

A091140

OSWEGO RIVER BASIN

LOCK 24 - ERIE CANAL

ONONDAGA COUNTY, NEW YORK

INVENTORY NO. N.Y. 792

⑥ PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM.

Lock 24 - Erie Canal (Inventory Number NY-792),
Oswego River Basin, Onondaga County, New York.

Phase I Inspection
Report,



⑩ Bent L. / Thomsen
Gary L. / Wood

Prepared by

THOMSEN ASSOCIATES

105 CORONA AVE. GROTON, N.Y.

Prepared for
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
NEW YORK, NEW YORK

⑫ 170

⑮

DACW51-79-C-0001

⑪ SEP 27 1980

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED
CONTRACT NO. DACW51-79-C0001

80 10 29 002

393970

DISCLAIMER NOTICE

**THIS DOCUMENT IS BEST QUALITY
PRACTICABLE. THE COPY FURNISHED
TO DTIC CONTAINED A SIGNIFICANT
NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.**

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

AD A091140

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A091140	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Lock 24 - Erie Canal Oswego River Basin, Onondaga County, NY Inventory No. 792		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
7. AUTHOR(s) Bent L. Thomsen Gary L. Wood		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Thomsen Associates 105 Corona Avenue Groton, NY 13073		8. CONTRACT OR GRANT NUMBER(s) DACW-51-79-C-0001
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation 50 Wolf Road Albany, NY 12233		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CofE New York, NY 10287		12. REPORT DATE 30 September 1980
		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; Distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) *Original contains color *This document is best quality practicable. *Copies furnished to DDC contained a *Incorrect number of pages which do not		
18. SUPPLEMENTARY NOTES Copies will be in black and white		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability Lock 24-Erie Canal Onondaga County Oswego River Seneca River		
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. The examination of documents and the visual inspections of the Lock 24 dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the		

DDC FILE COPY

dam has some deficiencies which require further investigation and remedial action.

The spillway cannot pass the peak outflow from one-half the PMF. For this storm and lesser storm events, a high tailwater condition resulting in flooding of downstream areas would occur. Therefore, overtopping would not significantly increase the hazard to loss of life downstream from that which would exist just before such overtopping and the spillway is assessed as inadequate. 

Stability analyses based on available information indicate that the stability of the dam is inadequate for all loading conditions. Additional stability analyses, taking into account measured characteristics of the dam/bedrock interaction, should be completed within six (6) months of the date of notification of the owner. Based upon the results of these investigations, appropriate remedial measures deemed necessary to insure the safety and integrity of the dam and appurtenant structures should be undertaken and completed during the first construction season following completion of the stability analyses.

During periods of unusually heavy precipitation and high runoff occurring over the watershed, continuous surveillance should be provided both at the dam and in the downstream areas to warn of high floodwater conditions. Such surveillance procedures and other measures deemed necessary should be developed documented and placed in readiness for future use as part of a detailed emergency operation-action plan. A warning system should also be developed and implemented; to be used in the event of dam failure.

In addition, the dam has a number of problem areas which, if left uncorrected, have the potential for the development of hazardous conditions and must be corrected within one year. These areas are:

1. Determine the responsibility for the maintenance of the powerhouse, boat yard, and Mercer mill, and correct the deficiencies noted.
2. Correct concrete deterioration on the dam crest and in the general lock area.

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.

Accession No.	
NTIS	
DTIC	
Unannounced	
Justification	
By	
Distribution	
Availability	
Dist	
A 23	

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LOCK 24 ERIE CANAL
I.D. NO. NY-792
ONONDAGA COUNTY, NEW YORK

TABLE OF CONTENTS

	<u>Page No.</u>
- ASSESSMENT	
- OVERVIEW PHOTOGRAPH	
1 PROJECT INFORMATION	1
1.1 GENERAL	1
1.2 DESCRIPTION OF PROJECT	1
1.3 PERTINENT DATA	3
2 ENGINEERING DATA	5
2.1 GEOTECHNICAL DATA	5
2.2 DESIGN/CONSTRUCTION RECORDS	6
2.3 OPERATION RECORDS	6
2.4 EVALUATION OF DATA	6
3 VISUAL INSPECTION	7
3.1 FINDINGS	7
3.2 EVALUATION OF OBSERVATIONS	8
4 OPERATION AND MAINTENANCE PROCEDURES	9
4.1 PROCEDURE	9
4.2 MAINTENANCE OF DAM AND APPURTENANT STRUCTURES	9
4.3 MAINTENANCE OF OTHER APPURTENANT STRUCTURES	9
4.4 WARNING SYSTEM IN EFFECT	9
4.5 EVALUATION	9
5 HYDROLOGIC/HYDRAULIC	11
5.1 DRAINAGE AREA CHARACTERISTICS	11
5.2 ANALYSIS CRITERIA	11
5.3 SPILLWAY CAPACITY	12
5.4 RESERVOIR CAPACITY	13
5.5 FLOODS OF RECORD	13
5.6 OVERTOPPING POTENTIAL	13
5.7 EVALUATION	14

	<u>Page No</u>
6 STRUCTURAL STABILITY	15
6.1 EVALUATION OF STRUCTURAL STABILITY	15
7 ASSESSMENT/RECOMMENDATIONS	17
7.1 ASSESSMENT	17
7.2 RECOMMENDED MEASURES	18

APPENDIX

- A. Photographs
- B. Visual Inspection Checklist
- C. Hydrologic/Hydraulic: Engineering Data and Computations
- D. Stability Computations
- E. Drawings

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NAME OF DAM: Lock 24 Erie Canal
STATE LOCATED: New York
COUNTY LOCATED: Onondaga
BASIN: Oswego River
STREAM: Seneca River
DATES OF INSPECTION: June 11 and June 26, 1980

ASSESSMENT

The examination of documents and the visual inspections of the Lock 24 dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

The spillway cannot pass the peak outflow from one-half the PMF. For this storm and lesser storm events, a high tailwater condition resulting in flooding of downstream areas would occur. Therefore, overtopping would not significantly increase the hazard to loss of life downstream from that which would exist just before such overtopping and the spillway is assessed as inadequate.

Stability analyses based on available information indicate that the stability of the dam is inadequate for all loading conditions. Additional stability analyses, taking into account measured characteristics of the dam/bedrock interaction, should be completed within six (6) months of the date of notification of the owner. Based upon the results of these investigations,

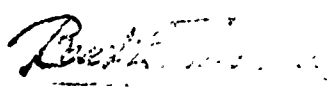
appropriate remedial measures deemed necessary to insure the safety and integrity of the dam and appurtenant structures should be undertaken and completed during the first construction season following completion of the stability analyses.

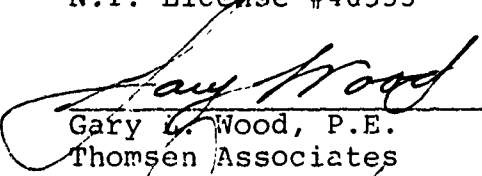
During periods of unusually heavy precipitation and high runoff occurring over the watershed, continuous surveillance should be provided both at the dam and in the downstream areas to warn of high floodwater conditions. Such surveillance procedures and other measures deemed necessary should be developed, documented and placed in readiness for future use as part of a detailed emergency operation-action plan. A warning system should also be developed and implemented; to be used in the event of dam failure.

In addition, the dam has a number of problem areas which, if left uncorrected, have the potential for the development of hazardous conditions and must be corrected within one year.

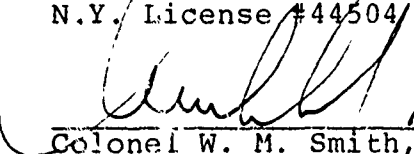
These areas are:

1. Determine the responsibility for the maintenance of the powerhouse, boat yard, and Mercer mill, and correct the deficiencies noted.
2. Correct concrete deterioration on the dam crest and in the general lock area.


Bent L. Thomsen, P.E.
Thomsen Associates
N.Y. License #40553


Gary L. Wood, P.E.
Thomsen Associates
N.Y. License #44504

APPROVED BY


Colonel W. M. Smith, Jr.
New York District Engineer



Panoramic View of
BALDWINVILLE DAM
(Lock 24)

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

LOCK 24 ERIE CANAL

I.D. NO. NY-792

ONONDAGA COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if they constitute hazards to human life and property, and to recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of the Dam and Appurtenant Structures

The Lock 24 dam is a masonry gravity overflow dam approximately 325 feet in length. It rises approximately 16 feet above its rock foundation to the fixed crest.

Flow is partially controlled by a taintor gate located at the north end (or left side) of the dam. This gate is approximately 50 feet wide.

North of the dam taintor gate, a small hydroelectric powerhouse is maintained by Niagara Mohawk Power Corporation. Flow into the powerhouse is controlled by another taintor gate approximately 50 feet in width.

The south abutment of the dam is a masonry wall of the Baldwinsville Boat Yard.

The lock which is associated with this dam is located to the south of a narrow island, approximately 200 feet south of the south dam abutment. This lock is approximately 350 feet long and 44 feet wide.

On the island are two structures which in the past have utilized the head developed by the dam for power. These are the Baldwinsville Boat Yard and the Mercer mill. These structures receive water from a forebay, or intake channel, which varies in width from approximately 120 feet to approximately 30 feet. Neither structure is utilizing the head at the present time. At the boat yard, upstream water is retained by gates with flashboards. At the time of inspection, the Mercer mill was inaccessible.

b. Location

The dam is located on the Seneca River, in the Village of Baldwinsville, New York.

c. Size Classification

The dam has a head of approximately 10 feet, and a storage volume of approximately 34,100 acre-feet. Therefore, the dam is classified as an intermediate size dam.

d. Hazard Classification

The dam is classified "high" hazard because of downstream residences and the potential impact on navigation.

e. Ownership

The Lock 24 dam is owned by the New York State Department of Transportation, Waterways Maintenance Subdivision. The controlling office is located in Syracuse, New York.

Their address is as follows:

New York State Department of Transportation
Region 3
Canal Maintenance
State Office Building
333 East Washington Street
Syracuse, New York

Mr. Leo Burns
315-473-8194

f. Purpose of the Dam

The primary purpose of the dam is to provide navigable upstream waters. The impounded waters behind the dam provide a storage pool for gravity inflow to the lock. A secondary purpose of the dam is to provide hydroelectric power.

g. Design and Construction History

The present dam is believed to have been constructed about 1893. Plans for the lock, taintor gate, and a concrete cap on the dam crest are dated 1908. Plans for a new taintor gate are dated 1963 and it is reported that this was accomplished at about this time.

h. Normal Operational Procedures

The water level behind the dam is maintained at or slightly above elevation 374.0 (BCD-Barge Canal Datum) (The dam crest elevation). Gauge readings upstream and downstream of the lock are recorded daily.

1.3

PERTINENT DATA

<u>a. Drainage Area</u> (square miles)	3266+
<u>b. Elevations</u> (Barge Canal Datum)	
Top of Dam (Lock Walls)	379.0
Dam Overflow Crest	374.0
Design Pool	374.0
Maximum Recorded Pool	378.8
Taintor Gate Crest	366.0
Streambed at Dam Centerline	358+
Maximum Recorded Tailwater	372.5
Minimum Recorded Tailwater	363+

c. Storage (acre-feet)

Design Pool 34,100₊

d. Dam

Type	Masonry
Length	325 feet
Height	16 ₊ feet
Top Width	5-6 feet
Foundation	Rock

e. Gate

Type	One Taintor Gate
Width	50 feet
Crest Elevation	366.0

f. Lock

Size	Approximately 350' long and 44' wide
------	---

g. Other Appurtenant Structures

1. Niagara Mohawk Power Corporation powerhouse
with 50' wide taintor gate
2. Baldwinsville Boat Yard
3. Mercer Mill

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Lock 24 is located within the Village of Baldwinsville, New York in the Erie-Ontario Lowlands physiographic province.

This channel is a major glacial drainageway and, as a result, the Seneca River valley proper is filled with stratified sand and gravel outwash from the melting continental ice sheet. The surrounding terrain consists of the Iroquoian Lake plain with associated lacustrine deposits; ground moraine (glacial till) underlies these materials in most areas and forms knolls and drumlins which are free of lacustrine sediments by virtue of the fact that they were of sufficient elevation to have formed "islands" during the proglacial phase. All glacial deposits in the area reflect the most recent, or Wisconsinan, stage of the Pleistocene.

Underlying this glacial drift are Upper Silurian age mudstones of the Vernon Formation (Salina Group) and dolostones of the older Lockport Group. The Vernon is known to be gypsiferous while the Lockport Dolomite is characteristically vuggy. All rock units in the area are flat-lying over short distances, although a gentle southward dip may be discerned; all strata are non faulted and the region is considered seismically stable. However, according to Figure 1 of the Guidelines, promulgated by the Corps of Engineers, this is in an area of Zone 2 seismic probability.

b. Subsurface Investigations

No records of subsurface investigations were available. Based upon the available plans and the site characteristics, it appears that the structure is founded on rock.

2.2 DESIGN/CONSTRUCTION RECORDS

No records were available for the original masonry dam. Plans dated 1908 and identified as contract 45 show the dam, lock, taintor gate, and appurtenant structures as they presently exist. Plans for a new taintor gate are dated 1963. Selected drawings are included in Appendix E.

2.3 OPERATION RECORDS

This site has an attendant on a year-round basis. Upstream and downstream water elevation readings are recorded daily throughout the year. The dam taintor gate and the Niagara Mohawk Power Corporation taintor gate are regulated to ensure that the upstream water surface does not drop below elevation 374.0 (BCD) (the dam crest).

2.4 EVALUATION OF DATA

The data presented in this report was obtained during the site inspections and from the files of the New York State Department of Transportation. The information is considered adequate for Phase I inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspections of the dam and appurtenant structures were conducted on June 11, 1980 and on June 26, 1980. The weather was generally fair. The upstream water surface elevation was 374.4 (BCD) during the first inspection. For the second inspection, the upstream water surface elevation was drawn down to just below 374.0 (BCD) (the dam crest), so that the dam crest and downstream face could be inspected. This was accomplished by entering the River below the dam in a small boat. The photographs in Appendix A depict the conditions described below.

b. Dam

The original masonry portion of the dam appeared to be in satisfactory condition. Concrete deterioration was noted along the cap that comprises the dam crest.

c. Dam Taintor Gate

The dam taintor gate was operable and appeared to be in satisfactory condition.

d. Lock

The lock in general is in satisfactory condition. Some areas of concrete deterioration were noted.

e. Powerhouse and Appurtenant Structures

Concrete deterioration was noted in the general area of the powerhouse and its appurtenant structures.

f. Baldwinsville Boat Yard and Mercer Mill

Significant concrete deterioration was noted in the area of the gates at the Baldwinsville Boat Yard. Also,

flashboards appeared to be old and were observed to be leaking.

At the time of inspection, the Mercer mill was inaccessible.

g. Upstream and Downstream Channels

The conditions of the river and its banks upstream and downstream of the dam appeared to be satisfactory.

3.2 EVALUATION OF OBSERVATIONS

The following deficiencies were noted:

1. Concrete deterioration along the dam crest.
2. Concrete deterioration in the lock area.
3. Concrete deterioration in the powerhouse intake, gate area, and the tailrace.
4. Concrete deterioration in the gate area at the Baldwinsville Boat Yard.
5. Old and leaking flashboards at the Baldwinsville Boat Yard.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURE

Normal practice is to not allow the upstream water surface to drop below elevation 374.0 (BCD) (the dam crest). Flow is regulated primarily by the dam taintor gate. At very low flows, both the dam taintor gate and the Niagara Mohawk Power Corporation taintor gate must be closed.

4.2 MAINTENANCE OF DAM AND APPURTENANT STRUCTURES

The dam and appurtenant structures (lock and taintor gate) are maintained by the New York State Department of Transportation. The dam tender reported that the current maintenance is on an as-needed basis.

Increased maintenance is required to correct concrete deterioration on the dam crest and in the general lock area.

4.3 MAINTENANCE OF OTHER APPURTENANT STRUCTURES

The maintenance of the other appurtenant or adjunct structures (powerhouse, boat yard and Mercer mill) appears to rest with their respective owners. No documents were found which define this responsibility. Yet there are cases such as deteriorating concrete and leaking flashboards which, if left to continue unchecked, could lead to failure and concomittant loss of control of the pool level.

4.4 WARNING SYSTEM IN EFFECT

No apparent warning system is present.

4.5 EVALUATION

Operation and Maintenance of the dam taintor gate are satisfactory. Additional maintenance is required to correct concrete deterioration on the dam crest, in the

general lock area, in the powerhouse area, and at the Baldwinsville Boat Yard. In addition, old and leaking flashboards at the Baldwinsville Boat Yard should be replaced. Maintenance procedures at the Mercer mill should be reviewed.

A detailed emergency warning system should be developed.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Oswego River Basin in which the dam and the lock are located is in Central New York State and has a drainage area of approximately 5100 square miles at its mouth. The drainage area of the watershed at the dam is about 3266 square miles. The river system upstream of the dam includes six Finger Lakes, Cross Lake, the Barge Canal, and outlets from the lakes to the canal. The Seneca River and 16 other principal waterways drain the watershed above the dam. The Seneca River flows from Seneca Lake generally northeastward nearly 61 miles to its confluence with the Oneida River approximately 12 miles downstream of the dam. Canals within the watershed include a reach of the Erie Canal, the Seneca Canal, and the Seneca-Cayuga Canal. All of the lakes in the watershed have regulated outlets.

A major part of the Finger Lakes area is a region of rolling hills separated by deeply eroded, steep-sided valleys of moderate width. Major valleys extend generally north-south, and most are largely occupied by the Finger Lakes. This region slopes generally northward from an elevation of approximately 2000 feet near the watershed boundary to an elevation of approximately 1000 feet near the northern ends of the Finger Lakes.

5.2 ANALYSIS CRITERIA

The hydrologic analysis of this dam was performed using the Corps of Engineers HEC-1 computer program, Dam Safety Version. The spillway design flood selected for analysis was the PMF in accordance with the Recommended Guidelines of the U.S. Army Corps of Engineers.

The basic input for this study was taken from an HEC-1 model developed by the New York State Department of Environmental Conservation with assistance from the U.S. Army Corps of Engineers, Buffalo District. The model was calibrated by the D.E.C. to the observed floods of Hurricane Agnes, June 20-26, 1972. The subbasin designation, 6-hour unit hydrographs, routing methods, and loss rates for the model (those used for Hurricane Agnes) were all adopted.

The Probable Maximum Flood (PMF) was developed assuming the uniform distribution of the Probable Maximum Precipitation (PMP) over the watershed above the dam. A PMP of 21.5 inches was obtained from Hydrometeorological Report Number 51 for a 24 hour duration and a 200 square mile area.

The flood routing at the dam was performed by the modified Puls method. It was assumed that the gates in the forebay and the lock are closed during the flood.

5.3

SPILLWAY CAPACITY

The dam has a 352 feet long ungated spillway structure and a 50 feet long spillway with a taintor gate. The crest elevation of the ungated spillway is 374 and the elevation of the taintor gate sill is 366. The discharge over the dam crest was computed assuming that the discharge coefficient varies with head. The values of discharge coefficient ranged from 3.38 to 3.83. The primary spillway was analysed assuming the gate is fully opened. The discharge over the spillway was computed as weir flow for flood elevations up to 379 and as orifice flow above elevation 379. The elevation of the top of the walls on both ends of the dam is 379 and, at all stages exceeding this elevation, there will be overflow from the channel. Therefore, the discharge at both ends of the dam above elevation 379 was also computed by approximating cross sections from the plans and the U.S.G.S. quadrangle for Baldwinsville.

The spillways do not have sufficient capacity for discharging the peak outflow from either the Probable Maximum Flood (PMF) or one-half the PMF. For the PMF, the peak inflow is 111,438 cfs and the peak outflow is 109,132 cfs. For one-half the PMF, the peak inflow is 41,606 cfs and the peak outflow is 41,033 cfs. The computed spillway capacity for a water surface elevation at the top of the dam (wall at both ends) is 23,274 cfs.

5.4 RESERVOIR CAPACITY

The reservoir at normal pool impounded by this dam lies primarily within the limits of the existing channel of the Seneca River, extending approximately 10 miles, and Cross Lake. The total storage capacity of this dam up to elevation 379 is approximately 34,100 acre-feet.

5.5 FLOODS OF RECORD

The maximum known flood in the watershed occurred on June 28, 1972 as a result of Hurricane Agnes. The discharge of 17,200 cfs was recorded at the U.S.G.S. gaging station 04237500 located about 400 feet downstream of the dam. The maximum high water occurred at this same time and was recorded at the dam as 378.8, while the maximum tailwater was 372.5.

5.6 OVERTOPPING POTENTIAL

The hydrologic analysis indicates that the dam does not have sufficient spillway capacity to pass the PMF or one-half the PMF. The dam would be overtopped by 12.95 feet and 7.45 feet during the PMF and one-half PMF, respectively.

5.7 EVALUATION

The spillway will not pass the calculated peak outflow from one-half the PMF. For this storm and lesser storm events, however, a high tailwater condition resulting in flooding of downstream areas would occur. Therefore, the additional overtopping would not significantly increase the hazard to loss of life downstream from that which would exist just before such overtopping.

The spillway is assessed as inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No visible evidence of structural instability of the dam was noted. The horizontal and vertical alignments, abutments, joints, and taintor gate all appeared to be satisfactory. The concrete deterioration noted in the visual inspection does not affect structural stability at this time.

b. Design and Construction Data

The subsurface and structural information used in the stability analyses was obtained from the contract drawings included in Appendix E. This information did not include specific properties of the supporting bedrock, precise details of dam embedment, or design details.

c. Data Review and Stability Evaluation

The stability analyses performed used the cross-section information provided on the contract drawings, plus certain simplifying assumptions regarding the dam and its foundation characteristics. The dam was considered a solid gravity section seated on, but not embedded in, bedrock.

The conditions analysed, and the resulting factors of safety, are summarized in the table which follows.

The analyses indicate less than desirable factors of safety for all loading conditions, and failure for most loading conditions. However, further inspections and analyses are required to verify or modify the assumptions made in the stability analyses. The most critical assumptions appear to be those involving the dam/bedrock interface and the actual uplift pressures.

LOCK 24 ERIE CANAL

SUMMARY OF STABILITY ANALYSES

CASE	LOADING CONDITIONS				FACTOR OF SAFETY		Resultant within Middle 1/3	Resultant within Base
	Full Uplift	1/2 Uplift	Ice	Seismic (Zone 2)	Overturning	Sliding		
a) Normal Pool		X			2.69	1.43	Yes	
	X				1.66	.90	Yes	
		X	X		1.34	.75	No	Yes
	X		X		1.02	.47	No	Yes
		X	X	X	1.29	.68	No	Yes
	X		X	X	.99	.43	No	No
b) 1/2 PMF		X			1.67	1.00	Yes	
		X		X	1.56	.83	Yes	
c) PMF		X			1.32	.61	Yes	
		X		X	1.22	.52	No	Yes

NOTE: FULL UPLIFT CONDITIONS NOT ANALYZED FOR 1/2 PMF AND PMF BECAUSE 1/2 UPLIFT CONDITIONS INDICATED FAILURE.

d. Seismic Stability

The dam is situated in seismic Zone 2. Therefore, seismic stability analyses were performed based on the Zanger hydrodynamic pressure distribution, which is similar to the Westergaard distribution recommended by the Corps of Engineers Guidelines. The analyses were performed under normal pool, one-half PMF, and full PMF. The results are tabulated in the accompanying table. Although undesirable factors of safety are indicated, further inspections and analyses are required to refine the assumptions made in the stability analyses.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I inspection of the Lock 24 dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional maintenance is required to correct concrete deterioration on the dam crest and in the general lock area. Also, the responsibility for maintenance of the other appurtenant structures (powerhouse, boat yard, and Mercer mill) should be investigated, because failure of these structures could create problems similar to those caused by loss of the dam itself.

The spillway does not have sufficient discharge capacity for passing one-half the PMF and is considered to be inadequate. For one-half the PMF and lesser storm events, a high tailwater condition resulting in flooding of downstream areas would occur. Therefore, the additional overtopping would not significantly increase the hazard to loss of life downstream from that which would exist just before such overtopping.

The stability analyses, which were based upon assumed parameters, indicate less than adequate factors of safety for all loading conditions and actual failure under severe loadings.

During periods of unusually heavy precipitation and high runoff occurring over the watershed, continuous surveillance should be provided both at the dam and in the downstream areas to warn of high floodwater conditions. Such surveillance procedures and other measures deemed necessary should be developed, documented and placed in readiness for future use as part of a detailed emergency operation-action plan. A warning system should also be developed and implemented; to be used in the event of dam failure.

b. Adequacy of Information

The information available for the preparation of this report was adequate for the purposes of a Phase I investigation. However, additional site specific data will be required for subsequent studies.

c. Necessity for Additional Investigations

Additional investigations are necessary regarding the stability of the dam. Such investigations should be based on actual measurements of embedment, dam/bedrock friction and uplift.

d. Urgency

The stability investigations required should be completed within six (6) months of the date of notification of the owner. Based upon the results of these investigations, appropriate remedial measures deemed necessary to insure the safety and integrity of the dam and appurtenant structures should be undertaken and completed during the first construction season following completion of the stability analyses.

The urgency of other remedial measures is discussed in the following section.

7.2

RECOMMENDED MEASURES

- a) The following actions should be undertaken:
1. Develop and implement a detailed emergency operation-action plan and warning system.
 2. Determine the responsibility for the maintenance of the powerhouse, boat yard, and Mercer mill.
 3. Correct concrete deterioration on the dam crest and in the general lock area.
 4. Correct deficiencies noted for the other appurtenant structures.
 5. Take any remedial actions that may be dictated by the stability analyses.

b) The urgency of the actions listed above is as follows:

- o Items 1 and 2 should be completed within 90 days after notification of the owner.
- o Items 3 and 4 should be completed within 12 months after notification of the owner.
- o Item 5 should be completed within the first construction season following completion of the stability analyses.

APPENDIX A

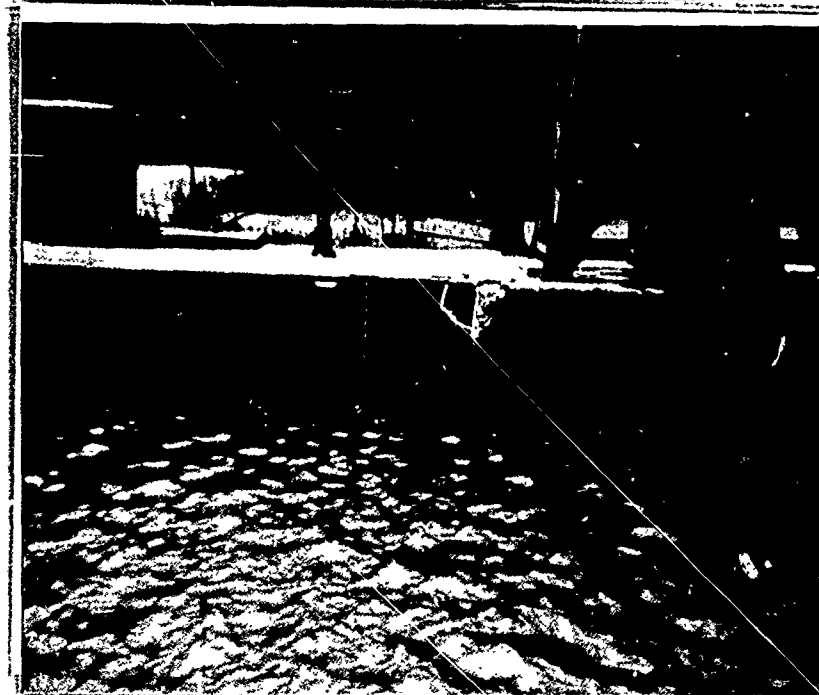
PHOTOGRAPHS



Approach to Lock 24, Facing downstream

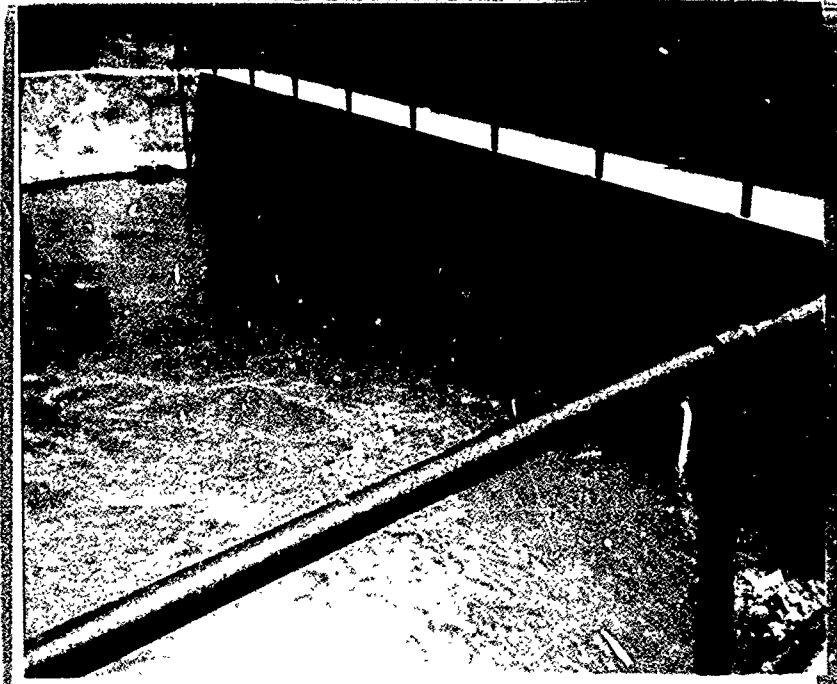


Lock 24, facing downstream

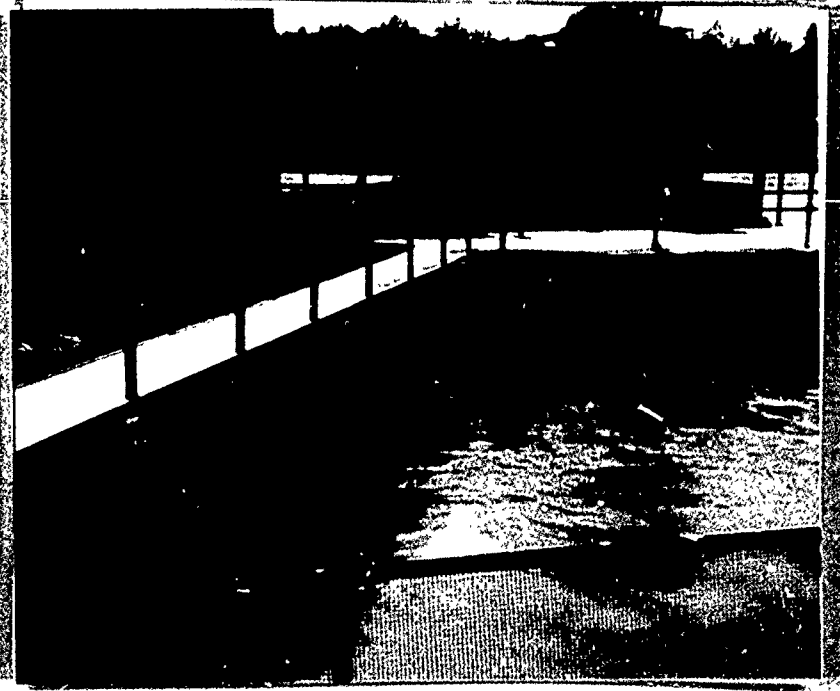


Upstream staff gauge
NOTE: Concrete deterioration

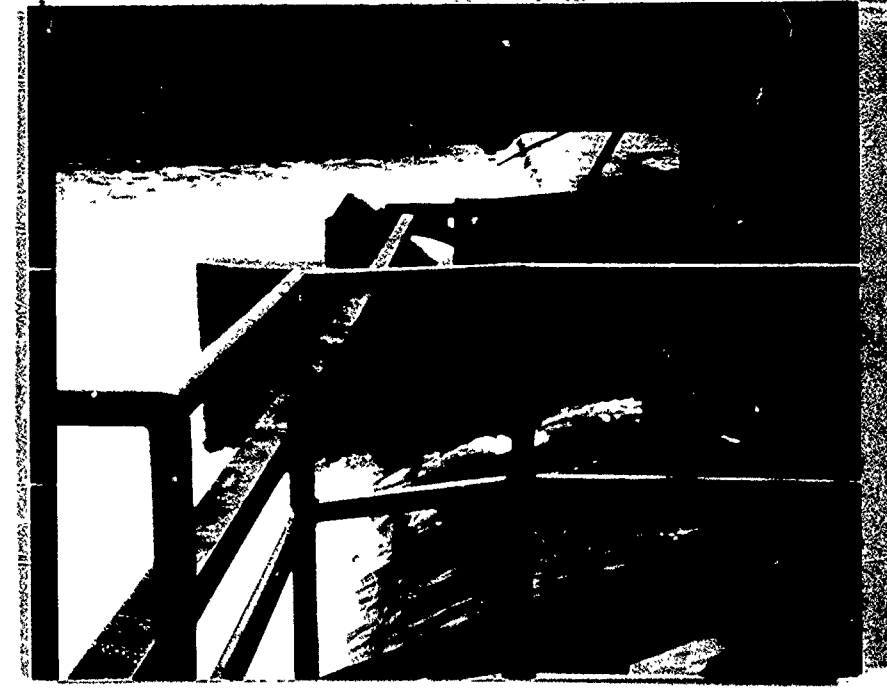
Niagara Mohawk Powerhouse
intakes.



Niagara Mohawk Entrance
Channel and Dam Taintor Gate

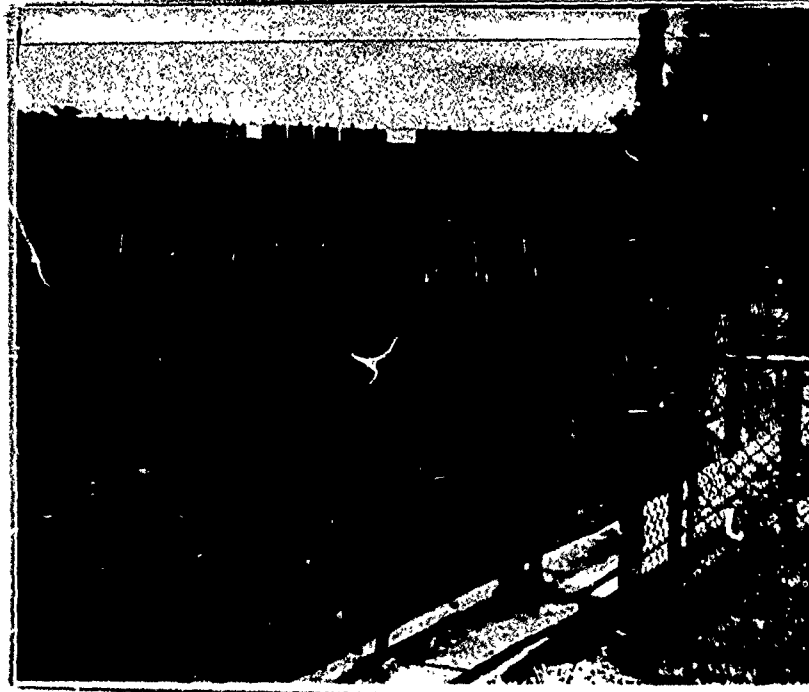


Dam Taintor Gate

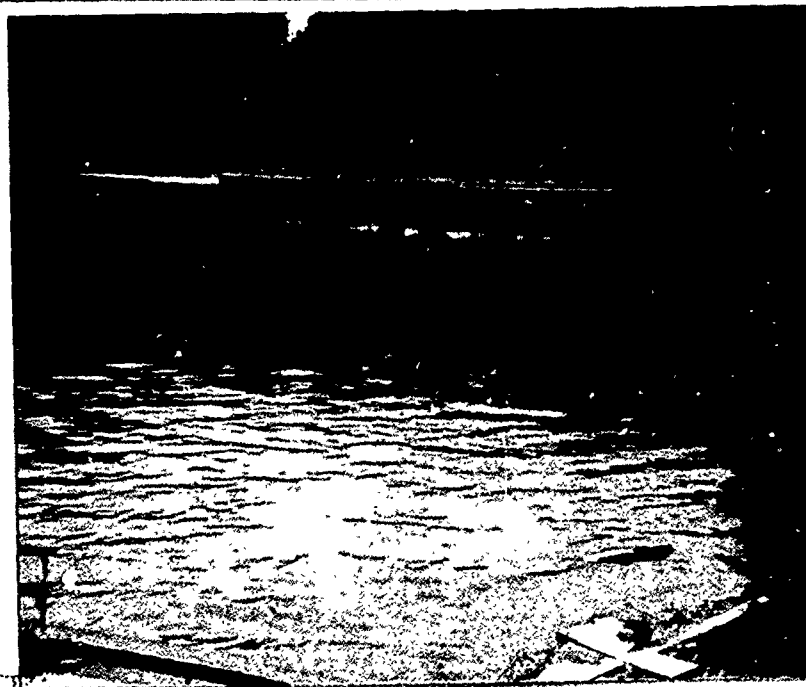




Niagara Mohawk Taintor Gate;
NOTE: Concrete deterioration



Niagara Mohawk Taintor Gate



Bridge between Lock approach
and Mill Intake Channel

Upstream view of Baldwinsville Boat Yard



Gates at Baldwinsville Boat yard



Leakage through flashboards at Baldwinsville Boat Yard

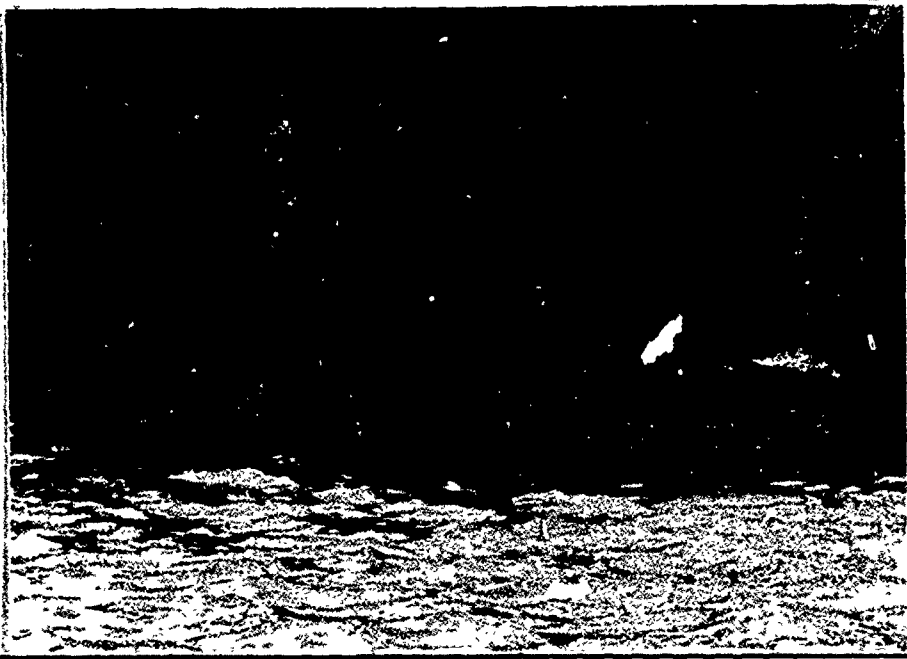




Concrete deterioration at
Boat Yard Gates

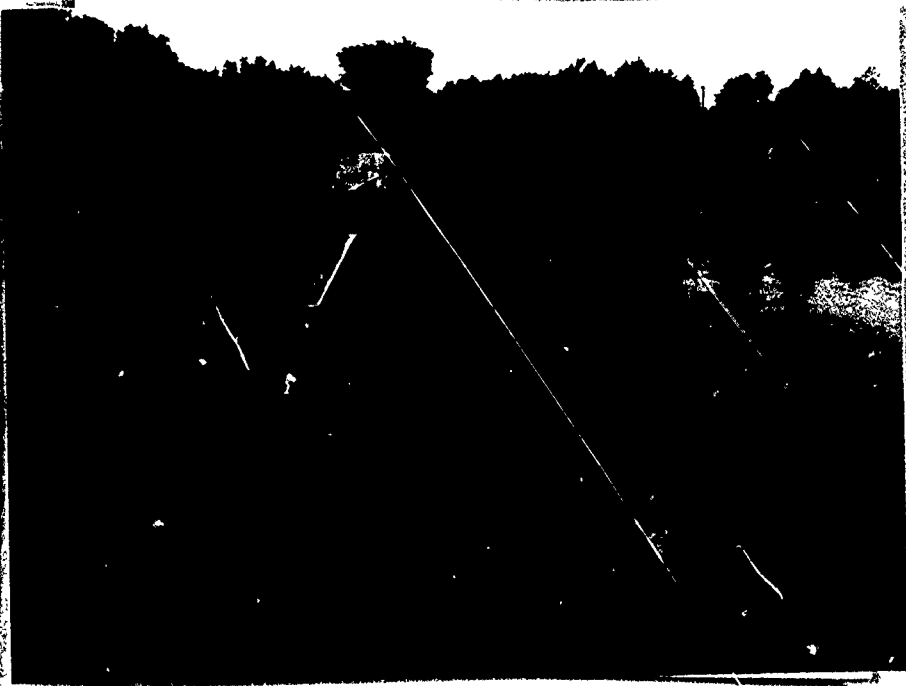


Upstream view of Mercer Mill

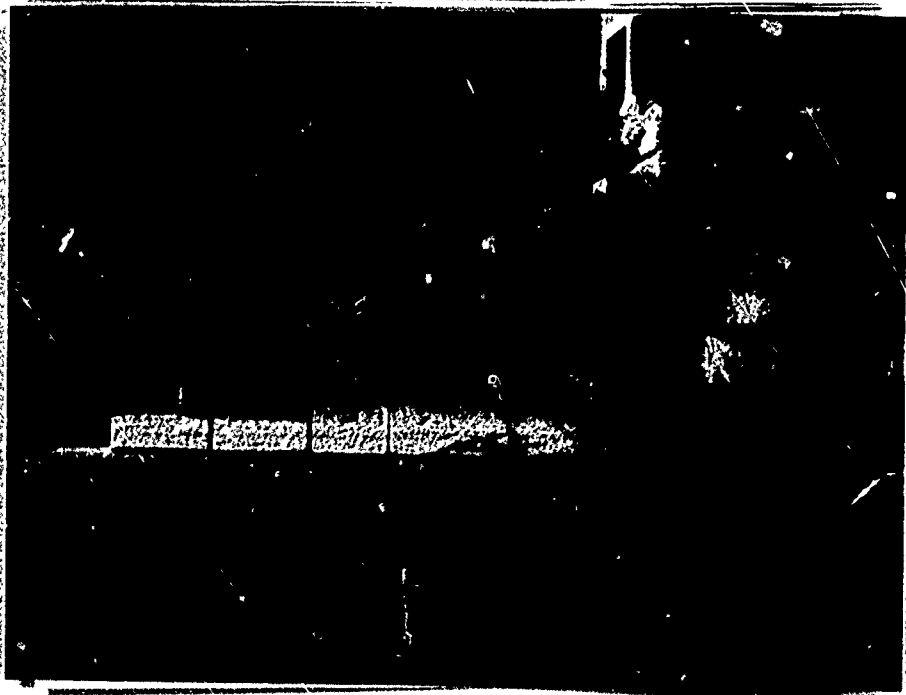


Downstream view of Mercer
Mill

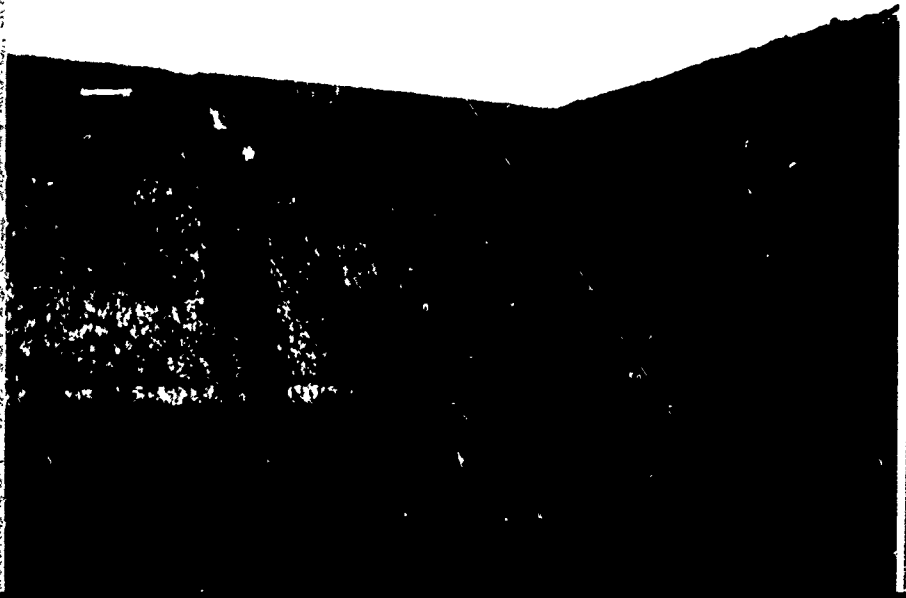
Dam, facing south



South abutment



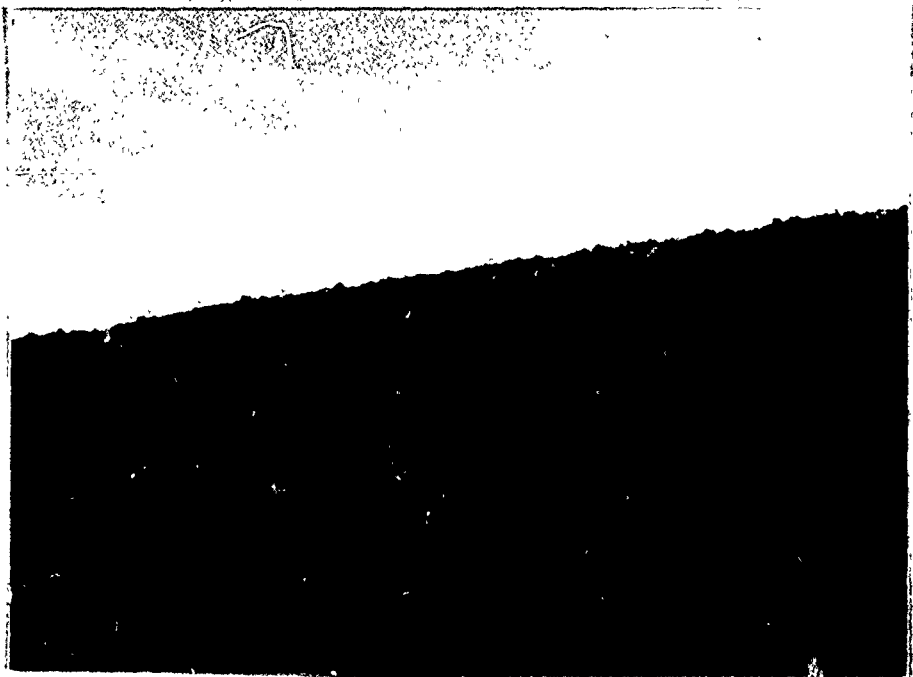
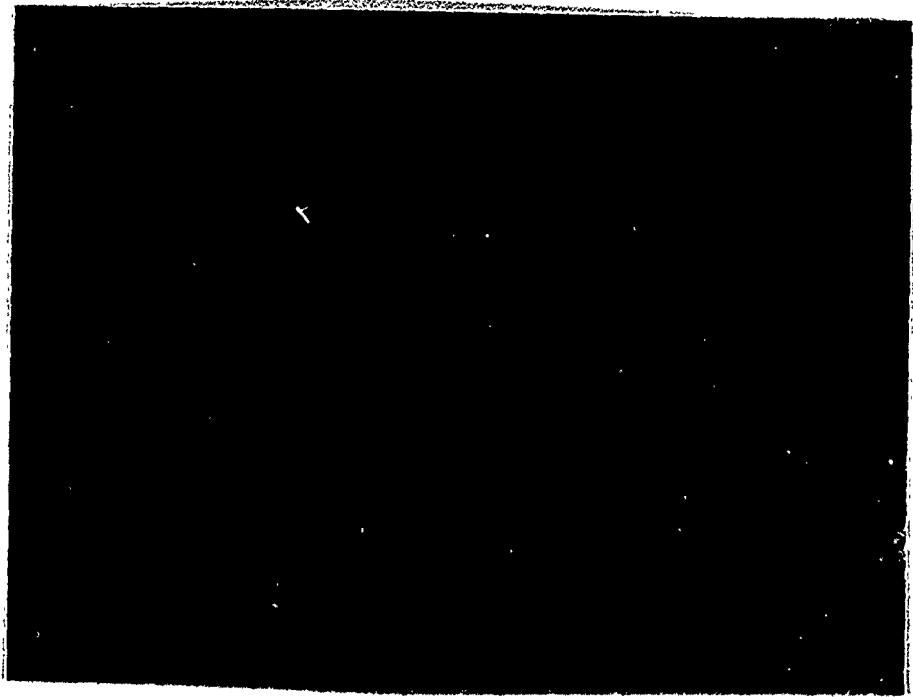
South interior corner



Concrete deterioration on Dam Crest

Concrete deterioration on Dam Crest

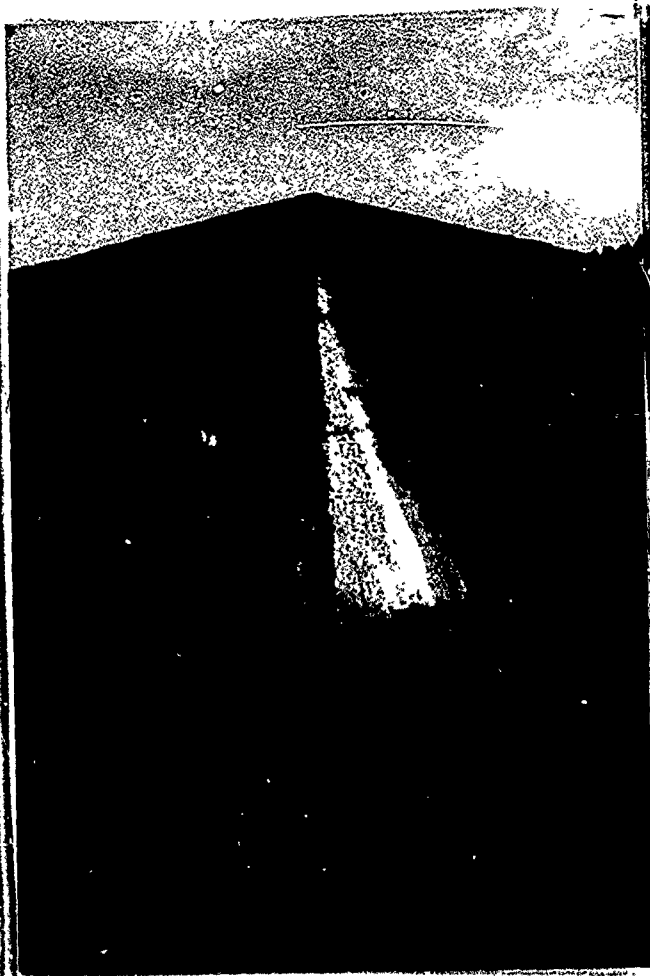
Concrete deterioration on Dam Crest



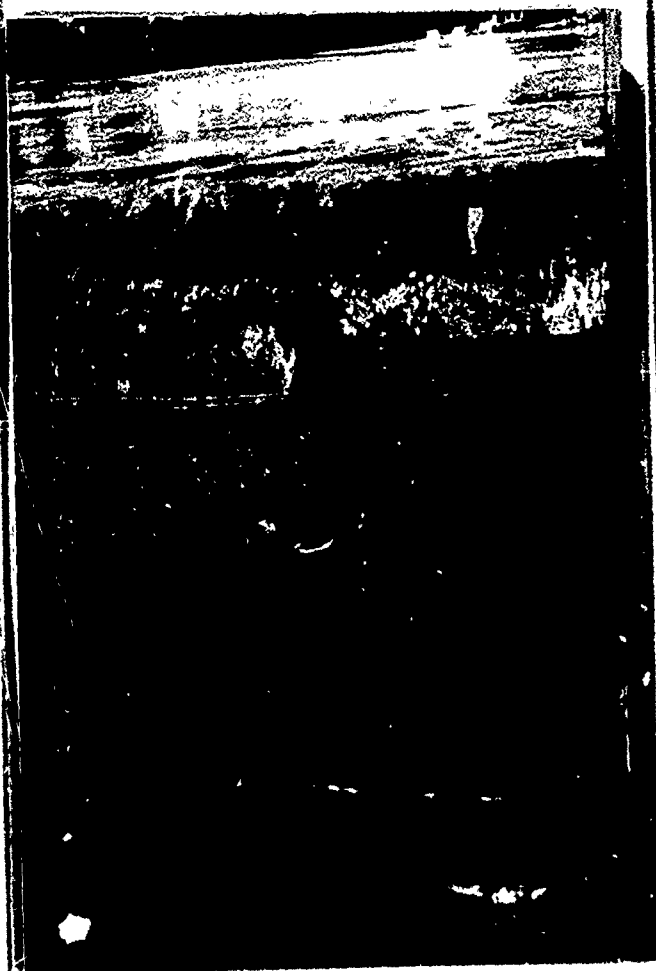
Concrete deterioration on
Dam Crest

Concrete deterioration on
Dam Crest

Concrete deterioration on
Dam Crest



South exterior corner



Concrete deterioration on
Dam Crest

APPENDIX B

VISUAL INSPECTION CHECKLIST

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam LOCK 24 LAKE CANAL
I.D. # 72B-230 DEC. Dam No. 792
River Basin SENECA RIVER
Location: Town LYSANDER County ONONDAGA
U.S.G.S. Quadrangle BALDWINVILLE
Stream Name SENECA RIVER
Tributary of OSWEGO RIVER
Latitude (N) 43° 9' Longitude (W) 76° 20'
Type of Dam MASONRY
Hazard Category HIGH
Date(s) of Inspection 6/11/80, 6/26/80
Weather Conditions FAIR - PARTLY CLOUDY
Reservoir Level at Time of Inspection 377.4
Tailwater Level at Time of Inspection 367.9

b. Inspection Personnel RAY TEETER (TA)
RICK HOIDT (INS)

c. Persons Contacted (Including Address & Phone No.)
LEE BIRNS, NYS DOT (515-473-8191)

d. History:

Date Constructed APPROX. 1893 Date(s) Reconstructed 1908 (P. 1111)
NEW DATE 1963 (P. 1111)

Designer UNKNOWN
Constructed by UNKNOWN
Owner PRESENTLY NYS DOT

e. Seismic Zone 2

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

2) Embankment

a. Characteristics

- 1) Embankment Material MASONRY DAM
- 2) Cutoff Type NONE
- 3) Impervious Core NONE
- 4) Internal Drainage System NONE
- 5) Miscellaneous _____

b. Crest

- 1) Vertical Alignment GOOD
- 2) Horizontal Alignment GOOD
- 3) Surface Cracks DETERIORATION OF CONCRETE
- 4) Miscellaneous _____

c. Upstream Slope

- 1) Slope (Estimate) (V:H) N. A.
- 2) Undesirable Growth or Debris, Animal Burrows N. A.
- 3) Sloughing, Subsidence or Depressions N. A.

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

4) Slope Protection N.A.

5) Surface Cracks or Movement at Toe UNOBSERVABLE

d. Downstream Slope

1) Slope (Estimate - V:H) N.A.

2) Undesirable Growth or Debris, Animal Burrows N.A.

3) Sloughing, Subsidence or Depressions N.A.

4) Surface Cracks or Movement at Toe UNOBSERVABLE

5) Seepage UNOBSERVABLE

6) External Drainage System (Ditches, Trenches; Blanket)

NONE

7) Condition Around Outlet Structure GENERALLY GOOD

8) Seepage Beyond Toe UNOBSERVABLE

e. Abutments-Embankment Contact

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

- 1) Erosion at Contact NONE NOTED
- 2) Seepage Along Contract NONE NOTED
- 3) Drainage System
- a. Description of System N.A.
- b. Condition of System N.A.
- c. Discharge from Drainage System N.A.
- 4) Instrumentation (Momentum/Surveys, Observation Wells, Weirs, Piezometers, Etc.)
- STAFF GAUGES - 1 UPSTREAM, 1 DOWNSTREAM
- USGS MAINTAINS 2 DISCHARGE GAUGES
- DOWNSTREAM OF DAM

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

5) Reservoir

- a. Slopes GENERALLY GOOD
- b. Sedimentation UNDetectABLE
- c. Unusual Conditions Which Affect Dam NONE NOTED

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) SEVERAL HOMES
- b. Seepage, Unusual Growth NONE NOTED
- c. Evidence of Movement Beyond Toe of Dam NONE NOTED
- d. Condition of Downstream Channel GENERALLY GOOD

7) Spillway(s) (Including Discharge Conveyance Channel)

- a. General
- b. Condition of Service Spillway GENERALLY GOOD

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

c. Condition of Auxiliary Spillway N.A.

d. Condition of Discharge Conveyance Channel Approx: Good

8) Reservoir Drain/Outlet

Type: Pipe _____ Conduit _____ Other Gate

Material: Concrete _____ Metal X Other _____

Size: Approx. 14' Length 50'

Invert Elevations: Entrance 366.0 Exit 366.0

Physical Condition (Describe): _____ Unobservable _____

Material: Good

Joints: Good Alignment Good

Structural Integrity: Good

Hydraulic Capability: _____

Means of Control: Gate X Valve _____ Uncontrolled _____

Operation: Operable X Inoperable _____ Other _____

Present Condition (Describe): Generally Good

THOMSEN ASSOCIATES

CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

9) Structural

a. Concrete Surfaces SOME DEGRADATION

b. Structural Cracking NONE NOTED

c. Movement - Horizontal & Vertical Alignment (Settlement)

NONE NOTED

d. Junctions with Abutments or Embankments

APPEAR GOOD

e. Drains - Foundation, Joint, Face N.A.

f. Water Passages, Conduits, Sluices APPEAR GOOD

g. Seepage or Leakage N.A.

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

- h. Joints - Construction, etc. APPEAR GOOD
- i. Foundation UNOBSERVABLE
- j. Abutments GENERALLY GOOD
- k. Control Gates GENERALLY GOOD
- l. Approach & Outlet Channels GENERALLY GOOD
- m. Energy Dissipators (Plunge Pool, etc.) N.A.
- n. Intake Structures (GATES) GENERALLY GOOD
- o. Stability
- p. Miscellaneous

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING
DATA AND COMPUTATIONS

McFarland-Johnson Engineers, Inc.
171 Front Street
BINGHAMTON, NEW YORK 13905

JOB HYDROLOGIC STUDY DAM #111712

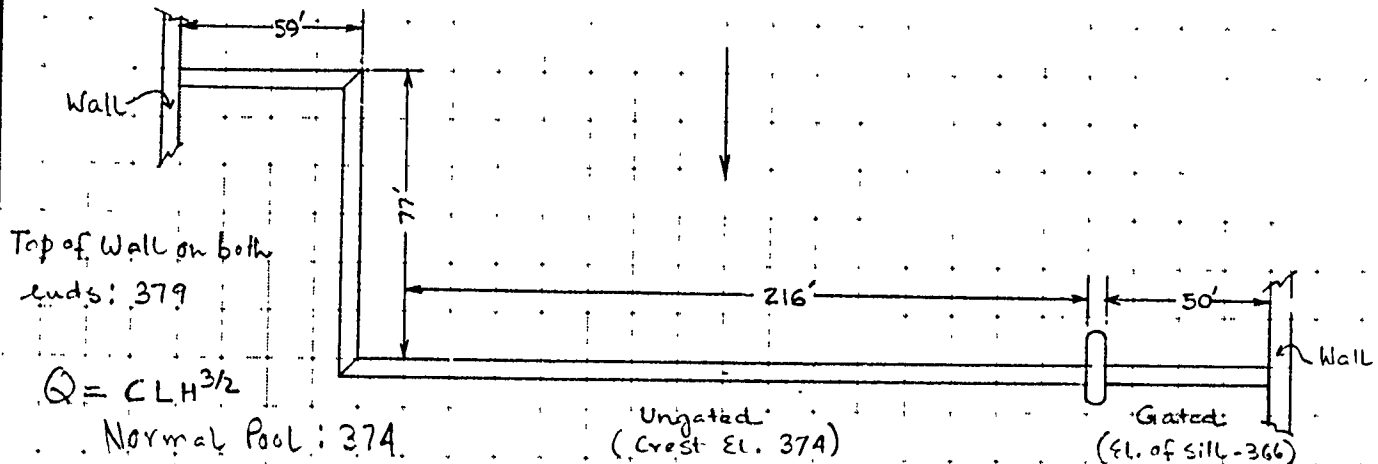
SHEET NO. _____ OF _____

CALCULATED BY P.S. DATE 8/18/80

CHECKED BY _____ DATE _____

SCALE _____

STAGE-DISCHARGE COMPUTATIONS (UNGATED SPILLWAY)



Shape of Spillway is similar to the one shown on Fig. 5-17 (King & Brater)
ALL Elevations are based on Barge Canal Datum.

ELEV.	H	H ^{3/2}	C	L	DISCHARGE
374	0			352	0
375	1	1	3.38	352	11.90
376	2	2.83	3.51	352	34.96
377	3	5.20	3.58	352	65.53
378	4	8.0	3.68	352	10,363
379	5	11.18	3.83	352	15,072
380	6	14.7	3.83	352	19,817
382	8	22.63	3.83	352	30,509
385	11	36.48	3.83	352	49,184
387	13	46.87	3.83	352	63,182

McFarland-Johnson Engineers, Inc.
171 Front Street
BINGHAMTON, NEW YORK 13905

JOB HYDROLOGIC STUDY OF LAR # NY 11

SHEET NO _____ OF _____

CALCULATED BY P.S. DATE 8/18/80

CHECKED BY _____ DATE _____

SCALE _____

STAGE-DISCHARGE COMPUTATIONS (GATED SPILLWAY)

Assumptions:

① Gate is fully open (bottom of gate @ el. 379)

② Neglect Approach Velocity

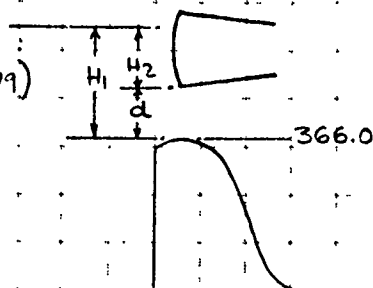
③ Normal Pool Elev. 374.0

Elevation of top of sill - 366.0

Length of spillway - 50'

Discharge $Q = 2/3 \sqrt{2g} C L (H_1^{3/2} - H_2^{3/2})$ (Eq. used for elev. above El. 379)

Discharge $Q = C L H^{3/2}$ (Eq. used for flood elev. below 379)



ELEV.	H ₁	d	d/H ₁	C	H ₂	H ₁ ^{3/2}	H ₂ ^{3/2}	H ₁ ^{3/2} - H ₂ ^{3/2}	Discharge
374	8	13	1.62	3.50	0	22.63			3960
375	9	13	1.44	3.50	0	27.0			4725
376	10	13	1.30	3.50	0	31.62			5533
377	11	13	1.18	3.50	0	36.48			6384
378	12	13	1.08	3.50	0	41.57			7275
379	13	13	1.0	3.50	0	46.87			8202
380	14	13	.93	.64	1	52.38	1	51.38	8796
382	16	13	.81	.64	3	64.0	5.20	58.80	10,066
385	19	13	.68	.647	6	82.82	14.70	68.12	11,790
387	21	13	.62	.655	8	96.23	22.63	73.60	12,895

NOTE: BUREAU PUBLICATION "DESIGN OF SMALL DAMS - FIG. 257" WAS USED TO COMPUTE COEFFICIENT OF DISCHARGE 'C' FOR ORIFICE FLOW.

McFarland-Johnson Engineers, Inc.

171 Front Street
BINGHAMTON, NEW YORK 13905

JOB HYDROLOGIC STUDY DAM # NY 71

SHEET NO _____ OF _____

CALCULATED BY P.E. DATE 8/20/50

CHECKED BY _____ DATE _____

SCALE _____

STAGE-DISCHARGE COMPUTATIONS IN OVERBANKS

SUBAREA-1

ELEV.	1.48%/m	A	P	R	$R^{2/3}$	Q	REMARKS
380	42.45	17.5	35	.5	.63	10.5	S=.0005 For all subareas. n=.035
382	42.45	197.5	145	1.36	1.23	230	
385	42.45	842.5	290	2.90	2.04	1631	
387	42.45	1532	395	3.88	2.47	3590	

SUBAREA-2

380	99	100	100	1	1	221	n=.015
382	99	300	100	3	2.08	1381	
385	99	600	100	6	3.30	4383	
387	99	800	100	8	4	7084	

SUBAREA-5

380	99	50	50	1	1	110	n=.015
382	99	150	50	3	2.08	690	
385	99	300	50	6	3.30	2191	
387	99	400	50	8	4.0	3542	

SUBAREA-6

380	148.6	90	90	1	1	299	n=.01
382	148.6	270	90	3	2.08	1866	
385	148.6	540	90	6	3.30	5921	
387	148.6	720	90	8	4.0	9569	

SUBAREA-7

380	49.5	140	280	.5	.63	98	n=.03
382	49.5	700	280	2.5	1.84	1425	
385	49.5	1540	280	5.5	3.11	5301	
387	49.5	2100	280	7.5	3.83	8905	

SUBAREA-8

380							n=.05
382	29.7	60	60	1	1	40	
385	29.7	375	150	2.5	1.84	458	
387	29.7	735	210	3.5	2.30	1125	

NOTE: SEE ATTACHED CROSS SECTION

McFarland-Johnson Engineers, Inc.
 171 Front Street
 BINGHAMTON, NEW YORK 13905

JOB HYDROLOGIC STUDY LAM # NY 792
 SHEET NO _____ OF _____
 CALCULATED BY P.S. DATE 8/20/80
 CHECKED BY _____ DATE _____
 SCALE _____

STAGE-DISCHARGE TABULATION

ELEV. (FEET)	PRIMARY SPILLWAY (C.F.S.)	AUXILIARY SPILLWAY (C.F.S.)	SUBAREA DISCHARGE IN C.F.S.						TOTAL DISCHARGE (C.F.S.)	REMARKS
			1	2	5	6	7	8		
374	3960	0							3,960	Normal Pool Elev. -374.0 (Barge Canal Datum) U.S.G.S. = B.C.D - 1.04
375	4725	1190							5,915	
376	5533	3496							9,029	
377	6384	6553							12,937	
378	7275	10,363							17,638	
379	8202	15,072							23,274	
380	8796	19,817	10	221	110	299	98	0	29,351	
382	10,066	30,509	230	1381	690	1866	1425	40	46,207	
385	11,790	49,184	1631	4383	2191	5921	5201	458	80,859	
387	12,895	63,188	3590	7084	3542	9569	8905	1125	109,898	

Note: Stage-Discharge Curve was plotted to interpolate other values for HEC-1 input. Curve is attached.

McFarland-Johnson Engineers, Inc.
171 Front Street
BINGHAMTON, NEW YORK 13905

JOB HYDROLOGIC STUDY DAM # NY 792

SHEET NO. _____ OF _____

CALCULATED BY P.S. DATE 8/21/80

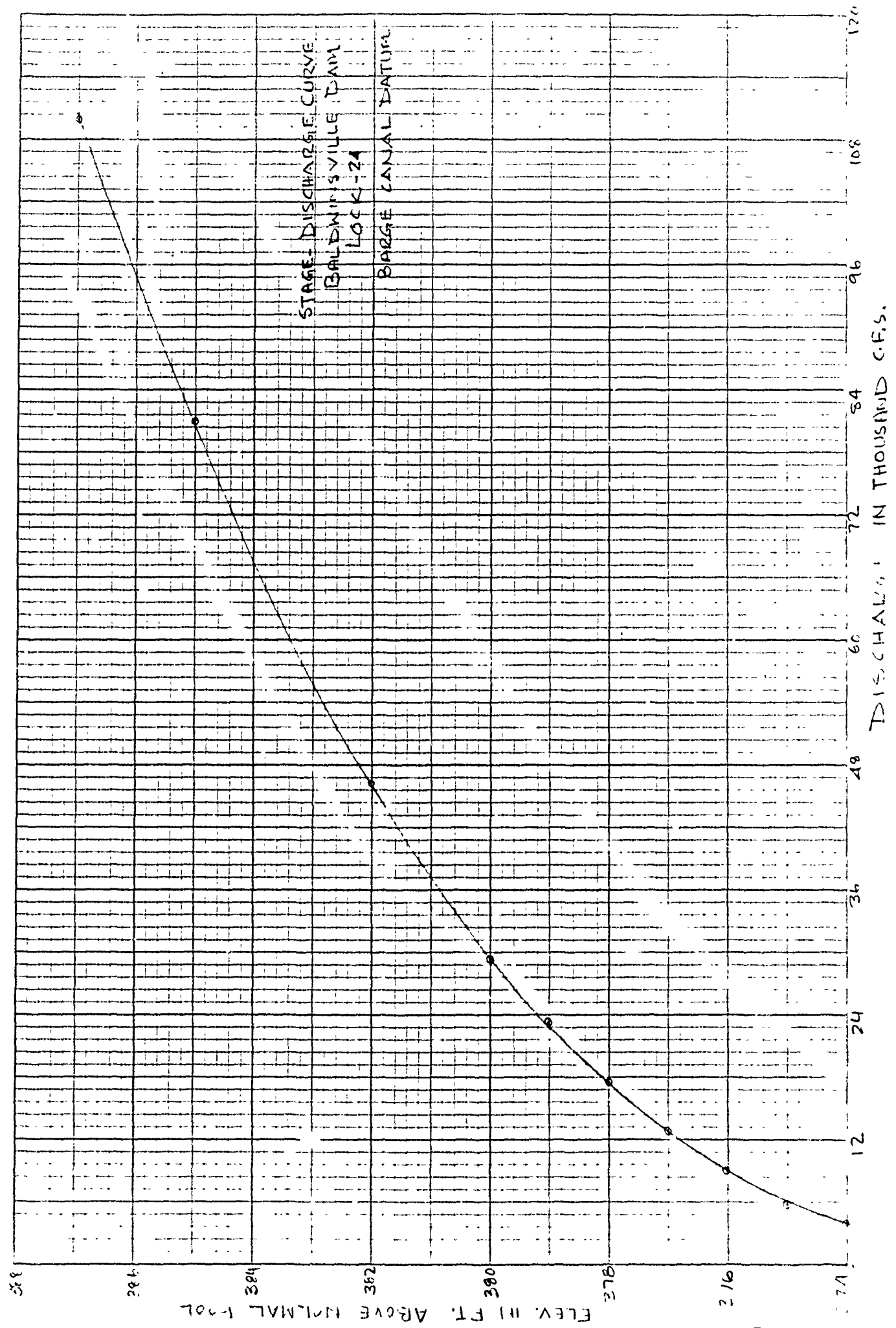
CHECKED BY _____ DATE _____

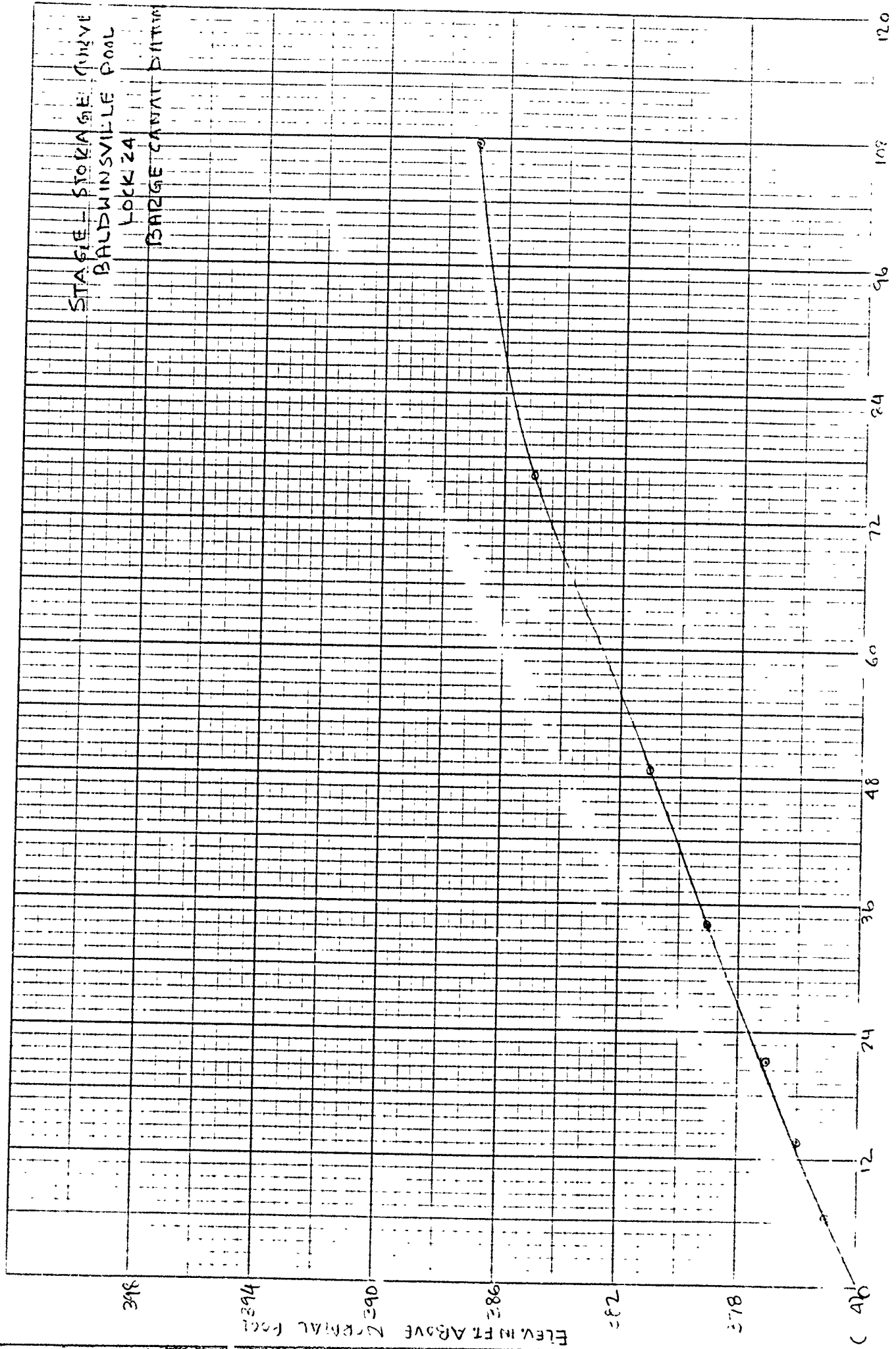
SCALE _____

STAGE-STORAGE TABULATION

U.S.G.S. DATUM		B.C.D.	CROSS LAKE STORAGE IN ACRE-FT.	TOTAL STORAGE (ACRE-FT.)	REMARKS
CROSS LAKE ELEV.	ELEV. AT DAM	ELEV. AT DAM			
373	373	374	0	0	Stage-storage data up to elevation 379 was obtained from N.Y. State D.E.C. Storage above elev. 379 was computed by estimating surface area adjacent to Cross Lake from U.S.G.S. quadrangles for Jordan, Lysander and Cato. Total Pool storage is estimated as 130% of Cross Lake storage in accordance with D.E.C.
375	374	375	5,000	6,500	
377	375	376	10,500	13,650	
379	376	377	16,400	21,320	
380	376.5	377.5	19,400	25,220	
382	378	379	26,200	34,100	
385	380	381	37,500	48,750	
390	384	385	58,750	76,375	
395	386	387	82,690	107,500	

Note: Stage-storage curve was plotted to interpolate other values
for HEC-1 input. Curve is attached.





STAGE - STORAGE CURVE
 BALDWINVILLE POOL
 LOCK 24
 BARGE CANAL DITCH

STORAGE IN THOUS. AC. FEET

ELEV. IN FT. ABOVE NORMAL POOL

Table A-2

Flood Model Drainage Areas

<u>Area Code</u>	<u>Area Description</u>	<u>Drainage Area (sq.mi.)</u>
A1	Canandaigua Lake	184
A2	Flint Creek at Mouth	102
A3	Canandaigua Outlet @ B.C. Confluence	155
B1	Keuka Lake	183
B2	Seneca Lake	524
B3	Cayuga Lake	782
B4	Seneca Lake Outlet to Lock 4	39
B5	Seneca Lake Outlet from Lock 4 to Mud Lock	36
C1	Owasco Lake	201
C2	Skaneateles Lake	74
C3	Otisco Lake	42.7
C4	Onondaga Reservoir	67.7
C5	Onondaga Lake	102.3
C6	Owasco Outlet @ B.C. Confluence	18.7
C7	Skaneateles Creek @ B.C. Confluence	27
C8	Ninemile Creek @ Mouth	72.3
D1	Chittenango Creek @ Mouth	288
D2	Canaseraga Creek @ Mouth	105
D3	Oneida Creek @ Mouth	144
D4	Fish Creek and Wood Creek	529
D5	Local Inflow to Oneida Lake	269
D6	Local Inflow to Oneida River above Lock 23	28.5
D7	Oneida River from Lock 25 to Three Rivers	110
E1	Ganargua Creek @ Lock 29	147
E2	Ganargua Creek @ Lock 27	118
E3	Local Inflow to B.C. Lock 29 to Lock 27	51
E4	Local Inflow to B.C. Lock 27 to Lock 26	89
E5	Local Inflow to B.C. Lock 26 to Lock 25	18
E6	Local Inflow to B.C. Lock 25 to Owasco Outlet	191
E7	Local Inflow to B.C. Owasco to Skaneateles Outlet	98
E8	Local Inflow to B.C. Skaneateles to Lock 24	98
E9	Local Inflow to B.C. Lock 24 to Three Rivers	37

Table A-6
Modelling Parameters

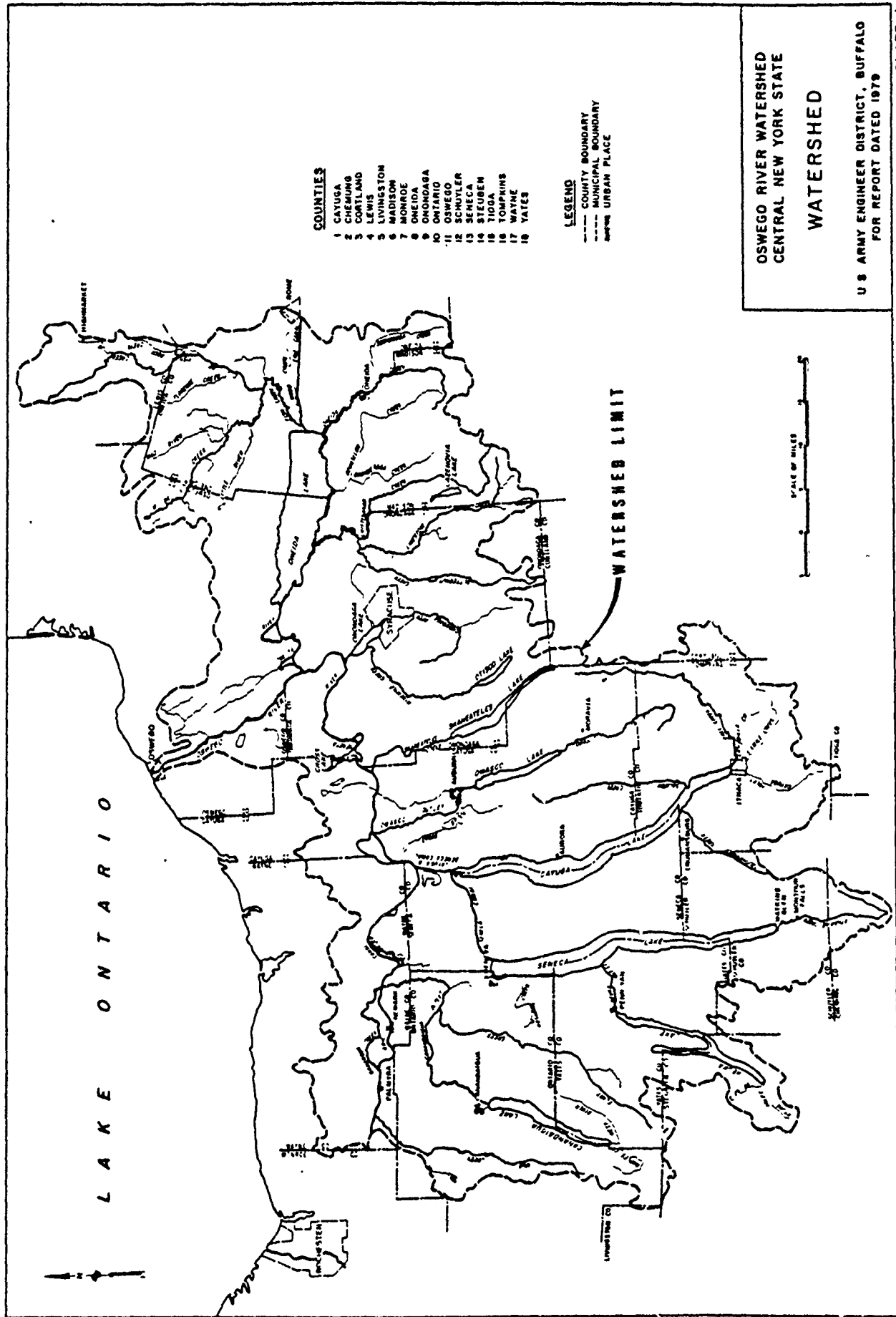
Subbasin	QRSCN*	RTIOR Ratio	Start Q CFS	Losses	
				Initial	Constant in 1 hr.
A-1 - Canandaigua Lake	1000	1.6	300	1.25	0.03
A-2 - Flint Creek	2000	1.6	90	0.50	0.06
A-3 - Canandaigua Outlet	200	1.6	150	0.60	0.06
B-1 - Keuka Lake	800	1.6	100	1.50	0.03
B-2 - Seneca Lake	2800	1.6	500	1.50	0.03
B-3 - Cayuga Lake	1700	1.6	1000	0.5	0.03
B-4 - Seneca Lake Outlet to Lock CS-4	200	1.6	92	0.50	0.05
B-5 - Seneca Lake Outlet to CS-4 to CS-1	200	1.6	92	0.50	0.05
C-1 - Owasco Lake	1000	1.6	450	0.75	0.05
C-2 - Skaneateles Lake	500	1.6	250	0.75	0.05
C-3 - Otisco Lake	300	1.6	90	0.75	0.05
C-4 - Onondaga Reservoir	302	1.6	250	1.5	0.06
C-5 - Onondaga Lake	500	1.6	250	1.25	0.06
C-6 - Owasco Lake Outlet	200	1.6	90	0.50	0.06
C-7 - Skaneateles Creek	200	1.6	90	0.50	0.06
C-8 - Ninemile Creek	300	1.6	250	1.00	0.06
D-1 - Chittenango Creek	2160	1.6	600	0.25	0.06
D-2 - Canaseraga Creek	800	1.6	240	0.25	0.06
D-3 - Oneida Creek	1080	2.00	320	0.25	0.06
D-4 - Fish Creek	3960	1.6	800	0.25	0.06
D-5 - Area Local to Oneida Lake	2000	1.6	540	0.25	0.05
D-6 - Oneida River above Lock E-23	210	1.6	70	0.5	0.06
D-7 - Oneida River Lock E-23 to Three Rivers	800	2.00	250	0.5	0.06
E-1 - Ganargua Creek Vic. Lock E-29	550	1.6	140	0.5	0.05
E-2 - Ganargua Creek Lock E-27	470	1.6	120	0.5	0.05
E-3 - Area Local to Barge Canal Lock E-29 to E-27	200	1.6	100	0.5	0.05
E-4 - Area Local to Barge Canal E-27 to E-26	360	1.6	100	0.5	0.06
E-5 - Area Local to Barge Canal E-26 to E-28	100	1.6	90	0.5	0.06
E-6 - Area Local to Barge Canal E-28 to Owasco Outlet	400	1.6	140	0.5	0.06
E-7 - Area Local to Barge Canal Owasco Outlet to Skan.Outlet	400	1.6	120	0.5	0.06
E-8 - Area Local to Barge Canal, Skan. Outlet to Lock E-24	400	1.6	120	0.5	0.06
E-9 - Area Local to Barge Canal Lock E-24 to Three Rivers	150	1.6	100	0.5	0.06

*Flow in cfs below which base flow recession occurs.

**Ratio of recession flow to that flow occurring 10 time intervals later.

A-23

C-143



ANALYSIS OF DAM OVERTIPPING USING RATIOS OF PMF HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF LOCK 24 DAM RATIOS OF PMF ROUTED THROUGH THE RESERVOIR										
100	A									
200	A									
300	A									
400	B	40	0	0	0	0	0	0	0	4
500	B1	5								
600	J	1	0	1						
700	J1	.2	.4	.5	.6	.8	1.0			
800	K	0	1	0	0	0	0	1		
900	K1	1 BARGE CANAL LOCK 30 AT MACEDON (SUB AREA G1)								
1000	M	-1	0	100	0	3236	0	0	0	1
1100	N	372	372	372	372	374	378	379	379	386
1200	N	390	380	375	372	113	23	25	21	22
1300	N	22	21	22	22	21	21	22	22	22
1400	N									
1500	K	1	2	0	0	0	0	1		
1600	K1	2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)								
1700	Y	0	0	0	0	1				
1800	Y1	0	3	1						
1900	K	0	2	0	0	0	0	1		
2000	K1	3 GANAGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)								
2100	M	1	-1	147	0	3236	0	0	0	1
2200	P	0	21.5	39	53	61	72			
2300	T	0	0	0	0	0	0	0.5	0.05	
2400	U	21								
2500	U1	514	1946	2958	2655	1978	1472	1095	815	515
2600	U1	366	250	186	138	103	76	57	42	25
2700	U1	21								
2800	X	140	550	1.6						
2900	K	2	2	0	0	0	0	1		
3000	K1	4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29								
3100	K	1	0	0	0	0	0	1		
3200	K1	5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS								
3300	Y	0	0	0	0	1				
3400	Y1	0	8	3						
3500	K	0	0	0	0	0	0	1		
3600	K1	6 LOWER GANAGUAL LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)								
3700	M	1	-1	118	0	3236	0	0	0	1
3800	P	0	21.5	39	53	61	72			
3900	T	0	0	0	0	0	0	0.5	0.05	
4000	U	27								
4100	U1	28	109	293	523	696	773	896	980	1246
4200	U1	1216	979	764	596	465	363	283	221	173
4300	U1	105	82	64	50	39	35	35		
4400	X	120	470	1.6						
4500	K	2	6	0	0	0	0	1		
4600	K1	7 COMBINED AND LOCAL FLOWS AT LOCK 27								
4700	K	0	3	0	0	0	0	1		
4800	K1	8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)								
4900	M	1	-1	51	0	3236	0	0	0	1
5000	P	0	21.5	39	53	61	72			
5100	T	0	0	0	0	0	0	0.5	0.05	
5200	U	10								
5300	U1	2081	1638	844	383	174	79	36	30	25
5400	X	100	200	1.6						
5500	K	1	6	0	0	0	0	1		
5600	K1	9 ROUTED FLOW E-3 TO LYONS (NODE 6)								
5700	Y	0	0	0	0	1				
5800	Y1	0	5	2						
5900	K	2	6	0	0	0	0	1		
6000	K1	10 COMBINE FLOWS AT NODE 6								
6100	K	0	4	0	0	0	0	1		



6200	K1	11 CANANDAIGUA LAKE INFLOW (SUBAREA A1)									
6300	M	1	-1	184	0	3236	0	0	0	1	
6400	P	0	21.5	39	53	61	72				
6500	I	0	0	0	0	0	0	1.25	0.03		
6600	U	0									
6700	U1	8550	5183	3260	1507	691	316	145	30		
6800	X	300	1000	1.0							
6900	K	1	4	0	0	0	0	1			
7000	K1	12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD									
7100	Y	0	0	0	1	1					
7200	Y1	1	0	0	0	0	0	51000			
7300	Y2	10700	21300	31900	42500	53100	63700	74300	84900	95500 106100	
7400	Y22	12500	319000								
7500	Y3	50	50	50	50	280	600	1000	1500	2250 3000	
7600	Y3	63000	200366								
7700	K	1	5	0	0	0	0	1			
7800	K1	13 ROUTED OUTFLOW TO FLINT CREEK MOUTH									
7900	Y	0	0	0	0	1					
8000	Y1	0	12	5							
8100	K	0	5	0	0	0	0	1			
8200	K1	14 FLINT CREEK INFLOW A-2									
8300	M	1	-1	102	0	3236	0	0	0	1	
8400	P	0	21.5	39	53	61	72				
8500	I	0	0	0	0	0	0	0.5	0.06		
8600	U	26									
8700	U1	93	534	903	1266	1367	1166	900	801	66 549	
8800	U1	455	377	311	259	215	178	147	104	101 84	
8900	U1	69	57	47	39	35	32				
9000	X	90	2000	1.0							
9100	K	2	5	0	0	0	0	1			
9200	K1	15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS									
9300	K	1	56	0	0	0	0	1			
9400	K1	16 ROUTED TO LOCK 27									
9500	Y	0	0	0	0	1					
9600	Y1	0	7	3							
9700	K	0	56	0	0	0	0	1			
9800	K1	17 OUTLET LOCAL FLOW A-3									
9900	M	1	-1	155	0	3236	0	0	0	1	
10000	P	0	21.5	39	53	61	72				
10100	I	0	0	0	0	0	0	0.6	0.06		
10200	U	22									
10300	U1	91	338	905	1348	1716	2408	2601	1921	1413 1038	
10400	U1	763	562	412	303	223	164	120	90	65 48	
10500	U1	35	34								
10600	X	150	200	1.0							
10700	K	2	56	0	0	0	0	1			
10800	K1	18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27									
10900	K	1	0	0	0	0	0	1			
11000	K1	19 ROUTE OUTLET TO CANAL									
11100	Y	0	0	0	0	1					
11200	Y1	0	1								
11300	K	2	0	0	0	0	0	1			
11400	K1	20 COMBINE FLOW AT 6 (OUTLET FLOW + E-1, E-2, E-3)									
11500	K	1	8	0	0	0	0	1			
11600	K1	21 ROUTE FLOWS AT LOCK 27 TO NODE 8									
11700	Y	0	0	0	0	1					
11800	Y1	0	8	3							
11900	K	0	7	0	0	0	0	1			
12000	K1	22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E4)									
12100	M	1	-1	89	0	3236	0	0	0	1	
12200	P	0	21.5	39	53	61	72				

McFARLAND - JOHNSON ENGINEERS, INC.



12300	I	0	0	0	0	0	0	0.5	0.00		
12400	U	23									
12500	U1	897	1078	1441	1144	908	721	572	454	301	287
12600	U1	227	181	143	114	90	72	57	45	36	29
12700	U1	23	23	23							
12800	X	100	300	1.0							
12900	K	1	8	0	0	0	0	1			
13000	K1	23	ROUTE FLOWS AT LOCK 20 TO NODE 8								
13100	Y	0	0	0	0	1					
13200	Y1	0	2								
13300	K	2	8	0	0	0	0	1			
13400	K1	24	COMBINE ROUTED AND LOCAL FLOWS AT NODE 8								
13500	K	1	10	0	0	0	0	1			
13600	K1	25	ROUTE FLOWS AT NODE 8 TO NODE 10								
13700	Y	0	0	0	0	1					
13800	Y1	0	5	2							
13900	K	0	9	0	0	0	0	1			
14000	K1	26	LOCAL FLOW BETWEEN LOCK 20 AND LOCK 25 (E-S)								
14100	M	1	-1	18	0	3236	0	0	0	1	
14200	P	0	21.5	39	53	61	72				
14300	I	0	0	0	0	0	0	0.5	0.00		
14400	U	21									
14500	U1	171	304	313	240	193	152	119	93	73	58
14600	U1	45	35	28	22	17	13	11	8	6	5
14700	U1	4									
14800	X	90	90	1.0							
14900	K	1	10	0	0	0	0	1			
15000	K1	27	ROUTE INFLOW E-S TO NODE 10								
15100	Y	0	0	0	0	1					
15200	Y1	0	2								
15300	K	2	10	0	0	0	0	1			
15400	K1	28	COMBINE ROUTED FLOW WITH FLOW AT NODE 10								
15500	K	1	15	0	0	0	0	1			
15600	K1	29	ROUTE FLOWS AT NODE 10 TO NODE 15								
15700	Y	0	0	0	0	1					
15800	Y1	0	5	2							
15900	K	0	11	0	0	0	0	1			
16000	K1	30	LOCAL INFLOW B-1 INTO KEUKA LAKE								
16100	M	1	-1	183	0	3236	0	0	0	1	
16200	P	0	21.5	39	53	61	72				
16300	I	0	0	0	0	0	0	1.50	0.03		
16400	U	6									
16500	U1	14318	3342	1273	483	183	0				
16600	X	100	800	1.6							
16700	K	1	11	0	0	0	0	1			
16800	K1	31	KEUKA LAKE OUTFLOW W/ MODIFIED PULS								
16900	Y	0	0	0	1	1					
17000	Y1	1	0	0	0	0	0	147000			
17100	Y2	107000	129500	141000	153500	172000	178000	191000	204000	217000	328550
17200	Y3	120	320	445	530	575	670	890	1130	1470	126000
17300	K	1	12	0	0	0	0	1			
17400	K1	32	ROUTE KEUKA LAKE OUTFLOWS TO 12								
17500	Y	0	0	0	0	1					
17600	Y1	0	6	2							
17700	K	0	12	0	0	0	0	1			
17800	K1	33	SENECA LAKE INFLOWS B-2								
17900	M	1	-1	524	0	3236	0	0	0	1	
18000	P	0	21.5	39	53	61	72				
18100	I	0	0	0	0	0	0	0.5	0.03		
18200	U	12									
18300	U1	20993	10631	8899	4332	2720	1706	1072	0	422	206

18400	J1	107	70									
18500	X	500	2000	1.0								
18600	K	2	12	0	0	0	0	1				
18700	K1	34	COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS									
18800	K	1	12	0	0	0	0	1				
18900	K1	35	SENECA LAKE OUTFLOWS - MODIFIED PULS METHOD									
19000	Y	0	0	0	1	1						
19100	Y1	1							534000			
19200	Y2372000	414000	450000	500000	543000	586000	630000	650000	674000	720000		
19300	Y2800000	1200000										
19400	Y3	700	700	700	700	700	700	700	1000	3000	3000	
19500	Y3	15000	77000									
19600	K	1	13	0	0	0	0	1				
19700	K1	36	SENECA LAKE OUTFLOWS ROUTED TO 13									
19800	Y	0	0	0	0	1						
19900	Y1	0	2									
20000	K	0	13	0	0	0	0	1				
20100	K1	37	LOCAL INFLOW B-4									
20200	M	1	-1	39	0	3230	0	0	0	1		
20300	P	0	21.5	39	53	61	72					
20400	T	0	0	0	0	0	0	0.5	0.05			
20500	U	15										
20600	U1	539	1094	796	549	378	260	179	123	85	58	
20700	U1	40	28	19	11	11						
20800	X	92	200	1.0								
20900	K	2	13	0	0	0	0	1				
21000	K1	38	COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4									
21100	K	1	14	0	0	0	0	1				
21200	K1	39	ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)									
21300	Y	0	0	0	0	1						
21400	Y1	0	0	2								
21500	K	0	14	0	0	0	0	1				
21600	K1	40	LOCAL INFLOW B-5									
21700	M	1	-1	36	0	3230	0	0	0	1		
21800	P	0	21.5	39	53	61	72					
21900	T	0	0	0	0	0	0	0.5	0.05			
22000	U	12										
22100	U1	895	1094	692	437	277	175	110	70	44	28	
22200	U1	14	10									
22300	X	92	200	1.0								
22400	K	2	14	0	0	0	0	1				
22500	K1	41	COMBINE FLOW B-5 WITH ROUTED FLOW									
22600	K	0	14	0	0	0	0	1				
22700	K1	42	CAYUGA LAKE INFLOW B-3									
22800	M	1	-1	782	0	3230	0	0	0	1		
22900	P	0	21.5	39	53	61	72					
23000	T	0	0	0	0	0	0	0.5	0.03			
23100	U	15										
23200	U1	24903	15540	13520	9524	6529	4470	3069	2104	1443	989	
23300	U1	678	465	319	219	81						
23400	X	1000	1700	1.0								
23500	K	2	14	0	0	0	0	1				
23600	K1	43	COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW									
23700	K	1	14	0	0	0	0	1				
23800	K1	44	CAYUGA LAKE OUTFLOW - MODIFIED PULS									
23900	Y	0	0	0	1	1						
24000	Y1	1	0	0	0	0	0	490000				
24100	Y2375000	417000	400000	503000	516000	589500	634000	660000	727000	854500		
24200	Y2902000											
24300	Y3	1700	1700	1700	3400	3400	3400	8700	8700	38510		
24400	Y3103500											

McFARLAND-JOHNSON ENGINEERS, INC.



24500	K	1	15	0	0	0	0	1				
24600	K1	45	ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15									
24700	Y	0	0	0	0	1						
24800	Y1	0	3	1	0							
24900	K	2	15	0	0	0	0	1				
25000	K1	46	COMBINE ROUTED FLOW WITH FLOW AT NODE 15									
25100	K	1	18	0	0	0		1				
25200	K1	47	ROUTE FLOWS TO NODE 18									
25300	Y	0	0	0	0	1						
25400	Y1	0	8	3								
25500	K	0	10	0	0	0	0	1				
25600	K1	48	LOCAL FLOW E-0									
25700	M	1	-1	191	0	3236	0	0	0	1		
25800	P	0	21.5	39	53	61	72					
25900	T	0	0	0	0	0	0	0.5	0.06			
26000	U	10										
26100	U1	3851	5102	3130	2409	1710	1175	808	555	381	262	
26200	U1	180	123	85	75	70	27					
26300	X	140	400	1.6								
26400	K	1	18	0	0	0	0	1				
26500	K1	49	ROUTE LOCAL FLOW E-0 TO NODE 18									
26600	Y	0	0	0	0	1						
26700	Y1	0	2									
26800	K	2	18	0	0	0	0	1				
26900	K1	50	COMBINE ROUTED FLOW W/ FLOW AT NODE 18									
27000	K	0	17	0	0	0	0	1				
27100	K1	51	HEAD GWASCO INFLOW C-1									
27200	M	1	-1	201	0	3236	0	0	0	1		
27300	P	0	21.5	39	53	61	72					
27400	T	0	0	0	0	0	0	0.75	.05			
27500	U	10										
27600	U1	6633	5878	4280	2273	1200	633	334	176	93	30	
27700	X	450	1000	1.6								
27800	K	1	17	0	0	0	0	1				
27900	K1	52	GWASCO LAKE INFLOWS - MODIFIED PULS METHOD									
28000	Y	0	0	0	1	1						
28100	Y1	1	0	0	0	0	0	92000				
28200	Y2	66000	73200	79900	86500	93200	99800	106500	113200	119600	126500	
28300	Y2	152900	205700									
28400	Y3	600	600	600	1100	1700	2300	2860	3400	3400	3400	
28500	Y3	24000	69100									
28600	K	1	18	0	0	0	0	1				
28700	K1	53	ROUTE GWASCO LAKE OUTLET FLOWS									
28800	Y	0	0	0	0	1						
28900	Y1	0	7	3								
29000	K	2	18	0	0	0	0	1				
29100	K1	54	COMBINE FLOWS WITH FLOWS AT NODE 18									
29200	K	0	18	0	0	0	0	1				
29300	K1	55	READ LOCAL FLOW C-0									
29400	M	1	-1	19	0	3236	0	0	0	1		
29500	P	0	21.5	39	53	61	72					
29600	T	0	0	0	0	0	0	0.5	0.06			
29700	U	18										
29800	U1	157	368	352	268	205	156	119	91	70	53	
29900	U1	40	26	23	18	14	10	8	6			
30000	X	90	200	1.6								
30100	K	2	18	0	0	0	0	1				
30200	K1	56	COMBINE LOCAL FLOW C-0 WITH FLOW AT NODE 18									
30300	K	1	21	0	0	0	0	1				
30400	K1	57	ROUTE FLOW AT 18 TO NODE 21									
30500	Y	0	0	0	0	1						



30600	Y1	0	7	3							
30700	K	0	19	0	0	0	0	1			
30800	K1	58	LOCAL INFLOW C-7								
30900	M	1	-1	98	0	3236	0	0	0	1	
31000	P	0	21.5	39	53	61	72				
31100	T	0	0	0	0	0	0	0.5	0.06		
31200	U	11									
31300	U1	2709	3138	1070	1115	664	396	230	141	84	50
31400	U1	19									
31500	X	120	400	1.0							
31600	K	1	21	0	0	0	0	1			
31700	K1	59	ROUTE LOCAL FLOW TO NODE 21								
31800	Y	0	0	0	0	1					
31900	Y1	0	6	2							
32000	K	2	21	0	0	0	0	1			
32100	K1	60	COMBINE ROUTED FLOW WITH FLOW AT 21								
32200	K	0	20	0	0	0	0	1			
32300	K1	61	SKANEATELES LAKE INFLOWS								
32400	M	1	-1	74	0	3236	0	0	0	1	
32500	P	0	21.5	39	53	61	72				
32600	T	0	0	0	0	0	0	0.75	0.05		
32700	U	5									
32800	U1	6839	791	232	56	10					
32900	X	250	500	1.0							
33000	K	1	20	0	0	0	0	1			
33100	K1	62	SKANEATELES LAKE OUTFLOWS								
33200	Y	0	0	0	1	1					
33300	Y1	1	0	0	0	0	0	0			
33400	Y2	0	17323	34750	52184	104308	208736	243492			
33500	Y3	0	353	747	1508	6403	13313	17359			
33600	K	1	21	0	0	0	0	1			
33700	K1	63	ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21								
33800	Y	0	0	0	0	1					
33900	Y1	0	0	2							
34000	K	2	21	0	0	0	0	1			
34100	K1	64	COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21								
34200	K	0	21	0	0	0	0	1			
34300	K1	65	LOCAL FLOW C-7								
34400	M	1	-1	27	0	3236	0	0	0	1	
34500	P	0	21.5	39	53	61	72				
34600	T	0	0	0	0	0	0	0.5	0.06		
34700	U	11									
34800	U1	496	946	581	351	212	127	77	46	28	17
34900	U1	7									
35000	X	90	200	1.6							
35100	K	2	21	0	0	0	0	1			
35200	K1	66	COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21								
35300	K	1	22	0	0	0	0	1			
35400	K1	67	ROUTING TO NODE 22								
35500	Y	0	0	0	0	1					
35600	Y1	0	4	1							
35700	K	0	22	0	0	0	0	1			
35800	K1	68	LOCAL FLOW E-8								
35900	M	1	-1	98	0	3236	0	0	0	1	
36000	P	0	21.5	39	53	61	72				
36100	T	0	0	0	0	0	0	0.5	0.06		
36200	U	7									
36300	U1	4887	3059	1402	642	259	135	42			
36400	X	120	400	1.6							
36500	K	2	22	0	0	0	0	1			
36600	K1	69	COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22								

McFARLAND-JOHNSON ENGINEERS, INC.



		1	22	0	0	0	0	0	1
3670J	K								
3680J	K1	70 BALDWIN-SVIBBLE POOL - MODIFIED PUGS METHOD							
3690J	Y	0	0	0	1	1			
3700J	Y1	1	0	0	0	0		-1	
3710J	12	0	0500	13050	21320	34100	48750	62400	70375 107500
3720J	13	390J	5915	9029	12337	23274	37200	55680	80859 109900
3730J	K	99							
3740J	A								
3750J	A								
3760J	A								
3770J	A								
3780J	A								



PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

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	5b
RUNOFF HYDROGRAPH AT	5b
COMBINE 2 HYDROGRAPHS AT	5b
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	18
RUNOFF HYDROGRAPH AT	16
ROUTE HYDROGRAPH TO	18
COMBINE 2 HYDROGRAPHS AT	18
RUNOFF HYDROGRAPH AT	17
ROUTE HYDROGRAPH TO	17
ROUTE HYDROGRAPH TO	18
COMBINE 2 HYDROGRAPHS AT	18
RUNOFF HYDROGRAPH AT	18
COMBINE 2 HYDROGRAPHS AT	18
ROUTE HYDROGRAPH TO	21
RUNOFF HYDROGRAPH AT	19
ROUTE HYDROGRAPH TO	2

McFARLAND - JOHNSON ENGINEERS, INC.



COMBINE 2 HYDROGRAPHS AT	21
RUNOFF HYDROGRAPH AT	20
ROUTE HYDROGRAPH TO	20
ROUTE HYDROGRAPH TO	21
COMBINE 2 HYDROGRAPHS AT	21
RUNOFF HYDROGRAPH AT	21
COMBINE 2 HYDROGRAPHS AT	21
ROUTE HYDROGRAPH TO	22
RUNOFF HYDROGRAPH AT	22
COMBINE 2 HYDROGRAPHS AT	22
ROUTE HYDROGRAPH TO	22
END OF NETWORK	

McFARLAND - JOHNSON ENGINEERS, INC.



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

TIME OF EXECUTION 27-AUG-80 08:13:58

ANALYSIS OF DAM OVERTIPPING USING RATIOS OF PMF
 HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF LOCK 24 DAM
 RATIOS OF PMF ROUTED THROUGH THE RESERVOIR

JOB SPECIFICATION									
NQ	NHR	NMIN	IDAY	IHR	IMIN	MEIRC	IPLT	IPRT	NSTAN
40	6	0	0	0	0	0	0	4	0
			JUPER	NAT	LRUPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
 NPLAN= 1 NRTIO= 6 LRTIO= 1
 RTIUS= 0.20 0.40 0.50 0.60 0.80 1.00

SUB-AREA RUNOFF COMPUTATION

1 BARGE CANAL LOCK 30 AT MACEDON (SUB AREA A1)

HYDROGRAPH DATA									
ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISIAQ	IAUTO	
1	0	0	0	0	0	1	0	0	
IHYDG	IURG	TAREA	SNAP	TRSDA	TKSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	100.00	0.00	3236.00	0.00	0.000	0	1	0

HYDROGRAPH ROUTING

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

ROUTING DATA									
ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISIAQ	IAUTO	
2	1	0	0	0	0	1	0	0	
JLOSS	CLOSS	AVG	IRES	ISAME	IDPT	IPMP	LSTR		
0.0	0.000	0.00	0	1	0	0	0		
NSIPS	NSIDL	LAG	AKSKK	X	TSK	STORA	ISPRAT		
0	3	1	0.000	0.000	0.000	0.	0		

SUB-AREA RUNOFF COMPUTATION
 McFARLAND-JOHNSON ENGINEERS, INC.



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

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA									
IHYDG	IUHG	TAREA	SNAP	IRSDA	TRSPC	RATIO	ISNDW	ISAME	LOCAL
1	-1	147.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA									
SPFE	PMS	R6	R12	R24	R48	R72	R96		
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00		

IRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA										
LROPT	STRKR	DLTKR	RTIOL	ERAIN	SIRKS	RTIOK	STRIL	CNSIL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.05	0.00	0.00

RECESSION DATA		
STRTJ	ORCSN	RTIOK
140.00	550.00	1.60

END-OF-PERIOD FLOW												
MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	CUMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS

SUM	14.37	12.12	2.24
	(365.)	(308.)	(57.)

COMBINE HYDROGRAPHS

4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA							
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTD	LAG	AMSK	X	ISK	STOK	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

McFARLAND - JOHNSON ENGINEERS, INC.



SUB-AREA RUNOFF COMPUTATION

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

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

1HYDG	1UHG	1AREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	118.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R5	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA

LROPT	STRKH	DLIAR	R1IUL	ERAIN	STRKS	RTIOK	SIRIL	CNSIL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.05	0.00	0.00

RECESSION DATA

STRIQ= 120.00 QRCSN= 470.00 RTIOK= 1.60

0

END-OF-PERIOD FLOW

MO.OA	HR.MN	PERIOD	RAIN	EXCS	LOSS	CMP 0	MO.OA	HR.MN	PERIOD	RAIN	EXCS	LOSS	CMP 0
SUM 14.37 12.12 2.24 155692. (365.)(308.)(57.)(4408.71)													

COMBINE HYDROGRAPHS

7 COMBINED AND LOCAL FLOWS AT LOCK 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

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

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

1HYDG	1UHG	1AREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	51.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

McFARLAND-JOHNSON ENGINEERS, INC.



LOSS DATA
 LROPT SIRKR DLTKR RIIDL ERAIN STRKS RTIDK STRIL CNSTL ALSMX RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 0.50 0.05 0.00 0.00

RECESSION DATA
 STRIS= 100.00 GRCSN= 200.00 RTIDR= 1.60

0
 MO,DA HR,MN PERIOD RAIN EXCS LOSS END-OF-PERIOD FLOW
 MO,DA HR,MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.37 12.12 2.24 68228.
 (365.)(308.)(57.)(1932.00)

HYDROGRAPH ROUTING

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

ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
0	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISAME	IDPT	IPMP	LSIK
0.0	0.000	0.00	0	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	5	2	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

10 COMBINE FLOWS AT NODE 6

ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
0	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

11 CANANDAIGUA LAKE INFLOW

ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IH1G	IUG	TAREA	SNAP	TRSDA	TRSPC	RATD	ISNOW	ISAME	LOCAL
1	-1	164.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PAS	R6	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

McFARLAND-JOHNSON ENGINEERS, INC.



LOSS DATA
 STRIKE= 300.00 GRCSN= 1000.00 RTIQR= 1.00
 END-OF-PERIOD FLOW
 MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q
 0 0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
 14.37 12.13 2.24 256548.
 (305.)(308.)(57.)(7264.63)

HYDROGRAPH ROUTING

12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD

ISIAQ	ICOMP	IECON	ITAPE	JPLI	JPKT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0
ROUTING DATA								
CLLOSS	AVG	IRLS	ISAME	IOPF	IPMP		LSTR	
0.0	0.000	0.00	1	0	0		0	
NSIPS								
1	0	0	0.000	0.000	0.000	51000.	ISPRAT	0
10700.00	21300.00	42500.00	53100.00	63700.00	74300.00	84900.00	95500.00	106100.00
212500.00	319000.00							
50.00	50.00	50.00	200.00	600.00	1000.00	1560.00	2250.00	3000.00
63000.00	200366.00							

HYDROGRAPH ROUTING

13 ROUTED OUTFLOW TO FLINT CREEK MOUTH

ISIAQ	ICOMP	IECON	ITAPE	JPLI	JPKT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0
ROUTING DATA								
CLLOSS	AVG	IRLS	ISAME	IOPF	IPMP		LSTR	
0.0	0.000	0.00	1	0	0		0	
NSIPS								
0	12	5	0.000	0.000	0.000	0.	ISPRAT	0

SUB-AREA RUNOFF COMPUTATION

McFARLAND-JOHNSON ENGINEERS, INC.



14 POINT CREEK INFLOW A-2

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	0	0	0	0	0	1	0	0

HYDROGRAPH DATA									
INIDG	LOGG	AREA	SNAP	IRSDA	IRSPC	RAIU	ISNOW	ISAME	LOCAL
1	-1	102.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA							
SPPE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

IRSPC COMPUTED BY THE PROGRAM IS 0.926

LOSS DATA										
CRUPT	SIRKR	ULTRR	RIIUD	ERAIN	SIRKS	RIIOK	SIRIL	CMSIL	ALSMX	RIIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.06	0.00	0.00

RECESSION DATA		
SIRKS=	90.00	GRCSN= 2000.00
RIIOK=	1.60	

END-OF-PERIOD FLOW													
MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

SUM	14.37	11.81	2.56	144965.
	(365.)	(300.)	(55.)	(4104.95)

COMBINE HYDROGRAPHS

15 COMBINE ROUTED CANANDAIGUA JOIFLOWS AND FLINT CR INFLOWS

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

HYDROGRAPH ROUTING

16 ROUTED TO LOCK 27

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
56	1	0	0	0	0	1	0	0
ROUTING DATA								
QLOSS	CLOSS	AVG	IKES	ISAME	IUPI	IPMF	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
WSPS	WSPDL	LAG	AMSKA	X	TSK	SIGRA	ISPRAT	
0	7	3	0.000	0.000	0.000	0.	0	

SUB-AREA RUNOFF COMPUTATION
 FARLAND-JOHNSON ENGINEERS, INC.



17 JUTLET LOCAL FLOW A-3

ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
50	0	0	0	0	0	1	0	0

HYDROGRAPH DATA									
IHYOG	IUNG	IAPEA	SWAP	TRSDA	TRSPC	RATIO	ISNO*	ISAME	LOCAL
1	-1	155.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA							
SPRE	PMS	K6	K12	K24	K48	K72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928.

LOSS DATA										
LRUPT	SIRKR	DLTKK	RTIOL	ERAIN	SIRKS	RTION	SIRIL	CHSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.60	0.00	0.00	0.00

RECESSION DATA		
SIRIQ=	150.00	RTIOR=
QRCSN=	200.00	

END-OF-PERIOD FLOW																
MO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	CUMP Q	MO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	CUMP Q			
												SUM	14.37	11.78	2.59	199066.
													(365.)	(299.)	(66.)	(5653.91)

COMBINE HYDROGRAPHS

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

ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
50	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

19 ROUTE JUTLET TO CANAL

ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0
ROUTING DATA								
WLOSS	CLOSS	AVG	IKES	ISAME	IOPT	IPMP	LSIR	
0.0	0.000	0.00	0	1	0	0	0	
WSIPS	WSIDL	LAG	AMSKK	X	TSK	SIORA	ISPRAT	
0	1	0	0.000	0.000	0.000	0.	0	

McFARLAND-JOHNSON ENGINEERS, INC.

COMBINE HYDROGRAPHS

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

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

HYDROGRAPH ROUTING

21 ROUTE FLOWS AT LOCK 27 TO NODE 8

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IKES	ISAME	IOPT	IPMP	LSIR
0.0	0.000	0.00	0	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	TSK	SFORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E4)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
7	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAKEA	SNAP	IKSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	89.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	K6	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA

LROPI	STRKK	DLTKR	RIIOL	ERAIN	SIRKS	RIIOK	STRIL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.06	0.00	0.00

RECESSION DATA

STRTO=	100.00	QRCSN=	360.00	RIIOK=	1.60
--------	--------	--------	--------	--------	------

END-OF-PERIOD FLOW

MD.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MD.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.37 11.81 2.56 116859.
(365.)(300.)(65.)(3309.08)

McFARLAND-JOHNSON ENGINEERS, INC.



HYDROGRAPH ROUTING

23 ROUTE FLOWS AT LOCK 26 TO NODE 8

ISIAW	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSIDL	LAG	AMSK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8

ISTAW	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

25 ROUTE FLOWS AT NODE 8 TO NODE 10

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSIDL	LAG	AMSK	X	TSK	STORA	ISPRAT
0	5	2	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

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

ISTAW	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
9	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INIOG	LUHG	TAREA	SNAP	IRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	18.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

McFARLAND-JOHNSON ENGINEERS, INC.



LOSS DATA
 LROPT 0 SIKRK 0.00 DLTKR 0.00 RIIDL 1.00 ERAIN 0.00 SIKRS 0.00 RILOK 1.00 SIRIL 0.50 CNSIL 0.06 ALSMA 0.00 RIIMP 0.00

RECESSION DATA
 SIRTJ= 90.00 JKCSN= 90.00 RIIDR= 1.60

0
 MD.DA HR.MN PERIOD RAIN EXCS LOSS END-OF-PERIOD FLOW
 MD.DA HR.MN PERIOD RAIN EXCS LOSS COMP 0
 SUM 14.37 11.81 2.56 24784.
 (365.)(300.)(65.)(701.80)

HYDROGRAPH ROUTING

27 ROUTE INFLOW E-5 TO NODE 10

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISAME	IJFT	IPMP	LSIR
0.0	0.000	0.00	0	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	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

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

HYDROGRAPH ROUTING

29 ROUTE FLOWS AT NODE 10 TO NODE 15

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
15	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSIR
0.0	0.000	0.00	0	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	ISK	STORA	ISPRAT
0	5	2	0.000	0.000	0.000	0.	0



SUB-AREA RUNOFF COMPUTATION

30 LOCAL INFLOW 8-1 INTO KEUKA LAKE

ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11	0	0	0	0	0	1	0	0

HYDROGRAPH DATA									
INHYG	IUNG	IAREA	SNAP	TRSDA	TRSPC	RAIO	ISNOW	ISAME	LOCAL
1	-1	183.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA							
SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA										
LROPI	SIRKR	DLTKR	RIOL	ERAIN	SIRKS	RIOK	STRIL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	0.03	0.00	0.00

RECESSION DATA		
SIRTK=	100.00	QRCNS= 800.00
		RIOR= 1.60

END-OF-PERIOD FLOW													
MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
						SUM	14.37	11.91	2.46	246833.			
							(365.)	(302.)	(62.)	(6989.53)			

HYDROGRAPH ROUTING

31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS

ISIAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11	1	0	0	0	0	1	0	0

ROUTING DATA							
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	147000.	0

STORAGE	107000.00	129500.00	141000.00	153500.00	172000.00	178000.00	191000.00	204000.00	217000.00
OUTFLOW	120.00	320.00	445.00	530.00	575.00	670.00	890.00	1130.00	1470.00

HYDROGRAPH ROUTING

32 ROUTE KEUKA LAKE OUTFLOWS 10 12

McFARLAND-JOHNSON ENGINEERS, INC.



SUB-AREA RUNOFF COMPUTATION

30 LOCAL INFLOW B-1 INTO KEUKA LAKE

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

YDG	1UHG	FAREA	SNAP	IKSDA	TRSPC	RAIO	ISNOW	ISAME	LOCAL
1	-1	183.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

PROGRAM IS 0.928

LOSS DATA

SIRRR	DLTKK	RIOL	ERAIN	SIRRS	RTIOK	STRIL	CNSTL	ALSMX	RTIMP
0.00	0.00	1.00	0.00	0.00	1.00	1.50	0.03	0.00	0.00

RECESSION DATA

STRIR= 100.00 QRCN= 800.00 RIIOK= 1.60

END-OF-PERIOD FLOW

IOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MM	PERIOD	RAIN	EXCS	LOSS	COMP Q
-----	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.37 11.91 2.46 246833.
(365.)(302.)(62.)(6989.53)

HYDROGRAPH ROUTING

31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	TSK	SIOA	ISPRAT
1	0	0	0.000	0.000	0.000	147000.	0

29500.00	141000.00	153500.00	172000.00	178000.00	191000.00	204000.00	217000.00	328550.00
320.00	445.00	530.00	575.00	670.00	890.00	1130.00	1470.00	126000.00

HYDROGRAPH ROUTING

32 ROUTE KEUKA LAKE OUTFLOWS 10 12

McFARLAND-JOHNSON ENGINEERS, INC.



2

ISIAQ	ICOMP	IECON	IIAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	1	0	0	0	0	1	0	0
ROUTING DATA								
LOSS	CLOSS	AVG	IRES	ISAME	IDPT	IPMP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
NSIPS	NSIDL	LAG	AMSKK	X	TSK	STORA	ISPRAT	
0	0	2	0.000	0.000	0.000	0.	0	

SUB-AREA RUNOFF COMPUTATION

33 SENECA LAKE INFLOWS B-2

ISIAQ	ICOMP	IECON	IIAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO	
12	0	0	0	0	0	1	0	0	
HYDROGRAPH DATA									
IHYDQ	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	524.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA								
SPFE	PMS	R6	R12	R24	R48	R72	R96	
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00	

TRSPC COMPUTED BY THE PROGRAM IS 0.926

LOSS DATA										
LROPI	STRAR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRIL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.03	0.00	0.00

RECESSION DATA			
STRTO=	500.00	QRCSN= 2800.00	RTIOK= 1.60

END-OF-PERIOD FLOW													
MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

SUM 14.37 12.75 1.62 758979.
(365.)(324.)(41.)(21491.89)

COMBINE HYDROGRAPHS

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

ISIAQ	ICOMP	IECON	IIAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

McFARLAND - JOHNSON ENGINEERS, INC.



0
 MO.DA HR.MN PERIOD RAIN EXCS LOSS END-JF-PERIOD FLOW
 MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.37 14.12 2.24 54130.
 (365.)(308.)(57.)(1532.79)

COMBINE HYDROGRAPHS

38 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4

ISTAG	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)

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

ROUTING DATA

QLOSS	QLOSS	AVG	IKES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	ISK	SIORA	ISPKA1
0	0	2	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

40 LOCAL INFLOW B-5

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

HYDROGRAPH DATA

INVOG	LONG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNO	ISAME	LOCAL
1	-1	36.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	Ro	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.926

LOSS DATA

LROPI	STRAR	DRICK	RILOL	ERAIN	SIRKS	RILOK	SIRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.05	0.00	0.00

RECESSION DATA
 SIRLS= 92.00 JRCSN= 200.00
 McFARLAND-JOHNSON ENGINEERS, INC.

0
MO.DA HR.MN PERIOD RAIN EXCS LOSS END-JF-PERIOD FLOW
COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.37 12.12 2.24 50339.
(365.)(308.)(57.)(1425.44)

COMBINE HYDROGRAPHS

41 COMBINE FLOW B-5 WITH ROUTED FLOW

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

SUB-AREA RUNOFF COMPUTATION

42 CAYUGA LAKE INFLOW B-3

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

HYDROGRAPH DATA

IHYDG IUNG TAKEA SNAP IRSDA TRSPC RAIID ISNUM ISAME LOCAL
1 -1 762.00 0.00 3230.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PMS R6 R12 R24 R48 R72 R90
0.00 21.50 39.00 53.00 61.00 72.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA

LROPT STRKR DLTKR RIOL ERAIN STRKS RIIOK SIRIL CNSTL ALSMX RIIMP
0 0.00 0.00 1.00 0.00 0.00 1.00 0.50 0.03 0.00 0.00

RECESSION DATA

STRTO= 1000.00 JKCSN= 1700.00 RIIOK= 1.60

0
MO.DA HR.MN PERIOD RAIN EXCS LOSS END-JF-PERIOD FLOW
COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.37 12.75 1.62 1103464.
(365.)(324.)(41.)(31240 61)

COMBINE HYDROGRAPHS

43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW

McFARLAND-JOHNSON ENGINEERS, INC.

ISTAQ 14 ICOMP 2 IECON 0 IIAPE 0 JPLT 0 JPRT 0 INAME 1 ISTAGE 0 IAUTO 0

HYDROGRAPH ROUTING

44 CAYUGA LAKE OUTFLOW - MODIFIED PULS

ISTAQ 14 ICOMP 1 IECON 0 IIAPE 0 JPLT 0 JPRT 0 INAME 1 ISTAGE 0 IAUTO 0
 14
 ROUTING DATA
 CLOSS 0.000 AVG 0.00 IRES 1 ISAME 1 IOPT 0 LSIR 0
 0.0 0.000 0.00
 NSIPS NSIDL 0 LAG AMSAK X TSK STORA ISPRAT 0
 1 0 0 0.000 0.000 0.000 490000.0

STORAGE 375000.00 417000.00 503000.00 545000.00 589500.00 634000.00 660000.00 727000.00 854500.00

OUTFLOW 1700.00 1700.00 1700.00 3400.00 3400.00 3400.00 8700.00 8700.00 38510.00

HYDROGRAPH ROUTING

45 ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15

ISTAQ 15 ICOMP 1 IECON 0 IIAPE 0 JPLT 0 JPRT 0 INAME 1 ISTAGE 0 IAUTO 0
 15
 ROUTING DATA
 CLOSS 0.000 AVG 0.00 IRES 0 ISAME 1 IOPT 0 LSIR 0
 0.0 0.000 0.00
 NSIPS NSIDL 3 LAG AMSAK X TSK STORA ISPRAT 0
 0 0 1 0.000 0.000 0.000 0

COMBINE HYDROGRAPHS

46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15

ISTAQ 15 ICOMP 2 IECON 0 IIAPE 0 JPLT 0 JPRT 0 INAME 1 ISTAGE 0 IAUTO 0
 15

HYDROGRAPH ROUTING

47 ROUTE FLOWS TO NODE 18

McFARLAND - JOHNSON ENGINEERS, INC.



ISIAQ	ICOMP	IECON	IIAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRLS	ISAME	IQPT	IPMP	LSIR
0.0	0.000	0.00	0	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	ISK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

48 LOCAL FLOW E-6

ISIAQ	ICOMP	IECON	IIAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
16	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYOG	IUNG	TAREA	SNAP	TRSDA	TKSPC	RATIO	ISNO#	ISAME	LOCAL
1	-1	191.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	Ro	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA

LKOPT	STRAR	DUTKR	RIICL	ERAIN	SIRKS	RILOK	STRIL	CNSIL	ALSMX	RIIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.06	0.00	0.00

RECESSION DATA

SIRIG= 140.00 JKCSN= 400.00 RIIOK= 1.60

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.37 11.81 2.56 242885.
(365.)(300.)(65.)(6877.74)

HYDROGRAPH ROUTING

49 ROUTE LOCAL FLOW E-6 TO NODE 16

ISIAQ	ICOMP	IECON	IIAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRLS	ISAME	IQPT	IPMP	LSIR
0.0	0.000	0.00	0	1	0	0	0

NSIPS	NSIDL	LAG	AMSKK	X	ISK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

McFARLAND-JOHNSON ENGINEERS, INC.



COMBINE HYDROGRAPHS

50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

51 HEAD UWASCO INFLOW C-1

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

HYDROGRAPH DATA

INIDG	IUGG	FAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	201.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	Rb	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA

LROPT	STRKR	DLTKP	RTIOL	ERAIN	SIRKS	RTIOR	STRIL	CNSIL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.75	0.05	0.00	0.00

RECESSION DATA

STRFQ= 450.00 GRCSN= 1000.00 RTIOR= 1.60

MO.DA	HR.MM	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP Q	MO.DA	HR.MM	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	------------------------------	-------	-------	--------	------	------	------	--------

SUM 14.37 11.97 2.39 276691.
(365.)(304.)(61.)(7835.01)

HYDROGRAPH ROUTING

52 UWASCO LAKE INFLOWS - MODIFIED PULS METHOD

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

ROUTING DATA

OLOSS	CLOSS	AVG	IRIS	ISAME	IDPT	IPMP	LSIK
0.0	0.000	0.00	1	1	0	0	0

MSIPS	MSIDL	LAG	AMSKA	X	ISK	STORA	ISPRAI
1	0	0	0.000	0.00	0.000	92000.	0

McFARLAND-JOHNSON ENGINEERS, INC.

SIRKAGE	6000.00	73200.00	79900.00	80500.00	93200.00	99800.00	106500.00	113200.00	119400.00	126500.00
OUTFLD*	152900.00	205700.00								
	600.00	600.00	600.00	1100.00	1700.00	2300.00	2860.00	3400.00	3400.00	3400.00
	24000.00	69100.00								

HYDROGRAPH ROUTING

53 ROUTE JASCO LAKE OUTLET FLOWS

1STAQ	18	ICOMP	1	IECON	0	ITAPE	0	JPLF	0	JPRI	0	INAME	1	ISTAGE	0	IAUTO	0
QLOSS	0.0	CLOSS	0.00	AVG	0.00	IRCS	0	ROUTING DATA	0	IPMP	0	LSIR	0				
NSIPS	0	NSIDL	7	LAG	3	AMSKK	0.000	X	0.000	TSK	0.000	STOKA	0.0	ISPRAT	0		

COMBINE HYDROGRAPHS

54 COMBINE FLOWS WITH FLOWS AT NODE 18

1STAQ	18	ICOMP	2	IECON	0	ITAPE	0	JPLF	0	JPRI	0	INAME	1	ISTAGE	0	IAUTO	0
-------	----	-------	---	-------	---	-------	---	------	---	------	---	-------	---	--------	---	-------	---

SUB-AREA RUNOFF COMPUTATION

55 READ LOCAL FLOW C-6

1HYDG	1	ITAREA	19.00	SNAP	0.00	FRSDA	3236.00	TRSPC	0.00	RATIO	0.000	ISNOW	0	ISAME	1	LOCAL	0
		SPFE	21.50	PMS	39.00	R12	53.00	R24	61.00	R48	72.00	R72	0.00	R96	0.00		

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LKOPT	0	SIRKAK	0.00	DLINK	0.00	RIIOL	1.00	ERAIN	0.00	STRKS	0.00	RIIOK	1.00	SIRTL	0.50	CNSTL	0.06	ALSMX	0.00	RTIMP	0.00
-------	---	--------	------	-------	------	-------	------	-------	------	-------	------	-------	------	-------	------	-------	------	-------	------	-------	------

SIRKIJ= 90.00 RECESION DATA
 GRCSM= 200.00
 MCFARLAND-JOHNSON ENGINEERS, INC



SCALE= 1.00

0
 MJ.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q END-OF-PERIOD FLOW
 MJ.DA COMP Q
 SUM 14.37 11.81 2.56 20786.
 (305.)(300.)(65.)(758.49)

COMBINE HYDROGRAPHS

56 COMBINE LOCAL FLOW C-0 WITH FLOW AT NODE 18

ISIAU	ICOMP	IECON	ITAPE	JPLI	JPRT	INAME	ISTAGE	IAUTO
18	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

57 ROUTE FLOW AT 18 TO NODE 21

ISIAU	ICOMP	IECON	ITAPE	JPLI	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLLOSS	AVG	IKES	ISAME	ICPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSIPS NSIDL LAG AMSKK X TSK STORA ISPRAT

0	7	3	0.000	0.000	0.000	0.000	0
---	---	---	-------	-------	-------	-------	---

SUB-AREA RUNOFF COMPUTATION

58 LOCAL INFLOW E-7

ISIAU	ICOMP	IECON	ITAPE	JPLI	JPRT	INAME	ISTAGE	IAUTO
19	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

ISIAU	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1 98.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R0	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LRDPT	SIRAR	ULIAR	KILUL	ERAIW	STIKS	RTICK	STRIL	CMSTL	ALSNX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.06	0.00	0.00

RECESSION DATA
 MCFARLAND-JOHNSON ENGINEERS, INC.



SIRTK= 120.00 JRCSY= 400.00 RIIOK= 1.00

0					END-JF-PERIOD FLOW												
MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q				
													SUM	14.37	11.81	2.56	130662.
														(365.)	(300.)	(65.)	(3699.93)

HYDROGRAPH ROUTING

59 ROUTE LOCAL FLOW TO NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0
ROUTING DATA								
QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
NSIPS	NSIDL	LAG	AMSKK	X	TSK	STORA	ISPRAT	
0	0	2	0.000	0.000	0.000	0.	0	

COMBINE HYDROGRAPHS

60 COMBINE ROUTED FLOW WITH FLOW AT 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

61 SKANEATELES LAKE INFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INIDG	LONG	AREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	74.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA

SPPE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.926

LOSS DATA

LRUPT	SIRKR	DLTKR	RTIOL	ERAIN	SIRKS	RIIOK	STRIL	CNSIL	ALSMX	RIIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.75	0.05	0.00	0.00

McFARLAND-JOHNSON ENGINEERS, INC.



RECESSION DATA
 SRTQ= 250.00 JRCN= 500.00 RIIDK= 1.00

0
 NO.DA HR.MM PERIOD RAIN EXCS LOSS CUMP Q NO.DA HR.MM PERIOD RAIN EXCS LOSS CUMP Q
 SUM 14.37 11.97 2.39 104801.
 (365.)(304.)(61.)(2967.63)

HYDROGRAPH ROUTING

02 SKANEATELES LAKE OUTFLOWS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	1	0	0	0	0	1	0	0
ROUTING DATA								
QLOSS	CLOSS	AVG	IRCS	ISAME	IUPT	IPMP	LSTR	
0.0	0.000	0.00	1	1	0	0	0	
NSIPS	NSIDL	LAG	AMSK	X	TSK	STORA	ISPRAT	
1	0	0	0.000	0.000	0.000	0.	0	
STORAGE	0.00	17323.00	34750.00	52184.00	104308.00	208730.00	243492.00	
OUTFLOW	0.00	353.00	747.00	1508.00	6403.00	13313.00	17359.00	

HYDROGRAPH ROUTING

03 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0
ROUTING DATA								
QLOSS	CLOSS	AVG	IRCS	ISAME	IUPT	IPMP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
NSIPS	NSIDL	LAG	AMSK	X	TSK	STORA	ISPRAT	
0	6	2	0.000	0.000	0.000	0.	0	

COMBINE HYDROGRAPHS

04 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0



SUB-AREA RUNOFF COMPUTATION

05 LOCAL FLOW C-7

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

HYDROGRAPH DATA									
INHYG	IUHG	IAREA	SNAP	IRSDA	IRSPC	RAIIO	ISNO*	ISAME	LOCAL
1	-1	27.00	0.00	3236.00	0.00	0.000	0	1	0

PRECIP DATA							
SPFE	PMS	Ko	R12	R24	R48	R72	R96
0.00	21.50	39.00	53.00	61.00	72.00	0.00	0.00

IRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA										
LROPI	SIRKR	DLTKR	RIIOL	ERAIN	SIRKS	RIIOK	STRIL	CNSTL	ALSMX	RIIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.06	0.00	0.00

RECESSION DATA		
STRIL=	90.00	ORCSN= 200.00
		RIIOK= 1.60

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

SUM	14.37	11.81	2.56	37841.
	(365.)	(300.)	(65.)	(1071.54)

COMBINE HYDROGRAPHS

06 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

07 ROUTING TO NODE 22

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	1	0	0	0	0	1	0	0

ROUTING DATA							
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSIK
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSIDL	LAG	AMSKK	X	ISK	STOWA	ISPRAI
0	4	1	0.000	0.000	0.000	0.	0

McFARLAND-JOHNSON ENGINEERS, INC.



SUB-AREA RUNOFF COMPUTATION

68 LOCAL FLOW E-6

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IMTOS	IMHG	IAREA	SNAP	IRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	98.00	0.00	3236.90	0.00	0.010	0	1	0

PRECIP DATA

SPFE	PMS	R5	R12	R24	R48	R72	K96
0.00	21.50	39.00	53.00	61.00	72.10	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.928

LOSS DATA

LRPT	SIRKR	DLTKR	RIOL	ERAIN	SIRKS	RIOK	SIRIL	CNSTL	ALSMX	RIIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.06	0.00	0.00

RECESSION DATA

SIRK= 120.00 JRCSN= 400.00 RIOR= 1.60

0

END-OF-PERIOD FLOW

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

SUM 14.37 11.81 2.56 130265.
(365.)(300.)(65.)(3688.69)

COMBINE HYDROGRAPHS

69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

70 BALDWINVILLE POOL - MODIFIED PULS METHOD

ISTAD	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRCS	ISAME	IOPT	IPMP	LSIK
0.0	0.000	0.00	1	1	0	0	0

ISIPS	NSIDL	LAG	AMSKK	X	ISK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

McFARLAND-JOHNSON ENGINEERS, INC.



STORAGE	0.00	6500.00	13650.00	21320.00	34100.00	48750.00	62400.00	76375.00	107500.00
JOIFLOW	3960.00	5915.00	9029.00	12937.00	23274.00	37200.00	55680.00	80859.00	109900.00



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	PLAN	RATIOS APPLIED TO FLOWS					
				RATIO 1 0.20	RATIO 2 0.40	RATIO 3 0.50	RATIO 4 0.60	RATIO 5 0.80	RATIO 6 1.00
HYDROGRAPH AT	1	100.00 (259.00)	1	78. (2.22)	157. (4.44)	196. (5.55)	235. (6.66)	314. (8.88)	392. (11.10)
ROUTED TO	2	100.00 (259.00)	1	78. (2.20)	156. (4.41)	195. (5.51)	234. (6.61)	311. (8.82)	389. (11.02)
HYDROGRAPH AT	2	147.00 (380.73)	1	6409. (181.47)	12817. (362.95)	16022. (453.69)	19226. (544.42)	25035. (725.90)	32044. (907.37)
2 COMBINED	2	247.00 (639.73)	1	6485. (183.63)	12970. (367.27)	16212. (459.09)	19455. (550.90)	25940. (734.54)	32425. (918.17)
ROUTED TO	6	247.00 (639.73)	1	3948. (111.79)	7896. (223.59)	9870. (279.48)	11844. (335.38)	15792. (447.17)	19740. (558.97)
HYDROGRAPH AT	6	118.00 (305.62)	1	2948. (83.49)	5897. (166.98)	7371. (208.73)	8845. (250.47)	11794. (333.96)	14742. (417.46)
2 COMBINED	6	365.00 (945.35)	1	6705. (189.87)	13410. (379.73)	16763. (474.67)	20115. (569.60)	26820. (759.47)	33525. (949.33)
HYDROGRAPH AT	3	51.00 (132.09)	1	4042. (114.45)	8084. (228.91)	10105. (286.14)	12126. (343.36)	16168. (457.82)	20210. (572.27)
ROUTED TO	6	51.00 (132.09)	1	2199. (62.26)	4398. (124.53)	5497. (155.66)	6596. (186.79)	8795. (249.05)	10994. (311.31)
2 COMBINED	6	416.00 (1077.44)	1	7200. (203.88)	14400. (407.76)	18000. (509.70)	21600. (611.64)	28800. (815.52)	36000. (1019.40)
HYDROGRAPH AT	4	184.00 (476.56)	1	16154. (457.44)	32308. (914.87)	40386. (1143.59)	48463. (1372.31)	64617. (1829.75)	80771. (2287.18)
ROUTED TO	4	184.00 (476.56)	1	905. (25.62)	2085. (59.05)	2802. (79.34)	6179. (174.96)	13864. (392.59)	20866. (590.85)
ROUTED TO	5	184.00 (476.56)	1	659. (24.32)	1910. (54.09)	2549. (72.17)	3773. (106.84)	7286. (206.33)	11042. (312.66)
HYDROGRAPH AT	5	102.00 (264.18)	1	2955. (83.67)	5910. (167.35)	7387. (209.18)	8865. (251.02)	11820. (334.69)	14775. (418.37)
2 COMBINED	5	286.00 (740.74)	1	3402. (96.33)	6714. (190.11)	8413. (238.23)	10551. (296.77)	15688. (444.24)	21015. (595.09)
ROUTED TO	56	286.00 (740.74)	1	2790. (78.99)	5529. (156.57)	6952. (196.86)	8854. (250.72)	13652. (386.59)	18710. (529.80)

McFARLAND-JOHNSON ENGINEERS, INC.



HYDROGRAPH A1	50	155.00 (401.45)	1	5300.	10775.	13159.	10163.	21551.	20939.
				(152.50)	(405.13)	(381.41)	(457.09)	(010.25)	(762.82)
2 COMBINED	50	441.00 (1142.18)	1	7901.	15670.	19596.	23797.	32819.	42051.
				(223.72)	(443.90)	(554.91)	(673.86)	(929.33)	(1190.75)
ROUTED TO	0	441.00 (1142.18)	1	7901.	15670.	19596.	23797.	32819.	42051.
				(223.72)	(443.90)	(554.91)	(673.86)	(929.33)	(1190.75)
2 COMBINED	0	857.00 (2219.02)	1	14095.	29204.	30582.	44180.	59990.	76022.
				(410.11)	(828.67)	(1035.88)	(1251.02)	(1698.89)	(2152.70)
ROUTED TO	8	857.00 (2219.62)	1	12617.	25130.	31434.	38065.	52001.	60109.
				(357.28)	(711.76)	(890.11)	(1077.67)	(1472.50)	(1872.01)
HYDROGRAPH A1	7	89.00 (230.51)	1	3532.	7063.	8829.	10595.	14126.	17658.
				(100.00)	(200.00)	(250.00)	(300.00)	(400.00)	(500.01)
ROUTED TO	0	89.00 (230.51)	1	3307.	0614.	8268.	9921.	13229.	16536.
				(93.65)	(187.30)	(234.12)	(280.95)	(374.59)	(468.24)
2 COMBINED	8	946.00 (2450.13)	1	13208.	26400.	33000.	39859.	54239.	68908.
				(375.70)	(747.74)	(934.62)	(1128.09)	(1535.89)	(1951.24)
ROUTED TO	10	946.00 (2450.13)	1	12730.	25347.	31684.	38281.	52220.	66372.
				(300.06)	(717.70)	(897.20)	(1084.01)	(1478.71)	(1879.46)
HYDROGRAPH A1	9	18.00 (40.02)	1	003.	1305.	1707.	2046.	2731.	3413.
				(19.33)	(38.60)	(48.33)	(57.99)	(77.33)	(96.66)
ROUTED TO	10	18.00 (40.02)	1	070.	1351.	1689.	2027.	2703.	3379.
				(19.13)	(38.27)	(47.84)	(57.40)	(76.54)	(95.67)
2 COMBINED	10	964.00 (2496.75)	1	12830.	25534.	31918.	38562.	52520.	66747.
				(303.30)	(723.05)	(903.81)	(1091.94)	(1487.20)	(1890.06)
ROUTED TO	15	964.00 (2496.75)	1	12404.	24687.	30860.	37298.	50823.	64014.
				(351.25)	(699.05)	(873.86)	(1056.16)	(1439.15)	(1829.67)
HYDROGRAPH A1	11	183.00 (473.97)	1	23066.	47331.	59104.	70997.	94663.	118328.
				(670.14)	(1340.27)	(1675.34)	(2010.41)	(2680.55)	(3350.69)
ROUTED TO	11	183.00 (473.97)	1	564.	872.	1078.	1346.	12291.	24065.
				(15.90)	(24.70)	(30.51)	(38.12)	(348.04)	(681.45)
ROUTED TO	12	183.00 (473.97)	1	503.	865.	1068.	1328.	6994.	14452.
				(15.94)	(24.49)	(30.23)	(37.61)	(198.04)	(409.24)
HYDROGRAPH A1	12	524.00 (1357.15)	1	48102.	96203.	120254.	144305.	192407.	240509.
				(1362.09)	(2724.16)	(3405.22)	(4080.27)	(5448.36)	(6810.44)
2 COMBINED	12	707.00 (1831.12)	1	48597.	96710.	120770.	144637.	192975.	241115.
				(1376.12)	(2738.53)	(3419.81)	(4101.34)	(5464.44)	(6827.02)
ROUTED TO	12	707.00 (1831.12)	1	700.	2711.	3000.	5220.	14284.	23751.
				(19.82)	(70.76)	(84.95)	(147.82)	(404.48)	(672.55)
ROUTED TO	13	707.00 (1831.12)	1	700.	2705.	3000.	5212.	14270.	23707.
				(19.82)	(70.59)	(84.95)	(147.60)	(404.25)	(671.32)
HYDROGRAPH A1	13	39.00	1	2214.	4426.	5535.	6642.	8850.	11070.

McFARLAND-JOHNSON ENGINEERS, INC.



	(101.01)	(62.65)	(125.39)	(156.74)	(188.08)	(250.76)	(313.47)
2 COMBINED	13 746.00 (1932.13)	1 2914. (62.52)	5128. (145.21)	6360. (180.11)	8206. (234.62)	15672. (443.78)	25512. (722.41)
ROUTED TO	14 746.00 (1932.13)	1 2025. (57.34)	3806. (110.03)	5354. (151.61)	6738. (190.79)	15192. (430.18)	24047. (703.58)
HYDROGRAPH AT	14 36.00 (93.21)	1 2182. (61.79)	4364. (123.57)	5455. (154.47)	6546. (185.36)	8728. (247.15)	10910. (308.94)
2 COMBINED	14 782.00 (2025.37)	1 3689. (104.46)	6678. (189.11)	8194. (232.02)	9825. (278.20)	15579. (441.15)	25342. (717.61)
HYDROGRAPH AT	14 782.00 (2025.37)	1 49040. (1300.65)	98079. (2777.29)	122599. (3471.61)	147119. (4105.94)	196158. (5554.58)	245198. (6943.23)
2 COMBINED	14 1564.00 (4050.74)	1 52189. (1477.83)	103679. (2935.85)	129423. (3664.85)	155166. (4393.86)	206672. (5852.31)	258304. (7314.36)
ROUTED TO	14 1564.00 (4050.74)	1 3400. (96.28)	8700. (246.36)	11777. (333.48)	20620. (583.89)	37926. (1073.94)	67166. (1901.93)
ROUTED TO	15 1564.00 (4050.74)	1 3400. (96.28)	8700. (246.36)	11636. (329.49)	20384. (577.21)	37673. (1060.78)	65888. (1865.75)
2 COMBINED	15 2528.00 (6547.49)	1 15804. (447.53)	33387. (945.41)	41208. (1166.88)	54138. (1533.01)	82157. (2326.44)	108878. (3083.09)
ROUTED TO	18 2528.00 (6547.49)	1 14896. (421.82)	31591. (894.56)	38906. (1101.68)	51612. (1461.50)	78794. (2231.20)	106408. (3013.15)
HYDROGRAPH AT	16 191.00 (494.69)	1 9966. (282.19)	19931. (564.38)	24914. (705.48)	29897. (846.58)	39862. (1126.77)	49828. (1410.96)
ROUTED TO	18 191.00 (494.69)	1 9363. (265.12)	18725. (530.24)	23406. (662.80)	28088. (795.36)	37450. (1060.46)	46813. (1325.59)
2 COMBINED	18 2719.00 (7042.18)	1 14970. (423.90)	31738. (898.73)	39099. (1107.15)	51844. (1468.05)	79103. (2239.94)	107170. (3034.71)
HYDROGRAPH AT	17 201.00 (520.59)	1 13453. (330.94)	26906. (761.88)	33632. (952.35)	40358. (1142.82)	53811. (1523.76)	67264. (1904.70)
ROUTED TO	17 201.00 (520.59)	1 2812. (79.63)	4403. (124.68)	9412. (266.51)	14557. (412.20)	23040. (652.41)	31912. (903.66)
ROUTED TO	18 201.00 (520.59)	1 2690. (76.18)	3678. (104.16)	6664. (188.71)	9981. (282.63)	16287. (461.21)	22844. (646.88)
2 COMBINED	18 2920.00 (7562.77)	1 16994. (481.21)	35094. (993.75)	42499. (1203.42)	55244. (1564.33)	82579. (2338.39)	112189. (3176.83)
HYDROGRAPH AT	18 19.00 (49.21)	1 797. (22.57)	1594. (45.14)	1993. (56.43)	2391. (67.71)	3188. (90.28)	3985. (112.85)
2 COMBINED	18 2939.00 (7611.98)	1 17029. (482.22)	35162. (995.07)	42587. (1205.94)	55351. (1567.35)	82728. (2342.61)	112414. (3183.22)
ROUTED TO	21 2939.00 (7611.98)	1 16550. (468.66)	34119. (966.16)	41239. (1167.75)	53792. (1533.22)	81030. (2294.52)	110244. (3121.77)

McFARLAND-JOHNSON ENGINEERS, INC.

HYDROGRAPH AT	19	98.00 (253.82)	1	6003.	12125.	15156.	18188.	24250.	30313.
				(171.07)(	343.35)(	429.18)(	515.02)(	686.09)(	858.37)(
ROUTED TO	21	98.00 (253.82)	1	3527.	7055.	8819.	10582.	14110.	17637.
				(99.89)(	199.77)(	249.71)(	299.66)(	399.54)(	499.43)(
2 COMBINED	21	3037.00 (7855.79)	1	16008.	34229.	41382.	53965.	81271.	110560.
				(470.29)(	909.27)(	1171.82)(	1528.11)(	2301.35)(	3130.72)(
HYDROGRAPH AT	20	74.00 (191.00)	1	10683.	21366.	26707.	32049.	42732.	53415.
				(302.51)(	605.01)(	750.27)(	907.52)(	1210.03)(	1512.53)(
ROUTED TO	20	74.00 (191.00)	1	188.	379.	484.	584.	841.	1233.
				(5.34)(	10.74)(	13.09)(	16.64)(	23.80)(	34.92)(
ROUTED TO	21	74.00 (191.00)	1	187.	370.	479.	582.	824.	1207.
				(5.29)(	10.64)(	13.56)(	16.48)(	23.34)(	34.18)(
2 COMBINED	21	3111.00 (8057.45)	1	16782.	34575.	41825.	54502.	82002.	111010.
				(475.22)(	979.06)(	1184.36)(	1543.34)(	2322.03)(	3160.45)(
HYDROGRAPH AT	21	27.00 (69.93)	1	1805.	3611.	4514.	5416.	7222.	9027.
				(51.12)(	102.25)(	127.81)(	153.37)(	204.49)(	255.62)(
2 COMBINED	21	3138.00 (8127.38)	1	16807.	34623.	41888.	54578.	82107.	111748.
				(475.93)(	980.41)(	1186.13)(	1545.46)(	2325.00)(	3164.34)(
ROUTED TO	22	3138.00 (8127.38)	1	16665.	34374.	41500.	54199.	81546.	111208.
				(471.90)(	973.36)(	1175.32)(	1534.74)(	2309.13)(	3149.07)(
HYDROGRAPH AT	22	98.00 (253.82)	1	8894.	17788.	22235.	26683.	35577.	44471.
				(251.86)(	503.71)(	629.64)(	755.57)(	1007.42)(	1259.28)(
2 COMBINED	22	3236.00 (8381.20)	1	16705.	34454.	41606.	54324.	81713.	111438.
				(473.03)(	975.62)(	1178.14)(	1536.29)(	2313.85)(	3155.57)(
ROUTED TO	22	3236.00 (8381.20)	1	16236.	33608.	41033.	53595.	81106.	109132.
				(459.75)(	951.07)(	1161.92)(	1517.65)(	2296.60)(	3090.27)(

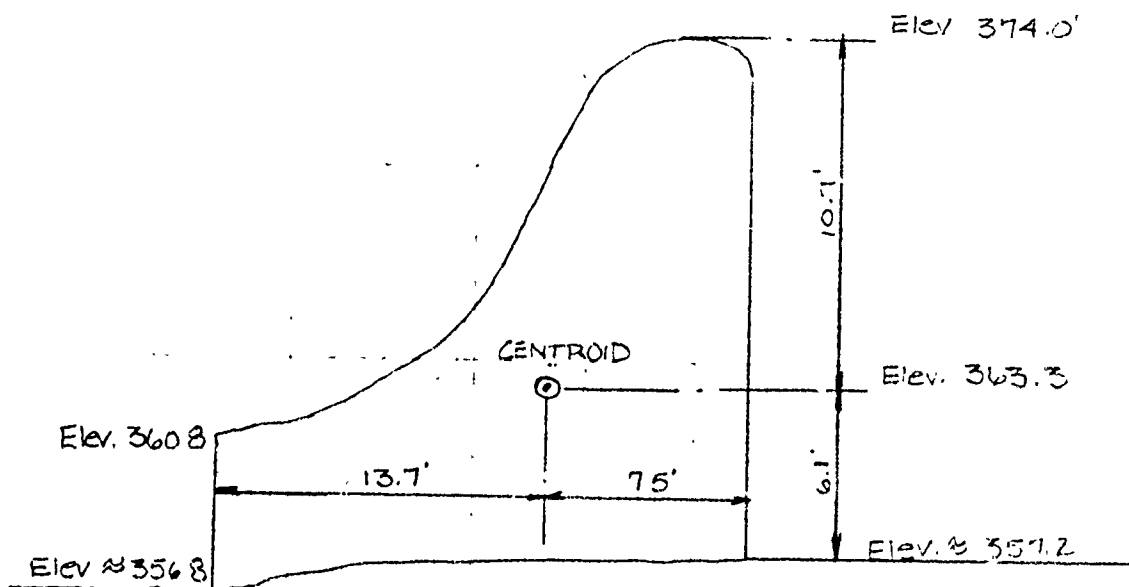


APPENDIX D

STRUCTURAL STABILITY ANALYSIS

LOCKE 24 Stability Analysis

20:0-D1



- ① Determine Weight of Masonry Dam

$$\begin{aligned}
 W_d &= (\text{Area})(150 \text{ pcf}) \\
 &= (204 \text{ sf})(150 \text{ pcf}) \\
 &= 30600 \text{ lbs/lin ft} \\
 &= 30.6 \text{ Kips/lin. ft.}
 \end{aligned}$$

- ② Determine Water Force for Following Conditions

A. Upstream

1. Normal Pool	Elev. 374.0
2 1/2 DMF	Elev. 381.45
3. PMF	Elev. 386.95

Locke 24
Stability Analysis

page 22

B. Downstream

- | | |
|-----------------------------|-------------|
| 1. Low Tailwater | Elev. 363.0 |
| 2. High Tailwater of Record | Elev. 372.5 |

A₁. Upstream Normal Pool

$$\begin{aligned}
 P_{\text{UWP}} &= \frac{1}{2} \gamma_w h^2 \\
 &= \frac{1}{2} (62.4) (16.8)^2 \\
 &= 8806 \text{ lbs/lin.ft} \\
 &= 8.81 \text{ Kips/lin.ft}
 \end{aligned}$$

Resultant Acts 5.6' Above Base

A₂. Upstream 1/2 PMF

$$\begin{aligned}
 P'_{\text{U}1/2\text{PMF}} &= \frac{1}{2} (62.4) (24.25)^2 - \frac{1}{2} (62.4) (7.45)^2 \\
 &= 18348 - 1732 \\
 &= 16616 \text{ lbs/lin.ft.} \\
 &= 16.62 \text{ Kips/lin.ft}
 \end{aligned}$$

Location of Resultant

$$\begin{aligned}
 \bar{y} [(16.8)(7.45) + \frac{1}{2}(16.8)(16.8)] &= (8.4)(16.8)(7.45) + (5.6) \frac{1}{2}(16.8)(16.8) \\
 \bar{y} (125.16 + 141.12) &= 1051.34 + 790.27 \\
 \bar{y} (266.28) &= 1841.61 \\
 \bar{y} &= 6.92' \text{ Above Base}
 \end{aligned}$$

Locke 24
Stability Analysis

page - D3

A₃ Upstream Full PMF

$$\begin{aligned} P_{UPMF} &= \left(\frac{1}{2}\right)(62.4)(29.75)^2 - \left(\frac{1}{2}\right)(62.4)(12.95)^2 \\ &= 27614 - 5232 \\ &= 22382 \text{ lbs. / lin. ft.} \\ &= 22.38 \text{ Kips / lin ft.} \end{aligned}$$

Location of Resultant

$$\begin{aligned} \bar{y} &= \left[(16.8)(12.95) + \frac{1}{2}(16.8)(16.8) \right] \cdot (8.4)(16.8)(12.95) + (5.6)\left(\frac{1}{2}\right)(16.3)(16.8) \\ \bar{y} &= (217.56 + 141.12) \cdot 1827.50 + 790.27 \\ \bar{y} &= (358.68) \cdot 2617.77 \\ \bar{y} &= 7.30' \text{ Above Base} \end{aligned}$$

B₁ Downstream Low Tailwater

$$\begin{aligned} P_{DLT} &= \frac{1}{2}(62.4)(6.20)^2 \\ &= 1199 \text{ lbs. / lin. ft.} \\ &= 1.20 \text{ Kips / lin ft.} \end{aligned}$$

Resultant Acts 2.07' Above Base

B₂ Downstream High Tailwater

$$\begin{aligned} P_{DHT} &= \frac{1}{2}(62.4)(15.7)^2 \\ &= 7690 \text{ lbs. / lin. ft.} \\ &= 7.69 \text{ Kips / lin ft.} \end{aligned}$$

Resultant Acts 5.23' Above Base

LOOSE 24
Stability Analysis

pg. 3 D4

③ Determine Ice Load

$$P_{I_{MAX}} = \frac{(5000 \text{ psf})(2' \text{ deep})}{1000}$$
$$= 10 \text{ Kips/lin ft.}$$

Resultant Acts 15.8' Above Base

④ Determine Upstream Siltation Force

Assume Siltation to Elev. 366 (Gate Crest)

$$P_s = \frac{1}{2} (85 \text{ psf}) (366.0 - 357.2)^2$$
$$= 3291.2 \text{ lbs/lin. ft.}$$
$$= 3.29 \text{ Kips/lin ft}$$

Resultant Acts 2.93' Above Base

⑤ Determine Hydrodynamic Pressure, Force, and Moment

$$P_e = C \lambda \gamma_w \sqrt{z h}$$

$$\text{for } z/h = 1 \quad C = .73$$

$$\text{for zone 2} \quad \lambda = .05$$

$$P_e = \frac{(.73)(.05)(62.4)(16.8)}{1000} = .0383 \text{ Ksf / lin ft}$$

(for Normal Pool)

Locke 24
Stability Analysis

Page D5

$$\begin{aligned} V_c &= .726 P_c Z \\ &= (.726)(.0383)(16.8) \\ &= .47 \text{ Kips / lin. ft.} \\ &\quad (\text{for Normal Pool}) \end{aligned}$$

$$\begin{aligned} M_c &= .299 P_c Z^2 \\ &= (.299)(.0383)(16.8)^2 \\ &= 3.23 \text{ Kip-ft / lin. ft.} \\ &\quad (\text{for Normal Pool}) \end{aligned}$$

For 1/2 PMF:

$$P_c = \frac{(.73)(.05)(62.4)(24.25)}{1000} = .0552 \text{ Ksf / lin. ft.}$$

$$V_c = (.726)(.0552)(24.25) = .97 \text{ Kips / lin. ft.}$$

$$M_c = (.299)(.0552)(24.25)^2 = 9.71 \text{ Kip-ft / lin. ft.}$$

For Full PMF:

$$P_c = \frac{(.73)(.05)(62.4)(29.75)}{1000} = .0678 \text{ Ksf / lin. ft.}$$

$$V_c = (.726)(.0678)(29.75) = 1.46 \text{ Kips / lin. ft.}$$

$$M_c = (.299)(.0678)(29.75)^2 = 17.94 \text{ Kip-ft / lin. ft.}$$

Locke 24
Stability Analysis

DSC-26

- ⑥ Determine Inertia Force Due to Seismic

$$\begin{aligned} P_c &= \lambda W_c \\ &= (.05)(30.6) \\ &= 1.53 \text{ Kips/lin.ft.} \end{aligned}$$

Resultant Acts Through Centroid,
6.1' Above Base

- ⑦ Determine Full and $\frac{1}{2}$ Uplift Pressures at Normal Pool,
 $\frac{1}{2}$ PMF, and Full PMF

At Normal Pool:

$$\begin{aligned} P_{u, \text{Full}} &= (62.4)(21.2)(365 - 356.8) + \frac{1}{2}(62.4)(21.2) \\ &\quad \left[(374 - 357.2) - (365 - 356.8) \right] \\ &= 10847 + 5688 \\ &= 16535 \text{ lbs/lin.ft.} \\ &= 16.54 \text{ Kips/lin.ft.} \end{aligned}$$

$$\bar{X} (10847 + 5688) = (10.6)(10847) + (14.1)(5688)$$

$$\bar{X} 16535 = 195179$$

$$\bar{X} = 11.8' \text{ From Toe}$$

At $\frac{1}{2}$ PMF:

$$\begin{aligned} P_{u, \text{Full}} &= (62.4)(21.2)(372.5 - 356.8) + \frac{1}{2}(62.4)(21.2) \\ &\quad \left[24.25 - (372.5 - 356.8) \right] \\ &= 20769 + 5655 \\ &= 26424 \text{ lbs/lin.ft.} \\ &= 26.42 \text{ Kips/lin.ft.} \end{aligned}$$

Locke 24
Stability Analysis

Page - D7

$$P_{u\frac{1}{2}} = 13.21 \text{ Kips/lin ft.}$$

$$\bar{X} (20769 + 5655) = (10.6)(20769) + (14.1)(5655)$$

$$\bar{X} 26424 = 299887$$

$$\bar{X} = 11.35' \text{ From Toe}$$

At Full PMF:

$$P_{u\text{ Full}} = 20769 + \frac{1}{2}(62.4)(21.2)(29.75 - 15.7)$$

$$= 20769 + 9293$$

$$= 30062 \text{ lbs./lin. ft.}$$

$$= 30.06 \text{ Kips/lin. ft.}$$

$$P_{u\frac{1}{2}} = 15.03 \text{ Kips/lin. ft.}$$

$$\bar{X} (20769 + 9293) = (10.6)(20769) + (14.1)(9293)$$

$$\bar{X} 30062 = 351183$$

$$\bar{X} = 11.68' \text{ From Toe}$$

Locke 24
Stability Analysis

page - 23

FORCE and MOMENT

LOADING		FORCE (KIPS)	MOMENT ARM (FT.)	MOMENT ABOUT TOE (KIP-FT)
Weight of Dam	W_c	30.6	13.7	+419.22
Water Forces				
Downstream				
Low	P_{DLT}	1.20	2.07	+2.48
High	P_{DHT}	7.69	5.23	+40.22
Upstream				
Normal	P_{UNP}	8.81	-5.6	-49.34
1/2 PMF	$P_{1/2 PMF}$	16.62	-6.92	-115.01
PMF	P_{UPMF}	22.38	-7.30	-163.37
Ice	P_{IMAX}	10.0	-15.8	-158.00
Silt	P_s	3.29	-2.93	-9.64
Hydrodynamic Loading (V_c, M_c)				
Normal		.97	-6.87	-3.23
1/2 PMF		.97	-10.01	-9.71
PMF		1.46	-12.29	-17.94
Seismic Inertia Force	P_c	1.53	-6.1	-9.33
Hydrostatic Uplift	(P_u)			
Normal Pool				
Full Uplift		16.54	-11.8	-195.17
1/2 Uplift		8.27	-11.8	-97.59
1/2 PMF				
Full Uplift		26.42	-11.35	-299.87
1/2 Uplift		13.21	-11.35	-149.93
PMF				
Full Uplift		30.06	-11.68	-351.10
1/2 Uplift		15.03	-11.68	-175.55

Locke 24
Stability Analysis

page D9

STABILITY CALCULATIONS

① Normal Pool, 1/2 Uplift, No Ice, No Seismic

A. OVERTURNING STABILITY

$$\text{Resisting Moments} = 419.22 + 2.48 = 421.7$$

$$\text{Overturning Moments} = -49.34 - 9.64 - 97.59 = 156.57$$

$$F.S. = \frac{421.70}{156.57} = 2.69 \text{ (with respect to overturning)}$$

$$\bar{x} = \frac{421.7 - 156.27}{30.6 - 8.27} = 11.87$$

$$e = B/2 - \bar{x} = \frac{21.2}{2} - 11.87 = -1.27$$

$$\frac{B}{6} = \frac{21.6}{6} = 3.53 > 1.27 \text{ (Resultant within Middle 1/3)}$$

B. SLIDING STABILITY

$$F.S. = \frac{(W_c - P_u) \tan \phi}{\sum F_{\text{horizontal}}}$$

$\sum F_{\text{horizontal}}$

$$= \frac{30.6 - 8.27 \tan 35^\circ}{1.20 - 8.81 - 3.29} = \frac{(22.33)(.70)}{10.9}$$

$$= 1.43$$

② Normal Pool, Full Uplift, No Ice, No Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 2.48 = 421.7$$

$$\text{Overturning Moments} = -49.34 - 9.64 - 195.17 = 254.15$$

$$F.S. = \frac{421.7}{254.15} = 1.66$$

Locke 24
Stability Analysis

$$\bar{x} = \frac{421.7 - 254.15}{30.6 - 16.54} = 11.92$$

$$e = 10.6 - 11.92 = 1.32 < 3.53 \text{ (Resultant within Middle } 1/3)$$

B. SLIDING

$$F.S. = \frac{(30.6 - 16.54)(1.70)}{1.20 - 8.81 - 3.29} = .90$$

③ Normal Pool, $1/2$ PMF, Ice, No Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 2.48 = 421.7$$

$$\text{Overturning Moments} = -49.34 - 158.0 - 9.64 - 97.59 = -314.57$$

$$F.S. = \frac{421.7}{314.57} = 1.34$$

$$\bar{x} = \frac{421.7 - 314.57}{30.6 - 8.27} = 4.80$$

$$e = 10.6 - 4.80 = 5.8 > 3.53 \text{ (Resultant outside Middle } 1/3)$$

B. SLIDING

$$F.S. = \frac{(30.6 - 8.27)(1.70)}{1.20 - 8.81 - 10.0 - 3.29} = .75$$

④ Normal Pool, Full Uplift, Ice, No Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 2.48 = 421.7$$

$$\text{Overturning Moments} = -49.34 - 158.0 - 9.64 - 195.17 = -412.15$$

Locke Z4
Stability Analysis

page 211

$$F.S. = \frac{421.7}{412.15} = 1.02$$

$$\bar{x} = \frac{421.7 - 412.15}{30.6 - 16.54} = .68$$

$$e = 10.6 - 6.8 = 9.92 > 3.53 \text{ (Resultant outside Middle } \frac{1}{3} \text{)}$$

B. SLIDING

$$F.S. = \frac{(30.6 - 16.54)(.70)}{1.20 - 8.81 - 10.0 - 3.29} = .47$$

⑤ Normal Pool, $\frac{1}{2}$ Uplift, Ice, Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 2.48 = 421.7$$

$$\text{Overturning Moments} = -49.34 - 158.0 - 9.64 - 3.23 - 9.33 - 97.59 \\ = -327.13$$

$$F.S. = \frac{421.7}{327.13} = 1.29$$

$$\bar{x} = \frac{421.7 - 327.13}{30.6 - 8.27} = 4.24$$

$$e = 10.6 - 4.24 = 6.36 > 3.53 \text{ (Resultant outside Middle } \frac{1}{3} \text{)}$$

B. SLIDING

$$F.S. = \frac{(30.6 - 8.27)(.70)}{1.20 - 8.81 - 10.0 - 3.29 - .47 - 1.53} = .68$$

Locke 24
Stability Analysis

page- D12

⑥ Normal Pool, Full Uplift, Ice, Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 2.48 = 421.7$$

$$\text{Overturning Moments} = -49.34 - 158.0 - 9.64 - 3.23 - 9.33 - 195.17 \\ = -424.71$$

$$F.S. = \frac{421.7}{424.71} = .99$$

$$\bar{x} = \frac{421.7 - 424.71}{30.6 - 16.54} = -.21$$

$$e = 10.6 + .21 = 10.81 \text{ (Resultant outside Base)}$$

B. SLIDING

$$F.S. = \frac{(30.6 - 16.54)(.70)}{1.20 - 8.81 - 10.0 - 3.29 - .47 - 1.53} = .43$$

⑦ 1/2 PMF, 1/2 Uplift, No Ice, No Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 40.22 = 459.44$$

$$\text{Overturning Moments} = -115.01 - 9.64 - 149.93 = -274.58$$

$$F.S. = \frac{459.44}{274.58} = 1.67$$

$$\bar{x} = \frac{459.44 - 274.58}{30.6 - 13.21} = 10.63$$

$$e = 10.6 - 10.63 = -.03 < 3.53 \text{ (Resultant Middle 1/3)}$$

Locke 24
Stability Analysis

Page - 13

B. SLIDING

$$F.S. = \frac{(30.6 - 13.21)(1.70)}{7.69 - 16.62 - 3.29} = 1.0$$

⑧ 1/2 PMF, 1/2 Uplift, No Ice, Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 40.22 = 459.44$$

$$\text{Overturning Moments} = -115.01 - 9.64 - 9.71 - 9.33 - 149.93 \\ = 293.62$$

$$F.S. = \frac{459.44}{293.62} = 1.56$$

$$\bar{x} = \frac{459.44 - 293.62}{30.6 - 13.21} = 9.54$$

$$e = 10.6 - 9.54 = 1.06 < 3.53 \text{ (Resultant Middle 1/3)}$$

B. SLIDING

$$F.S. = \frac{(30.6 - 13.21)(1.70)}{7.69 - 16.62 - 3.29 - 9.7 - 1.53} = 83$$

⑨ PMF, 1/2 Uplift, No Ice, No Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 40.22 = 459.44$$

$$\text{Overturning Moments} = -163.37 - 9.64 - 175.55 = 348.56$$

$$F.S. = \frac{459.44}{348.56} = 1.32$$

$$\bar{x} = \frac{459.44 - 348.56}{30.6 - 15.03} = 7.12$$

Locke 24
Stability Analysis

page D14

$$e = 10.6 - 7.12 = 3.48 < 3.53 \text{ (Resultant Middle 1/3)}$$

B. SLIDING

$$F.S. = \frac{(30.6 - 15.03)(.70)}{7.69 - 22.38 - 3.29} = .61$$

(10) PMF, 1/2 Uplift, No Ice, Seismic

A. OVERTURNING

$$\text{Resisting Moments} = 419.22 + 40.22 = 459.44$$

$$\text{Overturning Moments} = -163.37 - 9.64 - 17.94 - 9.33 = -175.55$$

$$= 375.83$$

$$F.S. = \frac{459.44}{375.83} = 1.22$$

$$\bar{x} = \frac{(459.44 - 375.83)(.70)}{30.6 - 15.03} = 5.37$$

$$e = 10.6 - 5.37 = 5.23 > 3.53 \text{ (Resultant outside Middle 1/3)}$$

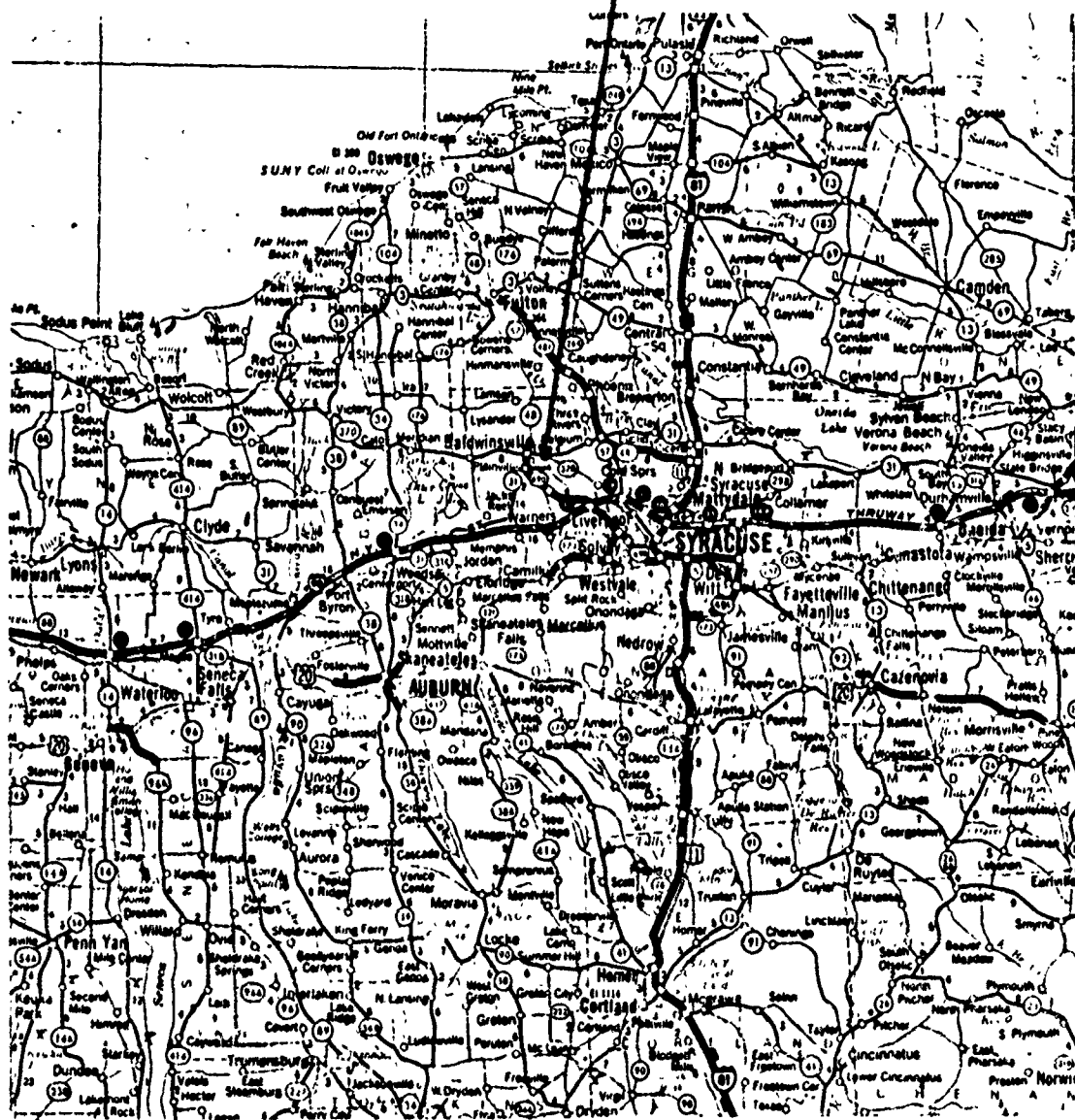
B. SLIDING

$$F.S. = \frac{(30.6 - 15.03)(.70)}{7.69 - 22.38 - 3.29 - 1.46 - 1.53} = .52$$

APPENDIX E

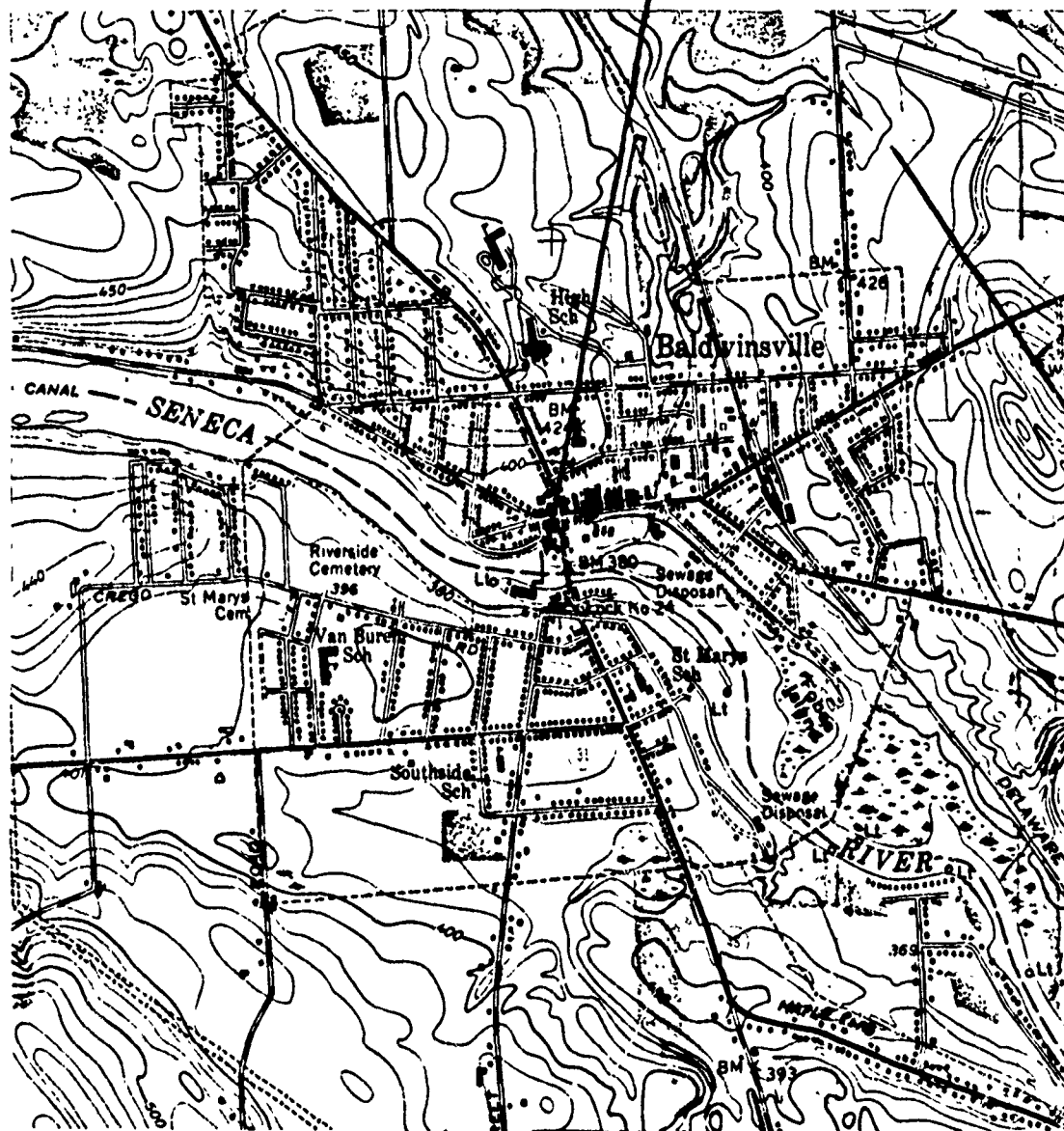
DRAWINGS

DAM SITE

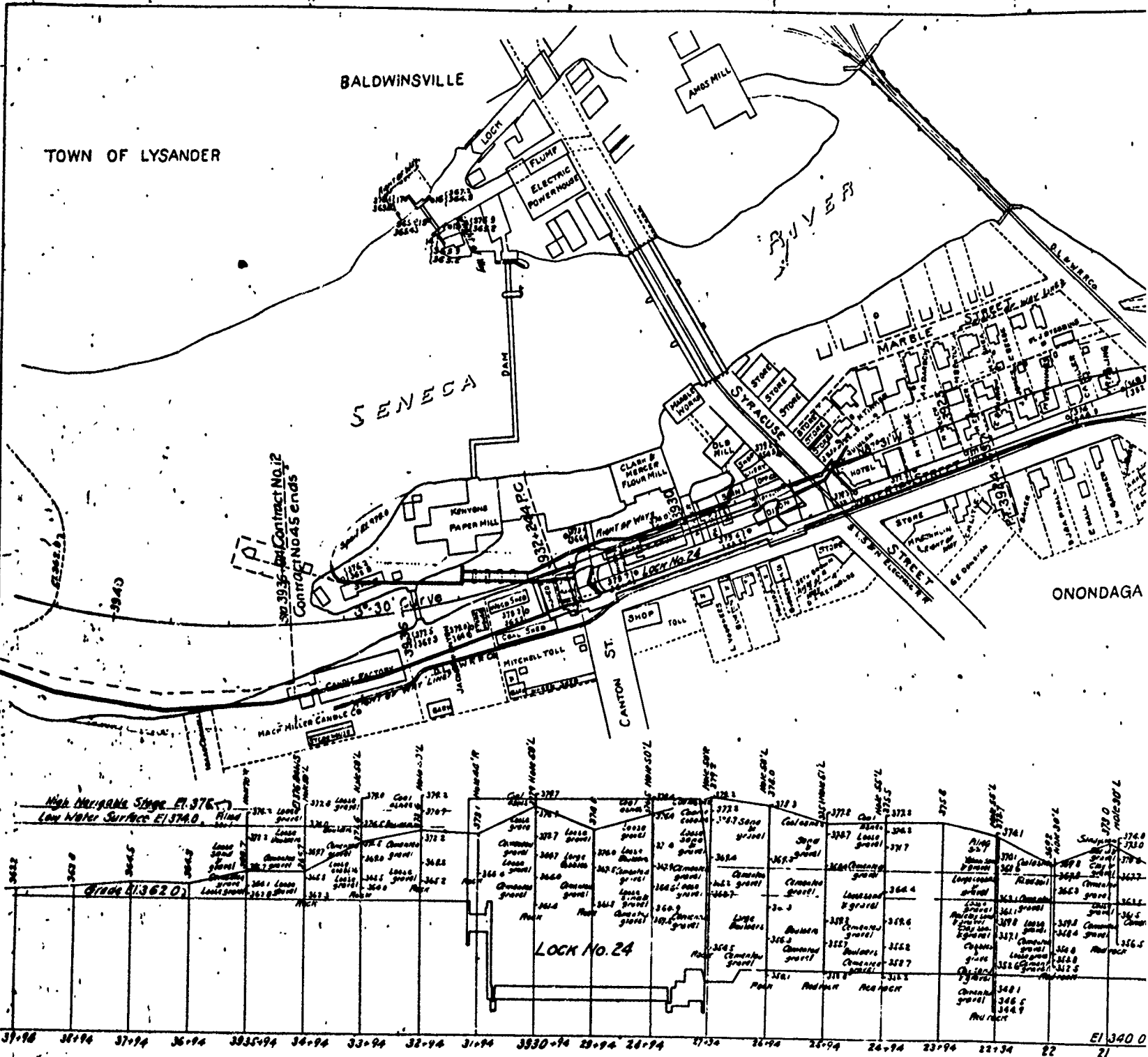


VICINITY MAP
 LOCK 24 ERIE CANAL
 I.D. NO. N.Y. 792

DAM SITE

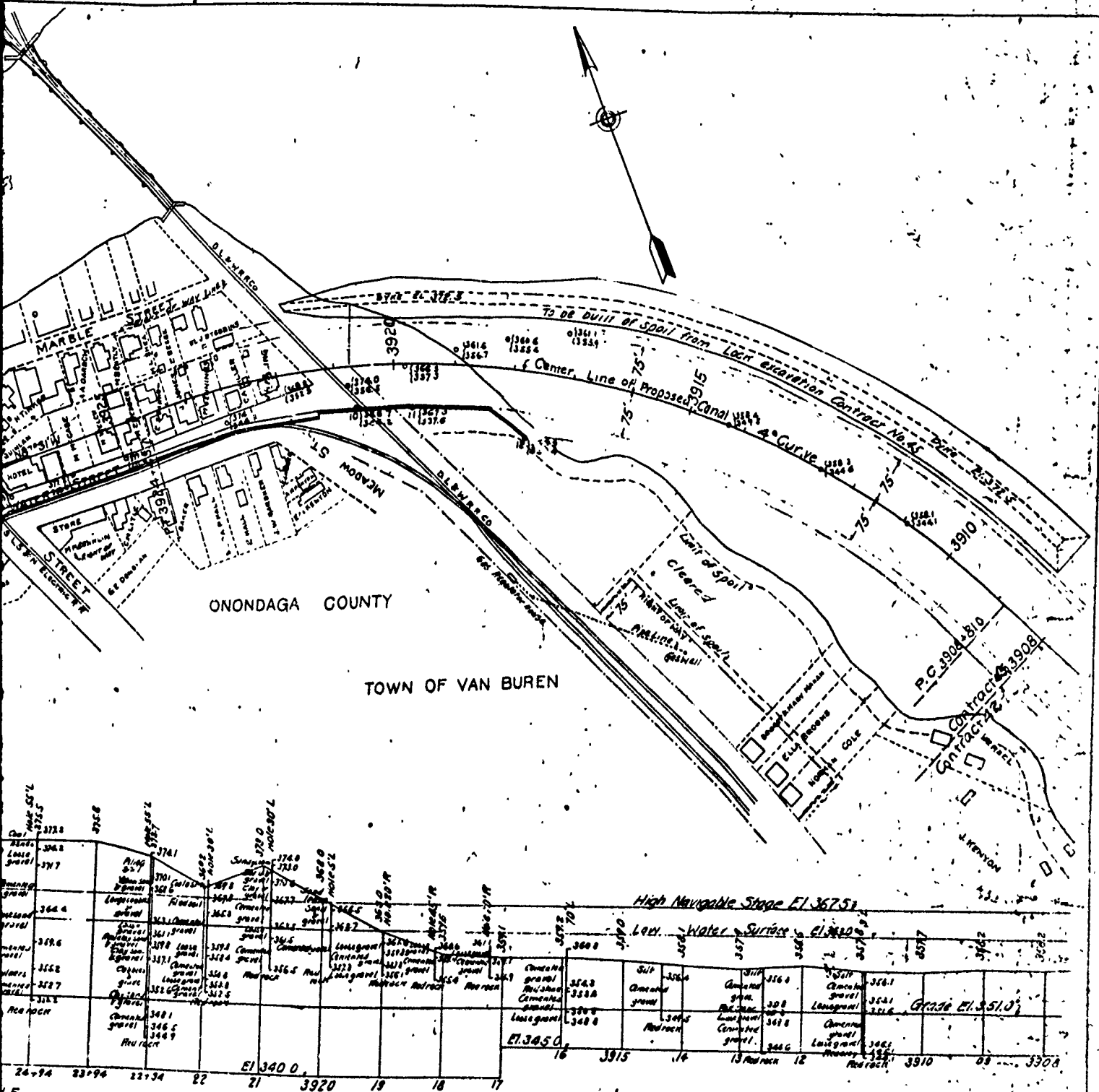


TOPOGRAPHIC MAP
LOCK 24 ERIE CANAL
I.D. NO. N.Y. 792



MADE BY: *[Signature]*
 TRACED BY: *[Signature]*
 CHECKED BY: *[Signature]*
 CHECK BY: *[Signature]*

1



Contract No. 45.

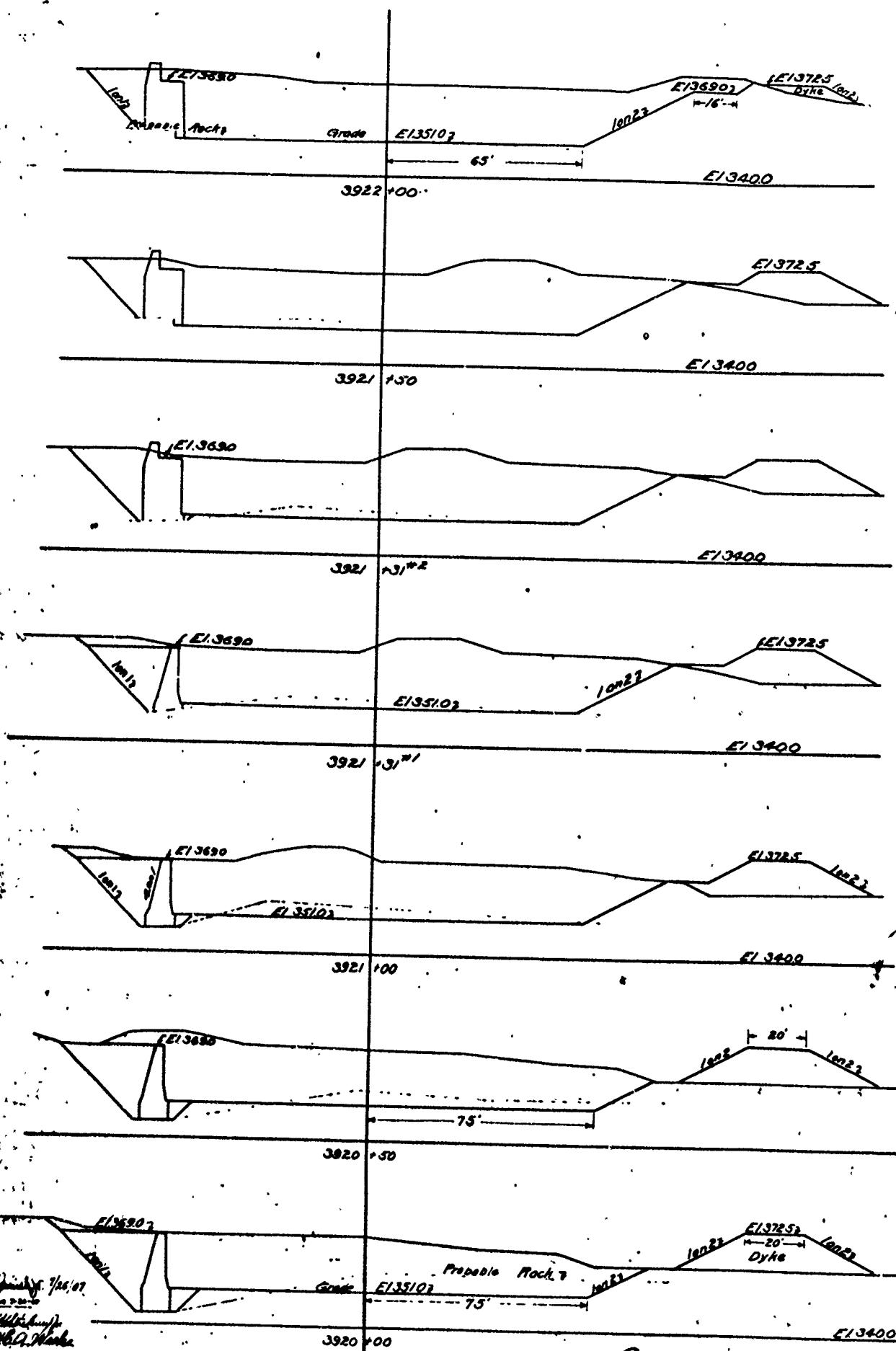
Erie Canal -- Section 6.
For the construction of a dam in the Oneida River at Oughdenoy and of Lock No. 24 and appertaining structures at Baldwinsville

PLAN & PROFILE OF LOCK NO. 24 & APPROACHES

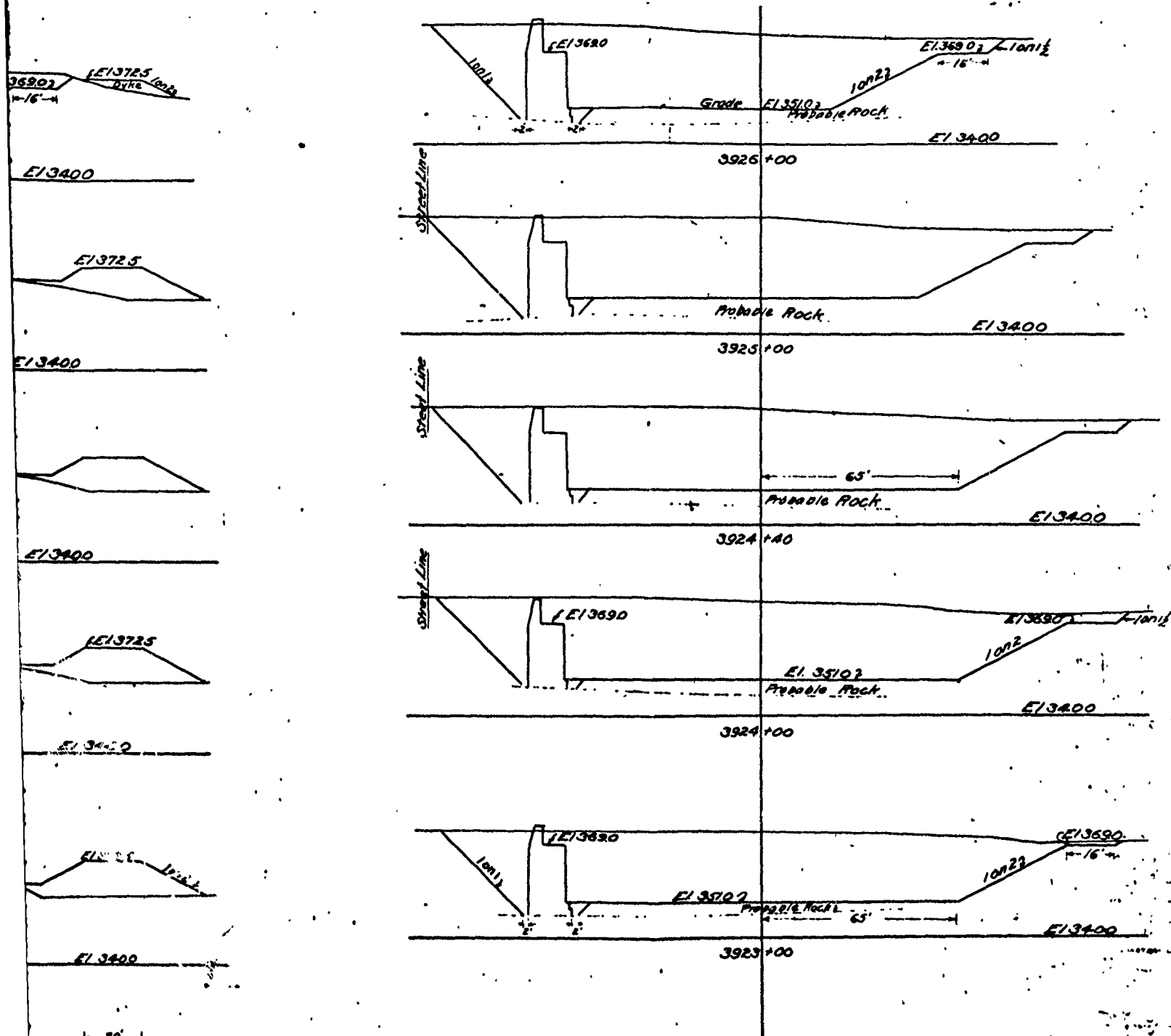
Scales: Hor. 100 feet to the inch
Vert. 1" = 10'

Examined and approved
S. F. Shaw
Superintendent
Nov 27 1907

Examined and approved
W. H. Hill
Assistant Engineer
Jan 22 1908



MADE BY J. J. Smith 7/26/07
 TRACED BY J. J. Smith 7/26/07
 CHECKED BY J. J. Smith 7/26/07
 2nd CHECK BY J. J. Smith 7/26/07



Contract No. 45.

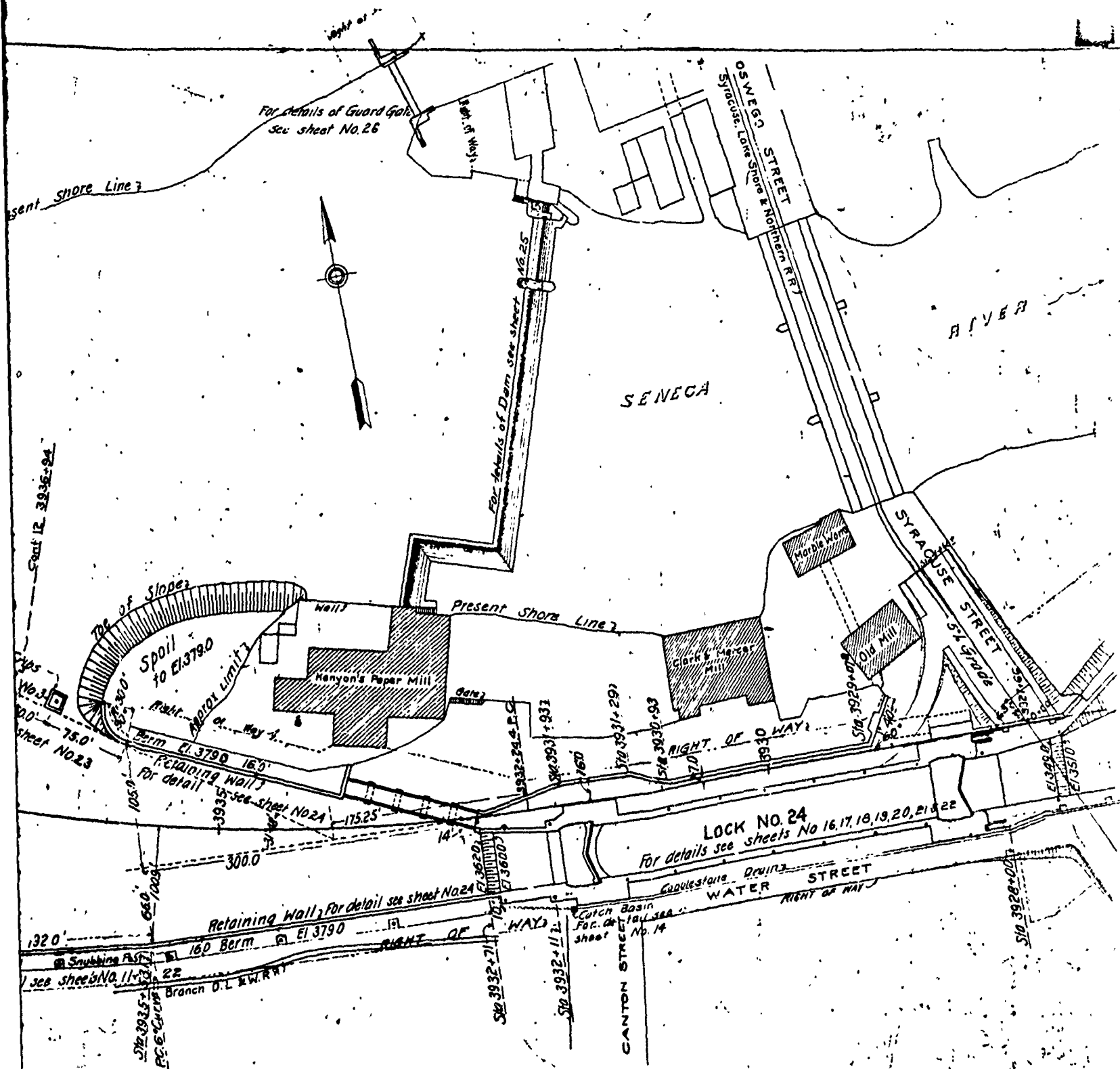
Erie Canal Section 6
 For the construction of a dam in the Oneida River at
 Oughdenoy and of Lock No. 24 and appertaining
 structures at Baldwinsville

CROSS SECTIONS OF LOWER APPROACH
 TO LOCK NO. 24, STA. 3920+00 TO
 STA. 3926+00

Scale: 20 feet to the inch

Examined and approved
S. F. Shockey
 Expert Lock Designer
 Jan. 22. 1907

Examined and approved
W. H. H. 2
 Special Deputy State Engineer
 Jan. 22. 1907



Contract No. 45.

Erie Canal

Section 6.

For the construction of a dam in the Oneida River at Oughdenoy and of Lock No. 24 and appertaining structures at Baldwinsville

DETAILED LOCATION PLAN OF UPPER APPROACH TO LOCK NO. 24

Scale: 50 feet to the inch

Examined and approved

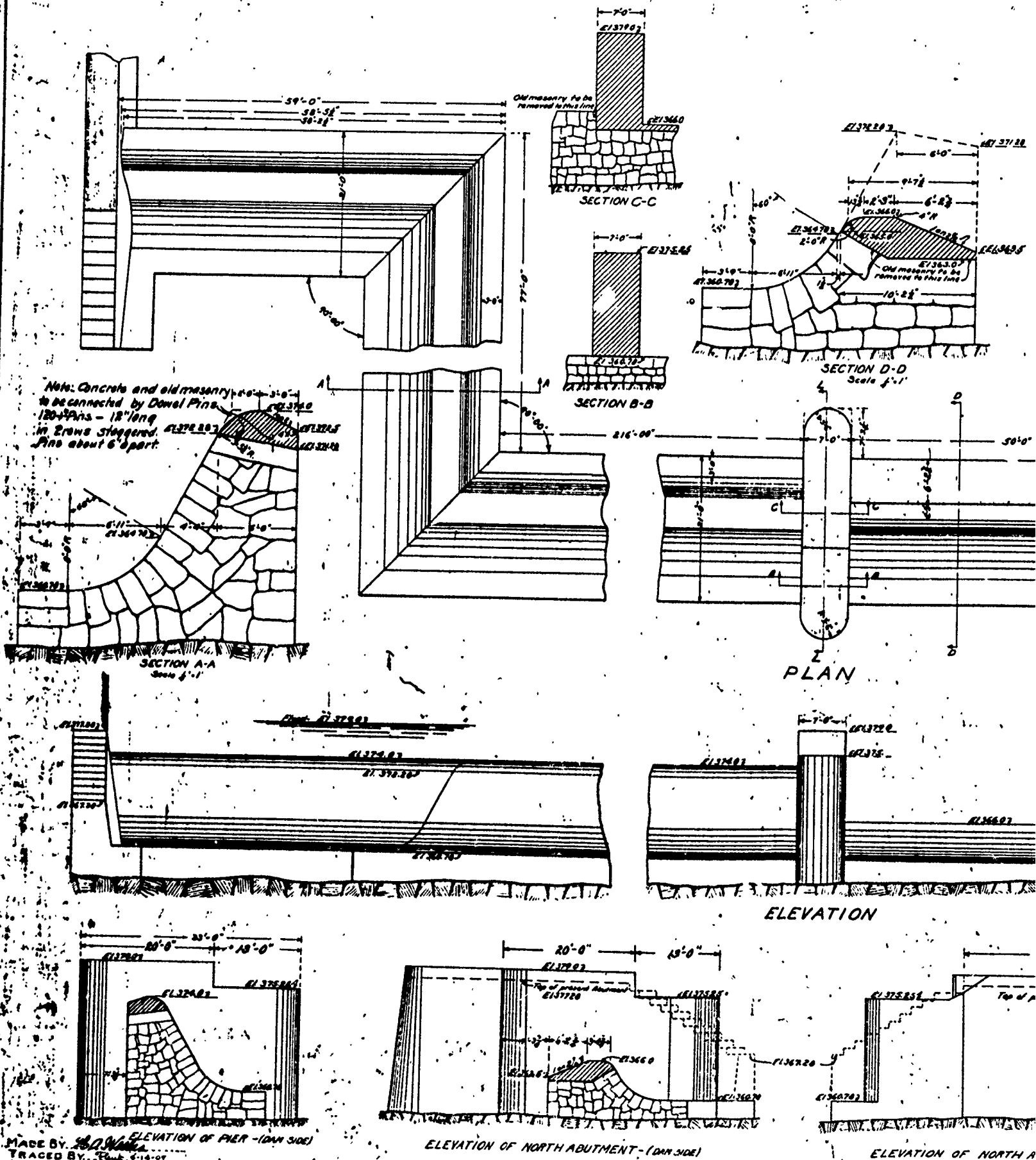
B. F. Shockey
Expert Lock Designer

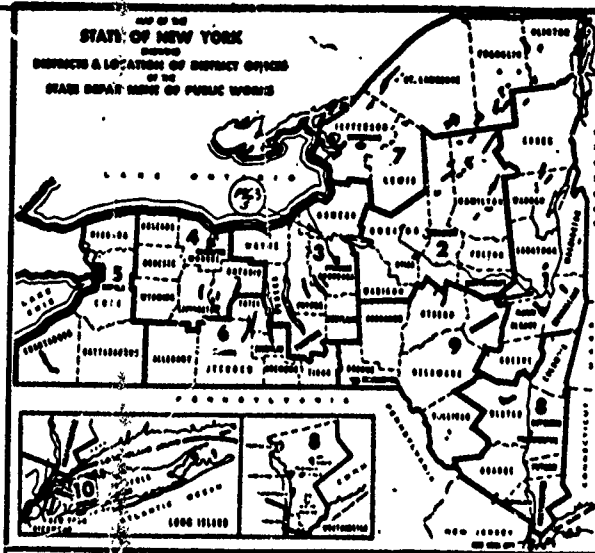
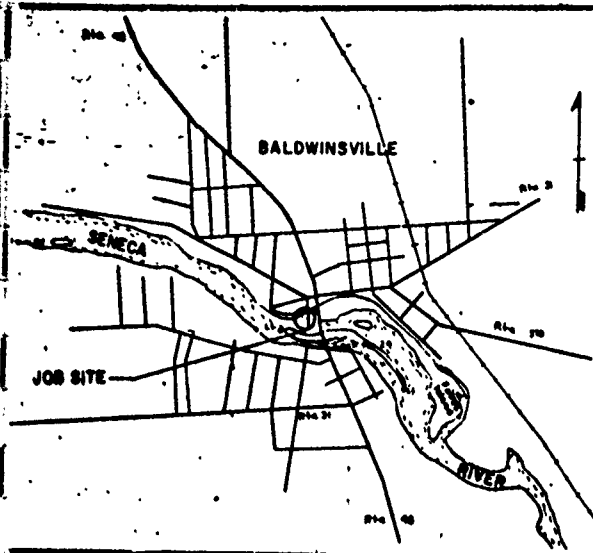
Nov. 27, 1907

Examined and approved

W. H. Miller
Special Deputy State Engineer

Jan 22





2



STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
DIVISION OF CONSTRUCTION
CHAPTER 542, LAWS OF 1939

CONTRACT M 63-5

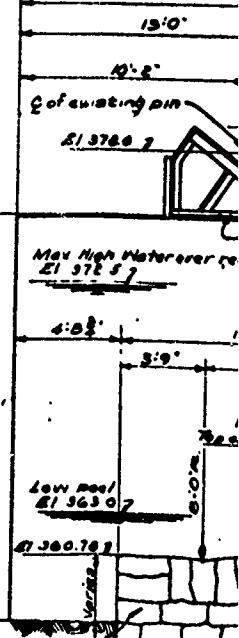
FOR
RECONSTRUCTION OF TAINTOR GATE
BALDWINVILLE DAM
BALDWINVILLE
ONONDAGA COUNTY
NEW YORK

SCALES AS INDICATED
SHEETS 1 TO 5

The provisions of the Public Works
Specifications of January 2, 1962 shall
apply to this contract.

Approved Sept 6 1963
M.A. BEEBEE
M.A. BEEBEE
Deputy Chief Engineer

Approved August 30 1963
C.W. HATHAWAY
C.W. HATHAWAY
Asst. Deputy Chief Engineer (Design)





Note:
For details of catwalk see sheet #5

(Hold these dimensions
in the field unless other-
wise ordered by the
Engineer)

Details of end of new railing
shall be as approved by the
Engineer

Existing needle sill

Proposed catwalk

8 railing and girder

Proposed roller gate

HP 10 beam

30'-0" clear

PLAN OF PROPOSED TAINTOR GATE

Scale 1"=1'-0"

SYMBOLS

- Existing
- Proposed
- Area of concrete to be removed and replaced

Gate in open position

Hoisting Machinery
(Supporting Beams)

End of lifting cable
tower

Existing anchorage
to remain
10'-0"

ITEM 25FG

Bottom edge of
Gate EL 376.0

For details of steel fabric
anchors see detail 0, Sh. 2

Proposed catwalk (See sheet No 5)

EL 3790.2

EL 378.5'-above High Water
(Existing through iron R
to be removed-Item 2/6)

EL 374.0-Low Pool

Top of stem plate

Max. High Water
EL 378.5'

4 Bars @ 14" c/c
Horizontal (vertical
1/4" threaded rod or bolt
See detail A, Sh. 5

6" Con. Typ.

Low Pool
EL 363.0

EL 360.78'

For other dimensions see sheet #2

Bottom Seal

If ordered by the
Engineer concrete sill
shall be repaired-Item 2/7

EL 363.92'

EL 366.05'

Per to be extended
See detail of Pier No 5

Item 5-All loose material
to be removed so concrete
will go to rock

River bottom

Dumped Riv. Rod
and Gravel

EL 359.5' (rock)

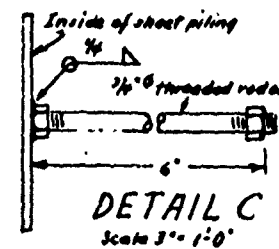
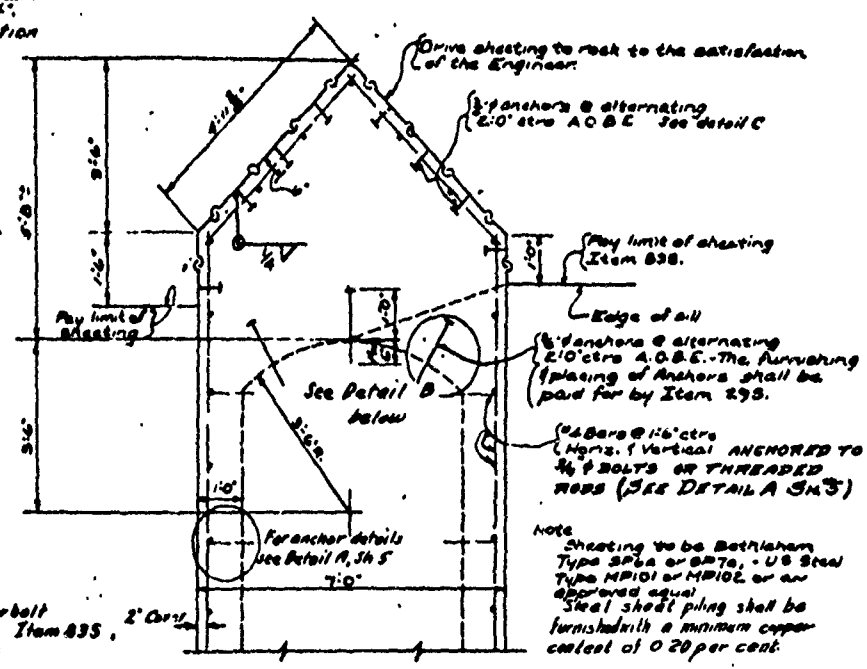
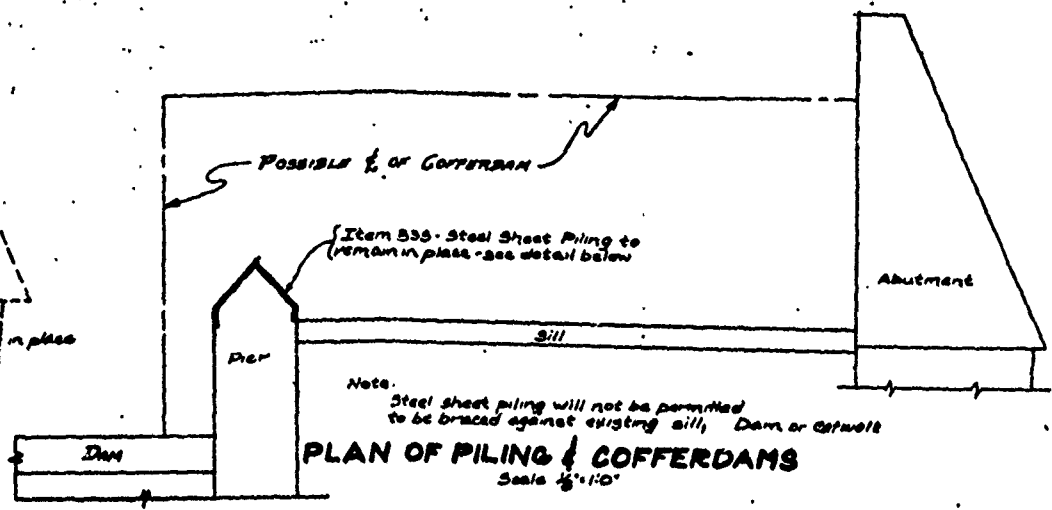
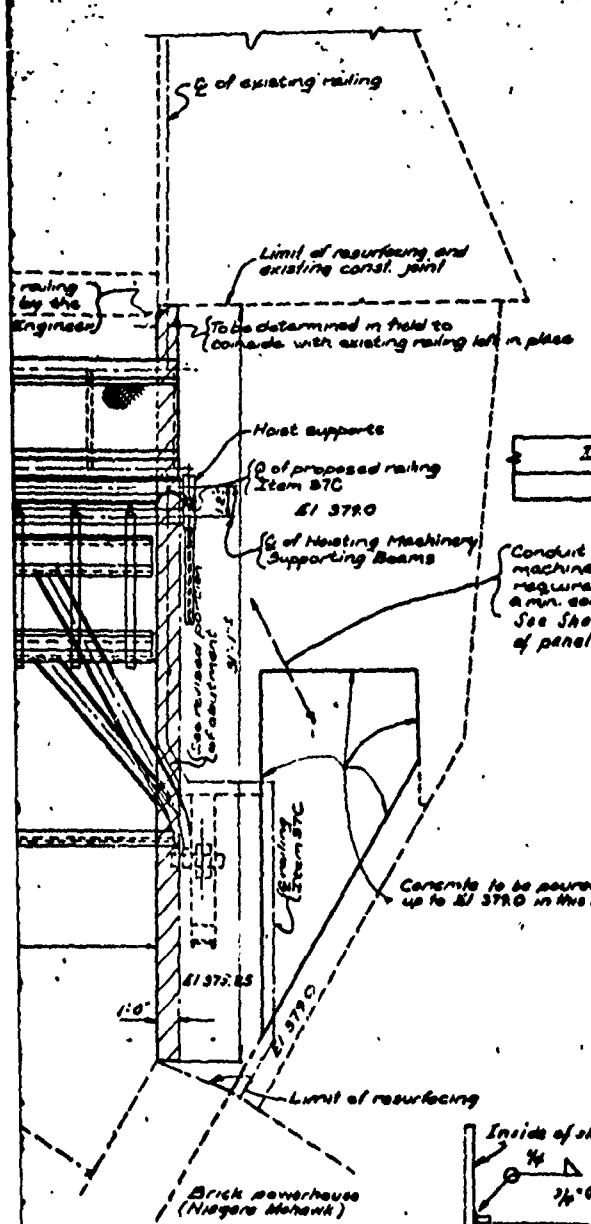
1'-0" of Tremie concrete if
required, A.O.B.E. Tremie

SECTION A-A

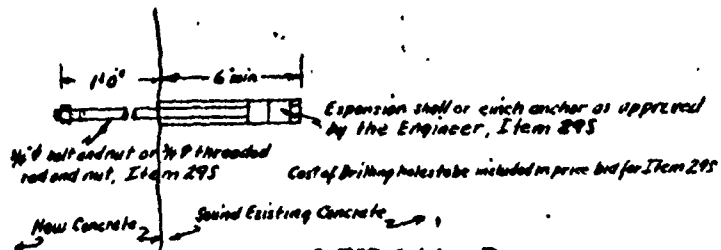
Note:
Elevations are based on C&G

Note:
The
min.
depth
to the
main
On
remov-
are to
the low
water

Ma
Works
shall
Re
All
items
For
Concr
Can
by th
If
plans
dimen
by th
A
The
as ca



DETAIL OF PIER NOSE
Scale 1/2" = 1'-0"

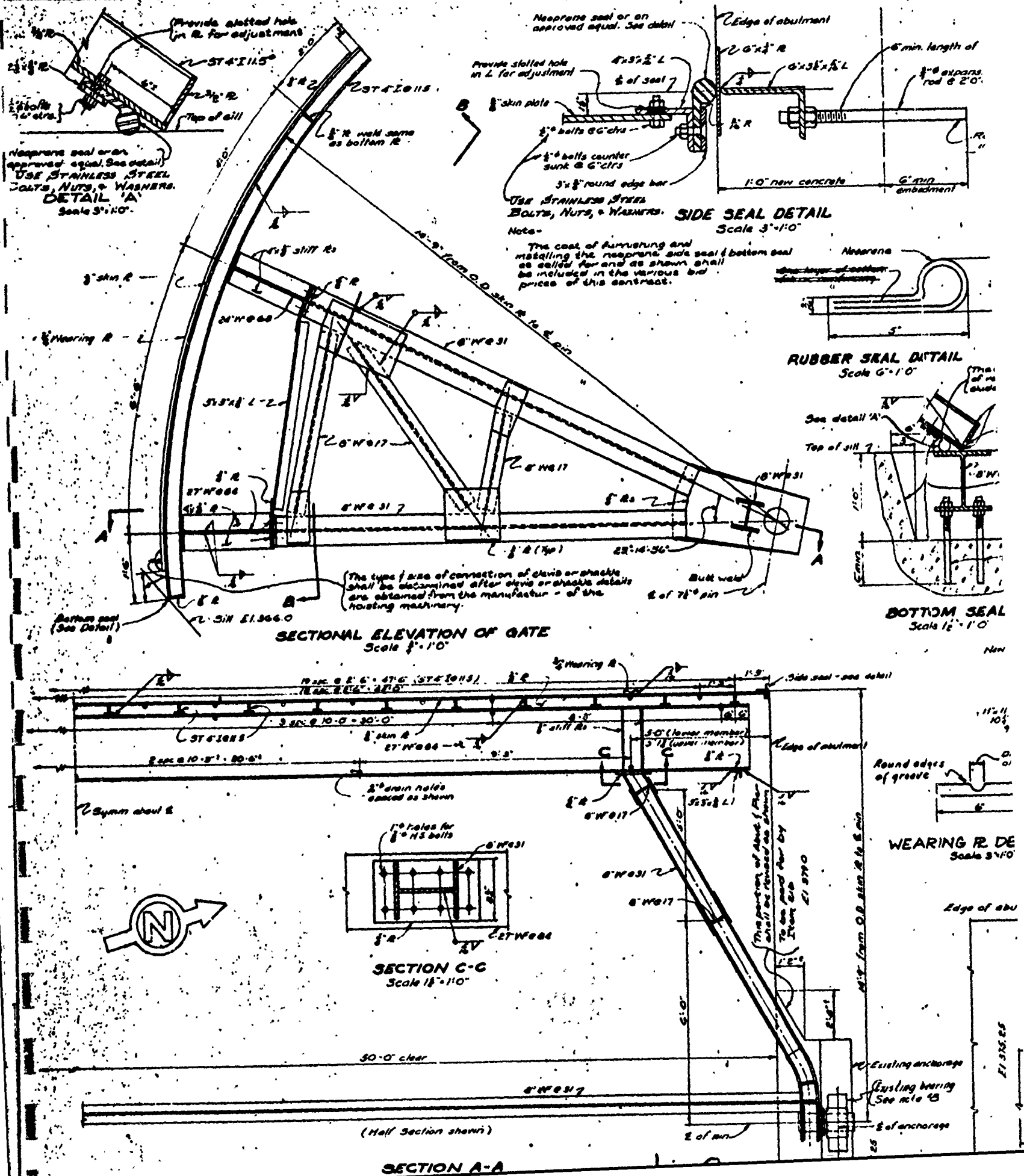


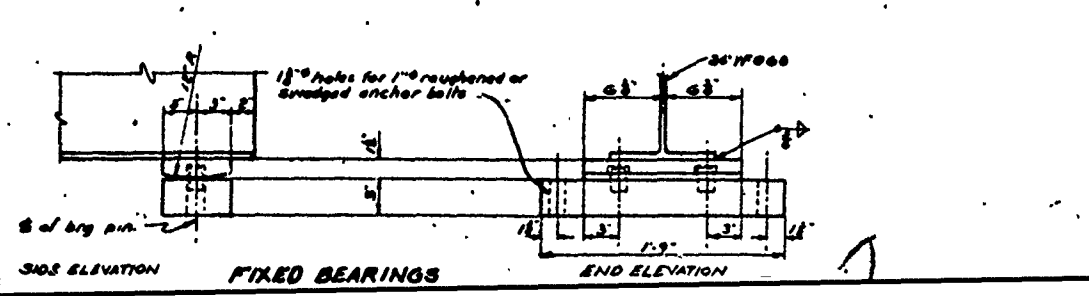
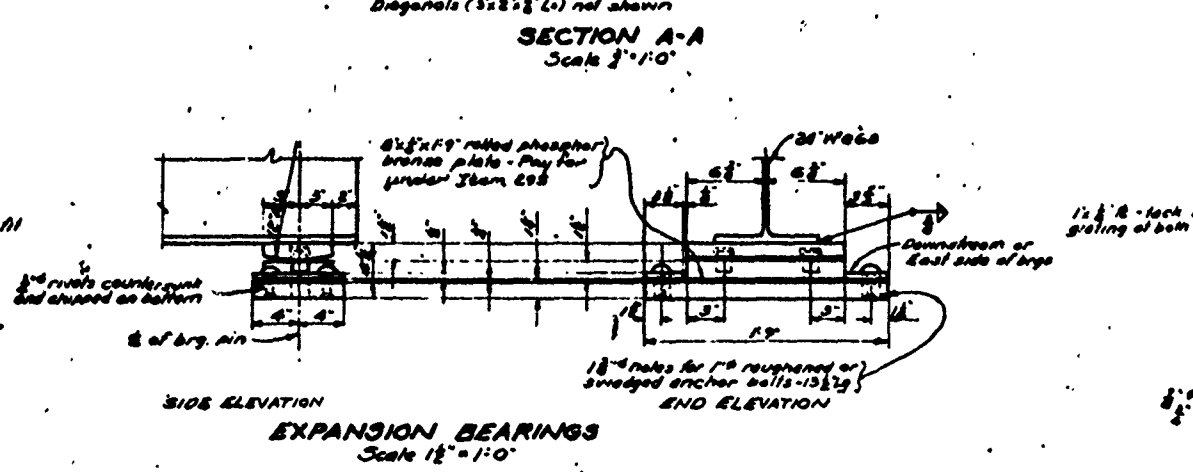
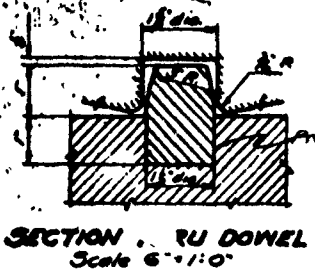
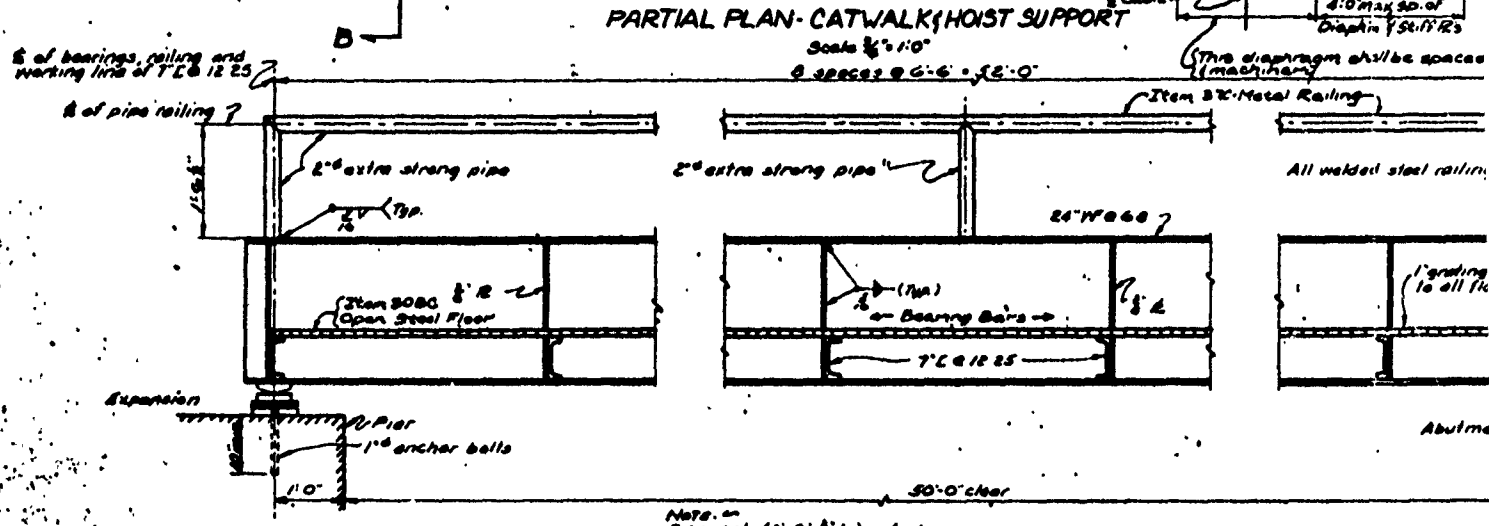
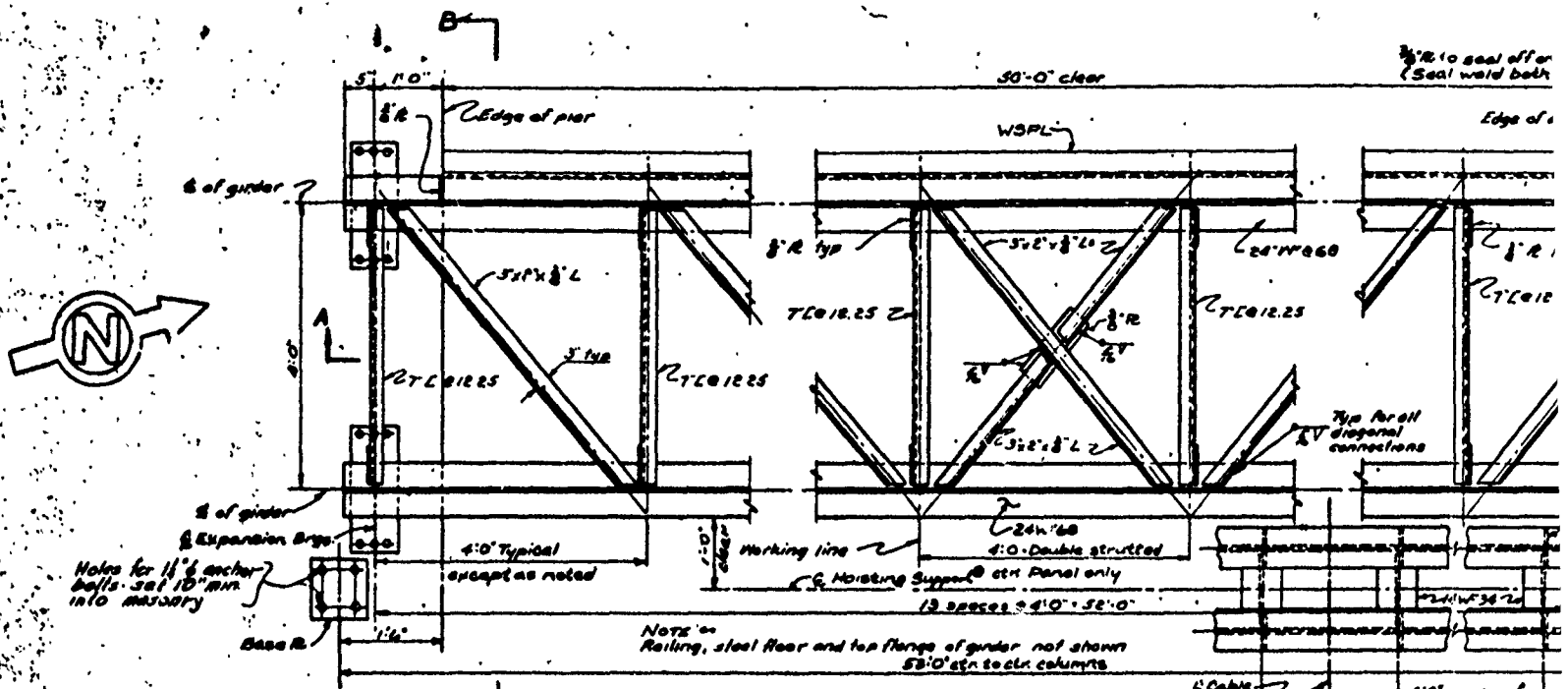
Notes on
The entire horizontal surface of the pier is to be resurfaced four (4) inches min. or to sound concrete (A.O.B.C.) of existing concrete is to be removed and replaced with concrete including steel fabric reinforcement Item 235 up to the elevations shown on the plans.
The horizontal surface of the abutment is to be resurfaced in the same manner as the pier within the limits shown.
One (1) foot min. or to sound concrete (A.O.B.C.) of existing concrete is to be removed from the vertical surfaces of the pier and abutment. These areas are to be replaced with new concrete from the top of the pier and abutment to the top of the existing sill. In the areas beyond the sill the new concrete shall extend down to rock.

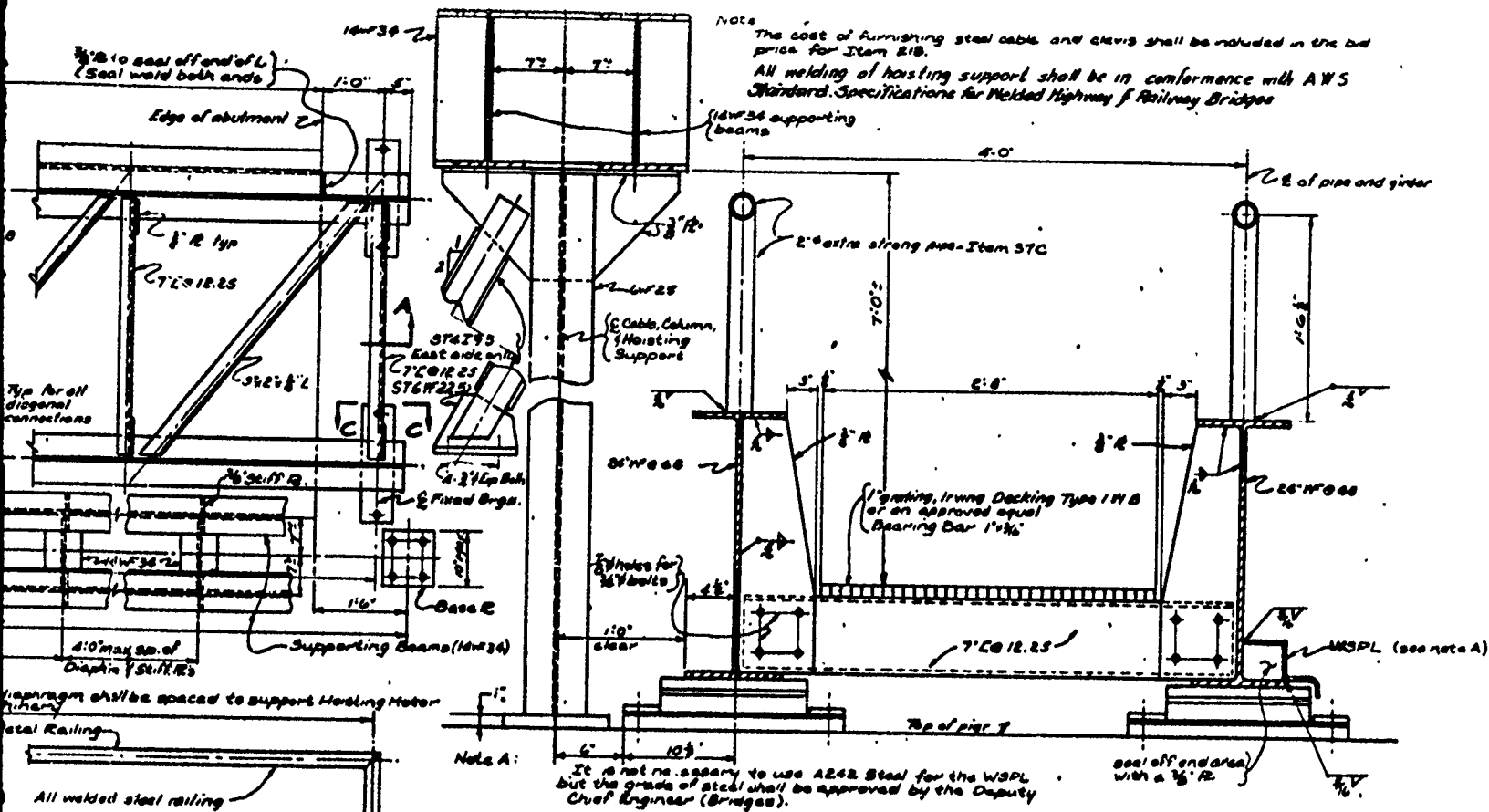
GENERAL NOTES

Material and Construction Specifications of N.Y.S. Department of Public Works dated January 2, 1962 with current additions and modifications shall be used.
Reinforcing Bars shall be lapped a minimum of 20 diameters.
All joint material if used, A.O.B.C., will be paid for under the various items of the contract.
Portland Cement, Type 2A, Item 15-2A shall be used in Item 18 - Class A Concrete for Structures.
Concrete surfaces exposed to view shall be rubbed if ordered by the Engineer.
If field conditions and dimensions differ from those shown on the plans, the Contractor shall work from actual field conditions and dimensions to satisfactorily perform the required work, as approved by the Engineer.
A field Engineer's Office is not required for this contract.
The support for the hoisting machinery shall be checked for stability, as called for by Item 210, by the supplier of the machinery.

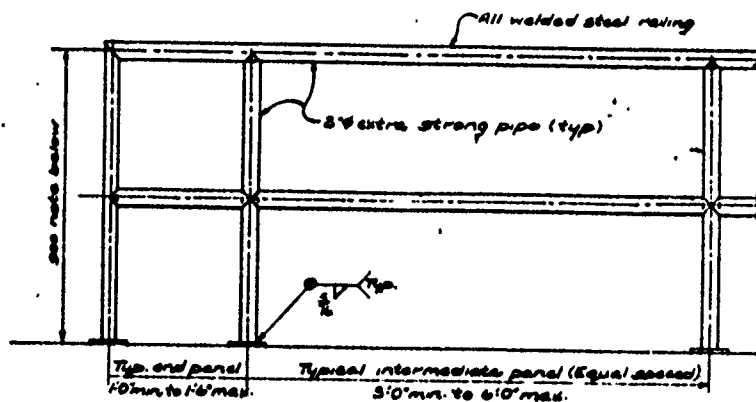
STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
DIVISION OF CONSTRUCTION
CONTRACT M63-5
BALDWINVILLE TAINTOR GATE





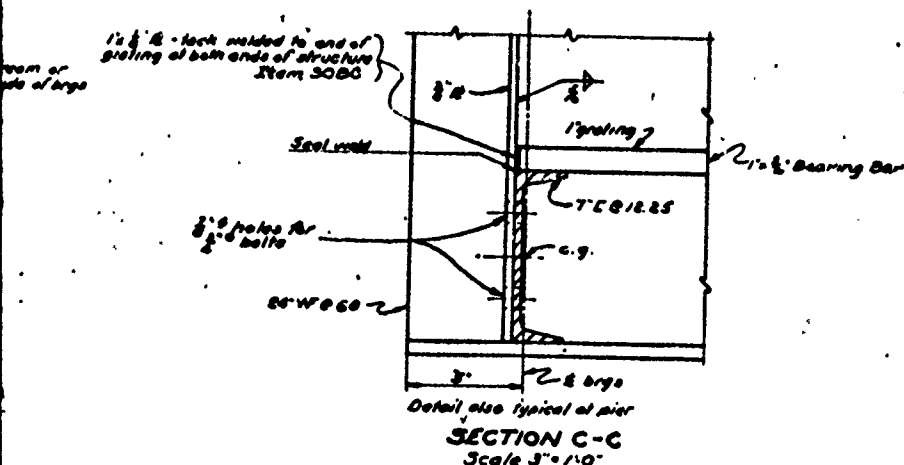
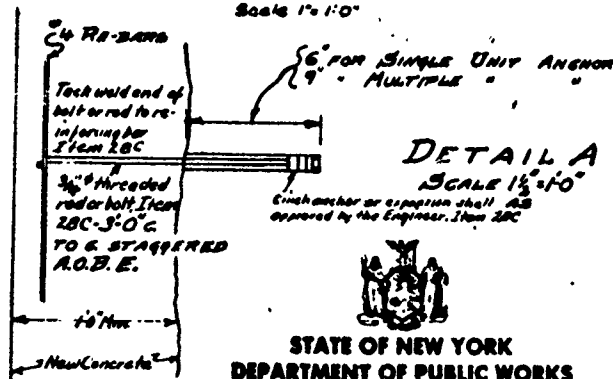


SECTION B-B
Scale 1/2" = 1'-0"

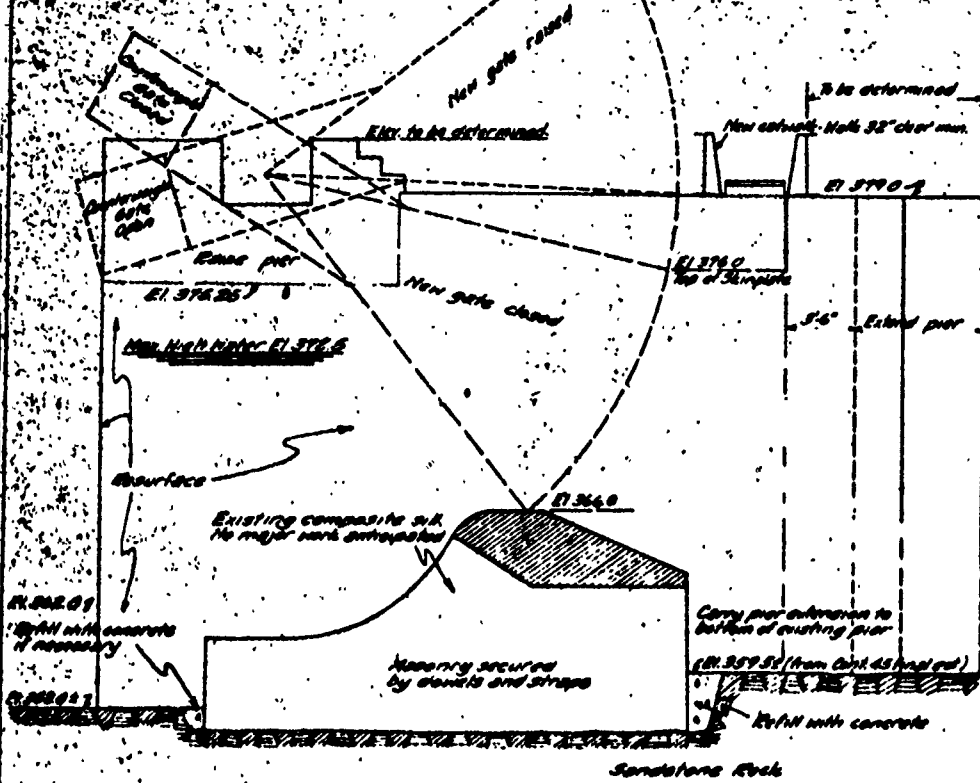


From dimensions taken in the field the Contractor shall lay out new railing for the North Abutment as approved by the Engineer. The height of the railing shall be determined in the field from the existing railing on the West end of the North Abutment.

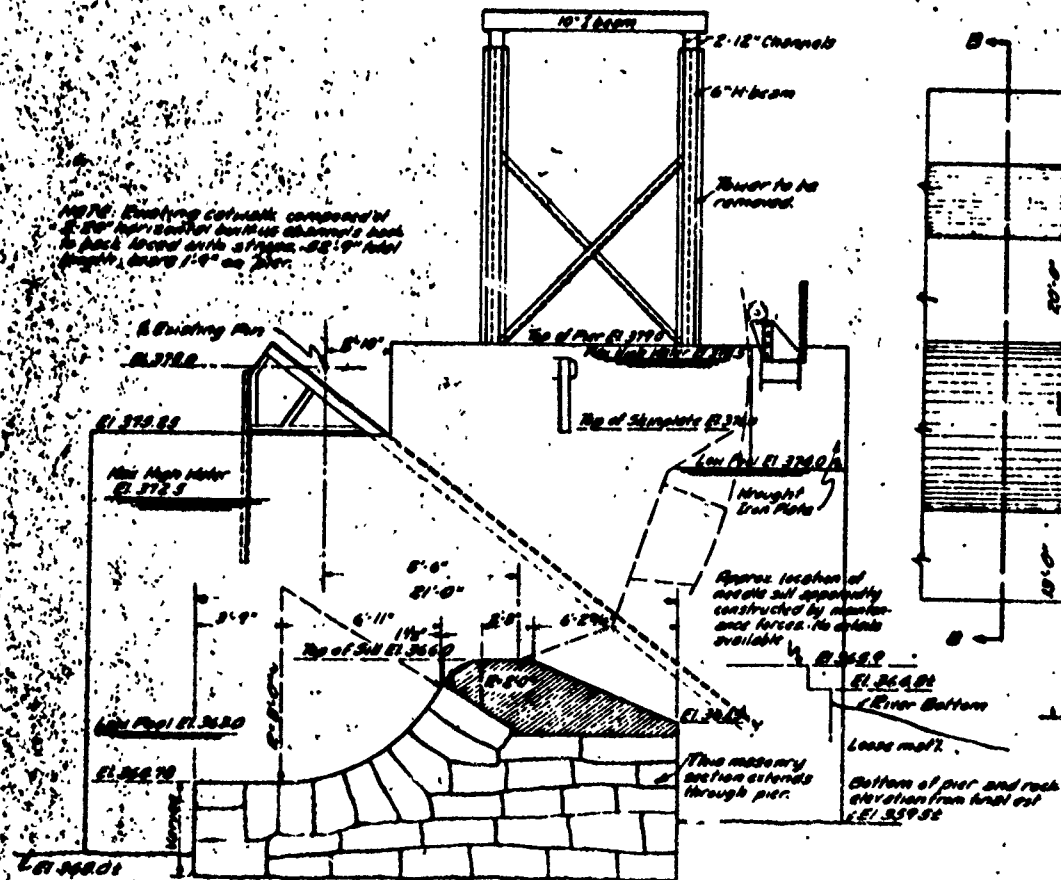
RAILING ELEVATION
Scale 1" = 1'-0"



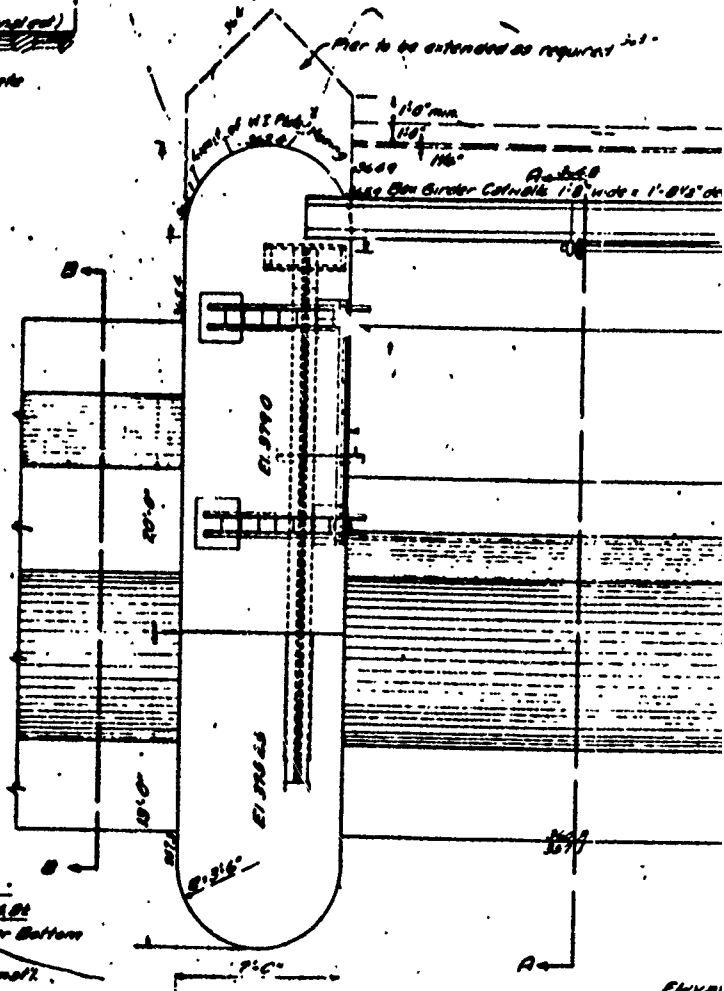
NOTE: Catwalk, needle beam to be offset downstream from needle slot to allow 1 1/2" in R² buffer on sheet piling nominal sections used are D²-1 or D²-2, 22'-0" long



REQUIRED

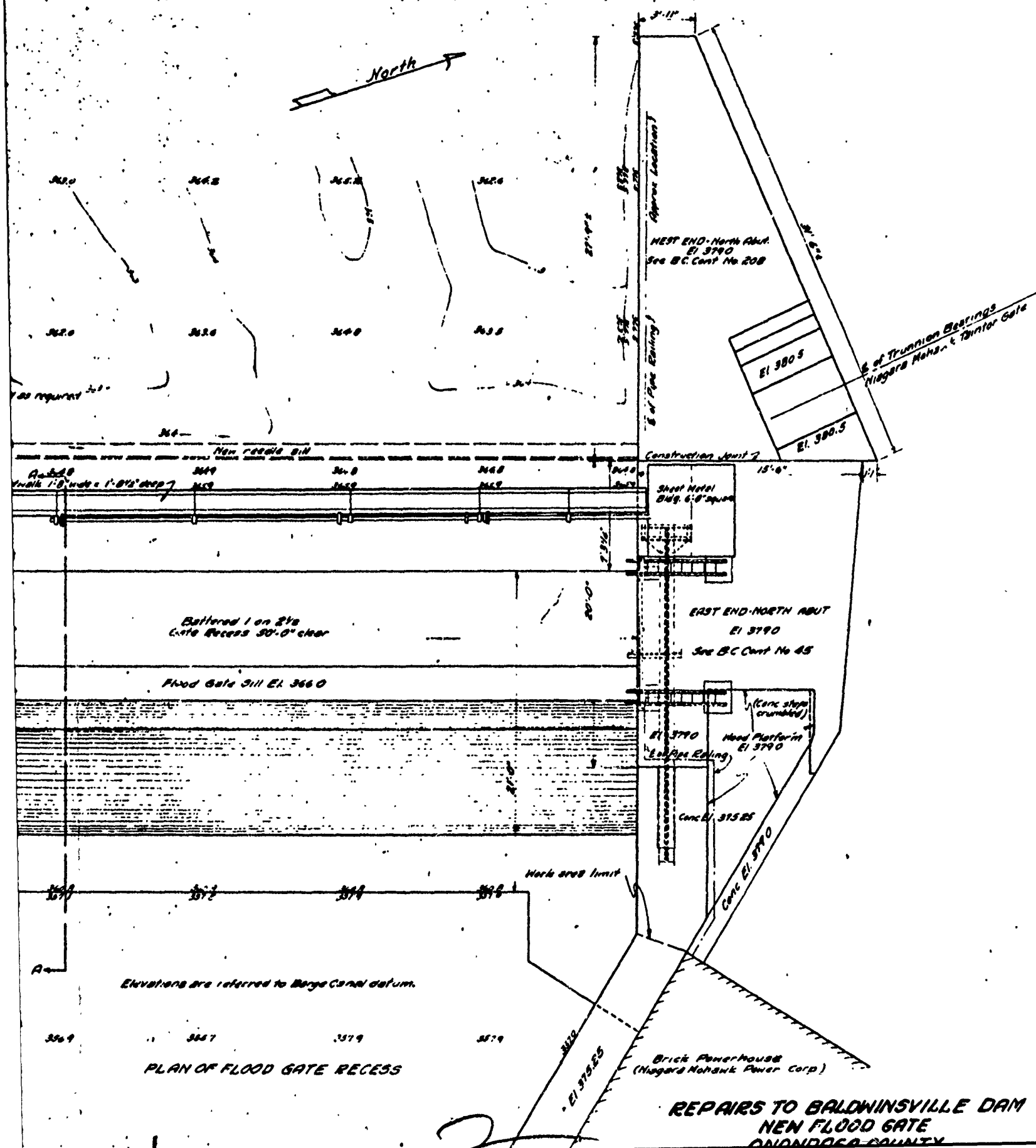


SECTION A-A

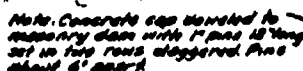


Ekvadi

P_L



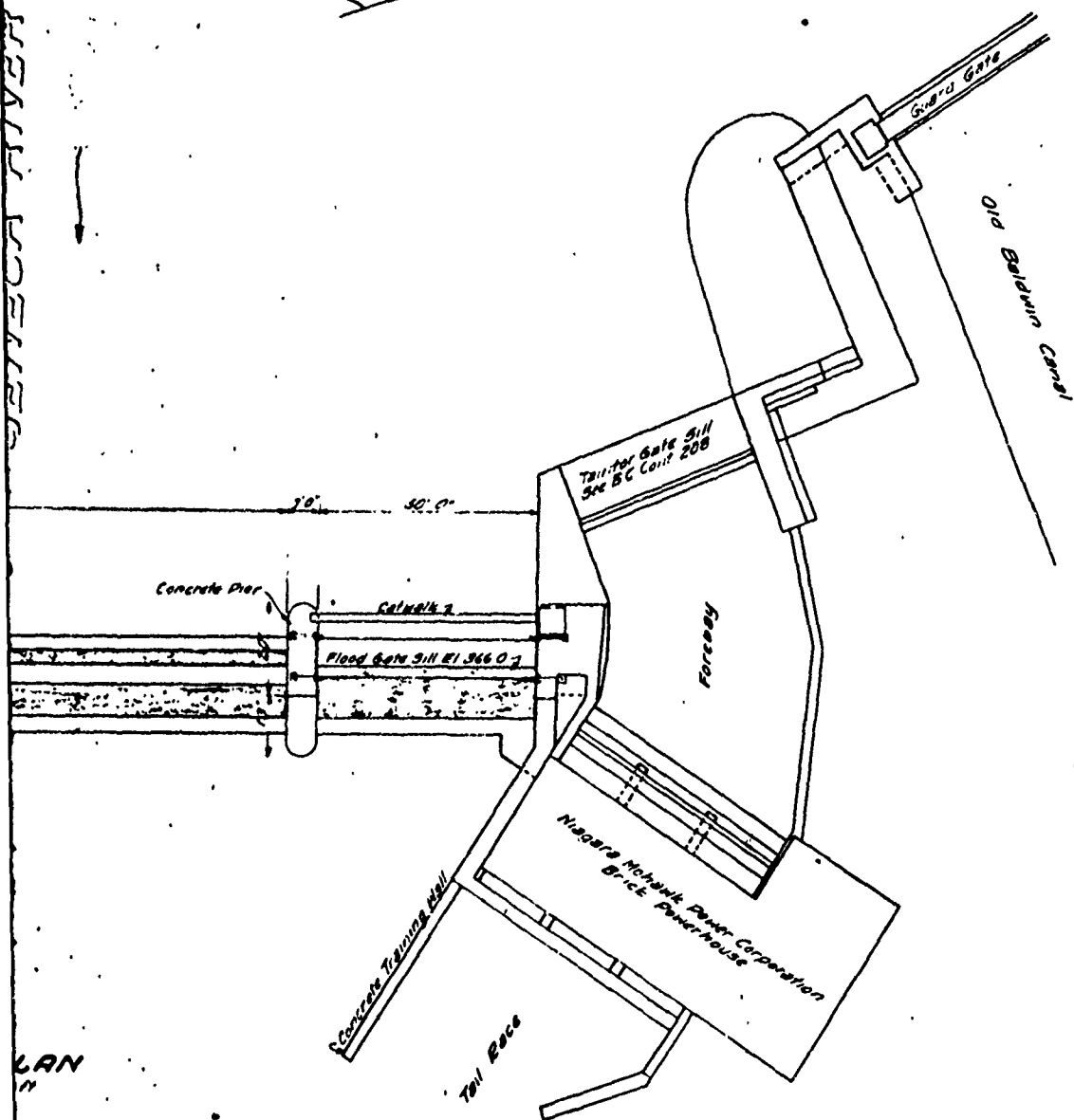
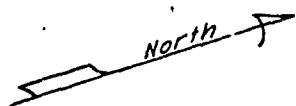
1



Scale 1" = 200'

made by J. J. Kilian
 1890

REVERE RIVER



LAN

2

REPAIRS TO BALDWINVILLE DAM
NEW FLOOD GATE
ONONDAGA COUNTY