posted to the Village's website, a press release will be issued and a hard copy of the plan will be made available at Village Hall

WOODARD &CURRAN

Next Steps

- Planning Process Phase 4 – Implement the plan and monitor progress
  - Implement mitigation measures
  - Monitor, evaluate and update the plan as needed
  - Hold an annual Plan Review Meeting to specifically evaluate the progress of the plan and document any mitigation activities.
  - Continue to engage stakeholders from the community

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Questions?

Hurricane

Village of Larchmont

villageoflarchmont.org

Village of Larchmont

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Larchmont police officer

Upcoming Events

- **May 31, 2013** – Board of Trustees Work Session
  Time: 10:00 am
- **June 1, 2013** – Leaf Blower Ban Begins
  Time:
- **June 3, 2013** – Board of Trustees Worksession
  Time: 7:00 pm
- **June 4, 2013** – Traffic Commission Meeting
  Time: 8:00 pm
- **June 10, 2013** – Board of Trustees Meeting
  Time: 7:30 pm

View full calendar

Village News and Announcements

Google™ Custom Search

Hazard Mitigation Plan

The Village of Larchmont is currently developing a Hazard Mitigation Plan for the community. The purpose of this Hazard Mitigation Plan is to (1) assist the Village in identifying and reducing its risk from natural hazards; (2) identify actions that can be taken to prevent damage to property and loss of life, (3) and prioritize funding for mitigation efforts. The project is being funded by a grant allocated by the New York State Office of Emergency Management (NYSOEM) and is being prepared in accordance with guidance from NYSOEM and the Federal Emergency Management Agency.

The Village of Larchmont has prepared a brief survey to engage the public and gather additional public input as a part of this project. The survey can be found at **http://villageoflarchmont.org/websurvey.html**. Hard copies of this survey are also available on the counter outside of the Village Clerk's Office. Residents may complete hard copies of the survey and return them to the Village Clerk's Office, either in person during normal business hours or by mailing them to 120 Larchmont Avenue, Larchmont, NY 10538.

The Village of Larchmont has scheduled a public forum on June 17, 2013, at 7:30 PM to discuss the development of the Hazard Mitigation Plan, describe the work completed to date, and highlight some of the hazards that could present the greatest risks to community operations. As part of this meeting, which will take place in the **Larchmont Village Center, 119 Larchmont Avenue** (behind the Larchmont Library), a brief presentation will be shown. Members of the Hazard Mitigation planning committee will be available to help explain the planning process, summarize existing mitigation initiatives, highlight recommended strategies and summarize the results of the hazard risk assessment undertaken as a key component of the Hazard Mitigation planning event. This meeting is designed as an open house where residents, members of neighboring communities, and other stakeholders are invited to attend the forum to gather information and provide feedback.

The Village of Larchmont has also set up an email address for residents to submit their questions, comments or concerns. We look forward to hearing from you! Please email: **hazardmitigation@villageoflarchmont.org**

How to Make Your Home More Energy Efficient

Have you been thinking about what you can do beyond attic insulation to make your house *really* energy-efficient? Perhaps you are considering solar panels, but are intimidated about the process and concerned about the costs. Or maybe you would like to know how to make your home greener, but have not had the time to look into it.

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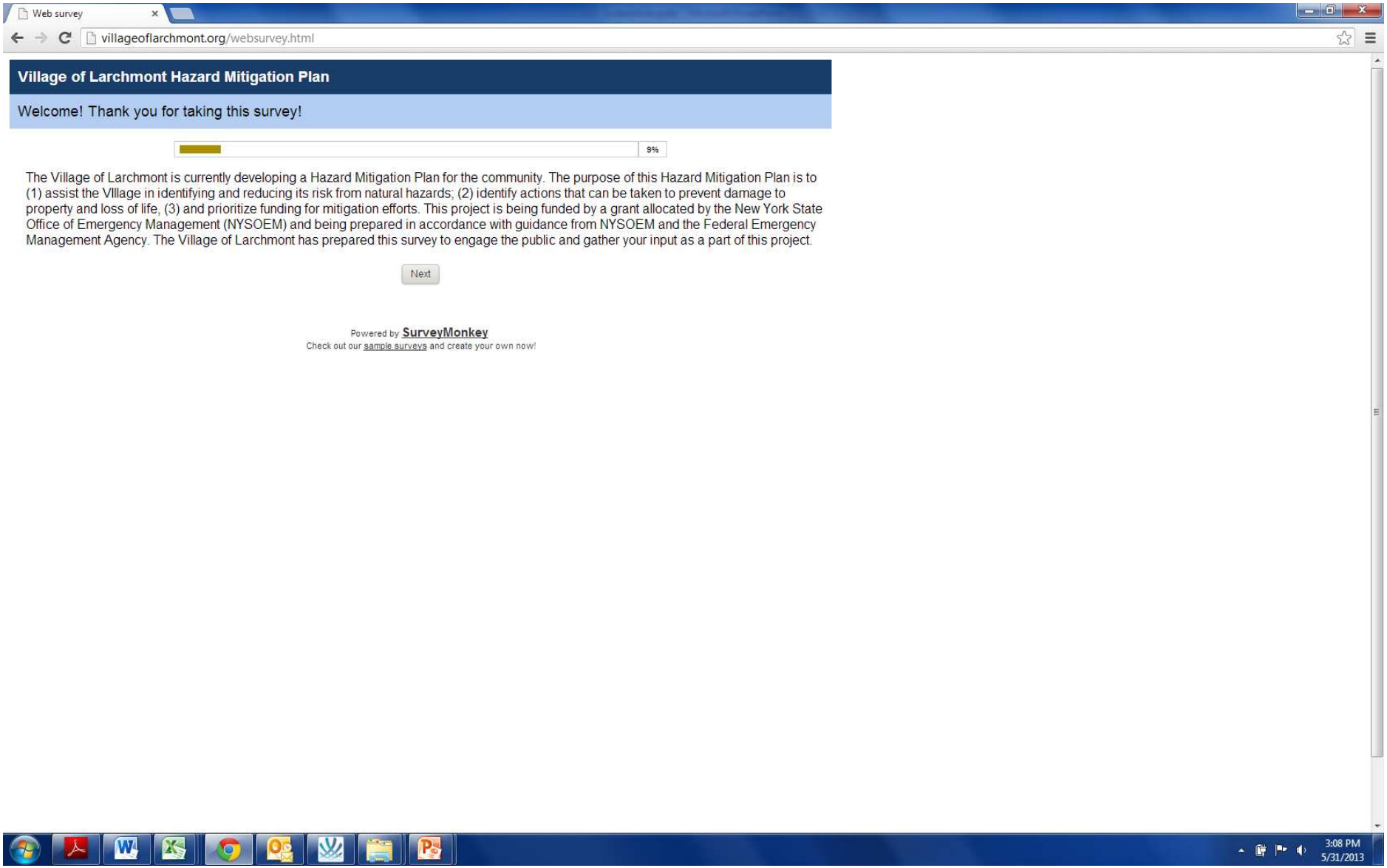
5/31/2013


Web survey
villageoflarchmont.org/websurvey.html
Village of Larchmont Hazard Mitigation Plan
Welcome! Thank you for taking this survey!
9%
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Next
Powered by SurveyMonkey
Check out our sample surveys and create your own now!
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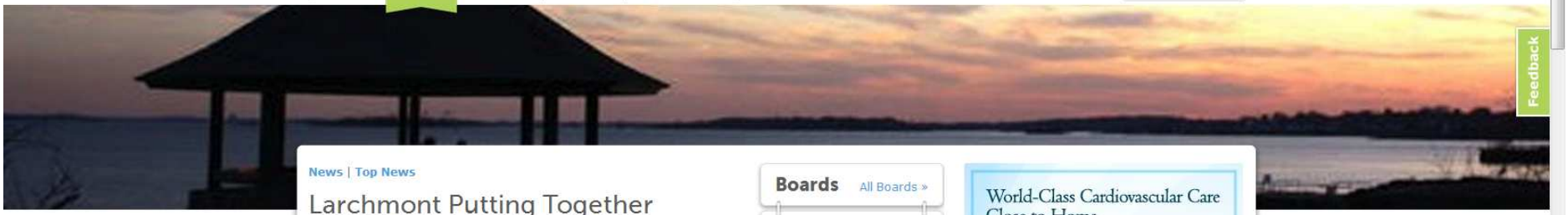
5/31/2013



News | Top News

Larchmont Putting Together Hazard Mitigation Plan

Posted by Stefani Kim (Editor), June 4, 2013 at 03:31 pm

Though it's unlikely that a catastrophic event like an earthquake or tsunami will hit Larchmont anytime soon, the village is in the process of formulating a Hazard Mitigation Plan to guard against more likely natural occurrences and their potentially

Boards All Boards »

Make an announcement, speak your mind, or sell something

Post

Woman's Club of Mamaroneck Awards College Scholarships
THE WOMAN'S CLUB OF MAMARONECK AWARD SCHOLARSHIPSt o WHITNEY SPIEGEL of Rye Neck High School...
Announcements June 4, 2013 at 02:21 pm
1 • • ellen

Larchmont Putting Together Hazard Mitigation Plan

Posted by Stefani Kim (Editor), June 4, 2013 at 03:31 pm

Though it's unlikely that a catastrophic event like an earthquake or tsunami will hit Larchmont anytime soon, the village is in

the process of formulating a Hazard Mitigation Plan to guard against more likely natural occurrences and their potentially disastrous outcomes.

The development of the plan will be funded by the New York State Office of Emergency Management (NYSOEM) and will be prepared in accordance with NYSOEM and Federal Emergency Management Agency (FEMA) guidelines, the village said in a statement.

Popular Stories

- Larchmont Contracted With USDA For Goose Removal
- New York National Guard Holds Shooting Match at Camp Smith
- Hundreds of Girl Scouts Prep Boxes, Pack Cookies for...

In an effort to gauge public opinion about the hazards that concern them, the village is asking residents to complete a survey, that can be accessed here.

And, on June 17 at 7:30 p.m., the village will hold a public forum at the Village Center to discuss the Hazard Mitigation Plan and members of the Hazard Mitigation planning committee "will be available to help explain the planning process, summarize existing mitigation initiatives, highlight recommended strategies and summarize the results of the hazard risk assessment undertaken as a key component of the Hazard Mitigation planning event," said the statement sent out by the village.

Questions, concerns and comments can be sent to village officials by emailing: hazardmitigation@villageoflarchmont.org

Next Story

Feeling a Bit Down? Five Stories to Help Inspire You

Read Now »

Comments

+ Leave a Comment

Comments

+ Leave a Comment

Richard Ward June 12, 2013 at 10:06 am

Arguably, one of the biggest hazard risks the Village of Larchmont faces is the financial consequences for which it currently would be liable under New York law if its one or both of its dams at its Larchmont Reservoir property were to catastrophically fail.

A massive amount of water would run downstream, inundating properties and potentially injuring or drowning anyone in its path. Estimates put the inundation reaching the "duck pond" in approximately 15 minutes, far faster than downstream residents could be warned to evacuate to safety. Former Mayor Feld characterized the risk as "the one thing that keeps me awake at night." Yet successive Boards have chosen not to address the risk, preferring that it not be brought to the public's attention. However, mitigating the risk would be relatively straight-forward. An agreement needs to be negotiated between the Village of Larchmont and the beneficiaries of the flood mitigation the dams now provide. They are the Town of Mamaroneck and the Village of Mamaroneck. In return for agreeing that the Village's property can continue to be used for flood mitigation purposes, the non-Village-of-Larchmont portion of the Town of Mamaroneck and the Village of Mamaroneck need to agree to take on responsibility for the consequences of any dam failure and to indemnify and hold harmless the Village of Larchmont. Otherwise, the Village should substantially reduce the water level behind the dam to minimize its liability, and then should consider breaching the upper dam to fully mitigate its risk. Some will say that because of the risk the Village of Larchmont should not own the 60 acre property on which the dam (and the smaller ice dam) sits. But this is a red herring. Properly managed, the risk can be shed while this irreplaceable property can be retained. It once served as the Village's water supply. With potential changes to the climate and the rising cost of water supply from alternative sources, who can say that a century from now the Village wouldn't want to have a potential source of water under its control? Others will say that reducing the water level or breaching the upper dam would cause unacceptable environmental impacts. That assertion also is a red herring. The dam waters actually have inundated what once was a pristine creek valley. That valley would quickly restore itself naturally. Still others might assert that the Village of Larchmont faces a risk that those who own properties that abut the reservoir might take legal action, asserting that a reduction in reservoir water levels would adversely affect their property values. That is a risk the Village's legal advisors will have to characterize, and perhaps parry, as the Village acts to mitigate what arguably is the greatest catastrophic financial risk it faces.

1 Recommend

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Announcements June 7, 2013 at 01:41 pm

• Gibbons Digital Consultants

2013 Leukemia Cup Regatta

The Westchester/Hudson Valley Chapter of The Leukemia & Lymphoma Society (LLS) will hold its...

Announcements June 7, 2013 at 01:40 pm

• Oliver Wade

Letter to the Editor: Construction on the Westchester...

I am writing to urge the Board of Trustees of Sustainable Playland and all elected officials...

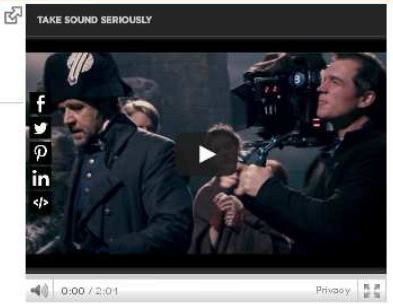
Announcements June 7, 2013 at 08:45 am

• Stefani Kim (Editor)

Remove the Construction Equipment From Pine

Larchmont Putting Together Hazard Mitigation Plan

Patch
Tuesday, 4 June 2013 (1 day ago)



Patch Larchmont-Mamaroneck, NY --

Though it's unlikely that a catastrophic event like an earthquake or tsunami will hit Larchmont anytime soon, the village is in the process of formulating a Hazard Mitigation Plan to guard against more likely natural occurrences and their potentially

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Baby said What?!

Sound Shore

New Rochelle, Larchmont, Mamaroneck, Rye, Port Chester, Pelham and Harrison

Village of Larchmont Preparing Hazard Mitigation Plan

31 May 2013 by Swapna Venugopal in Uncategorized - No Comments

From Mayor Anne McAndrews:

The Village of Larchmont is currently developing a Hazard Mitigation Plan for the community. The purpose of this Hazard Mitigation Plan is to (1) assist the Village in identifying and reducing its risk from natural hazards; (2) identify actions that can be taken to prevent damage to property and loss of life, (3) and prioritize funding for mitigation efforts. This project is being funded by a grant allocated by the New York State Office of Emergency Management (NYSOEM) and being prepared in accordance with guidance from NYSOEM and the Federal Emergency Management Agency.

The Village of Larchmont is holding a public forum on June 17, 2013, at 7:30 PM to discuss the development of the Hazard Mitigation Plan, describe the work completed to date, and highlight some of the hazards that could present the greatest risks to community operations. As part of this meeting, which will take place in the Larchmont Village Center, 119 Larchmont Avenue (behind the Larchmont Library), a brief presentation will be shown. Members of the Hazard Mitigation planning committee will be available to help explain the planning process, summarize existing mitigation initiatives, highlight recommended strategies and summarize the results of the hazard risk assessment undertaken as a key component of the Hazard Mitigation planning event. This meeting is designed as an open house where residents, members of neighboring communities, and other stakeholders are invited to attend the forum to gather information and provide feedback.

The Village of Larchmont has also prepared a brief survey to engage the public and gather additional public input as a part of this project. The survey can be found currently on the Village of

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Sound Shore
Tweets from a list by lohud.com
Reporters covering New Rochelle, Mamaroneck, Larchmont, Rye, Port Chester, Pelham and Harrison.

Swapna Venugopal @SwapnaVenugopal 10h
Study concludes no need to kill Larchmont's

February 11, 2013 Village

lmctvny.swagit.com/play/02112013-710

00:02 03:01

Item 9 - Consideration of amended agreement with Woodard & Curran for prepa

Item 9

Consideration of amended agreement with Woodard & Curran for preparation of hazard mitigation plan for the Village of Larchmont.

February 11, 2013 Village of Larchmont

Meeting Index | Full Agenda | Share

Items 1 & 2 - 1. Roll Call 2. Mayor's announcements and appointments to Committees or Commissions. »

Items 1 & 2

1. Roll Call 2. Mayor's announcements and appointments to Committees or Commissions.

Item 3 - Report by Police Department. »

Item 4 - Report by Fire Captain: - Consider SAFER Grant - Consider resolution to renew Larchmont's participation in the Westchester County Fire Mutual Aid Plan »

Item 7 - Consideration of request by Carolyn Lee to set dates for Larchmont's 5K Run and Mamaroneck Schools Foundation Triathlon. »

Item 8 - Set date for Public Hearing re Reusable Bag Initiative proposal by Larchmont Environmental Committee. »

Item 5 - Trustee Reports. »

Item 9 - Consideration of amended agreement with Woodard & Curran for preparation of hazard mitigation plan for the Village of Larchmont. »

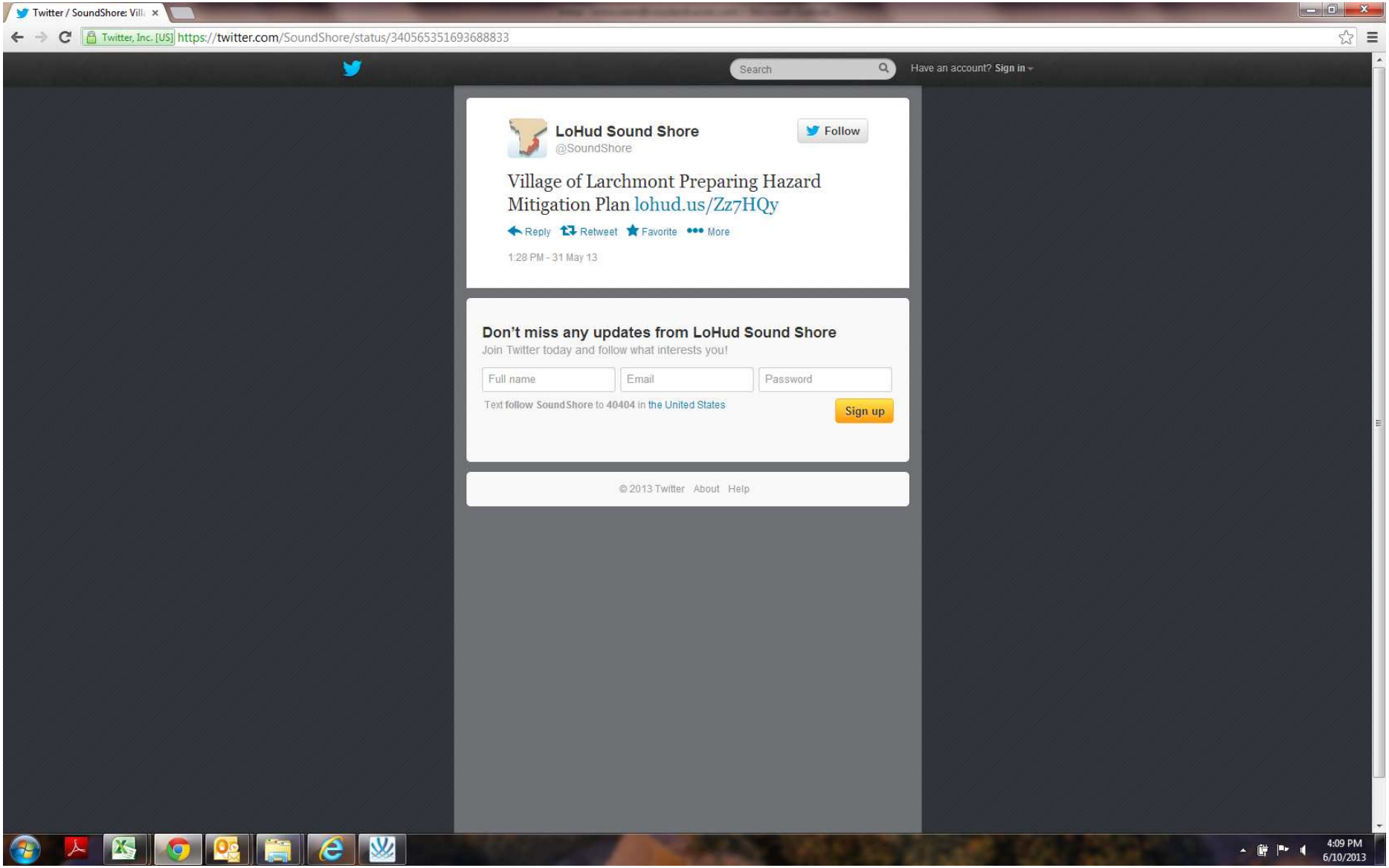
Item 9

Consideration of amended agreement with Woodard & Curran for preparation of hazard mitigation plan for the Village of Larchmont.

Items 12 - 14 - 12. Attorney – Legal matters. 13. Treasurer – Financial matters. 14. Approval of bills. »

Items 10 & 15 - 10. Approve minutes of meetings – Dec. 10, 2012; January 14, 2013 15. Adjournment »

8:51 AM
6/5/2013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Village of Larchmont Preparing Hazard Mitigation Plan lohud.us/Zz7HQy
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Text follow SoundShore to 40404 in the United States
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4:09 PM
6/10/2013

VILLAGE OF LARCHMONT
BOARD OF TRUSTEES
AGENDA

REGULAR MEETING – MONDAY, APRIL 15, 2013 - VILLAGE HALL – 7:15 PM

The Board will convene at 6:30 PM in a Work Session and immediately adjourn into Executive Session to discuss contractual and legal matters.

1.	Roll Call	
2.		Mayor's announcements and appointments to Committees or Commissions.
3.		Report by Police Chief.
4.		Report by Fire Captain - Administer Oaths of Office to newly elected officials of the Volunteer Fire Department
5.		Trustee Reports.
6.		Hear those persons who wish to address the Board.
7.		Continued consideration of request by Suzanne Despins for permission to build a circular driveway at 16 Hazel Lane.
8.	7:30 PM	Continued Public Hearing in connection with the 2013-2014 Preliminary Budget.
9.		Set date for Community Forum to gather public input for proposed Hazard Mitigation Plan for Village of Larchmont.
10.		Set Public Hearing – Proposed water rate increase for Village of Larchmont.
11.		Consideration of 2013 Stormwater Report for Village of Larchmont and authorization for Mayor to sign and submit to New York State.
12.		Consideration of agreement with Woodard & Curran for preparation of Stormwater Pollution Prevention Plan for the Village of Larchmont Public Works Department.
13.		Consideration of resolution – Establish standard work days for elected and appointed officials for the New York State and Local Employees' Retirement System.
14.		Approve minutes of meetings – March 19 and April 1, 2013
15.		Approve minutes of 2012 work sessions – June 4, Sept. 13, Nov. 26 and Dec. 3, 2012
16.	Attorney	Legal matters.
17.	Treasurer	Financial matters.
18.		Approval of bills.
19.		Adjournment.

The Village of Larchmont does not discriminate against the handicapped. Any person who needs special assistance, please call the Village Clerk at 834-6230.

All meetings are videotaped and shown regularly on LMC-TV, Channel 76 (Cablevision) or Channel 35 (Verizon).

Larchmont Village Discusses Hazard Mitigation Plan

by The Daily Voice Politics 3 hours ago Comment

The Village of Larchmont will host a public meeting Monday night to discuss its Hazard Prevention Plan with residents. Photo Credit: ***The Daily Voice File Photo***

LARCHMONT, N.Y. – The Village of

Larchmont Roundup

Larchmont News: Local news for Larchmont, NY continually updated from thousands of sources monitored by the B Media Network.

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Monday, June 17, 2013

Larchmont Village Discusses Hazard Mitigation Plan

LARCHMONT, N.Y. The Village of Larchmont will host a public meeting Monday at 7:30 p.m. at the Larchmont Village Center to discuss the village's Hazard Mitigation Plan.

via Larchmont Newswire http://mamaroneck.dailyvoice.com/politics/larchmont-village-discusses-hazard-mitigation-plan

Posted by Larchmont Roundup at 5:50 AM
Labels: Brian Harrod Editor, Larchmont Village Discusses Hazard Mitigation Plan

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APPENDIX C: HAZUS-MH ANALYSIS DOCUMENTS

Hazus-MH: Hurricane Event Report

Region Name: Village of Larchmont, NY

Hurricane Scenario: Probabilistic 100-year Return Period

Print Date: Friday, June 21, 2013

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1.07 square miles and contains 1 census tracts. There are over 2 thousand households in the region and has a total population of 6,485 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 2 thousand buildings in the region with a total building replacement value (excluding contents) of 781 million dollars (2006 dollars). Approximately 86% of the buildings (and 72% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 2,310 buildings in the region which have an aggregate total replacement value of 781 million (2006 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	564,534	72.3%
Commercial	172,052	22.0%
Industrial	12,891	1.7%
Agricultural	1,067	0.1%
Religious	14,805	1.9%
Government	4,944	0.6%
Education	10,623	1.4%
Total	**780,916**	**100.0%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 1 schools, 1 fire stations, 1 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 7 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

Table 2: Expected Building Damage by Occupancy : 100 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	7	97.99	0	1.76	0	0.19	0	0.06	0	0.00
Commercial	239	98.14	4	1.73	0	0.12	0	0.00	0	0.00
Education	10	98.37	0	1.60	0	0.04	0	0.00	0	0.00
Government	4	98.36	0	1.61	0	0.02	0	0.00	0	0.00
Industrial	51	98.28	1	1.64	0	0.07	0	0.01	0	0.00
Religion	15	98.32	0	1.63	0	0.05	0	0.00	0	0.00
Residential	1,920	97.07	51	2.59	7	0.33	0	0.00	0	0.00
Total	**2,246**		**57**		**7**		**0**		**0**	

Table 3: Expected Building Damage by Building Type : 100 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	22	97.93	0	2.03	0	0.04	0	0.00	0	0.00
Masonry	336	95.29	13	3.67	4	1.04	0	0.00	0	0.00
MH	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	128	98.18	2	1.72	0	0.09	0	0.00	0	0.00
Wood	1,615	97.86	34	2.06	1	0.08	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use. After one week, none of the beds will be in service. By 30 days, none will be operational.

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	1	0	0	1
Police Stations	1	0	0	1
Schools	1	0	0	1

Induced Hurricane Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 470 tons of debris will be generated. Of the total amount, 5 tons (1%) is Other Tree Debris. Of the remaining 465 tons, Brick/Wood comprises 49% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 9 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 235 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 6,485) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 2.3 million dollars, which represents 0.30 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 2 million dollars. 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 94% of the total loss. Table 4 below provides a summary of the losses associated with the building damage.

Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	1,958.97	104.69	5.16	16.62	2,085.43
	Content	116.35	7.70	0.45	0.22	124.73
	Inventory	0.00	0.06	0.08	0.01	0.16
	Subtotal	**2,075.31**	**112.45**	**5.69**	**16.86**	**2,210.32**
Business Interruption Loss						
	Income	0.00	1.14	0.00	0.00	1.14
	Relocation	74.12	2.01	0.05	0.10	76.28
	Rental	56.58	0.52	0.00	0.00	57.10
	Wage	0.00	0.40	0.00	0.00	0.40
	Subtotal	**130.70**	**4.07**	**0.05**	**0.10**	**134.92**
Total						
	Total	**2,206.01**	**116.53**	**5.75**	**16.95**	**2,345.24**

Appendix A: County Listing for the Region

New York
- Westchester

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
New York				
Westchester	6,485	564,534	216,382	780,916
Total	**6,485**	**564,534**	**216,382**	**780,916**
Study Region Total	**6,485**	**564,534**	**216,382**	**780,916**

Hazus-MH: Hurricane Event Report

Region Name: Village of Larchmont, NY

Hurricane Scenario: Probabilistic 500-year Return Period

Print Date: Friday, June 21, 2013

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

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Note:
Appendix A contains a complete listing of the counties contained in the region.

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Agricultural	1,067	0.1%
Religious	14,805	1.9%
Government	4,944	0.6%
Education	10,623	1.4%
Total	**780,916**	**100.0%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 1 schools, 1 fire stations, 1 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 150 buildings will be at least moderately damaged. This is over 7% of the total number of buildings in the region. There are an estimated 4 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

Table 2: Expected Building Damage by Occupancy : 500 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	5	73.81	1	18.05	0	5.27	0	2.54	0	0.33
Commercial	189	77.54	41	16.70	13	5.15	1	0.61	0	0.00
Education	8	79.68	2	15.84	0	4.18	0	0.30	0	0.00
Government	3	80.04	1	15.44	0	4.22	0	0.30	0	0.00
Industrial	41	79.15	8	15.13	2	4.74	0	0.91	0	0.06
Religion	12	76.79	3	18.36	1	4.47	0	0.37	0	0.00
Residential	1,396	70.57	451	22.79	121	6.09	6	0.32	4	0.22
Total	**1,654**		**506**		**137**		**9**		**4**	

Table 3: Expected Building Damage by Building Type : 500 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	17	77.76	4	16.55	1	5.49	0	0.20	0	0.00
Masonry	239	67.64	70	19.75	43	12.14	1	0.35	0	0.11
MH	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	102	78.81	19	14.97	7	5.40	1	0.81	0	0.01
Wood	1,202	72.84	377	22.85	62	3.78	5	0.32	3	0.21

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use. After one week, none of the beds will be in service. By 30 days, none will be operational.

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	1	0	0	1
Police Stations	1	0	0	1
Schools	1	0	0	0

Induced Hurricane Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 3,006 tons of debris will be generated. Of the total amount, 19 tons (1%) is Other Tree Debris. Of the remaining 2,987 tons, Brick/Wood comprises 69% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 82 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 931 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 5 households to be displaced due to the hurricane. Of these, 1 people (out of a total population of 6,485) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 21.5 million dollars, which represents 2.75 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 21 million dollars. 3% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 84% of the total loss. Table 4 below provides a summary of the losses associated with the building damage.

Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	13,853.02	1,390.12	105.16	242.66	15,590.96
	Content	3,047.65	366.61	56.34	58.16	3,528.77
	Inventory	0.00	5.58	7.68	0.80	14.06
	Subtotal	**16,900.67**	**1,762.31**	**169.19**	**301.61**	**19,133.79**
Business Interruption Loss						
	Income	0.00	206.42	1.38	30.52	238.32
	Relocation	791.18	247.68	9.08	43.44	1,091.39
	Rental	443.10	145.52	1.22	3.54	593.38
	Wage	0.00	222.66	2.36	180.34	405.36
	Subtotal	**1,234.28**	**822.28**	**14.04**	**257.84**	**2,328.44**
Total						
	Total	**18,134.95**	**2,584.59**	**183.23**	**559.45**	**21,462.23**

Appendix A: County Listing for the Region

New York
- Westchester

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
New York				
Westchester	6,485	564,534	216,382	780,916
Total	**6,485**	**564,534**	**216,382**	**780,916**
Study Region Total	**6,485**	**564,534**	**216,382**	**780,916**

Hazus-MH: Earthquake Event Report

Region Name: Village of Larchmont, NY

Earthquake Scenario: 100 Year Mag 7

Print Date: June 24, 2013

Totals only reflect data for those census tracts/blocks included in the user's study region.

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General Description of the Region

Hazus is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1.07 square miles and contains 1 census tracts. There are over 2 thousand households in the region which has a total population of 6,485 people (2002 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 2 thousand buildings in the region with a total building replacement value (excluding contents) of 780 (millions of dollars). Approximately 86.00 % of the buildings (and 72.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 39 and 0 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 2 thousand buildings in the region which have an aggregate total replacement value of 780 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 72% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of 0 beds. There are 1 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 0 dams identified within the region. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 0 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 39.00 (millions of dollars). This inventory includes over 3 kilometers of highways, 0 bridges, 77 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	0	0.00
	Segments	2	31.30
	Tunnels	0	0.00
		Subtotal	**31.30**
Railways	Bridges	0	0.00
	Facilities	0	0.00
	Segments	1	8.10
	Tunnels	0	0.00
		Subtotal	**8.10**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	0	0.00
		Subtotal	**0.00**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	0	0.00
	Runways	0	0.00
		Subtotal	**0.00**
		Total	**39.40**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	0.80
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.80**
Waste Water	Distribution Lines	NA	0.50
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.50**
Natural Gas	Distribution Lines	NA	0.30
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.30**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	0	0.00
		Subtotal	**0.00**
Communication	Facilities	0	0.00
		Subtotal	**0.00**
		Total	**1.60**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	100 Year Mag 7
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	100.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	7.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	7	0.30	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	244	10.56	0	0.00	0	0.00	0	0.00	0	0.00
Education	10	0.43	0	0.00	0	0.00	0	0.00	0	0.00
Government	4	0.17	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	52	2.25	0	0.00	0	0.00	0	0.00	0	0.00
Other Residential	380	16.45	0	0.00	0	0.00	0	0.00	0	0.00
Religion	15	0.65	0	0.00	0	0.00	0	0.00	0	0.00
Single Family	1,598	69.18	0	0.00	0	0.00	0	0.00	0	0.00
Total	**2,310**		**0**		**0**		**0**		**0**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1,658	71.79	0	0.00	0	0.00	0	0.00	0	0.00
Steel	156	6.75	0	0.00	0	0.00	0	0.00	0	0.00
Concrete	51	2.21	0	0.00	0	0.00	0	0.00	0	0.00
Precast	10	0.43	0	0.00	0	0.00	0	0.00	0	0.00
RM	60	2.60	0	0.00	0	0.00	0	0.00	0	0.00
URM	375	16.24	0	0.00	0	0.00	0	0.00	0	0.00
MH	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**2,310**		**0**		**0**		**0**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 0 hospital beds available for use. On the day of the earthquake, the model estimates that only 0 hospital beds (0.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 0.00% of the beds will be back in service. By 30 days, 0.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	1	0	0	1
EOCs	0	0	0	0
PoliceStations	1	0	0	1
FireStations	1	0	0	1

Transportation and Utility Lifeline Damage

Table 6 provides damage estimates for the transportation system.

Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	2	0	0	2	2
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
Railways	Segments	1	0	0	1	1
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	0	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	39	0	0
Waste Water	23	0	0
Natural Gas	16	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	2,418	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 0.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 6,485) will seek temporary shelter in public shelters.

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**
5 PM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**

Economic Loss

The total economic loss estimated for the earthquake is 0.00 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.00 (millions of dollars); 0 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.00	0.00	0.00	0.00	0.00
	Capital-Related	0.00	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Capital Stock Losses							
	Structural	0.00	0.00	0.00	0.00	0.00	0.00
	Non_Structural	0.00	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Hazus estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 14 presents the results of the region for the given earthquake.

Table 12: Transportation System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	31.32	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Subtotal	**31.30**	**0.00**	
Railways	Segments	8.12	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**8.10**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	0.00	$0.00	0.00
	Runways	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
	Total	**39.40**	**0.00**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	0.80	$0.00	0.00
	Subtotal	**0.78**	**$0.00**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	0.50	$0.00	0.00
	Subtotal	**0.47**	**$0.00**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	0.30	$0.00	0.00
	Subtotal	**0.31**	**$0.00**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Communication	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
	Total	**1.55**	**$0.00**	

Table 14. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

LOSS	Total	%

Appendix A: County Listing for the Region

Westchester,NY

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
New York					
	Westchester	6,485	564	216	780
Total State		**6,485**	**564**	**216**	**780**
Total Region		**6,485**	**564**	**216**	**780**

Hazus-MH: Earthquake Event Report

Region Name: Village of Larchmont, NY

Earthquake Scenario: Magnitude 7 - 500 year

Print Date: June 20, 2013

Totals only reflect data for those census tracts/blocks included in the user's study region.

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General Description of the Region

Hazus is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1.07 square miles and contains 1 census tracts. There are over 2 thousand households in the region which has a total population of 6,485 people (2002 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 2 thousand buildings in the region with a total building replacement value (excluding contents) of 780 (millions of dollars). Approximately 86.00 % of the buildings (and 72.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 39 and 0 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 2 thousand buildings in the region which have an aggregate total replacement value of 780 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 72% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of 0 beds. There are 1 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 0 dams identified within the region. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 0 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 39.00 (millions of dollars). This inventory includes over 3 kilometers of highways, 0 bridges, 77 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	0	0.00
	Segments	2	31.30
	Tunnels	0	0.00
		Subtotal	**31.30**
Railways	Bridges	0	0.00
	Facilities	0	0.00
	Segments	1	8.10
	Tunnels	0	0.00
		Subtotal	**8.10**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	0	0.00
		Subtotal	**0.00**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	0	0.00
	Runways	0	0.00
		Subtotal	**0.00**
		Total	**39.40**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	0.80
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.80**
Waste Water	Distribution Lines	NA	0.50
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.50**
Natural Gas	Distribution Lines	NA	0.30
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.30**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	0	0.00
		Subtotal	**0.00**
Communication	Facilities	0	0.00
		Subtotal	**0.00**
		Total	**1.60**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Magnitude 7 - 500 year
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	500.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	7.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Hazus estimates that about 11 buildings will be at least moderately damaged. This is over 0.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	7	0.30	0	0.34	0	0.40	0	0.43	0	0.23
Commercial	236	10.48	6	12.62	2	17.25	0	19.31	0	13.60
Education	10	0.43	0	0.48	0	0.61	0	0.64	0	0.58
Government	4	0.17	0	0.19	0	0.25	0	0.26	0	0.17
Industrial	50	2.24	1	2.56	0	3.57	0	3.69	0	2.15
Other Residential	369	16.41	8	17.51	2	20.09	0	21.41	0	22.27
Religion	14	0.64	0	0.80	0	1.11	0	1.32	0	1.34
Single Family	1,560	69.32	32	65.51	6	56.72	1	52.95	0	59.66
Total	**2,250**		**48**		**11**		**1**		**0**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1,629	72.40	26	54.78	3	27.56	0	9.10	0	0.00
Steel	152	6.74	3	6.75	1	8.87	0	7.32	0	0.00
Concrete	50	2.21	1	2.09	0	2.13	0	0.76	0	0.00
Precast	9	0.42	0	0.53	0	1.38	0	2.27	0	0.00
RM	58	2.59	1	2.35	1	4.88	0	5.31	0	0.00
URM	352	15.65	16	33.50	6	55.17	1	75.24	0	100.00
MH	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**2,250**		**48**		**11**		**1**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 0 hospital beds available for use. On the day of the earthquake, the model estimates that only 0 hospital beds (0.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 0.00% of the beds will be back in service. By 30 days, 0.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	1	0	0	1
EOCs	0	0	0	0
PoliceStations	1	0	0	1
FireStations	1	0	0	1

Transportation and Utility Lifeline Damage

Table 6 provides damage estimates for the transportation system.

Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	2	0	0	2	2
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
Railways	Segments	1	0	0	1	1
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	0	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	39	0	0
Waste Water	23	0	0
Natural Gas	16	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	2,418	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 77.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 6,485) will seek temporary shelter in public shelters.

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**
5 PM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**

Economic Loss

The total economic loss estimated for the earthquake is 1.17 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 1.17 (millions of dollars); 24 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 54 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.00	0.07	0.00	0.00	0.08
	Capital-Related	0.00	0.00	0.05	0.00	0.00	0.05
	Rental	0.01	0.01	0.03	0.00	0.00	0.06
	Relocation	0.04	0.01	0.04	0.00	0.01	0.10
	Subtotal	**0.05**	**0.02**	**0.20**	**0.00**	**0.01**	**0.28**
Capital Stock Losses							
	Structural	0.11	0.02	0.05	0.00	0.01	0.20
	Non_Structural	0.28	0.08	0.14	0.01	0.03	0.54
	Content	0.06	0.01	0.06	0.01	0.01	0.15
	Inventory	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.45**	**0.12**	**0.25**	**0.02**	**0.05**	**0.89**
	Total	**0.49**	**0.14**	**0.45**	**0.02**	**0.06**	**1.17**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Hazus estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 14 presents the results of the region for the given earthquake.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	31.32	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Subtotal	**31.30**	**0.00**	
Railways	Segments	8.12	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**8.10**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	0.00	$0.00	0.00
	Runways	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
	Total	**39.40**	**0.00**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Line	0.80	$0.00	0.03
	Subtotal	**0.78**	**$0.00**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Line	0.50	$0.00	0.02
	Subtotal	**0.47**	**$0.00**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Line	0.30	$0.00	0.00
	Subtotal	**0.31**	**$0.00**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Communication	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
	Total	**1.55**	**$0.00**	

Table 14. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

LOSS		Total	%

Appendix A: County Listing for the Region

Westchester,NY

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
New York	Westchester	6,485	564	216	780
Total State		**6,485**	**564**	**216**	**780**
Total Region		**6,485**	**564**	**216**	**780**

Hazus-MH: Flood Event Report

Region Name: Village of Larchmont, NY

Flood Scenario: 500 Year Flood - Larchmont

Print Date: Monday, June 24, 2013

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1 square miles and contains 150 census blocks. The region contains over 2 thousand households and has a total population of 6,485 people (2000 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 2,310 buildings in the region with a total building replacement value (excluding contents) of 781 million dollars (2006 dollars). Approximately 85.63% of the buildings (and 72.29% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 2,310 buildings in the region which have an aggregate total replacement value of 781 million (2006 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	564,534	72.3%
Commercial	172,052	22.0%
Industrial	12,891	1.7%
Agricultural	1,067	0.1%
Religion	14,805	1.9%
Government	4,944	0.6%
Education	10,623	1.4%
Total	**780,916**	**100.00%**

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	177,967	76.7%
Commercial	45,184	19.5%
Industrial	4,198	1.8%
Agricultural	262	0.1%
Religion	3,503	1.5%
Government	0	0.0%
Education	942	0.4%
Total	**232,056**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds.
There are 1 school, 1 fire station, 1 police station and no emergency operation centers.

Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Village of Larchmont, NY
Scenario Name:	500 Year Flood - Larchmont
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Building Damage

General Building Stock Damage

Hazus estimates that about 101 buildings will be at least moderately damaged. This is over 83% of the total number of buildings in the scenario. There are an estimated 10 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5.3 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	1	33.33	1	33.33	1	33.33	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	15	15.31	34	34.69	13	13.27	26	26.53	10	10.20
Total	**0**		**16**		**35**		**14**		**26**		**10**	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	0	0.00	1	11.11	4	44.44	1	11.11	3	33.33	0	0.00
Steel	0	0.00	1	33.33	1	33.33	1	33.33	0	0.00	0	0.00
Wood	0	0.00	14	15.73	30	33.71	12	13.48	23	25.84	10	11.24

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	1	0	0	0
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	1	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 213 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 383 people (out of a total population of 6,485) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 41.00 million dollars, which represents 17.67 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 40.85 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 63.24% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	15.73	3.53	0.17	0.28	19.70
	Content	10.18	9.50	0.33	0.93	20.94
	Inventory	0.00	0.18	0.03	0.00	0.20
	Subtotal	**25.91**	**13.20**	**0.52**	**1.21**	**40.85**
Business Interruption						
	Income	0.00	0.06	0.00	0.00	0.06
	Relocation	0.01	0.01	0.00	0.00	0.02
	Rental Income	0.00	0.01	0.00	0.00	0.01
	Wage	0.00	0.06	0.00	0.01	0.06
	Subtotal	**0.01**	**0.13**	**0.00**	**0.01**	**0.15**
ALL	**Total**	**25.93**	**13.33**	**0.52**	**1.22**	**41.00**

Appendix A: County Listing for the Region

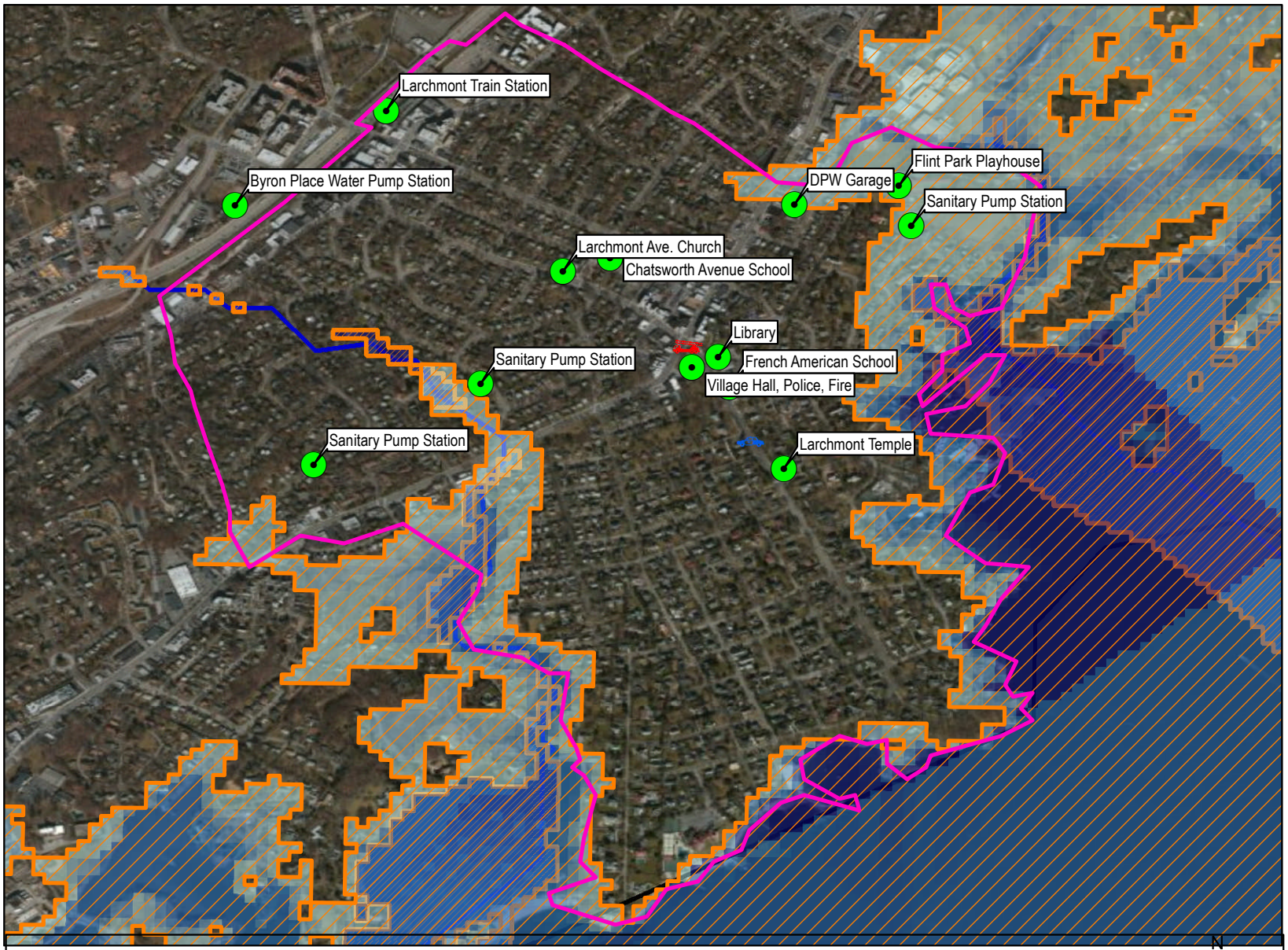
New York

- Westchester

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
New York				
Westchester	6,485	564,534	216,382	780,916
Total	**6,485**	**564,534**	**216,382**	**780,916**
Total Study Region	**6,485**	**564,534**	**216,382**	**780,916**

Study Region: Village of Larchmont, NY Description: FEMA Multi-Hazard Assessment
Scenario: 100 Year Flood - Larchmont



Legend

Study Region Boundary

Study Region Boundary

Critical Facilitie

100 Year Flooding - Coastal

High : 23.2858

Low : 0.00142956

100 Year Flooding - River

High : 3.66587

Low : 0.000400186

Reaches

Reaches

RegionShore

RegionShore

School

School

FireStation

FireStation

PoliceStation

PoliceStation

Any coastal surge estimates produced by Hazus do not represent official NOAA forcasts or estimates.

HAZUS MH

Hazus-MH: Flood Event Report

Region Name: Village of Larchmont, NY

Flood Scenario: 500 Year - USE

Print Date: Monday, June 24, 2013

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

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Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1 square miles and contains 150 census blocks. The region contains over 2 thousand households and has a total population of 6,485 people (2000 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 2,310 buildings in the region with a total building replacement value (excluding contents) of 781 million dollars (2006 dollars). Approximately 85.63% of the buildings (and 72.29% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 2,310 buildings in the region which have an aggregate total replacement value of 781 million (2006 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	564,534	72.3%
Commercial	172,052	22.0%
Industrial	12,891	1.7%
Agricultural	1,067	0.1%
Religion	14,805	1.9%
Government	4,944	0.6%
Education	10,623	1.4%
Total	**780,916**	**100.00%**

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	224,191	77.3%
Commercial	55,692	19.2%
Industrial	4,695	1.6%
Agricultural	262	0.1%
Religion	4,275	1.5%
Government	0	0.0%
Education	942	0.3%
Total	**290,057**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds.
There are 1 school, 1 fire station, 1 police station and no emergency operation centers.

Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Village of Larchmont, NY
Scenario Name:	500 Year - USE
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Building Damage

General Building Stock Damage

Hazus estimates that about 160 buildings will be at least moderately damaged. This is over 84% of the total number of buildings in the scenario. There are an estimated 24 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5.3 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	1	33.33	1	33.33	1	33.33	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	18	11.46	31	19.75	41	26.11	43	27.39	24	15.29
Total	**0**		**19**		**32**		**42**		**43**		**24**	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	0	0.00	1	10.00	2	20.00	3	30.00	3	30.00	1	10.00
Steel	0	0.00	1	33.33	1	33.33	1	33.33	0	0.00	0	0.00
Wood	0	0.00	17	11.56	29	19.73	38	25.85	40	27.21	23	15.65

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	1	0	0	0
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	1	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 363 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 753 people (out of a total population of 6,485) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 67.00 million dollars, which represents 23.10 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 66.80 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 66.24% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	27.57	5.45	0.36	0.49	33.87
	Content	16.79	13.56	0.61	1.67	32.62
	Inventory	0.00	0.25	0.06	0.00	0.31
	Subtotal	**44.35**	**19.26**	**1.03**	**2.16**	**66.80**
Business Interruption						
	Income	0.00	0.08	0.00	0.00	0.08
	Relocation	0.02	0.01	0.00	0.00	0.04
	Rental Income	0.00	0.01	0.00	0.00	0.01
	Wage	0.00	0.08	0.00	0.01	0.08
	Subtotal	**0.03**	**0.17**	**0.00**	**0.01**	**0.21**
ALL	**Total**	**44.38**	**19.43**	**1.03**	**2.17**	**67.00**

Appendix A: County Listing for the Region

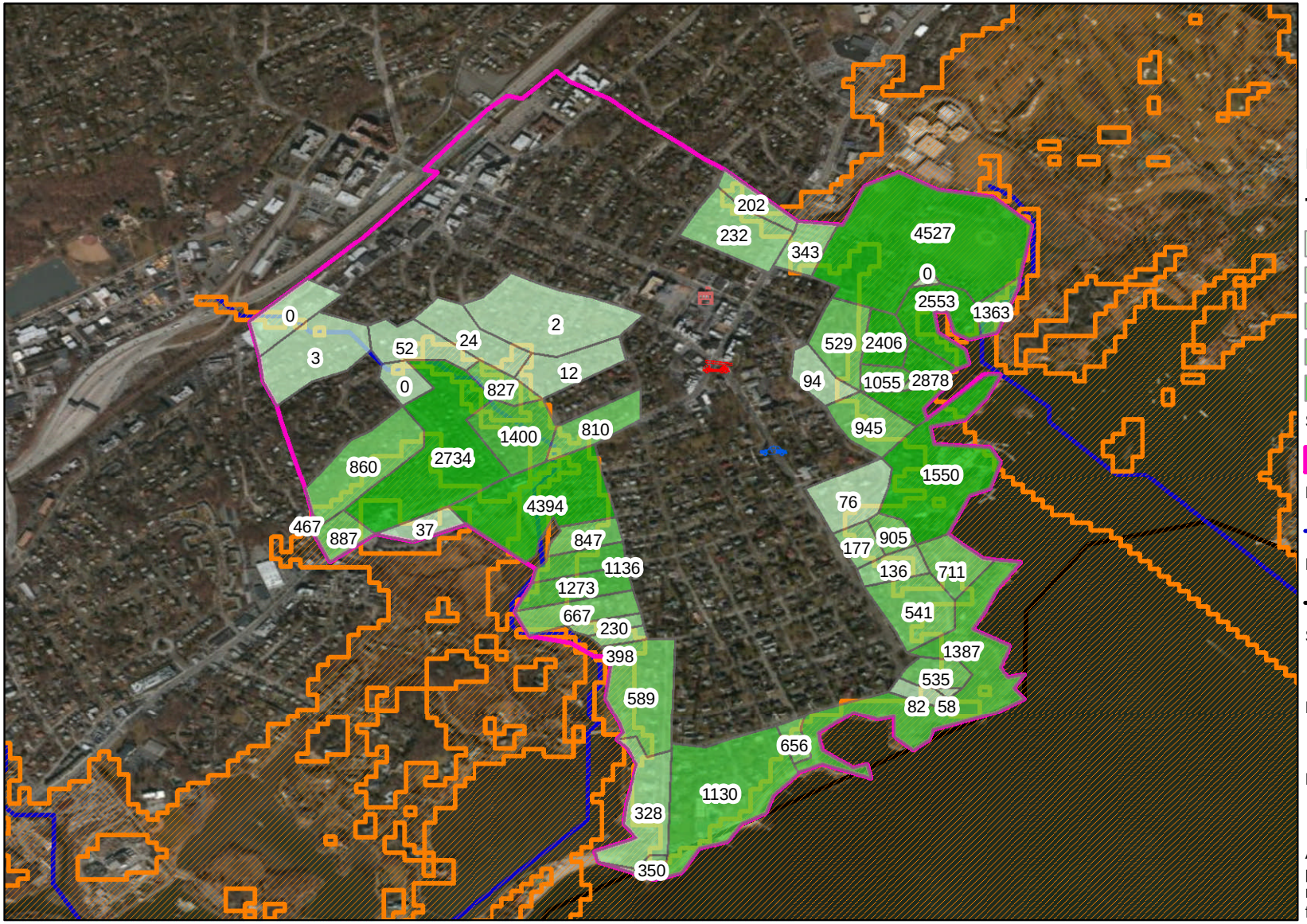
New York

- Westchester

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
New York				
Westchester	6,485	564,534	216,382	780,916
Total	**6,485**	**564,534**	**216,382**	**780,916**
Total Study Region	**6,485**	**564,534**	**216,382**	**780,916**

Study Region: Village of Larchmont, NY Description: FEMA Multi-Hazard Assessment
Scenario: 500 Year Flood



Legend

TotalLoss

- 0.0 - 100.0 (k,$)
- 100.1 - 500.0 (k,$)
- 500.1 - 1000 (k,$)
- 1001 - 1500 (k,$)
- 1501 - 5000 (k,$)

Study Region Boundary

Study Region Boundary

Reaches

Reaches

RegionShore

RegionShore

School

School

FireStation

FireStation

PoliceStation

PoliceStation

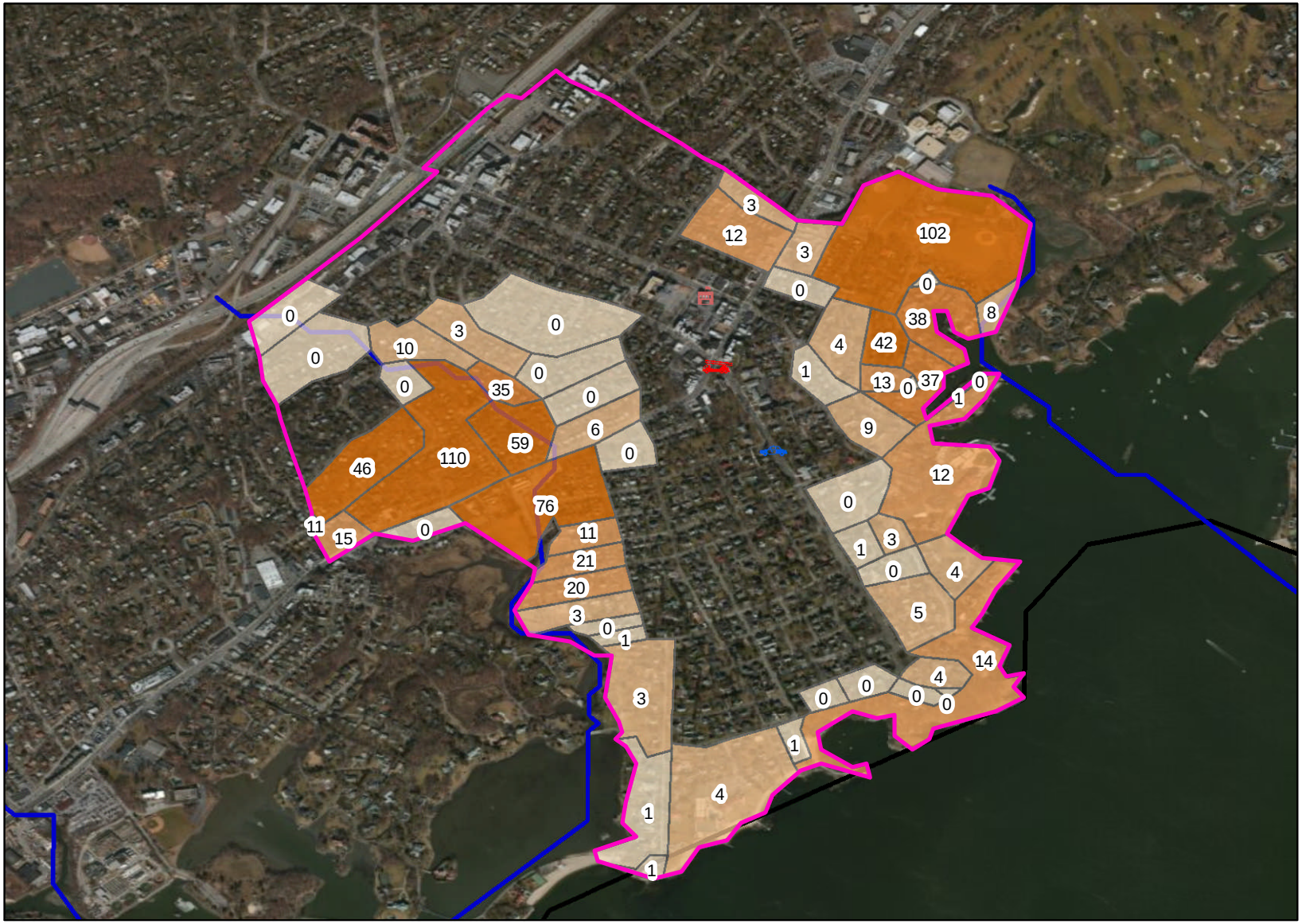
Any coastal surge estimates produced by Hazus do not represent official NOAA forcasts or estimates.

1 0.5 0 1 Kilometers

N W E S

HAZUS MH

Study Region: Village of Larchmont, NY Description: FEMA Multi-Hazard Assessment
Scenario: 500 Year Flood



Legend

Study Region Boundary

Study Region Boundary

DisplacedPopulation

- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 120

Reaches

Reaches

RegionShore

RegionShore

School

School

FireStation

FireStation

PoliceStation

PoliceStation

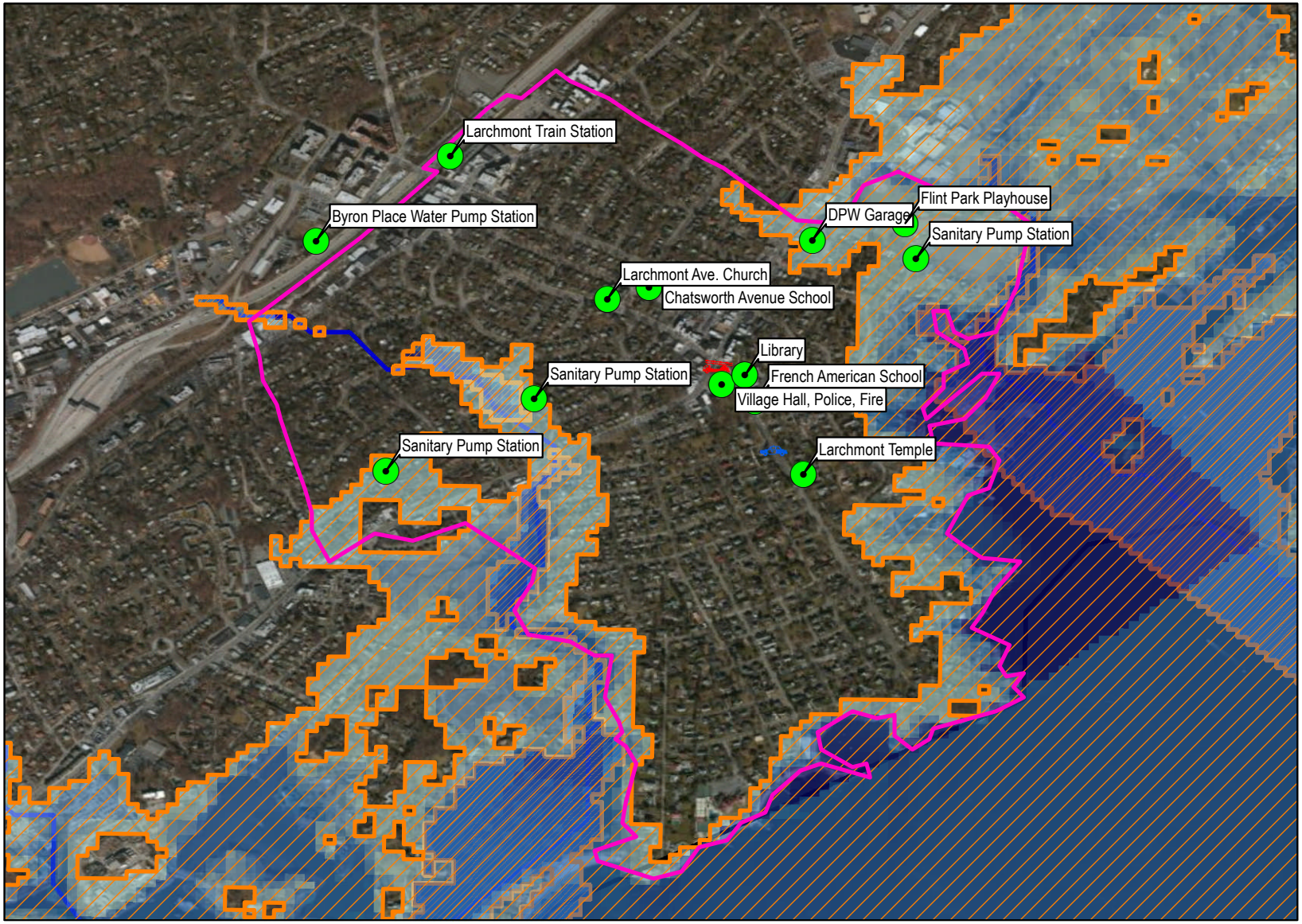
Any coastal surge estimates produced by Hazus do not represent official NOAA forcasts or estimates.

1 0.5 0 1 Kilometers

N W E S

HAZUS MH

Study Region: Village of Larchmont, NY Description: FEMA Multi-Hazard Assessment
Scenario: 500 Year Flood



Legend

Critical Facilities

Study Region Boundary

Study Region Boundary

500 Year Flooding Coastal

High : 26.788

Low : 0.00121498

500 Year Flooding - River

High : 5.58487

Low : 0.00126457

Reaches

Reaches

RegionShore

RegionShore

School

School

FireStation

FireStation

PoliceStation

PoliceStation

Any coastal surge estimates produced by Hazus do not represent official NOAA forcasts or estimates.

1 0.5 0 1 Kilometers

N W E S

HAZUS MH

APPENDIX D: MEETING NOTES, SIGN IN SHEETS, FLOODPLAIN MANAGER LETTER

March Mitigation Mtg - 3/1/2013

Name	Organization
Hugh Greechan	Woodard & Curran · 448 2266
Project Manager	HGreechan@woodardcurran.com
Anne McAndrews	Village of Larchmont, Mayor
Rick Vetere	Village of Larchmont, DPW
John Ciapparelli	Larchmont Fire Dept.
Capt Antonino Rigano	Larchmont Police
Chief John Poleway	Larchmont Police
Anthony C. Catalano	Woodard & Curran (914) 448-2266
Manjarisha Ivanovich	Woodard & Curran.

Village of Larchmont Hazard Mitigation Plan
Stakeholder Meeting
April 25, 2013

WOODARD &CURRAN

Name	Title	Address	Telephone	Email
HUGH GREECHAM	PROJECT MANAGER WOODARD & CURRAN	709 WESTCHESTER AVE WHITE PLAINS NY	914 448-2266	HGREECHAM@WOODARDCURRAN.COM
Ilir Tota	Software Architect (GIS)	148 Martine Ave #214 White Plains, NY 10601	914-995-5605	ITAT2@westchestergov.com
MaryCristin Ivanovich	Vice President	709 Westchester Ave White Plains NY	914-448-2266	MIVANOVICH@WOODARDCURRAN.COM
Robert Wasp	Engineer (W&C)	709 Westchester Ave " " "	" " "	rwasp@woodardcurran.com
John CAPARelli	CAPTAIN LARCHMONT F.D	120 Larchmont Ave	914 8340016	CAPTAINLFD@VILLAGEOFLARCHMONT.ORG
Rick VETERE	GENERAL FOREMAN DPW	120 LARCHMONT AVE	914 834-6965	PUBLICWORKS@VILLAGEOFLARCHMONT.ORG
Kevin Roseman	Traffic Engineer	148 Martine Ave. Rm 408 White Plains NY 10601	914-995 4084	KMR5@westchestergov.com
JEFF DEAN	ASSISTANT ENG (CIVIL/ENV)	148 MARTINE AVE RM 500 WHITE PLAINS, NY 10598	914-995-3660	JADC@WESTCHESTERGOV.COM
JOHN POLEWAY	CHIEF OF POLICE	120 LARCHMONT AVE LARCHMONT, NY 10538	(914) 834-1000	CHIEF@LARCHMONTPOLICE.ORG.
ANTHONY R. CARR, PE	VILLAGE OF MAMARONECK VILLAGE ENGINEER	169 MT. PLEASANT AVE. (3rd FL.) MAMARONECK, NY 10543	(914) 777-7731	ENGINEER@VOMNY.ORG
Dan Sarnoff	Village of Mamaroneck Asst Village Manager			
FRANK BIASI	Building Insp.	120 LARCHMONT AVE LARCHMONT, NY	914-834-4349	buildinginspector@villageoflarchmont.org
Denis J. Brancaccio	Village Treas.	"	914-834-6202	treasurer@villageoflarchmont.org

VILLAGE OF LARCHMONT, NY
STAKEHOLDER MEETING
Preparation of a Hazard Mitigation Plan
APRIL 25, 2013

Time: 2:00pm
Place: Village Hall, Village of Larchmont

AGENDA

Project Overview
- Background and Goals
- Roles and Responsibilities

Requirements of FEMA and NYSOEM
- Strategy, process, engagements
- Documentation

Hazard Mitigation Planning Process
- Hazard Identification and Risk Assessment
- Mitigation Strategy

Village of Larchmont

Next Steps

Open Discussion/Questions and Comments

* The Village of Larchmont is preparing this Hazard Mitigation Plan with a grant from the Department of Homeland Security/Federal Emergency Management Agency (FEMA). Oversight and technical assistance is being provided by the New York State Office of Emergency Management.

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Legislative Pre Disaster Mitigation Plan
Village of Larchmont
Westchester County, New York

Stakeholder Meeting
April 25, 2013
Meeting Minutes

Attendees:

Mr. Ilip Tota – Software Architect (GIS), Westchester County
Mr. Kevin Roseman – Traffic Engineer, Westchester County
Mr. Jeff Dean – Assistant Engineer, Westchester County
Mr. Frank Blasi – Building Inspector, Village of Larchmont
Mr. Denis J. Brucciani – Village Treasurer, Village of Larchmont
Mr. John Poleway – Chief of Police, Village of Larchmont Police Department
Mr. John Caparelli – Captain, Village of Larchmont Fire Department
Mr. Rick Vetere – General Foreman, Village of Larchmont Department of Public Works (DPW)
Mr. Dan Sarnoff – Assistant Village Manager, Village of Mamaroneck
Mr. Anthony R. Carr, PE – Village Engineer, Village of Mamaroneck
Mr. Hugh Greechan, PE – Woodard & Curran Engineering PA PC
Ms. Mary Kristin Ivanovich – Woodard & Curran Engineering PA PC
Mr. Robert Wasp, EIT, CDT – Woodard & Curran Engineering PA PC

A stakeholder meeting was held at the Village Hall Conference Room located at 120 Larchmont Avenue at 2:00 PM on April 25, 2013. The following is a summary of the discussions that took place:

1. Prior to the start of the meeting, Mr. Caparelli, informed Woodard & Curran that all Fire Department members have completed Hazardous Materials Technician as well as Personal Bailout Rescue Rope trainings. Mr. Caparelli stated that he was asked by Mayor McAndrews to inform the project team of such information.

2. The meeting was commenced by Ms. Ivanovich at 2:15 PM and presentation materials were distributed to all attendees. Ms. Ivanovich proceeded with a presentation to describe the Hazard Mitigation Planning Process and the involvements that should be expected by stakeholders during plan development, review and approval. The following is a summary of key points that were offered during the presentation.

    - Goals of the Hazard Mitigation Plan development process are to reduce repetitive loss, avoid long term vulnerabilities build partnerships amongst stakeholders, fulfill Federal and State plan requirements and to identify potential projects for future funding.
    - FEMA and NYS OEM have individual requirements that must be addressed during the development of a Hazard Mitigation Plan.
    - Four Stages of the Hazard Mitigation Plan development: (Organize Resources, Assess Risk, Develop Plan, Review and implementation).

- Significant Hazards to be addressed during Village of Larchmont plan development include: Coastal Erosion, Hurricanes and Flooding, Dam Failure, Earthquakes, Tornados
- Work tasks for multiple plan development stages are being overlapped to address time constraints for final plan acceptance and approval. Ongoing efforts to be implemented during the weeks to come should include
    i. Preparation of a single jurisdictional plan following FEMA & NYSOEM requirements.
    ii. Interviews with involved agencies
    iii. 1-2 additional stakeholder/public meetings
    iv. FEMA Plan Approval by 9/26/2013.

3. Following the completion of the presentation, Ms. Ivanovich opened the meeting to any questions by those in attendance. Chief Poleway asked if the public is given a chance to comment during the 30 day draft plan review period. Ms. Ivanovich clarified that the public is encouraged to be engaged during the draft plan review period. Mr. Poleway subsequently asked if public comments must be provided during a live Village Board meeting that would require a vote. Ms. Ivanovich indicated that the Plan is required to be adopted by the Village but is not necessarily required to be approved through a referendum. Chief Poleway and Mr. Brucciani expressed concern that public review may impede the intended timeline for plan review and acceptance. Mr. Greechan suggested that a decision regarding the format of public comment would be discussed by the Village Mayor and that Plan approval will likely be adopted by resolution. Mr. Greechan continued that public comment would most likely be heard at a Village Board meeting and that the 30 day review window will encourage such public involvement.
4. Chief Poleway inquired if the draft plan will be available for review by an established date. Ms. Ivanovich responded that the draft plan is intended to be completed by June. Ms. Ivanovich added that based upon Woodard & Currans' experience elsewhere, NYS OEM will work closely with FEMA to accelerate the Hazard Mitigation Plan review process.

Please note that any additions, deletions, or other corrections to these meeting minutes must be provided to Woodard & Curran in writing no later than seven (7) calendar days after the date of issue identified in the heading. If Woodard & Curran does not receive any such comments within this time period, these meeting minutes are assumed final.

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VILLAGE OF LARCHMONT
MULTI-HAZARD MITIGATION PLAN
HAZARD ASSESSMENT MEETING ATTENDEES LIST

This Meeting:	Hazard Identification & Risk Assessment	Meeting - Date/Time:	Wednesday, June 5, 2013 @ 10:00 AM
Project Name:	Village of Larchmont Multi-Hazard Mitigation Plan		

Attendees:

Name	Title	Telephone No.	E-mail Address
JOHN POLEWAY	CHIEF OF POLICE	(914) 774-2930	CHIEF@LARCHMONTPOLICE.ORG
John CAPARELLI	CAPTAIN LFD	914) 7559502	CAPTAINLFD@Village of Larchmont.org
Robert Warp	W&C	(914)-448-2266	rwarp@woodardcurran.com
Hugh COLEECHAM	W&C	914 448 2266	HCOLEECHAM@WOODARDCURRAN.COM
Anne McAndrews	mayor VOL	914 834-6030 x2006	mayor@village of larchmont.org

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VILLAGE OF LARCHMONT

MULTI-HAZARD MITIGATION PLAN

HAZARD ASSESSMENT MEETING ATTENDEES LIST

This Meeting:	Hazard Identification & Risk Assessment	Meeting - Date/Time:	Wednesday, June 5, 2013 @ 10:00 AM
Project Name:	Village of Larchmont Multi-Hazard Mitigation Plan		

Attendees:

Name	Title	Telephone No.	E-mail Address
Frank Blasi	Building Insp.	914-834-4349	building inspector @ Village of Larchmont.org
Rick Voights	General Foreman	834-6965	PUBLICWORKS @ VILLAGE OF LARCHMONT.ORG
Anne McAndrews			
Denis J. Braccigni	V. Treasurer	914-834-6202	treasurer @ Village of Larchmont.org

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Legislative Pre Disaster Mitigation Plan
Village of Larchmont
Westchester County, New York

Hazard Identification & Risk Assessment Meeting
June 5, 2013
Meeting Minutes

Attendees:

Ms. Anne McAndrews – Village Mayor, Village of Larchmont
Mr. Frank Blasi – Building Inspector, Village of Larchmont
Mr. Denis J. Brucciani – Village Treasurer, Village of Larchmont
Mr. John Poleway – Chief of Police, Village of Larchmont Police Department
Mr. John Caparelli – Captain, Village of Larchmont Fire Department
Mr. Rick Vetere – General Foreman, Village of Larchmont Department of Public Works (DPW)
Mr. Hugh Greechan, PE – Woodard & Curran Engineering PA PC
Ms. Mary Kristin Ivanovich – Woodard & Curran Engineering PA PC
Mr. Robert Wasp, EIT, CDT – Woodard & Curran Engineering PA PC

A stakeholder meeting was held at the Larchmont Village Center located at 119 Larchmont Avenue at 10:00 AM on June 5, 2013. The following is a summary of the discussions that took place:

1. The meeting was commenced by Ms. Ivanovich at 10:15 AM and presentation materials were distributed to all attendees. Ms. Ivanovich proceeded with a presentation to describe the potential hazards required to be assessed as part of mitigation plan development and a summary of our preliminary findings and hazard ranking methodology. The following is a summary of key points that were offered during the presentation.
    - Goals of the Hazard Mitigation Plan development process are to reduce repetitive loss, avoid long term vulnerabilities build partnerships amongst stakeholders, fulfill Federal and State plan requirements and to identify potential projects for future funding.
    - Public outreach for hazard mitigation plan development has been initialed through press releases, creation of a public survey and recent postings to the Village website including the creation of a dedicated email address for public inquiries regarding the plan.
    - Four Stages of the Hazard Mitigation Plan development: (Organize Resources, Assess Risk, Develop Plan, Review and implementation).
    - Significant natural hazards to that effect the Village of Larchmont include: Coastal Erosion, Hurricanes and Flooding, Dam Failure, Earthquakes, Tornados and Windstorms
    - Information has been gathered from review of historical records and interviews with various Village Departments. Some of the key items identified during data gathering includes:

i. Several critical facilities have been identified for identification in the Hazard Mitigation Plan. Additional locations should be brought to the attention of the consultant team.

ii. Localized flooding is a common occurrence. Significant recent notable storms include the storm of April 2007 and Hurricanes Irene & Sandy.

iii. A draft list of possible Mitigation Projects has been created based upon the information collected. Stakeholders should pursue identification of additional projects.

2. During the presentation, Mayor McAndrews brought attention to the fact that although the Village of Larchmont has responsibility for its two dams; both dams are not located within Village municipal limits. The dams are located within the Larchmont Reservoir / James G. Johnson Conservancy, a 60 acre park owned by the Village of Larchmont that is located within the Town of Mamaroneck. Mayor McAndrews clarified that the Village is responsible for dam maintenance. A dam failure poses risk to the downstream parkland and surrounding municipality of Mamaroneck, but would likely not impact land within Larchmont municipal limits. Mr. Vetere noted that during an overtopping event, the dam also risks damage to itself, the surrounding park property and its three bridges. Ms. Ivanovich and Mr. Greechan agreed that such information is important and must be distinguished in the Hazard Mitigation Plan.

3. A discussion regarding identification of critical facilities was initiated by Woodard & Curran representative Rob Wasp. Mayor McAndrews asked for an explanation of the definition for critical facilities. Mr. Wasp responded that critical facilities generally are places of public assembly or service that hold vital purpose during a natural disaster. Examples of critical facilities include police stations, hospitals and public shelters. Mr. Wasp added that several critical facilities have been identified at this time, but that the stakeholder team should contemplate if other locations should be identified. Collectively the group agreed that institutions such as the French American School, Larchmont Avenue Church and Larchmont Temple should be considered as critical facilities. Chief Poleway indicated that the Larchmont Train Station and Pump Station should also be added to the critical facilities list. Mayor McAndrews stated that all such establishments should be notified of their identification as a critical facility. Mr. Wasp concluded that any additional facilities should be forwarded to the consultant team for incorporation into the draft plan.

4. Woodard & Curran introduced that a draft list of possible mitigation projects has been created for consideration in the plan. Mr. Wasp stated that the majority of these projects are related to areas of flooding that were identified in documents provided by the Village of Larchmont DPW. The project team collectively pointed out that there are some erroneous street names on the draft projects list that should be corrected. Mr. Wasp asked the team to review the draft projects list and to please inform the consultant team of any changes or additional projects that should be considered. Chief Poleway suggested that there is frequent flooding observed on Nassau Road. An added concern related to the Nassau Road flooding is that there is a ConEd substation located in proximity to the flood prone area. Mr. Vetere added that some areas of flooding have also experienced damage to sea walls in prior storm events. The Walnut Avenue seawall has been repaired multiple times and the “Dog Beach” (Manor Park) has experienced seawall damage and beach erosion in prior storms as well. The seawall at Magnolia Avenue and Ocean Avenue has also experienced repetitive damage in historical storm events.

5. Mayor McAndrews suggested that when raising of structures is discussed at the Public meeting scheduled to occur on June 17, 2013, thorough information should be presented to

describe the process for obtaining funding and contact personnel at FEMA. The Mayor added that the Pine Brook community should be especially engaged on this information due to the frequent flooding that is experienced in their community. Ms. Ivanovich replied that once a disaster has been declared, services are made available by FEMA that include grants, loans and other types of assistance. Chief Poleway questioned if Village Code can be amended to require all new construction to be raised above flood elevations. Mr. Blasi responded that Village Code already requires the first floor of structures to be constructed 2 feet higher than base flood elevation. Mayor McAndrews continued that if someone were to demolish their home in the Pine Brook Area after experiencing greater than 50 percent property damage, the reconstructed home would have to be raised 2 feet above the 100 year flood elevation. Mr. Greechan added that this practice is also followed in other communities. Mr. Blasi pointed out that finished basements however are not covered by such requirement and that utilities located in basements are especially vulnerable to damage in these flood prone areas. Mr. Greechan suggested that zoning restrictions for building height may also be relaxed for homes that are raised due to flooding. Mr. Blasi agreed that such practice is done on a case by case basis with every home.

6. The stakeholder team discussed concerns regarding the establishment of designated emergency shelters during a disaster. Mayor McAndrews stated that the Village Library retained power during Hurricane Sandy and became used as a warming and charging shelter for Village residents. The Library did not have enough accommodations to serve the public demand. Ms. Ivanovich stated that preparing future accommodations for shelter needs could serve as a mitigation project in the Village Plan. Chief Poleway asserted that the Library may have retained electrical power during Hurricane Sandy, but that it may not in future storms. In past experience, Village residents generally have means and generally do not attend shelters. Ms. Ivanovich suggested that the identification of emergency shelters overlaps the development of the hazard mitigation plan and other local emergency response plans.

7. Mayor McAndrews reminded all in attendance that the emergency generator submittal must be filed by September 26, 2013. The Mayor explained that the $125,000 in grant funding for purchase and installation of the emergency generator at Village Hall is contingent upon FEMA approval of the Multi-Hazard Mitigation Plan. Ms. Ivanovich offered that a 30 day window has been suggested by NYSOEM for FEMA review to be completed prior to the September 26th deadline. NYSOEM has suggested that FEMA review will be expedited so that generator granting funding is not compromised.

8. The ranking methodology and preliminary rankings were reviewed by the stakeholder group for all required natural hazards. During review of preliminary hazard impact rankings, several changes were suggested and agreed upon by the stakeholders present. The following is a summary of key changes that were recorded

    - Tsunami Hazard– Low Ranking
    - Landslide Hazard – Low Ranking
    - Urban Fire Hazard– Medium Ranking
    - Windstorm Hazard– Medium Ranking

    In addition to the changes noted above, additional discussion was heard regarding the ranking of Dam Failure hazard. During the presentation, Chief Poleway questioned if Dam Failure should be left as “High Rank” hazard classification, given that the Dams are not located within the Village municipal limits. Mr. Greechan suggested that impacts to Village resources during dam failure events should be considered in the classification of hazard rankings. Ms.

Ivanovich indicated that FEMA guidelines will be examined for proper consideration of hazard rank for the Village of Larchmont owned dams. Mayor McAndrews added that the Village is in the process of holding discussions with the Town of Mamaroneck regarding responsibilities for these dams and stated that this is a very important issue to the Village. .

9. Following the completion of the presentation, Ms. Ivanovich opened the meeting to any questions by those in attendance. Mayor McAndrews inquired if training and equipment purchases for Village personnel may be identified as possible FEMA mitigation projects. Ms. Ivanovich responded that training can indeed be identified as FEMA projects and reminded that stakeholders that mitigation projects can be more than just "construction projects."

10. Mr. Wasp requested that before the meeting is concluded, several questions should be clarified by the project stakeholders that will assist in further development of the draft mitigation plan. The following additional information was shared by project stakeholders

    - The Village has undertaken some previous mitigation projects, including the purchase of a tow-behind generator for use during emergencies. The Byram Pump Station has been wired to accept generator feed. Several drainage studies have also been performed for the Pine Brook Drainage Basin.
    - There are no major employers located within the Village that would experience significant economic impact as a result of disaster downtime.
    - The Larchmont Train Station Parking Lot is the only open lot in the Village located outside of floodplains that could serve for temporary housing.
    - No known sites exist for the relocation of residences outside of flood plains.
    - A formal evacuation route does not exist for the Village of Larchmont. Major roads, such as Boston Post Road, Chatsworth Avenue, Larchmont Avenue and Beach Avenue serve as evacuation routes during a disaster.
    - Public shelters used in previous disasters include Mamaroneck High School, Larchmont Library, French American School and Chatsworth Avenue School.

Please note that any additions, deletions, or other corrections to these meeting minutes must be provided to Woodard & Curran in writing no later than seven (7) calendar days after the date of issue identified in the heading. If Woodard & Curran does not receive any such comments within this time period, these meeting minutes are assumed final.

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VILLAGE OF LARCHMONT
MULTI-HAZARD MITIGATION PLAN
PUBLIC MEETING ATTENDEES LIST

WOODARD &CURRAN

This Meeting:	Public Participation	Meeting - Date/Time:	Monday, June 17, 2013 @ 7:30 PM
Project Name:	Village of Larchmont Multi-Hazard Mitigation Plan		

Attendees:

Name	Title	Telephone No.	E-mail Address
Anthony C. Catalano	Principal	(914) 448 2266	acatalano@woodard-curran.com
Hugh Greechan	Project Manager	"	HGREECHAN "
Sue Jein Butcher	Home Owner	914-834-1492	SJButcher007@gmail.com
ERIK Mathieson	Resident	9146302456	E.Mathieson@MS.com
GERARD O'REILLY	RESIDENT	914-7400523	CHAN.OREILLY@EARTHLINK.NET
Paul Schmid	Resident	914-834-1292	David.Schmid@gmail.com
John Koman	Trustee	914 834 5858	JJKoman@Yahoo.com
Lorraine Mack	trustee	914-834-8335	lwdbh@sidneysystems.com
Anne McAndrews	mayor	914-834-1389	mayor@villageoflarchmont.org
PETER FANELLI	UCL	834.5507	
Mary Kristin Ivanovich	W&C	9144482266	UNITED STATES@WORLD
JIM BRILL	RESIDENT	9148333450	SPRING.COM
KEN DIRCKS	RESIDENT	914 834 1128	KENDIRCKS@me.com

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VILLAGE OF LARCHMONT
MULTI-HAZARD MITIGATION PLAN
PUBLIC MEETING HANDOUT

This Meeting:	Public Participation	Meeting - Date/Time:	Monday, June 17, 2013 @ 7:30 PM
Project Name:	Village of Larchmont Multi-Hazard Mitigation Plan		

The Village of Larchmont is currently developing a Hazard Mitigation Plan for the community. The purpose of this Hazard Mitigation Plan is to (1) assist the Village in identifying and reducing its risk from natural hazards; (2) identify actions that can be taken to prevent damage to property and loss of life, (3) and prioritize funding for mitigation efforts. The project is being funded by a grant allocated by the New York State Office of Emergency Management (NYSOEM) and is being prepared in accordance with guidance from NYSOEM and the Federal Emergency Management Agency.

The Village of Larchmont has prepared a brief survey to engage the public and gather additional public input as a part of this project. The survey can be found at **http://villageoflarchmont.org/websurvey.html.** Hard copies of this survey are also available on the counter outside of the Village Clerk's Office. Residents may complete hard copies of the survey and return them to the Village Clerk's Office, either in person during normal business hours or by mailing them to 120 Larchmont Avenue, Larchmont, NY 10538.

The purpose of the meeting tonight is to discuss the development of the Hazard Mitigation Plan, describe the work completed to date, and highlight some of the hazards that could present the greatest risks to community operations. Members of the Hazard Mitigation planning committee are available to help explain the planning process, summarize existing mitigation initiatives, highlight recommended strategies and summarize the results of the hazard risk assessment undertaken as a key component of the Hazard Mitigation planning event. This meeting is designed as an open house where residents, members of neighboring communities, and other stakeholders are invited to attend the forum to gather information and provide feedback.

The Village of Larchmont has also set up an email address for residents to submit their questions, comments or concerns. We look forward to hearing from you! Please email: **hazardmitigation@villageoflarchmont.org**

OFFICE OF
GENERAL FOREMAN
DEPARTMENT OF
PUBLIC WORKS

VILLAGE OF LARCHMONT
MUNICIPAL BUILDING
120 LARCHMONT AVENUE
LARCHMONT, N.Y. 10538
TEL.: (914) 834-6965
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publicworks@villageoflarchmont.org

Debra Ludwig Dunbrook
Environmental Specialist
NYS Division of Homeland Security & Emergency Services
NYS OEM Office of Emergency Management
1220 Washington Avenue
Albany, NY 12226-2251

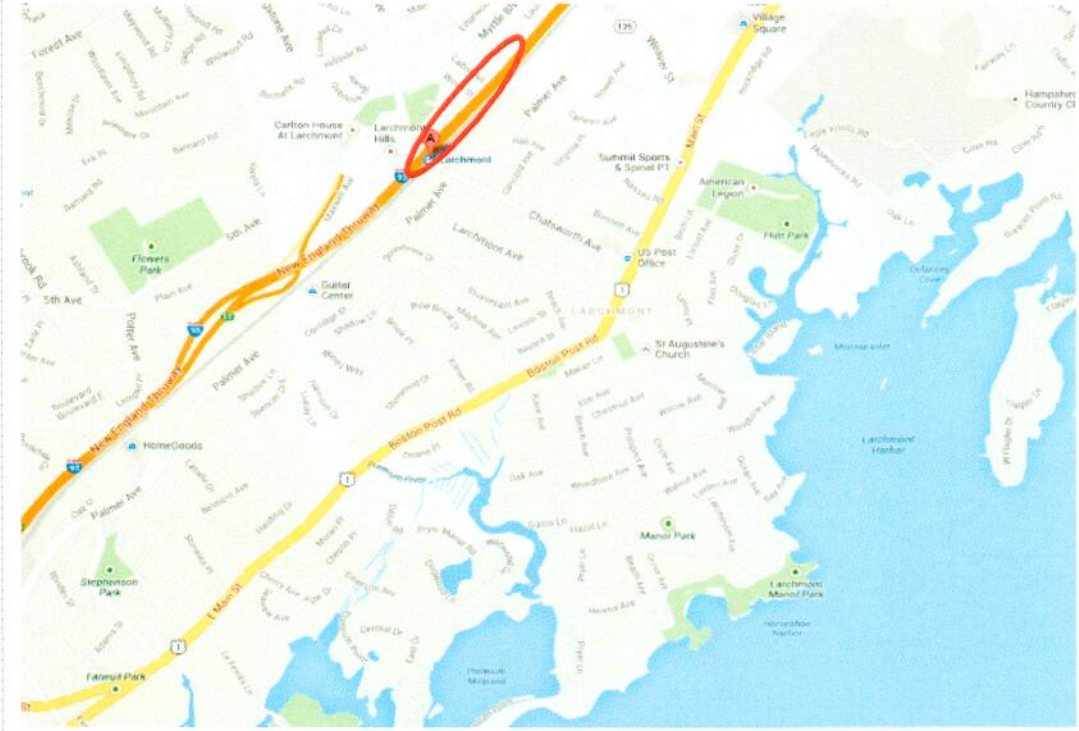
August 7, 2013

Dear Ms. Dunbrook,

The Village of Larchmont has prepared a Hazard Mitigation Plan for the community and during its development we have addressed the additional NYS Office of Emergency Management Hazard Mitigation Planning Standards. NYSOEM standards 3a and 3b require the identification of potential sites within the community suitable for the placement of temporary housing units to house residents displaced by disaster and identification of sites for relocating houses out of the floodplain, or building new houses once properties in the floodplain are razed. The guidance also states that *"Plans developed with State OEM-administered funds must identify potential sites and any pre-disaster actions required to make them viable, and include a letter from the local floodplain administrator listing any actions required to ensure conformance with the NYS Uniform Fire Prevention and Building Code, the applicable local floodplain law, etc."*

My role in the community is to serve as General Foreman for the Public Works Department and I am also the designated Local Floodplain Administrator. The Village of Larchmont considered potential sites in the community suitable for the placement of temporary housing units to house residents displaced by disaster and where potential sites in the community might be for relocating houses out of the floodplain or building new houses if properties in the floodplain are razed.

Larchmont, NY is a densely developed community that is largely built-out. For the purposes of temporary housing, utilizing the train station parking lots 1, 2 and 3 would be an option (see following page).



The train station parking lot sites are not located in a floodplain and preparation work would only consist of evacuating vehicles from the parking lots. The Village of Larchmont has very little town owned open spaces that are outside of a floodplain area that could serve the purpose of temporary housing. In addition, we do not have any sites in the community that could serve for the permanent relocation of homes currently located in the floodplain.

Thank you very much for the opportunity to prepare a Hazard Mitigation Plan for the Village of Larchmont. If you have any questions or need additional information, please contact me at 914-834-6965.

Sincerely,

Rick Vetere
General Foreman
Public Works Department
Local Floodplain Administrator

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VILLAGE OF LARCHMONT
MULTI-HAZARD MITIGATION PLAN
PUBLIC MEETING #2 ATTENDEES LIST

This Meeting:	Public Participation	Meeting - Date/Time:	Thursday, August 8, 2013 @ 7:30 PM
Project Name:	Village of Larchmont Multi-Hazard Mitigation Plan		

Attendees:

Name	Address	Telephone No.	E-mail Address
Anne McAndrews	Village Hall 120 Larchmont Ave. Larchmont, NY 10538	914-834-6038	mayor@villageoflarchmont.org
Mary Kristin Ivanovich	Woodard & Curran	914-448-2266	
Robert Wasp	W&C	(914)-448-2266	rwasp@woodardcurran.com