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NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. LOWER FULTON DAM (GRANBY)(INVENTOR--ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

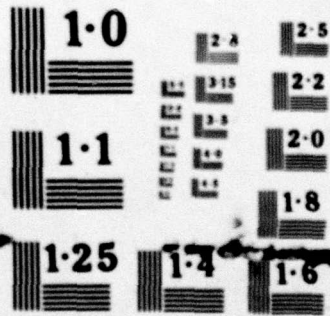
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OSWEGO RIVER BASIN

LOWER FULTON DAM (GRANBY)

OSWEGO COUNTY
NEW YORK

INVENTORY NO NY 406

11 28 Sep 79

(10) John B. / Stetson

(12) 171

(15) DACW51-79-C-0001

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM.

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Lower Fulton Dam (Granby) (Inventory Number NY 406). Oswego River Basin, Oswego County, New York. Phase I Inspection Report.

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NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1979

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.		

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Additional structural investigations should be initiated and completed within one year concerning the stability and through-the-dam seepage. The remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified:

1. Repair the spillway slab and verify the structural integrity of the spillway section.
2. Investigate the interior of the dam to evaluate the condition of the old masonry dam, to refine the stability analysis and to evaluate the severity of through-the-dam seepage.
3. Repair the abutment walls which are severely eroded at the water line.
4. Repair the mechanical equipment which operates the sluice gates.
5. Investigate the structural integrity and repair the lock walls, particularly where the walls are attached to or adjacent to the spillway or where a hazard potential related to loss of life or property is presented.

Computations prepared according to the Corps of Engineers' Screening Criteria establishes the spillway capacity of 35,000 cfs at 43% of PMF with the PMF and 1/2 PMF flows at 81,900 cfs and 46,800 cfs respectively. The spillway has been determined to be inadequate to pass the 1/2 PMF, but retains stability under loads providing that the effective base section of the spillway as assumed in the stability computations of this report is verified. Therein, the spillway

would not be considered seriously inadequate based on the Corps of Engineers' Screening Criteria, since the dam would be stable under the 1/2 PMF.

(mirrored)
Lower Station Dam (Grand)
Grand County
Utah

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Lower Fulton Dam at Lock 3, NY406

State Located New York
County Located Oswego
Stream Oswego River
Date of Inspection June 7, June 13, 1979

ASSESSMENT OF
GENERAL CONDITIONS

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.


Additional structural investigations should be initiated and completed within one year concerning the stability and through-the-dam seepage. The remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified:

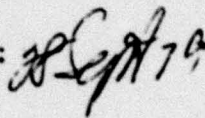
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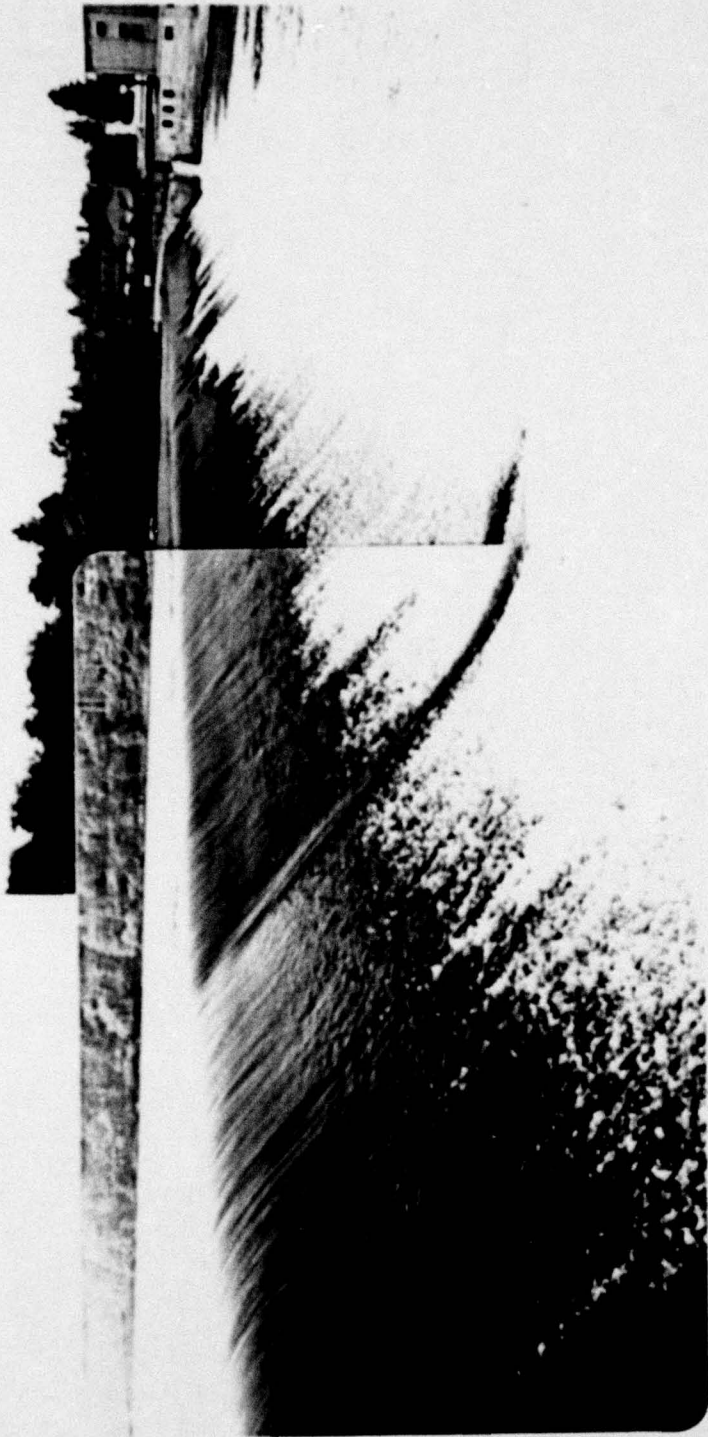
would not be considered seriously inadequate based on the Corps of Engineers' Screening Criteria, since the dam would be stable under the 1/2 PMF.

Dale Engineering Company

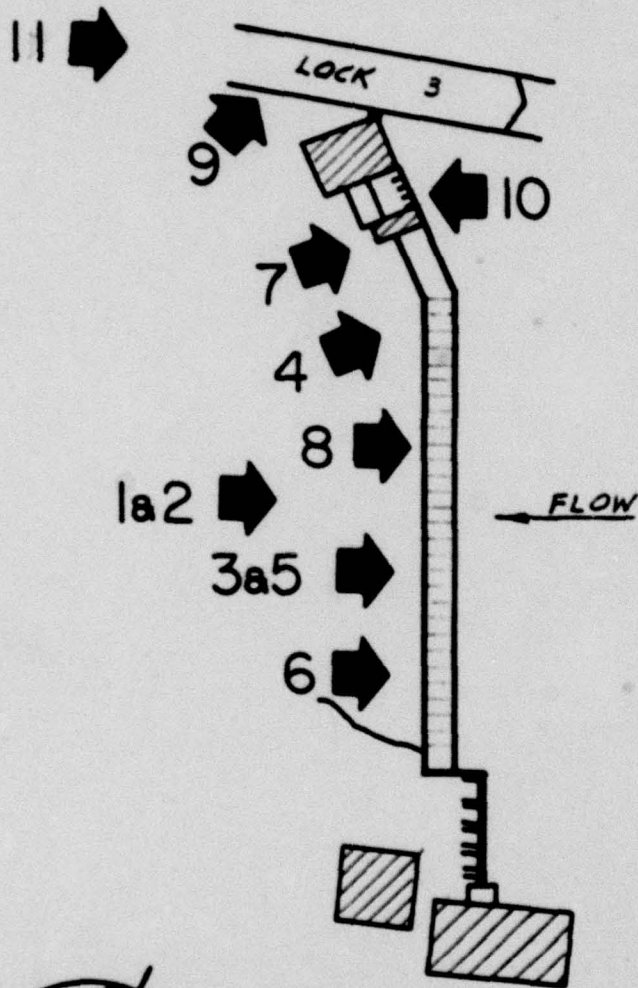

John B. Stetson, President

Approved By: 
Date:


Col. Clark H. Benn
New York District Engineer



Overview of dam at Lock 0-3 at mile 12 on the Oswego River
in Fulton, New York (Lower Dam).



PHOTOGRAPH
KEY MAP



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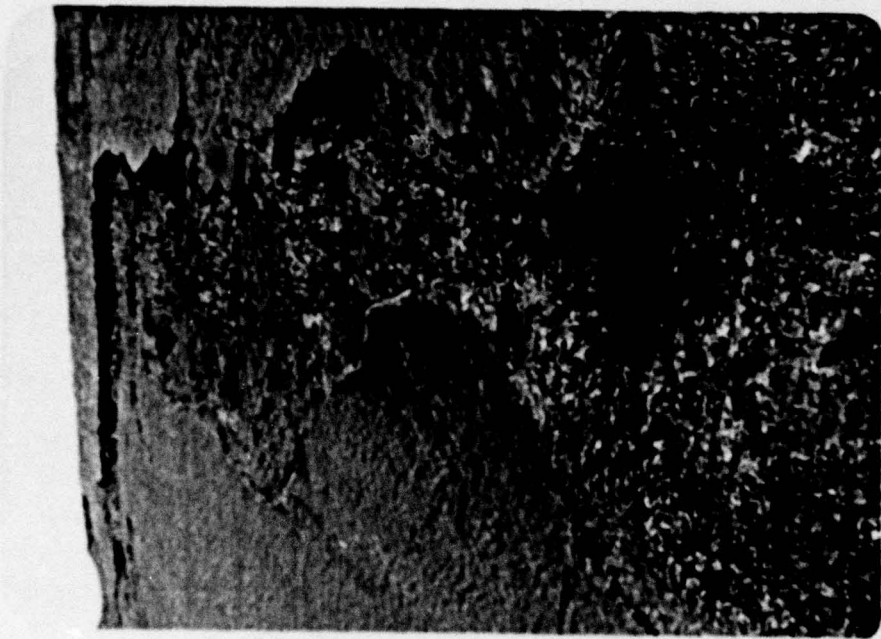
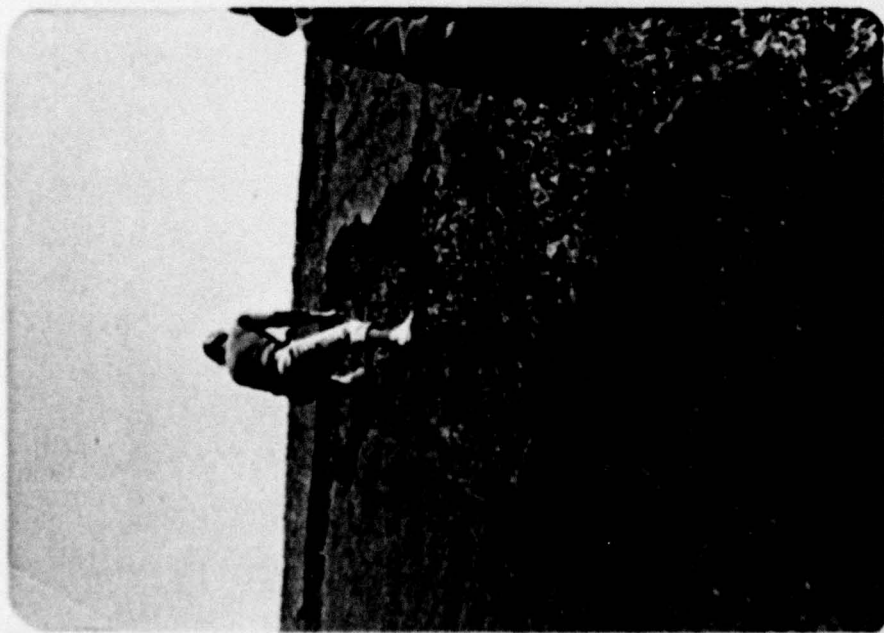
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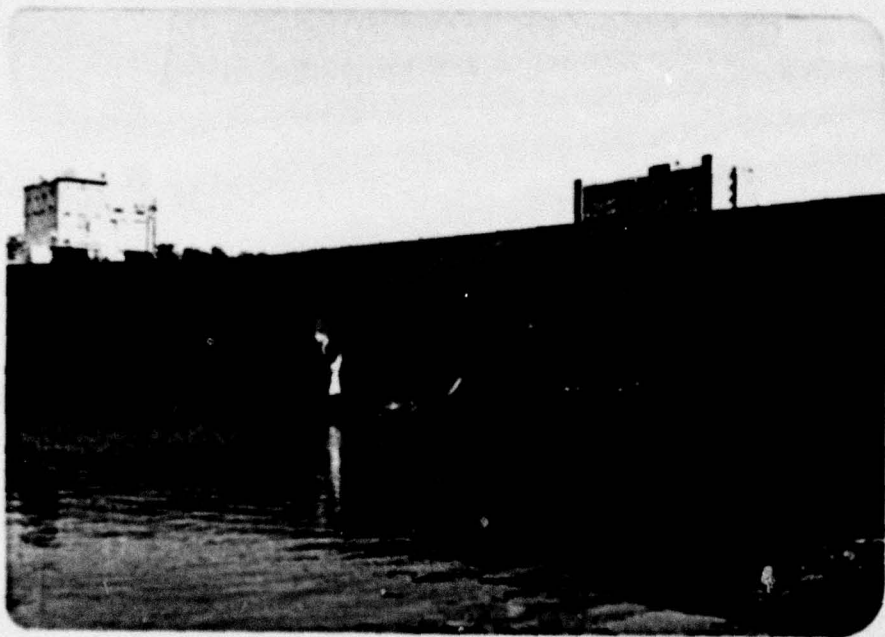
1. View of spillway with pool drawn down through powerhouse showing deteriorated spillway surface areas.



2. View of spillway area in left portion of picture number 1.



3. Close-up views of spillway area in picture number 2. Depth of removed concrete surface is 14 inches. The spillway is an 18 inch slab supported on 3 feet thick buttresses located 15 feet on center. The ogee spillway is a concrete overlay on the original stone masonry dam.



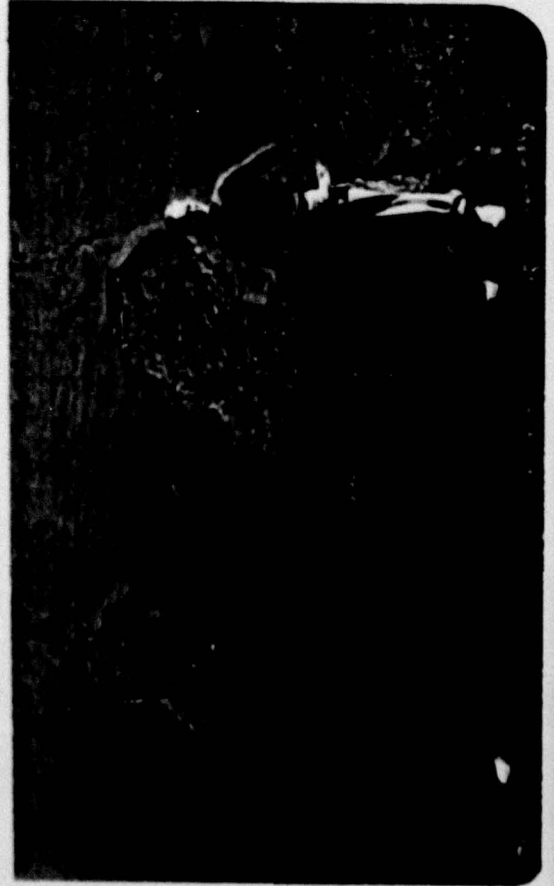
4. View of spillway section on east side of river (area not shown in picture number 2).



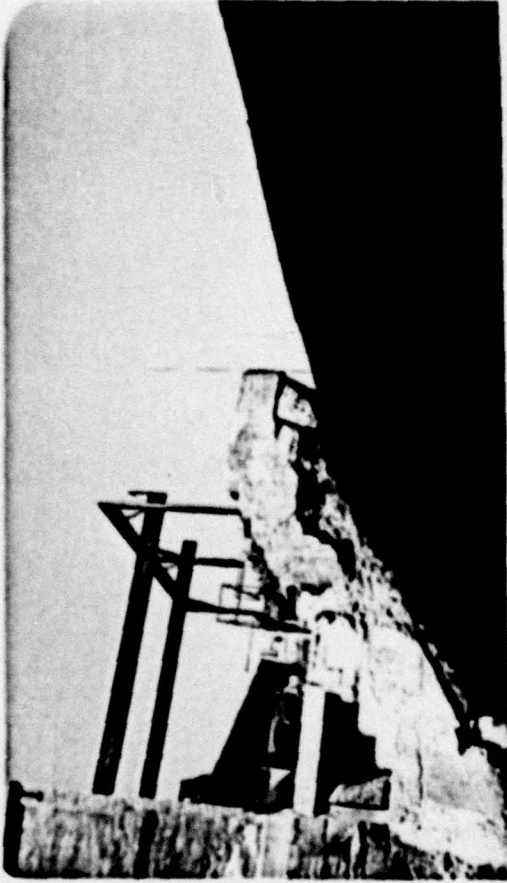
5. Close-up of deteriorated concrete surface measured 14-1/2 inches through an 18 inch slab section. Dam inspector is seen pointing at exposed reinforcing bar. Other picture shows extent of deterioration in area immediately below picture with dam inspector.



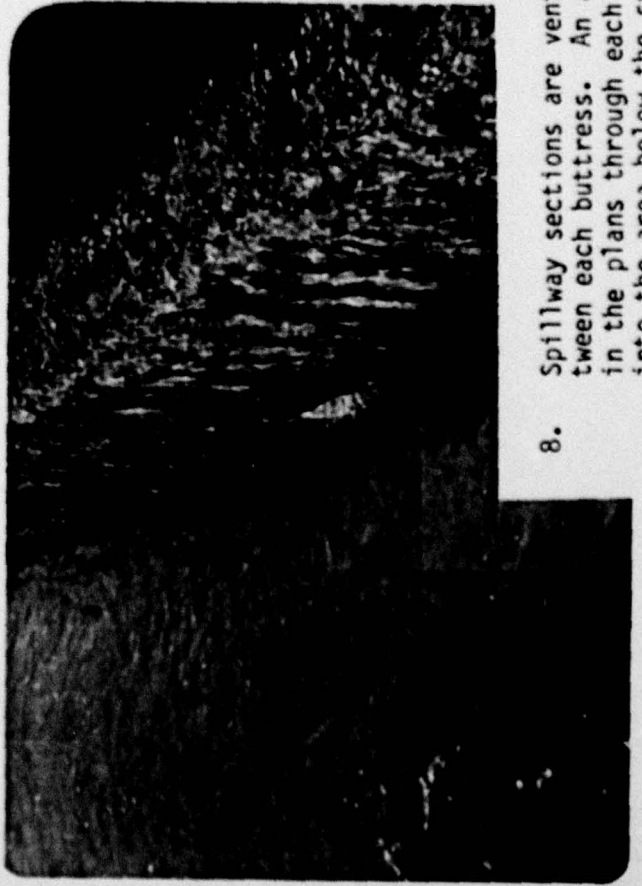
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6. Additional pictures of deteriorated spillway concrete section.



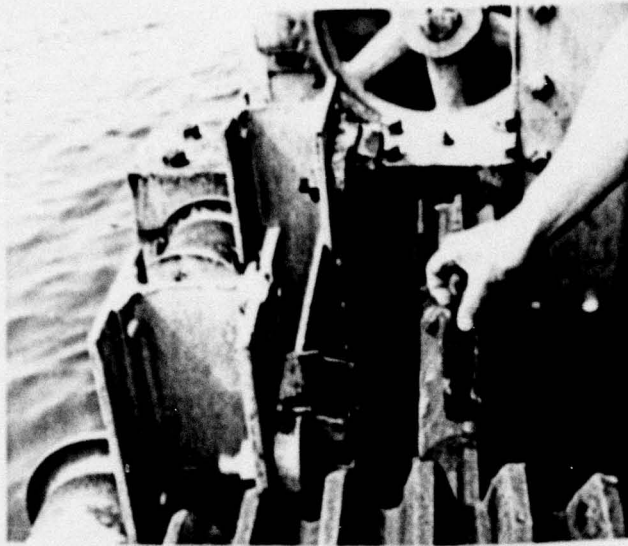
7. Spillway abutment wall on east side of river. Concrete is severely eroded.



8. Spillway sections are vented below spillway apron between each buttress. An access panel is also described in the plans through each buttress. There is no access into the area below the spillway slab. Discharges were evident through a number of the vents for a period of time after the pool was lowered below crest, indicating probably through dam seepage.



9. Riverside wall of lock shows seepage and advanced concrete surface deterioration.



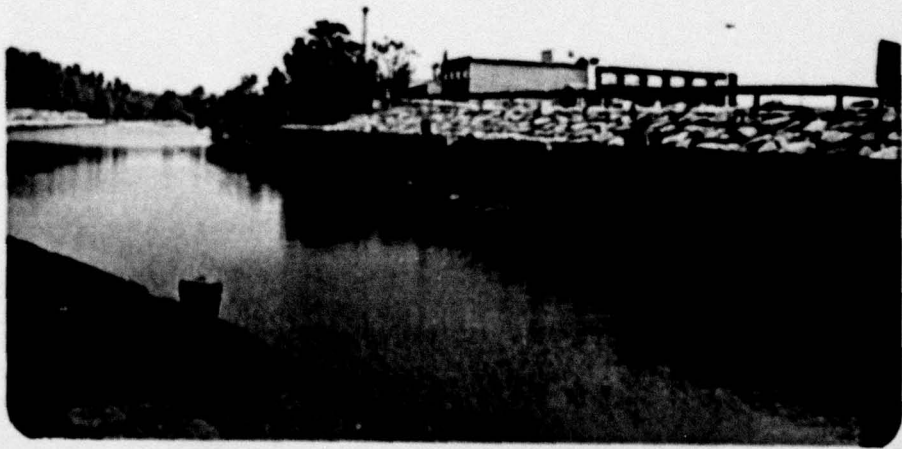
10. Tooth of pinion gear of sluice gate on east side of river used to regulate flow into powerhouse.



11. Deterioration of downstream walls of lock.



12. Undermining of Oneida Street Bridge pier adjacent to downstream gate of lock.



13. Deteriorated canal wall adjacent to downtown shopping area parking lot.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - LOWER FULTON DAM - LOCK NO. 3 ID# - NY 406

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Lower Fulton Dam - Lock Number 3 and appurtenant structures, owned by the New York State Department of Transportation, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Lower Fulton Dam at Lock Number 3, a 500 foot long crested spillway, is constructed as a composite masonry and concrete structure approximately 19 feet high. Lock Number 3 of the Oswego canal is situated on the east bank of the river. Immediately to the west of the lock there is located a small power generating station, owned by the Niagara Mohawk Power Corporation. This facility is presently undergoing renovation and will be placed in operation upon completion of the work. The west end of the power generating station forms the east abutment of the main dam. On the west bank of the river forming the west abutment of the dam is a sluice gate structure which controls flow into the forebay of the Granby Power Generating Station owned by Niagara Mohawk Power Corporation. This power generating

station is presently in operation. The combination of lock, power generating station, dam and an additional power generating station on the west bank spans the entire width of the Oswego River. The dam is the third in a series of six dams which regulate flow in the Oswego River for use in navigation and power generation.

b. Location

The Lower Fulton Dam at Lock Number 3 is located in the City of Fulton, Oswego County, New York.

c. Size Classification

The maximum height of the dam is approximately 19 feet. The storage volume in the impoundment is approximately 650 acre feet. Therefore, the dam is in the Small Size Classification as defined by The Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The Oswego River flows through the City of Fulton. The Oswego River is also used for navigational purposes, therefore, the dam is in the High Hazard Category as defined by The Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the New York State Department of Transportation.

Waterway Maintenance Subdivision:

Region Three:

New York State - DOT
Main Office - State Campus
1220 Washington Avenue
Albany, New York 12232
Director - Mr. Joseph Stellato
(518) 457-4420

New York State - DOT
Syracuse State Office
333 E. Washington Street
Syracuse, New York 13202
Engineer - Mr. Leo Burns
(315) 473-8194

f. Purpose of the Dam

The dam is used to regulate flows in the Oswego River for navigational use and power generation. The Oswego River is also used for recreational purposes.

g. Design and Construction History

The dam, as it now exists, was constructed in approximately the year 1914. At that time a concrete buttress overlay was constructed over an existing masonry dam. The date of the original masonry dam construction is unknown.

h. Normal Operational Procedures

The facility is operated by the New York State Department of Transportation in cooperation with the Niagara Mohawk Power Corporation. The main function of the facility is to provide adequate pool elevations for navigation in the Oswego Canal. The secondary function of the facility is for power generation at the Niagara Mohawk Power Generating Facilities. In order to fulfill the primary function of the facility, navigation, it is necessary to maintain the upstream water level at the elevation of the spillway crest. In order to maintain this level and have adequate flows for power generation, the Niagara Mohawk Power Corporation places flashboards on the dam each spring to provide sufficient impounded water during the low run-off periods. The gates which control the flow into the forebay of the power generating stations are owned and operated by the New York State Department of Transportation. These gates may be closed to shut off flow to the generating facilities. Representatives of the New York State Department of Transportation indicate that it has been unnecessary to manipulate these gates in order to regulate the generating flow. The gates are used only to dewater the forebay channel for maintenance purposes.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of Lower Fulton Dam - Lock 3 is 5100+ square miles.

b. Discharge at Dam Site

Peak discharges recorded at USGS gage 0424900, 10.6 downstream at Lock Number 7.

28 Mar 1936	37,900 cfs
10 Apr 1940	35,000 cfs
27 Jun 1972	32,300 cfs

For other values of annual peaks, see Appendix C.

Computed discharges:

Ungated spillway, top of dam	35,000 cfs
Ungated spillway, design flood	30,000 cfs
PMF	81,900 cfs
1/2 PMF	46,800 cfs
Maximum Navigation Pool	35,000 cfs
Gated drawdown, thru Niagara Mohawk <u>Power Plant</u>	7,400 cfs

c. Elevation* (Barge Canal Datum USGS +0.99 ft.)

Top of Dam	342.6
Maximum Pool - Design Discharge	341.6
PMF	347.5
1/2 PMF	344.0
Spillway Crest Nav. Season w/flashboards	335.5
Winter Season w/o flashboards	334.75
Stream Bed at Centerline of Dam	317.+

d. Reservoir (Up to Lock 2 at Upper Fulton)

Length of maximum pool	3300 ft
Length of normal pool	3300 ft

e. Reservoir Area

Top of dam	50+ acres
Spillway pool	50+ acres

f. Dam

Type - Masonry rubble with concrete crested spillway overlay with buttress and slab system.

Length - 500 feet

Height - 24 feet

Freeboard between normal reservoir and top of dam - 7 feet

Top width - See plans for crest dimensions

Side slopes - Upstream: 3 vertical/1 horizontal

g. Spillway

Type - Crested spillway

Length - 400 feet

Crest elevation - 335.5 navigation season

Gates - Gates control flow to hydropower facility

*Stages for flood flow conditions assume failure of flashboards under these high heads.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for evaluation of this dam has been included in this report. The information consisting of contract drawings is contained in the enclosed Figures 2 through 6. No information on design of the dam was available.

2.2 CONSTRUCTION

Details regarding the construction of this facility are included in Figures 2 through 6 along with previous inspection reports on the dam by New York State Department of Transportation and New York State Department of Environmental Conservation. Modifications and major maintenance activities by the Department of Transportation are also included through 1967. The last recorded New York State Department of Environmental Conservation inspection was dated in 1915.

2.3 OPERATION

No Operating Manual is known to exist for this structure.

2.4 EVALUATION

The engineering data included in this report is adequate to complete this Phase 1 investigation. Therefore, no additional requirement for data is given at this time.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Lower Fulton Dam at Lock Number 3 was inspected on June 7, 1979 and again on June 13, 1979. The Dale Engineering Company Inspection Team was accompanied on the inspection by Richard Aldrich of the New York State Department of Transportation, Region 3, and Robert McCarty of the New York State Department of Environmental Conservation, Dam Safety Section. The team was accompanied on the second inspection by Robert Levett, Niagara Mohawk Power Corporation and John Brennan, Niagara Mohawk Power Corporation.

b. Dam

The first inspection was conducted with substantial flow occurring across the spillway. During this inspection the water surface along the downstream spillway face showed evidence of surface deterioration. Subsequently, another inspection was scheduled with the impoundment drawn down so that the face of the concrete spillway could be inspected. The photographs show the heavily deteriorated surface of the concrete spillway. In some areas deterioration has occurred to a depth of 14-1/2 inches in slabs having a total depth of 18 inches. Both the east and the west abutment walls of the spillway were found to be in severely eroded condition. The area below the concrete slab which spans between the buttresses forming the spillway section are vented through 12 inch square holes at the toe of the apron. Flow through these vent holes indicate that seepage may be occurring through the dam.

c. Appurtenant Structures

The concrete surfaces on the lock walls show signs of seepage and advanced concrete surface deterioration. The concrete is in generally poor condition due to its advanced age. The canal wall which forms the east bank of the stream just below Lock Number 3 is in a severely deteriorated condition.

The sluice gates which control flow into the forebays of the two power generating stations are all in operating condition as evidenced by the fact that the gates to the small station adjacent to the lock are presently closed and maintenance is being performed in the turbines. The gates controlling the entrance to the Granby Power Generating System were manipulated by the inspection crew at the time of the inspection. However, some maintenance is required on a few of the mechanical operating devices. Teeth were missing in one of the pinion gears which operated the gates.

d. Control Outlet

Outlet from the impounded area is controlled by regulating the flow through the power generating station and by the placement of flashboards on the dam. Drawdown of the impoundment for the second inspection was accomplished increasing flow through the power generating station. The power generating station is presently in use by Niagara Mohawk Power Corporation.

f. Reservoir Area

The reservoir area extends approximately 3300 feet upstream to another run of river dam which performs a function similar to this facility. There are no known areas of bank instability along this course.

g. Downstream Channel

The downstream channel is formed in bedrock and is in generally good condition. No evidence of recent erosion was noted.

3.2 EVALUATION

The visual inspection reveals generally poor concrete surface conditions throughout the facility. This deterioration of concrete is most pronounced on the spillway of the main dam and on both abutments. No major deformation in the alignment of the structure was noted in the visual inspection. The spillway and control structures are in operating condition although somewhat poorly maintained.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The primary operational procedure is to control water level in the impoundment upstream from the dam for navigational purposes on the Oswego River. A secondary operational procedure is the utilization of excess water for power generating purposes. Total operational procedure is under the control of the New York State Department of Transportation. The operation is done in cooperation with Niagara Mohawk Power Corporation. Water level control through the use of hydro turbines is done in cooperation with Niagara Mohawk Power Corporation.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the New York State Department of Transportation. The flashboards are put in place by Niagara Mohawk Power Corporation. Each year a visual inspection is made of the structure by a New York State Department of Transportation inspector and a report on the condition of the structure is filed at the Department of Transportation Central Office in Albany. Maintenance to the structure is scheduled on a priority basis partly as a result of the annual inspection. Major maintenance items, such as the deteriorated spillway surface condition, have not been performed.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the entrance to the forebay of the power generating station are under the control of the New York State Department of Transportation. These gates are operated infrequently and are used mostly to accommodate Niagara Mohawk when dewatering of the forebay is required.

4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenant structures are inspected at regular intervals by the New York State Department of Transportation. Maintenance on the control gates to the forebay of Niagara Mohawk Power Station has been infrequent, however, these facilities are in operating condition. The deteriorated condition of concrete indicates that past maintenance has not been adequate. The Department of Transportation has indicated it plans to perform major maintenance repairs to the Oswego River structures in the near future.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Oswego River Basin located in central New York State, has a drainage area of approximately 5,100 square miles. It flows northerly discharging into Lake Ontario in the City of Oswego. The complex river system includes the seven Finger Lakes, Oneida Lake, Onondaga Lake, the Barge Canal and outlets from the lakes to the canal. The basin's major rivers, the Seneca, Oswego and Oneida, are incorporated into the Barge Canal System as are Oneida, Cayuga and Seneca Lake. All of the lakes have regulated outlets excepting Onondaga.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. Where the structure is integrated with hydropower and navigation lock facilities, interrelationships from a hydrologic standpoint have been evaluated. In general, in this screening analysis, control structures and gates used for the latter two purposes are not considered as flood control devices.

Different scenarios of partial dam failures, i.e., tainter gates or monolith failures, are beyond the scope of this analysis due to the fact that the dam is a run of river facility and the downstream dam break flood wave analysis is multi-dimensional. From a commentary viewpoint, the dam inspection team concludes that a partial failure under normal conditions would potentially be a navigational hazard rather than an inundation hazard.

The dam's stability and flood discharge capacity is assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration run-off of a specific location that is considered reasonably possible for a particular drainage area. Since this dam is in the Small Dam Category and is a High Hazard, the guidelines criteria (Ref. 1) require that the dam be capable of passing one-half the Probable Maximum Flood.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF.

An HEC-1 computer model for the basin was obtained from the New York State Department of Environmental Conservation. This model has been developed over the years through a number of study efforts by the Department with assistance from the U.S. Army Corps of Engineers, Buf-

falo District. The model was calibrated by D.E.C. to a peak flood event, Hurricane Agnes, June 20-26, 1972. The dam investigation team briefly reviewed these findings. It then obtained the flood records at USGS gage at Lock 7 near the dam sites, and within the constraints of this scope of work, verification of the existing model was obtained (See Figure C-8). The sub-basin designation, 6-hour unit hydrographs, routing methods, and loss rates for the model (those used for Hurricane Agnes) were all adopted. The model was recorded for the HEC-1DB PMF analysis. In reviewing the regulated outlet rating curves, it was determined the high discharges for this PMF analysis were not adequately described. However, these flows were accounted for by increasing the Modified Puls Method rating curves for these outlets (See Appendix C). In one instance, a rating curve developed for one of these outlets and used by the inspection team on a previous inspection report was substituted into the model.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB was utilized to evaluate the PMF hydrology. The Probable Maximum Precipitation (PMP) was 21.5 inches, Hydrometeorological Report (HMR #51) for a 24-hour duration, 200 square mile basin. Loss rates used from the D.E.C. model were in the range of 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. Actual values used were those calibrated during the storm of Hurricane Agnes, June 20-26, 1972. Only one multi-plan analysis (.2, .4, .5, .6, .8, 1.0 PMP) was performed. It distributed the rainfall over the 5,100 square mile area. If further in depth investigations are undertaken, they should attempt to center the storm for critical flows since the major sub-basins lend themselves to such an analysis and a potential for greater run-off. This work effort would be a refinement of the analysis provided herein.

This dam investigation at Lock No. 3 is one of six dam investigations on the Oswego River. These dams are located at Locks 1,2,3,5,6, and 7. The hydrologic analysis provides flood flows up to Lock 1 at Phoenix, New York (Lock 7 is near the mouth of the river at Oswego). It assumes the discharges from the 6-hour time increment PMF hydrographs will effectively be the same for all the dam sites since the upstream run-off area is over 5,000 square miles and the downstream run-off area is about 100 square miles. The results of the analysis have been compared to the USGS gage discharge-frequency plot results at Lock 7 (See Figure 8).

5.3 SPILLWAY CAPACITY

The spillway is a crested spillway which reaches across the effective width of the river. The dam is a combination buttress and concrete gravity dam and has an effective crest length of 509 feet. The channel spillway crest shape design head was estimated from the geometry of the section at 8.00 feet. Subsequently, discharge coefficients were computed in the range of 3.30 to 4.23.

Submergence was checked and found not to be effective up through the PMF. At the top of dam elevation, the overflow spillway capacity was computed at 35,000 cfs. Certain plans for these six dams, some of which were constructed under a single contract, call out the original design flood as 30,000 cfs. The gage at Lock 7 has recorded two events greater or equal in magnitude with the spillway top of dam capacity. The PMF was computed at 81,900 cfs while the 1/2 PMF flood was computed at 46,800 cfs.

SPILLWAY CAPACITY

	<u>Discharge</u>	<u>Without Flashboards Capacity as % of Discharge</u>
PMF	81,900	43%
1/2 PMF	46,800	75%

5.4 RESERVOIR CAPACITY

The reservoir storage at top of dam is estimated at approximately 650 acre feet. Lock 6, Upper Oswego Dam (High Dam), is located approximately 1/2 mile upstream.

5.5 FLOOD OF RECORD

Floods have been measured at USGS gaging station 04249000 at Lock 7. The gage datum is 246.0 ft.; the drainage area of the gage is 5121 sq. mi.; the period of record is from 1934 to present. The records through 1974 show that 4 events have had flood discharges in excess of the dam's original design flood. Two events were greater than or equal to existing top of dam discharge capacity.

March 28, 1936	37,500 cfs
April 10, 1940	35,000 cfs
June 27, 1972	34,300 cfs
April 4, 1960	31,200 cfs

A Corps of Engineers' investigation entitled Post Hurricane Agnes (June 20-26, 1972) Investigation indicates only \$14,000 in damages occurred in the reach from Lock 1 through Lock 7 to Lake Ontario.

5.6 OVERTOPPING ANALYSIS

The HEC1-DB analysis indicates that the dam would be overtopped as follows:

	<u>OVERTOPPING IN FEET</u>
PMF	5.0
1/2 PMF	1.5

According to this analysis, the dam may have been overtopped in the past since the top of dam discharge capacity is around 35,000 cfs. It would be overtopped with a 1/2 PMF.

5.7 EVALUATION

The spillway is inadequate to pass the 1/2 Probable Maximum Flood without overtopping the dam. However, based on the Corps of Engineers' Screening Criteria, it is not considered seriously inadequate, since the spillway is stable under the 1/2 PMF conditions. This assessment is made providing the Owner verifies that uplift forces beneath the spillway slab affect only the plan area of the rubble dam and the buttresses. If uplift forces between the buttresses exist because of the location of a continuous slab, then remedial action should be taken according the the Corps of Engineers' Criteria for a seriously inadequate spillway condition as to be directed by the New York State Department of Environmental Conservation.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations And Data Review

The main dam structure was observed when the upstream water level had been drawn down below the spillway flashboards making the dam's downstream face accessible for inspection. The upstream side of the dam was submerged.

Observations indicate the dam structure retains stability at this time with no indication of misalignment, displacement or other structural movement. Design drawings indicate this is a buttressed structure with an upstream stone rubble dam section being braced by concrete buttresses on the downstream side. The top of the rubble section and buttresses have been covered with a continuous concrete slab to create a crest shape. Under normal operation, this main dam functions as a crested spillway.

The concrete downstream face of the dam (buttress slab cover) has experienced varying degrees of deterioration and spalling, some significant. Field observations indicate water leaks into the buttress zones of the dam structure, but it could not be ascertained if the seepage entry is primarily through the upstream dam section and/or the downstream slab. The noted condition of the slab makes it highly probable that a significant volume of water does enter through deteriorated slab sections and joints. However, through-the-dam flow was observed at two locations through the vents along the apron while the upstream pool was drawn below the flashboards.

A concrete wall serves as the westerly abutment of the dam and the separation wall for the forebay of the power station situated on the west side of the river. The dam side of this abutment wall is deteriorated and eroded from the effects of spillway flow. The downstream wall of the forebay has deteriorated areas and leakage occurring. No indication of structural instability was noted, however, concrete in the dam's east abutment wall is severely eroded.

An inoperative power station is located adjacent to the east limits of the dam. The water intake gates for this facility are closed, but the concrete in the gate structure is deteriorating and leakage occurs.

Concrete and masonry walls of the navigation lock extending along the east side of the dam have experienced varying degrees of deterioration, along with undermining. No indication of structural instability was noted. On a similar note, deterioration and undermining of the concrete pier for the street bridge adjacent to the downstream lock gate was noted.

b. Geology and Seismic Stability

This Dam, in the Oswego River drainage basin, is located within the Ontario Lowland which is part of the Central Lowland Province. According to the 1915 Dam Report, the dam was sited on solid rock. Outcrops observed in the vicinity of the dam vary from thinly bedded cross-beds of reddish, very-fine to medium-grained sandstones to medium-bedded, grayish, medium-grained calcareous sandstone. Apparently two rock units are present: the reddish cross-bedded sandstones are of the Grimsby Sandstone of Lower Silurian age and are overlain by the grayish calcareous Kodak Sandstone of Middle Silurian age. Dip of the units is less than 1° to the south.

None of the original plans or inspection reports available indicate that the bedrock had been grouted prior to construction. If not grouted, the strongly jointed bedrock, friable in the thin red beds and calcareous in places, would over a period of time become weakened and separate easily along bedding and joint planes. Due to the ferruginous and calcareous cement of the sandstones, the bedrock is susceptible to deterioration by weathering and leaching; properly grouted and sealed bedrock could be rated as having a good bearing capacity.

Bedrock is well-jointed with several sets prominent; orientations, all with near vertical dips, are N60-65E, N15E, N15-20W, N35W, N50W, and N65W. Orientation of the dam crest is N70E. Thus the two major joint sets, N60-65E and N15-20W, are close to parallel and perpendicular to the dam face. Undercutting of the beds and leaching of the rock cement could lead to easy removal of blocks of rock in front of the dam face. If not grouted, additional undercutting of the spillway apron is feasible. No firm recommendation for grouting is implied, however, future repair work may give it consideration.

There are no known faults or shear zones in the vicinity of the dam according to the N.Y.S. Geologic Map (1970). The Preliminary Brittle Structures Map of the N.Y.S. Geologic Survey (1977) indicates a possible fault zone based on drill hole data located about 8 miles north of the dam.

The dam is located in an area having a Zone 2 Designation on the Seismic Probability Map. No earthquake activity has been recorded in the vicinity of the dam. The closest earthquake, as well as the largest (intensity IV, modified Mercalli scale), occurred in 1954 about 25 miles southwest of the dam. Several other minor earthquakes have occurred in the region, none closer nor more recent than that of 1954.

c. Stability Evaluation

Design drawings available for review show plan layout and cross-sections for the various structural elements comprising the dam-lock facility, but do not include information on the properties of the dam

and foundation materials, nor stability analysis. As part of the present study, stability evaluations have been performed for the dam/spillway sections. Actual properties of the dam's construction materials and foundations were not determined as part of this study; where information on properties were necessary for computations but lacking assumptions felt to be practical were made. These stability computations assumed a dam cross-section based on dimensions indicated by the plans included in this report. For the cross-section, two cases were considered because of lack of clarity on the available plans: the dam structure consists of the rubble section and buttresses or, the dam structure consists of the rubble section, buttresses, plus a ground level structural slab between buttresses. The analysis also assumed the dam section to be a monolith possessing necessary internal resistance to shear and bending occurring as a result of loading. It should be considered that in areas where deterioration has occurred, the section dimensions would be less than indicated by the plans with some adverse effect on the dam's structural strength expected.

The results of the stability computations are summarized in the table below. The stability analyses are included in Appendix D.

RESULTS OF STABILITY COMPUTATIONS

<u>Loading Condition</u>	<u>Factor of Safety*</u> <u>Overturning Sliding**</u>	<u>Location of Resultant***</u> <u>Passing through Base</u>
(I) Water elevations at normal operating levels, uplift acting on base plus 7.5 kip per lineal foot, ice load acting:		
(i) uplift on plan area of rubble dam and buttresses only	1.65	0.46b
(ii) uplift on total dam plan area (rubble section, buttresses, slab area between buttresses)	1.39	0.66b
(II) Water elevations at 1/2 PMF levels, uplift acting on base as computed for normal operating conditions:		
(i) uplift on plan area of rubble dam and buttresses only	1.57	0.35b
(ii) uplift on total dam area (rubble section, buttresses, slab area between buttresses)	1.32	0.48b
(III) Water elevation at PMF levels, uplift acting on base as computed for normal operating conditions:		
(i) uplift on plan area of rubble dam and buttresses only	1.58	0.33b
(ii) uplift on total dam area (rubble section, buttresses, slab area between buttresses)	1.34	0.29b

*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

**As determined applying the friction-shear method.

***Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

The analysis indicate the dam is stable under normal operating conditions, the 1/2 PMF and the PMF condition if the dam structure consists of the rubble section plus buttresses, as is felt most probable. Unsatisfactory stability is indicated for the dam subject to forces possible during normal operations and the PMF condition, according to Corps of Engineers' evaluation criteria if the dam monolith includes a structural slab foundation for buttresses as well as the buttresses and rubble section.

Critical to the analysis and resulting indication of stability are the items of uplift water pressures acting on the base of the dam and the relative permeabilities of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on a full headwater hydrostatic pressure acting on the dam's upstream corner and a zero tailwater hydrostatic pressure acting at the dam's downstream corner. Uplift pressures were assumed to vary linearly between the dam's upstream and downstream corners, and act upon 100 percent of the dam base. The resulting uplift force represents a condition that is significant in arriving at the computed factor of safety against overturning.

Uplift, as computed for the normal operating condition, was also assigned for the flood conditions studied, it being assumed that uplift pressures would not increase significantly over a relatively short flood stage time period, because of expected low foundation rock permeability.

Further investigation is recommended to determine conditions within the dam between buttress locations behind the rubble wall section, to ascertain the structural integrity of the rubble wall and concrete buttresses, to establish the presence or absence of a structural slab foundation for the buttresses, and to detect seepage and uplift occurrences. This investigation should extend to inspection of the area downstream of the dam under drawn down conditions to detect signs of underdam seepage.

Repair of deteriorated concrete should be accomplished for the dam spillway slab and abutment walls to prevent progressive deterioration and possible adverse structural effects.

Locations of under-dam seepage noted in future investigative and repair periods should be sealed.

Repair of deteriorated concrete in the navigation lock structure also should be undertaken.

Information about noted deteriorations and seepage in the power station structures on the west and east sides of the dam should be relayed to officials of the Niagara Mohawk Power Corporation, to enable them to undertake corrective measures.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

This Phase I inspection of Lower Fulton Dam at Lock 3 did not indicate conditions which constitute an immediate hazard to human life or property. However, the dam's spillway surface is very deteriorated and could develop into a hazardous condition at some time in the near future. The dam would be overtopped by 1/2 PMF flood, but can safely discharge 43 percent of the PMF. Additional structural investigations are warranted to determine the spillway base conditions so that the Corps of Engineers' Screening Criteria in regard to stability can be assessed. An issue is the determination of the effective base area of the spillway on which uplift pressure occurs. Through-the-dam seepage is also suspected and a more thorough investigation of the dam including the hollow interior portion is needed.

If uplift pressure is only under part of the spillway as believed to be the most likely case, then the spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria, since the spillway has been determined to be stable under the 1/2 PMF.

The following additional and/or specific safety assessments are based on the Phase I visual examination, analysis of hydrology and hydraulics, and structural stability:

1. The dam's concrete spillway is a composite masonry and concrete structure consisting of the old overflow masonry dam capped with a crest shaped concrete overlay. The downstream spillway is a slab system supported by the old dam and concrete buttresses located 15 feet on center (see Sketch in Appendix D). The slab system of the spillway is severely deteriorated and eroded across the entire width of the dam. In some areas deterioration has occurred to a depth of 14-1/2 inches in slabs which have a total depth of 18 inches. In one location a reinforcing bar is partially exposed. Deterioration is most prevalent along construction joints over the buttresses.
2. After the spillway was drawn down below the flashboards, continued flow was observed from a number of the slab system vents, indicating through-the-dam seepage. This is most likely through the masonry dam which forms the submerged upstream face of the dam.
3. Both abutment walls of the spillway are severely eroded at the waterline.

4. The concrete surface on the lock walls show signs of seepage and advanced concrete surface deterioration. The concrete is in generally poor condition.
5. The mechanical equipment which manipulates the sluice gates is in operating condition. Some teeth were missing in one of the pinion gears which operates the gates.
6. No deformation of the alignment of the structure was noted in the visual inspection.

b. Adequacy of Information

The information available is adequate for this Phase I inspection. Design and construction information is limited to construction plans.

c. Urgency

As previously described, the spillway base area which receives uplift pressure needs to be determined in order to assess the stability of the spillway. In addition, through the dam seepage was observed and needs to be further evaluated. Further investigation of these items should be undertaken immediately and completed within one year from notification. Where this investigation determines that, due to structural instability, a hazard to human life or property exists according to the Corps of Engineers' criteria, repairs should be undertaken immediately. Upon completion of the investigation phase, construction should commence and the remedial work should be completed within two years of notification.

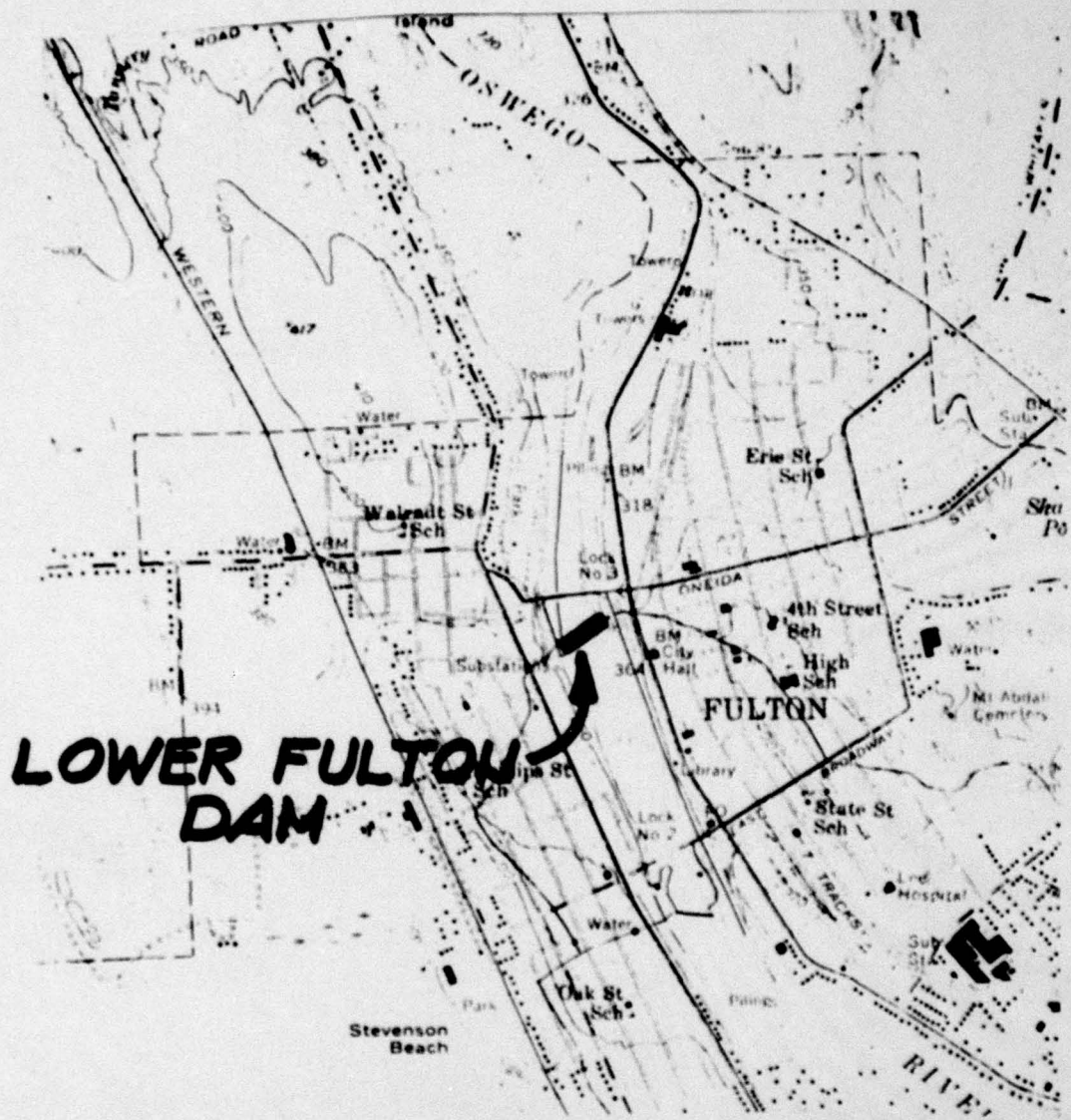
d. Need for Additional Information

As stated above and in the Safety portion of this assessment, additional information and investigation of the spillway area is required.

7.2 RECOMMENDED MEASURES

- a. The results of the aforementioned investigations will determine the remedial measures required to obtain adequate dam stability and assessment of through-the-dam seepage. This dam inspection and investigation has identified the following improvement needs:
 1. Repair the spillway slab and verify the structural integrity of the spillway section.
 2. Inspect the interior of the dam to evaluate the condition of the old masonry dam, to refine the stability analysis and to evaluate the severity of through-the-dam seepage.

3. Repair the abutment walls which are severely eroded at the waterline.
4. Repair the mechanical equipment which operates the sluice gates.
5. Investigate and repair the structural integrity of the lock walls, particularly where the walls are attached or adjacent to the spillway or where a hazard potential related to loss of life or property is presented.



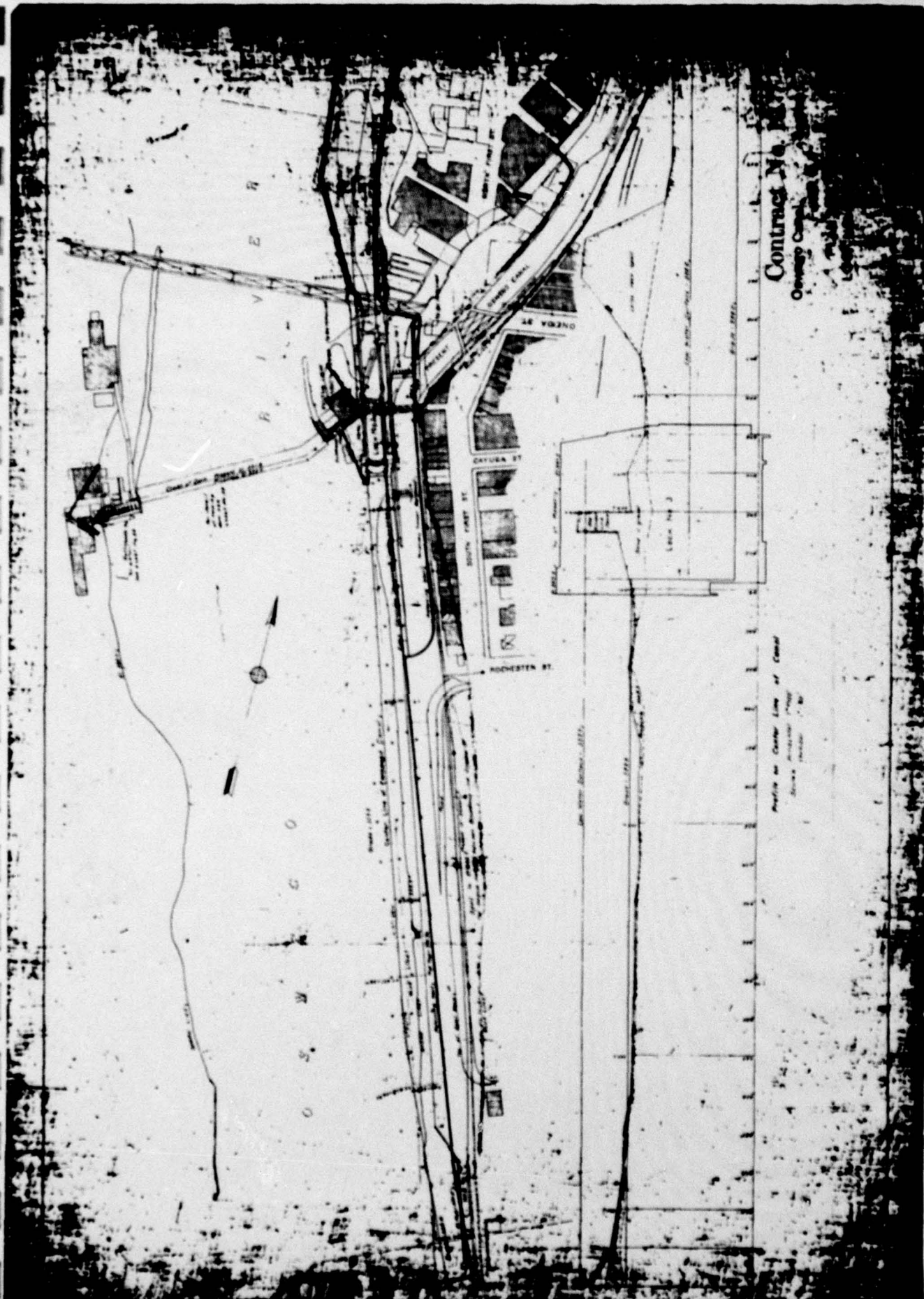
**LOWER FULTON
DAM**



VICINITY MAP

LOCATION PLAN

FIGURE I



Contract No. 10
 Oswego Canal

Profile as Center Line of Canal
 Scale: 1" = 100'

FIGURE 3

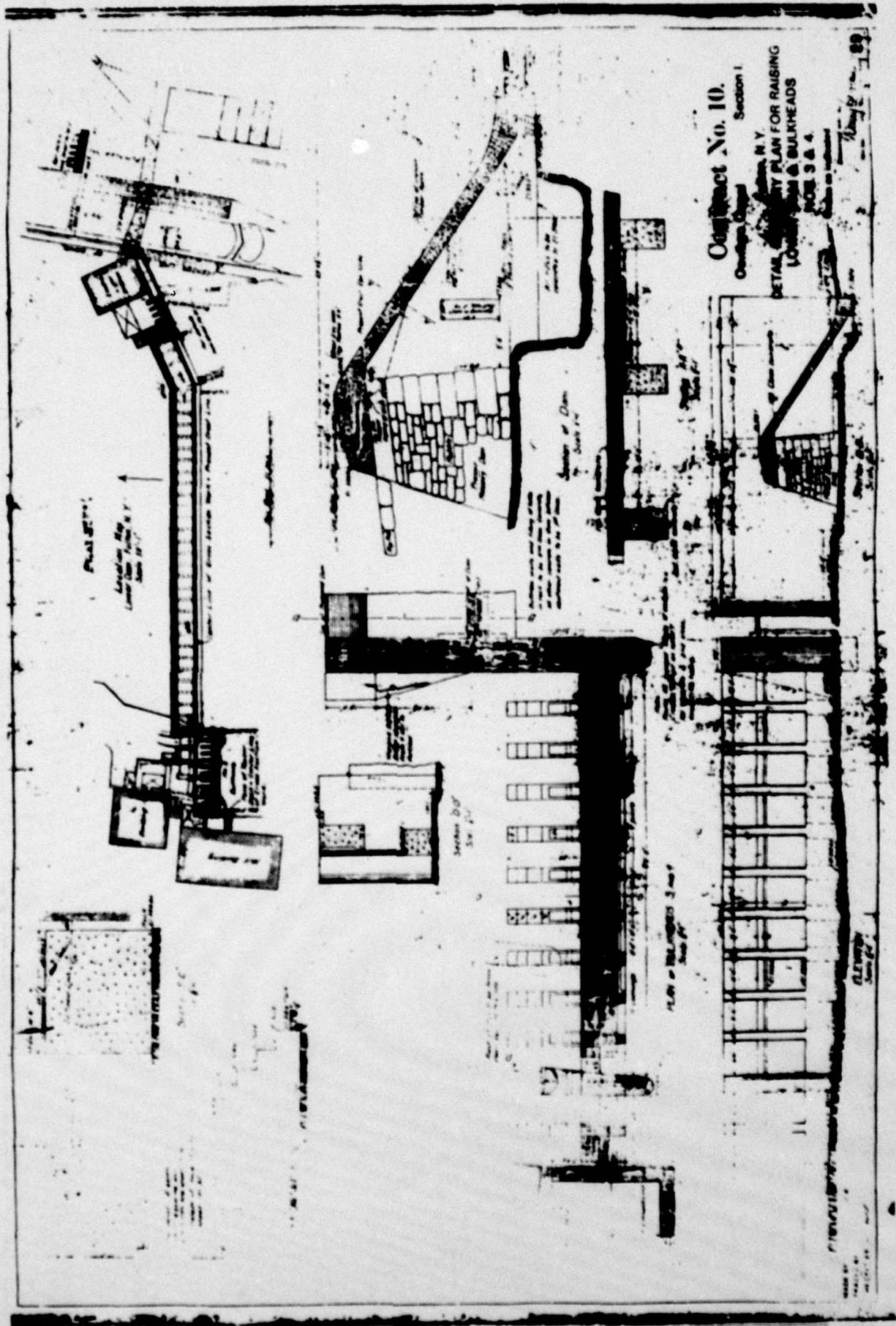


FIGURE 4

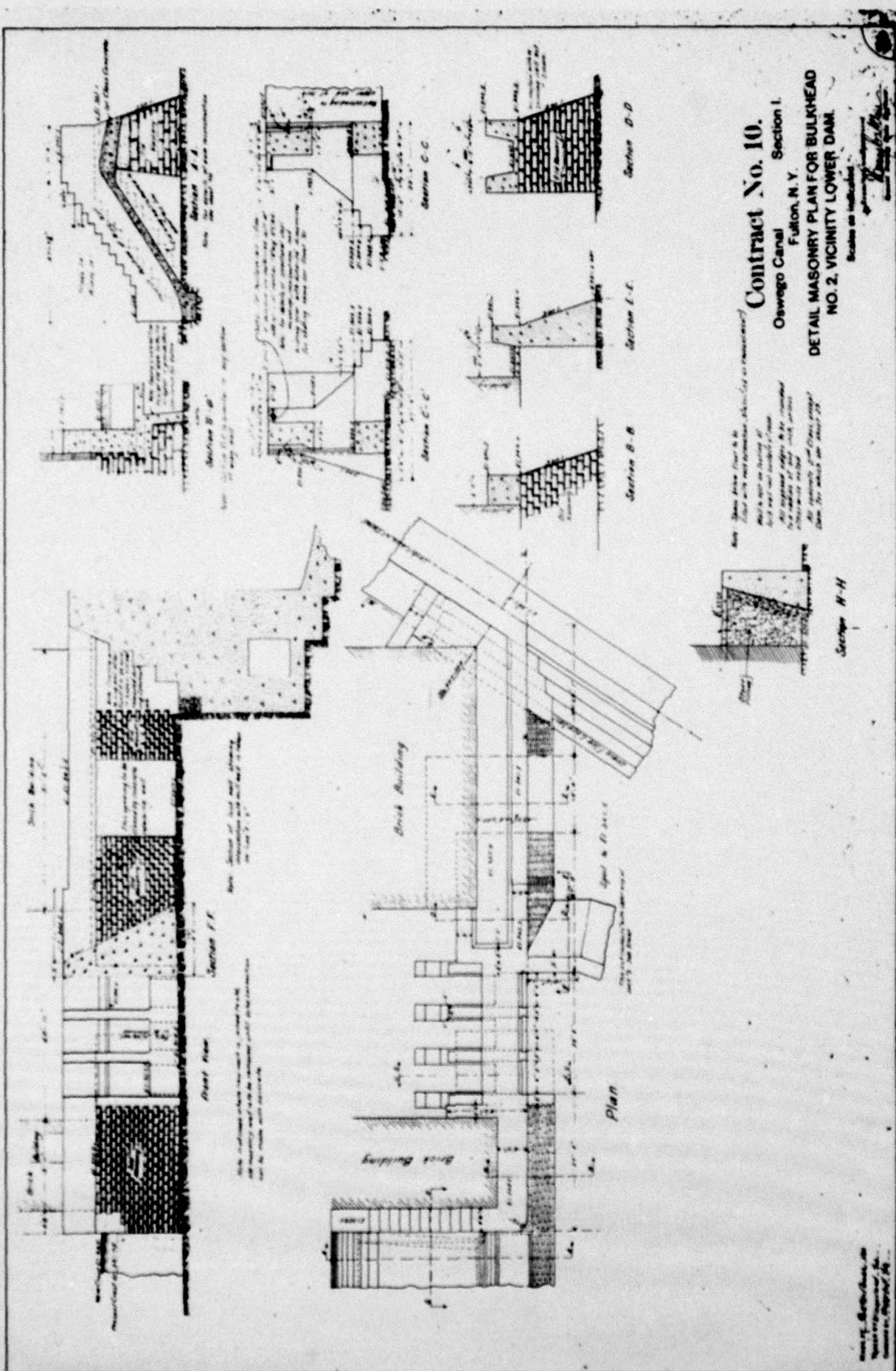
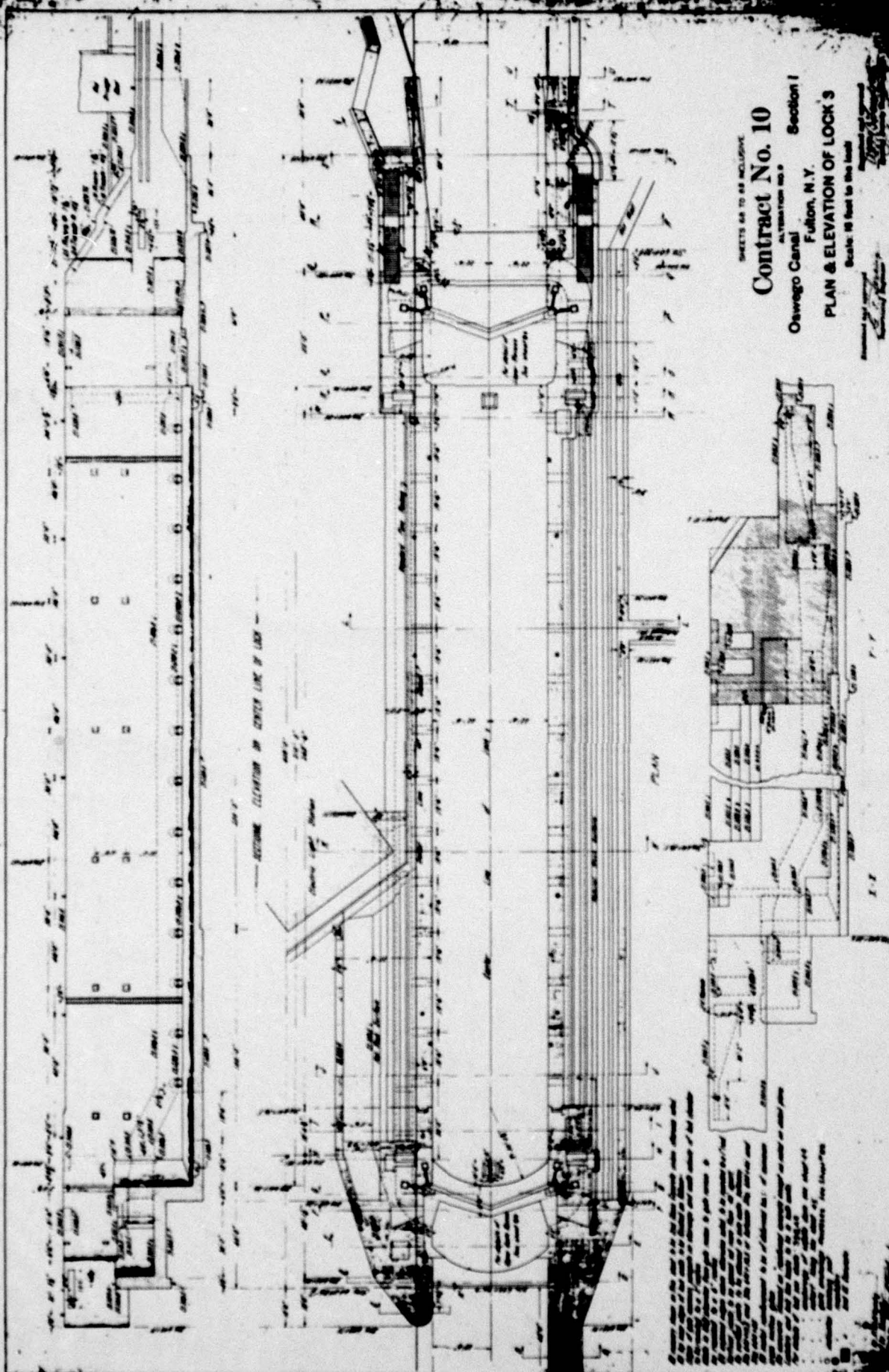


FIGURE 5

SHEETS 66 TO 68 INCLUSIVE
Contract No. 10
 ALTERNATION NO. 2
 Oswego Canal Fulton, N.Y. Section I
PLAN & ELEVATION OF LOCK 3
 Scale: 1/8" = 1'-0"



Notes:
 1. The lock is to be constructed of concrete masonry blocks and concrete.
 2. The lock is to be finished with a smooth surface.
 3. The lock is to be finished with a smooth surface.
 4. The lock is to be finished with a smooth surface.
 5. The lock is to be finished with a smooth surface.
 6. The lock is to be finished with a smooth surface.
 7. The lock is to be finished with a smooth surface.
 8. The lock is to be finished with a smooth surface.
 9. The lock is to be finished with a smooth surface.
 10. The lock is to be finished with a smooth surface.

FIGURE 6

CONTROL STRUCTURE AT LOCK 0-3, FULTON

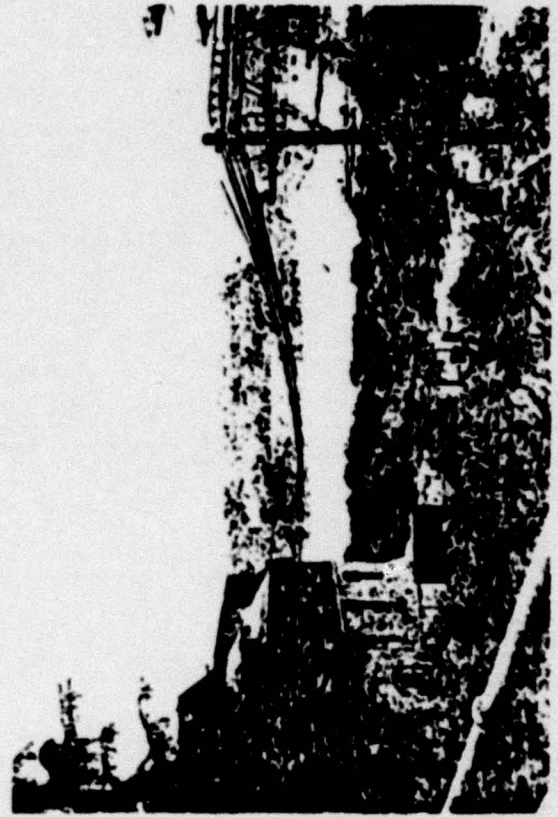
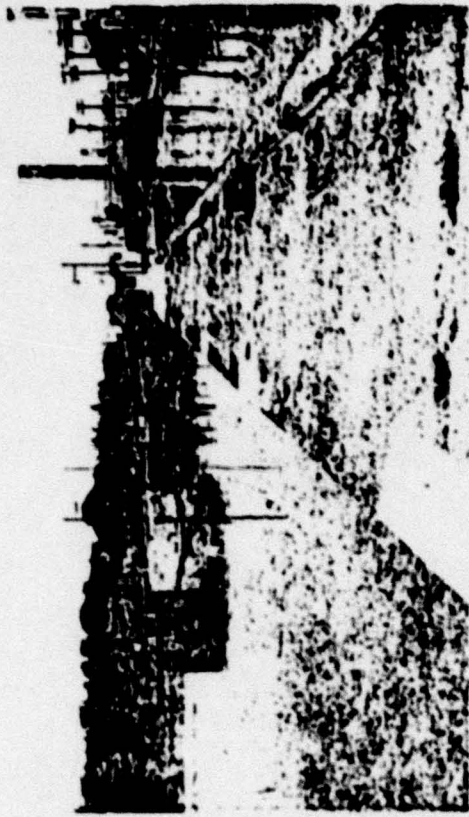
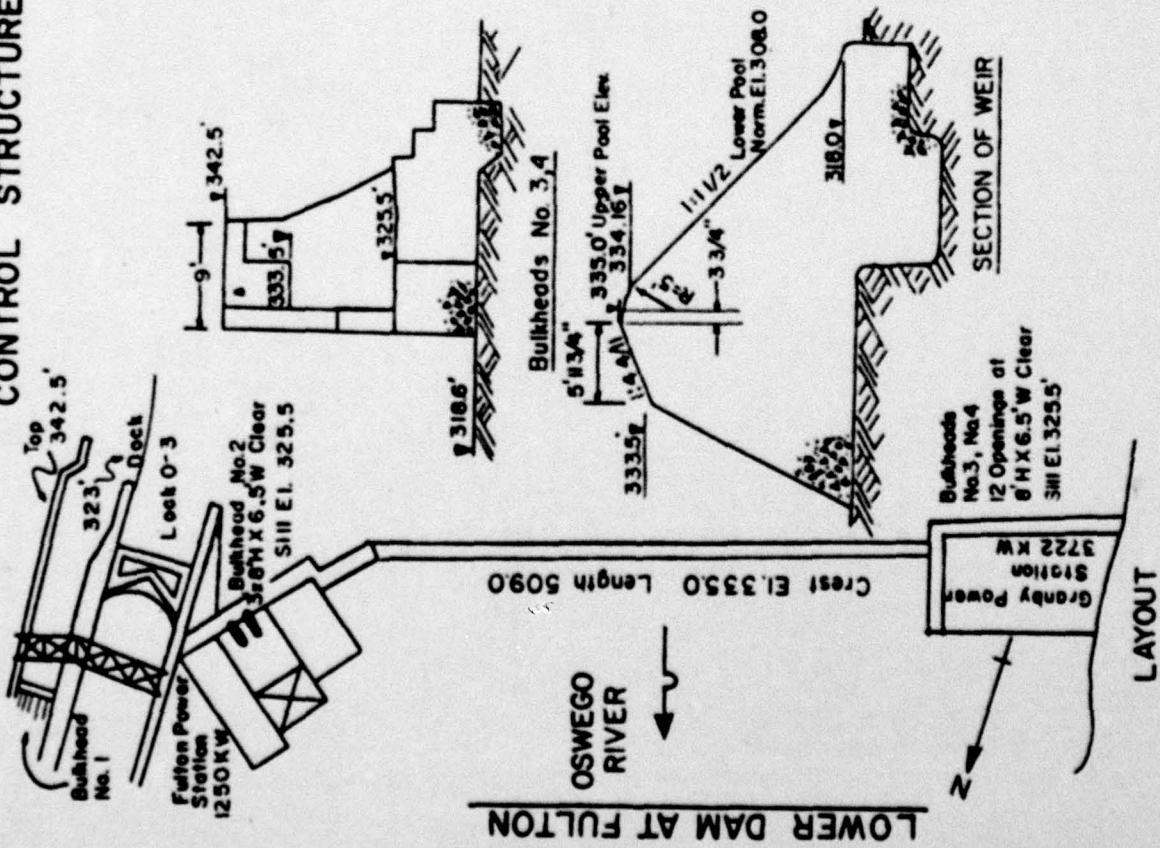
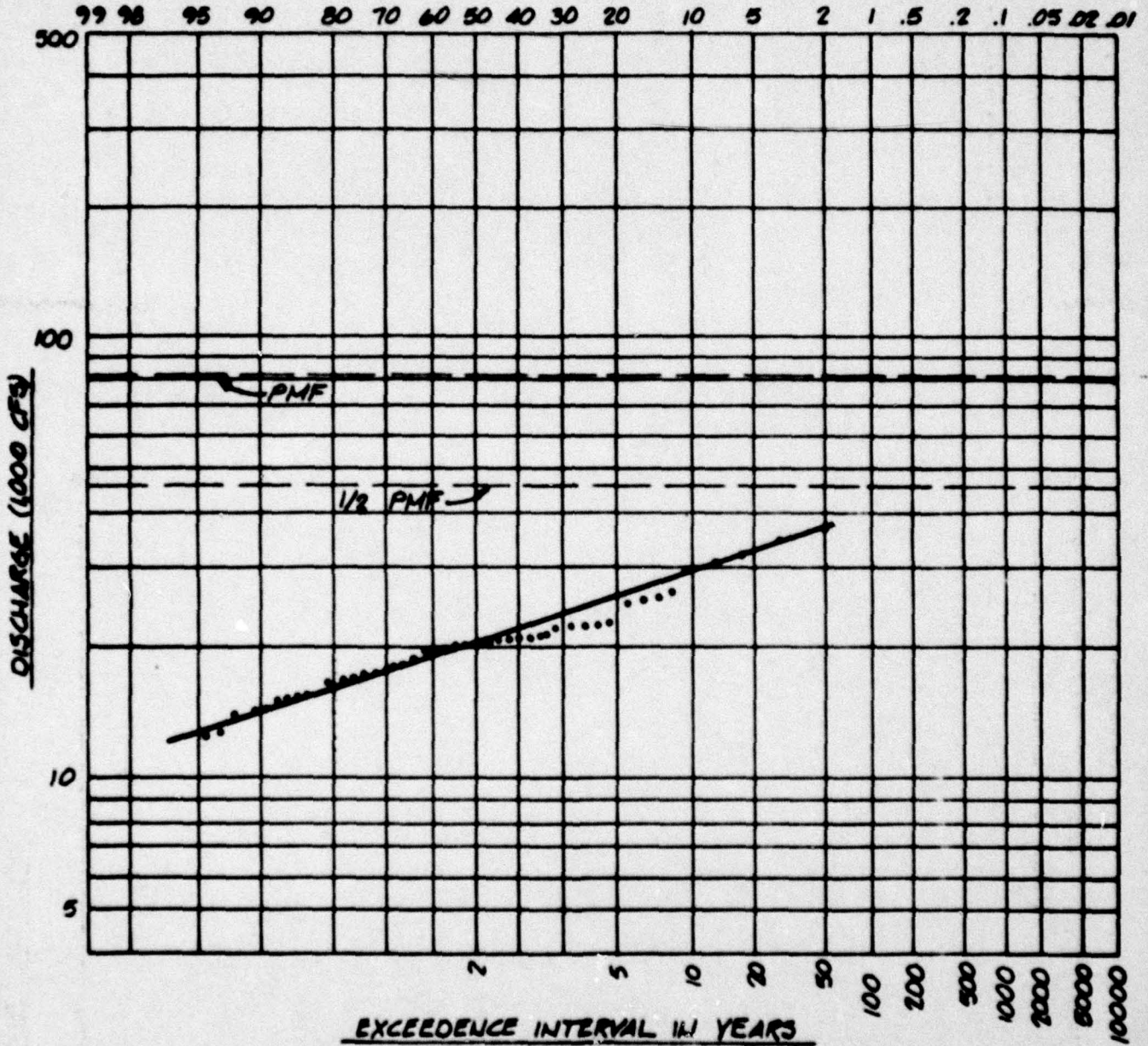


FIGURE 7

EXCEEDENCE FREQUENCY PER 100 YEARS



EXCEEDENCE INTERVAL IN YEARS

USGS GAGE
STATION 04249000

TOTAL DRAINAGE AREA = 5121 SQ MI

GAGE DATUM = 246.0 FT

PERIOD OF RECORD = 1934 - 1974

DISCHARGE - FREQUENCY
CURVE

APPENDIX A
FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Lower Fulton Dam at Lock 3 County Oswego State New York ID # 406
(Granby)
Type of Dam Concrete gravity crested spillway Hazard Category High
Date(s) Inspection (1) June 7, 1979 Weather Sunny Temperature 70's
(2) June 13, 1979
(2 - Below crest)

Pool Elevation at Time of Inspection (1) 335.5(+) Tailwater at Time of Inspection (1) 316.0
Use of Dam: Hydro Power, Navigation (2) 335.5(-) M.S.L.* Lift: Lock 5 to 3, 18 feet
(2) --

This inspection does not pertain to an independent evaluation of the condition of the lock or hydropower facility.

Inspection Personnel:

- (1), (2) F.W. Byszewski - Stetson-Dale (1), (2) Richard Aldrich N.Y.S.D.O.T., Region 3 Office
- (1), (2) N.F. Dunlevy - Stetson-Dale (1), (2) Robert McCarty N.Y.S.D.E.C., Dam Safety Section
- (1), (2) D.F. McCarthy - Stetson-Dale (2) Robert Levett Niagara Mohawk Power Corporation
- (1), (2) H. Muskatt - Stetson-Dale (2) John Brennan Niagara Mohawk Power Corporation
- (2) B. Colwell - Stetson Dale

N.F. Dunlevy Recorder

* Barge Canal Datum (USGS Datum to + 0.99 feet)

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Extensive cracks and erosion of concrete spillway slab surface. Exposed reinforcing bars. Measured depth of erosion is 14 inches plus in 18 inch slab at two locations. Erosion is along entire spillway.	A buttress system supports slab. These are located 15 feet o.c. and are 3 feet thick. Failure would likely occur to slab panels. Condition could lead to partial failure of concrete spillway system.
STRUCTURAL CRACKING	Structural cracking in spillway slab at various locations.	See Comment above.
VERTICAL & HORIZONTAL ALIGNMENT	Alignment of dam is good.	None
MONOLITH JOINTS	Spillway system is composed of slabs supported on concrete buttresses.	None
CONSTRUCTION JOINTS	Joints occur across buttresses and is the first point of deterioration and erosion of surface concrete.	None
STAFF GAGE OF RECORDER	In working order at lock.	None

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	Spillway section - concrete created which was over flow spillway. New crest is slab. Vents are located at toe of of slabs. On east side of dam flow was observed coming from vents long after pool was lowered below crest.	The older dam's structural integrity and seepage problems should be verified. Seepage problems through the stone dam should be investigated and repaired.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Visual observation shows spillway abutment concrete walls severely eroded. Surface of lock walls severely deteriorated and seepage is in evidence.	Deteriorated concrete should be repaired in spillway area. Condition could eventually lead to partial failure of spillway section. Condition of lock is remotely associated as a recreational hazard.
DRAINS	None other than vents described above.	
WATER PASSAGES	None	
FOUNDATION	Foundation appears to be on sandstone bedrock	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	N/A	
RIPRAP FAILURES	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A	
ANY NOTICEABLE SEEPAGE	N/A	
STAFF GAGE AND RECORDER	N/A	
DRAINS	N/A	

UNGATED SPILLWAY

Crested Spillway extends the effective width of the river and constitutes the major section of the dam under head.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	See comments on Sheets 2 and 3.	Concrete weir should be repaired. Replacement of entire spillway slab is likely in order.
APPROACH CHANNEL	Upstream face of dam. Approach channel is effective width of river.	None
DISCHARGE CHANNEL	Effective width of river. Is composed of bedrock. No movement of bedrock or boils located. Sandstone bedrock has some surface erosion and many fractures and joints.	No badly eroded areas threatening to undermine the dam.
BRIDGE AND PIERS	None.	

GATED SPILLWAY

Gates regulate flow to hydro power facility, since navigation has first rights to water during low flow.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	None	
APPROACH CHANNEL	N/A	None
DISCHARGE CHANNEL	N/A	None
BRIDGE AND PIERS	N/A	None
GATES AND OPERATION EQUIPMENT	Manually operated	None

OUTLET WORKS

Only outlets are through power house and lock. Neither of these can completely draw down reservoir pool, however capacity exists to drawdown below crest.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None	
INTAKE STRUCTURE	None	
OUTLET STRUCTURE	None	
OUTLET CHANNEL	None	
EMERGENCY GATE	None	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Channel clear and unobstructed. Bed of channel on rock.	Not a problem.
SLOPES	Channel slope very flat. Overbank condition sloped towards river with development above riverbank.	
APPROXIMATE NO. OF HOMES AND POPULATION	This dam is 6.5 miles above Lock 5. This reach of river has not been inspected to inventory hazards. A cursory examination lists the following: residential, commercial, recreational boats, and docks. Economic loss potential would be in range of \$100,00-\$1,000,000. Damage to the hydro generating station and lock also possible. Loss of life potential could be more than 4 people either from a flood flow or normal operating situation dam breach. A substantially high loss of life potential is not feasible.	Since the dam is located across a navigable waterway heavily used for recreational travel, a high hazard rating is appropriate.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
OBSERVATION WELLS	None observed.	
WEIRS	None observed.	
PIEZOMETERS	None observed.	
OTHER	None observed.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Little sloped terrain into river and dam pool.	Not a problem area.
SEDIMENTATION	No sedimentation build-up observed.	

Lower Fulton at
NAME OF DAM Lock No. 3

ID # 406

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

ITEM	REMARKS
AS-BUILT DRAWINGS	See this report.
REGIONAL VICINITY MAP	See this report.
CONSTRUCTION HISTORY	No data.
TYPICAL SECTIONS OF DAM	See this report.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report.
RAINFALL/RESERVOIR RECORDS	Not obtained for this inspection.

ITEM	REMARKS
DESIGN REPORTS	No data.
GEOLOGY REPORTS	No data.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	No data.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	No data.
POST-CONSTRUCTION SURVEYS OF DAM	No data.
BORROW SOURCES	N/A.

ITEM	REMARKS
MONITORING SYSTEMS	Information available at Lock and hydropower generating facility.
MODIFICATIONS	None.
HIGH POOL RECORDS	No data.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	No data. Limited to information on previous inspection reports, see this report.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	No data.
MAINTENANCE OPERATION: RECORDS	Same comments as above for monitoring system.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See this report.
OPERATING EQUIPMENT PLANS & DETAILS	See this report. More information available from N.Y.S.D.O.T. See card file on maintenance and improvements in this report.

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

Elevations: Barge Canal Datum (USGS + 0.99 feet)

DRAINAGE AREA CHARACTERISTICS: 5100 (+) square miles.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): Nav. Season w/flashboards 335.5
Winter Season w/o flashboards 334.75

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ----

ELEVATION MAXIMUM DESIGN POOL: ----

ELEVATION TOP DAM: 342.6

CREST:

a. Elevation Nav. Season w/flashboards 335.5
Winter Season w/o flashboards 334.75

b. Type -----

c. Width See report for crest shape.

d. Length 509

e. Location Spillover -----

f. Number and Type of Gates -----

OUTLET WORKS:

a. Type 6,000 cfs Granby side (under design) existing 2900 cfs (to be demolished in 1978)
1,000 cfs Fulton Side.

b. Location Granby-west side of river; Fulton - east side of river

c. Entrance Inverts -----

d. Exit Inverts -----

e. Emergency Draindown Facilities Limited use through power house
Reservoir cannot be completely drawn-down. Cannot drawdown through locks without damage to gates.

HYDROMETEOROLOGICAL GATES:

a. Type -----

b. Location -----

c. Records -----

MAXIMUM NON-DAMAGING DISCHARGE: Significant damage 50,000 cfs
Recreational hazard at 0 cfs
or normal operating condition

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

Lower Pool 308.00

Upper Mitre Sill 322.0

Upper Pool 337.00

Lower Mitre Sill 295.00

6 x 6 valves

- 1918 - New gate roller on N.E. Gate
 1930 - Anchors for "A" frames installed.
 Pipe fence erected along E. wall of lock on raceway side.
 Steel stairways erected at N. end of lock. New walks on lock gate.
 1911 - Lock unwatered and short sections of rails installed in the N.W. valve well. New 12 x 12 timber placed on E wall just So. of Lk.
 Lock signal light system installed.
 1912 - replaced both lower wheels on upper left valve.
 1933 - Mar. - Unwatered - new wheels on upper and lower Rt. valves, 2-10 ft. & 2-20 ft. sections of new rails in lower left valve, corner on counterweight side broke off and we placed plates on face of culvert wall and welded them to rail (west side) placed equalizers on both upper valves.
 May - Upper left valve would not seat. Placed needle dam in upper end burned side seal strips and rails placed a 1" x 6" plate and bolted same to bottom casting to prevent sides from closing in.
 1935 - Pumped & overhauled.
- 1943 - Upper end of lock overhauled.
 1944 - New cables laid from Lock 2 to Lock 3.
 1945 - Light poles cut down - New lamp installed.
 1946 - Valve replaced - culvert gratings repaired.
 1947 - Motors on W. side of lock overhauled. One upper valve replaced.
 1949 - Lock completely overhauled & rewired. New wood floor installed in lockhouse.
 1951 - New lockhouse, rewired motor panels.
 1953 - Gate & valve motors W. side of lock overhauled. Replaced rub sticks, boxed in all heat runs & insulated same. Installed storm windows for lockhouse.
 1954 - Replaced worn out rub sticks on gates. New conc. post cable - guard rail along raceway.
 1955 - Refurbished grids from gate & valve motors.
 1956 - Installed timbers on approach wall. Reshingled storehouse roof.
 1957 - Unwatered - Up & Low gates scraped & painted. Reconditioned valves installed. Strips welded on seating rails, Z bars repaired, Sills & Mitre posts repaired. New rub sticks. City water installed to lockhouse. Oil furnace installed, lockhouse & powerhouse. Lock ladders rebuilt. Rub sticks replaced. New walk for cable bridge.
 1958 - 160' conc. poured on E. wall between Lk. #2 & #3, removed old gate house.
 1959 - Contract U.S. 100, Sills lowered.
 1960 - Motors at lower end overhauled, steel railings repaired & welded.
 1962 - Stack lights on motor cabinets rewired, 8 motor control panels rewired. New water line installed, motors & grids repaired.

FULTON (CONTD.)

- 1963 - Addition to lockhouse constructed to house motor gen. set. New upper valves, rails, cupwheels and chains. Repaired up gates & anchor arms adjusted miter timbers.
- 1964 - New trash racks on upper culver.
- 1965 - Generator relocated.
- 1966 - Pumped for winter - conc. repairs to up. approach wall, valve overhaul, gates painted - new seals, rubsticks, conc. repairs to lock culvert & old buffer beam recess, parking area repaired.
- 1967 - Resurfaced top & face of 300' up rt. approach wall, resurfaced top of rt. lock wall, plated gate recesses, built new buffer beam slots.

STRUCTURE INVENTORY - GENERAL LISTING

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HEIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATION
WS F0F1 701 2A	F						BRIDGE ACROSS LIMESTONE FEEDER
WS F0A5 701 2A	F						FARM BRIDGE OVER LIMESTONE CREEK
WS 0002 701 2B	0	116+50				103	LOCK ST BR PHOENIX
WS 0003 701 2B	C	122+65				85	BRIDGE ST BR PHOENIX
WS 0004 701 2B	0	126+30	352.8			167	CULVERT ST BR PHOENIX
WS 0007 701 2B	0	613+65				117	SWING BR AT LOCK 02
WS 0001 701 2C	E						BRIDGE OVER OLD CAUGHDENY LOCK
WS F0R1 701 2C	F						ANDREWS ROAD BRIDGE
WS F0R2 701 2C	F						FARM RR. S. OF ANDREWS RD., BUTTERNUT FEEDER
WS F0D1 701 2C	F						TWIN PIPE CULV S. LAKE RD - DERUYTER
WS F0D2 701 2C	F						BOX CULV. E. LAKE ROAD DERUYTER
WS F0D3 701 2C	F						FARM BRIDGE, DERUYTER INLET
WS F0D4 701 2C	F						FARM BRIDGE, DERUYTER INLET
WS F0D5 701 2C	F						BRIDGE OVER DERUYTER OVERFLOW
WS 0028 701 3A	E	3932+00	374.0	13.2		45	RALDWINSVILLE DAM
WS F0B1 701 3A	F			5.0			BUTTERNUT CREEK DIVERSION DAM
WS F0D1 701 3A	F		1288.0	70.0			DERUYTER DAM
WS F0D2 701 3A	F						DERUYTER INLET DIVERSION DAM
WS F0F1 701 3A	F		430.0	6.5			LIMESTONE CREEK DIVERSION DAM
WS F0J1 701 3A	F		645.5				JAMESVILLE DAM
WS 0001 701 3A	0	117+00	343.0	11.0	6	90	PHOENIX DAM <i>Total Dam</i>
WS 0002 701 3A	0	608+60				10	UPPER DAM FULTON "
WS 0003 701 3A	0	641+00	335.0	17.0		10	LOWER DAM - FULTON <i>Key</i>
WS 0005 701 3A	0	971+00	308.0	19.5		37	DAM 5 AT MINETTO
WS 0006 701 3A	0	1146+25	290.0	33.0		37	DAM 6 - HIGH DAM AT LOCK 04 - OSWEGO

6

STRUCTURE INVENTORY - CANAL LISTING

STRUCTURE ID NO SEC/HIST TYPE	NO CANAL	STATION - APPROX STRUCTURE CENTER	POML ELEV (LOW/ONLY)	LEFT/ RIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATOR
WS 0037 701 3A	0	1166+00	270.0	12.0		35	CURVED DAM AT LOCK 07 - OSWEGO
WS X001 701 3A	X						CARPENTER BROOK DIVERSION DAM (NOT NEEDED)
WS Y002 701 3A	Y	5090+00	375.4			5	OWASCO CREEK ENTRANCE 550FT LEFT
WS 0023 701 3C	E		369.0	0.0		M93	CAUGHNENY DAM
WS 0124 701 30	E	3931+50			1	635	TAMTAR GATE CONT M63+5
WS F002 701 30	F				1		WASTE GATE - BUTTERNUT ABUEDUCT
WS F001 701 30	F				2		BUTTERNUT FEEDER GULKMEAD
WS F004 701 30	F				4		DERUYTER INLET HEADGATES
WS F003 701 30	F			5.0			STREAM ENT. - DERUYTER INLET
WS F001 701 30	F	1200.0	3.0				DERUYTER DAM SPILLWAY
WS F002 701 30	F				3		DERUYTER DAM OUTLET GATES
WS F001 701 30	F				0		LIMESTONE FEEDER GULKMEAD
WS F001 701 30	F				1		WASTE GATE - LIMESTONE ABUEDUCT
WS F0J1 701 30	F						JAMESVILLE DAM SPILLWAY
WS F0J2 701 30	F				3		JAMESVILLE DAM OUTLET GATES
WS 0031 701 30	0	363.0	12.0		6	00	TAMTAR GATES <i>Key E, Movable Crest</i>
WS 0021 701 30	0	363.0				00	NORTH AUTO FLASHBOARD BLOCKED TOP <i>Key D</i>
WS 0031 701 30	0	363.0				00	SOUTH AUTO FLASHBOARD BLOCKED TOP <i>Key F</i>
WS 0011 701 30	0	363.0	11.0			00	NORTH SPILLWAY <i>Key D</i>
WS 0041 701 30	0	363.0	11.0			00	SOUTH SPILLWAY <i>Key F</i>
WS 0012 701 30	0	352.8	10.3			10A	SPILLWAYS <i>Key H</i>
WS 0022 701 30	0				6	10A	TAMTAR GATES <i>Key J</i>
WS 0001 701 30	0	661+00	311.0			205	SPILLWAY IN DIKE BELOW LOCK 03
WS 0005 701 30	0	1100+75				35	BY-PASS CULVERT ABOVE LK 07 2 GATES
WS 0007 701 30	0	1104+00			1	709	FEED GATE - LOCK 07

Q
H

30-5 (2)

SLUICE GATES, SPILLWAYS, WASTE WEIRS - 1977

STRUCTURE ID NO	CONCRETE	SUPER STRUCTURE	MACHINERY	SL GATES	GATES FLUSHGIDS	STYLAGS	ELECT	T R A S H	C E M E N T
5 0126 3D	APUDSS	OC B	S F	SG GGS G	B A	SG	7 7	U 7	7
5 0127 3D	BIPWPP	PA A	LE	PA A A R U	O B E	T U I	N N	N N	7
5 0128 3D	TRSHLH	RT I	M U	NT T A I	A C	O P D	N N	N N	7
5 0129 3D	MRITLH	TV L	M S	NE B E T D	A R H	L O S	N N	N N	7
5 0130 3D	MSRWYI	HAL I	G T	VE S S E S	D R S	G S	N N	N N	7
5 0131 3D	TBMHYI	GL E	C D	L V A	D R S		N N	N N	7
5 0132 3D	SLAAS T	TES S	A B	L E H P L S	S S		N N	N N	7
5 0133 3D	EPFRER	ES S	R T	L E L L A T E			N N	N N	7
5 0134 3D	HRPFI	SS	I C	L E L L A T E			N N	N N	7
5 0135 3D	DOBCO	TL E	E G	L E L L A T E			N N	N N	7
5 0136 3D	SEER	LE B					N N	N N	7
5 0137 3D							N N	N N	7
5 0138 3D							N N	N N	7
5 0139 3D							N N	N N	7
5 0140 3D							N N	N N	7
5 0141 3D							N N	N N	7
5 0142 3D							N N	N N	7
5 0143 3D							N N	N N	7
5 0144 3D							N N	N N	7
5 0145 3D							N N	N N	7
5 0146 3D							N N	N N	7
5 0147 3D							N N	N N	7
5 0148 3D							N N	N N	7
5 0149 3D							N N	N N	7
5 0150 3D							N N	N N	7
5 0151 3D							N N	N N	7
5 0152 3D							N N	N N	7
5 0153 3D							N N	N N	7
5 0154 3D							N N	N N	7
5 0155 3D							N N	N N	7
5 0156 3D							N N	N N	7
5 0157 3D							N N	N N	7
5 0158 3D							N N	N N	7
5 0159 3D							N N	N N	7
5 0160 3D							N N	N N	7
5 0161 3D							N N	N N	7
5 0162 3D							N N	N N	7
5 0163 3D							N N	N N	7
5 0164 3D							N N	N N	7
5 0165 3D							N N	N N	7
5 0166 3D							N N	N N	7
5 0167 3D							N N	N N	7
5 0168 3D							N N	N N	7
5 0169 3D							N N	N N	7
5 0170 3D							N N	N N	7
5 0171 3D							N N	N N	7
5 0172 3D							N N	N N	7
5 0173 3D							N N	N N	7
5 0174 3D							N N	N N	7
5 0175 3D							N N	N N	7
5 0176 3D							N N	N N	7
5 0177 3D							N N	N N	7
5 0178 3D							N N	N N	7
5 0179 3D							N N	N N	7
5 0180 3D							N N	N N	7
5 0181 3D							N N	N N	7
5 0182 3D							N N	N N	7
5 0183 3D							N N	N N	7
5 0184 3D							N N	N N	7
5 0185 3D							N N	N N	7
5 0186 3D							N N	N N	7
5 0187 3D							N N	N N	7
5 0188 3D							N N	N N	7
5 0189 3D							N N	N N	7
5 0190 3D							N N	N N	7
5 0191 3D							N N	N N	7
5 0192 3D							N N	N N	7
5 0193 3D							N N	N N	7
5 0194 3D							N N	N N	7
5 0195 3D							N N	N N	7
5 0196 3D							N N	N N	7
5 0197 3D							N N	N N	7
5 0198 3D							N N	N N	7
5 0199 3D							N N	N N	7
5 0200 3D							N N	N N	7

N. cable frayed

clear brush out of walls, clean silt & debris above

some stones missing broken floor stand

Abutment needs painting

main anch poor, elect. poor, finish paint, all conc. poor

of surface work done, some over 1/2 inch deep, all conc. poor

disinfect union, paint bridge thru abut wall

Faint frame holding grating

STRUCTURE ID NO	CANAL	STATION - APPROX	POND ELEV	LIFT/ TUNNEL SZ/	OMIG	HISTORICAL NAME AND LOCATON
SEC/INST	TYPE	STRUCTURE CENTER	(LOW/ONLY)	NIGHT NO GATES	CONTRACT	
WS 0002	701 30	0	1191.00		255.0	M64 SIDE SPILLWAY BETWEEN LOCKS 07 & 08
WS 0003	701 30	0	1203.71		255.0	M64 SIDE SPILLWAY WEST WALL ABOVE LOCK 8
WS Y001	701 30	Y	60.15			T20 ONONDAGA CREEK SPILLWAY
WS 0224	701 3E	E	3931.00			208 TAINTOR GATE NH POWER RACE 530 FT L
WS F001	701 3E	F				OVERFLOW FLUME - DERUYTER DAM
WS F002	701 3E	F				DERUYTER OUTLET FLUME
WS 0051	701 3E	0	118.00	3	00	SOUTH HEADGATE NO 1 PLUGGED <i>Key G</i>
WS 0061	701 3E	0	119.10	4	00	SOUTH HEADGATE NO 2 PLUGGED "
WS 0071	701 3E	0	119.00	3	00	SOUTH HEADGATE NO 3 PLUGGED "
WS 0011	701 3E	0	121.00	8	00	NORTH HEADGATE NO 1 <i>BeeWay SILL</i>
WS 0021	701 3E	0	121.56	3	00	NORTH HEADGATE NO 2 PLUGGED <i>Key C</i>
WS 0031	701 3E	0	121.42	3	00	NORTH HEADGATE NO 3 PLUGGED "
WS 0041	701 3E	0	121.28	3	00	NORTH HEADGATE NO 4 PLUGGED "
WS 0053	701 3E	0	600.00		108	POWER FORERAY - LOCK 03 - FULTON <i>Key D</i>
WS 0063	701 3E	0	600.35	2	108	BULKHEAD NO 4 W SIDE LOWER DAM <i>Key M</i>
WS 0033	701 3E	0	600.50	10	108	BULKHEAD NO 3 W SIDE LOWER DAM "
WS 0023	701 3E	0	642.20	3	108	BULKHEAD NO 2 E SIDE LOWER DAM <i>Key H</i>
WS 0063	701 3E	0	652.00		10	POWER TAILRACE BELOW LOCK 03 <i>Key P</i>
WS 0005	701 3E	0	972.15		37	BULKHEAD NO 5 - MINETTO
WS 0052	701 3E	0		17	10	BULKHEAD NO 5 (UPPER DAM) <i>Key G</i>
WS 0006	701 3E	0	1195.90	24	37	BULKHEAD NO 6 - HIGH DAM - OSWEGO
WS 0077	701 3E	0	1169.06	24		BULKHEAD NO 7 - CURVED DAM - OSWEGO
WS 0017	701 3E	0	1185.00		35	HYDRAULIC CANAL BULKHEAD (SEALED)
WS 0001	701 0A	E			T20	CLEVELAND TERMINAL
WS 0002	701 0A	E				DUCK-FRENCHMANS IS

E-546
30

SURFACE GATES SPILLWAYS WASTE WEIRS - 1977

STRUCTURE ID NO	CONCRETE	SUPER STRUCTURE	MACHINERY	SE GATES	GATES FLANGES	STPLGS	EJECT	TIRE
SH	T APUDSS	O C R	S F S	G G S G	B A	S G	M M	A C R
CT	Y BIPMPP	P A I	T L P	A T A E U	O C H	T O I	O R I	K E C
TR	E PMSNLN	T W L	R N S	T E T A I	A R H	O P E	T O R	S C O
NC	MRSRSLN	I N G	M S V	E T E S E	D R O	L E S	M R A	M C M
	NSRRTW	L C S	S V F	S E S	S A G	L O G	R C S	M E N
	SBMMRYI	T S S	V F R	S S	E	S	S	D
	LA ST R		L V A					
	KPARRS		E L A					
	HRPFI		P L E					
	DORCO		I T L					
	SNRER		L T E					
5 0224 3E	5NXXXM	7 7 7	7 7 N	6 6 X X M	3 3	U N	U M	U N 5
5 0201 3E	MNNM3M	N N N	N N N	M M M N N	M N	U N	U M	U N 3
5 0202 3E	7 N N U N	U N U	N N N	M M M N N	M N	U N	U M	U N 9
5 0251 3E	3 T N N N N	N M 7	N N N	X X X X X	M N	U N	U M	U N 9
5 0261 3E	5 7 N M N N	N M 7	N N N	X X X X X	M N	U N	U M	U N 9
5 0271 3E	5 7 H U U N	H M 7	U M N	X X X X X	M N	U N	U M	U N 9
5 0211 3E	5 5 X X X N N	7 5 3	7 3 N	5 5 3 3 3	M N	U N	U M	U N 3
5 0281 3E	5 5 X X X N N	N M 7	U M N	U N U U U	M N	U N	U M	U N 7
5 0291 3E	5 5 X X X N N	U M 7	N N N	M M M U U	M N	U N	U M	U N 7
5 0282 3E	5 5 X X X U U	U U 7	U M N	M M M N N	M N	U N	U M	U N 7
5 0293 3E	6 6 N U U U	U U N	N N N	M M M N N	M N	U N	U M	U N 9
5 0283 3E	7 5 X X X N N	U M 7	3 3 U	X X X X X	M N	U N	U M	U N 3
5 0293 3E	7 5 X X X N N	U M 7	3 3 U	X X X X X	M N	U N	U M	U N 3
5 0281 3E	5 5 X X X N N	U M 7	3 3 U	X X X X X	M N	U N	U M	U N 3
5 0281 3E	5 5 X X X N N	U M 7	3 3 U	X X X X X	M N	U N	U M	U N 3
5 0004 3E	5 5 U U U N N	7 3 7	3 U M	3 1 3 M U	M N	U N	U M	U N 3
5 0052 3E	7 5 X X X N N	N 7 U	3 3 M	3 4 X X X	M N	U N	U M	U N 3
5 0005 3E	3 5 U U U N N	7 7 U	U 3 M	5 4 X X 5	M N	U N	U M	U N 5
5 0077 3E	7 7 X X X U U	5 N 7	U 3 U	5 5 X X 5	M N	U N	U M	U N 5
5 0017 3E	5 5 X X X N N	N M 5	U M N	X X X X X	M N	U N	U M	U N 7
5 0002 3E	5 5 X X X N N	U M 5	U M U	M M M U U	M N	U N	U M	U N 7
5 0001 3E	7 7 X X X N N	N 7 U	U 7 U	6 6 6 6 U	M N	U N	U M	U N 7
6 0001 3E	M N N N N N	N M N	U M N	M M M N N	M N	U N	U M	U N 7

fill debris knock in air to Seal dis. at 2.2 x

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK
CONSERVATION COMMISSION
ALBANY

DAM REPORT

III Deje

5/24/1917

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the For Lower Fulton Dam.

This dam is situated upon the Oswego River (Give name of stream) in the Town of Orangethorpe Oswego County.

about in (State distance) from the Village or City of Fulton

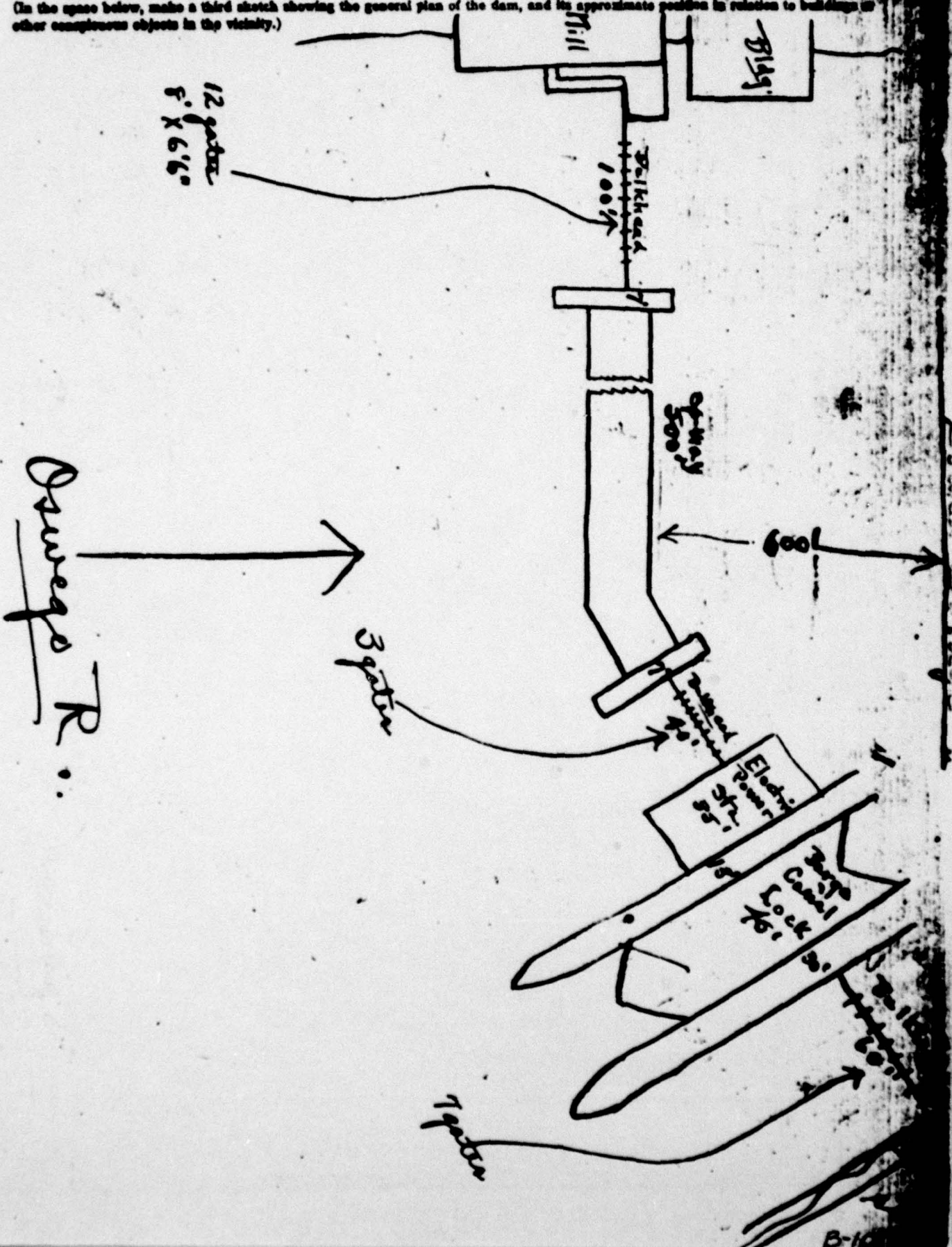
The distance down (Up or down) stream from the dam, to the Lower Bridge (Give name of nearest important stream or of bridge) is about 600 ft. (State distance)

The dam is now owned by New York State (Give name and address in full) and was built in or about the year 1917, and was extensively repaired or reconstructed during the year _____

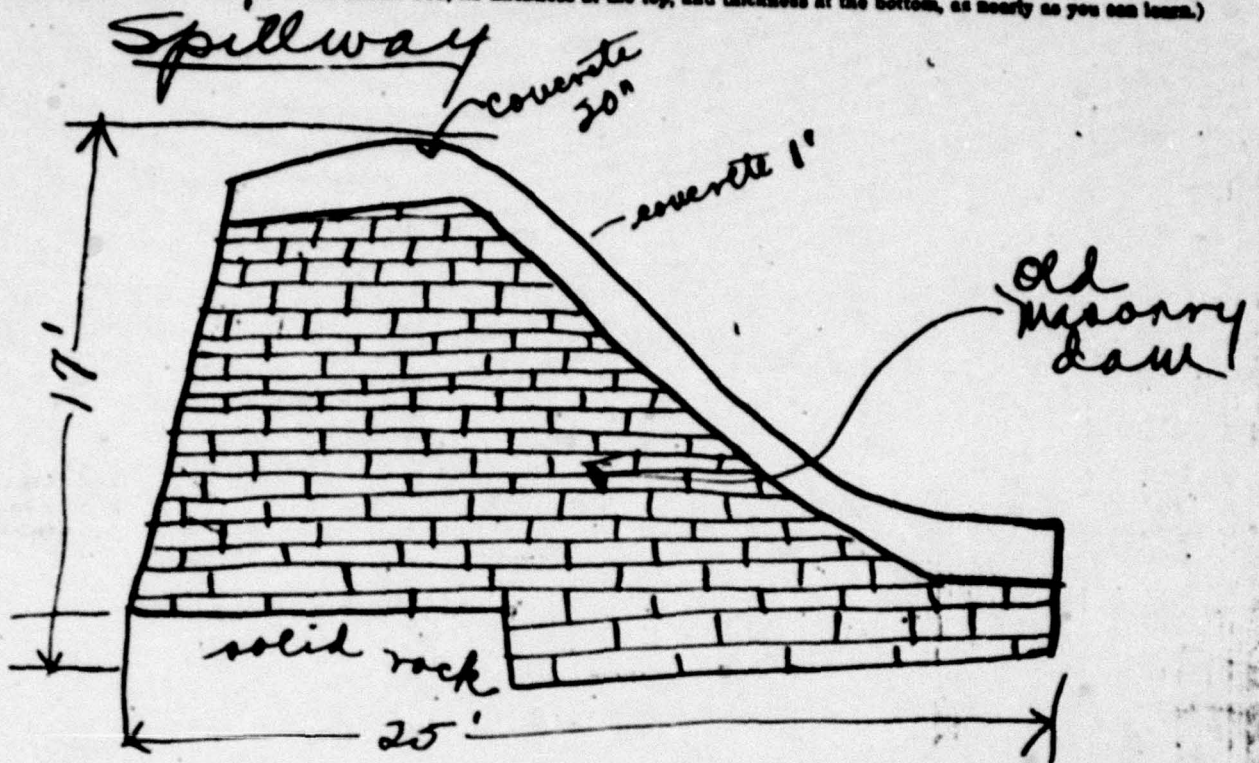
As it now stands, the spillway portion of this dam is built of masonry (State whether of masonry, concrete or timber) and the other portions are built of concrete (State whether of masonry, concrete, earth or timber with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is solid rock and under the remaining portions such foundation bed is solid rock

(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)



(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)



The concrete abutments at the ends of the spillway are 7' across and $7\frac{1}{2}$ ft. above the spillway. The other piers and abutments are at about the same level above the spillway. This is all state work and abutments which are plumb on the face have a batter of from 4 on 1 to 2 on 1 on the back.

The total length of this dam is 900 feet. The spillway or waste-weir portion, is about 300 feet long, and the crest of the spillway is about 7 1/2 feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: None

At the time of this inspection the water level above the dam was 4 ft. ~~below~~ above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

Excellent condition. No leaks or cracks —

#

Reported by C. W. Douglas

115 Standard Bldg.
(Address—Street and number, P. O. Box or R. F. D. route)

Syracuse, N. Y.
(Name of place)

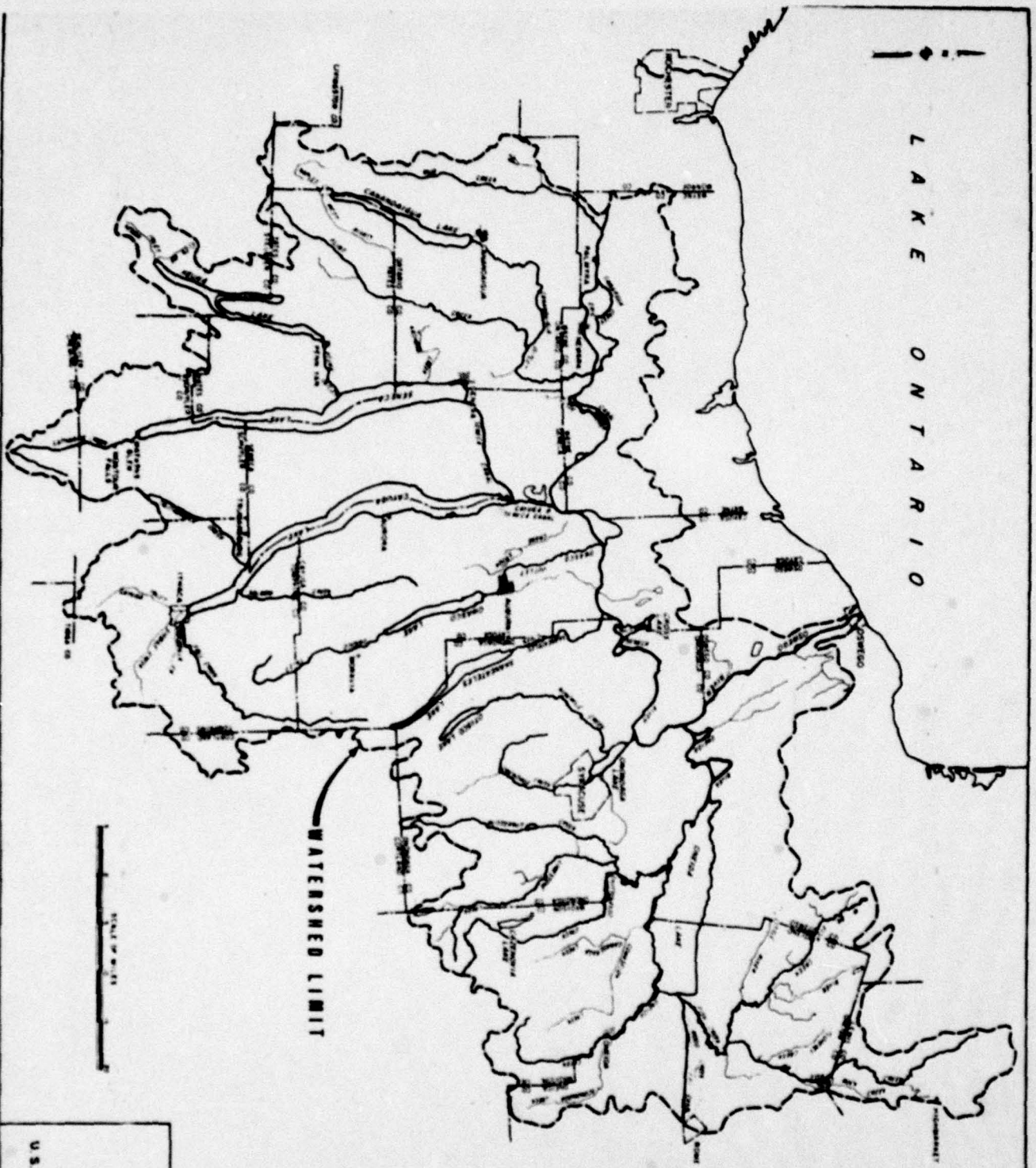
APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

HYDROLOGY

- Figure C-1 Watershed - Oswego River Basin
- Figure C-2 Principal Drainage System
- Figure C-3 Facilities (Water Management)
- Figure C-4 Storm Pattern June 20-25, 1972
- Figure C-5 HEC-1 Derived Discharge-Frequency Curve By
N.Y.S.D.E.C.
- Figure C-6 Basin Model (HEC-1) Sub-Basins and Sub-Areas
- Figure C-7 Basin Model (HEC-1) Flood Routing System
- Figure C-8 Calibrated HEC-1 Results (June 20-25, 1972)

- Table I-1 Physical Characteristics of Lakes in the Basin



LAKE ONTARIO

WATERSHED LIMIT



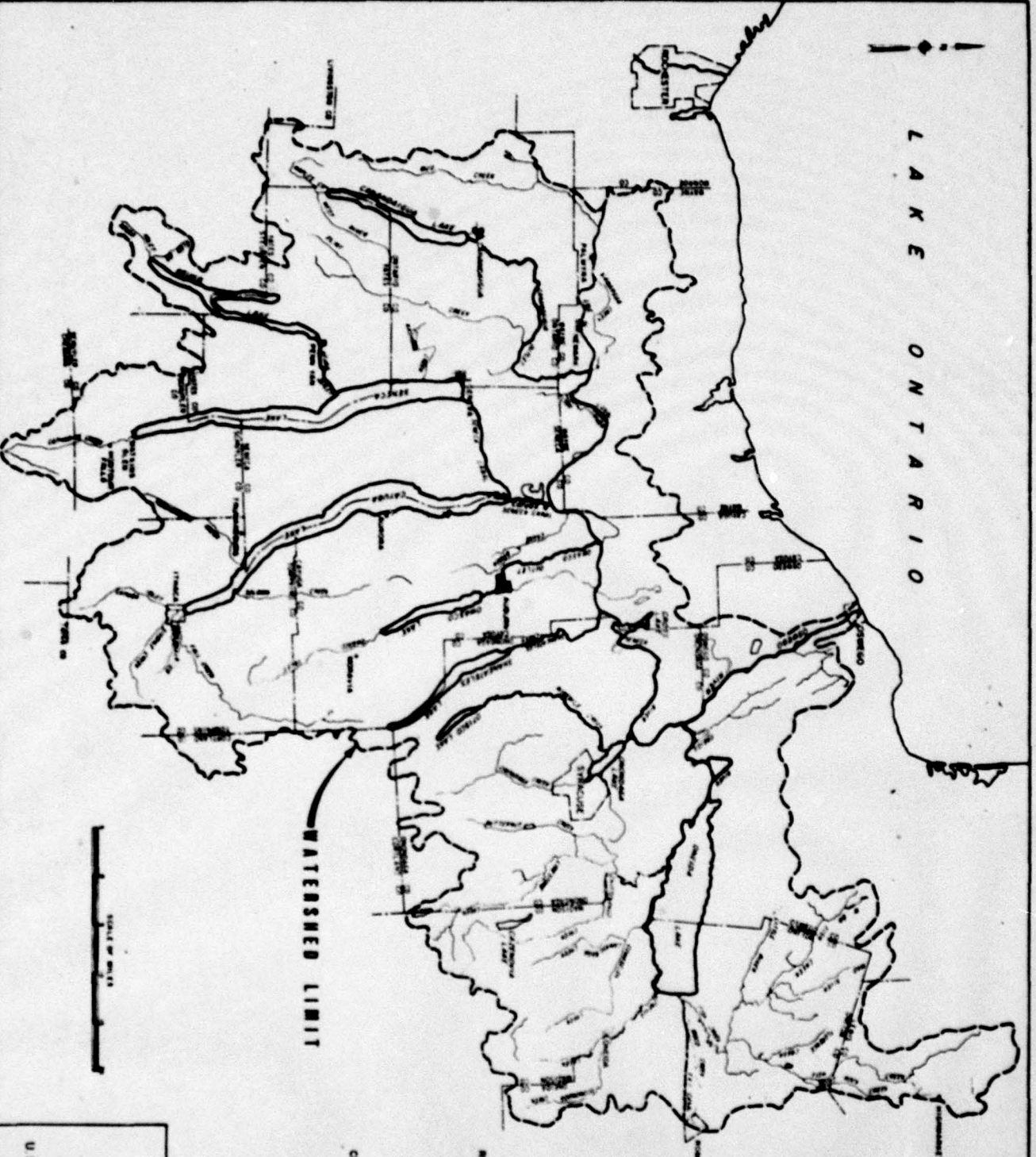
- COUNTIES**
- 1 CAYUGA
 - 2 CHEMUNG
 - 3 CORTLAND
 - 4 LEWIS
 - 5 LYNDENSTON
 - 6 MADISON
 - 7 MONROE
 - 8 ONEIDA
 - 9 ONTARIO
 - 10 OSWEGO
 - 11 SCHUYLER
 - 12 SENeca
 - 13 STEUBEN
 - 14 TIOGA
 - 15 TOMPKINS
 - 16 WARREN
 - 18 Yates

LEGEND

- COUNTY BOUNDARY
- - - MUNICIPAL BOUNDARY
- URBAN PLACE

OSWEGO RIVER WATERSHED
 CENTRAL NEW YORK STATE
WATERSHED
 U.S. ARMY ENGINEER DISTRICT, BUFFALO
 FOR REPORT DATED 1978

LAKE ONTARIO



WATERSHED LIMIT

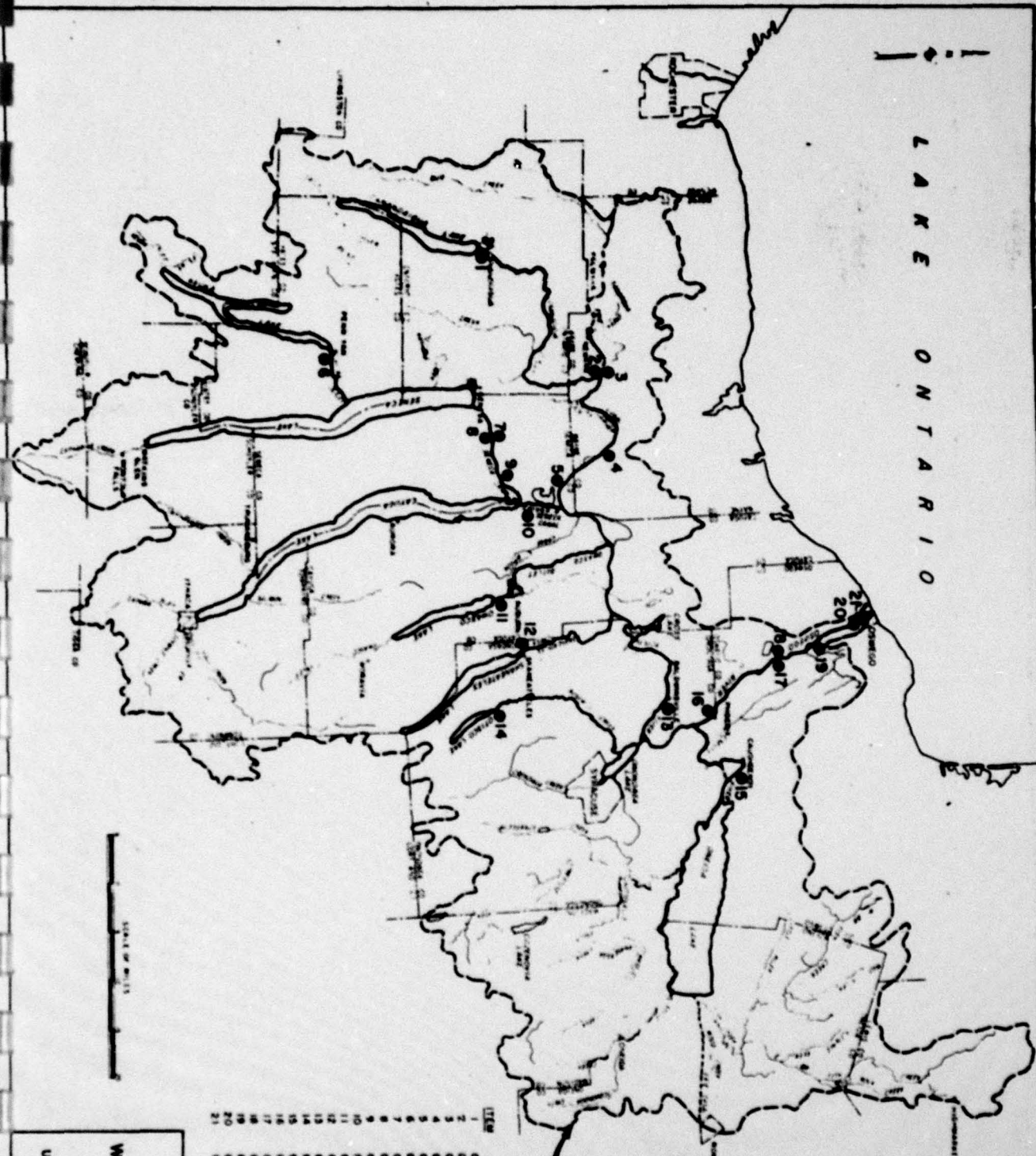


PRINCIPAL DRAINAGE SYSTEM

- RESERVOIRS: CARRANDIQUA
- KEUKA
- SENeca
- CAYUGA
- OSWAGO
- SHAWATELES
- OTISCO
- CROSS
- ONONDAGA
- ONEIDA
- CHANNELS:
- CARRANDIQUA OUTLET
- CLYDE RIVER
- KEUKA OUTLET
- SENeca RIVER & ASSOC. CHANN.
- OSWAGO OUTLET
- SHAWATELES CREEK
- MINERAL CREEK
- ONONDAGA OUTLET
- ONEIDA RIVER & ASSOC. CANAL
- OSWEGO RIVER
- FRINGED LAKES RESERVOIRS

OSWEGO RIVER WATERSHED
 CENTRAL NEW YORK STATE
**PRINCIPAL
 DRAINAGE SYSTEM**
 U. S. ARMY ENGINEER DISTRICT, BUFFALO
 FOR REPORT DATED 1978

LAKE ONTARIO



WATERSHED LIMIT

WATER MANAGEMENT FACILITY

ITEM	DESCRIPTION	LOCATION
1	GATED LAKE OUTLET	CAMARONVILLE
2	GATED RIVER DAM	LYONS
3	GATED RIVER DAM	LYONS
4	GATED RIVER DAM	CLYDE
5	GATED RIVER DAM	WATTS-FORRY
6	GATED LAKE OUTLET	PERIN VAN
7	GATED HYDRO-PULVER MILL	WATERLOO
8	GATED RIVER DAM	WATERLOO
9	GATED RIVER DAM	SENeca FALLS
10	GATED LAKE OUTLET	SLUD LOCK
11	GATED LAKE OUTLET	AUBURN
12	GATED LAKE OUTLET	SHARONVILLE
13	GATED RIVER DAM	BALDWINVILLE
14	GATED LAKE OUTLET	BARRETTA
15	GATED RIVER DAM	CAMPBELLTON
16	GATED RIVER DAM	PHOENIX
17	GATED RIVER DAM	FULTON
18	GATED RIVER DAM	FULTON
19	GATED RIVER DAM	MINNETTO
20	GATED RIVER DAM	OSWEGO
21	GATED RIVER DAM	OSWEGO

OSWEGO RIVER WATERSHED
 CENTRAL NEW YORK STATE
 WATER RESOURCE MANAGEMENT
 FACILITIES OF THE
 PRINCIPAL DRAINAGE SYSTEM
 U.S. ARMY ENGINEER DISTRICT, BUFFALO
 FOR REPORT DATED 1978

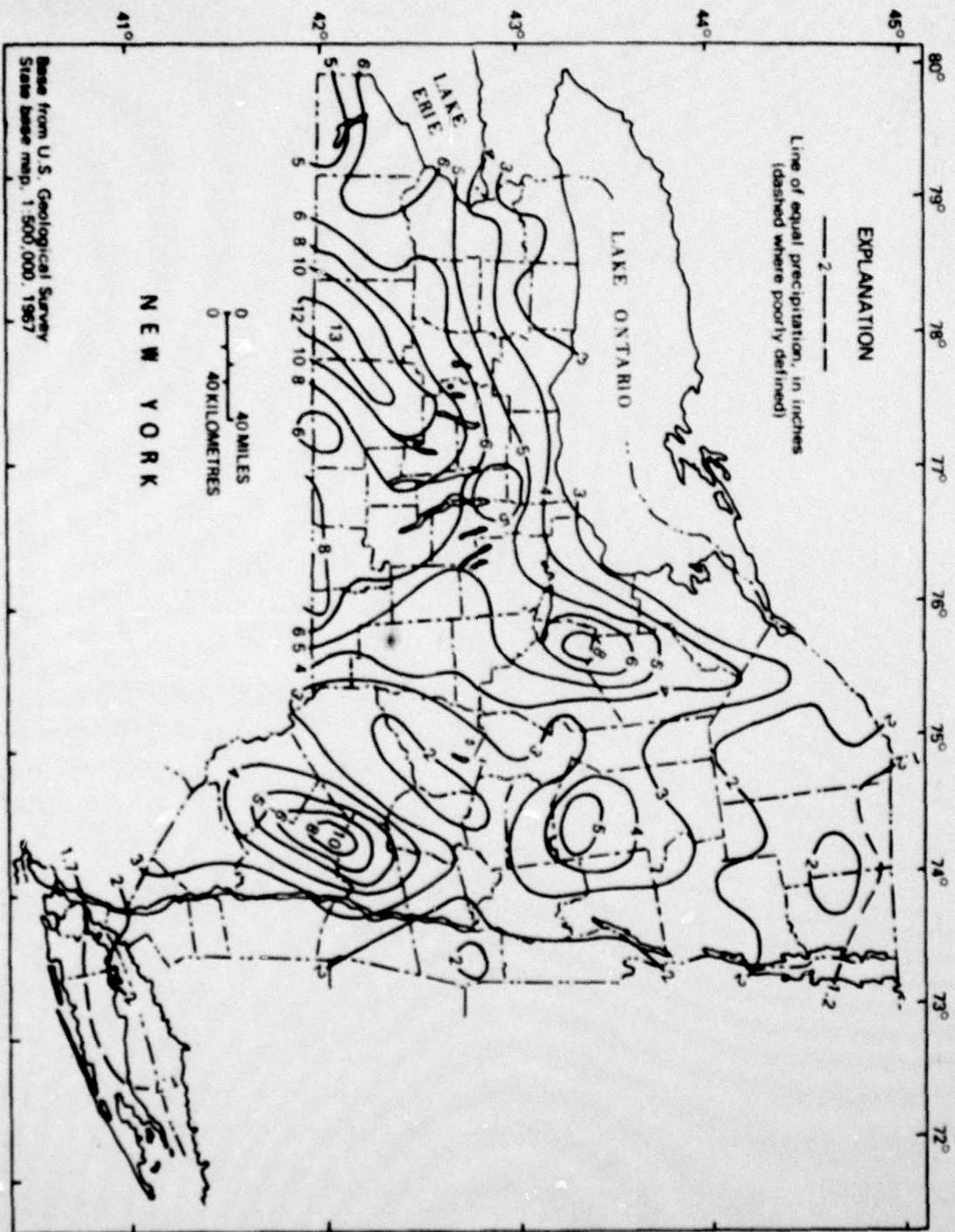
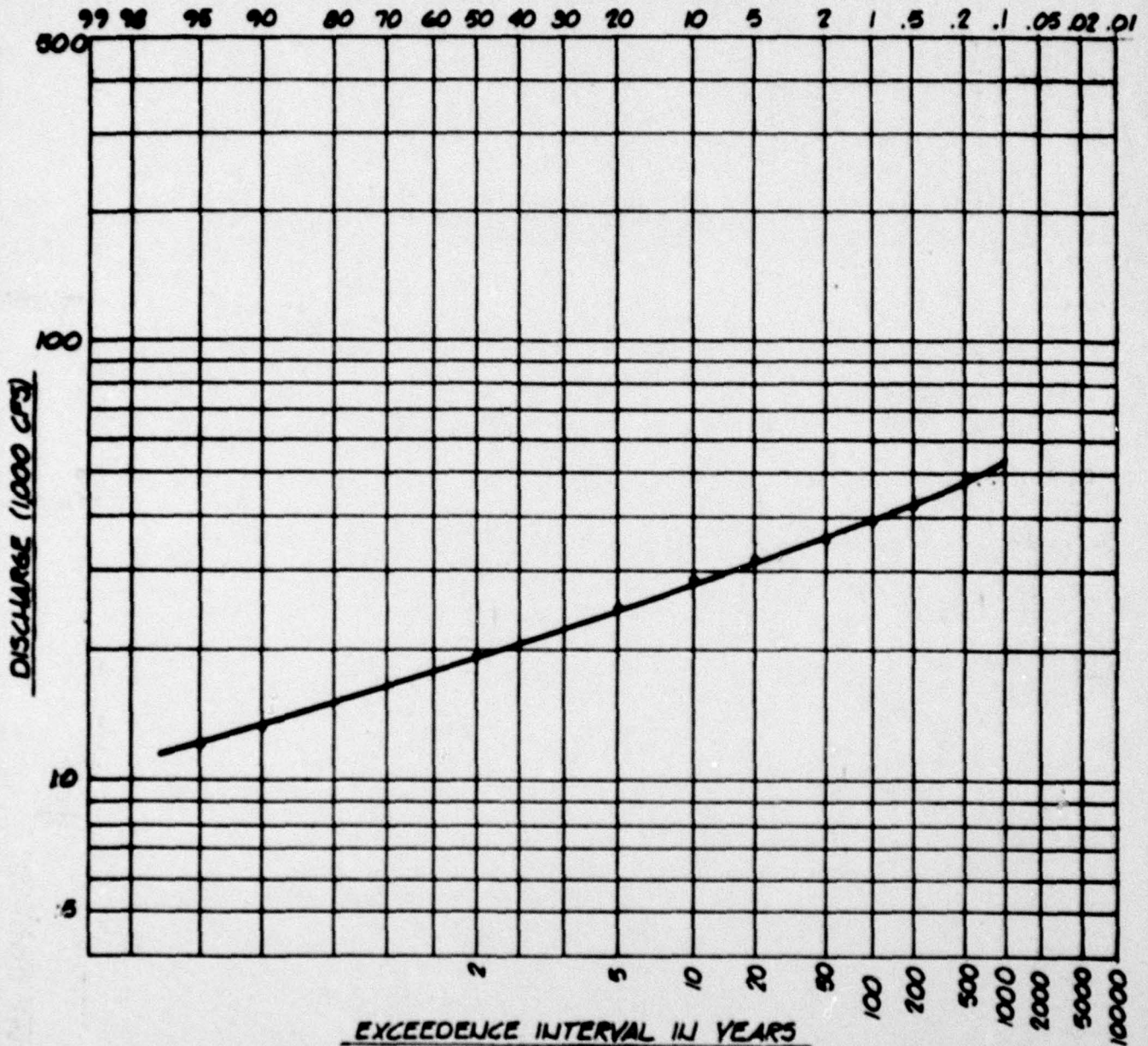


Figure 3.--Precipitation in New York, June 20-25. (Adapted from map furnished by A. B. Pack, Climatologist, National Weather Service, Ithaca, New York.)

EXCEEDENCE FREQUENCY PER 100 YEARS



NOTE: DISCHARGE - FREQUENCY CURVE CONVERTED FROM STAGE - FREQUENCY CURVE, USING STAGE - DISCHARGE RATING CURVES DEVELOPED BY D.E.C.

DISCHARGE - FREQUENCY CURVE

C-5



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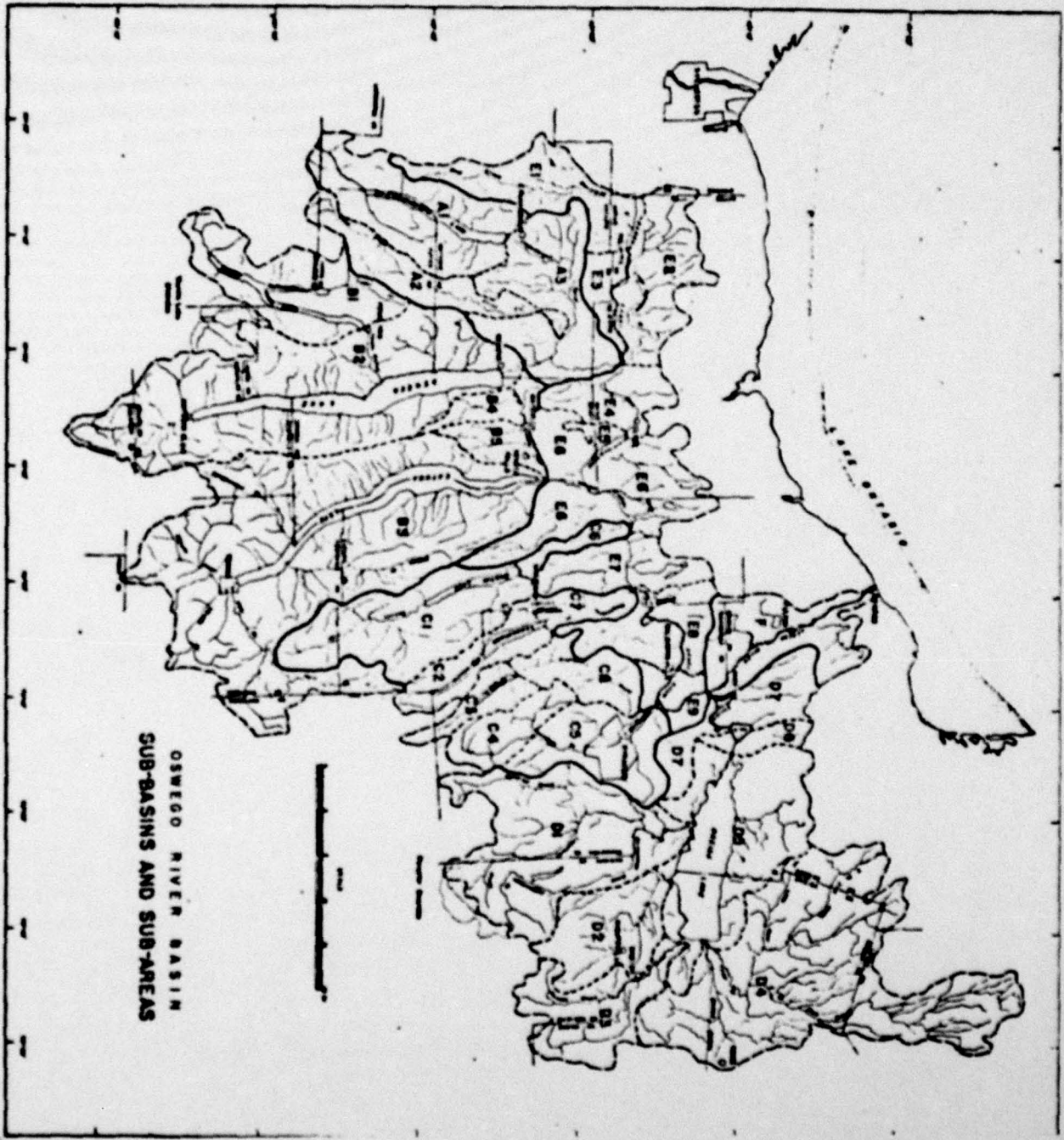
DATE 6-27-79

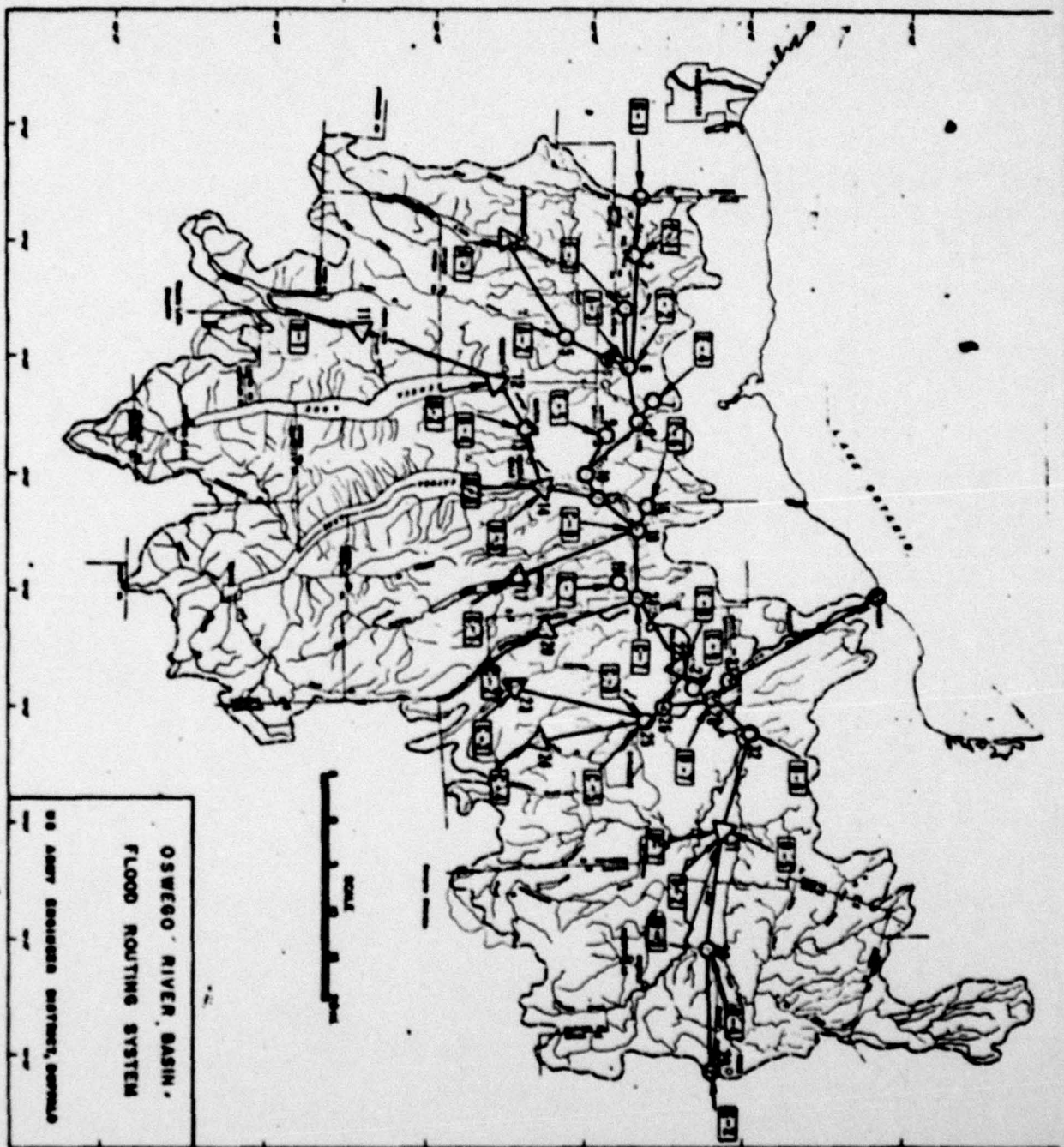
DESIGNER JPS

JOB 2305

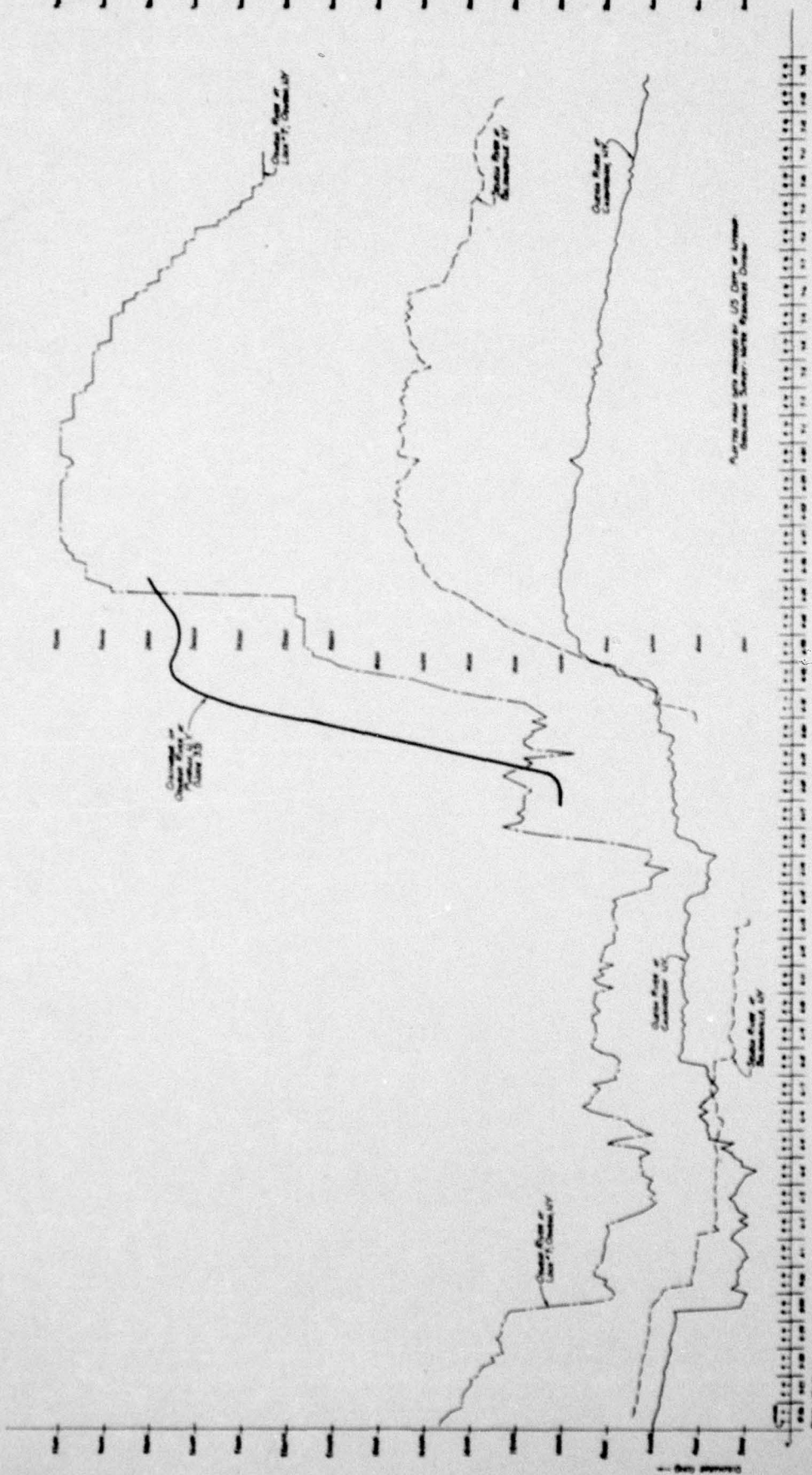
APP'G

THREE RIVERS (NODE 28)





OSWEGO RIVER BASIN.
FLOOD ROUTING SYSTEM
US ARMY ENGINEER DISTRICT, OSWEGO



Plotted from measurements of US Dept. of Interior
 Geological Survey - Water Resources Division



DISCHARGE CURVES
 OMEGA RIVER METERED
 FROM 1957 TO 1958



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DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-28-79
 SUBJECT OSWEGO RIVER CURVED DAM - LOCK #7 PROJECT NO. 2205
DISCHARGE - FREQUENCY RANKING DRAWN BY JPS

WATER YR	PEAK DISCHARGE	DATE	RANKING	DISCHARGE RAT PER
1936	37500 CFS	3-28-36	1	.02
1940	35000 CFS	4-10-40	2	.04
1972	32300 CFS	6-27-72	3	.06
1960	31200 CFS	4-4-60	4	.08
1950	29400 CFS	3-30-50	5	.11
1956	26800 CFS	4-13-56	6	.13
1942	25900 CFS	3-18-42	7	.15
1943	25400 CFS	5-15-43	8	.17
1947	25100 CFS	4-8-47	9	.19
1955	23600 CFS	3-23-55	10	.21
1951	23500 CFS	2-22-51	11	.23
1945	23400 CFS	3-26-45	12	.25
1939	23200 CFS	3-8-39	13	.28
1959	23100 CFS	4-6-59	14	.30
1973	23000 CFS	4-7-73	15	.32
1961	22700 CFS	2-26-61	16	.34
1971	22600 CFS	3-18-71	17	.36
1902	22500 CFS	3-13-02	18	.38
1904	22200 CFS	4-02-04	19	.40
1946	22000 CFS	10-4-46	20	.42
1963	21900 CFS	3-28-63	21	.45
1970	21600 CFS	4-6-70	22	.47
1905	21300 CFS	3-28-05	23	.49
1937	21200 CFS	4-24-37	24	.51
1969	20900 CFS	2-4-69	25	.53
1903	20300 CFS	3-35-03	26	.55
1954	20000 CFS	5-9-54	27	.57
1941	19900 CFS	4-7-41	28	.60
1974	19900 CFS	4-7-74	29	.62
1958	19100 CFS	4-23-58	30	.64
1952	18700 CFS	3-12-52	31	.66
1948	18400 CFS	3-26-48	32	.68



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DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-20-79
SUBJECT OSWEGO RIVER CURVED DAM - LOCK #7 PROJECT NO. 1305
DISCHARGE - FREQUENCY RANKING DRAWN BY FS

WATER YR	PEAK DISCHARGE	DATE	RANKING	DISCHARGE	PLOT POS
1968	18100 CFS	6-30-68	33	.70	
1953	18000 CFS	3-28-53	34	.72	
1938	18000 CFS	3-1-38	35	.74	
1966	17600 CFS	3-6-66	36	.77	
1964	17500 CFS	3-18-64	37	.79	
1955	16900 CFS	7-14-35	38	.81	
1934	16400 CFS	4-15-34	39	.83	
1949	16300 CFS	2-17-49	40	.85	
1944	16000 CFS	4-14-44	41	.87	
1957	15200 CFS	3-15-57	42	.89	
1962	15200 CFS	3-16-62	43	.91	
1906	14900 CFS	4-10-06	44	.94	
1965	13200 CFS	4-26-65	45	.96	
1967	12900 CFS	5-17-67	46	.98	



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DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-26-79
 SUBJECT EXPANSION OF STAGE - DISCHARGE PROJECT NO. 2305
CURVES TO UPPER LIMITS DRAWN BY W. B. ANFER

SENECA LAKE $Q = \frac{1.49}{n} AR^{2.5} S^{.5}$ ASSUME: $n = .085$

HEIGHT	1.49/n	A	R	S	Q	STORAGE
10	42.57	10000	10	.001	66745	800000
20	42.57	24800	20	.001	248455	1200000

CANANDAIGUA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	106,500
10	42.57	10000	10	.001	62965	212,500
20	42.57	20000	20	.001	200366	319,000

KEUKA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	217000
10	42.57	10000	10	.004	111550	328550

CAYUGA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.0005	0	727000
3	42.57	15000	3	.0005	29810	854500
6	42.57	30000	6	.0005	94058	982000

OWASCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.006	0	119800
3	42.57	3000	3	.006	20,653	126500
6	42.57	6000	6	.006	65,720	152900
9	42.57	9000	9	.006	129,350	205700



PROJECT NAME NEW YORK STATE DAM INSPECTION

DATE 6-27-79

SUBJECT EXPANSION OF STAGE - DISCHARGE

PROJECT NO. 1305

CURVES TO UPPER LIMITS

DRAWN BY JPG

OTISGO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	39,200
3	42.57	900	3	.004	5060	45700
6	42.57	1800	6	.004	16100	52300
9	42.57	2700	9	.004	31700	58800
12	42.57	3600	12	.004	51200	65300

ONONDAGA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	32500
3	42.57	1500	3	.001	4200	43500
6	42.57	3000	6	.001	13400	52300
9	42.57	4500	9	.001	26400	62200
12	42.57	6000	12	.001	42700	72100

ONEIDA LAKE

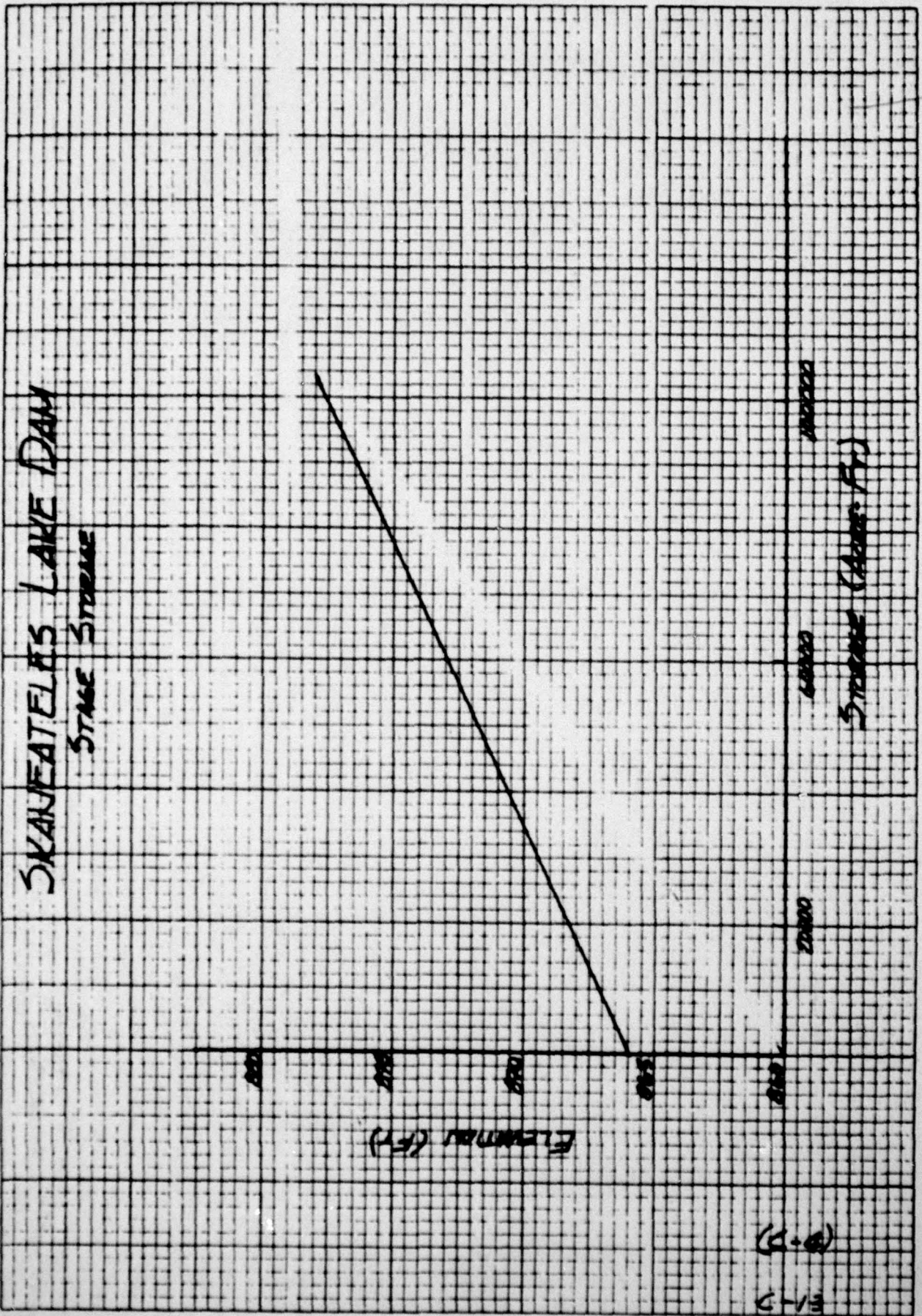
HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	845000
3	42.57	6000	3	.001	16900	998000
6	42.57	12000	6	.001	53700	1150000
9	42.57	18000	9	.001	103600	1304000

SKANEATELES LAKE

SEE SKANEATELES DAM INSPECTION REPORT DATE: SEPT 14/82
SHEETS C-4 & C-5

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SKANATELES LAKE DAM STAGE STORAGE



E-1-D
(K-O)



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DESIGN BRIEF

PROJECT NAME

NY DAM INSPECTION

DATE

9-15-78

TITLE

SKANEATELES LAKE DAM

PROJECT NO.

2210

DRAWN BY

JPS

STAGE - DISCHARGE TABULATION (FROM CREST OF SPILLWAY)

ELEV	PRINCIPAL ^Q SPILLWAY	^Q DAM	^Q TOTAL
866	—	—	—
867	124.80	—	124.80
868	352.99	—	352.99
868.5 (Top of Dam)	493.32	—	493.32
869	648.48	98.11	746.59
870	998.40	509.80	1508.20
871	1395.31	1096.92	2492.23
872	1834.18	1817.04	3651.22
873	2311.33	2649.00	4960.33
874	2829.90	3579.37	6409.27
875	3369.60	4582.68	7952.28
876	3946.52	5699.74	9646.26
877	4553.06	6876.88	11429.94
878	5187.84	8125.47	13313.31
879	5849.65	9441.63	15291.28
880	6537.42	10822.06	17359.48

(C-5)

C-4

OSWEGO RIVER BASIN										
HEC100										
PIF - OVERFLOW ANALYSIS										
B	40	6	0	0	0	0	0	0	0	4
B1	5									
J	1	6	1							
J1	.2	.4	.5	.6	.9	1.0				
K	0	1	0	0	0	0	0	1		
K1	1 BARGE CANAL LOCK 30 AT RACEDON (SUB AREA A1)									
H	-1	0	100	0	5100	0	0	0	1	
H	372	372	372	372	374	370	379	379	384	392
H	390	300	375	372	113	23	25	21	21	22
H	22	21	22	22	21	21	22	22	22	0
H										
K	1	2	0	0	0	0	1			
K1	2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)									
T	0	0	0	0	1					
T1	0	3	1							
K	0	2	0	0	0	0	1			
K1	3 CARRIQUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)									
H	1	-1	147	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.05		
U	21									
I	514	1946	2950	2655	1970	1472	1095	815	515	309
I	344	250	184	130	103	74	57	42	25	25
I	21									
I	140	550	1.4							
K	2	2	0	0	0	0	1			
K1	4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29									
K	1	6	0	0	0	0	1			
K1	5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS									
T	0	0	0	0	1					
T1	0	0	3							
K	0	6	0	0	0	0	1			
K1	6 LOWER CARRIQUA LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)									
H	1	-1	110	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.05		
U	27									
I	28	109	293	523	696	772	896	980	1244	1312
I	1210	979	744	596	445	362	283	221	173	135
I	105	82	64	50	39	35	35			
I	120	470	1.4							
K	2	6	0	0	0	0	1			
K1	7 COMBINED AND LOCAL FLOWS AT LOCK 27									
K	0	3	0	0	0	0	1			
K1	8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)									
H	1	-1	51	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.05		
U	10									
I	2001	1430	844	383	174	79	36	30	25	14
I	100	200	1.4							
K	1	6	0	0	0	0	1			

K1	V Routed Flow E-3 TO LYONS TRIBE 61										
T	0	0	0	0	1						
T1	0	5	2								
K	2	6	0	0	0	0	0	1			
K1	10 COMBINE FLOWS AT NODE 6										
K	0	4	0	0	0	0	0	1			
K1	11 CANADIAN LAKE INFLOW										
R	1	-1	104	0	5100	0	0	0	1		
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	0	1.25	0.03		
U	0										
I	9356	5183	3260	1307	691	316	145	30			
I	300	1000	1.6								
K	1	4	0	0	0	0	0	1			
K1	12 CANADIAN LAKE OUT FLOW USING MODIFIED PULS METHOD										
T	0	0	0	1	1						
T1	0	0	0	0	0	0	0	51000			
T2	10700	21300	31900	42500	53100	63700	74300	84900	95500	106100	
T22	12500	31900									
T3	50	50	50	50	200	600	1000	1560	2250	3000	
T3	63000	200366									
K	1	5	0	0	0	0	0	1			
K1	13 Routed Outflow to Flint Creek Mouth										
T	0	0	0	0	1						
T1	0	12	5								
K	0	5	0	0	0	0	0	1			
K1	14 FLINT CREEK INFLOW A-2										
R	1	-1	102	0	5100	0	0	0	1		
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	0	0.5	0.06		
U	26										
I	93	534	903	1266	1367	1166	966	801	663	509	
I	455	377	311	259	215	170	147	104	101	84	
I	69	57	47	39	35	32					
I	90	2000	1.6								
K	2	5	0	0	0	0	0	1			
K1	15 COMBINE Routed CANADIAN OUTFLOWS AND FLINT CR INFLOWS										
K	1	56	0	0	0	0	0	1			
K1	16 OUTLET Routed TO LOCK 27										
T	0	0	0	0	1						
T1	0	7	3								
K	0	56	0	0	0	0	0	1			
K1	17 OUTLET LOCAL FLOW A-3										
R	1	-1	155	0	5100	0	0	0	1		
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	0	0.6	0.06		
U	22										
I	91	330	905	1340	1710	2400	2601	1921	1413	1030	
I	763	562	412	303	223	164	120	90	65	40	
I	35	34									
I	150	200	1.6								
K	2	56	0	0	0	0	0	1			
K1	18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27										
K	1	6	0	0	0	0	0	1			
K1	19 ROUTE OUTLET TO CANAL										
T	0	0	0	0	1						
T1	0	1									
K	2	6	0	0	0	0	0	1			
K1	20 COMBINE FLOW AT 61 OUTLET FLOW + E-1, E-2, E-3										
K	1	0	0	0	0	0	0	1			
K1	21 ROUTE FLOWS AT LOCK 27 TO NODE 0										
T	0	0	0	0	1						
T1	0	0	3								
K	0	7	0	0	0	0	0	1			
K1	22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)										
R	1	-1	89	0	5100	0	0	0	1		

Y	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	23									
I	897	1670	1441	1144	900	721	572	454	361	287
I	227	181	143	114	90	72	57	45	34	29
I	23	23	23							
E	100	360	1.6							
K	1	0	0	0	0	0	1			
K1	23	ROUTE FLOWS AT LOCK 26 TO NODE 8								
T	0	0	0	0	1					
T1	0	2								
K	2	0	0	0	0	0	1			
K1	24	COMBINE ROUTED AND LOCAL FLOWS AT NODE 8								
K	1	10	0	0	0	0	1			
K1	25	ROUTE FLOWS AT NODE 8 TO NODE 10								
T	0	0	0	0	1					
T1	0	5	2							
K	0	9	0	0	0	0	1			
K1	26	LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)								
H	1	-1	10	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	21									
I	171	304	313	246	193	152	119	93	73	58
I	45	35	20	22	17	13	11	0	6	5
I	4									
I	90	90	1.6							
K	1	10	0	0	0	0	1			
K1	27	ROUTE INFLOW E-5 TO NODE 10								
T	0	0	0	0	1					
T1	0	2								
K	2	10	0	0	0	0	1			
K1	28	COMBINE ROUTED FLOW WITH FLOW AT NODE 10								
K	1	15	0	0	0	0	1			
K1	29	ROUTE FLOWS AT NODE 10 TO NODE 15								
T	0	0	0	0	1					
T1	0	5	2							
K	0	11	0	0	0	0	1			
K1	30	LOCAL INFLOW D-1 INTO KEUKA LAKE								
H	1	-1	103	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	1.50	0.03		
U	6									
I	14310	3342	1273	483	183	0				
Z	100	800	1.6							
K	1	11	0	0	0	0	1			
K1	31	KEUKA LAKE OUTFLOW W/ MODIFIED PULS								
T	0	0	0	1	1					
T1	0	0	0	0	0	0	147000			
T2	107000	129500	141000	152500	172000	170000	191000	204000	217000	
T3	120	320	445	530	575	670	890	1130	1470	
T3126000										
K	1	12	0	0	0	0	1			
K1	32	ROUTE KEUKA LAKE OUTFLOWS TO 12								
T	0	0	0	0	1					
T1	0	6	2							
K	0	12	0	0	0	0	1			
K1	33	SENECA LAKE INFLOWS D-2								
H	1	-1	524	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.03		
U	12									
I	26993	10031	6099	4332	2720	1700	1072	673	422	266
I	167	70								
Z	500	2000	1.6							

AD-A077 447

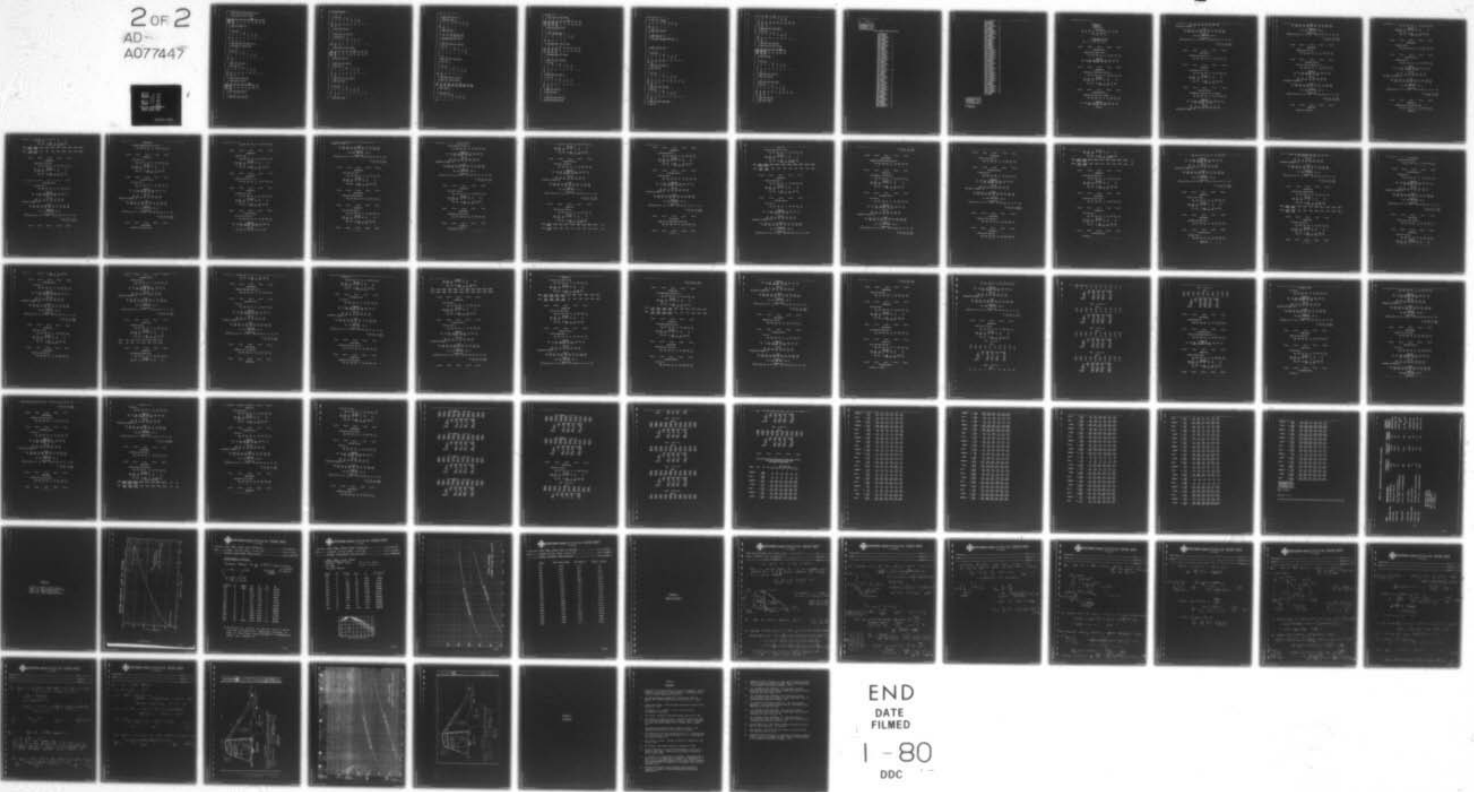
NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. LOWER FULTON DAM (GRANBY) (INVENTOR--ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

UNCLASSIFIED

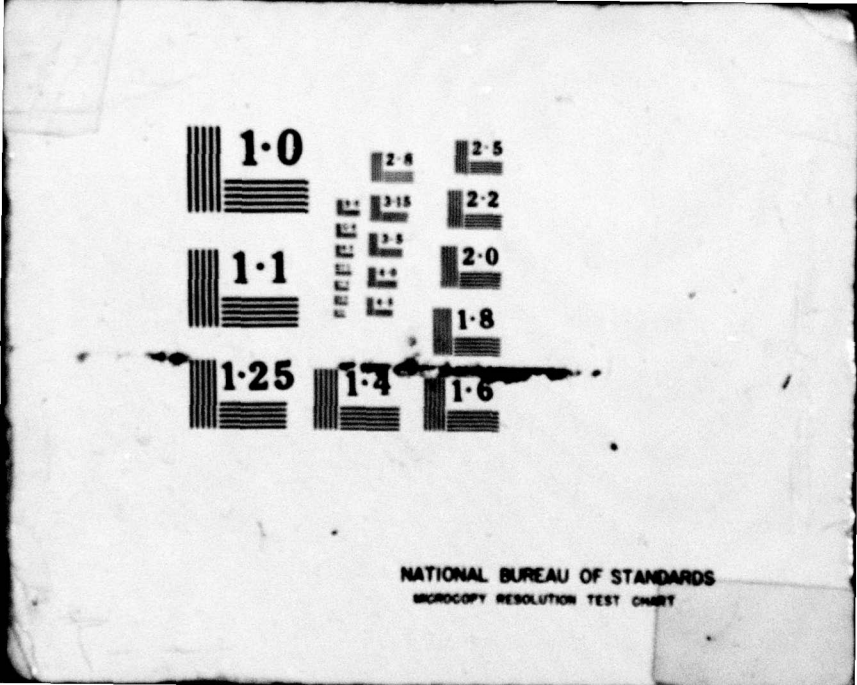
NL

2 OF 2

AD-A077447



END
DATE
FILMED
1-80
DDC



K1	34	COMBINE LOCAL FLOW B-2 AND ROUTED SENeca LAKE OUTLET FLOWS								
R	1	12	0	0	0	0	0	1		
K1	35	SENECA LAKE OUTFLOWS - MODIFIED PULS METHOD								
T	0	0	0	1	1					
T1								534000		
T2	2272000	414000	454000	500000	543000	584000	630000	650000	674000	720000
T3	700	700	700	700	700	700	700	1000	3000	3000
T4	13000	77000								
K	1	13	0	0	0	0	0	1		
K1	36	SENECA LAKE OUTFLOWS ROUTED TO 13								
T	0	0	0	0	1					
T1	0	2								
K	0	13	0	0	0	0	0	1		
K1	37	LOCAL INFLOW B-4								
R	1	-1	39	0	5100	0	0	0	0	1
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.05		
U	15									
I	529	1094	796	549	370	240	179	123	85	50
L	40	20	19	11	11					
E	92	200	1.6							
K	2	13	0	0	0	0	0	1		
K1	38	COMBINE ROUTED SENeca LAKE OUTFLOW AND LOCAL FLOW B-4								
K	1	14	0	0	0	0	0	1		
K1	39	ROUTE HYDROGRAPH TO 14 (CATUGA LAKE INFLOW)								
T	0	0	0	0	1					
T1	0	6	2							
K	0	14	0	0	0	0	0	1		
K1	40	LOCAL INFLOW B-5								
R	1	-1	36	0	5100	0	0	0	0	1
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0	0.5	0.05	
U	12									
I	895	1094	692	437	277	175	110	70	44	20
L	14	10								
E	92	200	1.6							
K	2	14	0	0	0	0	0	1		
K1	41	COMBINE FLOW B-5 WITH ROUTED FLOW								
K	0	14	0	0	0	0	0	1		
K1	42	CATUGA LAKE INFLOW B-3								
R	1	-1	702	0	5100	0	0	0	0	1
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0	0.5	0.05	
U	15									
I	24902	13540	13526	9524	6329	4476	3069	2104	1442	909
L	670	465	319	219	81					
E	1000	1700	1.6							
K	2	14	0	0	0	0	0	1		
K1	43	COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW								
K	1	14	0	0	0	0	0	1		
K1	44	CATUGA LAKE OUTFLOW - MODIFIED PULS								
T	0	0	0	1	1					
T1	0	0	0	0	0	0	0	0	0	0
T2	2272000	417000	460000	503000	546000	589500	634000	660000	727000	
T3	1700	1700	1700	1700	3400	3400	3400	8700	8700	
T4	30310	103500								
K	1	15	0	0	0	0	0	1		
K1	45	ROUTE CATUGA LAKE OUTFLOWS TO NODE 15								
T	0	0	0	0	1					
T1	0	3	1							
K	2	15	0	0	0	0	0	1		
K1	46	COMBINE ROUTED FLOW WITH FLOW AT NODE 15								
K	1	10	0	0	0	0	0	1		

K1	47 ROUTE FLOWS TO NODE 10										
T	0	0	0	0	1						
T1	0	0	3								
K	0	14	0	0	0	0	1				
K1	48 LOCAL FLOW E-6										
R	1	-1	191	0	5100	0	0	0	1		
P	0	21.5	33	47	35	65	72	74			
T	0	0	0	0	0	0	0.5	0.06			
U	14										
I	2051	5102	3130	2449	1710	1175	800	355	301	242	
I	100	123	85	75	70	27					
E	140	400	1.4								
K	1	10	0	0	0	0	1				
K1	49 ROUTE LOCAL FLOW E-6 TO NODE 10										
T	0	0	0	0	1						
T1	0	2									
K	2	10	0	0	0	0	1				
K1	50 COMBINE ROUTED FLOW W/ FLOW AT NODE 10										
K	0	17	0	0	0	0	1				
K1	51 HEAD OMSCO INFLOW C-1										
R	1	-1	201	0	5100	0	0	0	1		
P	0	21.5	33	47	35	65	72	74			
T	0	0	0	0	0	0	0.75	.05			
U	10										
I	6633	5070	4200	2273	1200	633	334	176	93	30	
I	430	1000	1.4								
K	1	17	0	0	0	0	1				
K1	52 OMSCO LAKE INFLOWS - MODIFIED PULS METHOD										
T	0	0	0	1	1						
T1	0	0	0	0	0	0	92000				
T2	64000	73200	79900	84500	93200	99000	104300	113200	119000	126500	
T2152900	205700										
T3	600	600	600	1100	1700	2300	2960	3600	3600	3400	
T3	24000	69100									
K	1	10	0	0	0	0	1				
K1	53 ROUTE OMSCO LAKE OUTLET FLOWS										
T	0	0	0	0	1						
T1	0	7	3								
K	2	10	0	0	0	0	1				
K1	54 COMBINE FLOWS WITH FLOWS AT NODE 10										
K	0	10	0	0	0	0	1				
K1	55 HEAD LOCAL FLOW C-6										
R	1	-1	19	0	5100	0	0	0	1		
P	0	21.5	33	47	35	65	72	74			
T	0	0	0	0	0	0	0.5	0.06			
U	10										
I	157	360	352	240	205	156	119	91	70	53	
I	40	26	23	18	14	10	8	6			
E	90	200	1.4								
K	2	10	0	0	0	0	1				
K1	56 COMBINE LOCAL FLOW C-6 WITH FLOW AT NODE 10										
K	1	21	0	0	0	0	1				
K1	57 ROUTE FLOW AT 10 TO NODE 21										
T	0	0	0	0	1						
T1	0	7	3								
K	0	19	0	0	0	0	1				
K1	58 LOCAL INFLOW E-7										
R	1	-1	90	0	5100	0	0	0	1		
P	0	21.5	33	47	35	65	72	74			
T	0	0	0	0	0	0	0.5	0.06			
U	11										
I	2769	3130	1070	1115	664	396	236	141	84	50	
I	19										
E	120	400	1.4								
K	1	21	0	0	0	0	1				
K1	59 ROUTE LOCAL FLOW TO NODE 21										

K	1	300	1.4								
K1	73	OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD									
T	0	0	0	1	1						
T1	0	0	0	0	0	0	29300				
T2	19600	21000	23900	26100	28300	30500	32600	34800	37000	39200	
T3	43700	52300	58000	63300							
T3	200	200	200	200	200	400	900	1600	2000	2000	
T3	7040	10100	33700	53200							
K	1	25	0	0	0	0	0	1			
K1	74	ROUTE OTISCO LAKE OUTFLOWS TO NODE 25									
T	0	0	0	0	1						
T1	0	10	4								
K	0	24	0	0	0	0	0	1			
K1	75	INFLOW INTO ONONDAGA RESERVOIR C-4									
R	1	-1	60	0	5100	0	0	0	0	1	
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	1.5	0.06			
U	4										
I	2010	3341	1250	435	151	57					
I	250	300	1.4								
K	1	24	0	0	0	0	0	1			
K1	76	ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD									
T	0	0	0	1	1						
T1	0	0	0	0	0	0	0	0			
T2	0	100	700	1900	3500	7900	10200	22200	27000	32500	
T2	43400	52300	62200	72100							
T3	00	430	640	800	1070	1420	1770	1040	2000	2000	
T3	6200	15400	20400	44700							
K	1	25	0	0	0	0	0	1			
K1	77	ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25									
T	0	0	0	0	1						
T1	0	0	3								
K	2	25	0	0	0	0	0	1			
K1	78	COMBINE ROUTED FLOW WITH FLOW AT NODE 25									
K	0	25	0	0	0	0	0	1			
K1	79	LOCAL INFLOW C-5									
R	1	-1	102	0	5100	0	0	0	0	1	
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	1.25	0.06			
U	11										
I	2671	3249	2030	1215	727	436	261	156	77	56	
I	27										
I	250	300	1.4								
K	2	25	0	0	0	0	0	1			
K1	80	COMBINE ROUTED FLOWS, LOCAL INFLOW									
K	0	25	0	0	0	0	0	1			
K1	81	LOCAL FLOW C-0									
R	1	-1	72	0	5100	0	0	0	0	1	
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	1.0	.06			
U	14										
I	459	1435	1054	1454	926	590	376	239	152	97	
I	62	39	25	12							
I	250	300	1.4								
K	2	25	0	0	0	0	0	1			
K1	82	COMBINE LOCAL FLOW AT NODE 25									
K	1	26	0	0	0	0	0	1			
K1	83	ROUTE FLOWS TO NODE 26									
T	0	0	0	0	1						
T1	0	0	3								
K	2	26	0	0	0	0	0	1			
K1	84	COMBINE ROUTED FLOW AND FLOW AT NODE 26									
K	1	20	0	0	0	0	0	1			
K1	85	ROUTE FLOWS TO NODE 20 (THREE RIVERS)									
T	0	0	0	0	1						

K	1	-1	200	0	5100	0	0	0		
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.25	0.06		
U	24									
I	103	504	1042	1512	2516	3750	4112	4139	3602	2645
I	1914	1204	066	727	527	320	274	200	145	105
I	76	55	50	50						
I	600	2160	1.4							
K	2	31	0	0	0	0	1			
K1		99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31								
K	0	31	0	0	0	0	1			
K1		100 LOCAL FLOW D-5								
H	1	-1	249	0	5100	0	0	0		1
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.25	0.05		
U	12									
I	12227	5035	4245	2505	1574	950	503	355	214	132
I	80	36								
I	540	2000	1.4							
K	2	31	0	0	0	0	1			
K1		101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31								
K	1	31	0	0	0	0	1			
K1		102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD								
T	0	0	0	1	1					
T1	0	0	0	0	0	0	670000			
T2	442000	635000	640000	650000	660000	725000	806000	845000		
T3	1000	1000	2000	4000	6000	8000	10000	11000		
T3	27900	64700	116600							
K	1	32	0	0	0	0	1			
K1		103 ROUTE FLOWS TO NODE 32								
T	0	0	0	0	1					
T1	0	1								
K	0	32	0	0	0	0	1			
K1		104 LOCAL FLOW D-6								
H	1	-1	20	0	5100	0	0	0		1
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	15									
I	274	531	401	491	330	233	160	110	76	53
I	36	25	10	12	7					
I	70	210	1.4							
K	2	32	0	0	0	0	1			
K1		105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32								
K	1	32	0	0	0	0	1			
K1		106 ROUTE FLOW AT 32 TO NODE 20								
T	0	0	0	0	1					
T1	0	4	2							
K	2	20	0	0	0	0	1			
K1		107 COMBINE ROUTED FLOW WITH FLOW AT NODE 20								
K	0	20	0	0	0	0	1			
K1		108 LOCAL FLOW D-7								
H	1	-1	110	0	5100	0	0	0		1
P	0	21.5	33	47	55	65	72	77		
T	0	0	0	0	0	0	0.5	0.06		
U	24									
I	402	1403	1000	1072	1496	1127	949	536	402	363
I	273	206	155	117	80	47	50	38	28	22
I	20	20	20	0						
I	250	800	2.0							
K	2	20	0	0	0	1	1			
K1		109 COMBINE WITH FLOW AT NODE 20								
K	1	33	0	0	0	1	1			
K1		110 ROUTE FLOW AT 20 TO NODE 33								
T	0	0	0	0	1					
T1	0	3	1							

3808T 14:31 JUN 27, '79

FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAN SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

1
RUNOFF HYDROGRAPH AT 1
ROUTE HYDROGRAPH TO 2
RUNOFF HYDROGRAPH AT 2
COMBINE 2 HYDROGRAPHS AT 2
ROUTE HYDROGRAPH TO 6
RUNOFF HYDROGRAPH AT 6
COMBINE 2 HYDROGRAPHS AT 6
RUNOFF HYDROGRAPH AT 3
ROUTE HYDROGRAPH TO 6
COMBINE 2 HYDROGRAPHS AT 6
RUNOFF HYDROGRAPH AT 4
ROUTE HYDROGRAPH TO 4
ROUTE HYDROGRAPH TO 5
RUNOFF HYDROGRAPH AT 5
COMBINE 2 HYDROGRAPHS AT 5
ROUTE HYDROGRAPH TO 56
RUNOFF HYDROGRAPH AT 56
COMBINE 2 HYDROGRAPHS AT 56
ROUTE HYDROGRAPH TO 6
COMBINE 2 HYDROGRAPHS AT 6
ROUTE HYDROGRAPH TO 8
RUNOFF HYDROGRAPH AT 7
ROUTE HYDROGRAPH TO 8
COMBINE 2 HYDROGRAPHS AT 8
ROUTE HYDROGRAPH TO 10
RUNOFF HYDROGRAPH AT 9
ROUTE HYDROGRAPH TO 10
COMBINE 2 HYDROGRAPHS AT 10
ROUTE HYDROGRAPH TO 15
RUNOFF HYDROGRAPH AT 11
ROUTE HYDROGRAPH TO 11
ROUTE HYDROGRAPH TO 12
RUNOFF HYDROGRAPH AT 12
COMBINE 2 HYDROGRAPHS AT 12
ROUTE HYDROGRAPH TO 12
ROUTE HYDROGRAPH TO 13
RUNOFF HYDROGRAPH AT 13
COMBINE 2 HYDROGRAPHS AT 13
ROUTE HYDROGRAPH TO 14
RUNOFF HYDROGRAPH AT 14
COMBINE 2 HYDROGRAPHS AT 14
RUNOFF HYDROGRAPH AT 14
COMBINE 2 HYDROGRAPHS AT 14
ROUTE HYDROGRAPH TO 14
ROUTE HYDROGRAPH TO 15
COMBINE 2 HYDROGRAPHS AT 15
ROUTE HYDROGRAPH TO 16
RUNOFF HYDROGRAPH AT 16
ROUTE HYDROGRAPH TO 10
COMBINE 2 HYDROGRAPHS AT 10
RUNOFF HYDROGRAPH AT 17
ROUTE HYDROGRAPH TO 17
ROUTE HYDROGRAPH TO 10
COMBINE 2 HYDROGRAPHS AT 10
RUNOFF HYDROGRAPH AT 10

OSWEGO RIVER BASIN
 HEC10B
 POF - OVERFLOW ANALYSIS

JOB SPECIFICATION

NR	NR	NRIN	YAT	ENR	ENIN	NETRC	IPLT	IPRT	NSTAR
00	6	0	0	0	0	0	0	4	0
			JAPER	INT	LMPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
 MPLAN= 1 INTIO= 6 LRTIO= 1
 RTIO= .20 .40 .50 .60 .80 1.00

SUB-AREA RUNOFF COMPUTATION

1 BRIDGE CANAL LOCK 30 AT MACEON (SUB AREA A1)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INYDC	INUC	TAREA	SIMP	TRSDA	TRSPC	RATIO	ISDN	ISME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

HYDROGRAPH ROUTING

2 BRIDGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)

ESTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVC	INES	ISME	IPPT	IPHP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAC	MSIX	X	TSK	STOR	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

3 GAMBURIA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INME	ISTAGE	IAUTO
2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INYDC	INUC	TAREA	SIMP	TRSDA	TRSPC	RATIO	ISDN	ISME	LOCAL
1	-1	147.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
 LABPT STRKX BLTRX RTIOL ERRAIN STRKX RTIOK STRTL CMTL ALSM1 RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .05 0.00 0.00

RECESSION DATA
 STRTO= 140.00 ORCSO= 550.00 RTIOR= 1.40

END-OF-PERIOD FLOW
 NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0
 SUM 14.04 11.56 3.30 106707.
 (377.1) (294.1) (04.1) (5204.22)

COMBINE HYDROGRAPHS

4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29

ISTAG ICOMP IECON ITAPE JPLT JPR1 INAME ISTAGE IAUTO
 2 2 0 0 0 0 1 0 0

HYDROGRAPH ROUTING

5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS

ISTAG ICOMP IECON ITAPE JPLT JPR1 INAME ISTAGE IAUTO
 6 1 0 0 0 0 1 0 0

ROUTING DATA

BLOSS CLOSS AWC IRES ISAME IPT1 IPMP LSTR
 0.0 0.000 0.00 0 1 0 0 0
 NSTPS NSTDL LAG AWSSX 1 TSK STORA ISPRAT
 0 0 3 0.000 0.000 0.000 0. 0

SUB-AREA RUMOFF COMPUTATION

6 LOWER CARBONACEOUS LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)

ISTAG ICOMP IECON ITAPE JPLT JPR1 INAME ISTAGE IAUTO
 6 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

INYDC TINC TAREA SWP TRSDA TRSPC RATIO ISHOW ISAME LOCAL
 1 -1 110.00 0.00 5100.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PHS R6 R12 R24 R40 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
 LADPT STRDR BLTKR RTIOL ERDIN STRIS RTIOL STRTL CAGTL ALSRE RTIHP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .05 0.00 0.00

RECESSION DATA
 STRTO= 120.00 BRCSH= 470.00 RTIOR= 1.40

0
 END-OF-PERIOD FLOW
 NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0
 SUM 14.04 11.54 3.30 147310.
 (377.1) (294.1) (04.1) (4171.50)

COMBINE HYDROGRAPHS

7 COMBINED AND LOCAL FLOWS AT LOCK 27

ISTAB ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAU0
 6 2 0 0 0 0 1 0 0

SUB-AREA BUFF COMPUTATION

8 LOCAL FLOW E-3 (AREA LOCAL TO DARGE CANAL E-29 TO E-27)

ISTAB ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAU0
 3 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

INTG IUNG TAREA SWP TRSDA TRSPC RATIO ISROU ISAME LOCAL
 1 -1 51.00 0.00 5100.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PHS R4 R12 R24 R40 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
 LADPT STRDR BLTKR RTIOL ERDIN STRIS RTIOL STRTL CAGTL ALSRE RTIHP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .05 0.00 0.00

RECESSION DATA
 STRTO= 100.00 BRCSH= 200.00 RTIOR= 1.40

0
 END-OF-PERIOD FLOW
 NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0
 SUM 14.04 11.54 3.30 65053.
 (377.1) (294.1) (04.1) (1042.10)

HYDROGRAPH ROUTING

9 ROUTED FLOW E-3 TO LYONS (INDE 6)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IBNME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

BLSS	CLOSS	AVC	INES	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTBL	LAG	ARSHK	I	TSK	STORA	ISPRAT
0	5	2	0.000	0.00	0.000	0.	0

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COMBINE HYDROGRAPHS

10 COMBINE FLOWS AT NODE 6

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IBNME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

11 CANNONICUM LAKE INFLOW

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IBNME	ISTAGE	IAUTO
4	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INYDC	IUNC	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
1	-1	104.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STNRK	DLTKR	RT10L	EDBNH	STNRK	RT10K	STRTL	CNSTL	ALSHI	RT1WP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.25	.03	0.00	0.00

RECESSION DATA

STRTO= 300.00 BRCSH= 1000.00 RT10R= 1.60

0
END-OF-PERIOD FLOW

HR.DA	HR.HH	PERIOD	RAIN	EXCS	LOSS	COMP 0	HR.DA	HR.HH	PERIOD	RAIN	EXCS	LOSS	COMP 0
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SUM 14.06 12.00 2.06 252691.
(377.)(305.)(73.)(7192.41)

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HYDROGRAPH ROUTING

12 CANNONICUM LAKE OUT FLOW USING MODIFIED PIALS METHOD

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IBNME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ROUTING DATA

COMBINE HYDROGRAPHS

15 COMBINE ROUTED CANNONICUM OUTFLOWS AND FLINT CR INFLOWS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IRME	ISTAGE	IAUTO
5	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

16 OUTLET ROUTED TO LOCK 27

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IRME	ISTAGE	IAUTO
56	1	0	0	0	0	1	0	0

ROUTING DATA

LOSS	CLOSS	AVC	INES	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTBL	LAG	WRSID	I	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

SUB-AREA RIBOFF COMPUTATION

17 OUTLET LOCAL FLOW A-3

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IRME	ISTAGE	IAUTO
56	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHC	INHC	TAREA	SNAP	TRSDA	TRSPC	RA710	TRSDA	ISAME	LOCAL
1	-1	155.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PHS	R4	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LRPT	STRM	BLTR	RTOR	EDRN	STRM	RTOR	STRTL	CUSTL	ALSHI	RTHP
0	0.00	0.00	1.00	0.00	0.00	1.00	.60	.06	0.00	0.00

RECESSION DATA

STRTO= 150.00 GRCSO= 200.00 RTTOR= 1.60

END-OF-PERIOD FLOW

NO.00	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.00	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.66 11.06 3.00 187.76.
(377.1)(281.1)(97.1)(5204.23)

COMBINE HYDROGRAPHS

18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
56	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

19 ROUTE OUTLET TO CANAL

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLASS	AVG	IRCS	ISARE	IOPY	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTBL	LAC	ANSXK	X	TSK	STORA	ISPRAT
0	1	0	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

20 COMBINE FLOW AT 6 (OUTLET FLOW + E-1, E-2, E-3)

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

21 ROUTE FLOWS AT LOCK 27 TO NODE 0

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
0	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLASS	AVG	IRCS	ISARE	IOPY	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTBL	LAC	ANSXK	X	TSK	STORA	ISPRAT
0	0	3	0.000	0.000	0.000	0.	0

SUB-AREA RUMFF COMPUTATION

22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
7	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTC	INIC	TAREA	SIMP	TRSDR	TRSPC	RATIO	ISWH	ISARE	LOCAL
1	-1	09.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	11.00	11.00	21.00	00.00	12.00	11.00	10.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LDPT	STWR	ULTR	RTIOL	ERAIN	STRKS	RTIOL	STRL	CNSTL	ALSHI	RTIHP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.04	0.00	0.00

RECESSION DATA

STRTD= 100.00 QRCSD= 340.00 RTIOR= 1.60

END-OF-PERIOD FLOW

NO.0A	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.0A	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0
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SUM 14.04 11.00 3.70 109181.
(377.1(281.1)(96.1(3091.64)

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HYDROGRAPH ROUTING

23 ROUTE FLOWS AT LOCK 26 TO NODE 0

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	IMARE	ISTAGE	IAUTO
0	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVG	INES	ISARE	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTBL	LAC	WRSIX	I	TSX	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

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COMBINE HYDROGRAPHS

24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 0

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	IMARE	ISTAGE	IAUTO
0	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

25 ROUTE FLOWS AT NODE 0 TO NODE 10

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	IMARE	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVG	INES	ISARE	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTBL	LAC	WRSIX	I	TSX	STORA	ISPRAT
0	3	2	0.000	0.000	0.000	0.	0

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SUBROUTINE COMPUTATION

26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)

ISTAD ICOMP IECON ITAPE JPLT JPRT IIMRE ISTAGE IAU70
 1 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

INYDC IUNG YAREA SHIP TRSBA TRSPC RATIO ISHOW ISARE LOCAL
 1 -1 10.00 0.00 3100.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PHS R6 R12 R24 R40 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT STRND ULTRK RTIOL ERAIN STRKS RTIOK STRTL CHSTL ALSX1 RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .04 0.00 0.00

RECESSION DATA

STRTO+ 90.00 QRCSS+ 90.00 RTIOR+ 1.60

END-OF-PERIOD FLOW

NO.00 HR.MN PERIOD RAIN EXCS LOSS COMP 0 NO.00 HR.MN PERIOD RAIN EXCS LOSS COMP 0
 SUM 14.04 11.00 3.70 23275.
 (377.)(201.)(96.)(659.07)

HYDROGRAPH ROUTING

27 ROUTE INFLOW E-5 TO NODE 10

ISTAD ICOMP IECON ITAPE JPLT JPRT IIMRE ISTAGE IAU70
 10 1 0 0 0 0 1 0 0

ROUTING DATA

BLOSS CLOSS AVG TRS ISARE IOPT IPMP LSTR
 0.0 0.000 0.00 0 1 0 0 0

HSTPS HSTBL LAG HRSIX I TSK STORA ISPRAT
 0 2 0 0.000 0.000 0.000 0. 0

COMBINE HYDROGRAPHS

28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10

ISTAD ICOMP IECON ITAPE JPLT JPRT IIMRE ISTAGE IAU70
 10 2 0 0 0 0 1 0 0

HYDROGRAPH ROUTING

29 ROUTE FLOWS AT NODE 10 TO NODE 15

ISTAD ICOMP IECON ITAPE JPLT JPRT IIMRE ISTAGE IAU70

HYDROGRAPH ROUTING

32 ROUTE KEUKA LAKE OUTFLOWS TO I2

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
I2	1	0	0	0	0	1	0	0

ROUTING DATA							
LOSS	CLOSS	AVG	INES	ISAME	IOP1	IPHP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTDL	LAC	AWRCK	I	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

33 SENECA LAKE INFLOWS 0-2

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
I2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TIRSDA	TIRSPC	RATIO	ISHDW	ISAME	LOCAL
1	-1	524.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PHS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .924

LOSS DATA

LRDPT	STDR	DLTR	RTDR	EDRIN	STDR	RTDR	STRTL	CHTL	ALSHI	RTHP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.03	0.00	0.00

RECESSION DATA

STRTO= 500.00 WRCSD= 2000.00 RTDR= 1.60

END-OF-PERIOD FLOW

NO. DA	HR. HR	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO. DA	HR. HR	PERIOD	RAIN	EXCS	LOSS	COMP 0
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SUM 14.06 12.52 2.34 7411.00
(377.)(310.)(59.)(21007.99)

COMBINE HYDROGRAPHS

34 COMBINE LOCAL FLOW 0-2 AND ROUTED KEUKA LAKE OUTLET FLOWS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
I2	2	0	0	0	0	1	0	0

35 SENECA LAKE OUTFLOWS - MODIFIED PULS METHOD

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO	
	12	1	0	0	0	0	1	0	0	
ROUTING DATA										
	GLSS	CLOSS	AVC	IRIS	ISARE	IOPT	IPWP	LSTR		
	0.0	0.000	0.00	1	1	0	0	0		
	NSTPS	NSTBL	LAC	ANSIX	I	TSK	STORA	ISPRAT		
	0	0	0	0.000	0.000	0.000	534000.	0		
STORAGE	372000.00	414000.00	456000.00	500000.00	543000.00	586000.00	630000.00	650000.00	674000.00	720000.00
	000000.00	120000.00								
OUTFLOW	700.00	700.00	700.00	700.00	700.00	700.00	700.00	1000.00	3000.00	3000.00
	15000.00	77000.00								

HYDROGRAPH ROUTING

36 SENECA LAKE OUTFLOWS ROUTED TO 13

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	13	1	0	0	0	0	1	0	0
ROUTING DATA									
	GLSS	CLOSS	AVC	IRIS	ISARE	IOPT	IPWP	LSTR	
	0.0	0.000	0.00	0	1	0	0	0	
	NSTPS	NSTBL	LAC	ANSIX	I	TSK	STORA	ISPRAT	
	0	2	0	0.000	0.000	0.000	0.	0	

SUB-AREA RUNOFF COMPUTATION

37 LOCAL INFLOW 0-4

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	17	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYD	IUNG	TAREA	SURP	TRESA	TRESPC	RATIO	ISHD	ISARE	LOCAL
1	-1	29.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PWS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRESPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LRPT	STBR	BLTR	RTIOL	ERAIN	STRS	RTIOL	STRTL	CHSTL	ALSH	RTHP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRT0= 92.00 BRCS0= 200.00 RTIOL= 1.40

END-OF-PERIOD FLOW													
NO.0A	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.0A	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0

COMBINE HYDROGRAPHS

30 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW 0-4

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
13	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	INES	ISAME	LOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

INSTPS	INSTL	LAG	AVRXX	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

40 LOCAL INFLOW 0-5

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHC	TUNG	TAREA	SNIP	TRSDA	TRSPC	RAT10	IRNDW	ISAME	LOCAL
1	-1	34.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	53.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT	STMR	DLTR	RTIL	ERAIN	STRS	RTI0K	STRTL	CHSTL	ALSHI	RTIIP
0	0.00	0.00	1.00	0.00	0.00	1.00	.30	.05	0.00	0.00

RECESSION DATA

STRTO= 92.00 BRCSR= 200.00 RTI0R= 1.60

0

END-OF-PERIOD FLOW

NO.04	HR.04	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.04	HR.04	PERIOD	RAIN	EXCS	LOSS	COMP 0
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COMBINE HYDROGRAPHS

41 COMBINE FLOW 0-5 WITH ROUTED FLOW

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
14 2 0 0 0 0 1 0 0

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SUB-AREA RIBOFF COMPUTATION

42 CAYUGA LAKE INFLOW 0-3

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
14 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

INTDC IUNG YAREA SMAP TRSBA TRSPC RATIO ISHOW ISAME LOCAL
1 -1 782.00 0.00 5100.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PMS R6 R12 R24 R48 R72 R96
0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT STMR DLTR RTIAL ERAIN STKRS RTI0K STRTL CMTL ALSM RTIMP
0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .03 0.00 0.00

RECESSION DATA

STRTO= 1000.00 BRCSN= 1700.00 RTI0R= 1.60

END-OF-PERIOD FLOW

NO. DA HR. MIN PERIOD RAIN EXCS LOSS COMP 0 NO. DA HR. MIN PERIOD RAIN EXCS LOSS COMP 0

SUM 14.06 12.52 2.34 1001195.
(377.11 310.11 59.11 30616.03)

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COMBINE HYDROGRAPHS

43 COMBINE LOCAL INFLOW 0-3 AND ROUTED FLOW

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
14 2 0 0 0 0 1 0 0

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HYDROGRAPH ROUTING

44 CAYUGA LAKE OUTFLOW - MODIFIED PULS

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
14 1 0 0 0 0 1 0 0

		ROUTING DATA								
		QLOSS	CLOSS	AVG	IRES	ISARE	IOPT	IPWP	LSTR	
		0.0	0.000	0.00	1	1	0	0	0	
		HSTPS	HSTBL	LAC	AVSIX	I	TSK	STORA	ISPRAT	
		0	0	0	0.000	0.000	0.000	490000.	0	
STORAGE	375000.00 854500.00	417000.00 902000.00	460000.00	503000.00	546000.00	589500.00	634000.00	680000.00	727000.00	0.00
OUTFLOW	1700.00 30510.00	1700.00 103500.00	1700.00	1700.00	3400.00	3400.00	3400.00	6700.00	6700.00	0.00

HYDROGRAPH ROUTING

45 ROUTE CATUGA LAKE OUTFLOWS TO NODE 15

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IMARE	ISTAGE	IAUTO
15	1	0	0	0	0	1	0	0

ROUTING DATA

		QLOSS	CLOSS	AVG	IRES	ISARE	IOPT	IPWP	LSTR	
		0.0	0.000	0.00	0	1	0	0	0	
		HSTPS	HSTBL	LAC	AVSIX	I	TSK	STORA	ISPRAT	
		0	3	1	0.000	0.000	0.000	0.	0	

COMBINE HYDROGRAPHS

46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IMARE	ISTAGE	IAUTO
15	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

47 ROUTE FLOWS TO NODE 10

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IMARE	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

		QLOSS	CLOSS	AVG	IRES	ISARE	IOPT	IPWP	LSTR	
		0.0	0.000	0.00	0	1	0	0	0	
		HSTPS	HSTBL	LAC	AVSIX	I	TSK	STORA	ISPRAT	
		0	0	3	0.000	0.000	0.000	0.	0	

SUB-AREA RUNDFF COMPUTATION

48 LOCAL FLOW E-6

ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
16	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	IUNR	TAREA	SIMP	TRSDA	TRSPC	RTIO	ISHOW	ISAME	LOCAL
1	-1	191.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R40	R72	R96
0.00	21.50	33.00	47.00	53.00	65.00	72.00	74.00

TOTPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT	STRKR	DLTR	RTIO	ERAIN	STRKS	RTIOK	STRTL	CHSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.04	0.00	0.00

RECESSION DATA

STRTO= 140.00 BRCSH= 400.00 RTIOR= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MM	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MM	PERIOD	RAIN	EXCS	LOSS	COMP Q
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SUM 14.86 11.00 3.70 227590.
(377.1)(281.1)(96.1)(6444.63)

HYDROGRAPH ROUTING

49 ROUTE LOCAL FLOW E-6 TO NODE 10

ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVC	TRCS	ISAME	ICPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTBL	LAC	AVSIX	I	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

50 COMBINE ROUTED FLOW W/ FLOW AT NODE 10

ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

SW AREA RUNOFF COMPUTATION

51 HEAD BASCO INFLOW C-1

ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
17	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INFLG INFLG INFLG INFLG INFLG INFLG INFLG INFLG INFLG INFLG INFLG INFLG

PRECIP DATA
 SPFE PWS R6 R12 R24 R40 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRAPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
 LROPT STRKR BLTKR RTIOL ERDIN STRKS RTIOL STRTL CNSTL ALSNK RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .75 .05 0.00 0.00

RECESSION DATA
 STRTD= 450.00 BRCSH= 1000.00 RTIOR= 1.60

END-OF-PERIOD FLOW
 NO.DA HR.NH PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.NH PERIOD RAIN EXCS LOSS COMP 0
 SUM 14.06 11.46 3.39 260013.
 (377.1) (291.1) (86.1) (7490.67)

HYDROGRAPH ROUTING

S2 OMASCO LAKE INFLOWS - MODIFIED PULS METHOD

ISTAG ICOMP IECON ITAPE JPLT JPRT INHRE ISTAGE IAUTO
 17 1 0 0 0 0 1 0 0

ROUTING DATA

GLSS CLOSS AVC IRES ISARE IOPT IPWP LSTR
 0.0 0.000 0.00 1 1 0 0 0

HSTPS HSTBL LAG AVSHK I TSK STORA ISPRAT
 0 0 0 0.000 0.000 0.000 92000. 0

STORAGE	66000.00	73200.00	79900.00	86500.00	93200.00	99000.00	104500.00	113200.00	119000.00	124500.00
OUTFLOW	600.00	600.00	600.00	1100.00	1700.00	2300.00	2840.00	3400.00	3400.00	3400.00
	24000.00	69100.00								

HYDROGRAPH ROUTING

S2 ROUTE OMASCO LAKE OUTLET FLOWS

ISTAG ICOMP IECON ITAPE JPLT JPRT INHRE ISTAGE IAUTO
 18 1 0 0 0 0 1 0 0

ROUTING DATA

GLSS CLOSS AVC IRES ISARE IOPT IPWP LSTR
 0.0 0.000 0.00 0 1 0 0 0

HSTPS HSTBL LAG AVSHK I TSK STORA ISPRAT
 0 7 3 0.000 0.000 0.000 0. 0

COMBINE HYDROGRAPHS

54 COMBINE FLOWS WITH FLOWS AT NODE 10

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

SUB-AREA RUMOFF COMPUTATION

55 READ LOCAL FLOW C-4

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNP	TRSDA	TRSPC	RATIO	ISHOW	ISAVE	LOCAL
1	-1	19.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LAOPT	STORR	ULTOR	RTIOL	ERAIN	STRCS	RTIOL	STRTL	CRSL	ALSRI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTO= 90.00 CRCSH= 200.00 RTIOR= 1.60

END-OF-PERIOD FLOW

NO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	COMP @	NO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	CRS @						
SUM													14.06	11.00	3.70	2500.0			
(377.)	(201.)	(96.)	(710.41)

COMBINE HYDROGRAPHS

56 COMBINE LOCAL FLOW C-4 WITH FLOW AT NODE 10

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

57 ROUTE FLOW AT 10 TO NODE 21

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

LOSS	CLOSS	AVC	IRCS	ISAVE	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HTPS	HTSL	LAC	HTSLA	I	LCA	STOR	ISPR
0	7	3	0.000	0.000	0.000	0.	0

SUB-AREA RIBOFF COMPUTATION

50 LOCAL INFLOW E-7

ISTAG	ICMP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
19	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	TUNG	TAREA	SNP	TRSDA	TESPC	RATIO	ISMOW	ISARE	LOCAL
1	-1	10.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPYE	PHS	R6	R12	R24	R40	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LAOPT	STRKR	DLTKR	RTIOL	ERAIN	STOKS	RTIOL	STRIL	CHSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTO= 120.00 QNCSH= 400.00 RTIOR= 1.60

END-OF-PERIOD FLOW

NO. DA	HR. MIN	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO. DA	HR. MIN	PERIOD	RAIN	EXCS	LOSS	COMP 0
--------	---------	--------	------	------	------	--------	--------	---------	--------	------	------	------	--------

SUR 14.06 63.00 3.70 122406.
(377.11 201.11 96.11 3440.42)

HYDROGRAPH ROUTING

59 ROUTE LOCAL FLOW TO NODE Z1

ISTAG	ICMP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
Z1	1	0	0	0	0	1	0	0

ROUTING DATA

BLOSS	CLOSS	AVC	IRCS	ISARE	IPPT	IPRP	LSTN
0.0	0.000	0.00	0	1	0	0	0

HTPS	HTSL	LAC	HTSLA	I	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

60 COMBINE ROUTED FLOW WITH FLOW AT Z1

ISTAG	ICMP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
Z1	2	0	0	0	0	1	0	0

000000000 000000000 000000000 000000000 000000000

SUB-AREA RUNOFF COMPUTATION

61 SHIMAEULES LAKE INFLOW

ISTAO ICOMP IECON ITAPE JPLT JPRT INME ISTAGE IAUTO
 20 0 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

IHYG IUNG TAREA SROP TRSDA TRSPC RATIO ISHOW ISAME LOCAL
 1 -1 74.00 0.00 5100.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PMS R6 R12 R24 R48 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LAOPT STRK ULTR RTOL EXAIN STOKS RTIOX STRTL CMTL ALSM RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .75 .05 0.00 0.00

RECESSION DATA

STRTO= 250.00 BRCSH= 500.00 RTIOR= 1.40

END-OF-PERIOD FLOW

NO.DA HR.NO PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.NO PERIOD RAIN EXCS LOSS COMP 0

SUR 14.06 11.46 3.29 100.49.
 (377.1) (291.1) (86.1) (2847.23)

000000000 000000000 000000000 000000000 000000000

HYDROGRAPH ROUTING

62 SHIMAEULES LAKE OUTFLOW

ISTAO ICOMP IECON ITAPE JPLT JPRT INME ISTAGE IAUTO
 20 1 0 0 0 0 0 1 0 0

ROUTING DATA

BLOSS CLOSS AVG INES ISAME IOPT IPMP LSTR
 0.0 0.000 0.00 1 1 0 0 0

HSTPS HSTBL LAG WSHK I TSK STORA ISPRAT
 0 0 0 0.000 0.000 0.000 0.

STORAGE 0.00 17323.00 34756.00 52104.00 104360.00 200726.00 243492.00

OUTFLOW 0.00 353.00 747.00 1500.00 6403.00 13213.00 17359.00

000000000 000000000 000000000 000000000 000000000

HYDROGRAPH ROUTING

63 ROUTE SHIMAEULES LAKE OUTFLOW TO NODE 21

ISTAO ICOMP IECON ITAPE JPLT JPRT INME ISTAGE IAUTO
 21 1 0 0 0 0 0 1 0 0

ROUTING DATA

BLOSS CLOSS AVG INES ISAME IOPT IPMP LSTR

0.0 0.000 0.00 0 1 0 0 0

NETPS	INSTL	LAC	ARSDX	I	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

44 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE Z1

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRY	IMME	ISTAGE	IAUTO
Z1	2	0	0	0	0	1	0	0

SUB-AREA RUMOFF COMPUTATION

45 LOCAL FLOW C-7

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRY	IMME	ISTAGE	IAUTO
Z1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INYDC	INHC	TAREA	SNAP	TKSDA	TRSPC	RATIO	ISHOW	ISARE	LOCAL
1	-1	27.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PHS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT	STORR	ULTRR	RTIOL	EMAIN	STIBS	RTIOL	STRTL	CHSTL	ALSHR	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTO= 90.00 BRCHO= 200.00 RTIOL= 1.60

END-OF-PERIOD FLOW

NO. DA	HR. IN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO. DA	HR. IN	PERIOD	RAIN	EXCS	LOSS	COMP Q
--------	--------	--------	------	------	------	--------	--------	--------	--------	------	------	------	--------

SUM 14.06 11.00 3.70 35544.
(377.1) (201.1) (96.1) (1007.12)

COMBINE HYDROGRAPHS

46 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE Z1

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRY	IMME	ISTAGE	IAUTO
Z1	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

ROUTING DATA										
	LOSS	CLOSS	AVG	IBES	ISARE	IOPT	IPWP	LSTR		
	0.0	0.000	0.00	1	1	0	0	0		
HYDROGRAPH DATA										
	INSTPS	INSTL	LAC	ANSHK	I	TSK	STORA	ISPRAT		
	0	0	0	0.000	0.000	0.000	3250.	0		
STORAGE	3250.00	5000.00	0400.00	10000.00	11700.00	14000.00	17000.00	20000.00	24000.00	30000.00
OUTFLOW	3000.00	4000.00	4000.00	8000.00	10000.00	12000.00	14000.00	15300.00	16600.00	17000.00

HYDROGRAPH ROUTING

71 ROUTE FLOW TO NODE Z6

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INME	ISTAGE	IAUTO
Z6	1	0	0	0	0	1	0	0
ROUTING DATA								
LOSS	CLOSS	AVG	IBES	ISARE	IOPT	IPWP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
HYDROGRAPH DATA								
INSTPS	INSTL	LAC	ANSHK	I	TSK	STORA	ISPRAT	
0	4	1	0.000	0.000	0.000	0.	0	

SUB-AREA RUNOFF COMPUTATION

72 INFLOW TO OTISCO LAKE C-3

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INME	ISTAGE	IAUTO	
Z3	0	0	0	0	0	1	0	0	
HYDROGRAPH DATA									
INHC	INIC	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISARE	LOCAL
1	-1	42.70	0.00	5100.00	0.00	0.000	0	1	0
PRECIP DATA									
SPFE	PMS	R6	R12	R24	R48	R72	R96		
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00		

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRND	DLTKR	RTIOL	EDRAIN	STOKS	RTIOL	STRIL	CNSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.75	.05	0.00	0.00

RECESSION DATA

STRTO= 90.00 URCSO= 300.00 RTIOR= 1.60

END-OF-PERIOD FLOW

NO. DA	HR. MO	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO. DA	HR. MO	PERIOD	RAIN	EXCS	LOSS	COMP 0			
SUM													14.06	11.46	3.39	57020.
(377.1)													(291.1)	(06.1)	(1637.51)	

HYDROGRAPH ROUTING

73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD

	ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	IMME	ISTAGE	IAUTO
	23	1	0	0	0	0	1	0	0
ROUTING DATA									
	LOSS	CLOSS	AVC	INES	ISAME	IOPT	IPWP	LSTR	
	0.0	0.000	0.00	1	1	0	0	0	
	HSTPS	HSTBL	LAC	AVSIX	X	TSK	STORA	ISPRAT	
	0	0	0	0.000	0.000	0.000	29300.	0	
STORAGE	19600.00 45700.00	21000.00 52300.00	23900.00 50000.00	26100.00 45300.00	28300.00	30500.00	32600.00	34800.00	37000.00 39200.00
OUTFLOW	200.00 7960.00	200.00 10100.00	200.00 33700.00	200.00 53200.00	200.00	400.00	900.00	1600.00	2000.00 2000.00

0000000000 0000000000 0000000000 0000000000 0000000000

HYDROGRAPH ROUTING

74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25

	ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	IMME	ISTAGE	IAUTO
	25	1	0	0	0	0	1	0	0
ROUTING DATA									
	LOSS	CLOSS	AVC	INES	ISAME	IOPT	IPWP	LSTR	
	0.0	0.000	0.00	0	1	0	0	0	
	HSTPS	HSTBL	LAC	AVSIX	X	TSK	STORA	ISPRAT	
	0	10	4	0.000	0.000	0.000	0.	0	

0000000000 0000000000 0000000000 0000000000 0000000000

SUB-AREA RUNOFF COMPUTATION

75 INFLOW INTO ONONDAGA RESERVOIR C-4

	ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	IMME	ISTAGE	IAUTO	
	24	0	0	0	0	0	1	0	0	
HYDROGRAPH DATA										
	INHC	IUNC	TAREA	SIMP	TRSDA	TRSPC	RATIO	IGNON	ISAME	LOCAL
	1	-1	48.00	0.00	5100.00	0.00	0.000	0	1	0
PRECIP DATA										
	SPFE	PWS	R6	R12	R24	R48	R72	R96		
	0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00		

TOTPC COMPUTED BY THE PROGRAM IS .924

LOSS DATA

	LRPT	STRR	BLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CRSTL	ALSHI	RTIOP
	0	0.00	0.00	1.00	0.00	0.00	1.00	1.30	.06	0.00	0.00

RECESSION DATA

STRTO= 250.00 QRCST= 300.00 RTIOR= 1.60

0
 NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.HH PERIOD RAIN EXCS LOSS COR? 0

HYDROGRAPH ROUTING

76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INBRE	ISTAGE	IAUTO	
	24	1	0	0	0	0	1	0	0	
	ROUTING DATA									
	LOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPWP	LSTR		
	0.0	0.000	0.00	1	1	0	0	0		
	HSTPS	HSTBL	LAC	AVSIX	X	TSK	STORA	ISPRAT		
	0	0	0	0.000	0.000	0.000	0.	0		
STORAGE	0.00	100.00	700.00	1900.00	3500.00	7940.00	18200.00	22200.00	27000.00	32500.00
	43400.00	52300.00	62200.00	72100.00						
OUTFLOW	00.00	430.00	660.00	800.00	1070.00	1420.00	1770.00	1040.00	2000.00	2000.00
	6200.00	15400.00	20400.00	44700.00						

HYDROGRAPH ROUTING

77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INBRE	ISTAGE	IAUTO
	25	1	0	0	0	0	1	0	0
	ROUTING DATA								
	LOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPWP	LSTR	
	0.0	0.000	0.00	0	1	0	0	0	
	HSTPS	HSTBL	LAC	AVSIX	X	TSK	STORA	ISPRAT	
	0	0	0	0.000	0.000	0.000	0.	0	

COMBINE HYDROGRAPHS

78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INBRE	ISTAGE	IAUTO
	25	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

79 LOCAL INFLOW C-5

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INBRE	ISTAGE	IAUTO
	25	0	0	0	0	0	1	0	0

000000000 000000000 000000000 000000000 000000000

COMBINE HYDROGRAPHS

82 COMBINE LOCAL FLOW AT NODE 25

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IMRE	ISTAGE	IAUTO
25	2	0	0	0	0	1	0	0

000000000 000000000 000000000 000000000 000000000

HYDROGRAPH ROUTING

83 ROUTE FLOWS TO NODE 26

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IMRE	ISTAGE	IAUTO
26	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVG	INES	ISARE	IOPT	IPRP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTBL	LAC	ANBIX	X	TSK	STOR	ISPRAT
0	0	3	0.000	0.000	0.000	0.	0

000000000 000000000 000000000 000000000 000000000

COMBINE HYDROGRAPHS

84 COMBINE ROUTER FLOW AND FLOW AT NODE 26

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IMRE	ISTAGE	IAUTO
26	2	0	0	0	0	1	0	0

000000000 000000000 000000000 000000000 000000000

HYDROGRAPH ROUTING

85 ROUTE FLOWS TO NODE 20 (THREE RIVERS)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IMRE	ISTAGE	IAUTO
20	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVG	INES	ISARE	IOPT	IPRP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTBL	LAC	ANBIX	X	TSK	STOR	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

000000000 000000000 000000000 000000000 000000000

SUB-AREA RUNOFF COMPUTATION

86 LOCAL FLOW (E-9) AT NODE 27

ISTAD ICONP IECON ITAPE JPLT JPRT IMAE ISTATE IAUTO
 27 0 0 0 0 0 0 1 0 0

HYDROGRAPH DATA
 INTDC IUNG YAREA SAMP YUSDA YUSPC RATIO ISHOW ISAME LOCAL
 1 -1 37.00 0.00 5100.00 0.00 0.000 0 1 0

PRECIP DATA
 SPFE PWS R6 R12 R24 R48 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRDPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
 LADPT STDRR BLTRR RTIOL ERRAIN STWRIS RTIOL STRTL CMTL ALSX RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .06 0.00 0.00

RECESSION DATA
 STRTO= 100.00 ORCSD= 150.00 RTIOR= 1.60

END-OF-PERIOD FLOW
 NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP 0
 SUM 14.06 11.00 3.70 46074.
 (377.1) (201.1) (96.1) (1327.32)

HYDROGRAPH ROUTING

07 ROUTE LOCAL FLOW E-9 TO NODE 20

ISTAD ICONP IECON ITAPE JPLT JPRT IMAE ISTATE IAUTO
 20 1 0 0 0 0 1 0 0 0

ROUTING DATA
 GLOSS CLOSS AVC IRES ISAME IOPT IPWP LSTR
 0.0 0.000 0.00 0 1 0 0 0

HSTPS HSTBL LAG ARESX X TSK STORA ISPRAT
 0 3 1 0.000 0.000 0.000 0. 0

STATION 20, PLAN 1, RTIO 1

OUTFLOW

19.	19.	10.	17.	17.	37.	160.	235.	200.	520.
1549.	2110.	1906.	996.	473.	259.	173.	74.	37.	20.
27.	26.	25.	24.	22.	21.	20.	20.	19.	10.
17.	16.	15.	15.	14.	13.	13.	12.	12.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2110.	2040.	1602.	734.	9360.
CMS	60.	50.	45.	21.	265.
INCHES		.51	1.61	2.22	2.36
MM		13.00	40.91	56.20	59.02
AC-FT		1015.	3177.	4370.	4645.
THOUS CU H		1253.	3919.	5390.	5730.

STATION 20, PLAN 1, RTIO 2

OUTFLOW

30.	30.	36.	35.	33.	75.	337.	470.	559.	1056.
-----	-----	-----	-----	-----	-----	------	------	------	-------

3076.	3077.	3078.	3079.	3080.	3081.	3082.	3083.	3084.	3085.
54.	52.	49.	47.	45.	43.	41.	39.	37.	36.
34.	32.	31.	29.	28.	27.	26.	24.	23.	23.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4221.	4096.	3203.	1469.	10736.
CMS	120.	116.	91.	42.	531.
INCHES		1.03	3.22	4.43	4.71
MM		26.16	81.83	112.95	119.65
AC-FT		2881.	6354.	8740.	9291.
THOUS CU H		2505.	7037.	10700.	11460.

STATION 20, PLAN 1, RT10 3

OUTFLOW									
40.	47.	46.	43.	41.	93.	421.	500.	699.	1320.
3072.	5276.	4964.	2491.	1102.	647.	432.	185.	92.	71.
40.	45.	42.	39.	36.	34.	31.	29.	27.	26.
42.	40.	39.	37.	35.	33.	32.	30.	29.	28.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5276.	5120.	4004.	1836.	23420.
CMS	109.	105.	113.	52.	663.
INCHES		1.29	4.03	5.54	5.09
MM		32.69	102.20	140.69	149.56
AC-FT		2539.	7942.	10925.	11613.
THOUS CU H		3131.	9797.	13475.	14325.

STATION 20, PLAN 1, RT10 4

OUTFLOW									
57.	54.	55.	52.	50.	112.	505.	705.	839.	1504.
4646.	6331.	5957.	2909.	1419.	777.	519.	222.	111.	85.
81.	70.	74.	71.	67.	64.	61.	59.	56.	53.
51.	48.	46.	44.	42.	40.	38.	37.	35.	34.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6331.	6144.	4805.	2203.	28105.
CMS	179.	174.	136.	62.	796.
INCHES		1.54	4.83	6.65	7.07
MM		39.23	122.74	160.83	179.47
AC-FT		3046.	9531.	13109.	13926.
THOUS CU H		3750.	11756.	16170.	17190.

STATION 20, PLAN 1, RT10 5

OUTFLOW									
76.	75.	73.	70.	66.	149.	674.	940.	1110.	2112.
6195.	8441.	7942.	3906.	1891.	1030.	692.	296.	140.	114.
100.	103.	99.	94.	90.	86.	82.	78.	74.	71.
48.	45.	42.	39.	36.	34.	31.	29.	27.	26.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8441.	8192.	6407.	2937.	37473.
CMS	239.	232.	181.	83.	1061.
INCHES		2.06	6.44	8.86	9.42
MM		52.31	163.65	225.10	239.30
AC-FT		4062.	12700.	17479.	18302.
THOUS CU H		5010.	15675.	21560.	22920.

STATION 20, PLAN 1, RT10 6

OUTFLOW									
95.	94.	91.	87.	83.	107.	042.	1175.	1390.	2640.
7744.	10531.	9920.	4902.	2364.	1295.	064.	370.	104.	142.
136.	129.	123.	110.	112.	107.	102.	90.	93.	89.
05.	01.	77.	74.	70.	67.	64.	61.	50.	56.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10551.	10240.	8009.	3672.	46041.
CMS	299.	290.	227.	104.	1326.
INCHES		2.57	0.85	11.00	11.70
MM		65.39	204.57	201.30	299.12
AC-FT		5077.	15005.	21049.	23227.
THOUS CU H		6263.	19594.	26950.	20450.

COMBINE HYDROGRAPHS

00 COMBINE HYDROGRAPHS AT 20

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	ISAME	ISTAGE	IAUTO
20	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

09 INFLOWS TO DARGE CANAL FROM EASTERN END OF BASIN (G-2)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	ISAME	ISTAGE	IAUTO
29	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHC	IUNC	TAREA	SNIP	TBSA	TSPC	RATIO	ISOU	ISAME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

HYDROGRAPH ROUTING

90 ROUTE FLOW AT NODE 29 TO NODE 30

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	ISAME	ISTAGE	IAUTO
30	1	0	0	0	0	1	0	0

ROUTING DATA

CLASS	CLAS	AVG	TRES	ISAME	TOP1	TOPP	LSTR
0.0	0.000	0.00	0	1	0	0	0
NDTPS	NSDL	LAC	NSDRC	I	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

91 LOCAL INFLOW B-4

ISTAB	ICORP	IECON	ITAPE	JPLT	JPRT	INME	ISTAGE	IAUTO
30	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHG	INHC	TAREA	SNP	TRSDA	TRSPC	RAT10	ISNDN	ISARE	LOCAL
1	-1	529.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PHS	R6	R12	R24	R40	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LMPT	STROR	BLTR	RT10L	EMAIN	STRKS	RT10K	STRTL	CMSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTO= 000.00 BRCSN= 3960.00 RT10R= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP
-------	-------	--------	------	------	------	------	-------	-------	--------	------	------	------	------

SUN 14.06 11.00 3.70 601577.
(377.)(281.)(96.)(19300.11)

COMBINE HYDROGRAPHS

92 COMBINE LOCAL FLOW WITH ROUTED FLOW

ISTAB	ICORP	IECON	ITAPE	JPLT	JPRT	INME	ISTAGE	IAUTO
30	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

93 ROUTE FLOWS TO NODE 31

ISTAB	ICORP	IECON	ITAPE	JPLT	JPRT	INME	ISTAGE	IAUTO
31	1	0	0	0	0	1	0	0

ROUTING DATA

BLOSS	CLOSS	AVC	IRCS	ISARE	IQPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTDL	LAC	AVGKX	I	TSK	STORA	ISPRAT
0	1	0	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

94 LOCAL FLOW B-3

ISTAD ICOMP IECON ITAPE JPLT JPRT IINHE ISTAGE IAUTO
 31 0 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

IHYDC IUNG TAREA SMAP TRSBA TRSPC RAT10 ISHOW ISARE LOCAL
 1 -1 144.00 0.00 5100.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PWS R6 R12 R24 R40 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT STRKR BLTKR RT10L ERDIN STRKS RT10K STRTL CHSTL ALSHR RT10P
 0 0.00 0.00 1.00 0.00 0.00 1.00 .25 .06 0.00 0.00

RECESSION DATA

STRTO= 320.00 ORCSH= 1000.00 RT10R= 2.00

END-OF-PERIOD FLOW

NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.HH PERIOD RAIN EXCS LOSS COMP 0
 SUM 14.06 11.00 3.70 176726.
 (377.1) (281.1) (96.1) (5004.32)

COMBINE HYDROGRAPHS

VS COMBINE LOCAL FLOW WITH FLOW AT NODE 31

ISTAD ICOMP IECON ITAPE JPLT JPRT IINHE ISTAGE IAUTO
 31 2 0 0 0 0 0 1 0 0

SUB-AREA RUMOFF COMPUTATION

% LOCAL FLOW D-2

ISTAD ICOMP IECON ITAPE JPLT JPRT IINHE ISTAGE IAUTO
 31 0 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

IHYDC IUNG TAREA SMAP TRSBA TRSPC RAT10 ISHOW ISARE LOCAL
 1 -1 105.00 0.00 5100.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PWS R6 R12 R24 R40 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT STRKR BLTKR RT10L ERDIN STRKS RT10K STRTL CHSTL ALSHR RT10P
 0 0.00 0.00 1.00 0.00 0.00 1.00 .25 .06 0.00 0.00

RECESSION DATA

STRTO= 240.00 ORCSH= 800.00 RT10R= 1.00

END-OF-PERIOD FLOW

SUM 14.06 11.00 3.70 136512.
 (377.1) (201.1) (96.1) (3065.99)

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COMBINE HYDROGRAPHS

97 COMBINE LOCAL FLOW 0-2 WITH FLOW AT NODE 31

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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SUB-AREA RIBBOFF COMPUTATION

98 LOCAL FLOW 0-1

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INYD	TIME	YAREA	SRIP	YRSDA	TRSPC	RTIO	ISHOW	ISARE	LOCAL
1	-1	200.00	0.00	3100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PWS	R4	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT	STRND	DLTKR	RTIOI	ERAIN	STWKS	RTIOK	STRTL	CRSTL	ALSHX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.04	0.00	0.00

RECESSION DATA

STRTO= 600.00 GRCSH= 2160.00 RTIOR= 1.60

0
 NO. DA HR. MIN PERIOD RAIN EXCS LOSS COMP 0 NO. DA HR. MIN PERIOD RAIN EXCS LOSS COMP 0

SUM 14.06 11.00 3.70 361700.
 (377.1) (201.1) (96.1) (10244.70)

000000000 000000000 000000000 000000000 000000000

COMBINE HYDROGRAPHS

99 COMBINE LOCAL FLOW 0-1 WITH FLOW AT NODE 31

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

000000000 000000000 000000000 000000000 000000000

FOR DATA RIBBOFF COMPUTATION

HYDROGRAPH ROUTING

103 ROUTE FLOWS TO NODE 32

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
32	1	0	0	0	0	1	0	0

ROUTING DATA

CLASS	CLASS	AVG	INES	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTL	LAC	AWKX	X	TSK	STOR	ISPRAT
0	1	0	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

104 LOCAL FLOW D-4

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
32	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYD	IINC	TAREA	SNP	TRSDA	TRSPC	RA10	ISHW	ISAME	LOCAL
1	-1	20.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PWS	R6	R12	R24	R40	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STOR	ULTR	RTOL	EDAIN	STNS	RTOK	SIRTL	CRSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTO= 70.00 CRCSH= 210.00 RTIM= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.HH	PERIOD	RAIN	EXCS	LOSS	COMP	NO.DA	HR.HH	PERIOD	RAIN	EXCS	LOSS	COMP				
													SUM	(4.06	11.00	3.70	34004.
														(377.1)	(201.1)	(96.1)	(1044.44)

COMBINE HYDROGRAPHS

105 COMBINE LOCAL FLOW D-4 WITH FLOW AT 32

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
32	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

105 ROUTE FLOW AT 32 TO NODE 32

107 ROUTE FLOW AT NODE 20

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	IMNE	ISTAGE	IAUTO
20	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVG	INES	ISNE	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTBL	LAC	RRDK	I	TSK	STOR	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

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COMBINE HYDROGRAPHS

107 COMBINE ROUTED FLOW WITH FLOW AT NODE 20

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	IMNE	ISTAGE	IAUTO
20	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

100 LOCAL FLOW 0-7

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	IMNE	ISTAGE	IAUTO
20	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNP	TCSA	TSPC	WATD	ISND	ISNE	LDCL
1	-1	110.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PHS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	77.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LAPPT	STRR	BLTR	RTIOL	ENAIN	STRKS	RTIOL	STRYL	CHTL	ALSRI	RTIP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.04	0.00	0.00

RECESSION DATA

STRTO= 250.00 BRCSH= 000.00 RTIOR= 2.00

END-OF-PERIOD FLOW

NO. DA	HR. IN	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO. DA	HR. IN	PERIOD	RAIN	EXCS	LOSS	COMP 0
--------	--------	--------	------	------	------	--------	--------	--------	--------	------	------	------	--------

SUR 15.46 11.25 4.21 120503.
 (393.) (286.) (107.) (3924.23)

000000000 000000000 000000000 000000000 000000000

COMBINE HYDROGRAPHS

109 COMBINE WITH FLOW AT NODE 20

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	IMNE	ISTAGE	IAUTO
20	2	0	0	0	1	1	0	0

SUM OF 2 HYDROGRAPHS AT 20 PLAN 1 RTIO 1									
8875.	8852.	8835.	8814.	8772.	8751.	8753.	9171.	9387.	10184.
12925.	15492.	18118.	19116.	20399.	22872.	23698.	24853.	25768.	26136.
26118.	23817.	23341.	24713.	24879.	23548.	23137.	22847.	22676.	22618.
22649.	22741.	22856.	22966.	23841.	23844.	23824.	22989.	22782.	22656.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26136.	26123.	23983.	24637.	753394.
CMS	748.	748.	734.	698.	21324.
INCHES		.85	.19	.54	1.37
HR		1.28	4.77	13.61	34.78
AC-FT		12954.	51279.	146688.	372984.
THOUS CU H		19978.	63375.	188828.	468889.

SUM OF 2 HYDROGRAPHS AT 20 PLAN 1 RTIO 2									
9194.	9172.	9183.	9204.	9288.	9256.	9778.	10326.	10873.	12382.
18236.	24255.	28584.	30267.	32346.	35868.	37554.	39189.	40382.	40638.
48357.	39735.	38988.	37933.	37848.	36447.	36898.	35988.	35844.	35971.
36287.	36358.	36973.	37448.	37929.	38418.	38828.	39161.	39482.	39559.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40438.	40518.	40218.	38315.	1155588.
CMS	1151.	1147.	1139.	1085.	32722.
INCHES		.87	.29	.83	2.18
HR		1.87	7.41	21.17	53.22
AC-FT		28888.	79753.	227993.	573815.
THOUS CU H		24778.	98376.	281225.	706883.

SUM OF 2 HYDROGRAPHS AT 20 PLAN 1 RTIO 3									
9353.	9332.	9357.	9399.	9414.	9588.	10191.	10984.	11615.	13797.
28868.	28325.	33482.	35435.	37781.	40731.	43514.	45298.	46658.	46955.
46699.	46865.	45287.	44188.	43287.	42689.	42483.	42299.	42352.	42545.
42858.	43269.	43752.	44776.	44818.	45319.	45766.	46123.	46381.	46549.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46935.	46827.	46496.	44555.	1348699.
CMS	1338.	1326.	1317.	1262.	37964.
INCHES		.88	.34	.97	2.43
HR		2.16	8.57	24.62	61.74
AC-FT		23228.	92224.	265123.	664818.
THOUS CU H		28641.	113757.	327824.	828831.

SUM OF 2 HYDROGRAPHS AT 20 PLAN 1 RTIO 4									
9513.	9492.	9531.	9593.	9628.	9741.	10484.	11483.	12358.	15818.
23482.	32353.	38377.	40457.	42871.	46182.	49268.	51253.	52815.	53242.
53863.	52458.	51992.	50531.	49638.	49876.	48888.	48877.	49831.	49317.
49711.	50189.	50725.	51293.	51889.	52391.	52882.	53211.	53466.	53627.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53627.	53547.	53135.	51275.	1527493.
CMS	1519.	1516.	1505.	1452.	43254.
INCHES		.18	.39	1.12	2.77
HR		2.47	9.79	28.34	78.34
AC-FT		26582.	108391.	305186.	757435.
THOUS CU H		32751.	129998.	376342.	934282.

SUM OF 2 HYDROGRAPHS AT 20 PLAN 1 RT10 5									
9831.	9813.	9879.	9985.	10050.	10267.	11430.	12640.	13863.	17443.
28680.	48290.	47974.	58278.	52989.	54966.	68770.	63310.	65400.	66295.
66360.	63040.	64971.	63000.	62825.	62263.	62134.	62211.	62450.	62820.
63201.	63860.	64490.	63164.	63834.	64468.	67821.	67451.	67750.	67951.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67951.	67854.	67360.	65143.	1984350.
CMS	1924.	1921.	1907.	1845.	53925.
INCHES		.12	.49	1.42	3.45
HR		3.12	12.41	36.00	87.70
AC-FT		33647.	133604.	387626.	944310.
THOUS CU H		41583.	164001.	478129.	1164789.

SUM OF 2 HYDROGRAPHS AT 20 PLAN 1 RT10 6									
10150.	10133.	10220.	10376.	10487.	10774.	12257.	13019.	15410.	19094.
33060.	48171.	57454.	59943.	62941.	67609.	72105.	75346.	78170.	79405.
79709.	79270.	78374.	77806.	75992.	75392.	75293.	75420.	75715.	76152.
76710.	77360.	78102.	78885.	79683.	80444.	81114.	81640.	82014.	82255.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	82235.	82136.	81530.	78889.	2279043.
CMS	2329.	2326.	2309.	2234.	64535.
INCHES		.15	.59	1.72	4.13
HR		3.78	15.02	43.60	104.95
AC-FT		40720.	161712.	449421.	1130104.
THOUS CU H		58230.	199469.	579823.	1393963.

HYDROGRAPH ROUTING

110 ROUTE FLOW AT 20 TO NODE 33

ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	IRME	ISTAGE	IAUTO
33	1	0	0	0	1	1	0	0
ROUTING DATA								
BLOS	CLOSS	AVC	IRCS	ISONE	IDPT	IPWP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
BSTPS	HSTBL	LAG	BRSHR	I	TSK	STORA	ISPRAT	
0	3	1	0.000	0.000	0.000	0.	0	

STATION 33 - PLAN 1, RT10 1

OUTFLOW

8875.	8868.	8854.	8834.	8807.	8779.	8825.	8950.	9171.	9501.
10032.	13014.	15656.	17719.	19206.	20529.	22056.	23541.	24770.	25383.
26002.	26021.	25756.	25291.	24711.	24111.	23505.	23175.	22807.	22715.
22640.	22669.	22749.	22854.	22954.	23024.	23043.	22999.	22905.	22824.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26021.	26012.	25804.	24505.	739529.
CMS	737.	737.	731.	696.	20901.
INCHES		.05	.19	.53	1.34

	1.20	4.72	13.39	24.00
AC-FT	12090.	51181.	146290.	366709.
THOUS CU H	15910.	63131.	100446.	452328.

STATION 33, PLAN 1, RTIO 2

OUTFLOW									
9194.	9187.	9183.	9186.	9196.	9220.	9411.	9707.	10326.	11260.
13097.	10390.	23663.	27675.	30372.	32560.	34909.	37270.	39042.	40070.
40459.	40244.	39667.	38859.	37970.	37149.	36535.	36146.	35952.	35912.
36014.	36242.	36574.	36990.	37453.	37932.	38392.	38799.	39130.	39322.
TOTAL VOLUME									
CFS	40439.	40351.	40032.	38240.	36240.	34909.	33720.	32560.	31046.
CMS	1146.	1143.	1134.	1083.	1003.	941.	870.	816.	766.
INCHES		.07	.29	.33					
HR		1.06	7.37	21.13					
AC-FT	20009.	79402.	227544.	550016.					
THOUS CU H	24601.	97940.	200671.	600303.					

STATION 33, PLAN 1, RTIO 3

OUTFLOW									
9353.	9346.	9340.	9343.	9390.	9441.	9704.	10201.	10903.	12106.
15424.	20994.	27936.	32414.	35539.	37956.	40649.	43101.	45154.	46301.
46760.	46573.	45990.	45151.	44225.	43305.	42793.	42463.	42251.	42390.
42305.	42091.	42293.	43766.	44279.	44802.	45290.	45736.	46090.	46295.
TOTAL VOLUME									
CFS	46760.	46670.	46304.	44495.	42495.	40649.	38901.	37154.	35301.
CMS	1324.	1322.	1311.	1260.	1200.	1141.	1081.	1021.	961.
INCHES		.00	.34	.97					
HR		2.15	8.53	24.59					
AC-FT	23142.	91042.	264766.	646429.					
THOUS CU H	28546.	113205.	326503.	797350.					

STATION 33, PLAN 1, RTIO 4

OUTFLOW									
9513.	9506.	9512.	9529.	9505.	9441.	9990.	10416.	11402.	12953.
16953.	23610.	31404.	37062.	40560.	43170.	46107.	48901.	51112.	52437.
52040.	52921.	52572.	51520.	50505.	49745.	49195.	48944.	48929.	49075.
49253.	49739.	50200.	50736.	51292.	51047.	52267.	52810.	53176.	53301.
TOTAL VOLUME									
CFS	53301.	53279.	52744.	50992.	48992.	46992.	45202.	43602.	42102.
CMS	1512.	1509.	1494.	1441.	1381.	1321.	1261.	1201.	1141.
INCHES		.10	.30	1.11					
HR		2.45	9.72	20.12					
AC-FT	26419.	104616.	302879.	735621.					
THOUS CU H	32300.	129042.	373533.	907375.					

STATION 33, PLAN 1, RTIO 5

OUTFLOW									
9831.	9825.	9841.	9892.	9974.	10103.	10505.	11046.	12644.	14640.
19995.	20007.	20904.	46103.	50413.	53411.	56900.	60399.	63106.	65020.
66045.	66160.	65726.	64076.	63060.	62965.	62407.	62203.	62263.	62494.
TOTAL VOLUME									
CFS	66045.	66160.	65726.	64076.	63060.	62965.	62407.	62203.	62494.
CMS	1846.	1843.	1834.	1783.	1703.	1603.	1503.	1403.	1303.
INCHES		.07	.29	.33					
HR		1.06	7.37	21.13					
AC-FT	20009.	79402.	227544.	550016.					
THOUS CU H	24601.	97940.	200671.	600303.					

0207. 0208. 0209. 0210. 0211. 0212. 0213. 0214. 0215. 0216.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67656.	67533.	66892.	64674.	1046286.
CMS	1916.	1912.	1894.	1831.	32284.
INCHES		.12	.09	1.41	3.35
MM		3.11	12.32	35.74	85.83
AC-FT		33487.	132679.	384838.	915563.
THOUS CU H		41386.	163657.	474691.	1129331.

STATION 33, PLAN 1, RATIO 6

OUTFLOW

10150.	10144.	10170.	10246.	10364.	10546.	11173.	12283.	13829.	16374.
23835.	33975.	46495.	55189.	68113.	63498.	67578.	71713.	75236.	77643.
79897.	79464.	79128.	78246.	77151.	76156.	75339.	75368.	75476.	75762.
76192.	76743.	77393.	78118.	78898.	79671.	80414.	81066.	81598.	81891.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	81891.	81748.	80963.	78329.	2287121.
CMS	2319.	2315.	2293.	2218.	62499.
INCHES		.15	.59	1.78	4.88
MM		3.76	14.91	43.29	101.64
AC-FT		48532.	168587.	466888.	1094448.
THOUS CU H		69996.	198881.	574912.	1349972.

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	RATIOS APPLIED TO FLOWS						
			PLAN	RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
			.20	.40	.50	.60	.80	1.00	
HYDROGRAPH AT	1	100.00 (259.00)	1	78.	157.	196.	235.	314.	392.
			(2.22)	(4.41)	(5.51)	(6.61)	(8.80)	(11.10)	
ROUTED TO	2	100.00 (259.00)	1	78.	156.	195.	234.	311.	389.
			(2.20)	(4.41)	(5.51)	(6.61)	(8.82)	(11.02)	
HYDROGRAPH AT	2	147.00 (388.73)	1	5716.	11432.	17191.	17189.	22865.	28581.
			(161.86)	(323.73)	(485.66)	(485.59)	(647.46)	(809.32)	
2 COMBINED	2	247.00 (639.73)	1	5793.	11585.	14481.	17378.	23178.	28963.
			(164.83)	(328.85)	(418.87)	(492.88)	(636.11)	(828.13)	
ROUTED TO	6	247.00 (639.73)	1	3651.	7301.	9127.	10952.	14682.	18253.
			(183.37)	(366.75)	(458.43)	(516.12)	(613.58)	(716.87)	
HYDROGRAPH AT	6	118.00 (305.62)	1	2725.	5449.	6837.	8284.	10939.	13674.
			(77.44)	(154.88)	(193.68)	(232.32)	(309.75)	(387.19)	
2 COMBINED	6	365.00 (945.35)	1	6222.	12444.	15535.	18666.	24888.	31110.
			(176.19)	(352.38)	(440.47)	(528.57)	(704.75)	(888.94)	

HYDROGRAPH AT	3	51.00 (132.09)	1	3559. (100.79)	7119. (201.50)	8090. (251.97)	10670. (302.37)	14237. (403.16)	17797. (503.95)
ROUTED TO	6	51.00 (132.09)	1	1974. (55.09)	3940. (111.70)	4934. (139.73)	5921. (167.67)	7095. (223.56)	9069. (279.46)
2 COMBINED	6	416.00 (1077.44)	1	6357. (185.60)	13115. (371.36)	16393. (464.21)	19672. (557.05)	26229. (742.73)	32707. (928.41)
HYDROGRAPH AT	4	104.00 (476.56)	1	14200. (402.32)	20416. (604.65)	35520. (1005.01)	42624. (1206.97)	56032. (1609.30)	71040. (2011.62)
ROUTED TO	4	104.00 (476.56)	1	060. (24.50)	1905. (56.20)	2666. (75.40)	5119. (144.96)	11504. (328.03)	18145. (513.00)
ROUTED TO	5	104.00 (476.56)	1	820. (23.45)	1033. (31.09)	2447. (69.29)	3475. (98.40)	6907. (195.59)	10624. (300.04)
HYDROGRAPH AT	5	102.00 (264.10)	1	2630. (74.70)	5276. (149.40)	6595. (186.75)	7914. (224.11)	10552. (298.01)	13190. (373.51)
2 COMBINED	5	206.00 (740.74)	1	3060. (86.66)	6020. (170.47)	7504. (213.63)	9244. (261.02)	13000. (390.99)	18651. (526.15)
ROUTED TO	56	206.00 (740.74)	1	2577. (72.97)	5093. (144.22)	6405. (181.30)	7999. (226.50)	12497. (353.00)	17263. (480.03)
HYDROGRAPH AT	56	155.00 (401.05)	1	4049. (137.32)	9690. (274.63)	12123. (343.29)	14540. (411.95)	19397. (549.26)	24246. (686.50)
2 COMBINED	56	441.00 (1142.10)	1	7157. (202.66)	14104. (401.65)	17730. (502.07)	21420. (606.56)	29520. (836.13)	37910. (1073.71)
ROUTED TO	6	441.00 (1142.10)	1	7157. (202.66)	14104. (401.65)	17730. (502.07)	21420. (606.56)	29520. (836.13)	37910. (1073.71)
2 COMBINED	6	857.00 (2219.62)	1	13490. (382.23)	26067. (740.00)	33505. (951.01)	40445. (1145.20)	54094. (1534.43)	69626. (1971.59)
ROUTED TO	0	857.00 (2219.62)	1	11700. (331.29)	23294. (659.62)	29131. (824.91)	35150. (995.56)	48020. (1360.00)	61131. (1731.02)
HYDROGRAPH AT	7	09.00 (230.51)	1	3132. (80.69)	6264. (177.30)	7030. (221.72)	9396. (266.07)	12520. (354.76)	15660. (443.44)
ROUTED TO	8	09.00 (230.51)	1	2937. (83.16)	5073. (146.31)	7342. (207.09)	8010. (249.47)	11746. (332.62)	14603. (415.70)
2 COMBINED	0	946.00 (2450.13)	1	12296. (340.10)	24459. (692.99)	30571. (865.60)	36030. (1043.14)	50260. (1423.43)	63931. (1810.31)
ROUTED TO	10	946.00 (2450.13)	1	11029. (334.95)	23520. (666.25)	29410. (832.79)	35496. (1005.12)	48475. (1372.67)	61600. (1746.50)
HYDROGRAPH AT	9	10.00 (46.62)	1	600. (17.23)	1217. (34.45)	1521. (43.07)	1825. (51.60)	2433. (68.91)	3042. (86.13)
ROUTED TO	10	10.00 (46.62)	1	601. (17.01)	1201. (34.02)	1502. (42.52)	1802. (51.03)	2403. (68.04)	3003. (85.05)
2 COMBINED	10	964.00 (2496.75)	1	11922. (337.50)	23714. (671.51)	29642. (839.37)	35710. (1011.43)	48772. (1381.00)	62051. (1757.09)
ROUTED TO	15	964.00 (2496.75)	1	11504. (326.00)	22961. (630.10)	28702. (812.76)	34595. (979.61)	47266. (1330.43)	60150. (1703.49)

HYDROGRAPH AT	11	183.00 (473.97)	1	28366. (576.78)	40732. (1153.40)	58915. (1441.75)	61898. (1738.18)	81444. (2386.88)	101830. (2883.49)
ROUTED TO	11	183.00 (473.97)	1	568. (15.85)	839. (23.74)	1036. (29.34)	1282. (36.38)	1845. (52.23)	2486. (68.14)
ROUTED TO	12	183.00 (473.97)	1	959. (15.88)	831. (23.52)	1026. (29.65)	1263. (35.78)	1817. (51.46)	2371. (67.13)
HYDROGRAPH AT	12	524.00 (1357.13)	1	41859. (1185.31)	83718. (2378.62)	104647. (2963.28)	125577. (3555.94)	167436. (4741.25)	209295. (5926.56)
Z COMBINED	12	787.00 (1831.12)	1	42358. (1199.22)	84221. (2384.88)	105156. (2977.69)	126181. (3578.79)	167996. (4757.11)	209892. (5943.48)
ROUTED TO	12	787.00 (1831.12)	1	788. (19.82)	2514. (71.28)	3888. (84.95)	4713. (133.47)	12318. (348.82)	19824. (561.34)
ROUTED TO	13	787.00 (1831.12)	1	788. (19.82)	2588. (71.81)	3888. (84.95)	4781. (133.12)	12312. (348.45)	19787. (558.85)
HYDROGRAPH AT	13	39.00 (101.81)	1	1958. (55.44)	3915. (118.87)	4894. (138.59)	5873. (166.31)	7831. (221.75)	9789. (277.18)
Z COMBINED	13	746.00 (1932.13)	1	2658. (75.26)	4615. (138.69)	5657. (168.19)	7189. (201.31)	13847. (392.89)	21998. (622.98)
ROUTED TO	14	746.00 (1932.13)	1	1917. (54.28)	3419. (96.83)	4912. (139.89)	5982. (169.39)	13144. (372.76)	20914. (592.22)
HYDROGRAPH AT	14	36.00 (93.24)	1	1927. (54.56)	3854. (109.12)	4817. (136.48)	5788. (163.68)	7787. (218.24)	9634. (272.88)
Z COMBINED	14	782.00 (2025.37)	1	3364. (95.26)	4828. (178.69)	7378. (208.71)	8781. (248.66)	13478. (381.42)	21512. (609.16)
HYDROGRAPH AT	14	782.00 (2025.37)	1	43279. (1225.51)	86557. (2451.83)	108197. (3063.78)	129836. (3676.54)	173114. (4982.85)	216393. (6127.57)
Z COMBINED	14	1564.00 (4058.74)	1	44193. (1288.84)	91486. (2596.25)	114432. (3248.36)	137179. (3884.47)	182681. (5172.96)	228285. (6464.31)
ROUTED TO	14	1564.00 (4058.74)	1	3488. (96.28)	8788. (246.36)	8788. (246.36)	8788. (246.36)	8788. (246.36)	8788. (246.36)
ROUTED TO	15	1564.00 (4058.74)	1	3488. (96.28)	8788. (246.36)	8788. (246.36)	8788. (246.36)	8788. (246.36)	8788. (246.36)
Z COMBINED	15	2528.00 (6547.49)	1	14944. (423.15)	31661. (896.54)	37482. (1059.12)	43295. (1225.97)	55966. (1584.78)	68858. (1949.84)
ROUTED TO	18	2528.00 (6547.49)	1	14139. (408.37)	38871. (851.52)	35426. (1083.14)	48968. (1159.86)	52754. (1492.83)	64739. (1833.21)
HYDROGRAPH AT	16	191.00 (494.69)	1	8778. (248.33)	17539. (496.66)	21924. (628.83)	26389. (744.99)	35879. (993.32)	43849. (1241.65)
ROUTED TO	18	191.00 (494.69)	1	8387. (235.22)	16613. (478.43)	28766. (808.84)	24928. (705.65)	33226. (948.86)	41533. (1176.88)
Z COMBINED	18	2719.00 (7042.18)	1	14213. (402.46)	38219. (853.78)	35618. (1088.36)	41181. (1166.12)	53849. (1502.18)	65188. (1843.65)
HYDROGRAPH AT	17	281.00 (528.99)	1	11928. (337.54)	23848. (675.89)	29881. (843.86)	35761. (1012.63)	47681. (1338.17)	59681. (1687.71)

ROUTED TO	17	201.00 (520.99)	1	2523. (71.45)	3400. (96.20)	4860. (194.25)	10099. (300.61)	19286. (546.11)	27153. (760.87)
ROUTED TO	18	201.00 (520.99)	1	2440. (69.09)	3400. (96.20)	5197. (147.16)	8317. (235.52)	14130. (400.12)	20256. (573.50)
Z COMBINED	18	2920.00 (7562.77)	1	14040. (454.42)	33061. (947.51)	39010. (1104.64)	44301. (1262.40)	56449. (1590.46)	68523. (1940.35)
HYDROGRAPH AT	18	19.00 (49.21)	1	700. (20.04)	1416. (40.09)	1770. (50.11)	2124. (60.13)	2831. (80.10)	3539. (100.22)
Z COMBINED	18	2939.00 (7611.90)	1	14002. (453.30)	33529. (949.43)	39095. (1107.04)	44683. (1265.20)	56505. (1602.30)	68692. (1945.15)
ROUTED TO	21	2939.00 (7611.90)	1	15651. (443.19)	32572. (922.33)	37923. (1073.86)	43327. (1226.00)	54904. (1554.71)	66706. (1880.91)
HYDROGRAPH AT	19	90.00 (253.82)	1	5333. (151.82)	10666. (302.04)	13333. (377.55)	15999. (453.86)	21333. (604.87)	26666. (755.89)
ROUTED TO	21	90.00 (253.82)	1	3197. (90.54)	6395. (181.07)	7993. (226.34)	9992. (271.61)	12789. (362.15)	15986. (452.68)
Z COMBINED	21	3037.00 (7865.79)	1	15710. (444.04)	32683. (925.49)	38062. (1077.00)	43494. (1231.62)	55127. (1561.02)	66905. (1896.79)
HYDROGRAPH AT	20	74.00 (191.66)	1	9096. (257.56)	18191. (515.12)	22739. (643.90)	27287. (772.68)	36383. (1030.24)	45478. (1287.00)
ROUTED TO	20	74.00 (191.66)	1	179. (5.06)	358. (10.13)	456. (12.93)	535. (15.72)	757. (21.44)	1124. (31.83)
ROUTED TO	21	74.00 (191.66)	1	177. (5.01)	354. (10.02)	451. (12.70)	549. (15.54)	745. (21.00)	1090. (31.00)
Z COMBINED	21	3111.00 (8057.45)	1	15077. (449.59)	30016. (934.92)	38004. (1089.74)	44007. (1246.13)	55021. (1500.66)	67932. (1923.62)
HYDROGRAPH AT	21	27.00 (69.93)	1	1504. (44.05)	3160. (89.69)	3939. (112.12)	4751. (134.54)	6335. (179.39)	7919. (224.24)
Z COMBINED	21	3130.00 (8127.30)	1	15903. (450.31)	32065. (936.29)	38545. (1091.66)	44079. (1248.19)	55918. (1503.41)	68053. (1927.06)
ROUTED TO	22	3130.00 (8127.30)	1	15706. (447.01)	32015. (929.21)	38247. (1083.04)	43745. (1230.71)	55465. (1570.59)	67005. (1910.96)
HYDROGRAPH AT	22	90.00 (253.82)	1	7764. (219.04)	15527. (439.69)	19409. (549.61)	23291. (659.53)	31035. (879.30)	38019. (1099.22)
Z COMBINED	22	3236.00 (8301.20)	1	15027. (440.10)	32090. (931.35)	38351. (1085.97)	43069. (1242.23)	55630. (1575.27)	67692. (1916.02)
ROUTED TO	22	3236.00 (8301.20)	1	15035. (425.76)	27531. (779.59)	32506. (920.40)	37945. (1063.17)	48117. (1362.53)	58777. (1644.30)
ROUTED TO	26	3236.00 (8301.20)	1	14971. (423.92)	27442. (777.07)	32406. (917.62)	37809. (1059.30)	47930. (1357.23)	58540. (1657.66)
HYDROGRAPH AT	23	42.70 (110.59)	1	4410. (125.10)	8825. (230.19)	11044. (312.74)	13253. (375.29)	17671. (500.30)	22009. (625.40)
ROUTED TO	23	42.70 (110.59)	1	740. (21.10)	1736. (49.17)	2000. (56.63)	2210. (62.01)	4376. (123.91)	6539. (185.17)

ROUTED TO	25	42.70 (110.59)	1	306. (16.59)	1319. (37.35)	1667. (47.21)	1911. (54.13)	2720. (77.03)	3610. (102.22)
HYDROGRAPH AT	24	60.00 (176.12)	1	5101. (144.45)	10202. (200.90)	12753. (361.13)	15304. (433.35)	20405. (577.00)	25506. (722.25)
ROUTED TO	24	60.00 (176.12)	1	1160. (32.05)	1510. (42.90)	1620. (46.11)	1743. (49.35)	1909. (54.05)	2000. (56.63)
ROUTED TO	25	60.00 (176.12)	1	1005. (30.72)	1401. (41.95)	1594. (45.12)	1707. (48.32)	1874. (53.05)	2000. (56.63)
Z COMBINED	25	110.70 (206.71)	1	1656. (46.91)	2000. (79.29)	3261. (92.33)	3610. (102.46)	4594. (130.09)	5610. (150.05)
HYDROGRAPH AT	25	102.00 (264.10)	1	5570. (157.74)	11141. (315.40)	13926. (394.34)	16711. (473.21)	22202. (630.95)	27052. (700.69)
Z COMBINED	25	212.70 (550.09)	1	6264. (177.37)	12169. (344.30)	15006. (427.20)	17971. (500.09)	23907. (676.97)	29054. (845.30)
HYDROGRAPH AT	25	72.00 (106.40)	1	3355. (94.99)	6709. (109.90)	8306. (237.40)	10064. (284.97)	13410. (379.97)	16773. (474.96)
Z COMBINED	25	204.70 (737.37)	1	9262. (262.26)	10165. (314.37)	22501. (639.42)	26965. (763.56)	35099. (1016.50)	44044. (1269.05)
ROUTED TO	26	204.70 (737.37)	1	5545. (157.03)	10654. (301.69)	13130. (372.02)	15563. (440.69)	20730. (587.02)	25914. (733.01)
Z COMBINED	26	3520.70 (9110.57)	1	17460. (494.42)	20027. (016.30)	34150. (967.24)	39333. (1119.46)	50532. (1430.91)	61524. (1742.17)
ROUTED TO	20	3520.70 (9110.57)	1	16731. (473.76)	20565. (000.06)	33060. (959.02)	39250. (1111.67)	50202. (1421.55)	61123. (1730.02)
HYDROGRAPH AT	27	37.00 (95.03)	1	3270. (92.02)	6556. (105.64)	8195. (232.06)	9034. (270.47)	13112. (371.29)	16390. (464.11)
ROUTED TO	20	37.00 (95.03)	1	2110. (59.76)	4221. (119.51)	5276. (149.39)	6331. (179.27)	0441. (239.02)	10551. (290.70)
Z COMBINED	20	3557.70 (9214.00)	1	16750. (474.52)	20507. (009.50)	33096. (959.02)	39292. (1112.62)	50247. (1422.03)	61100. (1732.42)
HYDROGRAPH AT	29	100.00 (259.00)	1	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)
ROUTED TO	30	100.00 (259.00)	1	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)
HYDROGRAPH AT	30	529.00 (1370.10)	1	23305. (659.93)	46610. (1319.06)	50263. (1649.02)	69915. (1979.70)	93221. (2639.71)	116526. (3299.64)
Z COMBINED	30	629.00 (1629.10)	1	23305. (659.93)	46610. (1319.06)	50263. (1649.02)	69915. (1979.70)	93221. (2639.71)	116526. (3299.64)
ROUTED TO	31	629.00 (1629.10)	1	23305. (659.93)	46610. (1319.06)	50263. (1649.02)	69915. (1979.70)	93221. (2639.71)	116526. (3299.64)
HYDROGRAPH AT	31	144.00 (372.96)	1	4722. (133.71)	9404. (267.41)	11004. (334.27)	14165. (401.12)	10007. (534.03)	23609. (668.53)
Z COMBINED	31	773.00 (2002.06)	1	20027. (793.63)	50054. (1507.27)	70067. (1904.09)	04001. (2300.90)	112100. (3174.54)	140135. (3968.17)

HYDROGRAPH AT	31	105.00 (271.95)	1	5045. (142.05)	10009. (285.09)	12611. (357.11)	15134. (428.54)	20170. (571.30)	25223. (714.23)
2 COMBINED	31	070.00 (2274.01)	1	32105. (911.30)	64370. (1822.75)	89442. (2270.44)	96355. (2730.13)	128740. (3645.50)	169925. (4536.00)
HYDROGRAPH AT	31	200.00 (745.92)	1	8352. (236.51)	16705. (473.03)	28081. (991.20)	25057. (709.54)	33410. (946.06)	41762. (1182.57)
2 COMBINED	31	1146.00 (3019.93)	1	36521. (1034.15)	73041. (2060.29)	91301. (2505.36)	109562. (3102.44)	146002. (4136.50)	182603. (5170.73)
HYDROGRAPH AT	31	249.00 (696.71)	1	19077. (540.19)	38153. (1000.30)	47691. (1350.47)	57230. (1620.57)	76306. (2160.75)	95303. (2700.94)
2 COMBINED	31	1435.00 (3716.63)	1	42495. (1203.33)	84990. (2406.65)	106230. (3000.32)	127405. (3609.90)	169900. (4813.31)	212476. (6016.64)
ROUTED TO	31	1435.00 (3716.63)	1	8666. (245.30)	12305. (340.44)	14006. (390.07)	15077. (449.59)	19464. (551.15)	23053. (652.79)
ROUTED TO	32	1435.00 (3716.63)	1	8666. (245.30)	12305. (340.44)	14006. (390.07)	15077. (449.59)	19464. (551.15)	23053. (652.79)
HYDROGRAPH AT	32	20.00 (72.52)	1	1215. (34.41)	2430. (68.01)	3030. (86.02)	3645. (103.22)	4060. (137.62)	4075. (172.03)
2 COMBINED	32	1463.00 (3709.15)	1	8004. (249.30)	12502. (354.01)	14309. (405.10)	16110. (456.41)	19761. (559.50)	23409. (642.06)
ROUTED TO	20	1463.00 (3709.15)	1	0756. (247.95)	12431. (352.02)	14229. (402.92)	16032. (453.90)	19659. (556.69)	23209. (659.47)
2 COMBINED	20	9020.70 (13003.55)	1	25303. (722.17)	39439. (1116.79)	46390. (1313.05)	53447. (1512.45)	67711. (1917.35)	81954. (2320.69)
HYDROGRAPH AT	20	110.00 (204.90)	1	3626. (102.67)	7251. (205.30)	9064. (256.67)	10077. (300.01)	14503. (410.67)	18120. (513.34)
2 COMBINED	20	5130.70 (13200.45)	1	26136. (740.00)	40630. (1150.75)	46935. (1329.62)	53627. (1510.56)	67951. (1924.16)	82255. (2329.20)
ROUTED TO	33	5130.70 (13200.45)	1	26021. (736.03)	40439. (1145.67)	46760. (1324.32)	53001. (1511.50)	67656. (1915.79)	81091. (2310.09)

 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAN SAFETY VERSION JULY 1970
 LAST MODIFICATION 26 FEB 79

 TERMINAL 32'S TIME OUT.

JOB= 3124 HOU= 7.364

Table 1-1: Physical Characteristics of Lakes in the Basin

<u>Name</u>	<u>Regulating Agency</u>	<u>Drainage Area (sq. mi.)</u>	<u>Surface Area (sq. mi.)</u>	<u>Shoreline (miles)</u>	<u>Principal Regulation Purpose</u>
Canandaigua Lake	City of Canandaigua	184	16.57	36	WS, WQ, FC, Rec.
Keuka Lake	Village of Penn Yan	179	17.43	19	WS, SQ, Rec., FC
Seneca Lake	N.Y. Electric & Gas Co. & N.Y.S. Dept. of Transportation	714	66.9	75	WS, Nav., P, FC, Rec.
Cayuga Lake	N.Y.S. Dept. of Transportation	780	66.4	85	WS, Nav., Rec. FC
Owasco Lake	City of Auburn	206	10.25	25	WS, WQ, FC, Rec.
Skaneateles Lake	City of Syracuse	74	13.8	33	WS, SQ, FC, Rec.
Otisco Lake	Onondaga County Water Authority	42.7	3.4	13	WS, SQ, FC, Rec.
Oneida Lake	N.Y.S. Dept. of Transportation	1382	79.8	55	Nav., FC, Rec.

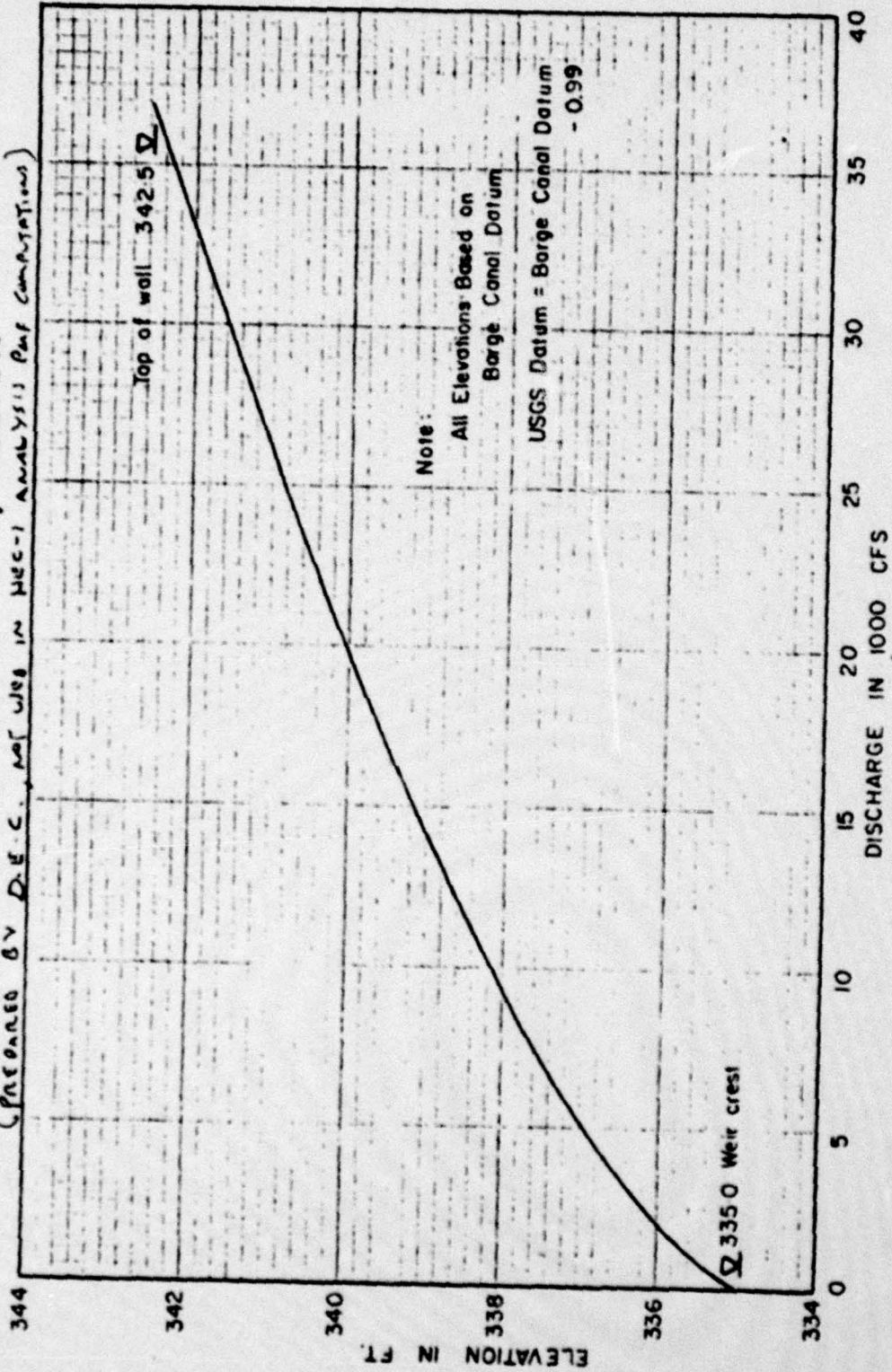
WS = Water Supply
WQ = Water Quality
FC = Flood Control
Nav. = Navigation
P = Power
Rec. = Recreation

HYDRAULICS

- Figure C-17 Rating Curve At Lock 0-3
- Figure C-18 Stage Discharge Computations
- Figure C-19 Stage Discharge Curve
- Figure C-20 Stage Storage Computations

RATING CURVE AT LOCK 0-3, FULTON

(PREPARED BY D.E.C. FOR USE IN REC-1 ANALYSIS) (Per Computations)



Note:

All Elevations Based on

Barge Canal Datum

USGS Datum = Barge Canal Datum

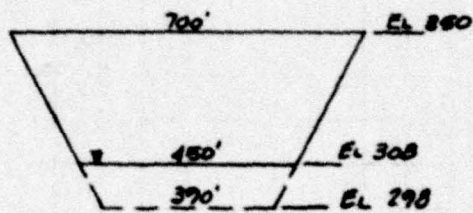
- 0.99'



PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-20-79
 SUBJECT LOWER FULTON DAM - LOCK #3 PROJECT NO. 2305
STAGE - DISCHARGE RELATIONSHIP DRAWN BY JPS & NFD

DOWNSTREAM CHANNEL

MANNING'S FORMULA : $Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$; ASSUME: $n = 0.035$
 $S = 0.001 \text{ ft/ft}$



$R = \frac{(b+2y)y}{b+2y\sqrt{1+z^2}}$; $A = (b+2y)y$

ELEV *	h	1.49/n	A	R	S	Q		
308	0	42.57	4200	6.87	0.001	20564		
310	2	↓	5112	10.66	↓	33596		
312	4		6048	12.22		43556		
314	6		7008	13.75		54621		
316	8		7992	15.22		66677		
318	10		9000	16.65		79743		
320	12		10032	18.04		93793		
322	14		11088	19.40		108839		
324	16		12168	20.73		124866		
326	18		13440	22.02		143612		
328	20		14580	23.29		161758		
330	22		15744	24.52		180800		
332	24		42.57	16992		25.74	0.001	200872

* ELEVATION AT LOCATION OF SECTION, 10000 FT ABOVE LOCK #5 @ MINETTO, NY. TRANSLATED UPSTREAM TO TOE OF DAM (ELEV 318) DISCHARGE AT SUBMERGENCE WOULD BE 134000[±] CFS.



PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6.20.79
 SUBJECT LOWER FULTON DAM - LOCK #3 PROJECT NO. 2305
STAGE-DISCHARGE RELATIONSHIP DRAWN BY JPS & HFD

FREE WEIR FLOW (Ogee)

SPILLWAY - 509 FT LENGTH

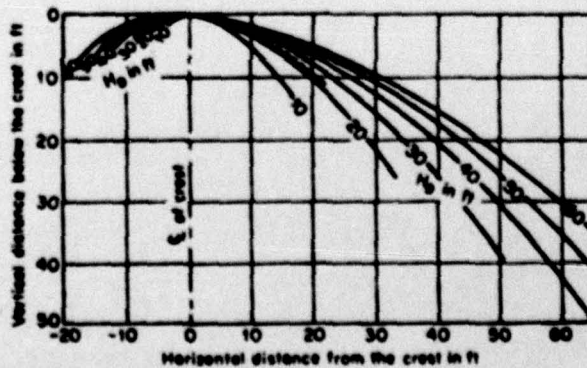
$C_d = 4.03$

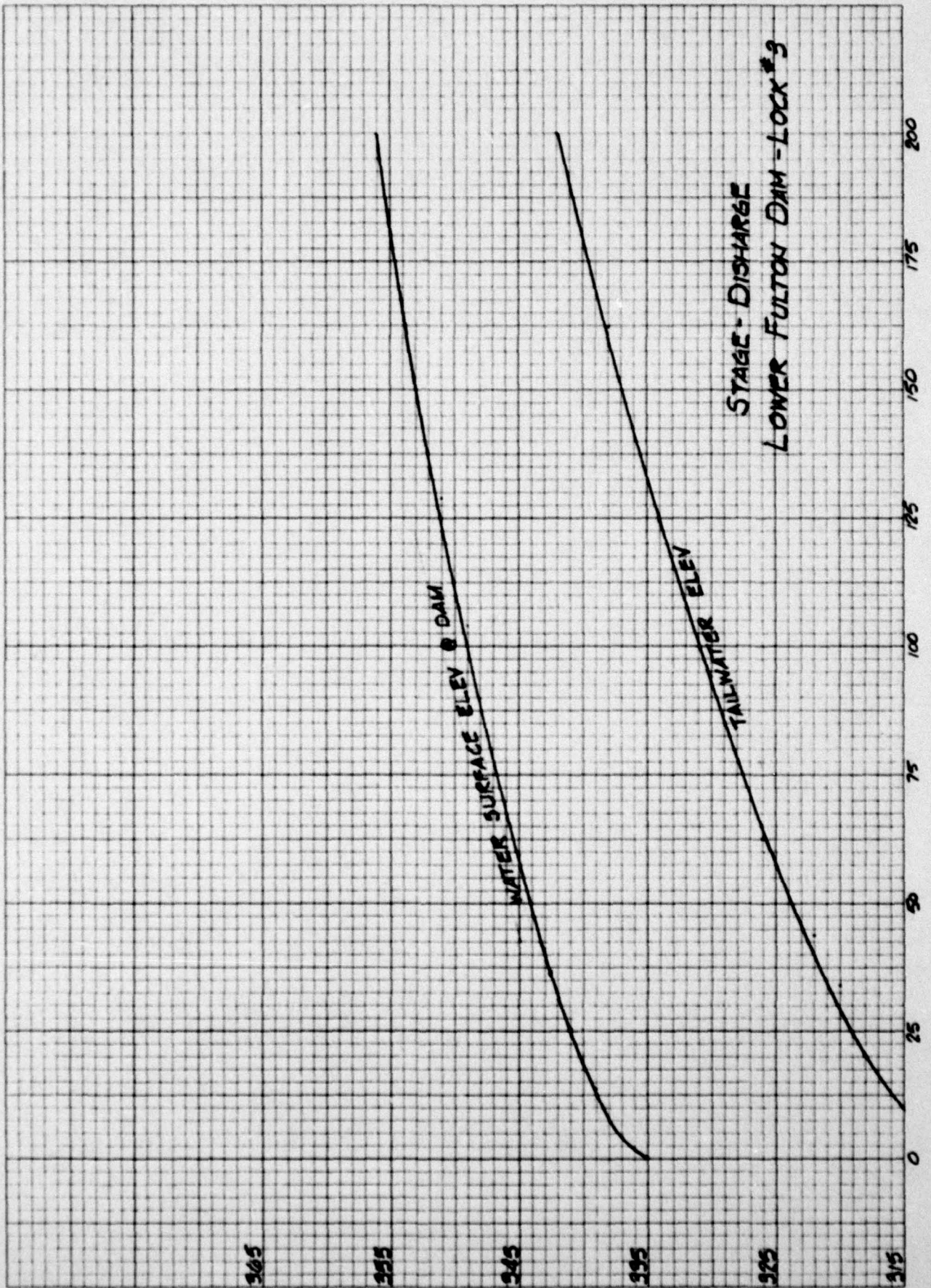
$H_d = 18.00'$ (ASSUME)

TOP OF DAM = 335.0'

HEIGHT OF DAM = 17

ELEV	H_e	H_e/H_d	C/C_d	C	$Q = C \cdot H_e^{1.5}$
335	0	0	0	0	0
337	2	.111	.75	3.023	4352
339	4	.222	.80	3.224	13128
341	6	.333	.85	3.426	25629
343	8	.444	.87	3.506	40380
345	10	.556	.92	3.708	59684
347	12	.667	.94	3.788	80149
349	14	.778	.97	3.909	104226
351	16	.889	.98	3.949	128643
353	18	1.000	1.00	4.030	156650
355	20	1.111	1.01	4.070	185292
357	22	1.222	1.02	4.111	215925
359	24	1.333	1.025	4.131	247224







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DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6.15.79
 SUBJECT LOWER FULTON DAM - LOCK # 3 PROJECT NO. 2305
STAGE - STORAGE RELATIONSHIP DRAWN BY JPG

<u>ELEV</u>	<u>END AREA (ACRE)</u>	<u>VOL (ACRE-Ft)</u>	<u>STORAGE (ACRE-Ft)</u>
316	.0242	6.3	6.3
318	.0250	19.1	25.4
320	.0257	33.4	58.8
322	.0264	48.1	106.9
324	.0272	63.7	170.6
326	.0279	94.9	265.5
328	.0287	97.6	363.1
330	.0293	99.6	462.7
332	.0301	102.3	565.0
334	.0308	104.7	669.7
336	.0316	107.4	777.1
338	.0323	109.8	886.9
340	.0331	112.5	999.4
342	.0338	114.9	1114.3
344	.0345	117.3	1231.6
346	.0353	119.0	1350.6
348	.0360	122.4	1473.0
350	.0367	124.8	1597.8
352	.0375	127.6	1725.3
354	.0382	129.8	1855.1
356	.0389	132.2	1987.3
358	.0397	135.0	2122.3
360			

APPENDIX D
STABILITY ANALYSIS



PROJECT NAME _____ DATE _____

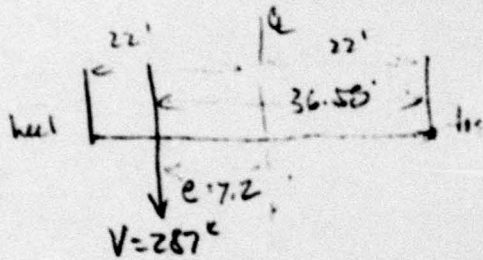
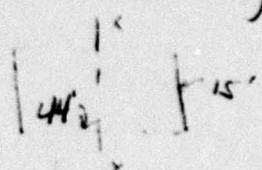
SUBJECT _____ PROJECT NO. _____

DRAWN BY _____

Estimating foundation contact stresses at toe and heel for case of uplift on full 15' wide section (dam and buttress)

$$I_{xx} = \frac{1}{12} bh^3 \text{ for 15' wide section}$$

$$= \frac{1}{12} (15)(44 \times 44 \times 44) = 106,480 \text{ ft}^4$$



$$\sigma_{\text{toe}} = \frac{V}{A} - \frac{Mc}{I}$$

$$= \frac{287^k}{(15 \times 44)} - \frac{(287^k \times 7.2)(22)}{(106,480 \text{ ft}^4)} = 0.44 - .43$$

$$= 0.44 - .43 = +0.01 \text{ ksf (comp)}$$

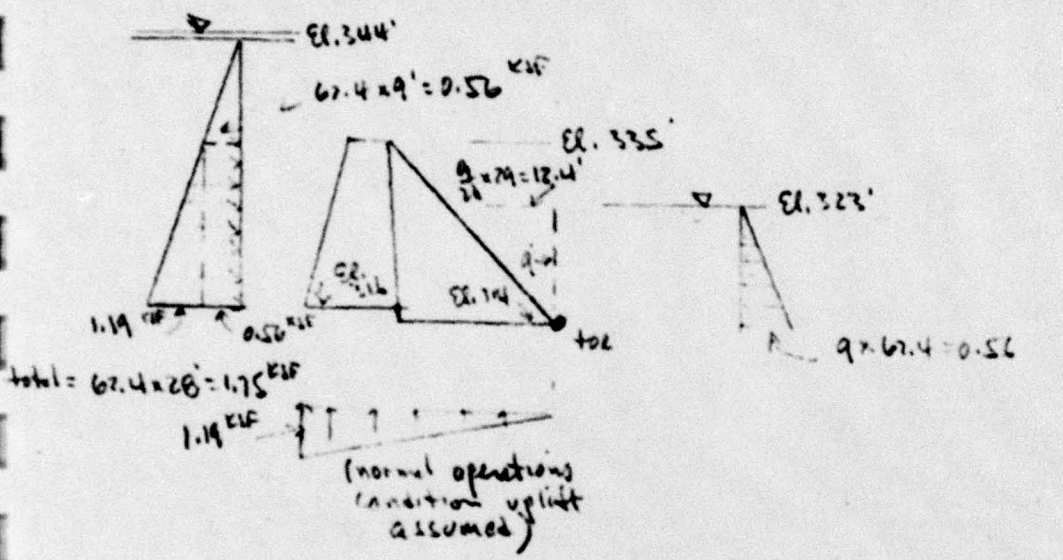
$$\sigma_{\text{heel}} = \frac{V}{A} + \frac{Mc}{I} = 0.44 + 0.43 = 0.87 \text{ ksf}$$

(Comp)



PROJECT NAME _____ DATE _____
 SUBJECT _____ PROJECT NO. _____
 DRAWN BY _____

II WL @ 1/2 PMF elevations upstream and downstream
 elev. 344' upstream, 9' above spillway
 elev. 323' downstream



(i) moments about toe resisting overturning: mass of dam + dest. H₂O + dest. pro

$$= 19,504 \text{ K} + (15) \left(\frac{17.4 \times 9}{2} \times 62.4 \right) \left(\frac{17.4}{3} \right) + (15) \left(\frac{9 \times 0.56 \times 9}{2} \times \frac{9}{3} \right)$$

$$= 19,504 + 216 - 113 = 19,617 \text{ K}$$

(ii) moments causing overturning: upstream water pressure + uplift

(a) uplift acts on 15' dam and 3' buttress:

$$= (15) \left[(0.56 \times 9) \left(\frac{19}{2} + 2 \right) + \left(1.19 \times \frac{19}{2} \right) \left(\frac{19}{3} + 2 \right) \right] + 9215 =$$

$$= 3249 + 9215 = 12,463 \text{ K}$$

FS against overturning = $\frac{19,617}{12,463} = 1.57$

location of resultant: $\bar{d} = \frac{\sum M_{toe}}{\sum V} = \frac{(19,617 - 12,463)}{637 - 266.43 + (15 \times \frac{17.4 \times 9}{2} \times 62.4)}$



PROJECT NAME _____ DATE _____
 SUBJECT _____ PROJECT NO. _____
 DRAWN BY _____

location of resultant in terms of b

$$\underline{d} = \frac{15.3}{44} (b) = \underline{0.35} (b)$$

(b) uplift acts on 15' wide dam and buttress sections

FS against overturning =

$$\underline{FS} = \frac{19,617}{32,49 + 8619 + \frac{15}{2}(596)} = \underline{1.32}$$

14848

location of resultant, $d = \frac{\sum M_{top}}{\sum V}$

$$\underline{d} = \frac{(19,617 - 14,848)''}{(637 - 393 + 43 + 52)''} = \frac{7154''}{339''} = \underline{21.1}''$$

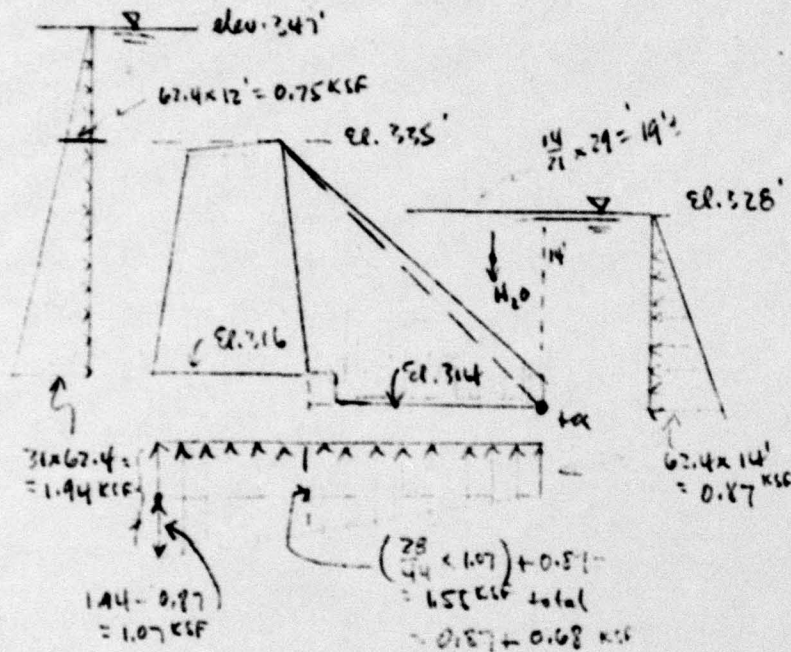
in terms of base width, b

$$\underline{d} = \frac{21.1}{44} (b) = \underline{0.48} (b)$$



PROJECT NAME _____ DATE _____
 SUBJECT _____ PROJECT NO. _____
 DRAWN BY _____

III. WL @ PMF elevations upstream and downstream
 elev. 347' upstream, 12' above spillway,
 elev. 328' downstream.



as for I, analyze
dam section length 15' wide

neglect the uplift pressure
diagram, assume uplift
for the normal operating
condition from (I)

(i) moments about toe resisting overturning: mass of dam + upstream wt. H₂O + upst. pres
 = $11,50 + 10 + (15') \left(\frac{1}{2} \times 14 \times 19 \times 62.4 \times \frac{19}{3} \right) + (15') \left(0.87 \times \frac{14}{2} \times \frac{14}{3} \right) =$
 $= 19,504 + 788 + 426 = 20,718 \text{ K}$

(ii) moments causing overturning: upst. water pressure + uplift =
 $= (15') \left[(0.75 \times 19) \left(\frac{19}{2} \times 2 \right) + (19 \times 62.4 \times \frac{19}{2}) \left(\frac{19}{3} \times 2 \right) \right] + 9215 = 3866 + 9215 = 13,081 \text{ K}$
 FS against overturning = $\frac{20,718}{13,081} = 1.58$

(2) uplift acts
on 15' base
for dam and
buttress apron

location of resultant d from toe: $d = \frac{\sum M_{toe}}{\sum V}$
 $= \frac{20,718 - 13,081}{637 + 43} = \frac{7637}{680} = 11.23 \text{ ft}$
 $\alpha = 14.29^\circ$



PROJECT NAME _____ DATE _____

SUBJECT _____ PROJECT NO. _____

DRAWN BY _____

(b) uplift on 15' wide buttress
and dam section

$$\begin{aligned} \text{overturning moment} &= \text{ups. water press} + \text{uplift} \\ &= 3866 + 8619 + \frac{15}{3}(596) = 15,465 \text{ }^k \end{aligned}$$

$$\text{FS against overturning} = \frac{20,718 \text{ }^k}{15,465 \text{ }^k} = 1.34$$

location of resultant, d , from toe

$$d = \frac{\sum M_{\text{toe}}}{\sum V} = \frac{(20,718 - 15,465) \text{ }^k}{651 - 393 + 104 + 43} = \frac{5253 \text{ }^k}{411} = 12.78'$$

$$\underline{d} = \frac{12.78}{41} (b) = 0.29 (b)$$

SLIDING

I. wt @ normal pool level

$$\begin{aligned} \text{(i) wt. of dam} &= 15' \left[(2 \times 17.5 \times 15) + \left(\frac{5.3}{2} \times 17.5 \times 15\right) + \left(\frac{14}{2} \times 17 \times 15\right) + \left(\frac{9}{2} \times 15 \times 15\right) \right. \\ &\quad \left. + 3' \left[\frac{1}{2} \times \frac{21 \times 27}{42.5} \times 15 \right] \right] = 510 + 128 = 637 \text{ }^k \end{aligned}$$

$$\text{(ii) wt. water above upstream face} = (15') \left[67.4 \times \frac{17.5}{2} \times 5.3 \right] = 43 \text{ }^k$$

$$\text{(ii) lateral water pressures upstream} = \left(1.19 \times \frac{19}{2} \right) = 11.3 \text{ }^k \times 15' \text{ wide} = 170 \text{ }^k$$

$$\text{(iii) uplift} = \left(1.19 \times \frac{14}{2} \right) = 26.2 \text{ }^k \times 15' \text{ wide} = 393 \text{ }^k$$

$$\text{uplift} = \left[(0.76 \times 16) + (0.43 \times \frac{10}{2}) \right] 15' \text{ wide} + \left[(0.76 \times \frac{20}{3}) \right] 3' \text{ wide} = 266 \text{ }^k$$

(for dam 15' wide buttress 3' wide)



PROJECT NAME _____

DATE _____

SUBJECT _____

PROJECT NO. _____

DRAWN BY _____

FS against sliding (friction-shear method, using Sepsis bond between dam concrete and bedrock, $\mu = 0.65$)

$$\frac{\mu N + \text{bond/shear}}{\text{horiz. water pressure} + \text{ice}}$$

$$= \frac{(0.65)(637 - 266 + 43) + (0.050)[(144 \times 16') \times (15') + (144 \times 28' \times 3')]}{170^k + 7.5^k (15)}$$

$$\underline{FS} = \frac{269 + 2333}{282.5} = \underline{9.2 \pm}$$

normal
(uplift, ice act)

II. WL @ $\frac{1}{2}$ PMF elevations

(i) wt. of dam = 637^k

(ii) wt. H₂O above upstream face = 43^k

(iii) wt. H₂O above downstream face = (15') $\left(\frac{12.4 \times 9}{2} \times 62.4 \right) = 52^k$

(iv) lateral water pressure upstream = $\frac{1}{2} (0.56 + 1.75) (19') (15') = 329^k$

(v) lateral water press downstream = $(0.56 \times 9 \times \frac{1}{2}) (15') = 38^k$

FS against sliding (friction-shear method), using factors as before

$$\underline{FS} = \frac{(0.65)(637 + 43 + 52 - 266) + 2333 + 38}{329} = \underline{8.1}$$

normal
(uplift, ice act)



PROJECT NAME _____ DATE _____
 SUBJECT _____ PROJECT NO. _____
 DRAWN BY _____

III. WL @ PMF elevations

(i) wt. of dam = 637^k

(ii) lateral water pressures

upstream = $(\frac{0.75 + 1.94}{2})(19') = 25.6^k \times 15' = 384^k$

downstream = $(0.87 \times \frac{14}{2}) = 6^k \times 15' = 90^k$

(iii) wt. water on downstream face of dam (vertical force) =

= $(\frac{14 \times 14}{2})(62.4) = 8.3^k \times 15' = 124.5^k$

(iv) uplift = $15' [(\frac{1.94 + 1.55}{2})(16')] + 3' [(\frac{1.55 + 0.87}{2})(20')]$
= $419^k + 102^k = 521^k$

use 260^k uplift
(normal
operating
condition)

FS against sliding (friction-shear method), using factors as before

$$FS = \frac{(0.65)(637 + 124 + 43 - 266) + 2333^k + 90^k}{384^k} = 7^k$$

normal
(uplift acts)
-06

NO. 343-10 DIETZEN DRAIN PAPER
10 X 10 PER INCH

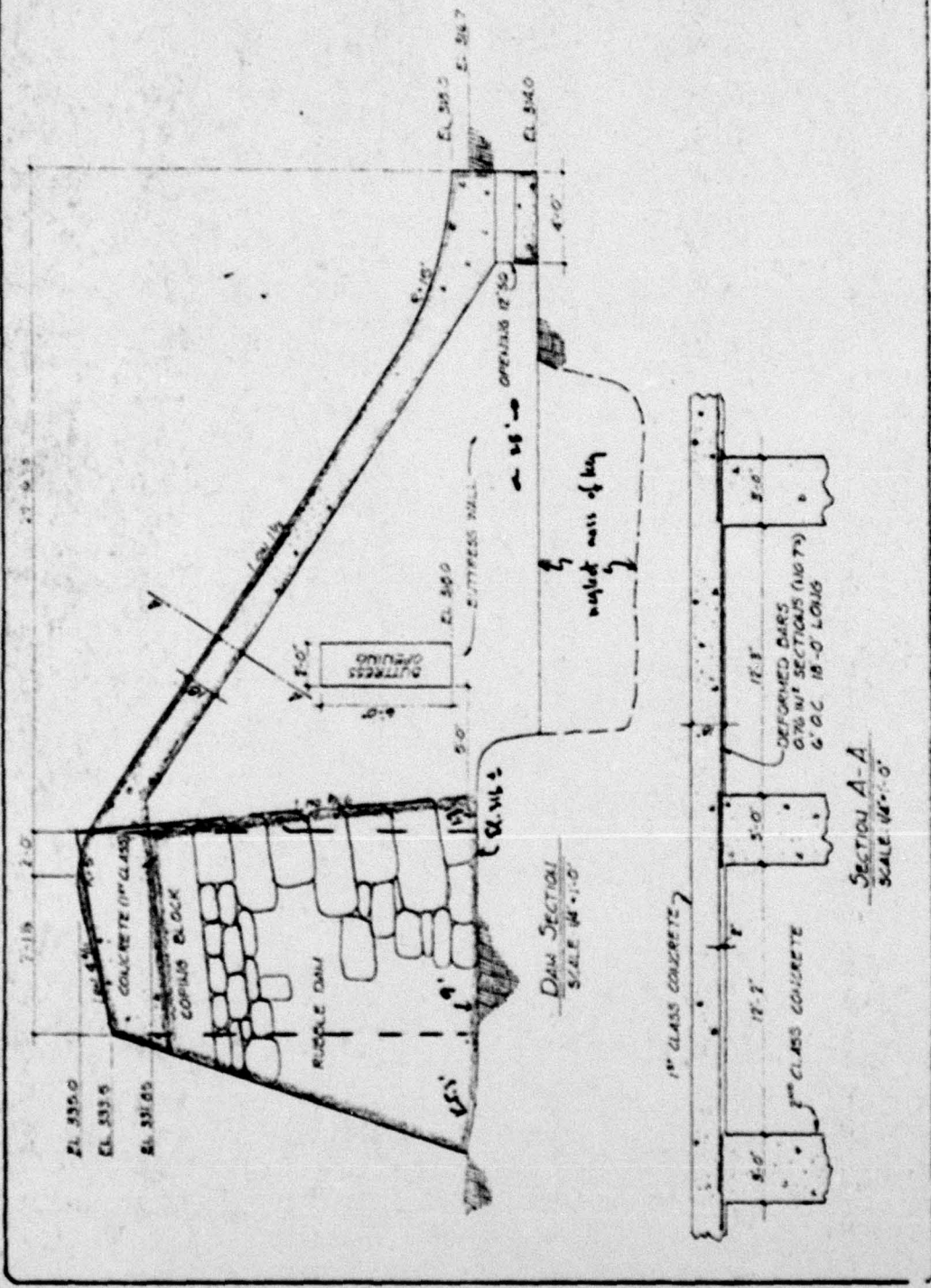
DIETZEN CORPORATION
MADE IN U.S.A.



147 1445

118 1425

1405



APPENDIX E
REFERENCES

APPENDIX
REFERENCES

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