



TOWN OF OYSTER BAY FLOODPLAIN MANAGEMENT AND HAZARD MITIGATION PLAN

October, 1998

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TOWN OF OYSTER BAY

FLOODPLAIN MANAGEMENT AND HAZARD MITIGATION PLAN

I. Introduction

A. Town Profile

The Town of Oyster Bay is one of three large suburban towns and two small cities that encompass Nassau County. The Town is located in the eastern part of Nassau County. Its borders include Long Island Sound on the north and the Atlantic Ocean on the south. The Towns of Huntington and Babylon located in Suffolk County border the Town to the east, and the Towns of Hempstead and North Hempstead to the west. The entire Town covers an area of approximately 104 square miles and is located 50 miles from mid-town Manhattan. The population of the Town, excluding the Incorporated Villages is 292,657 (1990 Census). There are 16 incorporated villages within the Town, each of which is an independent municipality with its own governing body and independent land-use and regulatory powers. The incorporated Villages constitute 43% of the land with the remaining 57% of the unincorporated area in the Town of Oyster Bay.

The Town contains 75,263 acres of land, approximately half of which is zoned residential. The predominant land use is single-family detached housing typical of post World War II suburban development. Over 85% of the Town residents reside in single family housing.

The Town is governed by a seven (7) member Town Board responsible for municipal services in the areas of highway and sanitation, environmental control, planning and community development, community services, parks and recreation. The Town Division of Highways maintains over 700 lane miles of roads; many of which are located in the high flood prone areas of the Town. There are some roads not located in these high flood prone areas exhibiting poor or antiquated drainage systems that are subject to dangerous flooding conditions as a result of severe storms. In addition, there are many county-owned and state roads maintained by their respective governments also located in the Town and will be discussed in the plan. Similarly, the Town Department of Parks and Recreation administers an extensive park and recreation system that includes almost 1,500 acres of land dedicated for the active and passive recreation needs of the residents. This includes nine (9) beaches and marinas that are in immediate danger to disasters or flooding conditions. There are eighteen (18) Town parks and over 150 parklets, many of which are located in areas effected by storms and floods.

One of the most important areas in the Town where storm and flood damage has been persistent over the years is located in Massapequa. This area borders on South Oyster Bay to the south, Merrick Road to the north, the Town of Hempstead line to the west and the Suffolk County line to the east. The population of this area of the Town (excluding the Village of Massapequa Park) is 18,608 (1990 Census). This area contains 925 housing units. At least 75% of these units are located in flood zone 'A' as indicated by the Flood Insurance Rate Map (FIRM).

B. Background and Purpose

The purpose of this plan is to identify the Town's flood hazards and recommend solutions to mitigate damage from future storms so as to protect both public and private resources within the Town. The Town has experienced disasters resulting in huge expenditures of both public and private funds, including federal and state funds, in repairing and rebuilding facilities severely damaged as a result of hurricanes, nor'easters, and floods.

As a result of federal requirements and state mandates, in the mid 1970's, the Town Attorney's office drafted a floodplain ordinance. This ordinance, which was adopted on July 25, 1978, allowed Town residents to participate in the national flood insurance program. Residents throughout the Town, especially those that lived in high flood prone areas were able to purchase flood insurance through the federal government or private companies authorized by the Flood Insurance Administration (FIA) in order to cover their properties during future storms. Town residents have received \$11,460,681.00 over 1,295 claims since 1978. The Town Board, recognizing that these costs to both public and private property are exorbitant, views mitigation measures as a solution in lessening these damages and hardships for our residents. The plan is intended to identify problems, define solutions, and recommend specific activities with the ultimate goal of reducing the fiscal burden and human hardship as a result of natural disasters.

The plan encourages property owners in the flood insurance program to initiate mitigation measures to their properties upon availability of federal funding. This funding may finance 75% of the project cost while the property owner must finance the remaining 25% matching share. The municipal projects listed in section VIII Action Plan are contingent upon the availability of federal and/or state funding, and further engineering feasibility studies. It is important to note that additional projects may be included by amending the plan.

This document has also been prepared to qualify as a "floodplain management plan" under the Community Rating System (CRS) of the National Flood Insurance Program (NFIP).

The Town intends to apply for participation in the CRS and hopes to receive maximum credit for the plan. Along with the plan, the Town will implement other activities which go beyond the minimum NFIP requirements. Through the CRS, residents of the Town will consequently see a reduction in their flood insurance premiums as well as increased property and personal protection.

II. Planning Committee

The Town Board, recognizing that it could institute a program by drafting an action plan in order to address storm and flood related issues, passed a formal resolution on February 24, 1998 creating a Hazard/Flood Mitigation Planning Committee. The function of the Committee was to pool resources among various Town departments and personnel to compile a Floodplain Management and Hazard Mitigation Plan.

The Floodplain Management and Hazard Mitigation Committee was chaired by a Town Planner and included representatives from various Town Departments including the Departments of Public Works, Parks, General Services, Intergovernmental Affairs, Planning and Development, and the Town Supervisor's office. Interested citizens also served on the Committee and offered first-hand experience with storm and flood problems. The Committee met on a bi-monthly basis and members were responsible for supplying information to the project consultant, Sidney B. Bowne & Son, LLP.

Individual members of the committee were as follows:

Gary Pappas, Planner – Deputy Commissioner, Town of Oyster Bay DPW
Richard W. Lenz, P.E. - Deputy Commissioner – Town of Oyster Bay DPW
John Tassone - Town of Oyster Bay Engineering Division
Guy Memoli - Town of Oyster Bay General Services
Louis Miritello - Town of Oyster Bay Engineering Division
Chester Kelsey, P.E., L.S. - Sidney B. Bowne & Son
Barry Bree - Town of Oyster Bay DPW Emergency Management Coordinator
Richard Pfaender - Town of Oyster Bay Supervisors Office
Larry Fitzgerald, Supt. of Beaches - Town of Oyster Bay Parks Department
Robert Dwyer - Town of Oyster Bay Highway Division
Jon Klein - Town of Oyster Bay – Department of Intergovernmental Affairs
Louis C. Warner, Jr. - Town of Oyster Bay Planning & Development
Director of Nassau County Emergency Management Office or his designee
President of the Nassau Shore Civic Association or his designee
President of the Old Harbor Green Civic Association or his designee
President of the Breezy Point Civic Association or his designee
Radworth E. Anderson - State Emergency Management Office
Associate Planner/Manager, Community
Mitigation Programs

Mr. Anderson served in an advisory capacity and was especially instrumental in providing guidance to the committee. As an advisor he was always available for helping the committee when needed.

Committee members representing the public provided information from residents relating to various flooding problems. (See letter dated April 3, 1988 in Appendix.)

The committee met on:

February 23, 1998
March 10, 1998
March 24, 1998
April 2, 1998
April 24, 1998
May 29, 1998
August 12, 1998
October 21, 1998

The purpose of the August 12, 1998 meeting by the full committee was to review and discuss the first draft plan.

The purpose of the October 21, 1998 meeting by the full committee was to review and discuss the second draft plan.

Sub committee meetings were held on:

April 13, 1998
June 15, 1998
July 1, 1998
July 10, 1998
August 11, 1998

III. Coordination With Other Agencies

In an effort to obtain as much information as possible, such as flood hazard data, technical information on various measures, guidance on regulatory requirements, advice and assistance in the planning effort, the following outside agencies were contacted by letter and invited to submit comments:

New York State Sea Grant Extension Program
3029 Sound Avenue
Riverhead, New York

Edward E. Wankel, Deputy Commissioner
New York State Office of Parks, Recreation and Historic Preservation
Belmont Lake State Park
P.O. Box 247
Babylon, New York 11702-0247

Mr. Ray Cowan, Regional Director
New York State Department of Environmental Conservation
Building 40
State University of New York
Stony Brook, New York 11790

Mr. George Stafford, Director
New York State Department of State
Division of Coastal Resources and Waterfront Revitalization
41 State Street
Albany, New York 12233

Mr. Rod McNeil
c/o South Shore Estuary Study
New York State Department of State
Division of Coastal Resources and Waterfront Revitalization
41 State Street
Albany, New York 12233

United States Coast Guard
300 E. Main Street, Suite 800
Norfolk, Virginia 23510

United States Department of the Army
Corps of Engineers
North Atlantic Division
90 Church Street
New York, NY 10017

John M. Waltz, P.E., Commissioner
Nassau County Department of Public Works
Mineola, New York 11501-4822

New York State Division of Military and Naval Affairs
330 Old Niskayuna Road
Latham, New York 12110-2224

Mr. Craig Siracusa, P.E., Regional Director
New York State Department of Transportation
Region 10
State Office Building
Veterans Memorial Highway
Hauppauge, New York 11788-5518

Mr. Vincent Vario, Chairman
Nassau County Soil and Water Conservation District
1425 Old Country Road
Building J
Plainview, New York 11803

Mr. Paul F. Ponessa, Planning Director
Nassau County Planning Commission
400 County Seat Drive
Mineola, New York 11501

During the course of preparing this plan, there were personal meetings with the following agencies:

- ◆ New York State D.E.C., Bureau of Flood Protection
- ◆ Nassau County Soil and Water Conservation District
- ◆ U.S. Army Corps of Engineers, New York District
- ◆ New York Sea Grant
- ◆ Town of Hempstead, Department of Conservation and Waterways
- ◆ U.S. Department of Interior, Geological Survey
- ◆ Nassau County Emergency Management Office

IV. Hazard Assessment

A. Floodplain Maps

The scope of this report extends to six separate study areas that comprise the flood plain in the unincorporated portion of the Town of Oyster Bay. Four areas are located on the north shore and two areas are located on the south shore.

The Key Map on the following page shows the locations of the six study areas as follows:

south shore	Massapequa Barrier Beach
north shore	Oyster Bay Hamlet Stehli Beach Center Island Beach Tappen Beach

There is a map for each area which identifies the floodplain as well as topographical features such as buildings, roads, and ground elevations.

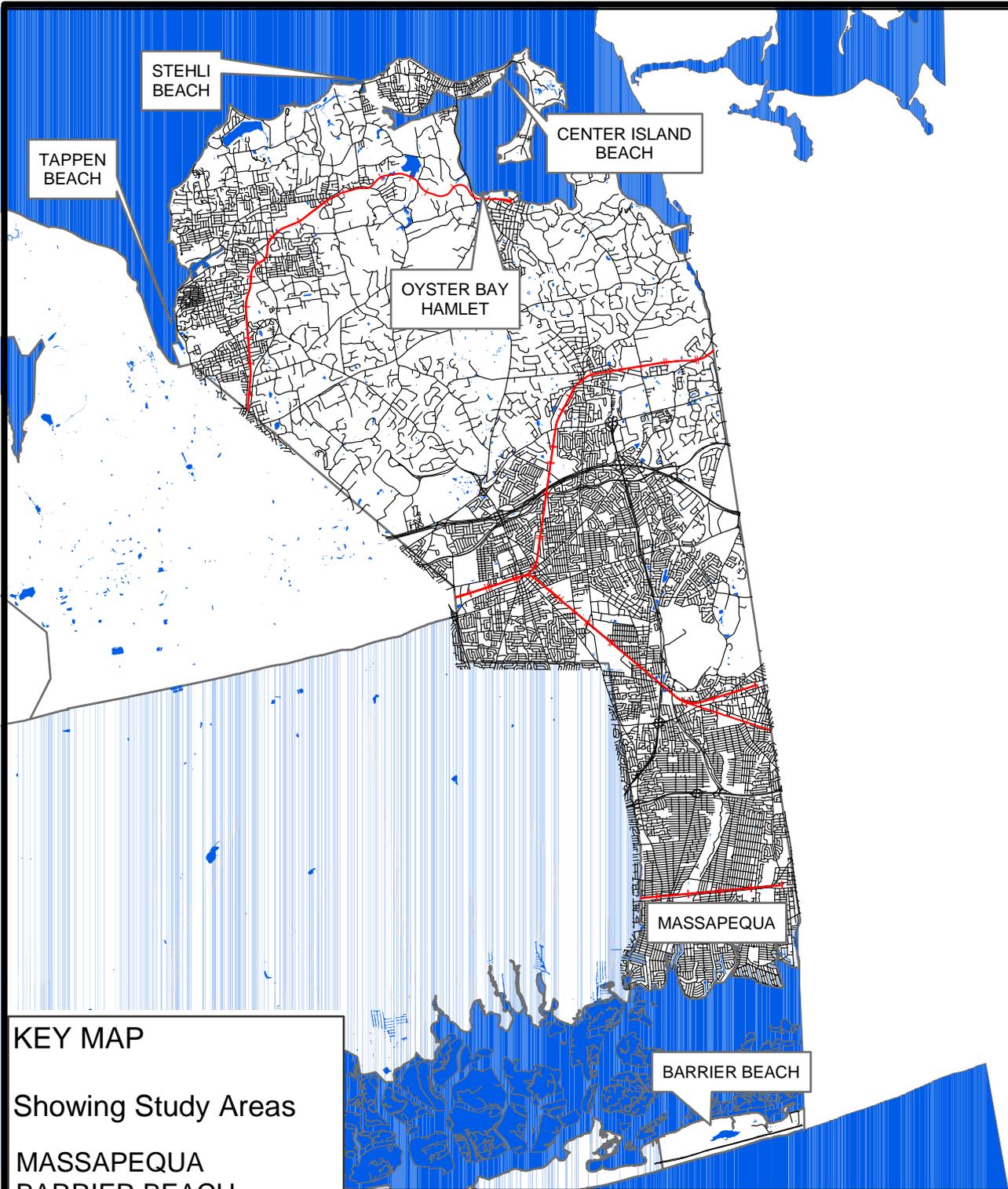
The floodplain has been identified through the use of Flood Insurance Rate Map (FIRM) studies that predict the Special Flood Hazard Areas inundated by the 100 year storm tide with added wave effects.

The FIRM designates two types of floodplain: A-Zone and V-Zone. The A-Zone is determined by the 100 year stillwater with added wave heights of less than 3 feet.

The V-Zone is determined by the 100 year stillwater with added wave heights of more than 3 feet. The V-Zone is the coastal high hazard, and most dangerous.

The maps are color-coded to illustrate the various FEMA flood zones which are defined as follows:

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AES	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE VE	Coastal flood with velocity hazard (wave action); base flood elevations determined.
ZONE X	Areas determined to be outside 500-year floodplain.
ZONE XS	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.



KEY MAP

Showing Study Areas

- MASSAPEQUA
- BARRIER BEACH
- OYSTER BAY HAMLET
- STEHLI BEACH
- CENTER ISLAND BEACH
- TAPPEN BEACH



Keymap

Town of Oyster Bay
Floodplain Management
and
Hazard Mitigation Plan

STUDY AREAS

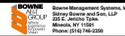


Town of Oyster Bay



Geographic Information System

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Original Date: October 21, 1998 Revised: January 15, 2003



B. Floodplain Topography

North Shore

The north shore of the Town of Oyster Bay borders the Long Island Sound and is, in large part, comprised of seven incorporated villages, which are **not** included in this report.

There are four separate areas in the unincorporated Town of Oyster Bay that are located in the Special Flood Hazard Area:

Oyster Bay Hamlet (see map)

Oyster Bay Hamlet is comprised of essentially open space area used for public access. The area includes Beekman Beach; Jakobson Shipyard, a 6-acre parcel now abandoned; former Capone property, a 2.5 acre parcel now vacant; and a 42-acre waterfront park, known as Roosevelt Memorial Park.

Other upland uses include a few waterfront homes and a mixture of commercial uses. In addition there is a Sewage Treatment Facility, and the Commander Oil Terminal.

The flood zones are comprised of VE with a base flood elevation of 15 and AE with a base flood elevation of 13 as well as zone X.

Center Island Beach (see map)

Center Island Beach, also known as Goose Point Park, is a Town-owned waterfront park located at the east end of Bayville peninsula. The primary facility is a bathing beach approximately 2600 feet long with two beach houses. Flood Zones are comprised of VE base flood elevations of 14 and 17, and AE with baseflood elevation 13.

Stehli Beach (see map)

Stehli Beach is a Town-owned facility located west of Bayville Avenue, Locust Valley adjacent to the Mill Neck Preserve. Ransom Beach, which is adjacent to Stehli Beach, is located in the incorporated Village of Bayville but under Town control. The total beach area is approximately 3400 feet long with a concession building and maintenance building. The Flood Zone is AE with a baseflood elevation of 13 feet.

Tappen Beach (see map)

Tappen Beach is a Town owned facility located in Hempstead Harbor along the west side of Shore Road, just south of the Village of Sea Cliff. The facility consists of a beach area approximately 2400 feet long, a marina with 272 slips, a marina building, beach house and pool house. The Flood zone is AE with a base flood elevation of 13 feet.

South Shore

The floodplain area in Massapequa is significantly larger than all the areas on the north shore combined and is shown on four maps. (Massapequa Maps 1 through 4)

The special flood hazard area in Massapequa, excluding the incorporated Village of Massapequa Park, contains approximately 1379 acres, ninety percent of which consists of single family residences.

The area contains various parks and a small beach at the foot of Florence Avenue.

This upland area is essentially flat. Elevations generally range from 4 to 9 feet above mean sea level. However there are a few areas that are lower as well as higher than this range.

Generally the East Massapequa areas, particularly Breezy Point, are in the lower range of elevations, 3.5 to 6 feet.

Another low-lying area is along Alhambra Road between the Massapequa River and Grand Canal, where elevations range from 4 to 6 feet.

Erosion protection for waterfront properties consists of timber bulkheads and seawalls, which average 2 - 3 feet above mean high tide.

There is approximately 2.8 miles of oceanfront on Jones Island within the Town of Oyster Bay. This barrier beach and dune formations are predominant natural features along the Jones Island oceanfront with extensive tidal wetlands in the back bay area.

This island which is in the V-zone is entirely publicly owned and has been developed primarily for recreational use.

The northern portion of the island contains a 550-acre wildlife sanctuary and the southern portion, a public bathing beach.

Tobay Beach and Tobay Boat Basin are situated at the east end of the island together with eight buildings consisting of a pavilion, concession buildings, marina building and maintenance buildings.

The crest of the island, which is generally along the paved Ocean Parkway, averages between 14 and 15 feet above mean sea level.

C. Flood Producing Storms

HURRICANES

Hurricanes originate principally during the months of August, September, and October in the belt of equatorial calms in the Caribbean area and in the vicinity of the Cape Verde Islands. Hurricanes are those tropical cyclones, which have a central barometric pressure of 29.0 inches or less of mercury and wind velocities of 75 miles per hour (65 knots), or more.

The winds frequently weaken to velocities on the order of 60 miles per hour upon reaching the North Atlantic coast. The revolving winds within the hurricane blow in a counter-clockwise direction about an eye or calm center. Diameters of storms vary from 50 to over 500 miles with wind velocities greatest near the eye and decreasing to relatively light winds at the outer periphery.

The hurricanes move forward at a moderate speed, usually 25 to 30 miles per hour, as they approach the Long Island coast, although at times the forward speed may reach 60 miles per hour. In most cases the hurricanes have moderated considerably from their peak intensity before reaching Long Island; however, a number of exceptions have occurred in which hurricanes of devastating intensity have struck the area.

Hurricanes are classified in accordance with the Saffir-Simpson Scale which estimates the destructive forces associated with hurricanes. Table I shows these classifications and associated potential destruction relating to the south shore of Long Island.

NORTHEASTERS

Northeaster is the term given to an extratropical cyclone, which develops near the Atlantic Coast of North America. The wind velocities are generally not as high and the center pressures are not as low as in a hurricane. The wind field of a northeaster is generally less symmetrical than in a hurricane, covers a greater area, and has a slower forward motion that may even cease.

Thus, while the intensity of a northeaster is generally less than that of a severe hurricane, its period of activity tends to be longer. The prolonged periods of onshore winds may result in longer periods of flooding and therefore in more severe tidal flooding of the Hempstead Bay and south Oyster Bay areas behind Long Beach and Jones Beach barrier islands.

◆ **STORM SURGE**

The storm surge is the rise in sea level due to the action of wind stresses on the ocean water surface and additionally, in the case of hurricanes, the rise in water level due to atmospheric pressure reduction. The storm surge has periods extending into hours but normally does not go through more than two or three tidal cycles. The peak of the storm surge may occur at any time during the astronomic tidal cycle. Thus, the sum of the storm surge and the elevation of the corresponding astronomic tide give the elevation of the storm tide.

◆ *DURATION*

The duration of the tide-producing storm is important, especially in the Hempstead Bay and South Oyster Bay areas. The height of the storm tide in the bay area is dependent on the height of the tide on the Atlantic Ocean side of the barrier islands, the duration of the storm tide, the number and size of waterway openings from the Atlantic Ocean into the bay area, and the water area, and therefore the volume, available in the various bay areas for storing the inflowing volume of storm tide waters.

Water flowing from the Atlantic Ocean into the bay areas passes through the East Rockaway Inlet and Jones Inlet and, during periods of extremely high tides, additional water may flow directly over the Long Beach Barrier Island into the bay area.

The South Oyster Bay area has relatively larger water areas available for the storage of tidal flows than the westerly Hempstead Bay areas, with the result that storm tide levels in the easterly South Oyster Bay areas are generally lower than in the westerly Hempstead Bay areas.

For a given storm tide in the Atlantic Ocean, other factors remaining constant, the tide levels in the Hempstead Bay and South Oyster Bay areas will be higher for a long duration storm and relatively lower for a rapidly peaking, short duration storm tide.

Another factor in the final storm ocean tide height is the relative timing of the peak of the tidal surge and the predicted astronomic tide. If the peak of the tidal surge produced by a given storm coincides with the astronomic high tide, the resulting storm tide will be far greater than if the tidal surge peak, at the other extreme, occurs at the time of low astronomic tide.

Floods caused by hurricanes are usually of much shorter duration than ones caused by northeasters. Flooding from hurricanes rarely lasts through one tidal cycle, while flooding from northeasters has been known to carry through as many as five tidal cycles.

TABLE 1***The Saffir/Simpson Hurricane Scale***

Category 1	Winds of 74 to 95 mph. Damage primarily to shrubbery, trees, foliage, and unanchored mobile homes. No real damage to other structures. Some damage to poorly constructed signs. And/or: storm surge 4 to 5 feet above normal. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.
Category 2	Winds of 96 to 110 mph. Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roofing materials of buildings; some window and door damage. No major damage to buildings. And/or: storm surge 6 to 8 feet above normal. Coastal roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying island areas required.
Category 3	Winds of 111 to 130 mph. Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Mobile homes destroyed. And/or: storm surge 9 to 12 feet above normal. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Flat terrain 5 feet or less above sea level flooded inland 8 miles or more. Evacuation of low-lying residences within several blocks of shoreline possibly required.
Category 4	Winds of 131 to 155 mph. Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows and doors. Complete failure of roofs on many small residences. Complete destruction of mobile homes. And/or: storm surge 13 to 18 feet above normal. Flat terrain 10 feet or less above sea level flooded inland as far as 6 miles. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Major erosion of beaches. Massive evacuation of all residences within 500 yards of shore possibly required, and of single-story residences on low ground within 2 miles of shore.
Category 5	Winds greater than 155 mph. Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. And/or: storm surge greater than 18 feet above normal. Major damage of lower floors of all structures less than 15 feet above sea level within 500 yards of shore. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required.

D. Potential for Future Storms

The National Weather Service has done a study of the frequency of storms in the Atlantic Area.

Utilizing statistical data on the motion of tropical storms in the Atlantic Area, the National Weather Service calculated the expected numbers of tropical storms and hurricanes per 100 year period impacting various locations along the eastern coast.

The data show that these occurrences are greater in the eastern portion of Long Island than the western portion which includes Nassau County.

The results of this study for the Oyster Bay area are as follows:

Expected No. of Tropical Storms/100 Years	Expected No. of Hurricanes/100 Years	Probability of at Least One Tropical Storm Over a 10 Year Period	Probability of at Least One Hurricane Over a 10 Year Period
19	7	0.85	0.50

Damaging tidal floods occur along the South Shore of Nassau County at a rate of about five every four years. In any given year there may be none, one or several such storm tides but the average rates are about 1.25 damaging floods per year.

E. Flood History

The following is a brief description of some significant tropical storms.

September 21, 1938: This hurricane caused severe damage due to flooding in most coastal areas. Wave heights averaged between 10 to 12 feet along the south shore. Tide in Massapequa reached elevation 8.0 (5.5 feet above normal high tide)

November 25, 1950: This northeaster caused 20 foot high waves in Jones inlet. Tides in Massapequa reached elevation 8.2. (5.7 feet above normal high tide)

August 31, 1954: Hurricane Carol caused 14 foot waves and wind speeds up to 125 miles per hour. Tides in Massapequa reached elevation 6.0. (3.5 feet above normal high tide)

September 12, 1960: Hurricane Donna had wind gusts of 97 miles per hour. There were some evacuations in Amityville. Tides in Massapequa ranged from elevation 6.1 to 7.3. (3.6 and 4.8 feet above normal high tide)

March 6-7, 1962: This northeaster caused extensive damage to the barrier beach. Ocean waves reached 20 to 30 feet high. Long Island was declared a disaster area. Tides in Massapequa reached elevation 6.5. (4 feet above normal high tide)

August 9-10, 1976: Hurricane Belle struck on a falling tide. Little coastal flooding and damage was reported. Wave heights were only 3 feet.

March 28-30, 1984: This northeaster produced 20 foot wave heights and Nassau and Suffolk Counties were declared disaster areas. Tide in Massapequa reached elevation 5.0 (2.5 feet above normal high tide)

September 27, 1985: Hurricane Gloria caused extensive damage, particularly to the barrier beach, the Town of Oyster Bay's beach pavilion was substantially destroyed by wave action and high winds.

December 10, 1992: This northeaster produced 14 foot waves. Inland areas received on to two feet of snow while coastal areas received two to four inches of rain and high tidal surges. Wind speeds at Tobay Beach reached 80 miles per hour. Tides in Massapequa reached elevation 6.2. (3.7 feet above normal high tide)

F. Beach Erosion

The barrier beach in the Town of Oyster Bay is of a middle section of Jones Island starting at the east end of parking lot 6 at Jones Beach State Park, extending easterly to the Suffolk County line.

This segment of Jones Island, known as Tobay Beach, is approximately 2.8 miles long by 0.6 miles wide. The public bathing beach is located along the south side of Ocean Parkway. The Tobay Beach parking lot, containing approximately 2500 parking spaces is located on the north side of Ocean Parkway with three underpasses providing pedestrian access to the ocean shorefront.

There are a total of eight buildings situated at the east end of Jones Island. One building, the Tobay Beach pavilion, is located on the beach on the south side of Ocean Parkway. The others are located on the north side of the road.

In addition there are three wells for potable water located at Tobay beach. Two wells are located on the south side of the road on the beach. The third well is located on the north side of the road within a building that houses the filtration and chlorination systems for all wells in addition to the hydropneumatic tanks.

This barrier beach area is designated on the FIRM as a Coastal High Risk Zone (VE-Zone) with base flood elevations from 9 to 14 and is very susceptible to erosion by wind and waves.

A notable example occurred on September 27, 1985 when Hurricane Gloria caused extreme beach erosion and substantially destroyed the pavilion. The pavilion was subsequently reconstructed at the same location seaward of Ocean Parkway.

G. Extent of Storm Surge

Flooding is not limited only to those areas within the Special Flood Hazard Area. According to the New York State Hurricane Evacuation Study, storm surges can reach areas well beyond the floodplain. These areas are shown on the Storm Surge Map as follows:

Hurricane Category 1-2 - surge area can reach Merrick Road

Hurricane Category 3 - additional area can reach Sunrise Highway

Hurricane Category 4 - additional area can reach half-way between
Sunrise Highway and Southern State Parkway

V. Problem Assessment

HAZARD AREA INVENTORY

North Shore

According to the “*Oyster Bay/Cold Spring Harbor Complex Harbor Management Plan*” prepared by Cashin Associates for the Town of Oyster Bay dated September 1997, the Special Flood Hazard Areas along the north coast contain a variety of land uses:

Oyster Bay Hamlet (see map)

- ◆ approximately 40 waterfront homes, to the east of Whites Creek;
- ◆ a vacant lot on the southeast side of Bayview Avenue to the south of Oysterman’s Dock, which is being used for the storage of construction equipment and supplies;
- ◆ a mixture of commercial uses on the northwest side of Bayview Avenue including a contracting company, a plumbing parts company, a lumber yard, a site that appears to be used as a recyclables transfer station, and a landscaping business - all of these uses are located inland of the deteriorated, waterfront property;
- ◆ a Town of Oyster Bay highway yard on Lake Avenue on the west side of Mill Pond.

Stehli Beach Area (see map)

- ◆ The Beaver Dam Winter Sports Club, Inc., a private recreational facility at the southern end of Beaver Lake in the Locust Valley Southeast area;
- ◆ Approximately 30 homes in the Locust Valley Northeast area, on the west side of Oak Neck Creek, interspersed with a few vacant lots;
- ◆ The Tides Motel, at the northerly end of the Oak Neck Creek wetland, in the Locust Valley Northeast area;
- ◆ The Mill River Rod and Gun Club, Inc., a private recreational facility on the north shore of Oyster Bay Harbor in the Bayville (unincorporated) area.

Tappen Beach Area (see map)

- ◆ This area is zoned marine commercial and contains a variety of related uses along Shore Road, Glenwood Landing on the east side of Hempstead Harbor such as: the Town-owned Tappen Beach Marina; the KeySpan natural gas facility; Glen Marine, a private marine facility, currently vacant; the Mobil Oil Terminal; and Powerhouse Park, a small Town-owned waterfront park located at the foot of Glenwood Road, Glenwood Landing.

Commercial Marinas and Boatyards:

- ◆ Oyster Bay Marine Center is a private facility in Oyster Bay Hamlet just west of the sewage treatment plant. The Marine Center has approximately 31 ships for docking boats and maintains 10 moorings in the harbor.
- ◆ Sagamore Yacht Club is located in Oyster Bay Hamlet, just west of the Marine Center. The club maintains a 90 foot long dock and a 70 foot long dock used to tie up boats and dinghies, and 15 moorings in the harbor for guest use.
- ◆ Roosevelt Marina is located in Oyster Bay Hamlet in the eastern portion of Roosevelt Memorial Park. The facility has slips for 100 vessels of various lengths.
- ◆ Jakobson Shipyard is located in Oyster Bay Hamlet. This facility, which is presently closed, was acquired by the Town of Oyster Bay and the State of New York in August 1997.
- ◆ Mill Neck Bay Marine Service is located on Oak Neck Creek at the end of Hernan Avenue in Locust Valley. The services provided by this facility include vessel launching and dry storage for 180 vessels.
- ◆ Frank M. Flower and Son Oyster Company, located in Oyster Bay Hamlet provides docking for the company's six vessels which are used for harvesting shell fish from underwater land leased from the Town.
- ◆ **Critical Facilities:**
 - ◆ Sewage Treatment Plant is operated by an independent public agency not under Town control. It is located just east of Roosevelt Memorial Park and discharges treated wastewater approximately 1000 feet offshore.
 - ◆ Commander Oil Terminal is located in the eastern section of Oyster Bay Hamlet. This facility receives a variety of refined oil products via water-borne transport, which are transformed from fourteen on-site above ground storage tanks to trucks for local delivery.
 - ◆ Mobil Oil Terminal is located on Shore Road, Glenwood Landing on the east side of Hempstead Harbor. This facility receives predominantly gasoline from barge transport which is stored in seven above ground tanks.
 - ◆ Long Island Lighting Company natural gas facility is located on Shore Road, Glenwood Landing on the east side of Hempstead Harbor south of the Tappen Marina.
 - ◆ Bayville Bridge is a County owned bridge which was last reconstructed in 1991. The horizontal width is 76 feet and vertical clearance is 9 feet at normal high tide.

Tides for the north shore waterfront are as follows:

Mean High Water elevation +7.6 Feet
Mean Low Water elevation +0.3 Feet
Mean Higher Water elevation +7.9 Feet
Extreme Low Water elevation -3.5 Feet

HAZARD AREA INVENTORY**South Shore**

The Special Flood Hazard Area in Massapequa along the south shore coast in Oyster Bay is comprised of 1379 acres in the A-Zone and 2406 acres in the V-Zone for a total of 3785 acres.

The A-Zone comprises approximately 3500 properties which contain predominantly single-family homes. The population in the Special Flood Hazard Area is approximately 13,000.

According to the 1984 “Hurricane Damage Mitigation Plan for the South Shore” prepared by the Long Island Regional Planning Board, the land use for the unincorporated area in Oyster Bay is as follows.

Land Use	A-Zone Acres	V-Zone Acres
Residential (total)	1222	0
Low Density	0	0
Medium Density	545	0
Intermediate Density	611	0
High Density	66	0
Commercial	17	0
Marine Commercial	8	0
Transportation	0	0
Utility & Communication	0	0
Institutional	34	0
Recreation	93	2406
Agriculture	0	0
Vacant	5	0
Total Acres	1379	2406

There are 5 marine commercial establishments, which accommodate 457 berthing slips for a variety of boats.

◆ **Critical Facilities:**

There are no critical facilities in Massapequa within the Special Flood Hazard Area such as hospitals, nursing homes, fire stations, chemical storage, and petroleum storage.

There is a two-lane bridge on Lincoln Avenue over Yacht Channel leading to Breezy Point. This bridge was recently reconstructed and is elevated well above the flood plain.

However, there are critical facilities within the Storm Surge Area such as the Massapequa Fire House located south of Merrick Road; Massapequa High School, Parkview Nursing Home and the Town of Oyster Bays' Carman Mill Road Highway yard, all located north of Merrick Road.

1. **Tidal Flooding**

The most flood-prone area in the Town, where storm and flood damage has persisted is located in Massapequa, especially in Breezy Point, as well as in other areas.

The flood-prone areas are adjacent to canals where drainage outfalls are located. Maps 1 through 12, in the Appendix, show the location of the Town's 155 outfalls which are numbered sequentially from west to east.

During periods of higher-than-normal high tides, canal water backs up into the outfalls, through the drainage pipe, up into the street inlet, and out into the street thereby flooding the street and adjacent properties.

Sometimes during extreme high tides, water from the canal can also rise above the bulkhead and inundate the property directly.



Tidal Flooding at Breezy Point, Massapequa

The frequency and severity of these tidal flooding events was determined by analyzing data from a tide gauge located in Seaford immediately adjacent to the westerly border of the Town of Oyster Bay.

This tide gauge, which continually records water levels has been maintained by the Town of Hempstead at this location for 18 years. The mean high tide for this location is elevation 2.5.

Data was analyzed to determine the number of times, in a given year, that water levels reached incremental ranges above mean high tide elevation 2.5.

The incremental ranges were:

Elevation 3.0 to elevation 3.5,
Elevation 3.6 to elevation 4.0,
Elevation 4.1 to elevation 4.5,
and elevation 4.6 and above.

The table below illustrates the number of yearly occurrences in each tidal range above mean high tide elevation 2.5:

	TIDAL RANGE			
	Elev. 3.0 To Elev. 3.5	Elev. 3.6 To Elev. 4.0	Elev. 4.1 To Elev. 4.5	Elev. 4.6 To Above
1987	90	3	0	1
1988	74	2	1	0
1989	63	11	2	0
1990	58	3	2	0
1991	87	10	0	1*
1992	76	3	2	4**
1993	109	9	1	1
1994	49	4	1	0
1995	100	12	4	0
1996	126	18	3	2***
1997	142	27	2	0

*Elevation 5.5 on 10/31/91

**Elevation 6.2 on 12/11/92

Elevation 5.0 on 12/12/92

Elevation 4.8 on 12/13/92

Elevation 4.6 on 12/14/92

***Elevation 5.2 on 10/19/96

a) Tidal Check Valves

To mitigate the tidal flooding problem, the Town installed tidal check valves, devices which prevent the intrusion of tide water through the drainage system, at the following locations:

1. Westerly Dead End at Orlando Street*
2. Dead End of Neptune Place
3. House No. 240 East Shore Drive
4. Intersection of Cedar Shore Drive and Sunset Blvd.
5. Intersection of Exeter Road and Bay Drive
6. Westerly Dead End of Exeter Road
7. Intersection of Fairview Road and Gloucester Road
8. Intersection of Cabot Road and Bay Drive
9. Vicinity of Kydd's Marina; South End of Alhambra Road*
10. House No. 62 Alhambra Road*
11. Westerly Dead End of Jefferson Place

*These Tidal Check Valves are functioning properly but did not solve the problem.

In addition, on behalf of the Town, Sidney B. Bowne & Son conducted a study entitled "Feasibility Study for the Installation of Tidal Check Valves at Various Locations in Massapequa, New York," Contact No. DR96-671, dated January 29, 1998.

This study was initiated to investigate the suitability of 26 of the Town's storm drainage outfalls in Massapequa for the installation of tidal check valves. The intent of the study was to produce a prioritized list of candidate sites where tidal check valve installation will result in the increased protection from reoccurring tidal flooding of Town roadways and adjacent private properties that is specifically caused by the intrusion of tide water through the storm drainage system.

The 26 locations are as follows:

<u>Site Number</u>	<u>Location</u>
4	Dead End of Cleveland Place
5	Dead End of Harrison Place
8	Dead End of Lincoln Place
13	Dead End of Jetmore Place
38	10 Division Avenue
51	45 Park Lane

<u>Site Number</u>	<u>Location</u>
53	99 Beach Road
58	7 Sea Breeze Road
59	34 Sea Breeze Road
60	17 Granada Place
61	16 Sutton Place
66	194 Biltmore Boulevard
67	304 Bayview Avenue & 10 Cabot Road W.
109	Dead End of Seneca Place
110	135 West Shore Road
117	60 South Bay Drive
118	43 Leewater Avenue
119	94 Leewater Avenue
120	33 Stillwater Avenue
121	45 Stillwater Avenue
123	135 Stillwater Avenue
126	Dead End of Harbor Place
128	Dead End of Iroquis Place
131	16 Carman Avenue
143	Dead End of Clocks Boulevard
145	370 Clocks Boulevard

In order to determine the effectiveness of a tidal check valve installation, a detailed field investigation was performed for each site.

This was necessary because topographical features, which are factors in evaluating the suitability of tidal check valves, are different at each site.

The elevation of the lowest inlet at a drainage system is an indication of the frequency that flooding can be expected to occur at that location, the lower elevations naturally being prone to flooding with greater frequency. Since the intent of any tidal check valve installation is to reduce tidal flooding, those locations with the lowest inlet elevations received a higher priority rating.

As a result of this study, all 26 sites were found to be suitable and a priority order was established in the report.

A quick analysis of how frequently these 26 sites are flooded can be made by simply referring to the table on page 22 regarding yearly occurrences in each tidal range.

Of these 26 sites, eleven (11) are in range elevation 3.0 to 3.5, nine (9) are in range elevation 3.6 to 4.0 and six (6) are in range elevation 4.1 to 4.5 and above.

b) Road Raisings

The Town of Oyster Bay has also mitigated tidal flooding problems within the floodplain by raising the elevation of some town roads. Most of these past road raising projects took place in the East Massapequa area.

There are additional areas that require road raisings where road elevations are below base flood elevation 7. Some have concentrations of repetitive loss properties. They are as follows:

- Area 1** Between Alhambra Canal and Massapequa River affecting 85 homes on Alhambra Road, Neptune Place, Saltaire Place, Park Lane Place, Canal Road and Beach Road. This area has concentrations of repetitive loss properties. (see photo below and Massapequa maps 1 and 2)
- Area 2** East Massapequa located adjacent to the bay affecting approximately 60 homes on Leewater Avenue, Nearwater Avenue and Ripplewater Avenue. This area has concentrations of repetitive loss properties. (see Massapequa map 4)
- Area 3** East Massapequa between the Nanasketuch River and Carmans River affecting approximately 50 homes on Roosevelt Boulevard, Ozone Place, Cove Street, Spring Street, Spray Street, Shell Street, and the south end of Clocks Boulevard. (see Massapequa map 4)
- Area 4** Between Jones Creek and Carmans River affecting approximately 36 homes on Orlando Street, Seneca Place, Harbor Place, Neptune Place and Iroquois Place. (see Massapequa map 4)
- Area 5** East side of Grand Canal affecting 24 homes on Bayview Avenue West, Adam Road West, and Cabot Road West. (see Massapequa map 2)



Flooding on Alhambra Road, Massapequa

2. Storm Water Flooding

There are areas scattered throughout the Town of Oyster Bay outside the Special Flood Hazard Area that are subject to localized flooding problems due to torrential rain events.

The problem is caused by drainage systems that are either clogged with debris or simply inadequate to handle the volume of water from strong rain events.

The Town of Oyster Bay Division of Highways maintains a complete list of problem areas. Some problems are very minor such as puddling, but others, are severe enough to have caused flooding in basements and damage to automobile. Some automobiles have been completely totaled.

Measures taken by the Town have corrected the most severe problem areas.

The Division of Highways currently has targeted 28 locations for special monitoring. They are located in such diverse areas as Hicksville, Glen Head, Locust Valley, Jericho, East Norwich, Woodbury, Plainview, Bethpage, North Massapequa and South Farmingdale.

At all 28 locations, the Highway Division inspects all catch basins or sluiceways for cleaning before, during and after each rain event.

The Town of Oyster Bay Division of Highways has identified the following 6 locations where storm water flooding occurs as a result of inadequate drainage systems:

1. Mill Road - South Farmingdale
2. Mangan Place - Hicksville
3. Lori Court - Woodbury
4. Sheppard Street and Union Avenue - Glen Head
5. Pal Street (dead end) – Plainview
6. Stillwell Lane - Woodbury

The solution to these problems will require an engineering study and probable redesign of the current drainage systems.

Repetitive Loss Areas

A repetitive loss property is one for which two or more NFIP losses of at least \$1,000 each have been paid since 1978.

According to information received from FEMA there were 474 repetitive loss claims from the Town of Oyster Bay dating from 1978 to the present.

There are 172 repetitive loss properties within the flood plain in Massapequa and only one on the North Shore's Stehli Beach Area in Locust Valley.

These are mostly scattered throughout the flood plain with some concentrations in Area 1 and Area 2.

Repetitive loss properties within the floodplain are shown on all maps.

There are 12 repetitive loss properties outside the floodplain which would indicate flooding due to storm water overload.



Beach Road, Massapequa

Table I illustrates the number of repetitive losses for each street and each storm event within the floodplain in Massapequa.

Table II illustrates the repetitive losses outside the floodplain.

Table III illustrates known first floor elevations within the floodplain in Massapequa.

TABLE II
REPETITIVE LOSSES OUTSIDE FLOODPLAIN

#	STREET NAME		TOWN	LOSS	DATES OF LOSSES		
1	ROLLING	DRIVE	BROOKVILLE	2	790215	790121	
2	SABINE	ROAD	SYOSSET	3	820104	800321	790121.
3	KNOLLWOOD	ROAD	MUTTONTOWN	2	840405	830319	
4	JODY	LANE	PLAINVIEW	3	800409	790121	780812
5	ELANOR	DRIVE	N MASSAPEQUA	2	790523	800428	
6	CORNELL	DRIVE	PLAINVIEW	2	790124	820104	
7	BROADWAY		BETHPAGE	2	790523	790120	
8	MAIDEN	LANE	JERICO	2	940108	900720	
9	WALNUT	AVE	E NORWICH	3	830416	800409	780125
10	S 6TH	STREET	LOCUST VALLEY	3	840707	790120	780812
11	PIPING ROCK	ROAD	LOCUST VALLEY	2	780314	780126	
12	WOODHOLLOW	LANE	OLD BROOKVILLE	2	800321	790524	

TABLE III
Known First Floor Elevations below Base Flood Elevation 7.0
Massapequa

rec. #	Street Name	no. of houses
1	ALHAMBRA RD.	15
2	S. BAY DRIVE	
3	BEACH RD	23
4	BAYVIEW AVE.	3
5	BAYVIEW PL.	4
6	BILTMORE BLVD.	3
7	BROCKMEYER DR.	5
8	CLOCKS BLVD.	10
9	CLEARWATER AVE.	
10	DIVISION AVE	4
11	DELTA ROAD	13
12	ERLWEIN CT.	
13	FLORENCE AVE.	3
14	FAIRWATER AVE.	5
15	HIGHWATER AVE.	2
16	HAMILTON AVE.	6
17	HARBOR PLACE	
18	JEFFERSON PLACE	6
19	JACKSON PLACE	
20	JETMORE PLACE	
21	LEEWATER AVE.	2
22	LINCOLN AVE. / PL.	8
23	NEPTUNE AVE.	4
24	NEARWATER AVE.	3
25	OSPREY PLACE	
26	SEA BREEZE RD.	2
27	W. ORLANDO ST.	
28	PARK LANE/PLACE	6
29	PIRATES COVE	15
30	CABOT ROAD	2
31	RIPPLEWATER AVE	5
32	RIVERDALE AVE.	14
33	ROOSEVELT BLVD	4
34	SEA CREST PLACE	
35	STILLWATER AVE.	8
36	SUTTON PLACE	1
37	SALTAIRE PL.	1
38	ST. MARKS PLACE	
39	E. SHORE RD	
40	W. SHORE RD	1
41	TIDEWATER AVE.	4
42	WATERVIEW AVE	7
43	GRANADA PLACE	1
44	GARFIELD PLACE	
45	BILTMORE BEACH	3
46	RIVERSIDE AVE.	

4. **First Floor Elevations**

The first floor elevations shown on Table III represent only a partial listing of buildings that are below base flood elevation 7 in the Special Flood Hazard Area in Massapequa. More investigation needs to be done to complete the list.

5. **Flood Warning Emergency Response**

There is a need for a flood warning system and emergency response plan for people who reside in the floodplain and beyond. A Hurricane Emergency Response Plan has been developed and is currently awaiting approval.

Natural Undeveloped Areas

1. ***South Shore***

The bay area in Town contains a large natural estuary area approximately 3 miles by 3 miles, extending from the Massapequa shoreline to the north side of Jones Island.

In addition to the dune formations and beachfront on the south side of the barrier beach the north side contains a 550-acre wildlife sanctuary which includes a natural salt pond.

The John F. Kennedy Memorial Wildlife Sanctuary is a New York State Designated Significant Fish and Wildlife Habitat which contains large breeding and nesting areas for colonial water birds, especially Terns and Piping Plovers.

Immediately north of the barrier island are many acres of tidal wetland islands that are mapped as low marsh, inter-tidal marsh, high marsh and coastal fresh marsh.

Tidal wetlands perform a variety of useful functions, including the following:

- ◆ marine food production - tidal wetlands are among the most productive ecosystems in the world
- ◆ wildlife habitat - tidal wetlands are important as breeding, nesting and feeding grounds for a variety of invertebrates, fishes, birds and mammals
- ◆ flood and storm control - tidal wetlands serve as a natural buffer, absorbing wave damage and protecting beaches and developed upland from storm tides
- ◆ recreation - tidal wetlands provide many opportunities for hunting, fishing, birdwatching, and study of natural history and ecology
- ◆ pollution control - tidal wetlands are capable of assimilating pollutants and chemically and biologically converting them into useful nutrients
- ◆ sedimentation - tidal wetlands absorb silt and organic matter, which otherwise would obstruct channels and harbors.

Other designated natural features include freshwater streams, tidal streams and ponds.

The Town of Oyster Bay Department of Parks maintains and operates the facilities at waterfront park and bathing beaches.

They maintain the dune formations, which are vital for erosion protection, by erecting and maintaining snow fencing and planting beach grasses.

In addition, they keep the shoreline free of any debris that accumulates.

As part of the south Shore Estuary Reserve the Town of Oyster Bay has developed an educational program for mitigating the impact of waterfowl on surface water quality.

The Town has posted signs in a number of key locations to discourage inappropriate feeding of waterfowl

2. North Shore

There are significant areas of wetlands along the coastline that have been classified by the NYSDEC as either tidal or freshwater based on the vegetation they support.

The Oyster Bay National Wildlife Refuge (OBNWR) was established in 1968 and consists of approximately 3220 acres of submerged lands and salt marsh. Most species of Long Island's waterbirds have been documented within the OBNWR.

The portion of the harbor complex within the (OBNWR) is subject to certain regulatory powers that are vested in the U.S. Department of the Interior, Fish and Wildlife Service (FWS). The FWS is charged with the responsibility of protecting and managing wildlife and migratory bird populations within the refuge. Since certain human uses of the harbor complex can adversely affect these ecological resources, the Town and the FWS jointly signed a Memorandum of Understanding (MOU) in January 1969.

The MOU establishes that fishing, swimming, boating, and other authorized recreational activities may be continued in accordance with the rules prescribed by the Town for related lands and waters under Town jurisdiction, provided that such use is regulated so as to avoid any interference with wildlife, to maintain the quality of the environment and the quality of outdoor recreation, and to preserve the natural beauty of the area.

Under the New York State Coastal Management Program, NYSDOS has designated Oyster Bay Harbor/Cold Spring Harbor as an Outstanding Natural Coastal Area (ONCA) because it has many significant coastal fish and wildlife habitats.

Future Development and Redevelopment

The Town of Oyster Bay was recently awarded a matching grant through the Environmental Protection Fund administered by the New York State Department of State to complete a conceptual land use plan for the western portion of the Oyster Bay Hamlet waterfront.

The project will develop a comprehensive plan for public use of these properties: (see map Oyster Bay Hamlet)

- ◆ Beekman Beach - this Town-owned facility is located west of Jakobson Shipyard and contains a long stretch of beach with scenic views of the harbor.
- ◆ Jakobson Shipyard - this 6 acre site is currently abandoned and dilapidated. In August 1997, the Town of Oyster Bay and the New York State Department of Environmental Conservation purchased the parcel for \$6 million, the Town purchased approximately one (1) acre and the State approximately five (5) acres.
- ◆ Former Capone parcel - this is a 2.3 acre parcel zoned for industrial use. In 1991 the Town purchased the parcel for \$1.35 million and it has since remained vacant.

The total area of these three parcels is 13.2 acres.

Roosevelt Memorial Park is a 42-acre parcel owned by the Town adjacent to the east side of the former Capone parcel.

The recent purchase of the shipyard property creates a continuous public waterfront of almost one mile in length.

The final plan entitled *Oyster Bay Western Waterfront Conceptual Land Use Plan*, which was adopted by the Town Board and endorsed by the New York State DOS, the New York State DEC and by the Community, will protect and preserve one of Oyster Bay's most important economic and natural resources, its coastline.

The final plan includes:

- ◆ Demolition of buildings north of West End Avenue
- ◆ Removal of dry dock facility
- ◆ Access to the Western Waterfront via an extension of West End Avenue
- ◆ Restoration of the pier, bulkheads, roads and utilities.
- ◆ Construction of State Launch Ramp for small boats
- ◆ Off-loading area for baymen
- ◆ Town Boat Launch Parking safety enhancements
- ◆ Wetlands creation and enhancements, along with uplands plantings to provide shoreline stabilization, stormwater runoff filtration and stormwater outfall treatment
- ◆ Renovation of three Jakobson Shipyard buildings for use by government agencies, the Oyster Bay Sailing School, the Sagamore Rowing Association, the Christeen Ship Restoration and an accompanying Maritime Museum.
- ◆ A new 15,000 square foot Community/Environmental Education Center with indoor and outdoor displays incorporating in water aquaculture activities.
- ◆ Paths, landscaping, benches and scenic overlooks
- ◆ A new 2,500 square foot Building with nearby water access for the Town of Oyster Bay's Bay Constable and the Atlantic Steamer Fire Co. Dive and Rescue Operations

- ◆ Finger piers for safe operation of sailing school, local baymen, education and regulatory agency vessels
- ◆ Tall ship dockage on the pier
- ◆ Renovation of Beekman Beach including new restrooms, picnic shelters, nature overlook, reduced paved area and increased natural vegetation and wetlands.

The preliminary cost estimate for implementation of the Conceptual Land Use Plan is \$12 to \$13 million dollars. The New York State Department of Environmental Conservation has already obtained a \$600,000 Federal Grant, and other funding sources are currently being investigated. Prior to implementation, the two site owners, the Town of Oyster Bay and the State of New York, are expected to negotiate an agreement for the joint operation and maintenance of the site.

In addition to the Oyster Bay Hamlet waterfront plan, the Town is undertaking a master plan for its north shore beaches and waterfront parks including Center Island Beach, Stehli Beach and Tappen Beach.

Summary of the Impact of Flooding

The damage caused by previous storms has had an enormous effect on Town resources. In 1984, Nassau and Suffolk Counties were declared disaster areas as a result of two separate storms on March 28 and April 8.

The damage caused by this disaster was small compared to later events. The Town spent approximately \$200,000 on debris clean-up and repairing damage to roads, beaches and erosion control facilities.

On September 27, 1985, Hurricane Gloria caused extensive damage, particularly to the barrier beach shoreline. A beach pavilion consisting of a lifeguard station, restrooms and a large concrete deck was substantially destroyed by wave action and winds. A total of over \$4 million was spent on repairs and clean-up, not only to the beach area but to roads, parking fields and other facilities Town-wide. The Town received over \$3 million in aid from FEMA and SEMO.

The Town spent over \$3 million in repairs and damage to roads, culverts, parking fields, etc. caused by the northeaster storm of December 1992. Much of the damage occurred to the north shore beaches. The Town received almost \$1 million in aid from FEMA and SEMO.

The Town's participation in the national flood insurance program (NFIP) enabled Town residents to purchase flood insurance in order to cover property damage. According to the latest information from the NFIP, there have been 1295 paid losses totaling \$11,460,681 since 1978. Estimates of losses to uninsured properties are not available.

The following table shows the latest NFIP summary.

Policies	Insurance	Adjusters	Number of	Total
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	in Force	In Force	Expenses	Paid Losses	Paid Losses
1-4 Family	2350	\$350,342,400.0	\$484,571.00	1245	\$10,482,433.00
Other Residences	0	00	\$693.00	4	\$4,353.00
Other Structures	24	\$3,095,900.00	\$13,638.00	30	\$601,048.00
Small Businesses	2	\$108,900.00	\$8,071.00	15	\$372,269.00
Total	2376	353,547,200.00	\$507,055.00	1295	\$11,460,681.00

VI. Goals

The following goals were established to guide this floodplain management plan and to address the flooding concerns of the residents of the Town of Oyster Bay.

- ◆ Preserve and protect natural resource areas for the natural and beneficial function

- ◆ Reduce damage from tidal flooding to properties located in the Flood Zones

- ◆ Reduce damage to properties caused by inadequate storm drains.

- ◆ Increase Public Awareness with regard to Flood Hazards and how to reduce property damage.

- ◆ Ensure that residents are given adequate warning so as to facilitate timely evacuation of people from low-lying areas in advance of hurricanes

- ◆ Use vacant land in the flood zone as open space for public users

- ◆ Increase recreational opportunities that are compatible with the environment and flood protection/prevention.

VII. Review of Possible Activities

During the course of numerous meetings, within the context of problems and goals, a number of different floodplain management activities were given consideration. They were organized under six primary categories:

1. Preventative

- a. **Planning and Zoning.** The Town of Oyster Bay presently owns several large waterfront properties in Oyster Bay Hamlet and has recently acquired the abandoned 6-acre Jakobson Shipyard site together with the New York State Department of Environmental Conservation. The opportunity exists for the Town to enhance public access to the harbor through an integrated land use plan which has already been initiated by means of a master plan for its existing north shore park facilities and a conceptual land use plan for the Oyster Bay Hamlet Waterfront.

The Town of Oyster Bay recently purchased a 2.3- acre vacant parcel adjacent to the Jakobson Shipyard site which was zoned for industrial development. The acquisition of this parcel, together with the adjacent shipyard property, has eliminated the threat of future residential or industrial development in this area. There are only a few small vacant parcels remaining in the Massapequa area on the south shore.

- b. **Floodplain Regulations.** Chapter 121 of the *Town of Oyster Bay Code* entitled "*Flood Damage Prevention*" protects any future development in the floodplain from flooding by requiring the first floor, including the basement, of any structure to be elevated to or above the base flood elevation.
 - c. **Stormwater Management and Drainage System Maintenance.** The Town of Oyster Bay Division of Highways maintains a comprehensive list of all drainage structures and has an active drainage system maintenance program, including street sweeping.
 - d. **Dune and Beach Maintenance.** The Town of Oyster Bay Department of Parks regularly maintains dune formations along the barrier beach by erecting snow fencing and planting beach grass. This plan for snow fencing and vegetation is a highly efficient way to not only prevent winter erosion, but will enhance summer growth of the dunes.
2. **Property Protection:** These are activities that are undertaken on a building-by-building basis.
- a. **Relocation and Acquisition.** These activities were determined to be not feasible and subsequently dismissed as alternatives because of the extreme high cost of property and lack of vacant space.
 - b. **Building Elevation and Floodproofing.** These were favored as alternatives to relocation and acquisition. The cost of elevating homes varies greatly and may be prohibitive to some home owners. Floodproofing is less expensive and may be appropriate for some homes. Property owners need to be made aware of

the various types of floodproofing such as dry flood proofing and wet flood proofing.

- c. Insurance. Many residents are probably not aware that their standard home policy does not cover flood damage. They need to be informed that flood insurance is available to them even for those who don't live in the floodplain and even if they have been flooded in the past. There are approximately over 3500 properties in the floodplain in the Town of Oyster Bay. According to the latest information from the NFIP, there are 2350 policies in force.

3. **Natural Resource Protection:**

The Town of Oyster Bay does not have an ordinance which addresses wetland protection.

However, the Town of Oyster Bay, in cooperation with the Nassau County Soil and Water Conservation District, has long advocated the use of artificial wetlands for shoreline stabilization, stormwater runoff filtration and stormwater outfall treatment.

The Town has received matching grant funds through the Environmental Protection Fund program administered by the NYSDOS to develop plans for a number of wetland creation and enhancement projects.

Man-made wetland projects, such as marsh restoration and dune restoration, have been proposed for the Center Island Beach facility, the west end of Beckman Beach, Stehli Beach, Tappen Beach and some areas of the West Shore Road wetland.

4. **Emergency Services:**

- a. Flood Warning. Recognizing the need to increase the flood warning time in advance of approaching storms, the Town Emergency Management Coordinator investigated the feasibility of installing a Southeastern New York Tide - Telemetry and Coastal Flood Warning System as proposed by the U.S. Geological Survey in coordination with the National Weather Service.

This system could be installed for less than \$30,000 and the operation and maintenance would be less than \$10,000 per year.

Federal matching funds from the U.S. Geological Survey may be available for the yearly operation and maintenance costs. In addition there may be funds available from incorporated villages who would benefit from the system.

- b. Flood Response. In cooperation with the Nassau County Emergency Management Office and the New York State Emergency Management Office, the Town of Oyster Bay has prepared a *Hurricane/Coastal Storm Emergency Response Plan*.

The plan is divided into three major parts:

- ◆ Emergency Operations Center (EOC) checklist, which details the specific agency emergency response activities that will be coordinated at the EOC during the different phases of coastal storm emergency response.
- ◆ Functional Resources and Responsibilities, which describes how the Town government, among all participating agencies, will address specific

functional response activities that are necessary in coping with a major storm.

- ◆ Agency Roles and Responsibilities, which lists all Town agencies that will play essential roles in this plan and individually summarizes their responsibilities.

The Town of Oyster Bay *Hurricane/Coastal Storm Emergency Response Plan*, which was submitted to the Town Board in May 1998, is awaiting adoption.

5. Structural Projects:

- a. Reservoirs, Diversions and Channel modifications are not feasible structural projects for Oyster Bay because the floodplain is comprised of high density residential areas with no vacant land available.

Levees, or berms, are impractical because they take up a great deal of property space. The typical property size in the floodplain is too small to accommodate such a structure.

Floodwalls are barriers of man-made materials that are thinner and take less space than a levee. They could be used to protect a structure or portions of a structure such as doors, window wells or basement entrances.

One potential problem with levees and floodwalls is that they can impede the natural flow of water in the floodplain possibly resulting in increased flooding of adjacent property. Similarly, they can also block the natural drainage from surrounding property.

Seawalls and bulkheads are in use along the waterfront in Oyster Bay.

- b. Tidal Check Valves. This is a device which is installed inside a drainage pipe that discharges into a tidal waterway. The purpose of a tidal check valve is to prevent tidal water from backing-up into the drainage pipe thereby flooding the street and adjacent property during periods of higher-than normal tides.

Tidal Check Valves are relatively inexpensive and can be installed in a short period of time with minimum disruption. They offer, at the very least, a short term solution to a flooding problem. Not all areas, however, are suitable for the installation of tidal check valves.

- c. Road Raisings. The most effective long-term solution to tidal flooding is to raise the elevation of low-lying streets. In order to be completely effective, however, a road raising project should be done in conjunction with elevating the buildings on that road that are below the base flood elevation.

Ideally, the road and house should be raised above the base flood elevation.

- d. Beach Nourishment. Beach nourishment results from navigational maintenance projects where underwater dredged material is deposited on to adjacent

beaches. The U.S. Army Corps of Engineers is responsible for maintaining navigation in various inlets along the south shore barrier islands.

Beach nourishment for Tobay Beach is done in conjunction with the Corps' Navigational Maintenance Projects for Fire Island Inlet normally scheduled on a bi-annual basis.

This is accomplished by hydraulic dredge. The dredged material is pumped onto the westerly beaches through a discharge pipe which extends westerly and terminates at Gilgo Beach, depositing material along the way.

Because of the westward littoral drift, some of the dredged material migrates from Gilgo Beach and gets deposited onto the adjacent Tobay Beach.

6. **Public Information:**

- a. Informational materials. Homeowners could use more information on the following topics: flood hazard, flood insurance, property protection and flood safety. The Town of Oyster Bay will be implementing various outreach projects that cover these topics as part of its Community Rating System activities.
- b. Site-specific advice. The Town of Oyster Bay's Building Department can provide advice and assistance to homeowners on how to retrofit homes or how to protect them from drainage and flooding problems.

VIII. Action Plan

Based on the review of the foregoing six categories of activities, it is recommended that the Town implement the following:

The implementation dates and priorities as identified below are subject to amendments as may be required, contingent upon the availability of federal and/or state funding and more detailed engineering feasibility studies. It is important to note that additional projects may be included, by amending the plan.

1. Preventative:

- a) The Town Board should continue to seek state grants to implement the *Western Waterfront Conceptual Land Use Plan*. To date the Town has applied for a total of \$6.67 million. The implementation of the plan will revitalize a dilapidated waterfront, preserve open space and create new tidal wetlands.
- b) The Division of Highways has a drainage system maintenance program of cleaning catch basins and sluiceways of silt and debris. Currently in operation is a clam-shell type basin cleaner and an aquatech power jetting vehicle. In addition, the Town Board recently approved an expenditure for \$230,000 for a Combination Cleaner/Vacuum Machine for high pressure storm drain cleaning. This piece of equipment can simultaneously vacuum solids and liquids and clean clogged drainage lines. This new state-of-the-art equipment will upgrade the drainage maintenance program and promote greater efficiency.
- c) The Department of Parks should continue their dune and beach program of maintaining fencing and providing dune nourishment. With regard to beach grass plantings, the Department utilizes the services of volunteers from various groups, as well as Town personnel.

The Department of Parks conducts an annual beach grass planting in winter where many volunteers from a number of different organizations participate.

2. Property Protection

The Building Department should provide technical advice and information on various retrofitting techniques and other flood protection information such as building elevation and flood proofing.

The Building Department should:

- a) collect and maintain FEMA elevation certificates on all buildings in the floodplain. A computer format from FEMA is available.
- b) provide flood related data such as first floor elevations where possible.
- c) maintain a list of consultants and contractors who are experienced in the latest retrofitting techniques
- d) attend FEMA sponsored retrofitting classes and obtain a certificate
- e) seek funds from the FMA, HGMA or whatever source to assist residents in elevating structures with first floor elevations below the base flood elevation.

- f) The Town will apply for participation in the CRS and will seek the maximum credits available.

This program should be in place by the end of 1999.

3. **Natural Resource Protection**

The Town Attorney, in cooperation with the Town of Oyster Bay Department of Public Works, Division of Engineering, should investigate the need for an ordinance that would address wetland protection.

Even though the New York State Department of Environmental Conservation regulates activities in Tidal Wetland areas, a Town ordinance may be appropriate.

4. **Emergency Services**

- a) Flood Warning:

The Emergency Management Coordinator should seek approximately \$80,000 for the installation of two Southeastern New York Tide-Telemetry and Coastal Warning Systems, as proposed by the U.S. Geological Survey in coordination with the National Weather Service.

The proposed weather stations, one of which should be located on the north shore and the other on the south shore, would increase the local flood warning time in advance of approaching hurricanes.

The Department of Intergovernmental Affairs should also seek federal matching funds which may be available from the U.S. Geological Survey for the yearly operation and maintenance costs.

The warning systems should be in place by the end of 1999.

- b) Flood Response:

The Town Board should adopt the Draft Hurricane/Coastal Storm Emergency Response Plan which was submitted in May 1998.

5. Structural Projects

A. Tidal Check Valves

- 1) The Engineering Division should implement the recommendations suggested in the Feasibility Study for the Installation of Tidal Check Valves at Various Locations in Massapequa, DR96-671, which established a priority list.

Approximately \$1,000,000 should be allocated for this project.

This project should be completed by December 2000.

Tidal Check Valve Priority List, Contract No. DR96-671

Priority	Site No.	
1	109	Dead End of Seneca Place
2	143	Dead End of Clocks Boulevard
3	128	Dead End Iroquois Place
4	118	43 Leewater Avenue
5	119	94 Leewater Avenue
6	126	Dead End of Harbor Place
7	67	304 Bayview Avenue & 10 Cabot Road West
8	123	135 Stillwater Avenue
9	110	135 West Shore Road
10	51	45 Park Lane
11	53	99 Beach Road
12	131	16 Carman Avenue
13	13	Dead End of Jetmore Place
14	66	194 Biltmore Boulevard
15	121	45 Stillwater Avenue
16	60	17 Granada Place
17	145	370 Clocks Boulevard
18	120	33 Stillwater Avenue
19	8	Dead End of Lincoln Place
20	117	60 South Bay Drive
21	4	Dead End of Cleveland Place
22	59	34 Sea Breeze Road
23	58	7 Sea Breeze Road
24	5	Dead End of Harrison Place
25	61	16 Sutton Place
26	38	10 Division Avenue

- 2) The Town should initiate additional feasibility studies to include the remaining drainage outfalls, which total 155 for tidal check valve installations.

B. Street Raisings

The Department of Intergovernmental Affairs should seek funding to raise Town streets in areas that have been identified as low-lying and with some concentrations of repetitive loss properties.

A grand total of \$8,500,000 is needed to fund the projects in areas 1 through 5.

The Engineering Division should proceed with a ten - year program, ending in December 2009 to complete the entire project.

Area 1 and Area 2, which have the greatest number of repetitive loss properties, should be given priority.

The cost breakdown for the five projects is as follows:

	Project Description	Linear Feet	Estimated Cost -1998
Area 1	Alhambra Road, Neptune Place, Saltaire Place, Park Lane Place, Canal Road, Beach Road	5,300	\$2,700,000
Area 2	Leewater Avenue, Nearwater Avenue, Ripplewater Avenue	3,650	\$1,900,000
Area 3	Roosevelt Blvd., Ozone Place, Cove Street, Spring Street, Spray Street, Shell Street, South end of Clocks Blvd.	3,400	\$1,760,000
Area 4	Orlando Street, Seneca Place, Harbor Place, Neptune Place and Iroquois Place	2,450	\$1,260,000
Area 5	Bayview Avenue W., Adam Road W. , Cabot Road W.	1,700	\$880,000
TOTAL:			\$8,500,000

C. Drainage Structures

The Division of Highways has targeted six locations that have insufficient drainage capacity that require modification.

Approximately \$332,000 is needed to upgrade the drainage systems at the following locations:

Mill Road, South Farmingdale
Mangan Place, Hicksville
Lori Court, Woodbury
Sheppard Street and Union Avenue, Glen Head
Pal Street Dead End, Plainview
Stillwell Lane, Woodbury

This project should be completed by December 2000.

D. Waterfront Projects

In accordance with a master plan for the Town's north shore beaches previously mentioned in this report, the Department of Parks has encumbered funds to undertake the following projects:

- **Tappen Beach, Sea Cliff** – this proposal is for the replacement of 170 feet of a concrete wall that has been undermined by erosion and the restoration of the upland parking field. The new construction will provide protection for this area from future erosion. The proposed project is pending permits from regulatory agencies and construction should begin early in 1999. The approximate cost is \$70,000.
- **Powerhouse Park, Glenwood Landing** (see Tappen Beach Map) – this waterfront park is in a state of disrepair due to the failure of a concrete retaining wall. This proposal calls for the redesign and construction of a new concrete retaining wall which will provide needed protection to the park from future erosion. The proposed project is due to enter the design phase in late 1998 and construction should begin in 1999. Approximate cost is \$300,000.
- **Centre Island Beach, Bayville** – this proposal includes a man-made wetland project south of Center Island Road on the west end of the beach; a dune restoration project along the beach both north and south of the road and the construction of a maintenance building south of the road. Similar projects, such as man-made wetlands and dune restoration, will take place at all north shore beaches over the next two years. Approximate total cost is \$1,000,000.

6. Public Information

The Town of Oyster Bay has sent a newsletter dated October 1998 to all Town residents informing them of the final stages in the development of a Hazard/Flood Mitigation Plan.

At various times during the year, the Town sends a newsletter informing the public about a variety of issues. The main focus of the October 1998 issue was to educate residents of the flood hazard, flood loss protection measures and the benefits that will be derived as a result of implementing the plan.

A copy of the newsletter entitled *Talk of the Town* is in the appendix.

The Town of Oyster Bay's Public Information Office should continue to educate the public and increase awareness of flood risk by outreach programs.

The Town's Public Information Office should:

- a) continue to send newsletters with updated information to all residents in the community, especially with regard to funding for mitigation measures for their properties.
- b) send notices specifically to properties in the Special Flood Hazard Areas
- c) educate the public on the need to obtain flood insurance
- d) educate real estate agents on the need to inform prospective buyers that they may need flood insurance
- e) use the reduced NFIP premium rates obtained through the CRS to promote the purchase of flood insurance.
- f) set up an informational booth at the annual boat show at Tobay Beach
- g) provide local libraries with information regarding flood protection, such as the current FIRM, documentation on flood insurance, documents on how to protect buildings, documents on community floodplain management and any pertinent document regarding local conditions.

APPENDIX

1. ***Talk of the Town* Newsletter, October, 1998**
2. **Breezy Point Civic Association Letter Dated April 3, 1998**
3. **Newsday Article Dated June 25, 1998**
4. ***Oyster Bay Western Waterfront Conceptual Land Use Plan - Executive Summary* March 1998**
5. **Map Nos 1 thru 16 showing locations of all Drainage Outfalls in Town of Oyster Bay**