

Step 7. Review Possible Activities

7. A Planning Process and Strategy

Step 7 presents activities that would reduce, control or limit the impact of various hazards on the Village of Patchogue. As discussed in Steps 4 and 5, the primary hazards of concern are floods and severe windstorms from hurricanes, nor'easters and other storms that threaten the village almost every year and can have a devastating impact. Other events like heat waves and earthquakes and man-caused events have been evaluated in this plan, but do not have the same frequency or level of impact as floods and severe storms. In Step 7 we have identified and organized the possible activities according to the goals and objectives established in Step 6. We have assigned the proposed mitigation activities to an action category and given each a general order of priority. The mitigation activity items and associated objectives are given for each goal along with their applicable hazards.

7. A.1 Mitigation Goals and Objectives

The proposed mitigation measures must first of all contribute to meeting the goals and objectives outlined in Step 6. Mitigation activities that will help achieve these goals are identified in Section 7 B below. The four primary goals identified by the Steering Committee include:

- Protect human life and safety from catastrophic disasters.
- Protect property from catastrophic disasters.
- Avoid the loss of property value from flood hazards.
- Protect and preserve environmental resources.

A number of possible mitigative activities that met the immediate goals and objectives were identified by the Steering Committee. For each of the goals and objectives, we have

associated a connection with specific proposed activities. The recommended actions will be incorporated in the action plan, which is presented in Step 8.

7. A.2 Mitigation Action Categories

Each mitigation activity item is classified according to FEMA guidance under one of six action categories:

- Preventive Measures (PM)
- Property Protection (PP)
- Public Information and Awareness (PI)
- Natural Resource Protection (NR)
- Emergency Services (ES)
- Structural Projects (SP)

Preventive Measures are institutional steps that reduce the impacts from hazards and avoid and limit personal harm and the loss of property value. These measures include any administrative, or regulatory actions that affect the way land, buildings, and infrastructure are developed. Preventive activities are designed to keep problems from getting worse. Items may include planning, zoning, building codes, laws and regulations, and preservation activities. For example, a road raising project will prevent flooding of these new infrastructures and stricter new Village building codes are in place that would control building in a flood plain. Each proposed Preventative Measure is identified as an ‘Activity Item’ and is identified beginning with a ‘PM’ to indicate it is a Preventative Measure Activity Item.

Property Protection measures are associated with the goals and objectives that protect new and existing properties from disasters and avoiding the loss of property value. Property owners may undertake these activities to protect buildings and properties by retrofitting structures, acquiring properties, relocating facilities or elevation of structures. Each proposed Property Protective Measure is identified as an ‘Activity Item’ and is identified as ‘PP’.

Public Information activities involve informing, educating, soliciting input and advising community members, elected officials, property owners and stakeholders concerning the actions proposed and planned. These are activities that help save lives and protect property through an informed public. They may include public meetings, Web Page productions, outreach projects and newspaper notices. 'PI' indicates Activity Items for Public Information Activities. These activities may be performed at various times and are generally associated with other mitigation items.

Natural Resources Protection activities are linked with the goal of preserving natural resources. The Village has a limited amount of open space and natural resource areas that are located adjacent to the Village's shoreline, riverfront and lakeshore areas.

Natural resource protection activities work to preserve or restore natural areas, the natural function of floodplain and watershed areas. These activities may include stream restoration, vegetation management, sediment and erosion control, water quality control or wetland management. Each proposed Natural Resource Protection Measure is identified as an 'Activity Item' and is identified as 'NR' to indicate it is a Natural Resource Protection Measure Action.

Emergency Services actions help avoid loss of life and harm just before, during and after a hazardous event. These actions may include emergency planning, warning systems, response services, and protection of critical facilities. These measures minimize the impact on people and property. Activity Items related to emergency services activities are designated as 'ES' for Emergency Services activities.

Structural Projects involve strategies for modifying or controlling the hazard itself. This strategy includes projects such as elevating roads or flood control structures such as levees, seawalls, bulkheads or retaining walls that direct floodwaters away from an area. The objective of this strategy is to modify or control the hazard itself. Activity Items related to structural project activities are designated as 'SP'.

7. A.3 Estimating Activity Item Costs

Detailed scopes of work for each activity item were not prepared for this Hazard Mitigation Plan but will be submitted with future grant applications. The proposed activities represent a summary or conceptual plan for work items. Therefore, detailed cost estimates are not available. Best professional judgment was used to provide a cost for each project based on past experience, known costs for similar activities or estimates based on engineering guides. These estimates may have a margin of error of +/- 25% and represent a value in current dollars.

7. A.4 Setting Priorities

An order of priority (1 through 5) has been developed for each of the mitigation actions proposed. The criteria for analyzing the alternative priorities are based on Social, Technical, Aministrative, Political, Legal, Economic and Environmental (STAPLEE) considerations provided in FEMA guidance. Implementation of the proposed actions must be socially acceptable to the community, technically feasible. They must have the administrated resources and jurisdiction to implement the actions and be acceptable to political decision makers, stakeholders, and representatives. The activities need to be backed by legal authority and be consistent with current laws. It needs to be economically affordable and cost effective and protective of or beneficial to the environment.

The priorities were determined in agreement with the Village officers and the review committee. Since the criteria for social, technical, administrative, political, legal, economic and environmental considerations were applied to all of the actions; priorities were based on the need for early implementation, cost effectiveness, economic affordability, availability of administrative resources, and funding. Reduction of economic impact and fostering community economic goals from implementing and activity were considered. The highest priorities were based on those actions already

started or that need to be taken before others can be implemented. Activities that were most cost effective were rated highest. Funding and available resources were also important considerations. Actions that can be done using available resources or having identified sources of funds also have a higher priority. Activity Items requiring procurement of additional local funds and resources or procurement of additional State or Federal funds would likely be planned in the future.

The prioritization of activity items involves maximizing the benefits relative to the costs. In most cases, a quantitative estimate of benefits in dollars cannot be made. Therefore a qualitative judgment of benefits relative to cost was made based on the benefits listed, and the properties at risk. Estimates are given in Step 5. The highest priority tasks are those that can be done with low costs relative to the benefits received (e.g. completing the CRS program requirements). Projects having high costs and very high benefits and risk reduction such as the sewage plant protection would also have a high priority. High cost items having a lower benefit would have a lower priority. Items such as the Wetland Restoration and Protection were given a lower priority because there are few areas of significance to protect in the Village. Therefore, there are fewer risks to reduce or mitigation benefits to the community relative to other activities.

A priority is associated with each Activity Item shown in Tables 7-1 to 7-4. Group 1 activities are the highest priority with group 5 having the lowest priority. Priority 1 activities are considered the most urgent projects to start with. As the plan is implemented these priorities are expected to change based on resource availability, funding, new information, and future community needs. Since some activity items have already started they will continue as a top priority. In addition, many of the activities are dependent on other activities and have a higher priority. Most of the proposed items require outside funding (grants) or other assistance.

The Steering Committee for this Hazard Mitigation Plan generated, reviewed and discussed the list of possible activities and proposed projects. Several activities were

screened out if they failed to help meet the Plan's goals. These were reviewed and evaluated in a subsequent meeting with the Mayor, the committee chairperson, the Commissioner of Public Works, and the consultant. Possible activities and projects were reviewed and included in this section. The results of these discussions are outlined in the following Sections 7.B.1 through 7.B.4. Each item includes the objective of concern, a description of the proposed mitigative measure, the hazards being addressed, the benefits produced by the action, estimated costs, feasibility of implementation, resources required, funding potential and its priority rating of 1 to 5. An activity item may fulfill one or more objective, goal, or activity item category.

7. A.5 Capability and Resources

The Village of Patchogue will have the responsibility, jurisdiction, capability and authority to administrate and implement the mitigation activities proposed below. Where applicable the Village official in charge of a project will be responsible for interfacing with the public and appropriate County, SEMO, NYSDEC, NYDOS, FEMA or other agencies identified in Step 3. Responsible officials for the village that may administer these projects are shown in Figure 1-3 in Step 1.

The village does not have financial resources or human resources to prepare the plans, studies, and engineering designs or implement public outreach and construction required for most of the activities proposed. Therefore, external agency funding for consultants and contractors will be needed to successfully implement this Hazards Mitigation Plan. In Step 8 Figure 8-1 illustrates some of the grant matching funds options available to the Village for implementing this Plan.

7.B Proposed Mitigation Activities

Numerous mitigation activities were identified and screened by the Steering Committee, and other Village officials. The proposed activities are listed in Tables 7-1, through 7-4,

and are arranged according to its primary goal. Each mitigation action is listed with its action category and key objective. A group priority of 1 to 5 was assigned with consideration given to the STAPLEE criteria discussed above. An implementation priority was recommended, and presented within parenthesis for each action item listed for that goal. We have also included the probable funding requirements of the items. Tables 7-1 to 7-4 summarize the proposed activity items and include the activity category, the relevant hazards associated with the mitigation action and a listing of possible mitigation benefits.

7. B.1 Protect Human Life and Safety from Catastrophic Disasters

Table 7-1 lists the proposed mitigation activities, objectives, priorities, hazards mitigated and the potential benefits to promote the goal of protecting human life and safety from catastrophic disasters. These activity items are discussed in the following sections.

7. B.1.1 Update Draft Emergency Response/Operations Plan

Updating the draft Emergency Response/Operations Plan is an Emergency Services Action and is intended to help meet the objective to **“Improve emergency response.”** This action responds to any and all potential hazards that may impact the Village. Other secondary objectives include “Protect critical village facilities, Improve public information activities and outreach” and “Control damage problems by planning”. The benefits to the Village include improved responses to hazards facing the community. Response time and effectiveness of the response should improve thus saving lives.

The Village has prepared a Working Copy of an emergency response and preparedness plan. The Village needs to evaluate and update the plan and obtain the resources to implement it. This plan needs to be further developed in concert with SEMO and between the local Village, Town and County agencies. This update will identify additional resources needed for response to various types of potential hazards discussed

in Step 5 above. These resources need to be fully defined, developed, trained, and funded in order to effectively respond to a major emergency. The Plan will be evaluated and updated for the leaders' current assigned roles, personnel responsibilities, additional specialized equipment needed, additional provisions for security of affected areas, the standards and procedures related to emergency response and operations, training and certification requirements, provisions for cleanup, and special precautions for each type of hazard covered.

Table 7-1. Proposed Activities to Protect Human Life and Safety from Catastrophic Disasters.

Action Type *	Activity Item	Primary Objective	Priority	Hazards Mitigated	Benefits/Comments	Cost (\$1,000)
ES	Update Emergency Response/Operations Plan	Improve the emergency response	1 (7)	All Hazards	Improve response time, resources and effectiveness for hazards.	15
ES	Develop a New Hazard Warning System	Improve the emergency response	2 (15)	All Hazards	Facilitate quick and appropriate hazard response, Provide efficient and orderly escape from a hazard area.	45
ES	Upgrade Emergency Response Program	Improve the emergency response	3 (19)	All Hazards	Improve hazard response, reduced damage, injury or death through upgraded facility, equipment, database, training and drills.	315
ES	Critical Evacuation Facilities Upgrades	Protect critical village facilities.	1 (10)	All Hazards	Meet codes for hazard protection, and protect public in shelters during and following and event.	35
PI	Prepare a Public Outreach Program	Improve public information activities and outreach.	1 (4)	All Hazards	Improved involvement of citizens in critical decisions, transmitting of timely information to the community, improved mitigation of and response to hazards.	15
PI	Website Expansion for Public Information	Improve public information activities and outreach.	1 (5)	All Hazards	Improved involvement of citizens in critical decisions, transmitting of timely information to the community.	45
SP	Pumping Stations, Sewage Facility Protection	Correct sewer overflow problems.	2 (14)	Floods/Severe Storms/Epidemics	Protection of the pumping station from floods, reduce overflowing waste, eliminate damage to personal property and damage to the environment from the waste backup.	125
SP	Upgrade and Expand Waste Water Treatment Plant	Reduce health risks by reducing on-site septic systems.	3 (21)	Epidemics/Floods	Protect people from septic system overflow, protect water quality.	1,000

*PM – Preventative Measures ES – Emergency Services Priority: 1 - High 4 - Medium Low Implementation ()
 PP – Property Protection SP – Structural Projects Group 2 - Medium High 5 –Low Priority
 NR – Natural Resources PI - Public Information 3 - Medium

Activity may also meet other objectives.

In addition to the current plan and the items listed above, the updated plan should also include the following information:

- How to use the Plan
- Authority and Policy
- Public Warning System
- Functional Resources and Responsibilities
- Communication Process
- Inter-Governmental Liaisons
- Evacuation and Sheltering Needs and Requirements

Resources to implement the Plan need to be allocated. The Plan needs to be a working flexible tool, which can be modified with changing circumstances and conditions. Financial resources for the development and implementation of the plan will come primarily from FEMA and the Department of Homeland Security through SEMO.

The update would require an evaluation of the current working copy of the Plan, interfacing with local, State and Federal agencies, preparing recommendations and the revision of the Plan. It is expected to cost about \$15,000. With the low cost of implementation, responses would be highly cost effective. The implementation of this activity would be very feasible with no technical restrictions. Potential funding would be from FEMA through SEMO. This plan has been given a priority 1 rating because of its low cost and high long-term benefit and its need to be ready prior to other emergency service activities.

7. B.1.2 Develop A New Hazard Warning System

Developing a Hazard Warning System is an Emergency Services Action. The objective of this system is to “**Improve emergency response**”. Other secondary objectives include “Improve public information activities and outreach” and “Control damage problems by planning”. This action is intended to respond to any and all potential

hazards that may impact the Village. The system is intended to provide a warning to people at risk in advance of, or during a hazardous event, and to induce those at risk to take appropriate action so as to reduce losses of life and injury. This warning could be in the form of an alert or notification. A good early warning system is needed during any emergency. The main concern would be weather related events such as hurricanes, floods, snow and ice storms. Proper and effective warning can prevent hazards from becoming fatal disasters. A successful public hazard warning system is a benefit to the Village because it can reduce damage to property, reduce the need for emergency personnel in areas that are extremely dangerous, and reduce the chances of Village residents being killed or harmed by the event. Exactly how beneficial this plan is to the Village can be measured by the timely and appropriate actions taken to mitigate the hazards and secure personal safety.

A hazard warning system must meet the following challenges:

- Generating adequate real-time data and intelligence upon which to base a warning.
- Determining the point at which data indicate that a warning should be issued.
- Using standard warning terminology that is easily understood by recipients.
- Refining the message for a diverse population with different levels of education and responsibility.
- Using a standard warning protocol that facilitates industry to implement it.
- Delivering the warning to people at highest risk and to emergency responders through multiple communications channels.
- Educating and training people to act in appropriate ways.
- Educating and training people as to the location of the evacuation shelters and the fastest, most direct, and safest route to it.
- Constantly evaluating and reevaluating the effectiveness of the overall system.

The development of a Hazard Warning System must interface with local, State, and Federal agencies and be compatible with other plans currently being used in adjacent

areas. Development of the system is expected to cost about \$45,000. This plan has been given a priority 1 rating because of its low cost of implementation, its need for early implementation, and it has a very high long-term benefit. This system will provide advance notice of the hazard event and it will provide a greater amount of accurate information regarding the impending hazard facing the community. Such notice is vital for authorities, emergency response teams, and residents, in order to make the proper decisions in a timely manner. The implementation of this plan will save property and lives, is cost effective, highly feasible and has no technical restrictions. Potential funding would be from FEMA through SEMO.

7.B.1.3 Upgrade Emergency Response Program

This activity is an Emergency Services Action intended to help meet the objective of “**Improve emergency response**”. Secondary objectives include “Protect existing structures and properties”, “Modify buildings and utilities in the flood plain”, “Prepare for post-disaster recovery and reconstruction”, “Protect existing structures and properties”, and “Become certified in the Community Rating System Program”. This action is intended to respond to any and all potential hazards that may impact the Village. The benefits to the Village would be improved quality and effectiveness in response to hazards facing the community that would save lives and property. This action incorporates several components:

- Emergency response facility upgrade
- Upgrade equipment
- Upgrade the database and computer
- Support for training and drills

Restricted resources in the past have limited the emergency response team to keep current its facility for storing and maintaining equipment and supplies. Equipment is outdated and the emergency response database needs to be updated and expanded with current information. Training needs to be current and drills more frequent.

The benefits to the Village would be an improved and more efficient emergency response to hazards that might strike the community. Program upgrades cost estimates include:

Facility Upgrades and Storage	\$ 150,000
Equipment Upgrades	\$ 85,000
Computer and Database	\$ 50,000
Training and Drills	<u>\$ 30,000</u>
	\$ 315,000

The cost of upgrading the emergency response program relative to the community need for reliable and effective response would be cost effective and would be technically feasible. Potential funding for the upgrades would be from FEMA through SEMO. This plan has been given a priority 3 rating because of its moderate cost relative to long-term benefits. Should funds become available, it is a needed upgrade and should be implemented over a period of time.

7. B.1.4 Critical Evacuation Facilities Upgrades Evaluation

This activity is an Emergency Services Action which will help meet the objective to **“Protect Critical Village Facilities”**. Secondary objectives include “Protect existing structures and properties”, “Modify building and utilities in the flood plain”, “Improve and protect electrical service to critical areas”, “Prepare for post-disaster recovery and reconstruction” and “Protect existing structures and properties”. This action is intended to ensure that each building chosen as an evacuation center will perform the basic function of housing and protecting a large number of people in the event that they need to be evacuated from their homes in the interest of their own personal safety. This action is intended to respond to any and all potential hazards that may impact the Village. This activity involves completing a survey of the buildings identified by the Village as evacuation shelters in the event of a severe storm or other hazard. These buildings are listed in Step 5 Table 5-2. The following is a list of criteria that each building must meet in order to perform this function.

- Determine if any of these buildings are part of a neighboring village or town's evacuation plan.
- Evaluate each building to determine how many evacuees can be reasonably housed.
- Based on the building's capacity, establish a perimeter containing a number of residents not greater than the established evacuee capacity for that building. People assigned to that shelter must be informed as to which shelter they must be evacuated to. (See also Section 7.B.1.2 "Develop a Hazard Warning System".)
- Each building must be centrally located to the residents that it will serve.
- Each building must be clearly identifiable as an evacuation shelter.
- The structural integrity of each building must be carefully examined, and its ability to withstand the storm for which it is protecting people evaluated.
- The age and condition of the roof must be determined. The facility's roof must be able to withstand the force of the most severe storm.
- Window glass must meet International Building Code Standards for hurricanes if a space having exterior windows is going to be used for sheltering people.
- Each building should have a sufficient number of lavatories for the number of people being sheltered.
- Each facility must have an emergency generator, with its own independent fuel supply in the event that public power supply is lost.
- Each building must have the appropriate number of cots and blankets to service the number of people intended to be sheltered.
- Each building must have a sufficient quantity of bottled water for a pre-specified amount of time.

Facilities not meeting these requirements would either be eliminated as evacuation facilities or designated for upgrades if the costs are reasonably justified. The estimated cost of this activity is \$35,000, not including potential upgrades to the facilities. Identification and obtaining funds for upgrades will be made following the determination of potential upgrade costs. Implementation of the emergency facility upgrades evaluation is cost-effective, highly feasible with no technical restrictions and needs to be done prior to other planning activities. This cost, relative to the potential lives saved, people

protected, and the increased ability to assist people during a hazard event, is considered to be low, and therefore gives this project a priority rating of 1. Potential funding would be from FEMA through SEMO.

7. B.1.5 Prepare a Public Outreach Program

Preparing a Public Outreach Program is a Public Information Action and is intended to help meet the objective to **“Improve Public Information Activities and Outreach.”** The Village actively encourages public participation in planning activities and monthly Board meetings. However, the Village currently does not have a formal written program. Implementing this activity item helps to meet the other goals and objectives. Secondary objectives include “Improve emergency response”, “Control damage problems by planning” and “Become certified in the Community Rating System Program”. This action is intended to respond to any and all potential hazards that may impact the Village. The community outreach program should provide a variety of forums so the public can comment and participate in the planning process. It should reflect the concerns of all interested individuals.

The benefits to the Village would be improved communication, more involvement of citizens in critical decisions and transmission of timely information to the community. These are activities that help save lives and protect property through an informed public. Public information activities are essential to all emergency management functions.

Public Information activities involve informing, educating, soliciting input and advising community members, elected officials, property owners and stakeholders about actions proposed or planned by the Village. They may include among other items public meetings, Web Page productions, outreach projects and newspaper notices. These activities may be performed at various times and be associated with other mitigation categories. The program should have the following:

- A process for identifying public participants and stakeholders.

- Identify public participation methods to use.
- Establish community meetings and/or briefings.
- Establish a “Hotline” and when it is needed.
- Elements for developing questionnaires and interviews.
- Process for obtaining and addressing public comments.
- Public education process.
- Dissemination of information in news media, brochures or newsletters.
- Use of outreach activities at public events.
- Use and expansion of the Village Web Page.

A formal Public Outreach Program would improve communication and input from the public. It would improve mitigation of and response to hazards impacting the community. A better-informed community protects people and properties. The Program development requires interfacing with the public, stakeholders, local, State, and Federal agencies, preparing program requirements, and recommendation and writing of the Program Plan. It is expected to cost about \$15,000. The cost of implementation relative to the cost savings from implementing a good program would be very low and hence the plan would be highly cost effective. The implementation of this activity would be highly feasible and has no technical restrictions. Potential funding for the program development would be from FEMA through SEMO. This plan has been given a priority 1 rating because of its low cost, high long-term benefit, immediate need and community requirement for information and input.

7. B.1.6 Website Expansion for Public Information

The Website Expansion for Public Information is a Public Information Action and is intended to help meet the objective of **“Improving Public Information Activities and Outreach.”** Secondary objectives include “Protect existing structures and properties” and “Improve Emergency Response”. This item strengthens the Public Information Program discussed above. Implementing this activity item also helps to meet the other

goals and objectives and is relevant to all potential hazards that may impact the Village. The community website should provide a focused source of information to the public and provide a mechanism for comments and participation in the planning process. Besides the benefits to the Village discussed above for establishing a formal public participation program, a hazards mitigation web link would be available at all times and could be updated rapidly to communicate with local citizens in making critical decisions. It would be a critical part of the Village's public warning system. This activity enhances the benefits through an informed public.

The Village of Patchogue currently has a website devoted to a discussion of village services at <http://www.patchoguevillage.org>. This site can be expanded to include meeting announcements, copies of plans and programs related to hazard mitigation activities, emergency notices and hazard warnings, draft documents for public review and input, status of current projects, contacts via email and postings of important messages and comments. Enhancement of the current Village website would require assistance from a professional website developer who would work closely with the Village officials to develop the web pages.

The website development requires interfacing with Village officials, the public and stakeholders so that the objective of the activity is met. Computer programming, writing and organizing the web pages, inputting information, and testing the draft website will be needed. It is expected to cost about \$45,000 to perform these tasks.

The cost of implementing a website relative to the benefits would be low. The construction of a hazards mitigation web page on the current Village site would be highly cost effective in meeting public information and outreach objectives. The completion of this activity would be highly feasible and has no technical restrictions. Potential funding for the program development would be from FEMA through SEMO. This plan has been given a priority 1 rating because of its low cost, high long term benefit and immediate community need.

7.B.1.7 Pumping Stations, Sewage Facility Protection

This activity is a Structural Project, Property Protection Action, And A Natural Resource Protection Activity. The objective of this action is to “**Correct Sewer Overflow Problems**”. Secondary objectives include “Protect existing structures and properties”, “Bring the Village into compliance with new storm water regulations”, “Improve and maintain water quality, and “Correct vulnerabilities to the sanitary sewer system”. This action is intended to respond to hazards resulting from hurricanes, nor’easters and other severe storms that may impact health and safety of the Village. This activity will provide a number of mitigation benefits to the Village. Implementation of this action will reduce the impacts on the sewage treatment plant, and the plants four lift stations located in the Villages roadways. It will also substantially reduce the amount of waste that over flows during storms, reducing the health hazard risk during storms.

The estimated cost of this project is \$125,000.00 and its implementation is considered to be cost effective, and highly feasible with no technical restrictions. This cost, relative to the damage done to homes and the environment, and the impact on the treatment plant load, is considered to be low. This plan has a long-term benefit and therefore gives this project a priority rating of 1. The problem is ongoing and there is an urgent need to correct it. Potential funding would be from NYSDEC.

7. B.1.8 Upgrade and Expand Waste Water Treatment Plant

The *Upgrading and Expansion Of The Villages Waste Water Treatment Plant*, is a Structural Project, a Property Protection Activity, and a Natural Resource Protection Activity. The primary objective of this activity is to “**Reduce Health Risks By Reducing On-Site Septic Systems**”. Secondary objectives include ”Correct Sewer Overflow Problems”, “Protect existing structures and properties”, “Bring the Village into compliance with new storm water regulations”, and “Improve and Maintain Water Quality”. The primary hazards addressed are impact reduction from epidemics and floods. This action is intended to respond to hazards resulting from hurricanes,

nor'easters and other severe storms that may impact health and safety of the Village. Homes, people, and waterways, will be protected from septic system overflow when proposed upgrades are made to the existing municipal wastewater treatment plant, allowing an increased amount of sewer hookups, therefore expanding the sanitary sewer system. Implementation of this action will also reduce the impacts from waste that overflows to the river and backs up in sewers during storms

The estimated cost of this project is \$10,000,000.00. Its implementation, though expensive, is cost effective and feasible. Upgrades would use currently best available technology. This cost, relative to the damage done to homes and the environment, and the impact on the current treatment plant load, is considered to be low. Due to the high costs and time to secure funding and resources, this project though urgent, was given a priority rating of 3. This project also has long-term benefits and meets the STAPLEE criteria mentioned above. Potential funding would be from NYSDEC.

7. B.2 Protect Property from Catastrophic Disasters

Table 7-2 lists the proposed mitigation activities, objectives, priorities, hazards mitigated and the potential benefits to promote the goal of protecting property from catastrophic disasters. These activities are discussed in the following sections.

7.B.2.1 Tree Hazards Survey, Assessment and Plan

Developing a “**Tree Hazards Survey, Assessment and Plan**” is a Preventive Measure Action intended to help meet the objective to “**Improve and protect electrical service to critical areas.**” Secondary objectives include “Protect existing structures and properties”, “Protect critical village facilities” and “Control damage problems by planning”. This action is intended to respond to storm hazards that may interrupt electric as well as phone and cable service to the Village.

This tree management program would reduce potential damages caused by fallen or wind blown trees or branches. The hazards to mitigate include strong winds from hurricanes, nor'easters, tornados; ice, and snow that may result in downed power lines from fallen trees and limbs. During and after a storm it is essential to maintain electrical power, phone communications, cable TV, and online computer information services.

Table 7-2. Proposed Activities to Protect Property from Catastrophic Disasters.

Action Type*	Activity Item	Primary Objective	Priority	Hazards Mitigated	Benefits/Comments	Cost (\$1,000)
PM	Tree Hazards Survey, Assessment and Plan	Improve and protect electrical service to critical areas.	1 (8)	Utility Failure/ Ice Storms/ Snow Storms/ Severe Wind Storms	Reduce damage to power lines, phone lines and cable service, reduce property damage caused by falling trees or branches,	75
PP	Community Rating System Program Certification	Protect existing structures	1 (3)	Floods/Hurricanes/ Severe Storms	Reduce the flood insurance premiums for the community	10
ES	Post-Disaster Recovery and Reconstruction Plan	Prepare for post-disaster recovery and reconstruction	2 (16)	All Hazards	Provide improved, efficient and orderly recovery from a hazard.	35
ES	Emergency Power Generator for Village Hall	Improve and protect electrical service to critical areas.	1 (9)	Utility Failure/ Severe Storms/ Ice Storm/ Snow Storm	Conduct emergency operations during power outages.	40
SP	New Breakwater for Erosion Protection on East Side of Shore Front Park	Create barriers to storm damage.	4 (25)	Floods, Severe Storms, Coastal Erosion	Protect shore front properties, reduce flood hazards, reduce beach erosion	3,000
PP	Marina Property Protection Plan	Protect existing structures and properties.	5 (28)	Floods/Hurricanes/ Severe Storms/ Winter Storms/	Protect shore front properties, reduce flood hazards	90

PM – Preventative Measures

ES – Emergency Services

Priority: 1 - High

4 - Medium Low

Implementation ()

PP – Property Protection

SP – Structural Projects

Group 2 - Medium High

5 –Low

Priority

NR – Natural Resources

PI - Public Information

3 - Medium

Activity may also meet other objectives.

A Tree Hazards Survey Assessment and Plan, would involve the Village obtaining services to conduct a tree survey in areas where trees have the potential to bring down utility lines. This program would identify trees requiring trimming, and trees that would need to be removed, and or replaced, due to disease, damage, or potentially hazardous conditions.

Tree species and location would be noted. They would then be mapped, and a description, assessment, and rating of potential damage to poles and types of service lines recorded. A determination of responsibility for maintaining the tree(s) in relation to the potential damage will be made. Since there may be conflicts of responsibility for tree maintenance between the property owners, electric service (LIPA), phone service (Verizon), and cable service (CableVision), the plan will establish a process to identify primary responsible party, for removal of trees and limbs having a potential to cause damage. The plan will contain provisions, guidelines and procedures for notifications, tree maintenance requirements, periodic surveys, and responsibilities.

The benefits of the Tree Hazards Survey Assessment and Plan to the Village would be to reduce damage to power lines, phone lines and cable service in the community during and after a storm. Maintaining communication with emergency services during a hazardous event would save lives and keep citizens informed of dangerous situations and key emergency routes. The tree survey, mapping, assessment, interfacing with village, town, county, and utility companies, preparing recommendations, public information activities, and preparing the plan is expected to cost about \$75,000. With the relatively low cost of implementation, reduced damage to utility lines, and high benefits to the community, this mitigation action would be highly cost effective. The implementation of this activity would be technically feasible with no apparent social, technical, administrative, political, economic or environmental restrictions. Because of the needed support of property owners, private utilities and the village administration, cooperation of all relevant stakeholders is needed. Potential funding would be from FEMA through SEMO and possibly regional utility support. This plan has a priority 1 rating because of its low cost, immediate need and high long-term benefit.

7. B.2.2 Community Rating System Program Certification

The Community Rating System (CRS) Program is a Property Protection program which when implemented will also result in reduction of flood insurance premiums of from 5% to 50%. This action is also a Preventive Measure Action intended to help meet the objective to **“Protect existing structures and properties”**. Secondary objectives include “Improve emergency response”, “Prepare for post-disaster recovery and reconstruction”, “Improve public information activities and outreach” and “Control damage problems by planning”.

The program involves implementing hazard management activities organized under four categories:

- Public Information outreach.
- Mapping and Regulations including identification of flood hazards, open space preservation, and storm water management.
- Flood Damage Reduction, including the preparation of this Management Plan and drainage system maintenance.
- Flood Preparedness including a Flood Warning Program.

This Hazards Mitigation Plan includes the requirements specified in these four categories and satisfies many if not most of the needs for the CRS Program. Public outreach programs are described for the proposed activities in this Plan. Activities include mapping flood hazards, storm water management, and flood damage reduction. Emergency preparedness and warning programs updates are part of this Plan.

The Village will apply for and obtain certification in the Community Rating System (CRS) Program. This involves designation of a program coordinator, preparation of the program plan, public notification, and submission of the Program for approval and rating to FEMA, and the Insurances Services Organization (ISO).

The benefits of the CRS Program Certification to the Village would be to reduce property damage, reduced claims and reduced flood insurance premiums for the community. Preparing the CRS Program plan would incorporate the elements of this hazards mitigation plan and its cost of about \$10,000 would include Village administrative resources, and public information activities. With the low cost of implementation and reduced damage liability costs, this mitigation activity would be highly cost effective. Potential funding would be from in-kind Village resources. This Program has a priority 1 rating because of its low cost and high long-term benefits and immediate community need.

7. B.2.3 Post-Disaster Recovery and Reconstruction Plan

This activity is an Emergency Services Action intended to help meet the objective of **“Prepare for post-disaster recovery and reconstruction”**. Other secondary objectives include “Improve public information activities and outreach”, “Protect existing structures and properties”, “Control damage problems by planning” and “Become certified in the Community Rating System Program”. This action is intended to aid in damage recovery and reconstruction from any and all potential hazards that may impact the Village.

The Village proposes to prepare a post-disaster mitigation plan. The purpose of this plan is to develop procedures for inspecting properties and identifying damage before reoccupation. This plan will also identify disaster recovery and reconstruction needs, as well as funding needs and sources before damage is repaired. A Plan for Post-Disaster Recovery and Reconstruction will include:

- Responsibilities and Assignments for Post-Disaster Recovery and Reconstruction.
- Damage Assessment Process.
- Emergency Needs and Requirements.
- Inspection of Properties and Damage.
- Long Term Reconstruction Needs and Measures.
- Formulation of a Recovery and Reconstruction Plan.
- Plan implementation.

- Updating the Plan.

The benefits to the Village would be a more efficient and orderly recovery from damages due to hazards that may strike the community. A well planned recovery and reconstruction would protect people returning to their homes and work.

The Plan development requires interfacing with local, County, State and Federal emergency agencies. These different agencies will be preparing recommendations for the writing of the Plan. The preparation and writing of this plan is expected to cost about \$35,000. The cost of implementation relative to the cost savings from implementing a good plan would be very low and hence the plan would be highly cost-effective. The implementation of this activity would be very feasible has no technical restrictions. Potential funding for the plan development would be from FEMA through SEMO. This plan has been given a priority 1 rating because of its low cost, immediate need and high long term benefit.

7. B.2.4 Emergency Power Generator for Village Hal.

Currently there is no backup emergency power generator for Village Hall. In the case of any large scale emergency, Village hall would act as the command center, as such it would need to be operable independent of publicly provided power, in the event power is lost. This action is an Property Protection Action, and a Emergency Service action, which will help meet the objective to **“Improve and protect electrical service to critical areas”**. Secondary objectives include “Protect critical village facilities”, “Improve emergency response” and “Protect existing structures and properties”. This action is intended to ensure that the services provided by this emergency command center are not interrupted during power outages. This action is in response to utility failure hazards that may impact the Village from hurricanes, severe storms, ice storms and snow storms. The benefits to the Village would be improved responses to hazards facing the community and maintain communications during a hazard event. Response time and effectiveness of the response should improve thus saving lives.

The estimated cost of this activity is \$40,000.00 and includes purchasing and installing of a backup generating system for Village Hall. Installing the emergency facility upgrades is cost effective, and highly feasible with no technical restrictions. This cost, relative to the benefits from uninterrupted emergency operations at the Village Hall command center, which will improve protection, and increase the ability to assist people during a hazard event, is considered to be low. Based on these considerations this action is given a priority rating of 1. This action also has a long-term benefit and meets other criteria mentioned above. Potential funding would be from FEMA through SEMO.

7. B.2.5 New Breakwater for Erosion Protection on East Side of Shore Front Park

A new breakwater is proposed for the east side of Shore Front Park to protect shorefront properties, reduce flood hazards, and reduce beach erosion. This action is a Structural Project, a Natural Resource Protection Activity, and a Property Protection Action which will help meet the objective to “**Create Barriers to Storm Damage**”. Secondary objectives include “Control erosion and sediment deposition”, “Protect new and existing structures and properties” and “Create barriers to flooding”. The benefits to the Village would be the protection of shorefront properties, reduce flood hazards, and reduce beach erosion. Mitigated hazards include control of storm surges from hurricanes and nor’easters.

The estimated cost of \$ 3,000,000.00 for this project includes environmental impact assessment, engineering design, permitting and construction of the breakwater. Due to the high cost and environmental impact uncertainties relative to the benefits of controlling shoreline erosion and protection of shorefront properties from storm surges, a priority 4 is assigned to this project.

7. B.2.6 Marina Property Protection Plan

Marinas in Patchogue are a significant commercial activity and provide an important service to recreational and commercial boaters in the area. These facilities are within the 500-Year Flood and/or Category 3 hurricane SLOSH zones and are at high risk from these hazards. (See Step 5

above.) A protection plan is proposed for the marinas along the Patchogue River to protect marina properties, reduce damage from floods and storms, and improve the marinas' access and usage. This action is a Property Protection Action, and a Natural Resource Protection Activity, which will help meet the objective to **“Protect existing structures and properties”**. Secondary objectives include “Control damage problems by planning”, “Improve Waterway drainage and value”, and “Control erosion and sediment deposition”. The benefits to the Village would be protection of shore front properties. Mitigated hazards include less damage to shore front property from storm surges created by hurricanes, nor'easters, and winter storms.

The plan would parallel and incorporate recommendations of the Local Waterfront Revitalization Plan for the Patchogue River Waterfront which is in draft. The Marina protection plan will be consistent with the Village Master Plan, and incorporate applicable recommendations of the Patchogue River Maritime Center Plan.

The estimated cost of \$ 400,000.00 for this project includes, assessment and evaluation of marina problems, feasibility analysis, conceptual design for solutions, environmental impact assessment, engineering design, construction cost estimates, permitting for construction of mitigation measures, and repair of bulkheads. This estimate does not include construction costs. Due to the high cost, time required to obtain funding, environmental impact and uncertainties relative to the benefits of improving protection of the marinas, controlling shoreline damage, and protection of shorefront properties from storm surges, a priority 4 is assigned to this project. An assessment and feasibility analysis may be advised as a first step with a higher priority.

7. B.3 Avoid the Loss of Property Value from Flood Hazards

Table 7-3 lists the proposed mitigation activities, objectives, priorities, hazards mitigated and the potential benefits to promote the goal of avoiding the loss of property value from flood hazards. These activities are discussed in the following sections.

Table 7-3. Proposed Activities to Avoid the Loss of Property Value from Flood Hazards.

Action Type	Activity Item	Primary Objective	Priority	Hazards Mitigated	Benefits/Comments	Cost (\$1,000)
PP	Improve Little Creek Drainage	Manage storm water problems in flood prone areas.	1 (6)	Floods/ hurricanes/ nor'easters/ severe storms	Improved emergency services, improved evacuation routes, reduce property damage, reduce septic system overflows, improve water quality.	400
PP	Road Elevation Project - Argyle Ln., Laurel St., Pine Blvd., and Campbell St.	Manage storm water problems in flood prone areas.	1 (1)	Floods/ hurricanes/ nor'easters/ severe storms	Improved emergency services, improved evacuation routes, reduce property damage.	370
PP	Develop a Local Waterfront Revitalization Plan	Manage storm water problems in flood prone areas.	3 (18)	Floods/Erosion	Mitigate flooding from storms and high tides.	60
PM	Storm Water Management Plan	Improve the storm water system.	2 (11)	Floods/Severe Storms	Improve hazard response, reduced damage, injury or death, protect water quality, reduce flood hazards, and reduce beach erosion.	45
PP	Correct Flood Area Problems – Bay Avenue	Manage storm water problems in flood prone areas.	4 (22)	Floods/ hurricanes/ nor'easters	Reduce flood hazards, improved emergency services, improved evacuation routes, reduce property damage.	825
PP	Correct Flood Area Problems – Brightwood St./Beach Ave/Roosevelt St.	Manage storm water problems in flood prone areas.	2 (13)	Floods/ hurricanes/ nor'easters/	Reduce flood hazards, improved emergency services, improved evacuation routes, reduce property damage.	525
PP	Correct Flood Area Problems – Bianca Road	Manage storm water problems in flood prone areas.	5 (29)	Floods/ hurricanes/ nor'easters/	Reduce flood hazards, improved emergency services, improved evacuation routes, reduce property damage.	94
PP	Correct Flood Area Problems – Central Business District	Manage storm water problems in flood prone areas.	2 (12)	Floods/ hurricanes/ nor'easters/	Reduce flood hazards, improved emergency services, improved evacuation routes, reduce property damage.	525
PP	Correct Flood Area Problems – West Lake Road	Manage storm water problems in flood prone areas.	4 (23)	Floods/ hurricanes/ nor'easters/	Reduce flood hazards, improved emergency services, improved evacuation routes, reduce property damage.	188
SP	Elevate Buildings and /or their Utilities	Modify building and utilities in the flood plain.	5 (30)	Floods/Severe Storms	Reduce property damage, reduce flood hazards	20/ bldg.
SP	Retrofit Buildings	Modify building and utilities in the flood plain.	4 (27)	Floods/Severe Storms	Reduce property damage, reduce flood hazards, and reduce insurance costs.	75/ home

*PM – Preventative Measures ES – Emergency Services Priority: 1 - High 4 - Medium Low Implementation ()
 PP – Property Protection SP – Structural Projects Group 2 - Medium High 5 –Low Priority
 NR – Natural Resources PI - Public Information 3 - Medium

Activity may also meet other objectives.

7. B.3.1 Improve Little Creek Drainage

The improvement of Little Creek Drainage is a Property Protection Action. The objective of this activity is to “**Manage Storm Water Problems in Flood Prone Areas**”. Secondary objectives include “Protect existing structures and properties”, “Bring the Village into compliance with new storm water regulations”, “Control erosion and sediment deposition”, and “Reduce flood hazards using new innovative measures”. Specifically this action is intended to improve the storm water drainage through Little Creek to Patchogue Bay in order to reduce the severity of flooding on Smith Street and Rider Avenue, allow the water to drain faster as the level of the Bay goes down with the tide, and substantially reduce the amount of waste that overflows from subsurface sewage disposal systems into the storm water drainage system. This action is intended to respond to any flood hazards resulting from hurricanes, nor’easters and other severe storms that may impact the Village.

Little Creek is primarily a storm water drainage culvert located in the southwest side of the Village. It flows from Smith Street, through Shore Front Park, out of the bulkhead located on the beach and out to Patchogue Bay. It services a watershed area of 163 acres, and handles the storm water runoff from 5.5 miles of road in the Village. Due to the poor drainage capabilities of Little Creek the following hazards have arisen and need to be mitigated:

- During heavy rains and high winds 2 to 2.5 feet of water accumulates on the southern end of Rider Avenue, Smith Street from South Ocean Avenue to a point 1,500 feet east, and the entire Shore Front Park area. This problem is compounded when a rain and or wind event coincides with high tide.
- Smith Street is a major road for traveling east to west or west to east in the southern part of the Village. Rider Avenue is one of the two major ways that Smith Street is accessed from the northern portion of the Village. When these roads flood they become impassable to emergency vehicles. The reduction of floodwater and rapid drainage of any floodwater that accumulates on these roads is crucial to the safety of the people in this area during storm conditions.

- Floodwaters enter the homes located on Rider Avenue and Smith Street damaging personal property and compromising the systems necessary to maintain the home.
- The homes on Rider Avenue and Smith Street have Sub Surface Sewage Disposal Systems that are rendered inoperable during these flood conditions. The integrity of these systems is also compromised so that portions of their contents are released into the floodwaters and ultimately into the river and then the bay.
- Due to the overflowing of Little Creek the banks have been eroding, increasing the width of the creek at an accelerated rate. Improving the drainage would keep the water level in the creek lower therefore reducing the rate of erosion.
- The expected useful service life of roads in a residential area under normal conditions is 20 to 25 years. Due to the frequency of flooding, and the freezing and thawing of the water on the roads during the winter months, this service life has been cut in half, thus creating a financial burden to the Village

This activity will provide several mitigation benefits to the Village. Evacuation procedures will improve due to less street flooding. Flooding and damage to people's homes will be reduced or eliminated. It will reduce or eliminate the overflowing of Sub Surface Sewage Disposal Systems and reduce or eliminate damage to the water quality of the bay from the waste of these systems. The rate of bank erosion of Little Creek will also be reduced.

To improve the drainage through Little Creek several steps need to be taken:

- Installation of tide flex valves on the three drainage pipes that run from a check valve vault at the base of the creek, and penetrate the bulkhead into the bay.
- Change the pitch of these pipes so that they are pitched towards the bay and not away from it.
- Increase the size of the check valve vault located at the base of the creek where the pipes that penetrate the bulkhead are connected.
- Install two low lift pumps.
- Remove the tide flex valves from the pipes that are on the influent side of the check valve vault.

- Stabilize the creek bottom and creek banks.

The estimated cost of this project is \$150,000.00. The cost includes assessment and evaluation of drainage problems, feasibility analysis, conceptual design for solutions, environmental impact assessment, engineering design, construction cost estimates, meetings with Department of Environmental Conservation, and permitting process for construction of mitigation measures. This cost does not include the construction cost. The cost relative to the damage done to homes and the environment, and the increased ability to assist people during a hazard event, is considered to be low, and therefore gives this project a priority rating of 1. This plan also has a long-term benefit and meets the STAPLEE criteria mentioned above. Potential funding would be from FEMA through SEMO.

7. B.3.2 Road Elevation and Drainage Improvements for Argyle Ln., Laurel St., Pine Blvd., and Campbell St.

This activity is a Structural Project and a Property Protection activity, part of which has started. The objective of this action is to **“Manage Storm Water Problems in Flood Prone Areas”**. Secondary objectives include “Protect existing structures and properties”, “Protect new buildings and infrastructures”, “Bring the Village into compliance with new storm water regulations”, “Reduce flood hazards using new innovative measures”, “Control erosion and sediment deposition”, and “Correct vulnerabilities to the sanitary sewer system”. This action is intended to respond to any flood hazards resulting from hurricanes, nor’easters and other severe storms that may impact the Village. This infrastructure will protect the new road against flooding, increase the rate of storm water drainage, and substantially reduce the amount of waste that overflows from subsurface sewage disposal systems into the storm water drainage system on Argyle Ln., Laurel St., Pine Blvd., and Campbell St. These roads and the adjoining properties are all located on the east bank of the Patchogue River, which is a tidal tributary of the Great South Bay.

All of the above mentioned roads are located in zone AE6 of the Flood Insurance Rate Map. A strong southern wind, combined with high tide and a full moon, subjects the entire area between Laurel Street and Campbell Street, to a point 400' east of the bulkhead, to be covered by six to eighteen inches of salt water. This has occurred as often as eight times between the months of January and March. As a result of this flooding the following hazards need to be mitigated.

- During these events the roads become impassable to residents and emergency vehicles. The reduction of floodwater and rapid drainage of any floodwater that accumulates on these roads is crucial to the safety of the people in this area during storm conditions.
- Docked at the end of Laurel Street, is the Patchogue Fire Department fireboat. This boat is used for rescues, as well as the extinguishing of boat fires, and those on any Patchogue shores. Floodwater in this area has prohibited access to the boat during flood events.
- Floodwaters enter homes located on these roads damaging personal property and compromising the systems necessary to maintain the home.
- The homes located on these roads have Sub Surface Sewage Disposal Systems that are rendered inoperable during these flood conditions. The integrity of these systems is also compromised such that portions of their contents are released into the floodwaters and ultimately into the river and then the bay.
- Also located on these roads are a construction yard, and two boat yards. None of these yards have ground cover; paved driveways, or curbing along the street side of their properties. As a result, when the floodwaters recede, silt/soil is removed from their properties and deposited directly into the river. This is not only causing an erosion of their properties, but the riverbanks are filling with this material creating a need for dredging.
- With the exception of Pine Boulevard, the roads included in this activity are subject to commercial traffic and have a useful service life of 15 to 17 years. Due to the frequency and flooding, and the freezing and thawing of the water on the roads during the winter season, this service life has been cut in half. This creates a financial burden for the Village

This activity includes the raising of the roads to a minimum centerline elevation of 6.0 feet and construction of a storm sewer system. This will enable access of emergency vehicles during a storm event and will prevent the roadways serving as a conduit to carry floodwater inland. The storm water system will include “duckbill” type check valves to prevent backflow of floodwaters. The system will be configured with numerous leaching structures including rings and slotted pipe runs to increase recharge of storm water collected from both the roadways and the adjoining properties. This system will facilitate groundwater recharge and rapid drainage of storm water after each storm event, whereas flood waters now pond in certain areas.

The profile of the elevated roadway will be configured to keep storm water from flowing onto adjoining properties, even though these parcels will generally be lower than the road. Leaching capacity and inlets behind the curb line will be included to drain storm water generated on the adjoining properties. The elevated roadways will also serve as dykes to limit the extent of flooding during major storm events.

This activity will provide a number of mitigation benefits to the Village. It will improve emergency vehicles assistance in these areas and keep open evacuation routes during storms. It will reduce or eliminate flooding of people’s homes and reduce or eliminate damage to personal property, reduce or eliminate the overflowing of Sub Surface Sewage Disposal Systems therefore reduce or eliminate damaged water quality from the overflow of waste to the river and the bay. Access to the fireboat during these flood events would improve, and reduce the amount of silt/soil being removed from the area and deposited into the river.

The storm drainage system will be configured to capture the “first flush” of storm water. This will reduce pollutants entering the river and is supportive of the Local Waterfront Revitalization and River Walk projects being planned by the village. The two bulk headed street ends within the project area also accumulate significant amounts of sediment now washed from the roads. This sediment contributes to filling of a federally designated navigation channel. The proposed system will be designed to capture this sediment and to allow easy maintenance.

The estimated cost of this project is \$370,000, and its implementation is considered to be cost effective, and highly feasible with no technical restrictions. This cost, relative to the damage done to homes and the environment, and the increased ability to assist people during a hazard event, is considered to be low, and therefore gives this project a priority rating of 1. This plan also has a long-term benefit and meets the STAPLEE criteria mentioned above. Funding would be from SEMO and FEMA.

7. B.3.3 Develop a Local Waterfront Revitalization Plan

The Village of Patchogue has not completed a Local Waterfront Revitalization Plan (LWRP). A preliminary draft plan covers proposed land and water uses, waterfront projects, new zoning districts, and program implementation. The LWRP is also concerned in part with water front hazards. This Plan would be a Preventive Measure Action intended to meet in part the objective of **“Managing storm water problems in flood prone areas.”** Secondary objectives include “Protect new buildings and infrastructures”, “Improve and Maintain water quality”, “Preserve Open Space”, “Control flood damage problems by planning”, “Control erosion and sediment deposition”, “Protect the village wetlands” and “Improve channel maintenance and drainage”.

Although it is primarily a waterfront use plan, mitigative actions in this plan would tend to respond to flood hazards that may interrupt activities along the waterfront. Zoning requirement under the LWRP are designed to protect new buildings and infrastructures along the waterfront. The hazards to mitigate would include flooding from storms and high tides. The LWRP therefore would be integrated as part of this Hazard Mitigation Plan.

The Village needs to revise and update its draft LWRP for the Patchogue River Waterfront. The plan will be consistent with the Village Master Plan and incorporate applicable recommendations of the Patchogue River Maritime Center Plan. The Plan will contain strategies for land and water use including natural, public, or developed waterfront. The content of the Plan should include:

- Current waterfront land uses

- Waterfront redevelopment uses
- Historic and scenic resources
- Flooding and erosion concerns and actions
- Water quality issues and solutions
- Fish, wildlife and wetland habitats
- Public access and recreational uses
- Water uses and harbor management

A plan will be prepared that reflects community consensus partnership among local, regional and State stakeholders, and will be consistent and compliant with State and Federal requirements.

In addition to the economic development benefits to the Village, the LWRP would improve safer waterfront usage, reduced river front flooding, contribute to improved water quality, and preserve natural areas and fish habitats. The evaluation of the current early draft of the Plan, and the key issues facing the waterfront concerning its interfacing with local, State, and Federal agencies, evaluating and developing alternative feasible options, and preparing the Plan, is expected to cost about \$60,000. With this cost for planning and follow-up implementation, the LWRP is expected to be highly cost effective. The implementation of this activity would be highly feasible with no technical restrictions. Potential funding would be from the New York Department of State Environmental Protection Fund. This plan has a number 1 priority because of its immediate need; low cost and high long term benefit. Currently it needs some local issues resolved, resources to prepare it, and a plan of action to revise and complete the document.

7. B.3.4 Storm Water Management Plan

The development of a Storm Water Management Plan is a Property Protection Action, A Natural Resource Protection Activity, and an Emergency Services Action. The objective of this activity is to “**Manage storm water problems in flood prone areas**”. Secondary objectives include “Correct vulnerabilities to the sanitary sewer system”, “Protect existing structures and properties”, “Bring the Village into compliance with new storm water regulations”, “Control

erosion and sediment deposition”, and “Reduce flood hazards using new innovative measures”. This action is intended to respond to any flood hazards resulting from hurricanes, nor’easters and other severe storms that may impact the Village. Implementation of the plan is expected to improve hazard emergency response, reduced damage to buildings and properties, reduce injury or death due to flooding, protect water quality and reduce soil erosion and sedimentation of waterways.

The estimated cost of this plan is about \$90,000.00. This cost, relative to the storm water damage done to homes and the environment, and the increased ability to assist people during hazard events, is considered to be low, and therefore gives this project a priority rating of 1. This plan also has a long-term benefit and should be completed prior to other plans related to flooding. Potential funding would be from New York State Department of Environmental Protection, and possible funding from local county departments.

There are many areas in the Village where groundwater levels are near the surface and these onsite storm water disposal methods may not be viable in those locations. Many streets in the Village lack adequate curbing which causes storm water to run off streets onto or across private property. There are also areas where no storm sewers exist that experience frequent local flooding (See Section 7.B.3.6 below). Other activity items are being proposed to correct specific identified flooding problems. (See Sections 7.B.1.7, 7.B.3.1 *Little Creek Drainage*, 7.B.3.2 *Road Elevation Improvements*, 7.B.3.6 *Flood Area Problems* and 7.B.4.1 *MS4 Program*.) These areas when flooded affect the flow of traffic and emergency vehicles and cause flood damage to adjacent property. In order to help mitigate these flooding problems a storm water management plan is needed.

Federal and State storm water regulations encourage the retention of on site storm water using on site leaching systems and/ or plantings. The use of these options is beneficial because:

- Pollutants in storm water are retained onsite and used in the soils and by the plants.
- The quantity of storm water leaving the site is reduced and which reduces the street flooding.

- Reduced street flooding results in smaller and less expensive storm water pipes for the remaining areas that flood.
- A smaller cost of treating the remaining storm water prior to discharge to the Patchogue River and the bay.

Preparation of a Storm Water Management Plan, which will include the following:

- Identify upstream storm water locations and effects on the Village.
- Evaluate existing storm water system condition and capacity. Determine the existing capacity of these storm sewers under existing conditions. Determine the potential for these storm sewers to provide additional capacity for new storm sewer connections and/or sump pump flows.
- Evaluate existing groundwater conditions. Determine the depth to groundwater and the change in groundwater levels in response to rainfall and saturated soils conditions.
- Evaluate the need for and feasibility of onsite storm water retention.
- Identify locations with wet basements and sump pumps.
- Evaluate existing street drainage and pavement conditions. Determine for each street the need for and location of curbing to contain storm water within the street. Identify locations where inadequate pavement drainage conditions exist and the specific cause at that location.
- Determine effect of the Patchogue Bay and River on storm water discharge during various wind and storm. Design of the storm water system may have to include the use of pressure sewers, duckbill check valves, and emergency pumping that would prevent the River and Bay water from flowing up into the storm sewer system.
- Determine storm water treatment requirements.
- Evaluate Storm Water Protection of Critical Facilities. These must be protected from flooding and be accessible during flooding conditions.
- Prepare conceptual design, cost estimates, and projects phasing. The Plan should contain the preferred conceptual design plus at least two design alternatives for the major system components.

- Develop recommended phasing of the action items in the Storm Water Management Plan. This will be based on a priority for flood reduction, maximizing property protection, and providing an orderly program for pavement improvement, curbing, and sump pump water discharges.

The Storm Water Management Plan shall be presented to the Village, Suffolk County, and to SEMO for their comments including a suggested phasing of the Storm Water Management Plan.

7. B.3.5 Correct Flood Area Problems

Correcting local flood problems in several areas of the Village is a Property Protection Action, a Natural Resource Protection Activity, and an Emergency Services Action, all of which is covered under five separate projects listed in Table 7-3. These areas include Bay Avenue, Brightwood Street/Beach Ave and Roosevelt St., Bianca Road, Central Business District (East Main Street) and West Lake Road. The objective of these actions is to **“Manage Storm Water Problems in Flood Prone Areas”**. Secondary objectives include “Protect existing structures and properties”, “Bring the Village into compliance with new storm water regulations”, “Reduce flood hazards using new innovative measures”, “Control erosion and sediment deposition”, and “Correct vulnerabilities to the sanitary sewer system”. All of the five listed activities in Table 7-3 may be covered by two to three feet of water during a rainstorm. As a result, this flood hazard needs to be mitigated. During flood events the roads may become impassable to residents and emergency vehicles. The reduction of floodwater and rapid drainage of any floodwater that accumulates on these streets is important to the safety of the people in this area during storm conditions.

These actions are intended to respond to any flood hazards resulting from hurricanes, nor’easters and other severe storms that may frequently flood local areas the Village. Implementation of these activities will reduce the flooding, improve storm water drainage, improved emergency services, improve evacuation routes, and reduce property damage.

The estimated cost of these activities and its priority varies with the specific project. Some may have a very high cost relative to the benefits obtained and hence a low priority. Some projects may be highly feasible with little or no technical restrictions and others may have engineering to overcome. These activities all would have long-term benefits. Correcting flooding problems in the Central Business district was given a priority of 2. This is higher than the other areas because of the volume of traffic on this road, it being a major route into and out of the Village, and the fact it runs through the most important economic area within the Village. Correcting the problems in this area also presents some engineering challenges that may be more costly than the others. The estimated cost for mitigating the Central Business District problem is approximately \$ 2,000,000.00. Funding would be from various sources including FEMA, SEMO, New York State Department of Environmental Conservation, and New York State Department of Transportation.

7. B.3.6 Elevate Buildings and /or their Utilities

To protect existing buildings, it may require raising them to a level, such that their lowest structural horizontal member is above the determined FEMA flood plain level. For construction of new buildings, these requirements are mandated to meet these criteria. All utilities should also be installed so that they are above the flood plain level. In the existing structures the utilities should be raised up with the house. This activity item is a Property Protection Action that helps meet the goal of “**Modify Buildings and Utilities in the Flood Plain**”. Secondary objectives include “Protect existing structures and properties”, “Protect new buildings and infrastructures”, and “Reduce flood hazards using new innovative measures”. Its benefits include reduction of property damage, and reduced exposure to flood hazards, during sever storms.

Having the lowest structural horizontal member above the base flood elevation, allows floodwaters to pass though the space below the structure. This will leave the structure unharmed and intact. However, there are many existing structures both in the floodplain and adjacent to the floodplain which could incur serious damage.

In the Village of Patchogue many of the properties which are in or adjacent to the floodplain would have about one or two feet of water in their building during a flood. If a building cannot be raised, or the expense of elevating the first floor of the building is too great, then the utilities of the building can be elevated to a higher floor above the base flood elevation. This would include:

- All electrical wiring, outlets, and panels.
- Water heater and the furnace.
- Securing or elevating the fuel oil tanks so it will not float or leak.
- All water shut off valves and water supply plumbing.

These changes would be far less expensive than raising an entire building's first floor. Since the occupant would have the use of the essential utilities as soon as the floor waters recede otherwise it could be days or weeks before the building can be used. This program would focus on homes in the flood prone areas in the Village. Funding for this grant program is limited and therefore this activity would be in the floodplain.

The activity consists of notifying homeowners in flooded areas to assess their interest in elevating their building and or their building utilities. Depending on the interest of the individual building owner, the Village would make application to FEMA for funds. If funding is available the program will proceed on a building-by-building basis. Based on past funding the building owner would pay 25% of the cost of this work, and FEMA (SEMO) would pay the balance.

Costs of this activity would vary depending on the type and number of buildings, and the extent of elevation actions conducted. In many cases elevation of a building may be too costly or not reasonably feasible. Elevation of utilities is likely more cost effective and technically feasible. Costs for elevating utilities can average as much as \$30,000.00 per building. Due to the cost uncertainties, limited funding and technical considerations this activity is given a priority of 5.

7. B.3.7 Retrofit Buildings

Property damage from flooding, hurricanes, nor'easters, windstorms, ice storms and blizzards can be minimized by retrofitting existing structures. This activity item is a Property Protection Action that helps meet the goal of **“Modify Buildings and Utilities in the Flood Plain”**. Secondary objectives include “Protect existing structures and properties”, and “Reduce flood hazards using new innovative measures”. Its benefits include reduction of property damage and insurance costs from exposure to flood hazards and severe storms.

These retrofits make a structure more hazard resistant. Retrofits of buildings include:

- Flood proofing
- Hurricane / wind proofing
- Window replacement
- Window shuttering
- Reinforce structures
- Roof tie downs or reinforcement

The Village would make information on retrofits and their benefits to residents available to residents in a public notification and education program. This program would consist of publication of information in the local newspaper, Village Website, and at public meetings and workshops. This program would be one of the items implemented by the Village as a part of its implementation of the Community Rating System (CRS) program as outlined below. Costs of this activity would vary depending on the type, number of buildings, and the extent of retrofitting actions conducted. Retrofitting a typical house to reduce damages from strong winds or floods may cost \$75,000 per home. In most cases retrofitting of a commercial building may be more costly. However, the proposed retrofits are generally technically feasible with high benefits and reasonable cost effectiveness. Due to the cost uncertainties and limited funding this activity is given a priority of 4.

7.B.4 Protect And Preserve Environmental Resources

Table 7-4 lists the proposed mitigation activities, objectives, priorities, hazards mitigated and the potential benefits to promote the goal of protecting and preserving environmental resources. These activities are discussed in the following sections.

7.B.4.1 Municipal Separate Storm Water Sewer System (MS4's), Storm Water Quality and Management Improvement Program

The MS4 activity is a Natural Resource Protection Action, whose objectives are to **“Improve and Maintain Water Quality”** and to **“Bring the Village into Compliance with New Storm Water Regulations”**. Secondary objectives include “Preserve Open Space”, “Control damage problems by planning” and “Control erosion and sediment deposition”. This action, which is currently in progress, is intended to respond to flood hazards resulting from hurricanes, nor'easters and other severe storms that may impact storm water discharges in the Village. The mitigation benefit to the Village will be the protection of human health, ecosystem integrity, better and more recreational opportunities and protection of our natural resources, through reduction of unintentional discharges and increased enforcement against illegal discharges.

Table 7-4. Proposed Activities to Protect and Preserve Environmental Resources

Action Type	Activity Item	Primary Objective	Priority	Hazards Mitigated	Benefits/Comments	Cost (\$1,000)
NR	MS4 Program Storm Water Quality Improvement	Maintain water quality.	1 (2)	Floods/Coastal Erosion/Epidemics	Required by NYSDEC regulations, Village compliance with new storm water regulations.	75
PM	Acquire easements from Suffolk Co. to improve drainage	Preserve open space.	2 (17)	Floods/Erosion	Protection of ecosystems, natural control of runoff, recreational opportunities, and reduction of discharges.	25
NR	Patchogue Lake Shoreline and Lake Front Property Restoration and Protection	Preserve open space.	3 (20)	Winter Storms/Floods	Control flooding and prevent soil erosion, protect wildlife habitat and water quality and improved recreation.	25
NR	Wetland and Habitat Conservation, Restoration and Protection	Protect the village wetlands.	4 (24)	Floods/Coastal Erosion	Control flooding and prevent soil erosion. Improved wildlife habitat and water quality.	15
PP	Waterway Maintenance and Dredging	Improve waterway drainage and value.	4 (26)	Floods/Erosion	Reduce boating hazards, reduce flooding, control sedimentation, improve marina access, and protect marinas.	4,000

*PM – Preventative Measures ES – Emergency Services
 PP – Property Protection SP – Structural Projects
 NR – Natural Resources PI - Public Information
 Activity may also meet other objectives.

Priority: 1 - High 4 - Medium Low Implementation ()
 Group 2 - Medium High 5 –Low Priority
 3 - Medium

This Program is intended to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality, and to satisfy the appropriate requirements of the Clean Water Act (CWA) in accordance with the EPA Phase II program. This program is intended to mitigate the following problems:

- The stressed condition of public bathing and recreational uses in Patchogue Bay due to the effects of storm water and urban runoff and recreational boating impacts.
- The impaired state of Shell fishing in the bay causing it to be restricted due to due to pathogens.
- The year round restrictions on fish consumption that apply to portions of the bay due to PCB contamination.
- The general advisory limiting consumptions of certain fish.
- The stressed state of Aquatic life support in these waters.
- The reduction of Pathogens, Priority Organics (PCB's/migratory fish), and Oxygen Demand, which are the priority pollutants.

To achieve the goals of this activity the following steps will be taken:

- **Public Education/Outreach.** The pollutant control measures will target homeowners, restaurateurs, industry and the general public. The plan has two major initiatives: the use of educational materials and the formation of partnerships with key sectors of the public.
- **Public Participation/Involvement.** Public meetings will provide an opportunity to discuss various viewpoints and provide input concerning appropriate storm water management policies and procedures.
- **Illicit Discharge Detection/Elimination.** The illicit discharge detection measure will involve both municipal staff and local citizens. The Village DPW will locate illicit discharge problem areas through public complaints, visual screening and dry weather screening methods and eliminate illicit discharges.
- **Construction Site Runoff Control.** The Village intends to adopt an Erosion and Sediment Control (ESC) Plan to reduce construction pollutants in its storm water runoff.

- **Post Construction Runoff Control.** The Village proposes to address the Post-Construction Runoff Measure with structural and non-structural procedures. The controls seek to reduce the amount of impervious cover on new residential and commercial construction by increasing natural lands set aside for conservation and to use pervious areas for more effective storm water management.
- **Pollution Prevention/Good Housekeeping.** The Village Pollution Prevention/ Good Housekeeping Measure for municipal operations program goal is to reduce pollutant runoff from municipal operations.

The initial setup and implementation of the MS4 program as outlined by the NYSDEC is an eight-year plan. The cost of this plan over the eight-year project is estimated at \$75,000.00. This cost includes both engineering, and Village administrative costs. This will however be an ongoing project. There are many tasks with in this project that will require continual attention to maintain the integrity of the systems put in place. This cost, both initial, and annual for maintenance, in consideration of the benefits to the environment and human health are considered to be low, and therefore gives this project a priority rating of 1. This plan also has long-term benefits, meets the STAPLEE criteria mentioned above, and is technically feasible. Potential funding would be from FEMA through SEMO, and DEC.

7.B.4.2 Acquire Easements from Suffolk County to Improve Drainage

The county currently owns several parcels of vacant land in the Village that could be acquired and maintained as buffer zones for flood control. This activity is a Natural Resource Protection Action, whose primary objective is to “**Preserve Open Space**”. Secondary objectives include “Manage storm water problems in flood prone areas”, “Improve and Maintain Water Quality”, “Protect Village Wetlands” and “Control erosion and sediment deposition”, “Protect new buildings and infrastructures”. Acquiring flood prone properties is a method of property protection. Building in these flood prone areas would not be permitted. Occasionally parcels in

the flood zone become available. Other public properties such as Town of Brookhaven parcels were recommended in the Patchogue River Maritime Center Plan for acquisition to develop into parks. The Village will pursue acquiring easements or properties to the extent parcels are available by donation, through grant funding or transfer from public ownership.

The Village needs to evaluate availability of vacant County properties regarding their value and benefit in meeting these goals. The acquisition is intended to respond to flood and storm hazards resulting in storm water discharges from the Village. The mitigation benefit to the Village will be protection or restoration of ecosystem integrity, natural control of runoff, recreational opportunities and our natural resources, through reduction of unintentional discharges and increased enforcement against illegal discharges.

The cost of the acquisition evaluation and plan is estimated at \$25,000. This cost includes field verification of their condition, legal fees, environmental evaluation, and assessment of their value. This estimate does not include the market value of the properties. This cost, compared to the environmental benefits is low, and therefore gives this project a priority rating of 2. This easement acquisition if implemented, has long-term benefits, meets the STAPLEE criteria mentioned above, and is technically feasible. Potential funding would be from FEMA through SEMO, and DEC.

7.B.4.3 Patchogue Lake Shoreline and Lake Front Property Restoration and Protection

Most of the wetlands surrounding Patchogue Lake are privately owned. Several parcels of wetland are governed by NYSDEC regulations and could be restored, protected and maintained as buffer zones for flood control. This activity is a Natural Resource Protection Action, whose primary objective is to “**Preserve Open Space**”. Secondary objectives include “Manage storm water problems in flood prone areas”, “Improve and Maintain Water Quality”, “Protect Village Wetlands” and “Control erosion and sediment deposition”. See also activity 7.B.4.4 on Wetland

Restoration and Protection below. The Village needs to evaluate and assess these properties along Patchogue Lake regarding their value and benefit in meeting these goals and the feasibility of restoring and protecting identified areas. However, private waterfront property costs are often prohibitive for a small community with a limited budget. Occasionally parcels in the flood zone become available. The Village will pursue land acquisition opportunities to the extent parcels are available by donation, through grant funding or transfer from public ownership.

The evaluation and assessment is intended to respond to flood and storm hazards resulting in storm water discharges from the Village. The mitigation benefit to the Village will be protection or restoration of ecosystem integrity, natural control of runoff and erosion, recreational opportunities and protection of natural resources such as wildlife and water quality through reduction of discharges.

The cost of the lake shore-line evaluation is estimated at \$25,000. This cost includes field verification of the extent of natural shore line properties and their condition, environmental evaluation, feasibility assessment of restoration, legal fees and an assessment of property value. This estimate does not include the market value of the properties. This cost, compared to the environmental benefits is considered to be low and the amount of natural shoreline is limited. Therefore this project is given a priority rating of 3. This activity if implemented, has long-term benefits, meets the STAPLEE criteria mentioned above, and is technically feasible. Public buy-in and resident approval will be necessary. Potential funding would be from FEMA through SEMO, and DEC.

7.B.4.4 Wetland and Habitat Conservation, Restoration and Protection

Limited wetland areas exist in the Village's along the shorelines of the Patchogue River, Great Patchogue Lake and West Lake. (See also activities above: 7.B.4.2 on open space acquisition and 7.B.4.3 Patchogue Lake shoreline.) NYS laws and regulations protect these wetlands. This activity proposes to develop and implement a program for the restoration where needed of

wetlands in the Village of Patchogue. This restoration will provide shoreline protection from erosion once it is completed and natural buffers for floodwaters. The Village plans to get various groups and government agencies interested in a process of restoration of these areas where appropriate.

This activity is a Natural Resource Protection Action, whose primary objective is to **“Protect the village wetlands”**. Secondary objectives include “Preserve Open Space“, “Manage storm water problems in flood prone areas”, “Improve and Maintain Water Quality”, “Protect Village Wetlands” and “Control erosion and sediment deposition”. The primary hazards for mitigation include floods and erosion. One of the key benefits of wetland restoration is that plants in the restored wetlands will help control erosion. Other benefits include improved wildlife habitat, water quality and controlled flooding.

The wetland restoration and protection will consist of preparing a Work Plan, wetland design, permit applications and plantings for wetlands restoration where needed. The planning will include an inventory of wetlands in the Village, a one-year period to collect baseline data and the development of a monitoring program.

The cost of Wetland Restoration and Protection program is estimated at \$15,000. This cost includes field verification of the extent of wetland properties and their condition, environmental evaluation, mapping, feasibility assessment of restoration and an assessment of property value. This cost, compared to the environmental benefits is considered to be low but the area of wetlands is limited and hence the total benefits are low. Therefore this project is given a priority rating of 4. This activity if implemented, has long-term benefits, and is technically feasible. Public buy-in and resident approval will be necessary. Potential funding would be from USEPA, NYSDEC and NYS Department of Parks

7.B.4.5 Waterway Maintenance and Dredging

This activity is a Property Protection Action, whose primary objective is to **“Improve waterway drainage and value”**. Secondary objectives include: “Improve and Maintain Water Quality”,

and “Control erosion and sediment deposition”. The primary hazards for mitigation include floods and erosion. Some key benefits include: reduce boating hazards, enhanced drainage of storm water, control of sedimentation, improved marina access, protection of marinas and improved water quality.

The US Army Corps of Engineers issued a public notice in 2004 for proposed maintenance dredging of the Patchogue River for the purposes of maintaining navigation. Dredging of the river last occurred in 1968. Erosion in some shoreline areas may be enhanced by dredging activities needed to maintain marine navigation and docking locations. However, an assessment is needed to determine current dredging needs and resolve issues with the public and the Village regarding what is needed and the extent of dredging. Locations use and maintenance of bulk heading and other hard shoreline features such as rip/rap, stone needs to be evaluated.

Patchogue River contains several boat docking areas including two ferry terminals and a fire boat dock. Due to the direction of the currents in the river silt and sandy materials tend to accumulate in various areas. Maintenance dredging of these areas is needed to ensure that proper navigational features are maintained and that adequate draft for marine vessels is provided. Adequate channel cross-sections must also be maintained to convey storm water discharges to the river and the bay while avoiding undue shoreline and streambed erosion. Therefore, prior to future dredging an evaluation should be performed of the areas to be dredged and the ultimate use and/ or disposal of the dredged material. The location, amount, and quality of dredged material to be removed and its ultimate destination and use needs to be evaluated. The feasibility of beneficial use of the dredged material for such uses as wetlands reconstruction, or use in the reconstruction and/or reinforcement of shoreline erosion areas need to be evaluated.

The cost of Waterway Maintenance and Dredging program is estimated at \$125,000.00. This cost of the program evaluation includes identification assessment of dredging needs, evaluation of dredged material uses and disposal, environmental evaluation, feasibility assessment and engineering evaluation, conceptual design and public and stakeholder participation activities and meetings. This cost does not include the actual cost for dredging the river which would be the

responsibility of the Corps of Engineers. The program cost, compared to the benefits to the river facilities is considered to be reasonable and hence the cost to benefits is acceptable. For these reasons this project is given a priority rating of 4. This activity if implemented, has long-term benefits, and is technically feasible. Public buy-in and Corps of Engineers approval will be necessary. Potential funding would be from USEPA, NYSDEC and US Army Corps of Engineers.