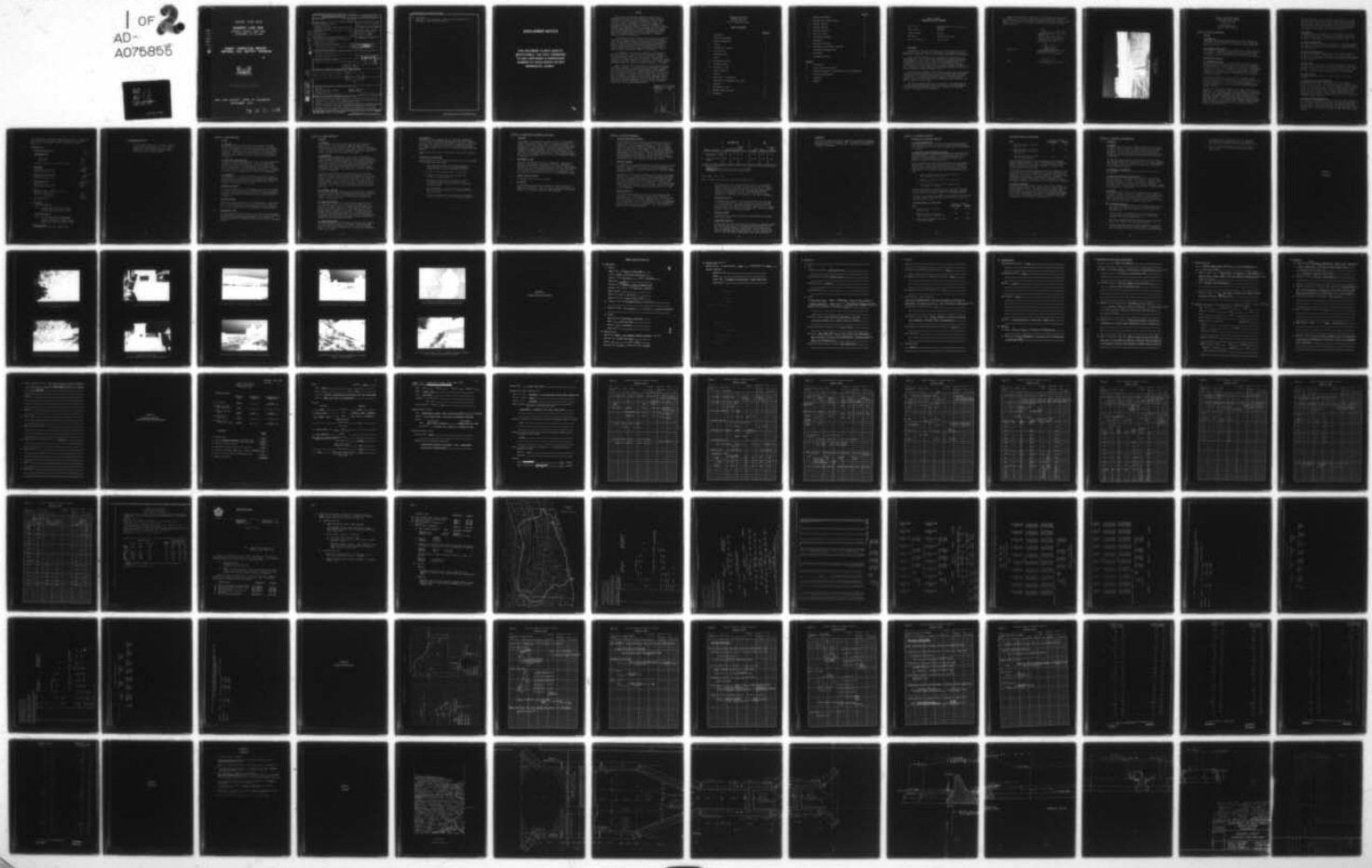
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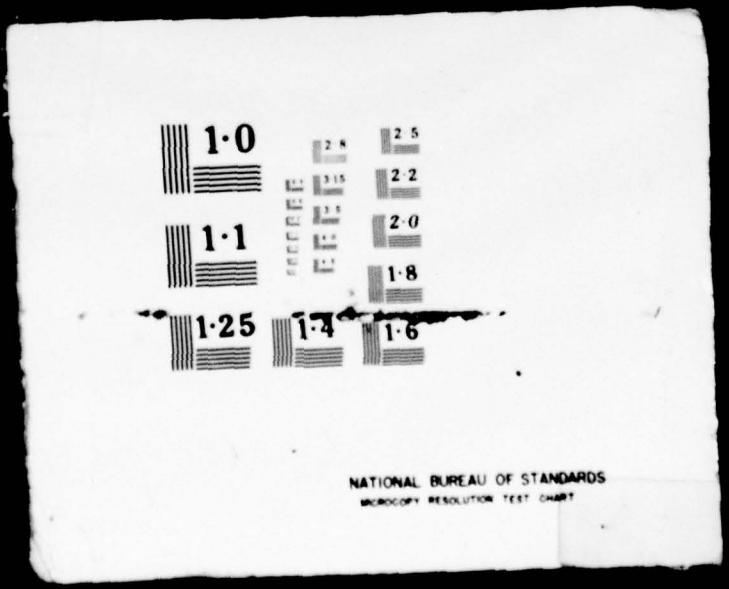
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GENESEE RIVER BASIN

CANADICE LAKE DAM

ONTARIO COUNTY, NEW YORK
INVENTORY No. NY 443

PHASE I INSPECTION REPORT
NATIONAL DAM SAFTEY PROGRAM



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NEW YORK DISTRICT CORPS OF ENGINEERS
SEPTEMBER 1979

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Canadice Lake Dam did not reveal any conditions which pose an immediate threat to life or property. Additional investigations required due to less than acceptable safety factors under certain loading conditions. Structural modifications may be needed. Total spillway discharge capacity sufficient to

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pass ½ PMF, but not whole PMF. Consequently, spillway capacity is inadequate. Minor deficiencies noted.

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PREFACE

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

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

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

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

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GENESEE RIVER BASIN
CANADICE LAKE DAM
I.D. No. N.Y. 443
Phase I Inspection Report

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PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Canadice Lake Dam - I.D. No. 443 (#42-1267)
State Located:	New York
County Located:	Ontario
Watershed:	Genesee River Basin
Date of Inspection:	June 14, 1979

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional investigations are required.

Brush and trees growing on the dam embankment, especially on the downstream slope at the eastern end, prevented a thorough inspection of the embankment. A wet area was noted along the downstream toe at the eastern end of the dam. This section of the embankment should be reinspected after the trees and brush are cut to ascertain the cause of the wet area. All clearing should be completed within 3 months of the date of approval of this report, and appropriate remedial work on the wet area should be performed within 1 year.

The structural stability evaluation indicated that the safety factors under certain loading conditions (ice loading, ½ PMF loading) are below acceptable levels. Further investigation of the structural stability is required to determine whether modifications to the structure are needed. These investigations should be commenced within 6 months of the date of approval of this report.

The total discharge capacity of the spillway is not sufficient to pass the Probable Maximum Flood (PMF). However, the discharge capacity is sufficient to pass one-half of the PMF. Therefore, the spillway capacity is considered to be inadequate.

Additional deficiencies noted were of a minor nature, but should be corrected within 1 year. Among these deficiencies were joints between concrete slabs which were missing the bituminous sealing material and a displaced slab at the downstream end of the western auxiliary spillway channel.

George Koch

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Chief, Dam Safety Section
New York State Department of
Environmental Conservation
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Approved By:

Col. Clark H. Benn
New York District Engineer

Date: 28 Sept 79



Overview
Canadice Lake Dam
I.D. No. N.Y. 443

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CANADICE LAKE DAM
I.D. No. N.Y. 443
#42-1267
GENESEE RIVER BASIN
ONTARIO COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase 1 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 these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam

The Canadice Lake Dam is an earth dam with both principal and auxiliary spillway channels on the western end of the structure. The embankment has a maximum height of 11 feet and a length of 735 feet. The crest is a minimum of 12 feet wide. The embankment slopes are 1 vertical on 3 horizontal on the upstream face and 1 vertical on 2½ horizontal on the downstream face. Concrete slabs have been placed on most of the upstream slope to protect it from wave action.

The principal spillway is one portion of a concrete channel which is divided into two sections. This portion of the spillway is 8 feet wide and flow is controlled by the operation of a vertical sluice gate. A row of sheet piling, extending 25 feet into the foundation soil, acts as a cutoff beneath the entire concrete channel.

The auxiliary spillway is composed of two ogee sections with identical crest elevations. One of the sections is 16 feet wide and is adjacent to the principal spillway, occupying the remaining portion of the concrete channel. The other section of the auxiliary spillway is approximately 40 feet to the west of the principal spillway. This concrete ogee section is 100 feet long and 3 feet high. A row of steel sheet piling extending 15 feet below the base of the concrete acts as a cutoff. The downstream channel below this ogee section is in a cut section which is lined with concrete slabs.

There is no actual reservoir drain, however, there is a 24-inch diameter bypass pipe which can be used to withdraw water from the reservoir when the water surface drops below the principal spillway crest. A pump house located about 1,000 feet from the dam, along the western bank, houses two vertical turbine pumps at the inlet to this pipe. The pipe outlets in the western auxiliary spillway channel downstream of the crest.

b. Location

Canadice Lake Dam is located at the northern end of the lake off Canadice Lake Road. The dam is on an unnamed stream which is called Canadice Outlet, downstream of the dam. The Village of Hemlock is approximately 5.5 miles south of the dam.

c. Size Classification

The dam is 11 feet high and the reservoir has a storage capacity of 16,195 acre-feet. Therefore, the dam is in the intermediate size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The dam is classified as "high" hazard due to the presence of a town road, 5 homes, a state highway, and a small diversion dam (Curve Dam) downstream of this dam. In addition, the Canadice Outlet joins with the Hemlock Outlet and then passes through the Village of Hemlock.

e. Ownership

The dam is owned by the City of Rochester, New York. Mr. Ray Lawrence and Mr. Om Popli from the City Department of Engineering and Maintenance were contacted concerning the inspection. Their address is City Hall - Room 326B, 30 Church Street, Rochester, New York. The Department's phone number is (716) 428-6844.

f. Purpose of Dam

The dam impounds a reservoir for water supply to the City of Rochester.

g. Design and Construction History

No records were available giving the date of the original construction of the dam. Major modifications were made to the dam in 1936 and in 1947. In 1936, the principal spillway currently in use was constructed, and the original spillway was filled to become part of the embankment. The 1947 reconstruction involved raising the dike to its present elevation and the addition of a second auxiliary spillway. Both of these modifications were designed by the Division of Engineering in the City of Rochester's Department of Public Works.

h. Normal Operating Procedures

The reservoir is operated as a part of the water supply system for the City of Rochester. Flows from the reservoir are controlled by the operation of the sluice gate in the principal spillway. The lake can be lowered approximately 7 feet (to elevation 1090) in this manner. There are two vertical turbine pumps with a total capacity of 23.2 cfs which can be used to lower the water surface further.

The average daily discharge at this dam is 12.4 cfs. A measuring weir located in the concrete channel downstream of the sluice gate is used to determine discharges through the principal spillway.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.)	12.34
b. Discharge at Dam	(cfs)
Top of Dam:	
Gate closed	6,527
Gate open	7,729
Auxiliary Spillway at maximum high water	6,527
c. Elevation	(ft.)
Top of dam	1,105.0
Auxiliary spillway crest	1,099.0
Principal spillway crest	1,090.0
d. Reservoir - Surface Area	(acres)
Top of dam	—
Auxiliary spillway crest	657
e. Storage Capacity	(acre-feet)
Top of dam	16,195
Auxiliary spillway crest	11,489
Principal spillway crest	4,712
f. Dam	
Embankment Type: Compacted earth fill	
Embankment length (ft.)	735
Slopes (V:H) upstream	1 on 3
downstream	1 on 2½
Crest elevation	1,105.0
Crest width (ft.)	12

g. Spillways

Principal Spillway

Type: Vertical sluice gate 8 feet wide; maximum opening 9.82 feet. Gate operated from house above spillway.

Auxiliary Spillway

Type: Two concrete ogee sections; ungated (16 feet wide and 100 feet wide). Vertical side walls at crest. Channel beyond ogee lined with concrete slabs.

h. Reservoir Drain

See Appurtenant Structures - Bypass Pipe

i. Appurtenant Structures

1. Bypass Pipe

24 inch diameter pipe with two vertical turbine pumps with total capacity of 23.2 cfs. Pipe extends from upstream pump house to a point downstream of ogee section on western slope of western auxiliary spillway channel.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The Canadice Lake Dam is located in the glaciated Alleghany Plateau physiographic province of New York State. The dam is in one of the Finger Lakes troughs which are glacially modified valleys of preglacial rivers. The bedrock in the area consists primarily of Early Upper Devonian Era shales, siltstones, and sandstones. The surficial soils are the result of glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation.

b. Subsurface Investigations

A series of borings were progressed in 1947 to provide subsurface information for the reconstruction. Logs from eleven holes drilled on the downstream slope of the dam were shown on the reconstruction plans. (See Appendix F). The borings indicate that the foundation soil is predominantly glacial till. However, the borings only provide subsurface information down to elevation 1085 which is just slightly below the base of the embankment.

c. Embankment

No information was available concerning the original design of the embankment. The contract plans for the 1947 reconstruction include a plan and cross sections of the embankment. These plans were prepared by the Division of Engineering in the City of Rochester's Department of Public Works.

2.2 CONSTRUCTION RECORDS

No information was available concerning the original construction of the dam. Plans for the 1936 reconstruction as well as plans and construction specifications from the 1947 reconstruction were available. Selected sheets from the plans have been included in Appendix F.

2.3 OPERATION RECORDS

The dam is visually inspected on an irregular basis. Lake levels are recorded periodically by the City of Rochester's Bureau of Water. The measuring weir located downstream of the sluice gate can be used to determine outflows through the concrete channel.

2.4 EVALUATION OF DATA

The data presented in this report was obtained from the Department of Environmental Conservation files and from the City of Rochester's Department of Engineering and Maintenance. The information available appears to be adequate and reliable for Phase I inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Canadice Lake Dam was conducted on June 14, 1979. The weather was sunny and clear, and the temperature was in the sixties. The water surface at the time of the inspection was several inches below the auxiliary spillway crest. The sluice gate on the principal spillway was partially opened allowing a flow in the spillway channel.

b. Embankment

Inspection of the embankment revealed several deficiencies. Trees and brush growing on the lower portion of the downstream slope prevented a thorough inspection of this portion of the dam. There was a wet area at the downstream toe on the eastern end of the dam. This wet area began beyond the eastern end of the dam and extended westward along approximately one-half the embankment. Due to the dense vegetation, it was not possible to determine the origin of the water (i.e., whether it was due to runoff or seepage).

All but the eastern end of the upstream face of the dam was lined with concrete slabs for protection against wave action. There was bituminous sealing material filling most of the joints between the slabs. The material was missing on some of the joints leaving voids up to one foot deep. Grass and weeds were growing through some of the joints. On the eastern end of the embankment, the upstream face is partially covered with riprap. There was a group of small trees growing through the riprap in this area.

c. Principal Spillway

The principal spillway appeared to be in satisfactory condition. The sluice gate was well maintained and operational. Some minor spalling of the concrete at the entrance to the spillway was noted. There was a weir across the principal spillway exit channel to measure the flow.

d. Auxiliary Spillway

The ogee sections on both the eastern and western portions of the auxiliary spillway were in satisfactory condition. The concrete slabs which cover the auxiliary spillway channel did not show any signs of distress. The bituminous joint sealer between slabs was missing in some areas, and vegetation was growing through a number of the joints. The last slab on the western side of the western section at the downstream end of the channel had settled and pulled away from the adjoining slab. It appeared that flow from the principal spillway channel had removed the soil from under this slab.

e. Downstream Channel

The outlet channel was in satisfactory condition with no severe side slope erosion or debris in evidence. The erosion under the final slab on the western side of the auxiliary spillway (which was discussed in Section 3.1-d.) was the only deficiency noted in this area.

f. Reservoir

There was an area, approximately 100 feet long, immediately to the west of the emergency spillway which had been scoured by wave action. Riprap had been dumped in the area to stabilize the slope. The slope appeared stable, although the surface of the riprap was irregular. A small tree was growing through this riprap, several feet west of the western auxiliary spillway wingwall.

There were no other signs of instability noted in the reservoir area.

3.2 EVALUATION OF OBSERVATIONS

Visual inspection revealed several deficiencies on this structure. The following items were noted:

1. Trees and brush growing on the lower portion of the downstream slope of the eastern embankment making a complete visual inspection impossible;

2. A wet area at the downstream toe of the dam;

3. A group of trees growing on the upstream face at the eastern end of the dam;

4. Bituminous sealing material missing on some of the joints between slabs of concrete on both the upstream face of the dam and in the auxiliary spillway channel;

5. The displacement of the final slab on the western side of the outlet channel of the western auxiliary spillway section;

6. A small tree growing on the reservoir shore several feet to the west of the auxiliary spillway wingwall.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURE

This reservoir is operated as a source to the City of Rochester's upland water supply system. Water is released by raising the vertical sluice gate. The base of the principal spillway is at elevation 1090. A measuring weir located in the concrete channel downstream of the sluice gate is used to determine discharges through the principal spillway. Below this elevation, it is possible to withdraw additional water from the reservoir by the operation of two vertical turbine pumps. These pumps discharge into a 24-inch diameter bypass pipe. The total discharge capacity by pumping is 23.2 cfs.

4.2 MAINTENANCE OF DAM

The dam is maintained by the City of Rochester. Pumps for the bypass pipe are tested monthly, and other minor maintenance functions are performed as necessary. While most of the embankment has a grass cover, there are numerous trees and brush growing on the lower part of the downstream face of the dam. There are also several trees growing on the crest of the embankment. All trees and brush should be cut as part of the maintenance program.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system is present.

4.4 EVALUATION

The maintenance and operation procedures on the dam seem to be generally satisfactory. There are several areas which need additional maintenance. Brush and trees growing on the embankment should be cut and grass should be mowed regularly.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The delineation of the contributing watershed to this dam is shown on the map entitled "Drainage Area - Canadice Lake Dam" (Appendix C). The rectangular watershed of over 12 square miles lies primarily between two ridgelines. The relatively steep forested slopes extend upward from the edge of Canadice Lake (elevation 1099) to the ridges at elevation 1860 and 2200. Runoff enters the lake directly from the surrounding watershed through numerous small streams. The heavily wooded strip of land immediately surrounding the lake is owned by the City of Rochester and is used as a buffer between the light residential development within the watershed and the lake itself.

5.2 ANALYSIS CRITERIA

A limited amount of hydrologic/hydraulic information was obtained from the City of Rochester, Bureau of Water (See Appendix C). This data (Reference 7) concerned itself with elevation-storage capacity quantities, watershed characteristics, and water supply withdrawal rates.

The analysis of the spillway capacity of this dam was performed using the Corps of Engineers HEC-1 computer program, Dam Safety version. This program develops an inflow hydrograph based upon the "Snyder Synthetic Unit Hydrograph" concept and then flood routs this hydrograph using the "Modified Puls" method, both through the reservoir and over the spillway. The spillway design flood selected for analysis was the Probable Maximum Flood (PMF) in accordance with the recommended guidelines of the U.S. Army Corps of Engineers.

5.3 SPILLWAY CAPACITY

The concrete ogee-shaped auxiliary spillway plus the vertical sluice gate act in conjunction with the earth embankment in forming the dam at the outlet to Canadice Lake. The sluice gate is 8 feet wide and has a maximum opening height of 9.82 feet. It was analyzed for orifice flow conditions. The two ogee-shaped auxiliary spillways (at 16 feet and 100 feet wide, respectively) were analyzed for weir flow conditions. The following table indicates the conditions analyzed:

ANALYSIS CONDITION	ONE-HALF PMF PEAK (cfs) INFLOW	ONE-HALF PMF PEAK (cfs) OUTFLOW	ONE-HALF PMF DEPTH ABOVE 1105.0*	PMF PEAK (cfs) INFLOW	PMF PEAK (cfs) OUTFLOW	PMF DEPTH ABOVE 1105.0*
1) Sluice gate closed (existing on 6/79)	8897	4375	-1.39	17795	12679	1.41
2) Sluice gate fully opened	8897	4385	-2.09	17795	11635	0.99

Spillway Capacity:

Condition 1)	6527
Condition 2)	7729

*Top-of-Dam: Elev. 1105.0

NOTE: Storage is not allowed to drop below elevation 1099

The spillway does not have sufficient capacity for discharging the peak outflow from the PMF. For this storm event, the peak inflow is 17,795 cfs and the peak outflow is 11,635 cfs. However, there is sufficient capacity for discharging the peak outflow of 4385 cfs from one-half the PMF. The computed spillway capacity for conditions 1) and 2) are 6527 cfs and 7729 cfs, respectively. Therefore, the spillway is assessed as inadequate.

5.4 RESERVOIR CAPACITY

The normal water surface is at or near elevation 1099, the crest of the auxiliary spillway. Storage capacity for that elevation is 11,489 acre-feet. Surcharge storage capacity to the top-of-dam elevation of 1105 adds 4706 acre-feet; equivalent to 7.1 inches of direct runoff over the entire drainage area. The total storage capacity of the dam is 16,195 acre-feet.

5.5 FLOODS OF RECORD

No records of the maximum discharge occurring during the maximum known flood exist.

5.6 OVERTOPPING POTENTIAL

Analyses for the sluice gate fully closed and fully opened indicates the spillway does not have sufficient discharge capacity for the PMF. The computed depths of overtopping for this storm event are 1.41 feet and 0.99 feet, respectively. For the one-half PMF event, the maximum water surface rises to 1.39 feet (gate closed) and 2.09 feet (gate open) respectively, below the top-of-dam.

5.7 EVALUATION

This dam has sufficient spillway capacity to adequately discharge the peak outflow from one-half to PMF. It does not have sufficient discharge capacity for the PMF event. Therefore, the spillway is assessed as inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observation of the structure did not reveal any signs of major distress. There was a wet area beyond the downstream toe of the embankment, but there were no indications of any sloughing or movement.

b. Data Review and Stability Evaluation

The primary sources of structural and subsurface information for this dam were the 1936 and 1947 reconstruction plans. The most recent structural revisions to the dam were made in 1947. Therefore, cross-sections shown on these plans were used to perform a structural stability analysis.

Separate stability analyses were performed for the two concrete ogee sections. The 16-foot wide section which is adjacent to the principal spillway will be referred to as the east section and the 100-foot wide section will be referred to as the west ogee section. The following conditions were analyzed for each case:

a. Normal conditions with the reservoir level at the auxiliary spillway crest;

b. Reservoir at spillway crest with an ice load of 5000 lb./ft.;

c. ½ PMF, water flowing over the spillway crest to a depth of 4.6 feet.

The PMF condition was not analyzed in the stability evaluation. Since the embankment would be overtopped under this condition, the dam cannot be considered capable of withstanding the PMF.

The analyses performed (See Appendix D) indicates that the factors of safety against overturning and sliding for each of the two sections are as follows:

East Ogee Section - 16 feet wide

Case	Factors of Safety Overturning	Sliding
a. Reservoir level at spillway crest, no ice	2.63	2.32
b. Reservoir level at spillway crest, ice load of 5000 lb./ft.	1.45	1.42
c. ½ PMF, water flowing 4.6 feet over the spillway crest	1.76	1.46

West Ogee Section - 100 feet wide

Case	Factors of Safety Overturning	Sliding
a. Reservoir level at spillway crest, no ice	2.99	5.35
b. Reservoir level 1 foot below spillway crest, ice load of 5000 lb./ft.	0.92	1.45
c. ½ PMF, water flowing 4.6 feet over the spillway crest	1.45	2.13

The safety factors against both overturning and sliding under normal loading conditions on each of the sections are acceptable. However, safety factors fall below acceptable levels on both sections when they are subjected to either ice loading or the loading associated with the PMF.

A more detailed structural stability analysis is required for each of the sections. Field investigations to better define the soil parameters as well as to obtain more information about the sheet piling and its connection to the ogee sections are required. This information should then be incorporated into the stability evaluation. Based on the results of this evaluation, it should be determined whether modifications to the structures are required.

d. Seismic Stability

This dam is located in Seismic Zone 2. Due to the location, a seismic stability analysis was performed in accordance with Corps of Engineers guidelines. The seismic analysis was performed for normal conditions with the water level at the spillway crest. For the east ogee section, the safety factor against overturning with seismic considerations included is 2.39 and against sliding is 1.82. For the west ogee section, the safety factor against overturning is 2.68 and against sliding is 3.01.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase 1 inspection of the Canadice Lake Dam did not reveal conditions which constitute a hazard to human life or property. No signs of serious instability were observed on the earth embankment. A wet area was observed at the downstream toe, but due to the trees and brush growing on the lower part of the embankment, it was not possible to determine the exact source of the water.

The stability analyses which were performed for the two ogee spillway sections on this dam indicate that for severe conditions (ice loading, ½ PMF) the safety factors are less than acceptable. The remaining deficiencies should be taken care of during the annual maintenance program.

b. Adequacy of Information

The information available for the preparation of this report was adequate.

c. Need for Additional Investigations

Further analysis of the structural stability of the two ogee spillway sections is required. This analysis should be a more detailed study than was made for this report. Included should be an investigation to better define the soil parameters (including whatever test borings and laboratory testing is deemed necessary), and a determination of the effect of the sheet piling on the stability of each section.

d. Urgency

The trees and brush growing on the downstream slope should be cut within 3 months of the date of approval of this report. The investigation of the structural stability of the ogee sections should be commenced within 6 months of the date of approval. These investigations should be completed, necessary modifications made, and minor deficiencies corrected within 1 year.

7.2 7.3

7.2 Recommended Measures

a. All trees and brush growing on the embankment should be cut. The area on the downstream face of the eastern end of the dam should be cleared to a minimum of 10 feet beyond the downstream toe.

b. The wet area at the downstream toe on the eastern end of the dam should be monitored, evaluated, and appropriate remedial work should be performed.

c. After the structural stability analysis has been completed, appropriate remedial work should be undertaken.

d. Bituminous sealing material should be placed in any of the joints between the slabs of concrete where it is needed on both the upstream face and in the auxiliary spillway channel.

e. The final slab on the western side of the auxiliary spillway should be brought back up to its original grade and its foundation protected against future scour.

f. The small tree growing on the reservoir shore several feet to the west of the auxiliary spillway wingwall should be cut.

APPENDIX A

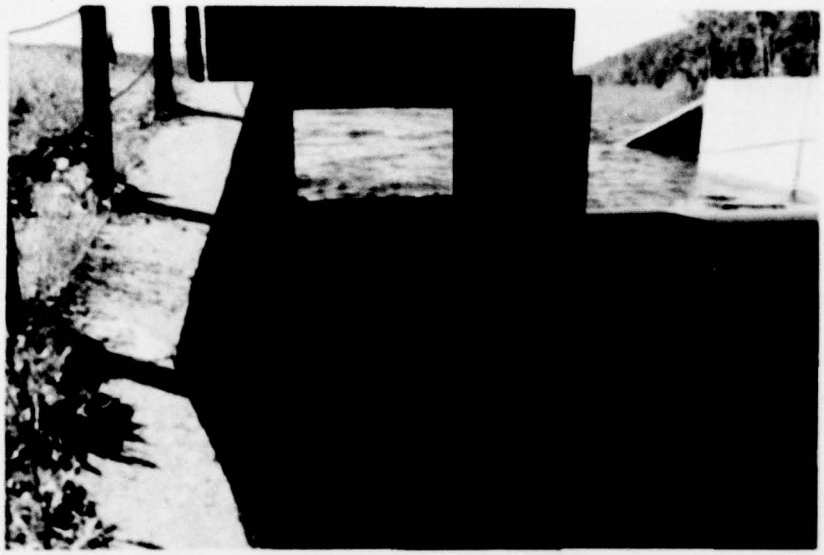
PHOTOGRAPHS



Trees and Brush Growing on Downstream Slope
at Eastern End of Dam



Trees Growing on Upstream Face at Eastern End of Dam



Principal Spillway Sluice Gate



Principal Spillway and
Adjacent Eastern Section of Auxiliary Spillway



Auxiliary Spillway - West Ogee Section - Looking Downstream



Auxiliary Spillway - West Ogee Section - Looking Upstream



Principal and Auxiliary Spillways - Looking Upstream



Displacement of Final Slab on Western Side of Western Auxiliary Spillway Section



Joint Between Concrete Slabs on Upstream Face
Which is Missing Bituminous Sealing Material



Area on Reservoir Bank to West of Western Auxiliary Spillway
Which Has Been Scoured By Wave Action

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam CANADICE LAKE DAM

I.D. # 443 (#42-1267 GENESEE)

Location: Town CANADICE County ONTARIO

Stream Name NA

Tributary of CANADICE & HEMLOCK OUTLETS (GENESEE RIVER)

Longitude (W), Latitude (N) 77°34.3'W 42°44.5'N

Hazard Category C

Date(s) of Inspection 6/14/79

Weather Conditions SUNNY. CLEAR 65°

b. Inspection Personnel R. WARRENDER W. LYNICK

c. Persons Contacted R. LAWRENCE O. POPLI (CITY OF ROCHESTER)

d. History:

Date Constructed MODIFICATIONS - 1936 & 1947

Owner CITY OF ROCHESTER

Designer CITY OF ROCHESTER

Constructed by

2) Technical Data

Type of Dam EARTH WITH CONCRETE PRINCIPAL & AUXILIARY SPILLWAYS

Drainage Area 12.34 SQ MILES

Height 11' Length 735'

Upstream Slope 1V: 3H Downstream Slope 1V: 2.5H

2) Technical Data (Cont'd.)

External Drains: on Downstream Face NONE @ Downstream Toe NONE

Internal Components:

Impervious Core _____

Drains _____

Cutoff Type @ CONCRETE SPILLWAYS (BOTH) - STEEL SHEET PILING

Grout Curtain _____

3) Embankment

a. Crest

(1) Vertical Alignment SATISFACTORY

(2) Horizontal Alignment CURVILINEAR

(3) Surface Cracks NONE

(4) Miscellaneous

b. Slopes

(1) Undesirable Growth or ~~Debris~~, An~~imal Burrows~~ WEST - 6" TREE AT END OF EMERGENCY SPILLWAY NEEDS TO BE CLEARED EAST - GROUP OF TREES BEYOND SLABSON UPSTREAM 10'-20' BEYOND DOWNSTREAM TOE TO PERMIT INSPECTION

(2) Sloughing, Subsidence or Depressions NONE

(3) Slope Protection EAST - BEYOND SLABS BROKEN R.P-RAP CONCRETE SLABS - WITH WEEDS GROWING THROUGH

(4) Surface Cracks or Movement at Toe NONE NOTED

(5) Seepage WET AREA AT TOE AT EAST END - NOT NECESSARILY FROM SEEPAGE THROUGH THE EMBANKMENT - STARTED BEYOND END OF EMBANKMENT.

(6) Condition Around Outlet Structure SATISFACTORY

c. Abutments

(1) Erosion at Embankment and Abutment Contact NONE

(2) Seepage along Contact of Embankment and Abutment NONE

(3) Seepage at toe or along downstream face No

d. Downstream Area - below embankment

EAST END OF EMBANKMENT - WET AREA EXTENDS ≈ ½ LENGTH OF EMBANKMENT TO ABANDONED OUTLET - WET AREA BEGINS BEYOND THE TOE.

(1) Subsidence, Depressions, etc. No

(2) Seepage, unusual growth TREES & BRUSH IN WET LOWLAND
NO APPARENT SEEPAGE FROM EMBANKMENT.

(3) Evidence of surface movement beyond embankment toe NONE

(4) Miscellaneous

e. Drainage System

NONE

4) Instrumentation

(1) Monumentation/Surveys NONE

(2) Observation Wells NONE

(3) Weirs NONE

(4) Piezometers NONE

(5) Other HYDROMETEOROLOGICAL GAGES (~~SEE APPENDIX C~~)

5) Reservoir

a. Slopes TREES; FOREST TO EDGE OF RESERVOIR

b. Sedimentation NONE APPARENT - ALTHOUGH SOIL IS ERODIBLE IN DRAINAGE AREA

6) Spillway(s) (including tail race channel)

ALL CONCRETE

a. General 2 SPILLWAYS WATER FLOWING THROUGH PRINCIPAL SLIDE GATE
NO FLOW OVER AUXILIARY

b. Principle Spillway MINOR CONCRETE CORNER SPALLING
GATE OPEN & OPERATIONAL

c. Emergency or Auxiliary Spillway MEASURED LENGTH 99.8'
WEEDS GROWING THROUGH JOINTS - 2' DIA STEEL (CMP)
PIPE COMES THROUGH SIDE SLOPE FOR PUMPING
LOW FLOWS

d. Condition of Tail race channel CONCRETE SLABS - SOME JOINT
SEPARATION - END SLAB SEPARATED DUE TO EROSION

e. Stability of Channel side/slopes BEYOND END WALLS OF PRIN.
SPILLWAY STONE BLOCK SURFACE - MORTAR FACED - CRACKED
W/SEVERAL HOLES; SETTLEMENT NEAR W.S. OF SLOPING

7) Downstream Channel

STREAM BACKWATER EFFECT UP ONTO EMERGENCY SPILLWAY SLABS

a. Condition (debris, etc.) NO DEBRIS IN CHANNEL - TREES & BRUSH TO EDGE. FINAL SLAB ON AUX. SPILLWAY HAD SEPARATED & SETTLED DUE TO SCOUR

b. Slopes STEEP. SOIL-ERODIBLE

c. Approximate number of homes SEVERAL HOUSES AT POINT WHERE STREAM CROSSES RTE 15A

8) Reservoir Drain/Outlet - NONE - ALTHOUGH IT IS POSSIBLE TO PUMP THROUGH 24" DIAM. PIPE TO BELOW LEVEL OF GATES

Type: Pipe _____ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (describe): Unobservable _____

Material: _____

Joints: _____ Alignment: _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (describe): _____

9) Structural

a. Concrete Surfaces MINOR V SLAB SPALLING & CRACKING - MOSTLY AT TRANSVERSE JOINTS BETWEEN 1 & 2 SLAB UP FROM LAKE LEVEL (AREA OF W.S. FLUCUATION)
. OVERALL - SURFACES ARE GOOD

b. Structural Cracking MINOR SLAB CRACKING

c. Movement - Horizontal & Vertical Alignment (Settlement) SLAB SEPARATION (±1") & EMBANKMENT PROJECTION JUST EAST OF GATEHOUSE
ALSO MINOR DIFFERENTIAL MOVEMENT AT WATER SURFACE

d. Junctions with Abutments or Embankments SATISFACTORY

e. Drains - Foundation, Joint, Face NA

f. ~~Water passages~~, ~~conduits~~, sluices - gate - operational

g. Seepage or Leakage NONE - SOME SEEPAGE COMING THROUGH WALL ON SIDE OF EMERGENCY SPILLWAY - BUT IT IS SEEPAGE OFF HILLSIDE.

h. Joints - Construction, etc. BITUMINOUS SEALED - SOME OF SEALING MATERIAL IS MISSING - SOME WEEDS GROWING THROUGH THE JOINTS.

i. Foundation

j. Abutments

k. Control Gates

l. Approach & Outlet Channels

m. Energy Dissipators (plunge pool, etc.) NONE

n. Intake Structures

o. Stability

p. Miscellaneous

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1105		16195
2) Design High Water (Max. Design Pool)	NA		
3) Auxiliary Spillway Crest	1099	657	11489
4) Pool Level with Flashboards	NA		
5) Service Spillway Crest (SLUICE GATE)	1090		4712

DISCHARGES

	Volume (cfs)
1) Average Daily	NA
2) Spillway ~~@ Maximum High Water~~ SLUICE GATE OPEN	7,709
SLUICE GATE CLOSED	6,527
3) Spillway @ Design High Water	NA
4) Spillway @ Auxiliary Spillway Crest Elevation	NA
5) Low Level Outlet (MAX. WATER SUPPLY - PUMPING WITHDRAWAL)	23.2
6) Total (of all facilities) @ Maximum High Water	NA
7) Maximum Known Flood	UNKNOWN

CREST: ELEVATION: 1105

Type: EARTH

Width: 12' Length: 735'

Spillover CONCRETE OGEE SPILLWAY (2 SECTIONS) PLUS ONE SLUICE GATE

Location NEAR WEST END OF EMBANKMENT

SPILLWAY:

PRINCIPAL		EMERGENCY
1080	Elevation	1099
SLUICE GATE	Type	CONCRETE OGEE - UNGATED
8' (MAX. OPENING - 9.80')	Width	16' + 100' = 116' (NET)
	Type of Control	
	Uncontrolled	✓
	Controlled:	
SLUICE GATE	Type (Flashboards; gate)	
NOT DETERMINED	Number	
8'+ WIDE x 2" HIGH CHANNELS WELDED TO ACT AS A UNIT	Size/Length	
	Invert Material	CONCRETE
	Anticipated Length of operating service	NA
	Chute Length	NA
ZERO	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	9.5'

BYPASS PIPE - WATER SUPPLY PUMPING (BELOW ELEV. 1090)

OUTLET STRUCTURES/[redacted]:

Type: Gate _____ Sluice _____ Conduit ✓ Penstock _____

Shape : ROUND CMP

Size: 24" DIAM.

Elevations: Entrance Invert _____

Exit Invert _____

Tailrace Channel: Elevation NA

HYDROMETEROLOGICAL GAGES:

Type : NONRECORDING GAGES - READ ONCE DAILY [USGS & CITY OF ROCHESTER]

Location: @ CANADICE LAKE AND @ 60' DOWNSTREAM FROM DAM

Records:

(#04229000) (#04228950)

Date - APRIL 1903 TO PRESENT OCTOBER 1970 TO PRESENT

Max. Reading - INDICATED AS CHANGE IN CONTENTS OF LAKE

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

Method of Controlled Releases (mechanisms):

SLUICE GATE (SERVICE SPILLWAY) PLUS REGULATING WEIR (FLOW MEASUREMENT)

DRAINAGE AREA: 12.34 SQ MILES

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: FORESTED ; CITY-CONTROLLED BUFFER STRIP AROUND LAKE

Terrain - Relief: STEEP

Surface - Soil: ERODIBLE

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

DEVELOPMENT - CONTROLLED BY CITY-OWNED LANDS

Potential Sedimentation problem areas (natural or man-made; present or future)

NA

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

NONE

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NA

Elevation:

Reservoir:

Length [redacted] 3.2 (Miles)

Length of Shoreline (@ [redacted] ELEV. 1090) 7.1 (Miles)

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Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	1 /		
SUBJECT	COR = CITY OF ROCHESTER	COMPUTED BY	DATE
DATA FOR PHASE I REPORT		WCL	7/17/79

DRAINAGE AREA: USGS 7.5' QUAD - SPRINGWATER

SCALE: 1" = 2000'

1 SQ IN = 91.827 ACRES

PLANIMETER CALIBRATION: 1 SQ IN = 0%

QUAD SHEET		AREA	ACTUAL	
SPRINGWATER	DR. AREA	51.62	86.03 →	7899.9 ACRES
				12.34 SQ MILES ←
	LAKE SURFACE - 100%	4.29	7.15 →	656.6 ACRES
	CONTOUR 1100	5.20	8.67 →	796.1 ACRES

LONGEST DRAINAGE PATH TO DAM:

L = 37,250' 7.13 MILES ←

DRAINAGE AREA (COR) = 12.6 SQ MILES

(USE 12.34) ←

CASE DATA - (USGS) = 12.4 SQ MILES

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	2/		
SUBJECT		**COMPUTED BY**	**DATE**
HYDROGRAPH PARAMETERS		WCL	7/18/79

DR. AREA = 12.34 SQ MILES L = 37950' = 7.19 MILES L_{CA} = 12350' = 2.33 MILES C_t = 2

LAG TIME: $t_p = C_t (L \cdot L_{CA})^{0.3}$

t_p = 4.72 HRS

UNIT RAIN DURATION: $t_r = \frac{t_p}{5.5}$

t_r = 0.86 HRS USE (t_R = 1.0) ←

ADJUSTED LAG TIME:

$TP = t_p + 0.25(t_R - t_r)$

TP = 4.76 HRS C_p = 0.625 ←

TRANSPOSITION FACTOR: $TRSPC = 1 - \frac{0.3008}{(DA)^{.17718}}$

TRSPC = 0.81 ←

LOSS RATES (SOIL):

SOIL CLASSIFICATION - VOLUSIA (WET) (HSG - C) INITIAL = 1.0 CONSTANT = 0.1 ←

BASE FLOW: 2 cfs/SQ MILE USE 25 cfs ←

PRECIPITATION: PMP

	200 SQ MI/24 HR	6	12	24	48
ZONE 1	21.5°	105	121	131	141
SITE	21.5°	113	123	135	145 ←
ZONE 2	21.5°	116	125	139	149

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	3/		
SUBJECT		**COMPUTED BY**	**DATE**
STAGE - AREA - CAPACITY DATA (COR = CITY OF ROCHESTER)		WCL	8/14/79

EXISTING DATA:

DESCR.	STAGE (COR)	STAGE MALCOLM PIRNIE (5/1977)	AC-FT (TOTAL) (COR)	$\times 10^6$ FT^3 (TOTAL) (COR)	STORAGE GALS. (MPNIE)	STORAGE AC-FT
PUMPING STA. 24" PIPE INVERT	—	—	4339	189	1.9×10^3	5831
U/S BASE-CREST	1089.3	1091.7				
		7'	9184	400	1.6×10^3	4910
SPILLWAY CREST	1096	1098.7				
	5.5'		13409	584		
TOP-CONC. ABUTS.	1101.5					
TOP-DAM EARTH	1101.5					

1936 DRAWINGS: EXISTING SPILLWAY

SHT #:

2 ELEVATIONS (1089.5 TO 1101.5) - SAME AS ABOVE

6 ELEV. 1090.0 INITIAL GATE DISCHARGE
ELEV. 1097.16 MAX. GATE OPENING

1947 DRAWINGS: RECONSTRUCTED EXISTING SPILLWAY PLUS NEW AUXILIARY SPILLWAY

SHT #		EXISTING	EAST AUX.	WEST AUX.
2	CREST ELEV.	1099	1099	1099
	TOP OF WALLS	1105		
	TOP OF EARTH EMB.	1105		

A19 OF CONTRACT SPECS; PARA 52.1 BOTTOM GATE @ MAX. OPENING = ELEV. 1099.82

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB					SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM					4/		
SUBJECT						COMPUTED BY	DATE
STORAGE CAPACITY						WCL	8/15/79

(USE)

USE CITY OF ROCHESTER - DATA

ASSUMPTION: LAKE HAS NOT CHANGED ONLY OUTLET ELEVS CHANGED

STAGE	ΔH	ΔV	VOL (AC-FT)
1082.5			4339
	0.5'	373	
1083		745.4 AF/FT	4712
	6'		
1092			9184
	3'	2805	
1095 (SPILLWAY CREST)		768.2 AF/FT	11489
	2.5'		
1101.5			13409
	2.5'	2786	
1105			16195

PLANIMETERED SURFACE AREA @ ELEV. 1100 = 79½ ACRES.

AREA:
79½ ACRES
79½ ACRES

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	5/		
SUBJECT		**COMPUTED BY**	**DATE**
DISCHARGE CAPACITIES		WCL	8/14/79

EXISTING SPILLWAY - VERTICAL SLUICE GATE

[WATER SURFACE @ ELEV. 1099 ; GATE IS OPENED ←
[WATER SURFACE ABOVE ELEV. 1099 ; GATE FULL OPEN ←

WIDTH = 8' NO END CONTRACTIONS

ORIFICE - SUBMERGED FLOW

$Q = CA\sqrt{2g\Delta H} = 4.815A\sqrt{\Delta H}$

C = 0.6
A VARIES WITH ΔH

(REF ELEV. = 1090) STAGE	H	OPEN AREA	ORIFICE CENTER ELEV.	(TAILWATER ELEV. = 1092) (REF. ELEV. = 1099) ΔH		Q
1090	—	—		—		—
1091	1	8	1090.5	7		102
1092	2	16	1091	7		204
1093	3	24	1091.5	7		306
1094	4	32	1092	7		408
1095	5	40	1092.5	6.5		491
1096	6	48	1093	6		566
1097.16	7.16	57.28	1093.58	5.42	ELEV CONTROL	642
1098	8	64	1094	5	ELEV 1099	689
1099	9	72	1094.5	4.5 —		735
1099.82	9.82	78.56	1094.91	4.91	STAGE CONTROL	838
1100	10			5.09		853
1101	11			6.09		933
1102	12			7.09		1007
1103	13			8.09		1076
1104	14			9.09		1140
1105	15	▼	▼	10.09		1202

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	5A/		
SUBJECT		COMPUTED BY	DATE
DISCHARGE CAPACITIES		WCL	8/14/79

EXISTING SPILLWAY + VERTICAL SLUICE GATE — WATER SURFACE RISES WITH GATE OPENING ←

DISCHARGE + TAILWATER CONTROL TO ELEV. 1090 & MEASURING WEIR

WIDTH = 8' NO END CONTRACTIONS

MAX — 1105

NORMAL WATER SURFACE — 1095

ΔH

1090

ORIFICE - SUBMERGED FLOW

$Q = CA\sqrt{2g\,\Delta H} = 4.815A\sqrt{\Delta H}$

GATE

MEASURING WEIR

WIDTH = 8'

C = 0.6

A VARIES WITH H

(REF ELEV. = 1090) STAGE	H	OPEN AREA	FLOW AREA	ORIFICE CENTER ELEV.	(REF. ELEV. 1090) ΔH	Q
1090	—	—	—		—	—
1092	2	16	—		—	—
1093	3	24	8	1092.5	0.5	27.2
1094	4	32	16	1093	1	77
1095	5	40	24	1093.5	1.5	142
1096	6	48	32	1094	2	218
1097.16	7.16	57.28	41.28	1094.58	2.58	319
1098	8	64	48	1095	3	400
1099	9	72	56	1095.5	3.5	504
1099.89	9.89	78.56	62.56	1095.91	3.91	596
1100	10	↓	↓	↓	4.09	609
1101	11				5.09	680
1102	12				6.09	743
1103	13				7.09	802
1104	14	↓	↓	↓	8.09	857
1105	15	78.56	62.56	1095.91	9.09	908

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	6/		
SUBJECT		**COMPUTED BY**	**DATE**
DISCHARGE CAPACITIES		WCL	8/14/79

RECONSTRUCTION OF EXISTING SPILLWAY = EAST AUXILIARY SPILLWAY
1947 PLANS - SHT #2

CLOSEST APPROXIMATION TO THIS WEIR → = FIG 5-17 (L = 15.97') HANDBOOK OF HYDRAULICS KING & BRATER 5TH ED. TABLE 5-13

$Q = C_1 H^{3/2}$ C - MODEL TESTS
L = 16' NO END CONTRACTIONS

STAGE	H	C	Q
1099	—		—
1099.82	0.82	3.39	40.3
1100	1	3.48	55.7
1101	2	3.67	166
1102	3	3.72	309
1103	4	3.82	489
1104	5		683
1105	6	↓	898

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	7/		
SUBJECT		**COMPUTED BY**	**DATE**
DISCHARGE CAPACITIES		WCL	3/15/79

NEW SPILLWAY = WEST AUXILIARY SPILLWAY
1947 PLANS - SHT #2

CLOSEST APPROXIMATION TO THIS WEIR → = FIG 5-17 (L_1 = 7.98') TABLE 5-13
HANDBOOK OF HYDRAULICS
KING & BRATER 5TH ED

$Q = CLH^{3/2}$ C - MODEL TESTS
L = 100'

STAGE	H	C	Q
1099	—		—
1099.82	0.82	3.29	244
1100	1	3.38	338
1101	2	3.51	993
1102	3	3.58	1860
1103	4	3.68	2944
1104	5	3.83	4282
1105	6	▼	5629

EARTH EMBANKMENT + BROAD CRESTED WEIR (TOP ELEV. 1105)
$Q = CLH^{3/2}$
C = 3.087
L = 763' (30 + 33 + 700)

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Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	8/		
SUBJECT		COMPUTED BY	DATE
DISCHARGE CAPACITIES - TOTAL		WCL	8/15/79

W.S. @ 1099 - INITIAL
THEN RISES

STAGE	SLUICE GATE	EAST AUXILIARY SPILLWAY	WEST AUXILIARY SPILLWAY	TOTAL Q: GATE CLOSED	TOTAL Q: GATE OPEN
1090	—			—	—
1091	102				102
1092	204			—	204
1093	306			—	306
1094	408			—	408
1095	491			—	491
1096	566			—	566
1097.16	642			—	642
1098	689			—	689
1099	735	—	—	—	735
1099.89	838	40.3	244	284	1122
1100	853	55.7	338	394	1247
1101	933	166	993	1159	2092
1102	1007	309	1860	2169	3176
1103	1076	489	2944	3438	4509
1104	1140	683	4282	4965	6105
1105	1202	998	5609	6527	7729

04228950 CANADICE LAKE NEAR HEMLOCK, NY

04229000 CANADICE OUTLET NEAR HEMLOCK, NY

LOCATION.--Lake: Lat 42°44'27", long 77°34'20", Ontario County, Hydrologic Unit 04130003, at dam at outlet of Canadice Lake, 3.6 mi (5.8 km) upstream from point of diversion to Hemlock Lake, and 4 mi (6 km) southeast of Hemlock. Outlet: Lat 42°44'27", long 77°34'20", Ontario County, upstream from weir, 60 ft (18.3 m) downstream from dam.

DRAINAGE AREA.--12.4 mi^2 (32.1 km^2).

PERIOD OF RECORD.--Lake: October 1970 to current year.
Outlet: April 1933 to current year. Prior to October 1966, published as "Canadice Lake Outlet."

REVISED RECORDS.--WRD NY 1967: Drainage area. WRD NY 1968: 1967.

GAGE.--Nonrecording gage read once daily and whenever control gate is changed. Datum of gage is 1,093.00 ft (333.146 m) above mean sea level (furnished by city of Rochester).

REMARKS.--Outflow from Canadice Lake diverted into Hemlock Lake for Rochester water supply. Flow regulated by gates at dam and augmented by pumping. Discharge computed by weir formula and from pumping records.

COOPERATION.--Records furnished by Department of Public Works, City of Rochester.

AVERAGE DISCHARGE.--73 years, 11.4 ft^3/s (0.323 m^3/s), unadjusted.

MONTHEND ELEVATION, CONTENTS, AND MONTHLY DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCT. 1975 TO SEPT. 1976

	04228950 CANADICE LAKE			04229000 CANADICE OUTLET			
	* Elevation FT	Contents FT^3	Change in contents FT^3/S	Observed discharge MEAN	† Adjusted for change in contents in Canadice Lake MEAN	CFSM	IN.
October	1,096.10	403.20	- 5.85	11.8	5.92	0.48	0.55
November	1,095.53	385.43	- 6.86	11.7	4.80	.39	.43
December	1,095.68	390.08	+ 1.74	16.7	18.4	1.48	1.71
CAL YR 1975			+ 2.88	6.33	9.21	.74	10.08
January	1,097.41	445.53	+20.7	0	20.7	1.67	1.92
February	1,098.88	494.92	+19.7	0	19.7	1.59	1.71
March	1,098.75	490.50	- 1.65	9.04	7.38	.60	.69
April	1,098.95	497.30	+ 2.62	0	2.62	.21	.24
May	1,098.80	492.20	- 1.90	0	- 1.90	- .15	- .18
June	1,098.80	492.20	0	0	0	0	0
July	1,098.90	495.60	+ 1.27	0	1.27	.10	.12
August	1,096.83	426.56	-25.8	22.3	- 3.43	- .28	- .32
September	1,096.84	426.68	+ .12	0	.12	.01	.01
WTR YR 1976			+ .25	6.02	6.28	.51	6.89

* Elevation at 2400 hrs last day of month.
† Adjustments by Geological Survey. Negative figures indicate that natural losses from Canadice Lake exceeded inflow.

NOTE.--All figures of contents expressed in millions.

City of Rochester

Bureau of Water
Department of
Environmental Services

10 Felix Street
Rochester, New York 14608

July 27, 1979

RE: Hemlock Lake Dam NY-477
Canadice Lake Dam NY-443

This is in response to your letter of June 20, 1979 to Mr. Gassman requesting information on the subject dams. The responses are identified in the order of the items requested:

A 1) Drainage areas
Hemlock Lake 48.0 sq. mi.
Canadice Lake 12.6 sq. mi.

2) NOTE: For the specific elevations listed we are only able to provide storage capacities. We have no table which lists surface areas at various elevations.

Refer to enclosed pages 12, 13, and 14 of May 1977 Comprehensive Water Supply Study by Malcolm Pirnie, Inc. for the description of streams entering the lakes.

	Hemlock Lake		ELEVATION	STORAGE
a)	Pipe invert-water supply outflow	—	887.3	0
b)	Base of spillway upstream side	(898.3)	898.8	621 MCF
c)	Spillway Crest	(900.8)	901.8	972 MCF
d)	Top of concrete abutments at spillway	(910.8)	910.8	1831 MCF
e)	Top of earth embankment	(909.8)	910.3	1787 MCF

7) Consulting Engineers' Reports (see enclosed copies). Pages 4-7 of the Malcolm Pirnie - January 1979 Upland Water Supply Study are enclosed for your use.

B) HEMLOCK LAKE DAM

1. WATER DIVERSION CONDUIT FROM CANADICE

60" CONCRETE Conduit constructed 1912, 3800' long maximum possible flow (assuming coefficient of 7) 104.7 MGD.

2. Water supply conduits at Hemlock

a) 6' brick tunnel 12,200' long
b) 36" cast iron conduit 13,600 long avg. daily outflow 37 MGD.

MAXIMUM POSSIBLE OUTPUT 47 MGD (GRAVITY FLOW) when lake level drops below 887.3 maximum pumped output is 30.2 MGD.

C) CANADICE LAKE DAM

1. MAXIMUM DISCHARGE RATE 11.730 MCF/day 4-4-73
AVG. DAILY DISCHARGE (1978) 1.069 MCF.

2. MAXIMUM PUMPING RATE POSSIBLE THROUGH 24" BYPASS PIPE 15 MGD.

Canadice Lake	ELEVATION	STORAGE
a) Pipe invert-water supply outflow		0
b) Base of spillway upstream side	1089.5	189 MCF
c) Spillway crest	1096.0	400 MCF
d) Top of concrete abutments at spillway	1101.5	584 MCF
e) Top of earth embankment	1101.54	584 MCF

3) MAX. KNOWN ELEVATION — DATE — SPILLWAY DISCHARGE

HEMLOCK 906+	6-23-72	UNKNOWN
CANADICE 1100+	6-23-72	478×10^3 cu ft/day

4)

	LENGTH
HEMLOCK	38,000'±
CANADICE	17,000'±

5) Length of shoreline (data available only for elevation indicated as determined by N.Y.S. Department of Health).

HEMLOCK	905.0'	17.10 mi.
CANADICE	1096.0'	7.10 mi.

Surface areas of lakes (obtained from N.Y.S. Dept. of Health).

HEMLOCK	3.594 sq. mi.
CANADICE	338.0×10^4 m^2

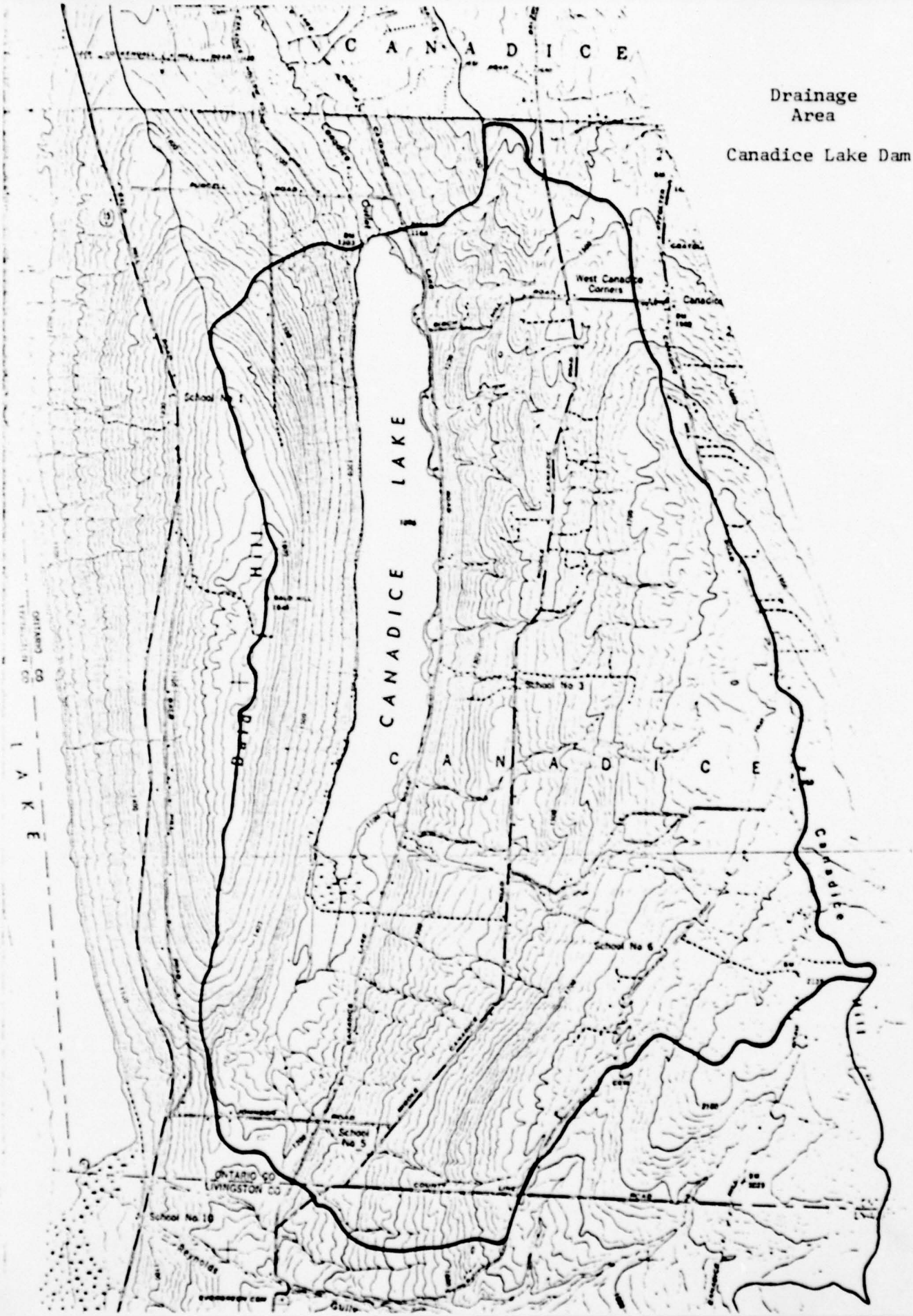
6) History

HEMLOCK

Original dam built by the City in early 1870's, rebuilt in 1908 and 1926, present Spillway constructed 1935.

CANADICE

Original dam at end of lake built around 1910, present Spillway built in 1936 several hundred feet west of original dam.


CANADICE
CANADICE LAKE
CANADICE
Drainage
Area
Canadice Lake Dam
West Canadice Corners
Canadice
School No. 7
School No. 3
School No. 6
School No. 5
School No. 10
ONTARIO CO.
LIVINGSTON CO.
Reynolds
Gulf
Cooper Creek

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**********

**********
THIS PROGRAM IS CURRENTLY BEING MODIFIED
TO RUN ON THE OGS HONEYWELL SYSTEM

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
TO MIKE TILLSON (RM. 423) PH: 7-5600
**********
    1              A CANADICE LAKE DAM     HY-443                                  GENESEE RIVER BASIN
    2              A                       CITY OF ROCHESTER                       ONTARIO COUNTY
    3              A                       WATER SUPPLY                            PMF - SNYDER UH
    4              B    100       1        0       0       0       0       0       0       0       0
    5              B1     5
    6              J      1       2        1
    7              J1   0.5       1
    8              K      0       1                                                1
    9              K1                      INFLOW HYDROGRAPH
   10              K      1       1    12.34           12.34    0.81                           1
   11              P             21.5     113     123     135     145
   12              T                                                      1.0     0.1
   13              N   4.76   0.625
   14              X     25      25        1
   15              K      1       1                                                1
   16              K1                      ROUTED HYDROGRAPH AT DAM - NO BREACH   SLUICE GATE-CLOSED
   17              Y                               1       1
   18              Y1     5                                                -1099      -1
   19              Y4  1099    1100     1101    1102    1103    1104    1105
   20              Y5     0     394     1159    2169    3433    4963    6527
   21              SS 11489   13409    16195
   22              SE  1099  1101.5     1105
   23              SS  1099
   24              SD  1105   3.067      1.5     763
   25              K     99
   26              A
   27              A
```

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
MODIFIED FOR HONEYWELL AP. 79
****

****
THIS PROGRAM IS CURRENTLY BEING MODIFIED
TO RUN ON THE DGS HONEYWELL SYSTEM

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
TO MIKE TILLSON (RM. 423) PH: 7-5000
****

RUN DATE 08/20/79

CANADICE LAKE DAM NY-443
CITY OF ROCHESTER
WATER SUPPLY

GENESEE RIVER BASIN
ONTARIO COUNTY
PMF - SNYDER UH

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
100	1	0	0	0	0	0	0	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 2 LRTIO= 1

RTIOS= 0.50 1.00

****

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	12.34	0.	12.34	0.81	0.	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.	21.50	113.00	123.00	135.00	145.00	0.	0.

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.	0.	1.00	0.	0.	1.00	1.00	0.10	0.	0.

UNIT HYDROGRAPH DATA
TP= 4.76 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= 25.00 QRCSN= 25.00 RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 5.45 AND R= 4.34 INTERVALS

[illegible] LAG= 4.76 HOURS, CP= 0.63 VOL= 1.00

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	1.00	1	0.01	0.	0.01	25.	1.03	3.00	51	0.	0.	0.	5408.
1.01	2.00	2	0.01	0.	0.01	25.	1.03	4.00	52	0.	0.	0.	4352.
1.01	3.00	3	0.01	0.	0.01	25.	1.03	5.00	53	0.	0.	0.	3479.
1.01	4.00	4	0.01	0.	0.01	25.	1.03	6.00	54	0.	0.	0.	2768.
1.01	5.00	5	0.01	0.	0.01	25.	1.03	7.00	55	0.	0.	0.	2202.
1.01	6.00	6	0.01	0.	0.01	25.	1.03	8.00	56	0.	0.	0.	1752.
1.01	7.00	7	0.02	0.	0.02	25.	1.03	9.00	57	0.	0.	0.	1394.
1.01	8.00	8	0.02	0.	0.02	25.	1.03	10.00	58	0.	0.	0.	1110.
1.01	9.00	9	0.02	0.	0.02	25.	1.03	11.00	59	0.	0.	0.	884.
1.01	10.00	10	0.02	0.	0.02	25.	1.03	12.00	60	0.	0.	0.	705.
1.01	11.00	11	0.02	0.	0.02	25.	1.03	13.00	61	0.	0.	0.	563.
1.01	12.00	12	0.02	0.	0.02	25.	1.03	14.00	62	0.	0.	0.	451.
1.01	13.00	13	0.15	0.	0.15	25.	1.03	15.00	63	0.	0.	0.	348.
1.01	14.00	14	0.17	0.	0.17	25.	1.03	16.00	64	0.	0.	0.	263.
1.01	15.00	15	0.22	0.	0.22	25.	1.03	17.00	65	0.	0.	0.	191.
1.01	16.00	16	0.55	0.23	0.32	46.	1.03	18.00	66	0.	0.	0.	98.
1.01	17.00	17	0.20	0.10	0.10	111.	1.03	19.00	67	0.	0.	0.	62.
1.01	18.00	18	0.16	0.06	0.10	214.	1.03	20.00	68	0.	0.	0.	38.
1.01	19.00	19	0.02	0.	0.02	324.	1.03	21.00	69	0.	0.	0.	34.
1.01	20.00	20	0.02	0.	0.02	403.	1.03	22.00	70	0.	0.	0.	31.
1.01	21.00	21	0.02	0.	0.02	420.	1.03	23.00	71	0.	0.	0.	29.
1.01	22.00	22	0.02	0.	0.02	391.	1.04	0.	72	0.	0.	0.	27.
1.01	23.00	23	0.02	0.	0.02	320.	1.04	1.00	73	0.	0.	0.	26.
1.02	0.	24	0.02	0.	0.02	261.	1.04	2.00	74	0.	0.	0.	25.
1.02	1.00	25	0.14	0.04	0.10	216.	1.04	3.00	75	0.	0.	0.	25.
1.02	2.00	26	0.14	0.04	0.10	190.	1.04	4.00	76	0.	0.	0.	25.
1.02	3.00	27	0.14	0.04	0.10	185.	1.04	5.00	77	0.	0.	0.	25.
1.02	4.00	28	0.14	0.04	0.10	196.	1.04	6.00	78	0.	0.	0.	25.
1.02	5.00	29	0.14	0.04	0.10	218.	1.04	7.00	79	0.	0.	0.	25.
1.02	6.00	30	0.14	0.04	0.10	242.	1.04	8.00	80	0.	0.	0.	25.
1.02	7.00	31	0.29	0.19	0.10	275.	1.04	9.00	81	0.	0.	0.	25.
1.02	8.00	32	0.29	0.19	0.10	341.	1.04	10.00	82	0.	0.	0.	25.
1.02	9.00	33	0.29	0.19	0.10	450.	1.04	11.00	83	0.	0.	0.	25.
1.02	10.00	34	0.29	0.19	0.10	598.	1.04	12.00	84	0.	0.	0.	25.
1.02	11.00	35	0.29	0.19	0.10	784.	1.04	13.00	85	0.	0.	0.	25.
1.02	12.00	36	0.29	0.19	0.10	920.	1.04	14.00	86	0.	0.	0.	25.
1.02	13.00	37	1.97	1.87	0.10	1201.	1.04	15.00	87	0.	0.	0.	25.
1.02	14.00	38	2.36	2.26	0.10	1892.	1.04	16.00	88	0.	0.	0.	25.
1.02	15.00	39	2.95	2.85	0.10	3234.	1.04	17.00	89	0.	0.	0.	25.
1.02	16.00	40	7.48	7.38	0.10	5690.	1.04	18.00	90	0.	0.	0.	25.
1.02	17.00	41	2.76	2.66	0.10	9300.	1.04	19.00	91	0.	0.	0.	25.
1.02	18.00	42	2.16	2.06	0.10	13243.	1.04	20.00	92	0.	0.	0.	25.
1.02	19.00	43	0.21	0.11	0.10	16377.	1.04	21.00	93	0.	0.	0.	25.
1.02	20.00	44	0.21	0.11	0.10	17795.	1.04	22.00	94	0.	0.	0.	25.
1.02	21.00	45	0.21	0.11	0.10	17156.	1.04	23.00	95	0.	0.	0.	25.
1.02	22.00	46	0.21	0.11	0.10	15039.	1.05	0.	96	0.	0.	0.	25.
1.04	23.00	47	0.21	0.11	0.10	12503.	1.05	1.00	97	0.	0.	0.	25.
1.03	0.	48	0.21	0.11	0.10	10160.	1.05	2.00	98	0.	0.	0.	25.
1.03	1.00	49	0.	0.	0.	8237.	1.05	3.00	99	0.	0.	0.	25.
1.03	2.00	50	0.	0.	0.	6683.	1.05	4.00	100	0.	0.	0.	25.
									SUM	25.25	21.51	3.74	172850.
										(641.)(	546.)(	95.)(	4894.57)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	17795.	15095.	6780.	2391.	172828.
CMS	504.	427.	192.	68.	4894.
INCHES		11.38	20.44	21.63	21.71
MM		289.03	519.27	549.38	551.54
AC-FT		7485.	13448.	14228.	14283.
THOUS CU M		9233.	16588.	17549.	17619.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

13.	13.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	23.	56.	107.	162.	201.
210.	196.	168.	136.	103.	95.	92.	98.	109.	121.
138.	171.	225.	298.	382.	488.	600.	946.	1617.	2845.
4650.	6622.	8181.	8397.	8578.	7524.	6251.	5080.	4119.	3341.
2704.	2176.	1739.	1394.	1101.	876.	697.	555.	442.	353.
282.	225.	179.	142.	96.	46.	31.	19.	17.	16.
15.	14.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	13.	13.	13.	13.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8397.	7568.	3390.	1196.	66419.
CMS	252.	214.	96.	34.	2447.
INCHES		5.69	10.22	10.81	10.86
MM		144.52	259.64	274.69	275.77
AC-FT		3743.	6724.	7114.	7142.
THOUS CU M		4616.	8294.	8775.	8809.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

25.	25.	25.	25.	25.	25.	25.	25.	25.	25.
25.	25.	25.	25.	25.	46.	111.	214.	324.	403.
420.	391.	326.	261.	216.	190.	185.	196.	218.	242.
275.	341.	450.	596.	764.	920.	1201.	1892.	3234.	5690.
9303.	13249.	16377.	17795.	17156.	15033.	12503.	10160.	8237.	6683.
5403.	4352.	3479.	2768.	2202.	1752.	1394.	1110.	884.	705.
563.	451.	348.	264.	191.	96.	62.	36.	34.	31.
29.	27.	25.	25.	25.	25.	25.	25.	25.	25.
25.	25.	25.	25.	25.	25.	25.	25.	25.	25.
25.	25.	25.	25.	25.	25.	25.	25.	25.	25.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	17795.	15095.	6700.	2391.	132828.
CMS	504.	427.	192.	68.	4894.
INCHES		11.38	20.44	21.63	21.71
MM		289.03	519.27	549.38	551.54
AC-FT		7495.	13448.	14228.	14283.
THOUS CU M		9233.	16568.	17549.	17618.

•••••••••• •••••••••• •••••••••• •••••••••• ••••••••••

HYDROGRAPH ROUTING

ROUTED HYDROGRAPH AT DAM - NO BREACH SLUICE GATE-CLOSED

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
5	0	0	0.	0.	0.	1099.	-1

STAGE	1099.00	1100.00	1101.00	1102.00	1103.00	1104.00	1105.00
FLOW	0.	394.00	1159.00	2169.00	3433.00	4965.00	6527.00
CAPACITY=	11489.	13409.	16195.				
ELEVATION=	1099.	1102.	1105.				

CREL	SPILD	COAX	EXPA	ELEVL	COQL	CAREA	EXPL
1099.0	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1105.0	3.1	1.5	763.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

1.	1.	1.	2.	2.	3.	3.	4.	4.	4.
5.	5.	5.	6.	6.	6.	8.	11.	16.	23.
33.	37.	43.	47.	50.	53.	54.	56.	58.	60.
63.	67.	72.	80.	91.	105.	122.	149.	196.	281.
453.	803.	1447.	2161.	2969.	3626.	4107.	4336.	4375.	4280.
4095.	3851.	3572.	3302.	3048.	2794.	2547.	2311.	2103.	1933.
1772.	1619.	1473.	1337.	1211.	1109.	1024.	945.	872.	805.
742.	685.	631.	585.	537.	496.	458.	423.	392.	376.
361.	347.	333.	319.	307.	295.	283.	272.	261.	251.
241.	231.	222.	213.	205.	197.	189.	182.	175.	168.

STORAGE

11490.	11491.	11492.	11493.	11494.	11494.	11495.	11496.	11497.	11497.
11498.	11499.	11499.	11500.	11500.	11501.	11504.	11510.	11520.	11534.
11548.	11562.	11573.	11581.	11587.	11591.	11595.	11598.	11602.	11607.
11612.	11619.	11630.	11645.	11666.	11693.	11728.	11780.	11872.	12037.
12316.	12727.	13244.	13801.	14311.	14704.	14953.	15072.	15093.	15043.
14947.	14820.	14675.	14520.	14361.	14201.	14045.	13896.	13755.	13621.
13494.	13375.	13264.	13160.	13065.	12975.	12890.	12811.	12737.	12669.
12609.	12549.	12495.	12446.	12401.	12359.	12321.	12286.	12253.	12222.
12193.	12165.	12138.	12112.	12087.	12063.	12040.	12018.	11997.	11977.
11958.	11940.	11922.	11905.	11889.	11873.	11858.	11844.	11830.	11817.

STAGE

1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0
1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.1
1099.1	1099.1	1099.1	1099.1	1099.1	1099.1	1099.1	1099.1	1099.1	1099.2
1099.2	1099.2	1099.2	1099.2	1099.2	1099.3	1099.3	1099.4	1099.5	1099.7
1100.1	1100.3	1100.3	1102.0	1102.6	1103.1	1103.4	1103.6	1103.6	1103.6
1103.4	1103.3	1103.1	1102.9	1102.7	1102.5	1102.3	1102.1	1101.9	1101.8
1101.6	1101.5	1101.3	1101.2	1101.1	1100.9	1100.8	1100.7	1100.6	1100.5
1100.5	1100.4	1100.3	1100.2	1100.2	1100.1	1100.1	1100.0	1100.0	1100.0
1099.9	1099.9	1099.8	1099.8	1099.8	1099.7	1099.7	1099.7	1099.7	1099.6
1099.6	1099.6	1099.6	1099.5	1099.5	1099.5	1099.5	1099.5	1099.4	1099.4

PEAK OUTFLOW IS 4375. AT TIME 49.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4375.	4155.	2719.	1139.	82464.
CMS	124.	118.	77.	32.	2335.
INCHES		3.13	8.20	10.30	10.36
MM		79.56	208.25	261.70	263.16
AC-FT		2040.	5393.	6777.	6815.
THOUS CU M		2542.	6652.	8360.	8406.

STATION 1, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

1.	2.	3.	4.	5.	6.	6.	7.	8.	9.

126.	134.	143.	161.	182.	209.	245.	299.	393.	713.
1277.	2316.	3735.	5899.	8757.	11770.	12679.	12066.	10809.	9435.
8173.	7116.	6210.	5917.	5402.	4890.	4401.	3937.	3504.	3159.
2849.	2567.	2296.	2072.	1883.	1714.	1548.	1393.	1253.	1135.
1048.	967.	893.	824.	761.	703.	649.	600.	554.	513.
474.	438.	406.	376.	349.	325.	341.	328.	310.	304.
292.	281.	271.	261.	251.	241.	232.	224.	215.	207.

STORAGE

11491.	11493.	11495.	11497.	11498.	11500.	11502.	11503.	11504.	11506.
11507.	11509.	11510.	11511.	11512.	11514.	11519.	11531.	11551.	11578.
11608.	11633.	11657.	11674.	11686.	11694.	11700.	11707.	11715.	11724.
11735.	11750.	11771.	11802.	11846.	11907.	11966.	12022.	12255.	12576.
13119.	13721.	14484.	15477.	16707.	17191.	17318.	17232.	17047.	16827.
16597.	16371.	16133.	15884.	15622.	15366.	15106.	14865.	14640.	14430.
14235.	14053.	13883.	13736.	13595.	13447.	13321.	13203.	13097.	13001.
12911.	12832.	12751.	12684.	12620.	12567.	12513.	12464.	12418.	12376.
12337.	12302.	12267.	12238.	12209.	12181.	12155.	12129.	12105.	12081.
12059.	12037.	12016.	11996.	11979.	11959.	11941.	11923.	11909.	11893.

STAGE

1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0
1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.0	1099.1	1099.1	1099.1
1099.2	1099.2	1099.2	1099.2	1099.3	1099.3	1099.3	1099.3	1099.3	1099.3
1099.3	1099.3	1099.4	1099.4	1099.5	1099.5	1099.6	1099.8	1100.0	1100.4
1101.1	1102.1	1103.3	1104.6	1105.6	1106.3	1106.4	1106.3	1106.1	1105.8
1105.5	1105.2	1104.9	1104.6	1104.3	1104.0	1103.6	1103.3	1103.0	1102.8
1102.5	1102.3	1102.1	1101.9	1101.7	1101.5	1101.4	1101.2	1101.1	1101.0
1100.9	1100.7	1100.7	1100.6	1100.5	1100.4	1100.3	1100.3	1100.2	1100.2
1100.1	1100.1	1100.0	1100.0	1099.9	1099.9	1099.9	1099.8	1099.8	1099.8
1099.7	1099.7	1099.7	1099.7	1099.6	1099.6	1099.6	1099.6	1099.5	1099.5

PEAK OUTFLOW IS 12679. AT TIME 47.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	12679.	10872.	5914.	2320.	167967.
CMS	359.	308.	167.	66.	4756.
INCHES		8.20	17.83	20.99	21.10
MM		208.17	452.93	533.09	536.02
AC-FT		5391.	11730.	13806.	13882.
THOUS CU M		6650.	14468.	17029.	17123.

********** ********** ********** ********** **********

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE 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 0.50	 RATIO 2 1.00
HYDROGRAPH AT	1	12.34	1	8397.	17795.
	(	0.00)	(	251.95)(	503.89)(
ROUTED TO	1	12.34	1	4375.	12679.
	(	0.00)	(	123.89)(	359.03)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1099.00	1099.00	1105.00
STORAGE	11489.	11489.	16195.
OUTFLOW	0.	0.	6527.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	1103.51	0.	15093.	4375.	0.	49.00	0.
1.00	1105.41	1.41	17316.	12679.	8.00	47.00	0.

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION       JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**********

**********
THIS PROGRAM IS CURRENTLY BEING MODIFIED
TO RUN ON THE OGS HONEYWELL SYSTEM

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
TO MIKE TILLSON (RM. 423) PH: 7-5666
**********
    1             A CANADICE LAKE DAM     NY-443                              GENESEE RIVER BASIN
    2             A                       CITY OF ROCHESTER                   ONTARIO COUNTY
    3             A                       WATER SUPPLY                        PMF - SNYDER UH
    4             B    100       1        0       0       0       0       0       0       0       0
    5             B1     5
    6             J      1       2        1
    7             J1   0.5       1
    8             K      0       1                                            1
    9             K1                    INFLOW HYDROGRAPH
   10             M      1       1   12.34           12.34    0.81                           1
   11             P             21.5     113     123     135     145
   12             T                                                    1.0     0.1
   13             W   4.76   0.625
   14             X     25      25        1
   15             K      1       1                                            1
   16             K1                    ROUTED HYDROGRAPH AT DAM - NO BREACH   SLUICE GATE-OPEN
   17             Y                             1       1
   18             Y1     5                                             -1099      -1
   19             Y4  1090    1091    1092    1093    1094    1095    1096  1097.2    1098    1099
   20             Y41099.8    1100    1101    1102    1103    1104    1105
   21             YS     0     102     204     306     408     491     566     642     689     735
   22             YS  1122    1247    2092    3176    4509    6105    7729
   23             SS 11489   13409   16195
   24             SE  1099  1101.5    1105
   25             SS  1090
   26             SD  1105   3.087     1.5     763
```

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1099.00	1090.00	1105.00
STORAGE	11689.	11689.	16195.
OUTFLOW	735.	0.	7729.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	1102.91	0.	14529.	4385.	0.	49.00	0.
1.00	1105.99	0.99	16980.	11635.	6.00	47.00	0.

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

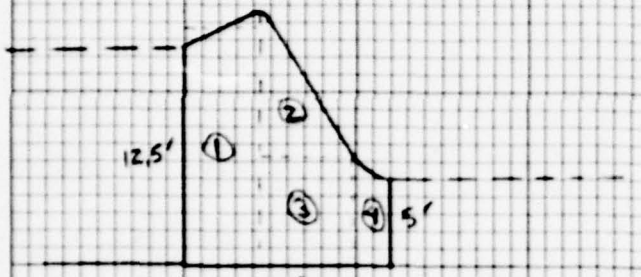
OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.50	 RATIO 2 1.00
HYDROGRAPH AT	1	12.34	1	8897.	17795.
	(	0.00)	(	251.95)(	503.89)(
ROUTED TO	1	12.34	1	4385.	11635.
	(	0.00)	(	124.18)(	329.48)(

APPENDIX D

STABILITY COMPUTATIONS

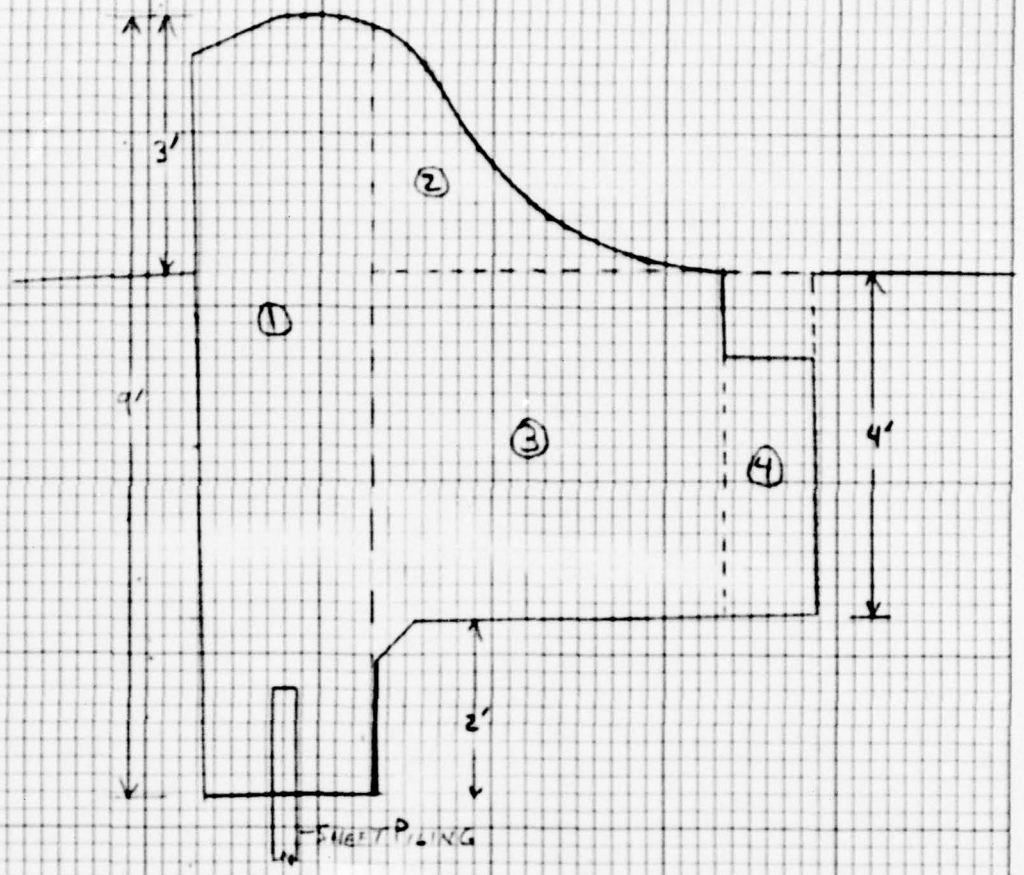
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

Eastern Auxiliary Spillway Section



	Area (ft²)	Distance From Toe to Centroid
①	(12.5)(4.0) = 54	10
②	½(6)(8.5) = 25.5	6
③	6(6) = 36	5
④	5(2) = 10	1

Western Auxiliary Spillway Section



	Area (ft²)	Distance From Toe to Centroid
①	(9)(2) = 18	6
②	½(3)(4) = 6	3.67
③	4(4) = 16	3
④	4(1) = 4	.5

CANADICE LAKE DAM - CROSS SECTIONS FOR STABILITY COMPUTATIONS

00-15-1 (3/78)
Formerly GA-17

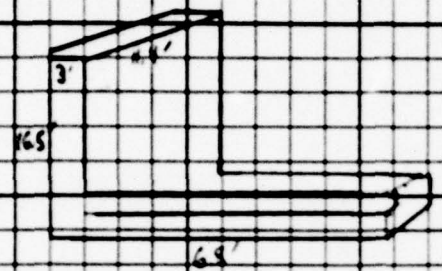
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	1		
SUBJECT		**COMPUTED BY**	**DATE**
STABILITY ANALYSIS - EAST OGEE SECTION		RLW	8/14/79

CALCULATE LOADS DUE TO SIDE RETAINING WALLS

1. EAST SIDE WALL



WALL + ½ OF BASE SLAB

$(11.4)(3)(16.5) + (10)(5.5)(6.6) = 940.5\ ft^2$

2. WEST SIDE WALL



① $(15.6)(2)(12) = 374.4$

② $\frac{1}{2}(15.6)(3.2)(12) = 299.5$

③ $(4.9)(5.2)(12) = 305.8$

④ $(1)(1.5)(12) = 18.0$

⑤ $2(1.5)(12) = 36.0$

⑥ $2(3)(12) = 72.0$

$1105.7\ ft^3$

TOTAL $= 1105.7 + 940.5 = \frac{2046.2\ ft^3}{16\ ft} = 127.9\ ft^3/ft$ of dam

ADD THIS TOTAL TO AREA NO. (3) FOR INPUT TO PROGRAM

$36 + 127.9 = 163.9\ ft^2$

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	2		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS - EAST OGEE SECTION		RLW	8/14/79

ADD EFFECT OF DOWNSTREAM SLAB TO SLIDING RESISTANCE

SLAB $(1)(27)(.15) = 4.05 K/ft$

SLIDING RESISTANCE $= (4.05 K/ft)(.45) = 1.82$

NORMAL CONDITIONS

$$F.S._{SLIDING} = \frac{\text{RESISTING FORCE + SLAB RESISTANCE}}{\text{DRIVING FORCE}} = \frac{16.67 + 1.82}{7.97} = 2.32$$

ICE LOADING

$$F.S._{SLIDING} = \frac{16.67 + 1.82}{12.98} = 1.42$$

PMF LOADING

$$F.S._{SLIDING} = \frac{15.88 + 1.82}{12.13} = 1.46$$

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	3		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS - EAST OGEE SECTION		RLW	8/14/79

SEISMIC ANALYSIS

NORMAL CONDITIONS - WATER AT SPILLWAY CREST - NO ICE

1. CALCULATE HORIZONTAL FORCE ON UPSTREAM FACE DUE TO WATER PRESSURE

$$P_e = c \gamma_w h = (.7)(.1)(.0624)(14.5) = .063$$

2. CALCULATE MOMENT & FORCE OF EARTHQUAKE

$$M_e = .299(P_e)y^2 = .299(.063)(14.5)^2 = 3.96$$

$$V_e = .726(P_e)y = (.726)(.063)(14.5) = .66$$

3. REDUCE WEIGHT OF CONCRETE BY 5%

$(.15)(.95) = .142$

4. REVISED OVERTURNING SAFETY FACTOR - SEISMIC ANALYSIS

$$F.S. = \frac{\text{RESISTING MOMENT}}{\text{OVERTURNING MOM.} + \text{EARTHQUAKE MOMENT}} = \frac{22093}{88.53 + 3.96} = 2.39$$

5. REVISED SLIDING SAFETY FACTOR - SEISMIC ANALYSIS

$$F.S. = \frac{\text{RESISTING FORCE}}{\text{SLIDING FORCE} + \text{EARTHQUAKE FORCE}} = \frac{15.75}{7.98 + .66} = 1.82$$

00-15-1 (3/78)
Formerly CA-17

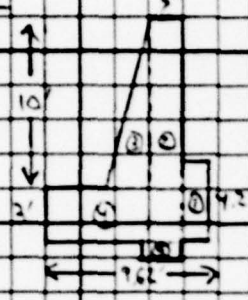
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	1		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS - WEST CREEK SECTION		RLW	8/15/79

CALCULATE LOADS DUE TO SIDE RETAINING WALLS

EAST SIDE WALL



① $1.5(4.25)(20) = 127.5$

② $2(13)(20) = 520.0$

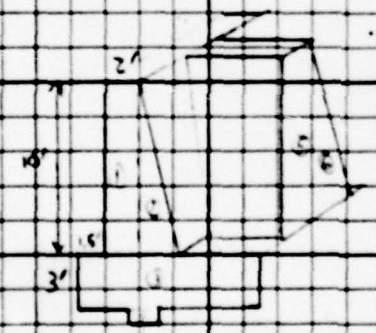
③ $\frac{1}{2}(10)(2.5)(20) = 2500$

④ $3(6)(20) = 360$

⑤ $(1.25)(2)(20) = 50$

1307.5

WEST SIDE WALL



① $2(10)(15) = 300$

② $\frac{1}{2}(2.5)(10)(15) = 187.5$

③ $3(9)(15) = 405$

④ $(.67)(1.5)(15) = 15.07$

⑤ $(2)(4.21)(10) = 84.2$

⑥ $\frac{1}{2}(4.6)(10)(4.31) = 96.8$

1088.6

TOTAL = $1088.6 + 1307.5 = \frac{2396.1}{100} = 23.96$ K/Ft OF DAM

ADD THIS TOTAL TO AREA No. ② FOR INPUT TO PROGRAM

$6 + 23.96 = 29.96$

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	3		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS - WEST OGEE SECTION		RLW	8/15/79

SEISMIC ANALYSIS

NORMAL CONDITIONS - WATER AT SPILLWAY CREST - NO ICE

1. CALCULATE HORIZONTAL FORCE ON UPSTREAM FACE DUE TO WATER PRESSURE

$$P_e = c\lambda w H = (.7)(.1)(.0624)(9) = .039$$

2. CALCULATE MOMENT & FORCE OF EARTHQUAKE

$$M_e = (.299)(P_e)\,y^2 = .299(.039)(9)^2 = .95$$

$$V_e = .726(P_e)\,y = (.726)(.039)(9) = .25$$

3. REDUCE WEIGHT OF CONCRETE BY 5%

$$(.15)(.95) = .142$$

4. REVISED OVERTURNING SAFETY FACTOR - SEISMIC ANALYSIS

$$F.S. = \frac{\text{RESISTING MOMENT}}{\text{OVERTURN. MOM.} + \text{EARTHQUAKE MOM.}} = \frac{44.01}{15.43 + .95} = 2.68$$

5. REVISED SLIDING SAFETY FACTOR - SEISMIC ANALYSIS

$$F.S. = \frac{\text{RESISTING FORCE}}{\text{SLIDING FORCE} + \text{EARTHQUAKE FORCE}} = \frac{6.38}{1.85 + .25} = 3.01$$

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
CANADICE LAKE DAM	2		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS - WEST OGEE SECTION		RLW	8/15/79

ADD EFFECT OF DOWNSTREAM SLAB TO SLIDING RESISTANCE

SLAB $(1)(50)(.15) = 7.5 K/ft$

SLIDING RESISTANCE $= (7.5)(.45) = 3.37$

NORMAL CONDITIONS

$$F.S._{SLIDING} = \frac{\text{RESISTING FORCES} + \text{SLAB RESISTANCE}}{\text{DRIVING FORCES}} = \frac{6.58 + 3.37}{1.86} = 5.35$$

ICE LOADING

$$F.S._{SLIDING} = \frac{6.48 + 3.37}{6.85} = 1.45$$

½PMF LOADING

$$F.S._{SLIDING} = \frac{6.12 + 3.37}{4.44} = 2.13$$

EASTERN OGEE
NORMAL COND.

0.15	RCL 1
54.	
54.	RCL 2
10.	
10.	RCL 3
25.5	
25.5	RCL 4
6.	
6.	RCL 5
163.9	
163.9	RCL 6
5.	
0.	RCL 7
12.	
12.	RCL 8
14.5	
14.5	RCL 9
0.	
0.	RCL 10
0.45	
0.45	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
0.	
0.	RCL 15
12.5	
12.5	RCL 16
5.	
5.	RCL 17
5.	
5.	RCL 18
0.0624	
0.0624	RCL 19
10.	
10.	RCL 20
1.	
1.	RCL 46
14.5	

EASTERN OGEE
ICE LOAD = 5000

0.15	RCL 1
54.	
54.	RCL 2
10.	
10.	RCL 3
25.5	
25.5	RCL 4
6.	
6.	RCL 5
163.9	
163.9	RCL 6
5.	
5.	RCL 7
12.	
12.	RCL 8
14.5	
14.5	RCL 9
5.	
5.	RCL 10
0.45	
0.45	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
0.	
0.	RCL 15
12.5	
12.5	RCL 16
5.	
5.	RCL 17
5.	
5.	RCL 18
0.0624	
0.0624	RCL 19
10.	
10.	RCL 20
1.	
1.	RCL 46
14.5	

F.S. OVERTURNING

2.633078456
4.708041788
2. [redacted]

1.447613277
2.347185758
1 [redacted]

EASTERN OGEE
½ PMF

0.15	RCL 1
54.	
54.	RCL 2
10.	
10.	RCL 3
25.5	
25.5	RCL 4
6.	
6.	RCL 5
163.9	
163.9	RCL 6
5.	
5.	RCL 7
12.	
12.	RCL 8
14.5	
14.5	RCL 9
0.	
0.	RCL 10
0.45	
0.45	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
4.6	
4.6	RCL 15
12.5	
12.5	RCL 16
5.	
5.	RCL 17
5.	
5.	RCL 18
0.0624	
0.0624	RCL 19
10.	
10.	RCL 20
1.	
1.	RCL 46
14.5	

1.75953479 ← F.S. OVERTURNING.
3.47146430[illegible]
[redacted]

EASTERN OGEE
EARTHQUAKE

0.142	RCL 1
54.	
54.	RCL 2
10.	
10.	RCL 3
25.5	
25.5	RCL 4
6.	
6.	RCL 5
163.9	
163.9	RCL 6
5.	
5.	RCL 7
12.	
12.	RCL 8
14.5	
14.5	RCL 9
0.	
0.	RCL 10
0.45	
0.45	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
0.	
0.	RCL 15
12.5	
12.5	RCL 16
5.	
5.	RCL 17
5.	
5.	RCL 18
0.0624	
0.0624	RCL 19
10.	
10.	RCL 20
1.	
1.	RCL 46
14.5	

[redacted]
4.6[illegible]6142419
[redacted]

WESTERN OGEE
NORMAL COND.

```
0.15        RCL
              1
18.
18.         RCL
              2
6.
6.          RCL
              3
29.96
29.96       RCL
              4
3.7
3.7         RCL
              5
16.
16.         RCL
              6
3.
3.          RCL
              7
7.
7.          RCL
              8
9.
9.          RCL
              9
0.
0.          RCL
             10
0.45
0.45        RCL
             11
0.055
0.055       RCL
             12
0.33
0.33        RCL
             13
3.
3.          RCL
             14
0.
0.          RCL
             15
6.
6.          RCL
             16
6.
6.          RCL
             17
2.
2.          RCL
             18
0.0624
0.0624      RCL
             19
4.
4.          RCL
             20
0.5
0.5         RCL
             46
7.
```

WESTERN OGEE
ICE LOAD = 5000

```
0.15        RCL
              1
18.
18.         RCL
              2
6.
6.          RCL
              3
29.96
29.96       RCL
              4
3.7
3.7         RCL
              5
16.
16.         RCL
              6
3.
3.          RCL
              7
7.
7.          RCL
              8
9.
9.          RCL
              9
5.
5.          RCL
             10
0.45
0.45        RCL
             11
0.055
0.055       RCL
             12
0.33
0.33        RCL
             13
3.
3.          RCL
             14
0.
0.          RCL
             15
6.
6.          RCL
             16
6.
6.          RCL
             17
2.
2.          RCL
             18
0.0624
0.0624      RCL
             19
4.
4.          RCL
             20
0.5
0.5         RCL
             46
7.
```

2.990655659 ← F.S. OVERTURNING → .915.210149
3.970145782 .553220636[illegible]

WESTERN OGEE
½ PMF

0.15	RCL 1
18.	
18.	RCL 2
6.	
6.	RCL 3
29.6	
29.6	RCL 4
3.7	
3.7	RCL 5
16.	
16.	RCL 6
3.	
3.	RCL 7
7.	
7.	RCL 8
9.	
9.	RCL 9
0.	
0.	RCL 10
0.45	
0.45	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
4.6	
4.6	RCL 15
6.	
6.	RCL 16
6.	
6.	RCL 17
2.	
2.	RCL 18
0.0624	
0.0624	RCL 19
4.	
4.	RCL 20
0.5	
0.5	RCL 46
7.	

1.453799058 ← F.S. OVERTURNING
2.134617642
1 [redacted]

WESTERN OGEE
EARTHQUAKE

0.142	RCL 1
18.	
18.	RCL 2
6.	
6.	RCL 3
29.96	
29.96	RCL 4
3.7	
3.7	RCL 5
16.	
16.	RCL 6
3.	
3.	RCL 7
7.	
7.	RCL 8
9.	
9.	RCL 9
0.	
0.	RCL 10
0.45	
0.45	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
0.	
0.	RCL 15
6.	
6.	RCL 16
6.	
6.	RCL 17
2.	
2.	RCL 18
0.0624	
0.0624	RCL 19
4.	
4.	RCL 20
0.5	
	46
7.	

[redacted]
3.97.103824
[redacted]

APPENDIX E

REFERENCES

APPENDIX E

REFERENCES

1) U.S. Army, Corps of Engineers:

Engineering Manual 1110-2-1405; Flood-Hydrograph Analyses and Computations, August 1959

HEC-1 Flood Hydrograph Package - Dam Safety Version, September 1978

2) U.S. Department of Agriculture, Soil Conservation Service; National Engineering Handbook; Section 4 - Hydrology, August 1972

3) U.S. Department of Commerce; Weather Bureau; Hydrometeorological Report No. 33 - Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours, April 1956

4) U.S. Department of the Interior, Bureau of Reclamation; Design of Small Dams, 2nd Edition (rev. reprint), 1977

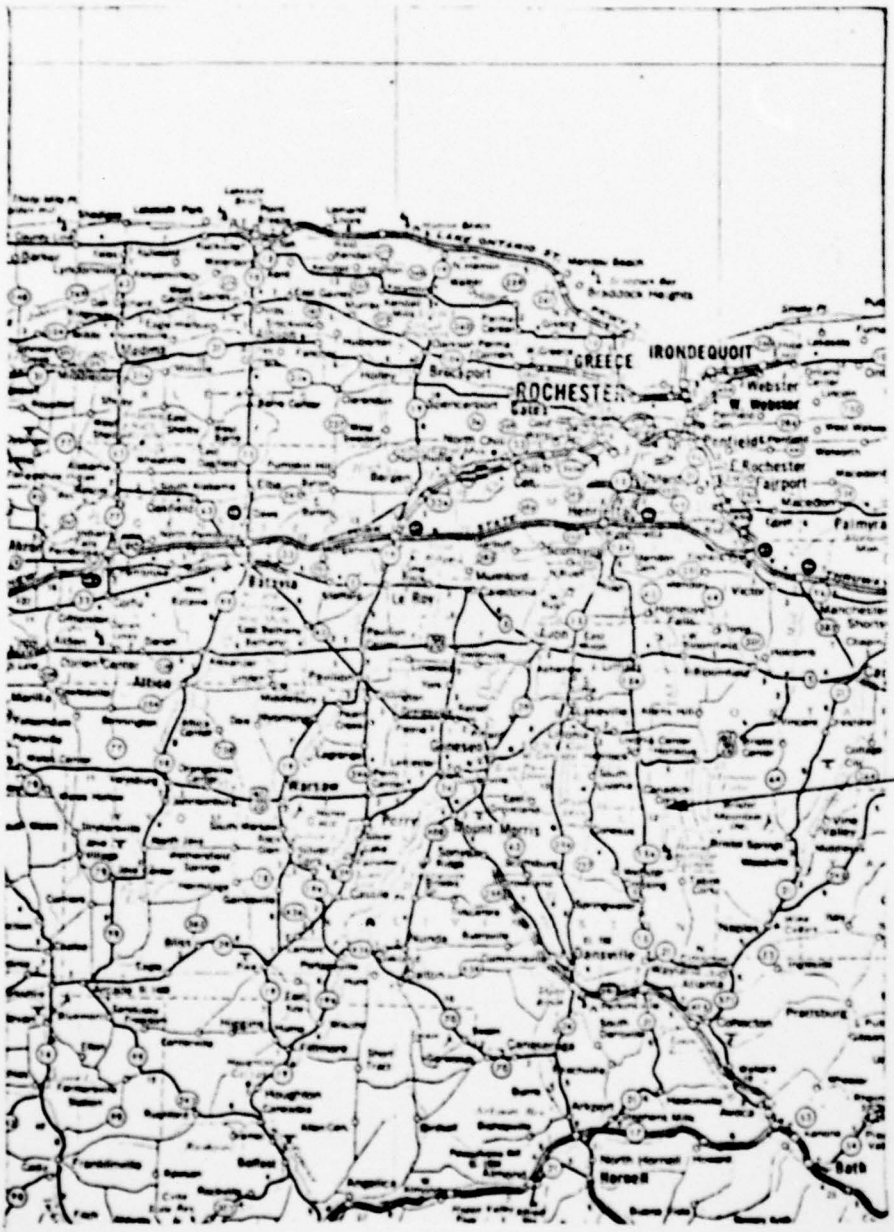
5) H.W. King and E.F. Brater; Handbook of Hydraulics, 5th Edition, McGraw-Hill, 1963

6) University of the State of New York; Geology of New York, Education Leaflet 20, (reprint) 1973

7) City of Rochester, Bureau of Water - 7/27/79 communication

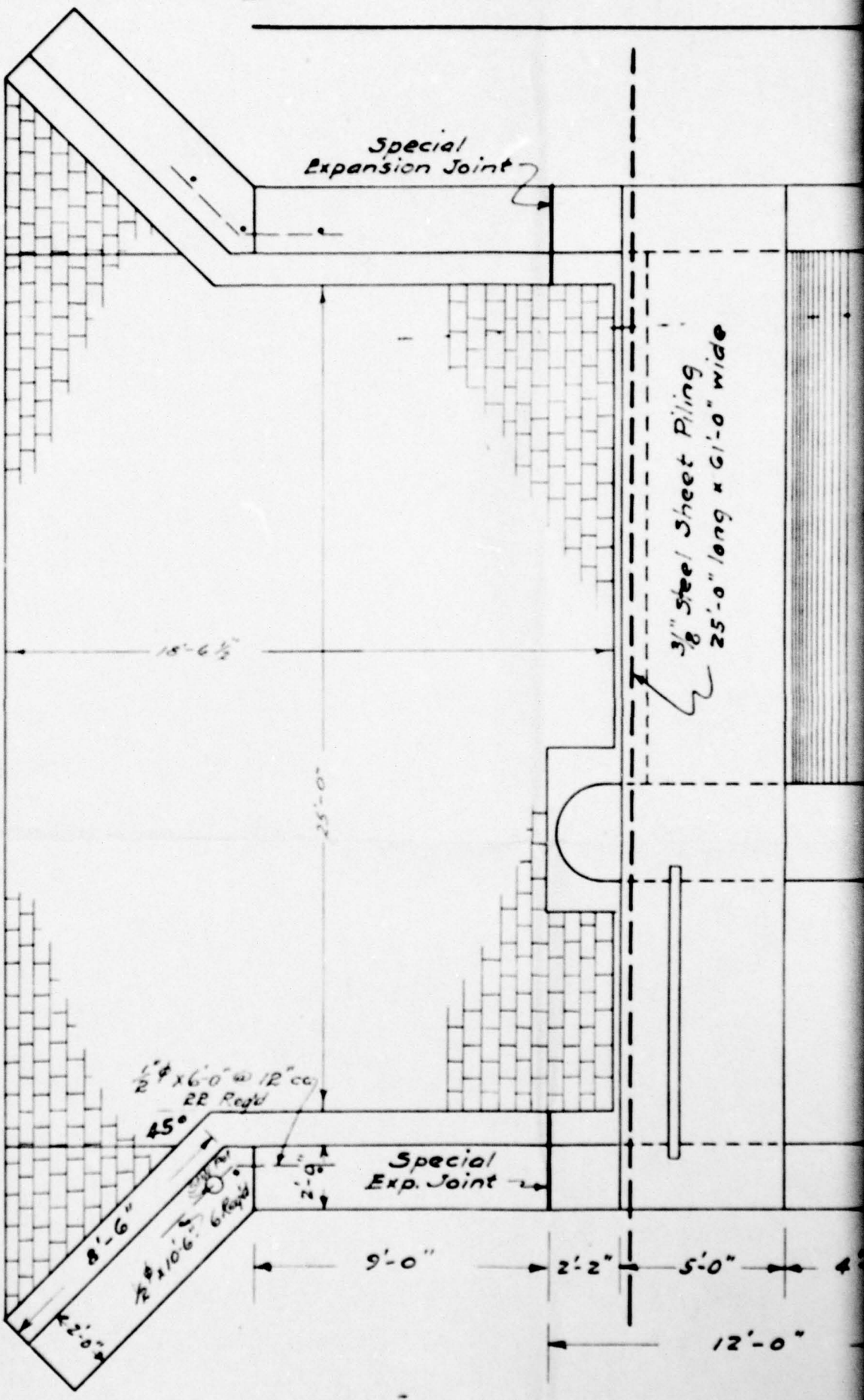
APPENDIX F

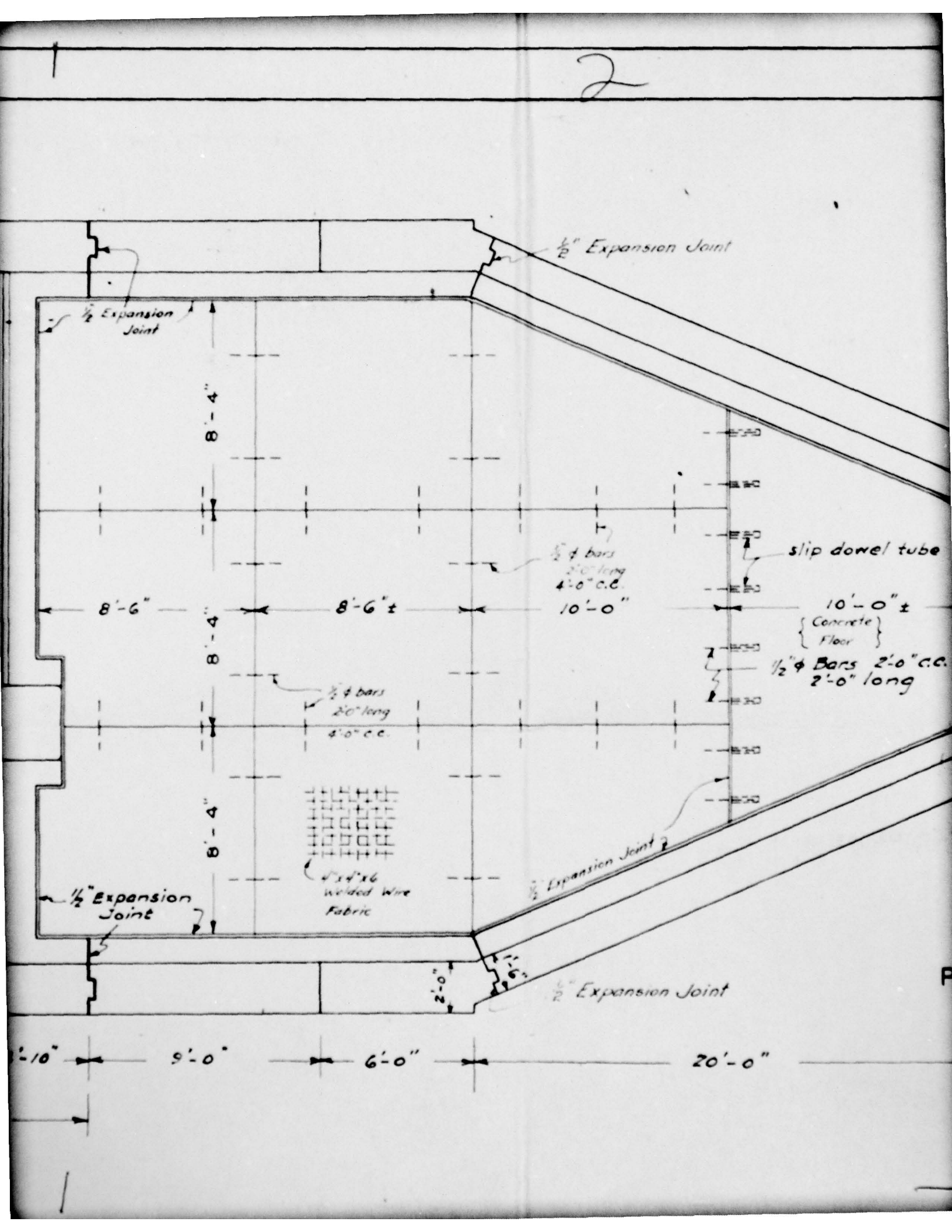
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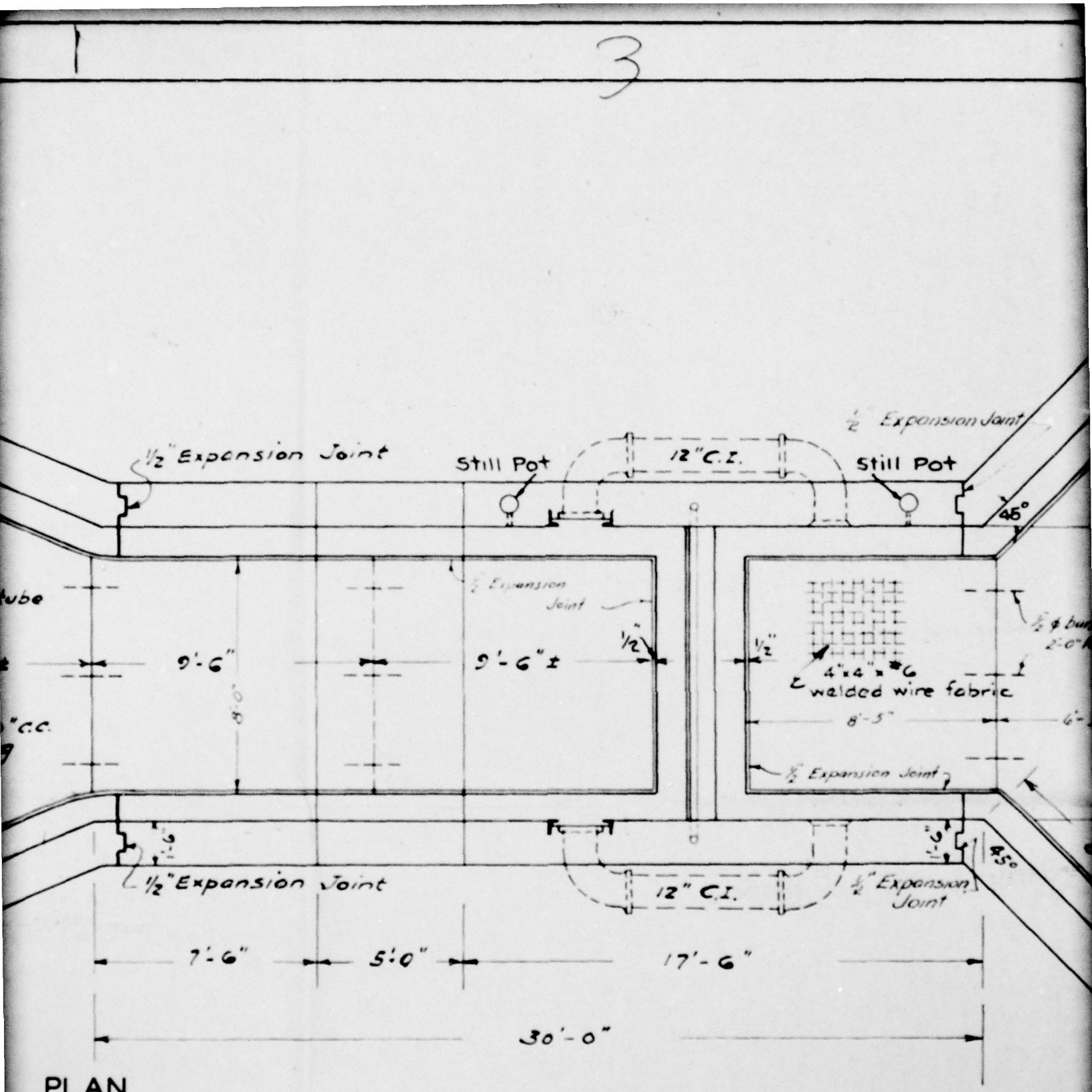


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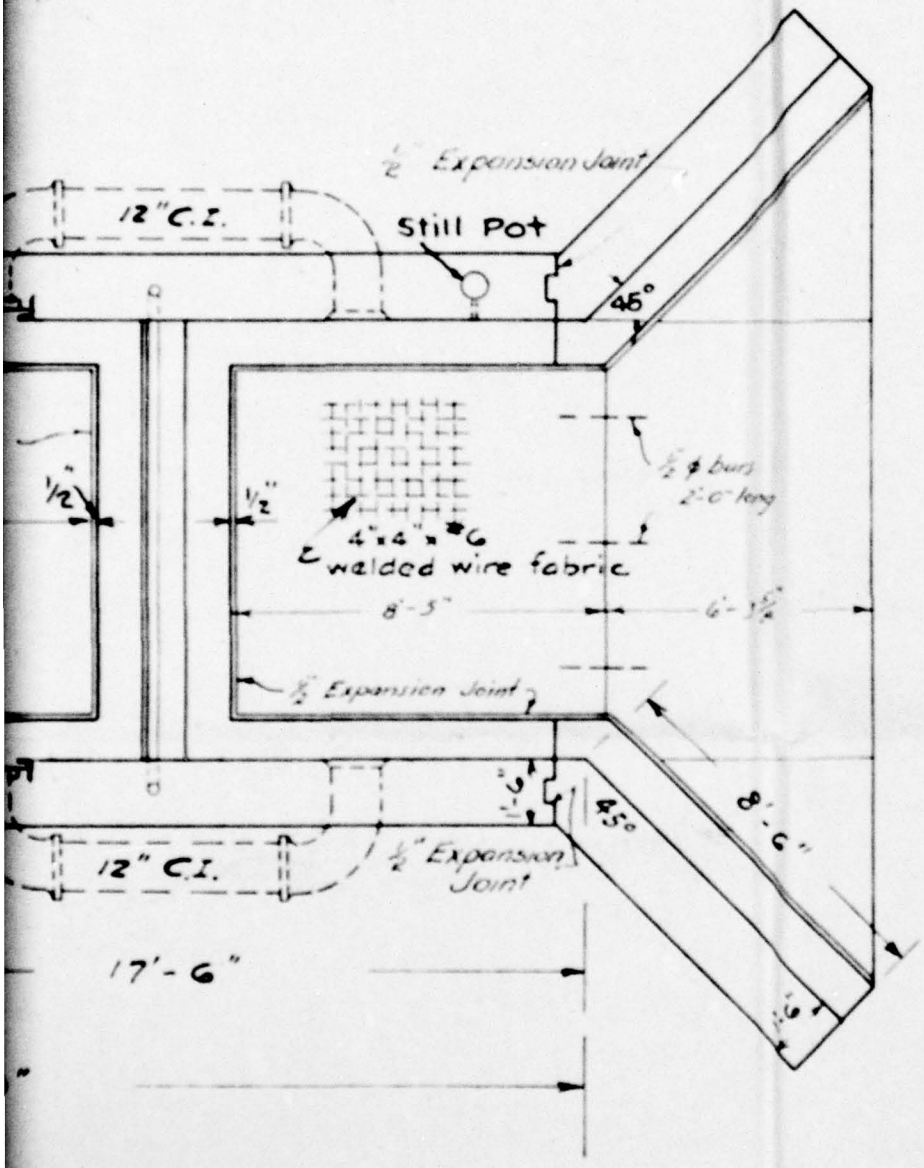
Canadice Lake Dam

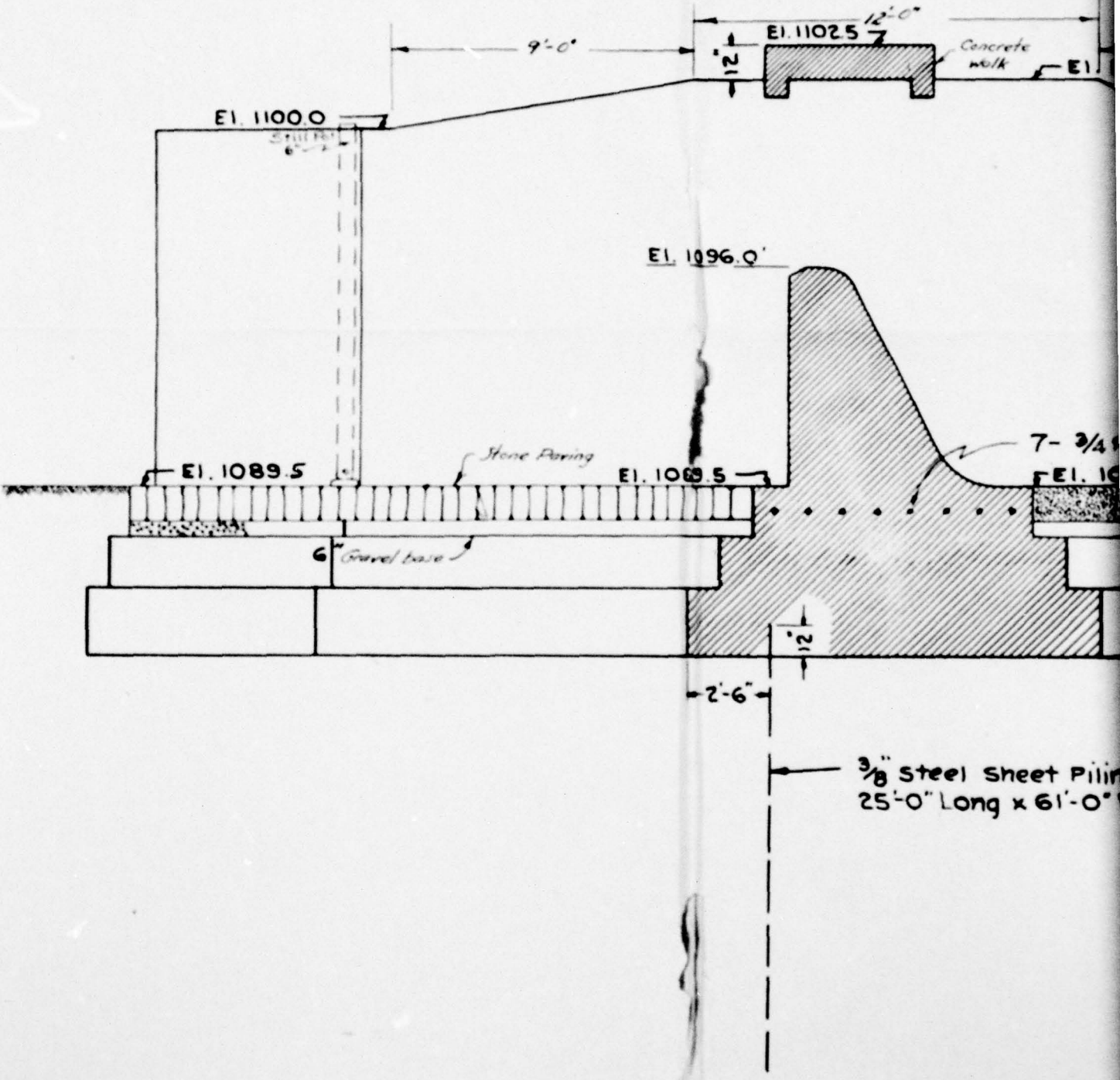

Special
Expansion Joint
3/8" Steel Sheet Piling
25'-0" long x 6'-0" wide
18'-6 1/2"
25'-0"
1/2" ϕ x 6'-0" @ 12" cc
2E Reqd
45°
Special
Exp. Joint
2'-6"
8'-6"
1/2" ϕ x 10'-6" L 6 Reqd
2'-0"
9'-0"
2'-2"
5'-0"
12'-0"

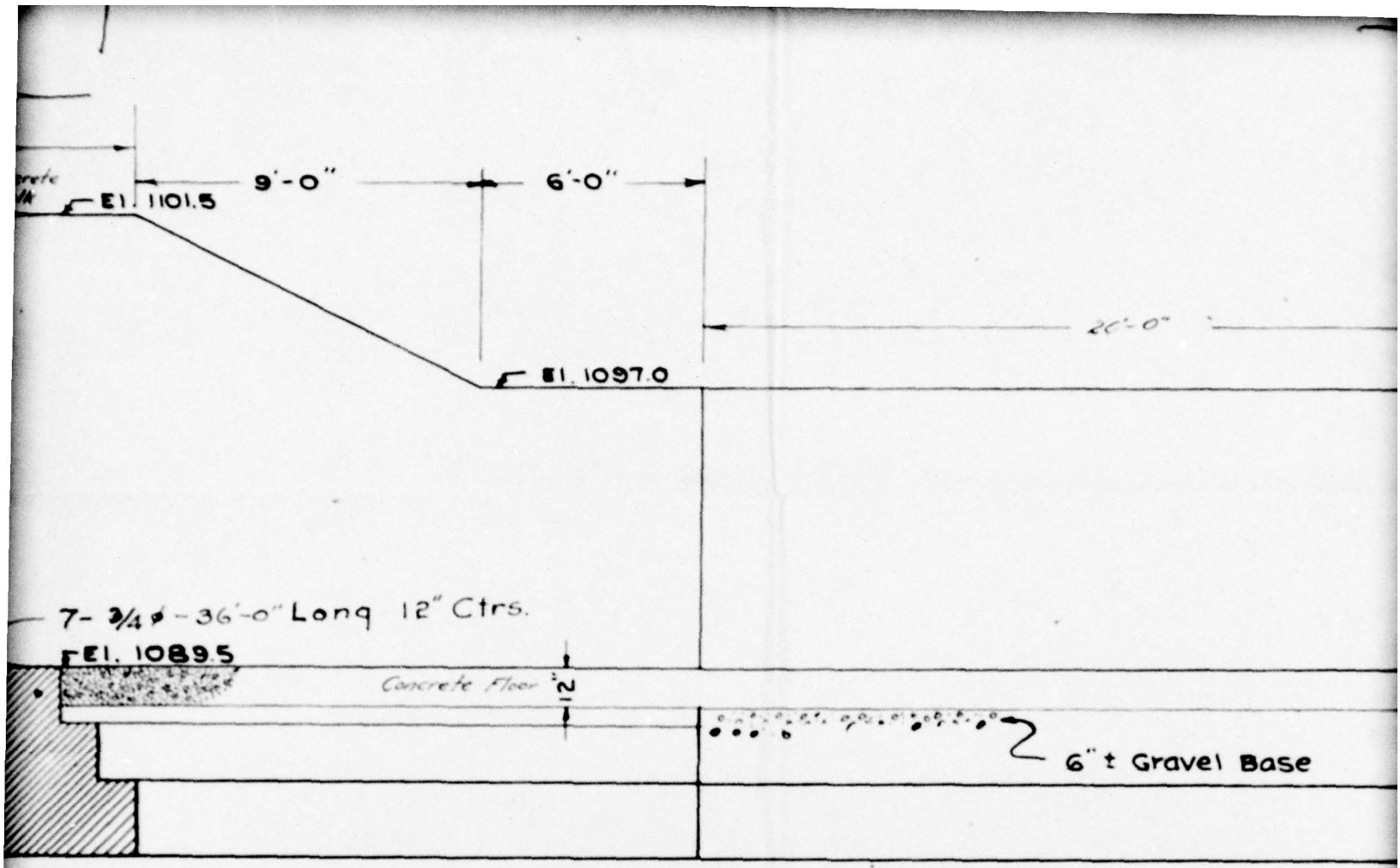

1
2
½" Expansion Joint
½" Expansion Joint
8'-4"
8'-4"
8'-4"
8'-6"
8'-6"±
10'-0"
10'-0"±
{Concrete Floor}
½"ϕ bars 2'-0" long 4'-0" c.c.
slip dowel tube
½"ϕ Bars 2'-0" c.c. 2'-0" long
½"ϕ bars 2'-0" long 4'-0" c.c.
½" Expansion Joint
4"x4"x6 Welded Wire Fabric
½" Expansion Joint
½" Expansion Joint
2'-0"
9'-0"
6'-0"
20'-0"


½" Expansion Joint
Still Pot
12" C.I.
Still Pot
½" Expansion Joint
45°
9'-6"
9'-6"
½"
½"
4"x4"x6
welded wire fabric
8'-5"
½" Expansion Joint
½" Expansion Joint
12" C.I.
½" Expansion Joint
45°
7'-6"
5'-0"
17'-6"
30'-0"

PLAN


½" Expansion Joint
12" C.I.
Still Pot
45°
½ ϕ bars
2'-0" long
1½"
1½"
4"x4"x ϕ6
welded wire fabric
8'-5"
6'-3½"
½" Expansion Joint
3"
45°
8'-6"
12" C.I.
½" Expansion Joint
17'-6"

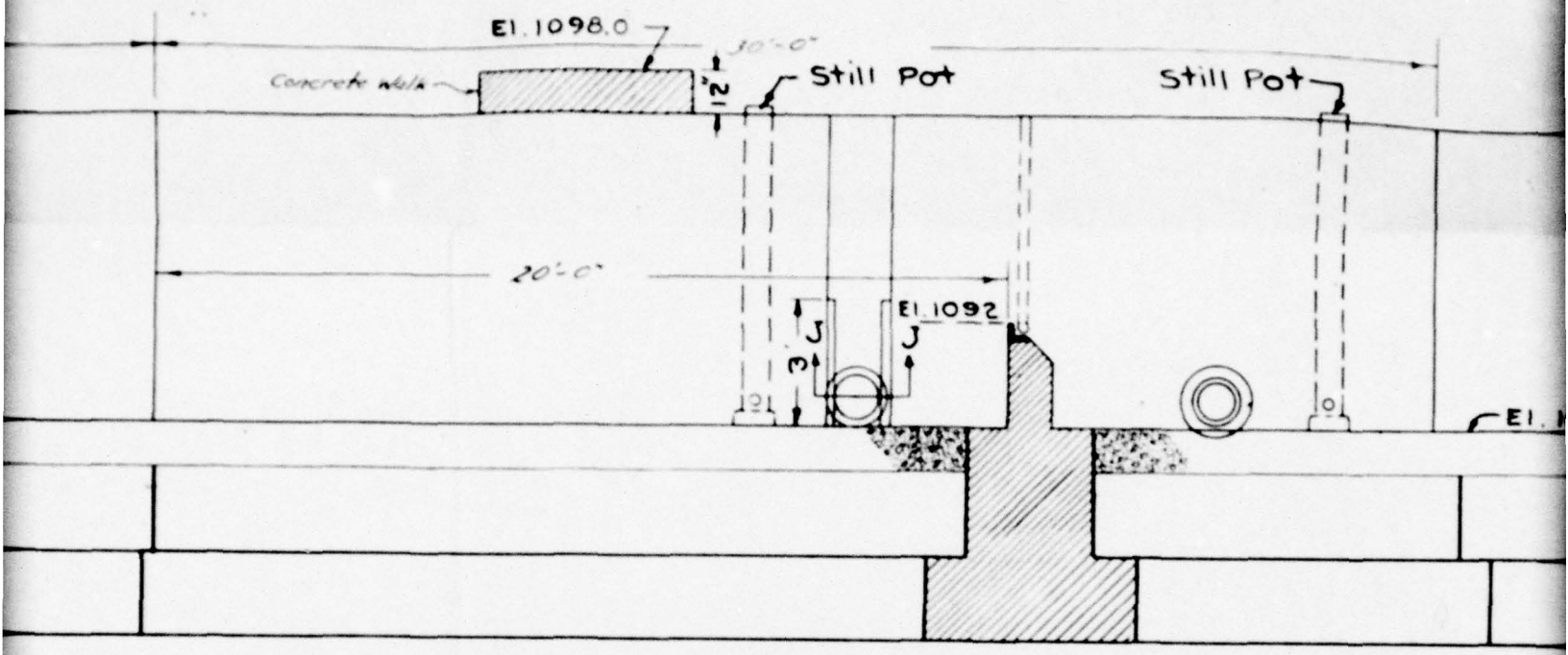

12'-0"
El. 1102.5
9'-0"
1'-2"
Concrete walk
El. 1100.0
El. 1096.0'
El. 1089.5
Stone Paving
El. 1089.5
7- 3/4
6" Gravel base
1'-2"
2'-6"
3/8" Steel Sheet Pilin
25'-0" Long x 61'-0"



Sheet Piling
g x 61'-0" Wide.

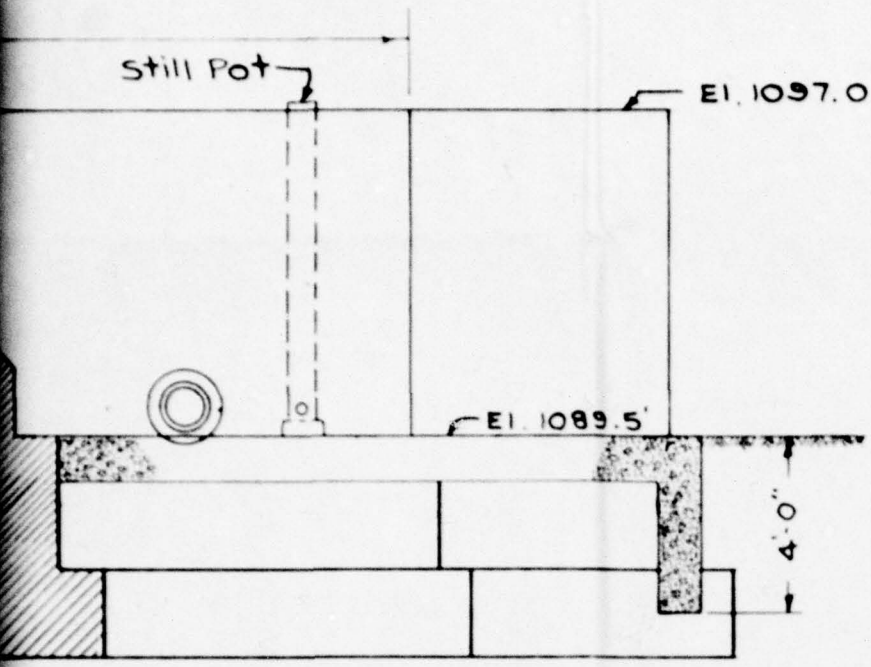
PROFILE ON ℄

6


El. 1098.0
Concrete walls
1'-2"
Still Pot
Still Pot
20'-0"
El. 1092
J
J
3'
El.

7

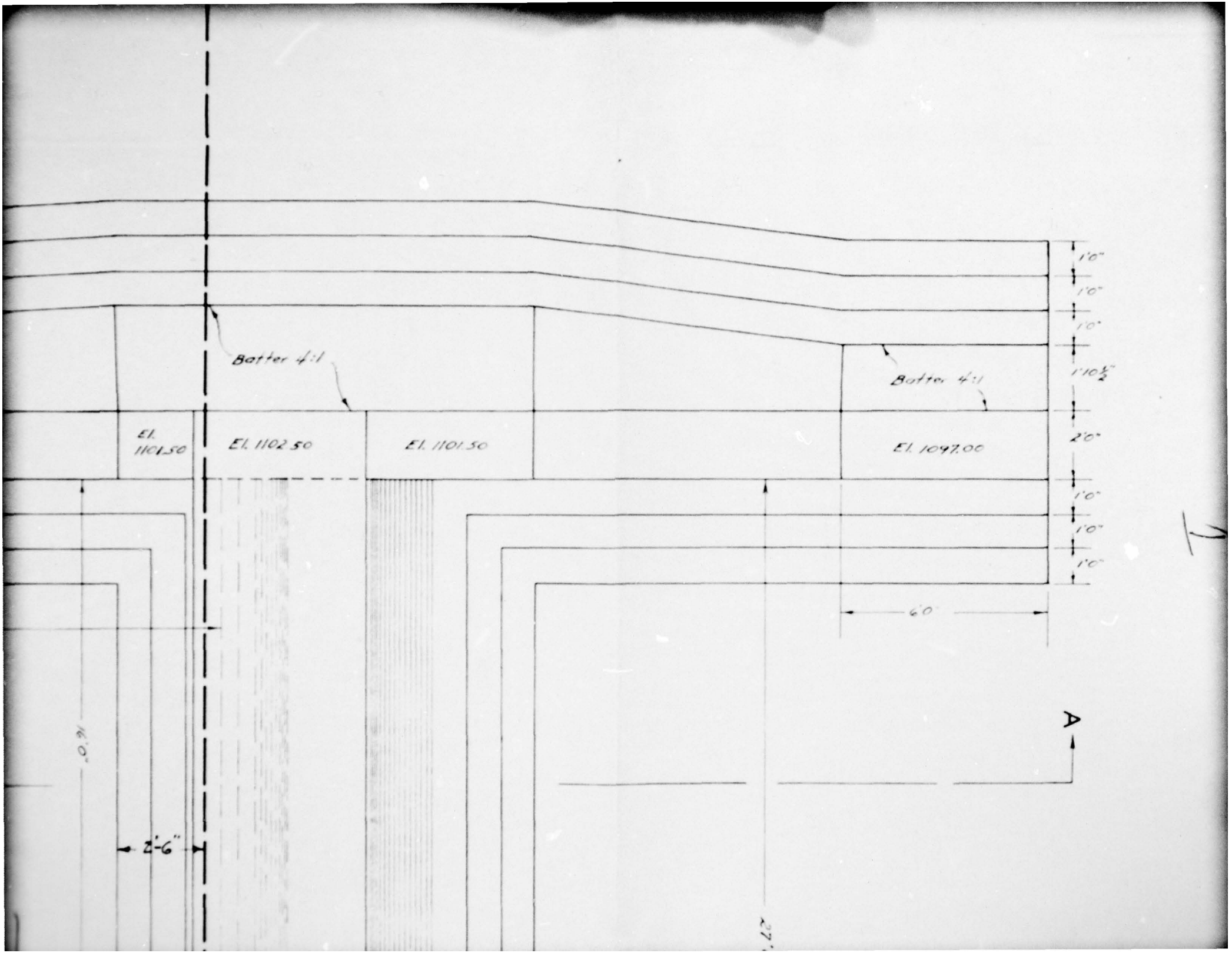
1



Revision Nov 2 1936 - Expansion Joints added at points 20' north of Spillway and 9' north of measuring weir Reinforcing added at corners 16' south of Spillway Elev of walk & stone paving corrected, Sheet #4 & Longitudinal bars

APPROVED BY SUP'T. WATER	APPROVED BY CITY ENGINEER	APPROVED BY COMM. PUBLIC WORKS
Wiley Smith	Morgan D. Hayes	Thos. J. Morris

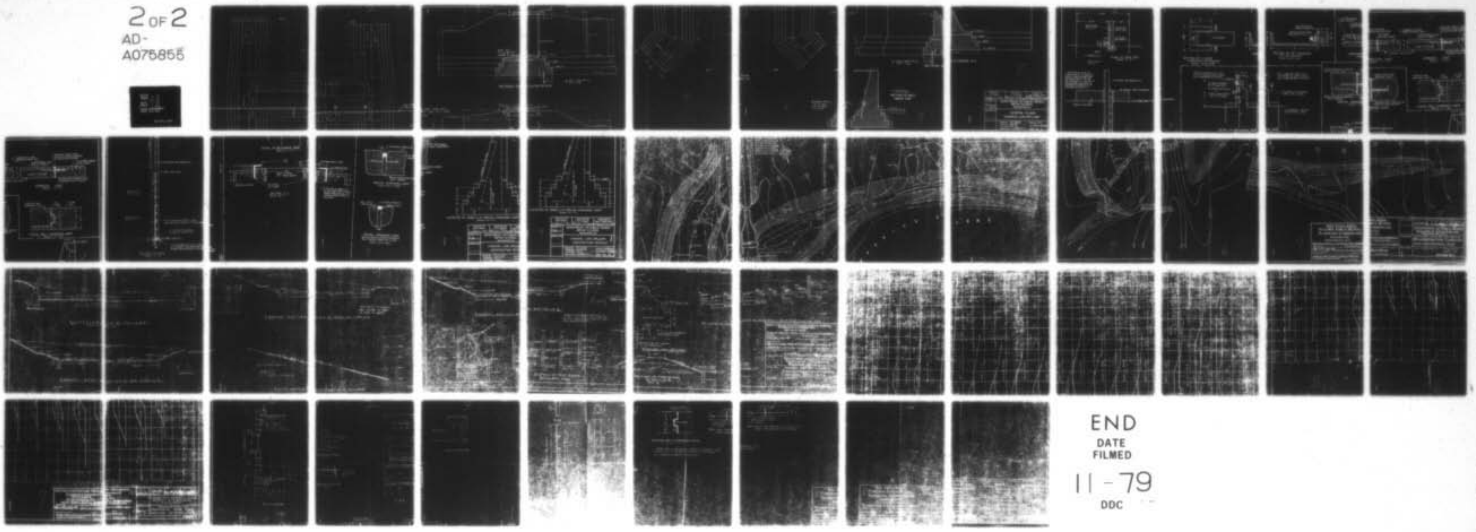
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ORDINANCE NO. — — —	GENERAL LAYOUT CANADICE LAKE SPILLWAY
	DRAWN BY A. P. Mussi — SCALE 1"=4' TRACED BY Sleuter — DATE Sept. 23, 193[illegible] CHECKED BY P.A.C. APPROVED BY [signature] — DWG. NO. 2[illegible]


Batter 4:1
Batter 4:1
El. 1101.50
El. 1102.50
El. 1101.50
El. 1097.00
1'0"
1'0"
1'0"
1'10½"
2'0"
1'0"
1'0"
1'0"
6'0"
A
14'0"
2'-6"

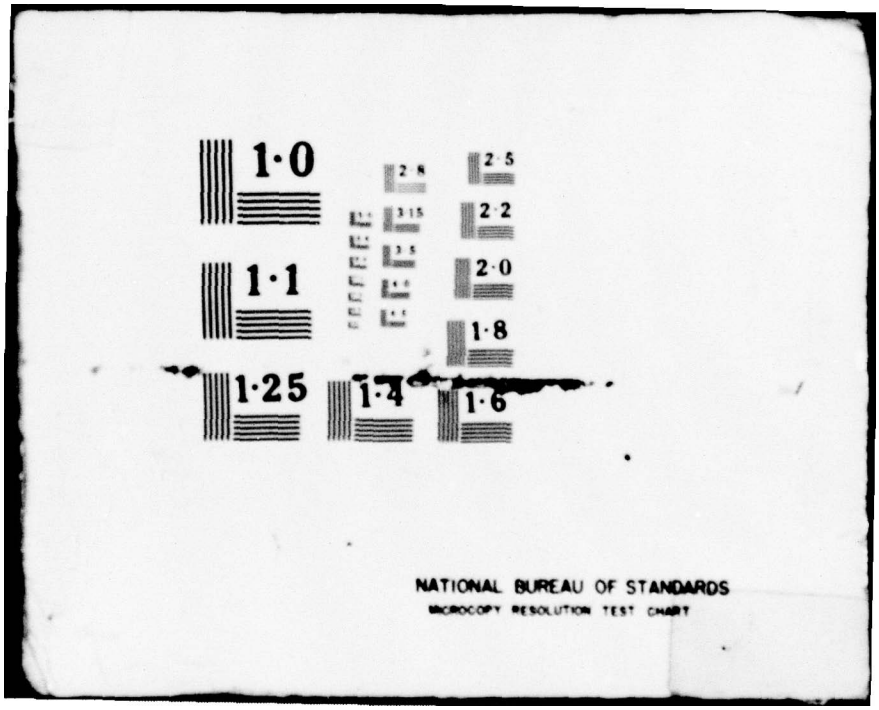
AD-A075 855 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. CANADICE LAKE DAM, INVENTORY NUMBE--ETC(U)
SEP 79 G KOCH DACW51-79-C-0001

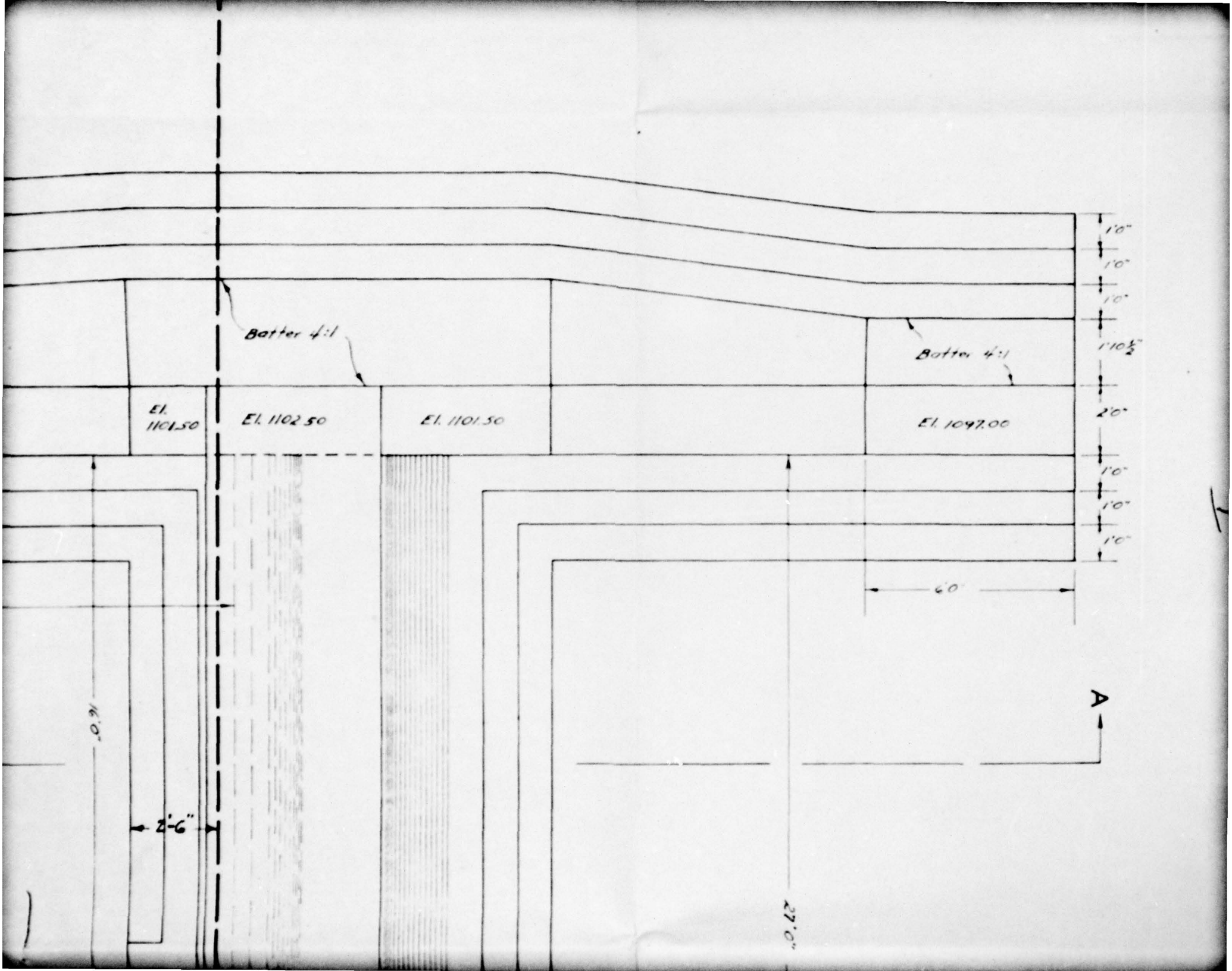
UNCLASSIFIED NL

2 OF 2
AD-
A075855

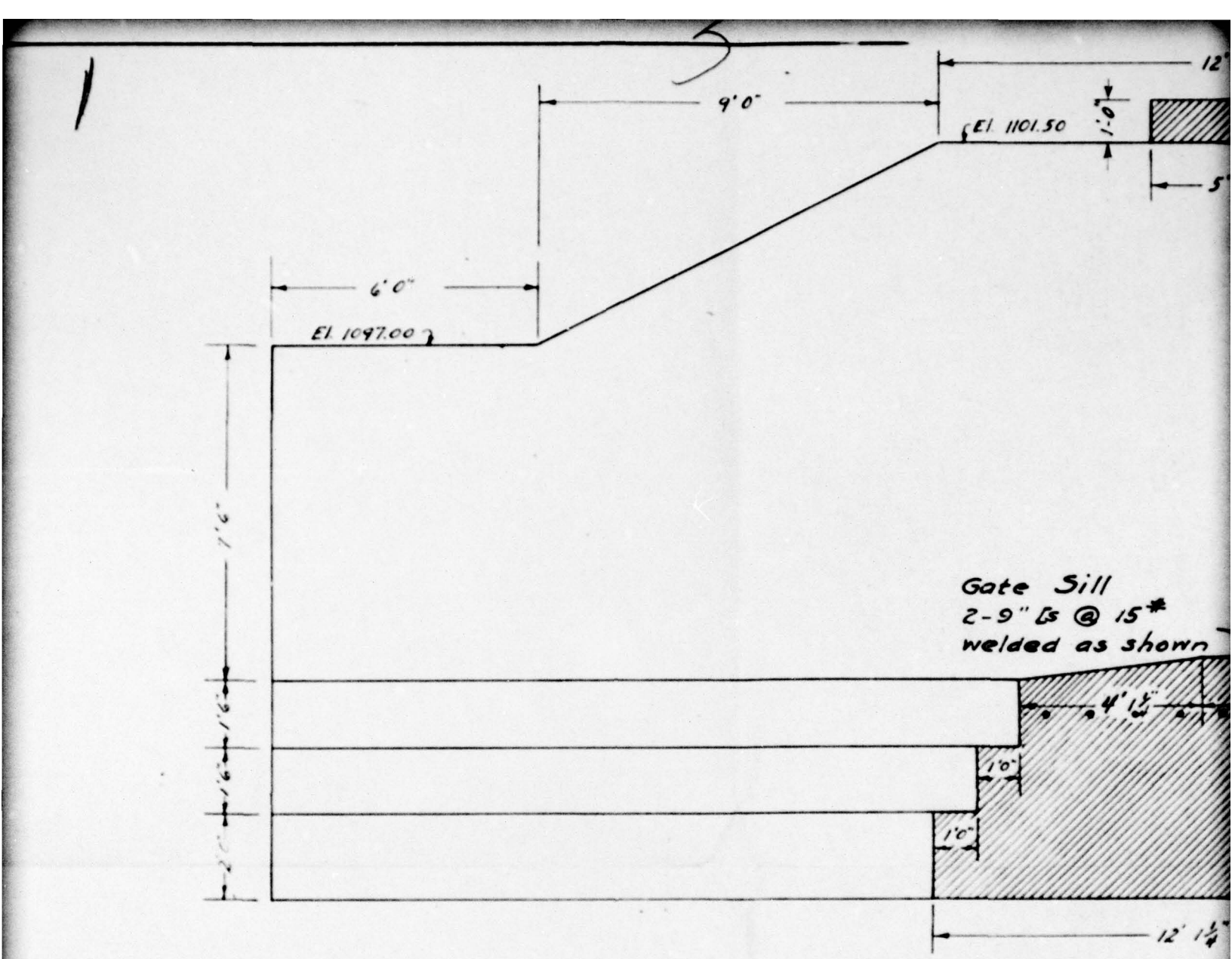


END
DATE
FILMED
11-79
DDC

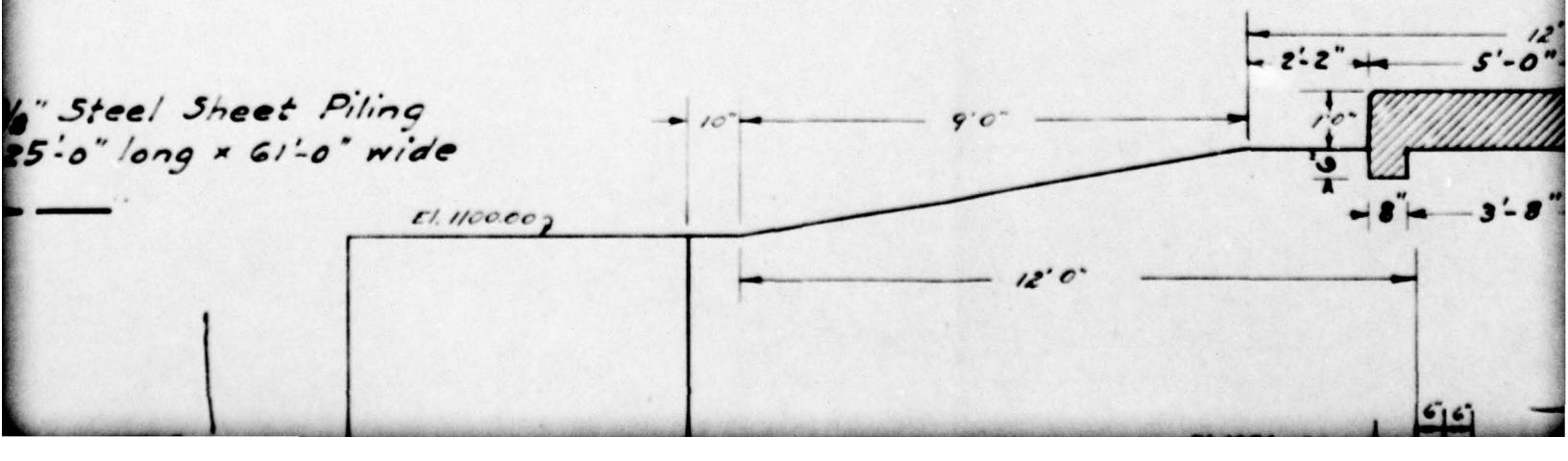

1·0
1·1
1·25
1·4
1·6
2·8
3·15
3·5
4·0
4·5
2·5
2·2
2·0
1·8
NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

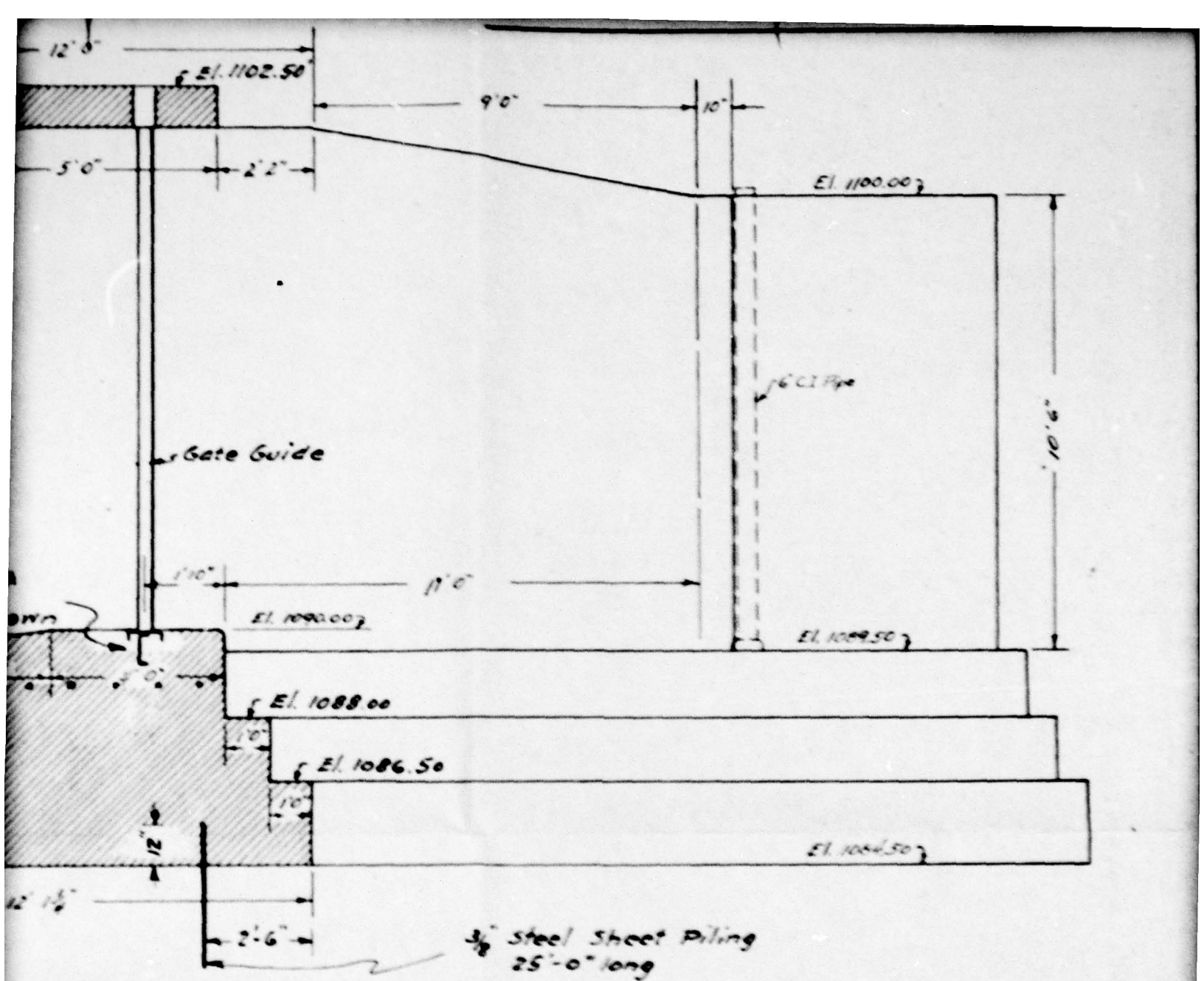

Batter 4:1
Batter 4:1
El. 1101.50
El. 1102.50
El. 1101.50
El. 1097.00
1'0"
1'0"
1'0"
1'10½"
2'0"
1'0"
1'0"
1'0"
60'
A
16'-0"
2'-6"
27'-0"

B
6'-0"
El. 109.00
Batter 4:1
3'-0"
4'-0"
El. 110.50
El. 110.50
5'-0"
3/8" Ste
25'-0" R
El. 110.50
3'-0"
8'-0"

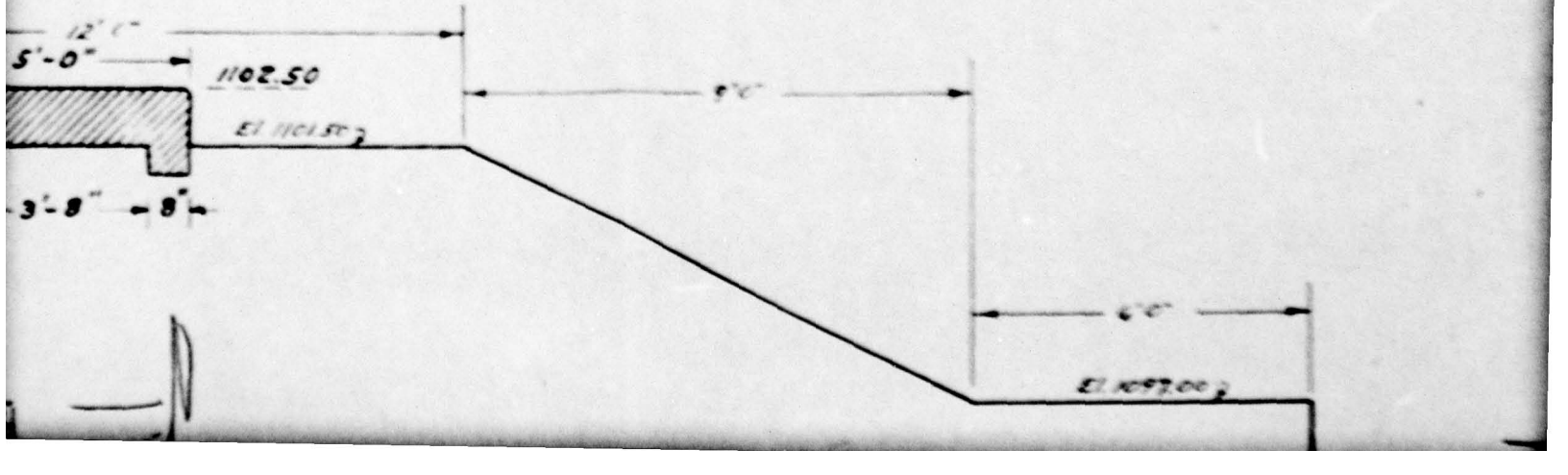


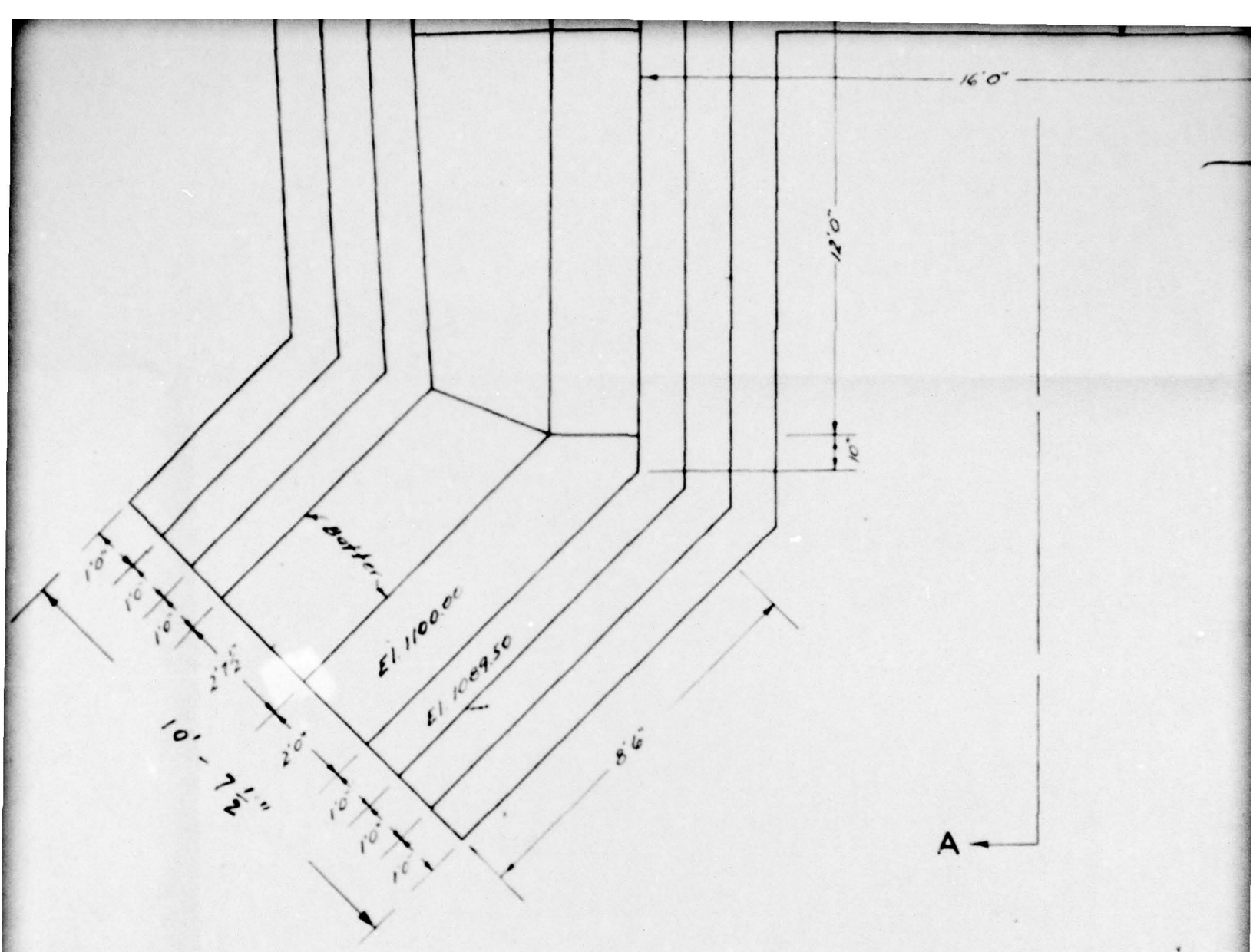
SECTIONAL EL



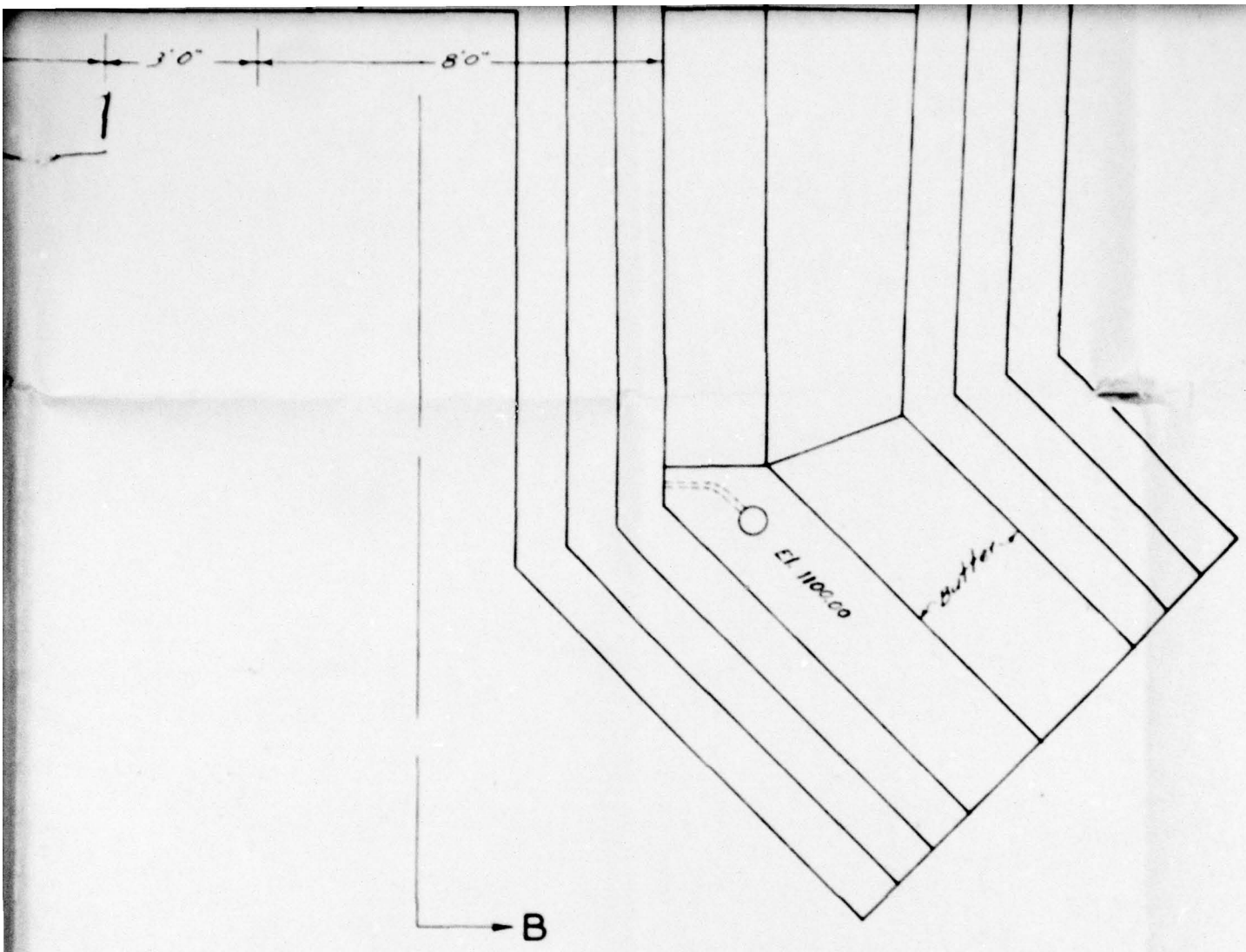


ELEVATION B-B




16'0"
12'0"
1'0"
Berm
El. 1100.00
El. 1098.50
1'0"
1'0"
1'0"
2'7½"
2'0"
10'-7½"
1'0"
1'0"
1'0"
8'6"
A

5



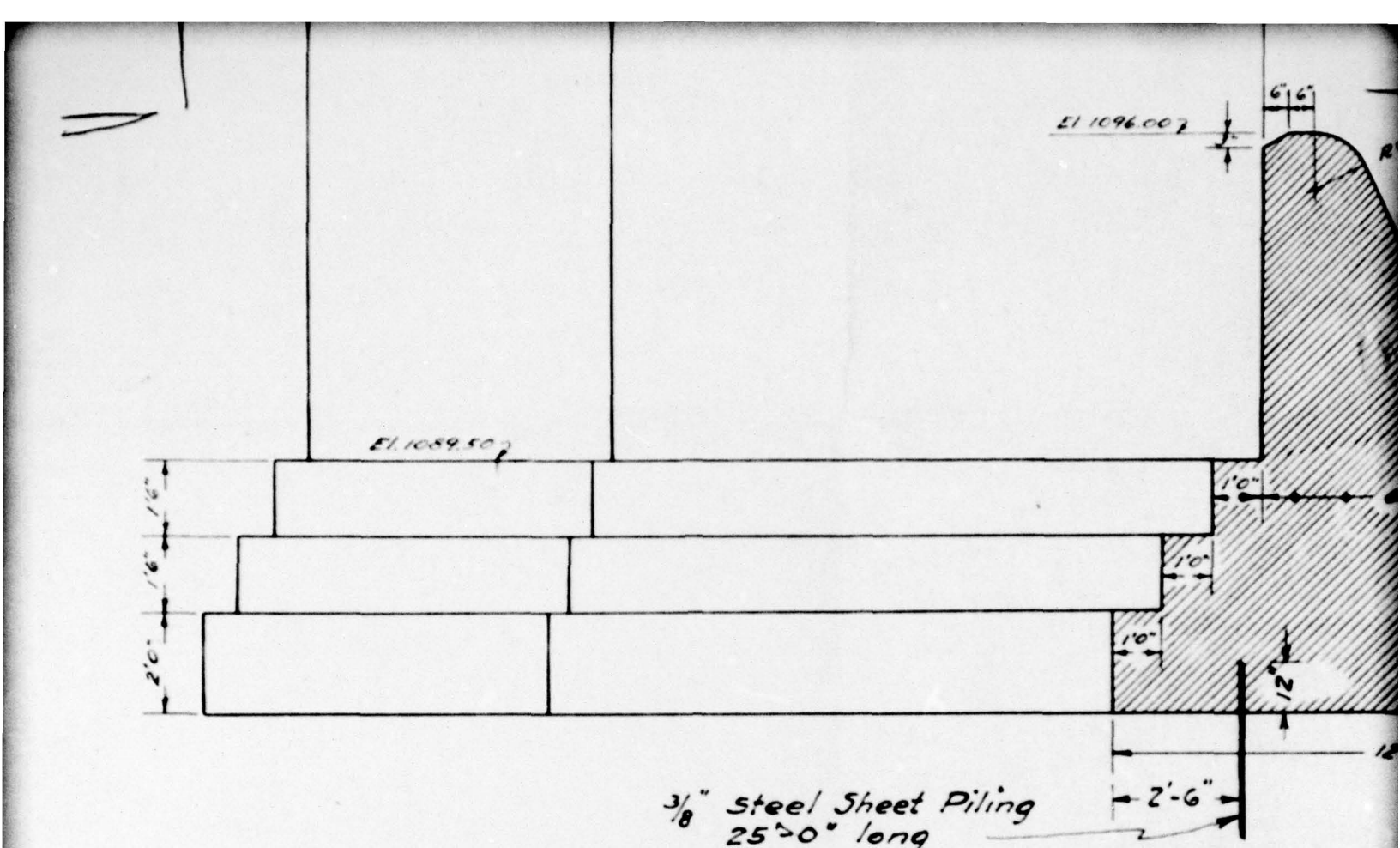
PLAN
CALE 1"=3'

3/4" ϕ Bars 18" c-c
5'-0" long
1/2" ϕ Tie Bars
3'-0" c-c

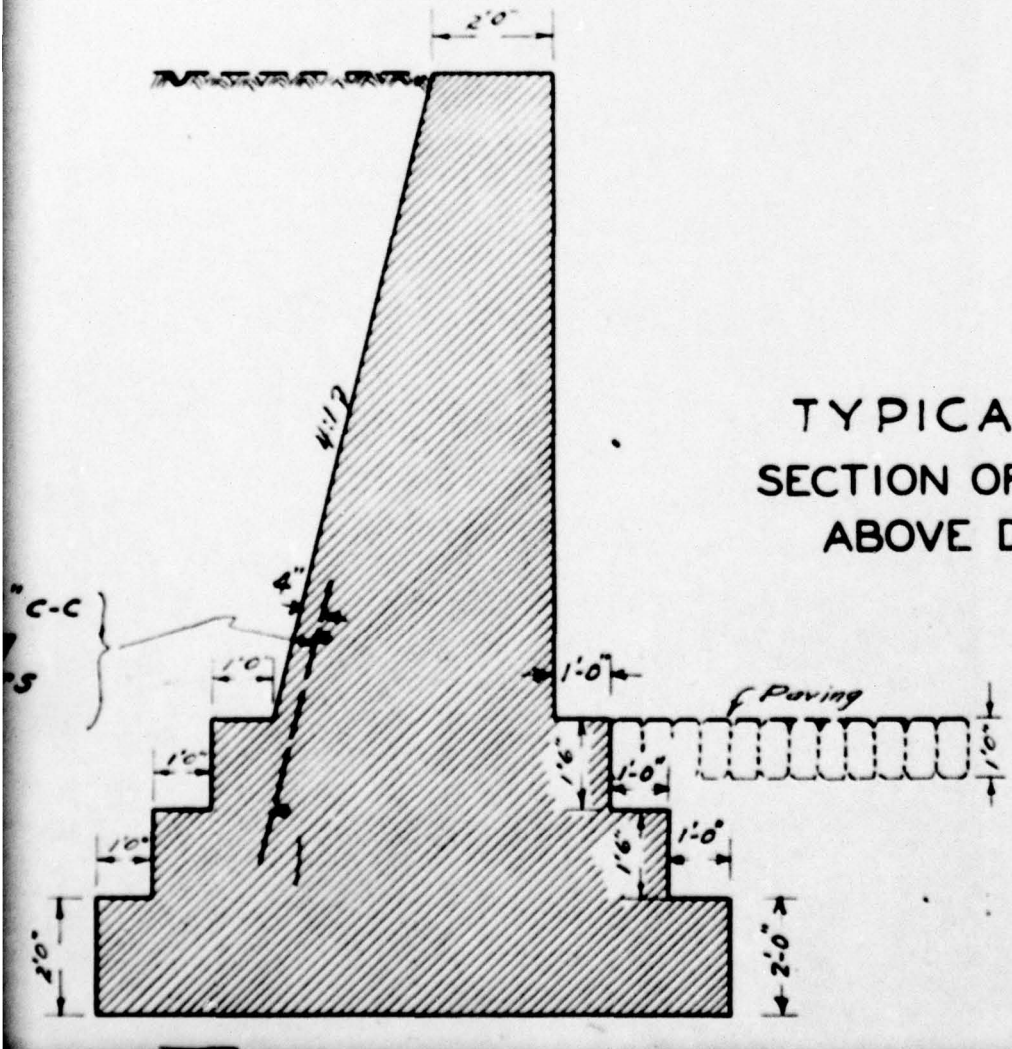
6

1



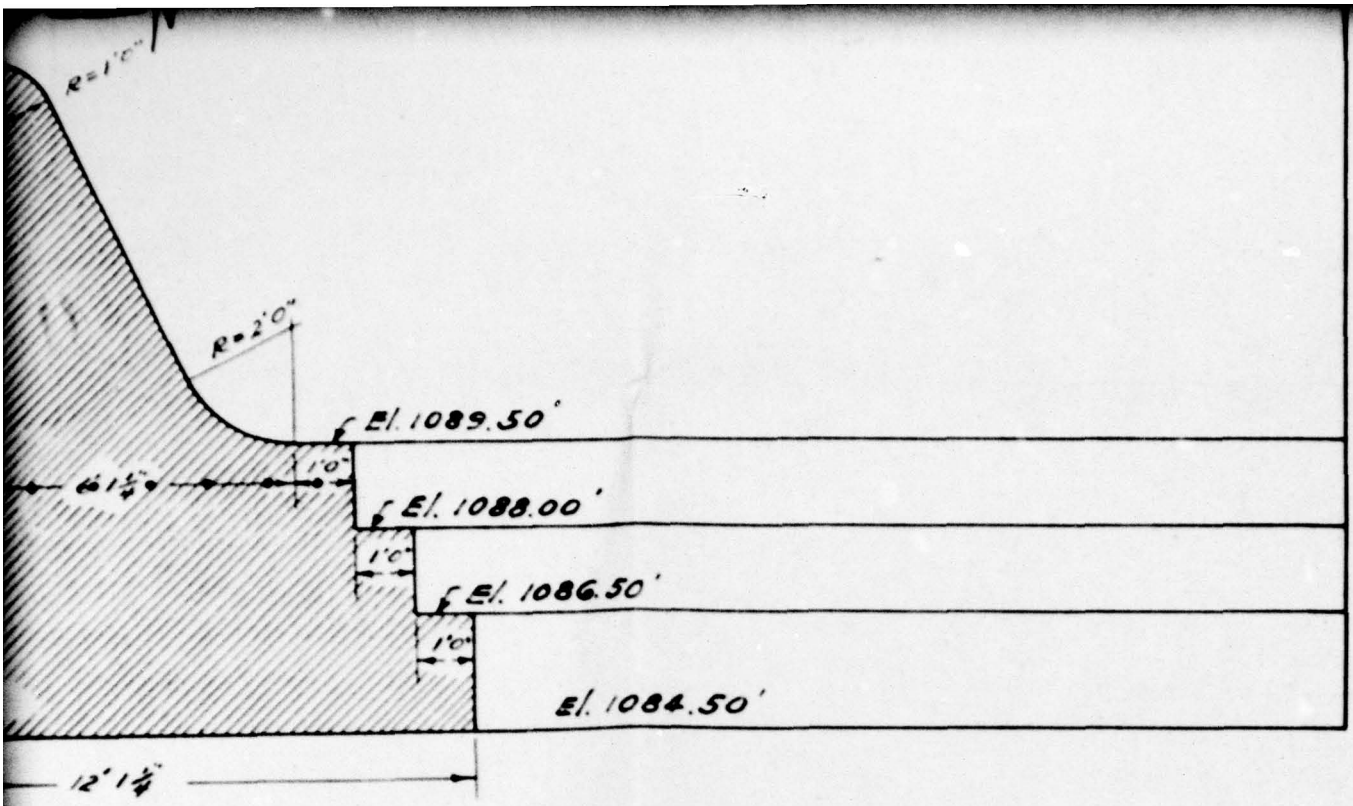


SECTIONAL E



TYPICAL
SECTION OF WALL
ABOVE DAM

7

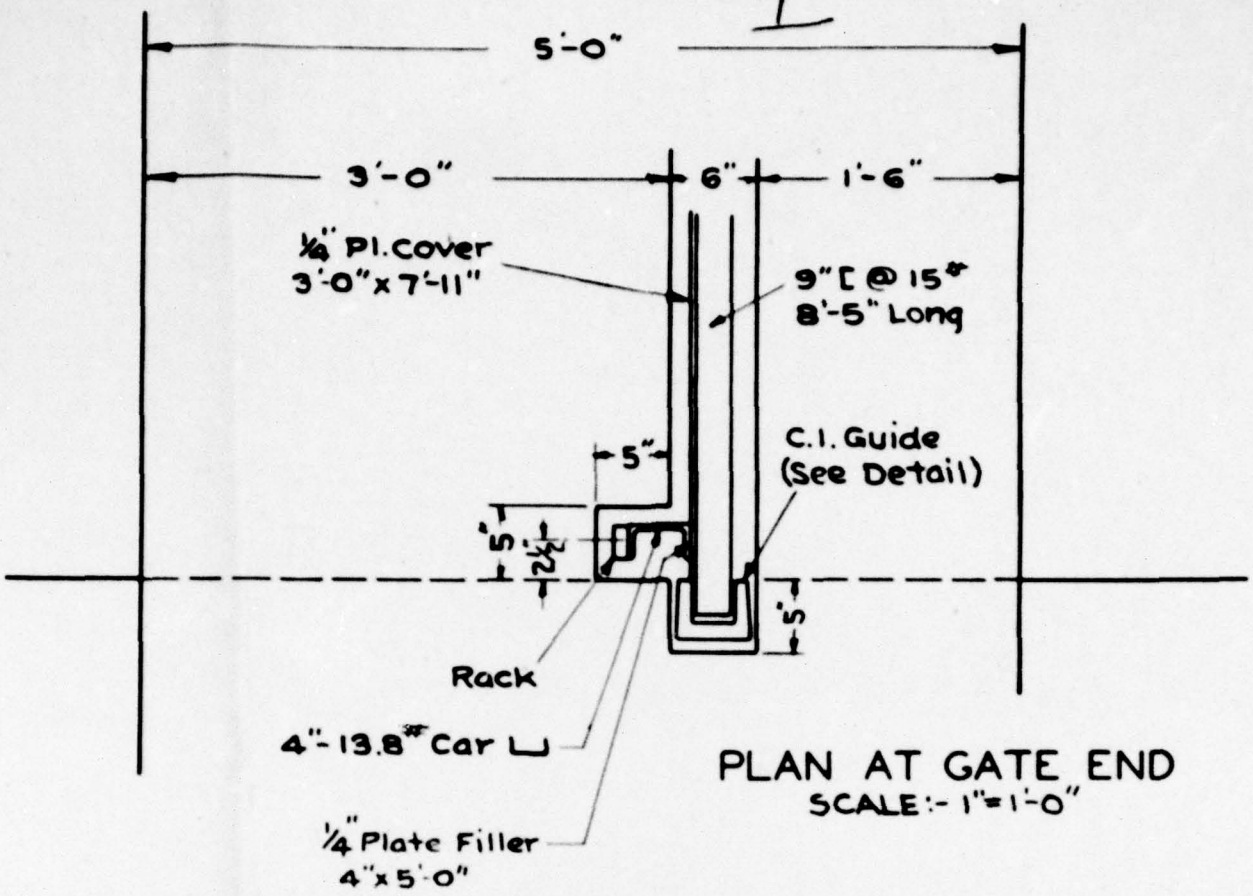


L ELEVATION A-A

8

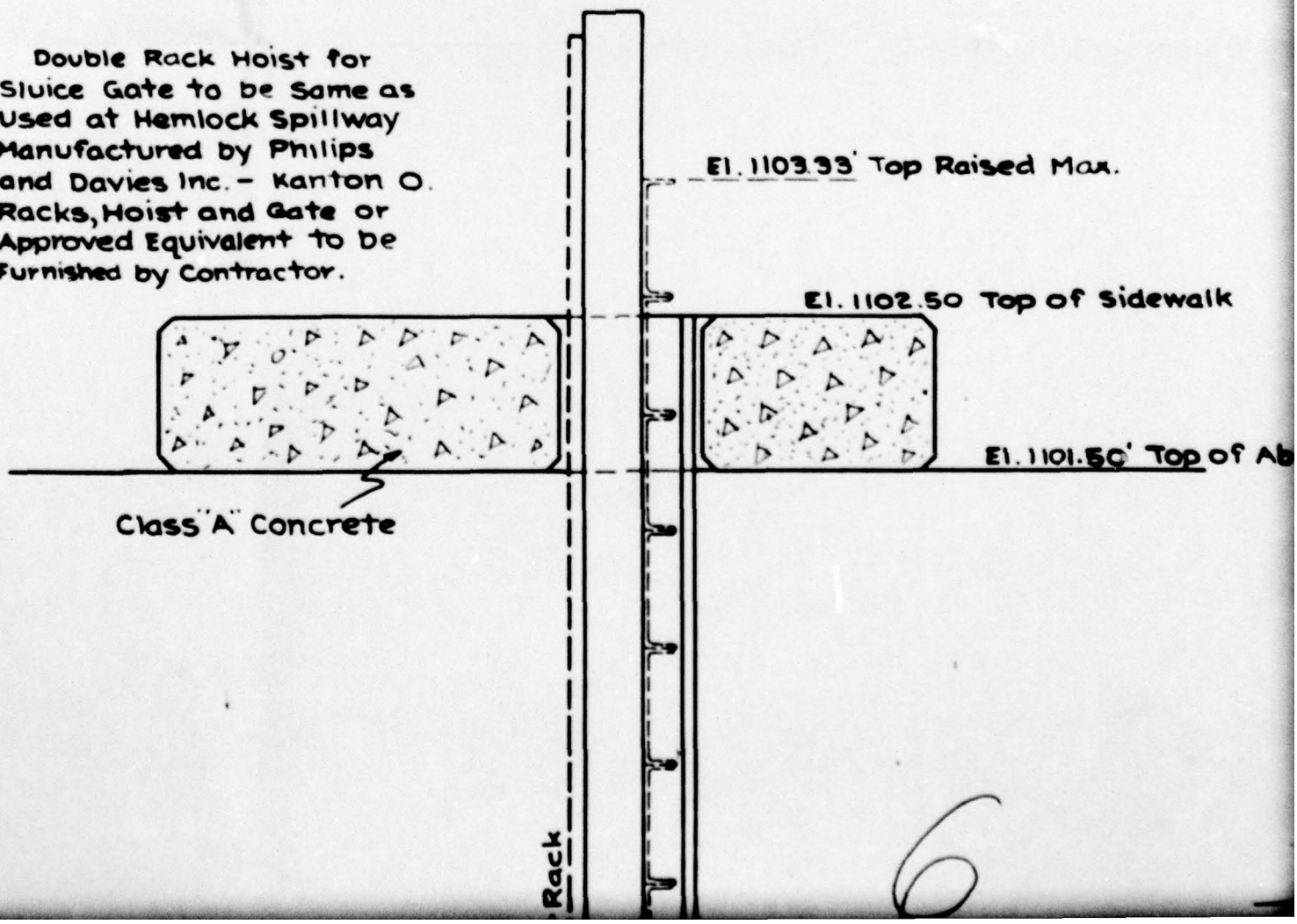
APPROVED BY SUP'T WATER.	APPROVED BY CITY ENGINEER.	APPROVED BY COMM. PUBLIC WORKS
Truby Turner	Morgan B. Hayes	Thos. J. Morrissey

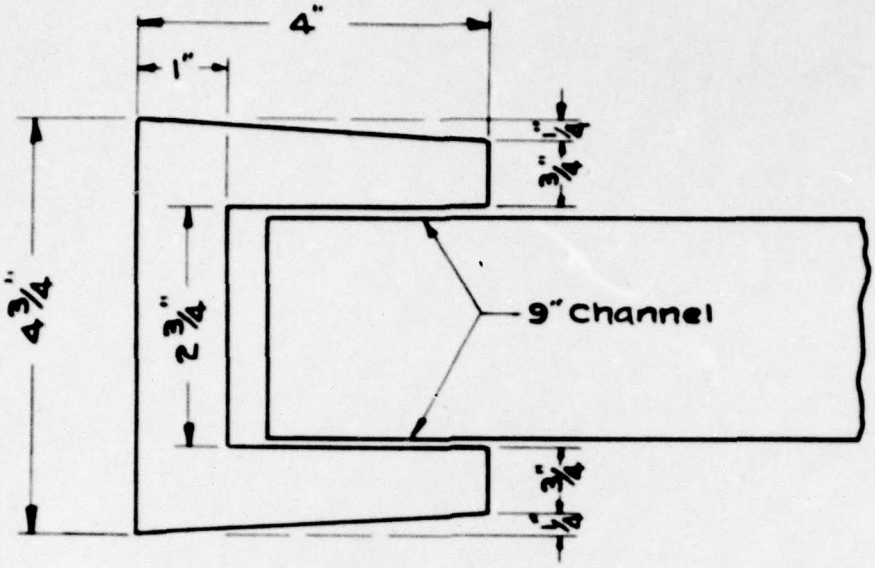
DESIGNED BY A.P. Mussi ASS'T. ENG.	DEPARTMENT OF PUBLIC WORKS WATER DIVISION ROCHESTER, N.Y.
ORDINANCE NO. ____	GENERAL PLANS CANADICE LAKE SPILLWAY
	DRAWN BY A.P. Mussi — SCALE 1"=3' TRACED BY Sleuter CHECKED BY P.A.C. — DATE Sept. 23, 1936 APPROVED BY P. Abbott — DWG. NO. 8

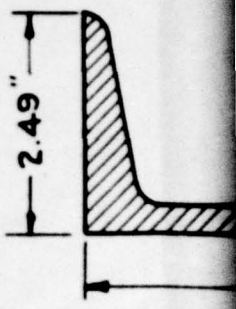


PLAN AT GATE END
SCALE:- 1"=1'-0"

Double Rack Hoist for Sluice Gate to be Same as Used at Hemlock Spillway Manufactured by Philips and Davies Inc. - Kanton O. Racks, Hoist and Gate or Approved Equivalent to be Furnished by Contractor.





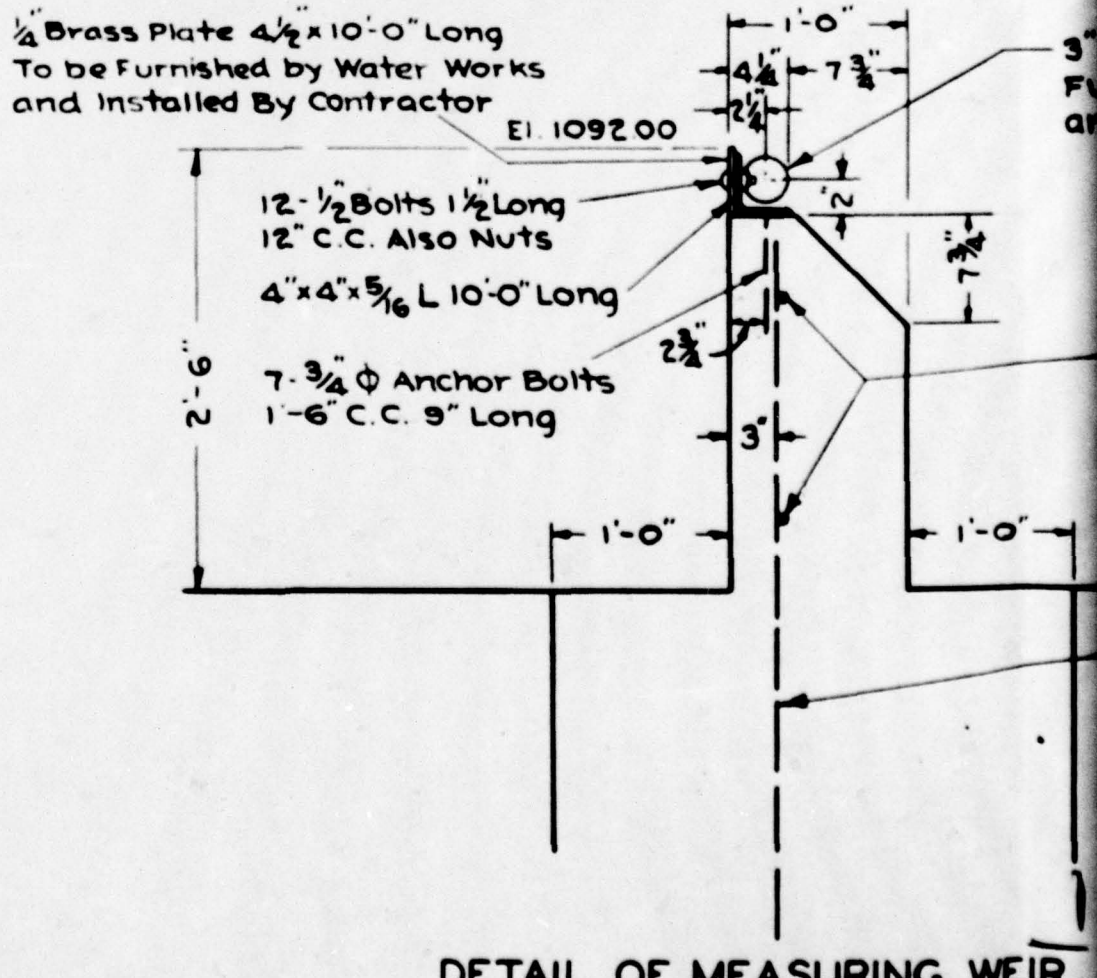


SECT

SECTION OF C.I GUIDE

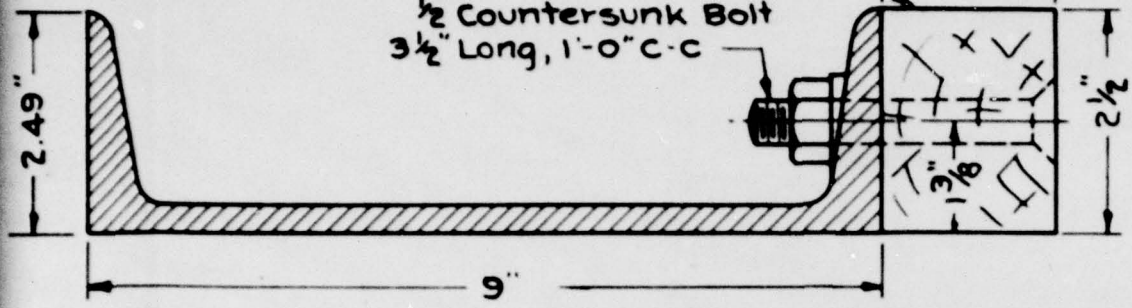
2- Required, 12'-8" Long Each

SCALE :- ½ FULL SIZE

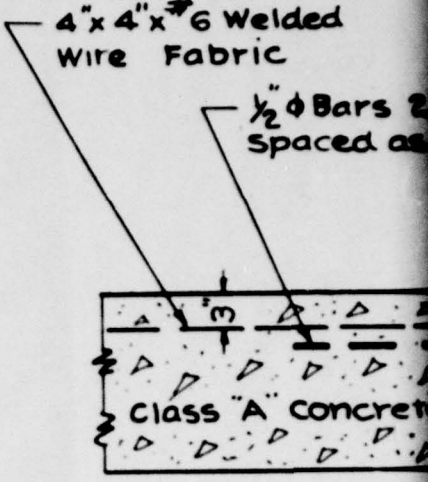


of Abutment

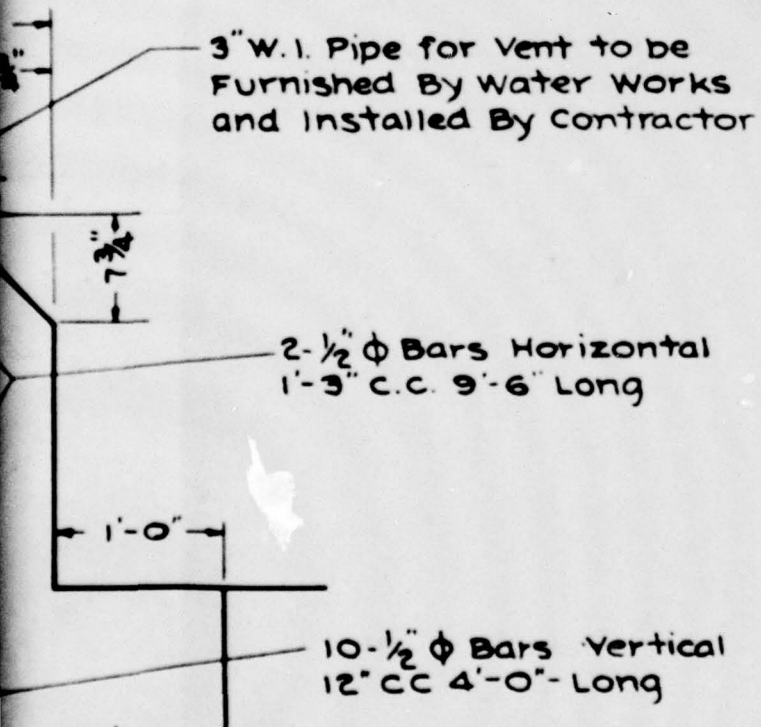
DETAIL OF MEASURING WEIR



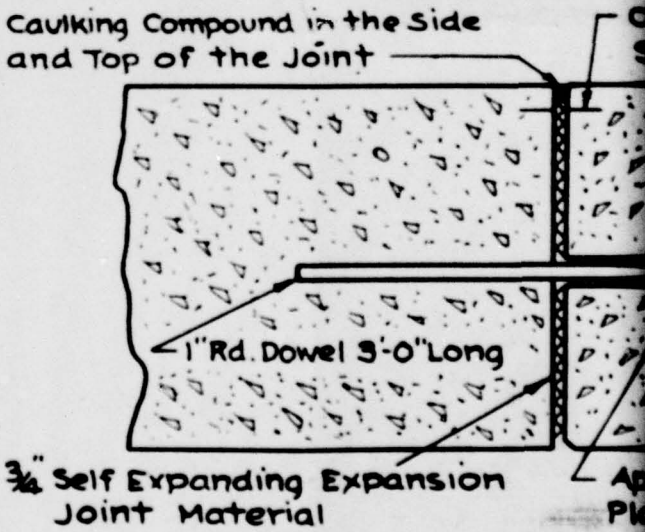
SECTION OF 15# 9" CHANNEL
8'-5" Long 8 Required
SCALE: ½ FULL SIZE



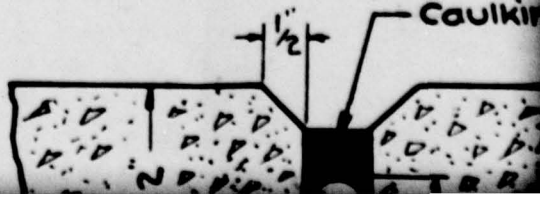
CONSTRUC
SCAL

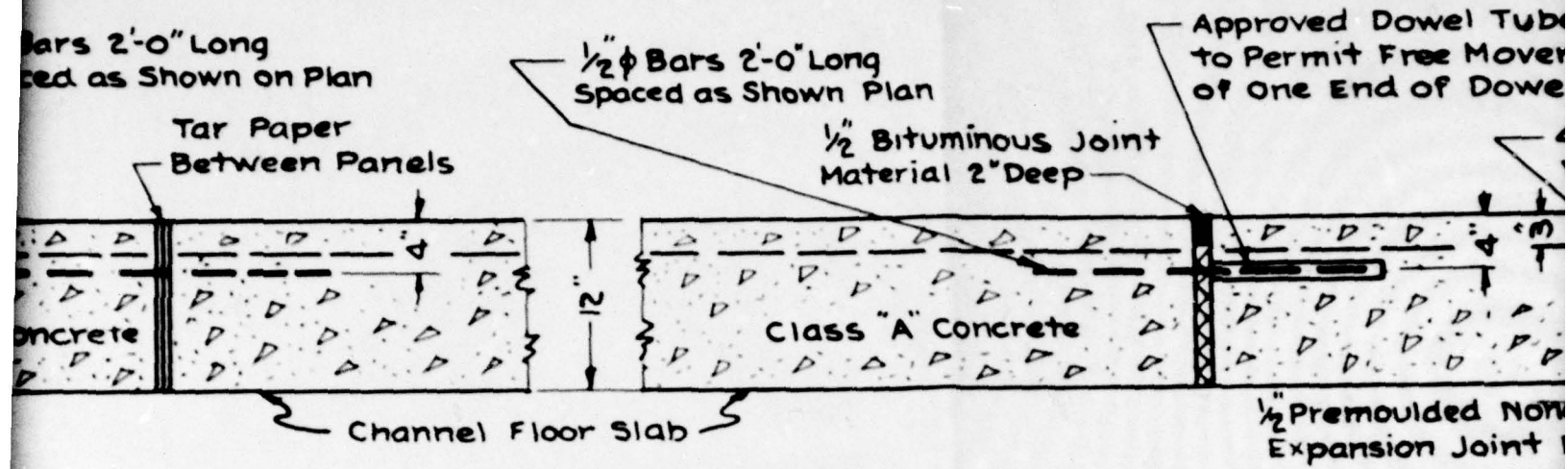


RING WEIR
1'-0"



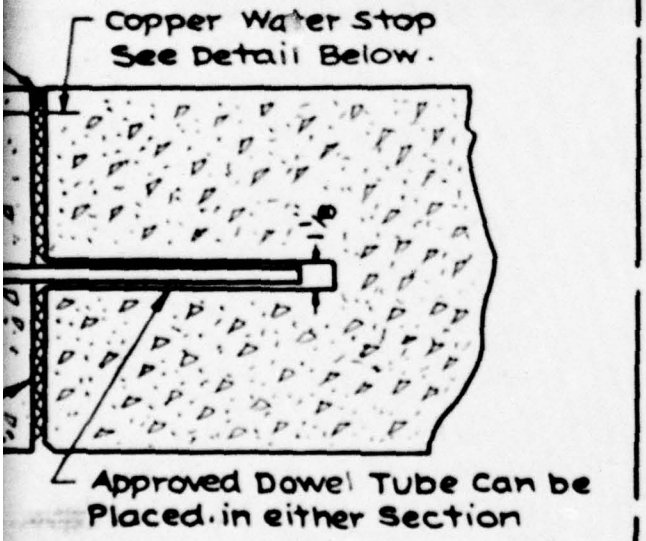
SPECIAL EXPANSIO
SCALE 1" = 1'-0



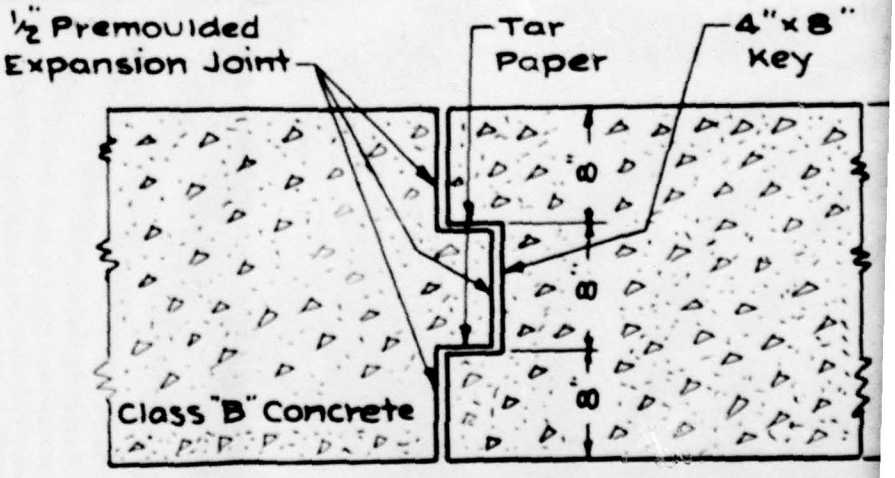


TRUCTION JOINT
SCALE :- 1" = 1'-0"

EXPANSION JOINT
SCALE :- 1" = 1'-0"

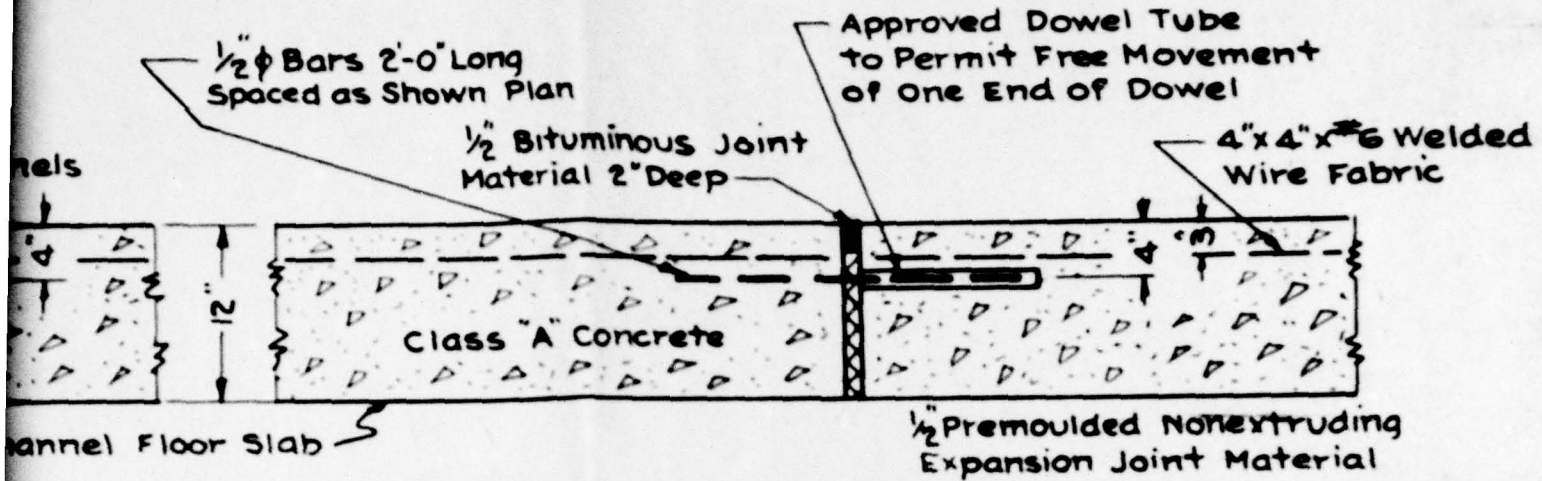


ANSION JOINT
1" = 1'-0"



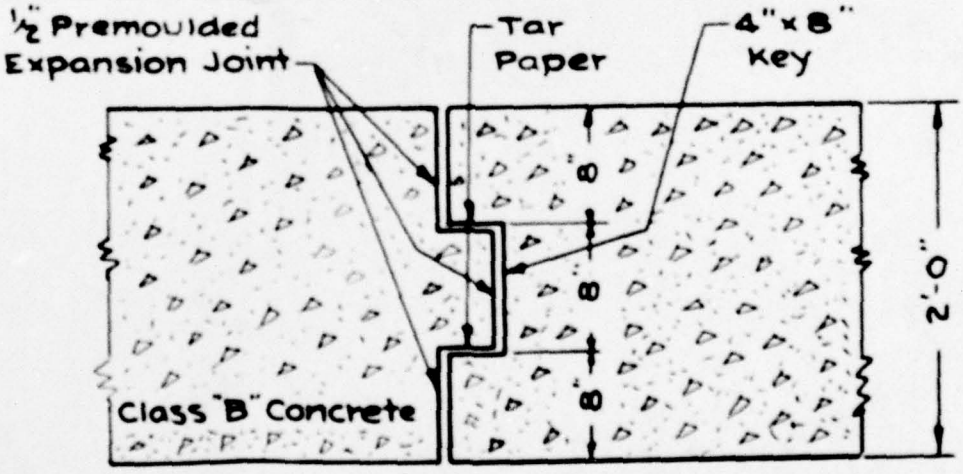
TYPICAL WALL EXPANSION JOINT
SCALE :- 1" = 1'-0"



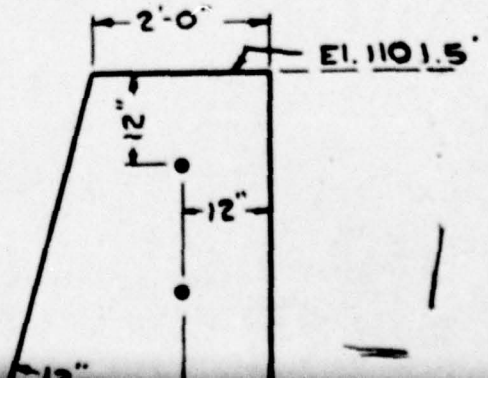


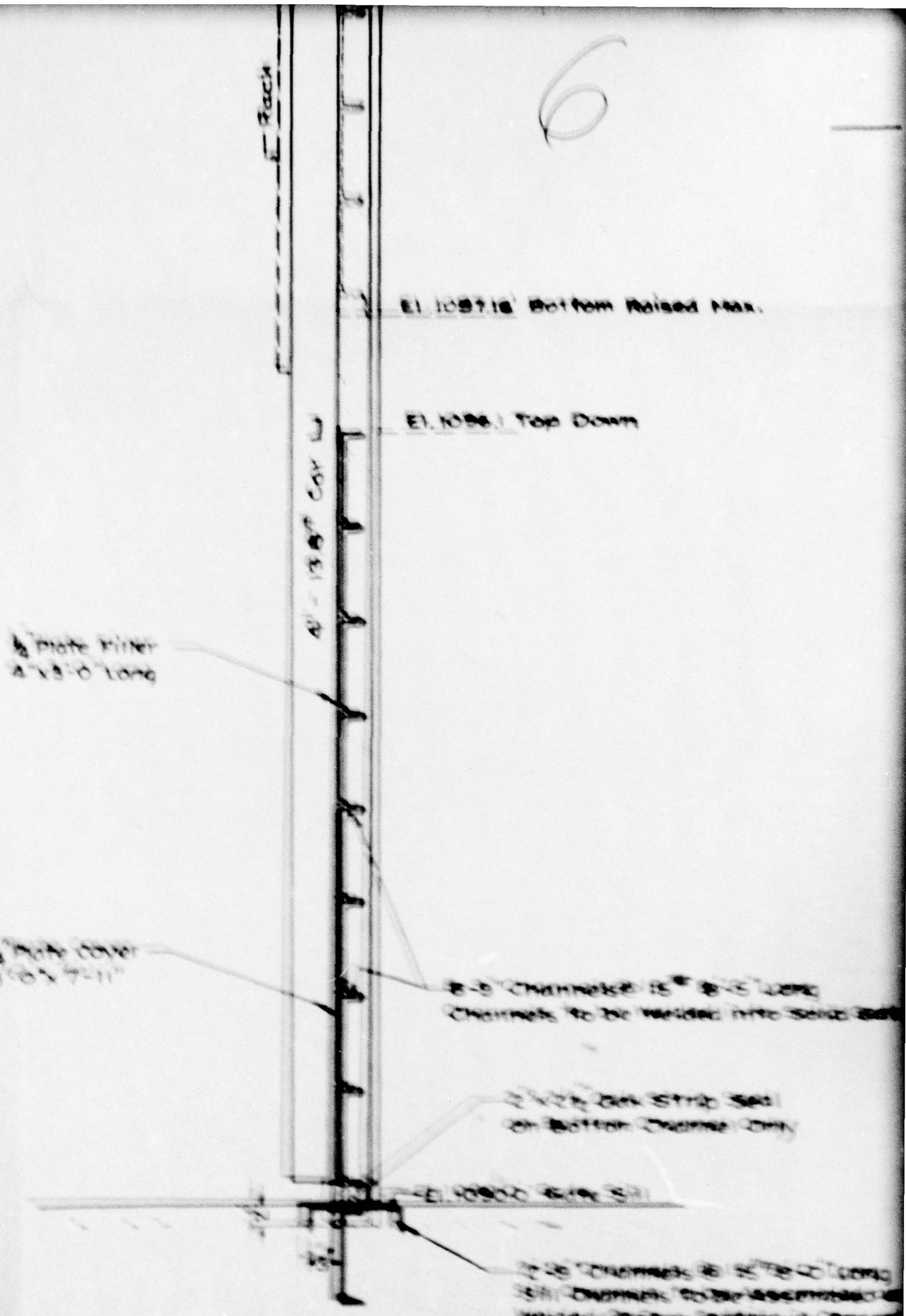
EXPANSION JOINT
SCALE :- 1" = 1'-0"





TYPICAL WALL EXPANSION JOINT
SCALE :- 1" = 1'-0"

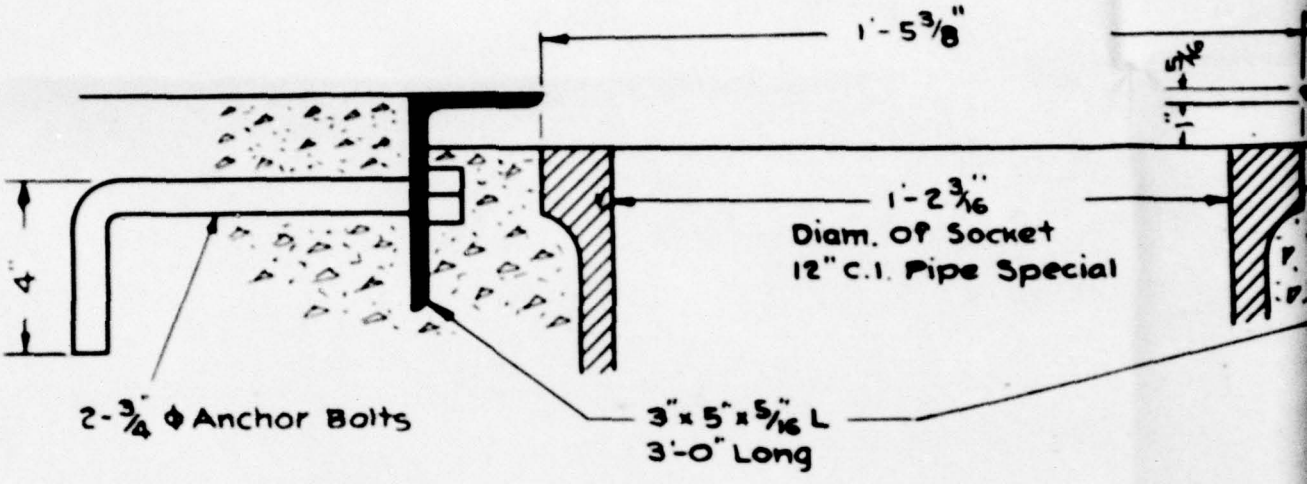




SECTION OF GATE
SCALE: 1"=1'-0"

DETAIL OF MEASURING WEIR

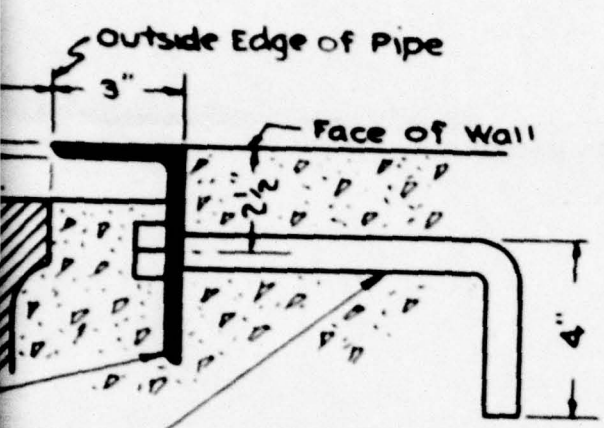
SCALE 1" = 1'-0"

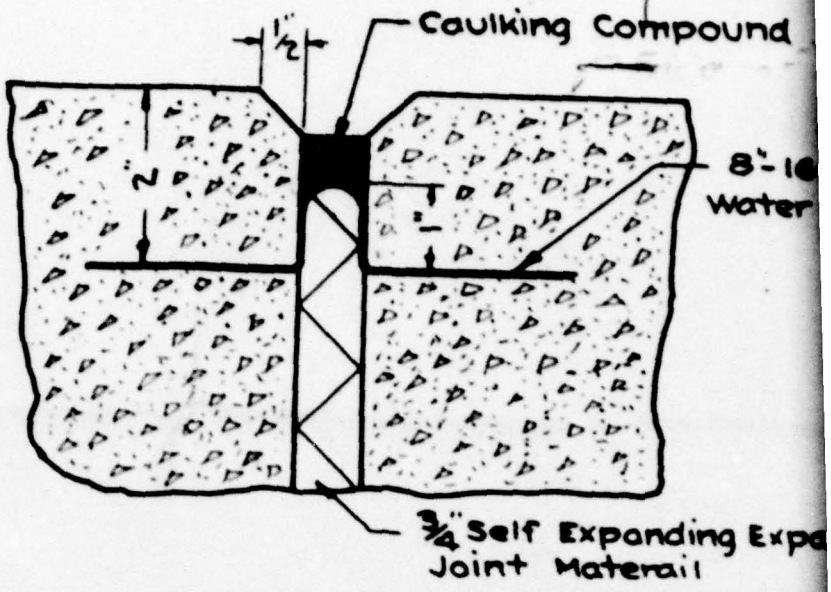


SECTION J-J

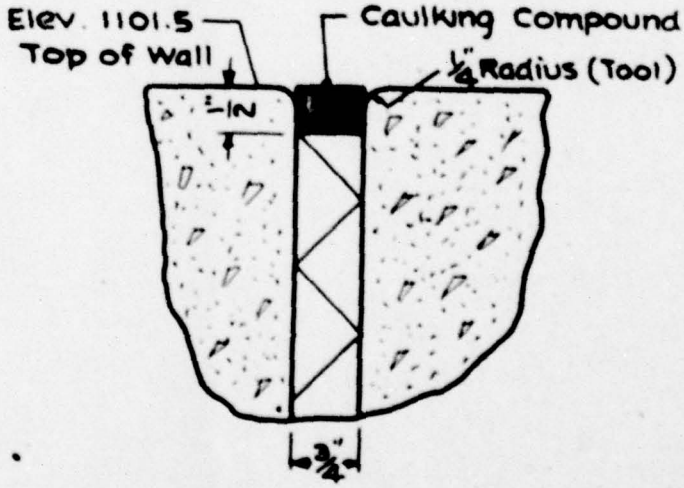
SCALE 1/4" = 1"

7





SPECIAL EXPANSION JOINT
SCALE ½ FULL SIZE



SPECIAL EXPANSION JOINT
Section Showing Method of Sealing
Top of Special Expansion Joints
SCALE ½ FULL SIZE

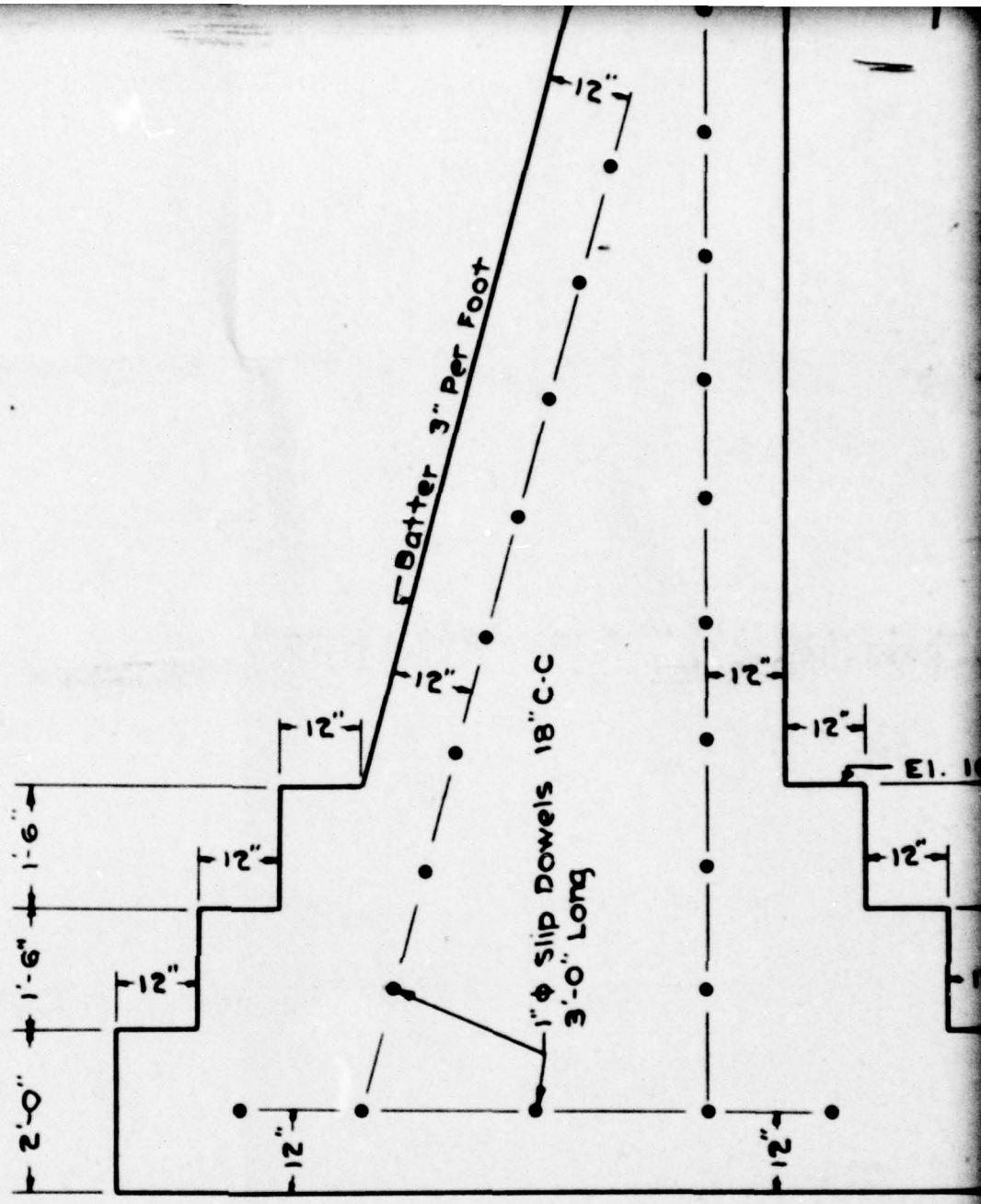
8"-16oz. Copper
Water Stop (Dam)

Expanding Expansion
Material

ON JOINT
ZE

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INT
ling

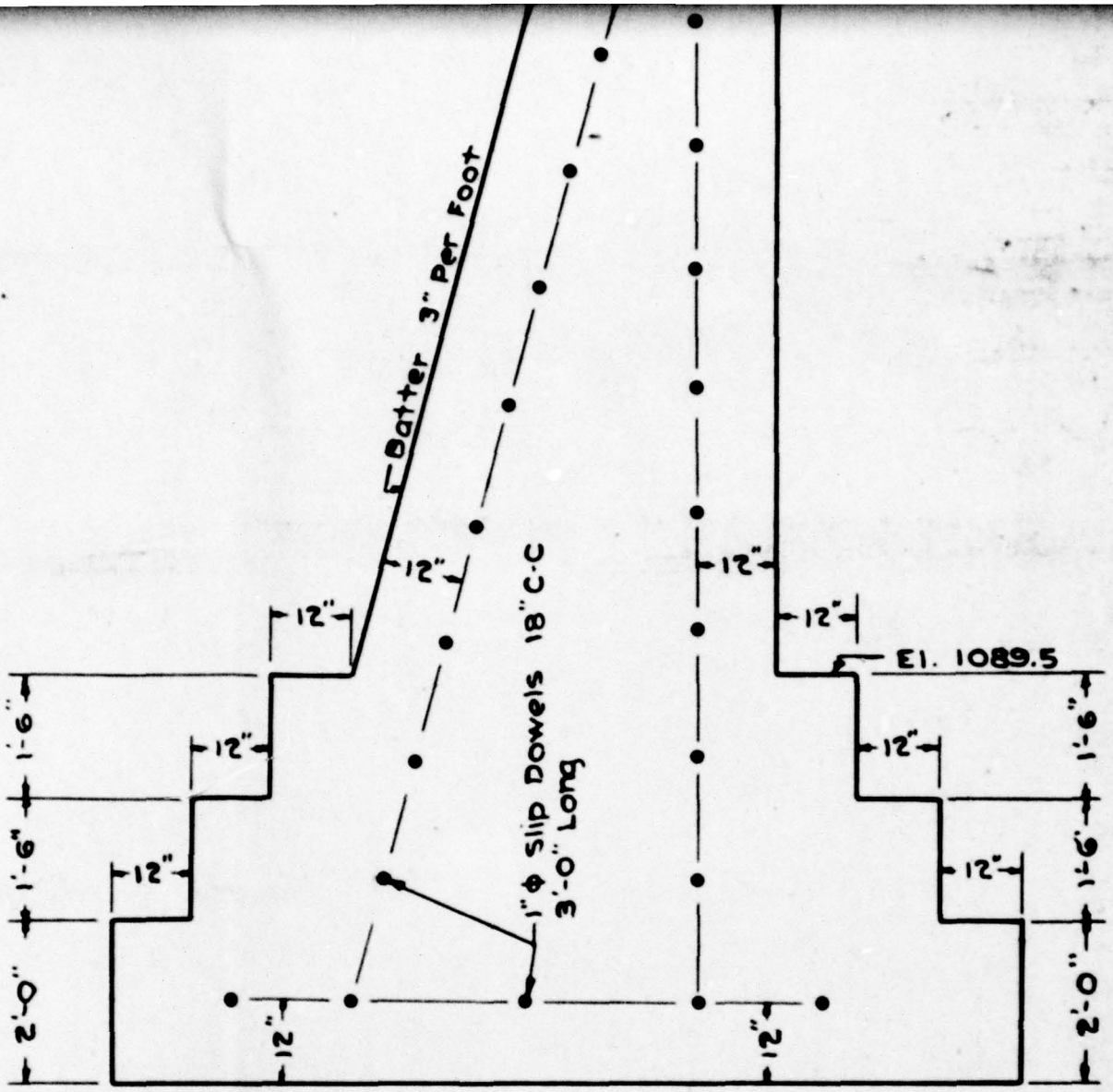


LOCATION OF DOWELS AT SPECIAL EXPANSION JOINT
SCALE ½"=1'-0"

Approved By Sup't. Water	Approved By City Engineer	App Comm. P
	Morgan S. Hayes	

Designed By	DEPARTMENT OF PUBLIC W WATER DIVISION ROCHESTER, N.Y.
Ordinance No.	CANADICE LAKE SPILLW CONSTRUCTION DETA
	Drawn By P.A. Covas SCAL Traced By L. Serenati Checked By P.A.C. Date

1-9

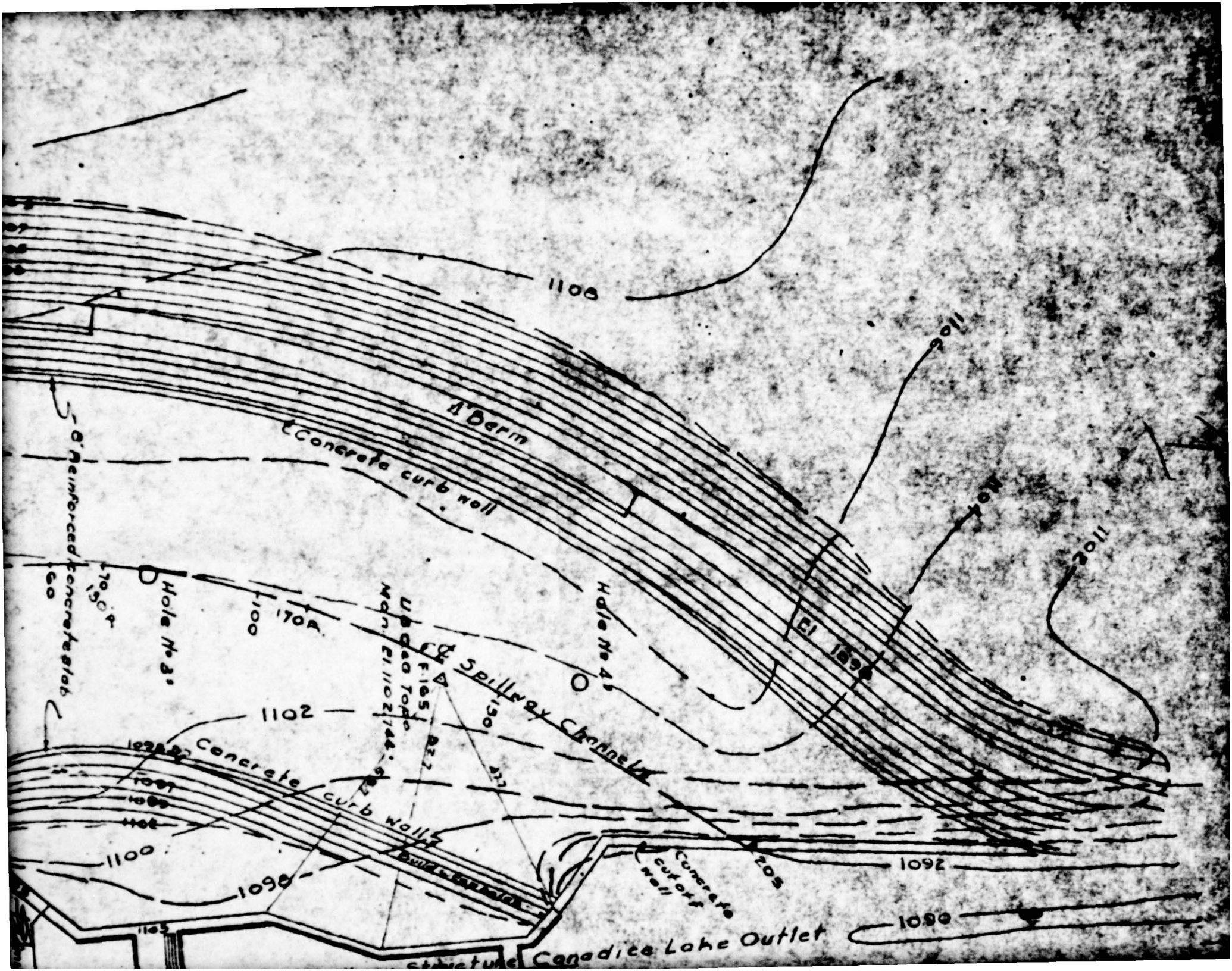


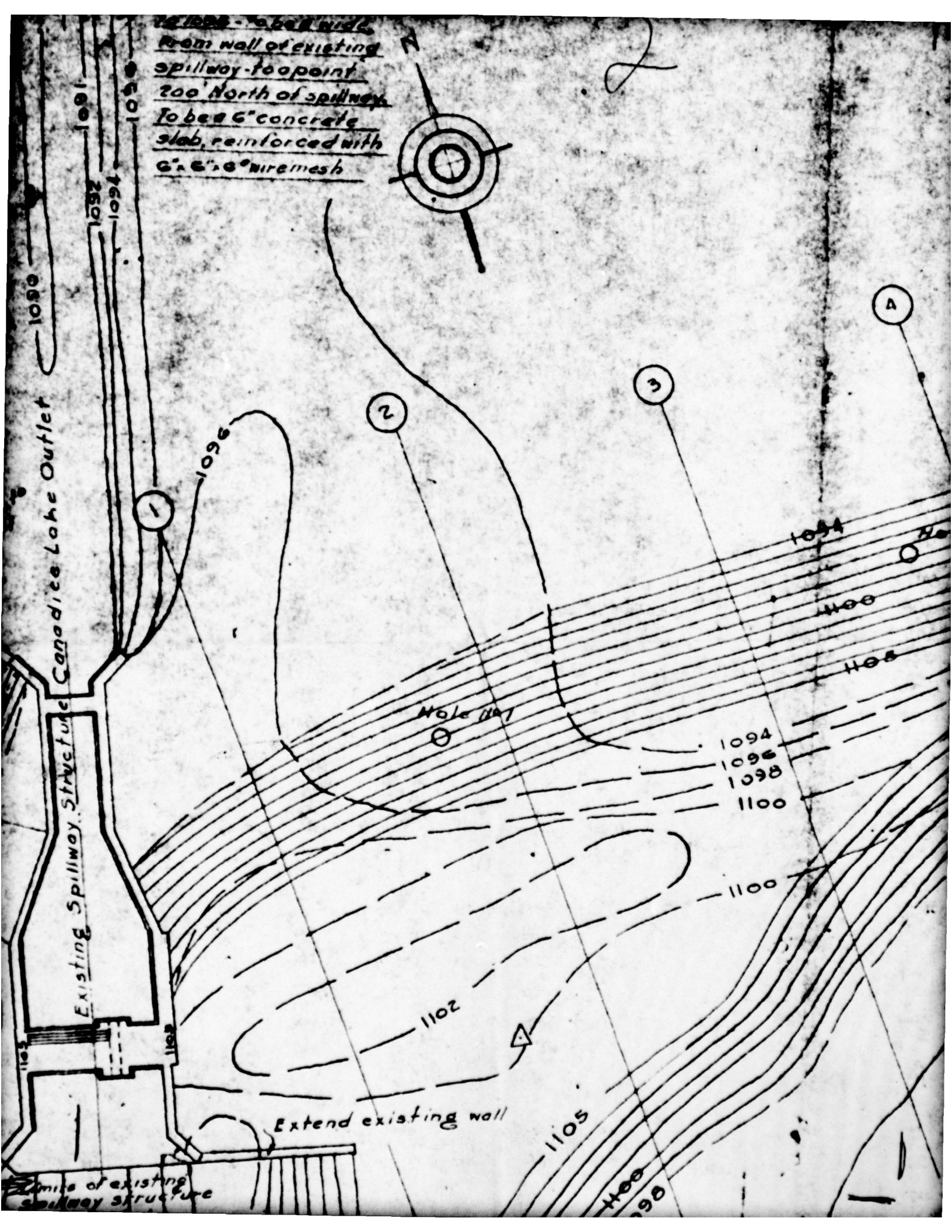
LOCATION OF DOWELS AT SPECIAL EXPANSION JOINT

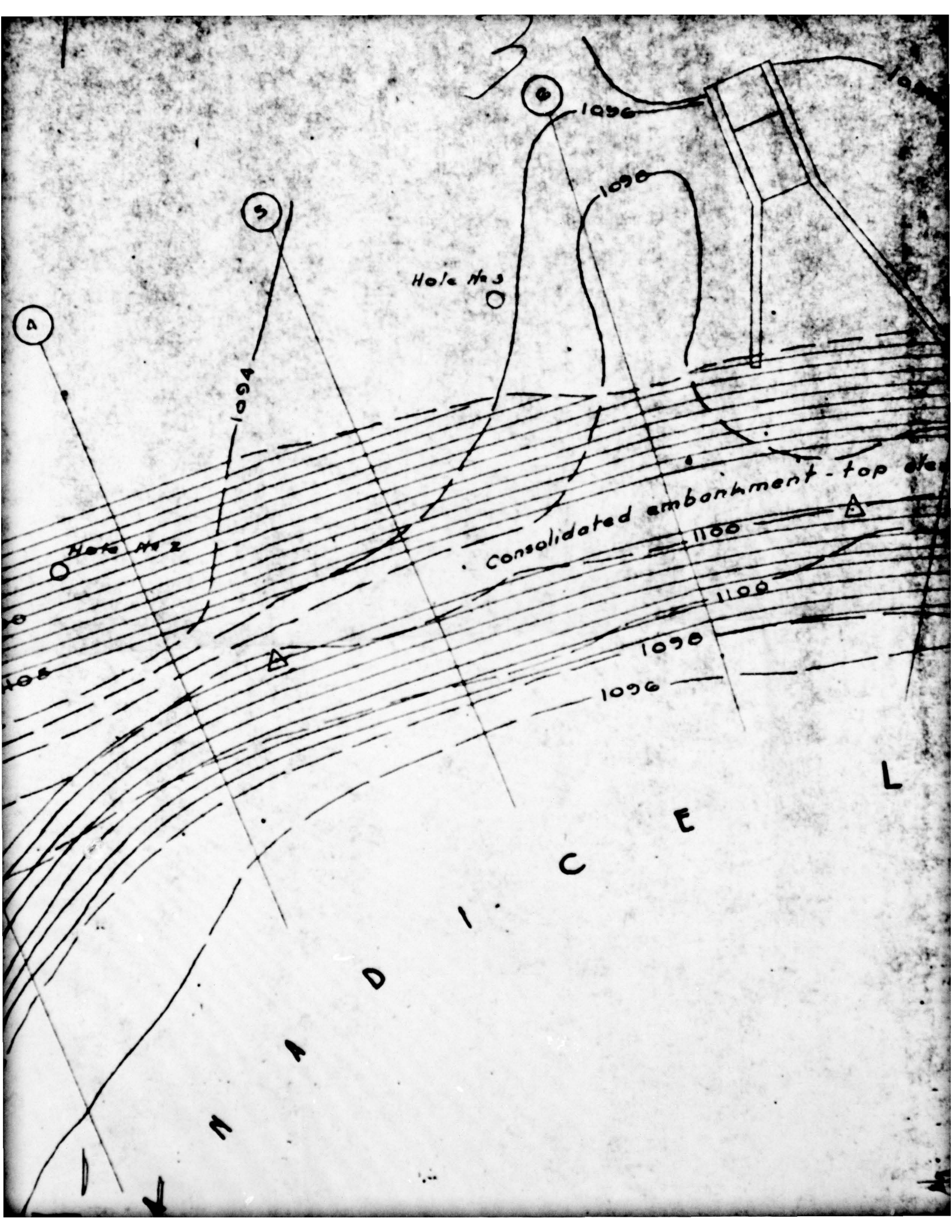
SCALE ½"=1'-0"

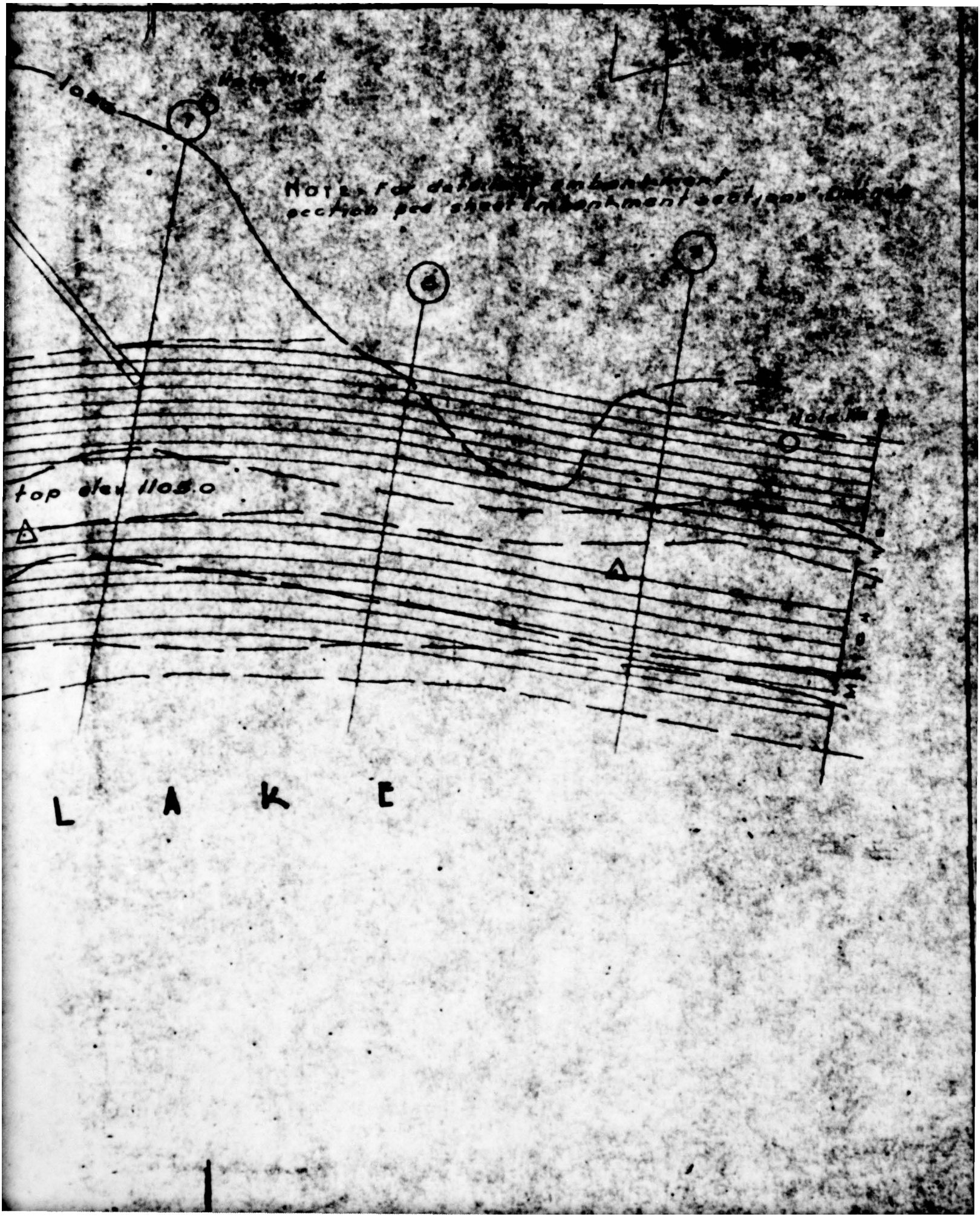
Approved By Sup't. Water	Approved By City Engineer	Approved By Comm. Public Works
	Morgan D. Hayes	Thos. J. Morrissey

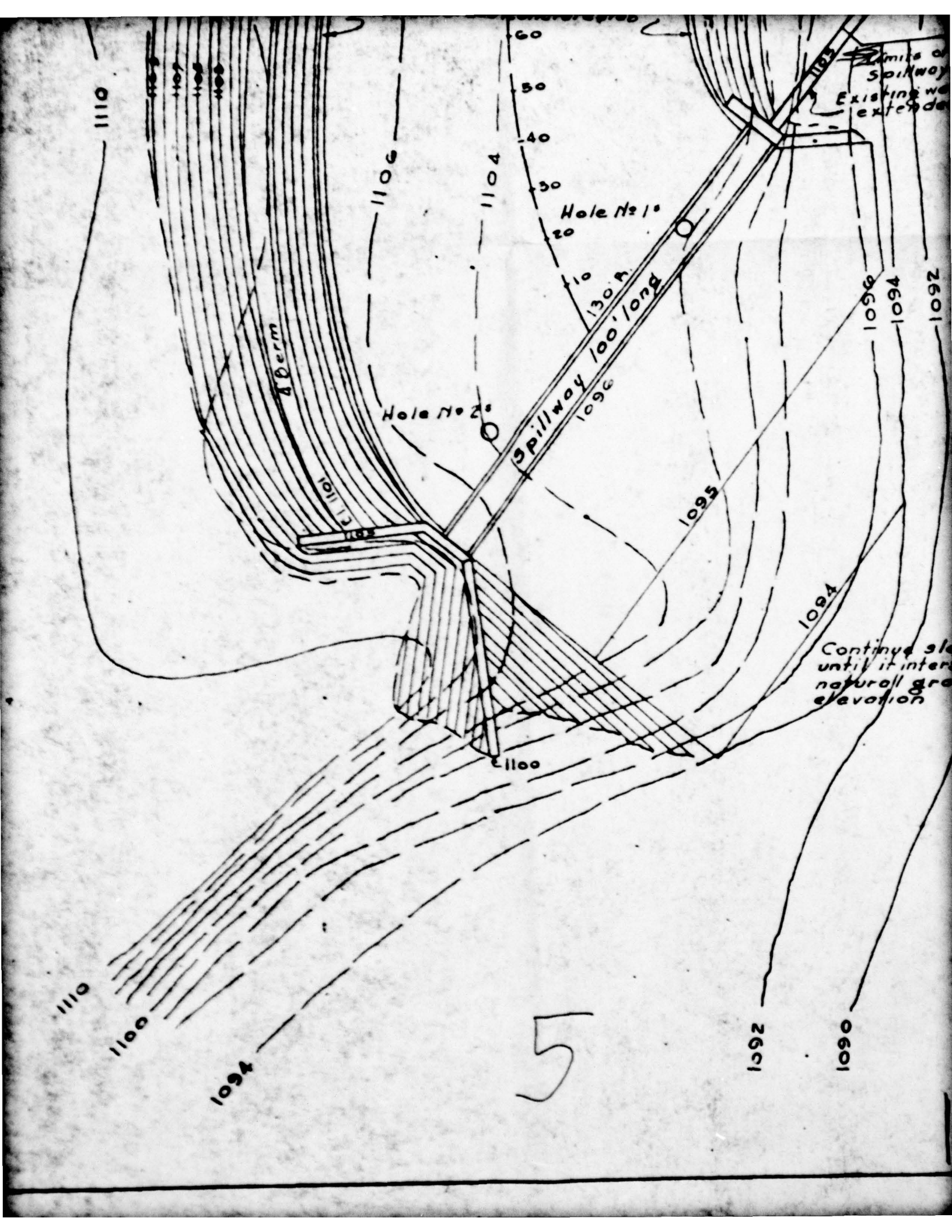
Designed By	DEPARTMENT OF PUBLIC WORKS — WATER DIVISION — ROCHESTER, N.Y.
Ordinance No. ----	CANADICE LAKE SPILLWAY CONSTRUCTION DETAILS
	Drawn By P.A. Covas — SCALE As Shown Traced By L. Serenati Checked By P.A.C. — Date Sept. 23 1932 Approved By — DWG. NO. 6

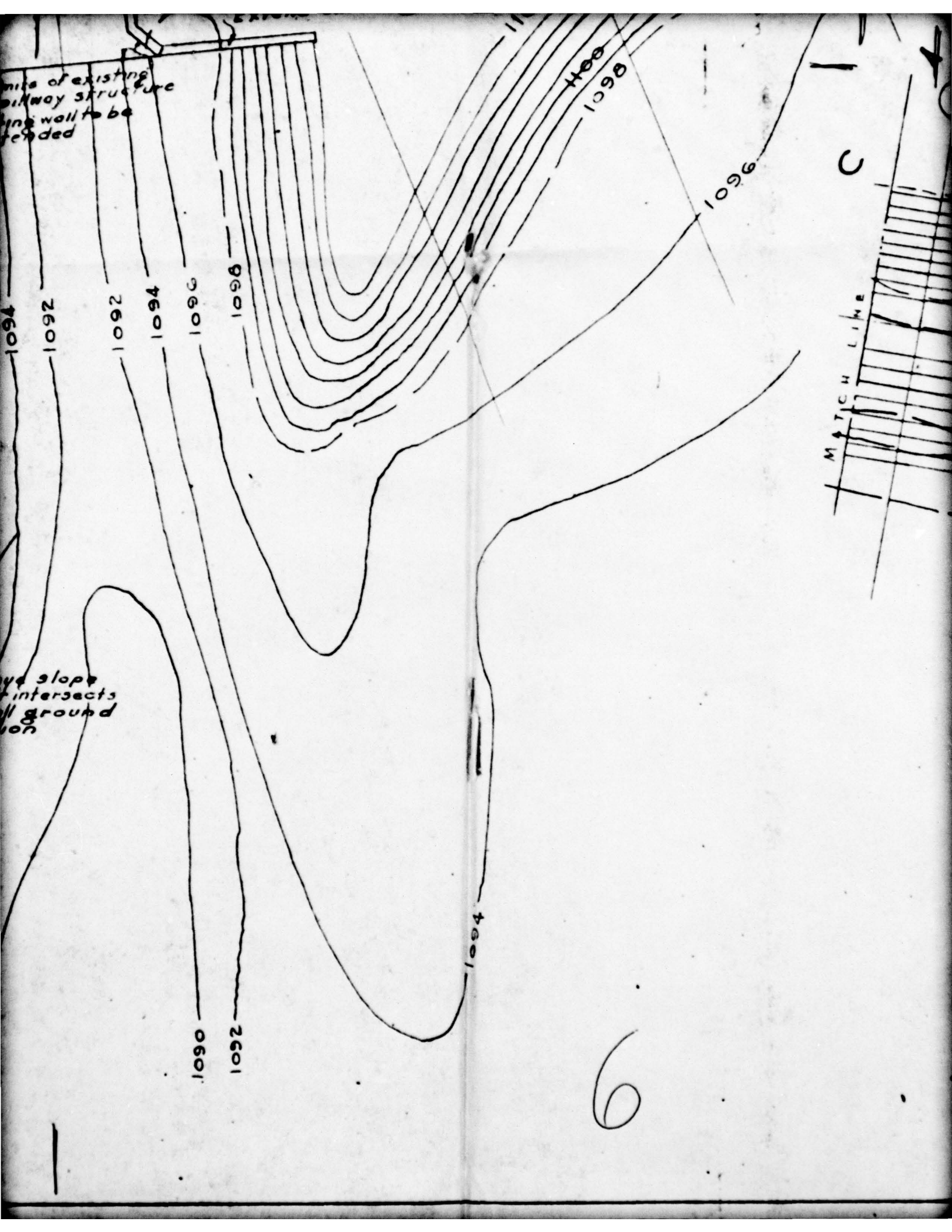

1108
1104
1106
1 Berm
t Concrete curb wall
2' Reinforced concrete slab
Hole No 3'
Hole No 4'
El 1098
Spillway Channel
1102
Concrete curb wall
1100
1098
1092
1090
Concrete cut off wall
Canadice Lake Outlet

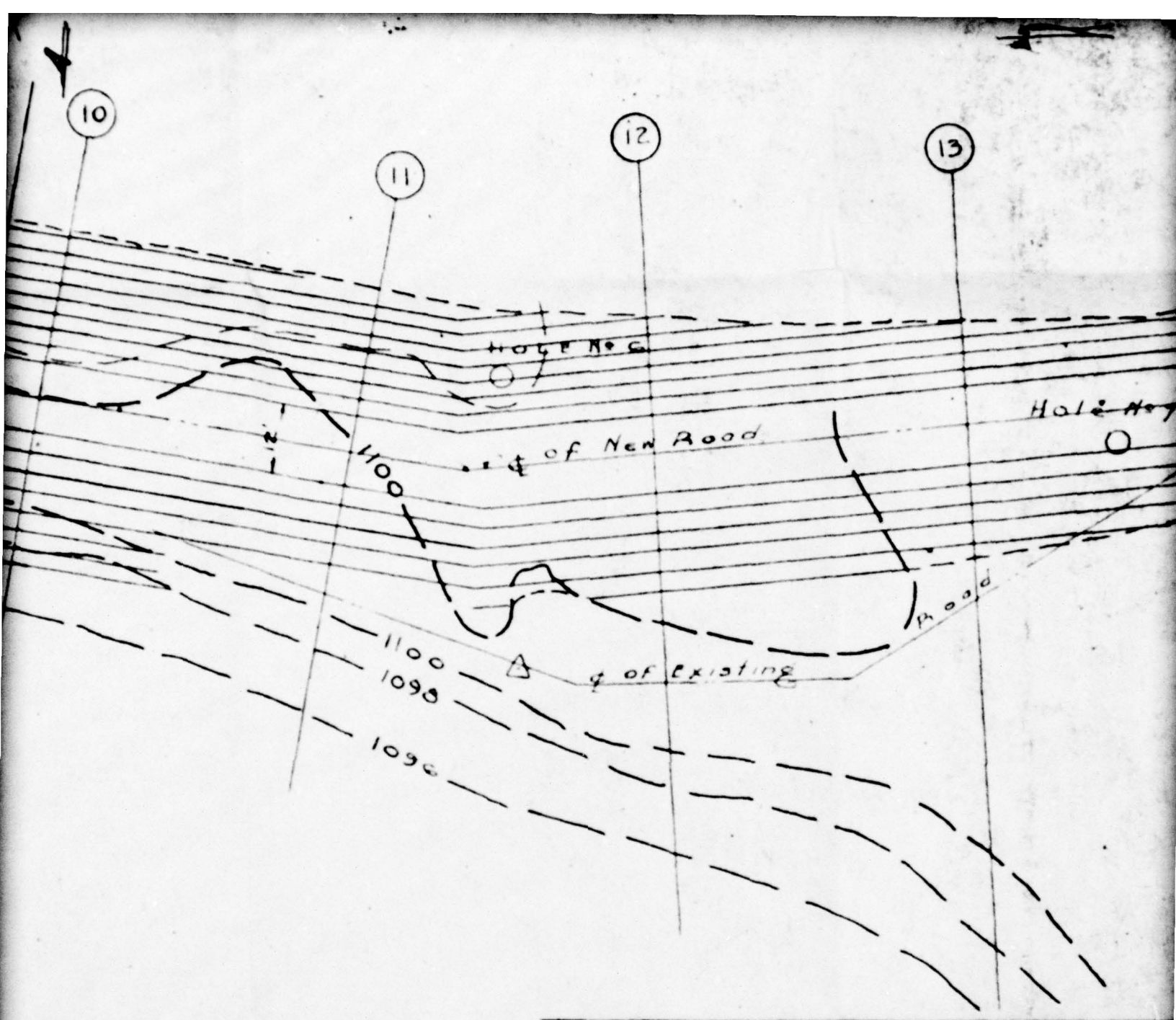

1088 - 6 ft wide from wall of existing spillway - to point 200' North of spillway. To be a 6" concrete slab, reinforced with 6" x 6" x 8" wire mesh
Canadica Lake Outlet
Existing Spillway Structure
Extend existing wall
Limits of existing spillway structure
Hole No. 1
1088
1090
1091
1092
1094
1096
1098
1100
1102
1105
1 2 3 4


6
1090
1090
5
Hole No 3
A
1094
Hole No 2
Consolidated embankment - top
1100
1100
1090
1090
C
E
L


top elev 1105.0
L A K E


1110
1106
1104
60
50
40
30
20
10
Hole No 1
Hole No 2
130 ft.
Spillway 100' long
1096
1095
1094
1092
1090
1100
Dam
1102
1101
1103
Continue sl
until it inter
natural gr
elevation
5


mits of existing
ilway structure
ing wall to be
tended
1094
1092
1092
1094
1096
1098
1098
1100
1096
1094
1092
1090
1092
1094
C
MICH LINE
6



NEW YORK STATE
POSTWAR PUBLIC WORKS
PLANNING COMMISSION

SERIAL No 2995

ROCHESTER, N.Y.

WATER SUPPLY SYSTEM ENLARGEM

MAP BY

APPROVED DATE:

Kenneth N. Krupp

CITY ENGINEER NEW YORK STATE SUP'T OF PUBLIC

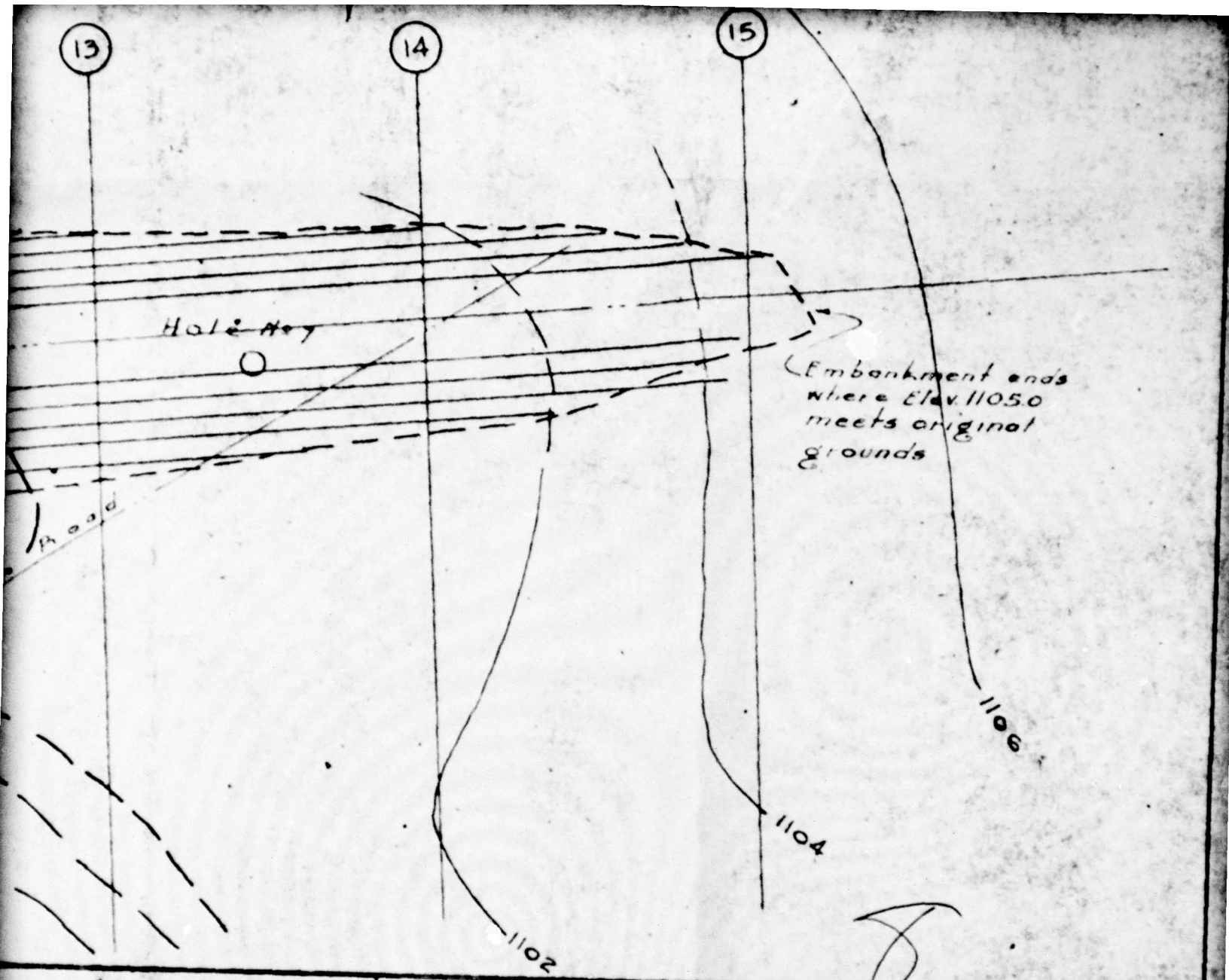
APPROVED BY DATE:

NEW YORK STATE PUBLIC WORKS
PLANNING COMMISSION

CHAIRMAN

7

1



ORK STATE
BLIC WORKS
COMMISSION
o 2995
A, N.Y.
STEM ENLARGEMENT
APPROVED DATE:
ORK STATE SUP'T OF PUBLIC WORKS
DATE:
UBLIC WORKS
CHAIRMAN

APPROVED BY ASS'T ENGINEER	APPROVED BY ENGINEER	APPROVED BY CITY ENGINEER	APPROVED BY COMM. PUBLIC WORKS
	E H Walker	Kenneth Keppler	

DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING
ROCHESTER, N.Y.

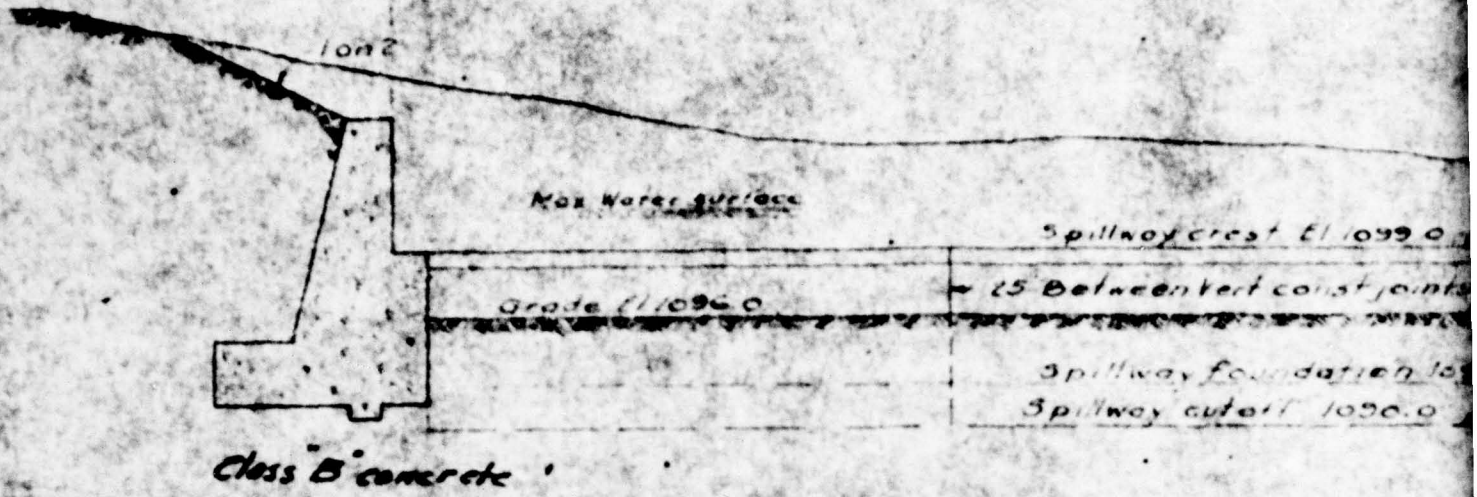
JOB NO

HEMLOCK LAKE WATER SUPPLY
RECONSTRUCTION - CANADICE LAKE DAM - GENERAL PLAN

FILE NO

TRACED BY: E.C. Bender
Date 4-8-47
Scale: 1" = 20'

DRAW'G No 1



ELEVATION

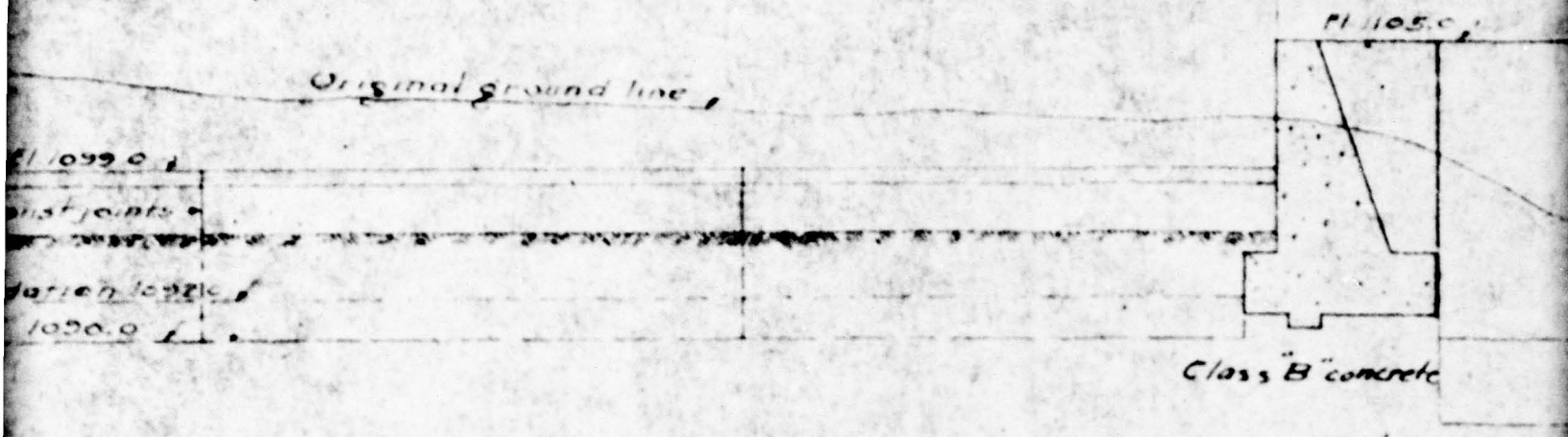
SCALE



CHANNEL SECTIO

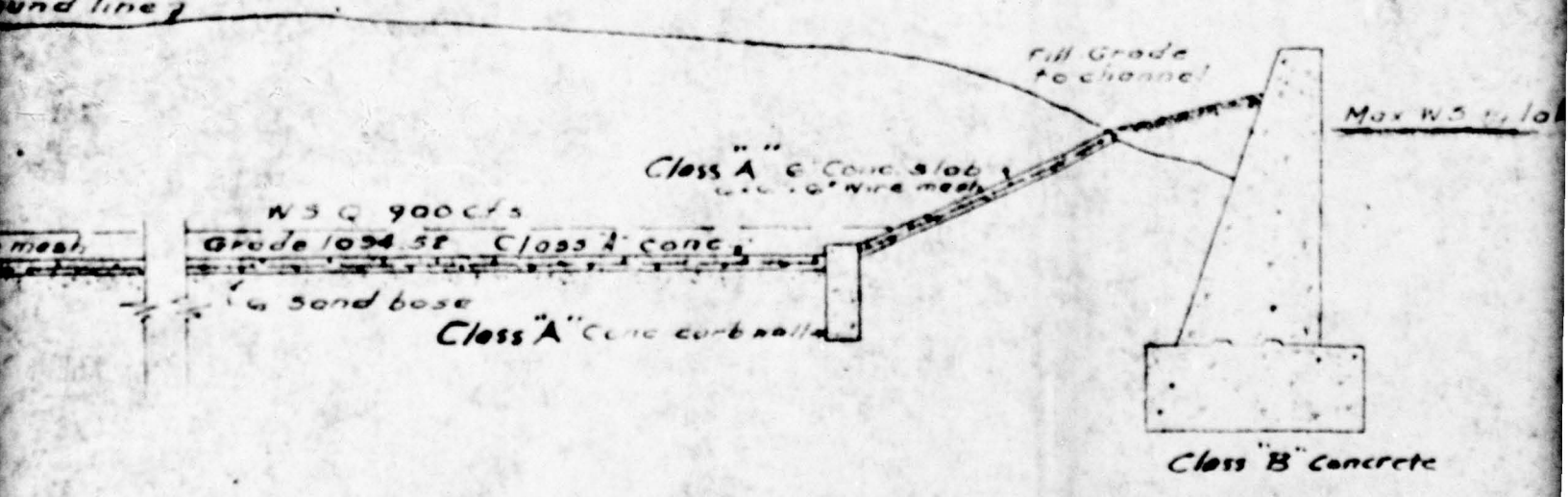
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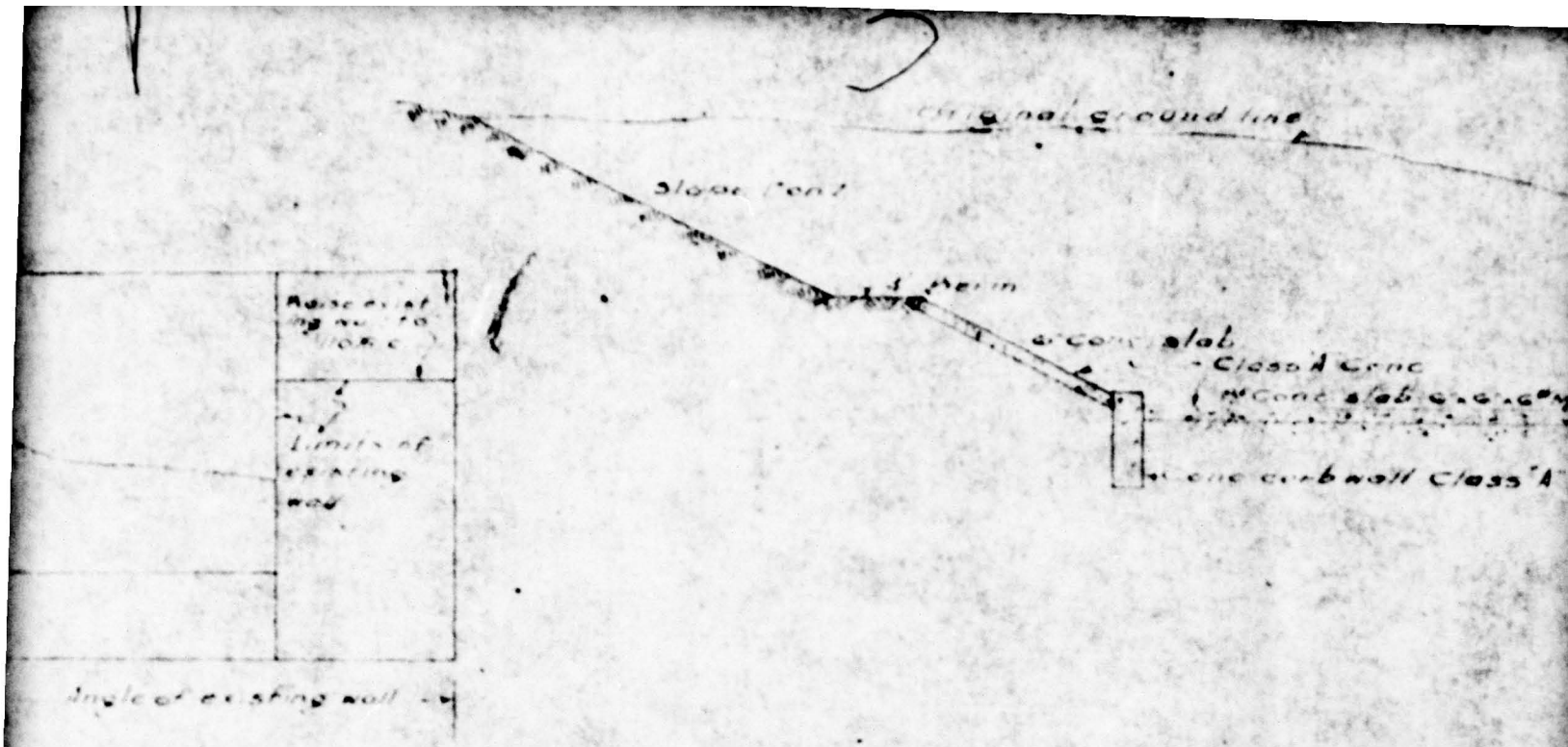


ON OF SPILLWAY

ALE ⅛" 1'0"



CTION AT STA. 0+50 ON ℄



CHANNEL SECTION

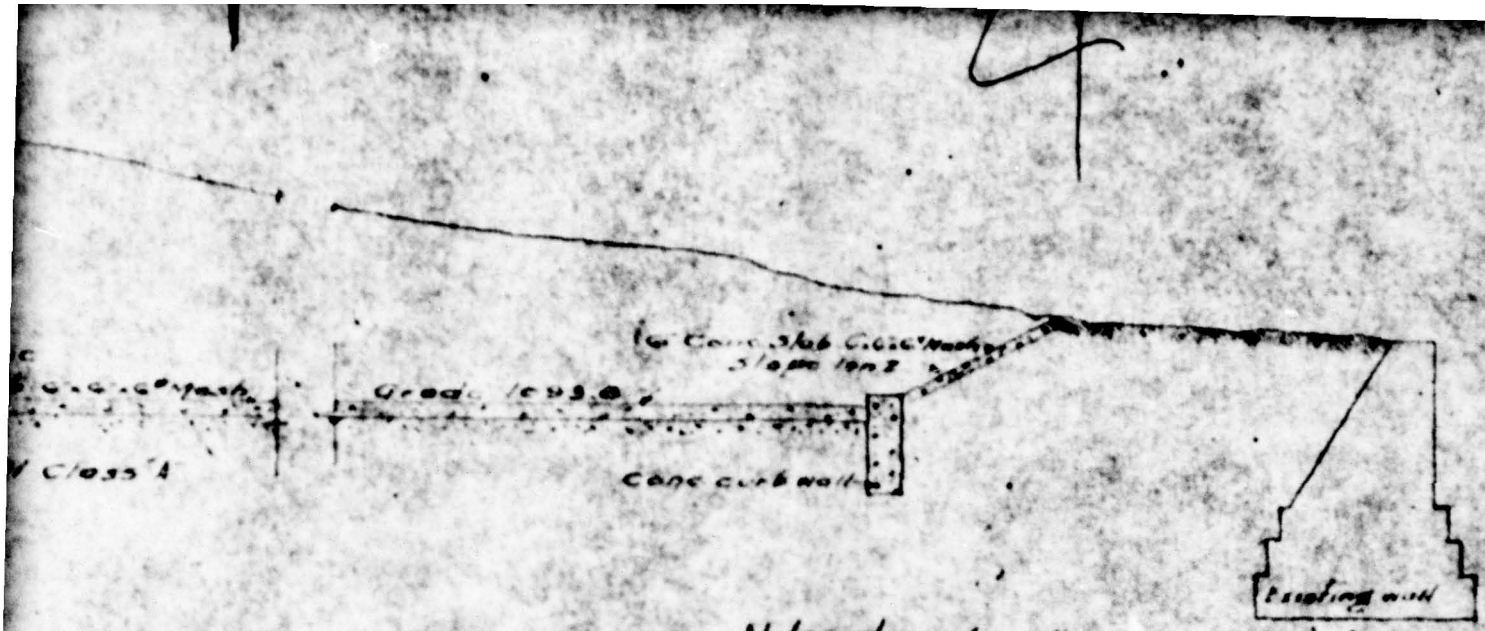
lake

Toe de of Spillway channel

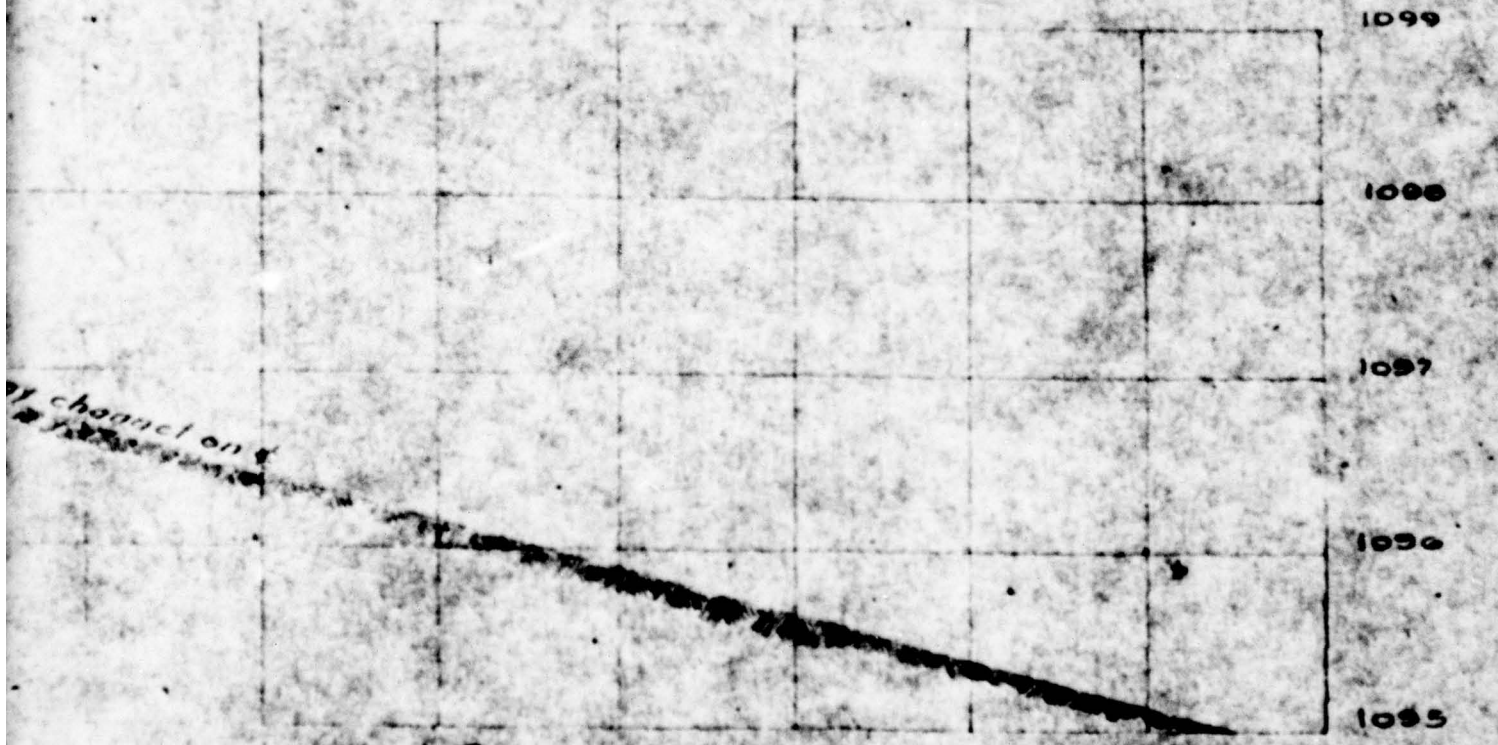
Sta 0+00 toe of spillway

Design data
Q = 900 cfs
n = 0.035 (Manning formula)

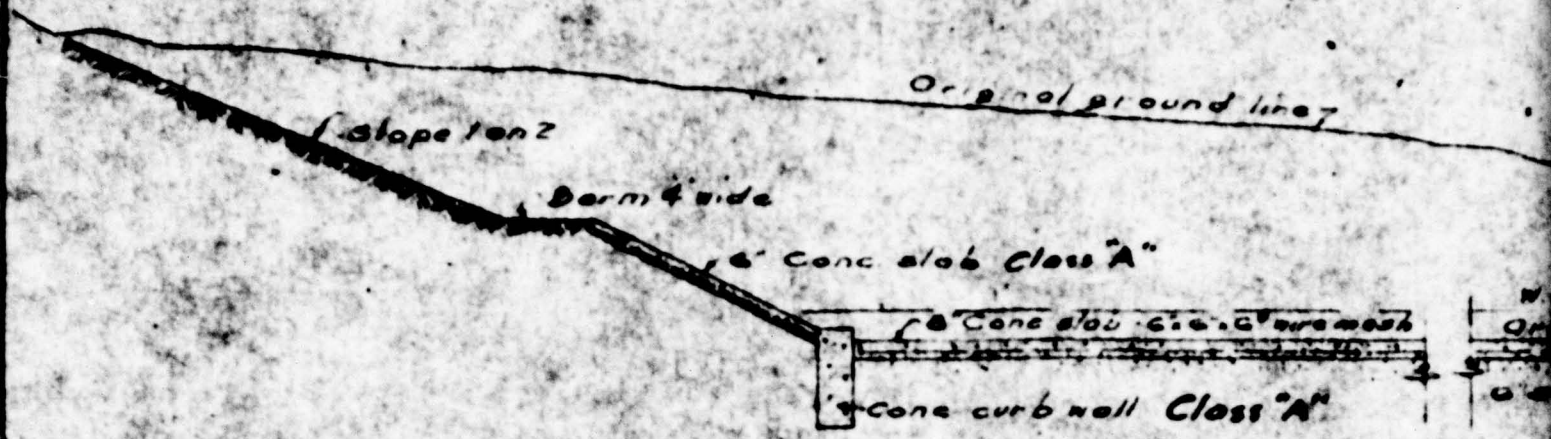
WATER SURFACE



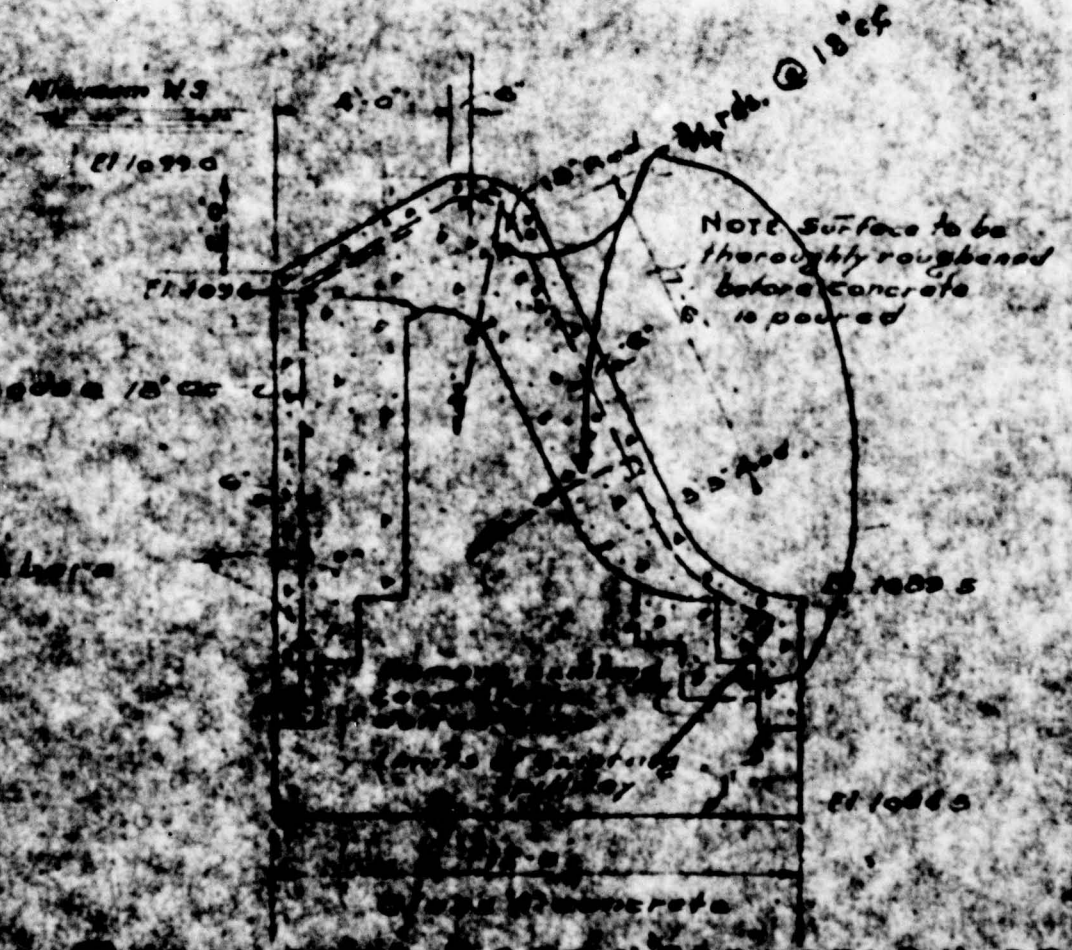
TION AT STATION 1+50 on ℄



FACE PROFILE OF SPILLWAY



CHANNEL SECTION AT



CONSTRUCTION OF
EXISTING SPILLWAY

Max High wat

Raise existing wall to El 1105 ±
Class "A" concrete

Fill — Grade to channel

El 1099 ±

℄ Conc slab
Galv Conc wire mesh

N S Q 9,000 cfs
Grade 1094.5?

sand base
Class "A" conc curb wall

Existing Wall

Grade 1096 ±
Slope 1on 30

AT STA. 1+00 ON ℄

GENERAL NOTE: All concrete shall be class "A" concrete except in gravity section retaining walls, which shall be class "B" concrete

El 1090.0

15' sheet pile

No 2.

No 3.

No 4.

1105

1100

1095

1090

silt and broken shale

2' fine sand silt broken shale

2' fine sand silt broken shale

2 sand silt broken shale

5.5 fine sand silt

6 fine sand

6' yellow clay shale
7' Blue clay

7.5 gray clay & gravel

8' yellow clay

gray clay

Blue clay & broken shale

10' Blue clay

12' fine gray sand

plastic gray clay

13.5 gray clay

14' plastic gray clay

14' plastic gray clay

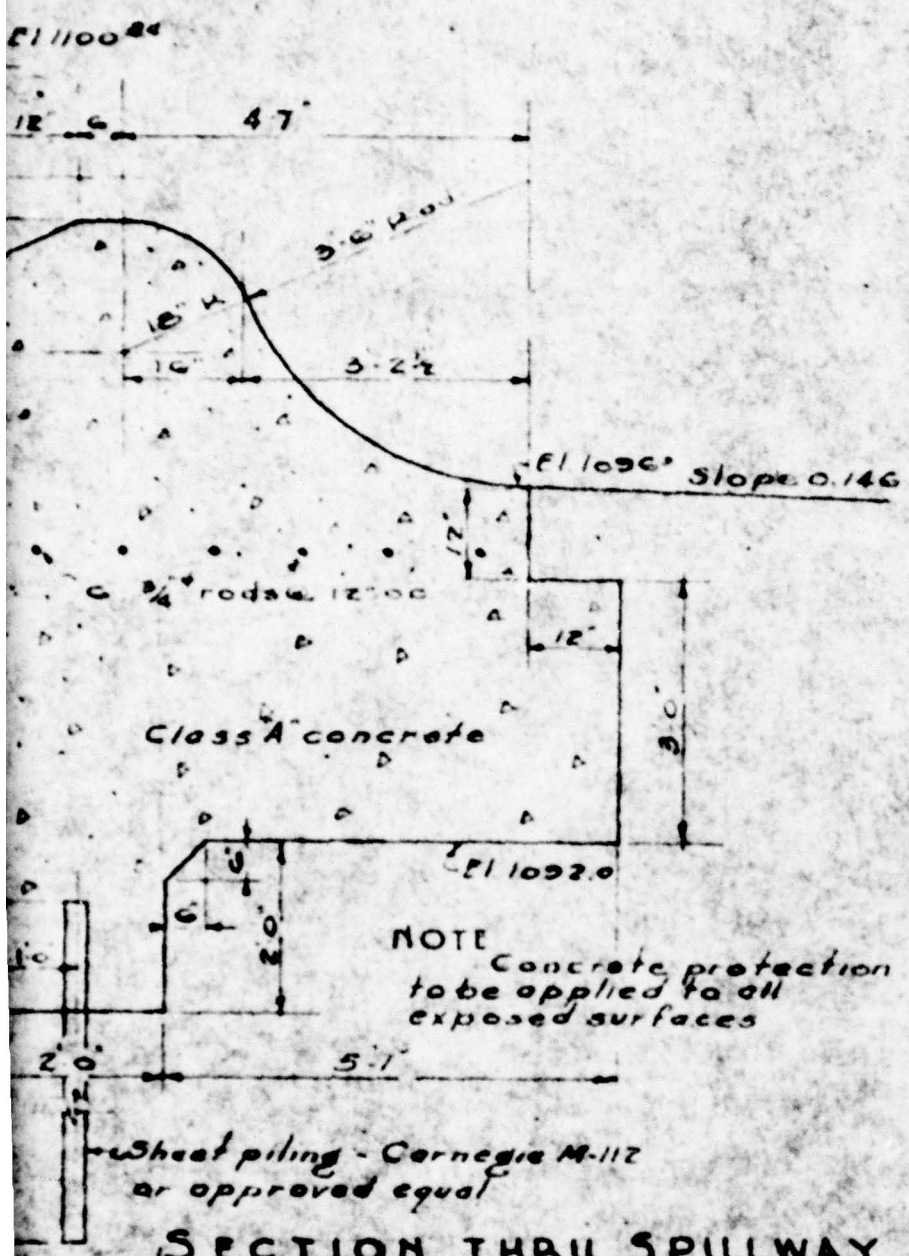
13' plastic gray clay

Top soil and

slope 1

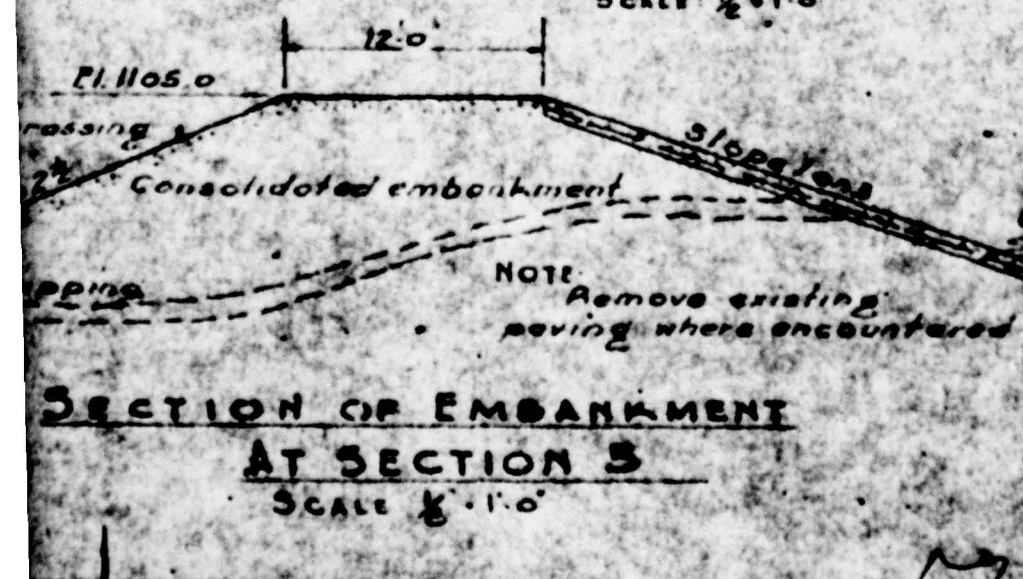
RECORD OF TEST HOLES
SPILLWAY SITE

WATER SURFACE PROFI



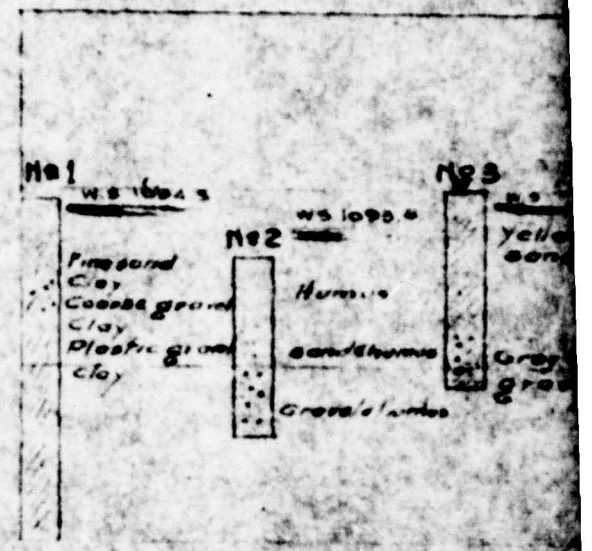
SECTION THRU SPILLWAY

SCALE ½" = 1'-0"

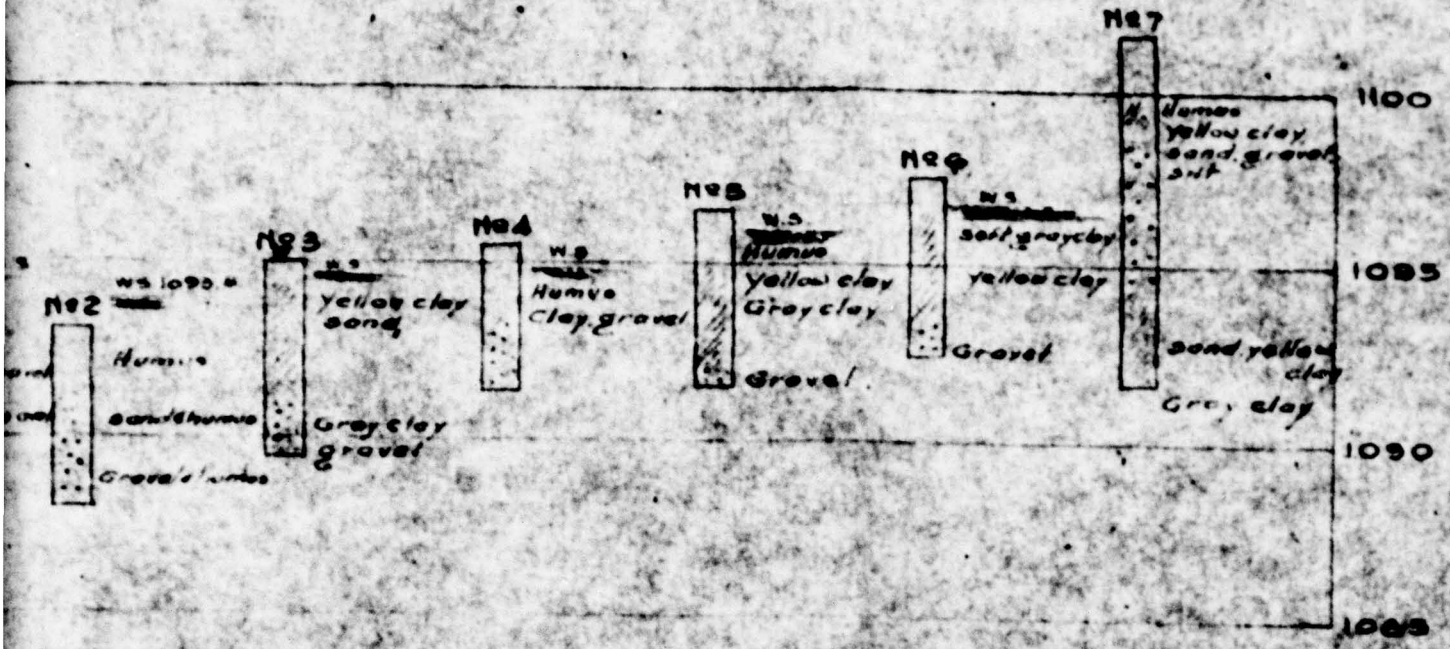


SECTION OF EMBANKMENT AT SECTION 3

SCALE ⅛" = 1'-0"



RECORD OF TES



CORD OF TEST HOLES NORTH OF EXISTING DAM

NEW YORK STATE POST WAR PUBLIC WORKS PLANNING COMMISSION

SERIAL No. 2209

ROCHESTER N.Y. WATER SUPPLY SYSTEM ENLARGEMENT

MAP BY

CITY ENGINEER

APPROVED DATE:

NEW YORK STATE POST WAR PUBLIC WORKS

APPROVED BY

DATE:

NEW YORK STATE PUBLIC WORKS PLANNING COMMISSION

CHAIRMAN

APPROVED BY Asst Engineer	APPROVED BY Engineer	APPROVED BY City Engineer	APPROVED BY Water Supply Engineer
	E H Wallbridge		

DEPARTMENT OF PUBLIC WORKS

DIVISION OF ENGINEERING

ROCHESTER N.Y.

JOB No.

HEMLOCK LAKE WATER SUPPLY

RECONSTRUCTION-CANADICE LAKE DAM. SECTIONS

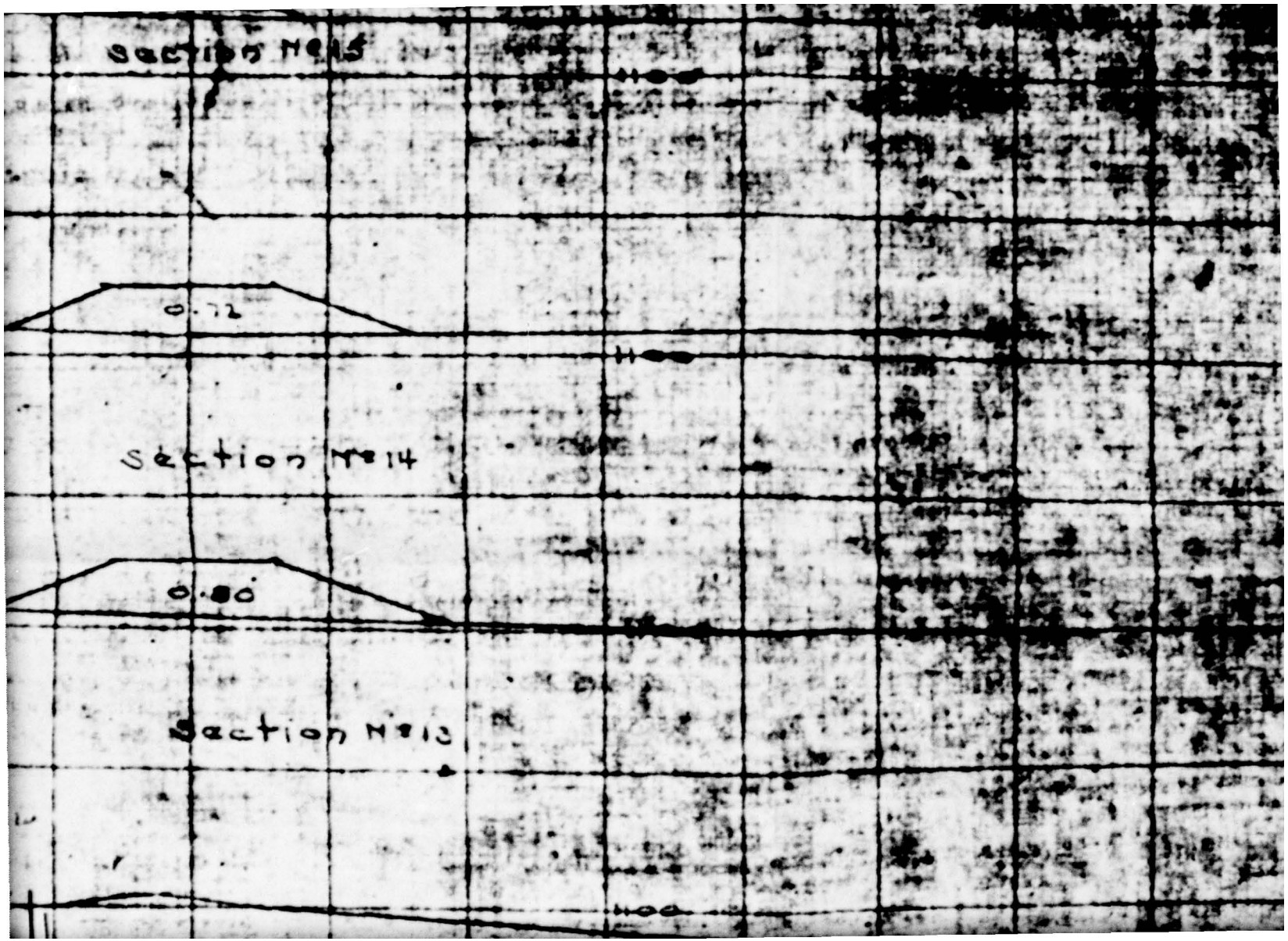
PLANNED

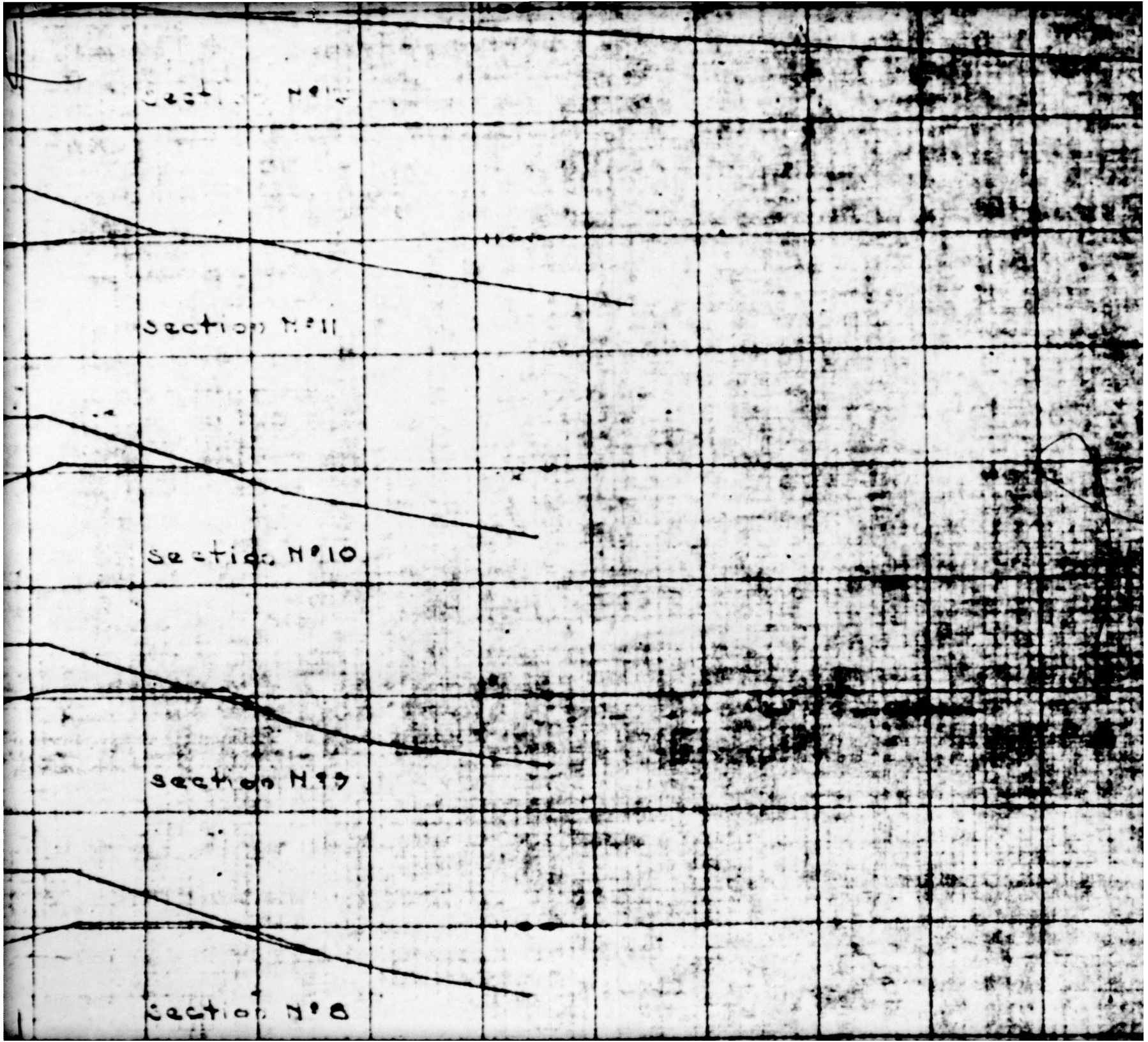
DRAWN

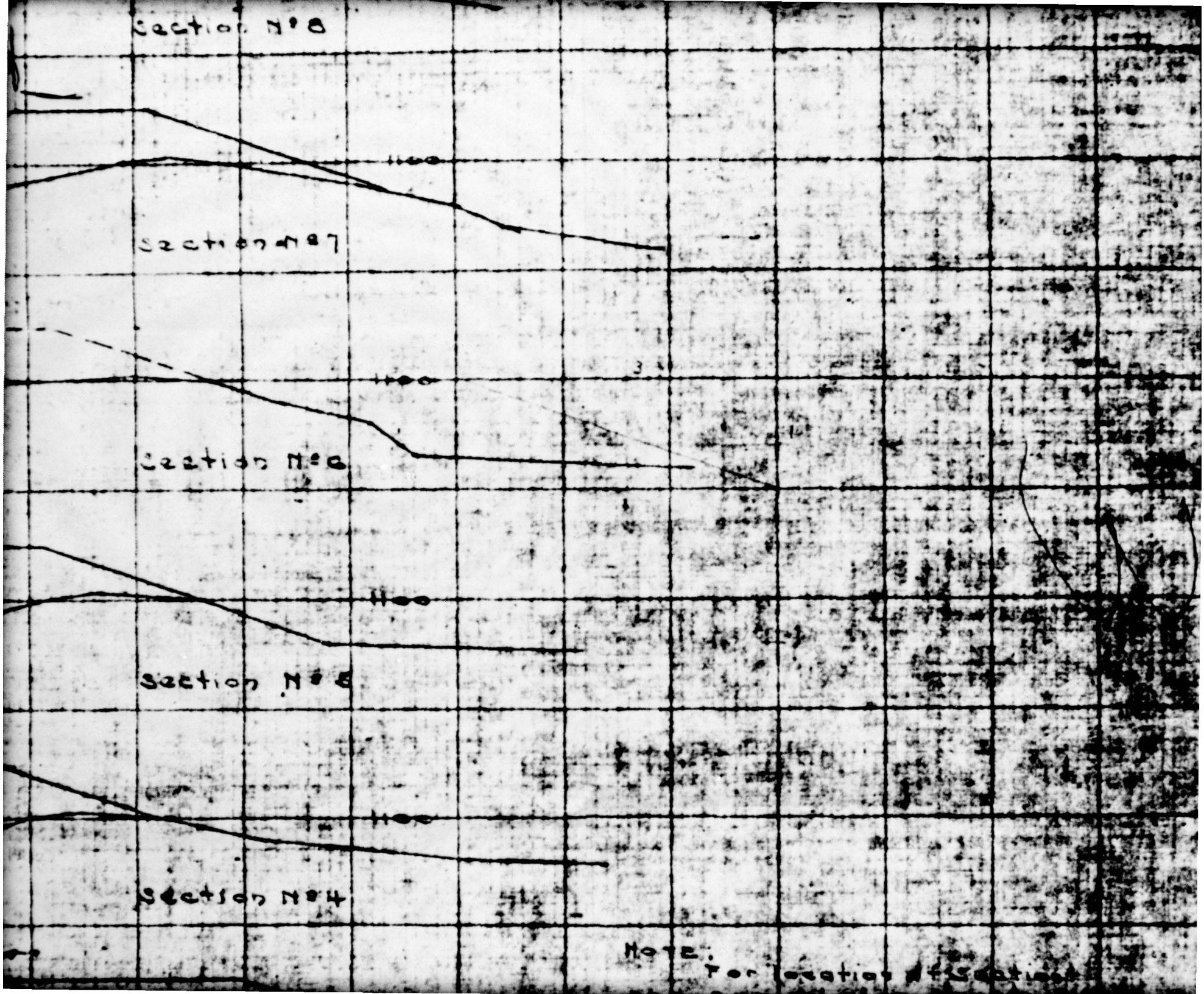
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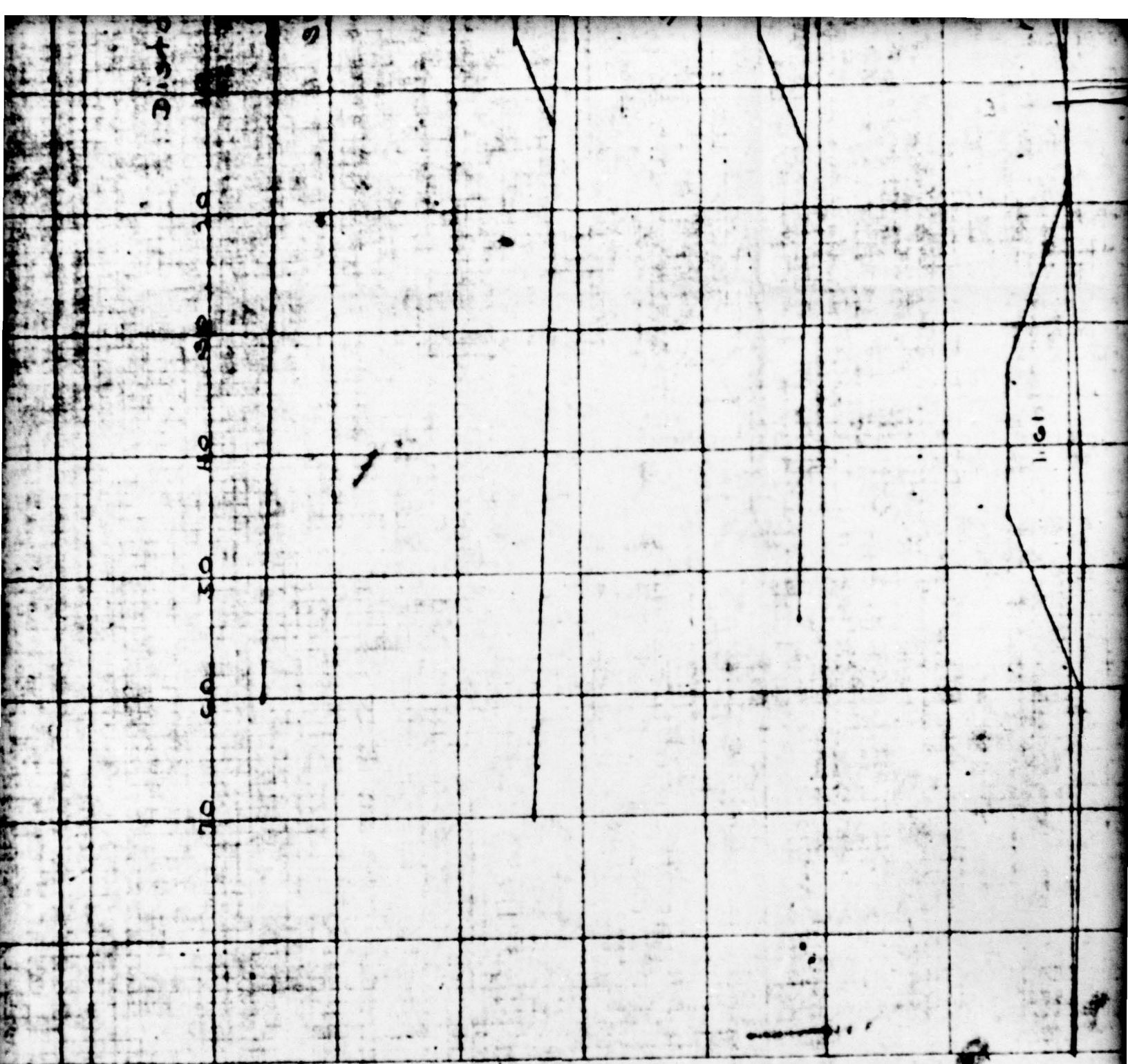
DATE

Class A
Trench
Original ground line
1090


Section N°15
0.72
Section N°14
0.80
Section N°13

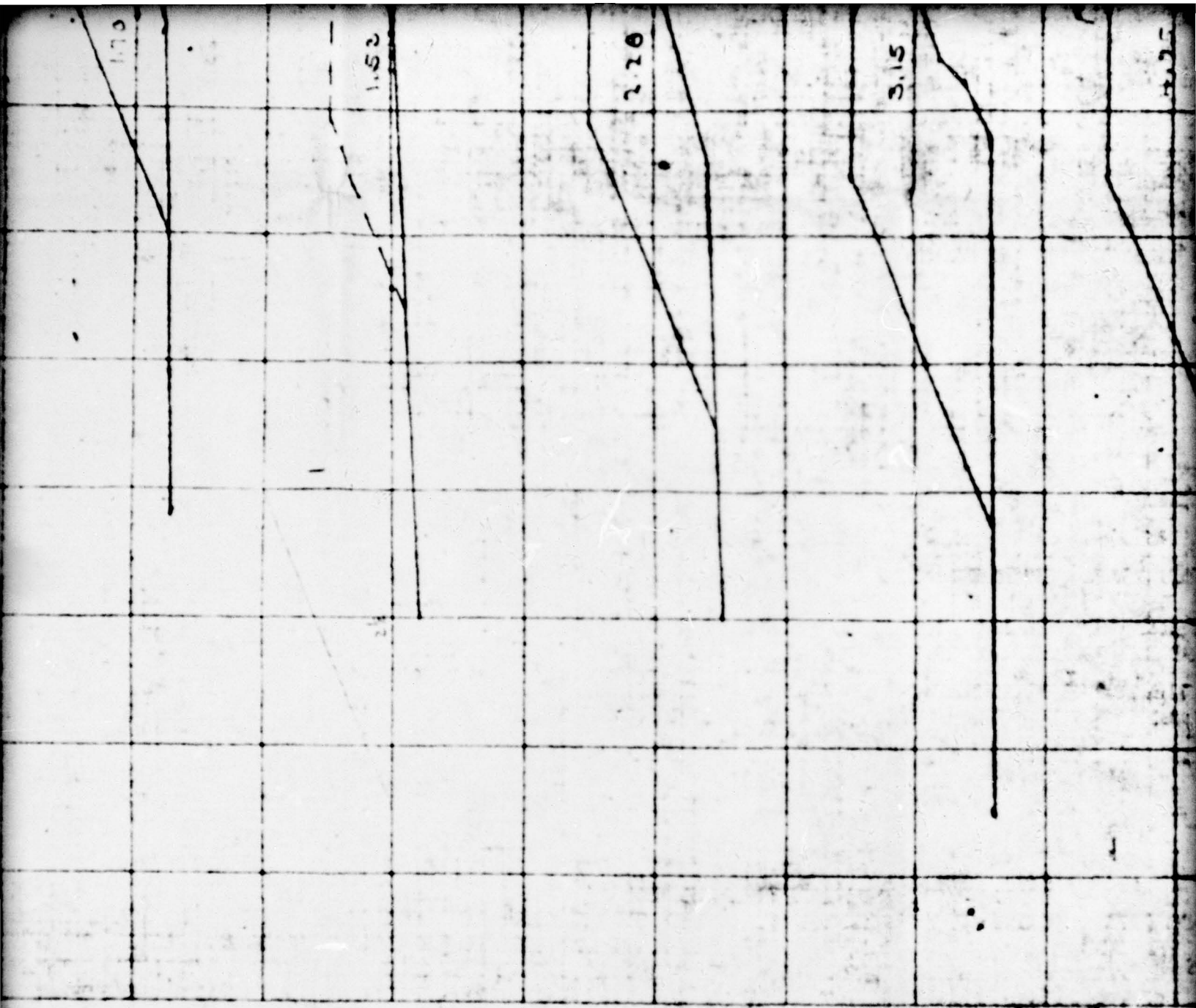

Section N°11
Section N°10
Section N°9
Section N°8


Section N°8
Section N°7
Section N°6
Section N°5
Section N°4
Note:



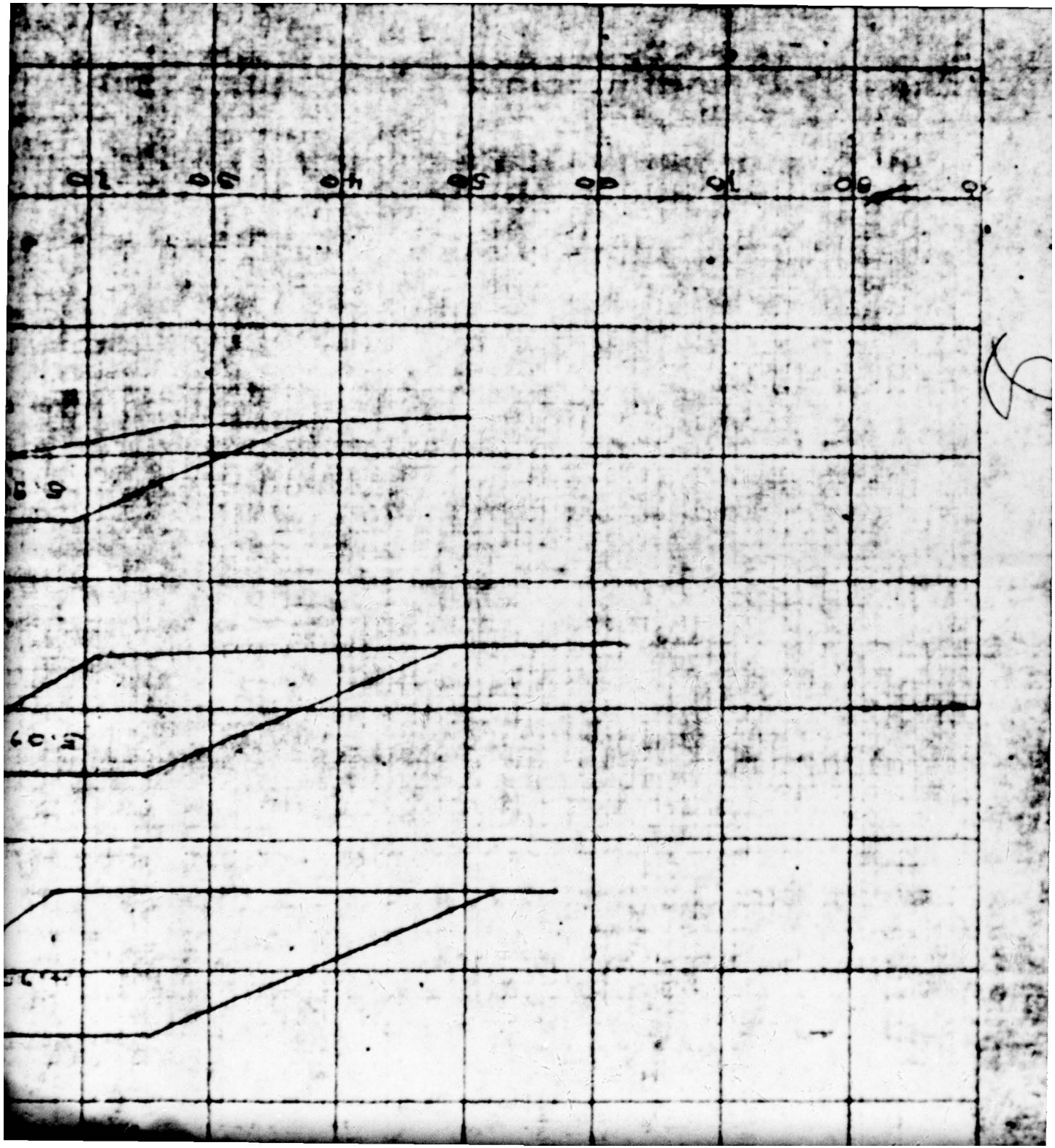
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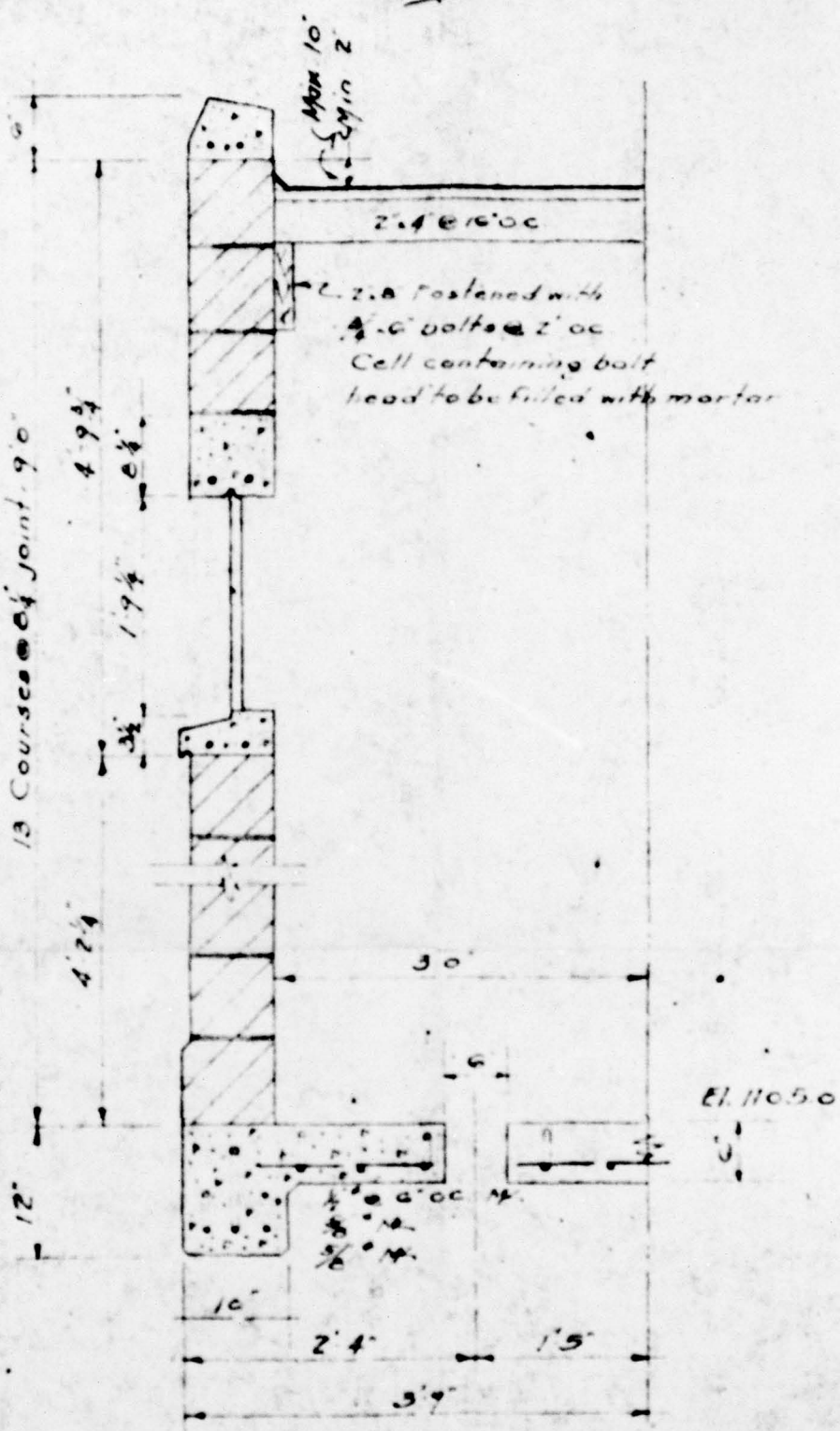
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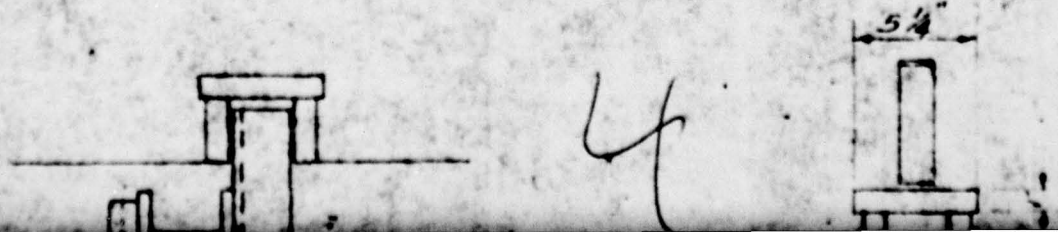
7

NEW YORK STATE POSTWAR PUBLIC
PLANNING COMMISSION
SERIAL NO. 5088
ROCHESTER, N.Y.
WATER SUPPLY SYSTEM
MAP BY
CITY ENGINEER
NEW YORK STATE
APPROVED BY:
DATE:
NEW YORK STATE PUBLIC
PLANNING COMMISSION

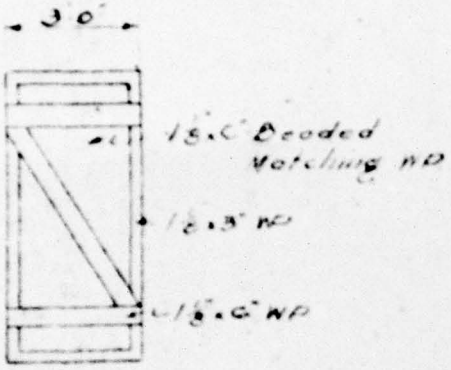



Mon 10"
2'-4" @ 6'-0" oc
L 2.8 Fastened with
¾" ø bolts @ 2' oc
Cell containing bolt
head to be filled with mortar
13 Courses @ 4" joint 90"
4'-9½"
4'-4"
1'-7½"
3½"
4'-2½"
30"
El. 110.50
12"
6" oc
10"
2'-4"
1'-5"
3'-9"

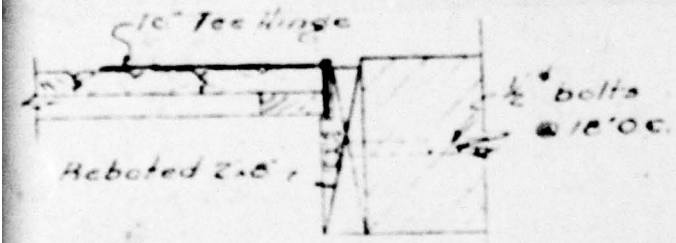
SECTION A-A


5½"

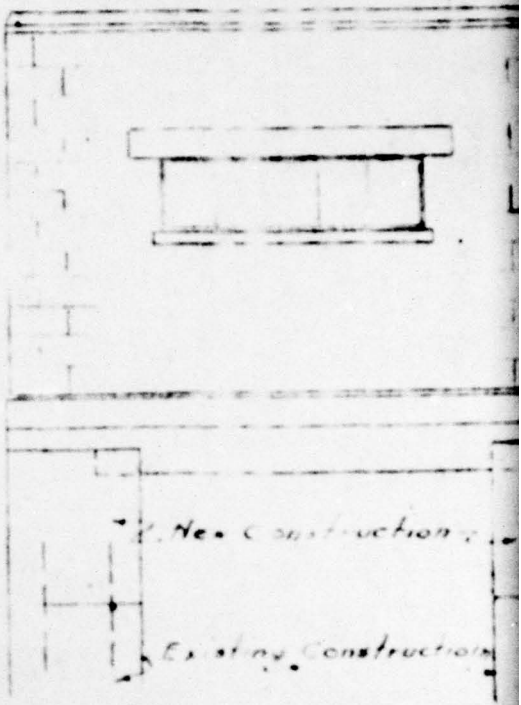
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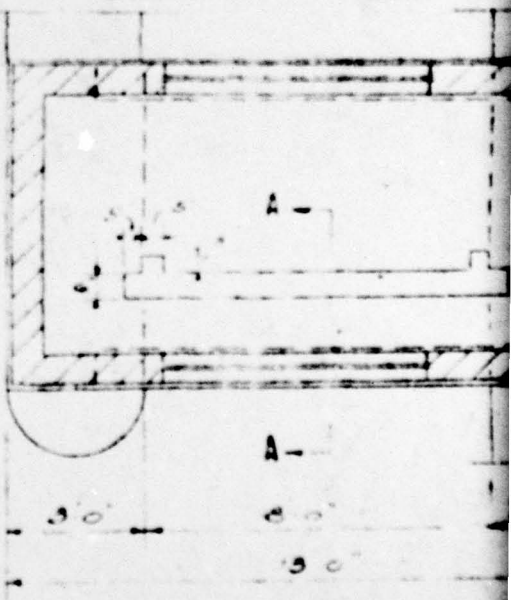
INTERIOR OF DOOR
½" = 1'0"



DETAIL OF JAMB
1½" = 1'0"



SOUTH ELEVATION
NORTH ELEVATION (Oppo

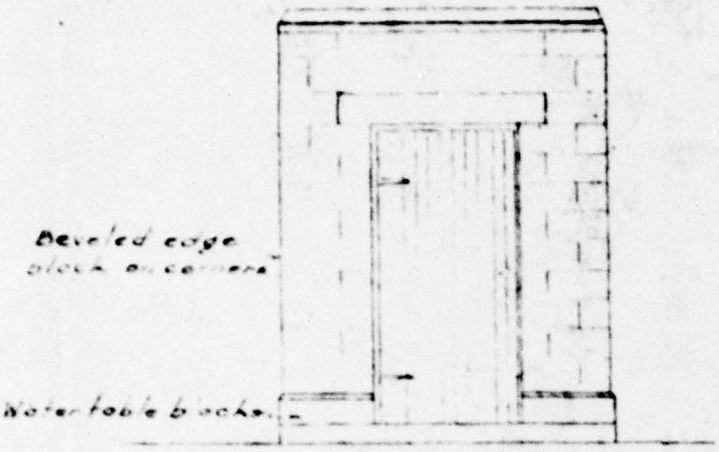


PLAN

½" Premoulded expansion joint

½" Premo Joint

3



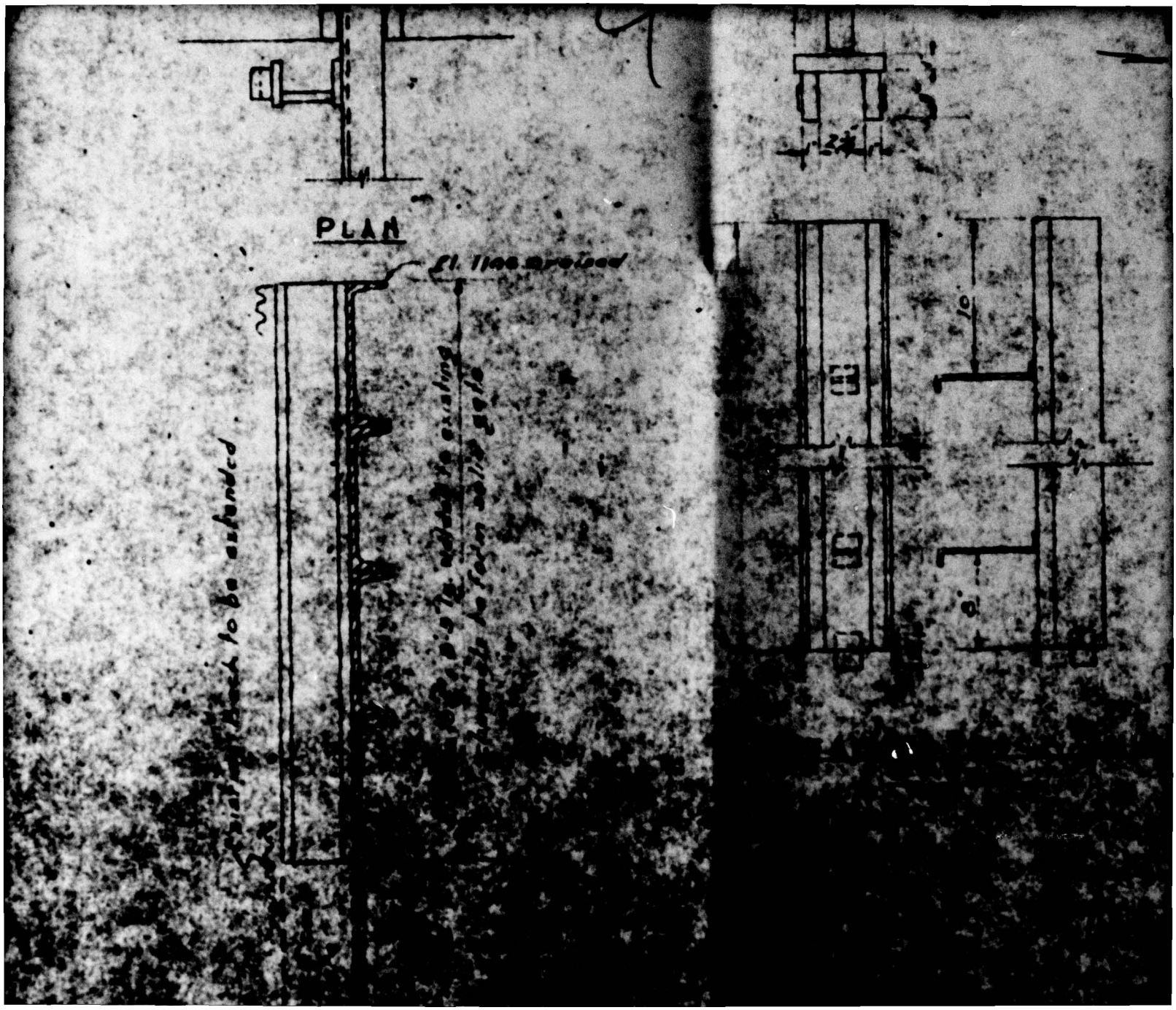
EAST ELEVATION.

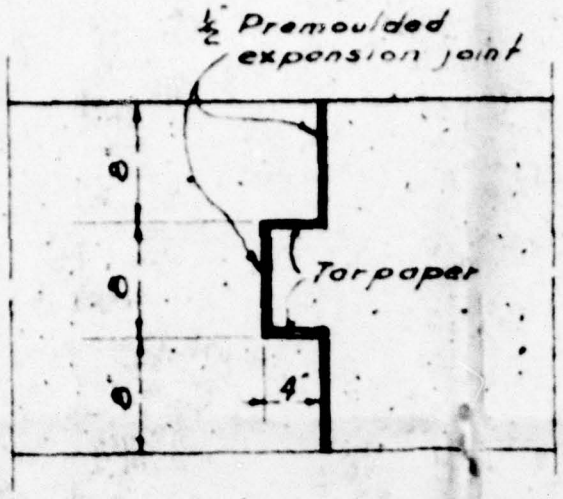
board)

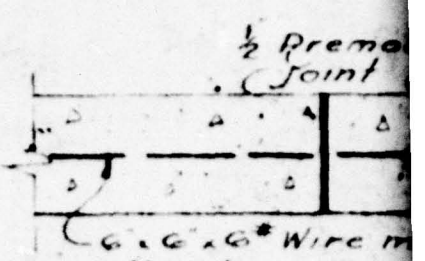
1

ded expansion

1


PLAN
10
8





6"x6"x6" Wire m
to be placed in c
of all slabs

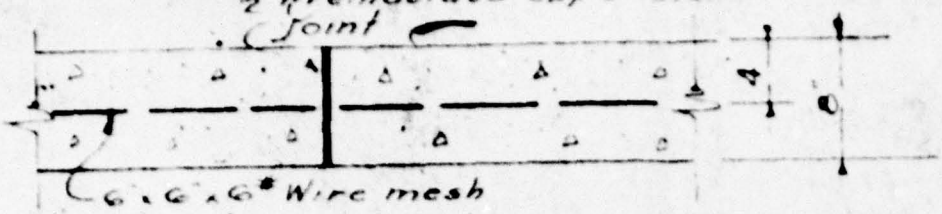
NOTE: All 6" slabs s
All 6" slabs s

TYPICAL WALL EXPANSION JOINT

Scale 1"-1'-0"

NOTE: Where expansion joint occurs in new walls built on present walls, locate expansion joint in new wall over expansion joint in present wall.

5

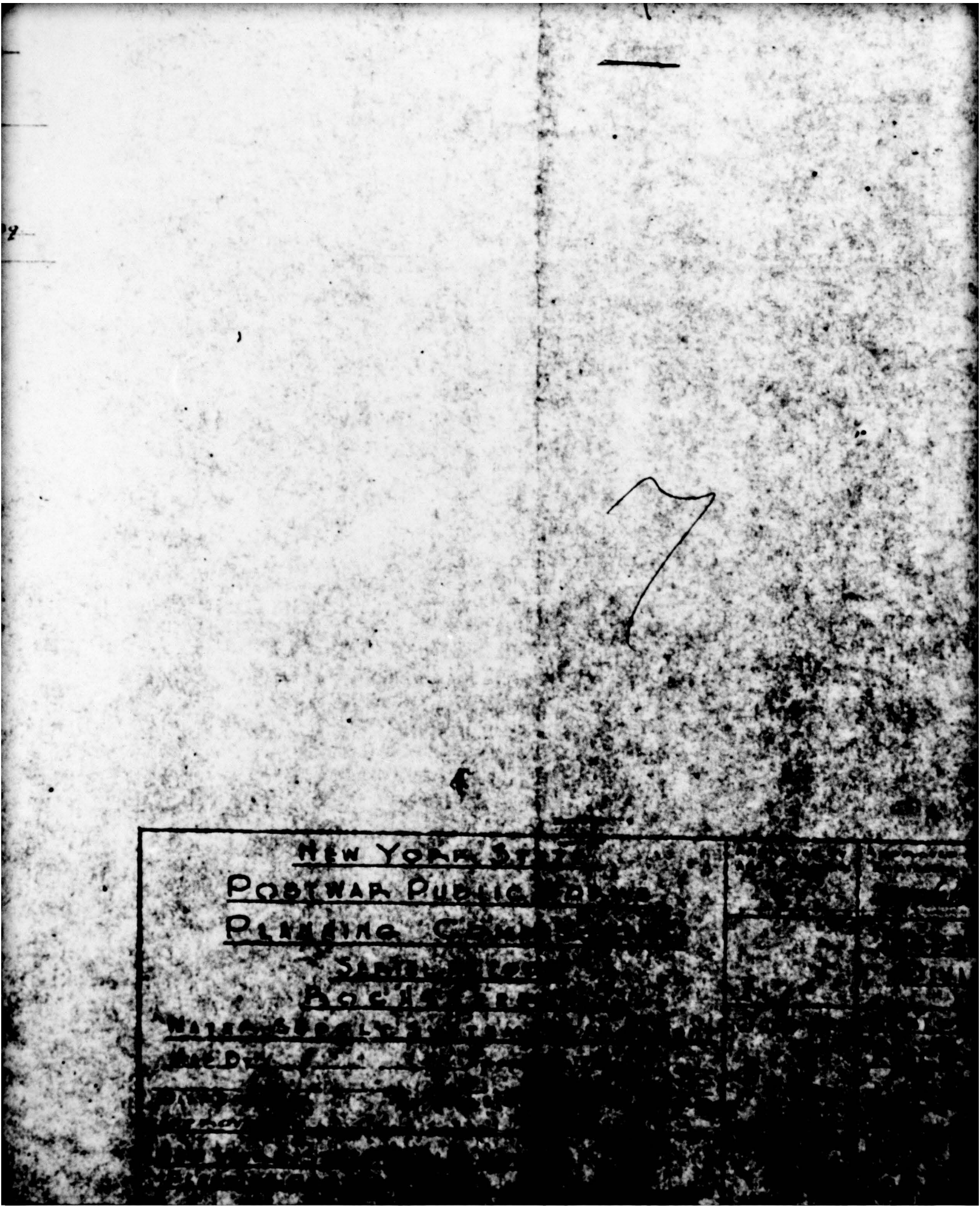


NOTE: All 8" slabs shall be a max of 10 x 10 sq
All 6" slabs shall be a max of 8 x 8 sq

new walls built
in new wall

6

NEW Y
POST WAR
PARKWAY
SL
BOR
WATERFRONT
DI


NEW YORK ST
POST WAR PUBLIC
PLANNING C
SA
BOG
MASS
MED

