

AD A091143

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18. SUPPLEMENTARY NOTES THIS DOCUMENT IS BEST QUALITY PRACTICABLE THE COPY CONTAINED TO DDC CONTAINED A SOME PAGES WHICH DO NOT REPRODUCE WELL. Lake Jefferson Sullivan County Callicoon Creek		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of Lake Jefferson Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.		

The discharge capacity of the spillway is inadequate for all flows in excess of 50% of the Probable Maximum Flood (PMF). During the 1/2 PMF event the water surface will be 0.1 feet below the top of the dam and the outflow will be 15,200 cfs.

The following problem areas were observed which require remedial action within 1 year of notification to the owners.

- 1.. Repair the deteriorated portions of the spillway, spillway walls, concrete core wall and capping.
2. Monitor the seepage observed at the toe of the earth embankment at bi-weekly intervals with the aid of weirs.
3. Remove the trees and brush on the slopes and abutments of the earth. Provide a program of periodic cutting and mowing.
4. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system, and monitoring of the sedimentation behind the spillway. Document this information for future reference. Also develop an emergency action plan.

DELAWARE RIVER BASIN

LAKE JEFFERSON DAM

SULLIVAN COUNTY NEW YORK
INVENTORY NO. NY 205

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

*Jefferson Dam (Inventory Number NY-205)
Delaware River Basin, Sullivan County,
New York, Phase I Inspection Report,*



(11) George/K...

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(15) DACWEI-79-C-4441

NEW YORK DISTRICT CORPS OF ENGINEERS

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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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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LAKE JEFFERSON DAM I.D. No. 205
DEC #147C-766 DELAWARE RIVER BASIN
SULLIVAN COUNTY

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Lake Jefferson (I.D. No. NY 205)
State Located: New York
County Located: Sullivan
Stream: East Branch of Callicoon Creek
(tributary of Callicoon Ck. & Delaware River)
Date of Inspection: November 16, 1979

ASSESSMENT

The examination of documents and visual inspection of Lake Jefferson Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.

The discharge capacity of the spillway is inadequate for all flows in excess of 50% of the Probable Maximum Flood (PMF). During the 1/2 PMF event the water surface will be 0.1 feet below the top of the dam and the outflow will be 15,200 cfs.

The following problem areas were observed which require remedial action within 1 year of notification to the owners:

- (1) Repair the deteriorated portions of the spillway, spillway walls, concrete core wall and capping.
- (2) Monitor the seepage observed at the toe of the earth embankment at bi-weekly intervals with the aid of weirs;
- (3) Remove the trees and brush on the slopes and abutments of the dam. Provide a program of periodic cutting and mowing; and
- (4) Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system, and monitoring of the sedimentation behind the spillway. Document this information for future reference. Also develop an emergency action plan.

A

George Koch

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Clark H. Benn

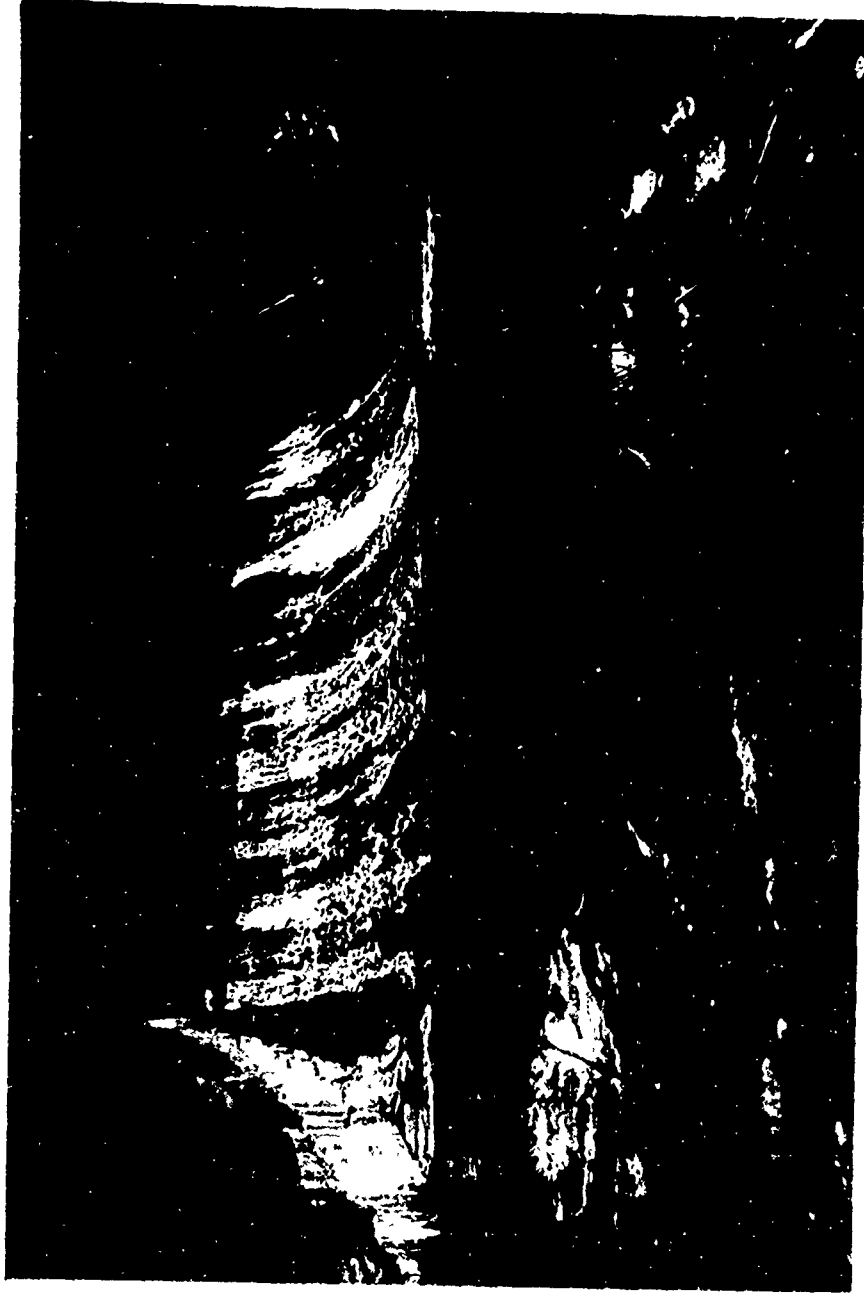
Col. Clark H. Benn
New York District Engineer

Date:

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Overview of Lake Jefferson Dam
Embankment Portion
Photo #1



Overview of Lake Jefferson Dam
Spillway Portion
Photo #2

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LAKE JEFFERSON DAM I.D. No. 205
DEC #147C-766 DELAWARE RIVER BASIN
SULLEIVAN COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

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

b. Purpose of Inspection

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to human life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Lake Jefferson Dam consists of a 160 feet long concrete covered masonry ogee spillway adjacent to 153 feet long compacted earth embankment containing a concrete core wall. The maximum height of the dam is 40 feet. The slopes of the earths embankment are: downstream slope = 1 vertical on 2 horizontal and upstream slope = 1 on 2.5. The concrete core wall extends from the exposed concrete cap to bedrock or "Red Clay Hard-Pan". The core wall has a top width of 2.5 feet and widens to 8 feet at the base. A 30 inch diameter cast iron pipe extends through the embankment adjacent to the spillway and serves as a reservoir drain.

b. Location

The dam is located on the East Branch of Callicoon Creek a tributary of the Callicoon Creek and the Delaware River, less than 1 mile from the Village of Jeffersonville, New York.

c. Size

The dam is 40 feet high and impounds approximately 420 acre-feet. The dam is classified as "intermediate" in size (40 to 100 feet in height).

d. Hazard Classification

The dam is classified as high hazard, because of its location above the Village of Jeffersonville.

e. Ownership

The dam is owned and operated by Mr. Ludwig Grupp, Jefferson Lake Hotel, Jeffersonville, New York 12748, Telephone (914)482-5383.

f. Purpose of the Dam

The dam provides storage for recreation.

g. Design and Construction

The dam was designed by Nial Sherwood C.E. Liberty N.Y. in 1927 and constructed by Lake Jefferson Inc. A prior design by Joseph B. Rider C.E. of New York City was initiated in 1922 by Clarke Water & Power Co. Inc. This design was partially built and remained incomplete until 1927 when Lake Jefferson Inc. completed the project. All available plans and related documents are on file at the N.Y.S. Department of Environmental Conservation 50 Wolf Road Albany, New York.

h. Normal Operating Procedures

All flows are discharged over the spillway. The reservoir drain system is operated periodically for maintenance purposes.

1.3 PERTINENT DATA

<u>a. Drainage Area (sq. mi.)</u>	30.34
Dam Height (ft.)	40
<u>b. Discharge at Dam Site (cfs)</u>	
Maximum known flood	4375 Aug. 17, 1947
Spillway at maximum pool (el. 1090)	15465
Maximum capacity of reservoir drain	50
Total discharge, max, pool	15500
Average daily	60
<u>c. Elevations (ft. above MSL, USGS)</u>	
Top of dam	1090.
Spillway crest	1081.
Original stream bed	1050.
<u>d. Reservoir</u>	
Length at spillway crest(mi.)	.75
Length & shoreline at spillway crest (mi.)	1.50
Surface area at spillway crest (acres)	48.
<u>e. Storage (acre-feet)</u>	
Top of dam	890.
Spillway Crest	420.
<u>f. Dam</u>	
Type:	Compacted earth embankment with concrete core wall.
Length (ft)	153
Upstream Slope	2.5:1
Downstream Slope	2:1
Core Material	concrete
<u>g. Spillway</u>	
Type:	Masonry, ogee section
Length(ft)	160
<u>h. Reservoir Drain</u>	
30" diameter cast iron pipe, valve on downstream side.	

SECTION 2: ENGINEERING DATA

2.1 GEOLOGY

Lake Jefferson Dam is located in the glaciated portion of the Appalachian Uplands (northern extreme of the Appalachian Plateau) physiographic province of New York State. These uplands were formed by the dissection of the uplifted, but flat sandstones, siltstones and shales of the Early Upper Devonian Period (365 to 385 million years ago). The plateau surface is represented by flat-topped divides with drainage generally south or southwestward toward the Delaware River.

Glacial cover is generally thin, the deposits of which have resulted from glaciations during the Wisconsin glaciation, approximately 11,000 years ago.

2.2 SUBSURFACE INVESTIGATION

No subsurface investigation could be located for the project. However, the "General Soil Map of New York State" prepared by Cornell University Agriculture Experiment Station indicates that the surficial soils are Lackawanna Soils of glacial till origin. These soils have poor internal drainage characteristics. Boulders are common and the depth to bedrock is variable.

Sandstone bedrock was observed outcropping at the left abutment of the spillway and in the bed of the downstream channel.

2.3 EMBANKMENT and APPURTENANT STRUCTURES

The original design of the dam was by Joseph B. Rider C.E., Consulting Engineers, 26 Cort Landt St., New York City, N.Y. in 1922. The Clarke Water & Power Company Inc. excavated the left rock abutment of the spillway, and built the core wall and possible the spillway elements of the dam. A 30 inch diameter cast iron reservoir drain pipe was also installed.

In 1927 Nial Sherwood C.E. of Liberty, NY, redesigned the dam, and construction of the earth embankments, left end of the spillway and reservoir drain valve were completed by Lake Jefferson, Inc.

The dam is 40 feet high and consists of a 160 feet wide ogee spillway and a 153 feet wide earth embankment. A concrete core wall extends to the top of the embankment. A 30 inch diameter cast iron pipe serves as a reservoir drain.

2.4 CONSTRUCTION RECORDS

No construction information is available other than that found the NYS DEC files.

2.5 OPERATION RECORDS

No operation records are available.

2.6 EVALUATION OF DATA

The information presented in this report has been compiled from information obtained in part from Mr. Ludwig Grupp, owner of the dam. This information appears adequate and reliable for Phase I inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The visual inspection of Lake Jefferson Dam was conducted on November 16, 1979. The weather was partly cloudy and the temperature ranged in the forties. The reservoir level at the time of the inspection was approximately 2 inches above the spillway crest.

b. Embankment

The earth embankment is located on the right side of the spillway and no evidence of sloughing subsidence, depressions or cracking was observed. Some trees and low brush was noted on the upstream and downstream slopes. One animal burrow was also evident approximately 15 feet from the crest on the downstream slope. (See Photos #1,5,6,7,8&11)

Seepage was observed along the toe of the embankment, and estimated to be approximately 10 gpm. (See Photo #11 & 12) About 5 gpm was observed emanating from the abutment area. This area is below a leach field for a resident and in the vicinity of an old tannery vat building which was not observed but is indicated on the plans (See Phot #11) Approximately 25 to 30 feet right of the right spillway wall at the toe of the embankment an additional 5 gpm was observed emanating from 2 small (1 inch diameter) holes. No migration of fines was observed. However, the soil in the area had a rusty appearance and a small amount of gray sediment was noted at the periphery of the seepage points. (See Photo #13)

Deterioration of the concrete core wall cap and minor cracking of the core wall was observed (See Photos #6 & 8)

c. Spillway

The spillway is concrete covered masonry ogee structure with a bedrock formed downstream channel. (See Photos #1 & 2) The downstream face of the spillway (i.e., concrete covering) is deteriorated, exposing the masonry substructure at numerous locations. (See Photos #3 & 4) The spillway abutment walls are cracked and deteriorated, and the downstream end of the right spillway buttress wall is partially undermined (See Photos #1,2,3,4, &10)

d. Downstream Channel

The downstream channel is bedrock formed. Some minor debris and trees were noted in the channel. (See Photos #1&2)

e. Reservoir

No signs of instability were observed in the reservoir area. Sediment has accumulated behind the spillway portion of the dam (See Photo #4) and it was reported that some sediment has accumulated at the upper end of the reservoir.

f. Reservoir Drain

A 30 inch cast iron pipe serves as a reservoir drain. The control mechanism is a valve located at the right spillway buttress on the downstream face of the dam (See Photos #1,2,&9).

3.2 EVALUATION

The problem areas observed during the inspection and the recommended remedial actions or investigations are as follows:

1. The seepage observed at the toe of the earth embankment should be monitored bi-weekly with the aid of weirs. If the seepage rate increases appreciably, repair measures will be required.
2. The deteriorated concrete of the spillway, core wall cap, spillway buttresses, and core wall requires repair.
3. Remove all tree and brush on the slopes and at the abutments of the earth embankment. Provide a program of periodic cutting and mowing of the embankment surfaces. Also, backfill the animal burrow on the downstream face of the embankment.
4. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of reservoir drain valve. Document this information for future reference. Also, develop an emergency action plan.
5. Monitor the sedimentation within the reservoir area particularly that behind the spillway and remove as required.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface is approximated by the crest of the spillway.

4.2 MAINTENANCE OF THE DAM

The dam is maintained by the owner. Maintenance of the dam is not considered satisfactory as evidenced by the deteriorated concrete elements of the dam, and the vegetation on the slopes of the embankment.

4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

4.4 EVALUATION

The dam and appurtenances have not been maintained in satisfactory condition as noted in "Section 3: Visual Inspection."

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Jefferson Lake Dam is located on the East Branch Callicoon Creek approximately 1/2 mile east of Jeffersonville, the township of Callicoon, Sullivan County, New York. The total drainage area is 30.34 square miles. The basin was broken into two subbasins, one of 12.18 square miles which tends toward flat and swampy and other of 18.16 square miles which is fairly steep and well drained.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 computer program incorporating the "Snyder Synthetic Unit Hydrograph" method and the "Modified Puls" flood routing procedure. The floods selected for analysis was the PMF and 1/2 PMF in accordance with the recommended guidelines of the Corps of Engineers.

5.3 SPILLWAY CAPACITY

The Lake Jefferson spillway is an uncontrolled ogee section, 160 feet long and 9 feet of depth to dam crest. It is a masonry structure in need of minor repair to the spillway crest due to slight deterioration.

The spillway has a capacity of 15,465 cfs at top of dam which is essentially 1/2 the computed PMF of 15250 cfs. The dam would be overtopped by approximately 4. feet at the PMF of 30,500 cfs.

5.4 RESERVOIR CAPACITY

Capacity to normal water elevation is 420 acre feet. Surcharge storage to top of dam is an additional 460 acre-feet, creating a total storage of 880 acre feet. The surcharge storage between spillway and dam crest is equivalent to .28 inches of runoff.

5.5 FLOODS OF RECORD

The maximum known flood of record occurred August 17, 1947 at Callicoon. Ratioed by drainage area the estimated discharge at Jefferson Lake was 4375 cfs, this flow would be approximately 4 feet above the spillway crest.

5.6 OVERTOPPING POTENTIAL

The PMF analysis indicates the dam will be overtopped by 4 feet during the PMF. Many homes downstream of the dam would be inundated in the case of a PMF. The spillway will handle 1/2 the PMF with approximately 0.1 feet of freeboard. It is felt that a flow with the magnitude of 1/2 the PMF would cause much flooding to the low lying homes in Jeffersonville.

5.7 EVALUATION

The spillway is inadequate to pass the PMF of 30,500 cfs, but is adequate to pass 1/2 the PMF of 15,250 cfs. As previously stated there are many low lying homes in Jeffersonville which would be flooded in either case.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of major distress were observed in connection with the earth embankment at the spillway. However, some seepage was observed at the toe of the embankment and the concrete elements of the spillway and core wall are deteriorated.

b. Design and Construction Data

The only information concerning the stability of the structure is that section of the spillway indicated on the plans which implies that the resultant of forces falls within the middle 1/3 of the structure's base. (See Appendix F Drawings)

c. Stability Analysis

A stability analysis was conducted for the concrete covered masonry gravity spillway section. The results of the analysis are as follows.

<u>Case</u>	<u>Description of Loading Conditions</u>
1	Normal Operating Conditions, reservoir as Spillway Crest full uplift tailwater 3 feet.
2	Same as case 1 with 5.0 kips/L.F. Ice Load
3	Water at 1/2 PMF level (El. 1090), Uplift as in case 1, tailwater = 6 feet
4	Water at PMF level (El. 1094), Uplift as in case 1, tailwater = 8 feet.
5	Normal Conditions as in case 1, with seismic forces of = 0.1

Note: the sliding and overturning resistance of the buttress walls has been neglected. The shear strength of the cut-off sections beneath the spillway have been included in the sliding stability analysis.

<u>Case</u>	<u>Factor of Safety Overturning</u>	<u>Location of Resulted from Toe</u>	<u>Factor of Safety Sliding</u>
1	1.80	18.3	8.25
2	1.63	15.9	7.78
3	1.45	14.0	5.60
4	1.32	11.6	4.82
5	1.49	13.5	6.20

The location of the middle 1/3 is 11.0 to 22.0 feet from the toe.

These results indicate that the spillway portion analyzed is stable for all design conditions, and further investigation is not required. Further information concerning this analysis is included in Appendix E "Stability Analysis."

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I Inspection of Lake Jefferson Dam did not reveal conditions which constitute a hazard to human life or property. The embankment and spillway portions of the dam are not considered to be unstable.

b. Adequacy of Information

Information reviewed for the purposes of the Phase I Inspection report is considered adequate.

c. Urgency

The remedial measures listed below should be completed within 1 year of notification to the owner.

d. Need for Additional Investigation

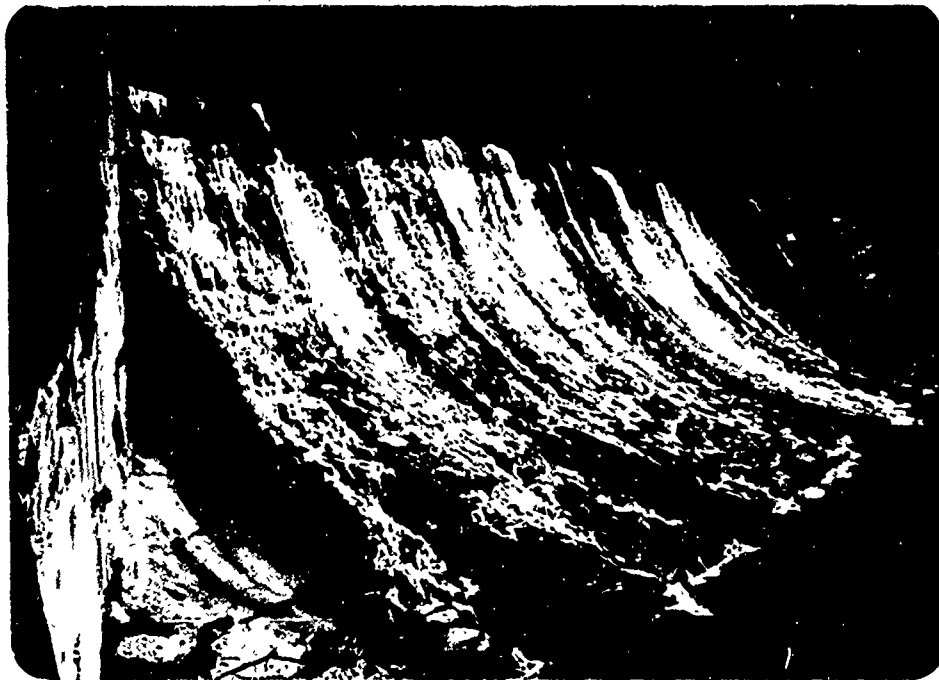
No additional investigations are required at this time.

7.2 RECOMMENDED MEASURES

1. Repair the loose spalled and deteriorated portions of the spillway, spillway walls, concrete core wall and concrete capping of the core wall.
2. Monitor the seepage observed at the toe of the earth embankment at bi-weekly intervals with the aid of weirs. If seepage rates increase appreciably, institute repairs.
3. Remove all trees and brush on the slopes and at the abutments of the earth embankment. Provide a program of periodic cutting and mowing of the embankment surfaces. Backfill the animal burrow on the downstream slope.
4. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system, and monitoring of the sedimentation behind the spillway. Document this information for future reference. Also develop an emergency action plan.

APPENDIX A

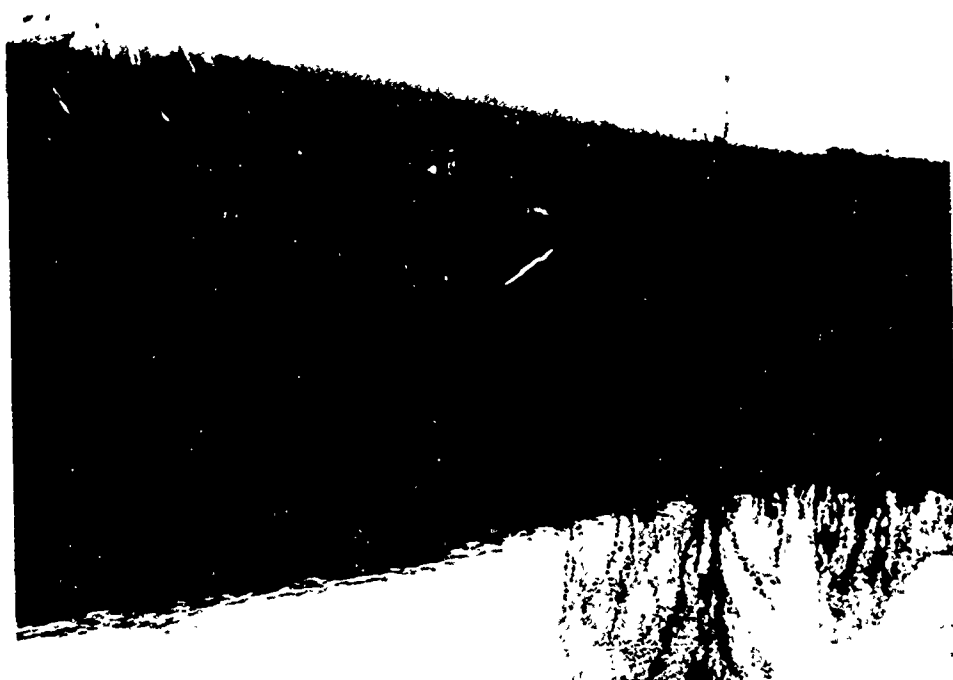
PHOTOGRAPHS



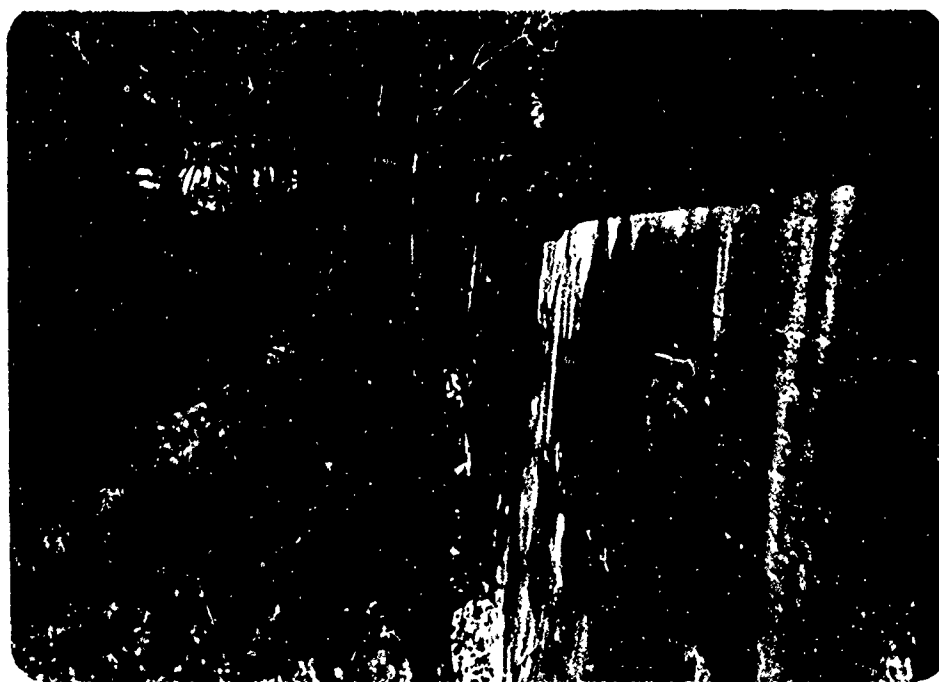
Spillway
Note deteriorated Concrete
Photo #3



Spillway Crest
Photo #4



Upstream Face of Embankment
Photo #5



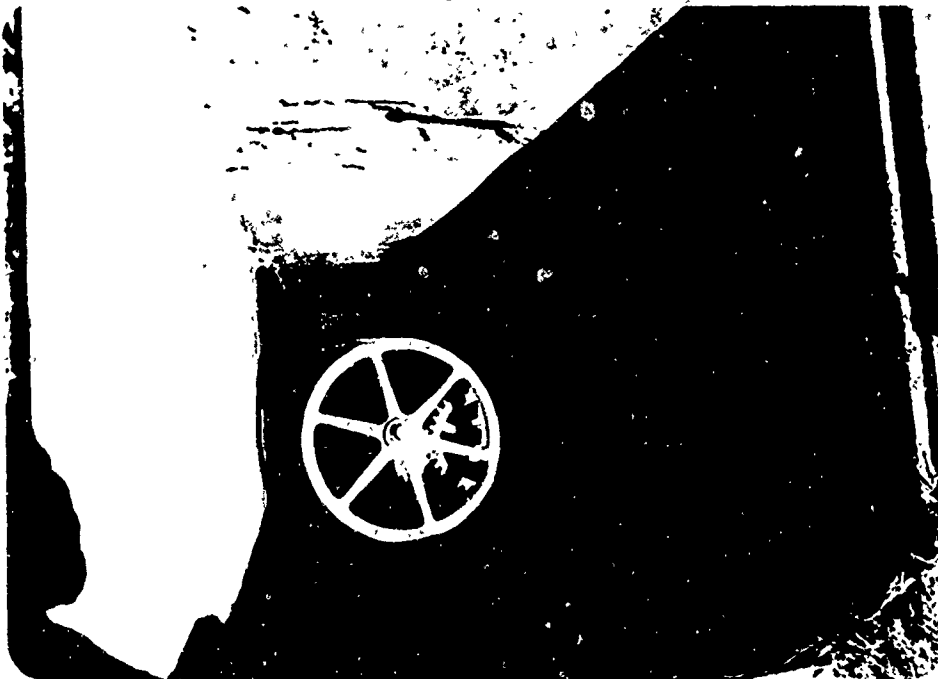
Embankment Core Wall
Photo #6



Top of Core Wall
Photo #8



Embankment viewed from
right abutment
Photo #7



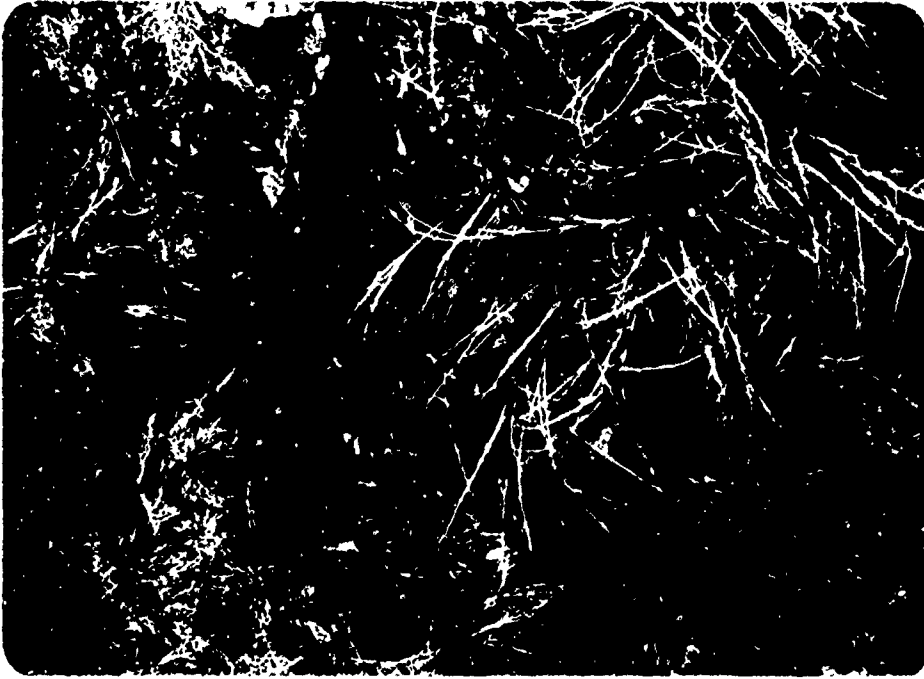
Reservoir Drain Valve
Photo #9



Right Spillway Buttress Wall
Note deterioration
Photo #10



Seepage at Toe of Embankment
Photo #11



Outlet of Seepage from Toe
Photo #12



Concentrated Seepage Points at toe of
Earth Embankment
Photo #13

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Lake Jefferson
Fed. I.D. # 205 DEC Dam No. 147C-766
River Basin Delaware
Location: Town Callicoon County Sullivan
Stream Name E. Branch Callicoon Ck.
Tributary of Callicoon Ck. & Delaware R.
Latitude (N) 41° 46.6' Longitude (W) 74° 55.5'
Type of Dam Ogee Spillway 160' Earth embankment 153'
Hazard Category "C" High
Date(s) of Inspection 11/16/79
Weather Conditions Partly Cloudy, Foggy
Reservoir Level at Time of Inspection 2 inches $\pm$ over spillway

b. Inspection Personnel J.C. Vatch, R.P. McCann,
L. Grupp

c. Persons Contacted (Including Address & Phone No.)
Lewis Grupp - owner
Lake Jefferson Hotel, Jeffersonville NY 12748
(914) 482-5283

d. History:

Date Constructed 1922 - 1927 Date(s) Reconstructed —
Designer Joseph B. Rider 1922, Nial Shannock 1927
Constructed By Clark & Walter & Pomeroy 1922, Lake Jefferson Inc. 1927
Owner Lewis Grupp

2) Embankment

a. Characteristics

- (1) Embankment Material Glacial Till
- (2) Cutoff Type Concrete to bedrock or bluffs
- (3) Impervious Core
- (4) Internal Drainage System none
- (5) Miscellaneous

b. Crest

- (1) Vertical Alignment good
- (2) Horizontal Alignment good
- (3) Surface Cracks none evident
- (4) Miscellaneous

c. Upstream Slope

- (1) Slope (Estimate) (V:H) 1:2.5
- (2) Undesirable Growth or Debris, Animal Burrows numerous trees
- (3) Sloughing, Subsidence or Depressions none

(4) Slope Protection none evident

(5) Surface Cracks or Movement at Toe unobservable

d. Downstream Slope

(1) Slope (Estimate - V:H) 1:2

(2) Undesirable Growth or Debris, Animal Burrows 1 animal

borrow ~ 15 ft from crest, numerous trees & brush on slope

(3) Sloughing, Subsidence or Depressions

none evident

(4) Surface Cracks or Movement at Toe

none evident

(5) Seepage at toe ~ 5 gpm from small area at abutment (possibly in septic tank

or old damaged structure - seepage) ~ 5 gpm coming from toe

at 3 locations ~ 25 to 30 ft from spillway edge - no flow but rusty color

and a little gray sediment surrounding seepage points

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

none

(7) Condition Around Outlet Structure under water

unobservable

(8) Seepage Beyond Toe none evident

e. Abutments - Embankment Contact

generally good contact, some areas

cracks at right abutment, especially downstream from

below wall of main structure

(1) Erosion at Contact none evident

(2) Seepage Along Contact none evident

3) Drainage System

a. Description of System none

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

none

5) Reservoir

- a. Slopes upper slope
- b. Sedimentation has accumulated behind spillway up to 2
feet from crest, also reported at upper end of lake
- c. Unusual Conditions Which Affect Dam

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) Village of
Jullarsenville < 1 mile from dam
- b. Seepage, Unusual Growth some minor debris & trees
- c. Evidence of Movement Beyond Toe of Dam None
- d. Condition of Downstream Channel adequate

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

- a. General concrete covered masonry construction
shape is good
- b. Condition of Service Spillway deterioration of concrete
covering of spillway, foundation, breast

c. Condition of Auxiliary Spillway _____

d. Condition of Discharge Conveyance Channel _____

adequate

8) Reservoir Drain/Outlet

Type: Pipe ☒ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other Cast Iron

Size: 30" Length Unknown

Invert Elevations: Entrance ≈ 24 feet below Exit _____

Physical Condition (Describe): crest of spillway Unobservable ☒

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve ☒ Uncontrolled _____

Operation: Operable ☒ Inoperable _____ Other _____

Present Condition (Describe): _____

operated periodically by owner / under water

unobservable

h. Joints - Construction, etc. _____

minor deterioration

i. Foundation _____ assumed to be bedrock for spillway

j. Abutments _____ some deterioration of wingwalls

k. Control Gates _____ operation

l. Approach & Outlet Channels _____ outlet adequate approach

is experiencing sedimentation

m. Energy Dissipators (Plunge Pool, etc.) _____ none

n. Intake Structures _____ none

o. Stability _____ appears - d. b. h.

p. Miscellaneous _____

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition _____

Done -
original plans called for a power house
but was never built

APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

1

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>1090</u>	<u>115.</u>	<u>890.</u>
2) Design High Water (Max. Design Pool)	<u>-</u>	<u>-</u>	<u>-</u>
3) Auxiliary Spillway Crest	<u>-</u>	<u>-</u>	<u>-</u>
4) Pool Level with Flashboards	<u>-</u>	<u>-</u>	<u>-</u>
5) Service Spillway Crest	<u>1081</u>	<u>48.</u>	<u>420.</u> ~~420.~~

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>60. ±</u>
2) Spillway @ Maximum High Water	<u>15,465</u>
3) Spillway @ Design High Water	<u>-</u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>-</u>
5) Low Level Outlet @ 1081	<u>50 cfs.</u>
6) Total (of all facilities) @ Maximum High Water	<u>15,500 cfs.</u>
7) Maximum Known Flood	<u>4375 cfs</u> (Reduced from gage @ Callhoun. Aug. 17, 1947)
8) At Time of Inspection	<u>35 cfs.</u>

CREST:

ELEVATION: 1081.0Type: Masonry, ogee sectionWidth: - Length: 160'Spillover -Location DAM

SPILLWAY:

SERVICE

AUXILIARY

1081.0Elevation -Masonry, ogee sectionType --Width -

Type of Control

✓Uncontrolled -

Controlled:

-Type
(Flashboards; gate)-Number --Size/Length -Invert Material -Anticipated Length
of operating service -Chute Length -Approx 1:1 slope
to crest.Height Between Spillway Crest
& Approach Channel Invert
(Weir Flow) -

HYDROMETEROLOGICAL GAGES:

Type: Water-stage recorder, concrete controlLocation: #01427500 Callicoon Creek @ Callicoon NY (DA = 111 mi.²)

Records:

Date - Aug 17, 1947 ht. 9.68'Max. Reading - 16,000 cfs. (for 30.34 mi.² Q = 4375 cfs.)

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

Method of Controlled Releases (mechanisms):

low level outlet.30" PIPE.

4
DRAINAGE AREA:

30.3 ^{mi.²}

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: woods, open field, little residential devel., except on water

Terrain - Relief: two basins: one steep, well drained, another typically flat & swampy

Surface - Soil: Lickhopper Soils of glacial till, generally at thin cover

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

No planned alterations, two basins, see Relief.

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

ongoing sediment problem - heavy siltting to spillway crest.

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

many homes & cottages close to Lake Jefferson

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

Location: None

Elevation:

Reservoir:

Length @ Maximum Pool 1.2 (Miles)

Length of Shoreline (@ Spillway Crest) 3.0 (Miles)

PREVIOUS SEQUENCE OF STREAM NETWORK CALCULATIONS

FOR N-5 HYDROGRAPH AT	1
UP OFF HYDROGRAPH AT	1
CUMULATIVE 2 HYDROGRAPHS AT	1
ROUTE HYDROGRAPH TO	1
END OF NETWORK	

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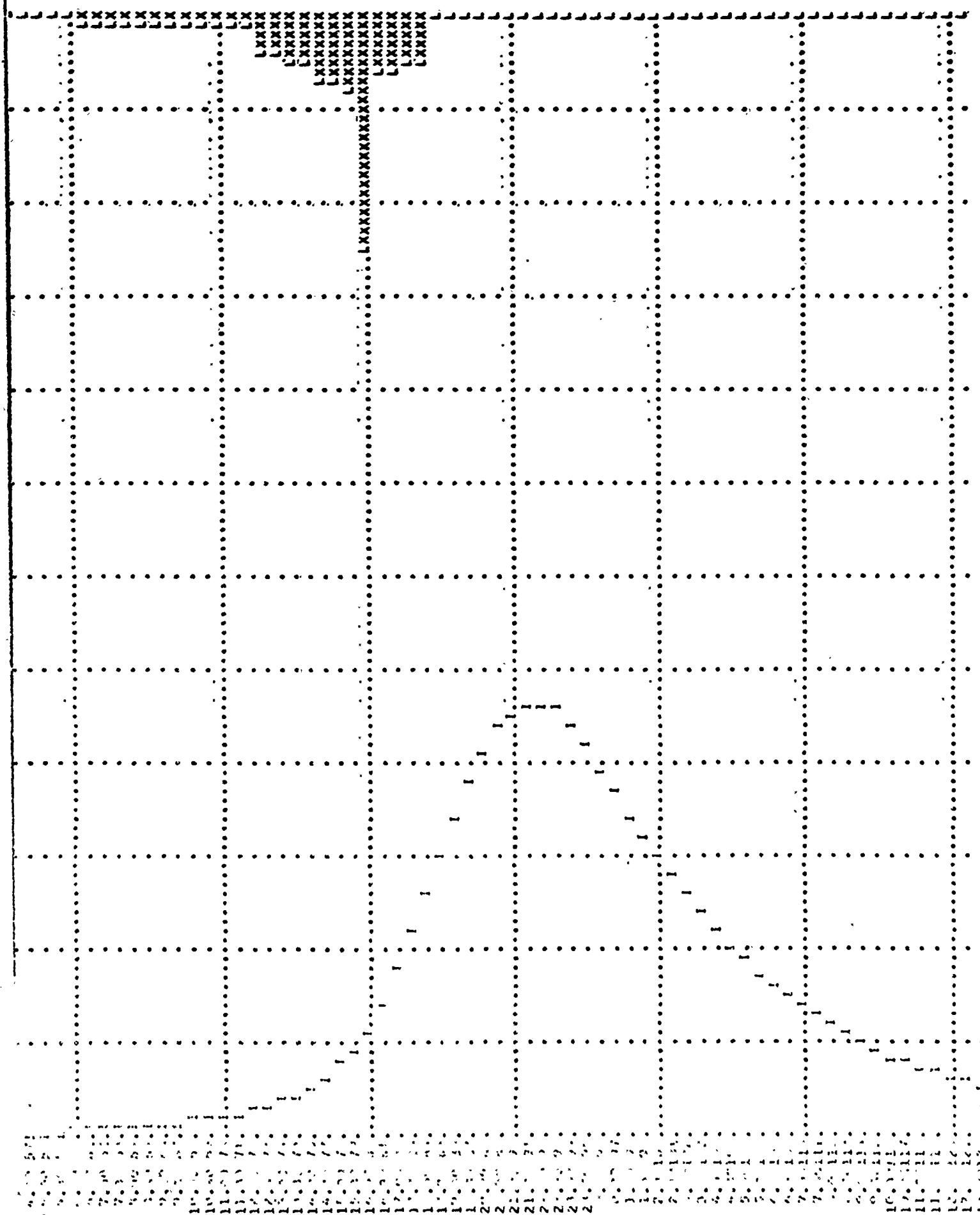
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DATE	PERIOD	HR.	PERIOD	MAIN	EXCS	LOSS	COMP. O
10/17	101	2.30	101	0.	0.	0.	1017
10/18	102	3.00	102	0.	0.	0.	1021
10/19	103	3.30	103	0.	0.	0.	9679
10/20	104	4.00	104	0.	0.	0.	8786
10/21	105	4.30	105	0.	0.	0.	8139
10/22	106	5.00	106	0.	0.	0.	7533
10/23	107	5.30	107	0.	0.	0.	6968
10/24	108	6.00	108	0.	0.	0.	6440
10/25	109	6.30	109	0.	0.	0.	5948
10/26	110	7.00	110	0.	0.	0.	5490
10/27	111	7.30	111	0.	0.	0.	5066
10/28	112	8.00	112	0.	0.	0.	4674
10/29	113	8.30	113	0.	0.	0.	4312
10/30	114	9.00	114	0.	0.	0.	3979
10/31	115	9.30	115	0.	0.	0.	3672
10/32	116	10.00	116	0.	0.	0.	3308
10/33	117	10.30	117	0.	0.	0.	3127
10/34	118	11.00	118	0.	0.	0.	2886
10/35	119	11.30	119	0.	0.	0.	2644
10/36	120	12.00	120	0.	0.	0.	2439
10/37	121	12.30	121	0.	0.	0.	2270
10/38	122	13.00	122	0.	0.	0.	2096
10/39	123	13.30	123	0.	0.	0.	1936
10/40	124	14.00	124	0.	0.	0.	1787
10/41	125	14.30	125	0.	0.	0.	1651
10/42	126	15.00	126	0.	0.	0.	1525
10/43	127	15.30	127	0.	0.	0.	1409
10/44	128	16.00	128	0.	0.	0.	1303
10/45	129	16.30	129	0.	0.	0.	1203
10/46	130	17.00	130	0.	0.	0.	1112
10/47	131	17.30	131	0.	0.	0.	1028
10/48	132	18.00	132	0.	0.	0.	950
10/49	133	18.30	133	0.	0.	0.	924
10/50	134	19.00	134	0.	0.	0.	924
10/51	135	19.30	135	0.	0.	0.	924
10/52	136	20.00	136	0.	0.	0.	924
10/53	137	20.30	137	0.	0.	0.	924
10/54	138	21.00	138	0.	0.	0.	924
10/55	139	21.30	139	0.	0.	0.	924
10/56	140	22.00	140	0.	0.	0.	924
10/57	141	22.30	141	0.	0.	0.	924
10/58	142	23.00	142	0.	0.	0.	924
10/59	143	23.30	143	0.	0.	0.	924
10/60	144	0.	144	0.	0.	0.	924
10/61	145	0.30	145	0.	0.	0.	924
10/62	146	1.00	146	0.	0.	0.	924
10/63	147	1.30	147	0.	0.	0.	924
10/64	148	2.00	148	0.	0.	0.	924
10/65	149	2.30	149	0.	0.	0.	924
10/66	150	3.00	150	0.	0.	0.	924
10/67	151	3.30	151	0.	0.	0.	924
10/68	152	4.00	152	0.	0.	0.	924
10/69	153	4.30	153	0.	0.	0.	924
10/70	154	5.00	154	0.	0.	0.	924
10/71	155	5.30	155	0.	0.	0.	924
10/72	156	6.00	156	0.	0.	0.	924
10/73	157	6.30	157	0.	0.	0.	924
10/74	158	7.00	158	0.	0.	0.	924
10/75	159	7.30	159	0.	0.	0.	924
10/76	160	8.00	160	0.	0.	0.	924
10/77	161	8.30	161	0.	0.	0.	924
10/78	162	9.00	162	0.	0.	0.	924
10/79	163	9.30	163	0.	0.	0.	924
10/80	164	10.00	164	0.	0.	0.	924

1.04	0.11	0.13	0.04	340.	1.04	10.30	165	0.	0.	924.
1.04	0.11	0.13	0.04	450.	1.04	11.00	166	0.	0.	924.
1.04	0.11	0.13	0.04	534.	1.04	11.30	167	0.	0.	924.
1.04	0.13	0.13	0.05	631.	1.04	12.00	168	0.	0.	924.
1.04	0.13	0.13	0.05	741.	1.04	12.30	169	0.	0.	924.
1.04	0.13	0.13	0.05	862.	1.04	13.00	170	0.	0.	924.
1.04	0.13	0.13	0.05	989.	1.04	13.30	171	0.	0.	924.
1.04	0.13	0.13	0.05	1122.	1.04	14.00	172	0.	0.	924.
1.04	0.13	0.13	0.05	1273.	1.04	14.30	173	0.	0.	924.
1.04	0.13	0.13	0.05	1403.	1.04	15.00	174	0.	0.	924.
1.04	0.13	0.13	0.05	1725.	1.04	15.30	175	0.	0.	924.
1.04	0.13	0.13	0.05	2059.	1.04	16.00	176	0.	0.	924.
1.04	0.13	0.13	0.05	2485.	1.04	16.30	177	0.	0.	924.
1.04	0.13	0.13	0.05	3025.	1.04	17.00	178	0.	0.	924.
1.04	0.13	0.13	0.05	3696.	1.04	17.30	179	0.	0.	924.
1.04	0.13	0.13	0.05	4509.	1.04	18.00	180	0.	0.	924.
1.04	0.13	0.13	0.05	5740.	1.04	18.30	181	0.	0.	924.
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1.04	0.13	0.13	0.05	8734.	1.04	19.30	183	0.	0.	924.
1.04	0.13	0.13	0.05	10376.	1.04	20.00	184	0.	0.	924.
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1.04	0.13	0.13	0.05	15789.	1.05	2.00	196	0.	0.	924.
1.04	0.13	0.13	0.05	14782.	1.05	2.30	197	0.	0.	924.
1.04	0.13	0.13	0.05	13771.	1.05	3.00	198	0.	0.	924.
1.04	0.13	0.13	0.05	12782.	1.05	3.30	199	0.	0.	924.
1.04	0.13	0.13	0.05	11672.	1.05	4.00	200	0.	0.	924.

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(589.)(495.)(94.)(14535.83)

CF'S	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
C-15	16743.	8766.	3530.	512840.
INC-LES	474.	249.	100.	14522.
ILL	5.56	15.00	21.70	21.69
AC-FT	217.84	457.23	551.07	556.05
THUS CO-1	3302.	17426.	21002.	21192.
	10241.	21497.	25906.	26140.



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HYDROGRAPH AT STA		1 FOR PLAN 1, RATIO 1	
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1.2	1.2	1.2	1.2
1.3	1.3	1.3	1.3
1.4	1.4	1.4	1.4
1.5	1.5	1.5	1.5
1.6	1.6	1.6	1.6
1.7	1.7	1.7	1.7
1.8	1.8	1.8	1.8
1.9	1.9	1.9	1.9
2.0	2.0	2.0	2.0
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2.3	2.3	2.3	2.3
2.4	2.4	2.4	2.4
2.5	2.5	2.5	2.5
2.6	2.6	2.6	2.6
2.7	2.7	2.7	2.7
2.8	2.8	2.8	2.8
2.9	2.9	2.9	2.9
3.0	3.0	3.0	3.0
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4.7	4.7	4.7	4.7
4.8	4.8	4.8	4.8
4.9	4.9	4.9	4.9
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9.1	9.1	9.1	9.1
9.2	9.2	9.2	9.2
9.3	9.3	9.3	9.3
9.4	9.4	9.4	9.4
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9.8	9.8	9.8	9.8
9.9	9.9	9.9	9.9
10.0	10.0	10.0	10.0

	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
PEAF	3,270	4,393	1765	256420.
CEB	262.	124.	50.	7261.
CEB	237.	9.	10.85	256420.
CEB	4.29	224.66	275.54	278.02
CEB	105.92	5714.	10501.	10596.
CEB	4141.	10748.	12953.	13070.
CEB	5120.			

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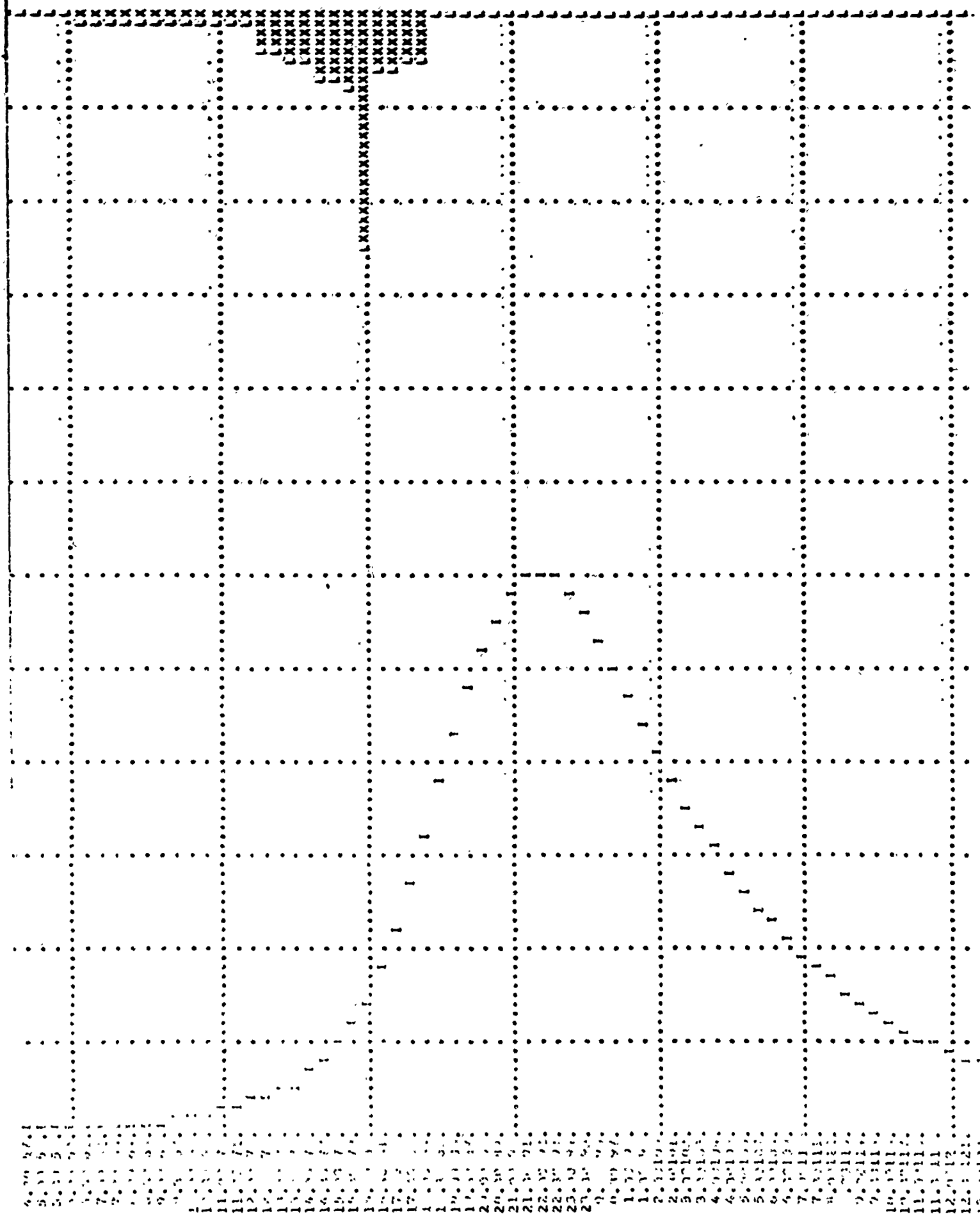
6-400P	24-HOUR	72-HOUR	TOTAL
16713.	5786.	3530.	512840.
1475.	474.	100.	14522.
523.	269.	21.89	21.89
	10.00	21.70	556.05
	457.26	551.07	21192.
	17425.	21002.	26140.
	21407.	25906.	
	10241.		

1321.	24.	0.01	0.01	1.03	14.00	124	0.	0.	0.	1321.
1224.	24.	0.06	0.06	1.03	14.30	125	0.	0.	0.	1224.
1133.	24.	0.09	0.09	1.03	15.00	126	0.	0.	0.	1133.
1050.	24.	0.07	0.07	1.03	15.30	127	0.	0.	0.	1050.
973.	24.	0.07	0.07	1.03	16.00	128	0.	0.	0.	973.
901.	24.	0.05	0.05	1.03	16.30	129	0.	0.	0.	901.
835.	24.	0.09	0.09	1.03	17.00	130	0.	0.	0.	835.
774.	24.	0.11	0.11	1.03	17.30	131	0.	0.	0.	774.
718.	24.	0.04	0.04	1.03	18.00	132	0.	0.	0.	718.
666.	24.	0.03	0.03	1.03	18.30	133	0.	0.	0.	666.
617.	24.	0.01	0.01	1.03	19.00	134	0.	0.	0.	617.
601.	24.	0.01	0.01	1.03	19.30	135	0.	0.	0.	601.
601.	24.	0.03	0.03	1.03	20.00	136	0.	0.	0.	601.
601.	24.	0.01	0.01	1.03	20.30	137	0.	0.	0.	601.
601.	24.	0.01	0.01	1.03	21.00	138	0.	0.	0.	601.
601.	24.	0.01	0.01	1.03	21.30	139	0.	0.	0.	601.
601.	24.	0.01	0.01	1.03	22.00	140	0.	0.	0.	601.
601.	24.	0.01	0.01	1.03	22.30	141	0.	0.	0.	601.
601.	24.	0.01	0.01	1.03	23.00	142	0.	0.	0.	601.
601.	24.	0.01	0.01	1.03	23.30	143	0.	0.	0.	601.
601.	24.	0.01	0.01	1.04	0.	144	0.	0.	0.	601.
601.	24.	0.01	0.01	1.04	0.30	145	0.	0.	0.	601.
601.	24.	0.01	0.01	1.04	1.00	146	0.	0.	0.	601.
601.	24.	0.01	0.01	1.04	1.30	147	0.	0.	0.	601.
601.	24.	0.01	0.01	1.04	2.00	148	0.	0.	0.	601.
601.	24.	0.01	0.01	1.04	2.30	149	0.	0.	0.	601.
601.	24.	0.05	0.05	1.04	3.00	150	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	3.30	151	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	4.00	152	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	4.30	153	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	5.00	154	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	5.30	155	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	6.00	156	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	6.30	157	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	7.00	158	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	7.30	159	0.	0.	0.	601.
601.	24.	0.07	0.07	1.04	8.00	160	0.	0.	0.	601.
601.	24.	0.11	0.11	1.04	8.30	161	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	9.00	162	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	9.30	163	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	10.00	164	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	10.30	165	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	11.00	166	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	11.30	167	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	12.00	168	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	12.30	169	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	13.00	170	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	13.30	171	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	14.00	172	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	14.30	173	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	15.00	174	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	15.30	175	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	16.00	176	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	16.30	177	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	17.00	178	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	17.30	179	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	18.00	180	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	18.30	181	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	19.00	182	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	19.30	183	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	20.00	184	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	20.30	185	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	21.00	186	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	21.30	187	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	22.00	188	0.	0.	0.	601.
601.	24.	0.13	0.13	1.04	22.30	189	0.	0.	0.	601.

1.01	21.00	0.00	0.10	0.05	0.00	115.05.	1.04	23.00	1.00	0.	0.	0.	601.
1.02	21.00	0.05	0.10	0.05	0.00	115.05.	1.04	23.30	1.01	0.	0.	0.	601.
1.03	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	0.	1.02	0.	0.	0.	601.
1.04	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	0.30	1.03	0.	0.	0.	601.
1.05	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	1.00	1.04	0.	0.	0.	601.
1.06	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	1.30	1.05	0.	0.	0.	601.
1.07	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	2.00	1.06	0.	0.	0.	601.
1.08	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	2.30	1.07	0.	0.	0.	601.
1.09	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	3.00	1.08	0.	0.	0.	601.
1.10	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	3.30	1.09	0.	0.	0.	601.
1.11	21.00	0.05	0.10	0.05	0.00	115.05.	1.05	4.00	1.10	0.	0.	0.	601.

SUM 23.18 19.49 3.69 341816.
(589.11 495.11 94.11 9679.15)

	6-17 US	24-HOUR	72-HOUR	TOTAL VOLUME
PER	104.05.	5659.	2351.	341527.
PER	110.	100.	07.	9671.
PER	212.13	17.90	21.54	21.74
PER	5422.	454.67	547.22	552.10
PER	0003.	11622.	13980.	14113.
PER		14336.	17254.	17408.



15.0121	15.0122	15.0123	15.0124	15.0125	15.0126	15.0127	15.0128	15.0129	15.0130	15.0131	15.0132	15.0133	15.0134	15.0135	15.0136	15.0137	15.0138	15.0139	15.0140	15.0141	15.0142	15.0143	15.0144	15.0145	15.0146	15.0147	15.0148	15.0149	15.0150	15.0151	15.0152	15.0153	15.0154	15.0155	15.0156	15.0157	15.0158	15.0159	15.0160	15.0161	15.0162	15.0163	15.0164	15.0165	15.0166	15.0167	15.0168	15.0169	15.0170	15.0171	15.0172	15.0173	15.0174	15.0175	15.0176	15.0177	15.0178	15.0179	15.0180	15.0181	15.0182	15.0183	15.0184	15.0185	15.0186	15.0187	15.0188	15.0189	15.0190	15.0191	15.0192	15.0193	15.0194	15.0195	15.0196	15.0197	15.0198	15.0199	15.0200	15.0201	15.0202	15.0203	15.0204	15.0205	15.0206	15.0207	15.0208	15.0209	15.0210	15.0211	15.0212	15.0213	15.0214	15.0215	15.0216	15.0217	15.0218	15.0219	15.0220	15.0221	15.0222	15.0223	15.0224	15.0225	15.0226	15.0227	15.0228	15.0229	15.0230	15.0231	15.0232	15.0233	15.0234	15.0235	15.0236	15.0237	15.0238	15.0239	15.0240	15.0241	15.0242	15.0243	15.0244	15.0245	15.0246	15.0247	15.0248	15.0249	15.0250	15.0251	15.0252	15.0253	15.0254	15.0255	15.0256	15.0257	15.0258	15.0259	15.0260	15.0261	15.0262	15.0263	15.0264	15.0265	15.0266	15.0267	15.0268	15.0269	15.0270	15.0271	15.0272	15.0273	15.0274	15.0275	15.0276	15.0277	15.0278	15.0279	15.0280	15.0281	15.0282	15.0283	15.0284	15.0285	15.0286	15.0287	15.0288	15.0289	15.0290	15.0291	15.0292	15.0293	15.0294	15.0295	15.0296	15.0297	15.0298	15.0299	15.0300	15.0301	15.0302	15.0303	15.0304	15.0305	15.0306	15.0307	15.0308	15.0309	15.0310	15.0311	15.0312	15.0313	15.0314	15.0315	15.0316	15.0317	15.0318	15.0319	15.0320	15.0321	15.0322	15.0323	15.0324	15.0325	15.0326	15.0327	15.0328	15.0329	15.0330	15.0331	15.0332	15.0333	15.0334	15.0335	15.0336	15.0337	15.0338	15.0339	15.0340	15.0341	15.0342	15.0343	15.0344	15.0345	15.0346	15.0347	15.0348	15.0349	15.0350	15.0351	15.0352	15.0353	15.0354	15.0355	15.0356	15.0357	15.0358	15.0359	15.0360	15.0361	15.0362	15.0363	15.0364	15.0365	15.0366	15.0367	15.0368	15.0369	15.0370	15.0371	15.0372	15.0373	15.0374	15.0375	15.0376	15.0377	15.0378	15.0379	15.0380	15.0381	15.0382	15.0383	15.0384	15.0385	15.0386	15.0387	15.0388	15.0389	15.0390	15.0391	15.0392	15.0393	15.0394	15.0395	15.0396	15.0397	15.0398	15.0399	15.0400	15.0401	15.0402	15.0403	15.0404	15.0405	15.0406	15.0407	15.0408	15.0409	15.0410	15.0411	15.0412	15.0413	15.0414	15.0415	15.0416	15.0417	15.0418	15.0419	15.0420	15.0421	15.0422	15.0423	15.0424	15.0425	15.0426	15.0427	15.0428	15.0429	15.0430	15.0431	15.0432	15.0433	15.0434	15.
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	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
EPS	6012.	5448.	2939.	1175.	170763.
CNS	170.	145.	93.	33.	4835.
HCNS		4.18	4.95	10.77	10.87
IN		105.06	227.34	273.61	276.05
AC-ET		2711.	5411.	6994.	7056.
TRIPUS CJ A		3344.	7168.	8627.	8704.

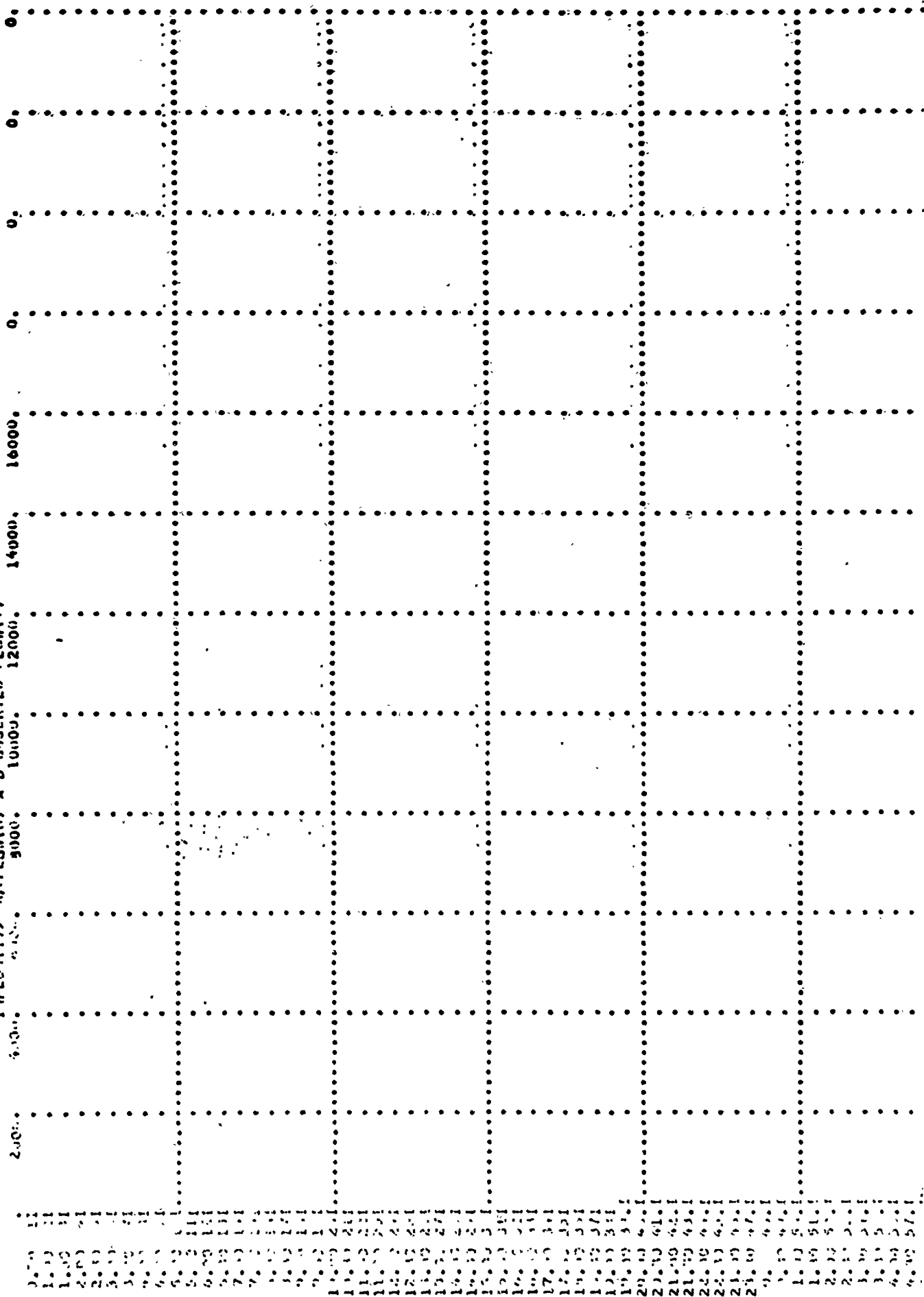
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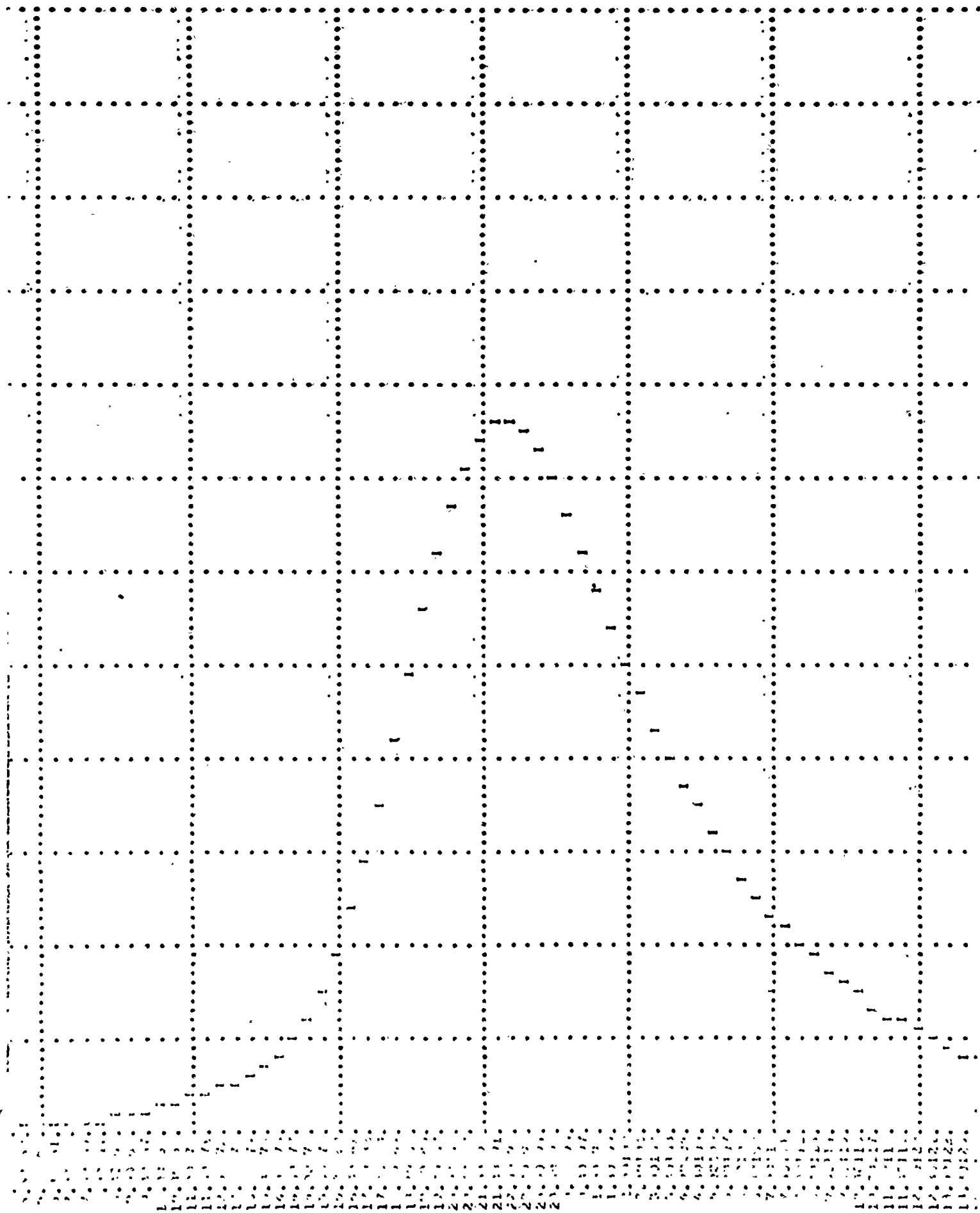
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	12424	10975	5359	2351	341527
CAS	353	310	166	67	9671
THICKNES		8.35	17.9	21.54	21.74
		212.13	454.67	547.22	552.10
ACFT		5422	11622	13988	14113
THICKNES		66.6	14336	17254	17408

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STATION 1

INFLOW (CFS) OUTFLOW (CFS) AND OBSERVED FLOOD (FT)

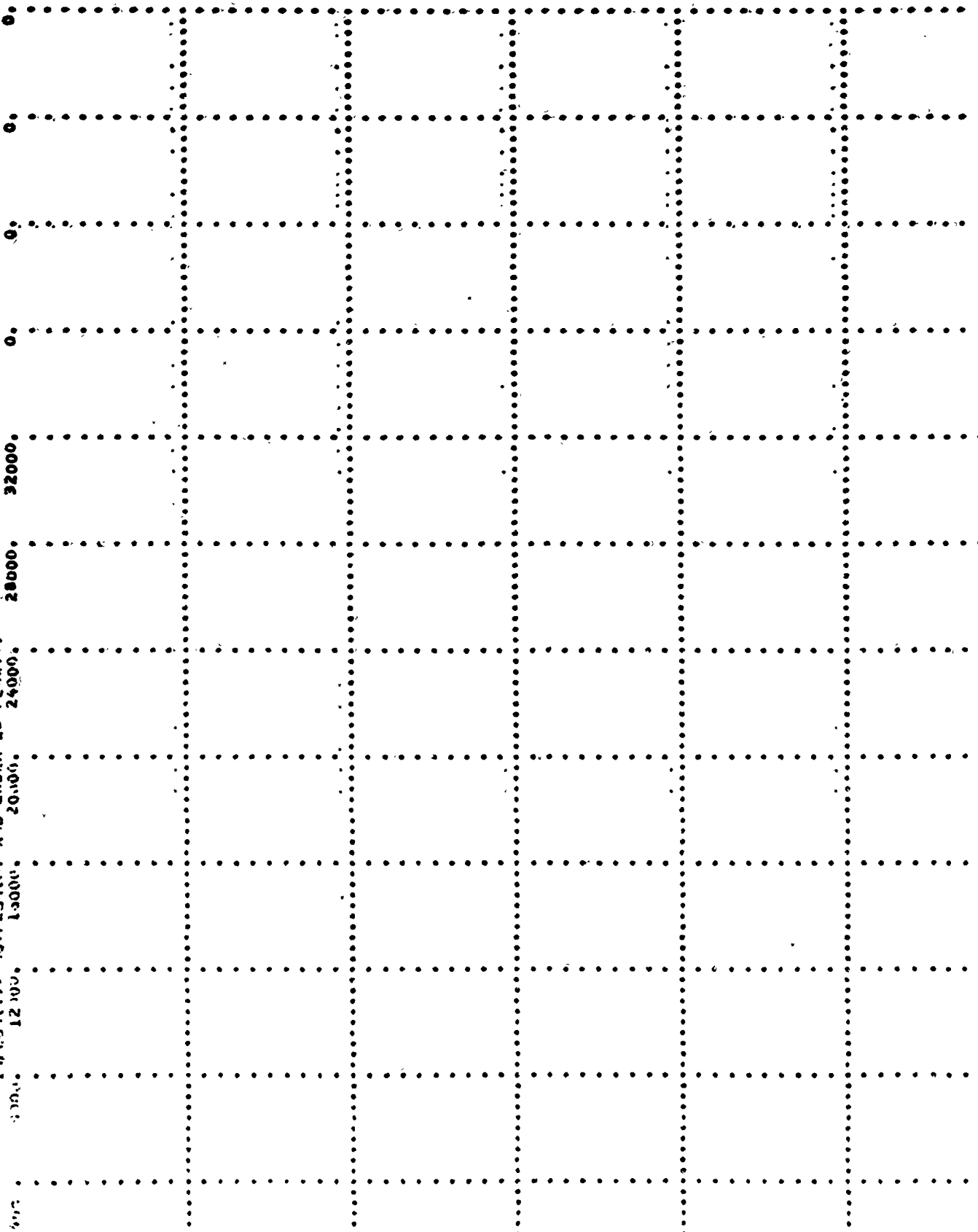




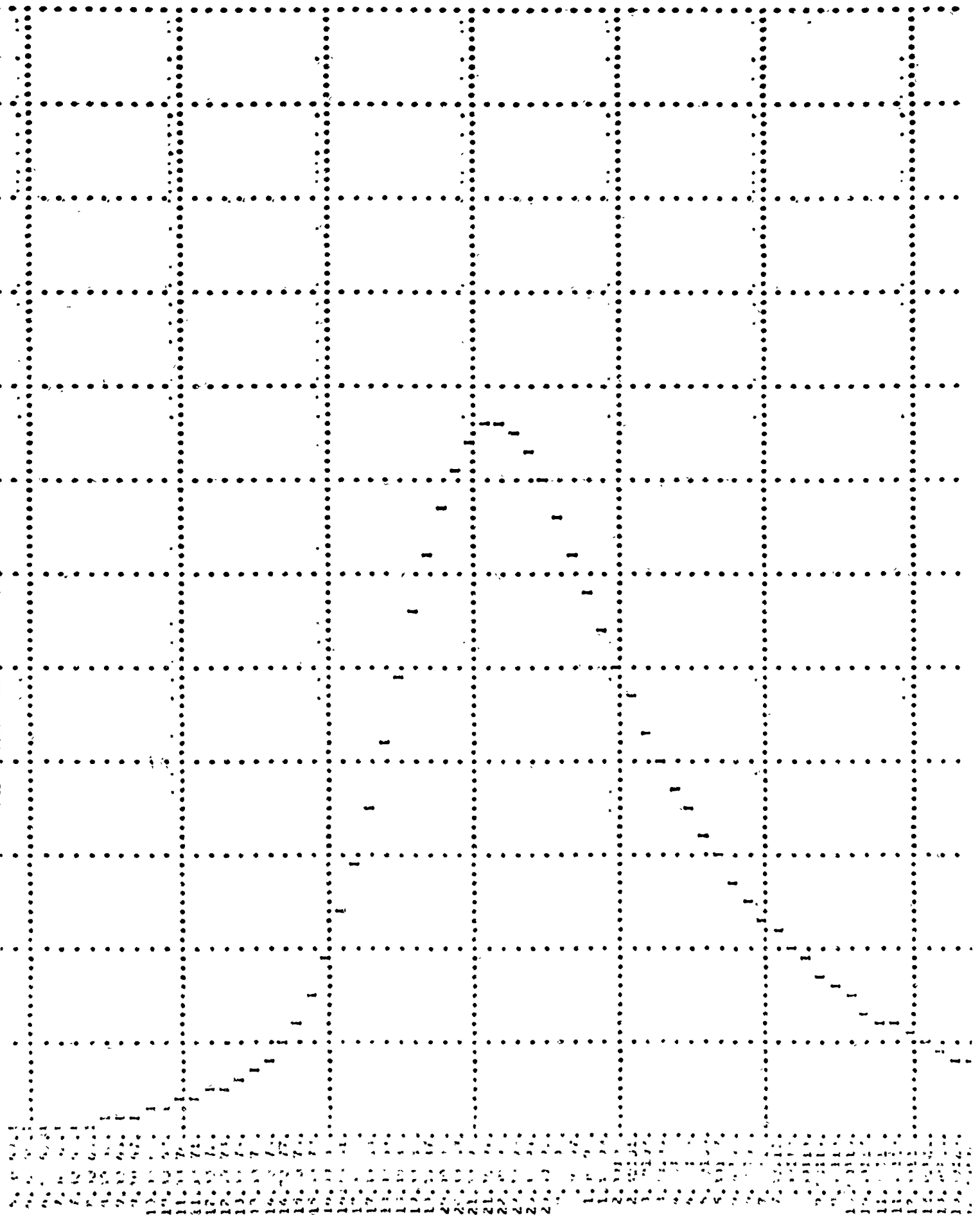
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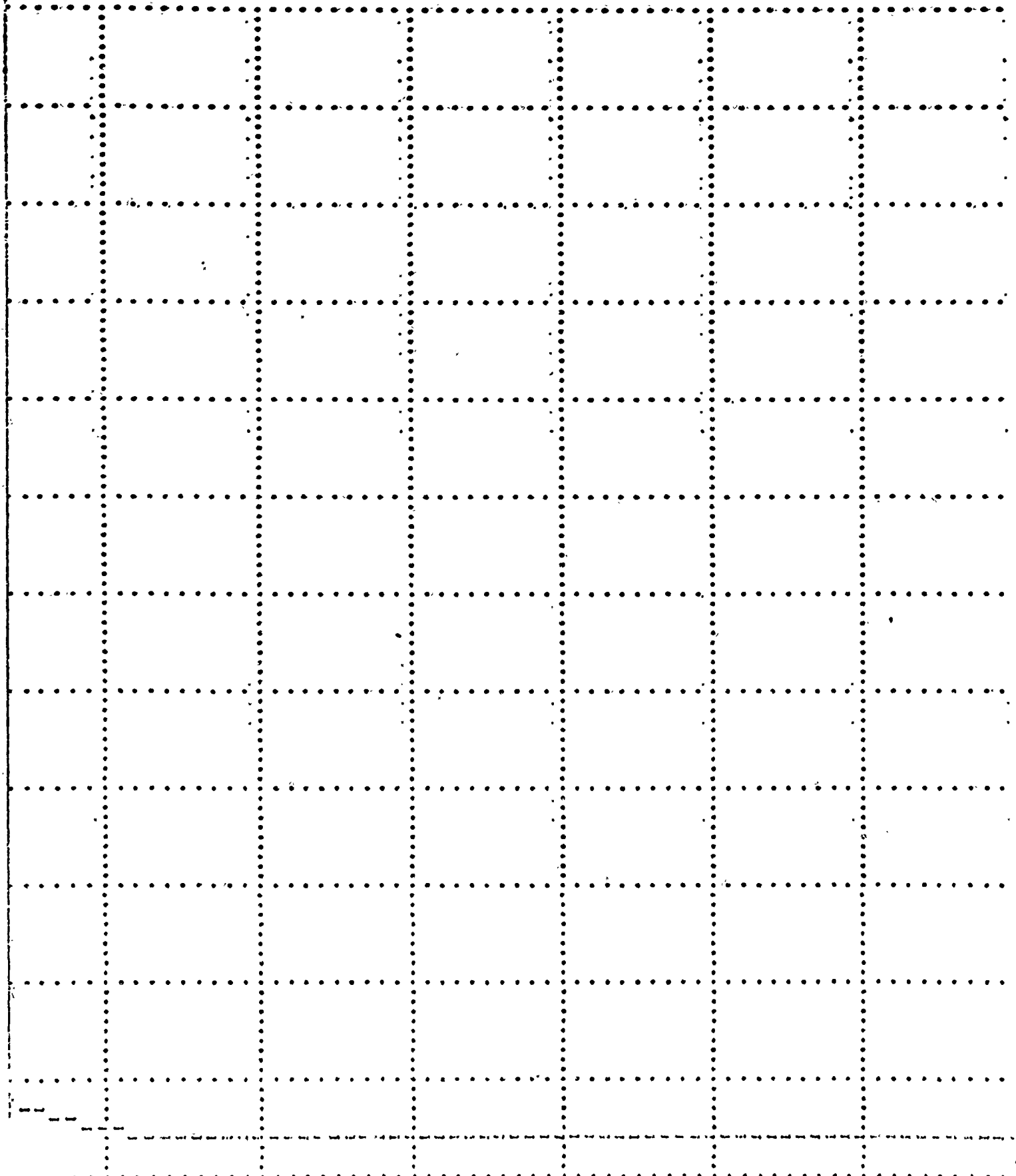
STATION 1

INFLUENT FLOW (CFS) AND OBSERVED FLOW (CFS)



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

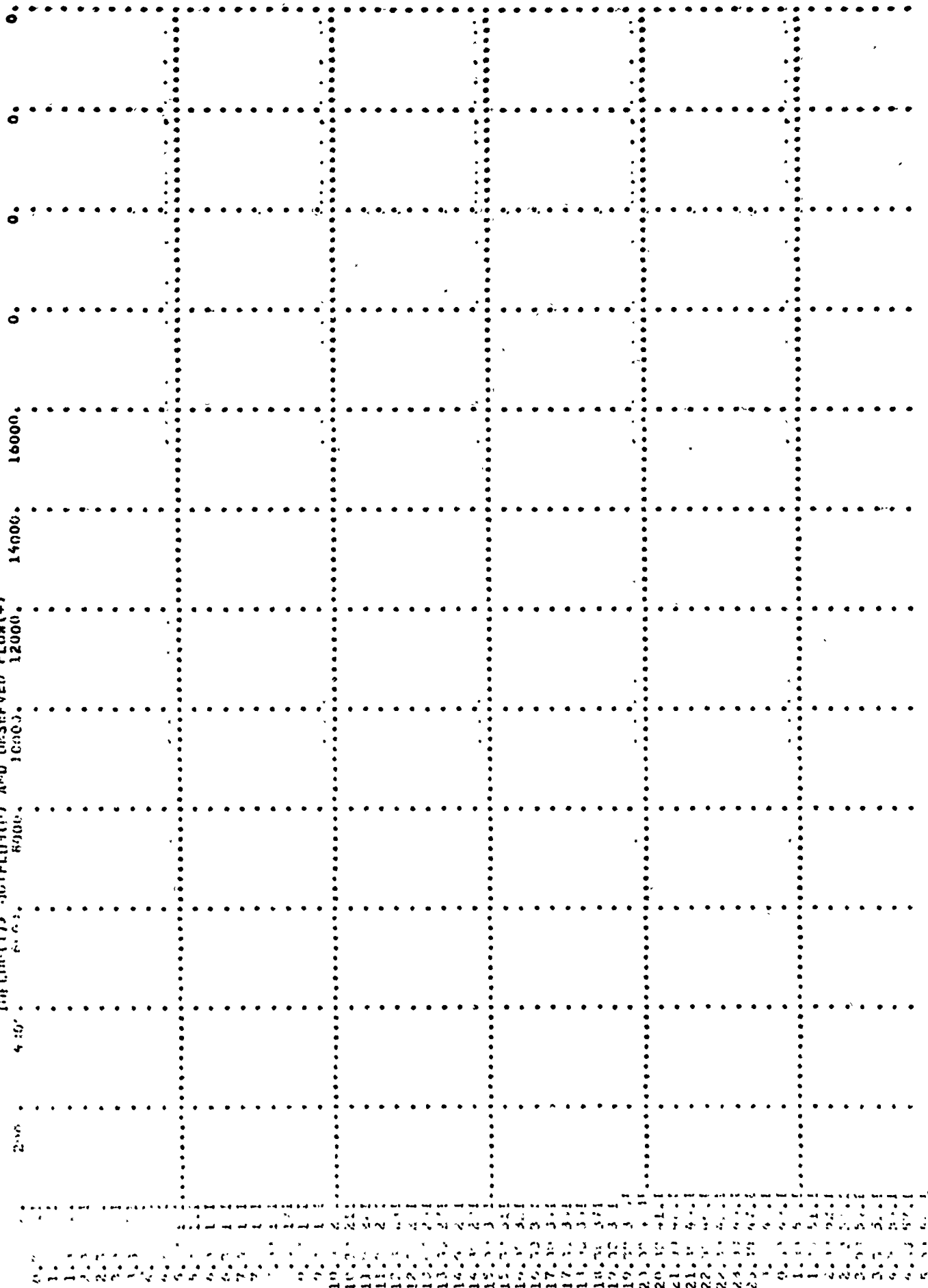


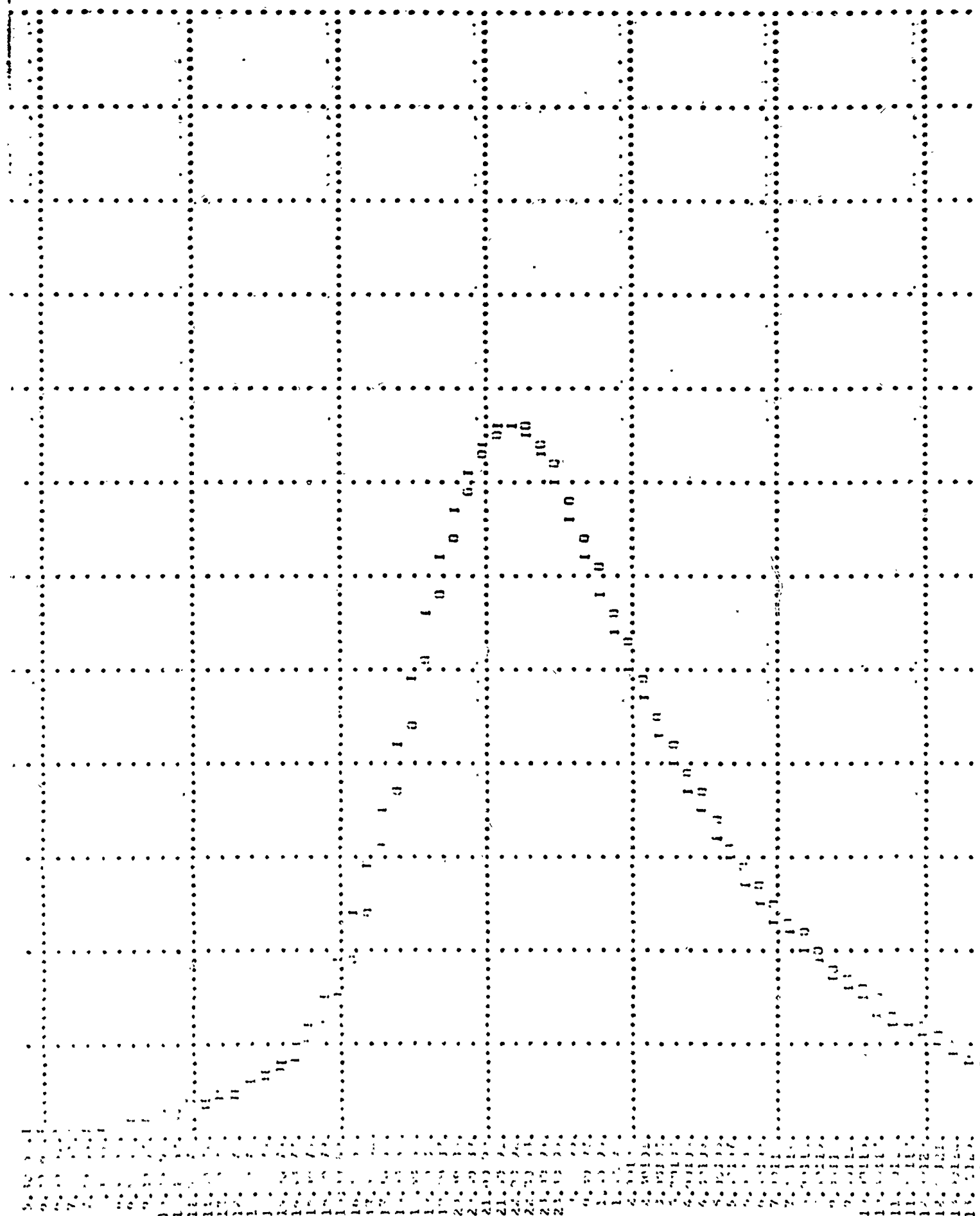


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SECTION 1

Inflow (1) - Outflow (2) and Observed Flux (*)





STORAGE-ELEVATION DATA

19.5.00
DULATED ABOVE ELEVATION 1085.00

ST-TIU: 1, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

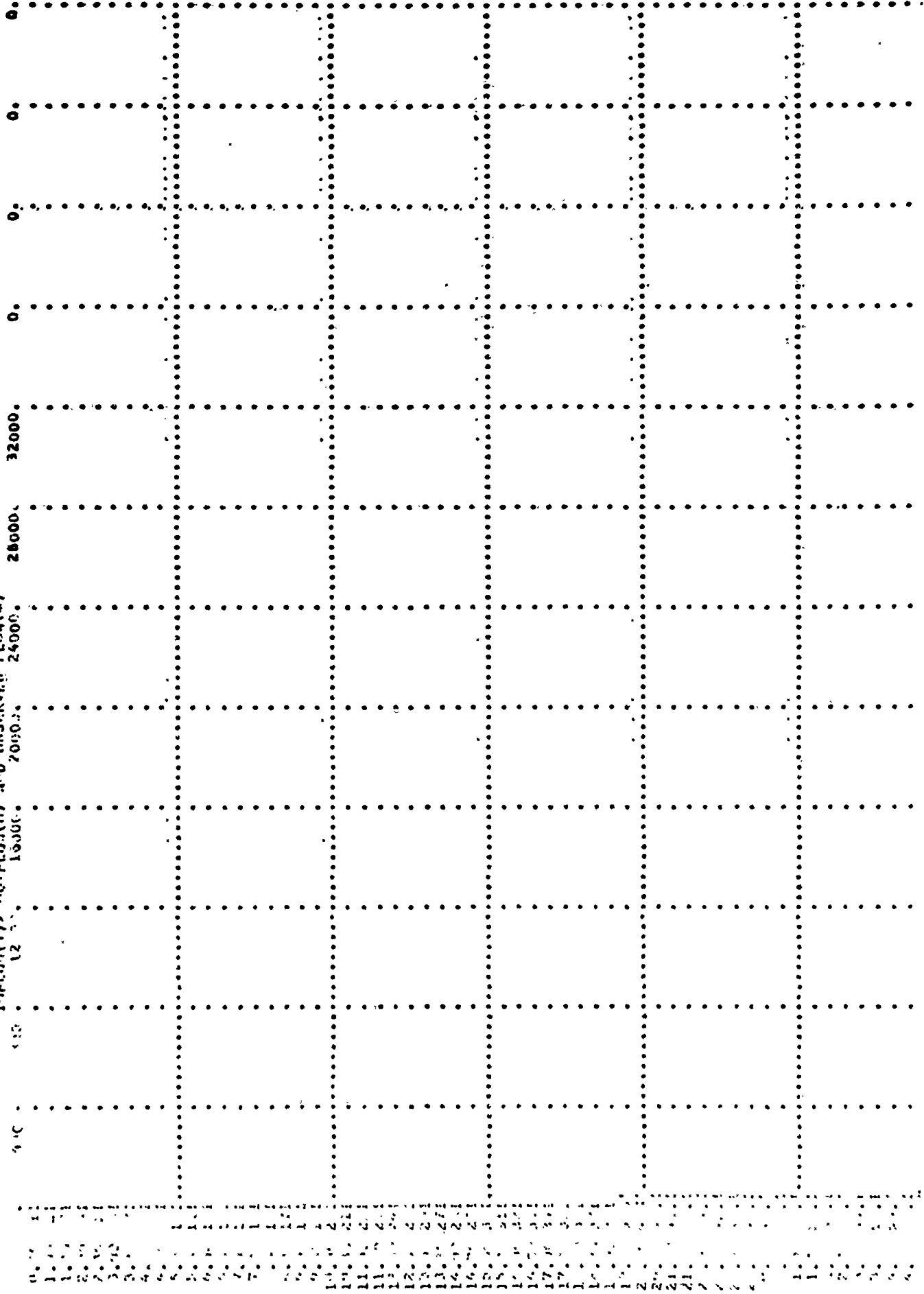
UNITFLUX	5	96	107	121	137	156	176	196	217	237	257	276	296	316	336	356	376	396	416	436	456	476	496	516	536	556	576	596	606	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616	616
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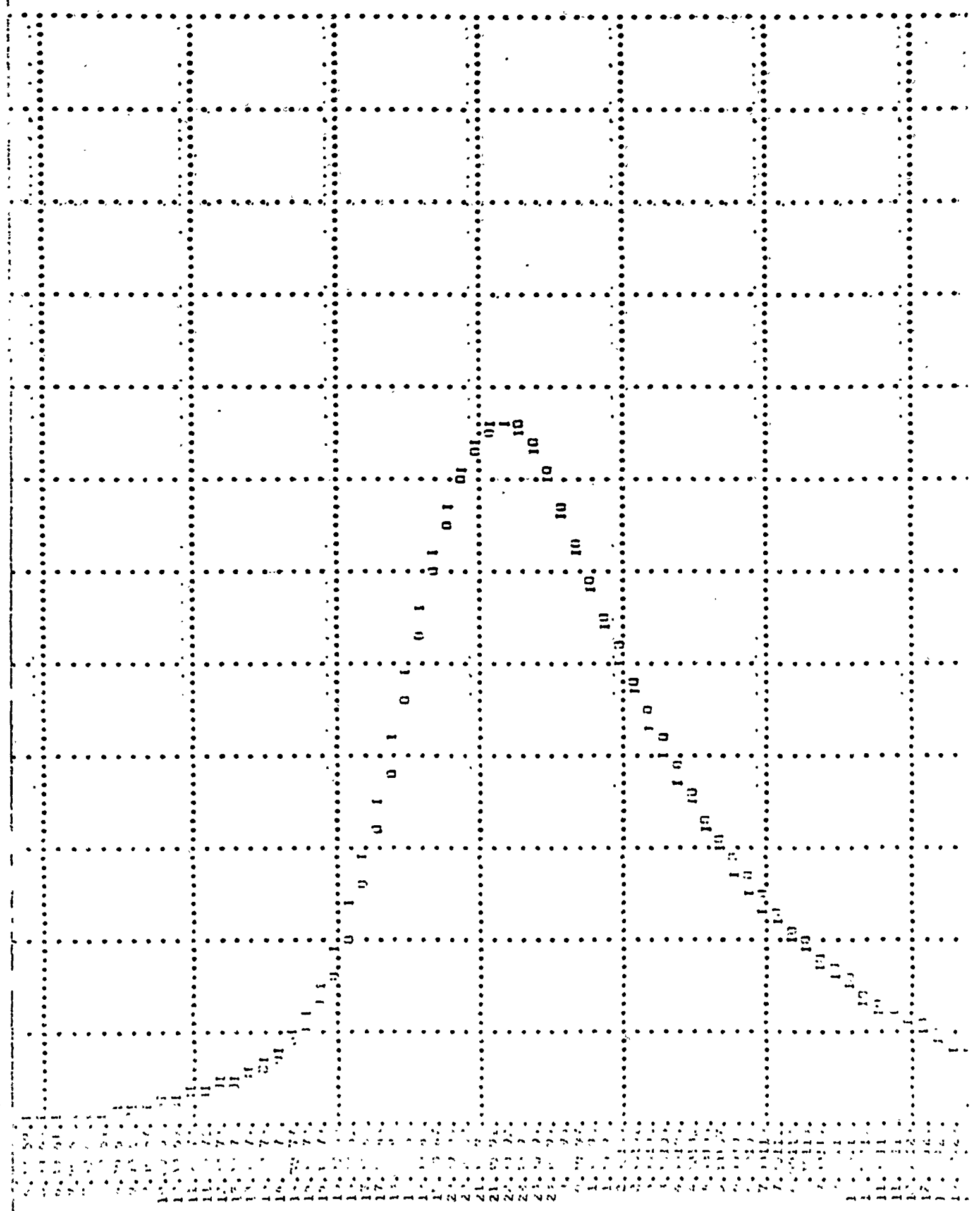
[illegible][illegible]

01/1/74

Station 1

IN-FLUX (1) 2 OUT-FLUX (1) 2 A-0 (RESERVED FLD-4 (M)
12 12 20000 24000





01010101

01010101

A large grid of dotted lines forming squares, typical of graph paper.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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TABLE 1. SUMMARY OF MULTIPLE PLAN-RATED ECONOMIC COMPUTATIONS
FIGURE 1.0 CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
IN SQUARE MILES (SQUARE KILOMETERS)

COUNTRY	SPECIES	AREA	PLANT	RATIOS APPLIED TO PLANTS	
				RATIO 1	RATIO 2
INDONESIA	1	14.16 (0.00)	1	9237. (241.54)	18475. (523.15)
	1	12.10 (0.00)	1	5912. (170.24)	12024. (340.48)
MALAYSIA	1	30.56 (0.00)	1	15240. (411.81)	30499. (863.63)
	1	31.74 (0.00)	1	15130. (410.30)	30470. (863.00)

..... 17

DATE	TIME	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.....	ELEVATION; STORAGE OUTFLOW	INITIAL VALUE 10=1.00 361. 0.	SPILLWAY CREST 1090.00 361. 0.	TOP OF DAM 1090.00 892. 15530.			
0.50	1032.67	0.	684.	15199.	0.	46.00	0.
1.00	1033.91	3.98	1127.	30479.	9.50	46.00	0.

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

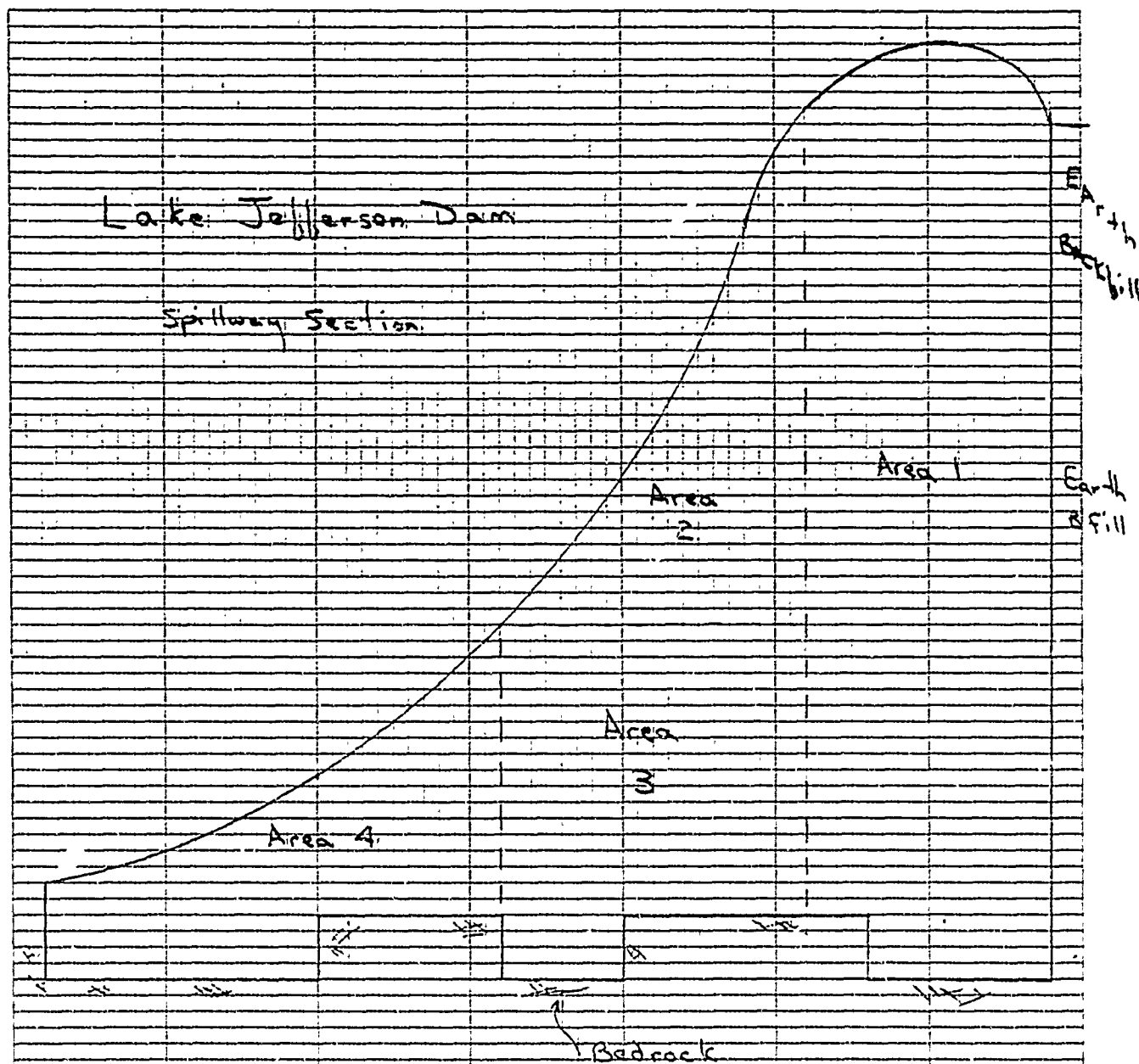
- 1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.
- 2) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).
- 3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.
- 4) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.
- 5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.
- 6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.
- 7) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E

STABILITY ANALYSIS

46 0700

10 X 10 TO THE INCHES
ALUMINUM & LESSER CO. MADE IN U.S.A.



Scale 1" = 5'

	Area	Moment Area
Area 1	28' high x 8' wide = 224 ft ²	29 ft
Area 2	$\frac{1}{2} \times 16'$ high x 10 wide = 80	21.7
Area 3	10' high x 10 wide = 100	20
Area 4	$\frac{1}{2} \times 11'$ high x 15' wide = 82.5	10

19 feet of concrete to shear

Assuming $f'_c = 500 \text{ psi}$

Shear strength = $.15 f'_c = 75 \text{ psi}$

$19 \text{ ft}^2 \times 144 \text{ in}^2/\text{ft}^2 \times 75 \text{ psi} =$

Shear strength = 205,200 lb/ft

Modify output of program

to account for shear strength
of shear key.

RCL 45 = sum of Resisting forces

+ 205 kips = shear strength
= quantity by

RCL 56 = sum of Sliding forces

= Factor of Safety for Sliding

INPUT FOR STABILITY ANALYSIS PROGRAM

<u>Input Location</u>	<u>Input Parameter Description</u>
0	Unit Weight of Dam (K/ft. ³)
1	Area of Segment #1 (ft. ²)
2	Location of Center of Gravity from toe (ft.) Segment #1
3	Area of Segment #2 (ft. ²)
4	Location of CG from toe, Seg. #2 (ft.)
5	Area of Segment #3 (ft. ²)
6	Location of CG from toe, Sg. #3 (ft.)
7	Total Base Width of Dam (ft.)
8	Height of Dam (ft.)
9	Ice Loading (K/L.F.)
10.	Coefficient of Sliding
11	Unit Weight of Soil (K/ft. ³)
12	Coefficient of Active Soil Pressure - Ka
13	Coefficient of Passive Soil Pressure - Kp
14	Height of Water over Top of Dam (ft.)
15	Height of Soil for Active Pressure (ft.)
16	Height of Soil for Passive Pressure (ft.)
17	Height of Water in Tailrace Channel (ft.)
18	Unit Weight of Water (K/ft. ³)
19	Area of Segment #4 (ft. ²)
20	Location of CG from toe, Seg. #4 (ft.)
46	Height of Ice Load or Active Water
49	Location of Foundation Drains from Heel (ft.)
50	Seismic Coefficient (α)
58	Resistance from Benefit of Shear Key (Kips)

Stability Analysis					
Input Parameters					
Parameter	Case I	Case II	Case III	Case IV	Case V
00	115				
01	229				
02	29				
03	80				
04	211.7				
05	100				
06	20				
07	33				
08	27				
09	0	5	0	0	0
10	0.7				
11	0.05				
12	0.4				
13	6				
14	0	0	8	12	0
15	25				
16	5				
17	3	3	6	8	3
18	0.0624				
19	82.5				
20	10				
46	27	25	27	27	27
50	0	0	0	0	0.1
	Normal Loads	Ice Load	1/2 PMF	PMF	Seismic Loading

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

LAKE JEFFERSON DAM
STABILITY ANALYSIS
SPILLWAY SECTION

Case I Normal Loading _ _ _ _ _

(a) 1.798864234

(b) 18.30176793

~~1.176121502~~

205. +
205. RCL
45

34.1017
34.1017 =
239.1017
239.1017 ÷
239.1017 RCL
56

28.9948
28.9948 =
(c) 8.246364865

Case II Ice Loading _ _ _ _ _

(a) 1.626218113

(b) 15.86957456

~~1.129998374~~

205. +
205. RCL
45

34.1017
34.1017 =
239.1017
239.1017 ÷
239.1017 RCL
56

30.75
30.75 =
(c) 7.77566504

Case III 1/2 PMF _ _ _ _ _

(a) 1.453269047

(b) 13.96438758

~~.7718261694~~

205. +
205. RCL
45

32.78194
32.78194 =
237.78194
237.78194 ÷
237.78194 RCL
56

42.4732
42.4732 =
(c) 5.598399461

Case IV PMF _ _ _ _ _

(a) 1.321719691

(b) 11.57540037

~~.6545931513~~

205. +
205. RCL
45

32.2141
32.2141 =
237.2141
237.2141 ÷
237.2141 RCL
56

43.2124
43.2124 =
(c) 4.820209947

Case V Seismic Loading

(a) 1.488029333

(b) 13.51614642

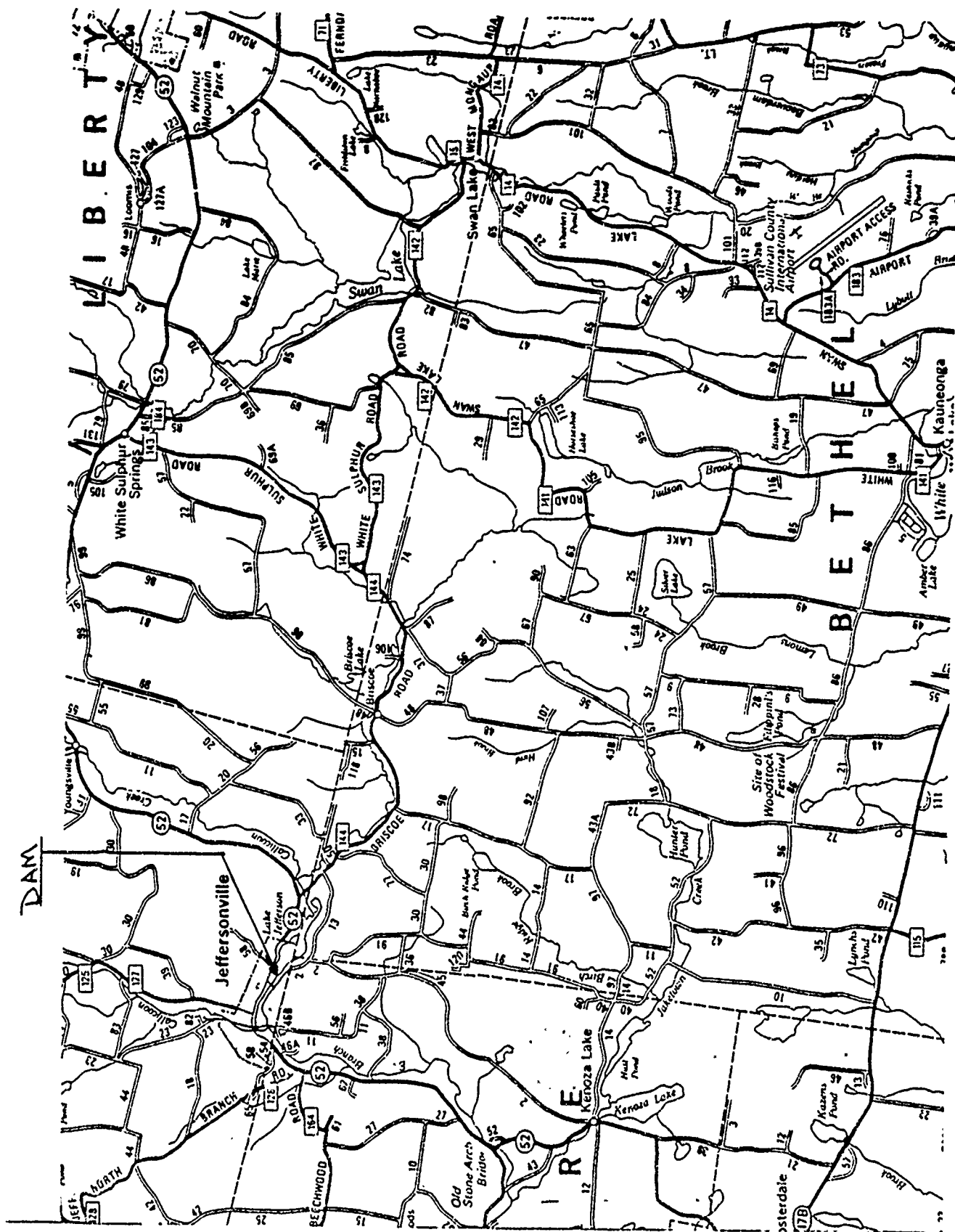
~~.8847222113~~

	0.	RCL
		45
	34.1017	
	34.1017	+
	205.	=
	239.1017	
	239.1017	÷
	239.1017	RCL
		57
	38.54464	
	38.54464	=
(c)	6.203241229	

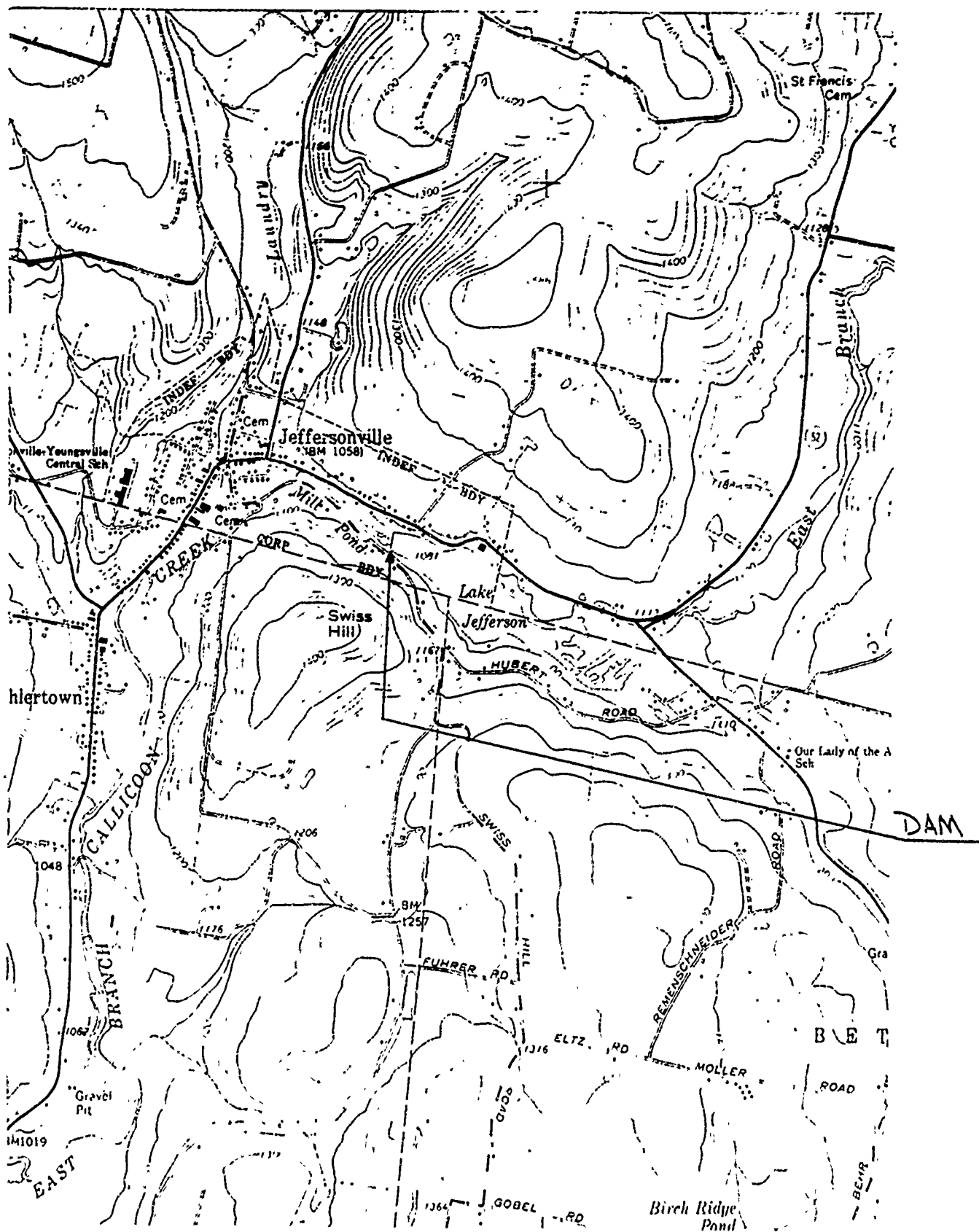
NOTE: (a) is the factor of safety for overturning;
 (b) is the location of the resultant from the toe;
 (c) is the factor of safety for sliding with the benefit of resistance from the shear key.

APPENDIX F

DRAWINGS



VICINITY MAP



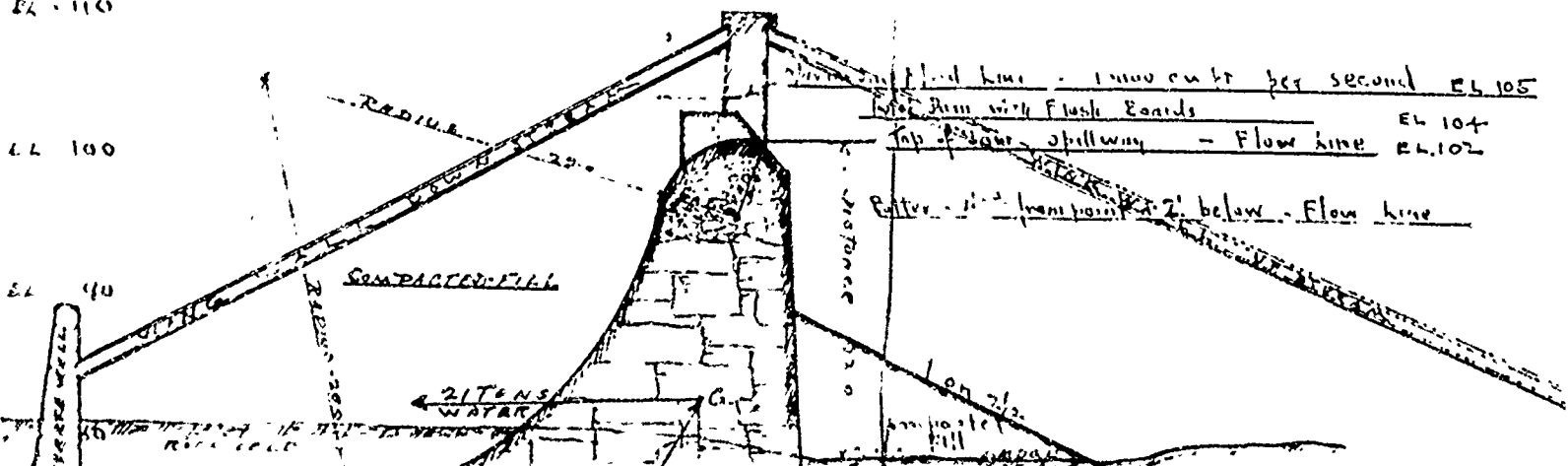
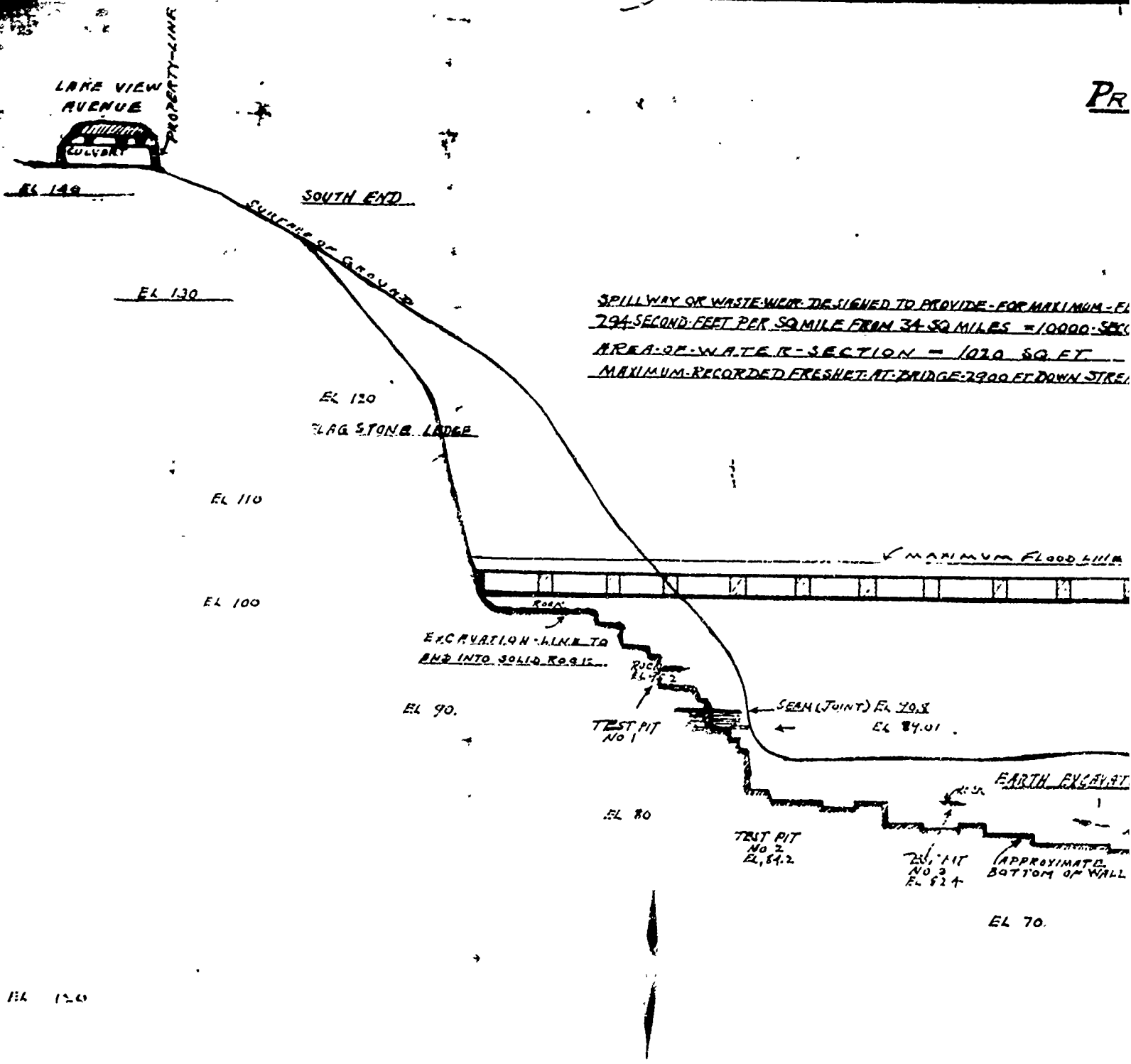
TOPOGRAPHIC MAP

LIST OF DRAWINGS

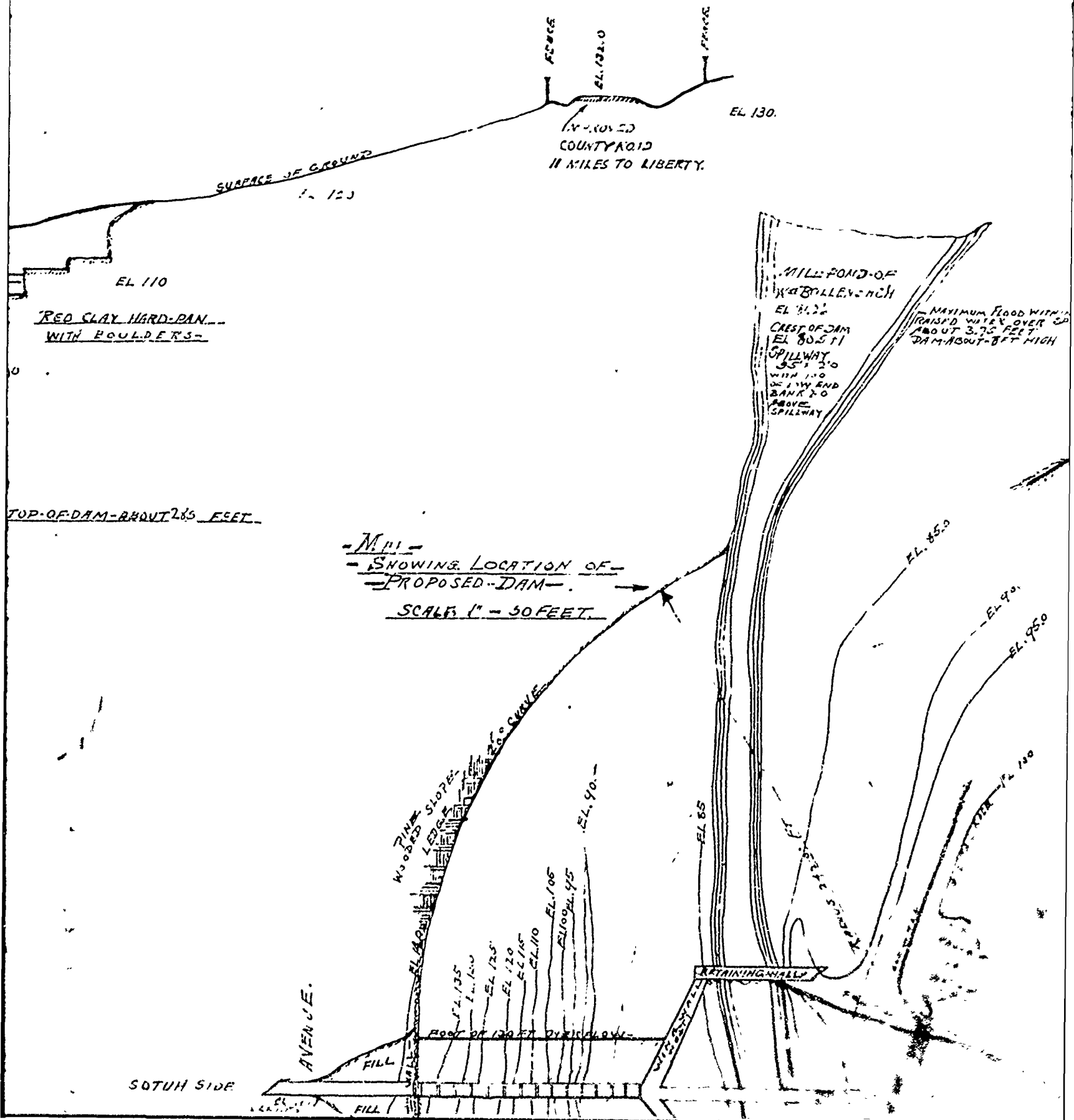
LAKE JEFFERSON DAM

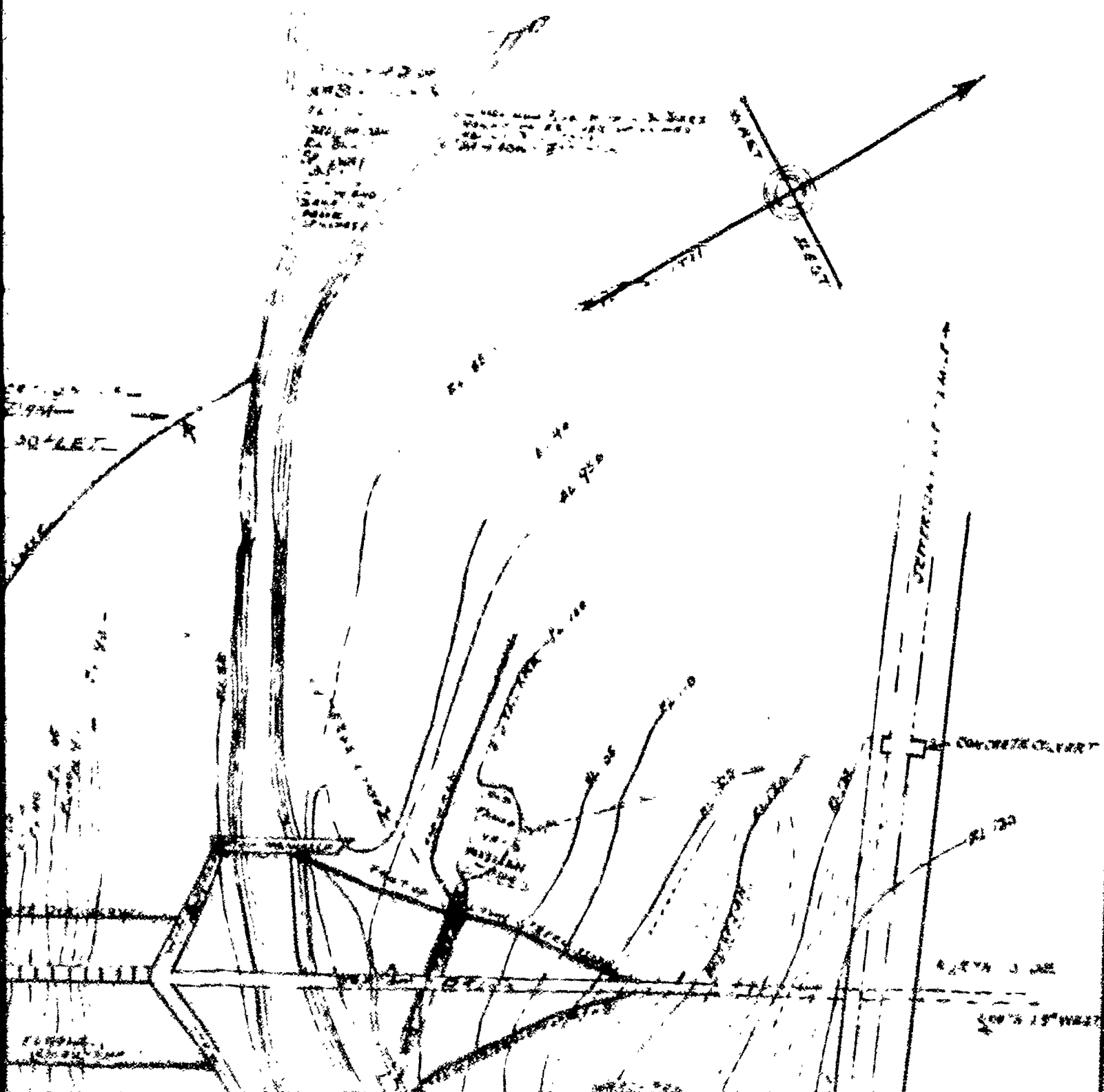
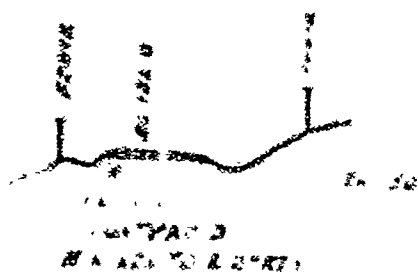
Map of Lake Jefferson	April 12, 1922
Proposed Dam & Hydro-Electric Power Plant	April, 1922
Lake Jefferson - Detailed Drawing	June 14, 1927

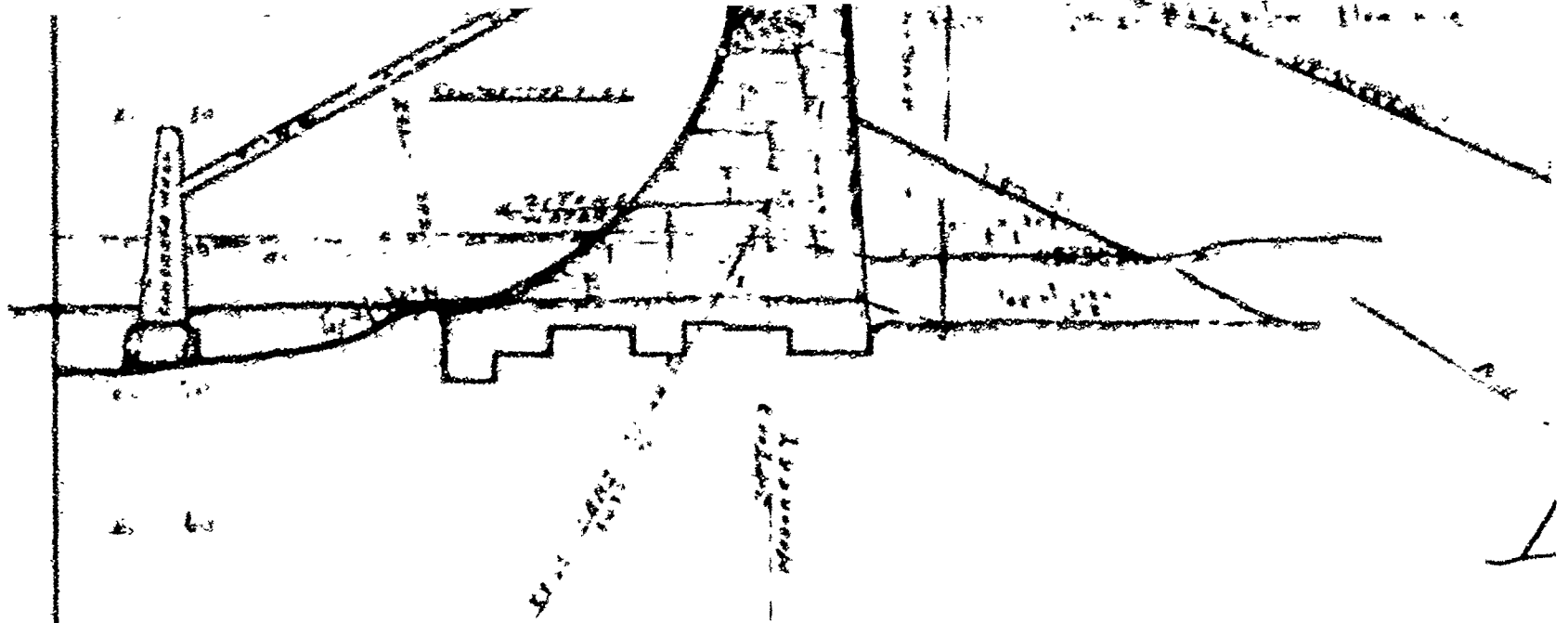
PR



3

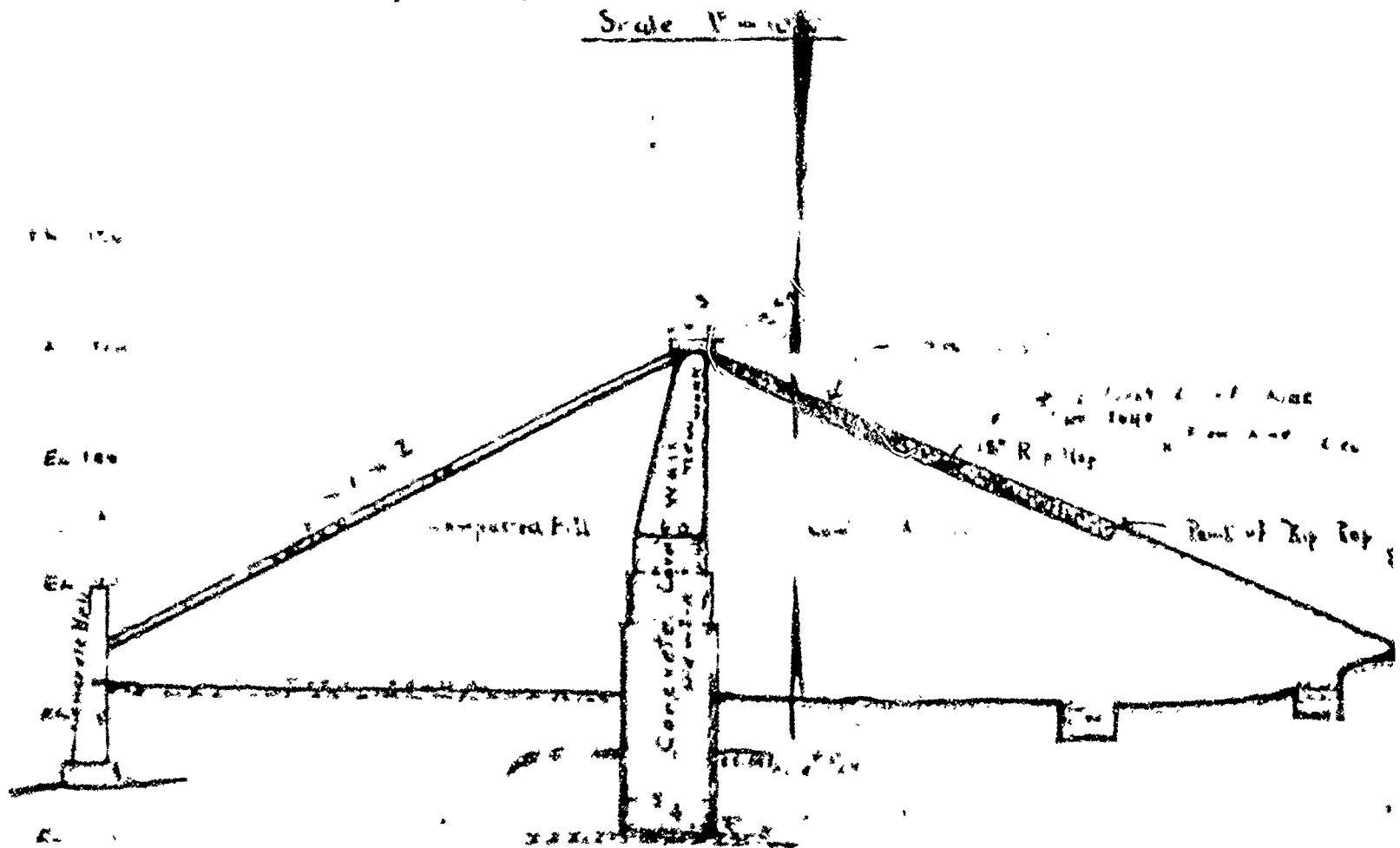






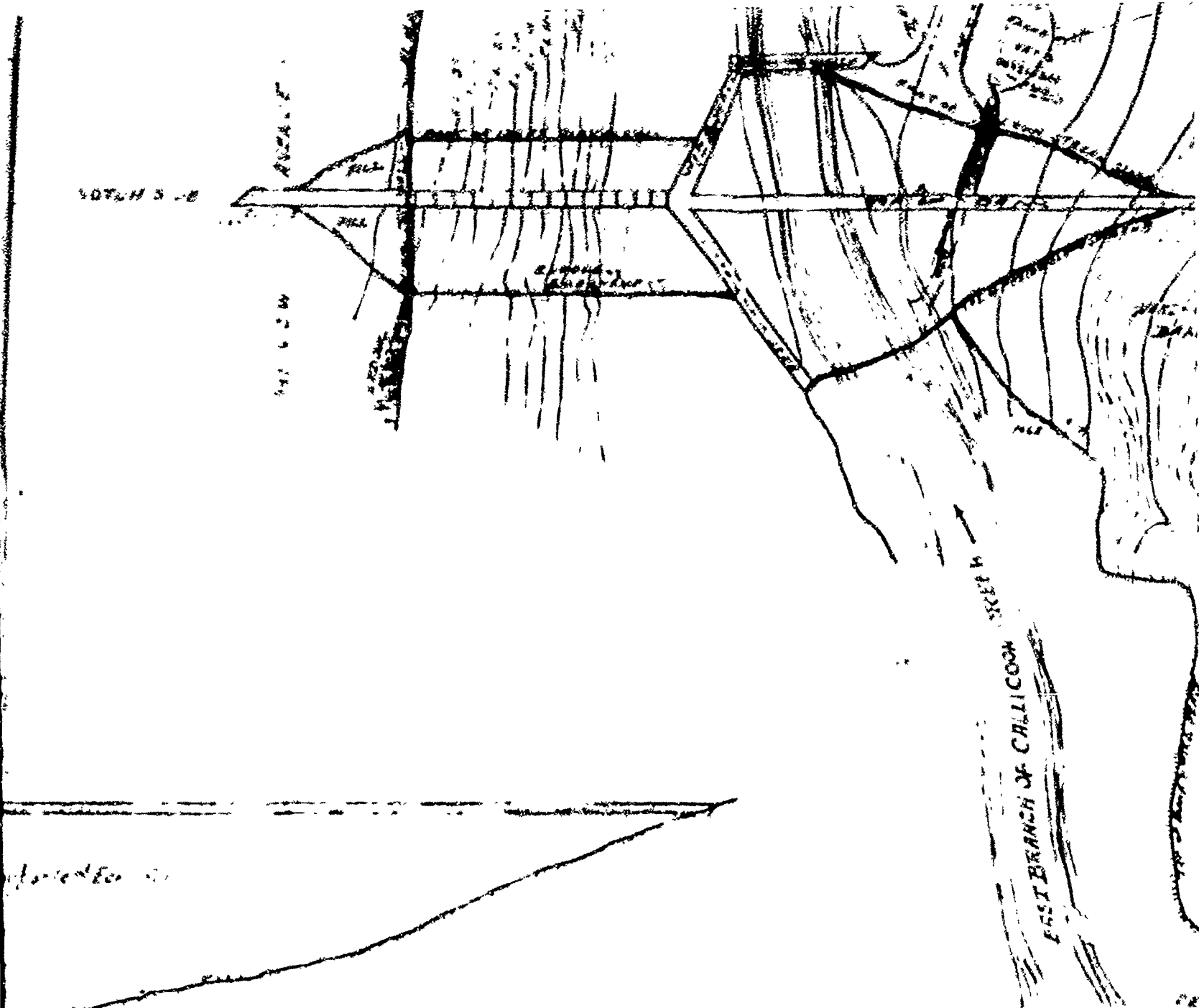
Typical Section Three - showing Earth

Scale 1" = 10'



Typical Section 1 - North of Ring Walls -

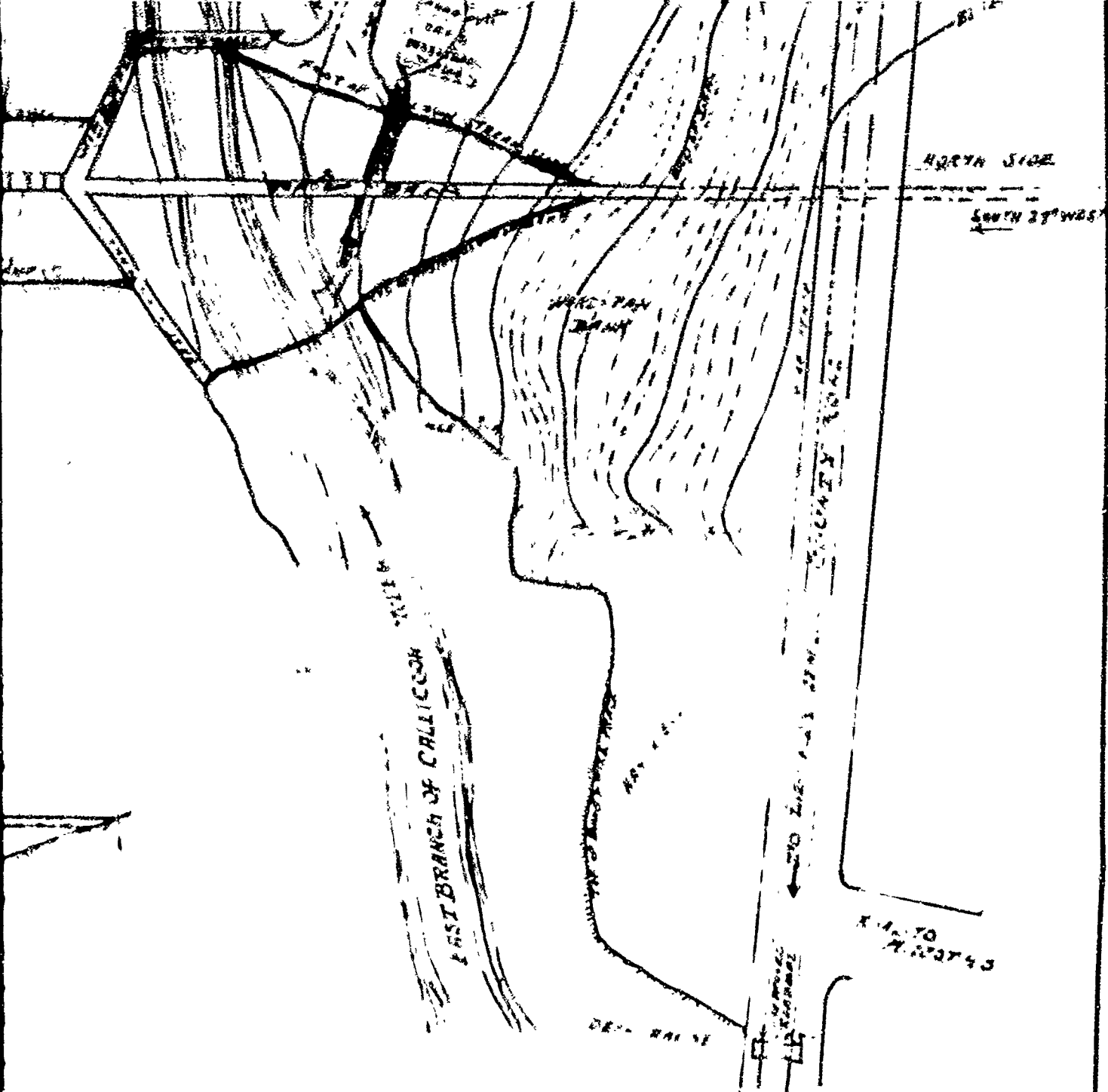
Scale 1" = 10'



DETAILED DRAINAGE
FOR
LAKE-JEFFERSONVILLE

— OWNED BY
-- LAKE-JEFFERSONVILLE
JEFFERSONVILLE
-- SCALE AS SHOWN -- DATED

— Nial Sherwin



DETAILED DRAWINGS
FOR
-LAKE-JEFFERSON-

— OWNED - BY —

--LAKE-JEFFERSON-INC--
JEFFERSONVILLE-NEW-YORK

-SCALE-AS-SHOWN-DATED-JUNE-14-1927-

—Nial Sherwood C.E.—

OLD TRAIL
RACE

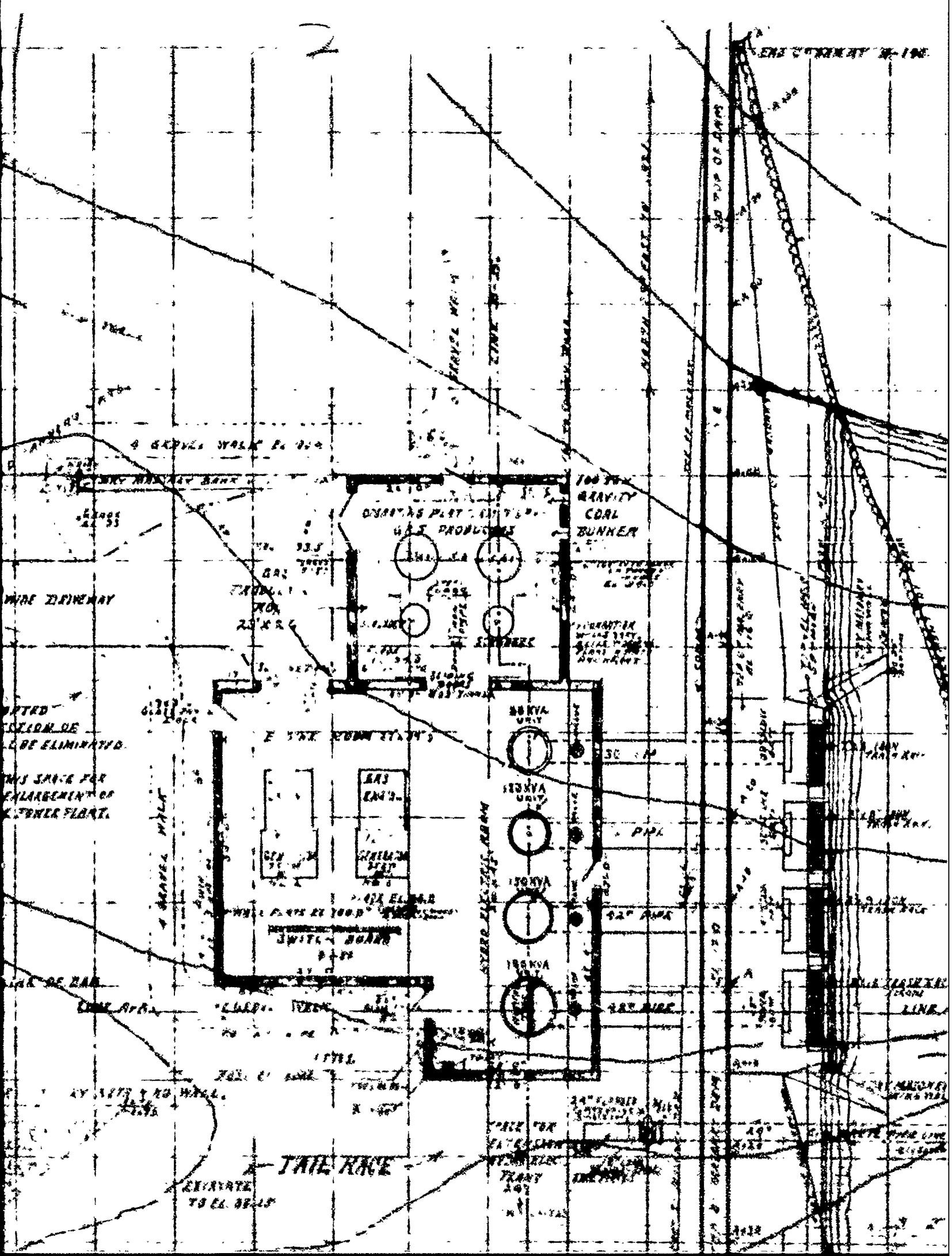
NOTE
IF OIL ENGINE POWER IS AT
THE "SAL PARALLEL FORM"
THE BUILDING ELEV. POWER IS

REMARKS
1955/84
SAL EXG

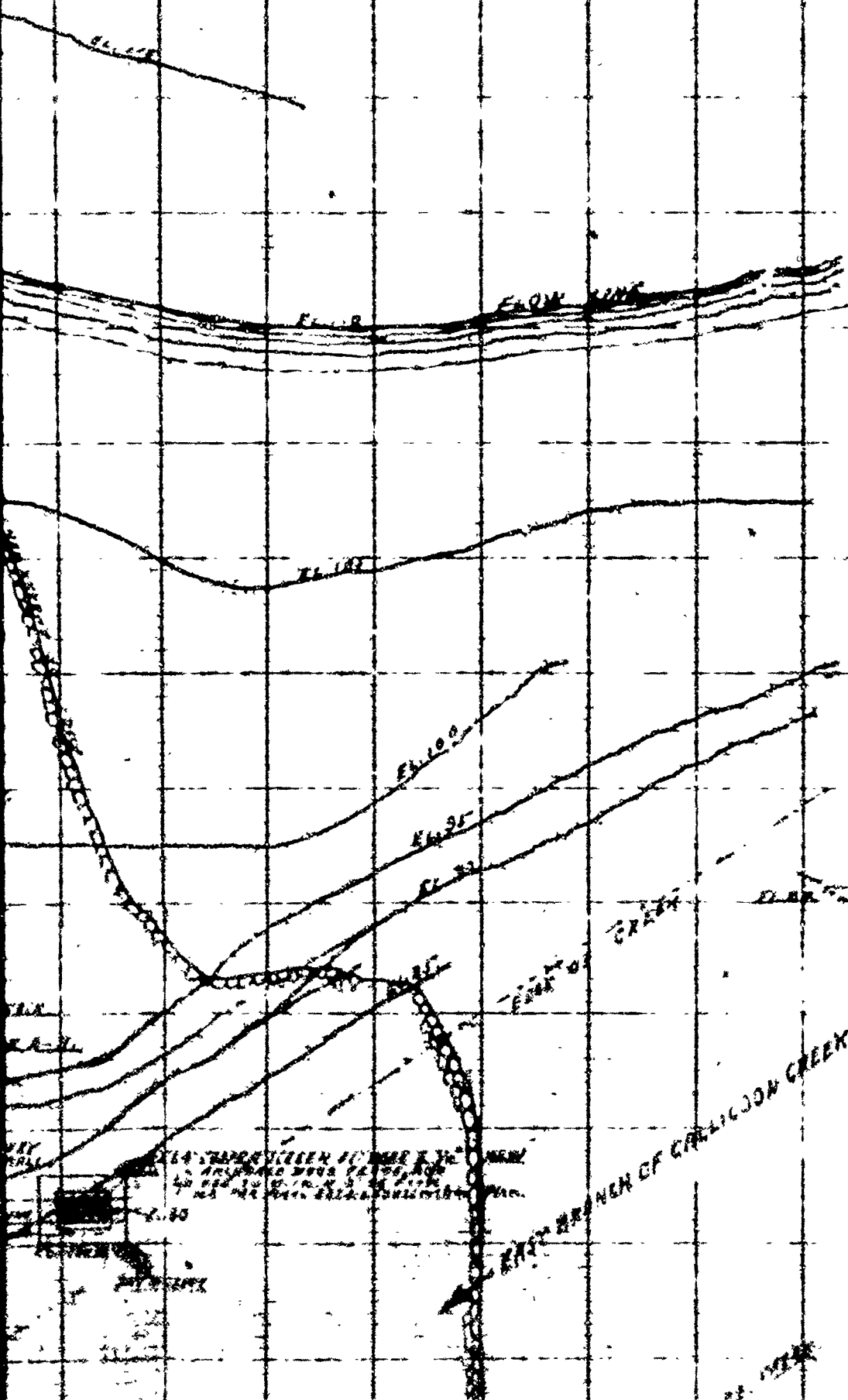
STATE LINE SADDLE STATION A 10
100

SPACE FOR
INITIALS, ETC.

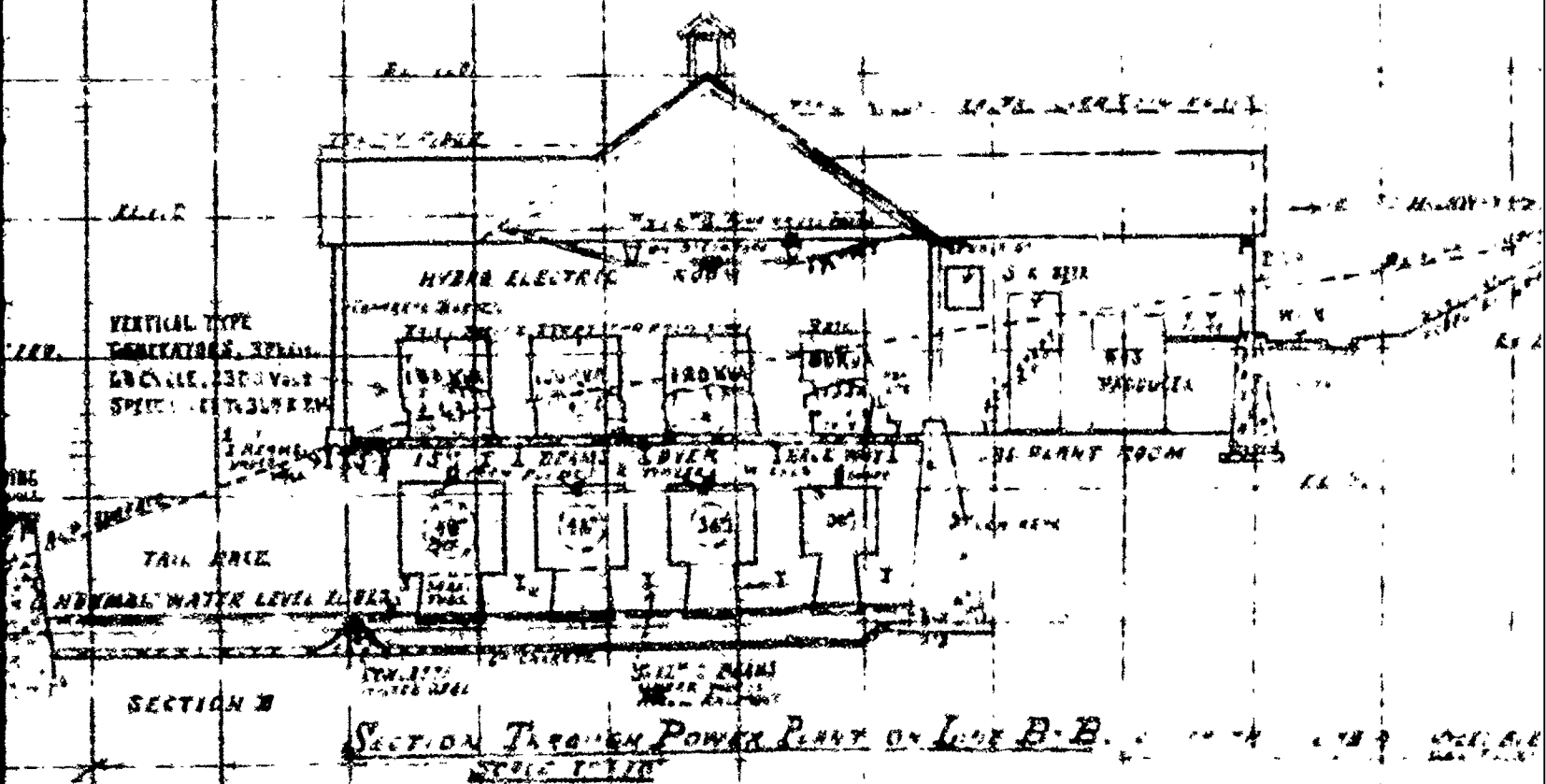
1955/84
SAL EXG



7-1-54
7-1-54
7-1-54
7-1-54



ELEVATION - SECTION
 OF BUILDING - WATER
 WILL BE TAKEN FROM
 TAIL RACE TO 2.50' WATER
 LEVEL



SHEET B OF FINAL DETAILED DRAWING
 FOR DAM & HYDRO-ELECTRIC POWER PLANT

CLARKE WATER & POWER

JEFFERSONVILLE, NEW YORK

BY JOHN E. RIVERA, C.E.

CONSULTING ENGINEER

24 CORTLANDT ST. N.Y.C.

DATE 1922

SCALE 1" = 10'

NOTE
IF WILEY'S 12-10000
11 00-100000000
12 10-100000000

WILEY
12 11

THIS LINE IS THE CENTER LINE

SPACE FOR
PROPERTY PLANTS

12 11
12 11

12 11

12 11
12 11 TO PROPERTY LINE FROM A.

ELEVATION WATER SURFACE
12 11
12 11

12 11

12 11

AS REQUIRED
FOR ELECTRICAL
WORK IN EXAMINATION
ROOMS AND LIT. PAR
SOL. IN ALG. R. AT RI
T. AL. BELL LIGHT.

A. B. LINE OF CAN.

LINE OF CAN.

TAIL RACE

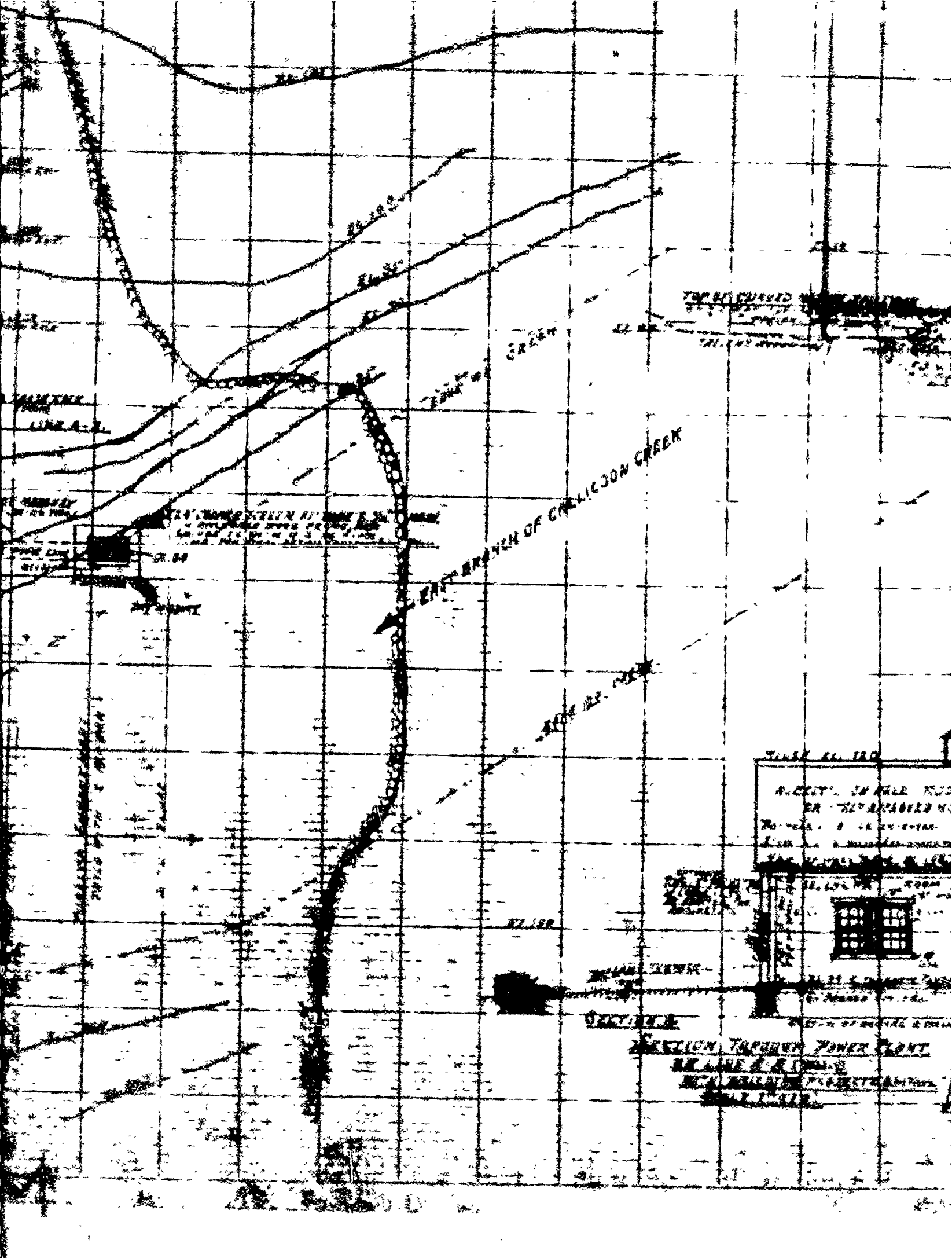
EXHIBIT
TO S. S. 10

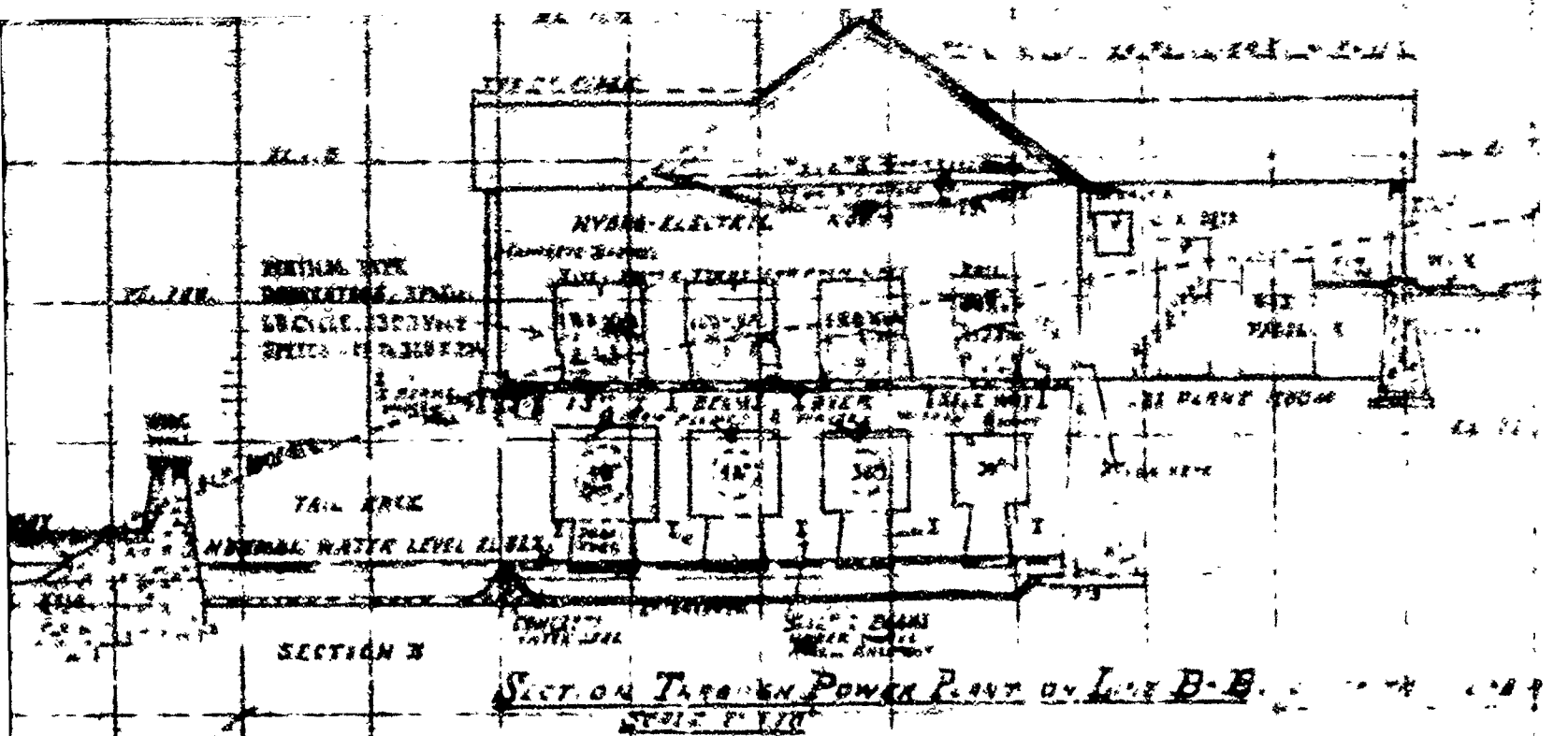
FOR THE
NEWLY
PLANT
ART. 10

TOP OF EXHIBIT 10 S. S. 10

CURVED
MOUNTAIN SHEDDING

PLAN OF POWER PLANT
SCALE 1/8" = 1' TO THE INCH





SHEET B OF FINAL DETAILED
FOR DAM & HYDRO-ELECTRIC P

FOR THE
CLARKE WATER

JEFFERSONVILLE, IN

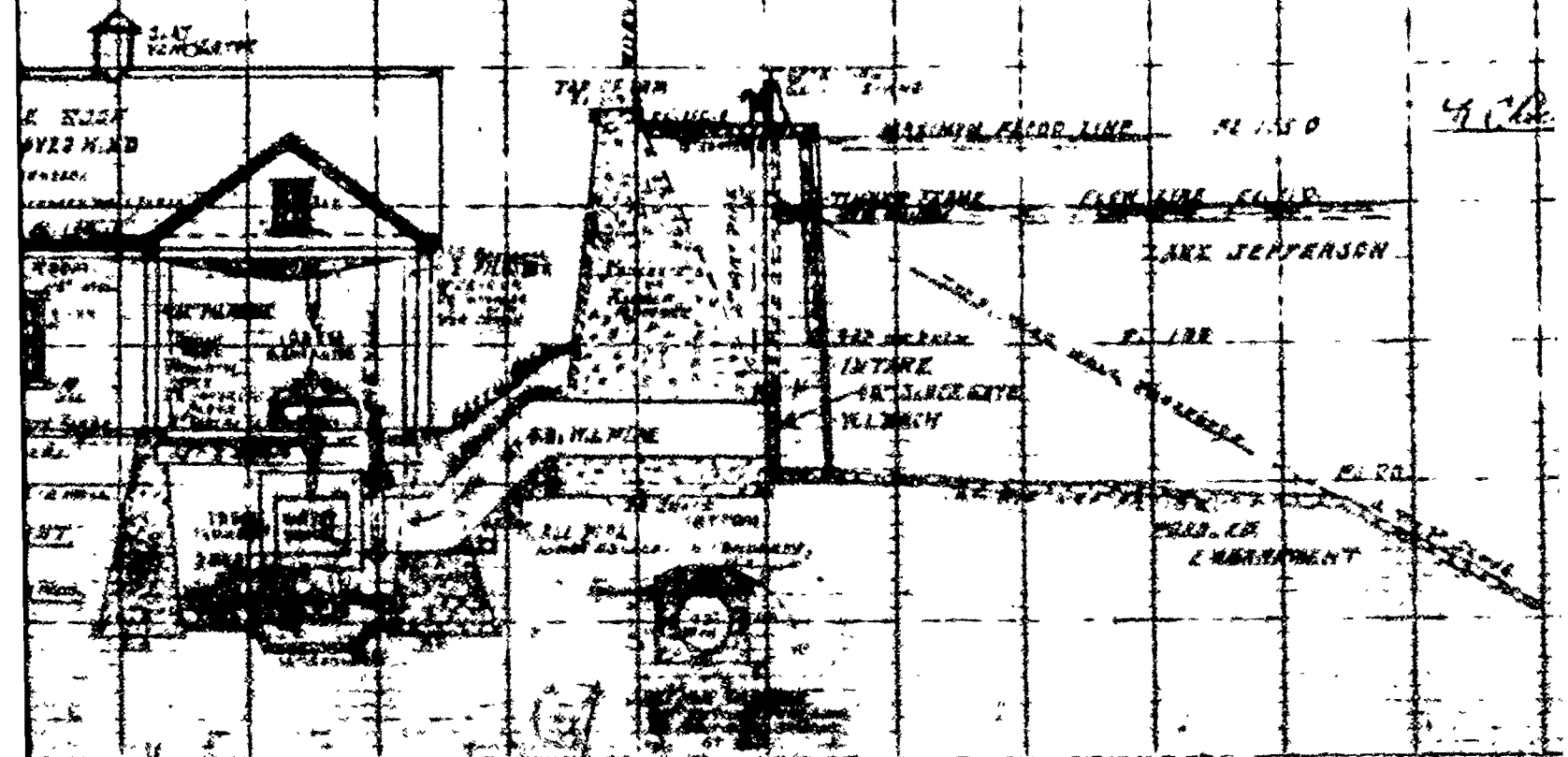
BY JOSEPH B. HARRIS

CONSULTING ENGR

DE CORTLAND

MAY, 1922

SCALES INDICATED.





44-1322

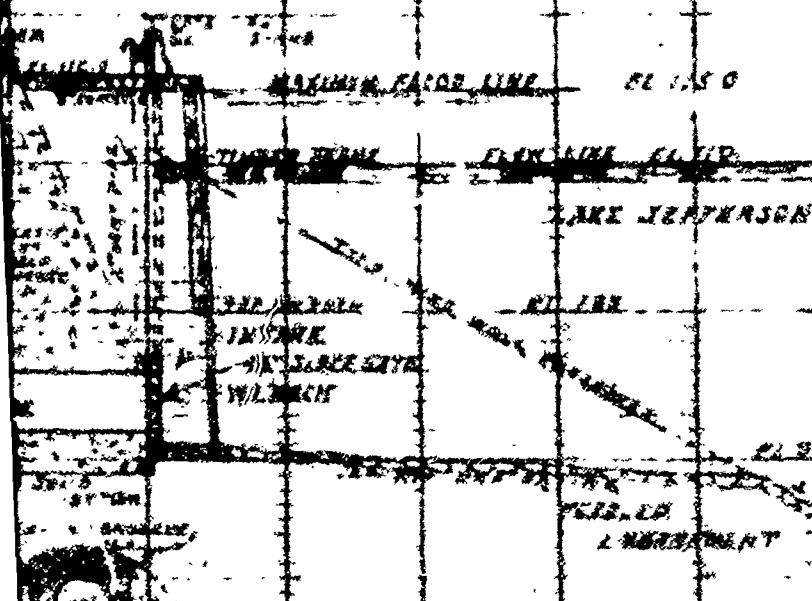
SOLUS INMEXED.

1944 10 22

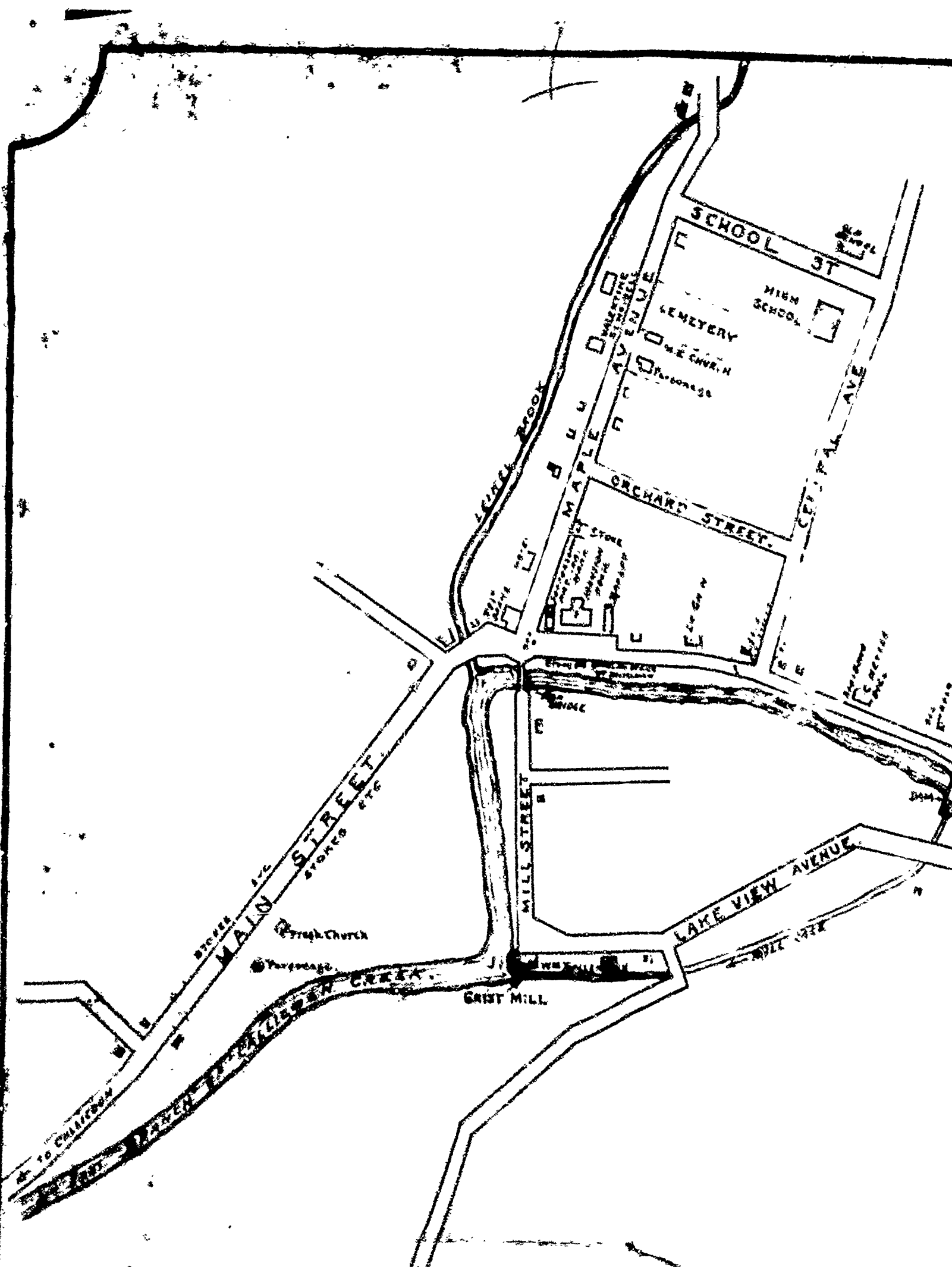
414

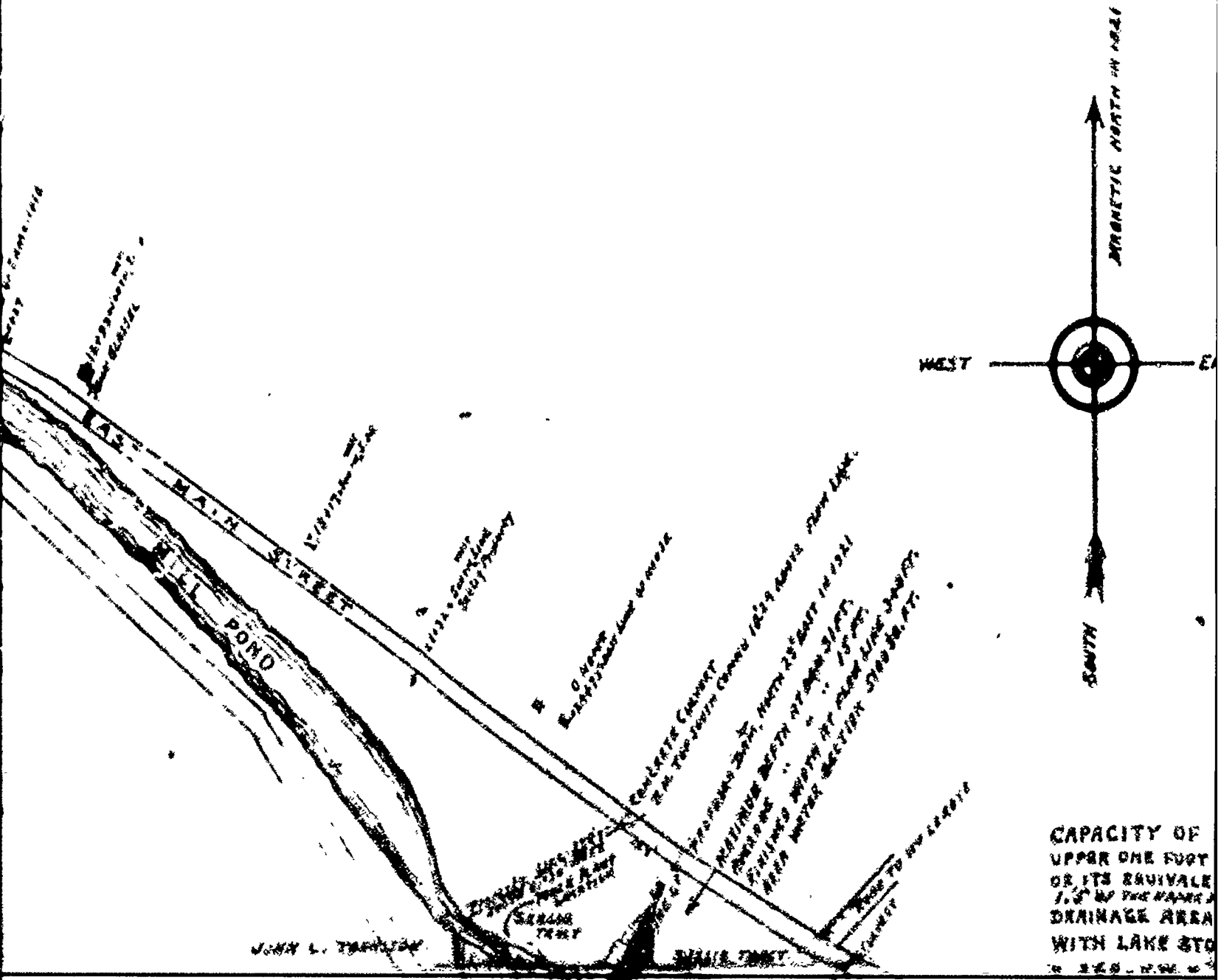
SECRET

Number 100



10

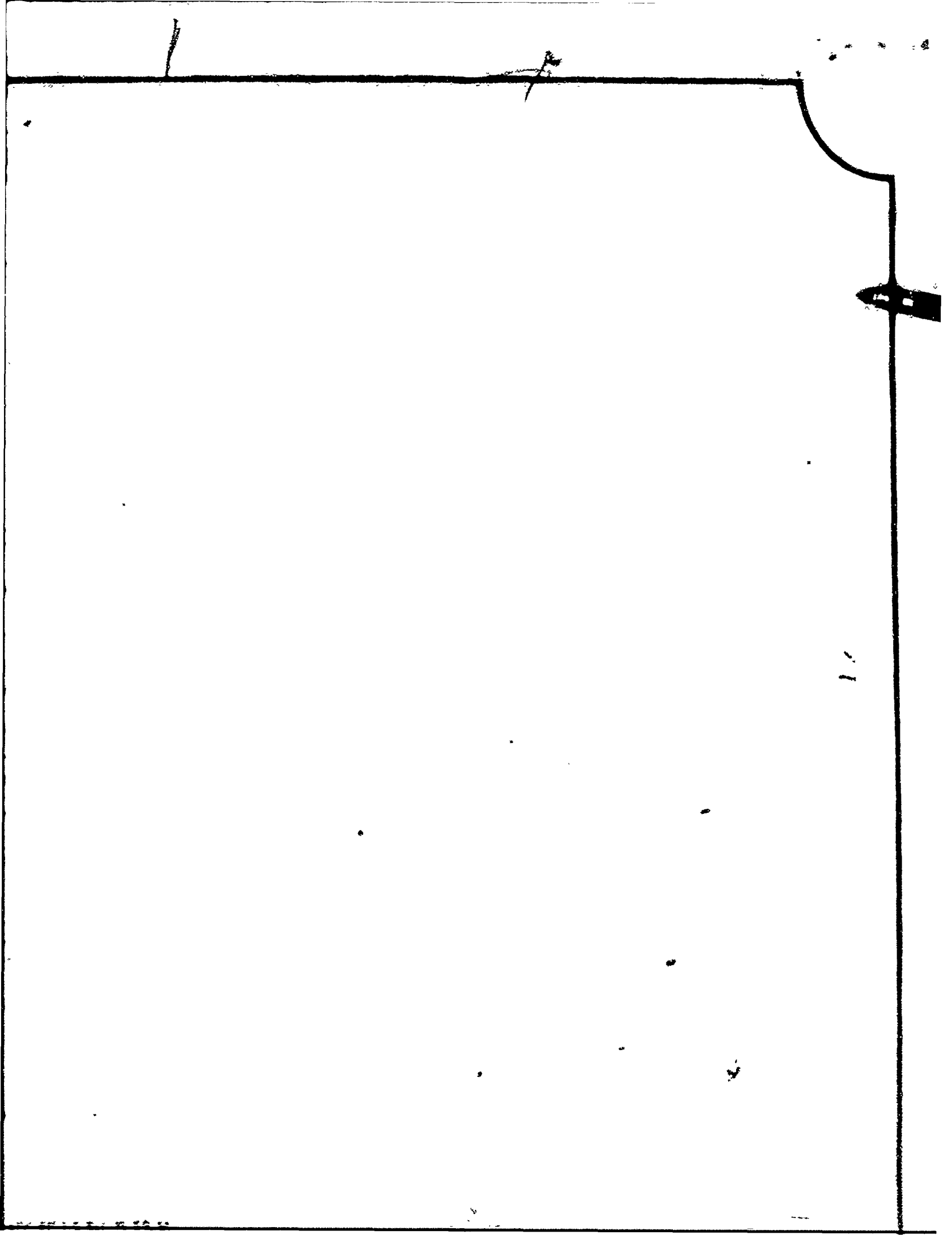


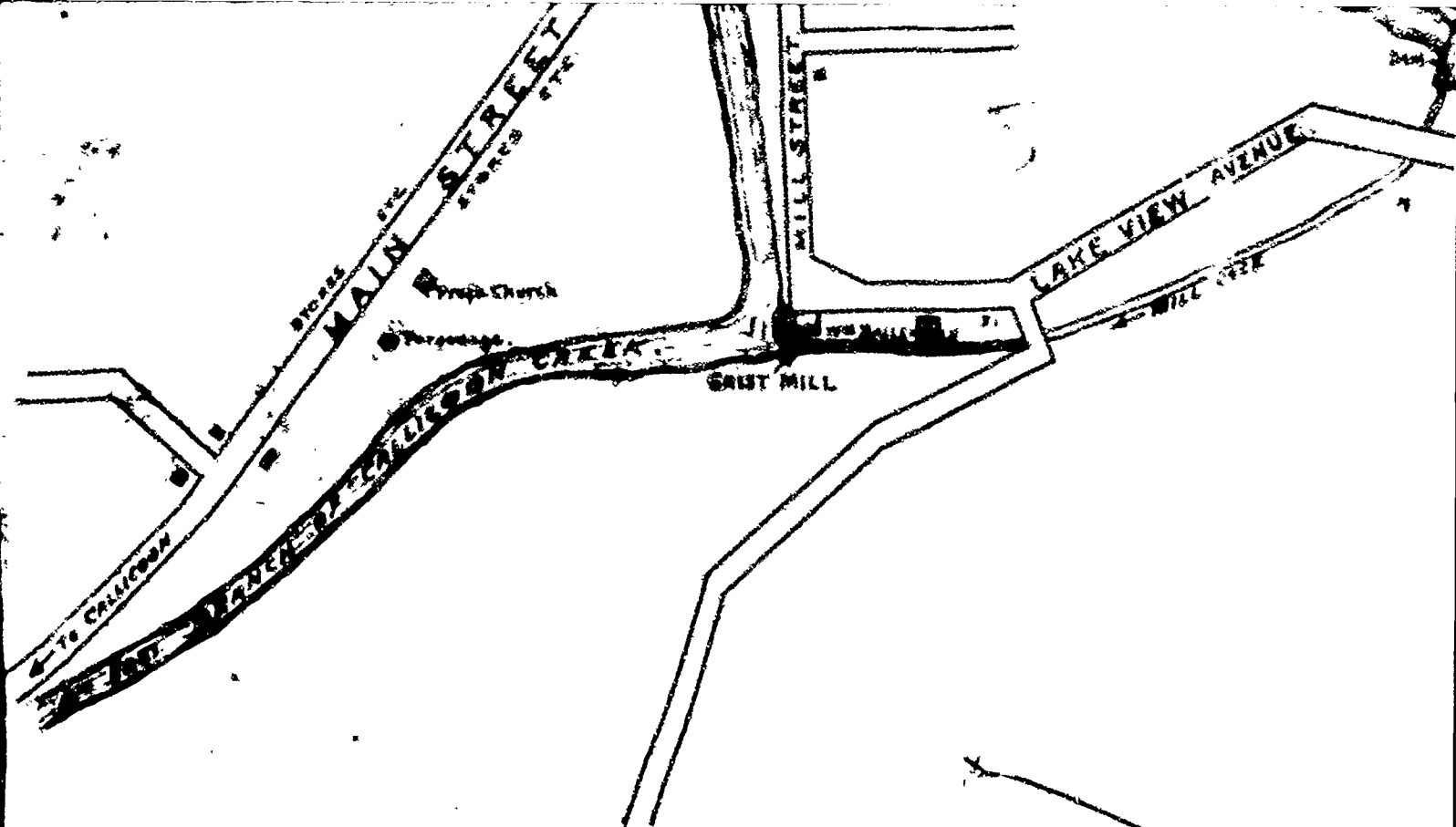


1-3

EAST

OF LAKE 30 MILLION CU. FT. = 225 MILLION GALLONS.
DUST OF WATER WILL GIVE 231 HORSE POWER FOR 10 HOURS,
VALENT UNDER THE 30 FT. AVAILABLE HEAD & 80% WHEEL EFFICIENCY.
AMOUNT OF DUST & POWER IS BASED ON THE ASSUMPTIONS SET FORTH BY THE INDIAN BUREAU OF RESEARCH.
AREA = 22,000 ACRES. MAIN STREAM = 12+50 MILES. BRISCOE SYSTEM = TOTAL OF 110 MILES.





7
LAKE 30 MILLION CU.FT. = 225 MILLION GALLONS

FT OF WATER WILL GIVE 231 HORSE POWER FOR 10 HOURS

MENT UNDER THE 30 FT. AVAILABLE HEAD & 80% WHEEL EFFICIENCY.

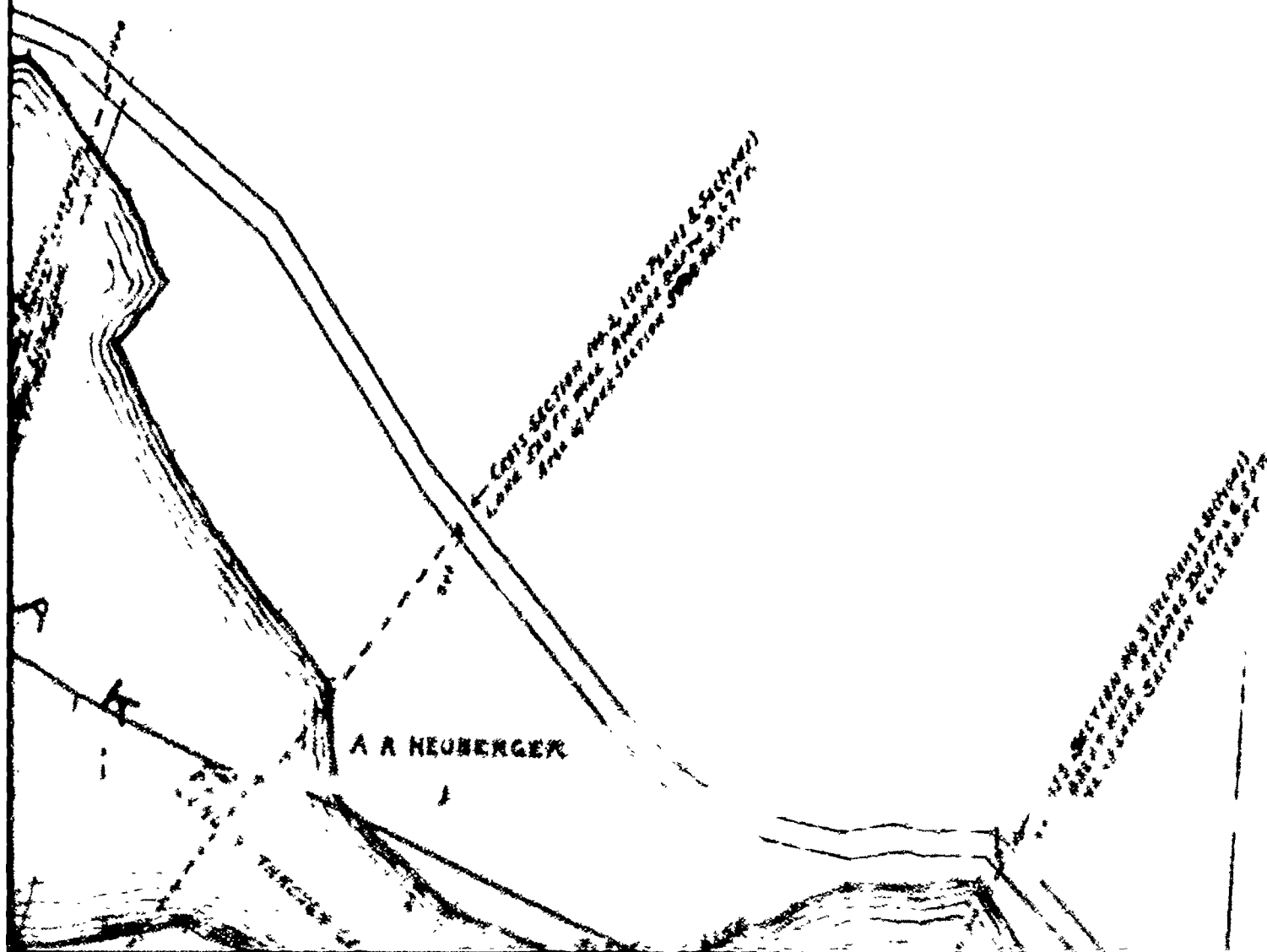
ANY OF WATER & POWER IS RETAINED ON THE AVERAGE EACH 24 HOURS BY THE INFLOW OF THE CREEK.

LA = 22.100. MILES, MAIN STREAM + 12.450. MILES, BRISCOE STREAM = TOTAL OF 34.550. MILES.

TORAGE FOR REGULATION, POWER AVAILABLE WITH 80% EFFICIENCY

231 HORSE POWER, AVERAGE 10 HOURS PER DAY, EVERY DAY, ASSUMING CONTROL OF AVERAGE RUN-OFF OF 1.6 SEC. IN 50. M.

AL DATA SEE MEMORANDA & REPORT. ESTIMATES, ETC.



JOHN E. HARRIS

TOWN OF DELAWARE
TOWN OF BETHEL

FRED HART

HIGHWAY

PROPOSED

ELSIK

ANY INC. -

APPROVED BY THE BOARD OF DIRECTORS
APRIL 12 1922

THIS SECTION OF PROPOSED ROAD
SEE DETAIL NO. 100 PAGE 4 SECTION 2

[Signature]

[Signature]

PRESIDENT

SECRETARY

APRIL 12 1922

19

A A NEUBERGER

WATER ELOWAGE & LAKE PROTECTION RESERVATION

PROPOSED

SOUTH SHORE ROAD .50 FT WIDE

ELSIE SHULTZ

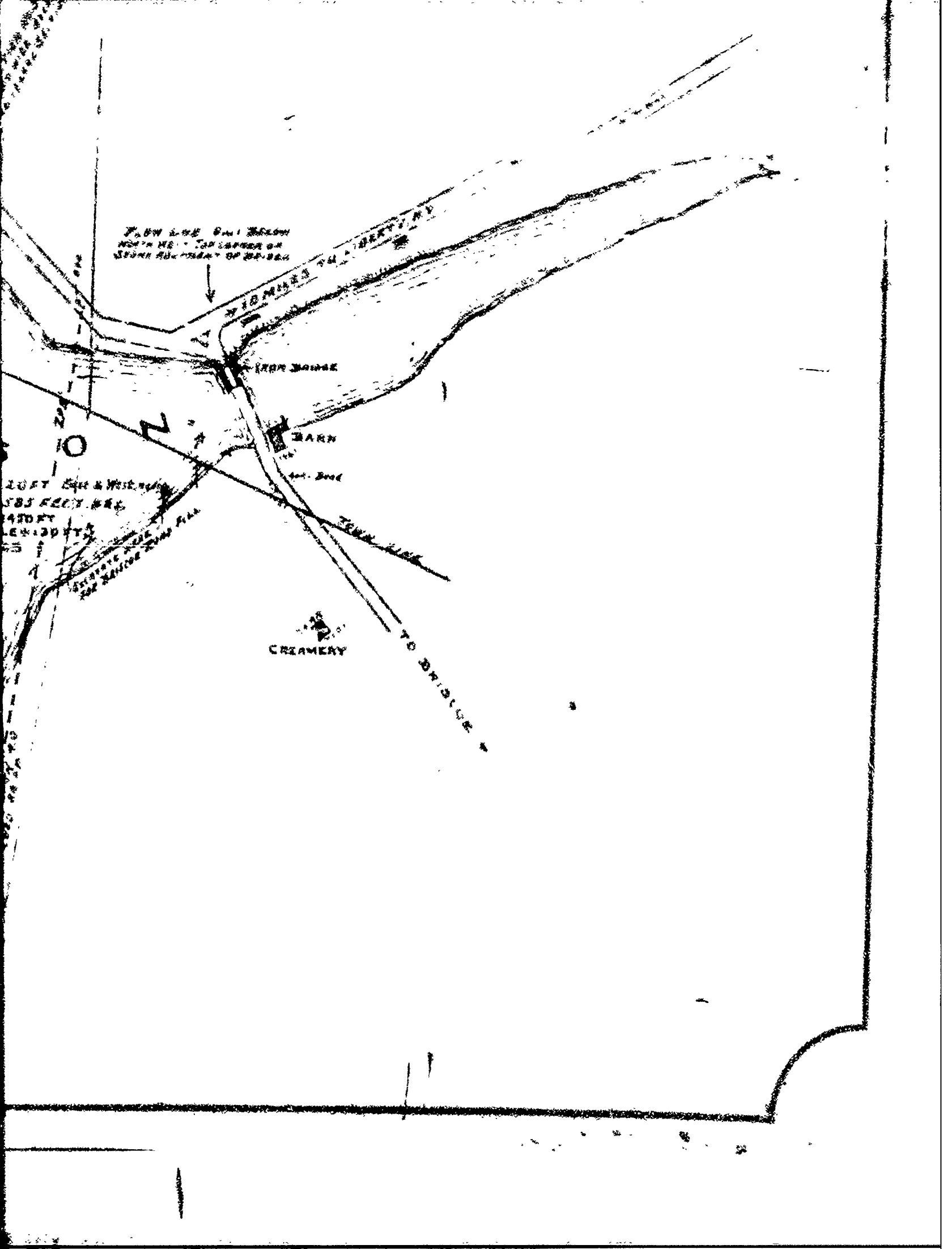
ELSIE SHULTZ

30 ACRES WERE SOLD TO A FARMER IN

LENGTH 5300 FT ± ONE MILE ± 20 FT
AVERAGE WIDTH TO FLOW LINE 585 FEET ±
GREATEST WIDTH, NORTH & SOUTH, 1430 FT
8 1/4 MILE ± 120 FT
AREA TO FLOW LINE ± 70 ACRES

CROSS SECTION AT A B
WITH 300 FT WIDE
AND 100 FT DEEP
AVERAGE DEPTH 70 FT
AREA 21000 SQ FT

FLOW &
NORTH OF
SPRING BR.



FARM HOUSE

100 FT. E. & W. of ...

BARN

CREAMERY

TO BRIDGE

100 FT. E. & W. of ...
100 FT. ...
100 FT. ...
100 FT. ...