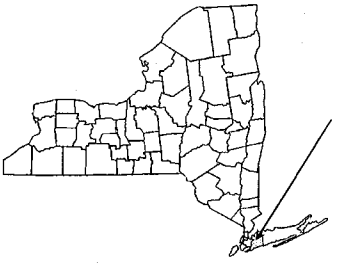
FLOOD INSURANCE STUDY

NASSAU COUNTY, NEW YORK
(ALL JURISDICTIONS)



COMMUNITY NAME	COMMUNITY NUMBER	COMMUNITY NAME	COMMUNITY NUMBER	COMMUNITY NAME	COMMUNITY NUMBER
ATLANTIC BEACH, VILLAGE OF	360458	ISLAND PARK, VILLAGE OF	360471	PLANDOME, VILLAGE OF	360484
BAXTER ESTATES, VILLAGE OF	360459	KENSINGTON, VILLAGE OF	360472	PLANDOME HEIGHTS, VILLAGE OF	360485
BAYVILLE, VILLAGE OF	360988	KINGS POINT, VILLAGE OF	360473	PLANDOME MANOR, VILLAGE OF	360486
BELLEROSE, VILLAGE OF[1]	361625	LAKE SUCCESS, VILLAGE OF[1]	361582	PORT WASHINGTON NORTH, VILLAGE OF	361562
BROOKVILLE, VILLAGE OF[1]	361626	LATTINGTOWN, VILLAGE OF	360474	ROCKVILLE CENTRE, VILLAGE OF	360488
CEDARHURST, VILLAGE OF	360460	LAUREL HOLLOW, VILLAGE OF	360475	ROSLYN, VILLAGE OF	360489
CENTRE ISLAND, VILLAGE OF	360461	LAWRENCE, VILLAGE OF	360476	ROSLYN ESTATES, VILLAGE OF[1]	361640
COVE NECK, VILLAGE OF	360462	LONG BEACH, CITY OF	365338	ROSLYN HARBOR, VILLAGE OF	361035
EAST HILLS, VILLAGE OF[1]	361627	LYNBROOK, VILLAGE OF	360478	RUSSELL GARDENS, VILLAGE OF	361583
EAST ROCKAWAY, VILLAGE OF	360463	MALVERNE, VILLAGE OF	361633	SADDLE ROCK, VILLAGE OF	360491
EAST WILLISTON, VILLAGE OF[1]	361628	MANORHAVEN, VILLAGE OF	360479	SANDS POINT, VILLAGE OF	360492
FARMINGDALE, VILLAGE OF[1]	361629	MASSAPEQUA PARK, VILLAGE OF	360480	SEA CLIFF, VILLAGE OF	360493
FLORAL PARK, VILLAGE OF[1]	361630	MATINECOCK, VILLAGE OF[1]	361634	SOUTH FLORAL PARK, VILLAGE OF[1]	361641
FLOWER HILL, VILLAGE OF	361604	MILL NECK, VILLAGE OF	360481	STEWART MANOR, VILLAGE OF[1]	361642
FREEPORT, VILLAGE OF	360464	MINEOLA, VILLAGE OF[1]	361635	THOMASTON, VILLAGE OF	360494
GARDEN CITY, VILLAGE OF[1]	361631	MUNSEY PARK, VILLAGE OF[1]	361636	UPPER BROOKVILLE, VILLAGE OF[1]	361643
GLEN COVE, CITY OF	360465	MUTTONTOWN, VILLAGE OF[1]	361637	VALLEY STREAM, VILLAGE OF	360495
GREAT NECK, VILLAGE OF	361519	NORTH HEMPSTEAD, TOWN OF	360482	WESTBURY, VILLAGE OF[1]	361644
GREAT NECK ESTATES, VILLAGE OF	360466	NORTH HILLS, VILLAGE OF[1]	361600	WILLISTON PARK, VILLAGE OF[1]	361645
GREAT NECK PLAZA, VILLAGE OF	361632	NEW HYDE PARK, VILLAGE OF[1]	361638	WOODSBURGH, VILLAGE OF	360496
HEMPSTEAD, TOWN OF	360467	OLD BROOKVILLE, VILLAGE OF[1]	361646		
HEMPSTEAD, VILLAGE OF[1]	361647	OLD WESTBURY, VILLAGE OF[1]	361639		
HEWLETT BAY PARK, VILLAGE OF	360468	OYSTER BAY, TOWN OF	360483		
HEWLETT HARBOR, VILLAGE OF	360469	OYSTER BAY COVE, VILLAGE OF	361486		
HEWLETT NECK, VILLAGE OF	360470				

[1]Non-floodprone community

REVISED:
SEPTEMBER 11, 2009

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
36059CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide FIS Effective Date: April 2, 1997

Revised Countywide FIS Dates: September 11, 2009

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FLOOD INSURANCE STUDY
NASSAU COUNTY, NEW YORK (ALL JURISDICTIONS)

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide Flood Insurance Study (FIS) investigates the existence and severity of flood hazards in, or revises previous FISs/Flood Insurance Rate Maps (FIRMs), for the geographic area of Nassau County, New York, including: the Cities of Glen Cove and Long Beach; the Towns of Hempstead, North Hempstead, and Oyster Bay; and the Villages of Atlantic Beach, Baxter Estates, Bayville, Bellerose, Brookville, Cedarhurst, Centre Island, Cove Neck, East Hills, East Rockaway, East Williston, Farmingdale, Flower Hill, Floral Park, Freeport, Garden City, Great Neck, Great Neck Estates, Great Neck Plaza, Hempstead, Hewlett Bay Park, Hewlett Harbor, Hewlett Neck, Island Park, Kensington, Kings Point, Lake Success, Lattingtown, Laurel Hollow, Lawrence, Lynbrook, Malverne, Manorhaven, Massapequa Park, Matinecock, Mill Neck, Mineola, Munsey Park, Muttontown, New Hyde Park, North Hills, Old Brookville, Old Westbury, Oyster Bay Cove, Plandome, Plandome Heights, Plandome Manor, Port Washington North, Rockville Centre, Roslyn, Roslyn Estates, Roslyn Harbor, Russell Gardens, Saddle Rock, Sands Point, Sea Cliff, South Floral Park, Stewart Manor, Thomaston, Upper Brookville, Valley Stream, Westbury, Williston Park, and Woodsburgh (hereinafter referred to collectively as Nassau County). The Villages of Bellerose, Brookville, East Hills, East Williston, Farmingdale, Floral Park, Garden City, Hempstead, Lake Success, Matinecock, Mineola, Munsey Park, Muttontown, North Hills, New Hyde Park, Old Brookville, Old Westbury, Roslyn Estates, South Floral Park, Stewart Manor, Upper Brookville, Westbury, and Williston Park are non-floodprone communities.

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This FIS has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Nassau County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The April 2, 1997, FIS was prepared to include incorporated communities within Nassau County into a countywide-format FIS. Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS, as compiled from their previously printed FIS reports, is shown below.

Baxter Estates, Village of:	the hydrologic and hydraulic analyses for the FIS report dated November 16, 1982, were prepared by Harris-Toups Associates, for the Federal Emergency Management Agency (FEMA), under Contract No. H-4606. That work was completed in December 1980.
Bayville, Village of:	the hydrologic and hydraulic analyses for the FIS report dated March 15, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Cedarhurst, Village of:	the hydrologic and hydraulic analyses for the FIS report dated March 1, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Centre Island, Village of:	the hydrologic and hydraulic analyses for the FIS report dated April 18, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Cove Neck, Village of:	the hydrologic and hydraulic analyses for the FIS report dated January 18, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
East Rockaway, Village of:	the hydrologic and hydraulic analyses for the FIS report dated June 1978, were prepared by Camp, Dresser, & McKee, Environmental Engineers, for the Federal Insurance Administration (FIA), under Contract No. H-3832. All field survey data for that FIS were collected and compiled by Harry R. Feldman, Inc., Civil Engineers and Land Surveyors, Boston, Massachusetts, and Grand Gorge, New York, under subcontract to Camp, Dresser, & McKee. All work was completed in November 1976.

Flower Hill, Village of:	the hydrologic and hydraulic analyses for the FIS report dated September 18, 1991, were prepared by Harris-Toups Associates during the preparation of the FISs for the Villages of Roslyn and Roslyn Harbor (FEMA, July 1983; FEMA, June 1983). That work was completed in December 1980.
Freeport, Village of:	the hydrologic and hydraulic analyses for the FIS report dated September 15, 1993, were taken from the FIS for the Town of Hempstead (U.S. Department of Housing and Urban Development, 1978).
Glen Cove, City of:	the hydrologic and hydraulic analyses for the FIS report dated September 1977 were prepared by Camp, Dresser, & McKee, Environmental Engineers for the FIA, under Contract No. H-3832. All field survey data for that FIS were collected and compiled by Harry R. Feldman, Inc., Civil Engineers and Land Surveyors, Boston, Massachusetts, and Grand Gorge, New York, under subcontract to Camp, Dresser, & McKee. All work was completed in October 1976. The wave height analyses for the September 5, 1984, Wave Height Analysis Supplement to the FIS report were prepared by Michael Baker, Jr., Incorporated in January 1982, and revised by Dewberry & Davis in September 1983.
Great Neck, Village of:	the hydrologic and hydraulic analyses for the FIS report dated May 17, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Great Neck Estates, Village of:	the hydrologic and hydraulic analyses for the FIS report dated December 15, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Hempstead, Town of:	the hydrologic and hydraulic analyses for the FIS report dated October 1978 were prepared by the U.S. Army Corps of Engineers (USACE), New York District, for the FIA, under Inter-Agency Agreement No. IAA-H-2-73, Project Order No. 4. The

	wave height analyses for the September 4, 1984, Wave Height Analysis Supplement to the FIS report were prepared by Dewberry & Davis.
Hewlett Bay Park, Village of:	the hydrologic and hydraulic analyses for the FIS report dated July 19, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Hewlett Harbor, Village of:	the hydrologic and hydraulic analyses for the FIS report dated December 1978 were prepared by Camp, Dresser, & McKee, Environmental Engineers for the FIA, under Contract No. H-3832. That work was completed in November 1976.
Hewlett Neck, Village of:	the hydrologic and hydraulic analyses for the FIS report dated July 19, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Kings Point, Village of:	the hydrologic and hydraulic analyses for the FIS report dated January 5, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Lattingtown, Village of:	the wave height analyses for the FIS report dated March 18, 1986, were prepared by Dewberry & Davis. That work was completed in February 1985.
Laurel Hollow, Village of:	the hydrologic and hydraulic analyses for the FIS report dated July 6, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Lawrence, Village of:	the hydrologic and hydraulic analyses for the FIS report dated November 16, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Long Beach, City of:	the wave height analyses for the June 1, 1983, Wave Height Analysis Supplement to the FIS report were prepared by Dewberry &

	Davis, for FEMA, under Contract No. EMW-C-0543. That work was completed in December 1982.
Manorhaven, Village of:	the hydrologic and hydraulic analyses for the FIS report dated December 1, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Massapequa Park, Village of:	the hydrologic and hydraulic analyses for the FIS report dated July 19, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Mill Neck, Village of:	the hydrologic and hydraulic analyses for the FIS report dated April 18, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
North Hempstead, Town of:	the hydrologic and hydraulic analyses for the FIS report dated October 1976 were prepared by the USACE, New York District, for the FIA, under Inter-Agency Agreement No. IAA-H-2-73, Project Order No. 4. The wave height analyses for the May 1983 Wave Height Analysis Supplement to the FIS report were prepared by Dewberry & Davis.
Oyster Bay, Town of:	the hydrologic and hydraulic analyses for the FIS report dated February 1978 were prepared by Camp, Dresser, & McKee, Environmental Engineers for the FIA, under Contract No. H-3832. All field survey data for that FIS were collected and compiled by Harry R. Feldman, Inc., Civil Engineers and Land Surveyors, Boston, Massachusetts, and Grand Gorge, New York, under subcontract to Camp, Dresser, & McKee. All work was completed in December 1976. The wave height analyses for the September 16, 1982, Wave Height Analysis Supplement to the FIS report were prepared by Dewberry & Davis.
Oyster Bay Cove, Village of:	the hydrologic and hydraulic analyses for the FIS report dated March 30, 1983, were

	prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Plandome Manor, Village of:	the hydrologic and hydraulic analyses for the FIS report dated December 15, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Port Washington North, Village of:	the hydrologic and hydraulic analyses for the FIS report dated January 5, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Rockville Centre, Village of:	the hydrologic and hydraulic analyses for the FIS report dated May 17, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Roslyn, Village of:	the hydrologic and hydraulic analyses for the FIS report dated July 5, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Roslyn Harbor, Village of:	the hydrologic and hydraulic analyses for the FIS report dated June 15, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Russell Gardens, Village of:	the hydrologic and hydraulic analyses for the FIS report dated May 17, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Saddle Rock, Village of:	the hydrologic and hydraulic analyses for the FIS report dated April 18, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Sands Point, Village of:	the hydrologic and hydraulic analyses for the FIS report dated December 15, 1982, were prepared by Harris-Toups Associates, for

	FEMA, under Contract No. H-4606. That work was completed in December 1980.
Sea Cliff, Village of:	the hydrologic and hydraulic analyses for the FIS report dated August 1977 were prepared by Camp, Dresser, & McKee, Environmental Engineers for the FIA, under Contract No. H-3832. All field survey data for that FIS were collected and compiled by Harry R. Feldman, Inc., Civil Engineers and Land Surveyors, Boston, Massachusetts, and Grand Gorge, New York, under subcontract to Camp, Dresser, & McKee. All work was completed in October 1976.
Valley Stream, Village of:	the hydrologic and hydraulic analyses for the FIS report dated July 5, 1983, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.
Woodsburgh, Village of:	the hydrologic and hydraulic analyses for the FIS report dated December 1, 1982, were prepared by Harris-Toups Associates, for FEMA, under Contract No. H-4606. That work was completed in December 1980.

The authority and acknowledgments for the Villages of Atlantic Beach, Bellerose, Brookville, East Hills, East Williston, Farmingdale, Floral Park, Garden City, Great Neck Plaza, Hempstead, Island Park, Kensington, Lake Success, Lynbrook, Malverne, Matinecock, Mineola, Munsey Park, Muttontown, North Hills, New Hyde Park, Old Brookville, Old Westbury, Plandome, Plandome Heights, Roslyn Estates, South Floral Park, Stewart Manor, Thomaston, Upper Brookville, Westbury, and Williston Park, are not included because there were no previously printed FIS reports for those communities.

For the April 2, 1997, countywide FIS, the updated hydrologic and hydraulic analyses were prepared for FEMA by Dewberry & Davis. This work was completed in July 1995. The digital base mapping information files were provided by the Nassau County Department of General Services, Division of Data Processing, Old Courthouse, Mineola, New York 11501-4822. The base map was copyrighted by the New York State Department of Transportation: Basemap copyright, 1993, County of Nassau, New York. Those files were photogrammetrically compiled at a scale of 1"=200' from aerial photography dated 1991-1994. The digital FIRM was produced in Universal Transverse Mercator coordinates referenced to the North American Datum of 1927 and the Clarke 1866 spheroid.

For this revision, a new coastal storm surge analysis was incorporated for the Atlantic Ocean and bays. In addition the stillwater elevations for the Long Island Sound and bay areas were updated. Finally, for both the Atlantic Ocean and Long Island Sound, overland wave height analyses were performed. This work was accomplished by Leonard Jackson Associates and Dewberry for FEMA under Contract No.EMN-2002-RP-0018 and completed in March 2008. Digital base map information was provided by the New York State Office of Cyber Security and Critical Infrastructure Coordination. The digital FIRM was produced with a horizontal projection of State Plane New York Long Island East, feet referenced to the North American Datum of 1983.

1.3 Coordination

An initial Consultation Coordination Officer's (CCO) meeting is held with representatives from FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify the streams to be studied by detailed methods. A final CCO meeting is held with representatives from FEMA, the community, and the study contractor to review the results of the study.

The dates of the initial and final CCO meetings held for the incorporated communities within the boundaries of Nassau County are shown in Table 1, "CCO Meeting Dates."

TABLE 1 – CCO MEETING DATES

Community Name	Initial CCO Date	Final CCO Date
Village of Baxter Estates	July 20, 1977	January 12, 1982
Village of Bayville	July 21, 1977	September 27, 1982
Village of Cedarhurst	July 22, 1977	March 1, 1982
Village of Centre Island	July 19, 1977	November 16, 1982
Village of Cove Neck	July 18, 1977	June 22, 1982
Village of East Rockaway	September 9, 1975	February 23, 1977
Village of Flower Hill	*	October 18, 1990
Village of Freeport	December 3, 1991	February 13, 1992
City of Glen Cove	September 9, 1975	January 12, 1977
Village of Great Neck	July 18, 1977	November 16, 1981
Village of Great Neck Estates	July 25, 1977	August 2, 1982
Town of Hempstead	*	January 20, 1983
Village of Hewlett Bay Park	July 22, 1977	November 17, 1981
Village of Hewlett Harbor	September 9, 1975	February 23, 1977
Village of Hewlett Neck	July 22, 1977	November 25, 1981
Village of Kings Point	July 18, 1977	August 19, 1982
Village of Lattingtown	*	May 1, 1985
Village of Laurel Hollow	July 20, 1977	January 28, 1982
Village of Lawrence	July 22, 1977	May 12, 1982
City of Long Beach	*	January 5, 1983
Village of Manorhaven	July 18, 1977	July 28, 1982

*Data not available

TABLE 1 - CCO MEETING DATES - continued

Community Name	Initial CCO Date	Final CCO Date
Village of Massapequa Park	July 21, 1977	January 28, 1982
Village of Mill Neck	July 21, 1977	December 10, 1982
Town of North Hempstead	*	January 20, 1983
Town of Oyster Bay	*	April 4, 1982
Village of Oyster Bay Cove	July 18, 1977	November 16, 1982
Village of Plandome Manor	July 19, 1977	July 20, 1982
Village of Port Washington North	July 18, 1977	August 2, 1982
Village of Rockville Centre	July 4, 1977	December 7, 1981
Village of Roslyn	July 19, 1977	January 13, 1983
Village of Roslyn Harbor	July 20, 1977	January 12, 1983
Village of Russell Gardens	July 19, 1977	December 28, 1981
Village of Saddle Rock	July 18, 1977	December 1, 1982
Village of Sands Point	July 18, 1977	July 20, 1982
Village of Sea Cliff	October 2, 1975	January 12, 1977
Village of Valley Stream	July 22, 1977	November 30, 1981
Village of Woodsburgh	July 22, 1977	November 17, 1981

*Data not available

For the April 2, 1997, countywide FIS, FEMA notified each community by a letter dated July 26, 1995, or August 28, 1995, that this countywide FIS would be prepared using Dewberry & Davis' analyses. A final CCO meeting was held on January 26, 1996, and was attended by representatives of the jurisdictions in Nassau County and FEMA.

For this revision, FEMA held an initial CCO meeting with representatives from the communities on July 18, 2007. At that meeting and a subsequent one on October 15, 2007, the communities were informed about the scope of this revision and the primary sources of data for the study. A final CCO meeting was held July 21-25, 2008, and was attended by representatives of the jurisdictions in Nassau County, Dewberry, NYDEC, and FEMA.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Nassau County, New York.

All or portions of the flooding sources listed in the following tabulation were studied by detailed methods. Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and/or on the FIRM (Exhibit 2).

Coastal/Tidal

Long Island Sound
Hempstead Harbor
Little Neck Bay
Manhassett Bay
Oyster Bay Harbor
including Beaver Brook,
Beaver Lake, Mill Neck
Creek, Oak Neck Creek
Atlantic Ocean
Baldwin Bay
Brosewere Bay
East Bay
Head of Bay
Cold Spring Harbor
Little New Bay

Coastal/Tidal (continued)

Hewlett Bay
including Mill River,
Powell Creek, Rockaway Creek
Middle Bay
Reynolds Channel
South Oyster Bay
Wreck Lead Channel

Riverine

Massapequa Creek
Massapequa Creek Tributary No. 1
Massapequa Creek Tributary No. 2
Motts Creek
Russells Creek
Valley Stream

As part of the April 2, 1997, countywide FIS, updated or new analyses were included for the flooding sources shown in the following tabulation.

Flooding Source	Limits of Revised or New Detailed Study
Atlantic Ocean	From the confluence of Jones Inlet to the Nassau County/Suffolk County boundary
Brosewere Bay	From Doughty Boulevard to Austin Boulevard
Head of Bay	For its entire shoreline within the county
Hewlett Bay	From Doughty Boulevard to Austin Boulevard
Middle Bay	From Loop State Parkway to Austin Boulevard

The April 2, 1997, countywide FIS also incorporated the determination of a Letter of Map Revision issued by FEMA on May 23, 1995, for the Town of Oyster Bay along the Great South Bay.

For this revision, all coastal flood hazards affecting the county were restudied. As the updated coastal analyses reflect different methodologies than those used in the City of New York FIS, there are discrepancies in flood elevations between the jurisdictions. An update of the Suffolk County, New York FIS is currently underway. The elevations between adjacent communities in these two counties will be consistent.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

All or portions of several unnamed tributaries and streams in Nassau County were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Nassau County.

2.2 Community Description

Nassau County is one of the two counties that comprise Long Island, which is located in the southeastern section of the State of New York. It is bordered on the west by the City of New York and on the east by Suffolk County, and by the Atlantic Ocean on the south. Nassau County's 2000 population was 1,334,544 (U.S. Department of Commerce, 2000). Nassau County is primarily residential. It is served by State Route 24, State Route 25A, State Route 27, the Northern and Southern State Parkways, the Long Island Expressway, and the Long Island Railroad.

As is typical of the eroded headland pattern on the north shore of Long Island, the soil is composed mainly of glacial deposits - a poorly sorted mixture of boulders, gravel, sand, silt, and clay. The soil cover is generally deep, well drained, and covered with woods or grass, which have a low runoff potential. Vegetation varies from a dense growth of trees in the undeveloped areas to typical suburban vegetation of shade and ornamental trees, shrubs, and lawns adjacent to residential properties.

Unless noted otherwise, all elevations in the following paragraphs are referenced to the North American Vertical Datum of 1988 (NAVD).

The lands in the Villages of Baxter Estates, Great Neck, Great Neck Estates, Kings Point, Manorhaven, Plandome Manor, Port Washington North, Roslyn Harbor, Russell Gardens, Saddle Rock, Sands Point, and Sea Cliff are part of a line of hills called the Harbor Hill Moraine, which is composed of poorly-sorted rock debris consisting of boulders, gravel, sand, silt, and clay. The eroded headlands along the north shore of Long Island are composed mainly of glacial deposits, but streams and waves sculpted their final form and the many wide and deep harbors were carved by streams flowing north. Wave erosion has steepened the northern slopes of these headlands into nearly vertical bluffs that, in places, are approximately 100 feet National Geodetic Vertical Datum of 1929 (NGVD) (U.S. Department of the Interior, 1968).

The lands in the Villages of East Rockaway, Hewlett Bay Park, Hewlett Harbor, Hewlett Neck, and Woodsburgh are part of a huge, glacial outwash plain which gradually slopes from a morainal ridge in the northern half of Nassau County to the wetlands and barrier beaches along the south shore of the county.

The topography of the Village of Baxter Estates is generally irregular, with a maximum elevation of approximately 110 feet in the southeast and northeast portions of the village. The terrain then slopes down toward the central portion of the village in the south and toward the central and western portions of the north.

The western portion of the village consists of tidal flats that are exposed to tidal flooding from Manhasset Bay.

The topography of the Village of Bayville is irregular, with a low-lying area to the west; a steeply sloping hill rising to 150 feet in the center, and flat land developed with housing in the eastern area, much of which lies below 9.4 (NAVD) feet.

The terrain of the Village of Cedarhurst slopes very gently from a maximum elevation of approximately 25 feet at the central portion of the village to elevations of only 5 to 10 feet at the northwestern edge of the village, and to 20 feet at the southeastern part.

The topography of the Village of Centre Island is mildly sloping, rising to an elevation of 100 feet in the south, and to 80 feet in the north, with low-lying wetlands in the central area.

The topography of the Village of Cove Neck is irregular, with steep to mildly steep hills rising to approximately 180 feet over much of the village. A marsh area exists on the northwestern tip. In the southwestern section, adjacent to Oyster Bay Cove, there is low-lying land which is flood-prone. The western and northern coasts of the village rise rapidly from the beach to 100 feet.

The terrain in the Village of East Rockaway slopes very gently from a maximum elevation of approximately 25 feet at the northern edge of the village to elevations of 5 to 10 feet at the southern and eastern edges of the village. Most of the land areas of the village lies at elevations between 5 to 15 feet.

The topography of the Village of Flower Hill is irregular, and varies from flat low-lying land adjacent to Hempstead Harbor, to a valley running north-south.

The terrain in the City of Glen Cove varies from areas of high elevations reaching a maximum elevation of 180 feet in the southeastern section of the city and dropping to low lying areas along the coastline. East and Dosoris Islands on the northern tip of Glen Cove are completely surrounded by water with Long Island Sound on the north and Dosoris and West Ponds on the south, respectively. Glen Cove has a relatively smooth coastline with few inlets, the largest being Glen Cove Creek. The soil in Glen Cove consists mainly of Carver and Plymouth sands which are lain deep and drain well. Soil texture is coarse to moderately coarse and features a rolling moraine type of topography (Nassau County Planning Commission, 1974).

The coastal areas of the Village of Great Neck Estates border Little Neck Bay. Some of the land mass extends into the bay's wetlands area between the barrier beaches along the ocean and the mainland of the island. The tidal wetlands area covers approximately 12,000 acres within the village which is well protected from the 14 miles of exposure on the ocean by the barrier islands of Long Beach Island from East Rockaway to Jones Inlet, and by part of Jones Beach Island.

The terrain of the Village of Hewlett Bay Park slopes very gently from a maximum elevation of 25 feet at the northwestern corporate limits to only 5 feet in the southeastern portion. Most of the land area of the village lies at elevations between 10 to 15 feet. The terrain of Hewlett Harbor slopes very gently from a maximum elevation of approximately 25 feet at the northern edge of the village to elevations of only 5 to 10 feet at the southern and western edges of the village. Most of the land area of the village lies at elevations between 5 and 15 feet. The land of Hewlett Harbor is part of a huge, glacial outwash plain which gradually slopes from a morainal ridge in the northern half of Nassau County to the wetlands and barrier beaches along the southern shore of the county. The soils consist of Riverhead-Plymouth loamy sand which is easily excavated and has good internal drainage (Nassau County Planning Commission, 1974).

The terrain of the Village of Hewlett Neck slopes very gently from a maximum elevation of 20 feet at the northwestern corporate limits to only 5 feet in the eastern and southern portion.

The topography of the Village of Lattingtown is irregular, with low-lying marshy areas draining into Frost Creek to the north. Higher ground in the south rises to approximately 200 feet. In the higher elevations, the land has a dense cover of trees.

The topography of the Village of Laurel Hollow consists generally of steep slopes rising to a fairly flat plateau at approximately 220 feet. A series of fresh water ponds lie in the valley on the eastern edge of the village. In the coastal zone, the land rises steeply from the beach for the most part, but scattered small areas of tidal flats and bar beaches are also found.

The terrain of the Village of Lawrence slopes very gently from a maximum elevation of approximately 20 feet at the northwestern portion of the village to elevations of only 5 to 10 feet at the southern and eastern edges. Approximately one-half of the total area of Lawrence is low-lying marshland, which lends itself to direct exposure to storm tide flooding.

The topography in the Village of Massapequa Park is slightly irregular and slopes gently from a maximum elevation of 40 feet at the very northern portion of the village to only 5 feet at the very southern tip of the Village of Great South Bay.

The topography of the Village of Mill Neck is irregular and varies from steeply sloped hills over most of the village, to flat low-lying land, lakes, and marshes along the western edge.

The topography of the Village of Oyster Bay Cove is irregular, with steeply sloped hills rising to approximately 280 feet over most of the inland area, and flatter low-lying land on the coast. A centrally located coastal headland divides the flatter land into two stretches. A sand-spit, giving shelter to the cove, projects from the headland.

The topography of the Village of Rockville Centre is slightly irregular and slopes from a maximum elevation of 50 feet at the very northern portion of the village to only 5 feet along the Mill River at the southwestern corporate limits.

The topography of the Village of Roslyn is irregular, and varies from flat low-lying land adjacent to Hempstead Harbor, to a valley running approximately north-south, with steep to moderately steep sides.

The topography of the Village of Russell Gardens is irregular, varying from relatively steep slopes along the banks of Russells Creek and in the southwestern portion of the village to moderately flat terrain within the central section of the village. Elevations range from a minimum of 58 feet in the northwestern section of the village to 168 feet in the northeastern section.

The terrain of the Village of Saddle Rock is slightly irregular with the central portion of the village at an elevation of approximately 80 feet. From there, the land slopes gently down in all directions western sector, where the elevations decrease very rapidly from an elevation of approximately 60 feet to only 5 to 10 feet.

The elevations in the Village of Sea Cliff vary from sea level to a high of 189 (NAVD) feet. The terrain is characterized by clay cliffs along most of the coastline for which Sea Cliff is so noted. The soil consists predominantly of Carver and Plymouth sands which are deep and drain well. Soil texture is coarse to moderately coarse and lies on a rolling moraine type of topography (Nassau County Planning Commission, 1974).

The topography of the Village of Valley Stream is flat to slightly irregular, with very mild slopes. All of the land area within the village drains into stream basins which flow south.

The terrain of the Village of Woodsburgh slopes very gently from a maximum elevation of 20 feet at the northern edge of the village to approximately 5 feet at the southern and eastern edges.

The climate on the north shore of Nassau County is moderate coastal with warm, humid summers and moderately cold winters. The temperature averages 51.4 degrees Fahrenheit (°F) annually, ranging from a low monthly average of 31.8°F in February to a high monthly average of 72.1°F in July. The climate on the southern shore of Nassau county is moderate also, although temperatures average 53.4°F over the entire year, and range from a low monthly average of 32.9°F in February to a high monthly average of 75.7°F in July. The average annual precipitation ranges from 40 to 45 inches and is fairly evenly distributed throughout the year (U.S. Department of Commerce, 1977).

2.3 Principal Flood Problems

Nassau County is subject to coastal flooding caused by northeasters and hurricanes. Northeasters can occur at any time of the year but are more prevalent in the winter. The prime hurricane season is from August to October during which

time 80 percent of all hurricanes occur. September is the worst month for hurricanes; during which 32 percent of the total occur. Hurricanes are of shorter duration than northeasters and generally last through only one tidal cycle (USACE, 1971).

In meteorological terms, a hurricane is defined as a tropical cyclone which has a central barometric pressure of 29 inches or less of mercury, and wind velocities of 75 miles per hour or more. The low barometric pressures and high winds combine to produce abnormally high tides and accompanying tidal flooding. The high winds can generate large waves, provided there are no obstructions or barrier beaches to dissipate wave momentum. Storm waves as high as 30 feet have been reported in the vicinity of the south shore of Long Island (USACE, 1971). The winds of a hurricane in the Northern Hemisphere spiral inward in a counterclockwise direction towards the "eye" or center of low pressure. The eye of the hurricane (where winds are subdued) can vary in diameter. Normally, the "eye" can extend for 15 miles, although the eye of a mature hurricane can reach diameters of 20 to 30 miles or even greater (USACE, 1971).

A hurricane develops as a tropical storm either near the Cape Verde Islands off the African coast or in the western Caribbean Sea. Most hurricanes which reach Long Island approach from a southerly direction after curving east of Florida and skirting the mid-Atlantic seaboard. These hurricanes start their journey with a forward speed of about 10 miles per hour, and after recurving towards Long Island may increase their speed to 20 to 30 miles per hour and up to 40 to 60 miles per hour as they reach the colder water temperatures found in the more northerly latitudes (USACE, 1973). Figure 1, "Tracks of Selected Hurricanes," shows the tracklines of Category 1 and greater landfalling hurricanes between 1858 to 1999.

The most destructive winds in a hurricane occur east of the eye, where the spiral wind movement and forward motion of the storm combine. An indication of wind intensity and direction relative to Nassau County may be inferred from the historical hurricane paths shown in Figure 1. The majority of past hurricanes have tracked over eastern Long Island; therefore, Nassau County has rarely experienced the full intensity of a major hurricane. In order for Nassau County to experience the highest winds and accompanying highest tides of a hurricane, the storm would need to track west of the county, over New York City.

Historical data indicates that two unusually severe hurricanes have passed over New York City since 1635 - one on September 3, 1821, and the other on August 24, 1893. The New York Times reported the severity of the hurricane of 1893 at Coney Island in New York City:

> "The waves swept in to a distance 600 feet back of the beach, and rose to a height of 30 feet. They swept over the elevated station to such a height that they caught and carried away a 20-foot electric light, which stood near the end of the structure."

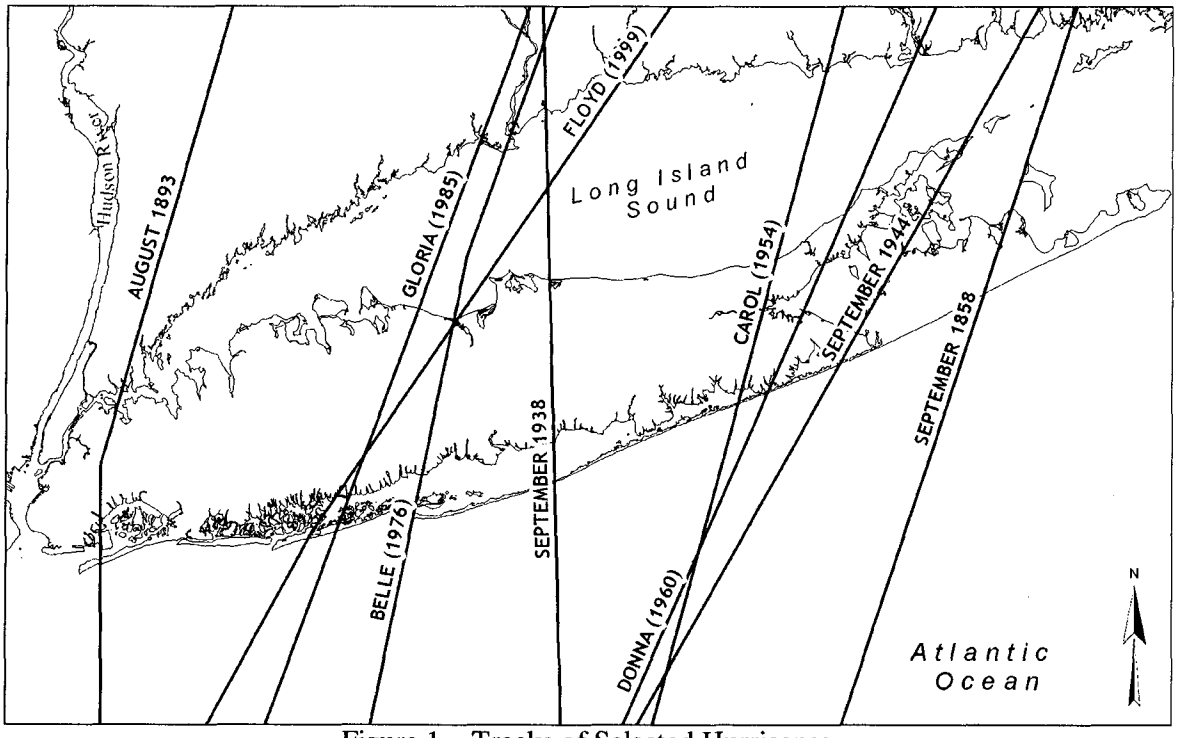


Figure 1 – Tracks of Selected Hurricanes

The dates of two other less severe hurricanes which made landfall in the vicinity of New York City are September 16, 1903, and September 14-15, 1904. The hurricanes of 1938, 1944, and 1954 swept over eastern Long Island and caused high tides in Suffolk County; however Nassau County did not experience the full brunt of these storms due to the easterly track (USACE, 1957). In more recent times, Hurricanes Gloria, Belle, and Donna made landfall on Long Island. Details on the impact of these events to Nassau County are summarized below.

Hurricane Gloria was the most recent instance where Nassau County has experienced the intensity of a hurricane. Gloria made landfall on September 27, 1985 approximately 10 miles east of Kennedy International Airport as a Category 2 hurricane. Wind gusts ranged from 51-mph in Central Park, 84-mph in Islip, 97-mph as recorded at Centerreach and 120-mph recorded at Fire Island Light. Peak storm surge ranged from 4 to 7 feet above tidal levels, fortunately, the storm made landfall at low tide which greatly reduced the potential coastal flooding. Extensive wind and flooding damaged led to a Federal Disaster Declaration. Total damages from the storm were estimated at $900 million for Virginia, New Jersey, New York and Connecticut (National Weather Service, 1985).

On August 10, 1976, Hurricane Belle threatened to severely damage Long Island. However, it finally proved to be a minimal hurricane in the Long Island area according to the National Hurricane Center in Miami. Two factors for this particular hurricane reduced its potential for tidal flooding on Long Island. First, storm intensity was diminished after traveling beyond the Gulf Stream and passing more slowly over the colder northern Atlantic Ocean waters. This was evidenced by the increase in its central barometric pressure and an accompanying decrease in the sustained wind velocity. Second, the storm reached land several hours after high tide (National Hurricane Center, August 11, 1976), minimizing storm surge and coastal flooding.

A hurricane derives its energy from the presence of warm water in its path. It draws in warm humid air over these waters, condenses out the moisture which falls as torrential rains, and uses the energy obtained to increase its wind speed and overland travel speed (National Hurricane Center, August 10, 1976). The critical water temperature for a hurricane is 26.5°C or 79.7°F (Landsea, 2000). When water temperature is below this value, the transfer of energy from the ocean to the storm ceases. For Hurricane Belle, the temperature was approximately 84°F off the coast of Florida, 81°F off the coast of North Carolina, and 71°F off the coast of Long Island. Belle was a full-fledged hurricane off the coast of Florida with winds of 150 miles per hour, but by the time it reached Long Island its intensity had so diminished that the strongest sustained wind was only 63 miles per hour, with gusts of 80 miles per hour (National Hurricane Center, August 11, 1976).

Hurricane Belle's winds were reduced, in part, by its slow northward movement of 25 miles per hour over the colder northern waters. By contrast, the hurricane of September 21, 1938, which occurred at a later period in the hurricane season, moved north at approximately 50 miles per hour. Had Belle occurred later in the hurricane season, the northern Atlantic waters would have been a few critical degrees warmer and would not have had the same effect in slowing the hurricane's velocity. Hurricane specialists at the National Hurricane Center warned Long Islanders that they should not feel confident that they had withstood a major hurricane, because Belle, in fact, was a borderline hurricane by the time it reached Long Island (National Hurricane Center, August 11, 1976).

Hurricane Donna is another example of hurricane impacts to Nassau County. Donna made landfall as a Category 2 hurricane on September 12, 1960, near Westhampton Beach in Suffolk County. At La Guardia Airport, 70 mile-per-hour winds from the northeast were recorded, with gusts up to 97 miles per hour. Hurricane Donna produced the highest tide of record at Hewlett Harbor and the tidal gage at Fort Hamilton-Fort Wadsworth (at the Narrows between Brooklyn and Staten Island) recorded a maximum tide of 7.5 (NAVD) feet (USACE, 1971). The maximum tide in Nassau County was slightly lower than at the Fort Hamilton tidal gage, because it is well protected behind the Long Beach barrier island. The tide level in Nassau County is a function of the tide duration and level in the ocean, the resulting quantities of water flowing through East Rockaway Inlet, Jones Inlet, and Wreck Lead Channel, the storage area available in the bay, and the prevailing wind speed and direction (USACE, 1971). Generally, tide levels in East Rockaway Channel and Reynolds Channel will be lower than those recorded in the Atlantic Ocean at the Fort Hamilton tidal gage.

Coastal flooding is not limited to hurricane activity; in fact, northeasters have caused the majority of tidal flooding along the south shore of Long Island. Northeasters develop near the Atlantic Coast of North America and can potentially occur at any time of year, but most frequently in the winter and spring months. Typically, a northeaster has lower wind velocities and higher central pressures than a major hurricane; however, wind velocities associated with a northeaster can easily reach tropical storm and Category 1 hurricane levels. In addition, the high winds of a northeaster can last for several days, causing repeated flooding and excessive coastal erosion. The long exposure of property to high water, high winds, and pounding wave action can result severe property damage.

Notable northeasters include the November 1950, November 1953, March 1962, December 1992, and March 1993 events. The November 1950 northeaster resulted in a storm surge above tidal levels of 7.9 feet at Sandy Hook, New Jersey, and 5.5 feet at New London, Connecticut. The northeast of November 1953 produced storm surge levels of 4.7 feet at Sandy Hook, New Jersey, and 3.6 feet at New London, Connecticut over tidal water levels. The March 1962 northeaster, known as the "Ash Wednesday" or locally as the "Five-High" storm because it lasted over five continuous high tides. The storm coincided with spring tides and caused severe erosion and property damage along the south shore of Long Island and along the eastern seaboard, with some of the worst damage along the New Jersey coast (USACE, 1963). The December 1992 northeaster carried hurricane-force winds and resulted in a storm surge in addition to tidal water levels of 5.9 feet at Sandy Hook, New Jersey, and 7.4 feet at Willets Point. The March 1993 northeasters, also known as the "Storm of the Century" caused extensive property damage along the Long Island coast, with a reported 18 homes falling to the sea. Wind gusts of 89 mph were recorded at Fire Island (NWS, 1993). Storm surge values in addition to tidal water levels of 6.1 feet and 4.9 feet were recorded at Willets Point and the Battery, respectively.

The best available verified historical records for water levels in the region are located at the NOAA stations for Sandy Hook, New Jersey, and New London, Connecticut. Annual water level maxima for the period of record at these gages are shown in Figure 2, "Annual Water Level Maxima at Sandy Hook," and Figure 3, "Annual Water Level Maxima at New London." These values represent the residual water level, or magnitude of the storm surge with the tidal water level removed. The five highest storm surge events of record at Sandy Hook, New Jersey, are: 1) March 1993 northeaster, 2) November 1950 northeaster, 3) Hurricane Gloria in 1985, 4) December 1992 northeaster, and 5) December 1974 northeaster. At New London, Connecticut, the five highest storm surge events of record are: 1) 1938 hurricane, 2) Hurricane Carol in 1954, 3) Hurricane Gloria in 1985, 4) November 1950 northeaster, and 5) September 1944 hurricane.

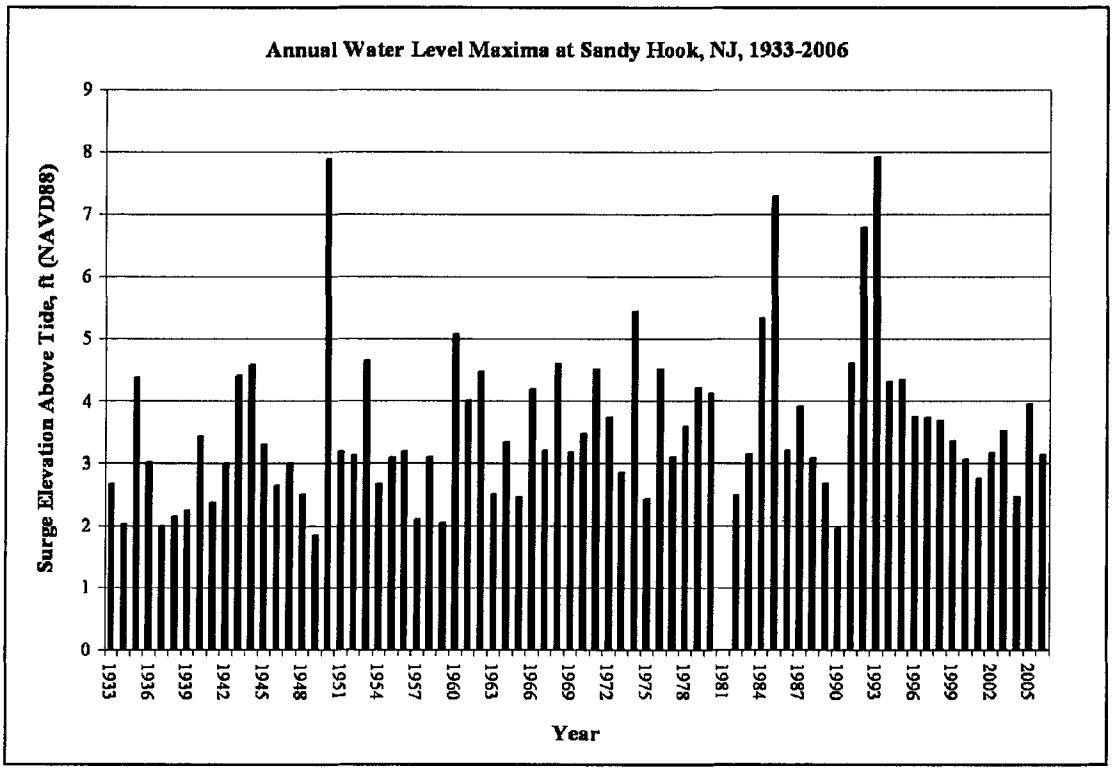


Figure 2- Annual Water Level Maxima at Sandy Hook

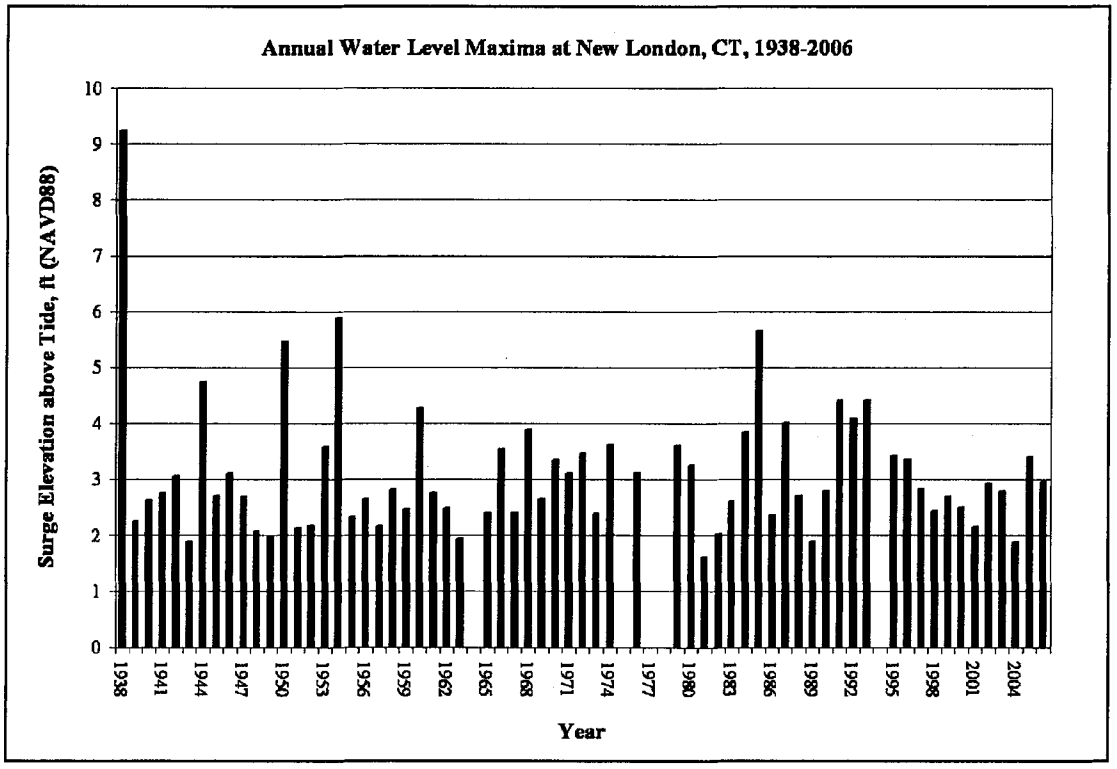


Figure 3 – Annual Water Level Maxima at New London

The two worst areas of flooding in the City of Glen Cove are the residential area of East Island and the industrial area surrounding Glen Cove Creek. Both areas are low lying and are susceptible to tide surges accompanying such storms.

In the Town of North Hempstead the flood problem is tidal in nature and stems from the extreme high tides that result from severe coastal storms and hurricanes. The history of storms in the area shows homes near the shore having been damaged on an average of once a year because of tropical hurricanes and northeasters.

The worst areas of flooding in the Town of Oyster Bay occur along Oyster Bay Harbor on the north shore and along the mainland adjacent to Great South Bay on the south shore. The majority of the flooding occurs predominantly in dense residential areas. Some industrial and park areas are also flooded.

The Village of Valley Stream has experienced some localized flooding during all seasons. The most severe floods in the past have been associated with intense rains caused by localized or transcontinental storms, land-falling hurricanes originating in the Caribbean Sea, or rain falling on previously frozen or saturated ground. For Valley Stream, the maximum known stream flow of 232 cubic feet per second (cfs) occurred in September 1960 during Hurricane Donna, as measured at the U.S. Geological Survey (USGS) gage at Valley Stream. Other large floods occurred in February 1971 (200 cfs) and in January 1979 (212 cfs). The village is also subject to tidal flooding from Head of Bay affecting Valley Stream and Motts Creek.

Flood damages have been relatively light along Motts Creek, Hook Creek and Valley Stream, even though county, village, and State lands have been flooded. Along Valley Stream, flooding areas have been reported by local officials and residents. At Hendrickson Park, due to the rise of Valley Stream Lake, 3 feet of water was found on the first floor of the Administration Building after the January 1979 storm. Water from this winter storm was also reported to have reached the centerline of the footbridge downstream of Valley Stream Boulevard. Motts Creek, during the January 1979 storm, produced water-surface elevations that flooded the overbank areas upstream of the Motley Street culvert to within inches of cellar windows; at the Argyle Street culvert water levels from the same rainstorm did not overflow the road, but upstream water did overflow the banks and almost reached the houses.

2.4 Flood Protection Measures

No major flood protection measures exist in the City of Glen Cove, the Town of Oyster Bay, or the Villages of Baxter Estates, Cedarhurst, Centre Island, Flower Hill, Freeport, Hewlett Bay Park, Hewlett Neck, Kings Point, Lattingtown, Laurel Hollow, Manorhaven, Massapequa Park, Plandome Manor, Port Washington North, Rockville Centre, Roslyn, Roslyn Harbor, Russell Gardens, Saddle Rock, Sands Point, Sea Cliff, Valley Stream, and Woodsburgh.

In the City of Glen Cove, the Town of Oyster Bay, the Villages of Cove Neck and East Rockaway, the Village of Great Neck, along the Manhasset Bay shoreline,

adjacent to the sewage disposal area, some of the coastline in the Village of Great Neck Estates, the Villages of Hewlett Harbor, Kings Point, Lawrence, Manorhaven, Plandome Manor, Port Washington North, Saddle Rock, Sands Point, and Sea Cliff bulkheading, seawalls, or riprap has been installed to protect the area in some cases from minor tidal flooding, prevent soil erosion, and provide a stable area for development. The elevations of these structures are not all uniform and extreme storm tides can be expected to exceed their elevations.

Along stretches of the north shore of the Village of Bayville, bulkhead sea walls have been constructed to a general elevation of 9.4 (NAVD) feet, providing some protection from minor flooding. The east end of the village, much of which lies below 9.4 (NAVD) feet and is historically subject to regular flooding, is not protected by sea walls. Gabions have been installed as erosion protection for the central region of the south shore. Under the local zoning ordinance, new construction below 9.4 (NAVD) feet is prohibited.

The Village of Centre Island has building regulations that restrict the building of new structures or improvements to existing structures below a first floor elevation of 10.9 (NAVD) feet. Construction of sea walls to an elevation of 9.4 (NAVD) feet has been undertaken along the east facing shore, providing some protection from minor flooding.

In the Town of Hempstead, and the Villages of Hewlett and Woodsburgh, existing and planned flood damage prevention measures are mostly in the form of sea walls, dikes, bulkheads, groins, jetties, levees, breakwaters, and protective sand beach fills and dunes.

The Town of Hempstead Building Code calls for a minimum street elevation of 6.4 (NAVD) feet above mean sea level and a minimum first floor level of 7.9 (NAVD) feet above mean sea level with all walls and floors below this level monolithic, without openings, and waterproofed.

At various times during the development of the Village of Hewlett Harbor, low lying areas were filled in, and many of the streets that were flood prone were also elevated. In many cases property owners along the waterfront have raised the elevation of their lots above the street elevation. In general, most of the village has been raised to a sufficiently high elevation, so that only extremely high storm tides will affect residents. The Code of Ordinances of the Village of Hewlett Harbor, Ordinance No. 36 adopted on February 10, 1955, states that no building shall be hereafter constructed such that the floor used for living accommodations (excluding basements, open porches, breezeways, unheated areas or garages) shall have an elevation less than eight feet NGVD (Village of Hewlett Harbor, 1962).

In the Village of Hewlett Neck, the local zoning ordinance, floodplain management laws exist which prohibit the construction of new buildings or improvements to existing buildings at a first-floor elevation lower than the base flood elevation from Middle Bay in the FIS for the Town of North Hempstead published in 1978 (FEMA, 1983). This elevation is 9 feet NGVD 29 (Mr. John Masiello, 1981; Village Clerk, 1982).

The Code of Ordinances for the Village of Lawrence, No. 140, adopted in 1953 and revised in 1972, states that a minimum street elevation must be set equal to the spring tide elevation plus 3 feet, and that a minimum first floor elevation of 9.0 feet is required (Village of Lawrence, 1979).

The Village of Massapequa Park has placed riprap along the shore of Great South Bay to protect the park owned by the village. Residents have installed bulkheading along the canal shore. Otherwise, there is no organized or official flood protection system in Massapequa Park, and the village zoning regulations do not delineate any flood zones in the flood-prone areas.

Construction of the causeway across Beaver Lake in the Village of Mill Neck alleviated some flooding along part of the coastal region of Mill Neck Creek. Along the north coast and most of the east coast a bulkhead seawall has been installed, protecting against minor tidal flooding and erosion, and has suffered extensive damage from the wave action. No other form of protection against flooding is known to exist.

Flood damage prevention measures in the Town of North Hempstead are mostly sand beach fill, flood walls, bulkheads, groins, dikes, and levees throughout the area. Homes are generally built to have their first floor 2 feet above the ground level or, if at lower elevations, flood proofing or other flood prevention measures are being taken. Some of the wave action along the shoreline is diminished in places due to the steep slopes rising from the beaches or the shallowness of the waters.

The Village of Oyster Bay Cove has 1.3 miles of coastline, of which a part is lined with cliffs extending 20 feet high. Bulkheads have been constructed along stretches of the coast as protection against erosion and minor flooding. No other structures to protect the village from coastal flooding are known to exist.

In the local zoning ordinance of the Village of Oyster Bay Cove, floodplain management laws exist preventing new construction or improvements to old structures at a first floor elevation lower than 12 feet NGVD 29. Construction of basements and foundations must be of solid concrete, built up to the 12-foot elevation (NGVD 29).

Bulkheads have been installed in the Village of Roslyn on both banks of the channel which passes under Roslyn Viaduct, to provide a stable area for development. The bulkhead protects the adjacent area from minor tidal flooding and erosion. The elevation of the top of the bulkhead ranges between 7.4 and 8.9 (NAVD) feet.

The steep terrain on either side of the shoreline in the Village of Russell Gardens acts as a natural barrier against flooding. The village follows the New York State Building Code for the construction of new residences and improvements to existing property.

The Village of Sands Point has passed an ordinance that states that no building shall be constructed, such that, the floor used for living accommodations shall have an elevation less than 12 feet NGVD 29 above mean high water.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this FIS. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1-percent chance of annual exceedance) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this FIS. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Riverine Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the county.

Discharges for Massapequa Creek were developed by applying a log-Pearson Type III frequency analysis, as outlined by the Water Resources Council to the 15 years of record subsequent to 1960 of the USGS gaging station No. 1-3095 in Massapequa Lake County Park (Water Resources Council, 1976; U.S. Department of the Interior, 1937-1974). Extensive improvements of Massapequa Creek (i.e., channelization, dredging, etc.) in 1960 created such a noticeable increase in annual peak discharges that the years previous to this are not currently characteristic of the creek.

Because gaging station flows only represent the creek at that location, there was a need to develop flows downstream and upstream of this station. The routing procedure outlined in Water Supply and Wastewater Disposal was performed on the gaging station flows through Massapequa Reservoir (F. Gair, 1954). These outflows were again routed through Massapequa Lake.

New flows were developed at the Southern State Parkway on the main branch of Massapequa Creek. New flows were developed again for the main branch and the Bethpage Parkway branch of Massapequa Creek. Here the creek on the west and east sides of the Bethpage Parkway converge.

The USGS operates a gage on Valley Stream within the Village of Valley Stream, at Valley Stream Boulevard (No. 01311500), approximately 0.4 mile upstream of the corporate limits at Mill Pond and 400 feet upstream of the confluence of Branch 1 of Valley Stream. The gage has a tributary drainage area of 4.5 square miles with continuous gaging records dating from 1954 to the present. Using these basic data, a log-Pearson Type III analysis, without the expected probability adjustment, was performed according to the Water Resources Council Bulletin 17A (Water Resources Council, 1977).

To develop a relationship between the discharges at the gage and the discharges to be used at the downstream corporate limits, it was necessary to examine the drainage basin of Branch 1 of Valley Stream and compare its hydrologic characteristics with the main branch of Valley Stream. The drainage area of Branch 1 of Valley Stream of 4.8 square miles, which is similar in size and shape to the gaged drainage area of the main stream. The relationship used to transpose the gage discharges was derived by developing discharge ratios in both basins, accounting for the average stream slope, the storage characteristics of the stream segment and the basin population. The same methodology was used to estimate the discharge-frequency relationships for Motts Creek based on the gaged analysis for Valley Stream.

The factors described above were consolidated into a discharge index ratio which is used as a multiplier and applied to the known discharges at the gage to obtain the discharges at the point desired. The discharge index ration (DIR) is given as:

$$DIR = Q_1/Q_2 = (A_1/A_2)^m (S_1/S_2)^n (ST_1/ST_2)^p (I_1/I_2)^r$$

Where Q_2 refers to the discharge at the gage location and Q_1 refers to the point for which discharges are to be estimated, and A, S, ST, and I are the drainage area, channel slope, storage index, and impervious cover index, respectively.

The 0.2-percent annual chance discharge for Branch 1 of Valley Stream and Motts Creek were obtained by plotting the respective 10-, 2-, and 1-percent annual chance discharges on log probability paper and extrapolating the Branch 1 and Motts Creek data to 0.2-percent annual chance using the Valley Stream relationship as a guide.

The discharges for Valley Stream at the Village of Valley Stream corporate limits were obtained by adding the gage discharges for Valley Stream and Branch 1 of Valley Stream. The time of peak discharges for both sub areas are approximately equal and there is very little drainage area between the confluence of Branch 1 of Valley Stream with the main stem of Valley Stream and the corporate limits of the community.

Russells Creek, which has a drainage area of 1.29 square miles, has no stream gage located on it. The detailed investigation of streamflow in the drainage basin was made according to the methodology in the Soil Conservation Service (SCS) Technical Paper 149 (U.S. Department of Agriculture, 1973). This method uses the soil type and distribution of the drainage area, the land use, and zoning within the basin, street maps, 24-hour rainfall, and the average watershed land slope

(Village Historian, 1980; U.S. Department of Agriculture, 1976; State of New York, 1975; Hagstrom Company, Inc., 1978; U.S. Department of Commerce, 1963; and Lockwood, Kessler, and Barlett, 1971). To calculate the weighted curve number (CN) used to determine discharges for Russells Creek, two graphs bounding the valuated CN value were used, and a ratio was employed to obtain the final flows. The results of the graphic determination are shown as follows:

	24-Hour Rainfall Intensity (I)	CN Values 75	80	Calculated CN 77.3
10-percent annual chance flood	5.10	240	325	279
2-percent annual chance flood	6.35	335	450	388
1-percent annual chance flood	7.10	425	540	478
0.2-percent annual chance flood	8.30*	535	660	593

*Obtained by straight-line extrapolation of values on extreme-value probability paper.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 2, "Summary of Discharges."

TABLE 2 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
MASSAPEQUA CREEK					
At USGS gaging station	38.00	360	560	670	990
At Southern State Parkway	35.40	340	540	640	940
Just upstream of confluence of Massapequa Creek Tributary No. 1	15.60	200	320	380	550
Downstream of Massapequa Reservoir	0.00	280	450	530	810
Downstream of Massapequa Lake	0.00	250	390	460	720
MASSAPEQUA CREEK TRIBUTARY NO. 1					
Just upstream of confluence with Massapequa Creek	17.90	220	350	410	610
Just upstream of confluence of Massapequa Creek Tributary No. 2	8.90	140	220	260	380

TABLE 2 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
MASSAPEQUA CREEK TRIBUTARY NO. 2					
Just upstream of confluence with Massapequa Creek Tributary No. 1	9.00	140	220	260	380
MOTTS CREEK					
At Valley Stream downstream corporate limits	4.50	388	602	755	1,180
RUSSELLS CREEK					
At Russell Gardens downstream corporate limits	1.29	279	388	478	593
VALLEY STREAM					
At Valley Stream downstream corporate limits	9.30	350	1,098	1,377	2,206
At USGS gaging station	4.50	235	423	532	876

3.2 Riverine Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Some cross sections for Massapequa Creek, Massapequa Creek Tributary No. 1, and Massapequa Creek Tributary No. 2 were obtained from field surveys, and others were developed from construction plans. These cross sections were spaced at specified intervals along the stream channel so that hydraulic properties would be accurately modeled by the computer.

For Russells Creek, Valley Stream, and Motts Creek, below-water cross sections were obtained from field surveys. Overbank topography for Russells Creek was obtained from aerial photographs taken in 1971 and topographic maps (Lockwood, Kessler, and Bartlett, 1971). Overbank topography for Valley Stream and Motts Creek was obtained from strip aerial photography taken in December 1978, at a scale of 1:4,800 (Geod Aerial Mapping, Inc., 1978). All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry.

Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (USACE, 1991).

For Russells Creek, the computer model was calibrated using high-water marks from the January 1979 flood, which were obtained from interviews with local residents and Village of Russell Gardens officials.

Starting water-surface elevations for Massapequa Creek began at Massapequa Lake by applying a spillway analysis at the downstream end of the lake, where there are two spillways flowing into tidal waters.

Starting water-surface elevations for Russells Creek were determined by performing rating curve analyses on the culvert whose entrance is located upstream of Great Neck Road. This method was used due to the varying hydraulic effects a culvert of this size has on water-surface elevations.

Starting water-surface elevations for Valley Stream and Motts Creek were developed using the slope/area method at the downstream end of the open channel with the tidal influence due to Head of bay superimposed on it. The computer models for Valley Stream and Motts Creek were calibrated using high-water marks from the January 1979 flood, which were obtained from interviews with residents and officials of the Village of Valley Stream.

Roughness factors (Manning's "n") were chosen by engineering judgment and based on field observations of the stream and floodplain areas. The channel and overbank "n" values for the streams studied by detailed methods are shown in the following tabulation:

Stream	Channel "n"	Overbank "n"
Massapequa Creek	0.025-0.040	0.030-0.080
Massapequa Creek Tributary No. 1	0.025-0.040	0.030-0.080
Massapequa Creek Tributary No. 2	0.025-0.040	0.030-0.080
Motts Creek	0.015-0.048	0.030-0.100
Russells Creek	0.015-0.080	0.035-0.100
Valley Stream	0.015-0.035	0.100-0.250

Riverine Approximate Analyses

For the flooding sources studied by approximate methods in the Village of Laurel Hollow, the 1-percent annual chance flood elevation was determined by conversations with village officials and referring to the USGS flood-prone area maps of the study area (Village Building Inspector, 1979; Village Deputy Clerk, 1979; Lockwood, Kessler, and Bartlett, 1971; and U.S. Department of the Interior, 1968).

The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All qualifying bench marks within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)

- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)

- Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monument below frost line)

- Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS bench marks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for bench marks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their Web site at www.ngs.noaa.gov.

It is important to note that temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with this FIS and FIRM. Interested individuals may contact FEMA to access this data.

3.3 Coastal Hydrologic Analyses

Initial Countywide Analyses

For the April 2, 1997, FIS, each community within Nassau County, except the Villages of Atlantic Beach, Bellerose, Brookville, East Hills, East Williston, Farmingdale, Floral Park, Garden City, Great Neck Plaza, Hempstead, Island Park,

Kensington, Lake Success, Lynbrook, Malverne, Matinecock, Mineloa, Munsey Park, Muttontown, North Hills, New Hyde Park, Old Brookville, Old Westbury, Plandome, Plandome Heights, Port Washington North, Roslyn Estates, South Floral Park, Stewart Manor, Thomaston, Upper Brookville, Westbury, and Williston Park had a previously printed FIS report describing each community's hydrologic analyses. This section compiles information regarding stillwater surge elevation determination methodology from previous FISs for Nassau County communities located along the Long Island Sound.

The stillwater surge elevation is the elevation of the water due solely to the effects of the astronomical tides, storm surge, and wave setup on the water surface.

For all of the coastal flooding sources studied by detailed methods, a Log Pearson Type III analysis, without expected probability, was performed for the data of all long-term gages in the particular community's vicinity (Water Resources Council, 1977).

For the Villages of Baxter Estates, Glen Cove, Great Neck Estates, Manorhaven, Port Washington North, Roslyn, Roslyn Harbor, and Sands Point, the results of this analysis were stage-related to the community through gage records from Glen Cove Yacht Club.

The hydrologic analyses for the flooding sources studied by detailed methods in the Village of Flower Hill were taken from the FISs for the Villages of Roslyn and Roslyn Harbor, which are described above (FEMA, July 1983; FEMA, June 1983).

For the Village of Saddle Rock, the results of the analysis were stage-related to the community.

For the Village of Lattingtown, stillwater elevations for Long Island Sound were determined by interpolating between the elevations obtained from the FISs for the City of Glen Cove and the Town of Oyster Bay (FEMA, 1984; FEMA, 1982). The stillwater elevations for Mill Neck Creek were directly obtained from the FIS for the Village of Bayville (FEMA, 1983).

The stillwater-surge elevations for each flooding source studied in the Villages of Bayville, Centre Island, Cove Neck, Laurel Hollow, and Oyster Bay Cove were determined by performing a Log Pearson Type III analysis, without expected probability, on the data from the Willets Point gage, with a period of record from 1931 to 1976, and the Stamford gage (Water Resources Council, 1977). These elevations were stage-related to the shoreline of the communities through gage records from Eaton's Neck, with a period of record from August 1, 1957, to December 31, 1958. Due to the complexity of the coastline of these communities, a numerical estuarine model was developed to study the surge levels throughout Oyster Bay Harbor (Harris-Toups Associates, 1979). The results of the numerical model were used to verify the water level elevations along the shoreline of Oyster Bay Harbor. For the Villages of Cove Neck, Laurel Hollow, and Mill Neck, the results of the numerical model were used to verify the water level elevations along the shorelines of Oyster Bay Harbor, Cold Spring Harbor, Mill Neck Creek, and Beaver Lake.

For the Villages of Great Neck, Kings Point, and Plandome Manor, the results of the log-Pearson analysis were stage-related to the community through gage records from Glen Cove Yacht Club. Elevations for Udalls Mill Pond were taken from the FIS for the Village of Saddle Rock (FEMA, unpublished).

The stillwater-surge elevation is the elevation of the water due solely to the effects of the astronomical tides, storm surges, and water setup on the water surface. The inclusion of wave heights, which is the distance from the trough to the crest of the wave, increases the water-surface elevations. The height of a wave is dependent upon wind speed and its duration, depth of water, and length of fetch. The wave crest elevation is the sum of the stillwater elevation and the portion of the wave height above the stillwater elevations.

The stillwater elevations for the flooding sources studied by detailed methods in the Long Island Sound portion of the Town of Oyster Bay were taken from the FISs for the Villages of Bayville and Oyster Bay Cove, Massapequa Park, Mill Neck, and Roslyn Harbor (FEMA, unpublished; FEMA, 1983; FEMA, unpublished; FEMA, unpublished; FEMA, unpublished; FEMA, unpublished).

The locations of the Battery, Bridgeport, Fort Hamilton, Montauk, New London, Port Jefferson, and Willets Point gaging stations are shown in Figure 4, "Location Map of Tidal Gaging Stations."

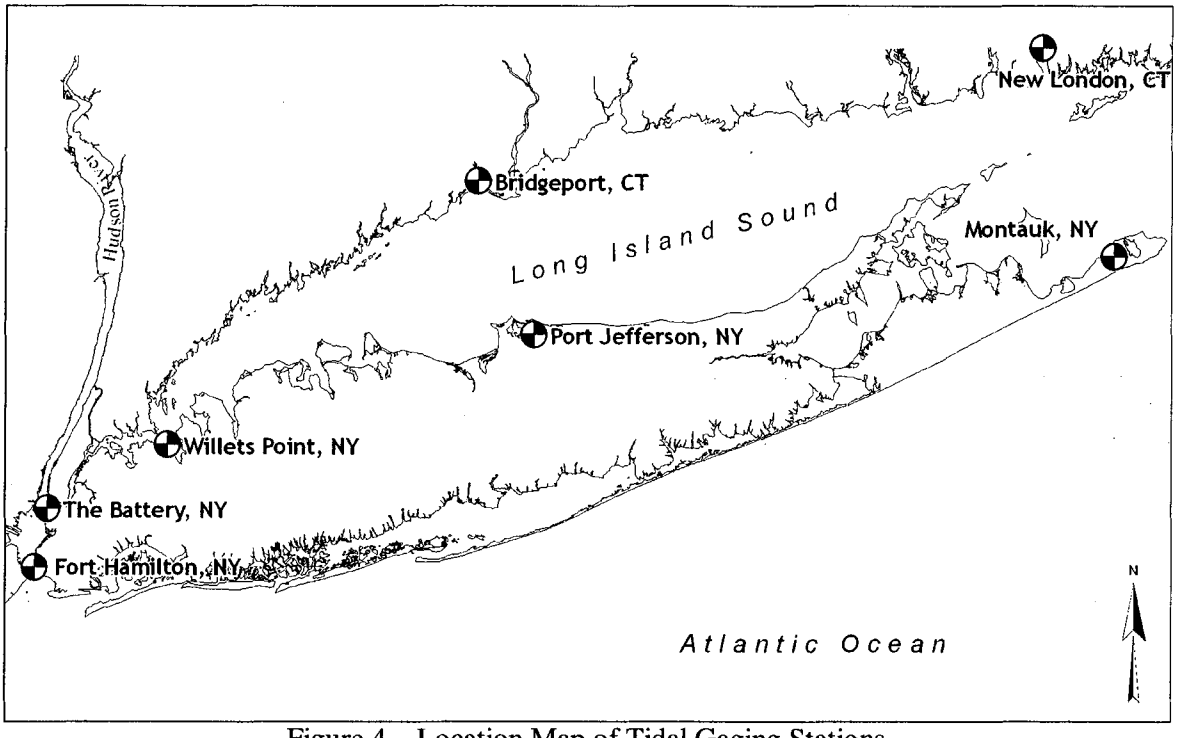


Figure 4 – Location Map of Tidal Gaging Stations

Countywide Revised Analyses

The increased period of record (25 years for the majority of communities) since the previous stillwater analyses was relatively quiescent, and analysis conducted by the National Oceanic and Atmospheric Administration (NOAA) suggested that stillwater elevations had slightly decreased over previous values (Zervas, 2005). Based on this information, it was necessary to update stillwater elevations for Nassau County. This was accomplished by implementing stage frequency analysis conducted by the USACE, New York District for the Atlantic coast and south shore bays, and conducting an updated gage analysis for the Long Island Sound coast and bays. The updated gage analysis for the Long Island Sound builds on the analyses conducted for the individual communities described above from a compilation of previous studies.

The New York District of the USACE conducted a baseline stage frequency elevation study for the south shore of Long Island (USACE, 2006) as part of the Fire Island to Montauk Point Reformulation Project (FIMP). The modeling method for the study involved simulation of historical tropical and extratropical events using the ADvanced CIRCulation (ADCIRC) and Delft3D hydrodynamic models. The ADCIRC model was used to simulate water levels along the open coast, whereas the Delft3D model was employed to simulate back-bay water levels. The models were calibrated to tidal water levels and model performance was extensively verified against 12 historical events, including notable events such as the September 1938 hurricane, March 1962 northeaster, and December 1992 northeaster. Modeled results had excellent agreement with measured water levels for both types of events. A total of 14 historical tropical events and 22 extratropical storms were simulated to develop stillwater elevations. The Empirical Simulation Technique (EST) was used to calculate the combined stillwater frequency curves for the 10-, 2-, 1-, and 0.2-percent annual chance stillwater elevations. The results of the USACE FIMP study are preliminary at this time. The USACE FIMP study represented the best available data and offered a significant improvement in data quality, resolution and accuracy over the 1997 FIS stillwater elevations for the south shore of Nassau County (FEMA, 1997). The base stillwater elevations from the 1997 FIS were over 27 years old (conducted in 1981). Subsequent to that study, three surge events greater than the previous storm of record (Hurricane Donna) have occurred. For these reasons, the USACE stillwater elevations, which have been subject to independent technical review, were adopted for this study. The terms of use of this data are provided in a Memorandum of Understanding between USACE, New York District, and FEMA Region 2, executed on February 4, 2008.

In addition to the hydrodynamic models, two-dimensional wave modeling and was carried out by the USACE for the FIMP study. Results from these models were not included in the updated stillwater levels, and wave effects were modeled separately for this study using standard FEMA methodologies.

A gage analysis at New London, Connecticut NOAA water level station was undertaken to update stillwater elevations for communities along the Long Island Sound coast of Nassau County. The New London station was chosen based on the length and quality of water level record, in addition to representation of

significant historical surge events. Gages at Willets Point, New York, and Port Jefferson, New York, were in closer proximity to the study area, but lacked the quality and quantity of data present at the New London station. Stage frequency relationships were developed for the period of record between 1938 and 2006 using the L-moments Generalized Extreme Value (GEV) statistical method, recommended as a standard FEMA methodology (FEMA, 2007). The potential of maximum surge occurring at low or high tide during tropical events was accounted for by employing a mixed population sampling method. Comparison of results for the 1-percent annual chance return period against the NOAA value (Zervas, 2005) showed minimal difference and provided validation of the analysis. Results are reported in Table 3.

TABLE 3 - STILLWATER ELEVATIONS AS DETERMINED FOR THE NEW LONDON, CONNECTICUT, GAGE

ELEVATION, FEET NAVD 88			
10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
5.18	6.73	7.45	9.28

Existing stillwater elevations (FEMA, 1997) were revised by applying the differences between the updated and existing analysis (FEMA, 1983) at New London, Connecticut, to the stillwater return period elevations at each study transect in Nassau County. Differences at the 10-, 2-, 1-, and 0.2-percent annual chance floods at New London, Connecticut, are given in Table 4.

TABLE 4 - DIFFERENCE BETWEEN PREVIOUS AND UPDATED STILLWATER ELEVATIONS AT NEW LONDON, CONNECTICUT

	ELEVATION, FEET			
	10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
PRE-EXISTING NGVD 1929	7.1	9	10	12.4
PRE-EXISTING NAVD 1988*	6.1	8	9	11.4
UPDATED NAVD 1988	5.18	6.73	7.45	9.28
DIFFERENCE:	-0.95	-1.3	-1.58	-2.15

*CONVERSION FACTOR OF 0.97 FT

The stillwater elevations for the 10-, 2-, 1-, and 0.2-percent annual chance floods have been determined for all of the flooding sources studied by detailed methods, and are summarized in Table 5, "Summary of Stillwater Elevations."

TABLE 5 – SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
ATLANTIC OCEAN				
Shoreline within the Town of Hempstead from Silver Point to about 5,000 feet west of Jones Inlet	6.7	8.8-8.9	9.9-10.2	12.0-12.5
Shoreline within the Town of Hempstead from about 5,000 feet west of Jones Inlet to Jones Inlet	6.6	8.5	9.4	11.2
Shoreline from Jones Inlet within the Town of Hempstead to the Oyster Bay/Babylon corporate limits	6.7	8.9-9.0	10.2-10.3	12.6-12.7
BALDWIN BAY				
Shoreline within the Village of Freeport and the Town of Hempstead	6.3-6.4	7.4-7.5	7.8-7.9	8.5-8.6
BROSEWERE BAY	6.7	8.2	8.9	9.8
EAST BAY				
Shoreline within the Town of Hempstead	5.6-6.0	6.7-7.1	7.0-7.4	7.7-8.1
HEAD OF BAY				
Shoreline within the Town of Hempstead	7.2	9.8	11.4	14.2
HEMPSTEAD HARBOR				
Shoreline within the Village of Sands Point from about 2,500 feet east of Sands Point to Mott Point	7.3	9.9-10.1	10.9	13.5
HEWLETT BAY				
Shoreline within the Town of Hempstead	6.7	8.1	8.7	9.5
LITTLE NECK BAY				
Shoreline within the Villages of Great Neck Estates, Saddle Rock and within the Village of Kings Point from the Saddle Rock/Kings Point corporate limits to Elm point	6.8	9.6-9.9	10.2	12.8

*North American Vertical Datum of 1988

TABLE 5 – SUMMARY OF STILLWATER ELEVATIONS – continued

FLOODING SOURCE AND LOCATION	ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
LONG ISLAND SOUND				
Shoreline within the Village of Kings Point from Elm point to about 4,500 feet southwest of Hewlett Point	6.9	9.9	10.4	13.0
Shoreline within the Village of Kings Point from about 4,000 feet southwest of Hewlett Point to about 3,500 feet southeast of Hewlett Point	7.0	9.9	10.6	13.0
Shoreline within the Village of Sands Point from Plum Point to about 2,500 feet east of Sands Point	7.0	9.9	10.6	13.0
Shoreline from Mott Point within the Village of Sands Point to about 1.1 mile southwest of Weeks Point within the City of Glen Cove	7.3	9.9-10.1	10.9	13.5
Shoreline within the City of Glen Cove from about 1.1 mile southwest of Weeks Point to about 3,500 feet southeast of Matinecock Point	6.3-7.0	8.7-9.1	10.6	13.0
Shoreline from about 3,500 feet southeast of Matinecock Point within the City of Glen Cove to Peacock Point within the Village of Lattingtown	6.3	8.7	10.5	13.0
Shoreline within the Village of Lattingtown from Peacock Point to about 2,000 feet east of Peacock Point	6.3	8.7	10.1	12.6
Shoreline within the Village of Lattingtown from about 2,000 feet east of Peacock Point to about 4,000 feet east of Peacock Point	6.3	8.7	9.9	12.4
Shoreline within the Village of Lattingtown from about 4,000 feet east of Peacock Point to Fox Point	6.3	8.7	9.7	12.1
Shoreline from about 4,000 feet east of Peacock Point to Fox Point within the Village of Lattingtown to Rock Point within the Village of Center Island	6.3	8.7	9.4	12.0
MANHASSET BAY				
Shoreline from about 3,500 feet southeast of Hewlett Point within the Village of Kings Point to Plum Point within the Village of Sands Point	7.3	9.9-10.2	10.9	13.5

*North American Vertical Datum of 1988

TABLE 5 - SUMMARY OF STILLWATER ELEVATIONS - continued

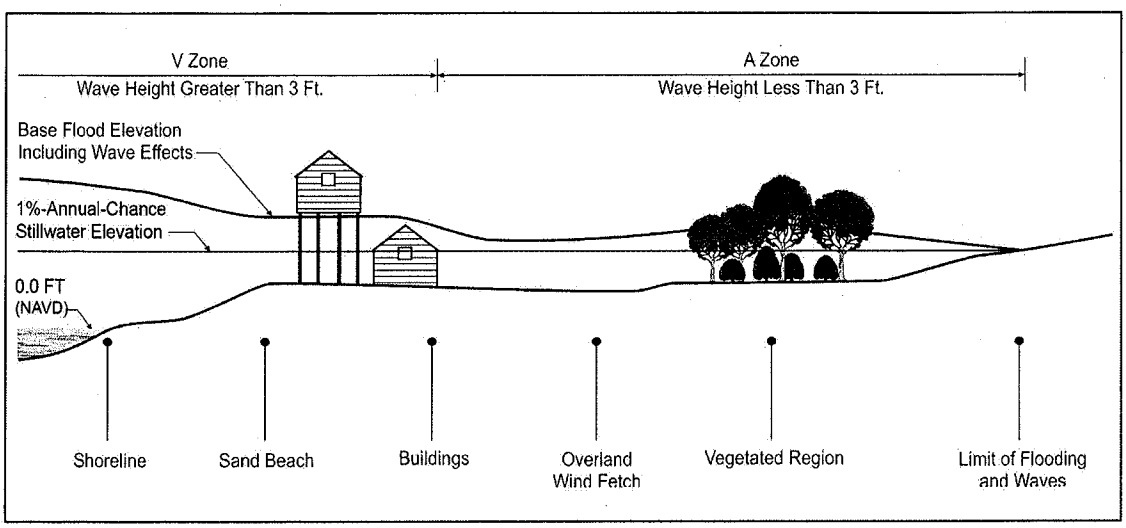
FLOODING SOURCE AND LOCATION	ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
MIDDLE BAY				
Shoreline within the Town of Hempstead	6.5	7.7-7.8	8.1-8.3	8.7-8.9
OYSTER BAY				
From Rock Point within the Village of Center Island to the Laurel Hollow/Huntington corporate limits	6.3	8.7-8.8	9.4	12.0
REYNOLDS CHANNEL				
Southern Shoreline within the Village of Lawrence	6.7	8.6	9.4-9.6	11.1-11.4
SOUTH OYSTER BAY				
Shoreline within the Town of Hempstead	5.2-5.5	6.2-6.4	6.5-6.8	7.2-7.5
WRECK LEAD CHANNEL				
Shoreline within the Town of Hempstead	6.6-6.7	7.9-8.0	8.4	9.0-9.1

*North American Vertical Datum of 1988

3.4 Coastal Hydraulic Analyses

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The USACE has established the 3.0-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (USACE, 1975). The 3.0-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame and brick veneer structures.

Figure 5, "Transect Schematic," illustrates a profile for a typical transect along with the effects of energy dissipation and regeneration on a wave as it moves inland. This figure shows the wave crest elevations being decreased by obstructions, such as buildings, vegetation, and rising ground elevations, and being increased by open, unobstructed wind fetches. The figure also illustrates the relationship between the local still water elevation, the ground profile and the location of the V/A boundary. This inland limit of the coastal high hazard area is delineated to ensure that adequate insurance rates apply and appropriate construction standards are imposed, should local agencies permit building in this coastal high hazard area.



TRANSECT SCHEMATIC Figure 5

For the south shores of Nassau County the deepwater wave conditions associated with the 1-percent annual chance storm were developed using the Automated Coastal Engineering System (ACES) Extreme Significant Wave Heights technique. The approach developed by Goda (1998) fits a probability distribution to an array of extreme significant wave heights. Data from seventeen Wave Information Study (WIS) hindcast stations and one NOAA buoy, located along Nassau and Suffolk County south shores, were selected to represent the storms climatology (accounting for both tropical and extra-tropical storms). The maximum wave height was extracted from the record at each selected station and fit into a Weibull distribution. The results at the NOAA buoy (#44025) were selected to be representative of the 1-percent annual chance wave conditions based on the quality of data fit and comparison with historical observational data.

The extreme analysis technique returns only a wave height. The associated wave period was determined based on observed deepwater wave steepness of tropical and extratropical storms (H/L = 0.035 as average between wave steepness of the two type of events - as per FEMA, 2003). The wave calculated at the NOAA station was then adjusted in order to be representative of deepwater conditions, and then applied at each transect location along the Nassau County shoreline exposed to the Atlantic Ocean.

For the Long Island Sound shore of Nassau County, and in bays and harbors where restricted fetch limits wave development, a fetch analysis was performed using the Automated Coastal Engineering System (ACES) Wave Prediction technique to determine the starting wave condition at each transect location. Wind direction, length of fetch and decay in wind intensity due to land friction were accounted for at each calculation location.

FEMA guidelines for V Zone mapping define H_s as the significant wave height or the average over the highest one third of waves and T_s as the significant wave

period associated with the significant wave height. Mean wave conditions are described as:

$$\overline{H} = H_s \times 0.626$$
$$\overline{T} = T_s \times 0.85$$

where $\overline{H}$ is the average wave height of all waves and $\overline{T}$ is the average wave period.

The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, transects were spaced at larger intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects. Transects are shown on the FIRM panels for the Nassau County, New York.

The transect profiles were obtained using bathymetric and topographic data from various sources. The topographic dataset is predominately comprised of vector contour data provided by Nassau County, New York. These were derived from April 1993 stereo photography and New York State High Resolution Statewide Digital Orthoimagery Program photography collected April 2004. The data were delivered in NAD 83 New York State Plane East, Long Island, in units of feet. Elevations were relative to NGVD 1929. To facilitate floodplain analysis, the provided vector data were processed into a digital elevation model (DEM). This was accomplished in a two-step process. First, a triangulated irregular network (TIN) was created from the vector contours. Quality control showed that contours were occasionally incomplete, especially in developed areas. The contours and TIN were edited as needed to correct for this, and ensure the best representation of the topographic surface. Once this editing was complete, the TIN was converted to a DEM surface with a grid spacing of 10 feet. Finally, the topographic DEM surface was limited to areas above the shoreline and within the county boundaries. On the south shore, the topography was limited to the continuous 30-foot contour. The base elevation dataset vertical datum was converted from NGVD 1929 to NAVD 1988 using Corpscon 6.0. The relative difference between the two datums was determined on a 100 ft grid spanning the entire domain of the topographic data coverage. The conversion was applied by adding the datum raster to the base topographic DEM. The average difference in elevation within the domain of the topographic data was -1.1 feet, where NAVD = NGVD - 1.1 feet.

More recent topographic LiDAR data, collected by the USACE Compact Hydrographic Airborne Rapid Total Survey (CHARTS) system were available for the barrier islands on the south shore of Nassau County. In accordance with FEMA's "best available data" policy, this data was incorporated into the topographic dataset. CHARTS bare earth LiDAR data collected in October and November 2005 for the Atlantic coast of Long Island were provided by the

USACE Joint Airborne LiDAR Technical Center of Expertise (JALBTCX) in NAD 83 UTM Zone 18 North coordinates, and the vertical datum was referenced to NAVD 88 in units of meters. The data were reprojected into NAD 83 New York State Plane East, Long Island, in units of feet to facilitate integration into the main topographic dataset. Complete coverage of the topographic portion of Long and Jones Beach Islands was not provided by the CHARTS data. Edge matching was a concern after integration of the CHARTs data; however, review subsequent to integration of the two datasets showed minimal differences.

Bathymetric data was primarily sourced from NOAA National Ocean Service (NOS) hydrographic surveys dating from 1884-2000. Vertical datum varied by NOS survey, usually in mean lower low water (MLLW), although some surveys were in mean low water (MLW). All depths were brought to mean sea level (MSL) using established datum relationships sourced from NOAA water level stations. Data in Long Island Sound (LIS), the south shore bays (i.e., Great South Bay), and the open ocean were treated with the appropriate conversion factors from gages available within each basin. Review of NGS available datum relationships between MSL and NAVD 1988 showed that the average difference in the region was 0.18 foot, with a standard deviation of 0.08 foot. This value was considered within the vertical accuracy of the datasets and a passive conversion was assumed. Data were then reprojected to the NAD 83 New York State Plane East, Long Island, coordinates in units of feet.

Voids in the base bathymetry were filled with the best available supplemental data. These data consisted of NOAA Electronic Navigation Chart (ENC) soundings, and the NOAA National Geophysical Data Center coastal relief model. Data were reprojected and the vertical datum and units were converted as necessary for implementation into the main bathymetric dataset.

For the south shore bathymetry, the age of the NOS soundings in the nearshore and lack of water penetration by the CHARTS resulted in a poor representation of the nearshore bathymetry and a problematic tie-in with the topographic surface. An improved tie-in between the bathymetric and topographic surfaces was achieved by incorporating Atlantic Coast of New York Monitoring Program coastal cross-sections into the bathymetry. The most completed coverage was provided by the April 2001 profiles. These data were processed to removal all topographic elevations, and then a vertical datum conversion from NGVD 1929 to NAVD 1998 was applied using Corpscon 6.0. The profiles were then incorporated into the bathymetric dataset and any overlapping data from older hydrographic surveys were removed.

Storm-induced beach erosion is well documented along the Atlantic and Long Island Sound coastlines of Nassau County. Review of the literature showed that the standard FEMA (2003) and FEMA (2007) Guidelines and Specifications for Flood Hazard Mapping Partners methodology were applicable for the Atlantic coast of Suffolk County. Where dunes were identified and delineated, the VE Zone was mapped up to the extent of the Primary Frontal Dune (PFD). Non-standard erosion techniques were applied to glacial cliffs and bluffs along the Long Island Sound shoreline. These techniques are summarized below.

Erosion methodologies for glacial cliffs and bluffs were guided by literature review and observed historical storm-induced erosion. For glacial cliffs, the standard area of 540 square feet was eroded. The standard area of 540 square feet resulted in excessive erosion for bluffs morphologies and therefore the erosion area was decreased to 175 square feet. This value is similar to methodologies adopted for the Great Lakes. In addition, the standard inflection point for the eroded profile transition from the middle to steep slopes was changed from the 1-percent annual chance stillwater elevation to an elevation of 4.5 feet for cliffs and bluffs along Long Island Sound. This change in elevation for the inflection point resulted in an eroded profile more representative of the erosion response observed in historical events and prevents excessive retreat areas due to improper profile geometry.

Nearshore wave-induced processes, such as wave setup and wave runup, constitute a greater part of the combined wave envelope than storm surge due to the islands' high cliffs and location exposed to ocean waves. For this particular environment, the Direct Integrated Method (FEMA, 2007) was used to determine wave setup along the coastline.

Wave height calculation used in this study follows the methodology described in the FEMA (2003) and the FEMA (2007) Guidelines and Specifications for Flood Hazard Mapping Partners.

RUNUP 2.0 was used to predict wave runup value on natural shore then adjusted to follow the FEMA (2005) "Procedure Memorandum No. 37" that recommends the use of the 2% wave runup for determining base flood elevations. Wave runup on vertical structures, withstanding the 1-percent annual chance event, was computed using the Shore Protection Manual (SPM) Method. For wave run-up at the crest of a slope that transitions to a plateau or downslope, run-up values were determined using the "Methodology for wave run-up on a hypothetical slope" as described in the FEMA (2003) and the FEMA (2007) Guidelines and Specifications for Flood Hazard Mapping Partners.

Figure 6, "Transect Location Map," illustrates the location of each transect. Along each transect, wave envelopes were computed considering the combined effects of changes in ground elevation, vegetation and physical features. Between transects, elevations were interpolated using topographic maps, land-use and land-cover data, and engineering judgment to determine the aerial extent of flooding. The results of the calculations are accurate until local topography, vegetation, or cultural development within the community undergo major changes. The transect data for the county are presented in Table 6, "Transect Descriptions," which describes the location of each transect. In addition, Table 6, provides the 1-percent annual chance stillwater, wave setup and maximum wave crest elevations for each transect along the island coastline. In Table 7, "Transect Data," the flood hazard zone and base flood elevations for each transect flooding source is provided, along with the 10-, 2-, 1-, and 0.2-percent annual chance stillwater elevations for the respective flooding source.

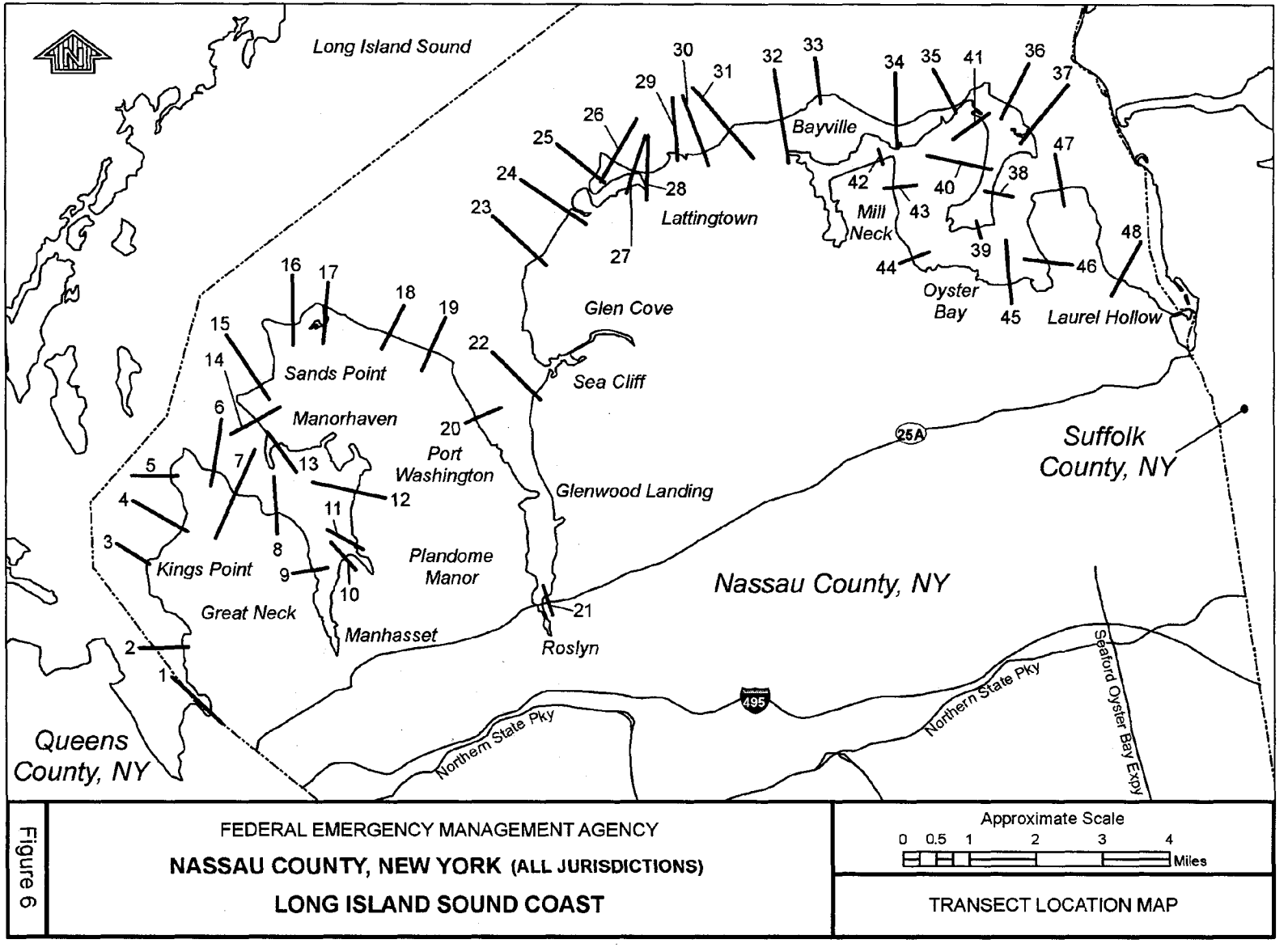


Figure 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NEW YORK (ALL JURISDICTIONS)

LONG ISLAND SOUND COAST

TRANSECT LOCATION MAP

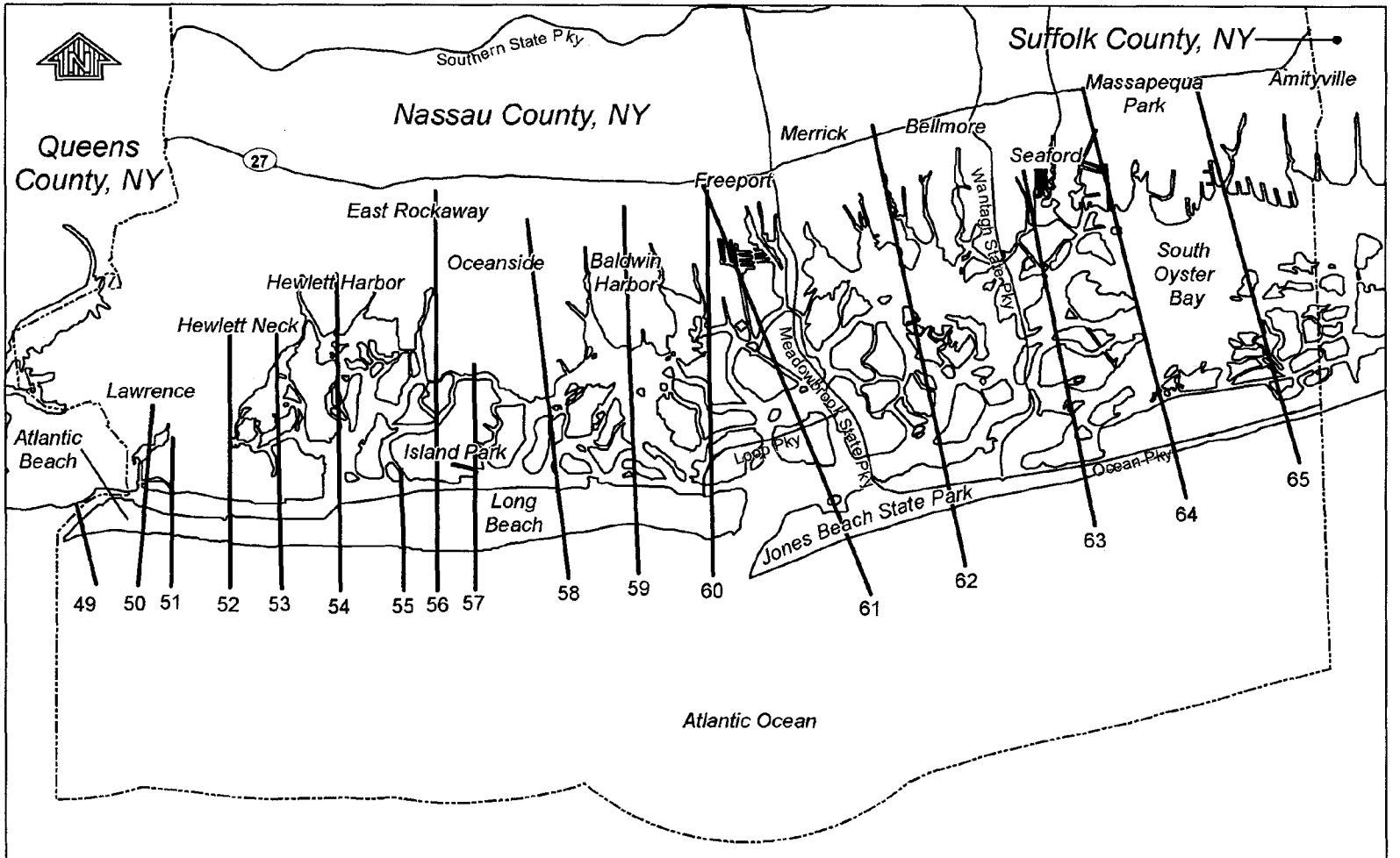


Figure 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NEW YORK (ALL JURISDICTIONS)

ATLANTIC COAST

Approximate Scale

0 0.5 1 2 3 4 Miles

TRANSECT LOCATION MAP

TABLE 6 - TRANSECT DESCRIPTIONS

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
1	On the Little Neck Bay coastline, on the north side of Long Island, approximately 1,220 feet southwest of intersection of Cedar Drive and Aspen Place, located in North Hempstead, at N 40.780553°, W 73.746432°	10.2	0.6	15.8
2	On the Little Neck Bay coastline, on the north side of Long Island, approximately 550 feet northwest of intersection of Long Fellow Road and Grist Mill Lane, located in North Hempstead, at N 40.794688°, W 73.753707°	10.2	0.8	24.9[1]
3	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,120 feet northwest of intersection of Steamboat Road and Elmridge Road, located in North Hempstead, at N 40.813476°, W 73.764757°	10.2	1.1	16.6
4	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,200 feet northwest of intersection of Kings Point Road and Lighthouse Road, located in North Hempstead, at N 40.820563°, W 73.753916°	10.4	0.7	15.9
5	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,440 feet northwest of intersection of Pond Road and Rodney Lane, located in North Hempstead, at N 40.832168°, W 73.756630°	10.6	0.8	16.5[1]
6	On the Manhasset Bay coastline, on the north side of Long Island, approximately 1,550 feet northeast of intersection of Kings Point Road and Pond Road, located in North Hempstead, at N 40.832720°, W 73.745134°	10.6	0.9	16.9
7	On the Manhasset Bay coastline, on the north side of Long Island, approximately 1,340 feet northeast of intersection of Split Rock Dr and Farmers Road, located in North Hempstead, at 40.828007°, W 73.738895°	10.9	0.8	17.0
8	On the Manhasset Bay coastline, on the north side of Long Island, approximately 1,550 feet northeast of intersection of Blossom Road and Broadlawn Avenue, located in North Hempstead, at N 40.823704°, W 73.727019°	10.9	0.7	16.8

[1]Wave runup elevation

*North American Vertical Datum of 1988

TABLE 6 - TRANSECT DESCRIPTIONS – continued

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
9	On the Manhasset Bay coastline, on the north side of Long Island, approximately 1,140 feet northeast of intersection of Shore Road and Rogers Road, located in North Hempstead, at N 40.811446°, W 73.716557°	10.9	0.4	14.2
10	On the Manhasset Bay coastline, on the north side of Long Island, approximately 770 feet northwest of intersection of Bayview Road and Heritage Way, located in North Hempstead, at N 40.813850°, W 73.706949°	10.9	0.7	19.0[1]
11	On the Manhasset Bay coastline, on the north side of Long Island, approximately 950 feet northwest of intersection of Plandome Road and Water Lane, located in North Hempstead, at N 40.816764°, W 73.703885°	10.9	0.6	16.7
12	On the Manhasset Bay coastline, on the north side of Long Island, approximately 1,610 feet southwest of intersection of Carlton Avenue and Prospect Avenue, located in North Hempstead, at N 40.828626°, W 73.703840°	10.9	0.5	15.2
13	On the Manhasset Bay coastline, on the north side of Long Island, approximately 1,200 feet southwest of intersection of Cornwall Lane and Prospect Lane, located in North Hempstead, at N 40.839059°, W 73.726847°	10.9	0.6	14.6
14	On the Manhasset Bay coastline, on the north side of Long Island, approximately 1,570 feet northwest of intersection of Hicks Lane and Barkers Pt Road, located in North Hempstead, at N 40.844274°, W 73.732651°	10.6	0.7	22.4[1]
15	On the Long Island Sound coastline, on the north side of Long Island, approximately 3,160 feet northwest of intersection of Hicks Lane and Barkers Pt Road, located in North Hempstead, at N 40.851481°, W 73.731051°	10.6	0.7	16.4
16	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,170 feet northeast of intersection of Middle Neck Road and Lighthouse Road, located in North Hempstead, at N 40.865230°, W 73.721887°	10.6	1.2	17.6

[1]Wave runup elevation

*North American Vertical Datum of 1988

TABLE 6 - TRANSECT DESCRIPTIONS – continued

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
17	On the Long Island Sound coastline, on the north side of Long Island, approximately 4,630 feet northwest of intersection of Middle Neck Road and Longwood Road, located in North Hempstead, at N 40.869610°, W 73.712278°	10.9	1.9	19.4
18	On the Long Island Sound coastline, on the north side of Long Island, approximately 3,270 feet northeast of intersection of Middle Neck Road and Luckenbach Lane, located in North Hempstead, at N 40.862931°, W 73.694274°	10.9	1.6	20.0
19	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,940 feet northeast of intersection of Mimosa Lane and Old House Lane, located in North Hempstead, at N 40.859189°, W 73.682512°	10.9	1.3	18.2
20	On the Hempstead Harbor coastline, on the north side of Long Island, approximately 2,720 feet northeast of intersection of East Road and Middle Road, located in North Hempstead, at N 40.844740°, W 73.668900°	10.9	1.3	22.5[1]
21	On the Hempstead Harbor coastline, on the north side of Long Island, approximately 770 feet northwest of intersection of Bryant Avenue and Wittes Lane, located in North Hempstead, at N 40.805712°, W 73.649359°	10.9	0.3	13.8
22	On the Hempstead Harbor coastline, on the north side of Long Island, approximately 730 feet northwest of intersection of Prospect Avenue and Maple Avenue, located in Oyster Bay, at N 40.849822°, W 73.652273°	10.9	1.0	17.4
23	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,300 feet northwest of intersection of Seaward Avenue and Old Estate Road, located in Oyster Bay, at N 40.879801°, W 73.651114°	10.6	1.2	17.4
24	On the Long Island Sound coastline, on the north side of Long Island, approximately 3,740 feet northwest of intersection of Pond View Drive and Dosoris Lane, located in Oyster Bay, at N 40.889790°, W 73.642261°	10.6	0.9	16.9

[1]Wave runup elevation

*North American Vertical Datum of 1988

TABLE 6 - TRANSECT DESCRIPTIONS – continued

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
25	On the Long Island Sound coastline, on the north side of Long Island, approximately 360 feet northwest of intersection of Westland Drive and Shell Drive, located in Oyster Bay, at N 40.897725°, W 73.634195°	10.6	0.8	16.8
26	On the Long Island Sound coastline, on the north side of Long Island, approximately 940 feet northwest of intersection of Southland Drive and Eastland Drive, located in Oyster Bay, at N 40.900778°, W 73.629752°	10.6	2.1	19.1
27	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,050 feet east of intersection of Southland Drive and Eastland Drive, located in Oyster Bay, at N 40.898582°, W 73.623671°	10.6	1.9	18.8
28	On the Long Island Sound coastline, on the north side of Long Island, approximately 2,980 feet northwest of intersection of Beach Drive and Lattingtown Road, located in Oyster Bay, at N 40.898010°, W 73.619617°	10.5	1.3	17.7
29	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,800 feet northwest of intersection of Frost Creek Drive and Great Meadow Road, located in Oyster Bay, at N 40.902332°, W 73.610981°	10.1	1.9	24.3[1]
30	On the Long Island Sound coastline, on the north side of Long Island, approximately 890 feet northeast of intersection of Frost Creek Drive and Great Meadow Road, located in Oyster Bay, at N 40.902091°, W 73.603042°	9.9	1.4	16.9
31	On the Long Island Sound coastline, on the north side of Long Island, approximately 2,080 feet northwest of intersection of Sheep Lane and Lands End Road, located in Oyster Bay, at N 40.907098°, W 73.595273°	9.7	1.3	16.4
32	On the Long Island Sound coastline, on the north side of Long Island, approximately 910 feet northeast of intersection of Bayville Road and Oak Neck Beach Road, located in Oyster Bay, at N 40.909327°, W 73.580609°	9.4	1.5	16.4

[1]Wave runup elevation

*North American Vertical Datum of 1988

TABLE 6 - TRANSECT DESCRIPTIONS – continued

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
33	On the Long Island Sound coastline, on the north side of Long Island, approximately 480 feet northwest of intersection of Wayaawi Avenue and Sowanishin Place, located in Oyster Bay, at N 40.915412°, W 73.569862°	9.4	1.8	17.0
34	On the Long Island Sound coastline, on the north side of Long Island, approximately 170 feet northeast of intersection of Pine Park Avenue and Howard Road, located in Oyster Bay, at N 40.908683°, W 73.547827°	9.4	2.0	17.2
35	On the Long Island Sound coastline, on the north side of Long Island, approximately 1,870 feet northeast of intersection of Whitney Road and Harbor Drive, located in Oyster Bay, at N 40.912928°, W 73.531580°	9.4	1.4	16.2
36	On the Oyster Bay coastline, on the north side of Long Island, approximately 1,200 feet northeast of intersection of Hill Road and Beach Road, located in Oyster Bay, at N 40.912933°, W 73.515665°	9.4	1.1	15.6
37	On the Oyster Bay coastline, on the north side of Long Island, approximately 1,470 feet northeast of intersection of Seawanhaka Road and Montecito Drive, located in Oyster Bay, at N 40.907269°, W 73.509236°	9.4	1.1	16.7[1]
38	On the Oyster Bay coastline, on the north side of Long Island, approximately 870 feet northeast of intersection of Roosevelt Road and Centre Island Road, located in Oyster Bay, at N 40.893751°, W 73.520397°	9.4	0.5	13.4[1]
39	On the Oyster Bay coastline, on the north side of Long Island, approximately 2,390 feet southwest of intersection of Roosevelt Road and Centre Island Road, located in Oyster Bay, at N 40.886056°, W 73.524504°	9.4	0.3	12.1[1]
40	On the Oyster Bay coastline, on the north side of Long Island, approximately 850 feet northeast of intersection of Harbor Drive and Centre Island Road, located in Oyster Bay, N 40.899306°, W 73.523113°	9.4	0.4	16.5[1]

[1]Wave runup elevation

*North American Vertical Datum of 1988

TABLE 6 - TRANSECT DESCRIPTIONS – continued

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
41	On the Oyster Bay coastline, on the north side of Long Island, approximately 570 feet northwest of intersection of Hill Road and Centre Island Road, located in Oyster Bay, N 40.909701°, W 73.523642°	9.4	0.4	13.0
42	On the Oyster Bay coastline, on the north side of Long Island, approximately 250 feet northwest of intersection of Oak lane and Harborview Road, located in Oyster Bay, at N 40.901094°, W 73.552189°	9.4	0.3	14.7[1]
43	On the Oyster Bay coastline, on the north side of Long Island, approximately 2,020 feet northeast of intersection of Horseshoe Road and Roger Canoe Hollow Road, located in Oyster Bay, at N 40.894968°, W 73.549256°	9.4	0.4	13.7[1]
44	On the Oyster Bay coastline, on the north side of Long Island, approximately 1,880 feet northwest of intersection of Main Street and Lake Avenue, located in Oyster Bay, at N 40.879298°, W 73.543674°	9.4	0.5	13.0
45	On the Oyster Bay coastline, on the north side of Long Island, approximately 1,470 feet northeast of intersection of Main Street and Blair Road, located in Oyster Bay, at N 40.873556°, W 73.515478°	9.4	0.5	13.2
46	On the Oyster Bay coastline, on the north side of Long Island, approximately 280 feet southwest of intersection of Tennis Court Road and Cove Neck Road, located in Oyster Bay, at N 40.878459°, W 73.504629°	9.4	0.4	12.9
47	On the Oyster Bay coastline, on the north side of Long Island, approximately 4,660 feet northeast of intersection of Sagamore Hill Road and Cove Neck Road, located in Oyster Bay, at N 40.894439°, W 73.500522°	9.4	1.1	15.7
48	On the Oyster Bay coastline, on the north side of Long Island, approximately 2,050 feet northwest of intersection of Laurel Hollow Road and Ridge Road, located in Oyster Bay, at N 40.874394°, W 73.483878°	9.4	1.0	15.4

[1]Wave runup elevation

*North American Vertical Datum of 1988

TABLE 6 - TRANSECT DESCRIPTIONS – continued

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
49	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 3,000 feet southwest of intersection of Atlantic Boulevard and Flamingo Street, located in Hempstead, at N 40.584288°, W 73.749206°	10.2	3.9	21.6
50	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 670 feet southwest of intersection of Ocean Boulevard and Dutchess Boulevard, located in Hempstead, at N 40.585538°, W 73.734348°	10.2	4.0	21.8
51	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 730 feet southwest of intersection of Ocean Boulevard and Nassau Avenue, located in Hempstead, at N 40.584937°, W 73.726580°	10.2	4.0	21.7
52	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 1,570 feet southeast of intersection of Bay Boulevard and Park Street, located in Hempstead, at N 40.583556°, W 73.711293°	10.1	3.9	21.5
53	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 740 feet southwest of intersection of Indiana Avenue and Ocean View Street, located in Hempstead, at N 40.582874°, W 73.697850°	10.1	4.0	21.7
54	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 950 feet southwest of intersection of Penn Street and Lindell Boulevard, located in Hempstead, at N 40.583064°, W 73.682320°	9.9	3.9	21.2
55	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 990 feet southeast of intersection of Penn Street and National Boulevard, located in Hempstead, at N 40.583008°, W 73.665643°	10.1	3.9	21.4
56	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 720 feet southeast of intersection of Shore Road and Long Beach Boulevard, located in Hempstead, at N 40.582465°, W 73.656742°	10.1	3.8	21.3

*North American Vertical Datum of 1988

TABLE 6 - TRANSECT DESCRIPTIONS – continued

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
57	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 1,040 feet southeast of intersection of Shore Road and Franklin Boulevard, located in Hempstead, at N 40.582380°, W 73.646681°	10.1	3.7	21.2
58	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 600 feet southwest of intersection of Biarritz Street and Ocean Boulevard, located in Hempstead, at N 40.585107°, W 73.623385°	10.1	3.7	21.2
59	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 2,690 feet southeast of intersection of Sharen Drive and Lido Boulevard, located in Hempstead, at N 40.584920°, W 73.603923°	10.1	3.8	21.2
60	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 680 feet southwest of intersection of Parkside Avenue and Ocean Boulevard, located in Hempstead, at N 40.585747°, W 73.584237°	9.4	4.0	20.6
61	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 10,090 feet southwest of intersection of Loop Parkway and Meadowbrook State Parkway, located in Hempstead, at N 40.582890°, W 73.547634°	10.3	4.0	22.0
62	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 5,140 feet southwest of intersection of Bay Parkway and Wantagh State Parkway, located in Hempstead, at N 40.589706°, W 73.520522°	10.3	4.1	22.1
63	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 1.2 miles southeast of intersection of Bay Parkway and Wantagh State Parkway, located in Oyster Bay, at N 40.596487°, W 73.485915°	10.3	4.0	21.9
64	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 2.4 miles northeast of intersection of Bay Parkway and Wantagh State Parkway, located in Oyster Bay, at N 40.601638°, W 73.462499°	10.3	4.2	22.2

*North American Vertical Datum of 1988

TABLE 6 - TRANSECT DESCRIPTIONS – continued

Nassau County

TRANSECT	LOCATION	ELEVATION (ft NAVD 88*) 1-PERCENT ANNUAL CHANCE STILLWATER	WAVE SETUP	MAXIMUM 1-PERCENT ANNUAL CHANCE WAVE CREST
65	On the Atlantic Ocean coastline, on the south side of Long Island, approximately 4.0 miles northeast of intersection of Bay Parkway and Wantagh State Parkway, located in Oyster Bay, at N 40.607930°, W 73.432841°	10.2	4.0	21.8

*North American Vertical Datum of 1988

TABLE 7 - TRANSECT DATA

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD88*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
		Nassau County					
Little Neck Bay	1	6.8	9.6	10.8[1]	12.8	VE	13-16
		6.8	9.6	10.2	12.8	VE	12-13
						AE	10-12
Little Neck Bay	2	6.8	9.7	10.2	12.8	VE	25[2]
Long Island Sound	3	6.8	9.9	11.3[1]	12.8	VE	14-17
		6.9	9.9	10.2	12.8	VE	13[2]
						AE	13[2]
Long Island Sound	4	6.9	9.9	11.1[1]	13.0	VE	16
		6.9	9.9	10.4	13.0	VE	15[2]
						AE	15[2]
Long Island Sound	5	7.0	9.9	10.6	13.0	VE	17[2]
						AE	17[2]
Manhasset Bay	6	7.0	9.9	11.5[1]	13.0	VE	14-17
						AE	14
		7.0	9.9	10.6	13.0	AE	13[2]
Manhasset Bay	7	7.3	9.9	11.7[1]	13.5	VE	14-17
						AE	12-14
		7.3	9.9	10.9	13.5	AE	10-12

*North American Vertical Datum of 1988
[1]Includes wave setup
[2]Wave runup elevation

TABLE 7 - TRANSECT DATA - continued

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD88*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
			Nassau County - continued				
Manhasset Bay	8	7.3	9.9	11.6[1]	13.5	VE	14-17
						AE	12-14
Manhasset Bay	9	7.3	9.9	11.3[1]	13.5	VE	13-14
						AE	11-13
Manhasset Bay	10	7.3	10.2	10.9	13.5	VE	19[2]
						AE	19[2]
Manhasset Bay	11	7.3	10.2	11.5[1]	13.5	VE	14-17
						AE	13-14
		7.3	10.2	10.9	13.5	AE	12[2]
Manhasset Bay	12	7.3	10.0	11.4[1]	13.5	VE	14-15
						AE	11-14
Manhasset Bay	13	7.3	9.9	11.5[1]	13.5	VE	14-15
						AE	11-14
Manhasset Bay	14	7.0	9.9	10.6	13.0	VE	22[2]
						AE	22[2]
Long Island Sound	15	7.0	9.9	11.3[1]	13.0	VE	13-16
						AE	11-13
Long Island Sound	16	7.0	9.9	11.8[1]	13.0	VE	15-18
		7.0	9.9	10.6	13.0	VE	14[2]
						AE	14[2]
Long Island Sound	17	7.3	9.9	12.8[1]	13.5	VE	15-19
						AE	13-15
		7.3	9.9	10.9	13.5	AE	11
Long Island Sound	18	7.3	9.9	12.5[1]	13.5	VE	20
		7.3	9.9	10.9	13.5	VE	19[2]
						AE	19[2]
Long Island Sound	19	7.3	10.1	12.2[1]	13.5	VE	14-18
						AE	12-14
Hempstead Harbor	20	7.3	10.2	10.9	13.5	VE	23[2]
							23[2]

*North American Vertical Datum of 1988
[1]Includes wave setup
[2]Wave runup elevation

TABLE 7 - TRANSECT DATA - continued

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD88*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
			Nassau County - continued				
Hempstead Harbor	21	7.3	10.2	11.2[1]	13.5	VE	13-14
						AE	11-13
Hempstead Harbor	22	7.3	10.2	11.9[1]	13.5	VE	14-17
						AE	12-14
Long Island Sound	23	7.0	9.1	11.8[1]	13.0	VE	14-17
		7.0	9.1	10.6	13.0	AE	14[2]
Long Island Sound	24	6.7	8.9	11.4[1]	13.0	VE	14-17
						AE	11-14
Long Island Sound	25	6.5	8.8	11.4[1]	13.0	VE	14-17
						AE	11-14
Long Island Sound	26	6.4	8.8	12.7[1]	13.0	VE	15-19
						AE	13-15
Long Island Sound	27	6.3	8.7	12.5[1]	13.0	VE	15-19
						AE	12-15
		6.3	8.7	10.6	13.0	VE	13
						AE	11-13
Long Island Sound	28	6.3	8.7	11.8[1]	13.0	VE	13-18
		6.3	8.7	10.5	13.0	VE	13
						AE	11-13
Long Island Sound	29	6.3	8.7	10.1	12.6	VE	24[2]
						AE	24[2]
Long Island Sound	30	6.3	8.7	11.3[1]	12.4	VE	13-17
						AE	11-13
Long Island Sound	31	6.3	8.7	11.0[1]	12.1	VE	13-16
				9.7		VE	12-13
						AE	10-12
Long Island Sound	32	6.3	8.7	10.9[1]	12.0	VE	15-16
		6.3	8.7	9.4	12.0	VE	14[2]
						AE	14[2]
						AO	Depth 1
		6.3	8.7	9.4	12.0	AE	9-11

*North American Vertical Datum of 1988
[1]Includes wave setup
[2]Wave runup elevation

TABLE 7 - TRANSECT DATA - continued

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD88*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
			Nassau County - continued				
Long Island Sound	33	6.3	8.7	11.2[1]	12.0	VE	17
		6.3	8.7	9.4	12.0	VE	16[2]
						AE	16[2]
Long Island Sound	34	6.3	8.7	11.4[1]	12.0	VE	16-17
		6.3	8.7	9.4	12.0	VE	15[2]
						AE	15[2]
						AO	Depth 2
		6.3	8.7	9.4	12.0	AE	9-10
Long Island Sound	35	6.3	8.7	10.8[1]	12.0	VE	13-16
						AE	11-13
		6.3	8.7	9.4	12.0	AE	9
Long Island Sound	36	6.3	8.7	10.5[1]	12.0	VE	15-16
				9.4		VE	14[2]
						AE	14[2]
Long Island Sound	37	6.3	8.7	9.4	12.0	VE	17[2]
						AE	17[2]
						AE	9-10
Oyster Bay Harbor	38	6.3	8.7	9.4	12.0	VE	13[2]
						AE	13[2]
Oyster Bay Harbor	39	6.3	8.7	9.4	12.0	VE	12[2]
						AE	12[2]
Oyster Bay Harbor	40	6.3	8.7	9.4	12.0	VE	16[2]
						AE	16[2]
Oyster Bay Harbor	41	6.3	8.7	9.8[1]	12.0	VE	12-13
						AE	10-12
Oyster Bay Harbor	42	6.3	8.7	9.4	12.0	VE	15[2]
						AE	15[2]
Oyster Bay Harbor	43	6.3	8.7	9.4	12.0	VE	14[2]
						AE	14[2]
Oyster Bay Harbor	44	6.3	8.7	9.9[1]	12.0	VE	12-13
						AE	10-12

*North American Vertical Datum of 1988
[1]Includes wave setup
[2]Wave runup elevation

TABLE 7 - TRANSECT DATA - continued

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD88*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
			Nassau County - continued				
Oyster Bay Harbor	45	6.3	8.8	9.9[1]	12.0	VE	12-13
						AE	11-12
Cold Spring Harbor	46	6.3	8.8	9.8[1]	12.0	VE	12-13
						AE	11-12
		6.3	8.8	9.4	12.0	AE	10[2]
Cold Spring Harbor	47	6.3	8.7	10.5[1]	12.0	VE	13-16
						AE	13
		6.3	8.7	9.4	12.0	AE	12[2]
Cold Spring Harbor	48	6.3	8.7	10.4[1]	12.0	VE	13-15
						AE	10-13
Atlantic Ocean	49	6.7	8.9	14.1[1]	12.5	VE	16-22
		6.7	8.9	12.6[1]	12.3	AE	13-16
Atlantic Ocean	50	6.7	8.9	14.2[1]	12.4	VE	16-22
		6.7	8.8	11.1[1]	12.0	AE	11-16
		6.7	8.6	9.6	11.3	VE	12
						AE	10-12
Atlantic Ocean	51	6.7	8.9	14.2[1]	12.4	VE	16-22
		6.7	8.8	10.5[1]	11.9	AE	11-16
		6.7	8.5	9.4	10.8	VE	12-13
						AE	9-12
Atlantic Ocean	52	6.7	8.9	14.0[1]	12.4	VE	16-22
						AE	14-16
		6.7	8.4	9.3	10.4	VE	11-12
						AE	9-13
Atlantic Ocean	53	6.7	8.9	14.1[1]	12.4	VE	16-22
		6.7	8.7	10.1[1]	11.5	AE	10-16
		6.7	8.3	9.0	9.9	VE	11-13
						AE	9-12
Atlantic Ocean	54	6.7	8.8	13.8[1]	12.0	VE	15-21
		6.7	8.4	10.1[1]	10.7	AE	10-15
		6.7	8.1	8.6	9.4	VE	11-12
						AE	9-11

*North American Vertical Datum of 1988
[1]Includes wave setup
[2]Wave runup elevation

TABLE 7 - TRANSECT DATA - continued

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD88*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
			Nassau County - continued				
Atlantic Ocean	55	6.7	8.9	14.0[1]	12.4	VE	16-21
		6.7	8.4	10.1[1]	10.8	AE	10-16
		6.7	8.1	8.6	9.2	AE	9-10
Atlantic Ocean	56	6.7	8.9	13.9[1]	12.4	VE	16-21
		6.7	8.5	10.1[1]	10.8	AE	10-16
		6.7	8.0	8.4	9.1	VE	11
						AE	8-11
Atlantic Ocean	57	6.7	8.9	13.8[1]	12.4	VE	16-21
		6.7	8.4	10.1[1]	10.9	AE	10-16
		6.6	8.0	8.4	9.1	VE	10-12
						AE	8-10
Atlantic Ocean	58	6.7	8.9	13.8[1]	12.4	VE	16-21
						AE	14-16
		6.6	8.3	10.2[1]	10.4	AE	10-13
		6.6	7.8	8.3	8.9	VE	10-11
						AE	8-10
Atlantic Ocean	59	6.7	8.9	13.8[1]	12.4	VE	16-21
						AE	15-16
		6.5	8.1	9.5[1]	10.0	AE	10-14
		6.5	7.7	8.1	8.7	VE	10-13
						AE	8-10
Atlantic Ocean	60	6.6	8.5	13.4[1]	11.2	VE	15-21
						AE	15
		6.5	7.9	9.0[1]	9.8	AE	10-14
		6.4	7.5	7.9	8.6	VE	10-11
						AE	8-10
Atlantic Ocean	61	6.7	9.0	14.3[1]	12.7	VE	16-22
						AE	15-16
		6.6	8.6	12.5[1]	11.9	AE	13-14
		6.4	7.5	7.9	8.6	VE	10-11
						AE	8-10
Atlantic Ocean	62	6.7	9.0	14.4[1]	12.7	VE	17-22
						AE	14-17
		6.0	7.1	7.5	8.1	VE	9-11
						AE	7-10

*North American Vertical Datum of 1988
[1]Includes wave setup

TABLE 7 - TRANSECT DATA - continued

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD88*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
			Nassau County - continued				
Atlantic Ocean	63	6.7	9.0	14.3[1]	12.7	VE	16-22
						AE	15-16
		6.4	8.2	13.2[1]	11.1	AE	13-14
		5.7	6.7	7.1	7.7	VE	9-11
						AE	7-9
Atlantic Ocean	64	6.7	9.0	14.5[1]	12.7	VE	16-22
		6.4	8.1	13.4[1]	10.9	AE	13-16
		5.5	6.5	6.9	7.5	VE	9-11
						AE	7-9
Atlantic Ocean	65	6.7	8.9	14.2[1]	12.6	VE	16-22
						AE	15-16
		6.3	7.3	13. 2[1]	9.4	AE	13-14
		5.2	6.2	6.5	7.2	VE	9-11
						AE	7-9

*North American Vertical Datum of 1988
[1]Includes wave setup

Users of the FIRM should also be aware that coastal flood elevations are provided in the Summary of Stillwater Elevations table in this report. If the elevation on the FIRM is higher than the elevation shown in this table, a wave height, wave runup, and/or wave setup component likely exists, in which case, the higher elevation should be used for construction and/or floodplain management purposes.

As defined in the July 1989 *Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping,* the coastal high hazard area (Zone VE) is the area where wave action and/or high velocity water can cause structural damage (*Guidelines and Specifications for Wave Elevation Determination and V-Zone Mapping*, Federal Emergency Management Agency [FEMA], 1989). It is designated on the FIRM as the most landward of the following three points:

1) The point where the 3.0 ft or greater wave height could occur;
2) The point where the eroded ground profile is 3.0 ft or more below the maximum runup elevation; and
3) The primary frontal dune as defined in the NFIP regulations.

These three points are used to locate the inland limit of the coastal high hazard area to ensure that adequate insurance rates apply and appropriate construction standards are imposed, should local agencies permit building in this area.

Along each transect, wave heights and wave crest elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. Wave heights were calculated to the nearest 0.1 foot, and wave crest elevations were determined at whole-foot increments along the transects. The calculations were carried inland along the transect until the wave crest elevation was permanently less than 0.5 foot above the stillwater-surge elevation or the coastal flooding met another flooding source (i.e., riverine) with an equal water-surface elevation. The results of the calculations are accurate until local topography, vegetation, or cultural development of the community undergo any major changes.

It has been shown in laboratory tests and observed in field investigations that wave heights as little as 1.5 feet can cause damage to and failure of typical Zone AE construction. Therefore, for advisory purposes only, a Limit of Moderate Wave Action (LiMWA) boundary has been added in coastal areas subject to wave action. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave.

The effects of wave hazards in the Zone AE between the Zone VE (or shoreline in areas where VE Zones are not identified) and the limit of the LiMWA boundary are similar to, but less severe than, those in Zone VE where 3-foot breaking waves are projected during a 1-percent annual chance flooding event.

In areas where wave runup elevations dominate over wave heights, such as areas with steeply sloped beaches, bluffs, and/or shore-parallel flood protection structures, there is no evidence to date of significant damage to residential structures by runup depths less than 3 feet. However, to simplify representation, the LiMWA was continued immediately landward of the VE/AE boundary in areas where wave runup elevations dominate. Similarly, in areas where the Zone VE designation is based on the presence of a primary frontal dune or wave overtopping, the LiMWA was also delineated immediately landward of the Zone VE/AE boundary.

3.5 Vertical Datum

All FISs and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FISs and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the finalization of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMs are being prepared using NAVD 88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD 88. Structure and ground elevations in the community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This may result in differences in base flood elevations across the corporate limits between the communities.

Prior versions of the FIS report and FIRM were referenced to NGVD 29. When a datum conversion is effected for an FIS report and FIRM, the Flood Profiles, Base Flood Elevations (BFEs), and Elevation Reference Marks (ERM) reflect the new datum values. To compare structure and ground elevations to 1-percent annual chance flood elevations shown in the FIS report and on the FIRM, the subject structure and ground elevations must be referenced to the new datum values.

As noted above, the elevations shown in the FIS report and on the FIRM for Nassau County are referenced to NAVD 88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD 29 by applying a standard conversion factor. The conversion factor to NGVD 29 is +1.1 feet, where:

$$\text{NGVD 29} = \text{NAVD 88} + 1.1 \text{ ft}$$

The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 102.4 will appear as 102 on the FIRM and 102.6 will appear as 103. Therefore, users that wish to convert the elevations in this FIS to NGVD 29 should apply the stated conversion factor(s) to elevations shown on the Flood Profiles and supporting data tables in the FIS report, which are shown at a minimum to the nearest 0.1 foot.

For more information on NAVD 88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, FEMA Publication FIA-20/June 1992, or contact the Spatial Reference System Division, National Geodetic Survey, National Oceanic and Atmospheric Administration, Silver Spring Metro Center, 1315 East-West Highway, Silver Spring, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS generally provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance flood is employed to indicate additional areas of flood risk in the community.

The 1- and 0.2-percent annual chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones VE, A, AE, and AO), and the 0.2-percent annual chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent annual chance floodplain boundaries are close together, only the 1-percent

annual chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

In areas where a wave height analysis was performed, the A and V zones were divided into whole-foot elevation zones based on the average wave crest elevation in that zone. Where the map scale did not permit delineating zones at 1 foot intervals, larger increments were used.

For the streams studied by approximate methods, only the 1-percent annual chance floodplain boundary is shown on the FIRM (Exhibit 2).

Countywide Revised Analyses

The topographic dataset used to delineate coastal floodplain boundaries with the exception of Long Beach and Jones Island was comprised of vector contour data at 2-foot intervals provided by the Nassau County Department of Information Technology. These data were originally derived from April 1993 stereo photography.

Coastal floodplain delineation on Long Beach and Jones Island was based on topographic data provided by the USACE. These data were comprised of bare earth LiDAR topography collected by the USACE Compact Hydrographic Airborne Rapid Total Survey (CHARTS) system in October and November 2005.

Riverine floodplain boundaries for both detailed and approximate special flood hazard areas were refined using the aforementioned Nassau County contour data.

4.2 Floodways

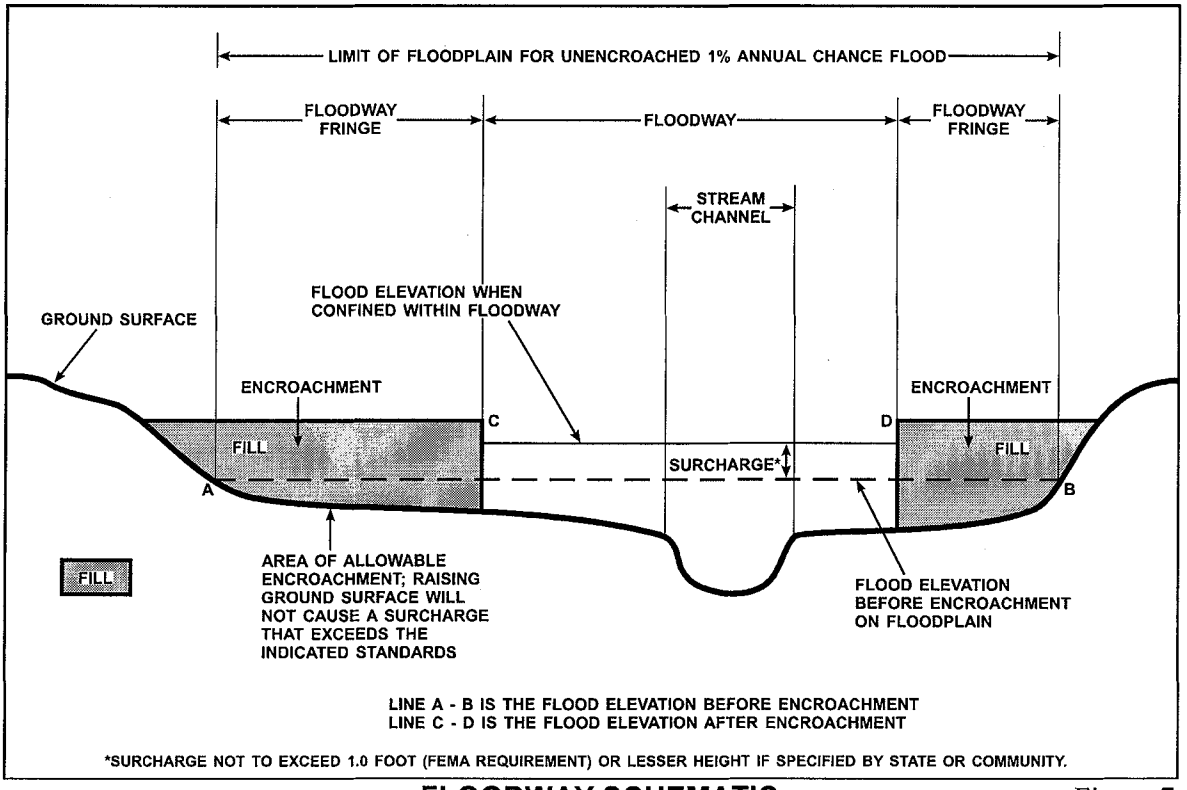
Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent annual chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent annual chance flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this FIS are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this FIS were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections.

Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 8). The computed floodways are shown on the FIRM (Exhibit 2). In cases where the floodway and 1-percent annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the Motts Creek floodway extend beyond the county boundary. No floodways were computed for Massapequa Creek, Massapequa Creek Tributary No. 1, and Massapequa Creek Tributary No. 2.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 8, "Floodway Data." In order to reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 7.



FLOODWAY SCHEMATIC Figure 7

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Motts Creek								
A	16,540[1]	37	220	3.4	11.4	8.1[3]	9.0	0.9
B	16,850[1]	43	300	2.5	11.4	10.2[3]	11.0	0.8
C	17,015[1]	40	243	3.1	11.4	10.3[3]	11.1	0.8
D	17,862[1]	42	282	2.7	11.4	11.3[3]	12.0	0.7
E	18,878[1]	40	206	3.7	11.5	11.5	12.1	0.6
F	23,270[1]	35	394	1.9	22.9	22.9	23.8	0.9
G	24,608[1]	46	399	1.9	24.6	24.6	25.5	0.9
H	25,395[1]	34	347	2.2	25.2	25.2	25.9	0.7
I	26,206[1]	39	272	2.8	25.4	25.4	26.1	0.7
J	27,090[1]	100	553	1.4	28.6	28.6	29.1	0.5
Russells Creek								
A	929[2]	32	61	7.8	70.1	70.1	70.2	0.1
B	1,082[2]	20	52	9.2	76.0	76.0	76.0	0.0
C	2,115[2]	16	53	9.1	96.9	96.9	96.9	0.0
D	2,300[2]	15	47	10.2	98.2	98.2	98.2	0.0
E	2,479[2]	17	54	8.8	101.3	101.3	101.3	0.0

[1]Feet above mouth
[2]Feet above Limit of Detailed Study (Limit of Detailed Study located approximately 1,009 feet downstream of Clent Road)
[3]Elevation computed without consideration of tidal flooding effects from Head of Bay

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY
(ALL JURISDICTIONS)

FLOODWAY DATA

MOTTS CREEK – RUSSELLS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Valley Stream								
A	19,190	100	459	3.0	11.4	9.1[2]	9.3	0.2
B	19,836	100	420	3.3	11.4	9.3[2]	9.6	0.3
C	20,505	43	242	5.7	11.4	11.1[2]	11.7	0.6
D	20,625	32	251	5.5	11.4	11.2[2]	11.9	0.7
E	20,835	200	984	1.4	14.2	14.2	14.3	0.1
F	21,335	200	1,077	1.3	14.3	14.3	14.4	0.1
G	21,645	20	157	3.4	14.5	14.5	14.5	0.0
H	23,184	30	205	2.6	17.4	17.4	17.6	0.2
I	24,085	200	2,041	0.3	17.4	17.4	17.7	0.3
J	25,170	69	446	1.2	18.3	18.3	18.3	0.0
K	26,455	31	170	3.1	19.7	19.7	19.7	0.0

[1]Feet above mouth
[2]Elevation computed without consideration of tidal flooding effects from Head of Bay

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY
(ALL JURISDICTIONS)

FLOODWAY DATA

VALLEY STREAM

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 1-percent annual chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 1-percent annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent annual chance floodplain, areas within the 0.2-percent annual chance floodplain, and to areas of 1-percent annual chance flooding where average depths are less than 1 foot, areas of 1-percent annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent annual chance flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent annual chance floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent annual chance floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

The current FIRM presents flooding information for the entire geographic area of Nassau County. Previously, separate Flood Hazard Boundary Maps and/or FIRMs were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. This countywide FIRM also includes flood hazard information that was presented separately on Flood Boundary and Floodway Maps, where applicable. Historical data relating to the maps prepared for each community up to and including the April 2, 1997, countywide FIS are presented in Table 9, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Atlantic Beach, Village of	April 2,1997	None	April 2, 1997	
Baxter Estates, Village of	June 14, 1974	October 24, 1975	May 16, 1983	April 2, 1997
Bayville, Village of	May 3, 1974	March 26, 1976	September 15, 1983	June 2, 1992 April 2, 1997
Bellerose, Village of[1]	April 2, 1997	None	April 2, 1997	
Brookville, Village of[1]	April 2, 1997	None	April 2, 1997	
Cedarhurst, Village of	April 2, 1976	None	September 1, 1983	April 2, 1997
Centre Island, Village of	August 9, 1974	May 28, 1976	October 18, 1983	April 2, 1997
Cove Neck, Village of	October 18, 1974	June 11, 1976	July 18, 1983	April 2, 1997
East Hills, Village of[1]	April 2, 1997	None	April 2, 1997	
East Rockaway, Village of	July 26, 1974	July 9, 1976	December 1, 1978	April 2, 1997
East Williston, Village of[1]	April 2, 1997	None	April 2, 1997	
Farmingdale, Village of[1]	April 2, 1997	None	April 2, 1997	
Floral Park, Village of[1]	April 2, 1997	None	April 2, 1997	
Flower Hill, Village of	September 18, 1991	None	September 18, 1991	April 2, 1997

[1]Non-floodprone community

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Freeport, Village of	May 31, 1974	None	February 14, 1976	September 15, 1993 April 2, 1997
Garden City, Village of[1]	April 2, 1997	None	April 2, 1997	
Glen Cove, City of	August 16, 1974	June 11, 1976	March 1, 1978	April 4, 1983 September 5, 1984 May 18, 1992 April 2, 1997
Great Neck, Village of	July 26, 1974	May 28, 1976	November 17, 1982	April 2, 1997
Great Neck Estates, Village of	June 14, 1974	October 3, 1975	June 15, 1983	April 2, 1997
Great Neck Plaza, Village of	April 2, 1997	None	April 2, 1997	
Hempstead, Town of	April 25, 1975	None	April 16, 1979	March 4, 1985 December 15, 1989 May 18, 1992 April 2, 1997
Hempstead, Village of[1]	April 2, 1997	None	April 2, 1997	
Hewlett Bay Park, Village of	June 28, 1974	May 28, 1976	January 19, 1983	April 2, 1997
Hewlett Harbor, Village of	March 8, 1974	June 25, 1976	June 15, 1979	April 2, 1997
Hewlett Neck, Village of	June 28, 1974	June 4, 1976	January 19, 1983	April 2, 1997

[1]Non-floodprone community

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Island Park, Village of	May 17, 1974[2]	None	February 14, 1976	April 2, 1997
Kensington, Village of	June 14, 1974	May 14, 1976	January 19, 1983	April 2, 1997
Kings Point, Village of	June 21, 1974	August 6, 1976	July 5, 1983	April 2, 1997
Lake Success, Village of[1]	April 2, 1997	None	April 2, 1997	
Lattingtown, Village of	May 17, 1974	July 16, 1976	September 1, 1978	March 18, 1986 May 18, 1992 April 2, 1997
Laurel Hollow, Village of	June 28, 1974	July 9, 1976	January 6, 1983	April 2, 1997
Lawrence, Village of	June 21, 1974	August 6, 1976	May 16, 1983	April 2, 1997
Long Beach, City of	March 5, 1971	None	March 5, 1971	July 1, 1974 October 31, 1975 December 1, 1983 April 2, 1997
Lynbrook, Village of	June 21, 1974	None	April 2, 1997	
Malverne, Village of	April 2, 1997	None	April 2, 1997	
Manorhaven, Village of	June 14, 1974	August 13, 1976	June 1, 1983	April 2, 1997
Massapequa Park, Village of	June 21, 1974	April 9, 1976	January 19, 1983	April 2, 1997

[1]Non-floodprone community
[2]The Village of Island Park Initial FHBM is dated January 4, 1974

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Matinecock, Village of[1]	April 2, 1997	None	April 2, 1997	
Mill Neck, Village of	March 8, 1974	August 20, 1976	October 18, 1983	April 2, 1997
Mineola, Village of[1]	April 2, 1997	None	April 2, 1997	
Munsey Park, Village of[1]	April 2, 1997	None	April 2, 1997	
Muttontown, Village of[1]	April 2, 1997	None	April 2, 1997	
New Hyde Park, Village of[1]	April 2, 1997	None	April 2, 1997	
North Hempstead, Town of	June 28, 1974	May 28, 1976	April 15, 1977	May 16, 1983 April 2, 1997
North Hills, Village of[1]	April 2, 1997	None	April 2, 1997	
Old Brookville, Village of[1]	April 2, 1997	None	April 2, 1997	
Old Westbury, Village of[1]	April 2, 1997	None	April 2, 1997	
Oyster Bay, Town of	November 29, 1974	September 12, 1975	August 1, 1978	March 16, 1983 May 18, 1992 April 2, 1997
Oyster Bay Cove, Village of	December 20, 1974	None	September 30, 1983	April 2, 1997
Plandome, Village of	April 2, 1997	None	April 2, 1997	

[1]Non-floodprone community

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Plandome Heights, Village of	October 29, 1976	None	August 11, 1978	April 2, 1997
Plandome Manor, Village of	June 21, 1974	October 31, 1975	June 15, 1983	April 2, 1997
Port Washington North, Village of	June 24, 1977	None	July 5, 1983	April 2, 1997
Rockville Centre, Village of	June 28, 1974	May 21, 1976	November 17, 1982	April 2, 1997
Roslyn, Village of	June 28, 1974	June 18, 1976	January 5, 1984	April 2, 1997
Roslyn Estates, Village of[1]	April 2, 1997	None	April 2, 1997	
Roslyn Harbor, Village of	June 28, 1974	December 19, 1975	December 15, 1983	April 2, 1997
Russell Gardens, Village of	November 17, 1982	None	November 17, 1982	April 2, 1997
Saddle Rock, Village of	June 14, 1974	April 23, 1976	October 18, 1983	April 2, 1997
Sands Point, Village of	June 28, 1974	April 23, 1976	June 15, 1983	May 18, 1992 April 2, 1997
Sea Cliff, Village of	February 1, 1974	June 30, 1976	February 1, 1978	April 2, 1997
South Floral Park, Village of[1]	April 2, 1997	None	April 2, 1997	
Stewart Manor, Village of[1]	April 2, 1997	None	April 2, 1997	
Thomaston, Village of	June 14, 1974	June 18, 1976	April 17, 1985	April 2, 1997

[1]Non-floodprone community

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Upper Brookville, Village of[1]	April 2, 1997	None	April 2, 1997	
Valley Stream, Village of	October 15, 1976	None	January 5, 1984	April 2, 1997
Westbury, Village of[1]	April 2, 1997	None	April 2, 1997	
Williston Park, Village of [1]	April 2, 1997	None	April 2, 1997	
Woodsburgh, Village of	June 28, 1974	June 25, 1976	June 1, 1983	April 2, 1997

[1]Non-floodprone community

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

In 1971, the USACE, New York District, prepared a tidal floodplain information report for the south shore of Nassau County, in which a tidal frequency-elevation curve was determined for the coastline along the south shore of Nassau County (USACE, 1978). This curve was based on a statistical study of the data at the Fort Hamilton tidal gage. The only difficulty in developing the tidal frequency-elevation curve was extrapolating the curve to the low frequencies of occurrences where no data were available. The USACE approach was to use the results of a study that transposed the Cape Hatteras hurricane of September 14, 1944, to a track over the New York Harbor area. The Cape Hatteras hurricane was classified by the USACE as the Standard Project Hurricane. This hurricane is defined as the worst hypothetical hurricane that may be expected from the most severe combination of meteorological conditions considered reasonably characteristic of the region, according to the Standard Project Hurricane indices developed by the National Weather Service (USACE, 1973; USACE, unpublished). The USACE then added the storm surge from this hurricane (12.3 feet) to the mean sea level to yield the Standard Project Tide Level. Thus, the Standard Project Tide was used to determine the upper portion of the tidal frequency-elevation curve, and the lower portion of the curve was determined from a statistical study of the tidal data at the Fort Hamilton gage. The Fort Hamilton tidal frequency-elevation curve was then used by the USACE to develop tidal frequency-elevation curves for Reynolds Channel and the other bay areas along the south shore of Nassau County.

In 1972, the USACE, New York District, prepared a tidal floodplain information report for the north shore of Nassau County (USACE, 1972).

In 1973, the USACE, New York District, prepared a tidal floodplain information report for the north shore of Nassau County (USACE, 1973).

An FIS has been prepared for the City of New York (FEMA, September 5, 2007). An FIS is currently being prepared for Suffolk County, New York (All Jurisdictions) (FEMA, Unpublished).

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Nassau County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS reports, FIRMs, and Wave Height Analysis Supplement reports for all of the incorporated jurisdictions within Nassau County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, 26 Federal Plaza, Room 1337, New York, New York 10278.

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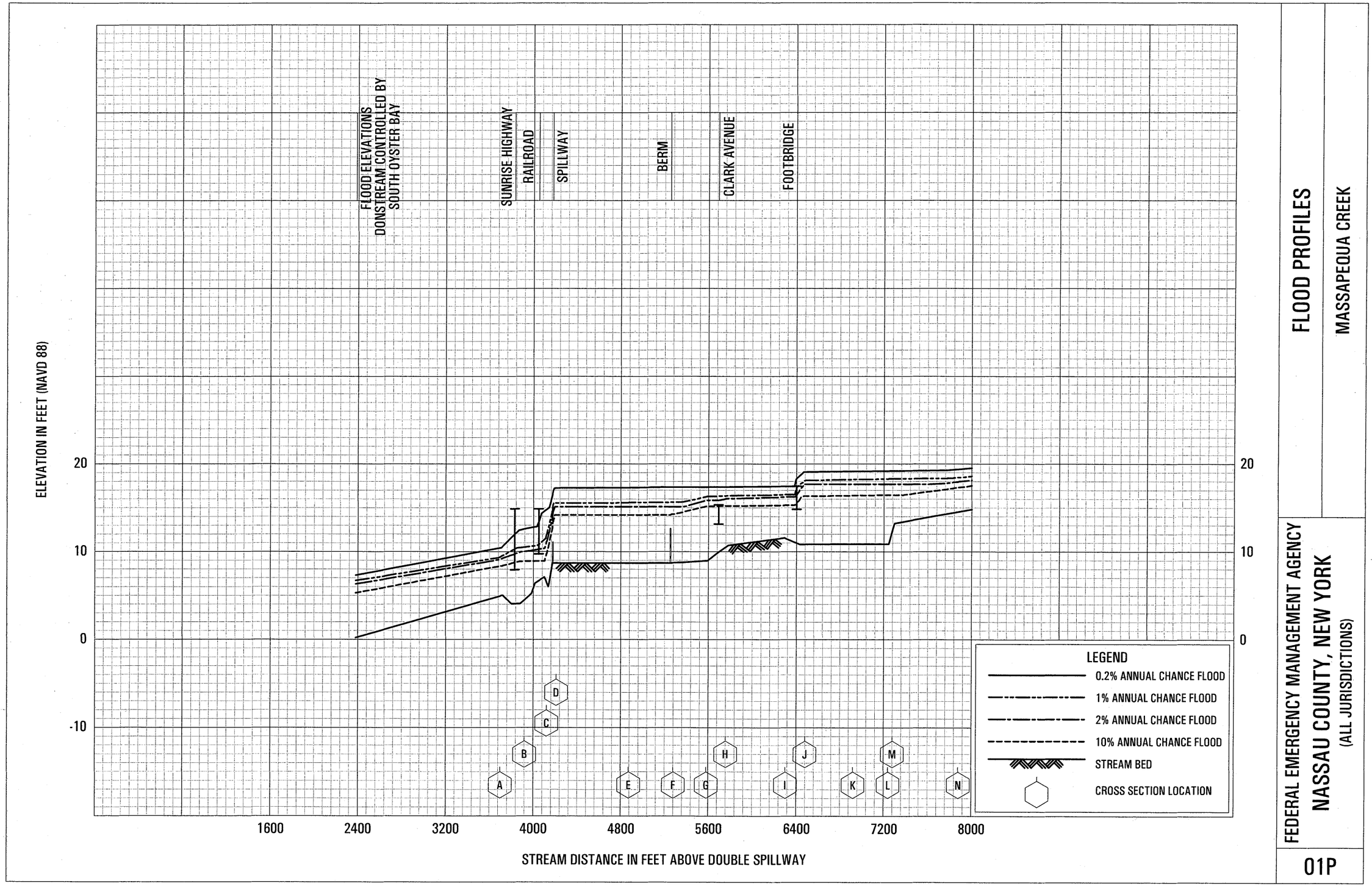


FLOOD PROFILES

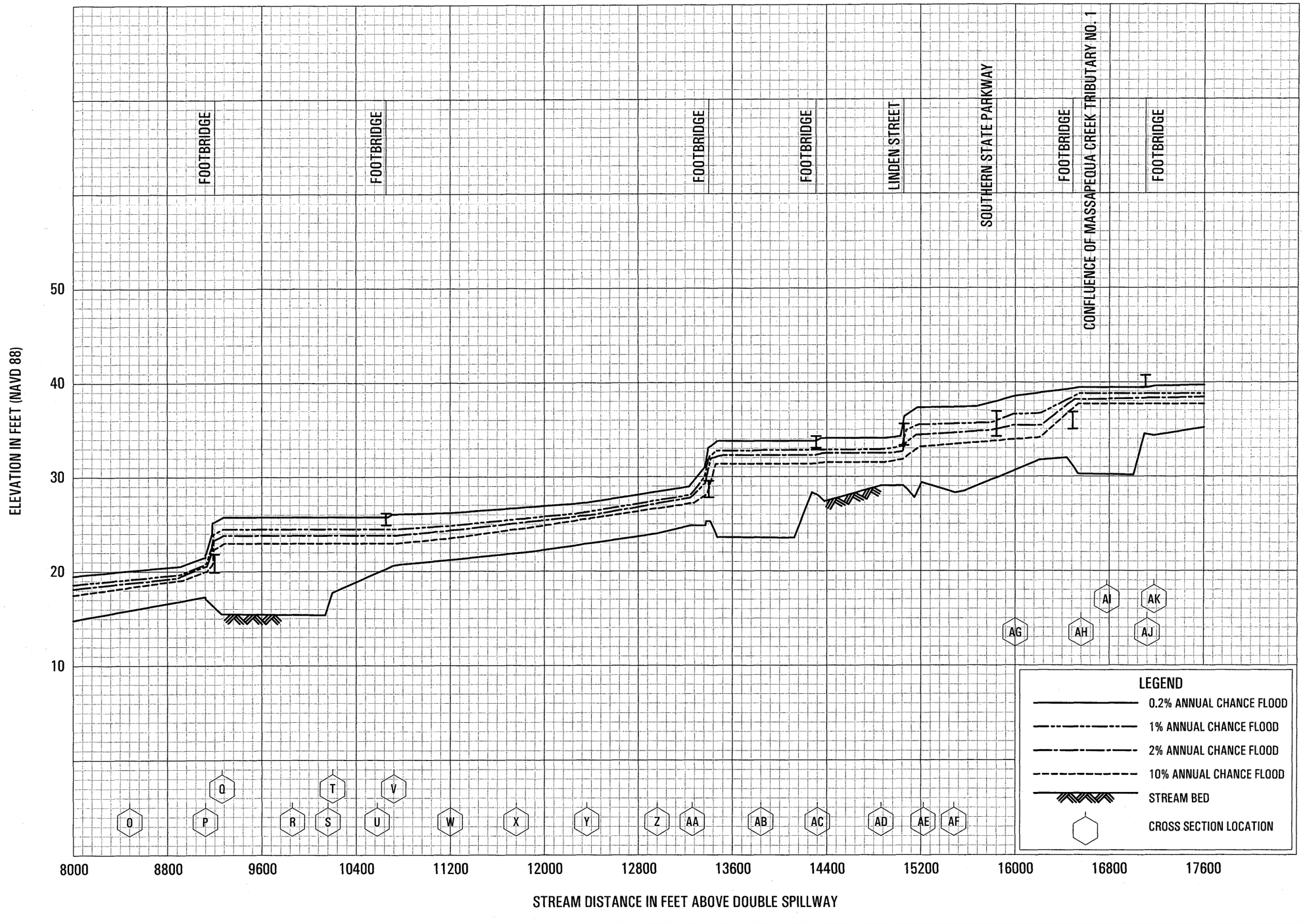
MASSAPEQUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NEW YORK

(ALL JURISDICTIONS)

01P



FLOOD PROFILES

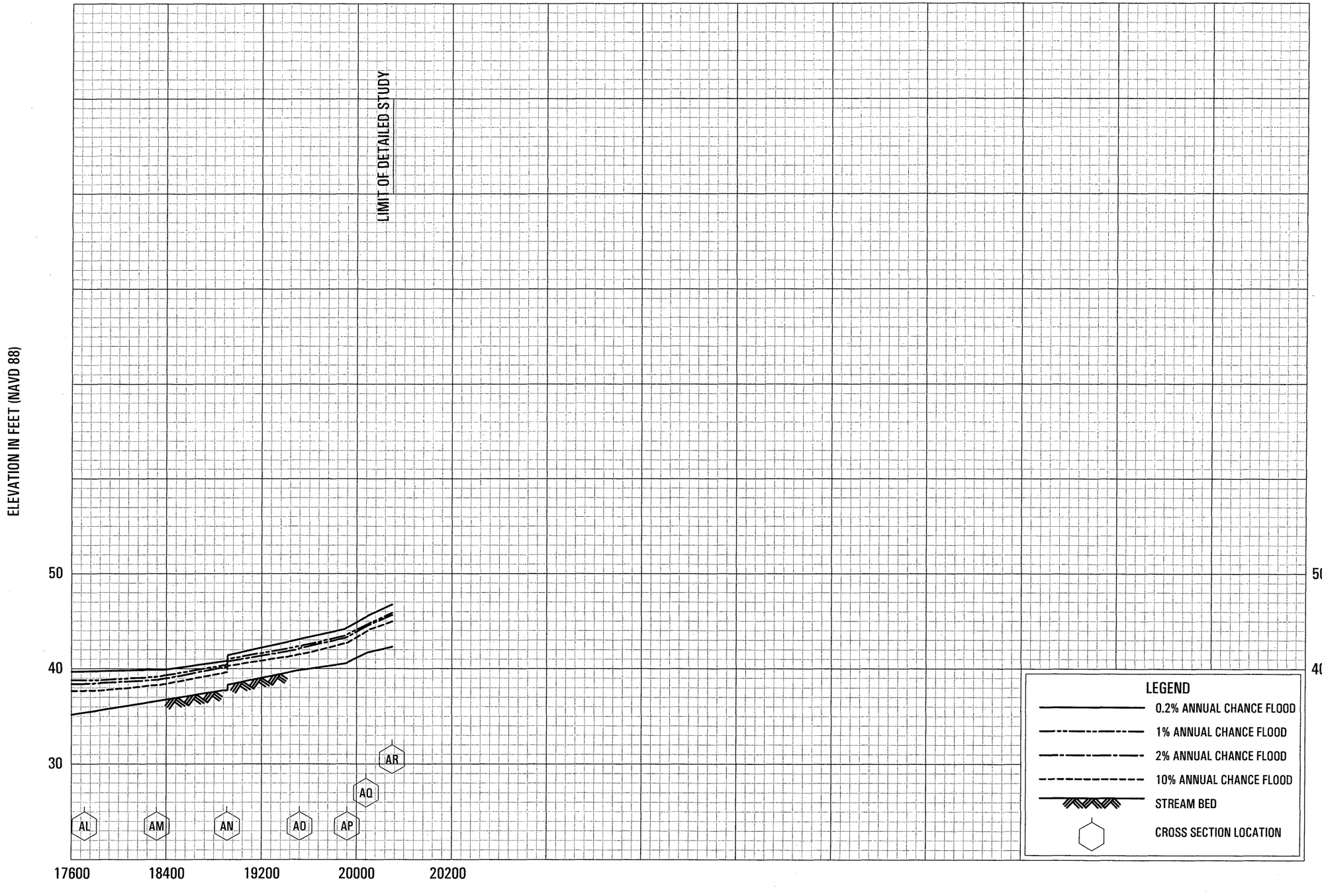
MASSAPEQUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NEW YORK

(ALL JURISDICTIONS)

02P



FLOOD PROFILES

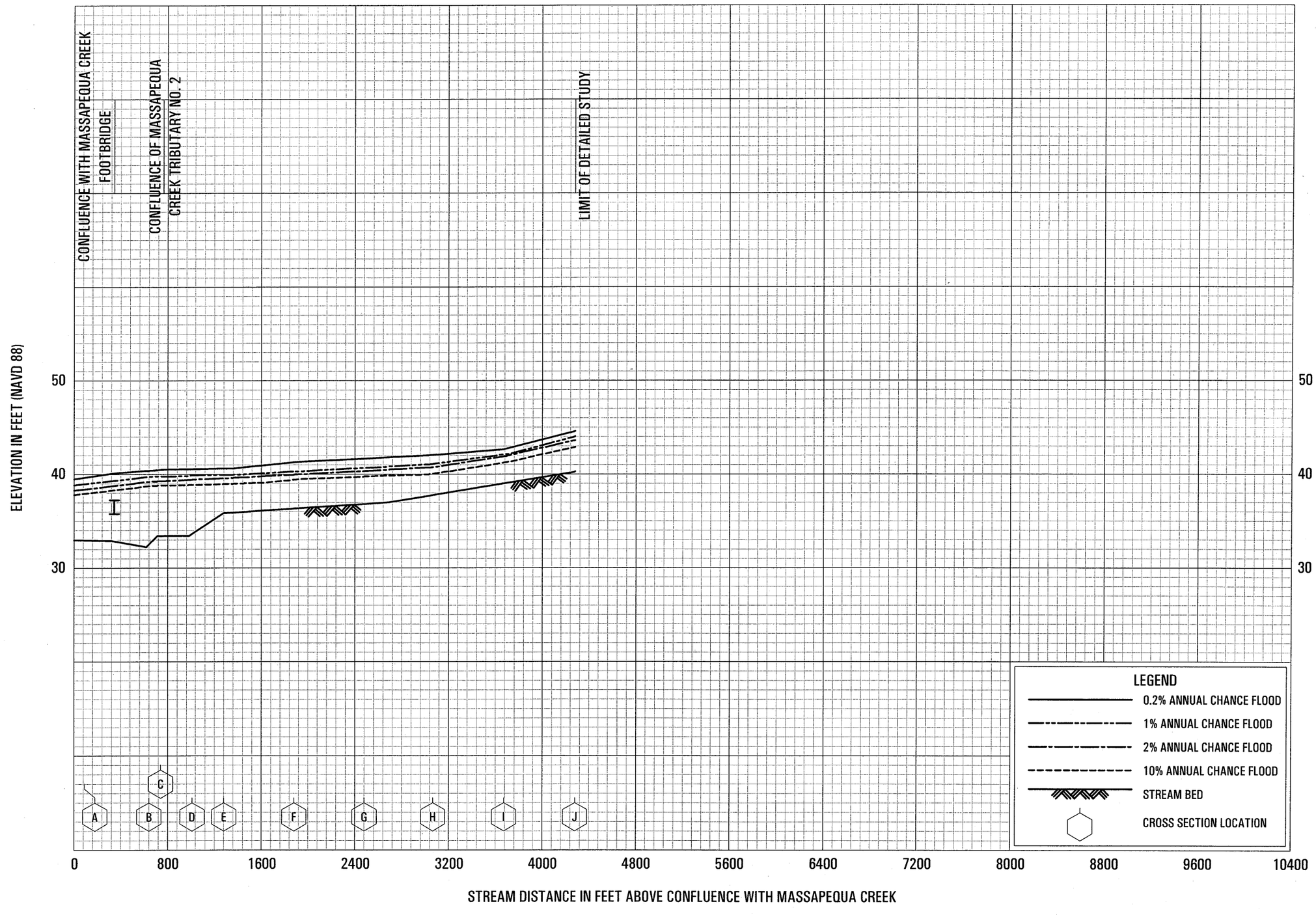
MASSAPEQUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NEW YORK

(ALL JURISDICTIONS)

03P

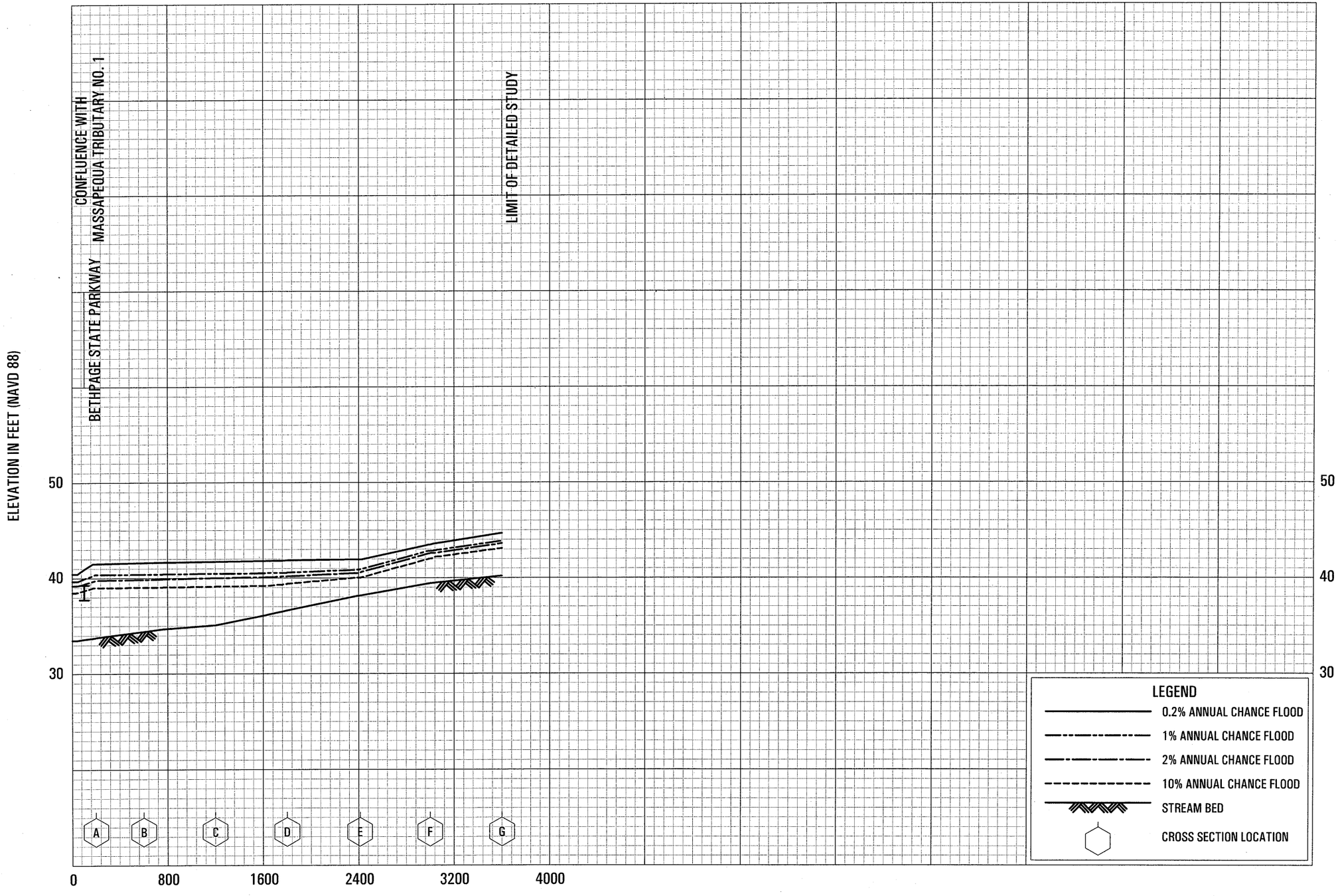


FLOOD PROFILES

MASSAPEQUA CREEK TRIBUTARY NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
NASSAU COUNTY, NY
(ALL JURISDICTIONS)

04P

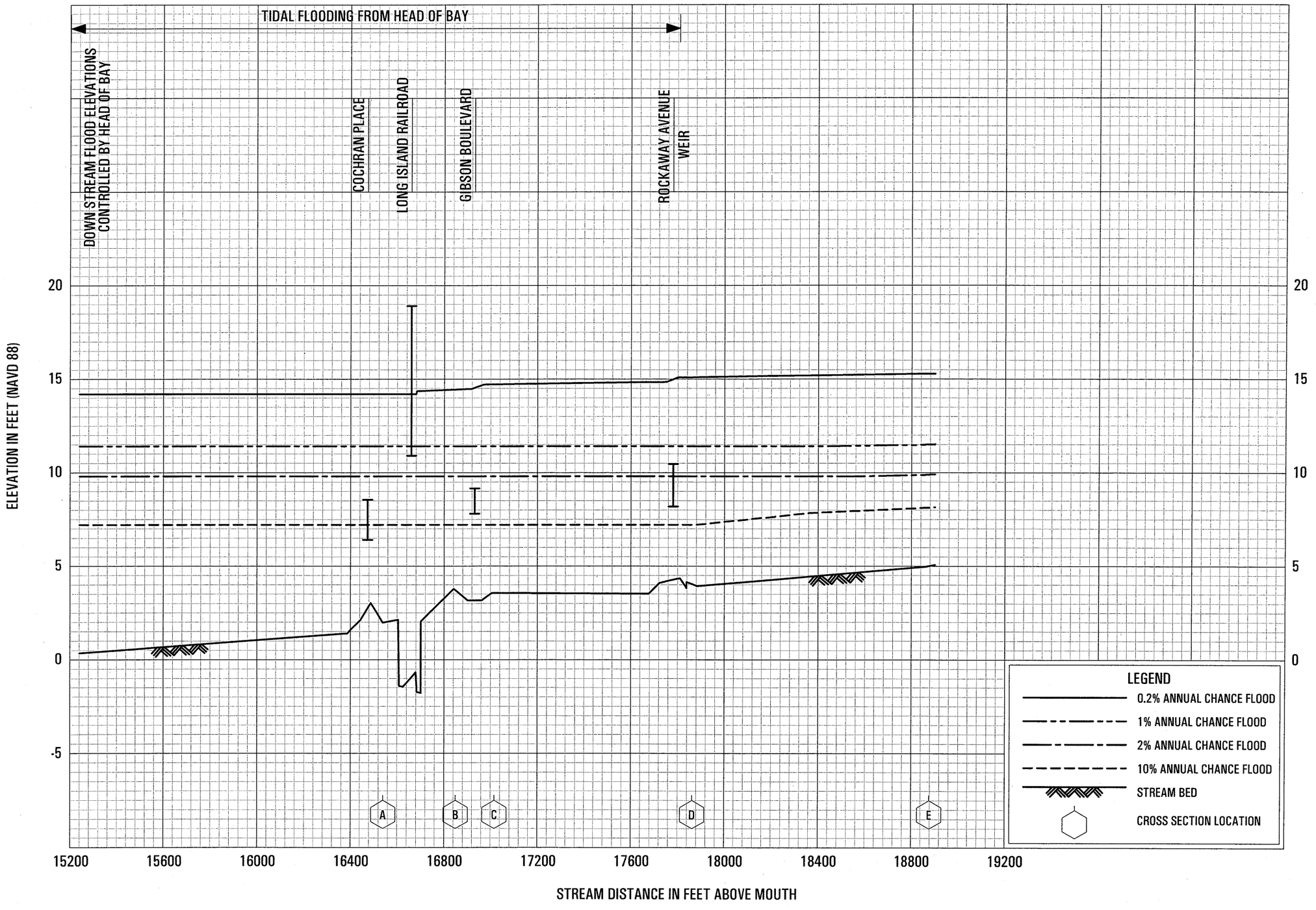


FLOOD PROFILES

MASSAPEQUA CREEK TRIBUTARY NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
NASSAU COUNTY, NY
(ALL JURISDICTIONS)

05P



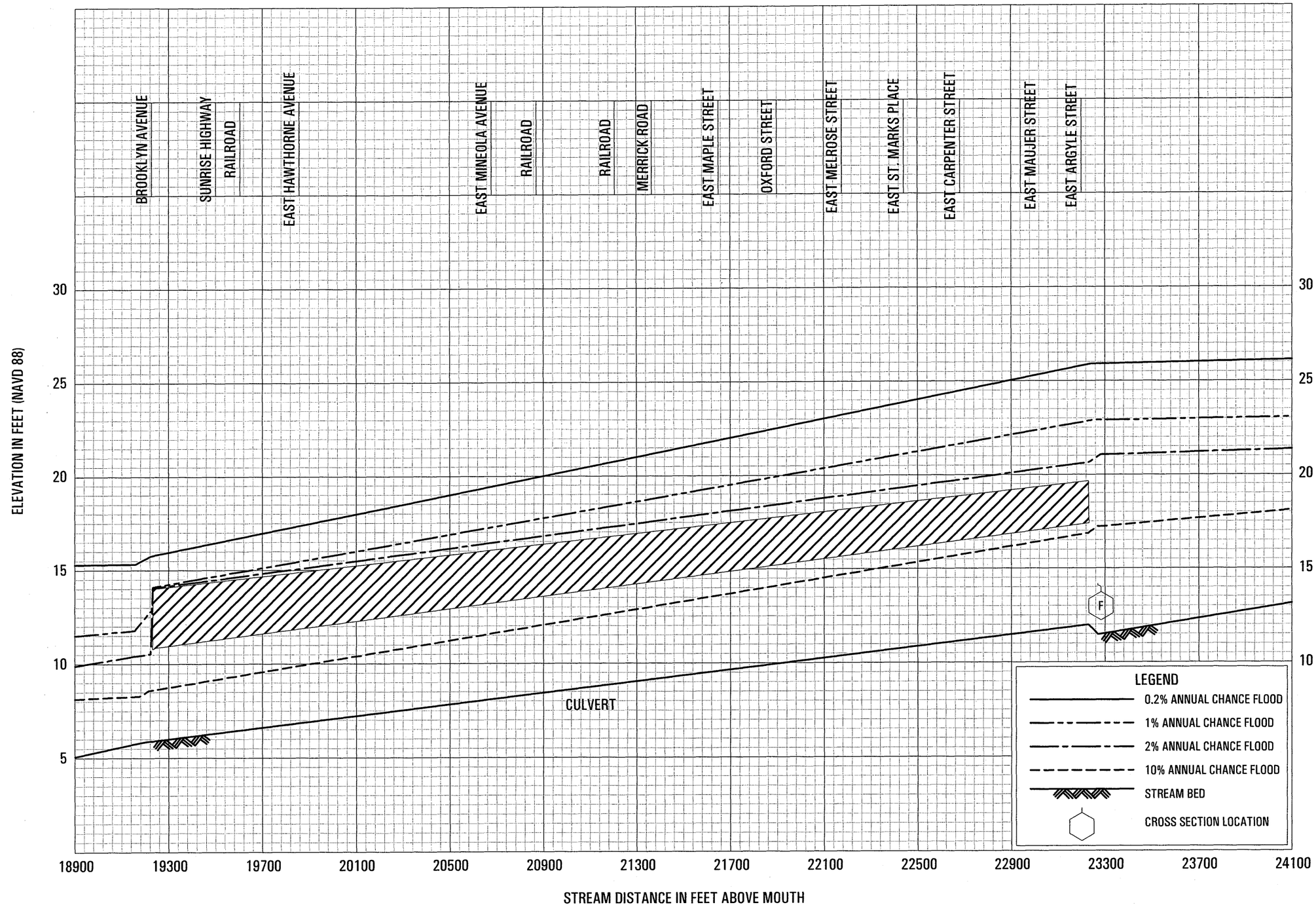
FLOOD PROFILES

MOTTS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)



FLOOD PROFILES

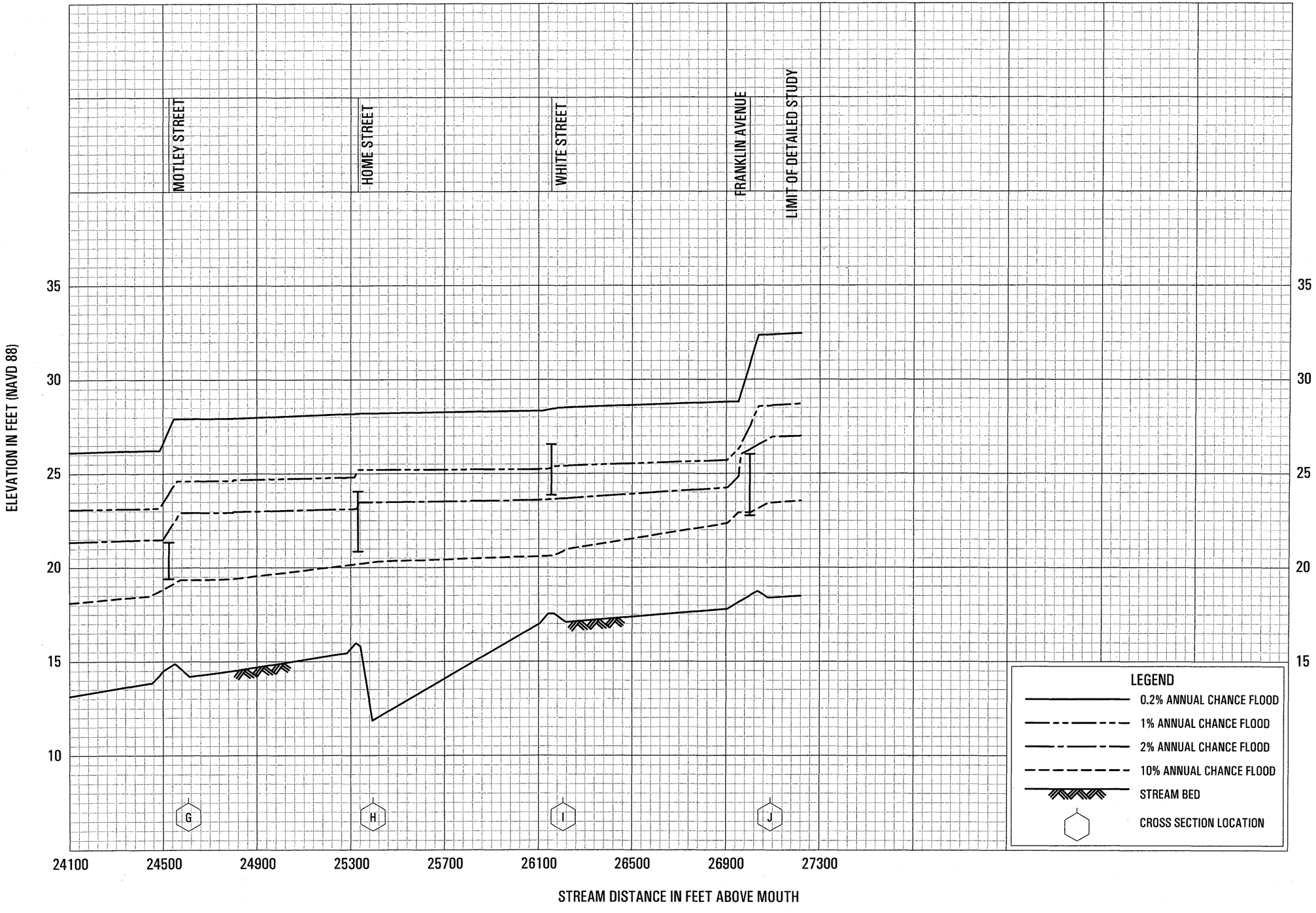
MOTTS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)

07P



FLOOD PROFILES

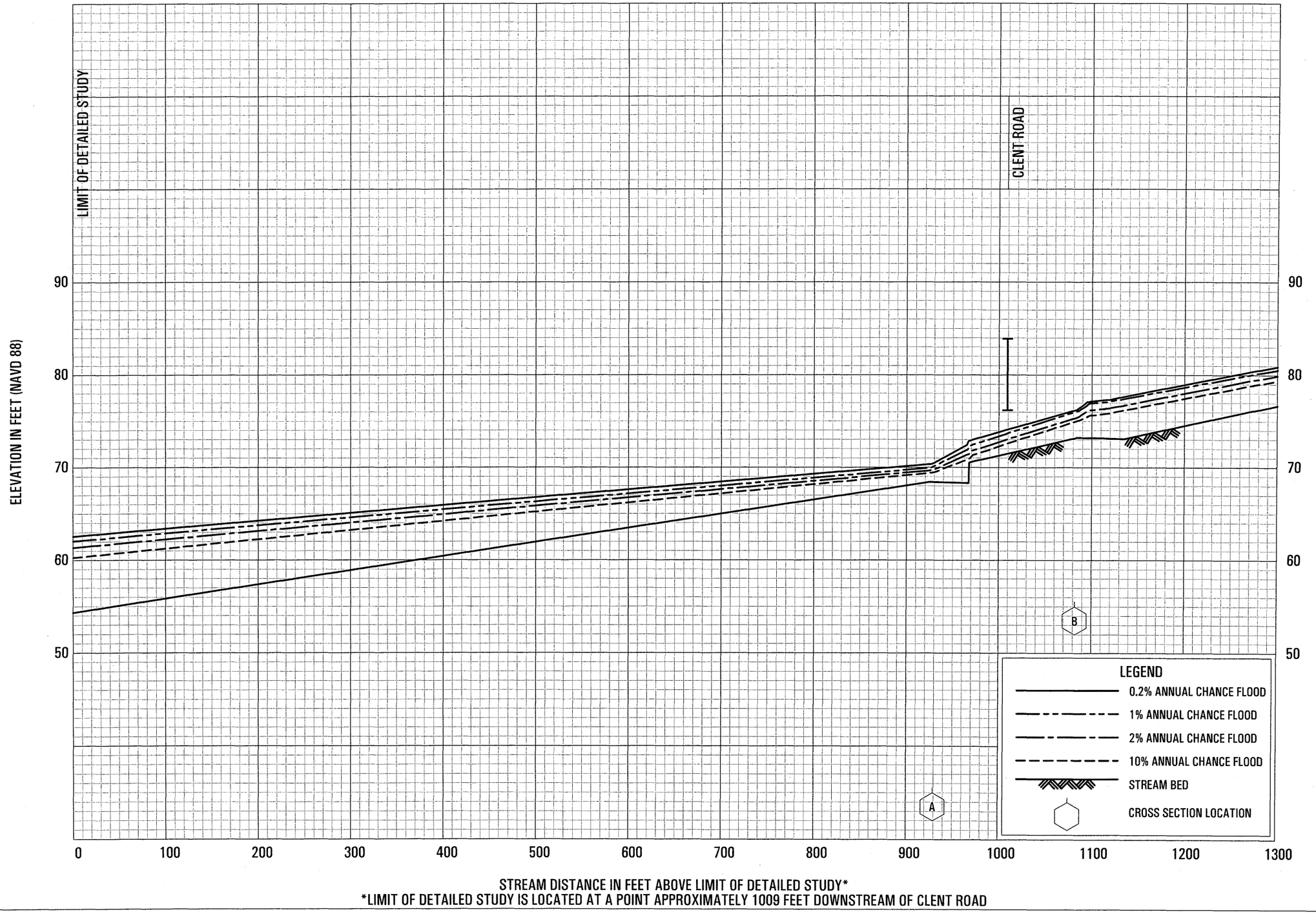
MOTTS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)

08P



FLOOD PROFILES

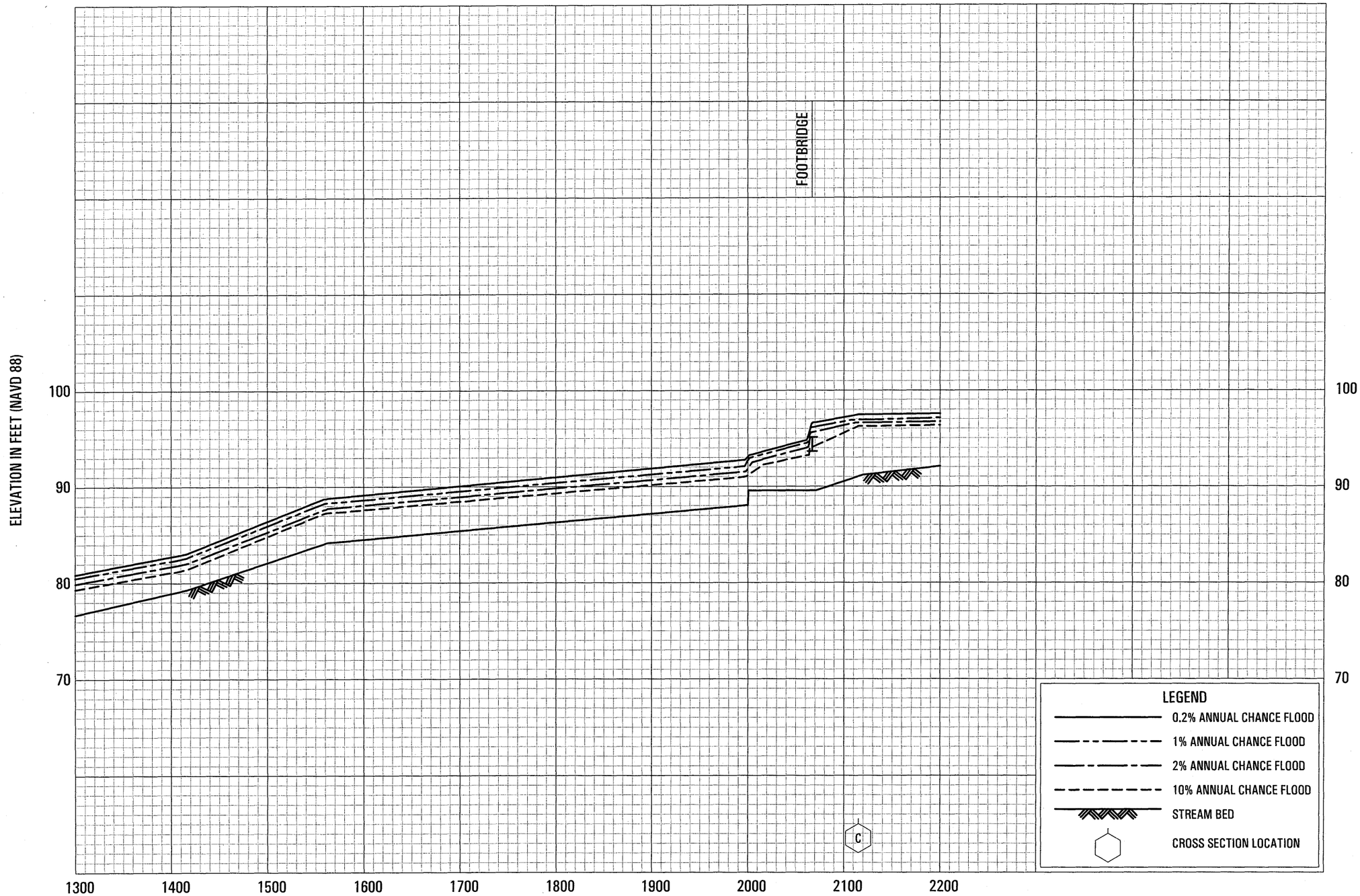
RUSSELLS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)

09P

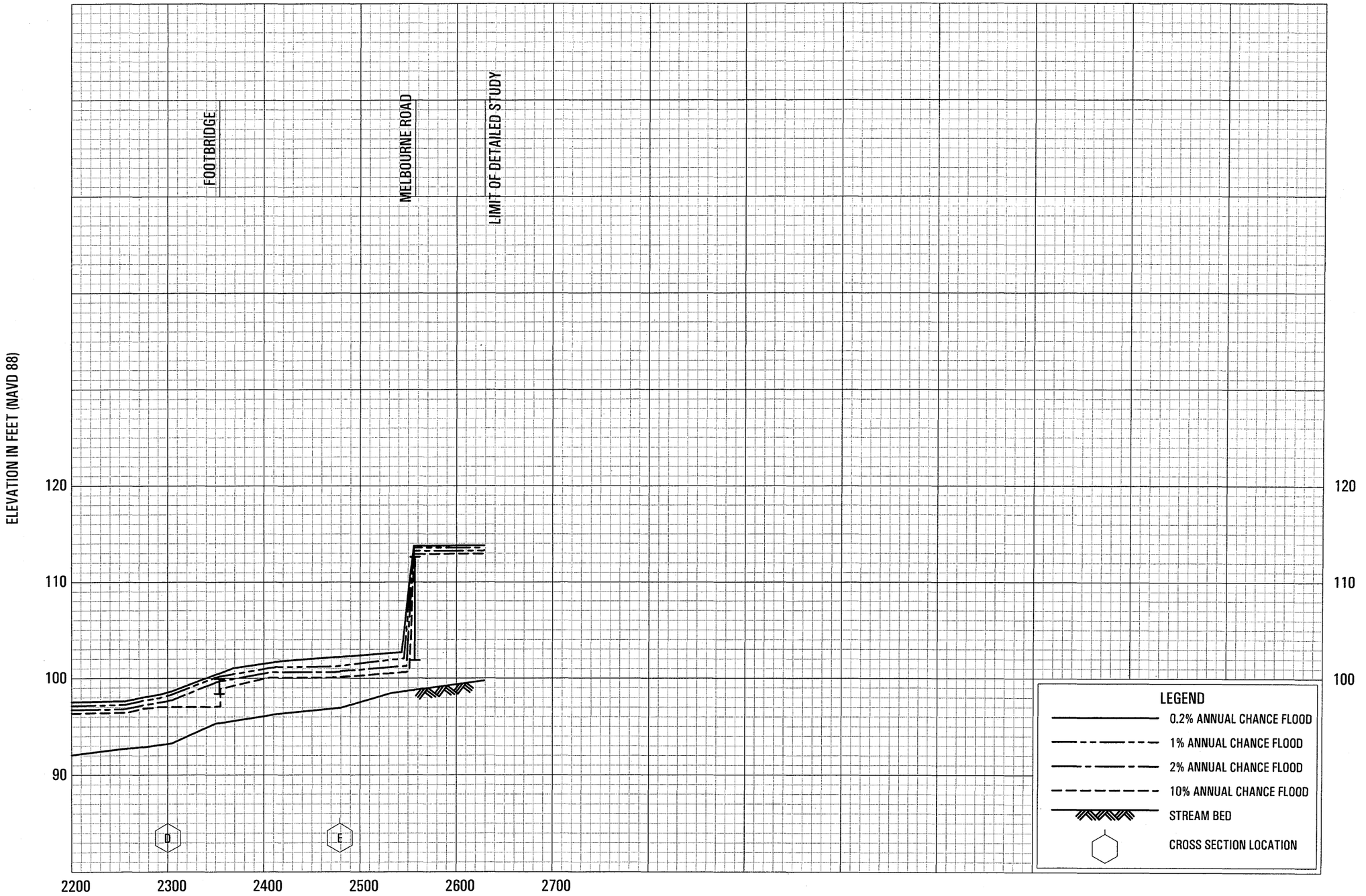


STREAM DISTANCE IN FEET ABOVE LIMIT OF DETAILED STUDY*
*LIMIT OF DETAILED STUDY IS LOCATED AT A POINT APPROXIMATELY 1009 FEET DOWNSTREAM OF CLENT ROAD

FLOOD PROFILES

RUSSELLS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
NASSAU COUNTY, NY
(ALL JURISDICTIONS)



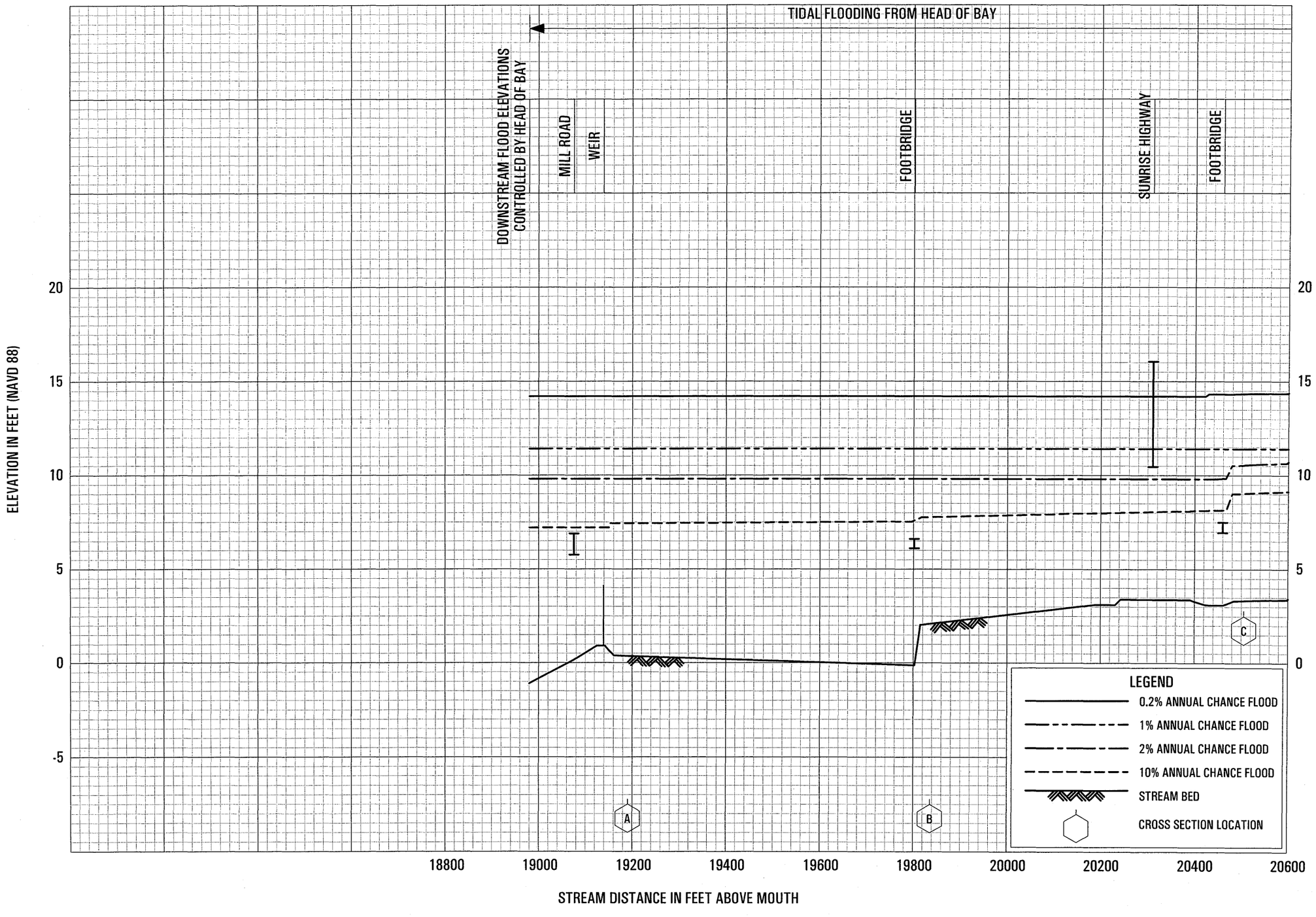
FLOOD PROFILES

RUSSELLS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)



FLOOD PROFILES

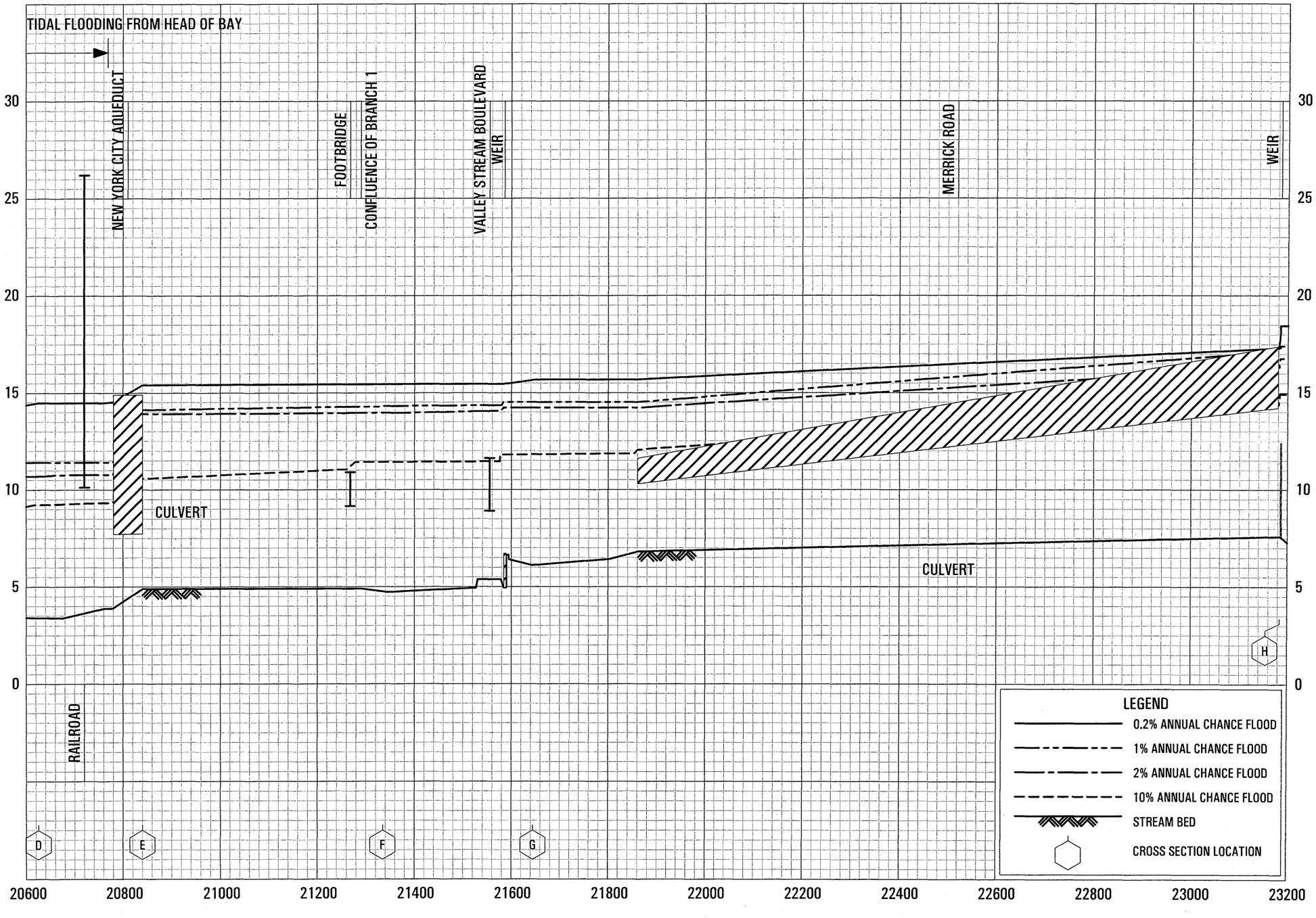
VALLEY STREAM

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)

12P



FLOOD PROFILES

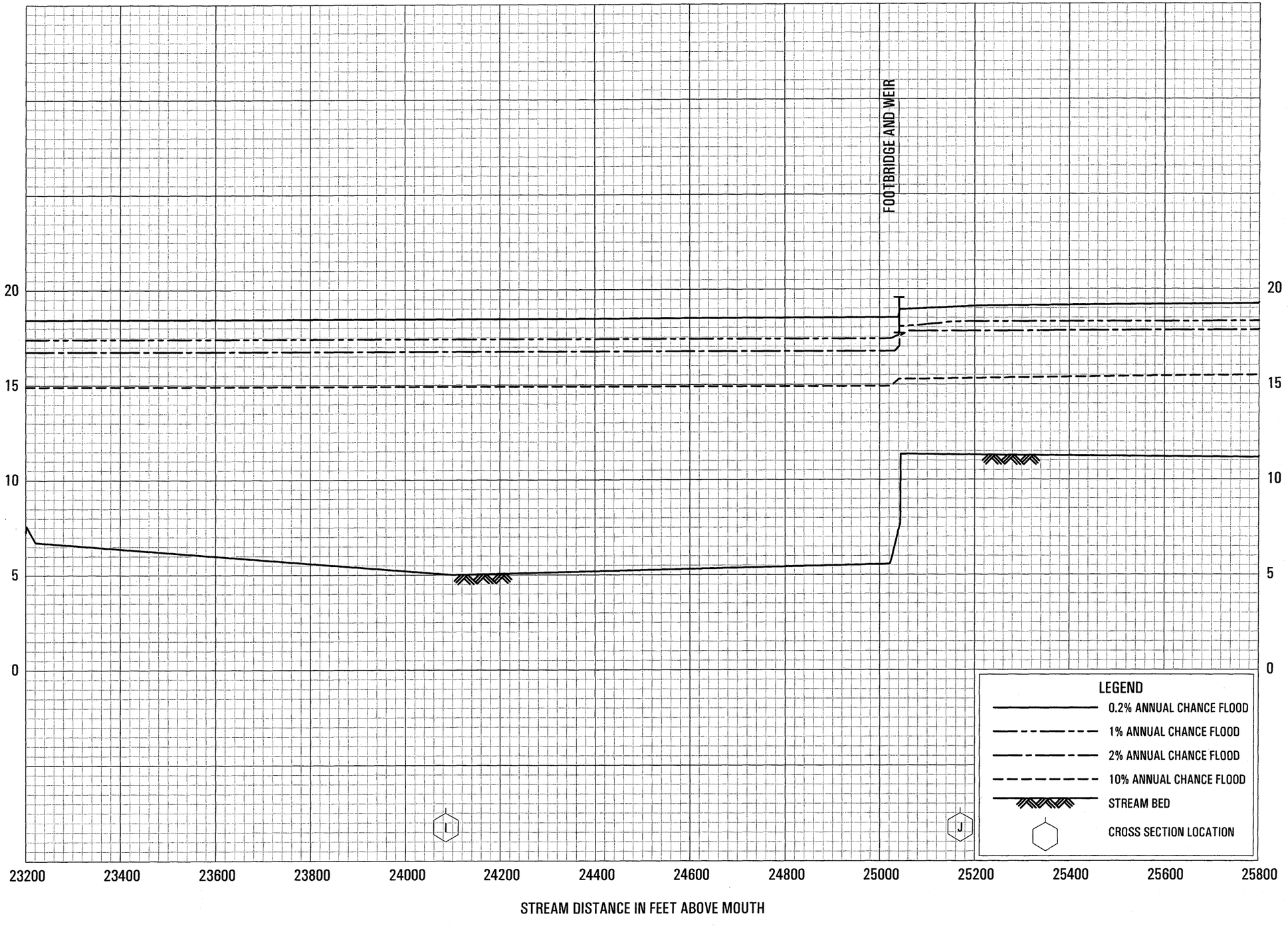
VALLEY STREAM

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)

13P



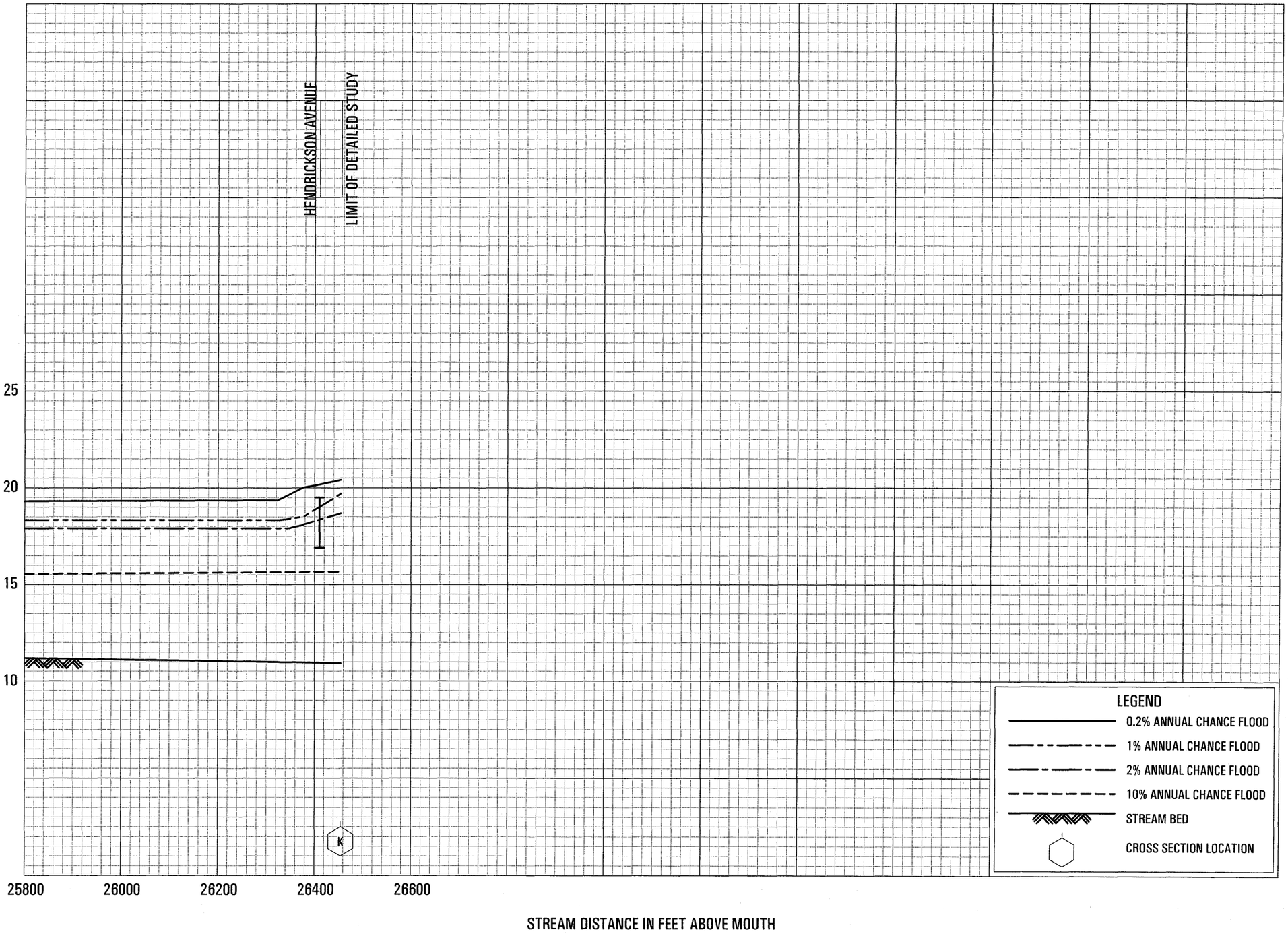
FLOOD PROFILES

VALLEY STREAM

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)



FLOOD PROFILES

VALLEY STREAM

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, NY

(ALL JURISDICTIONS)

15P