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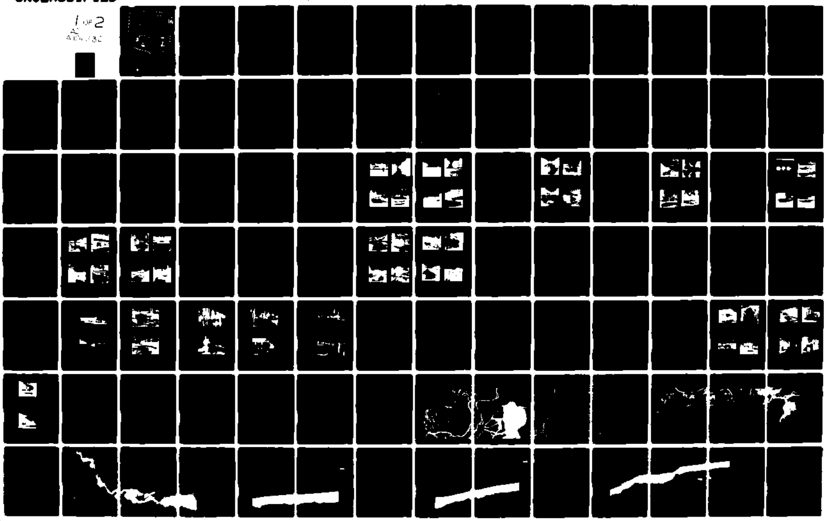
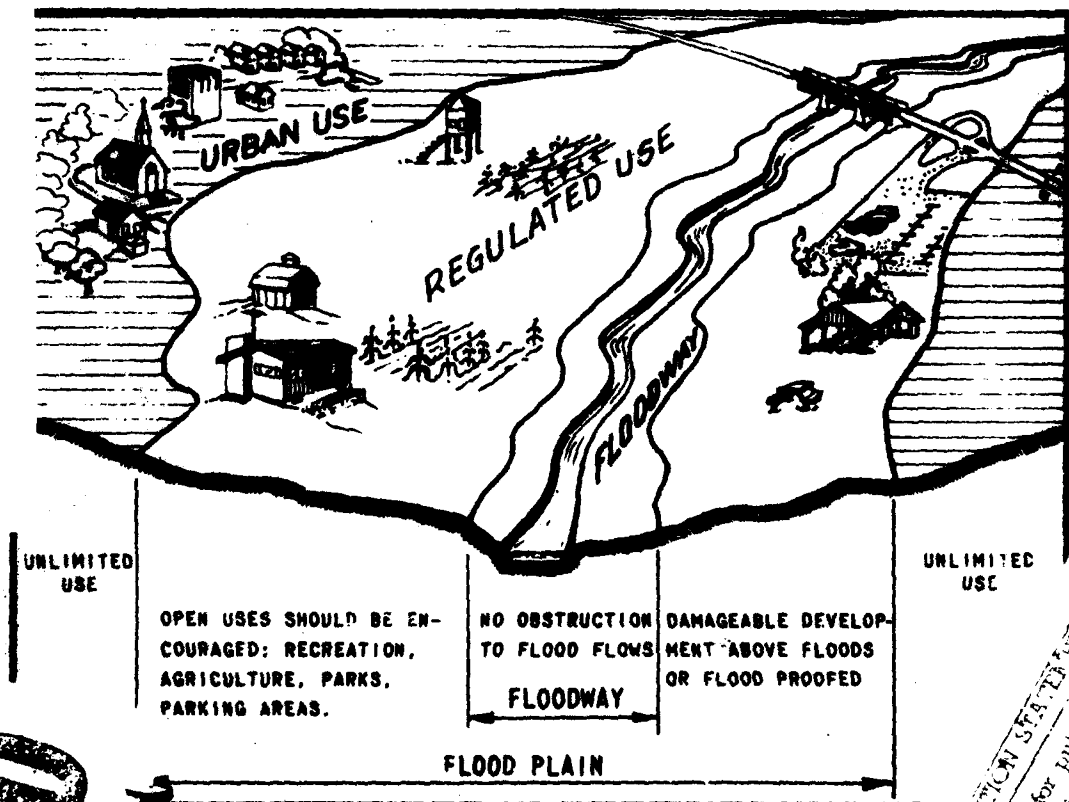


FLOOD PLAIN INFORMATION

ELLICOTT CREEK

IN THE CITY OF
TONAWANDA
AND IN THE TOWNS OF
TONAWANDA, AMHERST, CHEEKTOWAGA & LANCASTER

ERIE COUNTY, NEW YORK



PREPARED FOR

ERIE-NIAGARA BASIN REGIONAL WATER RESOURCES PLANNING AND DEVELOPMENT BOARD

By

CORPS OF ENGINEERS, U.S ARMY

BUFFALO DISTRICT

JANUARY 1968 (REPRINTED JUNE 1971)

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This report is intended to provide planners and local governments with technical information on the largest known floods of the past and to present data on possible future floods known as the Intermediate Regional Flood and the Standard Project Flood. This report is based on hydrological facts, historical and recent flood heights, and other techncial data bearing upon the occurrence and magnitude of floods in the Ellicott Creek area. Included in this report are maps, profiles and cross sections which indicate the extent of flooding that has been experienced and that which might occur

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered) in the future. These data; if properly used, can be very beneficial in wise flood plain management. From the maps, profiles and cross sections in this report the depth of probable flooding at any location by a recurrence of one of the past floods or by the future occurrence of either the Intermediate Regional flood or the Standard Project Flood may be determined.

12

This report is a reprint of the January 1968 flood plain information report. No changes have been made in the text. However, there are some minor changes that should be noted. The New York State Conservation Department is now called the New York State Department of Environmental Conservation. The Town of Cheektowaga has established flood plain regulations which utilizes the information in this report. On Plate 3, the March 1960 and Intermediate Regional Flood outlines downstream of Niagara Falls Blvd. have been revised to reflect more accurate information.

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* Photos courtesy of the Buffalo Evening News

** Photos courtesy of the town of Cheektowaga

INTRODUCTION

This flood plain information report on Ellicott Creek, Erie County, New York, has been prepared at the request of the Erie County Department of Public Works through the New York State Department of Public Works and the New York State Water Resources Commission. It will be distributed to local interests through the Erie-Niagara Basin Regional Water Resources Planning and Development Board.

The study covers approximately 21.8 miles of Ellicott Creek from its confluence with Tonawanda Creek in the city of Tonawanda, upstream to Stony Road in the town of Lancaster. The lower 3.4 miles of the study area are within the city and town of Tonawanda, 11.7 miles of the study area are within the town of Amherst and the remaining 6.7 miles are within the towns of Cheektowaga and Lancaster. This report is intended to provide planners and local governments with technical information on the largest known floods of the past and to present data on possible future floods, known as the Intermediate Regional Flood and the Standard Project Flood. Whenever reference is made to the flood plain in this report, it refers to the area which would be inundated by the Standard Project Flood discharge. The Intermediate Regional Flood has a frequency of occurrence in the order of once in 100 years, which means that over a long period of, say, 500 years, the magnitude of this flood would have a discharge which would probably be equalled or exceeded about 5 times, or on the average of once in 100 years. In other words, each year there is a one percent chance that a discharge of at least that magnitude will occur. The Standard Project Flood is a flood of rare occurrence and, on most streams in this area, is considerably larger than any floods that have occurred in the past. However, it is recommended that possible future floods, including the Standard Project Flood, be considered when development within the flood plain is planned. Using these data as a guide, the planners and local officials have a basis for effective and workable legislation for the control of land use within the flood plain.

The report is based on hydrological facts, historical and recent flood heights, and other technical data bearing upon the occurrence and magnitude of floods in the Ellicott Creek area.

Included in this report are maps, profiles and cross sections which indicate the extent of flooding that has been experienced and that which might occur in the future. These data, if properly used, can be very beneficial in wise flood plain management. From the maps, profiles and cross sections in this report the depth of probable flooding at any location by a recurrence of one of the past floods or by the future occurrence of either the Intermediate Regional Flood or the Standard Project Flood may be determined. Based on this information, future construction may be planned high enough to avoid flood damage or, if at lower elevations, with recognition of the chances and hazards of flooding.

This report does not include plans for the solution of flood problems. Rather, it is intended to provide the basis for further study and planning on the part of local governments within the study area in arriving at solutions to minimize future flood damages. This can be accomplished by local planning programs to guide developments by controlling the type of use made of the flood plain through zoning and subdivision regulations. Another means in which local flood plain management can be accomplished is through public acquisition for a low development use such as recreation.

Pamphlets and guides pertaining to flood plain regulations, flood proofing and other related actions have been prepared by the Corps of Engineers. They are made available for use of State, local governments and citizens in planning and taking action to reduce their flood damage potential.

The Buffalo District of the Corps of Engineers will, upon request, provide technical assistance to Federal, State and local agencies in the interpretation and use of the information contained within this report and will provide other available flood data related thereto.

SUMMARY OF FLOOD SITUATION

This flood plain information study covers the inundated areas along Ellicott Creek from its confluence with Tonawanda Creek upstream to Stony Road, a distance of 21.8 miles. Within this reach the creek flows through the city of Tonawanda, village of Williamsville, hamlet of Bowmansville, and the towns of Tonawanda, Amherst, Cheektowaga and Lancaster, all within Erie County, New York, as shown on plate 1.

There is one automatic water-stage recording gaging station in operation by the U. S. Geological Survey on Ellicott Creek in the area which this study covers. This gage, which was used to estimate discharge frequencies in the study area, is located on the downstream side of Wehrle Drive bridge in the village of Williamsville at creek mile 14.1, and measures the discharge from an area of 72.4 square miles. This station was established in December 1958 and has a continuous record to the present time. The U. S. Geological Survey has also maintained a staff gage and a crest stage gage, established September 1956 at the same bridge location. The automatic water-stage recorder is an instrument which produces a graphic representation of the rise and fall of a water surface with respect to time. The advantage of the automatic recorder over a crest stage gage is that both maximum and minimum stages are recorded, the time of their occurrence can be noted, and their corresponding discharges can be determined. The crest stage gage indicates only the maximum stage reached during any given flood by means of a line of burnt cork powder on a calibrated stick within an enclosed pipe. The Erie County Department of Public Works has maintained staff gages at the Niagara Falls Boulevard and Stony Road bridge sites since 1961. A staff gage provides for a visual determination of the water surface at a given time by reading a graduated scale anchored permanently in a vertical position within the stream channel.

Local government officials and residents along the creek have been interviewed to determine high water marks. Newspaper files and historical documents were searched for information concerning past floods. From these data and studies of possible future floods, the local flood situation, both past and future, has been developed. The following paragraphs summarize the significant findings which are discussed in more detail in succeeding sections of this report.

HISTORICAL FLOODS - Historical documents state that two floods of approximately equal magnitude occurred in March 1916 and January 1929. The frequency of occurrence or recurrence interval of floods of this magnitude are on the average of once in 15 years.

THE GREATEST FLOOD - The greatest known flood in the study area occurred 17 March 1936 and it has a frequency of occurrence estimated to be on the average of once in 50 years. Although the 1916 and 1929 flood stages exceeded the 1936 flood at various locations in the town of Amherst, it is generally considered to be the most damaging flood in the area covered by this report.

ANOTHER GREAT FLOOD - The most severe flood in recent years occurred in March 1960. The Corps of Engineers estimated the discharge to be approximately equal to the March 1916 and January 1929 occurrences.

OTHER LARGE FLOODS - The following dates have been recorded in newspaper articles and Corps of Engineers files as additional occurrences of high water and damage in the study area within recent years: June 1937, March 1940, March 1954, March 1956, January 1959 and March 1963. Other floods probably occurred previous to 1916 but no definite dates or stages could be established because of the lack of development and records in the area at the time.

INTERMEDIATE REGIONAL FLOOD - The Intermediate Regional Flood is a flood that has an average frequency of occurrence in the order of once in 100 years. From an analysis of past floods and as shown on plates 5 through 7 and table 1, it is estimated that this flood is from 0.3 foot to 3.4 feet higher than the 1960 flood.

STANDARD PROJECT FLOOD - The Standard Project Flood is a flood produced by the most severe combination of meteorological and hydrological conditions that is considered reasonably characteristic of the drainage basin under study. The elevation from a flood of this magnitude is considered by the Corps of Engineers to be the upper limit of the flood plain.

FLOOD DAMAGES - The recurrence of major known floods such as the 1916, 1929, 1936, and 1960 floods would result in substantial damage in the study area. A damage survey of the area flooded by the March 1960 flood was made in the summer of 1962 by personnel of the Buffalo District. The damages for this flood were estimated at $126,000 for residential, $43,000 for commercial, $22,000 for public and highways and $6,000 for agricultural. This amounts to a total of $197,000 based on August 1967 price levels and conditions of development as of the summer of 1962. Of the total, $129,000 is in the town of Amherst, $5,000 in the town of Cheektowaga and the remaining $63,000 in the town of Lancaster. Minor damages were sustained in the city and town of Tonawanda for the 1960 highwater occurrence. An occurrence of the Intermediate Regional Flood or Standard Project Flood in the study area would cause extensive damage because of the ever increasing development within the flood plain, their wider extent and greater depth of flooding and accompanying higher velocities.

MAIN FLOOD SEASON - The major damaging floods in the Ellicott Creek basin have often been caused by melting snow coincident with moderate amounts of precipitation. Although damaging floods have and can occur at all times of the year, almost all instances of major floods have occurred in the late winter or early spring (January - April). Relatively few damaging floods have been produced by precipitation alone. This is due to the orientation of the basin with respect to the usual direction of travel of frontal systems in this area. In the study area Ellicott Creek flows generally in a west northwesterly direction whereas the frontal systems normally travel from west to east. This was not the case for the June 1937 flood. This flood was the result of an intense rainfall falling on the already saturated basin. Heavy rainfall was recorded on 17-18 June and again during 20-21 June. A total of 4.26 inches was recorded for this period of which 1.50 inches fell in a three-hour period on 21 June. From a study of this storm it appears that the storm center entered the basin from the southwest, then veered easterly so to travel almost parallel to the Ellicott Creek basin.

VELOCITIES OF WATER - During periods of high water, channel velocities vary from about 6 feet per second at Niagara Falls Boulevard bridge to about 12 feet per second at Wehrle Drive bridge. During an Intermediate Regional Flood or a Standard Project Flood, velocities would be substantially greater and would be extremely dangerous to life and property. Velocities greater than 3 feet per second combined with depths of 3 feet or greater are generally considered hazardous.

HAZARDOUS CONDITIONS - The larger floods have caused hazards to local residents in many ways. Since almost all of the floods occur in the late winter and/or early spring, residents suffer illness and discomfort from lack of heat for a number of days due to basement flooding which extinguishes furnace fires. Due to the long duration and extent of flooding, health problems frequently develop when septic tanks and municipal sewage treatment facilities are taxed above their capabilities, and sediment is deposited on banks and surrounding grounds. Flood waters which overtop roads can cause hazardous driving conditions for anyone attempting to drive through the inundated areas. Also, the danger from underestimating the velocity and depth of flood waters by unsuspecting children is an age old problem confronting residents within the flooded ares.

FLOOD DAMAGE PREVENTION MEASURES - In 1959, the Corps of Engineers completed a clearing and snagging project from Niagara Falls Boulevard upstream to the Amherst Sewage Treatment Plant, in the town of Amherst, at a cost of $75,700. The Buffalo District is presently preparing a report to determine the feasibility of possible flood control measures within the Tonawanda Creek watershed. Considered plans of improvement for flood control include channel improvements and retardation of flood waters by means of a reservoir. At the present time none of the communities have flood plain regulations.

FUTURE FLOOD HEIGHTS - Estimated flood crests that would be attained if either the Intermediate Regional Flood or the Standard Project Flood occurred in the study area, along with the March 1960 flood are shown in table I. This table gives a comparison of the Intermediate Regional and Standard Project Floods with the March 1960 flood, which was the highest and most damaging flood in recent years. These data are prepared for the various locations indicated so that future floods can more easily be compared with the March 1960 flood.

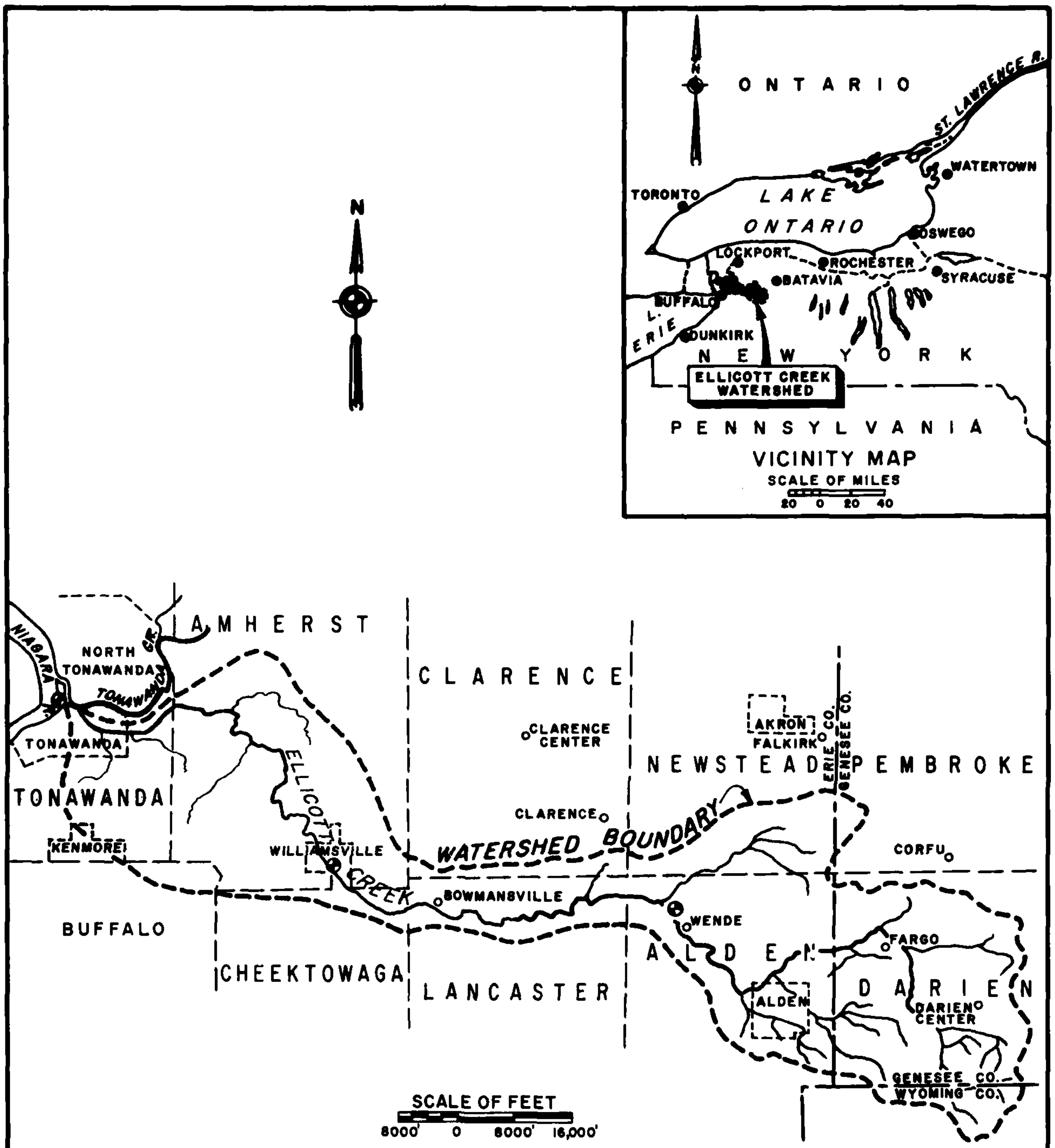
TABLE I

RELATIVE FLOOD HEIGHTS

Location	Mile above Mouth	Flood	Estimated Peak Discharge (cfs)	Above 1960 Flood (feet)
Erie County Staff Gage at Niagara Falls Boulevard	3.4	March 1960	4,200	0
		Intermediate Regional	6,300	1.4
		Standard Project	23,500	5.8
Bridge crossing at Sheridan Drive (upstream side)	10.8	March 1960	5,000	0
		Intermediate Regional	7,300	3.4
		Standard Project	27,000	8.4
U.S.G.S. Gage at Williamsville	14.1	March 1960	4,860	0
		Intermediate Regional	7,500	0.3
		Standard Project	28,400	1.2
Stony Road bridge (downstream side)	21.8	March 1960	4,860	0
		Intermediate Regional	7,500	1.5
		Standard Project	28,400	2.5

Zero of staff gage at Niagara Falls Boulevard - 564.98 U.S.C. & G.S.

Note: All elevations referred to in this report are based on mean sea level datum of the United States Coast and Geodetic Survey (U.S.C. & G.S.) unless otherwise specified.



LEGEND:

SOLID LINE INDICATES REACH COVERED BY THIS STUDY.

U.S.G.S. RECORDING GAGE

ELLICOTT CREEK
ERIE COUNTY, NEW YORK
FLOOD PLAIN INFORMATION REPORT

BASIN MAP

U.S. ARMY ENGINEER DISTRICT, BUFFALO

JANUARY 1968

GENERAL CONDITIONS AND PAST FLOODS

GENERAL

This section of the report is a history of floods on Ellicott Creek, in Erie County, New York. The study area covers the reach from the confluence with Tonawanda Creek in the city of Tonawanda, creek mile 0.0, upstream to Stony Road in the town of Lancaster, creek mile 21.8, a distance of 21.8 miles. Plate 1 and plates 3 and 4 of this report show the geographical orientation of Ellicott Creek.

Ellicott Creek flows generally from east to west by northwest in the reach covered by this report. It follows a meandering course through a rather broad flood plain over most of the reach covered by this study.

A major portion of the residential and commercial properties located in close proximity to the creek suffer flood damages frequently. Although a portion of the flood plain has been inundated by floods of the past, floods such as the Intermediate Regional and Standard Project would cause an extremely large amount of damage in areas which have never been subjected to flooding.

The first record of stages and discharges on Ellicott Creek began on 14 October 1955 with the installation of a wire-weight gage located at Wehrle Drive bridge in the village of Williamsville, New York. On 17 December 1958, the wire-weight gage was replaced with a recording gage at the same site, and continuous records are available to date. The majority of information on past and future floods given in this report is based on significant stream flow and stage data compiled at this gage location. The Erie County Department of Public Works has maintained a staff gage at the Niagara Falls Boulevard and Stony Road sites since 1961.

A search of the flood history on Ellicott Creek has indicated frequent and extensive damage in the past and indicates damage will continue to increase because of the rapid development within the flood plain. Much of the flood data given in this report are based on reconnaissance made during or shortly after high water periods and on a survey by Buffalo District personnel in the summer of 1962 which was conducted to determine damages within most of the study area. During the survey local residents were interviewed and information was gathered pertaining to water elevations for various floods, damages suffered in the past and damage that could be expected during a recurrence of past floods or potential floods of greater magnitude. Through these field investigations an accurate profile for the largest recent flood, that of March 1960, has been developed for Ellicott Creek. A search was also made of newspaper files, historical documents, gage records and other miscellaneous sources enabling a history of known floods to be developed for the area being studied.

Settlement

Large scale settlement in the area of New York State occupied by the Lake Erie-Niagara River drainage basin was delayed until after 1797 by the presence of the Seneca Indians, who were the last hold-outs of the once powerful Iroquois Confederacy. By 1797 all basin land had been purchased except for a few small areas which the Senecas held for themselves. The Holland Land Company acquired lands in the basin and began land sales in 1801. The manager of the Holland Land Company laid out the basic system of roads and founded many towns including Buffalo. Despite the military activities along the Niagara Frontier during the war of 1812, the population of the Holland Project grew rapidly and had reached about 100,000 persons by 1821, most of which were in the Lake Erie-Niagara River drainage basin.

The Erie Canal was opened to Buffalo in 1825 and the subsequent development of the northwestern portion of the basin was rapid. Buffalo became the great port of transfer for immigrants and manufactured goods from canal barge to lake vessel and of grain and other bulky produce from lake vessel to canal barge. By 1850, when the railroad reached the lake shore, Buffalo and its surroundings were well on the way to becoming a leading industrial area. During the subsequent period of industrial growth, general farming practices gave way to more specialized activities such as truck gardening, fruit growing and dairying.

There has been no change in the geographical boundaries of townships within Erie County since 1857, except for the City of Lackawanna which was incorporated in 1909 from the Town of West Seneca. The following is a list of formation dates of Erie County and political subdivisions within the study area.

a. Erie County - As far as can be determined, this county was originally in the possession of the Kahquath Indian tribe. It was the 53rd county formed in the state and was created on 2 April 1821 from Niagara County. Its name was derived from the tribe of Indians living in that area prior to 1654.

b. City of Tonawanda - Incorporated in 1903.

c. Town of Tonawanda - Formed from Buffalo 16 April 1836.

d. Village of Williamsville - Incorporated in 1869.

e. Town of Amherst - Formed from Buffalo 10 April 1818, which included part of Cheektowaga at that time.

f. Town of Cheektowaga - Formed from Amherst 2 March 1839.

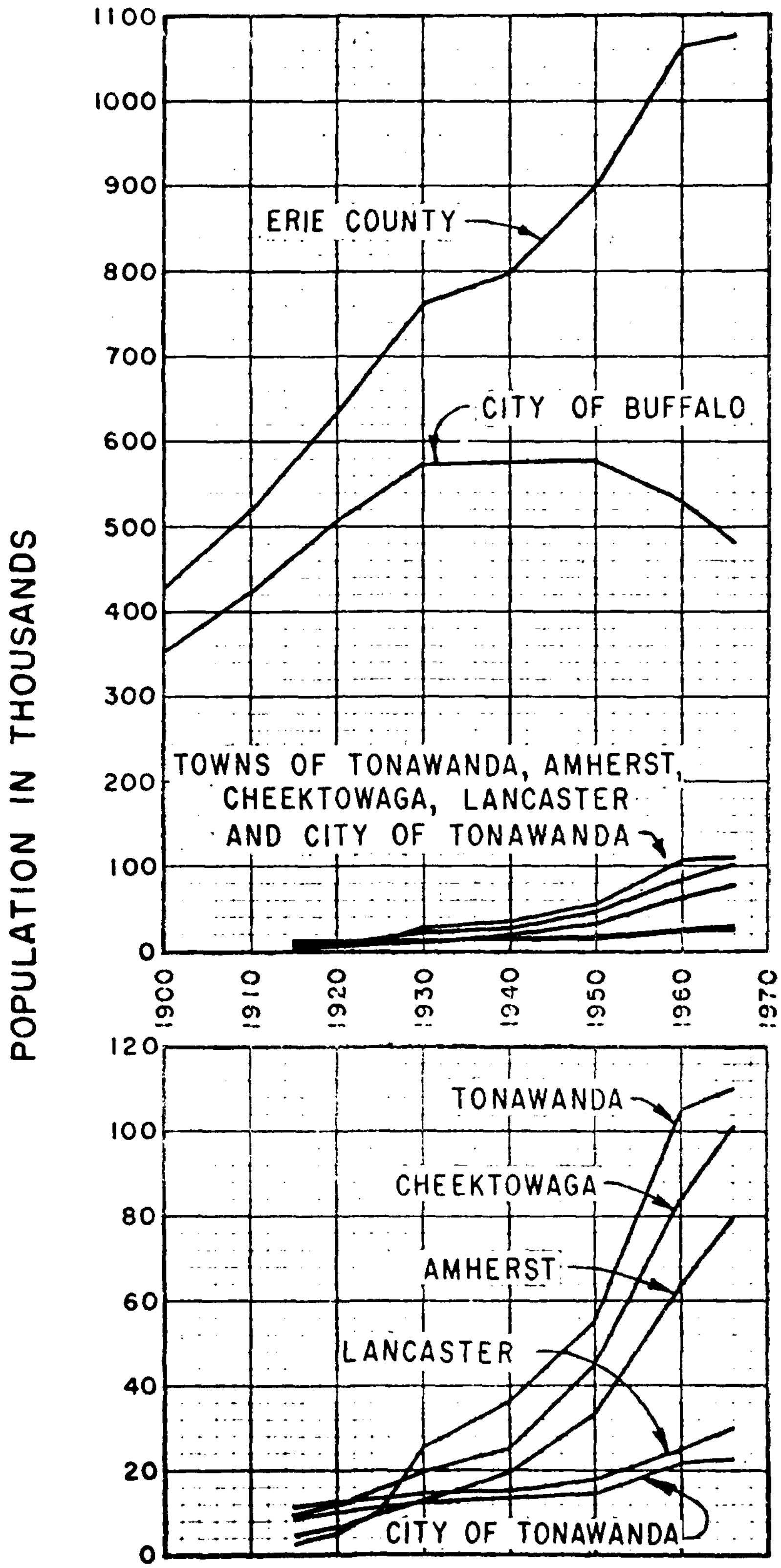
g. Town of Lancaster - Formed from Clarence 22 March 1833, part of West Seneca taken off in 1851 and part of Elma taken off in 1857.

Population

The U. S. Bureau of Census figures for 1966 show the population of the City of Buffalo has decreased from 532,759 in April 1960 to 481,453 in April of 1966, a drop of 9.6 percent in six years. During this same period the population of Erie County has increased from 1,064,688 in April 1960 to 1,087,183 in April 1966, an increase of 2.1 percent. Also during this period the population for the communities in the study area has increased 12.3 percent, the largest increase being 26.0 percent in the town of Amherst. This trend of population moving from Buffalo to the suburbs started early in the 1950's and is expected to continue. Figure 1 exemplifies the population trends for Erie County and City of Buffalo from 1900 to the present. Also shown are the population trends for the communities in the study area from 1915 to the present.

During the period from 1920 to 1966 the estimated population of the study area portion of the Ellicott Creek drainage basin has increased from 17,180 to 138,333, representing an increase of approximately 800 percent for the 46-year period. Table 2 shows the estimated increase in population for each community within the flood plain for the period 1920 thru 1966.

The net result of the population trends within Erie County shows a definite direction of increased development within the flood plain. Unless proper Flood Plain Management is instituted and enforced as soon as possible, this increase in development of the flood plain, if allowed to continue without regard for flooding at the rate it has in the past, will lead to more frequent and greater depth of flooding, and considerably increase the amount of damages for its inhabitants.



POPULATION TRENDS

FIGURE 1

TABLE 2 - ESTIMATED POPULATION IN STUDY AREA

Erie County, New York

Name of Community	Estimated percent of Community in Ellicott Creek Basin	*	1920	1930	1940	1950	1960	1966	Percent Increase 1960 to 1966
City of Tonawanda	47	A	10,068	12,681	13,008	14,617	21,561	21,946	
		B	4,732	5,960	6,114	6,870	10,134	10,315	1.8
Town of Tonawanda	57	A	5,505	25,006	32,155	55,270	105,032	109,702	
		B	3,138	14,253	18,328	31,504	59,868	62,530	4.4
Town of Amherst	56	A	6,286	13,181	19,400	33,744	62,837	79,147	
		B	3,520	7,381	10,864	18,897	35,189	44,322	26.0
Town of Cheektowaga	11	A	11,923	20,849	25,006	45,354	84,056	101,017	
		B	1,312	2,293	2,751	4,989	9,246	11,112	20.2
Town of Lancaster	34	A	13,172	15,260	15,300	18,470	25,605	29,510	
		B	4,478	5,188	5,202	6,280	8,706	10,054	15.5
Total estimated population for Ellicott Creek Basin within Erie County			17,180	35,075	43,259	68,540	123,143	138,333	12.3

* A - Total population for each community.

B - Estimated population within the Ellicott Creek Basin, assuming population is evenly distributed throughout each community.

Flood Damage Prevention Measures.

The Ellicott Creek basin was studied in regard to flood control by the Buffalo District in a survey which was submitted to Congress in 1939. Although at the time available data indicated that flood protection on Ellicott Creek was feasible, the annual costs of such protection exceeded the anticipated annual benefits in such proportion as not to justify further investigation of a local protection project for the basin.

At the present time the Buffalo District is engaged in a study entitled "Review of Reports for Flood Control and Allied Purposes on Tonawanda Creek and Tributaries." Possible flood control measures being considered on Ellicott Creek are channel improvements, levees, and a reservoir site. The results pertaining to justification of these plans of improvement along with recommendations are expected to be submitted to Congress early in 1970. Because justification for improvements is unknown at the present time and actual construction of flood preventative measures, if found to be economically possible, would take several years, it is recommended local communities immediately develop and enforce flood plain regulations. It should be understood that flood control projects can not provide complete protection. They protect only against flooding up to a degree found to be the most economically justified, which is the basis for design purposes.

In the summer of 1965, the County of Erie completed construction of a diversion channel from Ellicott Creek to Tonawanda Creek.

Existing Regulations.

Present regulations for the communities within the study area do not have specific provisions to regulate building within the flood plain, or regulate the use of land with respect to flood risk, although development within known flooded areas is usually discouraged by local governments.

Although zoning regulations have been in effect for the communities within this study area for a number of years, there are no provisions which regulate the use of land with respect to flood risk. However, the State of New York enabling statutes which permit city zoning, specify in Chapter 21, Article 2-A, Section 24, that "such regulations shall be designed to secure safety from fire, floods and other dangers, and to promote the public health and welfare..." The State of New York Town Law, Section 263, states "such regulations shall be made in accordance with comprehensive plan and design to lessen congestion in the streets to secure safety from fire, floods, panic and other dangers to promote health and general welfare..." Also, Section 277 concerning planning boards and official maps, states that "land shown on such plats shall be of such a character that it can be used safely for building purposes without danger to health or peril from fire, flood or other menace."

The 1965 Legislature of New York State passed amendments adding Part IIIA, Use and Protection of Waters, to Article 5 of the Conservation Law. Although Part IIIA is not meant to regulate the flood plain, it does help prevent encroachment of streams, thereby helping to reduce future flood damages. Part IIIA states, in part, that no person or public corporation shall change, modify or disturb the course, channel or bed of any stream or shall erect, reconstruct or repair any dam or impoundment structure without a permit from the Water Resources Commission. The amendments became effective on 1 January 1966. The full text of the Act can be found in Chapter 955 Sections 429 a-g of the Laws of New York State - 1965.

Flood Warning and Forecasting Services.

At present there is no specific flood warning or forecasting service for the Ellicott Creek basin. The study area, however, is well within the effective range of the Weather Surveillance Radar operating continuously at the U. S. Weather Bureau, Buffalo Airport Station. This equipment provides for the early detection and plotting of heavy precipitation and makes possible immediate radio and television broadcasts of information concerning the predicted path and amount of rainfall from the storm.

Snow surveys taken periodically during the winter months also provide basic data for flood predictions. They are conducted on a state wide basis in accordance with a schedule set by the United States Geological Survey in Albany.

These snow survey data are published monthly or periodically in the "New York Cooperative Snow Survey Bulletin" and in addition personnel of the Buffalo District, Corps of Engineers analyze the data in regard to flood potential.

At the present time, none of the communities within the study area have a definite plan for flood fighting and/or evacuation. Although residents within the study area usually can be alerted to a possible flood situation, accurate forecasting of the timing and stages of flood peaks is difficult on a drainage area as small as Ellicott Creek.

Observations made through coordination of communities upstream of the study area along with observations made at existing and proposed gage locations within the study area would provide an indication of the timing and relative severity of a flooding situation. Excellent observation points along Ellicott Creek would be at the existing Williamsville gage location and at the Millgrove gage location just upstream of the study area. It is also suggested that reference points also be established at Stony Road bridge, mile 21.8, and Sheridan Drive bridge, mile 10.8. These observations will provide flood warning to residents within the affected area. Although the anticipated flood may be of moderate proportions, forewarning permits public utilities, highway departments and property owners to set up warning and detours and to reduce flood damage as much as possible.

A survey of the communities within the study area showed that no formal flood warning program exists. However, surveillance of Ellicott Creek and its tributaries is maintained by Highway Departments, local Police Departments and State and County law enforcement agencies.

The Stream and Its Valley

Ellicott Creek is the largest tributary of Tonawanda Creek and drains an area of approximately 110 square miles in Erie, Genesee and Wyoming Counties. Its source is about 22 miles easterly of Buffalo, at an elevation of about 1,300 feet above mean sea level. It flows in a northwesterly direction into the canalized section of Tonawanda Creek at an elevation of about 564 feet. There are three named tributaries to Ellicott Creek: Elevenmile Creek - drainage area 10.4 square miles; Crooked Creek - drainage area 6.1 square miles; and, Spring Creek - drainage area 6.1 square miles. The topography of the watershed varies from flat lands near the mouth to steep hills around the head waters. Near the head waters the stream flows through steep valleys and is fed by small streams and gullies from the hillsides. The slope of the stream varies from about 2 feet per mile in the flatlands near its mouth to about 70 feet per mile near the head waters. There is a precipitous drop of about 60 feet over a length of approximately 0.2 miles at the village of Williamsville, just below the dam constructed in 1929 as a flood control measure.

Ellicott Creek pursues a very meandering course and achieves a total length of approximately 47 miles in a basin roughly 27 miles long. Plate I shows the drainage system for the entire Ellicott Creek Basin.

Pertinent drainage areas of Ellicott Creek and its tributaries are listed in table 3, following:

TABLE 3

DRAINAGE AREAS WITHIN THE ELLICOTT CREEK BASIN

Ellicott Creek	Distance upstream of Tonawanda Creek, miles	Drainage area above locality, miles
Source	47.3	0.0
Elevenmile Creek Junction	40.0	10.4
Crooked Creek junction	40.0	16.5
Spring Creek junction	33.9	22.6
Sand Ridge	31.6	38.0
Millgrove Gage	28.7	40.7
Pavement Road	23.1	62.3
Wehrle Drive Gage	14.1	72.4
Niagara Falls Boulevard	3.4	101.7
Tonawanda Creek junction	0.0	110.0

Description and Development in the Flood Plain

City and Town of Tonawanda

This reach covers a distance of approximately 3.4 miles and extends from the confluence of Tonawanda Creek upstream to Niagara Falls Boulevard. In this reach development along the banks is confined to residential and commercial units. There is a large commercial boating facility establishment along with many private boat docks as shown in figures 2 and 3. Also located in this reach is the Ellicott Creek county park, an excellent example of wise flood plain planning. Although the area is subjected to frequent and great depths of flooding only minor damages are sustained to the units in the park.

In an effort to lessen the flood hazard in this reach, the County of Erie completed construction of a diversion channel from Ellicott Creek to Tonawanda Creek in the summer of 1965. There is shown in figures 4 and 5 the diversion channel which connects with Ellicott Creek about 800 feet downstream from Niagara Falls Boulevard, extends due west across Ellicott Creek Park to its confluence with Tonawanda Creek. The diversion has been designed to receive flood waters from Ellicott Creek when the discharge at Niagara Falls Boulevard exceeds 1,700 cfs (assuming the Niagara River is at its annual monthly mean stage of elevation 564.0). The design capacity of the diversion channel is 2,000 cfs at a prediversion discharge of 6,150 cfs.

Town of Amherst

In the reach from Niagara Falls Boulevard upstream to the Main Street bridge in the village of Williamsville, the flood plain covers large vast areas of low, flat terrain and is used primarily for high value residential units with a scattering of commercial units throughout this 9.7 mile length. There are shown in figures 6 through 9 the three golf courses located in the flood plain. They are also an excellent example of wise flood plain planning. All three golf courses are subjected to frequent flooding with only minor damages being sustained. In the near future, part of the proposed campus for the State University of New York at Buffalo will be located within the area flooded by the 1960 highwater occurrence. The site for the campus, shown on plate 3, is on the left bank of Ellicott Creek and is enclosed by the creek, Sweet Home Road and North Forest Road. University officials have indicated to the Buffalo District office a desire to provide complete protection for all high value development facilities (education buildings, offices, dormitories, etc.) against a relatively infrequent flood occurrence. At the same time the lower value development facilities (parking areas, athletic fields, etc.) would probably be set at a lower elevation and be subjected to more frequent flood occurrences. This is an excellent example of exercising wise use of the flood plain in that although the lower value development would be subjected to more frequent flooding, damages from such flood occurrences would not be serious.

In November of 1963, a comprehensive drainage plan for the town was introduced. This plan, proposed construction of the Amherst Marine Parkway,

Figure 2- Photo of commercial boating facilities located at approximate creek mile 0.2.

Figure 3- Photo of private boat docks. Note large trees and brush along the channel banks.

Photos taken September 1967

Figure 4- Photo of diversion channel located in Ellicott Creek Park. This channel is also utilized as a parking area. A part of Ellicott Creek county park is shown in the background.

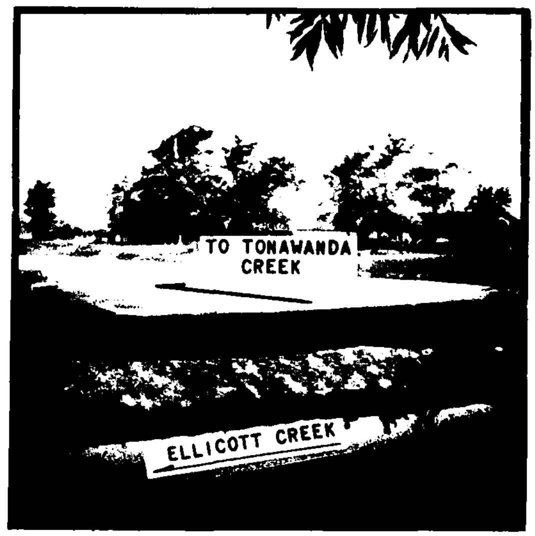


Figure 5- Photo again showing diversion channel and direction of flow.

Figure 6- Photo of Audubon Golf Course near creek mile 9.2.

Figure 7- Photo of Audubon Golf Course near creek mile 9.3.

Photos taken September 1967

Figure 8- Photo of Westwood Country Club near creek mile 10.2.

Figure 9- Photo of Park Country Club near creek mile 11.6.

Figures 6-9 all show excellent examples of wise flood plain planning.

a channel between Ellicott and Tonawanda Creeks to solve a portion of the drainage problem in the lower end of this reach, which would be very difficult and expensive to drain by conventional enclosed storm conduits. The proposed channel, shown on plate 3, would lie in a north-south direction beginning at approximate creek mile 5.2. Although this plan was first conceived as a drainage ditch, it has been expanded to include complete water oriented outdoor recreational facilities. If this parkway channel becomes a reality, consideration must be given to a control structure at the Ellicott Creek terminus of the connecting channel to control the amount of flood water diverted from Ellicott Creek. Consideration must also be given to the possibility of high stages on Tonawanda Creek discharging into Ellicott Creek via the connecting channel when the flood peak has receded on Ellicott Creek. Information available at present indicates that peak stages on Tonawanda Creek near the considered parkway channel occur 24 to 36 hours after the peak stage at the Ellicott Creek terminus.

Comparison of discharge measurements made during flood stages at Niagara Falls Boulevard with discharges recorded at the Wehrle Drive gage in Williamsville during the same floods, show a decrease in discharge at Niagara Falls Boulevard although the latter has an additional 29.3 square miles of drainage area. This condition is caused by the large amount of overbank storage which occurs in this reach, particularly between Sweet Home Road and Millersport Highway as shown on plate 3.

The existing channel in this reach is covered in many locations with brush, large trees, debris and various obstructions as shown in figures 10 through 13.

In the reach from Main Street in the village of Williamsville to Youngs Road, flooding is generally localized and caused by channel restrictions. In most instances flooding in the village has been restricted to the low areas in close proximity to the creek. The flood plain is characterized by residential development with very little vacant land left for development. Commercial properties which comprise the business

Figure 10- Photo taken looking up-stream of Millersport Highway bridge.

Figure 11- Photo looking at upstream side of Millersport Highway bridge.

Photos taken September 1967

Figure 12- Photo of trash being dumped in area on right bank of Ellicott Creek near Heim Road, near creek mile 7.9.

Figure 13- Photo of upstream side of Maple Road bridge. Note amount of debris collecting at center pier.

Figures 10-13 all show that floodway capacity is greatly reduced by debris, weeds, brush and trees.

center for the village are located primarily on Main Street.

In 1929, the village, at a cost of $64,000, executed a flood control project just upstream from Main Street. The project consisted of a gate controlled dam (shown in figure 14), a new channel upstream from the dam approximately 1,100 feet long, and cleaning, deepening and widening of the existing channel for a distance of approximately 1,400 feet. Figure 15 shows the existing overflow weir just upstream of the Main Street bridge.

At present there are 2 municipal parks located in this reach. One is just upstream of the gate controlled dam and is enclosed by the new and old creek channel. The other park is located just south of Main Street and is enclosed by South Ellicott and Division Streets, and Oak Grove Avenue. Both parks are excellent examples of wise flood plain planning and are shown in figures 16 and 17.

Town of Cheektowaga

In the reach from Youngs Road to Transit Road, there is a scattering of residential and commercial development. The extended jet runway for the Greater Buffalo International Airport is located in this reach. Figure 18 shows the culverts which carry the runway extension over Ellicott Creek. There is shown in figure 19 a photograph of a large area being cleared for future development. Although not evident in the photograph, the carrying capacity of the channel has been reduced as the channel bottom has been restricted from a width of about 50 feet to only 12 feet.

Town of Lancaster

There are two distinctive flood problems in the reach from Transit Road to Stony Road (upper limit of study area). In the reach from Transit Road to Harris Hill Road, the flood plain is developed similarly to that in the village of Williamsville. In this reach is the hamlet of Bowmansville and flooding is localized and restricted to low areas in close proximity to the creek and is generally caused by channel restrictions. In the remaining portion of this reach, the flood plain is a large area of low, flat land and is characterized by a scattering of residential and commercial units. There are shown in figures 20 and 21 photographs

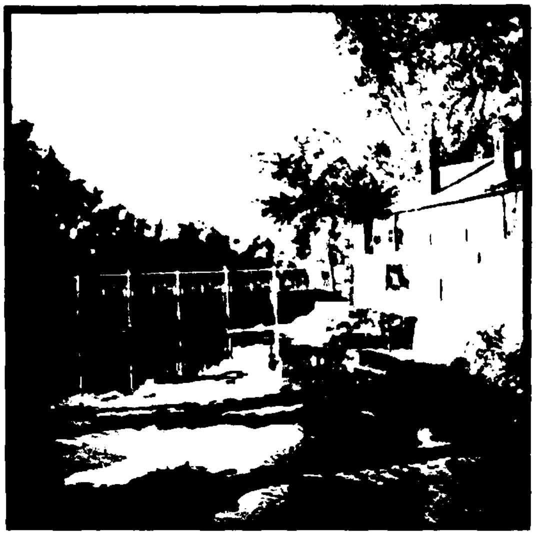


Figure 14- Photo of gate controlled dam constructed by the village of Williamsville in 1929 as a flood control measure.

Figure 15- Photo of overflow weir upstream of Main Street bridge in the village of Williamsville.

Photos taken September 1967

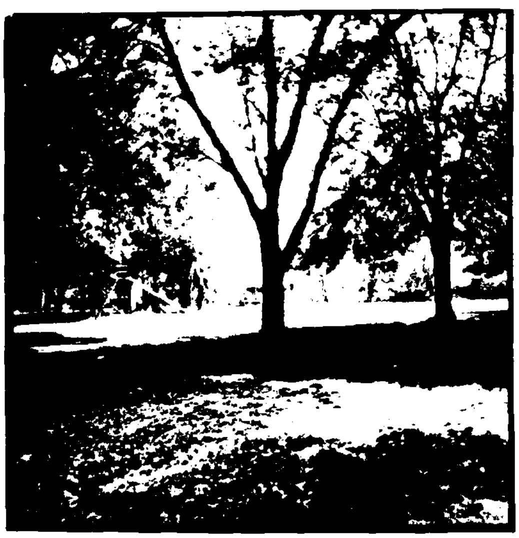


Figure 16- Photo showing Residents Park in village of Williamsville. Photo depicts excellent example of wise flood plain planning.

Figure 17- Photo showing Village Park at Garrison and Park Drive in village of Williamsville. Photo also depicts excellent example of wise flood plain usage.

of development in the Bowmansville area.

Throughout the entire study area, as future development occurs, there are factors which can affect flood flows and stages in the flood plain area. Based on a study made by R. W. Canter on the effects of suburban development on the magnitude and frequency of floods in suburban areas, indications are that peak discharges will increase if the land now vacant develops at a rate it has in recent years. It is estimated by the Buffalo District that an increase in peak flows of 15 percent can be realized in the town of Amherst from Niagara Falls Boulevard upstream to the Main Street bridge in Williamsville. For the remainder of the study area it has been estimated that an increase of 5 percent in peak flows can be realized. This increase in flows results from increased runoff from roofs, parking lots, paved roads, roadside ditches and storm sewers. If there is no compensating improvement in the carrying capacity of the existing channel as development increases in the flood plain, it will result in increased discharges accompanied by higher flood elevations. Since the flood plain of Ellicott Creek in the reach covered by this report is largely undeveloped and the trend is to suburban development, the purpose of this report is to identify the flood plain as shown on plates 3 and 4 and the frequency of flood stages so that future development can make the most effective use of the area without suffering an increase in present damages.

Bridges Across the Stream

At present there are four railroad bridges, six foot bridges and twenty-three highway or vehicular bridges which cross Ellicott Creek in the reach covered by this study. Table 4 lists pertinent data for these structures and shows the relation of the Intermediate Regional Flood and Standard Project Flood to the March 1960 flood, the most severe flood in recent years. There are shown in figures 22 through 29 photographs of some of the bridges which cross over Ellicott Creek. Most of the bridges within the study area are not considered to be overly constrictive because of the elevation of the adjacent roads which allow large amounts of overbank flow. Because of the relatively high road elevations several of the

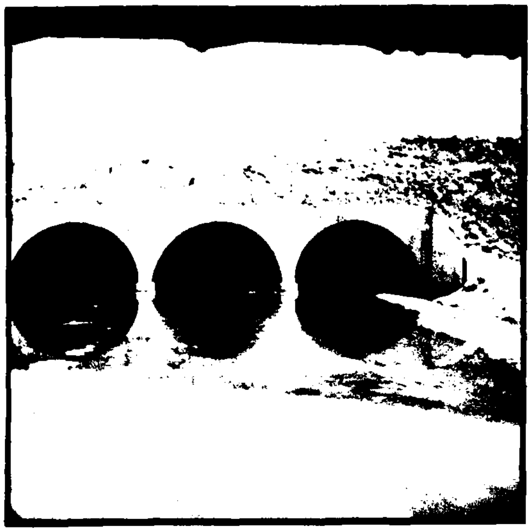


Figure 18- Looking upstream at the 3 culverts which carry the Buffalo Airport jet runway extension over Ellicott Creek.

Figure 19- Photo showing encroachment of the channel at Aero Drive and Rein Road, near creek mile 15.9 Channel bottom width reduced from about 50 feet to 12 feet due to bulldozing operations.

Photos taken September 1967

Figure 20- Photo showing view of Bowmansville Volunteer Fire House. Note that although front of building has been built up, unless flood-proofing is provided at door and window sill, fire house would be subject to frequent flooding.

Figure 21- Looking at shelter within flood plain at Bowmansville Volunteer Fire Company Grove. Photo indicates wise flood plain usage.

bridges are severe obstructions to flood flows as shown on plates 5 through 7.

Head losses (defined in the Glossary of this report) of up to 3 feet at the Wehrle Drive bridge, creek mile 14.1, were evident from high water marks for the March 1960 flood. At this same location hydraulic computations indicate head losses of up to 4 feet for the Intermediate Regional and Standard Project floods. An estimate of the relative effects of the bridge constrictions can be obtained by inspection of the water surface profiles shown on plates 5 through 7. These profiles should be used as a guide for all future construction of new bridges or alterations to existing bridges which cross the creek in the study area. To assure against an increase in water surface elevation or head loss caused by insufficient bridge waterway opening, future construction of bridges should include sufficient clearance for drift and debris which usually accompany a highwater occurrence.

Figure 22- Looking downstream toward the Fremont Street bridge at creek mile 0.44 in the city of Tonawanda.

Figure 23- Looking upstream at the Erie-Lackawanna Railroad bridge at creek mile 0.70 in the city of Tonawanda.

Photos taken September 1967

Figure 24- Looking upstream at the Sheridan Drive bridge at creek mile 10.75 in the town of Amherst.

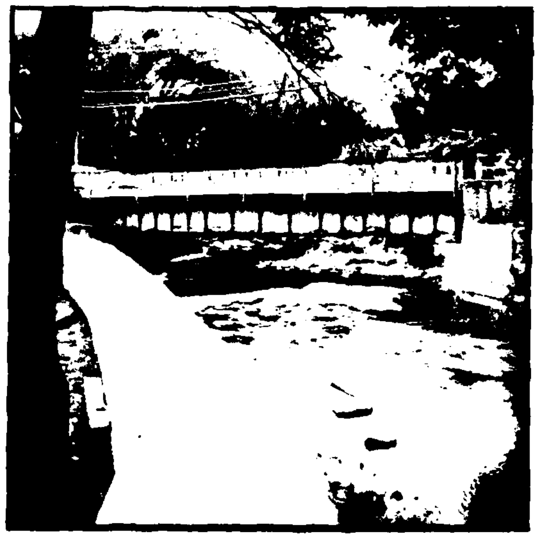


Figure 25- Looking downstream at the Glen Avenue bridge at creek mile 12.9 in the village of Williamsville. This bridge constructed in 1937 after the 1936 flood washed out the existing structure.

Figure 26- Looking downstream toward Main Street bridge at creek mile 13.1 in the village of Williamsville.

Figure 27- Looking downstream at the Youngs Road bridge at creek mile 15.07 in the towns of Amherst and Cheektowaga.

Photos taken September 1967

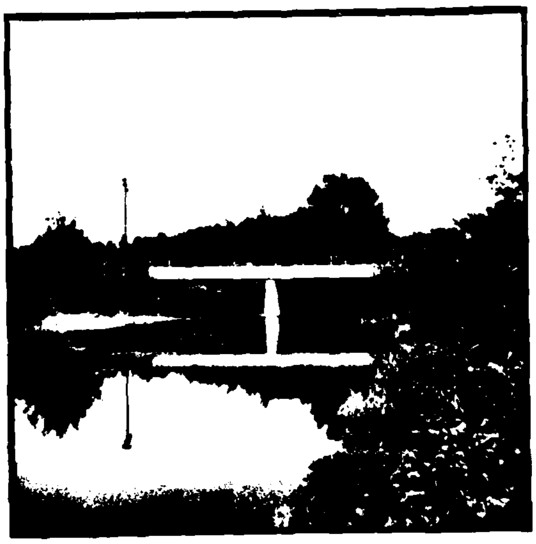


Figure 28- Looking upstream toward the Transit Road bridge at creek mile 17.1 in the town of Cheektowaga.

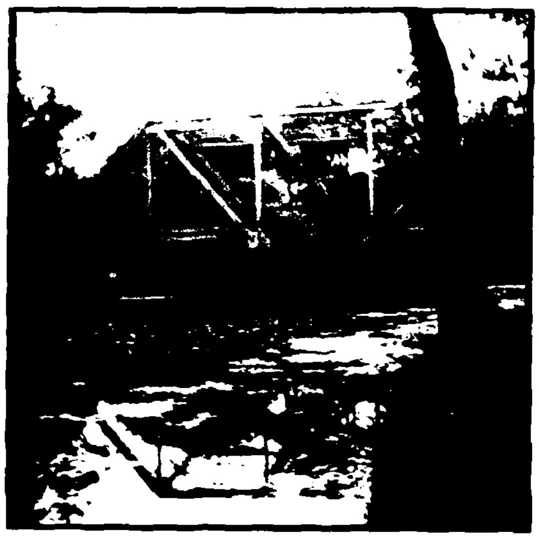


Figure 29- Looking upstream at the Harris Hill Road bridge at creek mile 18.35 in the town of Lancaster.

TABLE 4

BRIDGES ACROSS ELLICOTT CREEK

Mile Above Mouth	Identification	Stream Bed Elev.	Floor Elev.(3)	Standard Project Flood Crest Elev.(1)	Intermediate Regional Flood Crest Elev.(1)	March 1960 Flood Crest Elev.(1)	Underclearance Low Steel Elev.
0.05	E. Niagara St. NY Hwy. 266	553	584.0	574.0	566.3	565.7	582.0
0.15	Delaware Ave. NY Hwy. 384	553	580.8	574.6	566.8	566.0	573.6
0.44	Fremont Street	551	579.2	575.0	567.9	567.0	573.8
0.67	N.Y. Central Railroad	550	592.0(2)	575.2	569.0	567.9	589.4
0.70	Erie-Lackawanna Railroad	551	584.0(2)	575.6	569.8	568.5	577.4
1.00	Young St. Arterial Hwy.	555	594.0	575.8	570.2	569.1	589.0
2.65	Lehigh Valley Railroad	559	581.7(2)	579.1	572.7	572.5	577.5
2.90	Foot Bridge - Ellicott Creek Park	557	574.1	579.2	573.2	572.8	571.2
3.23	Foot Bridge - Ellicott Creek Park	557	574.5	579.2	574.0	573.4	572.2
3.40	Niagara Falls Boulevard NY Hwy. 18 and US Hwy. 62	559	578.9	580.1	574.8	573.5	573.9
4.80	Sweet Home Road	560	577.6	581.5	577.8	576.0	574.7
7.43	Millersport Highway, NY Hwy. 263	569	584.4	585.0	583.0	581.3	581.6
9.15	Foot Bridge - Audubon Golf Course	579	591.8	592.7	591.4	589.2	589.3
9.32	Maple Road	580	594.0	594.0	592.5	590.8	590.2
10.10	Foot Bridge - Westwood Country Club	583	596.1	597.2	596.3	594.8	594.0
10.43	Forest Road	584	600.1	601.7	598.7	596.2	597.8
10.75	Sheridan Drive NY Hwy. 324	587	606.0	606.4	601.4	598.0	600.3
11.15	Service Bridge - vehicular	588	599.0	606.9	602.5	599.4	596.9
11.55	Foot Bridge - Park Country Club	589	601.9	607.2	603.5	600.5	596.1

TABLE 4 (Cond't)

Mile Above Mouth	Identification	Stream Bed Elev.	Floor Elev. (3)	Standard Project Flood Crest Elev. (1)	Intermediate Regional Flood Crest Elev. (1)	March 1960 Flood Crest Elev. (1)	Underclearance Low Steel Elev.
12.05	Foot Bridge - Park Country Club	590	601.2	608.0	604.8	602.1	599.0
12.90	Glen Avenue	611	631.0	-	-	-	623.1
13.10	Main Street NY Hwy. 5	658	672.0	673.0	671.0	670.0	668.3
14.10	Wehrle Drive	670	680.3	683.0	681.8	680.5	676.9
14.53	N.Y.S. Thruway Interstate 90	673	691.5	690.0	685.7	684.0	686.9
15.07	Youngs Road	682	692.1	695.2	692.6	690.6	689.7
15.62	Aero Drive	681	695.0	700.4	696.0	695.0	692.2
16.15	Rein Road	683	696.8	700.8	697.0	696.0	693.7
16.70	N.Y. Central Railroad	683	701.0 (2)	701.7	698.4	697.0	697.0
17.10	Transit Road NY Hwy. 78	684	702.2	703.8	700.0	698.8	698.5
17.80	Main Street	691	705.8	705.5	701.3	700.7	702.6
17.92	Genesee Street NY Hwy. 33	698	709.9	710.8	703.2	702.0	705.7
18.35	Harris Hill Road	698	714.7	716.0	712.3	709.3	710.2
21.75	Stony Road	709	721.7	721.0	720.0	718.6	717.8

(1) All elevations referred to upstream side of respective bridge except at Stony Road bridge where elevations are referred to downstream side.

(2) Top of rail elevation

(3) All floor elevations are taken at the centerline of the street except where top of rail is given.

Note: All elevations are referred to U.S. Coast and Geodetic Survey Datum

Obstructions to Flood Flows

The effects of obstructions to flood flows due to bridges which traverse the channel are shown on the profiles on plates 5 through 7 and in figures 30 through 37. Another serious obstruction to flood flows is the condition of the channel itself. It has many bends, has an irregular section, and in many locations is lined with heavy brush, weeds, and large trees growing on the channel banks and extending into the stream.

FLOOD SITUATION

Flood Records

Records of creek stages and discharges on Ellicott Creek have been maintained since October 1955 when the U. S. Geological Survey installed a wire-weight gage at the upstream side of Wehrle Drive bridge, creek mile 14.1, in the village of Williamsville. In December 1958, a recording gage was installed at the downstream side of same bridge, and continuous records are available to date.

To supplement the record obtained at this gaging station, local residents were interviewed for information on past floods. Newspaper files were searched, as were historical documents and records. Valuable data were obtained from reports of field investigations made after floods. These records and investigations have developed a knowledge of floods in the study area dating back to the early 1900's.

Flood Stages and Discharges

Table 5 lists flood crests and peak discharges for the known floods exceeding bankfull stage of 7 feet at the U.S.G.S. gaging station on Ellicott Creek at Wehrle Drive. A stage of 7 feet at this gage location will produce a discharge of 1,800 cfs, which is estimated to be the maximum discharge the creek will carry at its initial damaging stage.

Figure 30- Looking downstream from Sheridan Drive bridge. Note bends, weeds, brush and large trees in channel at approximate creek mile 10.7.

Figure 31- Looking upstream at the Wehrle Drive bridge at creek mile 14.1. Note bridge opening on left bank overgrown with brush.

Photos taken September 1967

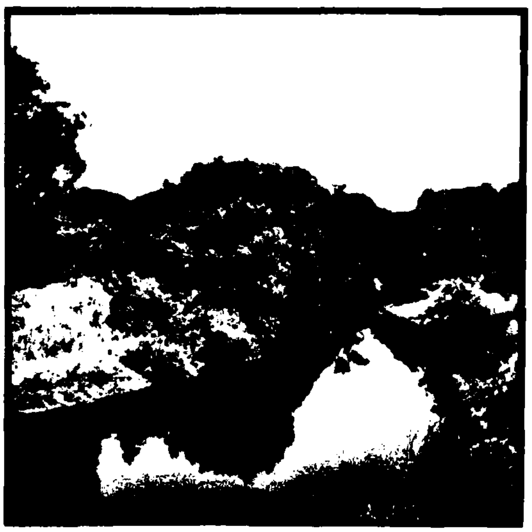


Figure 32- Looking upstream above Rein Road bridge. Note large trees, brush and weeds lining channel banks at approximate creek mile 16.1.

Figure 33- Looking downstream toward Rein Road bridge at approximate creek mile 16.2. Channel capacity greatly reduced due to encroachment in the channel.

Figure 34- Note large amounts of weeds, brush and trees lining channel banks at approximate creek mile 16.7.

Figure 35- Looking upstream from the Transit Road bridge at approximate creek mile 17.2. Note large amount of growth on left bank and right bank is relatively clean.

Photos taken September 1967

Figure 36- Looking downstream at the Main Street bridge from the Genesee Street bridge in the hamlet of Bowmansville at approximate creek mile 17.9. Note large trees which line channel banks.

Figure 37- Looking downstream toward Stony Road bridge at approximate creek mile 21.8. Due to large amount of brush and weed growth in the channel the water surface is not visible.

TABLE 5

ELLICOTT CREEK AT WEHRLE DRIVE, WILLIAMSVILLE, N. Y.

This table includes all known floods above bankfull stage of 7 feet at Wehrle Drive gage location over Ellicott Creek at creek mile 14.1. Drainage area measured at this site is 72.4 square miles. Zero of gage = 668.93 USC & GS Datum.

During the period from 14 October 1955 to 16 December 1958 flood stages and discharges were obtained from U. S. Geological Survey wire-weight and crest stage gage readings. On 17 December 1958 an automatic recording gage was installed at the same bridge location.

Date of Crest	Gage Heights: Stage feet	Gage Heights: Elevation feet	Discharge cfs
7 March 1956	10.4 (1)	679.3	2,510
23 Jan 1957	9.4 (1)	678.3	2,410
23 Jan 1959	9.1 (2)	678.0	1,220
31 March 1960	9.0	677.9	4,860 (3)
18 March 1963	8.8	677.7	4,040
5 March 1964	7.1	676.0	1,890
March 1936	9.1 (4)	678.0 (4)	6,500 (4)

(1) Gage location upstream side of bridge. Therefore stage reflects upstream water surface elevations.

(2) Stage affected by ice.

(3) Maximum discharge of record.

(4) Estimated by Buffalo District.

Duration and Rate of Rise

There is shown on plate 2 the stage hydrograph for the March 1960 flood at the U.S.G.S. gaging station located at Wehrle Drive. During this flood the creek rose to its crest in 40 hours at an average of 0.14 foot per hour with a maximum rate of 1 foot in 3 hours, and remained above bankfull stage for 35 hours.

Velocities

During the March 1960 flood, channel velocities measured at Wehrle Drive exceeded 11 feet per second with an average velocity in the channel in excess of 8 feet per second. During larger floods, such as the Intermediate Regional and Standard Project, velocities would be higher.

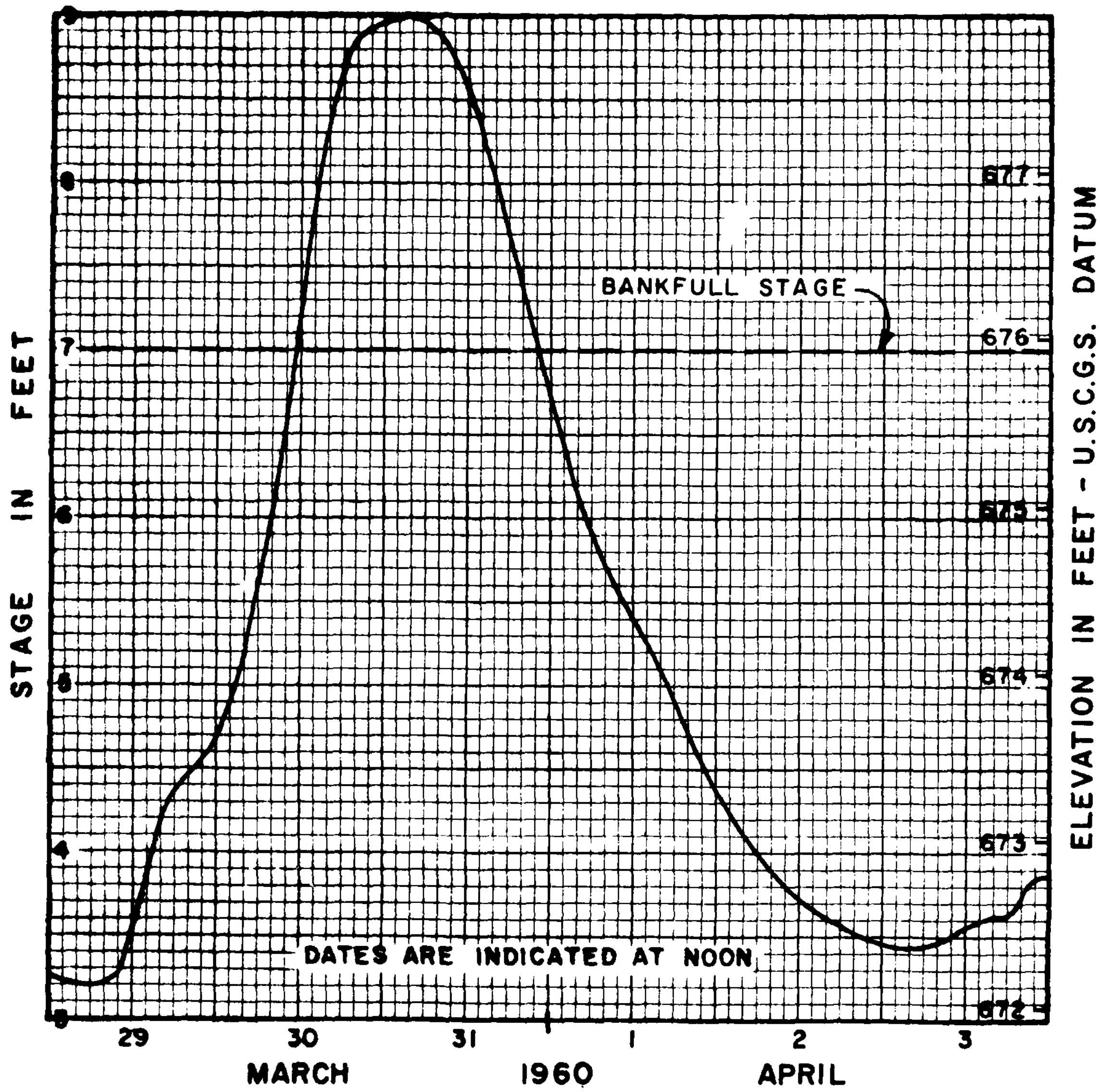
Flooded Areas, Flood Profiles, and Cross Sections

Plates 3 and 4 show the approximate areas along Ellicott Creek that would be inundated by the March 1960 flood, the Intermediate Regional Flood and Standard Project Flood. The actual limits of these overflow areas on the ground may vary some from those shown on the map because the 10-foot contour interval and scale of the map do not permit precise plotting of the flooded area boundaries.

Plates 5 through 7 show the water surface profiles for the normal water surface, March 1960 flood, Intermediate Regional Flood and Standard Project Flood.

Plates 8 through 10 show 9 valley sections that are indicative of the flood plain within the study area investigated. The locations of these sections are shown on plates 3 and 4. The approximate elevations of the March 1960 flood, Intermediate Regional Flood and Standard Project Flood are indicated on the sections.

By using the flooded area maps, flood profiles, and cross sections contained in this report as a guide, limited urban development, dependent upon the frequency of flooding, can be allowed in the flood plain. Continued recreational use of the flood plain for parks, marinas and golf courses should be encouraged. Similar land use as well as other low damage construction should be stressed during future development in areas



WEHRLE DRIVE, CREEK MILE 14.1

NOTE:

ZERO OF GAGE 668.93 U.S.C. & G.S.

FLOOD STAGE 7 FEET OR ELEV. 675.93.

ELLICOTT CREEK
ERIE COUNTY, NEW YORK
FLOOD PLAIN INFORMATION REPORT

STAGE HYDROGRAPH

U.S. ARMY ENGINEER DISTRICT, BUFFALO
JANUARY 1968

PLATE 2

which are susceptible to frequent flooding. If future high value development is considered in areas subject to frequent flooding and it is found uneconomical to elevate the land in these areas, means of flood proofing the structures should be given careful consideration.

FLOOD DESCRIPTIONS

Descriptions of known large floods that have occurred on Ellicott Creek are based upon field investigations, historical records and newspaper accounts. The greatest flood of historical record occurred in March 1936. Other damaging floods occurred in March 1916, January 1929 and March 1960. The only summer flood to have occurred was in June 1937. All of the floods with the exception of the June 1937 flood were caused by melting snow accompanied with moderate amounts of precipitation. A condensation of available information on these flood occurrences is given in the following paragraphs. This information is presented as an example of the type and extent of flood problems which have already occurred and an indication of possible future flood problems.

17-19 January 1929

This flood was produced by a sudden thaw accompanied by a 48-hour rain. Of the total 1.51 inches of precipitation that fell, 1.09 inches fell on 18 January. At the same time the temperature rose to a maximum of 62 degrees Fahrenheit and remained above freezing until the evening of 19 January. Excerpts from the Amherst Bee newspaper indicated this flood to be the most destructive flood of record to that time and stated that several foundations and homes were washed away.

25-26 March 1936

This flood was produced by a sudden thaw following a record snowfall as reported at the Buffalo Weather Bureau Station. A record 38.5 inches of snow fell during the month of March of which 19.5 inches fell on 17-18 March. The maximum and minimum temperatures recorded for the period 18 through 22 March were 35 and 25 degrees Fahrenheit, respectively. On 23 March a warming trend began and extended through to 27 March. During this period the temperature reached a maximum of 55 degrees Fahrenheit on

24 March and remained above freezing for the five-day period. Although flooding conditions were not as severe as the January 1929 flood in the village of Williamsville, it is considered by residents in the town of Amherst to be the most destructive flood to occur in Amherst. Experts agree that never in the records of the town has such a volume of water passed under the Main Street bridge in Williamsville. Three vehicular bridges were destroyed. Many farmers in the area south of the village limits were stranded and helpless to render aid to suffering livestock and damaged property because of being totally surrounded by high water. Many residents in the flood areas suffered first floor damage. Rescue parties carried food, milk and drinking water to the marooned residents by flat bottom boats. Figures A through D on pages 41 and 42 show flooding conditions at the locations indicated during this flood.

<u>30-31 March 1960</u>

This flood was also produced by a sudden thaw following the second coldest March of record. Temperatures for the period 1 March through 26 March averaged only 20 degrees Fahrenheit with a high of 35 degrees and a low of -2 degrees. Temperatures began to rise on 27 March to 54 degrees and continued above 50 degrees for the five-day period to 31 March. The maximum temperature was recorded on 30 March at 69 degrees and on 29 March it was 67 degrees. This five-day period of above freezing temperatures caused a large amount of runoff from the eight inches of snow covering the area. The creek crested at 5:00 A.M. on 31 March at 8.99 feet, which is the maximum stage of record at the Wehrle Drive gage. Figure E on page 43 shows flooding conditions in the village of Williamsville during this flood. Figures F through J on pages 43 through 45 show flooding conditions for various floods in the study area.

This concludes the "General Conditions and Past Floods" section of this report. But what can be done to prevent and/or reduce future flood damages? Local governments can develop and enforce as soon as possible flood plain regulations based on the information contained in this report. This would provide them with the necessary legal tools to control the extent and type of development which would be allowed to take place within the flood plain. Regulation of the flood plain can usually be carried out most effectively by a combination of the several regulatory methods ... zoning ordinances, subdivision regulations and building codes. They can also police and maintain the floodway so as to insure against the overgrowth of brush, weeds, debris and large trees from obstructing flood flows since all these factors result in increased river stages. The U. S. Army Corps of Engineers has prepared and is distributing to state, county and local governments copies of pamphlets entitled "Guidelines for Reducing Flood Damages" and "Introduction to Flood Proofing." The combination of data presented in this report and the pamphlets will provide general guidelines for flood damage reduction to future development within the Ellicott Creek flood plain. Figure 38 on page 40 lists the corrective and preventative measures described in the above-mentioned pamphlets. The U. S. Army Corps of Engineers will distribute to state, county and local governments other helpful pamphlets as well as additions to existing pamphlets as they are developed.

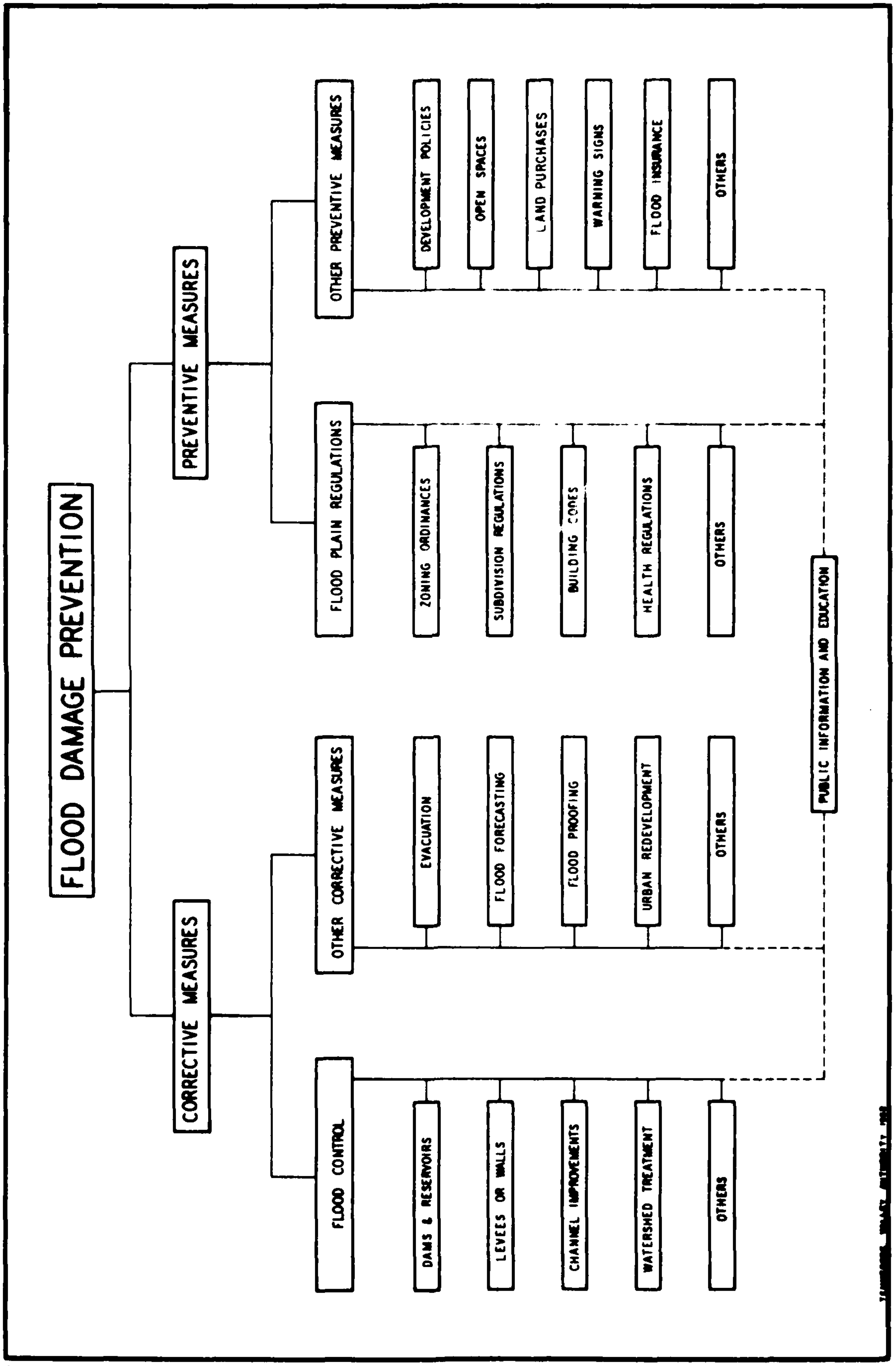

FLOOD DAMAGE PREVENTION
CORRECTIVE MEASURES
PREVENTIVE MEASURES
FLOOD CONTROL
DAMS & RESERVOIRS
LEVEES OR WALLS
CHANNEL IMPROVEMENTS
WATERSHED TREATMENT
OTHERS
OTHER CORRECTIVE MEASURES
EVACUATION
FLOOD FORECASTING
FLOOD PROOFING
URBAN REDEVELOPMENT
OTHERS
FLOOD PLAIN REGULATIONS
ZONING ORDINANCES
SUBDIVISION REGULATIONS
BUILDING CODES
HEALTH REGULATIONS
OTHERS
OTHER PREVENTIVE MEASURES
DEVELOPMENT POLICIES
OPEN SPACES
LAND PURCHASES
WARNING SIGNS
FLOOD INSURANCE
OTHERS
PUBLIC INFORMATION AND EDUCATION

FIGURE 38

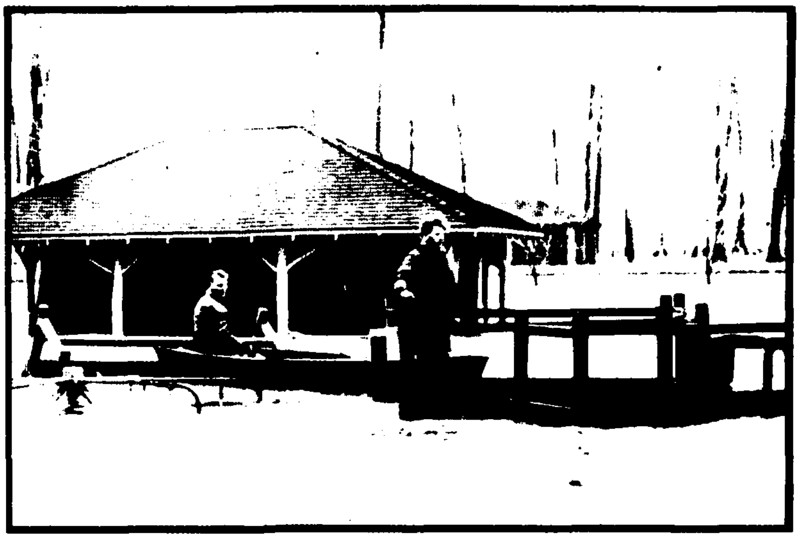


Figure A- Photo showing the depth of flooding in Ellicott Creek County Park during the March 1936 flood. This park is located in the town of Tonawanda. Even with the depth of flooding indicated, only minor damages were sustained to the park and its facilities. Example of excellent flood plain usage.

Figure B- Photo showing flooding conditions on Sweet Home Road near the intersection of North Ellicott Creek Road near creek mile 4.8 in the town of Amherst during the March 1936 flood.

Figure C- Photo showing the remains of the Glen Avenue bridge in the village of Williamsville, at creek mile 12.9, during the March 1936 flood.

Figure D- Photo showing the water surface upstream side of Wehrle Drive bridge in the village of Williamsville, at creek mile 14.1 during the March 1936 flood.

Figure E- Photo showing flooding conditions in the vicinity of Lehn Springs Drive in the village of Williamsville during the March 1960 flood.

Figure F- Photo shows flood water flowing over Rein Road near creek mile 16.1 in the town of Cheektowaga during the March 1960 flood.

Figure G- Photo showing the depth of flooding at Sturm's Grove near creek mile 16.7 on Genesee Street in the town of Cheektowaga during the March 1960 flood. Although the grove was completely inundated, only minor damage was suffered. This is a good example of low damage type development within the flood plain.

Figure H- Photo showing flooding conditions on the grounds of St. Rita's Convalescent Home for Children, Millersport Highway near North Forest Road, town of Amherst, at creek mile 7.4 during the April 1940 flood.

Figure I- Photo showing flooding conditions on North Forest Road near the intersection of Maple Road in the town of Amherst, near creek mile 9.3 during the March 1956 high water occurrence. This intersection is the initial point where Ellicott Creek overflows its banks.

Figure J- Photo showing flooding conditions on Frederick Road in the city of Tonawanda, near creek mile 1.5, during the January 1959 flood.

FUTURE FLOODS

Large floods have been experienced in the past on streams in the general geographical and physiographical region of this study. Climatological conditions similar to those causing these floods could occur over the Ellicott Creek basin. In this event, floods would result on Ellicott Creek comparable in magnitude with those experienced on neighboring streams. It is therefore desirable, in connection with any determination of future floods which may occur on Ellicott Creek to consider storms and floods that have occurred in the region. Table 6 lists the maximum known floods that have occurred, their date, peak discharge, discharge per square mile, and recurrence interval that have occurred at various U.S.G.S. gaging stations in the region of this study area. Also shown in table 6 are the estimated peak discharges that have occurred at various stream locations prior to the installation of the U.S.G.S. gaging station. Although in some instances the Ellicott Creek basin differs in area and terrain from other streams, the tabulation indicates that floods of greater magnitude than have occurred in the study area are likely to occur.

The Standard Project Flood concept was developed by the U. S. Army Corps of Engineers and it provides an indication of the upper limit of flooding in any particular area. Although the occurrence of a flood of this magnitude is possible, a flood of greater magnitude would be very rare. Floods of Intermediate Regional magnitude, although not as high as the Standard Project Flood, may reasonably be expected to occur more frequently than the infrequent occurrence of the Standard Project Flood. Either flood could occur at any time.

Unfortunately, when data are given pertaining to future floods such as the Intermediate Regional and Standard Project, people have the opinion that this will probably not happen during their lifetime and have a tendency to ignore the potential problems. Although it is true that the Intermediate Regional Flood has a recurrence interval in the order of once in 100 years, and the Standard Project Flood is even less frequent, it must be kept in mind, that either or both floods can happen in any given year.

DETERMINATION OF INTERMEDIATE REGIONAL FLOODS

The Intermediate Regional Flood is defined as a flood having a recurrence interval of once in 100 years, at a designated location, although the flood may occur in any year or in consecutive years. Some probability estimates are based on statistical analyses of stream flow records available for the basin under study, but limitations in such records usually require analyses of rainfall and runoff characteristics in the "general region" of the area under study. The Intermediate Regional Flood represents a major flood, although it is much less severe than the Standard Project Flood.

Results of the studies indicate that the Intermediate Regional Flood on Ellicott Creek at the Wehrle Drive gaging station would have a peak discharge of 7,500 cubic feet per second, and a peak discharge of only 6,300 cubic feet per second at Niagara Falls Boulevard. This reduction in discharge is created by the low banks and flat terrain which provide abundant storage in the lower reaches of Ellicott Creek. Peak discharges of the Intermediate Regional Flood along Ellicott Creek are shown in table 7.

TABLE 6

MAXIMUM KNOWN FLOOD DISCHARGES AT U.S.G.S. GAGING STATIONS IN THE REGION OF ELLICOTT CREEK, NEW YORK

Stream	Location New York	Period of Record (Years)	Drainage Area (sq.mi.)	Date	Peak discharge of record: Amount (cfs)	Peak discharge of record: per sq. mi. (cfs)	Estimated recurrence interval * (years)	Estimated peak discharge (3): Date	Estimated peak discharge (3): Discharge (cfs)	Estimated peak discharge (3): Estimated recurrence interval* (years)
Cattaraugus Cr.	Gowanda	27	432	17 Mar 1942	35,900	83	30			
Buffalo Cr.	Gardenville	28	144	1 Mar 1955	13,000	90	20	June 1937	16,000	90
Cayuga Cr.	Lancaster	27	94.9	22 Jan 1959	8,750	92	15	June 1937	18,000	greater than 200
Cazenovia Cr.	Ebenezer	25	134	1 Mar 1955	13,500	101	25			
Scajaquada Cr.	Cheektowaga	9	15.9	7 Aug 1963	2,620	165	100			
Little Tona. Cr.	Linden	51	22.1	7 Mar 1956	2,700	122	35			
Tonawanda Cr.	Batavia	21	171	31 Mar 1960	7,200	42	15			
Tonawanda Cr.	Alabama	11	231	1 Apr 1940	9,000 (1)	39	20			
Tonawanda Cr.	Rapids	11	351	1 Apr 1960	10,600 (1)(2)	30	25			
Ellicott Cr.	Williamsville	12	72.4	31 Mar 1960	4,860	67	15	Mar 1936	6,500	50

* Based on conditions of development at time of flood.

(1) Estimated by Corps of Engineers.

(2) Includes overflow down Black Creek.

(3) Estimated by Corps of Engineers from known high water marks and hydraulic computations.

TABLE 7

INTERMEDIATE REGIONAL FLOOD PEAK DISCHARGES

Location	Creek Mile	Drainage Area (sq. mi.)	Discharge (cfs)
Erie County staff gage at Niagara Falls Boulevard	3.4	101.7	6,300
U.S.G.S. gage at Williamsville	14.1	72.4	7,500
Stony Road bridge	21.8	67.4	7,500

Intermediate Regional Floods may occur on Ellicott Creek in the reach investigated, that would be from 0.3 foot to 3.4 feet higher than the March 1960 flood, the most damaging flood of record.

DETERMINATION OF STANDARD PROJECT FLOODS

Only in rare instances has a specific stream experienced the largest flood that can be expected to occur. Severe as the maximum known flood may have been on any given stream, it is a commonly accepted fact that in practically all cases, sooner or later a larger flood can and probably will occur. The Corps of Engineers, in cooperation with the Weather Bureau, has made broad and comprehensive studies and investigations based on the vast records of experienced storms and floods and has evolved generalized procedures for estimating the flood potential of streams. These procedures have been used in determining the Standard Project Flood. It is defined as the largest flood that can be experienced from the most severe combination of meteorological and hydrological conditions that is considered reasonably characteristic of the geographical region involved. Although the Standard Project Flood has only a rare chance of occurrence, it is not the most severe flood that could occur. The Standard Project Storm rainfall used for Ellicott Creek at the U.S.G.S. gaging station amounts to 4.52 inches in three hours, 9.03 inches in six hours, 11.89 inches in 24 hours, and a total of 14.49 inches in 96 hours. Peak discharges of the Standard Project Flood on Ellicott Creek at various locations within the study area are shown in table 8. In July 1942, rainfall in excess of 20 inches was observed in northern Pa. and southern N.Y. over a 200 square mile area. In July 1935, 10.5 inches of precipitation was recorded at Burdett, N.Y. in a 48-hour period.

TABLE 8

STANDARD PROJECT FLOOD PEAK DISCHARGES

Location	Creek Mile	Drainage Area (sq. mi.)	Discharge (cfs)
Erie County staff gage at Niagara Falls Boulevard	3.4	101.7	23,500
U.S.G.S. gage at Williamsville	14.1	72.4	28,400
Stony Road bridge	21.8	67.4	28,400

Frequency

It is not practical to assign a frequency to a Standard Project Flood. The occurrence of such a flood would be a very rare event; however, it could occur in any year.

Possible Larger Floods

Floods larger than the Standard Project Flood are possible; however, the combination of factors that would be necessary to produce such floods would seldom occur. The consideration of floods of this magnitude is of greater importance in some problems than in others but should not be overlooked in the study of any problems.

HAZARDS OF GREAT FLOODS

The amount and extent of damages caused by any flood depends in general on how much area is flooded, the height of flooding, the velocity of flow, the rate of rise and the duration of flooding.

Areas Flooded and Heights of Flooding

The areas along Ellicott Creek flooded by the March 1960, Standard Project, and Intermediate Regional Floods are shown on plates 3 and 4. Depths of flow for the Standard Project Flood, the Intermediate Regional Flood, the March 1960 flood and normal water surface can be estimated from the crest profiles which are shown on plates 5 through 7.

The March 1960 flood profile is based on actual high water marks, while the Intermediate Regional and Standard Project Floods were computed by using stream characteristics for selected reaches as determined from observed flood profiles, topographic maps and valley cross sections. The overflow areas shown on plates 3 and 4 and the water surface profiles shown on plates 5 through 7 have been determined with an accuracy consistent with the purpose of this study and the accuracy of the available basic data. The Standard Project Flood overflow in the urban areas should be considered to be indicative only, because of the effects of buildings, railroad fills, etc. The water surface profiles of the Standard Project and Intermediate Regional Floods depend to a great extent upon the degree of destruction or clogging of various bridges during the flood occurrence. Because it is impossible to forecast these events; it was assumed that all bridge structures would stand, and that no clogging would occur.

The Standard Project Flood profile for Ellicott Creek is approximately 8 feet higher at the confluence with Tonawanda Creek to about 2.5 feet higher at Stony Road bridge than the March 1960 flood. The maximum difference occurs at the upstream side of Sheridan Drive bridge where it is about 8.4 feet above the 1960 flood and this is caused principally by the high roadway elevation.

The Intermediate Regional Flood profile is approximately 0.6 foot higher at the confluence with Tonawanda Creek to about 1.5 feet higher at Stony Road bridge, than the 1960 flood. The maximum difference again occurs at the upstream side of Sheridan Drive bridge where it is about 3.4 feet higher than the 1960 flood.

The approximate heights that would be reached at structures presently existing within the flood plain covered by this report by the Standard Project Flood, the Intermediate Regional Flood and the 1960 flood are shown in figures 39 through 48.

Elevations of the Intermediate Regional and Standard Project Floods should be given careful consideration in all future planning especially in the study area because of the difference between past and possible future flood heights.

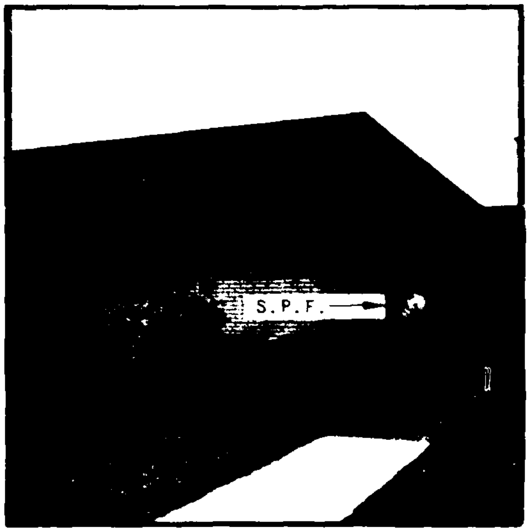


Figure 39- Arrow indicates the height of the Standard Project Flood at the Millstream School located on Luksin Drive at approximate creek mile 1.2 in the city of Tonawanda.

Figure 40- Arrows indicate the height of the Standard Project, Intermediate Regional and the 1960 flood at the boat house in Ellicott Creek Park at approximate creek mile 3.1 in the town of Tonawanda.

Photos taken September 1967

Figure 41- Arrows indicate the depth of flooding for the Standard Project and Intermediate Regional Floods at the Ellicott Creek Volunteer Fire Company house upstream of Niagara Falls Boulevard, creek mile 3.45 in the town of Amherst.

Figure 42- Arrows indicate the height of the Standard Project, Intermediate Regional and the 1960 flood at the proposed subdivision just upstream of Sweet Home Road, creek mile 4.8 in the town of Amherst.

Figure 43- The relative flood heights of the Standard Project, Intermediate Regional and 1960 flood are indicated by arrows at the St. James Lutheran Church, approximate creek mile 9.15 in the town of Amherst.

Figure 44- The heights of the Standard Project and Intermediate Regional Floods are indicated by arrows at the Sturbridge Village Apts. under construction at approximate creek mile 9.3 in the town of Amherst.

Photos taken September 1967

Figure 45- The heights of the Standard Project and Intermediate Regional Flood are indicated by arrows at the Town of Amherst sewage treatment plant near creek mile 10.0.

Figure 46- The Standard Project, Intermediate Regional and the 1960 flood heights are indicated by arrows at Walker's Grove just downstream of Wehrle Drive near creek mile 14.0 in the town of Amherst. Although depth of flooding is great, damages would be minor.

Figure 47- The Standard Project and Intermediate Regional Flood heights are indicated by the arrows at the Bowmansville Volunteer Fire Company House, near creek mile 17.8 in the town of Lancaster.

Photos taken September 1967

Figure 48- The heights of the Standard Project and Intermediate Regional Flood heights are indicated by the arrows at the residence located just downstream of Harris Hill Road, creek mile 18.35 in the town of Lancaster.

Velocities, Rates of Rise and Duration of Flooding

Average channel velocities during floods depend largely upon the size and shape of the channel section, the composition of the surface with which the water is in contact, the condition of the stream, and the slope of the channel bottom, all of which vary on different streams and at different locations on the same stream.

Table 9 lists the average velocities that would occur in the channel and overbank areas for a discharge of the Intermediate Regional Flood magnitude.

TABLE 9

INTERMEDIATE REGIONAL FLOOD VELOCITIES

Location	Creek Mile	Average Velocities Channel (ft. per sec.)	Average Velocities Overbank (ft. per sec.)
Niagara Falls Boulevard	5.4	5.0	none
U.S.G.S. gage at Williamsville	14.1	12.2	2.3
Youngs Road	15.1	10.7	1.9
Harris Hill Road	18.4	5.9	none

Note: Since Table 9 indicates only average velocities, maximum velocities would be somewhat greater in both the channel and overbank areas.

Table 10 lists the average velocities that would occur in the channel and overbank areas for a discharge of the Standard Project Flood magnitude.

TABLE 10

STANDARD PROJECT FLOOD VELOCITIES

Location	Creek Mile	Average Velocities Channel (ft. per sec.)	Average Velocities Overbank (ft. per sec.)
Niagara Falls Boulevard	3.4	5.0	2.4
Sweet Home Road	4.8	5.0	2.2
U.S.G.S. gage at Williamsville	14.1	12.8	4.3
Youngs Road	15.1	11.7	5.1
Harris Hill Road	18.4	11.1	3.8

Note: Since table 10 indicates only average velocities, maximum velocities would be somewhat greater in both the channel and overbank areas.

Rates of rise are dependent upon the shape of the basin, intensity of the storm, development within the basin and loss rate of rainfall. It can also depend upon the condition and amount of debris in the channel at the time of the storm. The duration of a flood above bankfull stage is dependent upon the duration of the storm and on the assumption that the storm was caused by rainfall and does not include prolonged runoff from snowmelt and high stages caused by ice jams, etc. Table 11 lists the height of rise, time of rise, maximum rate of rise, and the duration above bankfull stage of the Intermediate Regional Flood for the area being studied. Table 12 lists the same information as table 11 for the Standard Project Flood.

TABLE 11

INTERMEDIATE REGIONAL FLOOD

RATE OF RISE AND DURATION

Location	Creek mile	Height of Rise (feet)	Time of Rise (hours)	Maximum Rate of Rise (ft. per hr.)	Duration Above Bankfull Stage (hours)
U.S.G.S. gage at Williamsville	14.1	6.2	40	0.33	36

TABLE 12

STANDARD PROJECT FLOOD

RATE OF RISE AND DURATION

Location	Creek Mile	Height of Rise (feet)	Time of Rise (hours)	Maximum Rate of Rise (ft. per hr.)	Duration Above Bankfull Stage (hours)
U.S.G.S. gage at Williamsville	14.1	7.1	44	0.60	50

These rates of rise should give adequate warning that a flood is coming; however, debris clogging and ice jamming could act as a dam and cause water to back up and form a pond. When sufficient head accumulates in the pond to break the jam, a surge of water would flow downstream causing an almost instantaneous rate of rise.

High channel and overbank velocities in combination with deep, fairly long-duration flooding would create a hazardous situation to the flood plain. Velocities greater than 3 feet per second combined with depths of 3 feet or greater are generally considered hazardous.

GLOSSARY OF TERMS

Flood. An overflow of lands not normally covered by water and that are used or usable by man. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river or stream or an ocean, lake, or other body of standing water.

Normally a "flood" is considered as any temporary rise in stream flow or stage, but not the ponding of surface water, that results in significant adverse effects in the vicinity. Adverse effects may include damages from overflow of land areas, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions or other unfavorable situations by deposition of materials in stream channels during flood recessions, rise of ground water coincident with increased stream flow, and other problems.

Flood Crest. The maximum stage or elevation reached by the waters of a flood at a given location.

Flood Peak. The maximum instantaneous discharge of a flood at a given location. It usually occurs at or near the time of the flood crest.

Flood Plain. The relatively flat area or low lands adjoining the channel of a river, stream or watercourse or ocean, lake, or other body of standing water, which has been or may be covered by flood water.

Flood Profile. A graph showing the relationship of water surface elevation to location, the latter generally expressed as distance above mouth for a stream of water flowing in an open channel. It is generally drawn to show surface elevation for the crest of a specific flood, but may be prepared for conditions at a given time or stage.

Flood Stage. The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

Head Loss. The effect of obstructions, such as narrow bridge openings or buildings that limit the area through which water must flow, raising the surface of the water upstream from the obstruction.

Intermediate Regional Flood. A flood having an average frequency of occurrence in the order of once in 100 years although the flood may occur in any year. It is based on statistical analyses of streamflow records available for the watershed and analyses of rainfall and runoff characteristics in the "general region of the watershed."

Left Bank. The bank on the left side of a river, stream, or watercourse, looking downstream.

Low Steel (or Underclearance). See "underclearance."

Right Bank. The bank on the right side of a river, stream, or watercourse, looking downstream.

Standard Project Flood. The flood that may be expected from the most severe combination of meteorological and hydrological conditions that is considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations. Peak discharges for these floods are generally about 40% to 60% of the Probable Maximum Floods for the same basins. Such floods, as used by the Corps of Engineers, are intended as practicable expressions of the degree of protection that should be sought in the design of flood control works, the failure of which might be disastrous.

Underclearance. The lowest point of a bridge or other structure over or across a river, stream, or watercourse that limits the opening through which water flows. This is referred to as "low steel" in some regions.

AUTHORITY, ACKNOWLEDGMENTS AND INTERPRETATION OF DATA

This report has been prepared in accordance with the authority granted by Section 206 of the Flood Control Act of 1960 (PL 86-465), as amended.

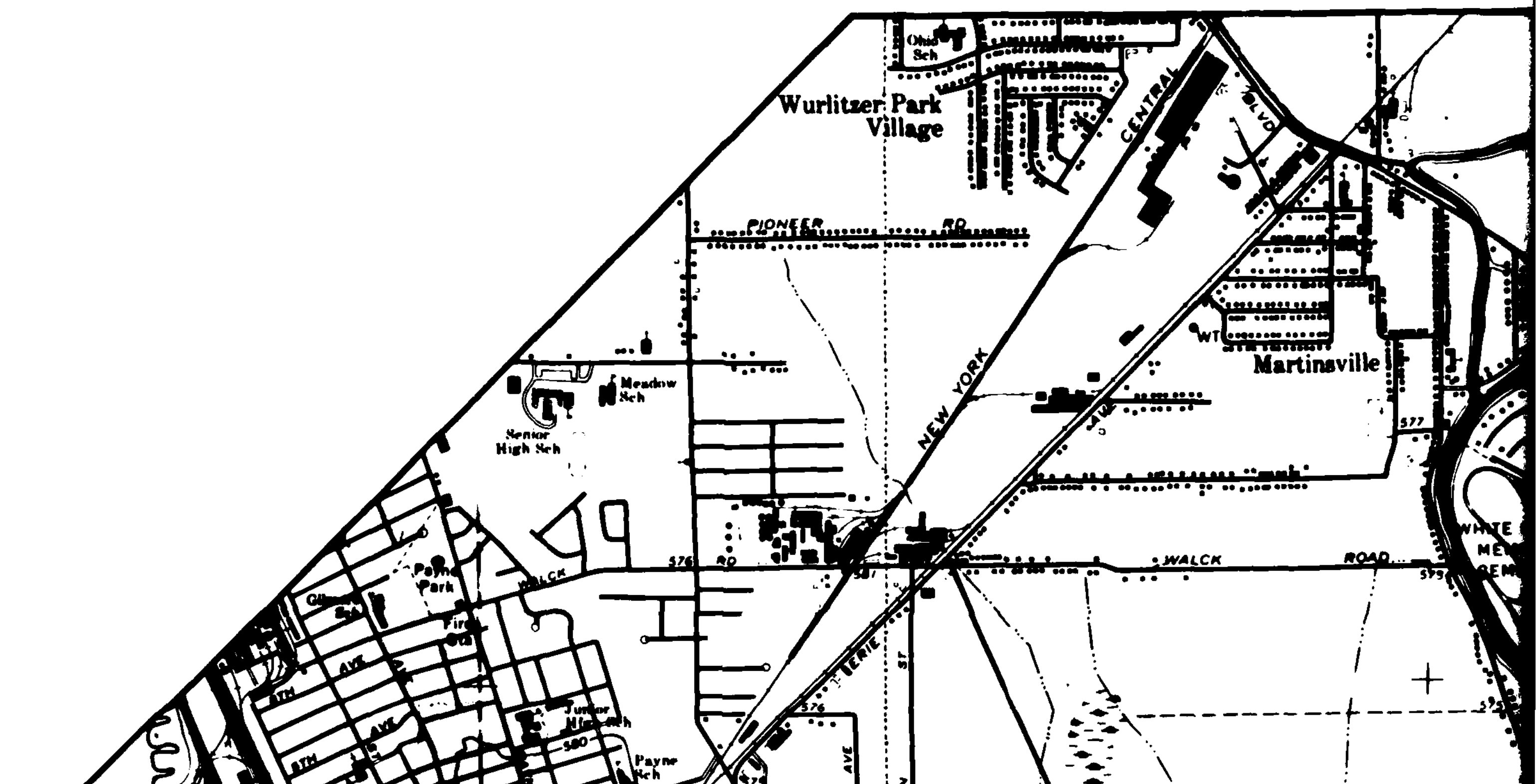
* * *

Considerable information was obtained from the Review of Reports for Flood Control and Allied Purposes on Tonawanda Creek and Tributaries now being prepared by the Buffalo District.

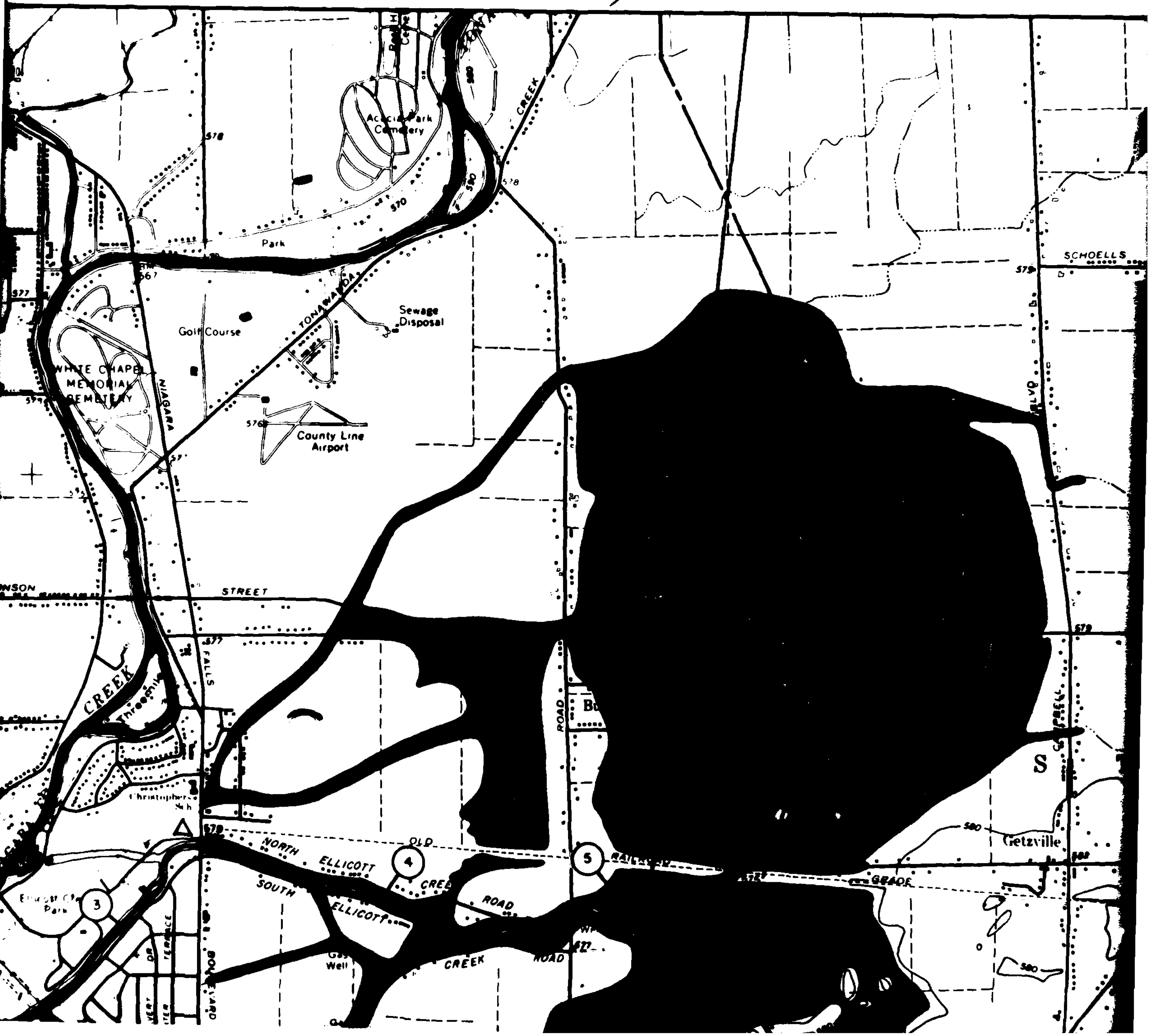
Assistance and cooperation of Federal, State and Local Agencies in supplying useful information is appreciated.

* * *

This report presents the local flood situation caused by Ellicott Creek in the city of Tonawanda, towns of Tonawanda, Amherst, Cheektowaga and Lancaster, all within Erie County, New York. The U. S. Army Engineer District, Buffalo, will provide, upon request, interpretation and limited technical assistance in the application of the data contained in this report, particularly as to its use in developing effective flood plain regulations. After local authorities have selected the flood magnitude or frequency to be used as the basis for regulation, the Corps of Engineers can assist in the selection of floodway limits by providing information on the effects of various widths of floodway on the profile of the selected flood.



Wurlitzer Park Village
Ohio Sch
CENTRAL
NEW YORK
PIONEER RD
Martinsville
Meadow Sch
Senior High Sch
WALCK RD
WALCK ROAD
Payne Park
Junior High Sch
Payne Sch
DIVISION
ERIE
ZIMMERMAN
HAGEN AVE
EAST ROBINSON
ROMBOLD AVE
PARK AVE
NORTH TONAWANDA
WEIGHT AVE
Sweeney Park
City Hall
Spruce Sch
SPRUCE
Park Village
SWEENEY
ROAD
NIAGARA
TONAWANDA
DeGraff Memorial Hospital
TREMONT
EAST NIAGARA ST
NEW YORK CENTRAL
Ellicott Creek Park
NIAGARA RIVER
LITTLE RIVER
Tonawanda Island
FLOW
NIAGARA CO
ERIE CO
Canton Park
WHITE



Acacia Park Cemetery
Park
Golf Course
Sewage Disposal
TONAWANDA
CREEK
WHITE CHAPEL MEMORIAL CEMETERY
NIAGARA
County Line Airport
STREET
SCHOELLS
FALLS
ROAD
Christopher Sch
NORTH ELLICOTT
OLD
SOUTH
ELLICOTT
ROAD
CREEK
Gas Well
GRADE
Getzville
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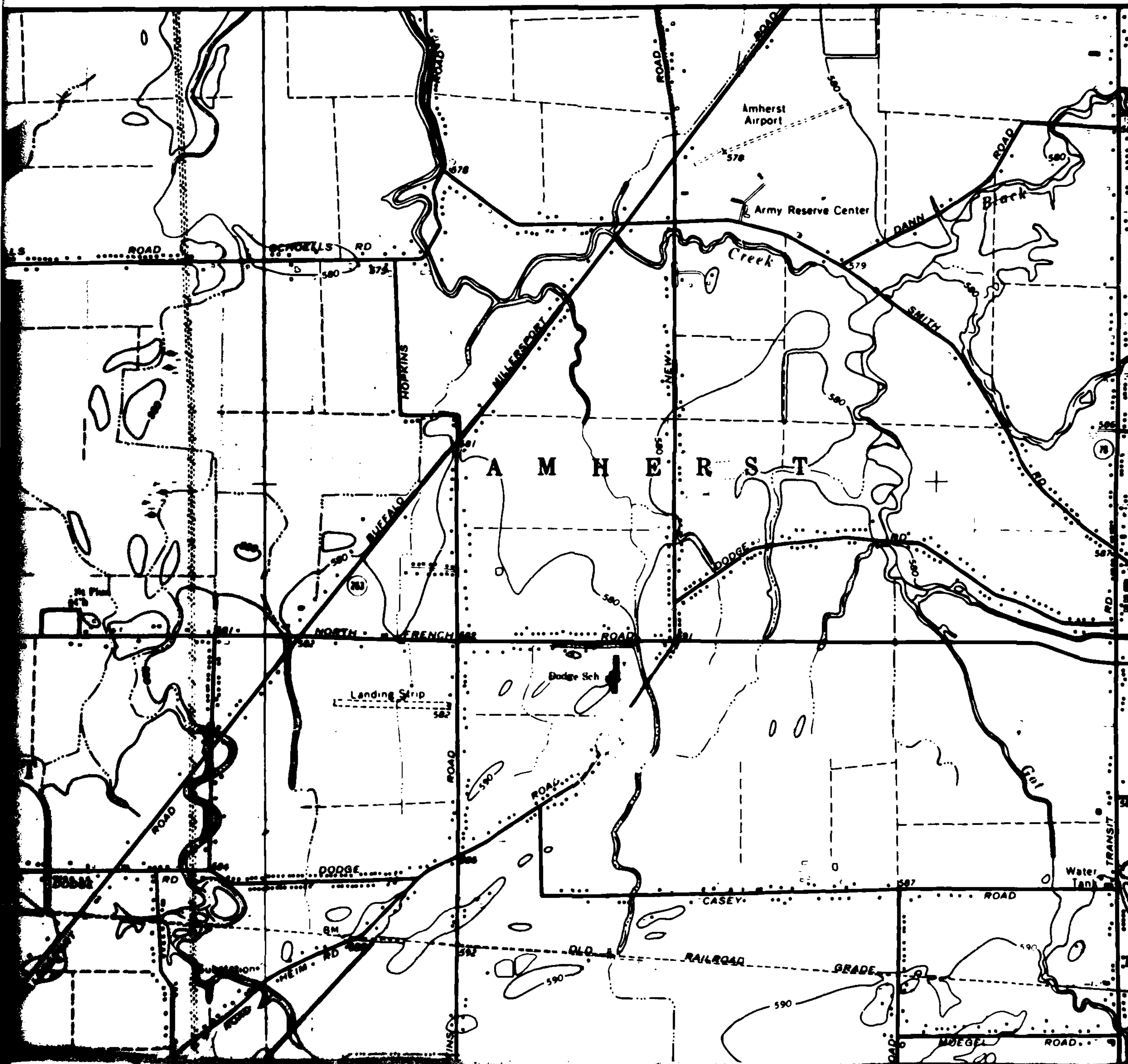
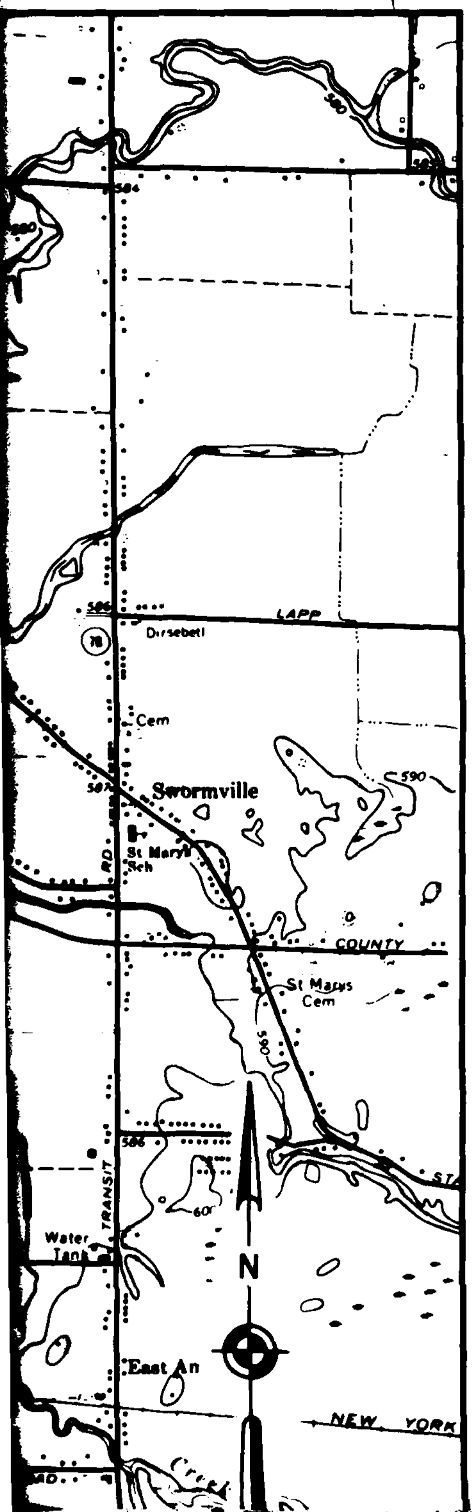
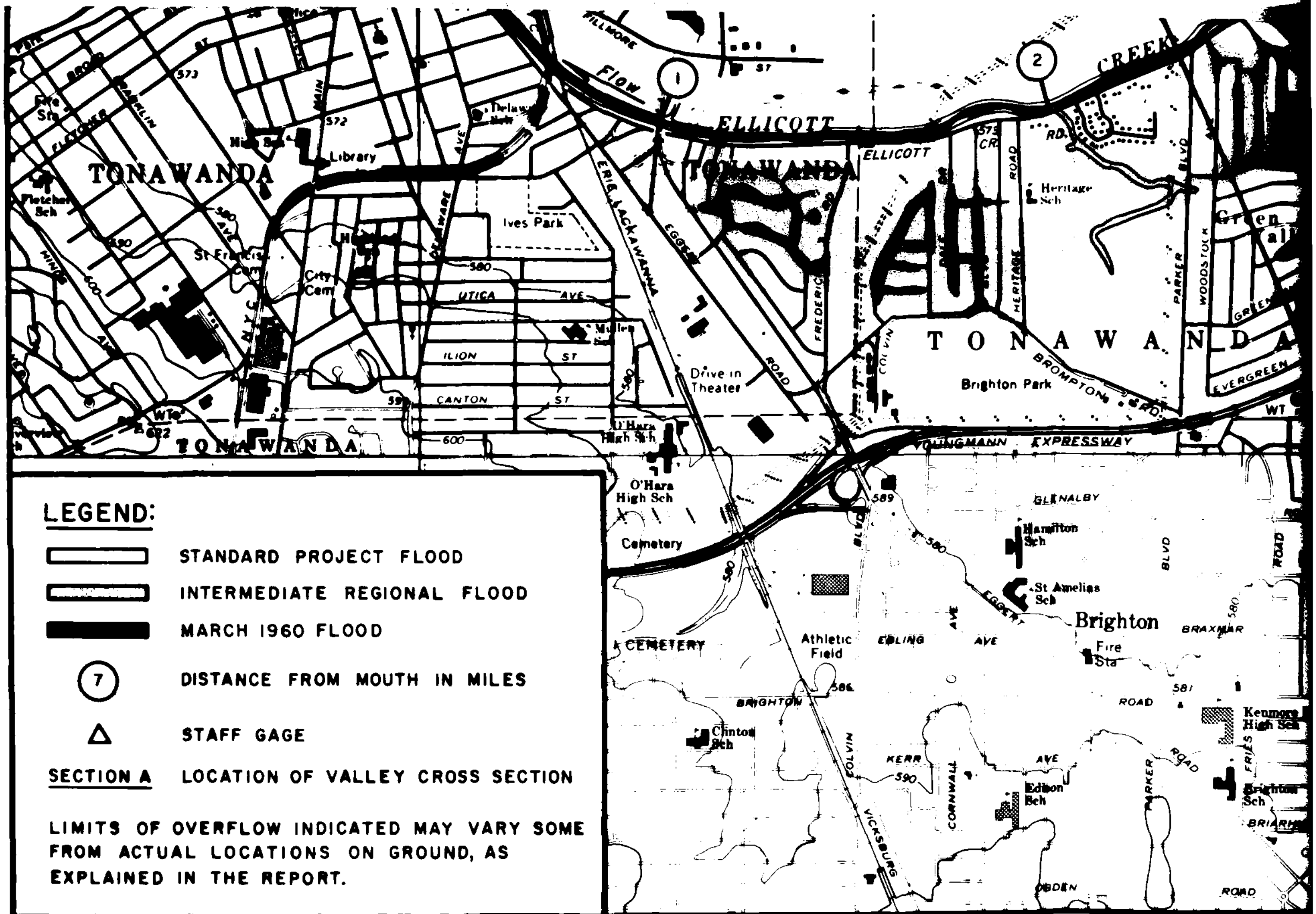
3

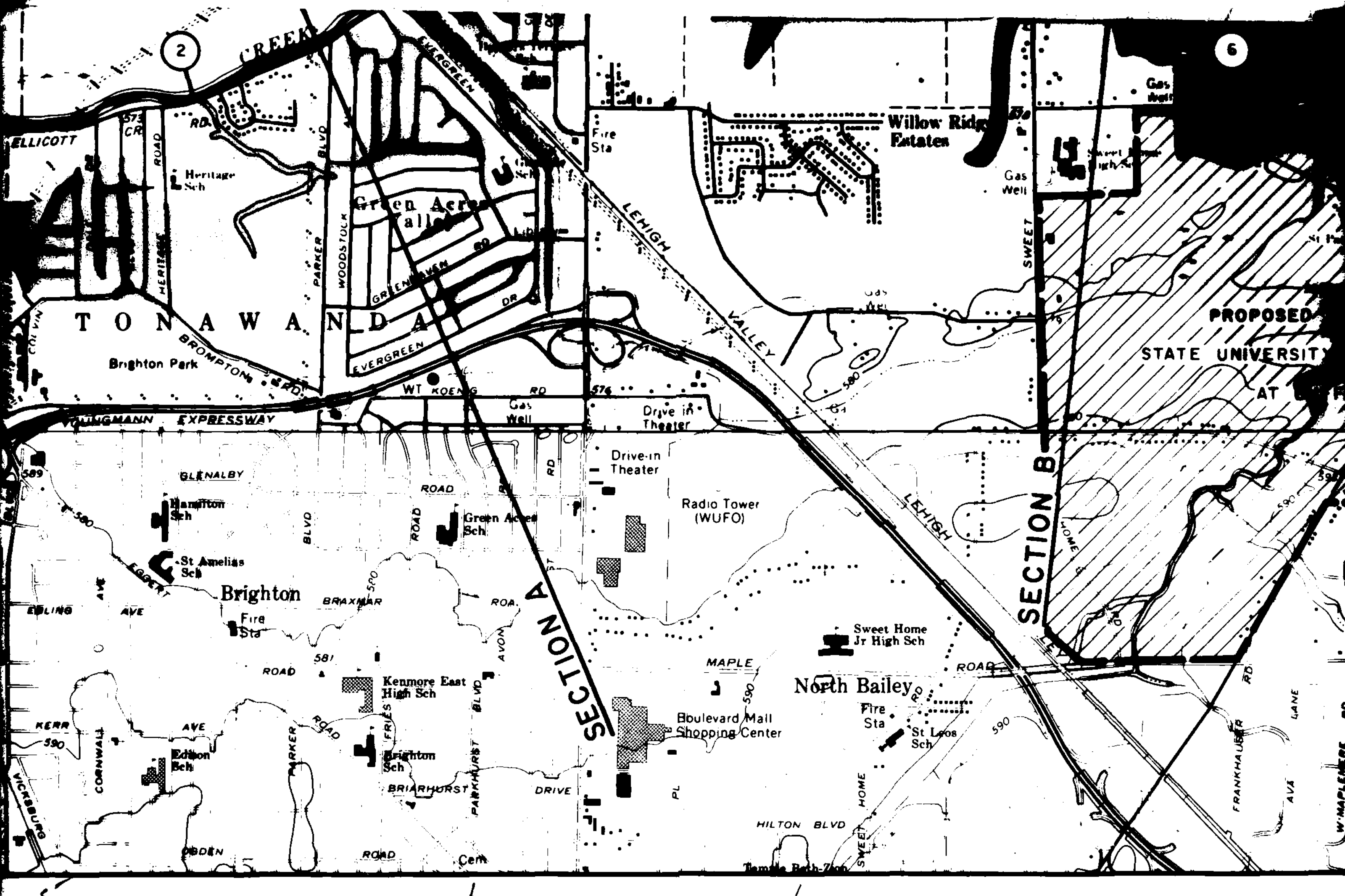


Amherst Airport
Army Reserve Center
A M H E R S T
Black
Creek
DANN ROAD
SMITH RD
SCHOELLS RD
ROAD
HOPKINS
MILLERSPORT
NEW
ROAD
BUFFALO
NORTH FRENCH ROAD
DODGE RD
Dodge Sch
Landing Strip
ROAD
DODGE
CASEY
ROAD
OLD RAILROAD GRADE
ROAD
TRANSIT
Water Tank
Amherst Airport
580
590

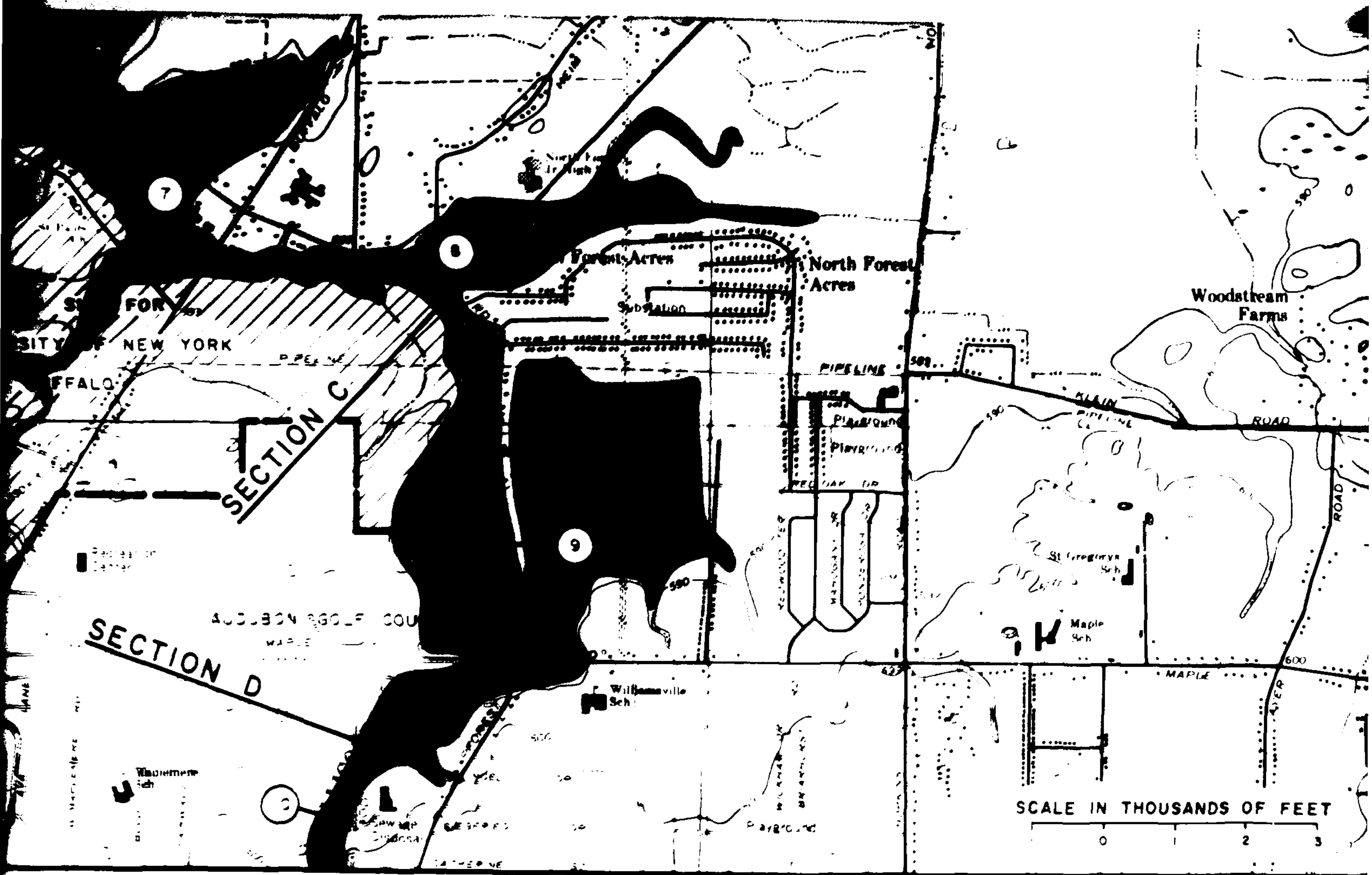


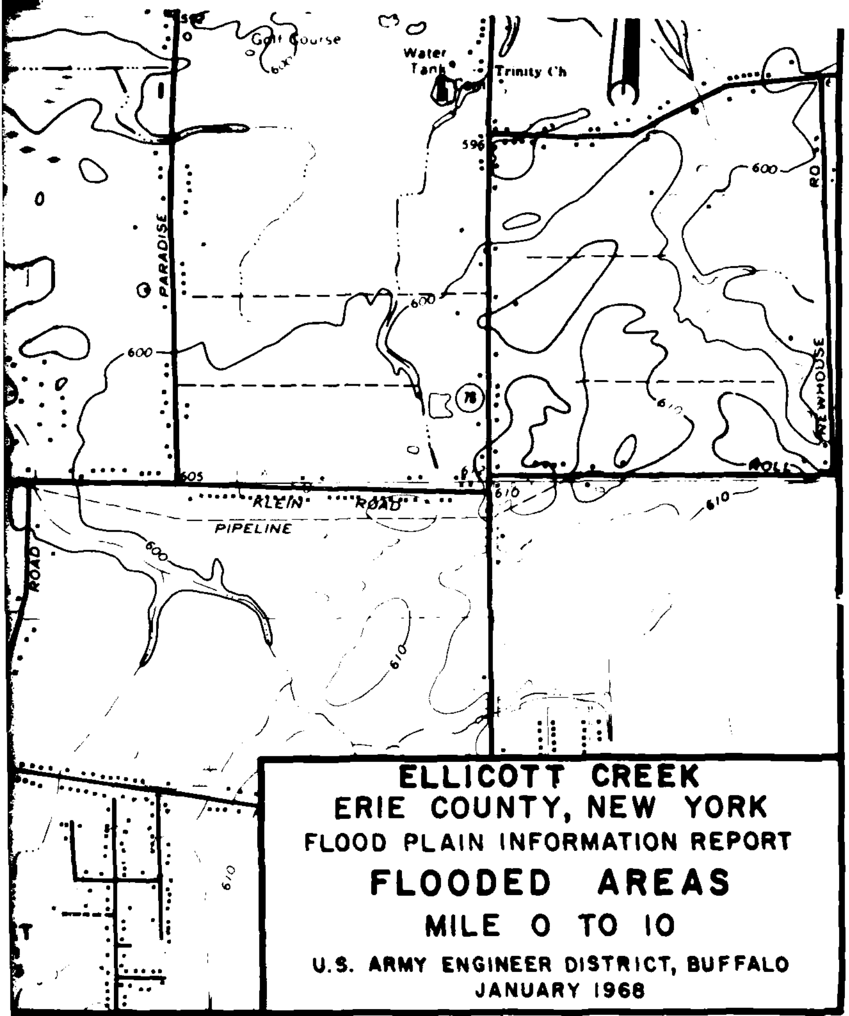
LAPP
Cem
Swormville
St Marys Sch
COUNTY
St Marys Cem
TRANSIT RD.
Water Tank
N
East An
NEW YORK
Creek


LEGEND:
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
MARCH 1960 FLOOD
DISTANCE FROM MOUTH IN MILES
STAFF GAGE
SECTION A LOCATION OF VALLEY CROSS SECTION
LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATIONS ON GROUND, AS EXPLAINED IN THE REPORT.
TONAWANDA
ELLICOTT
CREEK
Flow
FILLMORE
Library
Ives Park
UTICA AVE
ILION ST
CANTON ST
Drive in Theater
O'Hara High Sch
Cemetery
YOUNGMANN EXPRESSWAY
Brighton Park
BROMPTON RD
Heritage Sch
Brighton
Athletic Field
Hamilton Sch
St Amelias Sch
Fire Sta
Clinton Sch
Edison Sch
Kenmore High Sch
Brighton Sch
ERIE LACKAWANNA
EGGERT ROAD
FREDERICK RD
COLVIN BLVD
HERITAGE RD
PARKER BLVD
WOODSTOCK
EVERGREEN
GLENALBY
ERLING AVE
BRIGHTON
KERR AVE
CORNWALL
VICKSBURG
OGDEN
BRAXMAR
CEMETERY
St Francis Cem
City Cem
Fletcher Sch
Fire Sta
580
590
600
573
572
589
581
586



SECTION A
SECTION B
PROPOSED STATE UNIVERSITY AT
TONAWANDA
Brighton
North Bailey
Green Acres Valley
Willow Ridge Estates
Brighton Park
YOUNGMANN EXPRESSWAY
LEHIGH VALLEY
Radio Tower (WUFO)
Boulevard Mall Shopping Center
Drive-in Theater
Sweet Home Jr High Sch
Kenmore East High Sch
Brighton Sch
Edison Sch
Hamilton Sch
St Amelias Sch
Green Acres Sch
Heritage Sch
St Leos Sch
Fire Sta
Gas Well
ELLICOTT CREEK RD
MAPLE ROAD
EGGERT
BRAXMAR
HILTON BLVD
SWEET HOME RD
PARKER BLVD
GLENALBY
KERR AVE
EBLING AVE
BRIARHURST DRIVE
OGDEN ROAD
Cem


North Forest Acres
Forest Acres
Woodstream Farms
SECTION C
SECTION D
SITY OF NEW YORK
FFALO
PIPELINE
KLEIN ROAD
MAPLE
Substation
Playground
Playground
St Gregorys Sch
Maple Sch
Williamsville Sch
Recreation Center
Playground
SCALE IN THOUSANDS OF FEET
0
1
2
3



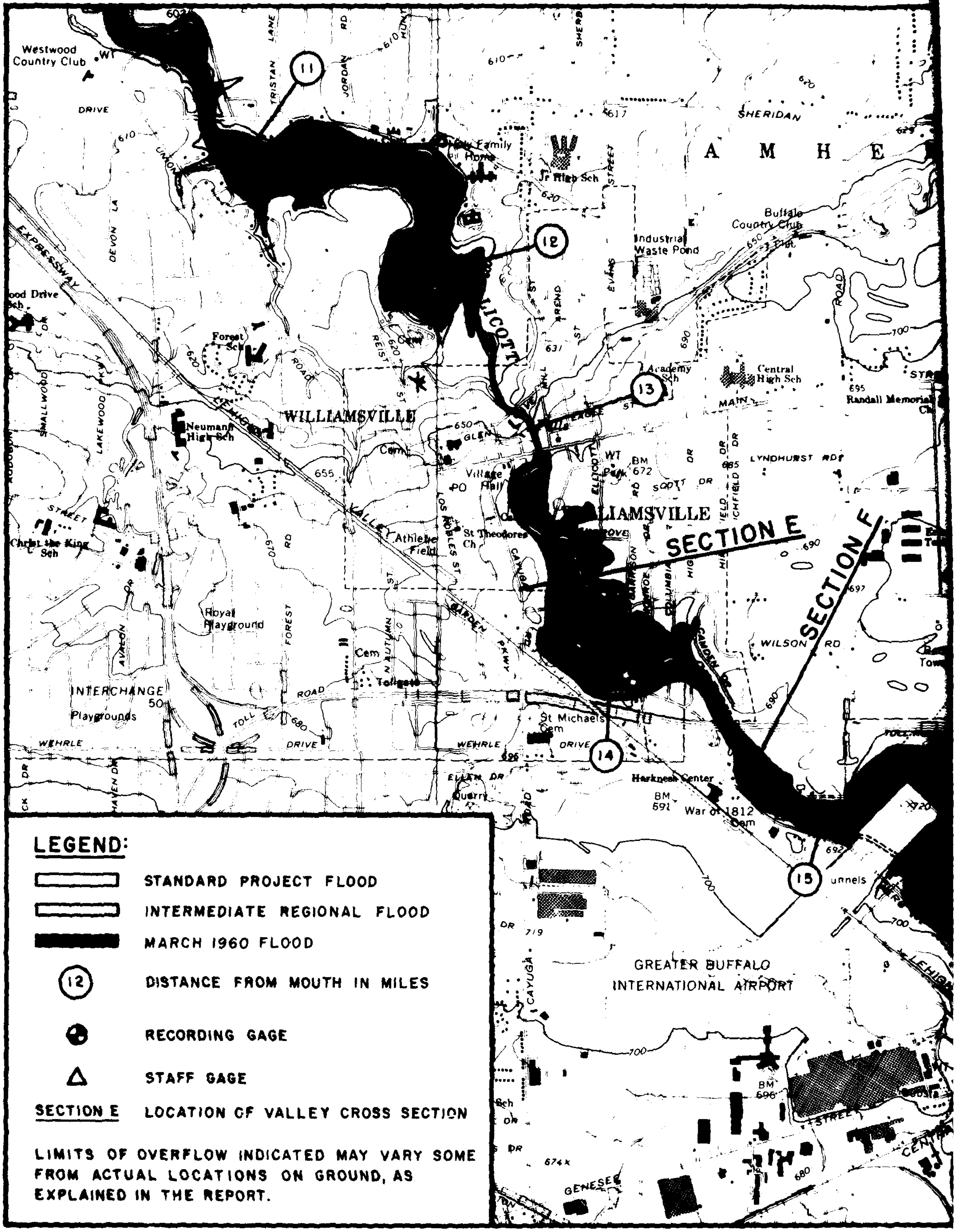
ELLICOTT CREEK
ERIE COUNTY, NEW YORK
FLOOD PLAIN INFORMATION REPORT

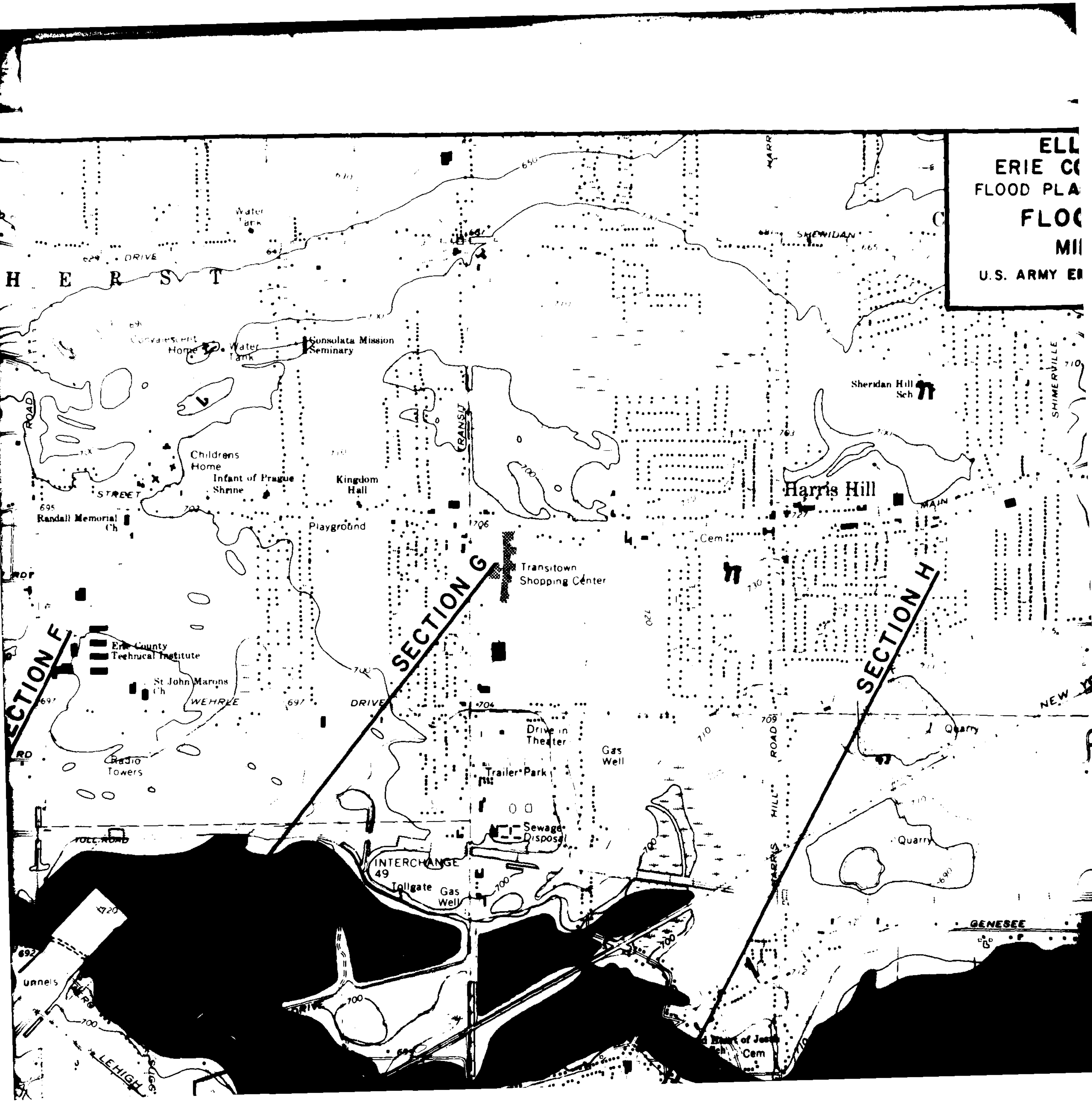
FLOODED AREAS

MILE 0 TO 10

U.S. ARMY ENGINEER DISTRICT, BUFFALO
JANUARY 1968

PLATE 3


LEGEND:
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
MARCH 1960 FLOOD
DISTANCE FROM MOUTH IN MILES
RECORDING GAGE
STAFF GAGE
SECTION E LOCATION OF VALLEY CROSS SECTION
LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATIONS ON GROUND, AS EXPLAINED IN THE REPORT.
Westwood Country Club
WILLIAMSVILLE
SECTION E
SECTION F
Neumann High Sch
Forest Sch
Academy Sch
Central High Sch
Randall Memorial
Industrial Waste Pond
Buffalo Country Club
Jr High Sch
Village Hall
St Theodores Ch
Athletic Field
Royal Playground
INTERCHANGE 50
Playgrounds
Christ the King Sch
St Michaels Cem
Harkness Center
War of 1812 Cem
Quarry
Tollgate
GREATER BUFFALO INTERNATIONAL AIRPORT
SHERIDAN
MAIN
WILSON RD
LYNDHURST RD
WEHRLE DRIVE
EXPRESSWAY
GARDEN PKWY
GENESEE
CAYUGA
11
12
13
14
15


ELL
ERIE C
FLOOD PLA
FLOO
MI
U.S. ARMY E
H E R S T
DRIVE
Water Tank
SHERIDAN
Convalescent Home
Water Tank
Consolata Mission Seminary
ROAD
TRANSIT
Sheridan Hill Sch
SHIMERVILLE
Childrens Home
Infant of Prague Shrine
Kingdom Hall
STREET
Harris Hill
MAIN
Randall Memorial Ch
Playground
Cem
Transitown Shopping Center
SECTION F
SECTION G
SECTION H
Erie County Technical Institute
St John Marons Ch
WEHRLE
DRIVE
Drive in Theater
Gas Well
ROAD
HILL
HARRIS
NEW
Quarry
Radio Towers
Trailer Park
Sewage Disposal
TOLL ROAD
INTERCHANGE 49
Tollgate
Gas Well
Quarry
GENESEE
Tunnels
LEHIGH
Cem

ELLICOTT CREEK
ERIE COUNTY, NEW YORK
FLOOD PLAIN INFORMATION REPORT

FLOODED AREAS
MILE 10 TO 22

U.S. ARMY ENGINEER DISTRICT, BUFFALO

JANUARY 1968

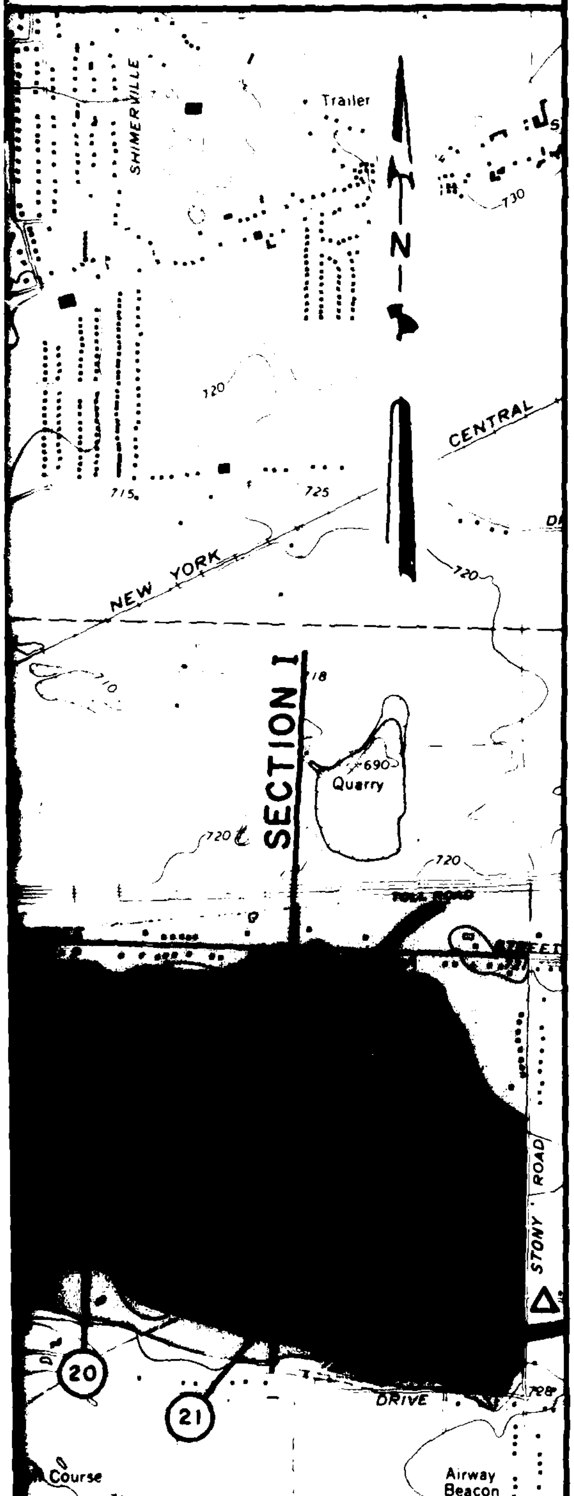
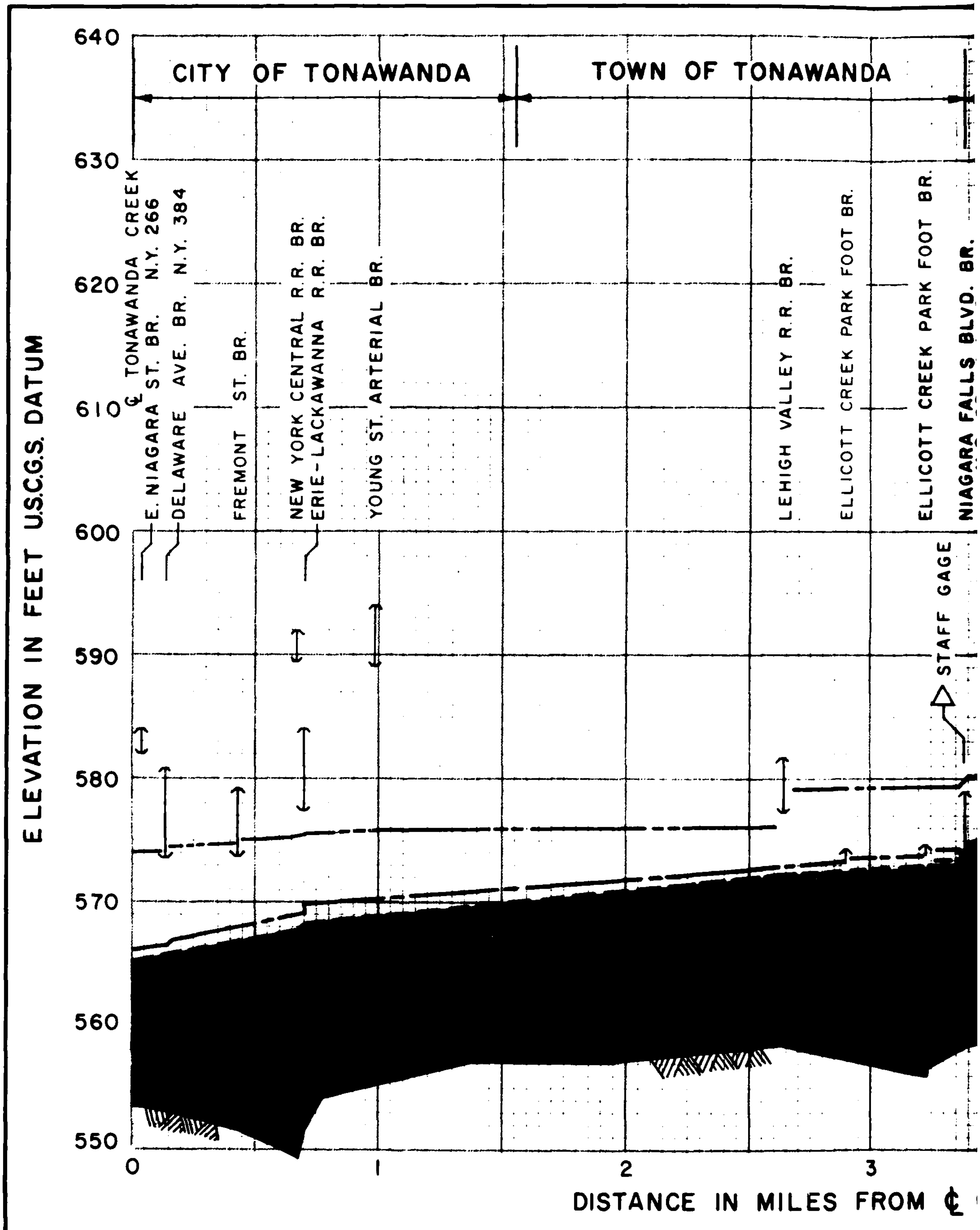
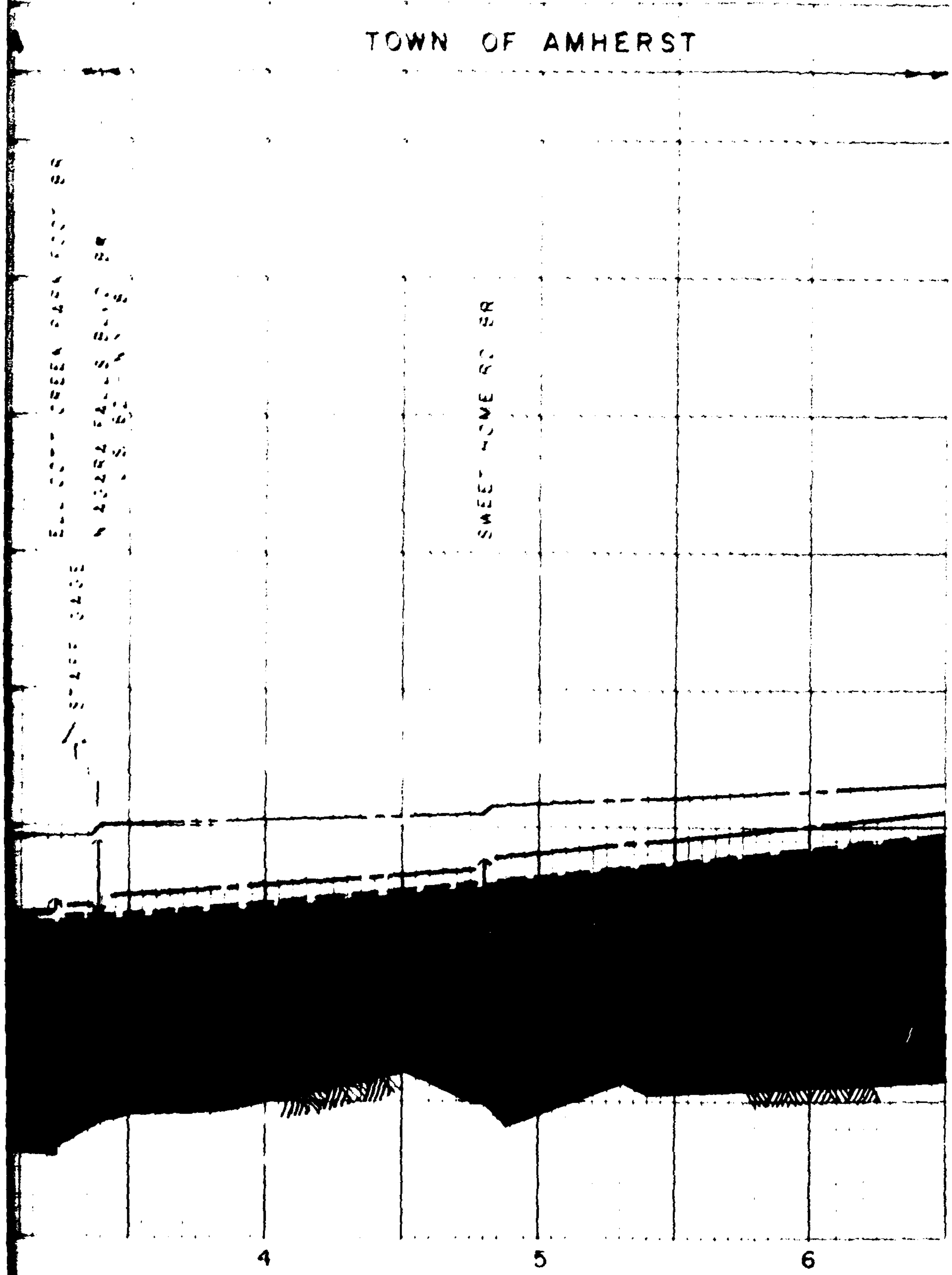


PLATE 4


CITY OF TONAWANDA
TOWN OF TONAWANDA
ELEVATION IN FEET U.S.C.G.S. DATUM
640
630
620
610
600
590
580
570
560
550
℄ TONAWANDA CREEK
E. NIAGARA ST. BR. N.Y. 266
DELAWARE AVE. BR. N.Y. 384
FREMONT ST. BR.
NEW YORK CENTRAL R.R. BR.
ERIE-LACKAWANNA R.R. BR.
YOUNG ST. ARTERIAL BR.
LEHIGH VALLEY R.R. BR.
ELLICOTT CREEK PARK FOOT BR.
ELLICOTT CREEK PARK FOOT BR.
NIAGARA FALLS BLVD. BR.
STAFF GAGE
0
1
2
3
DISTANCE IN MILES FROM ℄



OM ¢ OF TONAWANDA CREEK

LEGEND

STAFF GAGE LOC
ABUTMENT DOWN
OF NIAGARA FAL
BRIDGE. ZERO OF
EQUALS 564.98
DATUM.

STANDARD PROJEC
INTERMEDIATE RE
MARCH 1960 FLOO
APPROXIMATE STRE
APPROXIMATE FLOO
APPROXIMATE LOW

NOTES

CREST PROFILES ARE BAS
FOLLOWING:
1. EXISTING CHANNEL COI
2. EXISTING STRUCTURES
3. EXISTING CONDITIONS (
LARGE SCALE FILLING WI
PROFILES UNLESS SUFFICIENT
PROVIDED.

ELLICOTT C
ERIE COUNTY, N
FLOOD PLAIN INFORM
PROFIL
MILE 0 TO
U.S. ARMY ENGINEER DIST
JANUARY 19

AGE LOCATED ON RIGHT
T DOWNSTREAM SIDE
ARA FALLS BOULEVARD
ZERO OF STAFF GAGE
564.98 U.S.C.G.S.

D PROJECT FLOOD

DIATE REGIONAL FLOOD

960 FLOOD

ATE STREAM BED

ATE FLOOR ELEVATION

ATE LOW STEEL ELEVATION

ARE BASED ON THE

NEL CONDITIONS
CTURES
ITIONS OF DEVELOPMENT
LING WILL RAISE THE
FICIENT FLOODWAY IS

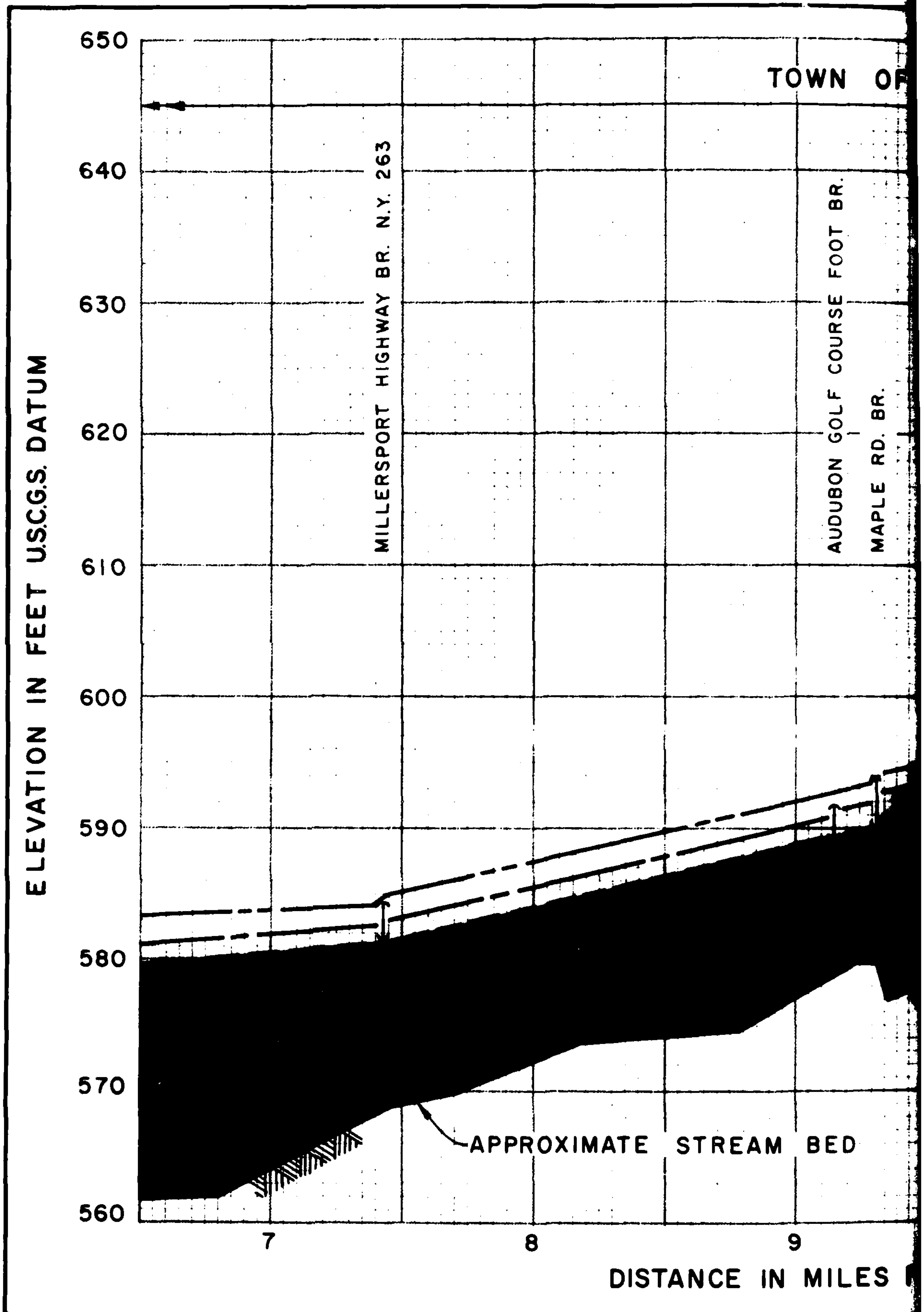
TT CREEK
TY, NEW YORK
FORMATION REPORT

OFILES

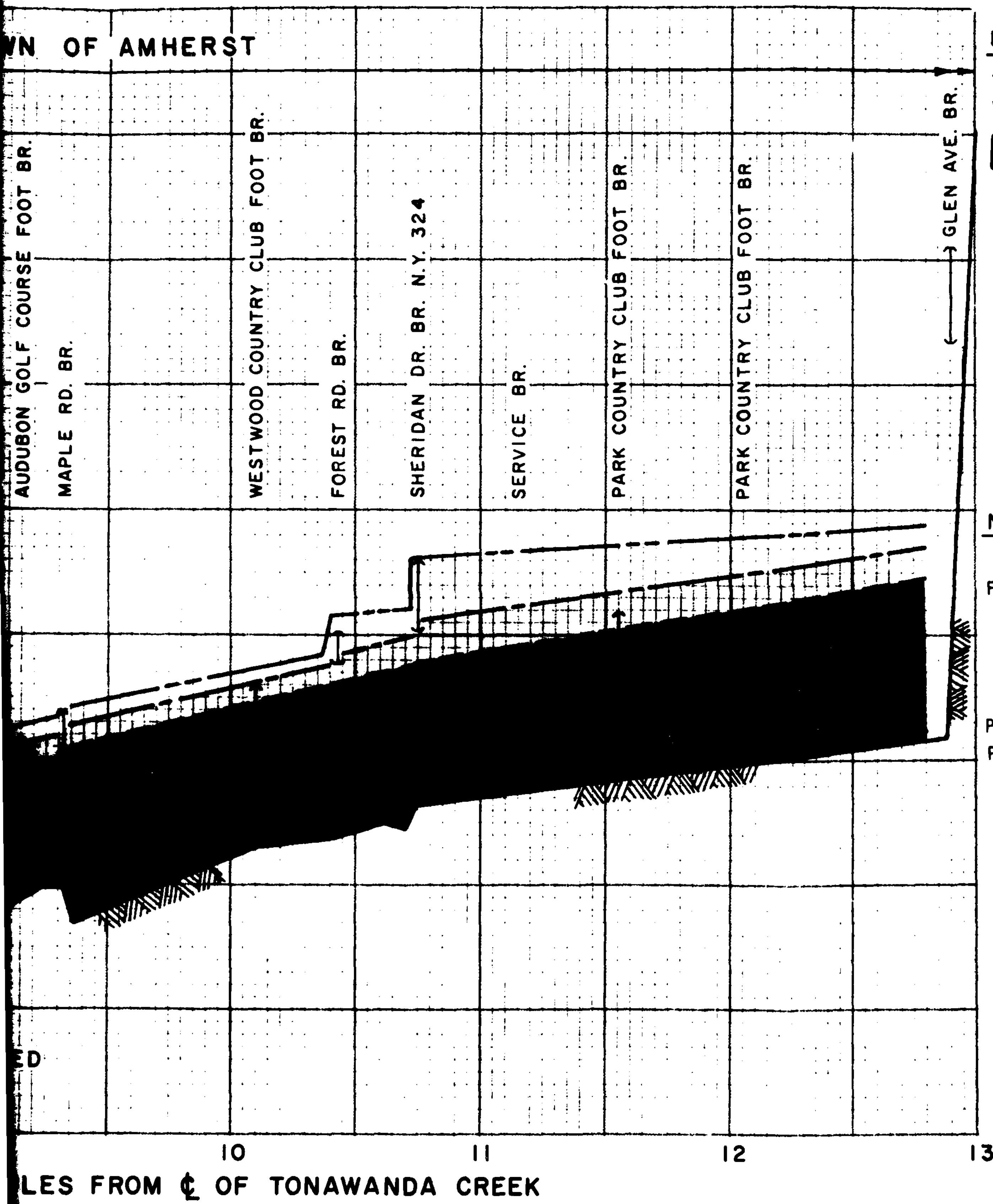
D TO 6.5

R DISTRICT, BUFFALO
ARY 1968

PLATE 5



TOWN OF
ELEVATION IN FEET U.S.C.G.S. DATUM
650
640
630
620
610
600
590
580
570
560
MILLERSPORT HIGHWAY BR. N.Y. 263
AUDUBON GOLF COURSE FOOT BR.
MAPLE RD. BR.
APPROXIMATE STREAM BED
7
8
9
DISTANCE IN MILES



LEGEND:

STAN
INTE
MARG
APPR
APPR
APPR

NOTES:

CREST PROFI
FOLLOWING:
1. EXISTING
2. EXISTING
3. EXISTING
LARGE SCALE
PROFILES UNLESS
PROVIDED.

ELL
ERIE C
FLOOD PLA

MILE
U.S. ARMY

D:

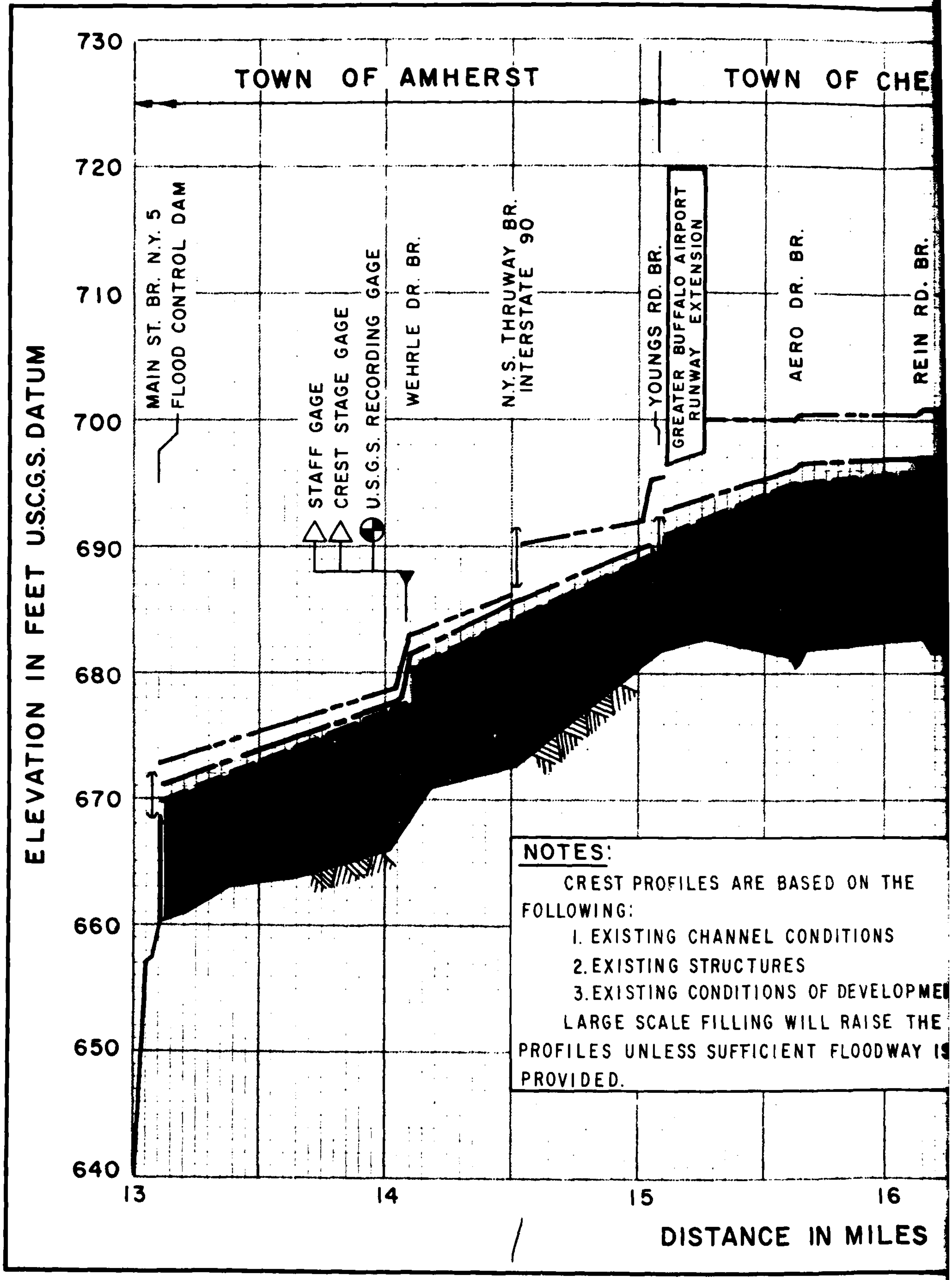
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
MARCH 1960 FLOOD
APPROXIMATE STREAM BED
APPROXIMATE FLOOR ELEVATION

APPROXIMATE LOW STEEL ELEVATION

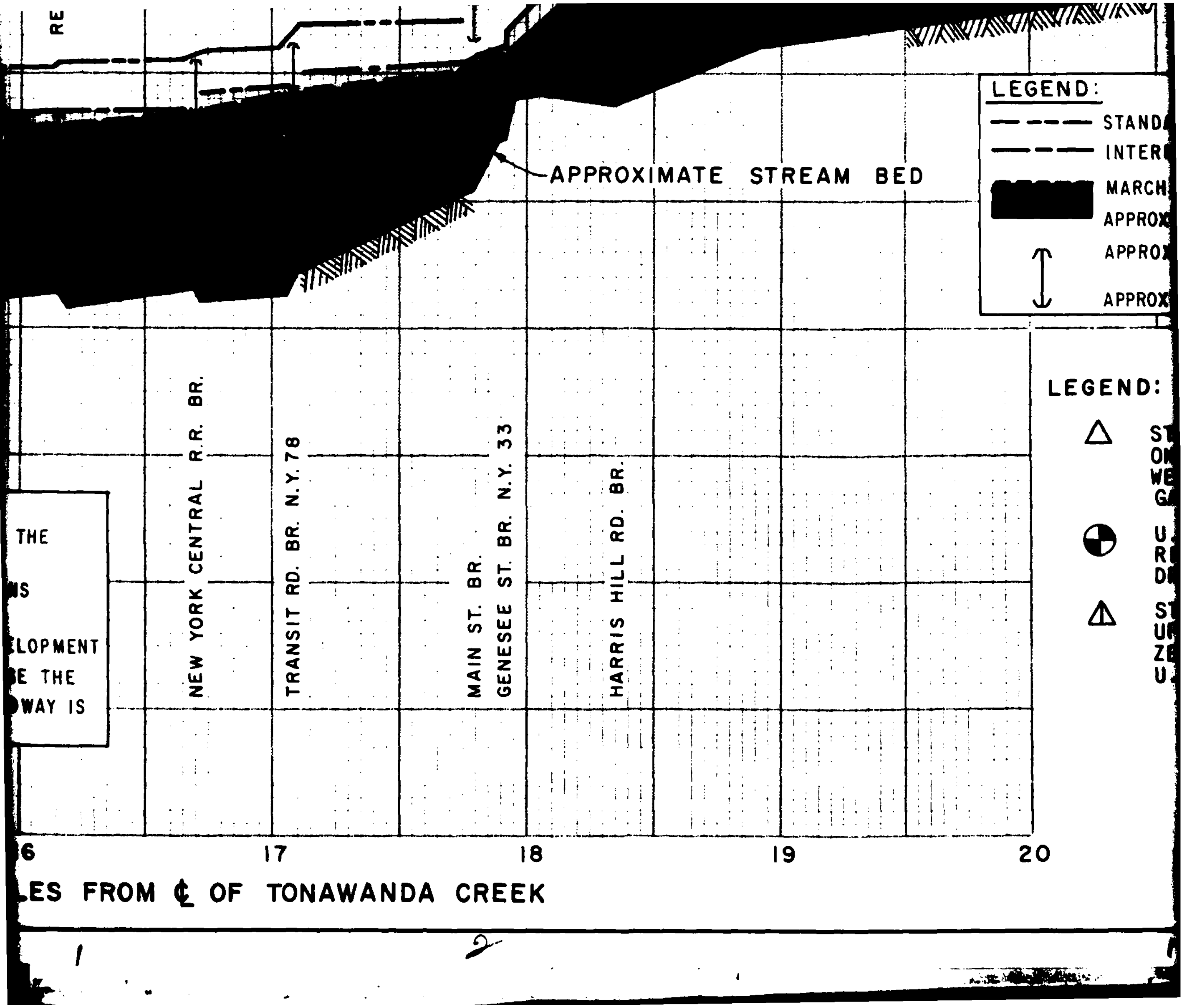
T PROFILES ARE BASED ON THE
G:
ISTING CHANNEL CONDITIONS.
ISTING STRUCTURES
ISTING CONDITIONS OF DEVELOPMENT
E SCALE FILLING WILL RAISE THE
UNLESS SUFFICIENT FLOODWAY IS
.

ELLICOTT CREEK
RIE COUNTY, NEW YORK
D PLAIN INFORMATION REPORT
PROFILES
MILE 6.5 TO 13.0
ARMY ENGINEER DISTRICT, BUFFALO
JANUARY 1968

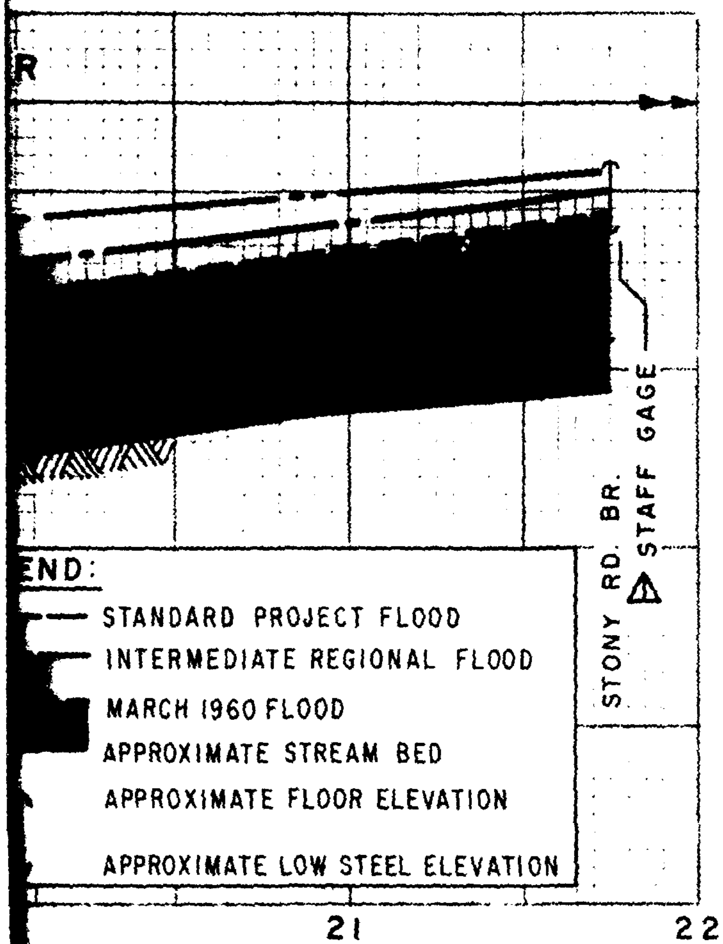
PLATE 6



TOWN OF AMHERST
TOWN OF CHE
MAIN ST. BR. N.Y. 5
FLOOD CONTROL DAM
STAFF GAGE
CREST STAGE GAGE
U.S.G.S. RECORDING GAGE
WEHRLE DR. BR.
N.Y.S. THRUWAY BR.
INTERSTATE 90
YOUNGS RD. BR.
GREATER BUFFALO AIRPORT
RUNWAY EXTENSION
AERO DR. BR.
REIN RD. BR.
ELEVATION IN FEET U.S.C.G.S. DATUM
730
720
710
700
690
680
670
660
650
640
13
14
15
16
DISTANCE IN MILES
NOTES:
CREST PROFILES ARE BASED ON THE FOLLOWING:
1. EXISTING CHANNEL CONDITIONS
2. EXISTING STRUCTURES
3. EXISTING CONDITIONS OF DEVELOPME
LARGE SCALE FILLING WILL RAISE THE PROFILES UNLESS SUFFICIENT FLOODWAY I PROVIDED.



RE
APPROXIMATE STREAM BED
LEGEND:
STAND
INTER
MARCH
APPROX
APPROX
APPROX
LEGEND:
THE
NS
LOPMENT
E THE
WAY IS
NEW YORK CENTRAL R.R. BR.
TRANSIT RD. BR. N.Y. 78
MAIN ST. BR.
GENESEE ST. BR. N.Y. 33
HARRIS HILL RD. BR.
6
17
18
19
20
LES FROM ℄ OF TONAWANDA CREEK



EGEND:

△ STAFF AND CREST STAGE GAGE LOCATED ON RIGHT BANK DOWNSTREAM SIDE OF WEHRLE DRIVE BRIDGE ZERO OF STAFF GAGE EQUALS 668.92 U.S.C.G.S. DATUM.

⊕ U.S.G.S. RECORDING GAGE LOCATED ON RIGHT BANK DOWNSTREAM SIDE OF WEHRLE DRIVE BRIDGE.

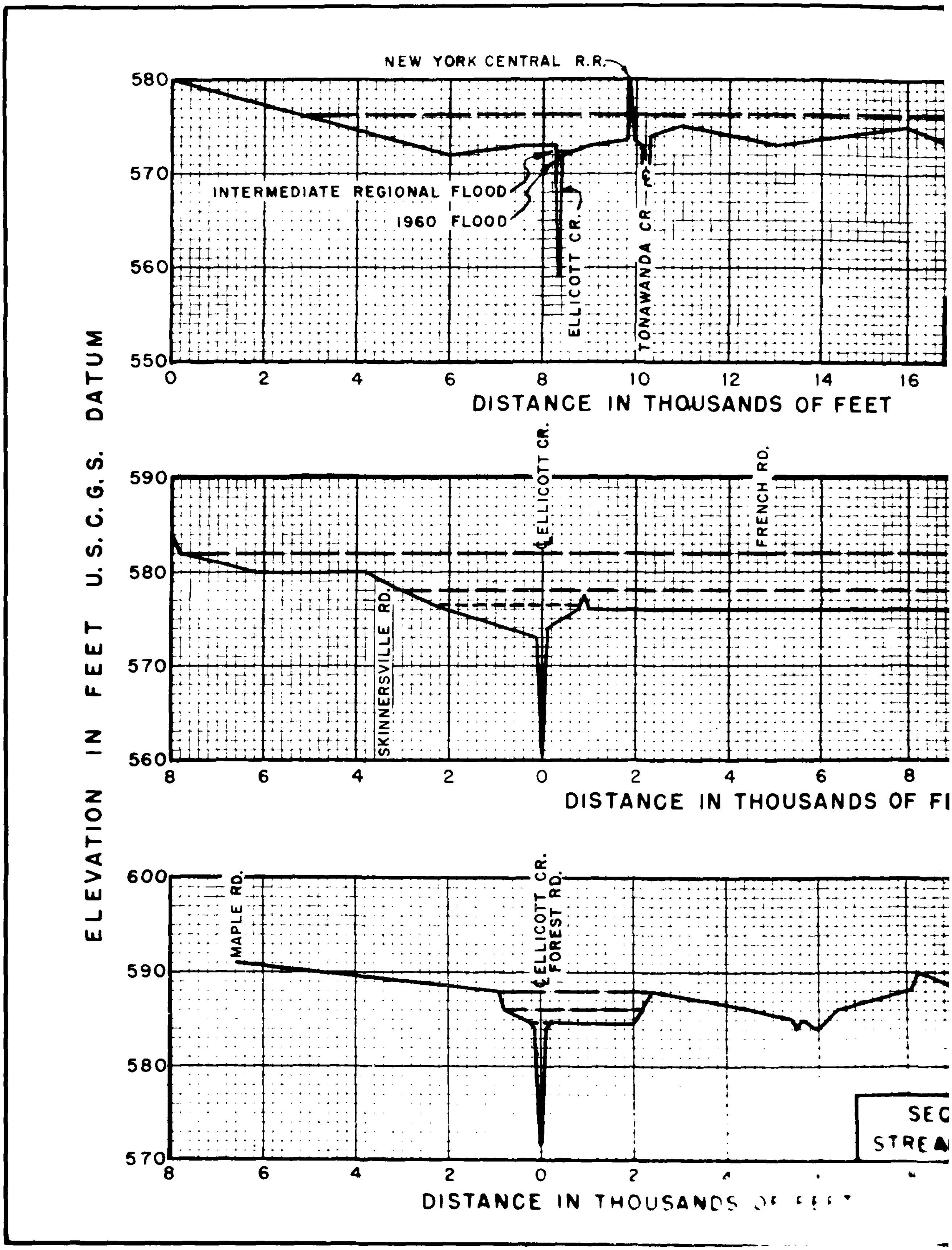
⚠ STAFF GAGE LOCATED ON RIGHT ABUTMENT UPSTREAM SIDE OF STONY ROAD BRIDGE. ZERO OF STAFF GAGE EQUALS 710.54 U.S.C.G.S. DATUM.

ELLICOTT CREEK
ERIE COUNTY, NEW YORK
FLOOD PLAIN INFORMATION REPORT

PROFILES
MILE 13.0 TO 22.0

U.S. ARMY ENGINEER DISTRICT, BUFFALO
JANUARY 1966

1 3 PLATE 7



ELEVATION IN FEET U.S.C.G.S. DATUM
NEW YORK CENTRAL R.R.
INTERMEDIATE REGIONAL FLOOD
1960 FLOOD
ELLICOTT CR.
TONAWANDA CR.
580
570
560
550
0
2
4
6
8
10
12
14
16
DISTANCE IN THOUSANDS OF FEET
ELLICOTT CR.
FRENCH RD.
SKINNERSVILLE RD.
590
580
570
560
8
6
4
2
0
2
4
6
8
DISTANCE IN THOUSANDS OF FI
MAPLE RD.
ELLICOTT CR.
FOREST RD.
600
590
580
570
8
6
4
2
0
2
SEC
STREA
DISTANCE IN THOUSANDS

AD-A101 232 CORPS OF ENGINEERS BUFFALO N Y BUFFALO DISTRICT F/G 8/8
FLOOD PLAIN INFORMATION, ELLICOTT CREEK IN THE CITY OF TONAWAND--ETC(U)
JUN 71

UNCLASSIFIED NL

2 OF 2

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DATE FILMED
7-81
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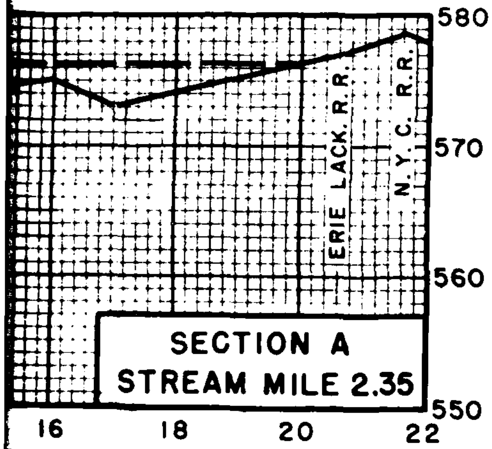


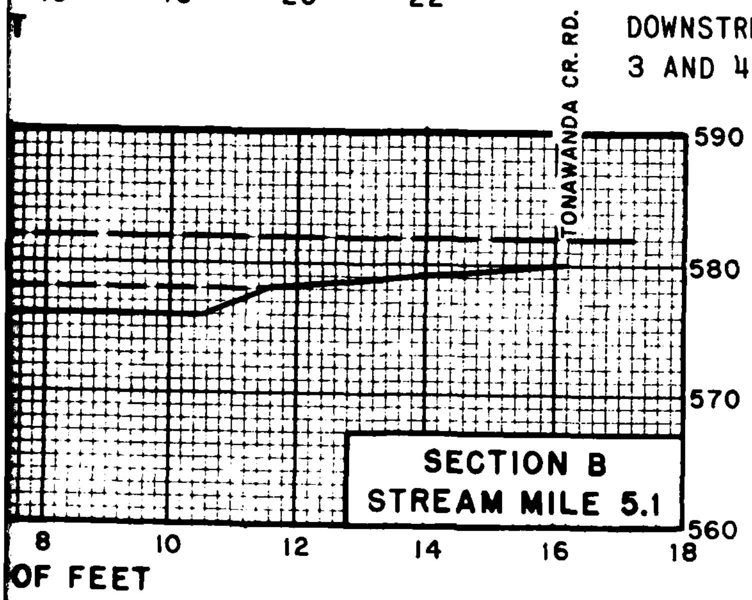
LEGEND

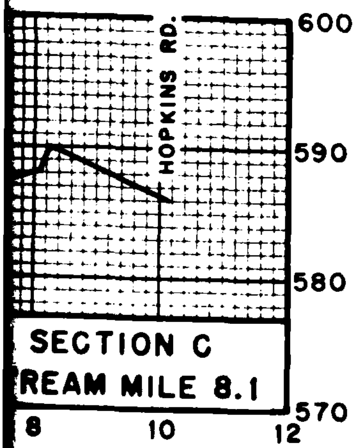
- STANDARD PROJECT FLOOD
- INTERMEDIATE REGIONAL FLOOD
- MARCH 1960 FLOOD

NOTES:

VALLEY CROSS SECTIONS ARE BASED ON ACTUAL FIELD SURVEYS AND U.S. GEOLOGICAL QUADRANGLE MAPS.

VALLEY CROSS SECTIONS ARE LOOKING DOWNSTREAM AND ARE LOCATED ON PLATES 3 AND 4.

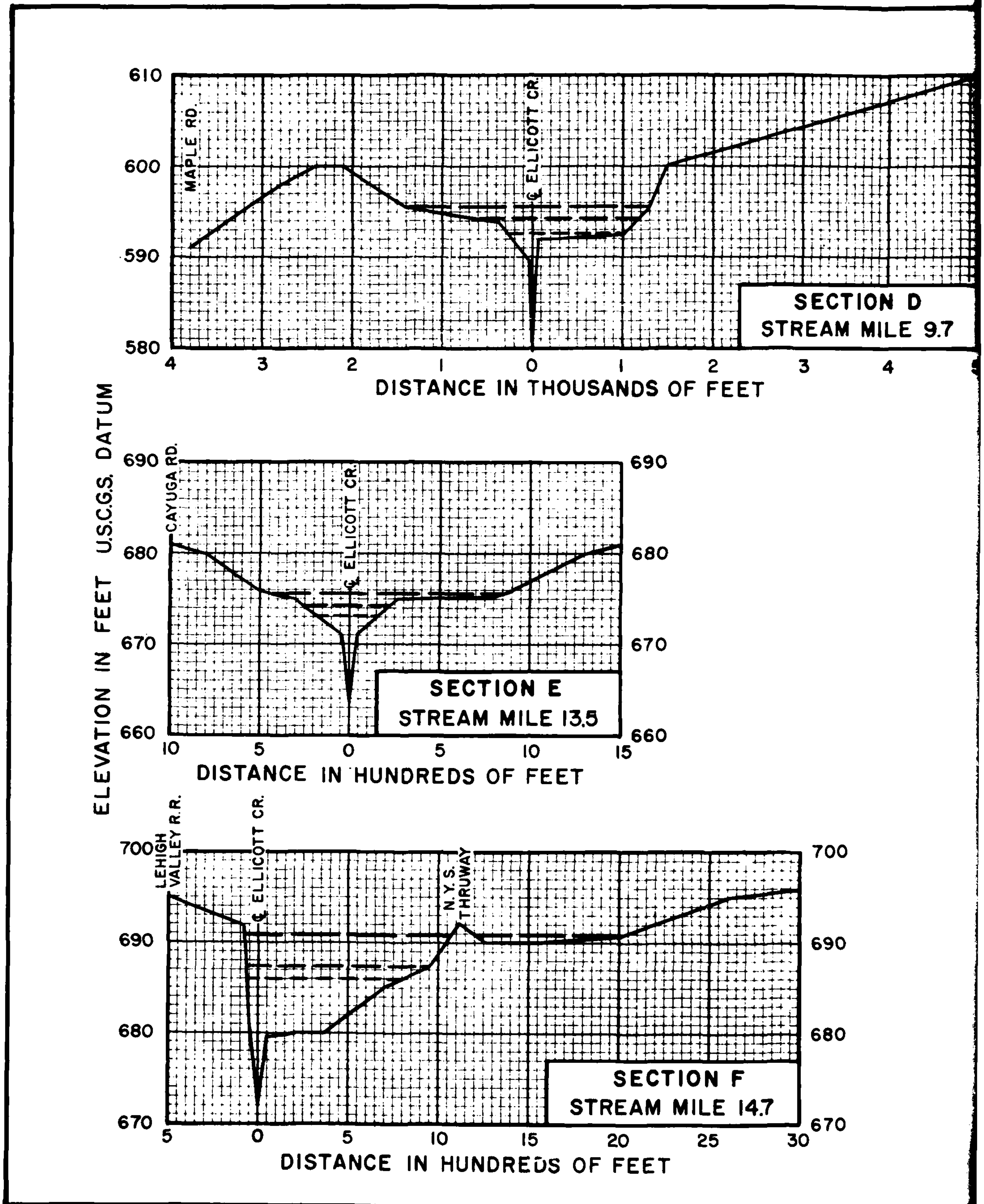




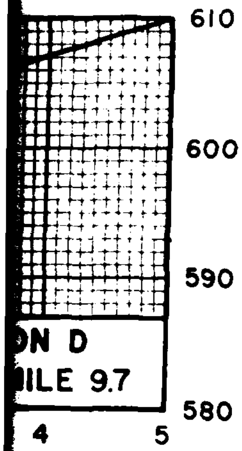
ELLICOTT CREEK
ERIE COUNTY, NEW YORK
FLOOD PLAIN INFORMATION REPORT

VALLEY CROSS SECTIONS
A, B, AND C

U.S. ARMY ENGINEER DISTRICT, BUFFALO
JANUARY 1968



ELEVATION IN FEET U.S.C.G.S. DATUM
MAPLE RD.
℄ ELLICOTT CR.
SECTION D
STREAM MILE 9.7
DISTANCE IN THOUSANDS OF FEET
CAYUGA RD.
℄ ELLICOTT CR.
SECTION E
STREAM MILE 13.5
DISTANCE IN HUNDREDS OF FEET
LEHIGH VALLEY R.R.
℄ ELLICOTT CR.
N.Y.S. THRUWAY
SECTION F
STREAM MILE 14.7
DISTANCE IN HUNDREDS OF FEET



LEGEND:

— — STANDARD PROJECT FLOOD

— — — INTERMEDIATE REGIONAL FLOOD

– – – – – MARCH 1960 FLOOD

NOTES:

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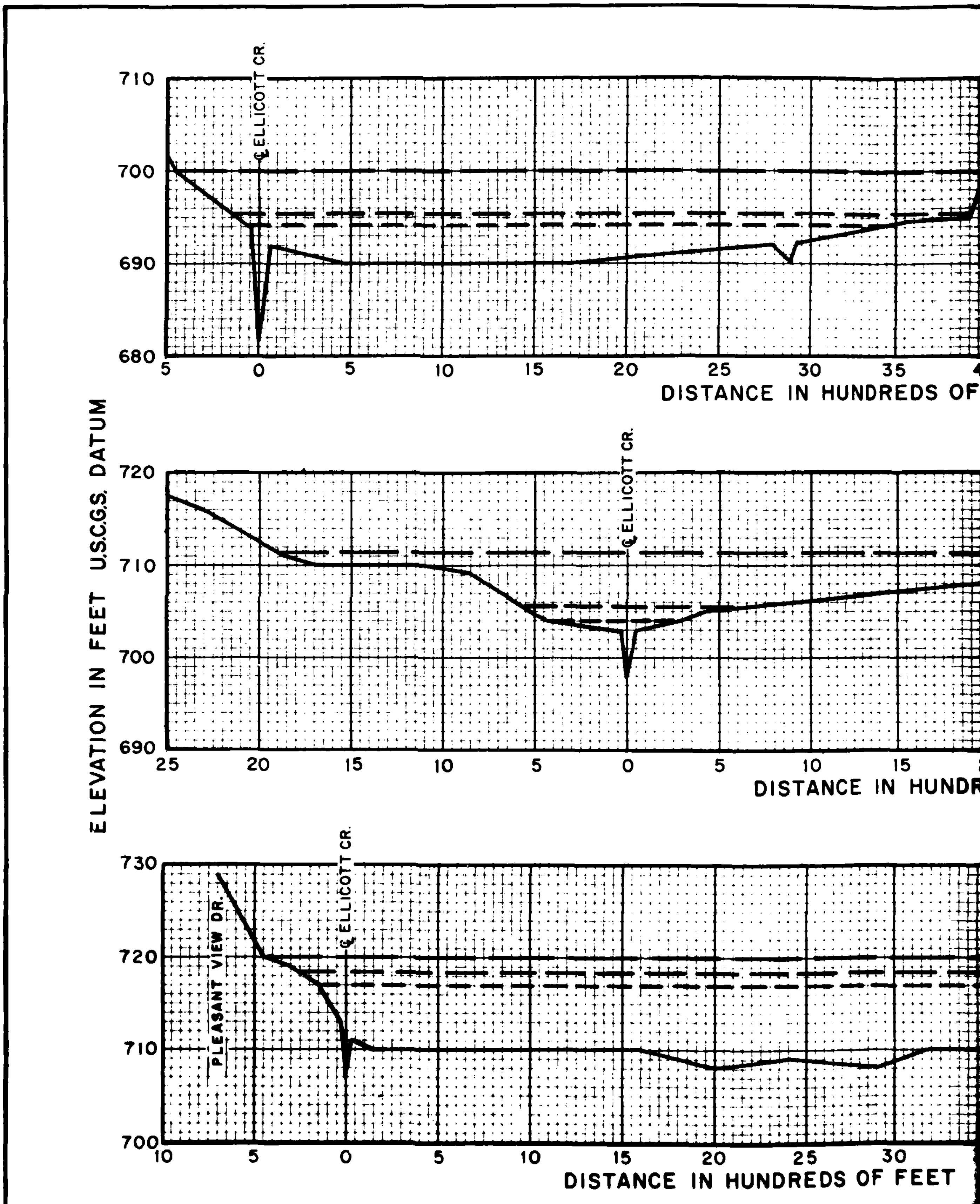
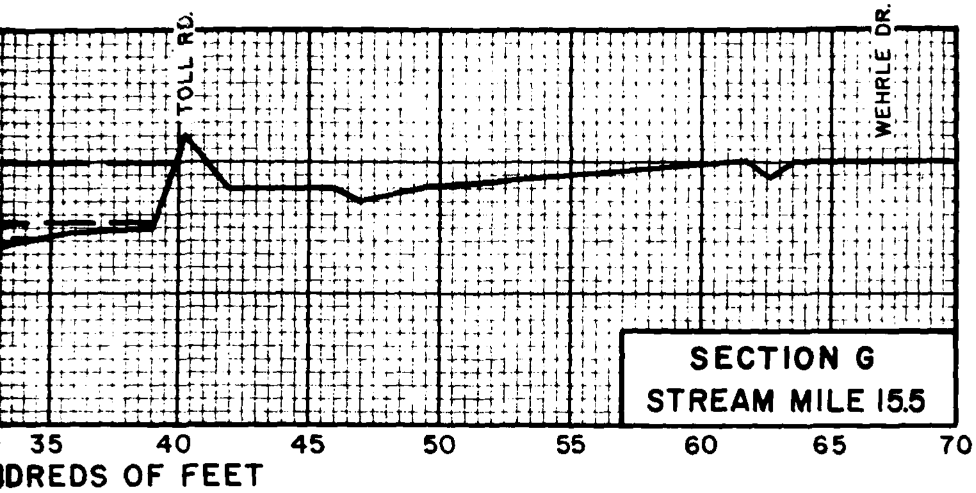
ELLICOTT CREEK
ERIE COUNTY, NEW YORK
FLOOD PLAIN INFORMATION REPORT

VALLEY CROSS SECTIONS
D, E, AND F

U.S. ARMY ENGINEER DISTRICT, BUFFALO
JANUARY 1968



ELEVATION IN FEET U.S.C.G.S. DATUM
℄ ELLICOTT CR.
710
700
690
680
5
0
5
10
15
20
25
30
35
DISTANCE IN HUNDREDS OF
℄ ELLICOTT CR.
720
710
700
690
25
20
15
10
5
0
5
10
15
DISTANCE IN HUNDR
PLEASANT VIEW DR.
℄ ELLICOTT CR.
730
720
710
700
10
5
0
5
10
15
20
25
30
DISTANCE IN HUNDREDS OF FEET



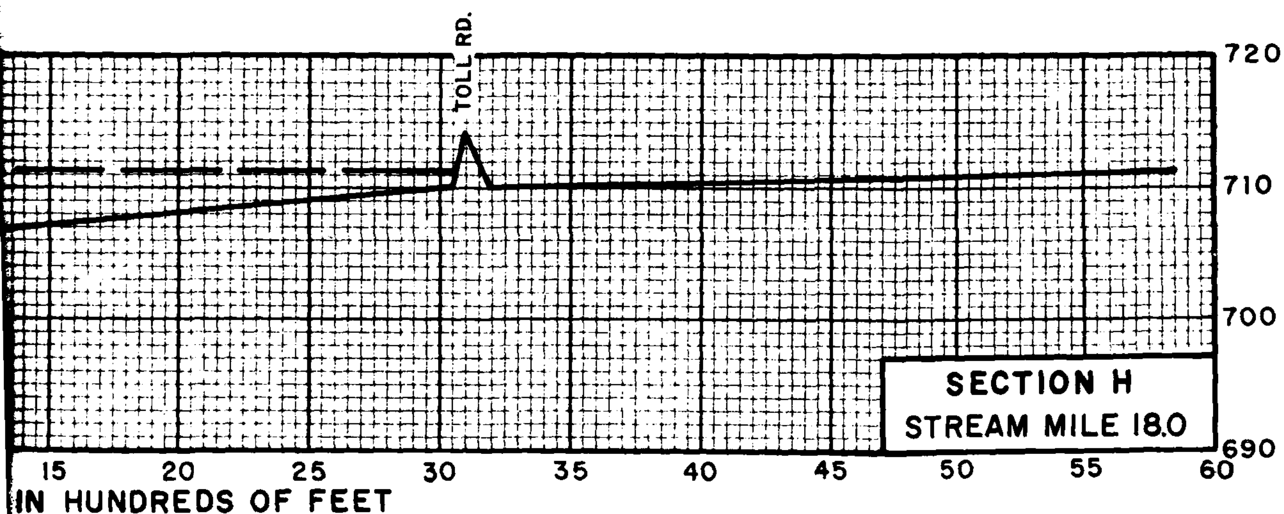
LEGEND:

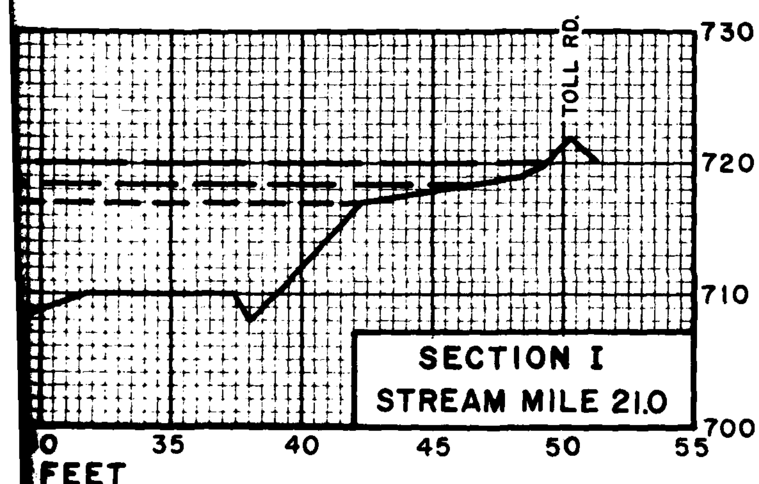
- STANDARD PROJECT FLOOD
- INTERMEDIATE REGIONAL
- MARCH 1960 FLOOD

NOTES:

VALLEY CROSS SECTIONS ARE BASE ACTUAL FIELD SURVEYS AND U.S. GEOL CAL QUADRANGLE MAPS.

VALLEY CROSS SECTIONS ARE LOOK DOWNSTREAM AND ARE LOCATED ON PLAT 3 AND 4.





ELLICOTT CREEK
ERIE COUNTY, NEW YOR
FLOOD PLAIN INFORMATION REP
VALLEY CROSS SECTIO
G, H, AND I
U.S. ARMY ENGINEER DISTRICT, BUF
JANUARY 1968

PL

2

FLOOD
IONAL FLOOD

E BASED ON
. GEOLOGI-

E LOOKING
N PLATES

EEK
W YORK
ON REPORT
ECTIONS

T, BUFFALO

PLATE 10 3