FLOOD INSURANCE STUDY

VILLAGE OF BELLE TERRE

SUFFOLK COUNTY, NEW YORK

Prepared by

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Lake Success, New York

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PRELIMINARY

for

U. S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Federal Emergency Management Agency

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FLOOD INSURANCE STUDY

VILLAGE OF BELLE TERRE, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Belle Terre, Suffolk County, New York, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the community to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by Harris-Toups Associates, Study Contractor of the FEMA under Contract No. H-4606. This study was completed in January, 1980. All field survey data for this study were collected and compiled by Geod Aerial Mapping, Inc., Oak Ridge, New Jersey, subcontracted to Harris-Toups Associates.

Approximate flood boundaries in the Village of Belle Terre were determined in December, 1974 and June, 1976 for the FEMA.

1.3 Coordination

Upon the initiation of the study, a legal notice was placed in the Port Jefferson Record in October, 1978 to notify all interested persons to submit any relevant facts and technical data concerning local flood hazards.

A meeting was held in the Village of Port Jefferson, on August 2, 1977, attended by appropriate officials of Belle Terre, a representative of the FEMA and a representative of Ebasco Services, Inc. The meeting was held to explain the nature and purpose of the study, the scope and limits of the work, as well as to obtain flood information currently available concerning the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Belle Terre, New York. The area of study is shown on the Vicinity Map

(Figure 1). A detailed tidal flood analysis was performed on the complete coastline of the community, whose flooding sources are Long Island Sound and Port Jefferson Harbor.

The areas studied were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through January, 1985.

The scope and methods of study were proposed to and agreed upon by FEMA.

2.2 Community Description

The Village of Belle Terre was settled in the early 1800's after the Revolutionary War. The area was primarily used for agriculture before changing over to a private club for hunting and fishing prior to incorporation. The village was incorporated in 1930 before which it was part of the Town of Brookhaven (Reference 1).

The village is located in the northern section of Suffolk County approximately 37 miles east of the New York City border at Queens. The village lies within the Town of Brookhaven and is bordered to the east and south by the Incorporated Village of Port Jefferson. The western border is formed by the Port Jefferson Harbor and the northern border by Long Island Sound.

The total village area is approximately 0.9 square miles, with a population of 678 according to the 1970 U. S. Census. Current population is estimated at 843 with a forecast for 967 in 1985 (Reference 2). The village is zoned exclusively for residential housing which are not effected by flooding from Long Island Sound and Port Jefferson Harbor.

The topography of Belle Terre is very irregular consisting of extremely steep sloping hills varying from a maximum elevation of approximately 150 feet along Port Jefferson Harbor to approximately 100 feet along Long Island Sound. On the sea-ward side of these hills there are relatively flat beach areas that run all along the coastline of the village. The land of Belle Terre is part of a northern line of hills termed the Harbor Hill Moraine. These moraines are 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, and the many wide and deep harbors affiliated with these headlands were carved by northward flowing streams. Wave erosion has steepened the northern slopes of these headlands into nearly vertical bluffs that, in places, are about 100 feet high (Reference 3). Soil cover within the village is generally deep and well draining where covered by vegetation. Vegetation is typical of the suburban variety consisting of shrubs, lawns, shade and ornamental tree plantings.

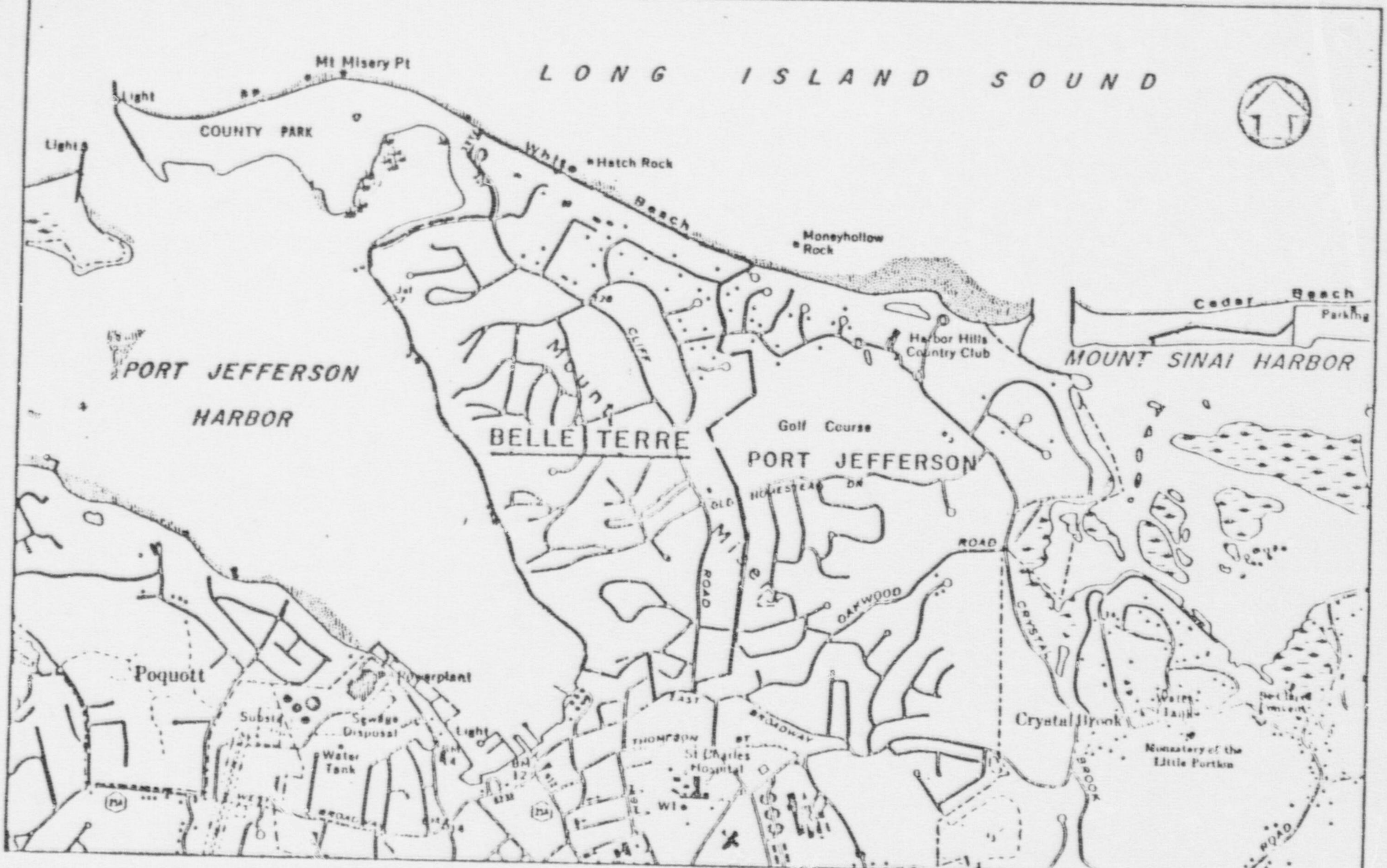

FIGURE 1

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF BELLE TERRE, N. Y.
(SUFFOLK COUNTY)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

VICINITY MAP

The Village of Belle Terre possesses a moderate coastal climate, with warm-humid summers and moderately cold winters. Temperatures average 51.4 degrees Farenheit (°F) over the entire year, ranging from a low monthly average of 31.8°F in February to a high monthly average of 72.1°F in July. Precipitation averages from 40 to 45 inches annually and is distributed fairly evenly over all months of the year (Reference 4).

2.3 Principal Flood Problems

The Village of Belle Terre 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 months, whereas hurricanes occur in the late summer and early fall months. A summary of major storms which have affected the community is presented in Table 1.

The worst storm of record was the September 21, 1938, hurricane which produced a tidal elevation of 13.7 feet above the National Geodetic Vertical Datum (NGVD) at the Willets Point, N.Y. tidal elevation gaging station and a tidal elevation of 9.2 feet above NGVD at the Bridgeport, Conn., tidal elevation gaging station. Hurricane Carol (August 31, 1954) produced the second highest tidal elevations at Willets Point and Bridgeport, of 11.7 feet and 9.2 feet above NGVD, respectively. The worst northeaster occurred February 6-7, 1978 and resulted in the third highest tidal elevations: 10.7 feet above NGVD at Willets Point. No records exist for Bridgeport on that date (Reference 5).

The following discussion on hurricanes and northeasters is useful for understanding their relationship to tidal elevations in the vicinity of Belle Terre. 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 recurving east of Florida and skirting the mid-Alantic states. 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 even up to 40 to 60 miles per hour as they approach the colder water temperatures found in the more northerly latitudes (Reference 6). Figure 2, shows the actual tracks of recent hurricanes associated with tidal flooding, as they have crossed Long Island.

The most destructive hurricane winds occur east of the eye where the spiral wind movement and forward motion of a storm combine. For this reason, the actual track of a hurricane is very important because of the effect its high wind velocity region may have on the community. Tidal levels along the coastline are greatly influenced by the forces, duration and direction of these winds as well as the distance or fetch across open water over which the winds act.

As Figure 2 indicates, the majority of the severe hurricanes of this century have tracked across the eastern end of Long Island. Even though the tracks of these hurricanes are not in the immediate vicinity of the community, their influence is felt throughout Long Island Sound. For example, the eye


CONNECTICUT

TABLE 1 - STORM TIDES (1938 THROUGH 1978)*

Storm-Type and Date	Elevation of Tide in Feet (NGVD) Willets Point	Bridgeport
1. Hurricane September 21, 1938	13.7	9.2
2. Hurricane September 14, 1944	***	8.8
3. Northeaster, November 25, 1950	10.0	8.8
4. Northeaster, November 6-7, 1953	9.0	8.6
5. Hurricane Carol, August 31, 1954	11.7	9.2
6. Northeaster April 13, 1961	8.9	7.7
7. Northeaster, March 6-8, 1962	8.8	7.7
8. Northeaster February 19, 1972	9.4	7.3
9. Northeaster February 6-7, 1978	10.7	***

* Reference 5
*** No records available

of the hurricane of 1938 had a diameter of approximately 43 miles as it crossed over Long Island (Reference 7) creating high winds and tidal elevations at most locations in Long Island Sound. For these hurricanes tracking across eastern Long Island, the wind direction in Long Island Sound, and hence along the coast to the North Shore of Suffolk County, would vary from northeast to north to northwest.

A northeaster storm can also produce high tide levels in Long Island Sound and along the coastline of the community. These high levels result from a drop in the barometric pressure and from strong winds which can blow out of the northeast across the considerable fetch of Long Island Sound. The duration of a northeaster may be several days causing high tidal elevations in the bays and inlets of the Sound as well as in the open waters.

2.4 Flood Protection Measures

As of this time, no major flood protection measures are in existence in the Village of Belle Terre. The village has approximately 2.5 miles of coastline, of which part is lined with cliffs exceeding 100 feet in height. These act as a natural barrier to protect the interior of the village against storm flooding caused by abnormally high tides. There has also been installed, along some of the beach area, bulkheading, which is used to prevent soil erosion and to minimize flood damage caused by minor tidal surges.

3.0 ENGINEERING METHODS

For tidal surges affecting the community, standard coastal engineering study methods were used to determine the flood hazard data required for this study. Tidal surges having recurrence intervals of 10-, 50-, 100-, and 500-years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions for flooding sources in the community.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak stage relationships for floods of the selected recurrence intervals for areas of tidal surge studied in detail in the community. This was achieved by performing a Pearson Type III analysis, without expected probability, for the data of all the long term tide gages in the vicinity (Reference 8).

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the coastline in the community were carried out to provide estimates of the elevations of tides of the selected recurrence intervals.

Due to the complexity of the coastline of the Village of Belle Terre, a numerical estuarine model was developed to study the surge levels throughout Long Island Sound and Port Jefferson Harbor. The results of the numerical model were used to adjust the water level elevations along the coastline.

Tide levels for the community are shown in Table 2 below.

Table 2. Tidal Elevations for Selected Recurrence Intervals

Frequency	Long Island Sound Open Coast Elevation (NGVD)	Port Jefferson Inner Harbor Elevation (NGVD)
10 - year	8.4 feet	8.7 feet
50 - year	10.5 feet	10.0 feet
100 - year	11.4 feet	10.8 feet
500 - year	13.5 feet	12.2 feet

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Emergency Management Agency as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community.

The 100-year flood boundaries of areas subjected to tidal flooding were determined by tracing, on 1"=200', 5 foot contour interval topographic maps (Reference 9), the outline of the interpolated contour which was equivalent to the elevation of the 100-year recurrence interval tide.

Flood boundaries for areas of approximate study were determined by referring to flood-prone area maps and by conversations with village officials, and then interpolating the results on the five foot contour maps. Flood boundaries are shown on the Flood Insurance Rate Map.

Small areas within the flood boundaries may lie above the flood elevation and therefore may not be subject to flooding; owing to limitations of the map scale, such areas are not shown. Where the widths of approximate flood plains are too narrow to be shown on the maps because of map scale limitations, they are not shown.

4.2 Floodways

The floodway concept does not apply in this study because of the inexact nature of estimating water-surface levels by the approximate method. In the case of tidal flooding, the floodway concept is also inapplicable because of the vast water volume represented by the oceans, which tends to maintain the 100-year tidal surge elevation without regard to any artificial fill or other device which would restrict the intrusion of sea water and which would result in raising the tidal level by any predetermined or calculable amount.

Since the floodway concept does not apply, no Floodway or Flood Boundary Map is included with this report. It is replaced by the Flood Insurance Rate Map.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source affecting the village.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-year Floods	Variation
2 to 7 feet	1.0 foot

Because of the tidal nature of the flooding and the complexity of the coastline, two reaches are required in order to meet the above criteria for the Village of Belle Terre. These are, for the open coast, the Long Island Sound reach, and for the inner harbor, the Port Jefferson Harbor reach.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Emergency Management Agency device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three digit code. For example, if the difference between water-surface elevations of the 10-year and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10-year and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire incorporated area of the village was divided into zones, each having a specific flood potential or hazard. High velocity flooding zones (V - zones) have been designated as areas where a three (3) foot maximum wave could exist. Wave heights along the shoreline were developed based on the procedures outlined in the Guidelines for Identifying Coastal High Hazard Zones (Reference 10) and the Shore Protection Manual (Reference 11). These procedures consist of the determination of the water depth and area across which the wind blows to generate waves.

Each zone was assigned one of the following flood insurance zone designations:

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods, no base flood elevations or Flood Hazard Factors determined.

Zone A6,A4:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factors.
Zone V6,V4:	Special Floc. Hazard Areas along coasts inundated by the 100-year flood, as determined by detailed methods, and that have additional hazards due to velocity (wave action); base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Area between the numbered A Zones and the limits of the 500-year flood; Zone B is not subdivided.
Zone C:	Area not subject to flooding by the 500-year flood; not subdivided.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, Flood Hazard Factors, flood insurance zones and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Village of Belle Terre is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Emergency Management Agency.

6.0 OTHER STUDIES

In June, 1976, the U. S. Army Corps of Engineers (CoE), New York District, completed a Flood Insurance Study for the Town of Brookhaven (Reference 12). This report was not utilized due to the difference between the methodology used and that required by FEMA for developing tidal stage frequencies. Although the required methodology for determining tidal flood elevations differs from the one used in the existing report, the values from this report was analyzed and compared to the results with a 95% confidence limit, it was determined that the existing values matched the more recent correlations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic and other pertinent data used in this study can be obtained by contacting the office of the Federal Emergency Management Agency, Regional Director, 90 Church Street, Room 801-B, New York, New York 10007.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10-YR)	2% (50-YR)	0.2% (500-YR)			
Long Island Sound Reach 1		-3.00	-0.90	2.10	030	A6	11'
Port Jefferson Harbor Reach 2		-2.10	-0.80	1.40	020	A4	11'

[1]FLOOD INSURANCE RATE MAP PANEL

[2]WEIGHTED AVERAGE

[3]ROUNDED TO NEAREST FOOT

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF BELLE TERRE, N. Y.
(SUFFOLK COUNTY)

FLOOD INSURANCE ZONE DATA

LONG ISLAND SOUND, PORT JEFFERSON HARBOR

8.0 BIBLIOGRAPHY AND REFERENCES

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10. U. S. Army Corps of Engineers, Galveston District, Guidelines for Identifying Coastal High Hazard Zones, Galveston, TX, June, 1975.

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12. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study: Town of Smithtown, Suffolk County, NY, June, 1978.

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U. S. Department of Commerce, Coast and Geodetic Survey, Port Jefferson and Mount Sinai Harbors, (Chart 12362) Scale 1:10,000, Washington, DC, 1974.

U. S. Department of the Interior, Geological Survey, N. Y. Quadrangles, 7.5 Minute Series (Topographic), Port Jefferson, NY, Scale 1:24000, Washington, DC, 1967.

Request 371.18:

Identify, locate on a map, and describe all structures and topographic alterations in the floodplains.

Response:

Topographic alterations within the floodplain, as defined prior to construction, are as shown on Fig. 371.18-1. Identification of structures and details of site grade revisions are shown on Fig. 371.18-2.

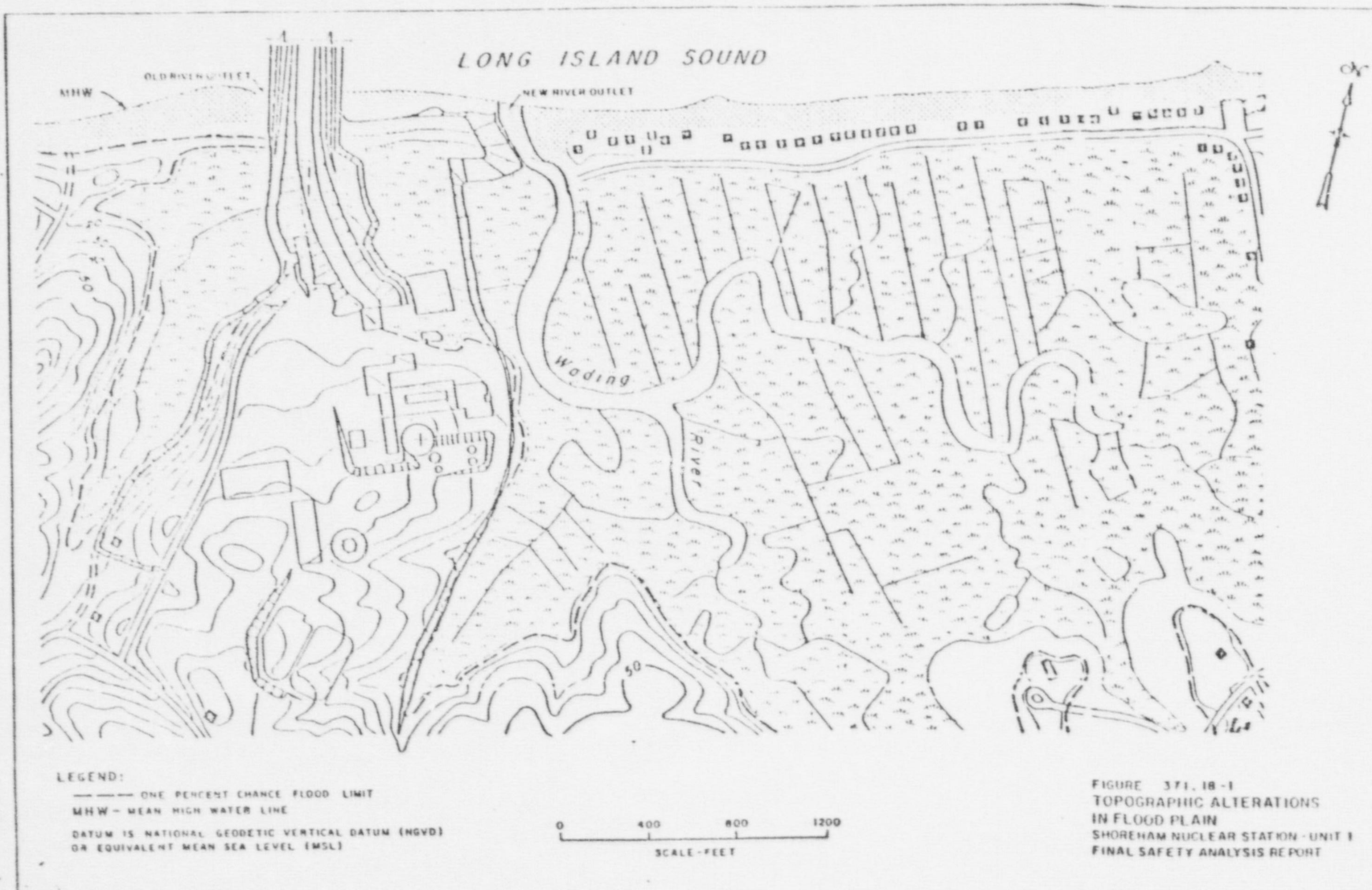

FIGURE 371.18-1
TOPOGRAPHIC ALTERATIONS IN FLOOD PLAIN
SHOREHAM NUCLEAR STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

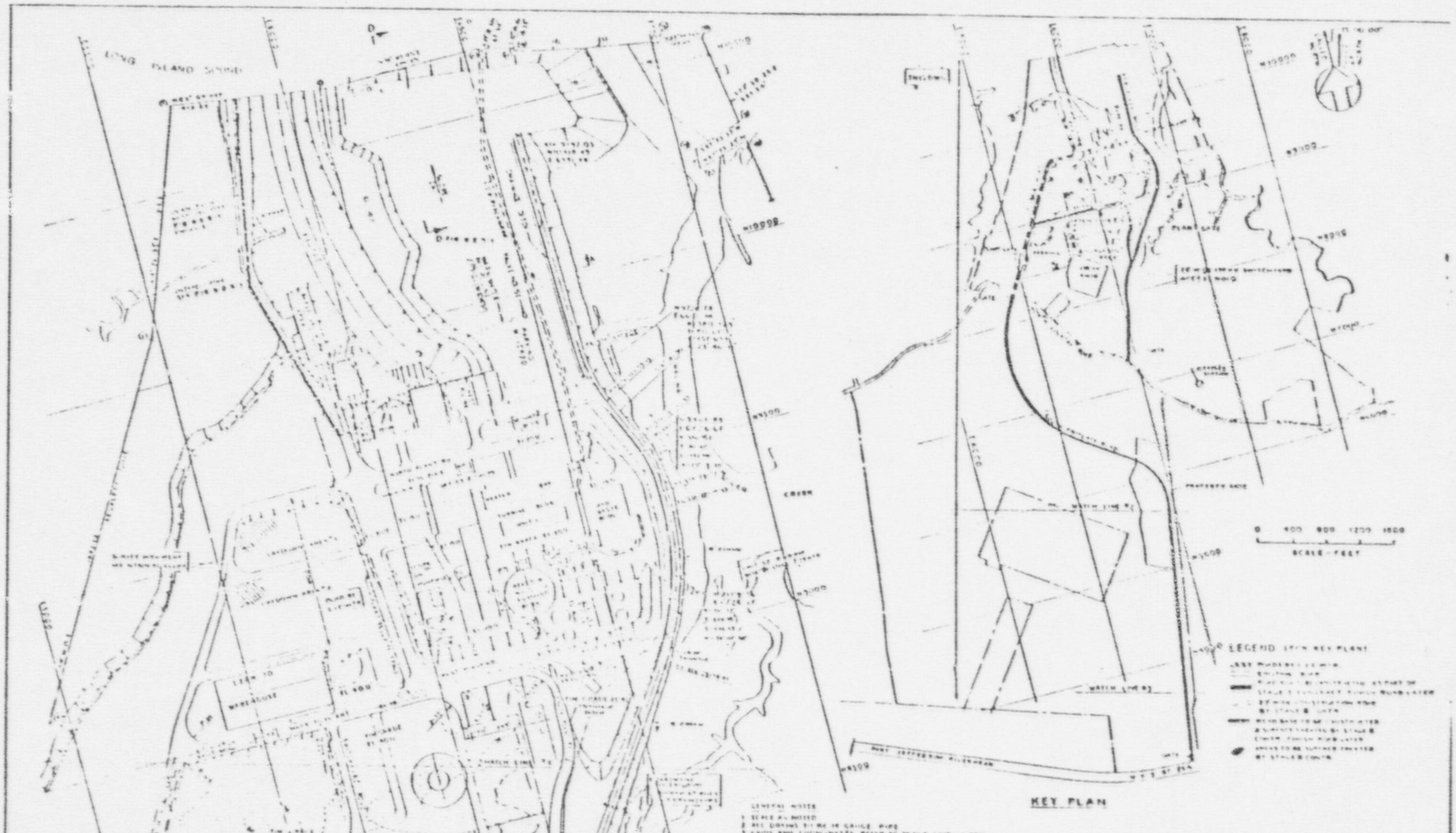

FIGURE 371.18-2
SHOREHAM SITE ALTERATIONS
SHOREHAM NUCLEAR POWER STATION-UNIT 1
FINAL SAFETY ANALYSIS REPORT

Request 371.19:

Discuss the hydrologic effects of all items identified in 3. (R371.18) above. Discuss the potential for altered flood flows and levels, both upstream and downstream. Include the potential effect of debris accumulating on the plant structures. Additionally, discuss the effects of debris generated from the site on downstream facilities.

Response:

The plant structures within the 100 year flood zone have no effect on coastal flooding generated by Long Island Sound. The large size of the Long Island Sound eliminates the possibility that water levels will change due to the presence of these structures in the flood zone. Similarly, debris accumulation on structures within the site area has no effect on the flood level in the floodplain.

Request 371.20:

Provide the details of your analysis used in response to 4. (R371.19) above. The level of detail is similar to that identified in item 2. (R371.17) above.

Response:

The response to Request 371.19 is based on the physical characteristics of the site and did not require a detailed quantitative analysis.

REQUEST: 121.34

Recently Sequoyah 1, Watts Bar 2, Salem 2, and North Anna 2 performed augmented ultrasonic inspections of their reactor vessel nozzles. These examinations were conducted (1) to determine if underclad cracks, resulting from certain pre- and post-clad heat treatments used by some European fabricators, were present in the nozzles, and (2) to demonstrate that cladding heat treatments used in the United States did not result in the type of underclad cracks recently found by a European fabricator. The results from the ultrasonic examinations, however, did not indicate an explicit correlation between observed cracking and pre- and post-clad heat treatment.

In order to better define the potential for cracking in reactor vessel nozzles, it is requested that the following information be provided:

Nozzle base metal material specification type and grade.

Clad process type, electrode size and number of clad layers.

Heat input (amps, volts, speed) for each clad layer.

Clad pre- and post-heat temperature and interpass temperature for each clad layer.

Vessel stress relief treatment.

Manufacturer or subcontractor who fabricated vessel and applied nozzle cladding.

RESPONSE:

QUESTION	RESPONSE
1. Manufacturer or Subcontractor who fabricated the vessel and applied nozzle cladding.	Combustion Engineering Company, Inc.
2. Nozzle Base Material Specification Type and Grade	ASME SA508, Class 2.
3. Clad Process Type (Electrode Sizes and Clad Layers)	Shielded Metal Arc and Gas Metal Arc Welding per Table 1
4. Weld Heat Input for Each Cladding Layer (amps, volts, and speed)	See Table 1.

TABLE 1

SHOREHAM RPV NOZZLE CLADDING WELDING PROCESS SUMMARY

	Cladding Weld Spec.	Process/ Position	Clad Layer	Elect Size (in)	Volts	Amps	Speed (Inches/ Minute)	Heat Input (Joules/in)	Pre-Heat	Inter Pass Temp.	Intermediate Post Weld Heat Treat
1	GMAA-3 Rev 1	GMAW/ Flat	1	1/16	29-30	250	6.5	67,000	250°F	350°F Max.	1100°F+50, -0 Max.
			2	1/16	29-30	275	7.0	70,000	250°F		
2	MA-12 Rev 0	SMAW/ Flat	1	3/16	25	175	-	-	250°F	*	*
			2	3/16	25	145-185	-	-	250°F	*	
3	MA-13 Rev 0	SMAW/ Flat	1	5/32	22	115	-	-	250°F	*	*
			2	5/32	22	110-140	-	-	250°F	*	
4	MA-32 Rev 0	SMAW/ Flat & Horiz.	1	5/32 (Flat)	24	120	-	-	250°F	*	*
			2	5/32 (Horiz)	24	105	-	-	250°F	*	
5	MA-53 Rev 0	SMAW/ Flat & Horiz.	1	3/16 (Flat)	24	145-185	-	-	250°F	*	*
			2	5/32 (Horiz)	23	110-140	-	-	250°F	*	
6	MA-604-0	SMAW/ Flat & Horiz.	1	3/16 (Flat)	25	140-180	-	-	250°F	400°F Max.	*
			1	5/32 (Horiz)	24	110-140	-	-	250°F	*	
			2	1/8 in	23	80-110	-	-	250°F	*	

NOTES:
1) All welding is by single arc.
2) Pre-heat is maintained until PWHT is applied.
3) In manual SMAW the travel speed is not available and heat input is therefore not given (If 4-6 inches per minute travel is assumed and 185 amps, 25 volts, the highest heat input would be 65,000 Joules/inch).

QUESTION	RESPONSE
5. Vessel Stress Relief Treatment	Per ASME Code (1 hour per inch of thickness)
6. Clad Pre- and Post-Heat Temperature and Interpass Temperature for Each Clad Layer	See Table 1

The data reviewed showed that Shoreham RPV clad nozzles were fabricated by Combustion Engineering Company, Inc. using ASME SA508, Class 2 base material. The information developed shows only shielded metal arc welding (SMAW) and gas metal arc welding (GMAW) single electrode techniques were used. The highest weld heat input apparently was obtained by the semi-anutomatic GMAW process (approximately 70K Joules/inch in the maximum combination of volts, amperes and travel speed). Travel speeds were not available for the SMAW process, as manual welding does not lend itself to measurement of travel speed. However, in these electrode sizes and amperes, assuming a typical travel speed of 4 to 6 inches per minute, heat input would be no higher than in the GMAW process.

The vessel stress relief was a post weld heat treatment (PWHT) in accord with ASME Code requirements at 1150 F for one hour per inch of thickness as noted in the Combustion Engineering Documents.

Thermal treatments applied during cladding operations were preheat, interpass temperature, and intermediate PWHT which is to heat to 1100-1150 F and hold for 15 minutes minimum. Contact with the manufacturer by telephone indicated that pre-heat was maintained through both the 1st and 2nd layer deposition until the intermediate PWHT was performed. General Electric specifications also state that the cladding must be a minimum of 3/16 inch in thickness before welding can be performed on it without pre-heat. In the telephone contact to C.E. it was determined that the first pass thickness did not reach 3/16 inch and therefore pre-heat was performed on both layers. This conversation will be confirmed by letter from G.E. to LILCO.

TABLE 1.3.2-1 (CONT'D)

Significant Changes Since PSAR	FSAR Section
75. ~~A decoupler will be installed between the recirculation pump and motor to eliminate the recirculation pump missile hazard due to suction line breaks.~~	5.5.1.4
76. A Prompt (Pressure) Relief Trip system has been incorporated to mitigate the consequences of overpressure during end-of-cycle turbine trip and load rejection incidents.	7.6.1.4 15.1.1 15.1.2
77. A remote shutdown panel has been added to provide the capability to shut down the reactor from outside the main control room.	7.4.1.4 7.5.1.4
78. The low population zone has been reduced from 5 to 2 mi.	2.1.3
79. A second personnel hatch has been installed in the drywell (in the center of the equipment hatch) to comply with OSHA requirements (to provide a second egress).	3.8.1