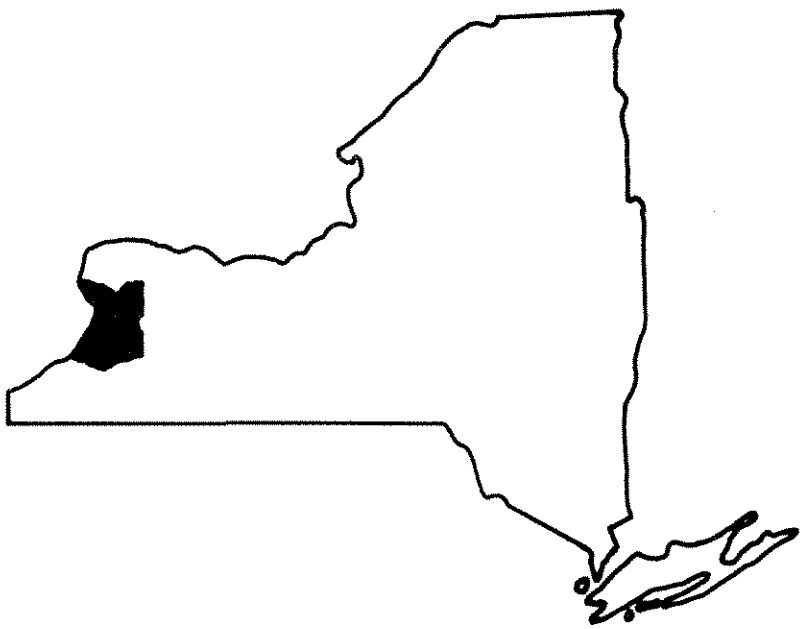
FLOOD INSURANCE STUDY

TOWN OF TONAWANDA, NEW YORK
ERIE COUNTY



FEBRUARY 17, 1981

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 360260

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
TOWN OF TONAWANDA, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Tonawanda, Erie 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 Tonawanda to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by Deleuw, Cather and Company of New York, Inc., for Federal Insurance Administration, under Contract No. H-4552. This work was completed in November 1979.

1.3 Coordination

Identification of streams to be studied by detailed and approximate methods was made at the initial Consultation and Coordination Officer's (CCO) meeting on May 23, 1977, between the FIA, DeLeuw, Cather and Company of New York, Inc., (the study contractor), and town officials.

For those streams studied in detail, technical data were coordinated with the New York State Department of Environmental conservation (NYSDEC),the U. S. Geological Survey (USGS), the U. S. Army Corps of Engineers (COE), the Erie-Niagara Counties Regional Planning Board and the engineering firms of Erdman, Anthony Associates and Goodkind & O'Dea.

Other organizations contacted for information included the Soil Conservation Service (SCS), the New York State Departments of Highway Planning, Drainage and Sanitation, Environmental Quality and Soils Conservation. Information from the general public was solicited through newspaper announcements in October 1977.

On September 3, 1980, results of this study were reviewed at a final CCO meeting attended by representatives of the FIA, the study contractor and the Town of Tonawanda.

2.0 AREA STUDIED

2.1 Scope of Study

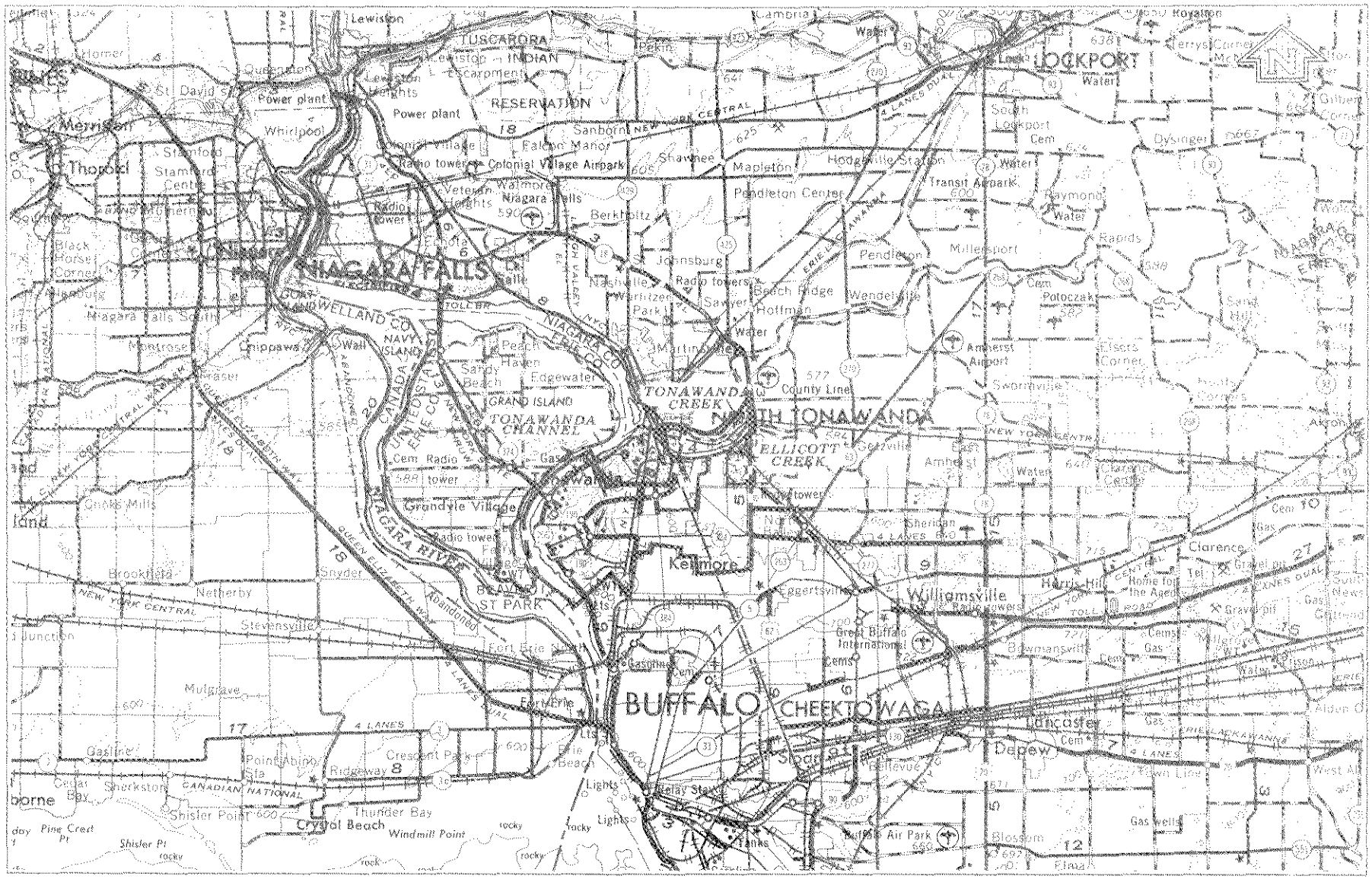
This Flood Insurance Study covers the incorporated area of the Town of Tonawanda, Erie County, New York. The area of study is shown on the Vicinity Map (Figure 1).

A 2,500-foot portion of Ellicott Creek, centered around Colvin Boulevard, was studied by detailed methods. The Niagara River-Tonawanda Channel was studied in detail from about 2,000 feet upstream of Motor Island to the upstream corporate limits of the Town of Tonawanda. Tonawanda Creek was studied from the northeastern corporate limits to a point about 1,600 feet upstream. 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 for the next five years, through November 1984.

A portion of Ellicott Creek from Niagara Falls Boulevard to 1,000 feet upstream of Colvin Boulvard, and the portion of the Niagara River-Tonawanda Channel between a point about 2,000 feet upstream of Motor Island to the upstream corporate limits were studied by approximate methods. A portion of Tonawanda Creek was also studied by approximate methods. Approximate methods of analysis were used to study those areas having low development potential and minimal flood hazards as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by the FIA.

2.2 Community Description

The Town of Tonawanda is located in western New York State in the northwest corner of Erie County and, together with the Village of Kenmore, forms the northern boundary of the City of Buffalo. The town is bordered by the City of North Tonawanda to the north, the Town of Amherst to the east, the City of Buffalo to the south, and by the City of Tonawanda and the Niagara River-Tonawanda Channel to the west.


Lewiston
TUSCARORA
INDIAN
RESERVATION
Power plant
Whirlpool
Niagara Falls
Sanborn
Colonial Village Airpark
Shawnee
Mapleton
Hodgeville Station
Transit Airpark
Pendleton Center
Raymond
Pendleton
Millersport
Rapids
Johnsburg
Nashville
Sawyer
Beach Ridge
Hoffman
Wendelville
Martinsville
Amherst Airport
County Line
Swormville
NIAGARA FALLS
WELLAND CO.
NAVY ISLAND
Chippawa
Wall
Edgewater
GRAND ISLAND
TONAWANDA CHANNEL
TONAWANDA CREEK
NORTH TONAWANDA
ELLICOTT CREEK
Grandyle Village
NIAGARA RIVER
Kenmore
Williamsville
Eggertsville
Sheridan
Clarence
Harris Hill
Home for the Aged
Great Buffalo International
Buffalo Airport
Cheektowaga
Lancaster
Depew
Bellevue
Stevensville
Netherby
Brookfield
Mulgrave
Fort Erie
Crescent Park
Ridgeway
Point Abino
Crystal Beach
Thunder Bay
Windmill Point
Shisler Point
Pine Crest Pt
Shisler Pt
Shirkston
Cedar Bay
Gasline
Lockport
South Lockport
Dysinger
Royalton
Gilbert Corners
Potoczak
Elsers Corners
Sand Hill
Elma
Blossom
Gas wells
Tanks
Lights
Relay Stn
Cemetery
Water
Cem
Gas
Radio tower
Radio towers
Veterans Heights
Walmore
Berkholtz
Black Horse Corners
Niagara Falls South
Montrose
Brasur
Sandy Beach
Peach Haven
Snyder
Oakes Mills
Merriman
Thorold
Stamford
Stamford Cent
Lewiston Heights
Lewiston Escarpment
Queenston
Homer
St David
Cambria
Pekin
Lockport
Gasline
Fort Erie
Erie Beach
Bergmann
Tonawanda
Kenmore
Williamsville
Clarence
Lancaster
Depew
Cheektowaga
Buffalo
Niagara Falls
Lockport
Thorold
Welland
Grand Island
Tonawanda
North Tonawanda
Amherst
Clarence
Elma

The Town of Tonawanda was formed from the City of Buffalo on April 16, 1836. It has an area of 19.8 square miles and in 1970 had a population of 107,282. The town is a mix of residential, commercial and industrial land, with some open space areas. Ellicott Creek Park, a county recreational facility, is located within the corporate limits, as are several town parks and golf courses.

Ellicott Creek comprises the major drainage feature in Tonawanda. Flowing west through the northern part of town, it joins Tonawanda Creek in the City of Tonawanda, meandering through Ellicott Creek Park. For part of this reach, development along the banks is residential and commercial.

Surface soils within the town reflect the texture of the glacial till and lake deposts from which they are formed. The predominant surface soils are unsorted rock material, forming a thin mantle over the bedrock in the southern portion of town, and interbedded clay, silt and fine sand in the remainder of town. Soils are generally shallow and well-drained. Elevations within the community vary from 570 feet to 620 feet.

Precipitation in the study area averages 33.0 inches annually. The average annual snowfall is 85.0 inches. Average temperatures range from 42 degrees Fahrenheit (°F) to 86°F in summer and from -7°F to 30°F in the winter.

2.3 Principal Flood Problems

The low-lying areas of Tonawanda have been subject to frequent and great depths of flooding. Floods usually occur in the late winter or early spring and are caused by melting snow coincident with moderate amounts of rainfall. Flood hazards have been lessened since the construction of a diversion channel from Ellicott Creek to Tonawanda Creek. It was constructed in the summer of 1965 and is located upstream of Niagara Falls Boulevard. Only minor damages have been sustained within Ellicott Creek Park.

The most recent significant flood occurred in March 1960, inundating parts of the town. Other large floods occured in March 1916, January 1929, March 1936, June 1937, March 1940, March 1954, March 1956, January 1959 and March 1963.

The maximum recorded flood of march 1960 had a discharge determined to be a 20-year event at a location 11 miles upstream of Tonawanda. The greatest known flood occurred on march 17, 1936, and was estimated to be a 50-year event.

A damage survey of the area flooded by the March 1960 flood was made in the summer of 1962 by the Buffalo District of the COE. Only minor damages were sustained within the Town of Tonawanda.

Figures 2 and 3 illustrate potential flood elevations within Tonawanda.

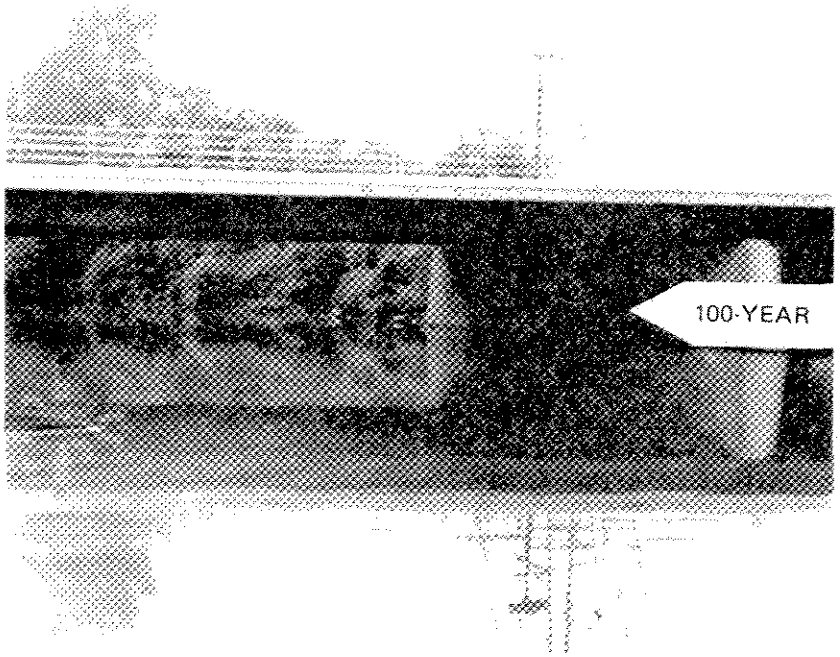


Figure 2 - The potential 100-year flood would be approximately 3 feet lower than the bottom of the Colvin Boulevard bridge over Ellicott Creek.

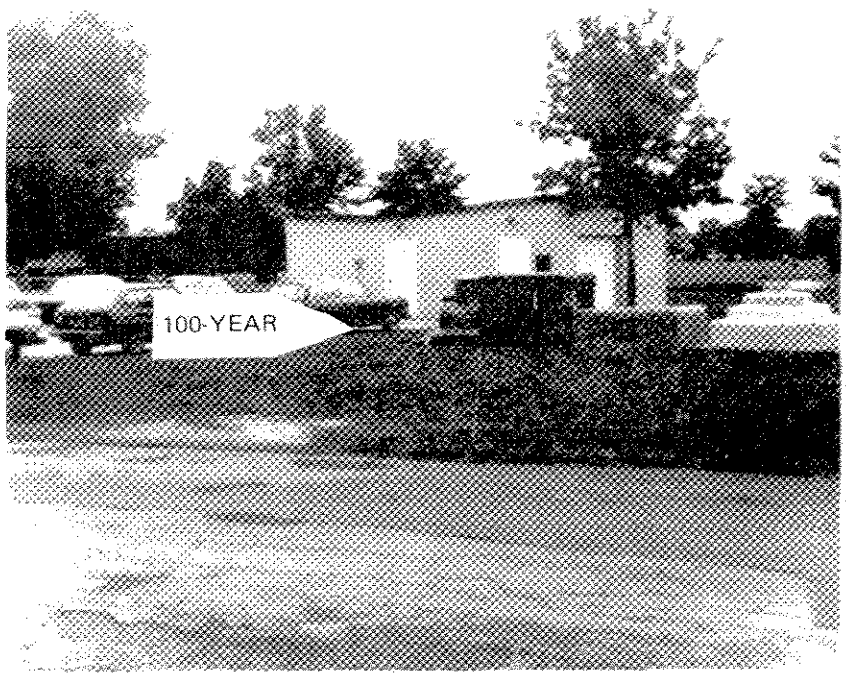


Figure 3 - The potential 100-year flood is approximately 0.5 foot lower than the ground floor of the playground building at the Heritage Road School.

2.4 Flood Protection Measures

Construction of a diversion channel in Ellicott Creek Park from Ellicott Creek to Tonawanda Creek, in the town, was completed in 1965. This channel has lessened the flood hazards from Ellicott Creek within Tonawanda.

Major channelization and diversion channels for Ellicott Creek in the Town of Amherst and widening of the diverionary channel in Ellicott Creek Park between Ellicott Creek and Tonawanda Creek in the Town of Tonawanda are planned and funded for construction. However, construction may not take place until 1980, and its effects were not considered in this study.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled 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 flood plain management and for flood insurance premium 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 equalled 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 one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency and peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

Hydrologic data on Ellicott Creek were obtained from the Buffalo District of the COE publication dated November 1976 and revised April 1978 (Reference 1). A Beard-type (statistical) discharge-frequency curve was computed from the annual peak discharges of the since-discontinued

Williamsville gage on Ellicott Creek at Wherle Drive in the Town of Amherst. To compensate for the short period of record (1955 - 1968), Beard-type generalized frequency curves were developed using peak discharge information form three western New York gaging stations with basin characteristics similar to Ellicott Creek. They were Canaseraga Creek near Dansville, Little Tonawanda Creek at Linden and Tonawanda Creek at Alabama. The resulting regional discharge-frequency analysis was the data source for flows on Ellicott Creek used in this study.

The gages mentioned above are all USGS gages. The Williamsville gage (no. 04218500) downstream of Wehrle Drive was replaced in September 1972 by another USGS gage upstream of Sheridan Drive (no. 04218518). The Canaseraga Creek gage (no. 04225000) is located west of Dansville, New York, in Livingston County. It provided sporadic records to 1919 and continuously from 1919 except 1969. The Linden gage on Little Tonawanda Creek is a partial record station (no. 04216500) and has been operating since 1913. It is located at Linden, New York, in Genesee County. The Tonawanda Creek gage (no. 04217500) is located west of Alabama, New York, in Genesse County (Reference 2).

The hydrologic information for Tonawanda Creek was obtained from regional flood-frequency curves determined by Goodkind and O'Dea, Consulting Engineers, in their performance of other Flood Insurance Studies in Erie and Niagara Counties. The peak discharge-frequency relationships of six USGS gaging stations within the Tonawanda Creek basin were established using the standard log-Pearson Type III method and then adjusted for expected probability. The regional skew value of -0.3 was a computed weighted average considering the natural skews and years of record for each gage. A set of regional curves was then derived for the basin, graphically correlating peak discharge and drainage area for the selected return periods. These curves provided the Tonawanda Creek discharges used in this study. Discharge values for Tonawanda Creek were also established by Erdman, Anthony Associates in the performance of the Flood Insurance Study for the City of Tonawanda, New York.

Using information supplied by the Buffalo District of the COE and Ontario-Hydro, stage-frequency relationships were derived for the Tonawanda Channel of the Niagara River (References 3 and 4).

Stage elevations for the following gages on the Tonawanda Channel operated by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Survey, Lake Survey Center, were obtained from the Buffalo District of the COE (Reference 3).

The Black Rock Gage, located near the northern end of Squaw Island in the City of Buffalo, New York, was continuously in operation from 1933 until its removal in 1975.

The Huntley Station Gage, located southwest of the intersection of Sawyer Avenue and River Road in the Town of Tonawanda, New York, has been in operation since 1967.

The Tonawanda Island Gage, located on the southwestern side of Tonawanda Island in the City of North Tonawanda, New York, has been continuously in operation since 1967.

The Lasalle Gage, located near the Lasalle Yacht Club in the City of Niagara Falls, New York, has been continuously in operation since 1965.

From the maximum annual instantaneous peaks, statistical analyses were made for the gages using non-log-Pearson Type III distribution (Reference 5). Using a skew of 0.0 and the standard deviation computed for each gage, stage elevations were computed for the selected recurrence intervals . Profiles for the Niagara River-Tonawanda Channel were established by connecting the respective stage elevations at the various gages.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, " Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
ELLICOTT CREEK					
at Colvin Boulevard	106.0	3,300	4,400	4,900	6,300
TONAWANDA CREEK					
At Twin Cities Memorial Highway, about 2,700 feet downstream of corporate limits	525	11,700	15,900	17,150	22,000

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail were carried out to provide estimates of the elevations of

floods of the selected recurrence intervals along each of these flooding sources.

Cross section data for Ellicott Creek were obtained from aerial photographs flown in April 1978 (Reference 6). The below-water sections were obtained by field measurement. All bridges, culverts and dams were surveyed to obtain elevation data and structural geometry.

Water-surface elevations were developed using the COE HEC-2 step-backwater computer model (References 7 and 8). The starting water-surface elevtion for Ellicott Creek was obtained from elevations computed for the Flood Insurance Study of the City of Tonawanda (Reference 9).

A culvert on the south bank of Ellicott Creek about 1,000 feet upstream of Colvin Boulevard permits flood flows from Ellicott Creek to enter the area south of Ellicott Creek Road. The area is inundated by shallow flooding. Similar floodwaters coming from the City of Tonawanda at the western corporate limits also contribute to this area of shallow flooding.

Water-surface elevations for the Niagara River-Tonawanda Channel were taken directly from the Flood Insurance Study for the Town of Grand Island, New York (Reference 10). Water-surface elevations for Tonawanda Creek were taken directly from the Flood Insurance Study for the City of North Tonawanda, New York (Reference 11).

Roughness coefficients (Manning's "n") for Ellicott and Tonawanda Creeks were determined by field inspection. The range of roughness values for the overbanks of Ellicott Creek was between 0.060 and 0.075, and the channel roughness value was 0.035. For Tonawanda Creek, the overbank "n" ranged between 0.065 and 0.100, and the channel "n" ranged between 0.020 and 0.035.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 3).

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are valid only if hydraulic structures remain unobstructed and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study 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 FIA 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. For each stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400 and at a scale of 1:24,000 with a contour interval of 10 feet (References 6 and 12). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

The 100-year flood boundaries for the portions of Ellicott Creek, Tonawanda Creek and the Niagara River-Tonawanda Channel which were studied by approximate methods were delineated using the Flood Hazard Boundary Map for the Townof Tonawanda, which was published in June 1974 and revised in October 1975 (Reference 13).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights. Minimum standards of the

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Ellicott Creek								
A	8,650[1]	*	1,827	2.7	572.2	572.2	573.1	0.9
B	9,810[1]	*	1,945	2.5	572.4	572.4	573.4	1.0
C	10,810[1]	*	1,520	3.2	572.6	572.6	573.5	0.9
Tonawanda Creek								
A	200[2]	*	4,713	3.6	572.0	572.0	572.7	0.7

[1]Feet above mouth
[2]Feet above corporate limits
*Floodway coincident with channel banks

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF TONAWANDA, NY
(ERIE CO.)

FLOODWAY DATA

ELLICOTT CREEK AND TONAWANDA CREEK

FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plains. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

A floodway is not appropriate in areas such as those that may be inundated by floodwaters from the Niagara River-Tonawanda Channel, which generally are a result of high-water elevations on Lake Erie. Thus, no flodway was computed for the Niagara River-Tonawanda Channel. The floodways computed for Ellicott and Tonawanda Creeks were found to be coincident with the channel banks.

As shown on the Flood Boundary and Floodway Map (Exhibit 3), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

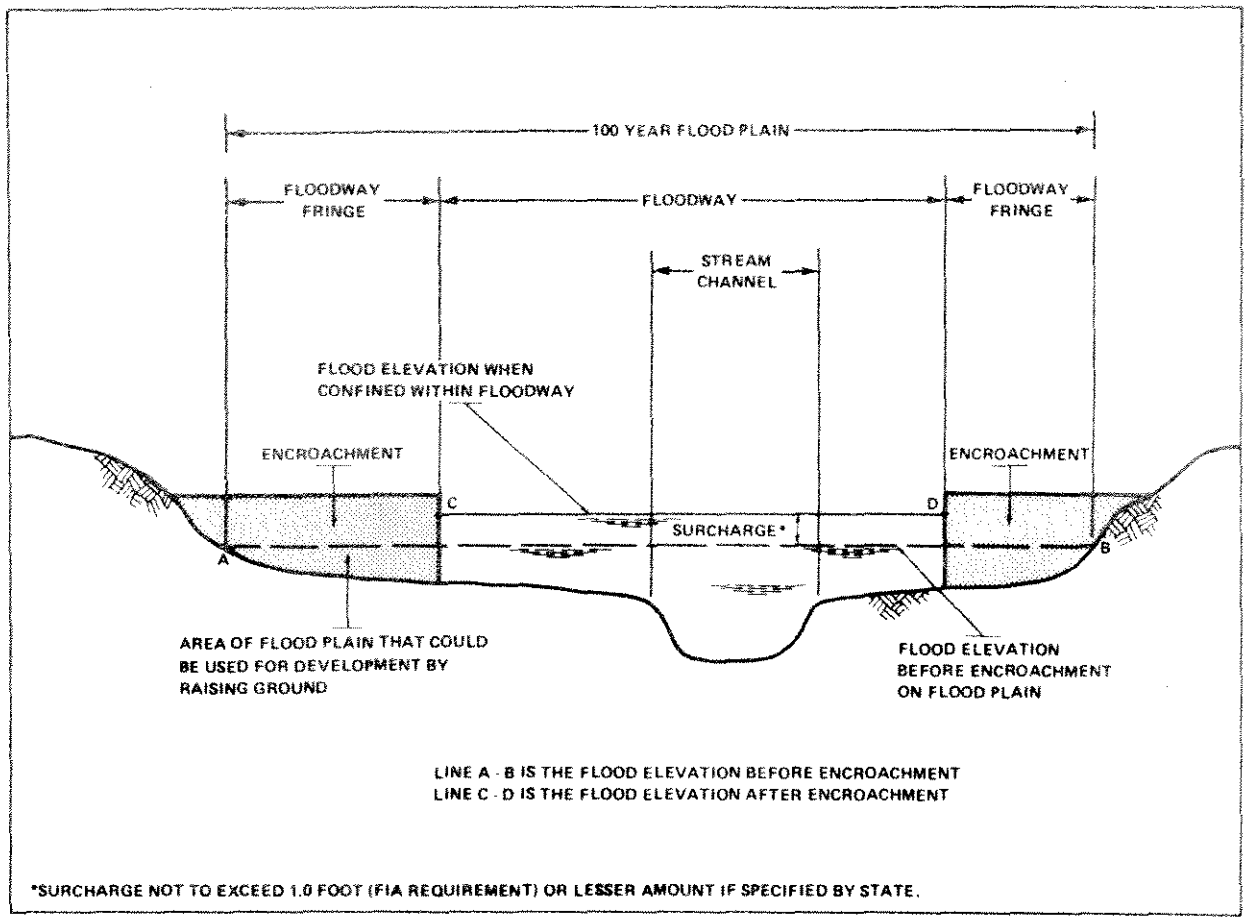
The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 4.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA 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 (FHFs), and flood insurance zone designations for each flooding source affecting the Town of Tonawanda.

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



FLOODWAY SCHEMATIC

Figure 4

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
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the Town of Tonawanda are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 3).

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs 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 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- 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- 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 FHFs, the entire incorporated area of the Town of Tonawanda was divided into zones, each having a specific flood potential or hazard. 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 shown or FHFs determined.
Zone AH:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; base flood elevations are shown, but no FHFs are determined.
Zones A2 and A3:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Ellicott Creek							
Reach 1	03	-1.5	-0.4	+1.3	015	A3	Varies
Ponding Area	03		shallow	flooding		AH	573
Niagara River - Tonawanda Channel							
Reach 1	01,04	-0.9	-0.2	+0.5	010	A2	Varies
Tonawanda Creek							
Reach 1	03	-1.5	-0.4	+1.4	015	A3	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF TONAWANDA, NY
(ERIE CO.)

FLOOD INSURANCE ZONE DATA

ELLICOTT CREEK, NIAGARA RIVER - TONAWANDA CHANNEL AND TONAWANDA CREEK

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the Town of Tonawanda.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Tonawanda is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) 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 FIA.

6.0 OTHER STUDIES

The USGS Flood Prone Area Map covering the Town of Tonawanda defines the 100-year flood boundary (Reference 14). These flood-prone areas were delineated by the USGS based only on readily available information. Because of the approximate nature of the results, the flood boundaries depicted therein were used to check the accuracy of this study.

The Buffalo District of the COE has issued a series of reports on flood control and allied purposes for the Ellicott Creek Basin. Reports were issued in April 1939, January 1968 (reprinted June 1971), May 1970, October 1972, August 1973 and November 1976 (updated April 1978) (References 15, 16, 17, 18 and 1). The 1939 report is unavailable. The 1968 report delineated a 100-year flood boundary and profile which served as rough checks in this study because of the increased development in the watershed since 1968. The 1970, 1972 and 1973 reports were geared toward flood-control solutions. They are also summarized in the November 1976/April 1978 report. This last report was prepared to determine the economic, social and environmental acceptability of a plan for flood control and allied purposes on Ellicott Creek. The plan has not been implemented.

The USGS has maintained the Williamsville gage no. 04218500 and no. 04218518 on Ellicott Creek for 24 years. It is located 1.4 miles northwest of Williamsville and has a drainage area of 77.6 square miles. Their log-Pearson Type III flood frequency analyses of field data substantiates the accuracy of the discharges obtained from the above-mentioned COE reports (References 19 and 20).

A Regional Storm Drainage Management Plan was prepared by the Erie and Niagara Counties Regional Planning Board in May 1973 (Reference 21). Its purpose was to recommend solutions to drainage problems common to Erie and Niagara

Counties. Flood profiles and flood boundaries were established in this report. The 10- and 100-year profiles are for the projected 1990 level of urbanization with implementation of the recommended improvements. The 100-year boundaries were determined from these profiles using topographic maps with 10-foot and 20-foot contour intervals. The information generated was strictly for planning purposes. As recommended in the report itself, more accurate profiles and mapping are necessary to implement flood plain zoning flood insurnace programs.

There are completed and ongoing Flood Insurance Studies in many of the communities adjacent to the Town of Tonawanda. Completed studies are available for the Town of Grand Island and the City of Tonawanda (References 10 and 9). Ongoing studies are being performed for the City of Buffalo and the Towns of Amherst and Clarence and the City of North Tonawanda (References 22, 23, 24 and 11). Continuity of all pertinent flood data among these studies has been maintained. Flood boundaries on Ellicott Creek at the Town of Tonawanda and City of Tonawanda corporate limits do not agree because this study used more detailed topographic maps than were used in the previously published study for the City of Tonawanda.

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

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 Insurance and Mitigation Division of the Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 19-100, New York, New York 10278.

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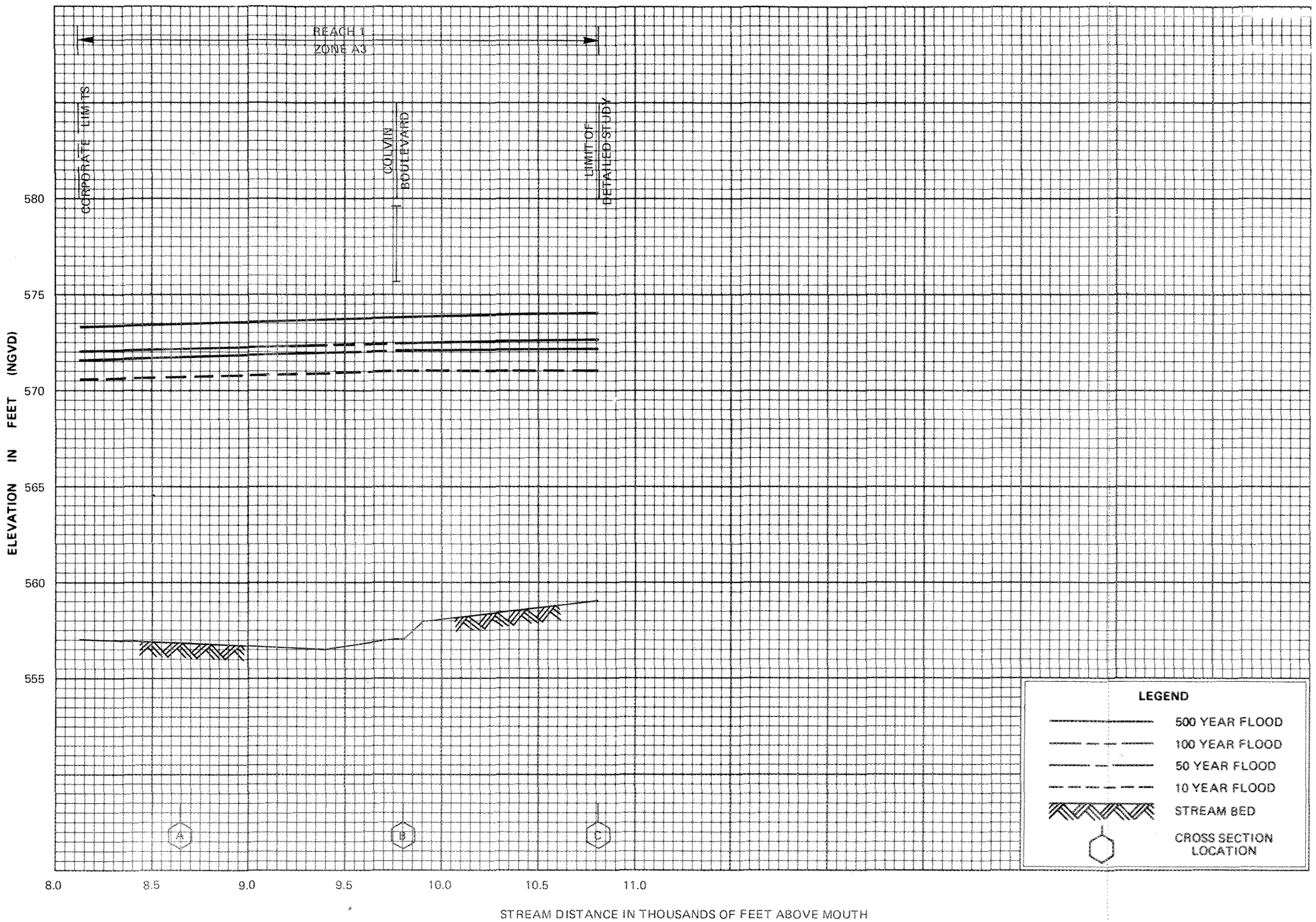


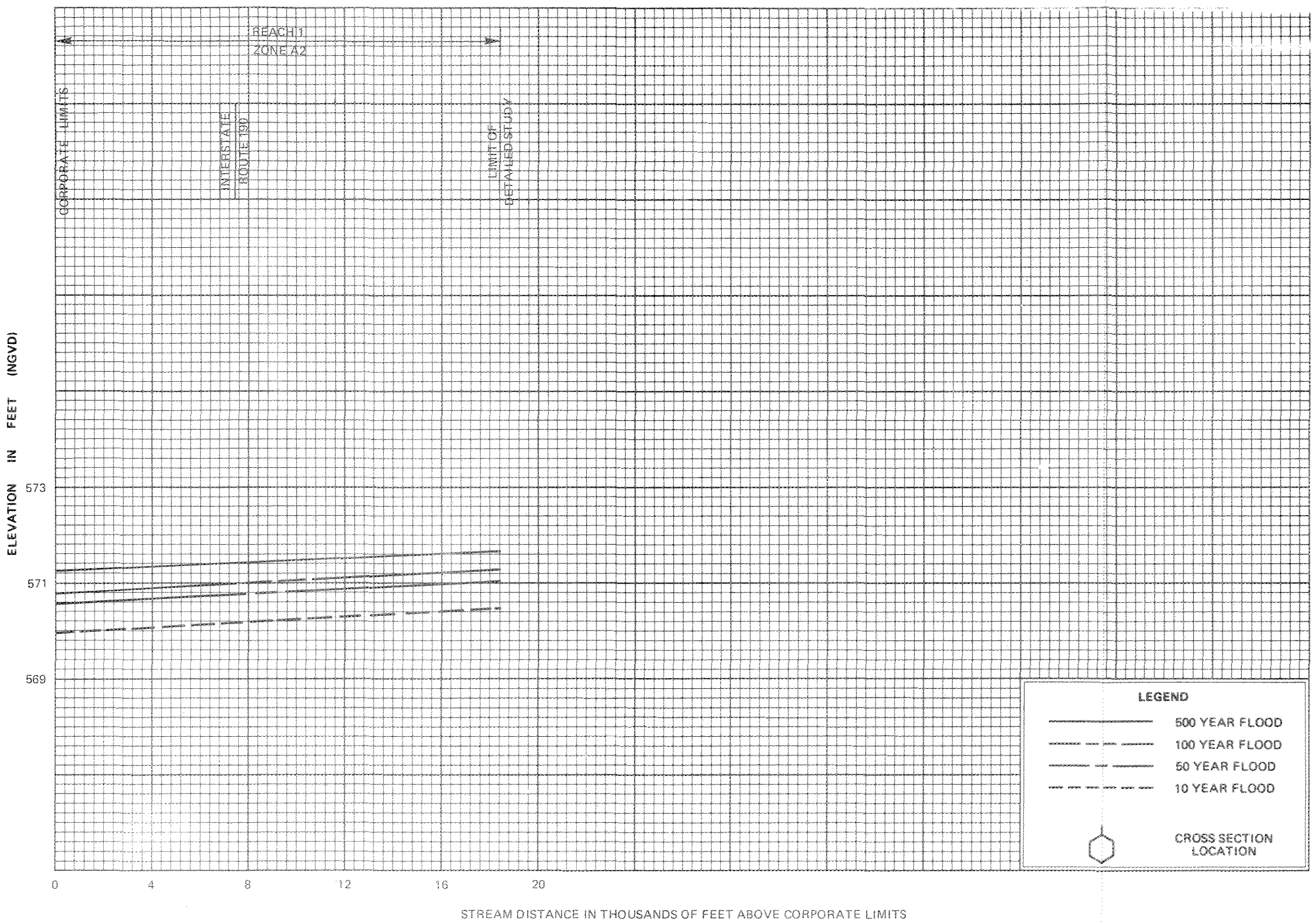
FLOOD PROFILES

ELLICOTT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF TONAWANDA, NY
(ERIE CO.)

01P



FLOOD PROFILES

NIAGARA RIVER-TONAWANDA CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF TONAWANDA, NY
(ERIE CO.)

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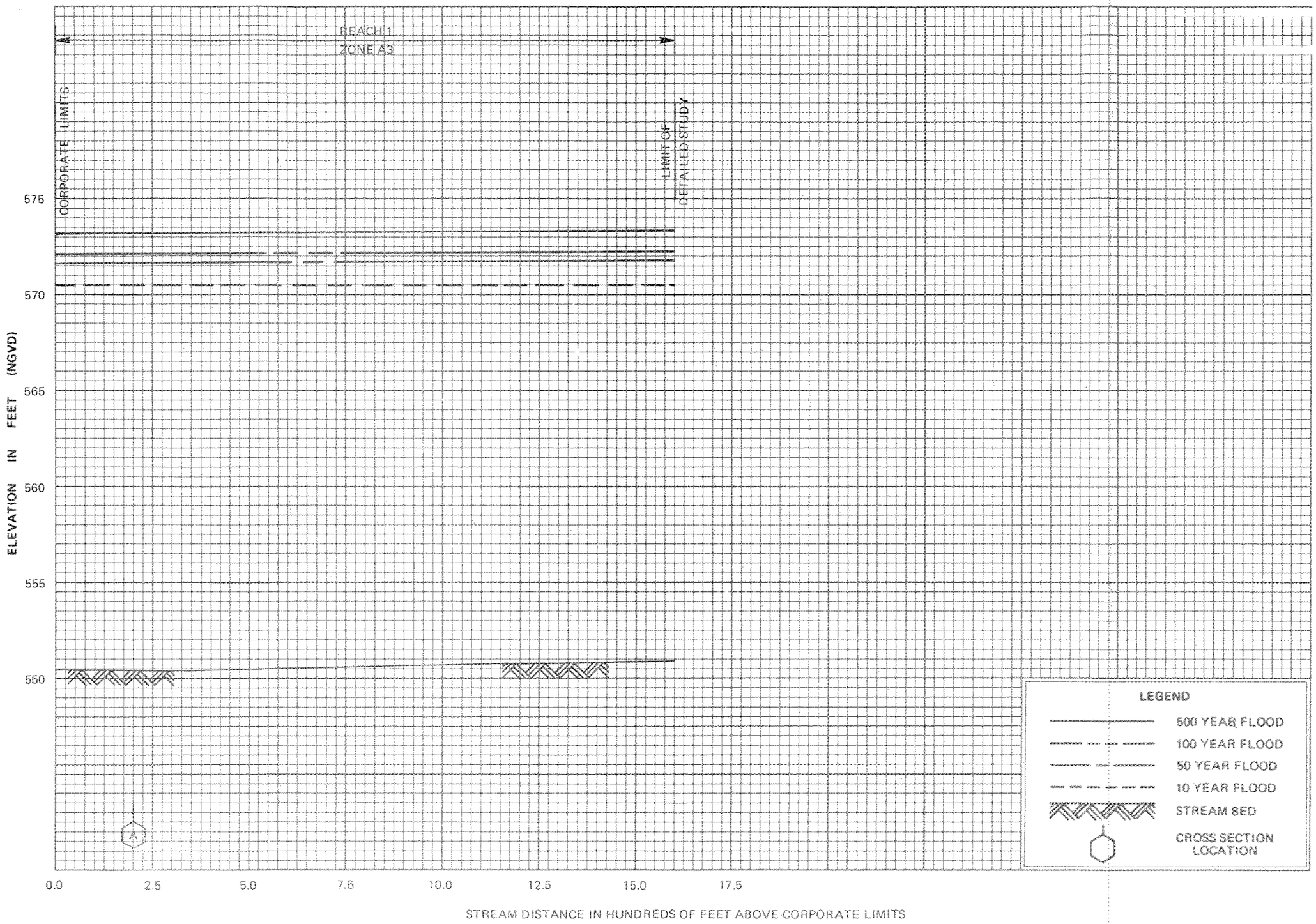

FLOOD PROFILES

TONAWANDA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF TONAWANDA, NY
(ERIE CO.)

03P