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NATIONAL DAM SAFETY PROGRAM. GOSHEN RESERVOIR NUMBER 1 DAM (INV--ETC(U)
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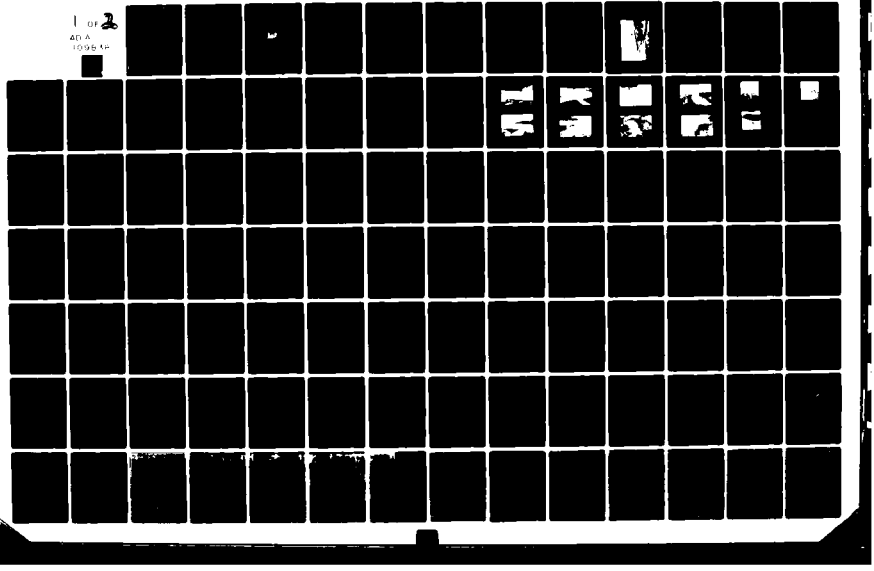

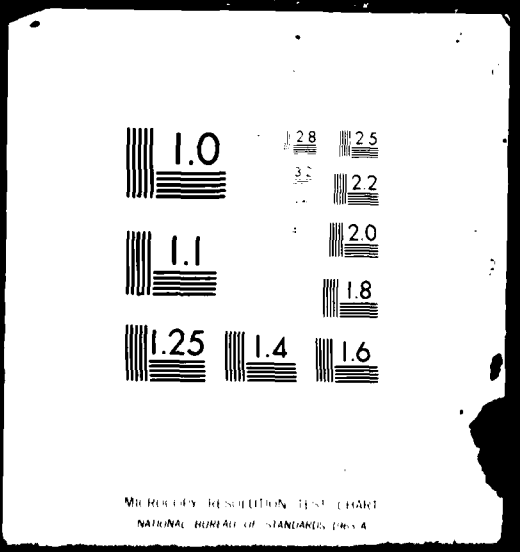

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the investigation reveal

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

LEVEL

1. REPORT NUMBER: NAP-A-10988	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): Phase I Inspection Report Goshen Reservoir No. 1 Dam Lower Hudson River Basin, Orange County, NY Inventory No. NY00488	5. TYPE OF REPORT & PERIOD COVERED: Phase I Inspection Report National Dam Safety Program
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): GEORGE KOCH	8. CONTRACT OR GRANT NUMBER(s): DACW51-79-C-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS: New York State Department of Environmental Conservation 50 Wolf Road Albany, New York 12233	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: Department of the Army 26 Federal Plaza New York District, CofE New York, New York 10287	12. REPORT DATE: 14 September 1981 13. NUMBER OF PAGES
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16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; Distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

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18. SUPPLEMENTARY NOTES

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

Goshen Reservoir No. 1 Dam
Orange County, NY
Lower Hudson River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The examination of documents and the visual inspection of the Goshen Reservoir did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies and remedial work.

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The most serious of these deficiencies are the two areas of seepage on the downstream slope of the dam. First is at the end of the grouted stone spillway channel and the second is at the toe in the center of the dam. It is recommended that within six months from notification, an engineering investigation is initiated to determine the sources of the seepage found.

Using the Corps of Engineers' "screening criteria" for the intial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 51% of the Probable Maximum Flood (PMF). Therefore, the spillway is adjudged as "inadequate".

LOWER HUDSON RIVER BASIN

GOSHEN RESERVOIR NO. 1 DAM

ORANGE COUNTY, NEW YORK

INVENTORY NO. N.Y. 488

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST, 1981

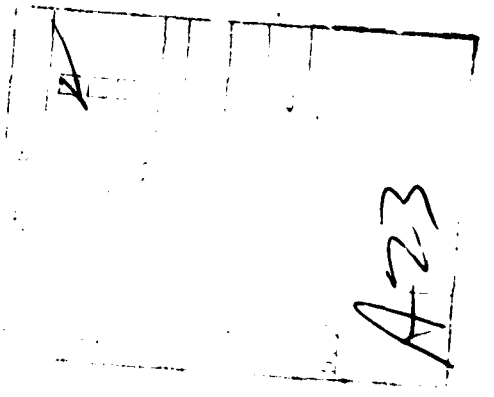
PREFACE

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.



PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
GOSHEN RESERVOIR NO.1 DAM
I.D. NO. NY 488
D.E.C. NO. 179B-3163
LOWER HUDSON RIVER BASIN
ORANGE COUNTY, N.Y.

TABLE OF CONTENTS

APPENDICES

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Goshen Reservoir No. 1 Dam (I.D. No. NY 488)
State Located:	New York
County Located	Orange
Stream:	Rio Grande Creek
Date of Inspection:	November 20, 1980

ASSESSMENT

The examination of documents and the visual inspection of the Goshen Reservoir did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies and remedial work.

The most serious of these deficiencies are the two areas of seepage on the downstream slope of the dam. First is at the end of the grouted stone spillway channel and the second is at the toe in the center of the dam. It is recommended that within six months from notification, an engineering investigation is initiated to determine the sources of the seepage found.

Using the Corps of Engineers' "screening criteria" for the intial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 51% of the Probable Maximum Flood (PMF). Therefore, the spillway is adjudged as "inadequate".

In addition the dam has a number of problem areas, which if left uncorrected, have the potential for the development of hazardous conditions and must be corrected within 1 year. The following remedial work is required:

a. Repair the spillway walls.

b. Clean and recaulk the joints in the spillway.

c. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including operation and lubrication of all gates and valves. This information should be documented for future reference.

d. An emergency action plan must be established.

George Koch
Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

Approved By:

Col. W.H. Smith, Jr.
New York District Engineer

Date: 14 Sept 81

OVERVIEW OF GOSHEN RESERVOIR #1 DAM

PHOTO #1

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
GOSHEN RESERVOIR NO. 1 DAM I.D. NO. NY 488
DEC # 179 B - 3163 LOWER HUDSON RIVER BASIN
ORANGE COUNTY

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

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

The Goshen Reservoir No. 1 Dam consists of a 550 feet long earth embankment with a 25 feet concrete overflow spillway located at the left abutment. The original embankment was raised 4 feet in 1963 to its present height of 37 feet. The rip rap protected upstream slope is 3 on 1, while the downstream slope was backfilled to a 2 on 1 grade. The crest width is 12', but there has been fill placed on the downstream slope in the recent past, increasing the crest width to 20' in the area adjacent to the access road. The gate house is located on the upstream slope on the right side of the embankment. It houses two 20" intake valves to the Goshen water supply system. The spillway is a concrete channel with a concrete cutoff extending into the embankment. The outlet channel is grouted stone channel which follows the abutment contact and bends back into the original stream bed. There is no reservoir drain except for the intake lines to the filtration plant.

b. Location

The dam is located on the Rio Grande Creek, a tributary of the Wallkill River, Lower Hudson River Basin. It is in the Town of Goshen, Orange County, State of New York.

c. Size

The dam is approximately 37 feet high and impounds 704. acre feet at normal or spillway crest elevation. The dam is classified as "small" in size (25 to 40 feet in height).

d. Hazard Classification

The dam is classified as high hazard due to its location above several homes along Reservoir Road.

e. Ownership

The dam is owned by the Village of Goshen, New York. The owner's representative is Conrad Kroll, Superintendent of Public Works, Village of Goshen, 276 Main Street, Goshen, NY 10924, (914) 294-6750.

f. Purpose of the Dam

The dam augments the storage for the Village of Goshen water supply.

g. Design and Construction History

The original dam was constructed around 1875. In 1964 the embankment was raised 4 feet and a new spillway was constructed. The design of the reconstruction was by Chumark & McGough, Consulting Engineers, Middletown, New York.

h. Normal Operating Procedures

Releases from the Goshen Reservoir are normally passed into the treatment plant and into the water supply system. Excess runoff is passed over the spillway and into the original stream channel.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.)	0.59
b. Elevations (ft. USGS datum)	
Top of Dam	546.0
Spillway Crest	543.0
Original Stream Channel	509.0
c. Reservoir (acre feet)	
Storage at Top of Dam	867.0
Storage at Spillway Crest	704.0

d. Dam

Type: Homogeneous earth fill with a clay addition to the top of the embankment, upstream slope is rip rapped.

Length (ft):	550.0
Downstream Slope:	2:1
Upstream Slope:	3:1
Crest Width (ft):	12.
Height (ft):	37.

e. Spillway

Type: Concrete channel with concrete cutoff wall and grouted stone outlet channel.

Weir Length (ft):	25.0'
Maximum Capacity (cfs):	236.

SECTION 2: ENGINEERING DATA

2.1: DESIGN

a. Geology

The Goshen Reservoir No. 1 Dam is located in the "Hudson Valley Lowlands" physiographic province of New York State. These lowland areas have gentle relief and are underlain by Ordovician shales that have been exposed by the erosion of overlying Silurian and Devonian limestones. Drainage is generally northeast towards the Hudson River.

b. Subsurface Investigation

The Troy-Cossayuna is the dominant association of the glacial till of the Hudson Valley (Ref. 8). The only information or past investigation of the site that could be located are the boring logs included in the report. These are borings through the original dam embankment taken for the design of the raising embankment.

c. Dam and Appurtenant Structures

There is no data on the original structure except what can be interpreted from the reconstruction plans (App. E). The reconstruction was designed by Chumard and McGough, Consulting Engineers in 1963 and believed to be implemented the dame year.

2.2 CONSTRUCTION RECORDS

Some correspondence regarding seepage and some settlement problems were located in the files located in the Dam Safety Section, Department of Environmental Conservation, 50 Wolf Road, Albany, NY 12233. Several of the reconstruction photos are included in this report (See App. A).

2.3 OPERATION RECORD

All information regarding operation and maintenance of the dam is on file with the Goshen Water Superintendent.

2.4 EVALUATION OF DATA

The data presented in this report is compiled from information made available by the representatives of the Village of Goshen and the files at Department of Environmental Conservation. This information appears to be adequate and reliable for Phase 1 Inspection purposes.

SECTION 3: VISUAL INSPECTION

3. 1: FINDINGS

a. General

Visual inspection of the Goshen Reservoir No. 1 dam and surrounding watershed was conducted on November 20, 1980 and April 30, 1981. The weather was clear and the temperature ranged in the thirties; there was approximately 2 inches of snow on the ground in November and clear of snow in April. The reservoir was approximately 4 feet below normal or spillway crest elevation.

b. Dam

The dam, which was raised in 1963 is approximately 37 feet high. It is composed of an earth embankment with a concrete spillway. The upstream rip rap was well placed and in good condition, and the embankment as a whole appeared stable. However, there were several points of seepage on the downstream slope, eminating from under the grouted spillway channel and a wet area at the toe, in the center of the dam. This seepage was also found during and after construction in 1964 (See photos, App. A), and suspected to be flowing in the area of the original spillway. The seepage did not show signs of material transport. The Department of Public Works has been placing fill material on the downstream slope adjacent to the access road. This has widened the crest by 10 feet in this area of the dam.

c. Spillway

As evidenced in the construction photos settlement of the embankment was large. This movement is apparent in the spillway. Both walls are cracked and the right wall has moved inward. The construction joints are showing signs of deterioration, much of the compound is missing. The grouted stone channel is in good condition, however, there was a small amount of seepage eminating from under the channel.

d. Appurtenent Structures

The gate house was raised in 1963 with the embankment and appears to be sound. All gates are operated continually and in good working condition.

e. Abutments

There is no sign of seepage or other unusual conditions at the abutments, however, the right abutment is concealed by the backfilling on the downstream slope of the dam.

f. Downstream Channel

The channel downstream of the spillway is natural, stream bed upon leaving the grouted stone spillway channel. Although the channel contains natural vegetation, including large trees and brush, its present condition would not significantly impede discharges from the spillway.

g. Reservoir Area

In the vicinity of the dam there is no evidence of sloughing, potentially unstable slopes or other unusual conditions which may adversely affect the dam. No evidence of excessive sedimentation was observed.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the investigation reveal several deficiencies which should be corrected before further deterioration leads to a hazardous condition. They are;

a. Determine the source of the seepage found at the toe and the center of the dam and at the end of the grouted spillway channel. Monitor the seepage at bi-weekly intervals with the aid of weirs.

b. Repair the spillway walls.

c. Clean and recaulk joints in the spillway.

d. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including operation and lubrication of all gates and valves. This information should be documented for future reference.

e. An emergency action plan must be established.

SECTION 4: OPERATIONS AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface is at the spillway crest. The reservoir is kept at or below this elevation by discharge through the two 20" lines into the Goshen Water Supply. Flows in excess of this requirement are passed over the ungated spillway.

4.2 MAINTENANCE OF THE DAM

Maintenance of the dam is provided by the owner, the Village of Goshen, NY. Maintenance of the dam is considered unsatisfactory, as evidenced by the cracking of concrete elements, deteriorated concrete joints, and unmonitored seepage.

4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

4.4 EVALUATION

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

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The total drainage area tributary to this dam is 0.59 square miles with generally moderate slopes. The area is fairly well drained and was treated as a single basin for analysis purposes.

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 were the PMF and 1/2 PMF in accordance with the recommended guidelines of the Corps of Engineers.

5.3 SPILLWAY CAPACITY

The spillway has a capacity of 343 cfs with the reservoir level at the top of the dam. For the 1/2 PMF the peak inflow will be 895 cfs and the peak outflow will be 338 cfs. For the PMF the peak inflow will be 1789 cfs and the peak outflow will be 1466 cfs. During this event, the dam will be overtopped by 0.89 foot of water.

5.4 RESERVOIR CAPACITY

Capacity to normal water elevation is 704 acre-feet. Surcharge storage to top of dam is an additional 163 acre-feet, creating a total storage of 867 acre-feet. The surcharge storage between spillway and dam crest is equivalent to 5.18 inches of runoff.

5.5 FLOODS OF RECORD

No records of past floods for Rio Grande Creek are available.

5.6 OVERTOPPING POTENTIAL

Our analysis indicates the dam will be overtopped by 0.89 foot during the PMF which could cause damages to several homes located downstream. It would, however, be able to handle 1/2 the PMF but with practically no freeboard (about 0.03 feet).

5.7 EVALUATION

The spillway is inadequate to pass all floods exceeding 51% of the PMF and is, therefore, adjudged as "inadequate".

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The most serious signs of distress in connection with the earth embankment are the seepage areas previously noted. There are a number of other problem areas, discussed in "Section 3: Visual Inspection", which if left uncorrected, have the potential for the development of hazardous conditions.

b. Design and Construction Data

Some information on the problems resulting from the 1963 reconstruction is available in the NYS Department of Environmental Conservation files. No data was available on the original structure, but plans and photos of the reconstruction are included in this report.

c. Post Construction Changes

The original dam was constructed about 1875 and raised in 1963 to its present configuaration. The last raising was designed by Chumard and McGough, Consulting Engineers, Middleton, NY.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase 1 Inspection of Goshen Reservoir No. 1 Dam revealed that the spillway as"inadequate" based on the Corps of Engineer's "screening criteria". The dam will be overtopped by all storms in excess of 51% of the PMF. Also several areas of seepage were found at the spillway channel outlet and at the toe of the dam. These areas must be investigated to determine the source of this seepage and what remedial action must be initiated.

b. Adequacy of Information

The information reviewed is considered adequate for Phase 1 Inspection purposes.

c. Need for Additional Investigations

There is need for a further engineering investigation into the seepage found at the toe of the embankment and at the end of the spillway channel. After these investigations have been completed, appropriate remedial measures must be initiated.

d. Urgency

The engineering investigations must be initiated within six months from the date of notification, and remedial measures as a result of these investigations completed within 18 months from the date of notification. In the interim monitor the seepage area on a regular basis, develop an emergency action plan for notification of downstream residents and the proper governmental authorities, and provide around-the-clock surveillance of the dam during periods of unusually heavy runoff. The other repairs and maintenance noted in Section 3.2 must be complete within one year from the date of notification.

7.2 RECOMMENDED MEASURES

a. Initiate an engineering study to determine the source of the seepage found on the dam and determine a method of treatment. Monitor this seepage at biweekly intervals with the aid of weirs.

b. Repair the spillway walls.

c. Clean and recaulk the joints in the spillway.

d. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including operation and lubrication of all gates and valves. This information should be documented for future reference.

e. An emergency action plan must be established.

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

1. Monitor seepage in the spillway and outlet conduit. If significant increases are observed, investigate and repair.

2. Monitor the calcification of the outlet conduit construction joints and repair as required.

3. Repoint all joints of the masonry construction. Recaulk all construction joints where necessary.

4. Repair the deteriorated stoplog brackets.

5. Remove the debris in the spillway area, outlet conduit and downstream channel.

6. Remove the tree and brush growth on the embankment and in the downstream channel. Provide a program of periodic cutting and mowing.

7. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.

APPENDIX A

PHOTOGRAPHS

PHOTO # 2: DOWNSTREAM SLOPE AT EMBANKMENT

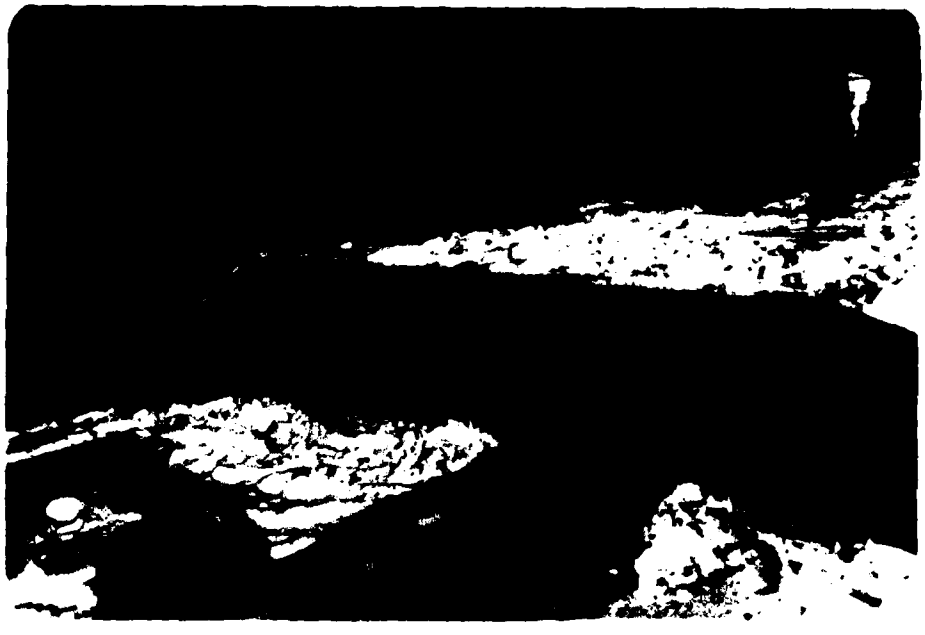


PHOTO #3: SPILLWAY LOCATED AT LEFT ABUTMENT

NOTE CRACK IN WALL

PHOTO #4: LEFT SPILLWAY WALL
NOTE CRACK ABOVE FISH SCREEN

PHOTO #5: BACKFILLED AREA ON DOWNSTREAM SLOPE
RESULTING IN WIDENED CREST

PHOTO #6: SPILLWAY CHANNEL
BELOW COBBLE PAVED CHANNEL

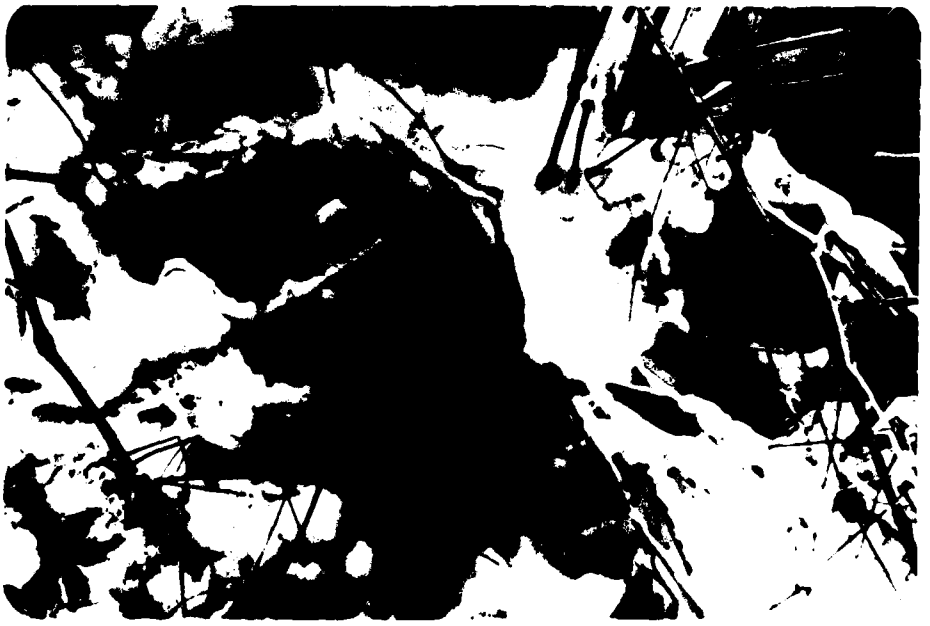


PHOTO #7: SEEPAGE AT END OF SPILLWAY CHANNEL

PHOTO # 8: GATE HOUSE LOCATED AT RIGHT ABUTMENT

PHTOT # 9: RESERVOIR FROM CREST OF DAM

PHOTO # 10: SETTLEMENT DURING RECONSTRUCTION OF DAM IN 1963

PHOTO # 11: SEEPAGE AT END OF SPILLWAY CHANNEL

1963

PHOTO # 12: SEEPAGE AT TOE IN SAME GENERAL AREA AS WAS FOUND DURING PHASE I INSPECTION PHOTO TAKEN IN 1963

APPENDIX B

VISUAL INSPECTION CHECKLIST

93-15-3(9/80)

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam GOSHEN RESERVOIR

Fed. I.D. # NY 488 DEC Dam No. 179 B - 3163

River Basin LOWER HUDSON

Location: Town GOSHEN County ORANGE

Stream Name RIO GRANDE CREEK

Tributary of WALLKILL RIVER

Latitude (N) 41°23.0' Longitude (W) 74°20.0'

Type of Dam EARTH FILL

Hazard Category 'C' high

Date(s) of Inspection NOVEMBER 20, 1980 / APRIL 30, 1981

Weather Conditions SNOWY 30's / clear 30's

Reservoir Level at Time of Inspection 4 feet below spillcrest

b. Inspection Personnel KEN HARMER, JAMIE VEITCH

c. Persons Contacted (Including Address & Phone No.)

MR. CONRAD KROLL, SUPERINTENDENT

276 MAIN STR.

GOSHEN NY 10929

(914) 294-6750

d. History:

Date Constructed 1875 Date(s) Reconstructed 1964

Designer Chumark & McGough, Middletown NY

Constructed By —

Owner Village of GOSHEN

93-15-3(9/80)

2) Embankment

a. Characteristics

(1) Embankment Material EARTH/CLAY FILL

(2) Cutoff Type NONE

(3) Impervious Core CLAYFILL

(4) Internal Drainage System None

(5) Miscellaneous backfilled on downstream slope.

b. Crest

(1) Vertical Alignment good

(2) Horizontal Alignment good

(3) Surface Cracks None

(4) Miscellaneous —

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1:3

(2) Undesirable Growth or Debris, Animal Burrows None

(3) Sloughing, Subsidence or Depressions None

(4) Slope Protection rip rap - well placed, good condition

(5) Surface Cracks or Movement at Toe None apparent

d. Downstream Slope

(1) Slope (Estimate - V:H) ORIGINAL 1:2, presently backfill to slightly steeper slope

(2) Undesirable Growth or Debris, Animal Burrows brush & tree growth

(3) Sloughing, Subsidence or Depressions —

(4) Surface Cracks or Movement at Toe —

(5) Seepage Several points of seepage at toe and from under spillway channel

(6) External Drainage System (Ditches, Trenches; Blanket) none

(7) Condition Around Outlet Structure None

(8) Seepage Beyond Toe None

e. Abutments - Embankment Contact

good

93-15-3(9/80)

(1) Erosion at Contact None

(2) Seepage Along Contact None

3) Drainage System

a. Description of System gravel/tile underdrain under the spillway channel

b. Condition of System

c. Discharge from Drainage System SMALL AMOUNT ≈ 0.5gal/MIN

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

93-15-3(9/80)

5) Reservoir

a. Slopes stable, shallow

b. Sedimentation SOME, NO PROBLEM

c. Unusual Conditions Which Affect Dam NONE

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) SEVERAL HOMES. just downstream (1/4 mi) on Reservoir Rd.

b. Seepage, Unusual Growth WET AREAS CAUSED BY SEEPAGE

c. Evidence of Movement Beyond Toe of Dam NONE

d. Condition of Downstream Channel heavily treed

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

a. General in need of maintenance

b. Condition of Service Spillway movement apparent, cracking joints deteriorated.

c. Condition of Auxiliary Spillway N/A

d. Condition of Discharge Conveyance Channel grouted channel in good condition

8) Reservoir Drain/Outlet N/A

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 gate house / INTAKE STRUCTURE — good

b. Structural Cracking spillway

c. Movement - Horizontal & Vertical Alignment (Settlement) spillway

d. Junctions with Abutments or Embankments —

e. Drains - Foundation, Joint, Face

f. Water Passages, Conduits, Sluices None

g. Seepage or Leakage at toe & from spillway underdrain

h. Joints - Construction, etc. spillway - deteriorated -

i. Foundation no apparent problem

j. Abutments good

k. Control Gates operational (to water supply only)

l. Approach & Outlet Channels good

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

n. Intake Structures good

o. Stability good

p. Miscellaneous

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

a. Description and Condition gate house intake good condition

11) Operation Procedures (Lake Level Regulation):

water supply fluctuations.

APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

GOSHEN RESERVOIR

Spillway Capacity

Top of Dam - 546.0 Streambed = 507.

Spillway Crest - 543.0

$L_{weir} = 25'$ 1.5' fish screen assume fail

$C = 2.64$ (KING & BRATER; 5.3)

EL.	H.	C	Q
543.3	0	2.64	0
543.5	.5		23.
544.0	1.0		66.
544.5	1.5		121.
545.0	2.0		187.
545.5	2.5		261.
546.0	3.0	2.64	343.

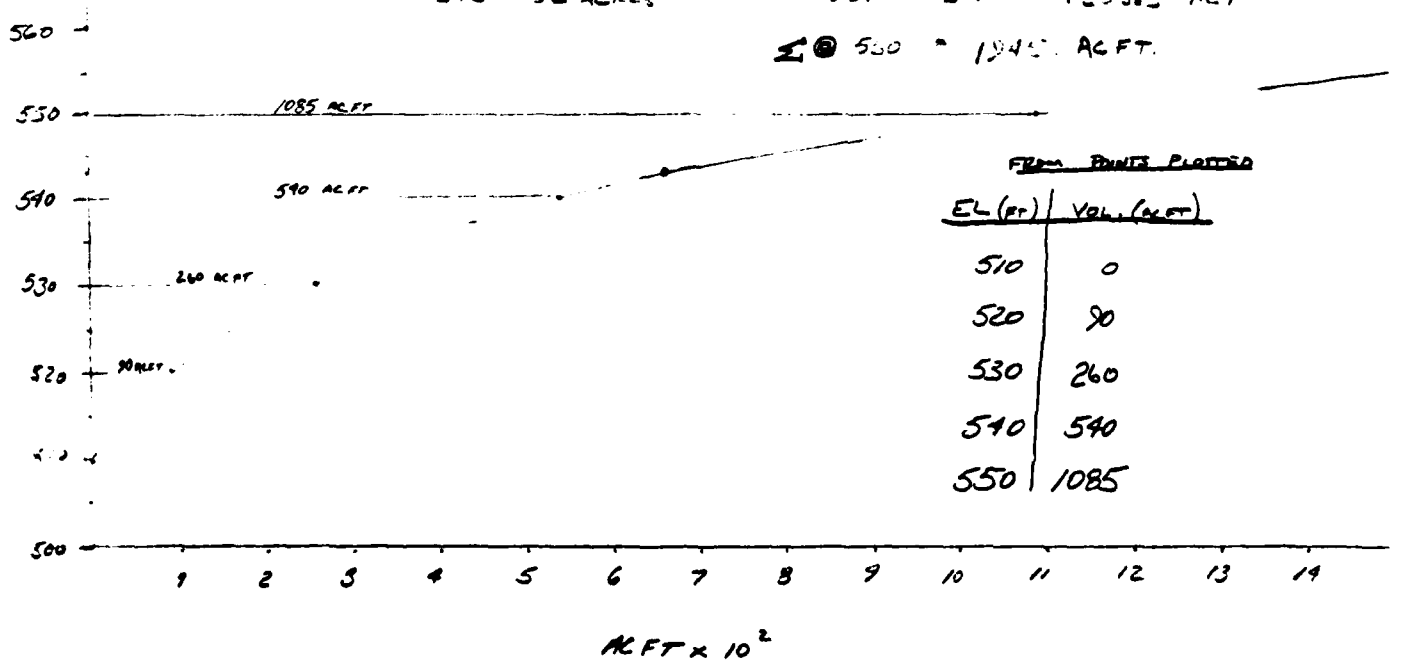
Reservoir Capacity

Volume 215×10^6 gal @ 543.0 = 661.4 AC FT. (USE FIGURE FROM DEVELOPED CURVE 704 AC FT.

AREA 543 = 52 ACRES

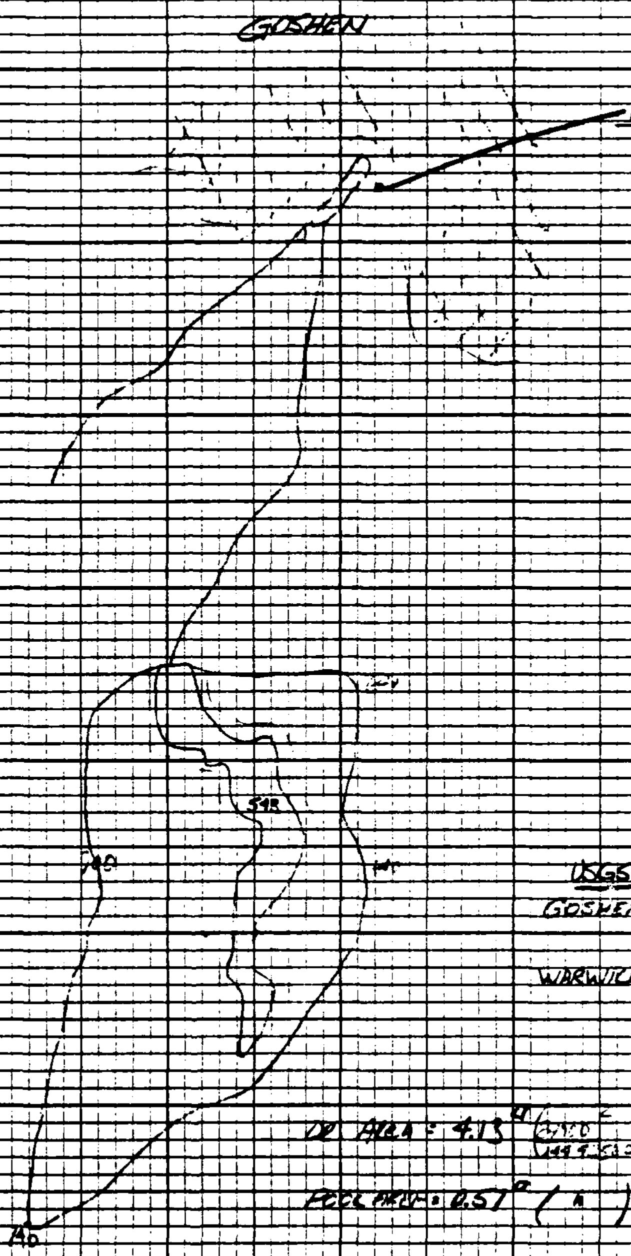
543 - 52 ACRES Vol = $\left(\frac{99+52}{2}\right)17$ = 1292.5 AC FT

Σ @ 550 = 1945 AC FT.



From Points Plotted

EL (FT)	VOL. (AC FT)
510	0
520	90
530	260
540	540
550	1085



41°22'30"

USGS QUAD SHTS. 1" = 2000'
GOSHEN NY

WARWICK NY

DR AREA = $4.13^{\square''}\left(\frac{2000^2}{43{,}560}\right) = 379.25$ ACRES
$= 0.59\ MI^2$

POOL AREA = $0.57^{\square''}(\quad'' \quad) = 52.34$ ACRES
$= .082\ MI^2$

$\frac{\text{POOL A.}}{\text{TOTAL A.}} = 13.8\ \%$

S = .06 ~ .08
L = 5200'
L_{ca} = 750'

$T_E = 1 - \frac{0.3005}{(.59)^{.17718}}$
$= 0.670$

20'

$t_p = 2.0(L \times L_{ca})^{.3} = .95$

$t_r = \frac{.95}{5.5} = 10$ MIN

GOSHEN cont.

PRECIPITATION

Σ (PMP) = 21.5"

Dur →	6	12	24	48
% →	111	123	133	142

$L = 3200'$ DA = 0.59 mi.^{2} POOL AREA = .08 mi.^{2}

$L_{ca} = 750'$

$t_p = 0.95$ hr. $T_p = .95 + .25(.17 - .17) = .95$ hr. USE $T_p = .90$ hr

$t_r = 10$ MIN $t_r = 10$ MIN

TRANSPOSITION FACTOR = $1 - \frac{0.3008}{(.59)^{0.17718}} = 0.67$

USE SINGLE BASIN ANALYSIS W/ shortened T_p MORE Conservative RUNOFF COMBINED RUNOFF AND DIRECT INFLOW

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	546.0		867.0
2) Design High Water (Max. Design Pool)	NA		
3) Auxiliary Spillway Crest	NA		
4) Pool Level with Flashboards	NA		
5) Service Spillway Crest	543.0		704.0

DISCHARGES

	Volume (cfs)
1) Average Daily	1.2
2) Spillway @ Maximum High Water	
3) Spillway @ Design High Water	NA
4) Spillway @ Auxiliary Spillway Crest Elevation	NA
5) Low Level Outlet	NA
6) Total (of all facilities) @ Maximum High Water	
7) Maximum Known Flood	
8) At Time of Inspection	

CREST: ELEVATION: 546.0

Type: Compacted earth

Width: 12' Length: 550'

Spillover

Location

SPILLWAY:

SERVICE		AUXILIARY
543.0	Elevation	
Concrete channel	Type	
25'	Width	
	Type of Control	
✓	Uncontrolled	
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

HYDROMETEROLOGICAL GAGES:

Type : None

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: None

_____

Method of Controlled Releases (mechanisms):

None except for two 20" intake lines into the filtration plant.

DRAINAGE AREA: 0.59 mi^2

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: _____

Terrain - Relief: _____

Surface - Soil: _____

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

No alterations planned or anticipated

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

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

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

Location: _____

Elevation: _____

Reservoir:

Length @ Maximum Pool _____ (Miles)

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

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
MAY 1991 VERSION:  JULY 1978
LAST MODIFICATION  28 FEB 79
RUN DATE  1 APR 79
**********

**********
NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU
**********

     1          A1       GOSHEN RESERVOIR
     2          A2       PHASE I
     3          A3       PMF
     4          P    200       0      10       0       0       0       0       0       0       0
     5          P1     5
                J       1       6       1
     7          J1    .2      .4      .5      .6      .8      1.
     8          K       0       1       0       6       2               1
     9          K1         INFLOW FROM BASIN
    10          K       1       1   0.59                            .670
    11          P              21.5     111     125     135     142
    12          I                                                       1     0.1
    13          M1    .93    .625
    14          X      -2      -.1       1
    15          K       1       1                       2       1
    16          K1         ROUTE THROUGH RESERVOIR
    17          Y                                       1       1
    18          Y1      1                                                -.93    -1
    19          Y4    .93    .935      .94     .944     .95    .955      .93
    20          Y5       0      25      60     121     197     271     343
     1          S5       0      93     266     547    1095
                S1     510     520     530     540     550
                S5     343
                C1     .1      .2      .1     .05
                A
                A
                A
                A
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PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	1
END OF NETWORK	

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

RUN DATE 05/01/79

                                                    **********
                                                    N.Y. STATE
                                                    DEPT OF ENVIRONMENTAL CONSERVATION
                                                    FLOOD PROTECTION BUREAU
                                                    **********

                    GOSHEN RESERVOIR
                    PHASE I
                    PMF

                                JOB SPECIFICATION
      NO     NHR    NMIN    IDAY     IST     IMIN    METRC    IPLT    IPRT   NSTAN
     200       0      10       0       0       0        0       3       0       0
                          JOPER     NWT   LROPT   TRACE
                              5       0       0       0

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

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

                    SUB-AREA RUNOFF COMPUTATION

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

                                HYDROGRAPH DATA
      IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
          1       1    0.59      0.    0.59    0.67    0.6       0       0       0

                                PRECIP DATA
                SPFE     PMS      R6      R12     R24     R48     R72     R96
                  0.   21.50  111.00  125.00  131.00  142.00      0.      0.

                                LOSS DATA
      LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOS   STRTL   CNSTL   ALSMX   RTIMP
          0      0.      0.    1.00      0.      0.    1.00    1.00    0.10      0.      0.

                            UNIT HYDROGRAPH DATA
                        TP=  0.20    CP=0.63    NTA=  0

                            RECESSION DATA
                        STRTQ=   -2.00    QRCSN=   -0.0    RTIOR= 1.00
PRECIP DATA CARDS ARE FROM GIVEN SNYDER CP AND TP ARE TC= 6.31 AND R= 4.30 INTERVALS

UNIT HYDROGRAPH 35 END-OF-PERIOD ORDINATES, LAG=  4.50 HOURS, CP= 0.63  VOL= 1.00
      1.      6.     14.     20.     21.     20.     17.     15.     13.     11.
    10.      8.      7.      5.      4.      3.      3.      2.      2.      1.
     1.      1.      0.      0.      0.      0.      0.      0.      0.      0.
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1.01	0.20	2	0.00	0.	0.00	1.	1.02	0.20	136	0.02	0.	0.02	1.
1.01	0.30	3	0.00	0.	0.00	1.	1.02	0.30	137	0.02	0.	0.02	1.
1.01	0.40	4	0.00	0.	0.00	1.	1.02	0.40	138	0.02	0.	0.02	1.
1.01	0.50	5	0.00	0.	0.00	1.	1.02	0.50	139	0.02	0.	0.02	1.
1.01	1.00	6	0.00	0.	0.00	1.	1.02	1.00	140	0.02	0.	0.02	1.
1.01	1.10	7	0.00	0.	0.00	1.	1.02	1.10	141	0.02	0.	0.02	1.
1.01	1.20	8	0.00	0.	0.00	1.	1.02	1.20	142	0.02	0.	0.02	1.
1.01	1.30	9	0.00	0.	0.00	1.	1.02	1.30	143	0.02	0.	0.02	1.
1.01	1.40	10	0.00	0.	0.00	1.	1.02	1.40	144	0.02	0.	0.02	1.
1.01	1.50	11	0.00	0.	0.00	1.	1.02	1.50	145	0.02	0.	0.02	1.
1.01	2.00	12	0.00	0.	0.00	1.	1.02	2.00	146	0.02	0.	0.02	1.
1.01	2.10	13	0.00	0.	0.00	1.	1.02	2.10	147	0.02	0.	0.02	1.
1.01	2.20	14	0.00	0.	0.00	1.	1.02	2.20	148	0.02	0.	0.02	1.
1.01	2.30	15	0.00	0.	0.00	1.	1.02	2.30	149	0.02	0.	0.02	1.
1.01	2.40	16	0.00	0.	0.00	1.	1.02	2.40	150	0.02	0.	0.02	1.
1.01	2.50	17	0.00	0.	0.00	1.	1.02	2.50	151	0.02	0.	0.02	1.
1.01	3.00	18	0.00	0.	0.00	1.	1.02	3.00	152	0.02	0.	0.02	1.
1.01	3.10	19	0.00	0.	0.00	1.	1.02	3.10	153	0.02	0.	0.02	1.
1.01	3.20	20	0.00	0.	0.00	1.	1.02	3.20	154	0.02	0.	0.02	1.
1.01	3.30	21	0.00	0.	0.00	1.	1.02	3.30	155	0.02	0.	0.02	1.
1.01	3.40	22	0.00	0.	0.00	1.	1.02	3.40	156	0.02	0.	0.02	1.
1.01	3.50	23	0.00	0.	0.00	1.	1.02	3.50	157	0.02	0.	0.02	1.
1.01	4.00	24	0.00	0.	0.00	1.	1.02	4.00	158	0.02	0.	0.02	1.
1.01	4.10	25	0.00	0.	0.00	1.	1.02	4.10	159	0.02	0.	0.02	1.
1.01	4.20	26	0.00	0.	0.00	1.	1.02	4.20	160	0.02	0.	0.02	1.
1.01	4.30	27	0.00	0.	0.00	1.	1.02	4.30	161	0.02	0.	0.02	1.
1.01	4.40	28	0.00	0.	0.00	1.	1.02	4.40	162	0.02	0.	0.02	1.
1.01	4.50	29	0.00	0.	0.00	1.	1.02	4.50	163	0.02	0.	0.02	1.
1.01	5.00	30	0.00	0.	0.00	1.	1.02	5.00	164	0.02	0.	0.02	1.
1.01	5.10	31	0.00	0.	0.00	1.	1.02	5.10	165	0.02	0.	0.02	1.
1.01	5.20	32	0.00	0.	0.00	1.	1.02	5.20	166	0.02	0.	0.02	1.
1.01	5.30	33	0.00	0.	0.00	1.	1.02	5.30	167	0.02	0.	0.02	1.
1.01	5.40	34	0.00	0.	0.00	1.	1.02	5.40	168	0.02	0.	0.02	1.
1.01	5.50	35	0.00	0.	0.00	1.	1.02	5.50	169	0.02	0.	0.02	1.
1.01	6.00	36	0.00	0.	0.00	1.	1.02	6.00	180	0.02	0.	0.02	1.
1.01	6.10	37	0.00	0.	0.00	1.	1.02	6.10	181	0.05	0.03	0.02	2.
1.01	6.20	38	0.00	0.	0.00	1.	1.02	6.20	182	0.05	0.03	0.02	4.
1.01	6.30	39	0.00	0.	0.00	1.	1.02	6.30	183	0.05	0.03	0.02	8.
1.01	6.40	40	0.00	0.	0.00	1.	1.02	6.40	184	0.05	0.03	0.02	15.
1.01	6.50	41	0.00	0.	0.00	1.	1.02	6.50	185	0.05	0.03	0.02	22.
1.01	7.00	42	0.00	0.	0.00	1.	1.02	7.00	186	0.05	0.03	0.02	31.
1.01	7.10	43	0.00	0.	0.00	1.	1.02	7.10	187	0.05	0.03	0.02	38.
1.01	7.20	44	0.00	0.	0.00	1.	1.02	7.20	188	0.05	0.03	0.02	45.
1.01	7.30	45	0.00	0.	0.00	1.	1.02	7.30	189	0.05	0.03	0.02	50.
1.01	7.40	46	0.00	0.	0.00	1.	1.02	7.40	190	0.05	0.03	0.02	54.
1.01	7.50	47	0.00	0.	0.00	1.	1.02	7.50	191	0.05	0.03	0.02	58.
1.01	8.00	48	0.00	0.	0.00	1.	1.02	8.00	192	0.05	0.03	0.02	60.
1.01	8.10	49	0.00	0.	0.00	1.	1.02	8.10	193	0.05	0.03	0.02	63.
1.01	8.20	50	0.00	0.	0.00	1.	1.02	8.20	194	0.05	0.03	0.02	65.
1.01	8.30	51	0.00	0.	0.00	1.	1.02	8.30	195	0.05	0.03	0.02	66.
1.01	8.40	52	0.00	0.	0.00	1.	1.02	8.40	196	0.05	0.03	0.02	67.
1.01	8.50	53	0.00	0.	0.00	1.	1.02	8.50	197	0.05	0.03	0.02	68.
1.01	9.00	54	0.00	0.	0.00	1.	1.02	9.00	198	0.05	0.03	0.02	69.
1.01	9.10	55	0.00	0.	0.00	1.	1.02	9.10	199	0.05	0.03	0.02	70.
1.01	9.20	56	0.00	0.	0.00	1.	1.02	9.20	200	0.05	0.03	0.02	70.
1.01	9.30	57	0.00	0.	0.00	1.	1.	0.	201	0.05	0.03	0.02	71.
1.01	9.40	58	0.00	0.	0.00	1.	1.	0.	202	0.05	0.03	0.02	71.
1.01	9.50	59	0.00	0.	0.00	1.	1.	0.	203	0.05	0.03	0.02	71.
1.01	10.00	60	0.00	0.	0.00	1.	1.	0.	204	0.05	0.03	0.02	72.
1.01	10.10	61	0.00	0.	0.00	1.	1.	0.	205	0.05	0.03	0.02	72.
1.01	10.20	62	0.00	0.	0.00	1.	1.	0.	206	0.05	0.03	0.02	72.
1.01	10.30	63	0.00	0.	0.00	1.	1.	0.	207	0.05	0.03	0.02	72.
1.01	10.40	64	0.00	0.	0.00	1.	1.	0.	208	0.05	0.03	0.02	72.

1.01	11.00	66	0.00	0.	0.00	1.	0.	0.	210	0.05	0.03	0.02	72.
1.01	11.10	67	0.00	0.	0.00	1.	0.	0.	211	0.05	0.03	0.02	72.
1.01	11.20	68	0.00	0.	0.00	1.	0.	0.	212	0.05	0.03	0.02	72.
1.01	11.30	69	0.00	0.	0.00	1.	0.	0.	213	0.05	0.03	0.02	72.
1.01	11.40	70	0.00	0.	0.00	1.	0.	0.	214	0.05	0.03	0.02	72.
1.01	11.50	71	0.00	0.	0.00	1.	0.	0.	215	0.05	0.03	0.02	72.
1.01	12.00	72	0.00	0.	0.00	1.	0.	0.	216	0.05	0.03	0.02	72.
1.01	12.10	73	0.02	0.	0.02	1.	0.	0.	217	0.27	0.25	0.02	77.
1.01	12.20	74	0.02	0.	0.02	1.	0.	0.	218	0.27	0.25	0.02	92.
1.01	12.30	75	0.02	0.	0.02	1.	0.	0.	219	0.27	0.25	0.02	121.
1.01	12.40	76	0.02	0.	0.02	1.	0.	0.	220	0.27	0.25	0.02	165.
1.01	12.50	77	0.02	0.	0.02	1.	0.	0.	221	0.27	0.25	0.02	220.
1.01	13.00	78	0.02	0.	0.02	1.	0.	0.	222	0.27	0.25	0.02	278.
1.01	13.10	79	0.02	0.	0.02	1.	0.	0.	223	0.32	0.30	0.02	335.
1.01	13.20	80	0.02	0.	0.02	1.	0.	0.	224	0.32	0.30	0.02	381.
1.01	13.30	81	0.02	0.	0.02	1.	0.	0.	225	0.32	0.30	0.02	424.
1.01	13.40	82	0.02	0.	0.02	1.	0.	0.	226	0.32	0.30	0.02	464.
1.01	13.50	83	0.02	0.	0.02	1.	0.	0.	227	0.32	0.30	0.02	502.
1.01	14.00	84	0.02	0.	0.02	1.	0.	0.	228	0.32	0.30	0.02	536.
1.01	14.10	85	0.03	0.	0.03	1.	0.	0.	229	0.40	0.38	0.02	566.
1.01	14.20	86	0.03	0.	0.03	1.	0.	0.	230	0.40	0.38	0.02	595.
1.01	14.30	87	0.03	0.	0.03	1.	0.	0.	231	0.40	0.38	0.02	626.
1.01	14.40	88	0.03	0.	0.03	1.	0.	0.	232	0.40	0.38	0.02	658.
1.01	14.50	89	0.03	0.	0.03	1.	0.	0.	233	0.40	0.38	0.02	690.
1.01	15.00	90	0.03	0.	0.03	1.	0.	0.	234	0.40	0.38	0.02	722.
1.01	15.10	91	0.02	0.	0.02	1.	0.	0.	235	0.36	0.35	0.02	750.
1.01	15.20	92	0.04	0.	0.04	1.	0.	0.	236	0.61	0.59	0.02	775.
1.01	15.30	93	0.07	0.	0.07	1.	0.	0.	237	1.09	1.08	0.02	815.
1.01	15.40	94	0.10	0.	0.10	1.	0.	0.	238	2.75	2.72	0.02	921.
1.01	15.50	95	0.05	0.	0.05	1.	0.	0.	239	0.79	0.77	0.02	1110.
1.01	16.00	96	0.03	0.	0.03	1.	0.	0.	240	0.49	0.47	0.02	1356.
1.01	16.10	97	0.03	0.	0.03	1.	0.	0.	241	0.37	0.36	0.02	1584.
1.01	16.20	98	0.03	0.01	0.02	1.	0.	0.	242	0.37	0.35	0.02	1748.
1.01	16.30	99	0.03	0.01	0.02	2.	0.	0.	243	0.37	0.36	0.02	1789.
1.01	16.40	100	0.03	0.01	0.02	3.	0.	0.	244	0.37	0.36	0.02	1713.
1.01	16.50	101	0.03	0.01	0.02	4.	0.	0.	245	0.37	0.36	0.02	1573.
1.01	17.00	102	0.03	0.01	0.02	5.	0.	0.	246	0.37	0.36	0.02	1457.
1.01	17.10	103	0.02	0.00	0.02	8.	0.	0.	247	0.29	0.28	0.02	1320.
1.01	17.20	104	0.02	0.00	0.02	10.	0.	0.	248	0.29	0.28	0.02	1221.
1.01	17.30	105	0.02	0.00	0.02	11.	0.	0.	249	0.29	0.28	0.02	1133.
1.01	17.40	106	0.02	0.00	0.02	12.	0.	0.	250	0.29	0.28	0.02	1054.
1.01	17.50	107	0.02	0.00	0.02	13.	0.	0.	251	0.29	0.28	0.02	983.
1.01	18.00	108	0.02	0.00	0.02	11.	0.	0.	252	0.29	0.28	0.02	920.
1.01	18.10	109	0.00	0.	0.00	11.	0.	0.	253	0.02	0.01	0.02	861.
1.01	18.20	110	0.00	0.	0.00	10.	0.	0.	254	0.02	0.01	0.02	799.
1.01	18.30	111	0.00	0.	0.00	9.	0.	0.	255	0.02	0.01	0.02	727.
1.01	18.40	112	0.00	0.	0.00	8.	0.	0.	256	0.02	0.01	0.02	643.
1.01	18.50	113	0.00	0.	0.00	7.	0.	0.	257	0.02	0.01	0.02	552.
1.01	19.00	114	0.00	0.	0.00	5.	0.	0.	258	0.02	0.01	0.02	461.
1.01	19.10	115	0.00	0.	0.00	4.	0.	0.	259	0.02	0.01	0.02	379.
1.01	19.20	116	0.00	0.	0.00	3.	0.	0.	260	0.02	0.01	0.02	312.
1.01	19.30	117	0.00	0.	0.00	2.	0.	0.	261	0.02	0.01	0.02	256.
1.01	19.40	118	0.00	0.	0.00	1.	0.	0.	262	0.02	0.01	0.02	212.
1.01	19.50	119	0.00	0.	0.00	1.	0.	0.	263	0.02	0.01	0.02	179.
1.01	20.00	120	0.00	0.	0.00	1.	0.	0.	264	0.02	0.01	0.02	179.
1.01	20.10	121	0.00	0.	0.00	1.	0.	0.	265	0.02	0.01	0.02	179.
1.01	20.20	122	0.00	0.	0.00	1.	0.	0.	266	0.02	0.01	0.02	179.
1.01	20.30	123	0.00	0.	0.00	1.	0.	0.	267	0.02	0.01	0.02	179.
1.01	20.40	124	0.00	0.	0.00	1.	0.	0.	268	0.02	0.01	0.02	179.
1.01	20.50	125	0.00	0.	0.00	1.	0.	0.	269	0.02	0.01	0.02	179.
1.01	21.00	126	0.00	0.	0.00	1.	0.	0.	270	0.02	0.01	0.02	179.
1.01	21.10	127	0.00	0.	0.00	1.	0.	0.	271	0.02	0.01	0.02	179.

1.01	21.40	130	0.00	0.	0.00	1.	1.	0.	274	0.02	0.01	0.02	179.
1.01	21.50	131	0.00	0.	0.00	1.	1.	0.	275	0.02	0.01	0.02	179.
1.01	22.00	132	0.00	0.	0.00	1.	1.	0.	276	0.02	0.01	0.02	179.
1.01	22.10	133	0.00	0.	0.00	1.	1.	0.	277	0.02	0.01	0.02	179.
1.01	22.20	134	0.00	0.	0.00	1.	1.	0.	278	0.02	0.01	0.02	179.
1.01	22.30	135	0.00	0.	0.00	1.	1.	0.	279	0.02	0.01	0.02	179.
1.01	22.40	136	0.00	0.	0.00	1.	1.	0.	280	0.02	0.01	0.02	179.
1.01	22.50	137	0.00	0.	0.00	1.	1.	0.	281	0.02	0.01	0.02	179.
1.01	23.01	138	0.00	0.	0.00	1.	1.	0.	282	0.02	0.01	0.02	179.
1.01	23.10	139	0.00	0.	0.00	1.	1.	0.	283	0.02	0.01	0.02	179.
1.01	23.20	140	0.00	0.	0.00	1.	1.	0.	284	0.02	0.01	0.02	179.
1.01	23.30	141	0.00	0.	0.00	1.	0.	0.	285	0.02	0.01	0.02	179.
1.01	23.40	142	0.00	0.	0.00	1.	1.	0.	286	0.02	0.01	0.02	179.
1.01	23.50	143	0.00	0.	0.00	1.	0.	0.	287	0.02	0.01	0.02	179.
1.01	0.	144	0.00	0.	0.00	1.	0.	0.	288	0.02	0.01	0.02	179.
									SUM	20.46	16.84	3.61	41911.
										(520.)(428.)(92.)(1186.79)			

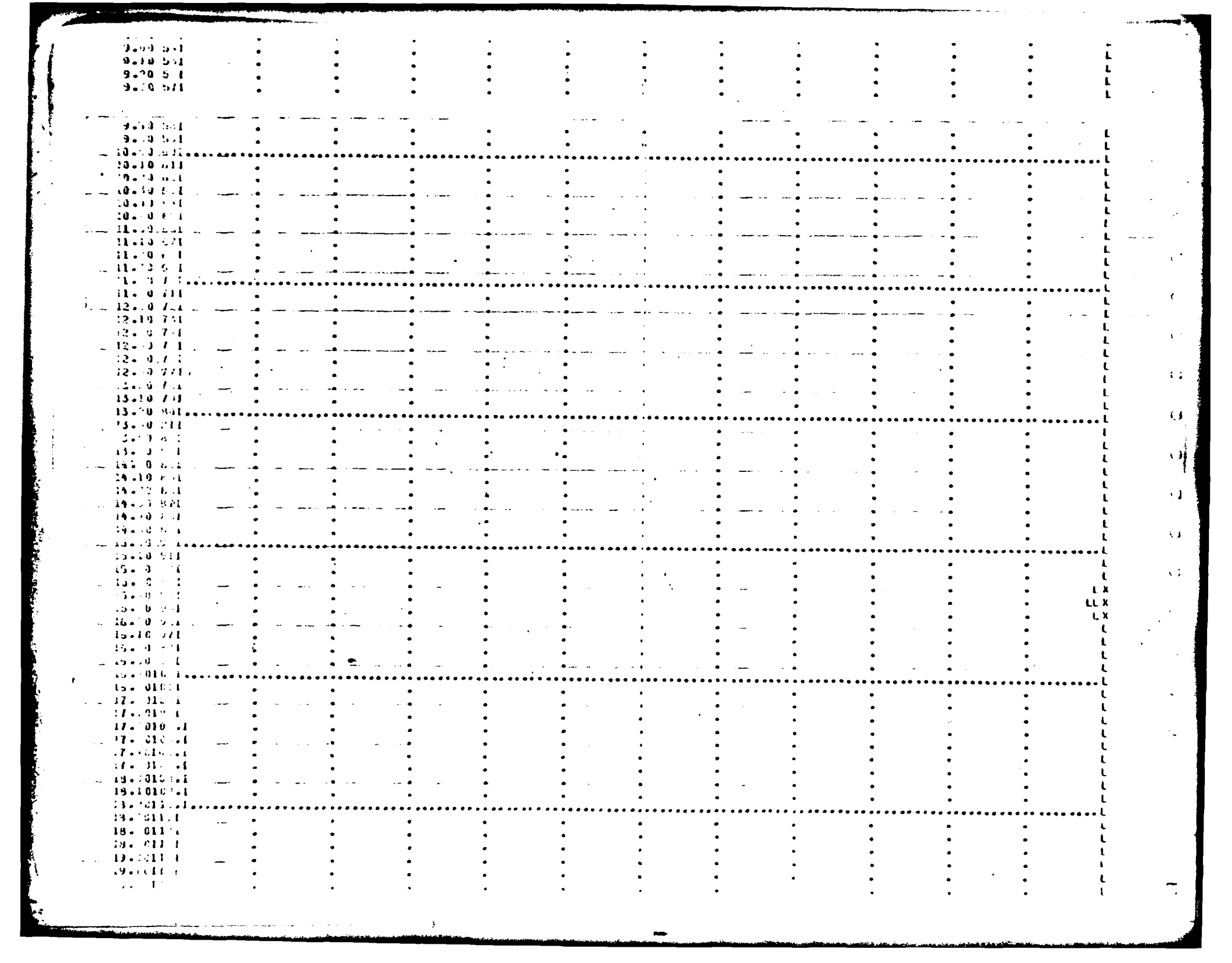
	PEAK	5-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1789.	919.	289.	141.	41953.
CMS	51.	26.	8.	4.	1185.
INCHES		14.36	18.09	18.33	18.33
MM		364.62	462.21	465.59	465.59
AC-FT		451.	573.	576.	576.
THOUS CU M		557.	706.	711.	711.

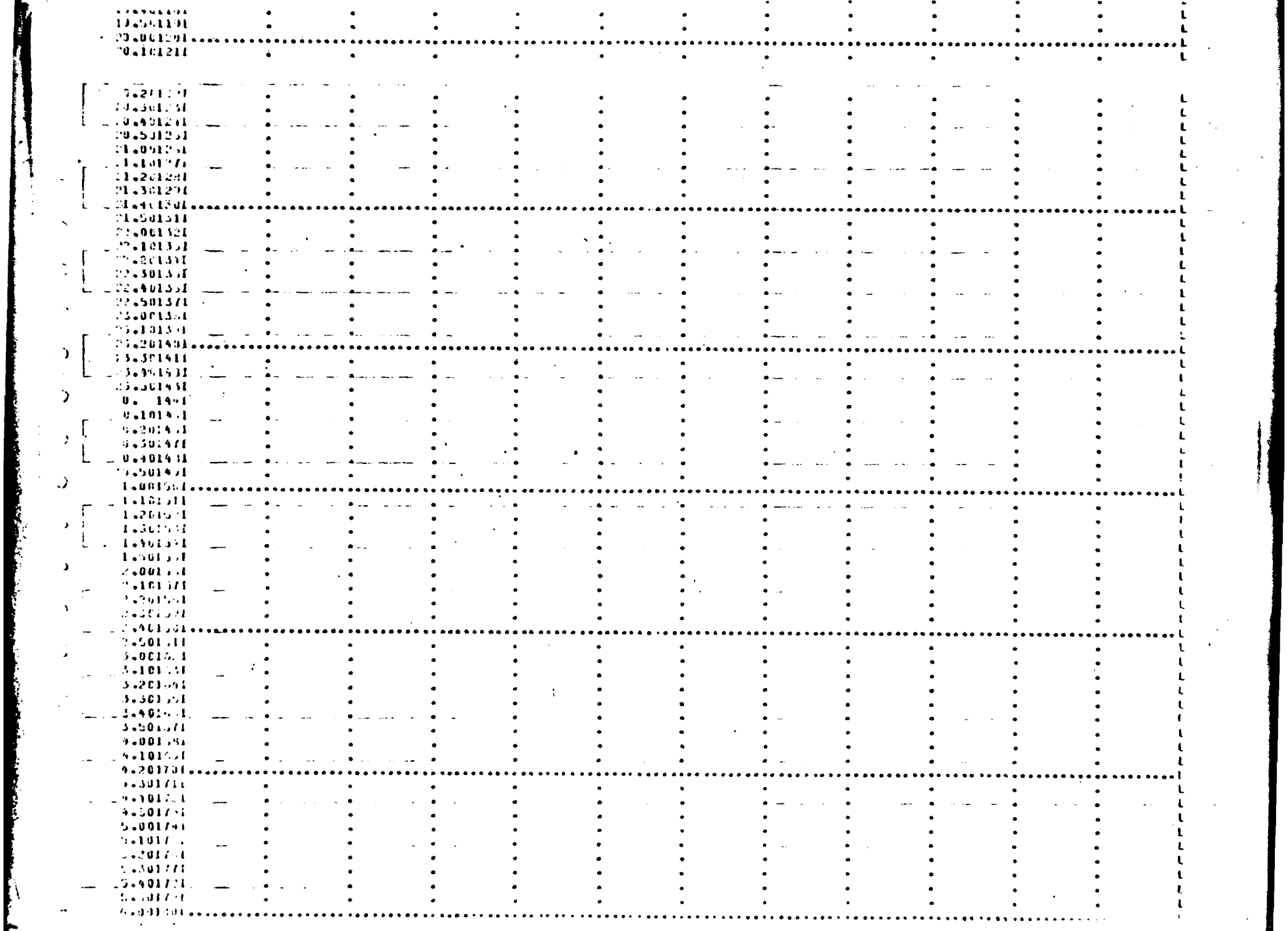
STATE= 1

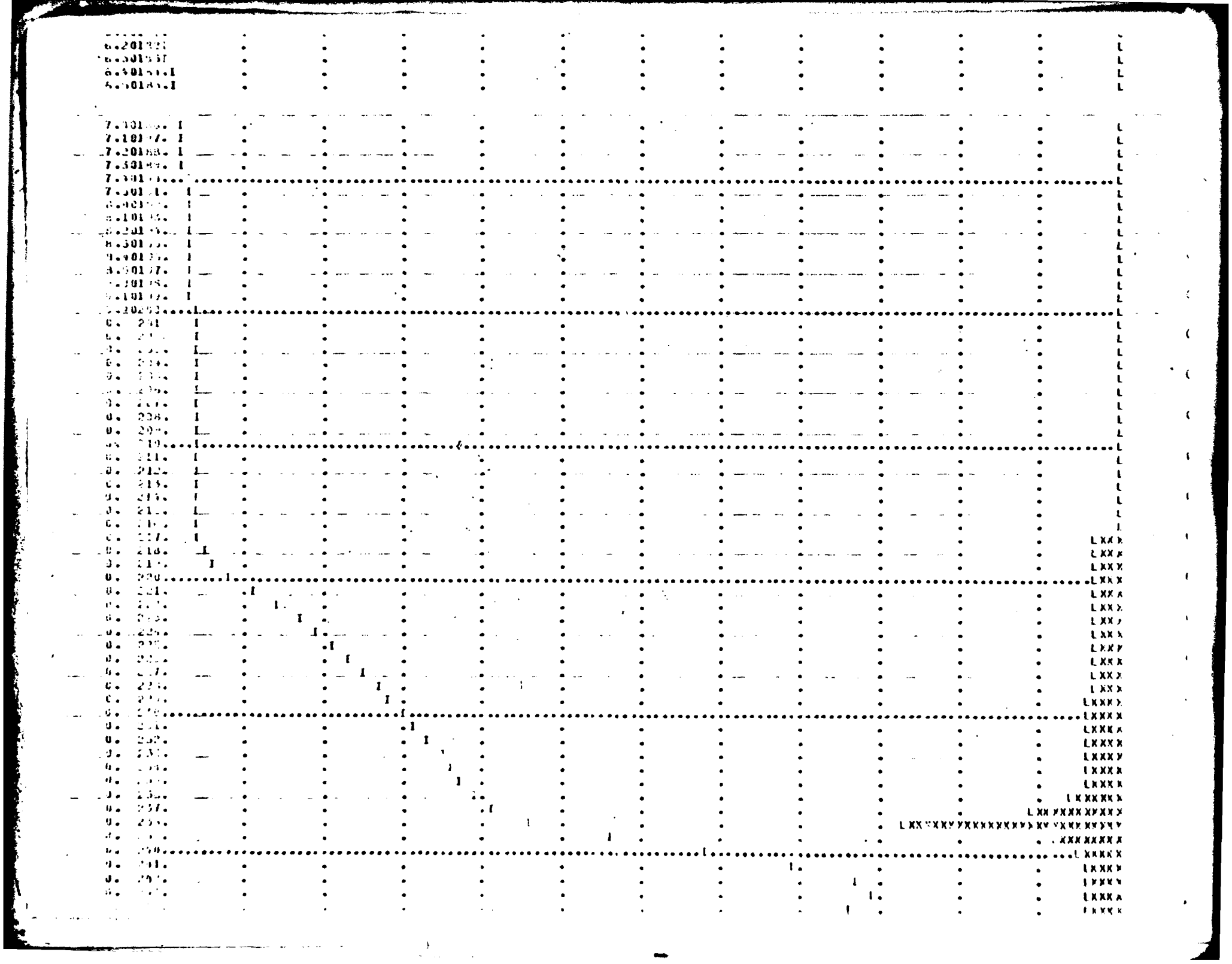
INFLOW(I), OUTFLOW(O) AND RESERVOIR STORAGE(S)

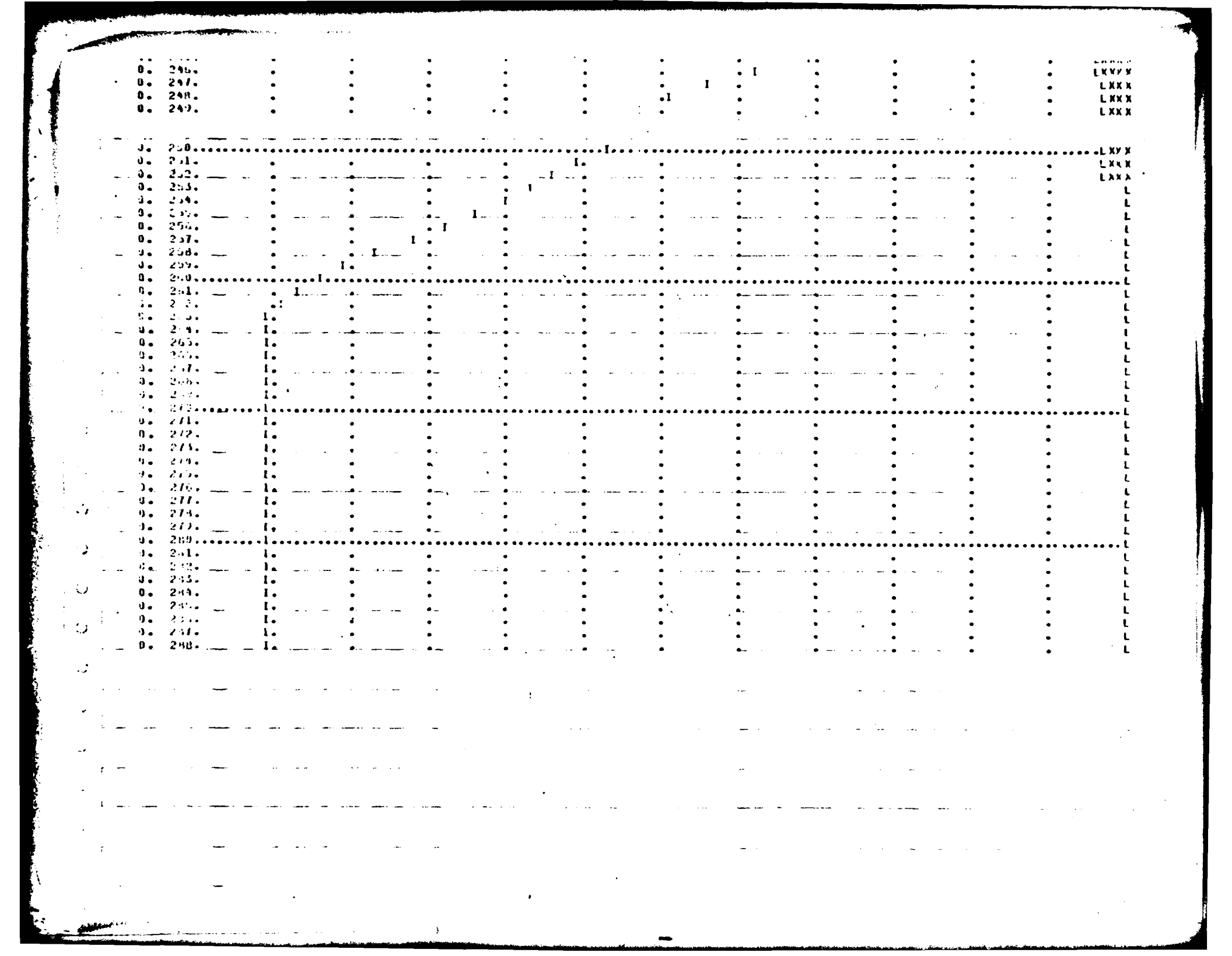
	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	3.	2.	1.	0.

PRECIP(L) AND EXCESS(X)









•OV•

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	2.	3.	4.	6.	8.	9.	10.	11.
12.	13.	13.	13.	13.	13.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	15.	18.	24.	33.
50.	56.	67.	76.	86.	93.	100.	107.	113.	119.
130.	132.	138.	144.	150.	155.	163.	183.	225.	272.
318.	341.	358.	363.	315.	287.	264.	239.	227.	211.
197.	184.	172.	160.	145.	129.	110.	92.	76.	62.
51.	42.	36.	36.	36.	36.	36.	36.	36.	36.
36.	36.	36.	36.	36.	36.	36.	36.	36.	36.
36.	36.	36.	36.	36.	36.	36.	36.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	358.	182.	58.	29.	8571.
CMS	10.	5.	2.	1.	237.
INCHES		2.87	3.64	3.67	3.67
MM		72.92	92.44	93.12	93.13
AC-FT		90.	114.	115.	115.
THOUS CU M		111.	141.	142.	142.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
2.	3.	3.	4.	5.	5.	5.	5.	4.	4.
4.	3.	3.	3.	2.	2.	2.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	2.	3.	5.	9.	2.	15.	19.	20.	22.
23.	24.	25.	26.	26.	27.	27.	28.	28.	28.
28.	28.	29.	29.	29.	29.	29.	29.	29.	29.
29.	29.	29.	29.	29.	29.	31.	37.	48.	66.
88.	111.	133.	152.	170.	186.	201.	219.	226.	238.
250.	263.	276.	289.	300.	310.	326.	368.	446.	543.
636.	698.	716.	685.	629.	575.	528.	488.	453.	422.
345.	368.	345.	320.	291.	267.	221.	184.	152.	125.
103.	95.	82.	72.	72.	72.	72.	72.	72.	72.
72.	72.	72.	72.	72.	72.	72.	72.	72.	72.
72.	72.	72.	72.	72.	72.	72.	72.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	716.	364.	119.	58.	16741.
CMS	20.	10.	3.	2.	474.
INCHES		5.74	7.54	7.33	7.33
MM		145.85	184.89	186.24	186.24
AC-FT		181.	227.	231.	231.
THOUS CU M		223.	280.	284.	284.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	3.	4.	5.	6.	6.	6.	6.	5.	5.
5.	4.	4.	3.	3.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	4.	7.	11.	15.	19.	22.	24.	27.
29.	31.	31.	32.	33.	34.	34.	35.	35.	35.
35.	36.	36.	36.	36.	36.	36.	36.	36.	36.
36.	36.	36.	36.	36.	36.	38.	46.	61.	83.
110.	133.	166.	190.	212.	232.	251.	268.	283.	298.
313.	329.	345.	361.	375.	388.	408.	450.	559.	679.
765.	873.	895.	857.	787.	715.	560.	619.	565.	527.
491.	460.	431.	399.	365.	332.	276.	231.	190.	156.
128.	105.	89.	89.	89.	89.	89.	89.	89.	89.
89.	89.	89.	89.	89.	89.	89.	89.	89.	89.
89.	89.	89.	89.	89.	89.	89.	89.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	895.	452.	149.	73.	20927.
CMS	25.	13.	4.	2.	593.
INCHES		7.18	9.43	9.17	9.17
MM		182.41	239.61	232.79	232.79
AC-FT		226.	284.	288.	288.
THOUS CU M		278.	350.	355.	355.

..	..	..	..	..	..	..	..	..	..
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	2.
3.	4.	5.	6.	7.	7.	7.	7.	6.	6.
6.	5.	4.	4.	3.	3.	2.	2.	2.	2.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	5.	9.	13.	18.	23.	27.	30.	33.
39.	36.	38.	39.	40.	40.	41.	41.	42.	42.
42.	43.	43.	43.	43.	43.	43.	43.	43.	43.
43.	43.	43.	43.	43.	43.	46.	59.	75.	99.
152.	167.	206.	229.	255.	279.	301.	321.	340.	357.
377.	395.	414.	433.	450.	465.	489.	552.	669.	815.
934.	1044.	1074.	1028.	944.	862.	792.	732.	680.	632.
598.	562.	517.	473.	436.	386.	351.	277.	227.	187.
154.	127.	107.	107.	107.	107.	107.	107.	107.	107.
107.	107.	107.	107.	107.	107.	107.	107.	107.	107.
107.	107.	107.	107.	107.	107.	107.	107.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1074.	546.	173.	87.	25112.
CMS	30.	15.	5.	2.	711.
INCHES		8.41	10.92	11.00	11.00
MM		218.77	277.32	279.35	279.35
AC-FT		271.	345.	346.	346.
THOUS CU M		334.	426.	427.	427.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 5

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	2.
3.	5.	7.	8.	9.	9.	9.	9.	9.	8.
7.	7.	6.	5.	4.	4.	3.	3.	2.	2.
2.	2.	2.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	3.	7.	12.	18.	25.	31.	35.	40.	43.
46.	48.	50.	51.	53.	54.	55.	55.	56.	56.
57.	57.	57.	57.	58.	58.	58.	58.	58.	58.
58.	58.	58.	58.	58.	58.	61.	73.	97.	132.
176.	224.	266.	301.	329.	352.	401.	439.	455.	476.

780.	735.	685.	630.	581.	515.	449.	369.	305.	249.
205.	169.	143.	143.	143.	143.	143.	143.	143.	143.
143.	143.	143.	143.	143.	143.	143.	143.	143.	143.
143.	143.	143.	143.	143.	143.	143.	143.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1431.	729.	231.	116.	33483.
CMS	41.	21.	7.	3.	948.
INCHES		11.48	14.06	14.66	14.66
MM		291.70	369.77	372.47	372.47
AC-FT		361.	458.	461.	461.
THOUS CU M		445.	565.	569.	569.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 6

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	2.	3.
4.	6.	8.	10.	11.	11.	12.	11.	11.	10.
9.	8.	7.	6.	5.	5.	4.	3.	3.	3.
2.	2.	2.	2.	2.	2.	2.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	4.	8.	15.	22.	31.	38.	45.	50.	54.
58.	60.	63.	65.	66.	67.	68.	69.	70.	70.
71.	71.	71.	72.	72.	72.	72.	72.	72.	72.
72.	72.	72.	72.	72.	72.	77.	92.	121.	165.
220.	278.	333.	381.	424.	464.	502.	536.	566.	595.
626.	658.	690.	722.	750.	775.	815.	921.	1116.	1358.
1569.	1745.	1785.	1713.	1575.	1457.	1320.	1221.	1153.	1054.
945.	920.	861.	791.	727.	673.	632.	461.	379.	312.
256.	212.	179.	179.	179.	179.	179.	179.	179.	179.
179.	179.	179.	179.	179.	179.	179.	179.	179.	179.
179.	179.	179.	179.	179.	179.	179.	179.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1789.	910.	289.	145.	41853.
CMS	51.	26.	8.	4.	1185.
INCHES		14.36	18.28	18.33	18.33
MM		364.62	462.91	465.59	465.59
AC-FT		451.	572.	576.	576.
THOUS CU M		557.	705.	711.	711.

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

HYDROGRAPH ROUTING

ROUTE THROUGH RESERVOIR

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

0.	0.	0.	1	1	0	0		0

	NSTPS	PSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
	1	0	0	0.	0.	0.	-545.	-1

STAGE	543.00	543.50	544.00	544.50	545.00	545.50	546.00
FLOW	0.	23.00	66.00	121.00	187.00	261.00	343.00
CAPACITY=	0.	90.	261.	440.	1045.		
ELEVATION=	540.	520.	536.	540.	560.		

	CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
	543.0	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COOD	EXPD	DAMWID
547.0	2.6	1.5	450.

STATION 1, PLAN 1, RATIO 1.

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	2.	2.	2.	2.	2.
2.	2.	3.	3.	3.	3.	3.	3.	3.	4.
4.	4.	4.	4.	4.	4.	4.	5.	5.	5.
5.	6.	7.	7.	8.	9.	10.	11.	12.	14.
15.	16.	17.	19.	20.	22.	23.	27.	31.	35.
41.	47.	54.	60.	66.	73.	78.	83.	87.	91.
99.	97.	95.	101.	102.	101.	103.	103.	103.	102.
101.	99.	98.	96.	94.	93.	91.	90.	89.	87.
85.	84.	83.	81.	80.	79.	78.	76.	75.	74.
73.	72.	71.	70.	69.	68.	67.	67.		

STORAGE

704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.

704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	705.
705.	705.	705.	705.	705.	705.	706.	706.	706.	706.
706.	706.	707.	707.	707.	707.	707.	707.	708.	708.
708.	708.	708.	708.	708.	708.	709.	709.	709.	709.
710.	710.	711.	712.	713.	714.	715.	717.	718.	719.
721.	724.	724.	726.	728.	731.	731.	733.	736.	739.
742.	746.	750.	754.	758.	761.	764.	766.	768.	770.
772.	773.	774.	775.	776.	776.	777.	777.	776.	776.
775.	774.	774.	773.	772.	771.	770.	770.	769.	768.
766.	767.	766.	766.	765.	764.	764.	763.	763.	762.
762.	761.	761.	760.	760.	759.	759.	758.		

STAGE

543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1
543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1
543.1	543.1	543.1	543.2	543.2	543.2	543.2	543.2	543.3	543.3
543.3	543.3	543.4	543.4	543.4	543.5	543.5	543.6	543.6	543.6
543.7	543.8	543.9	543.9	544.0	544.1	544.1	544.2	544.2	544.2
544.3	544.3	544.3	544.3	544.3	544.3	544.3	544.3	544.3	544.3
544.3	544.3	544.3	544.3	544.3	544.2	544.2	544.2	544.2	544.2
544.2	544.2	544.2	544.1	544.1	544.1	544.1	544.1	544.1	544.1
544.1	544.1	544.0	544.0	544.0	544.0	544.0	544.0		

PEAK OUTFLOW IS 103. AT TIME 42.83 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	103.	20.	30.	10.	4302.
CMS	3.	3.	1.	0.	124.
INCHES		1.41	1.91	1.92	1.92
MM		35.89	48.5	48.8	48.86
AC-FT		11.	60.	21.	60.
[illegible]		.	75	7	7

STATION 1, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	2.	2.	2.
2.	3.	3.	3.	4.	4.	4.	5.	5.	5.
6.	6.	6.	7.	7.	7.	8.	8.	8.	9.
9.	9.	10.	10.	10.	11.	11.	11.	12.	12.
13.	15.	16.	18.	20.	23.	27.	32.	37.	43.
48.	54.	60.	67.	75.	83.	92.	101.	113.	128.
148.	170.	194.	219.	241.	256.	277.	292.	304.	314.
322.	328.	333.	336.	338.	338.	336.	333.	328.	322.
315.	307.	298.	290.	282.	274.	266.	259.	253.	247.
241.	236.	231.	225.	220.	216.	211.	206.	202.	198.
194.	190.	187.	183.	180.	177.	174.	172.		

STORAGE

704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	705.
705.	705.	705.	705.	705.	705.	705.	705.	705.	705.
705.	705.	705.	705.	705.	705.	705.	705.	705.	705.
705.	705.	705.	705.	705.	705.	705.	705.	705.	705.
705.	705.	705.	705.	705.	705.	705.	705.	705.	705.
705.	705.	705.	705.	705.	705.	705.	705.	705.	705.
705.	705.	705.	705.	705.	705.	705.	705.	705.	705.
705.	705.	705.	705.	705.	705.	705.	705.	705.	705.
705.	705.	705.	705.	705.	705.	705.	705.	706.	706.
706.	707.	707.	708.	708.	708.	709.	709.	710.	710.
710.	711.	711.	712.	712.	713.	713.	713.	714.	714.

719.	721.	723.	725.	728.	730	733.	736.	740.	743.
747.	751.	754.	758.	762.	767	771.	775.	781.	788.
796.	804.	815.	824.	833.	839	845.	850.	854.	857.
860.	862.	864.	865.	865.	865	865.	864.	862.	860.
858.	857.	852.	849.	847.	844	842.	839.	837.	835.
833.	830.	829.	827.	825.	823	821.	820.	818.	817.
815.	814.	812.	811.	810.	808	807.	806.		

STAGE

543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0	543.0
543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1	543.1
543.1	543.1	543.1	543.1	543.2	543.2	543.2	543.2	543.2	543.2
543.2	543.2	543.2	543.2	543.2	543.2	543.2	543.2	543.3	543.3
543.3	543.3	543.4	543.4	543.4	543.5	543.5	543.6	543.7	543.7
543.8	543.9	543.9	544.0	544.1	544.2	544.2	544.3	544.4	544.5
544.7	544.9	545.0	545.2	545.4	545.5	545.6	545.7	545.8	545.8
545.9	545.9	545.9	545.9	546.0	546.0	546.0	546.0	545.9	545.9
545.8	545.8	545.7	545.7	545.6	545.6	545.5	545.5	545.4	545.4
545.4	545.3	545.3	545.3	545.2	545.2	545.2	545.1	545.1	545.1
545.0	545.0	545.0	545.0	544.9	544.9	544.9	544.9		

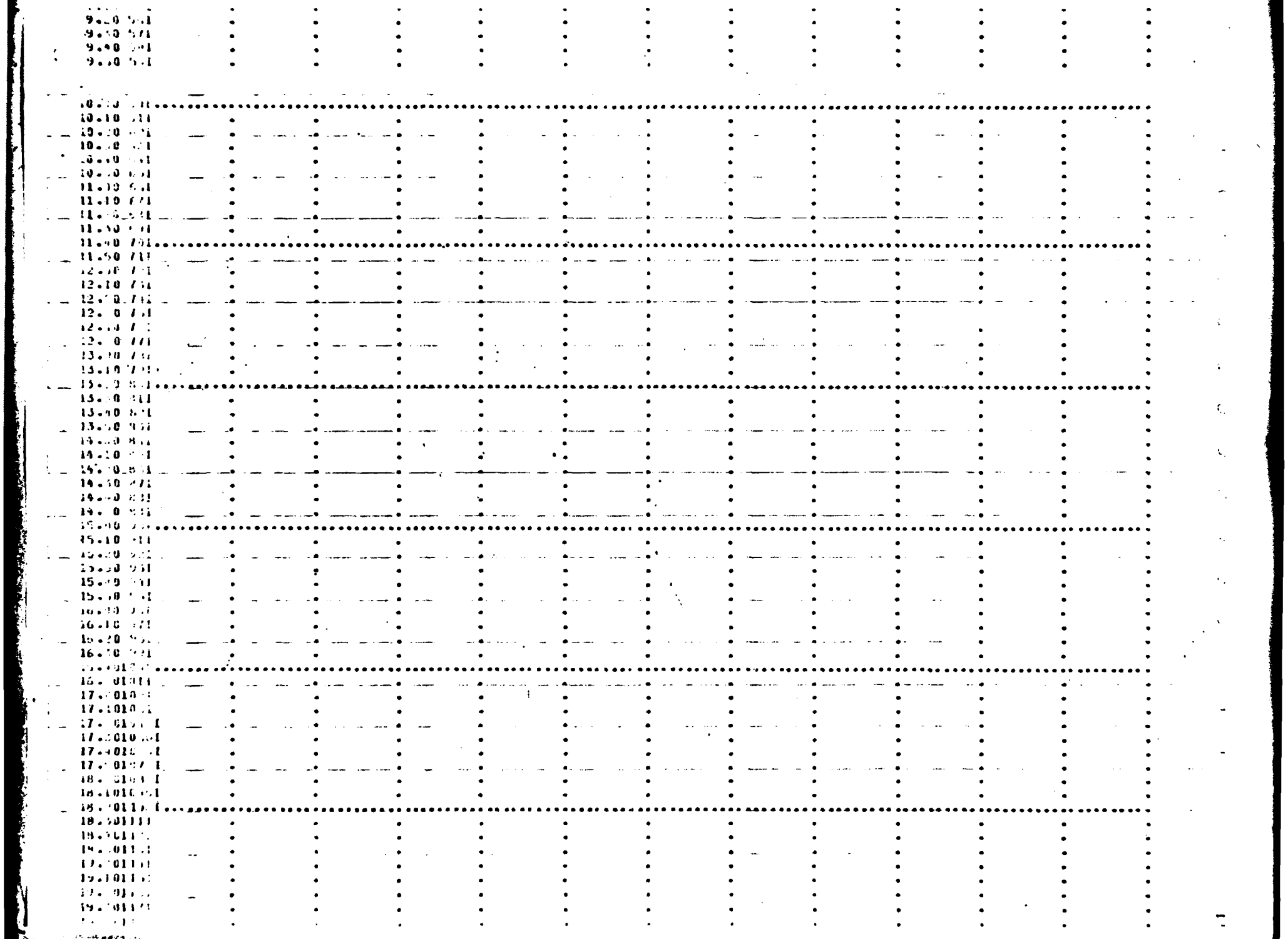
A[illegible] IS 331. AT TIME 42.67 HOURS

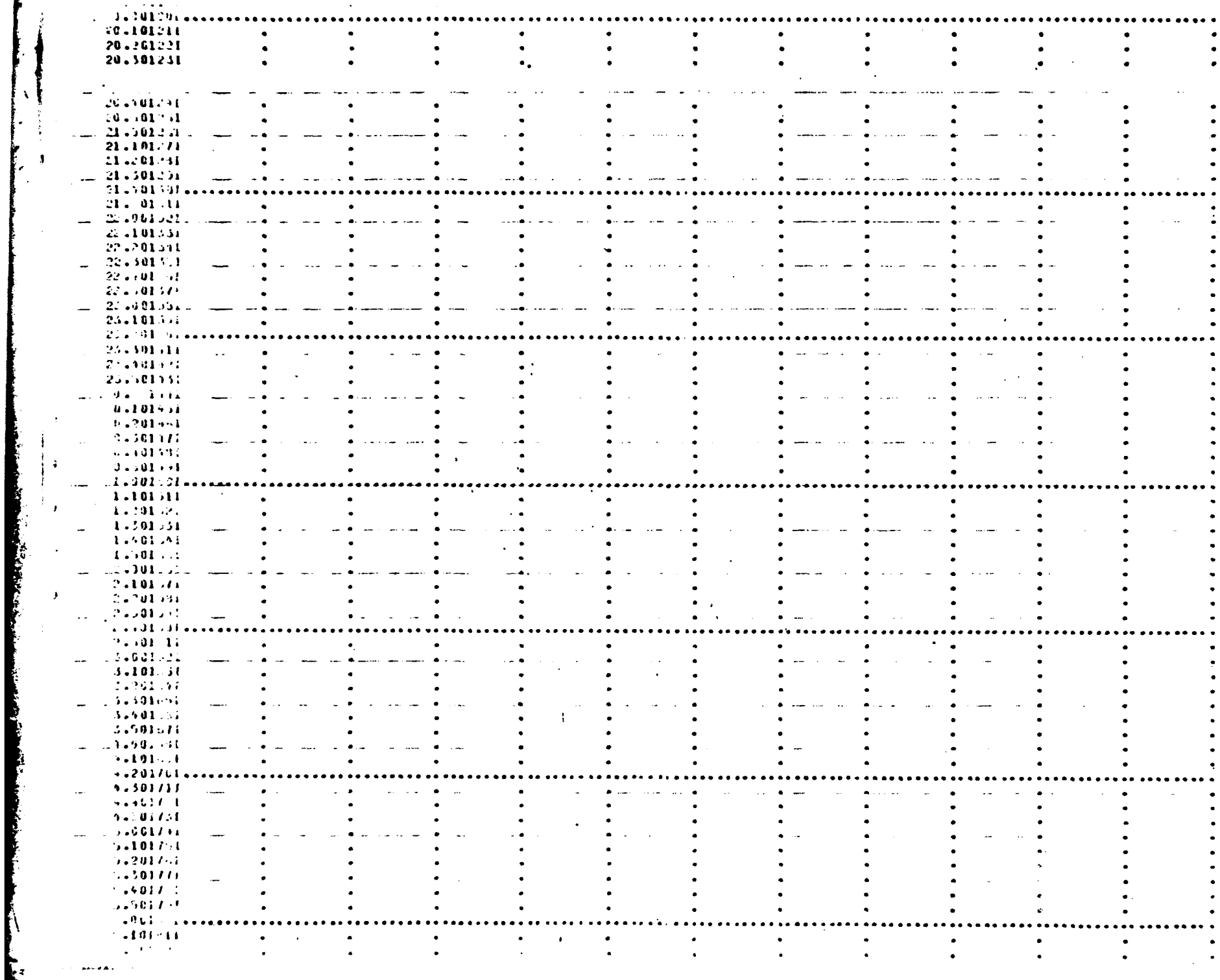
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	338.	278.	93.	47.	13480.
CMS	10.	8.	3.	1.	382.
INCHES		4.38	5.87	5.90	5.90
MM		111.20	149.2[illegible]	149.95	149.95
AC-FT		1[illegible]	185.	186.	186.
THOUS CU M		170.	228.	229.	229.

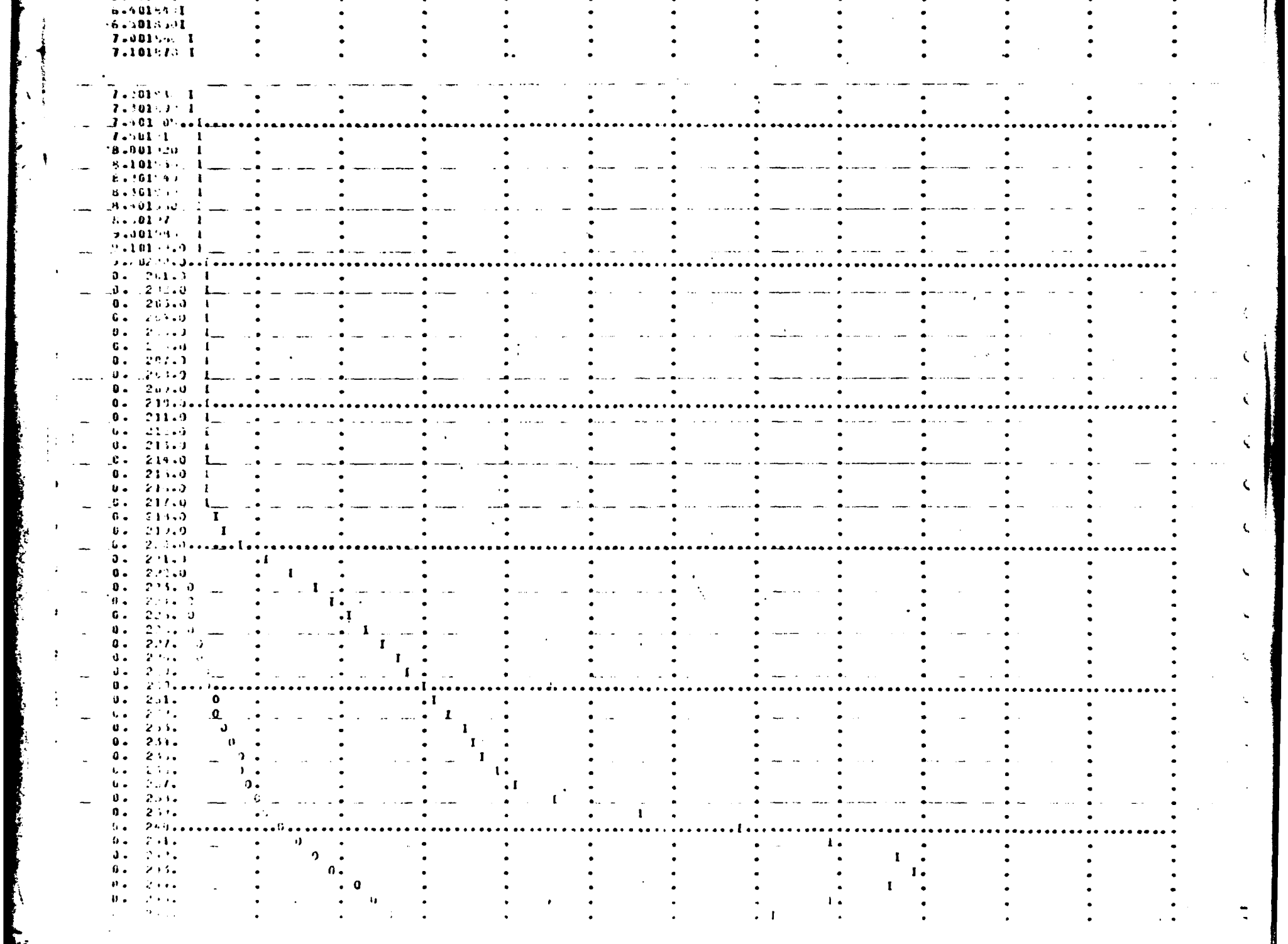
STATION 1

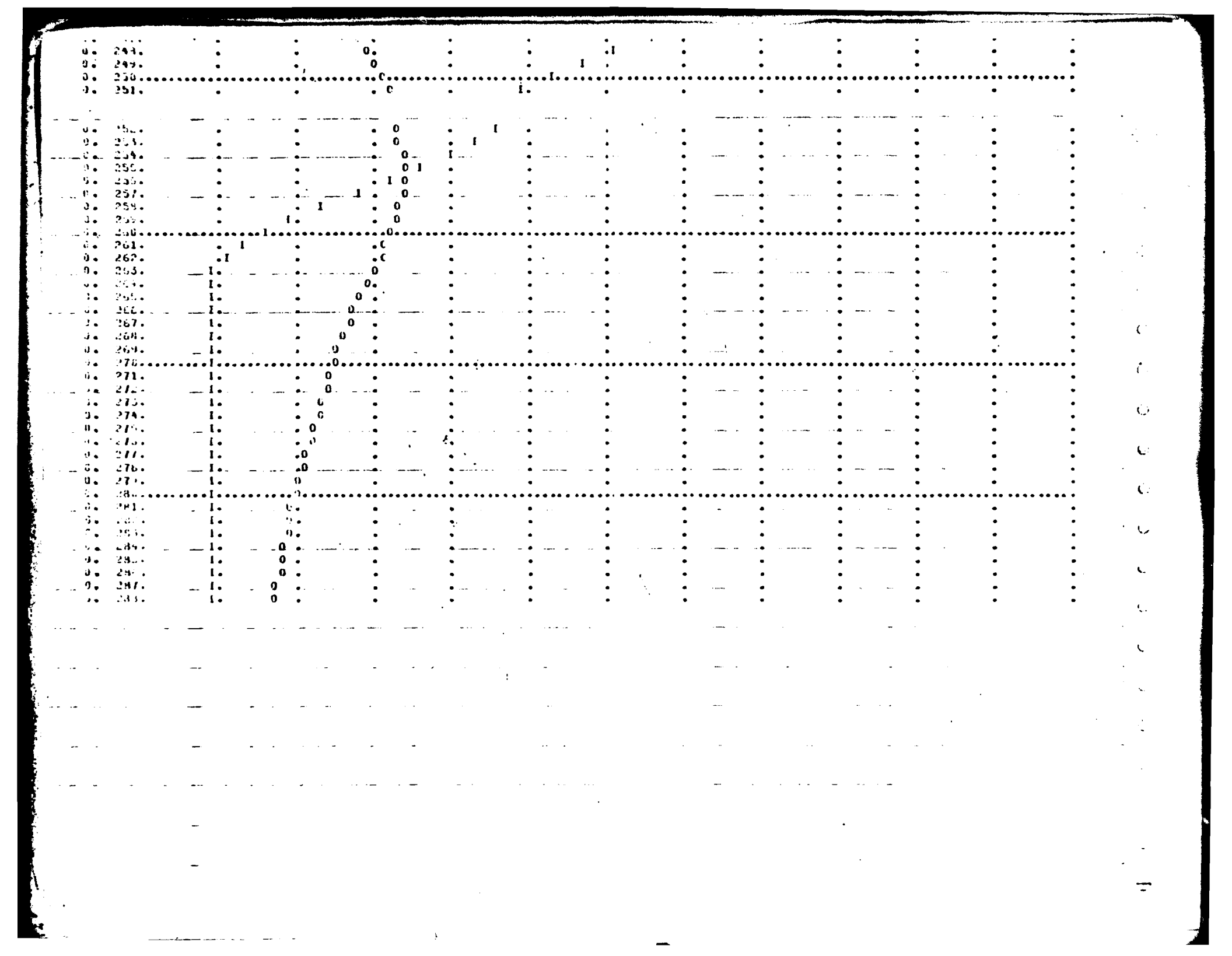
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

100. 200. 300. 400. 500. 600. 700. 800. 900. 0. 0. 0.









STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	3.	3.	4.	4.
5.	6.	6.	7.	7.	8.	9.	10.	10.	11.
12.	12.	13.	14.	14.	15.	16.	16.	17.	18.
18.	19.	19.	20.	21.	21.	22.	23.	24.	27.
30.	35.	41.	49.	55.	64.	74.	87.	99.	115.
127.	141.	161.	179.	199.	220.	241.	264.	285.	333.
457.	792.	1101.	1328.	1443.	1460.	1434.	1374.	1303.	1229.
1156.	1087.	1022.	960.	898.	838.	784.	692.	620.	552.
491.	438.	394.	362.	344.	331.	331.	325.	319.	313.
303.	305.	298.	293.	288.	284.	280.	275.	272.	268.
264.	261.	258.	255.	252.	249.	247.	244.		

STORAGE

704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
704.	704.	704.	704.	704.	704.	704.	704.	704.	704.
705.	705.	705.	705.	705.	705.	705.	705.	705.	706.
706.	706.	706.	706.	706.	706.	706.	706.	706.	706.
706.	706.	706.	706.	706.	706.	706.	706.	706.	706.
706.	706.	706.	706.	706.	706.	706.	706.	706.	706.
706.	706.	706.	706.	706.	706.	706.	706.	706.	706.
706.	706.	706.	706.	706.	706.	706.	706.	706.	706.
706.	706.	706.	706.	706.	706.	706.	706.	706.	706.
706.	706.	706.	706.	706.	706.	706.	706.	706.	706.
706.	706.	706.	706.	706.	706.	707.	707.	708.	709.
709.	710.	711.	712.	712.	713.	714.	715.	716.	716.
717.	718.	719.	720.	721.	722.	723.	724.	725.	726.

```
  [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]    752.     768.     775.     781.
     788.     795.     802.     809.     817.     824.     832.     841.     851.     864.
     878.     892.     904.     911.     915.     915.     914.     913.     910.     908.
     906.     903.     901.     899.     897.     894.     891.     888.     885.     882.

     878.     875.     872.     870.     867.     865.     863.     861.     859.     857.
     855.     854.     852.     850.     849.     847.     846.     845.     843.     842.
     841.     840.     839.     838.     836.     835.     835.     834.

                                          STAGE
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0    543.0
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    543.4    543.4    543.4    543.4    543.5    543.5    543.5    543.5    543.5    543.5
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    546.7    546.7    546.6    546.6    546.5    546.5    546.4    546.4    546.3    546.3
    546.2    546.2    546.1    546.0    546.0    546.0    545.9    545.9    545.9    545.8
    545.8    545.8    545.7    545.7    545.7    545.6    545.6    545.6    545.6    545.5
    545.5    545.5    545.5    545.5    545.4    545.4    545.4    545.4

  PEAK OUTFLOW IS     1466. AT TIME  41.00 HOURS

                                  PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
                          CFS    1466.     723.      224.      113.        32439.
                          CMS      42.      20.        6.        3.          919.
                       INCHES              11.39     14.15     14.21         14.21
                           MM             289.42    359.39    360.36        360.86
                        AC-FT               358.      445.      447.          447.
                   THOUS CU M               442.      549.      551.          551.
```
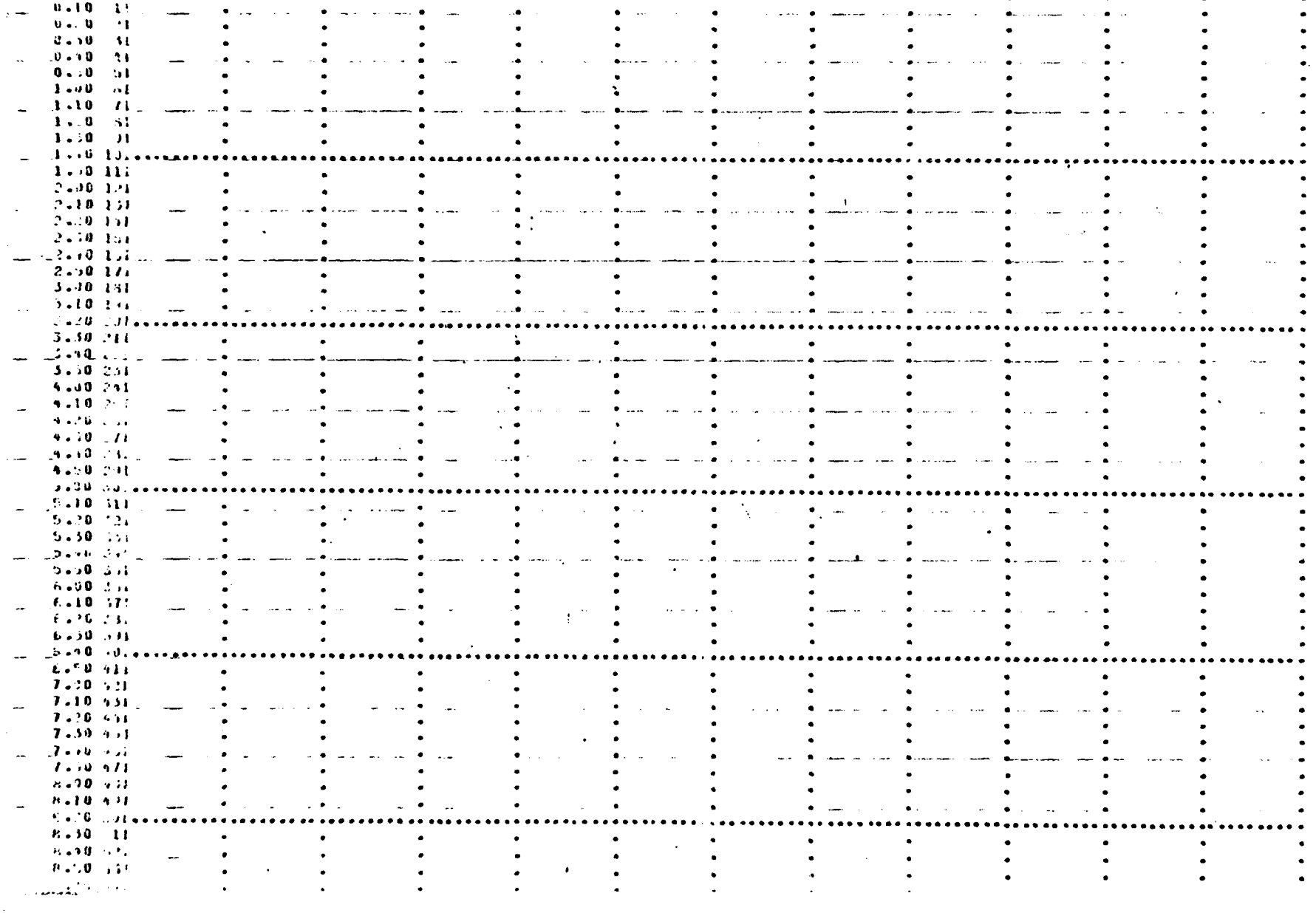
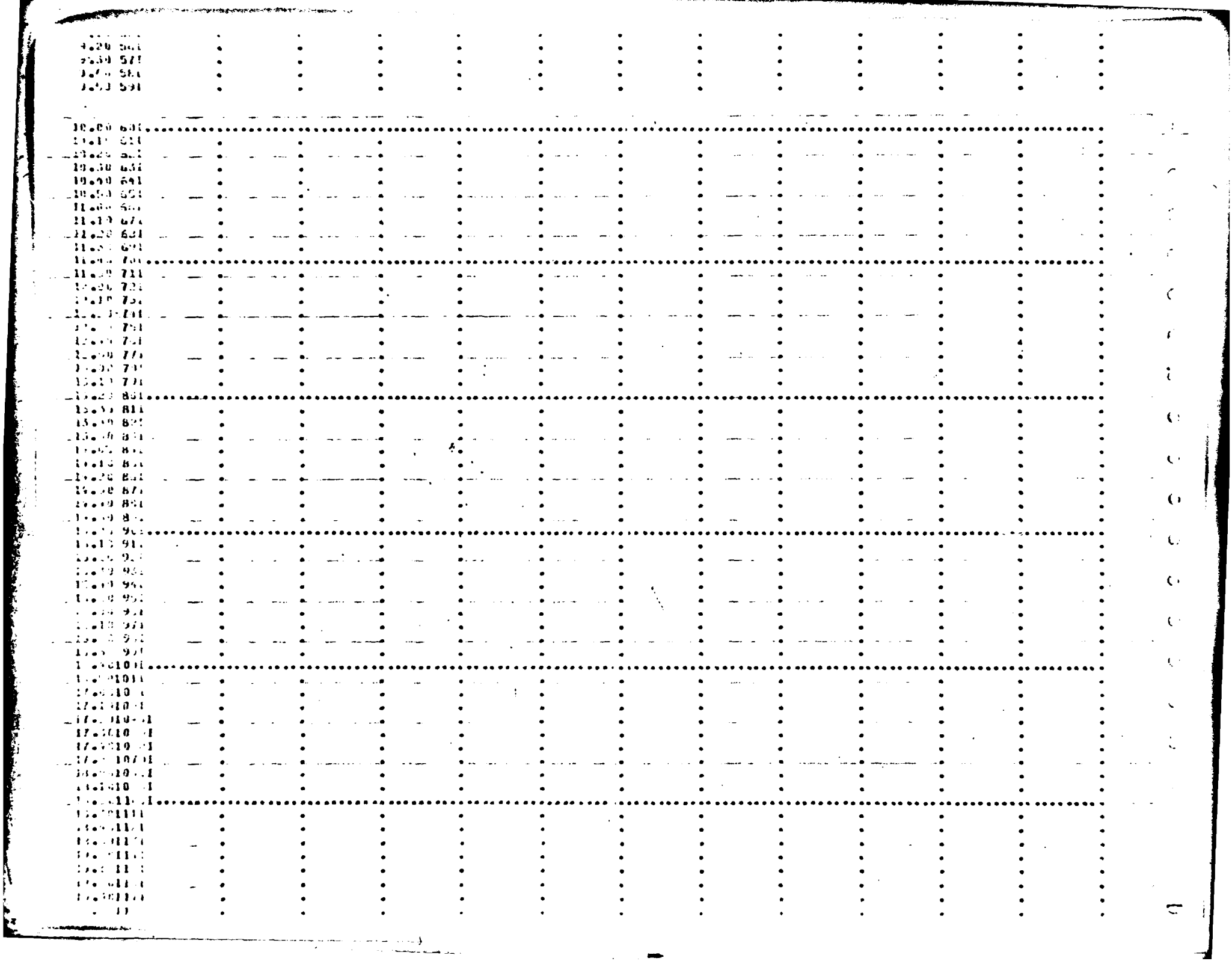
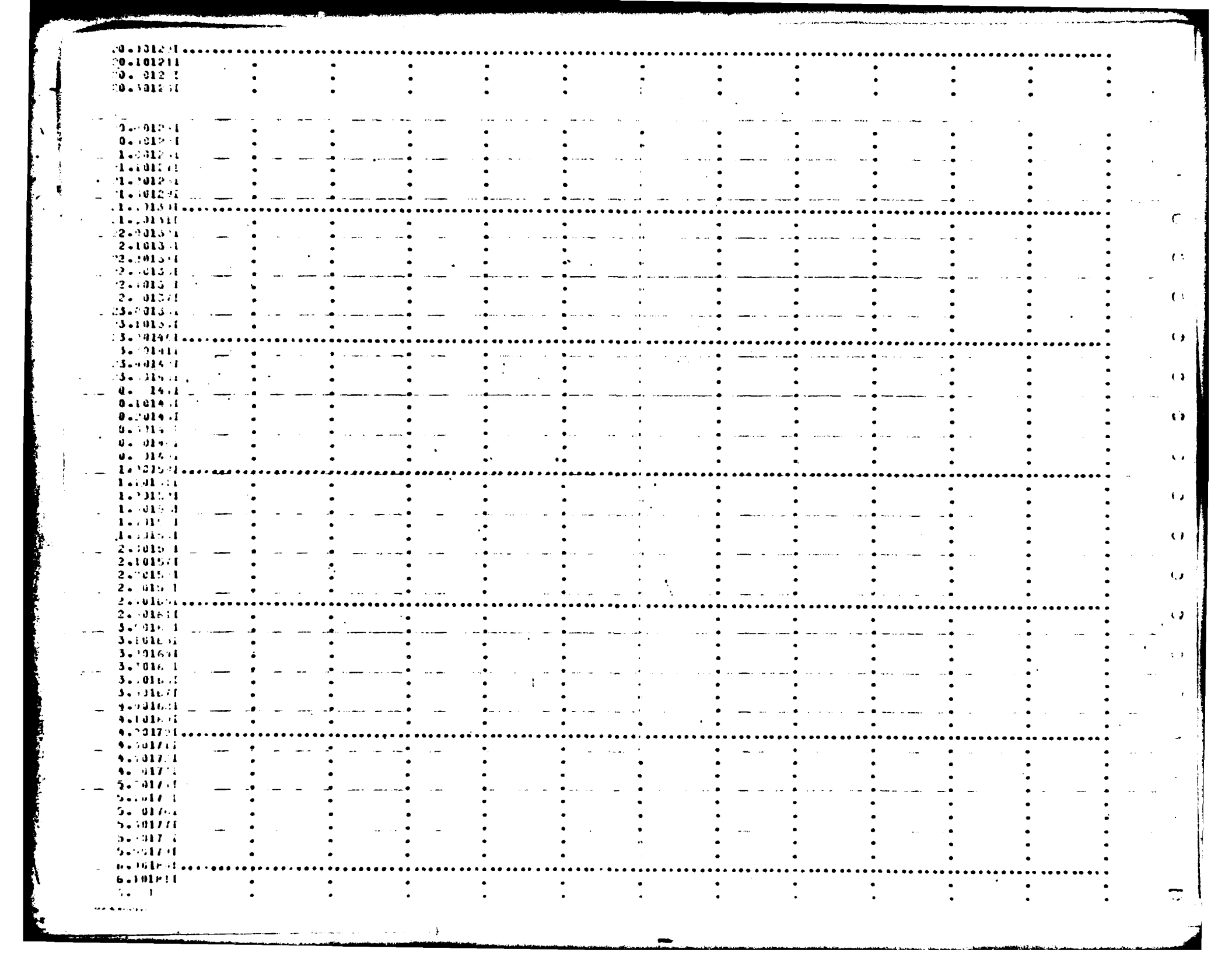

STATION 1

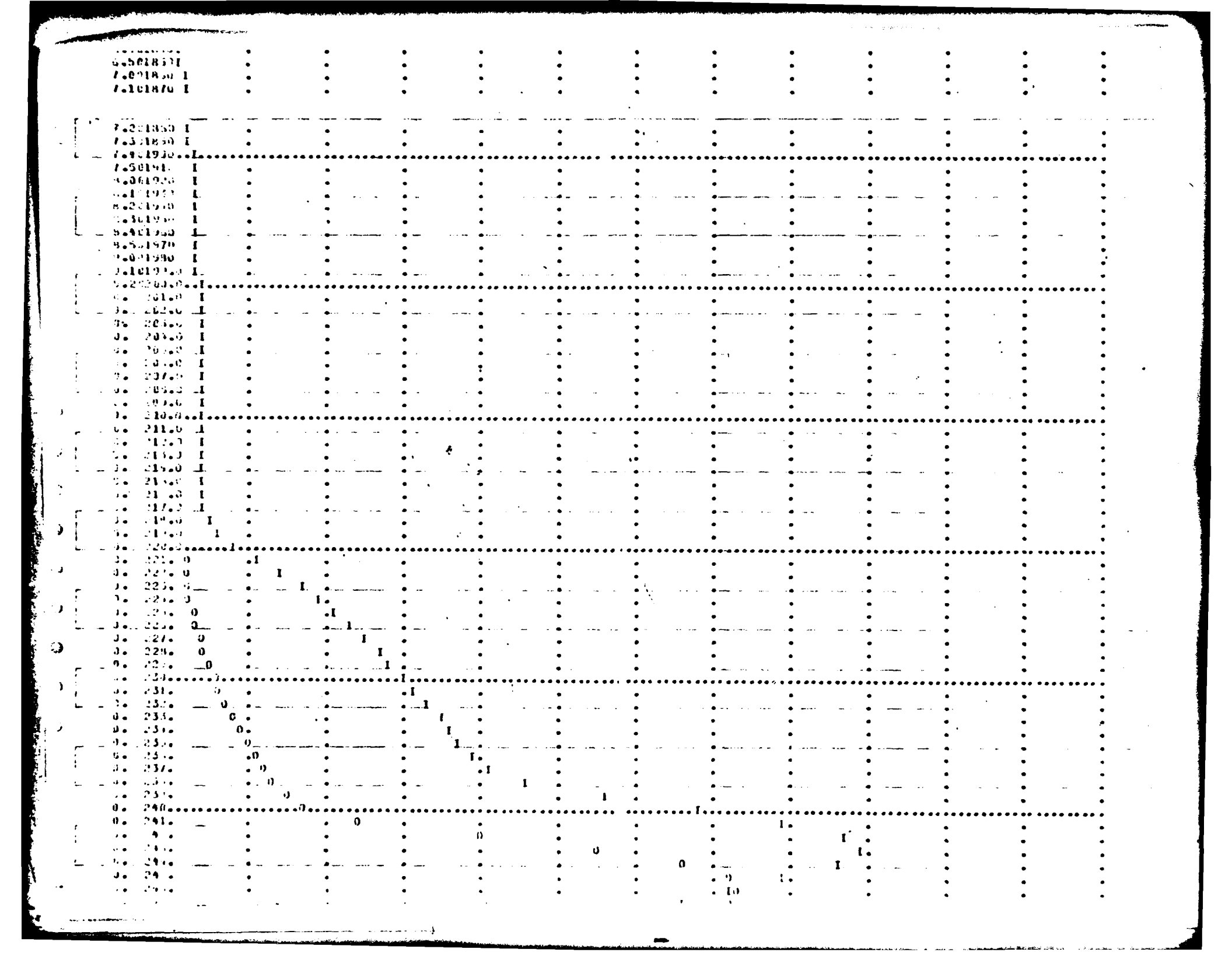
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(+)

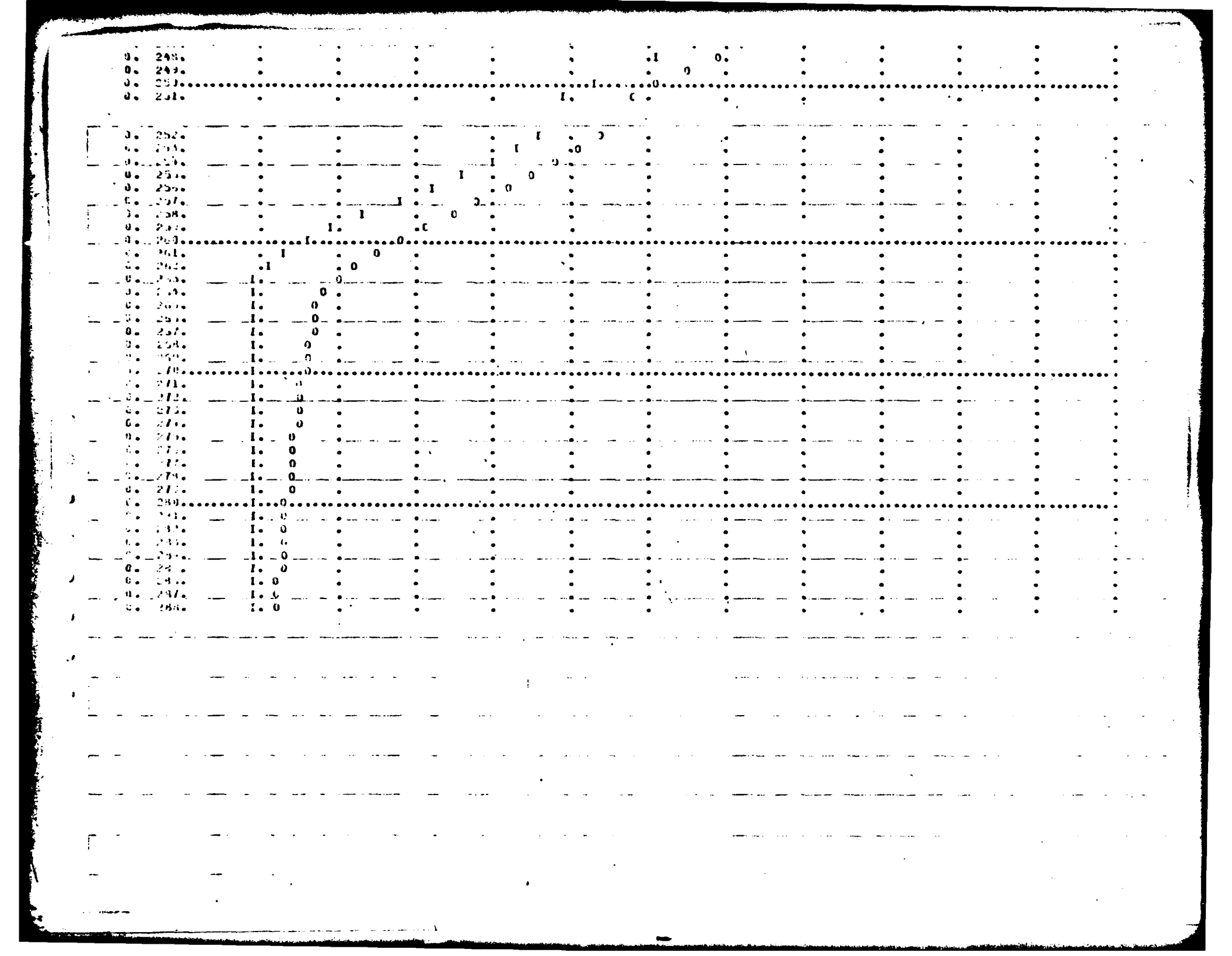
0. 200. 400. 600. 800. 1000. 1200. 1400. 1600. 1800. 0. 0. 0.











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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS					
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				0.20	0.40	0.50	0.60	0.80	1.00
HYDROGRAPH AT	1	0.59	1	358.	716.	895.	1074.	1431.	1789.
		(1798.09)		(10.13)(	20.27)(	25.33)(	30.40)(	40.53)(	50.67)(
ROUTED TO	1	0.59	1	103.	255.	338.	555.	1009.	1466.
		(1798.09)		(2.93)(	7.21)(	9.57)(	15.72)(	28.57)(	41.53)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	543.00	543.00	546.00
STORAGE	709.	709.	867.
OUTFLOW	0.	0.	543.

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
0.20	544.34	0.	777.	103.	0.	42.83	0.
0.40	545.46	0.	857.	255.	0.	42.67	0.
0.50	545.97	0.	865.	338.	0.	42.67	0.
0.60	546.27	0.27	882.	555.	2.50	42.00	0.
0.80	546.82	0.82	901.	1009.	3.50	41.33	0.
1.00	546.89	0.89	915.	1466.	4.17	41.00	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) U.S. Department of Commerce, 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.

3) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).

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

5) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.

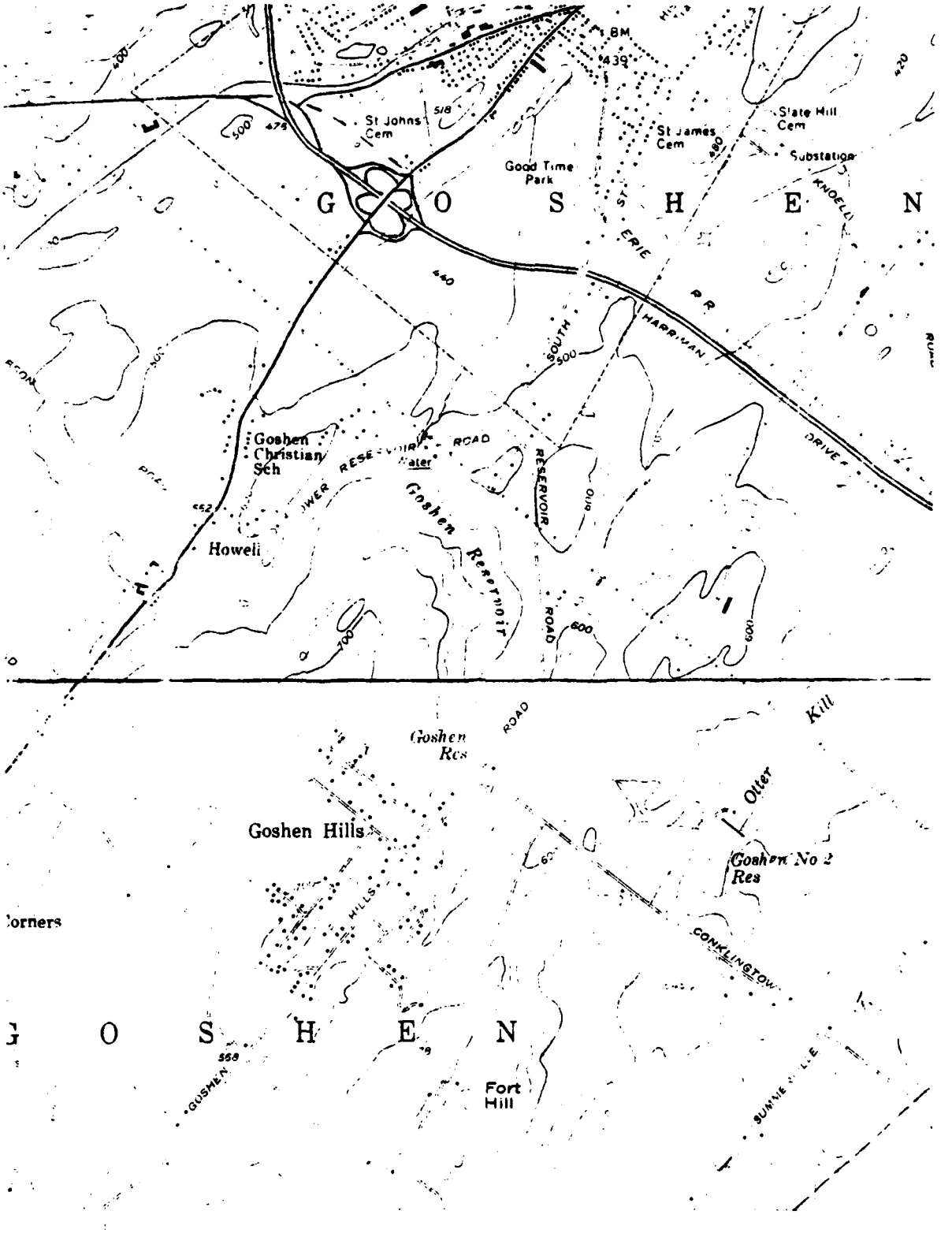
6) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

7) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

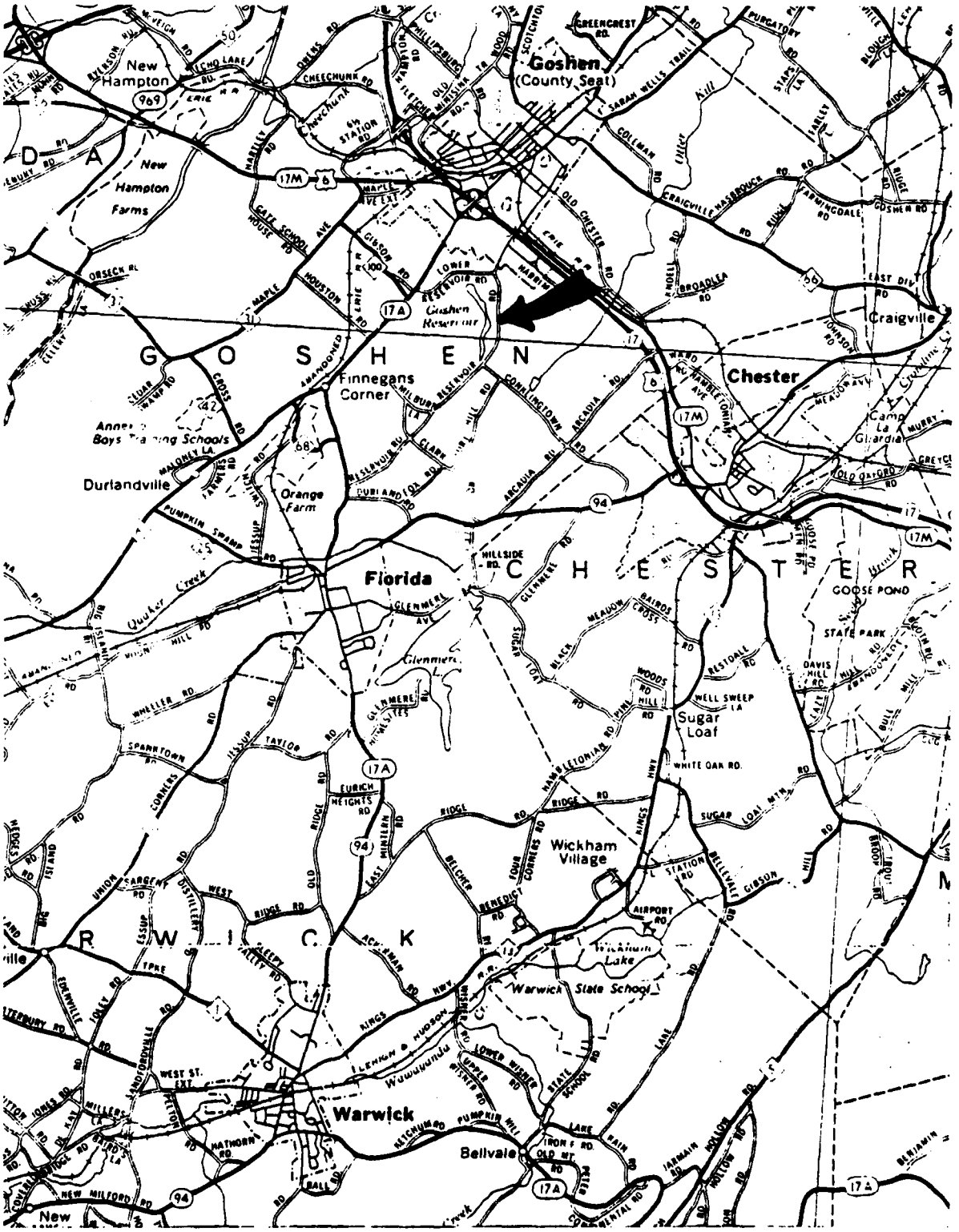
8) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E

DRAWINGS



TOPOGRAPHIC MAP



VICINITY MAP

F 3611-C-50 PADS 8-60

TEST BORING REPORT
RAYMOND
CONCRETE PILE DIVISION
RAYMOND INTERNATIONAL INC.
140 CEDAR STREET - NEW YORK 6, N. Y.

To CHUMARD & MC GOUGH Date JUNE 4 19 63

Address 4 FAIRLAWN AVENUE, MIDDLETOWN, NEW YORK

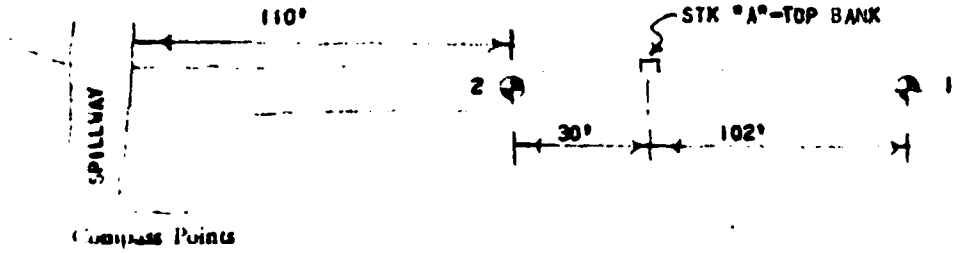
We have completed the following borings for you at EXISTING RESERVOIR DAM, VILLAGE OF GOSHEN, GOSHEN, N.Y.

with results shown below. In accordance with your instructions, we WILL SEND labelled samples of the strata encountered

To SAME AS ABOVE Address SAME AS ABOVE

Via RAILWAY EXPRESS under date of JUNE, 1963 Raymond Concrete Pile Division

Raymond International Inc. LOCATION PLAN SCALE 1" =



Compass Points

This boring report prepared in the NEW YORK OFFICE of the Raymond Concrete Pile Division

RAYMOND INTERNATIONAL INC.

By CQ

Job No. B-2734

Sheet 1 of 2

TEST BORING REPORT
RAYMOND
CONCRETE PILE COMPANY
GOW DIVISION

To CHUMARD & MC GOUGH Date JUNE 4, 1963

Location of Borings GOSHEN, NEW YORK

All borings are plotted to scale of 1" = 8 ft. using ELEVATIONS TAKEN FROM PRINT SUPPLIED BY CLIENT as a fixed datum.

Boring No. 1

ELEV. 100.89' ±

0.0	FINE BRN SAND, GRAVEL & SOME BOULDERS	12	36 42 50 54
4.0			
(WL) 6.0 (12)	FINE BROWN SAND, SOME GRAVEL & CLAY	14	20 16 19 17 12 10 9 8 8 11
		7	7 8 9 10
17.0	GRAY BROWN SILTY CLAY & SOME SHALE	18	9 6 9 11 10
		8	9 7 12 13 10
		9	11 7 13 14
32.5	FINE BRN SANDY CLAY & SHALE	100/6	39 54
34.5			

Boring No. 2

ELEV. 100.82' ±

0.0	SAND, GRAVEL & BOULDERS	15	32 46 54 39
4.0			
(WL) 8.0 (12)	FINE BROWN SAND, SOME GRAVEL & CLAY	13	20 16 14 11 11 9 8 7 10
		9	7 6 8 8 9
19.0	FINE GRAY BROWN SANDY SILTY CLAY & SOME SHALE	9	7 10 11 11 9
		6	9 7 7 8 9
		10	10 8 10 10
		8	11 11 9 11
37.0	FINE BRN SANDY CLAY & SOME GRAVEL	19	12 16 22
40.0			

Boring No. _____

GENERAL NOTE: NUMBERS ON EXTREME RIGHT OF COLUMN INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE 2 1/2" CASING ONE FOOT, USING 350 LB WEIGHT FALLING 18"

Classifications are made from visual inspection.

Water Levels (WL). Figure indicates time of reading (hours) after completion of boring. Water levels indicated are those observed when borings were made, or as noted. Porosity of the soil stratas, variations of rainfall, site topography, etc., may cause changes in these levels.

Figures in right hand column indicate number of blows required to drive 2" O. D. sampling pipe one foot, using a 140 lb. weight falling 30 inches.

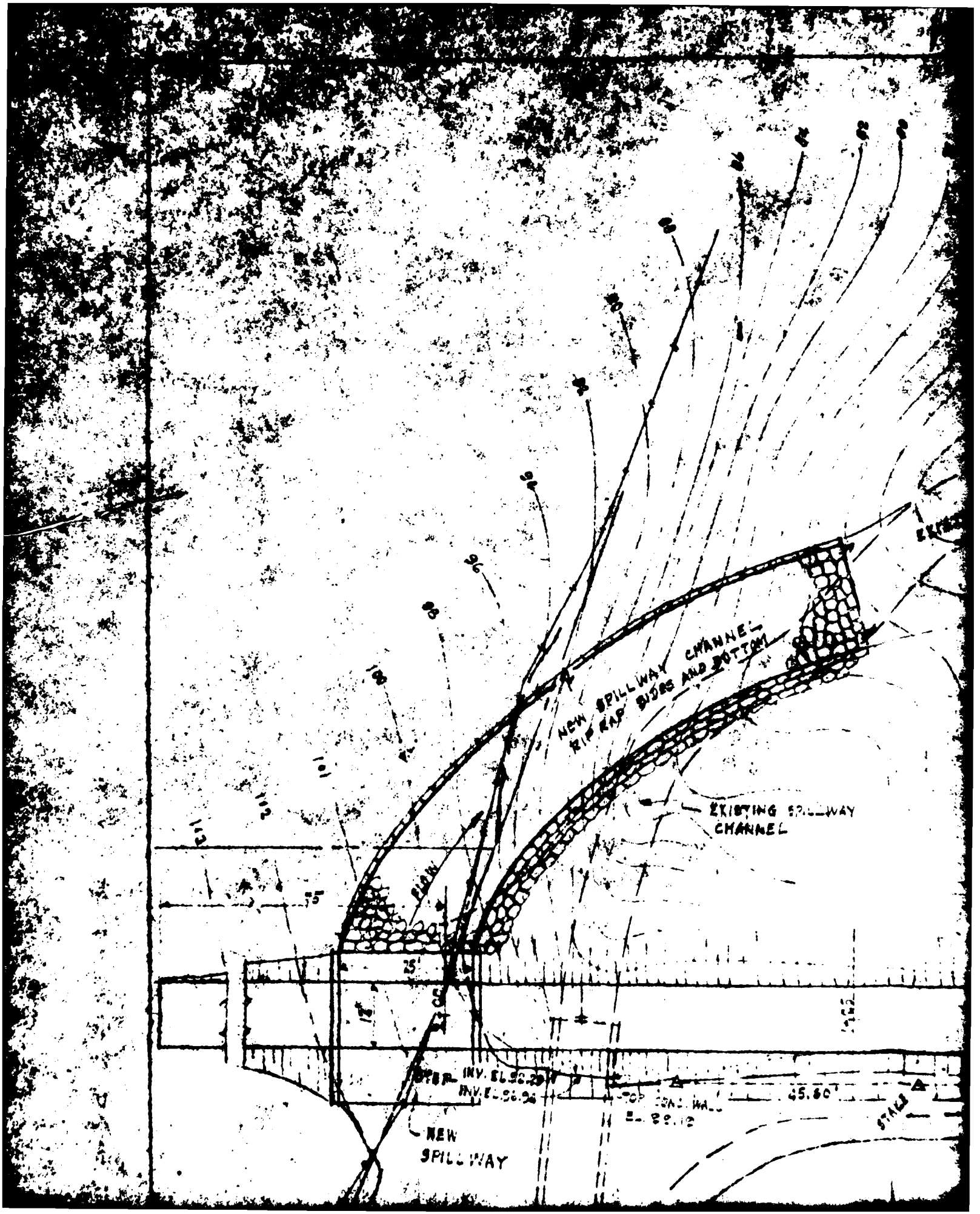
Total Footage 74.5'

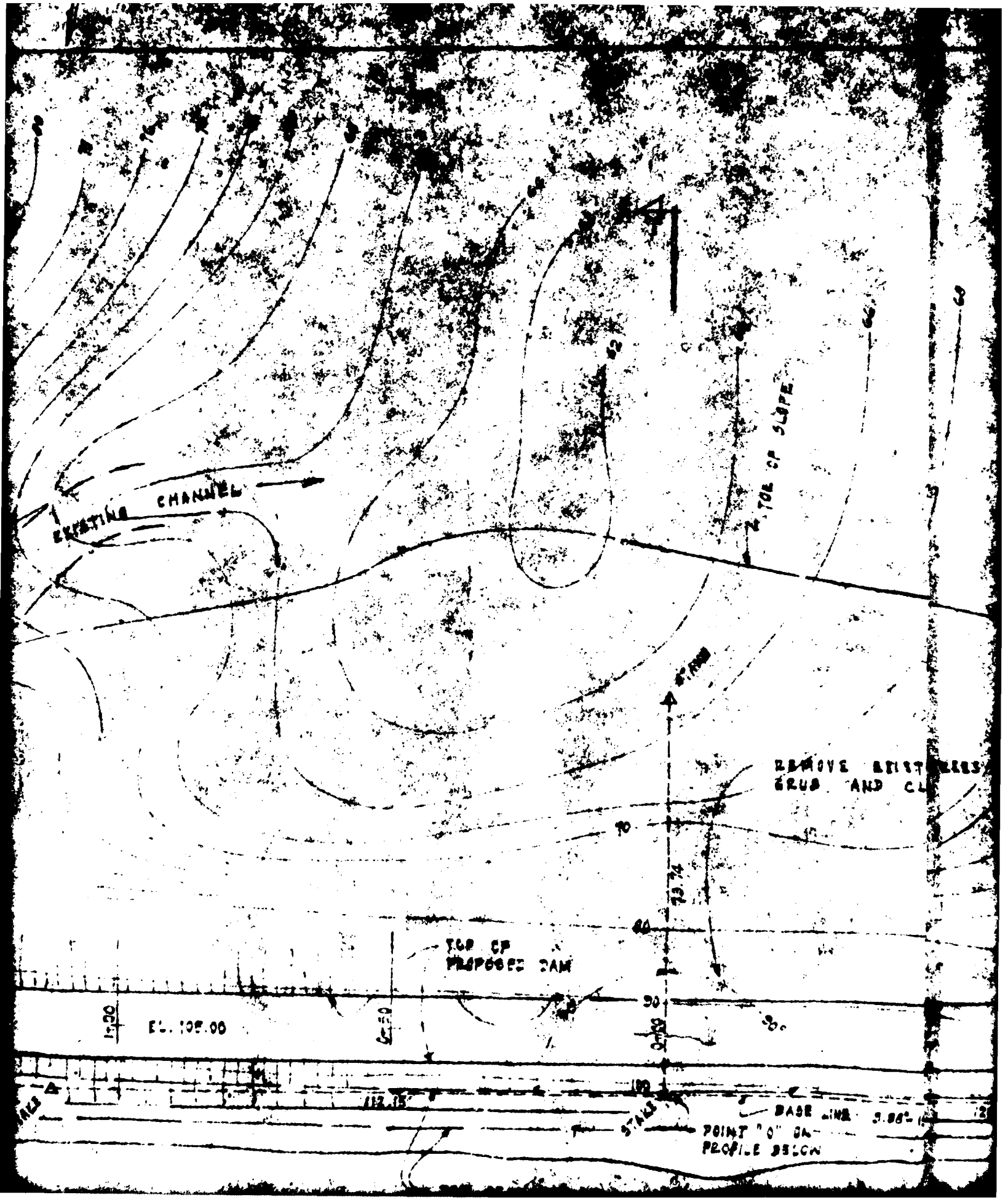
Foreman WATTERS

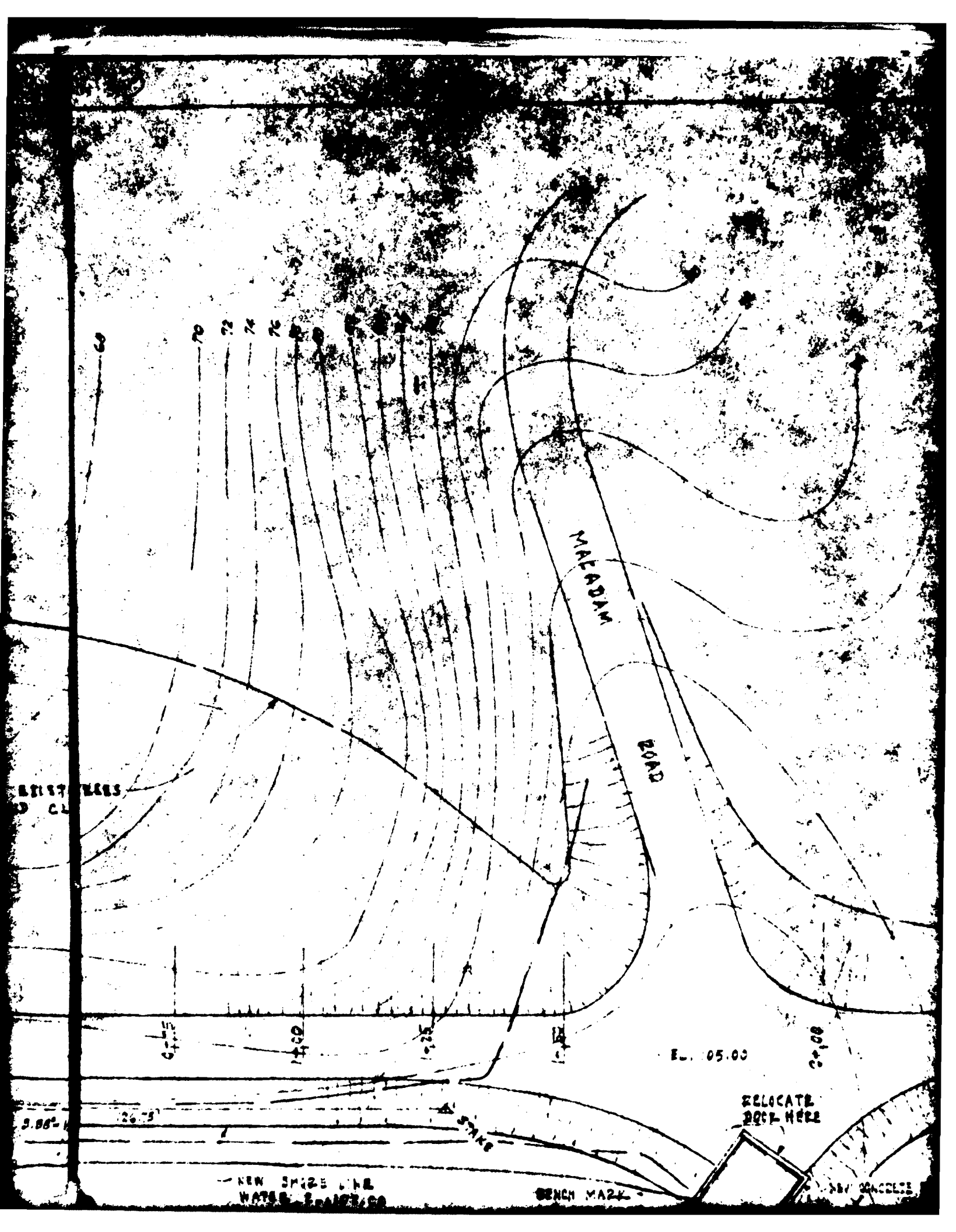
Classifications by WI/WB

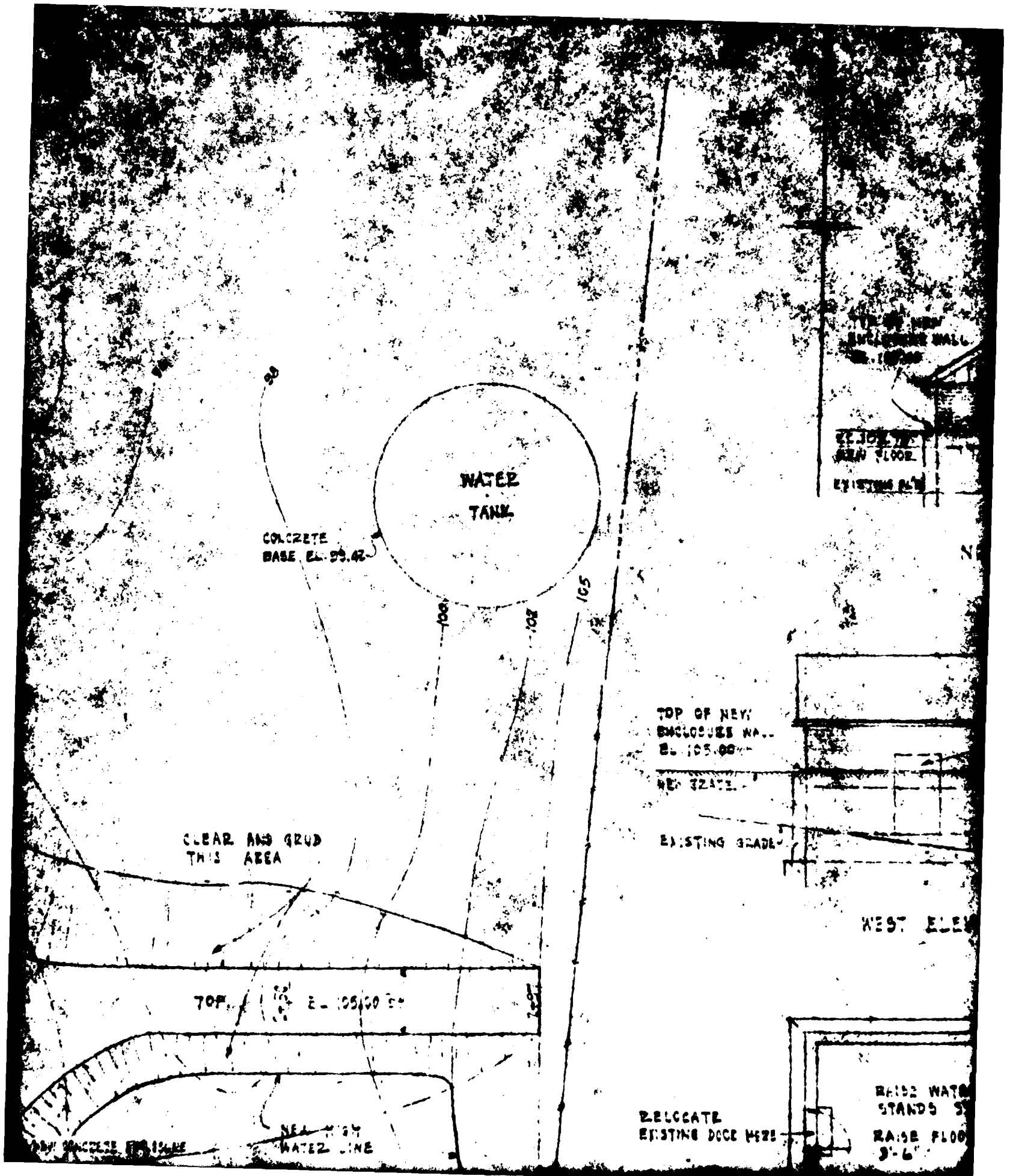
Job No. B E-2734

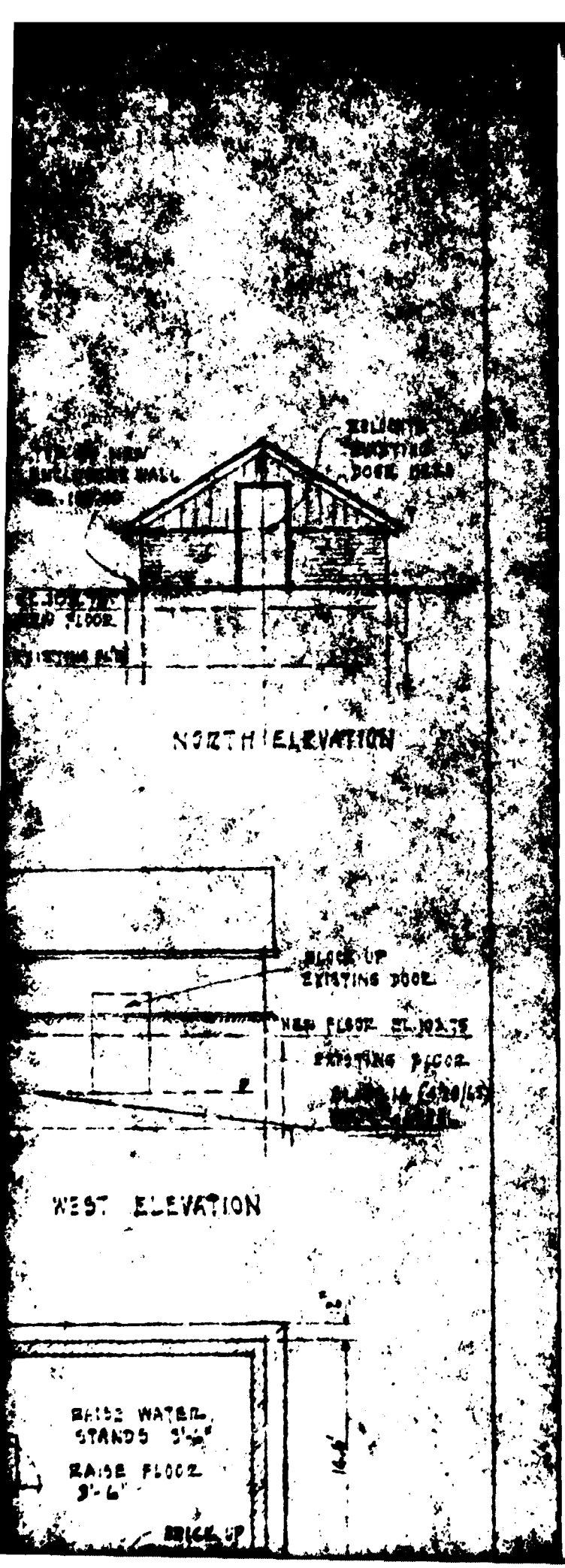
Sheet 2 of 2

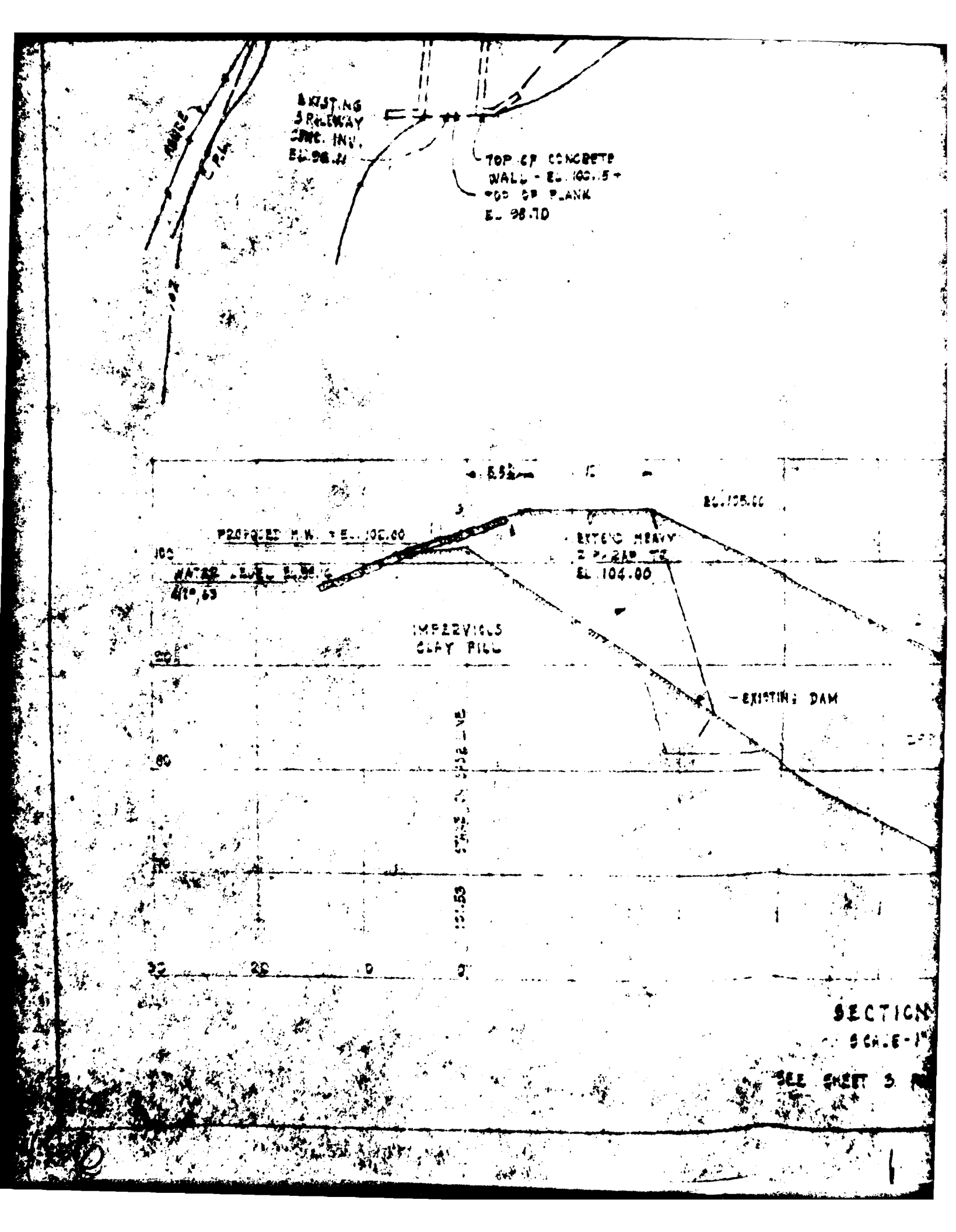

NEW SPILLWAY CHANNEL - RIP RAP SIDES AND BOTTOM
EXISTING SPILLWAY CHANNEL
NEW SPILLWAY
INV. EL.
INV. EL.
45.60'
STAKE

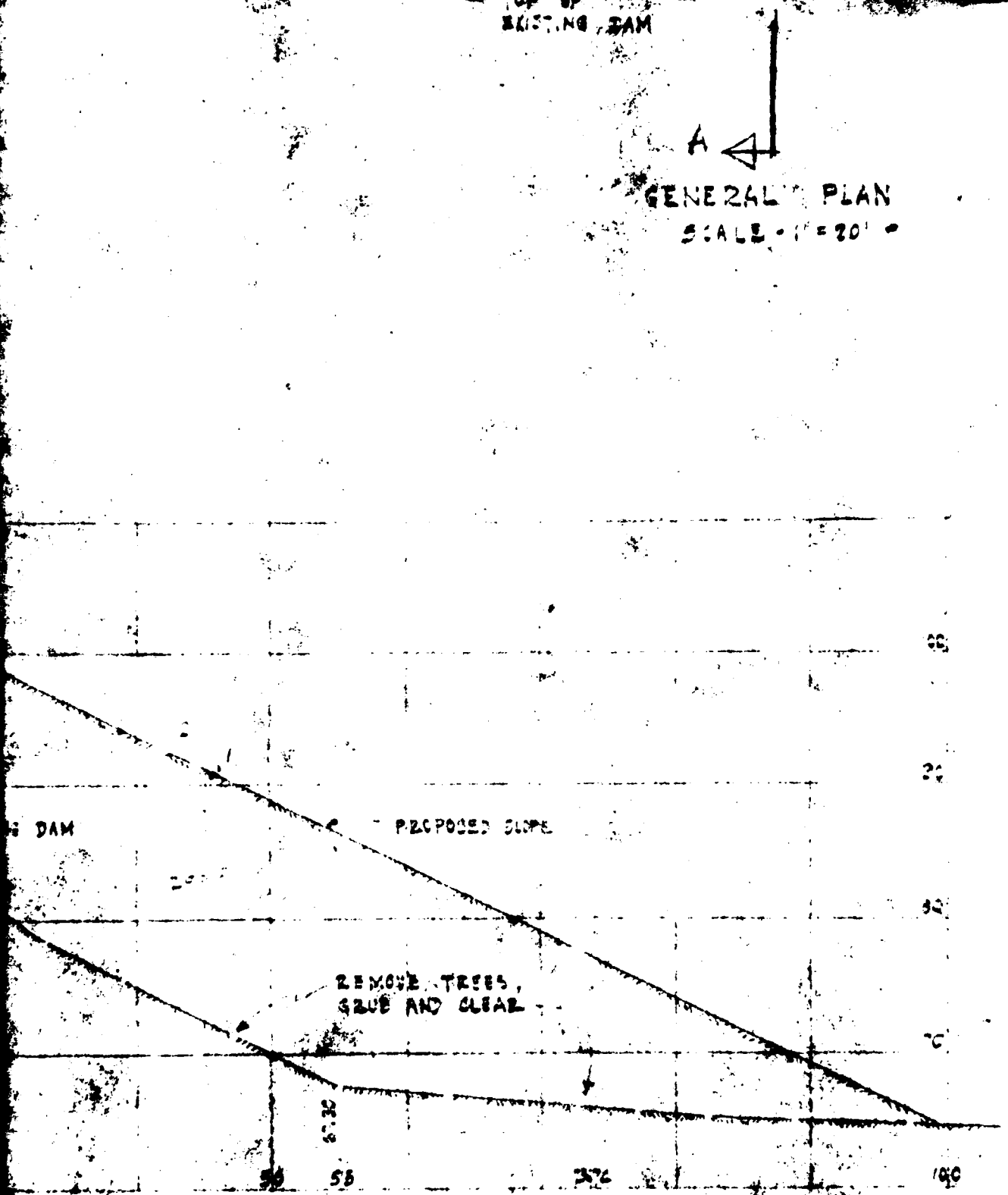

EXISTING CHANNEL
TOE OF SLOPE
REMOVE EXIST
GRUB AND CL
TOP OF
PROPOSED DAM
EL. 105.00
1:30
BASE LINE
POINT "O" ON
PROFILE BELOW


70
72
74
76
MACADAM
ROAD
E.L. 05.00
RELOCATE
POST HERE
NEW SHORE LINE
BENCH MARK


WATER
TANK
CONCRETE
BASE EL. 99.42
100
105
TOP OF NEW
ENCLOSURE WA..
EL. 105.00
EXISTING GRADE
CLEAR AND GRUB
THIS AREA
WEST ELE
RELOCATE
EXISTING DOOR HERE
RAISE FLOO
3'-6"


NORTH ELEVATION
BLOCK UP
EXISTING DOOR
NEW FLOOR EL. 10.43
EXISTING FLOOR
WEST ELEVATION
RAISE WATER
STANDS 3'-6"
RAISE FLOOR
3'-6"
BRICK UP


EXISTING
SPILLWAY
CONC. INV.
EL. 98.11
TOP OF CONCRETE
WALL - EL. 100.5 ±
TOP OF PLANK
EL. 98.70
EL. 105.00
PROPOSED H.W. - EL. 102.00
EXISTING HEAVY
EL. 104.00
IMPERVIOUS
CLAY FILL
EXISTING DAM
SECTION
SEE SHEET 3



GENERAL PLAN

SCALE - 1" = 20'

SECTION A-A

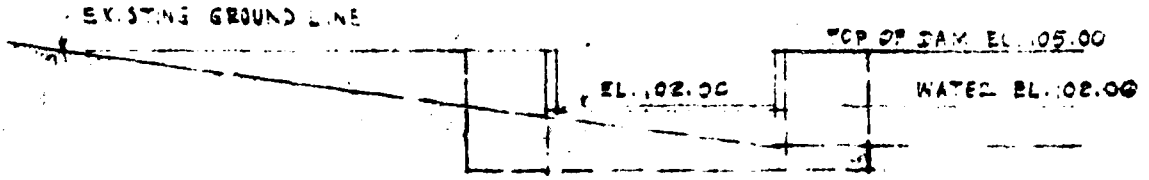
SCALE - 1" = 10'

SEE SHEET 3 FOR OTHER SECTIONS

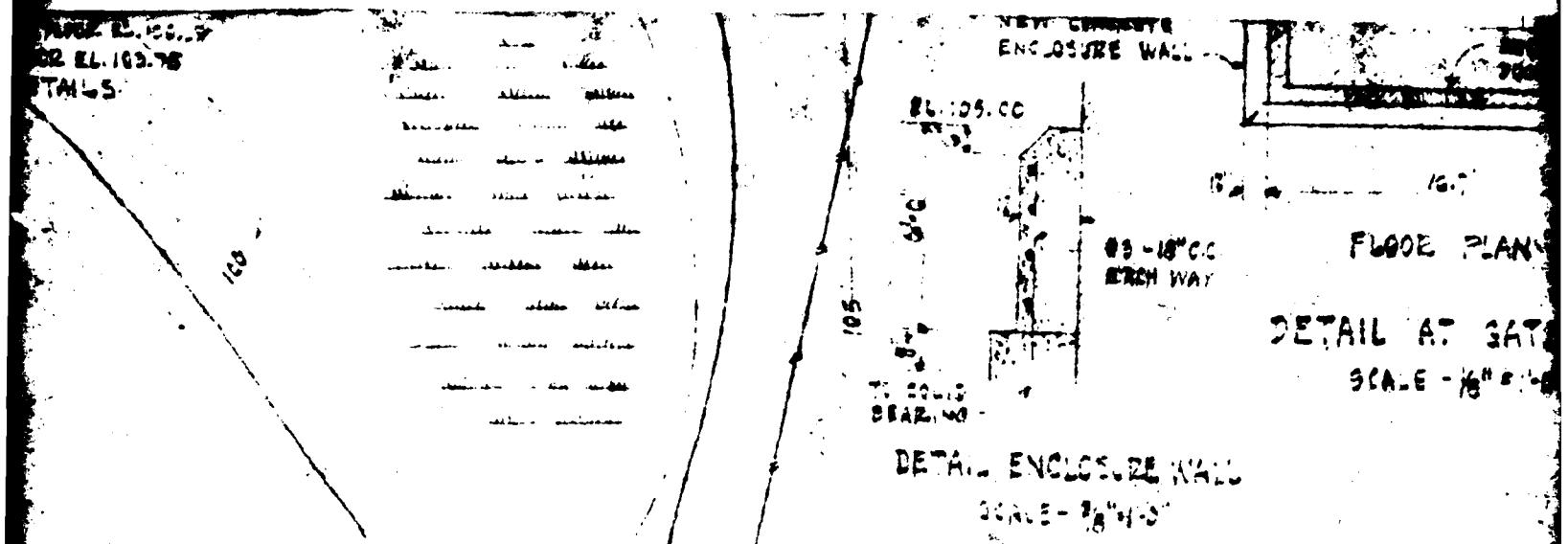
LINE

EXISTING
GATE HOUSE

NEW FLOOR EL. 103.
SEE DETAILS



NEW SPILLWAY
SCALE- 1" = 20'



STATE OF NEW
DEPARTMENT OF PU
DIVISION OF CONS
ALBANY, N.

This plan for re-construct
Lower Hudson Ri
approved under the provisions o
Conservation Law.

Examined and recommended fo
approval.

ASSOC

APPROVED

CH
Depart

By

D

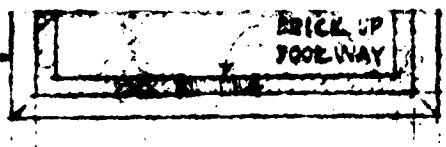
INCREASING STORAGE CAPA
PROSPECT RESERVOIR
VILLAGE OF GOSHEN ORANGE CO

SCALE - STATED

ASSOCIATE - JOSEPH A. KESTNER JR.
CONSULTING ENGINEER
TROY, N.Y.

DEP. ENGR BK. 3
BK. 17

SHEET 1 OF 5



FLOOR PLAN

DETAIL AT GATE HOUSE

SCALE - 1/8" = 1'-0"

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
DIVISION OF CONSTRUCTION
ALBANY, N. Y. July 5, 1963

This plan for re-constructing dam No. ORIG # 490 ITEM-3163 Lower Hudson River watershed is hereby approved under the provisions of Section 948 of the Conservation Law.

Examined and recommended to the Chief Engineer for approval.

ASSOCIATE CIVIL ENGINEER

APPROVED

CHIEF ENGINEER
Department of Public Works

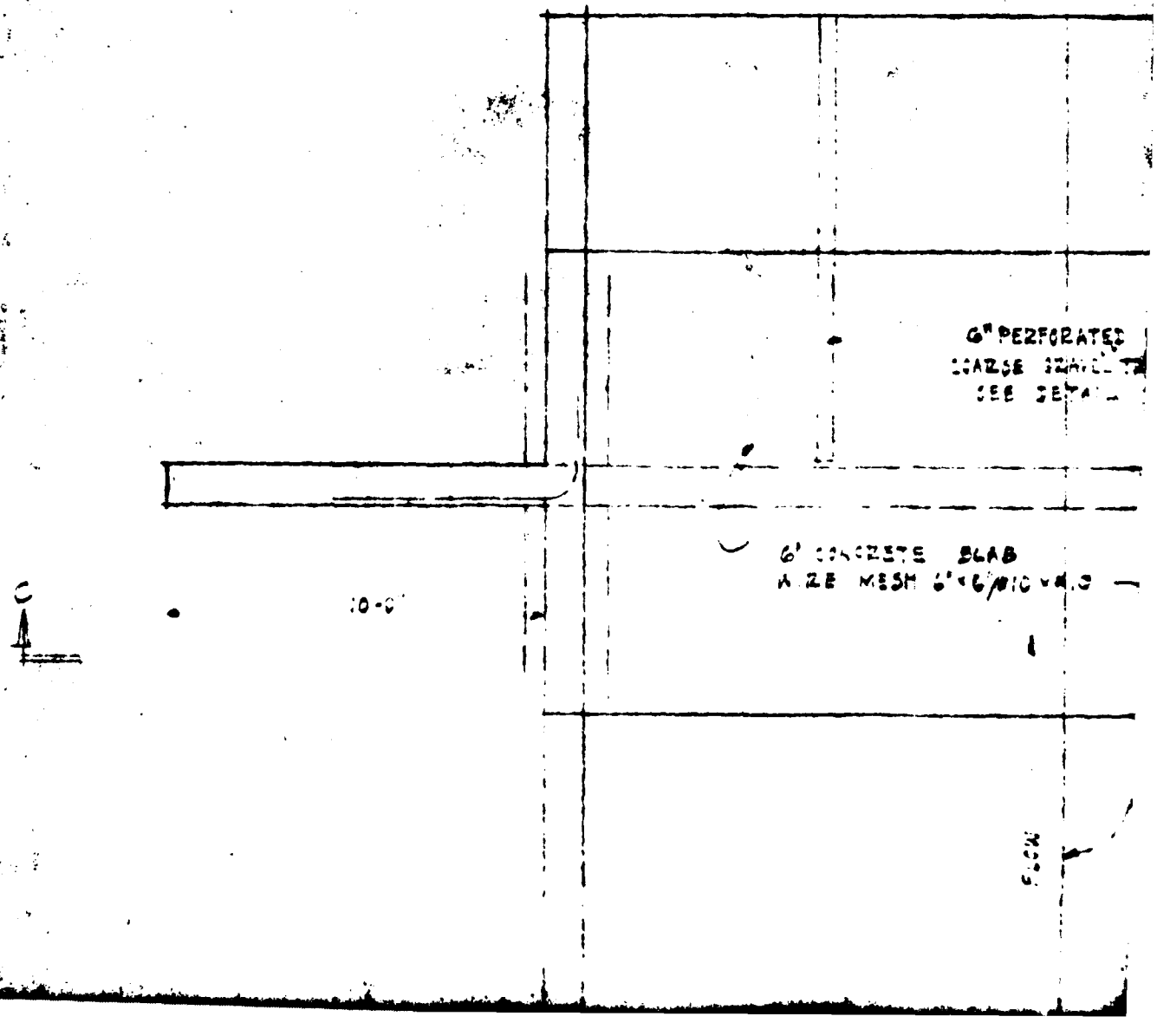
By Deputy Chief Engineer

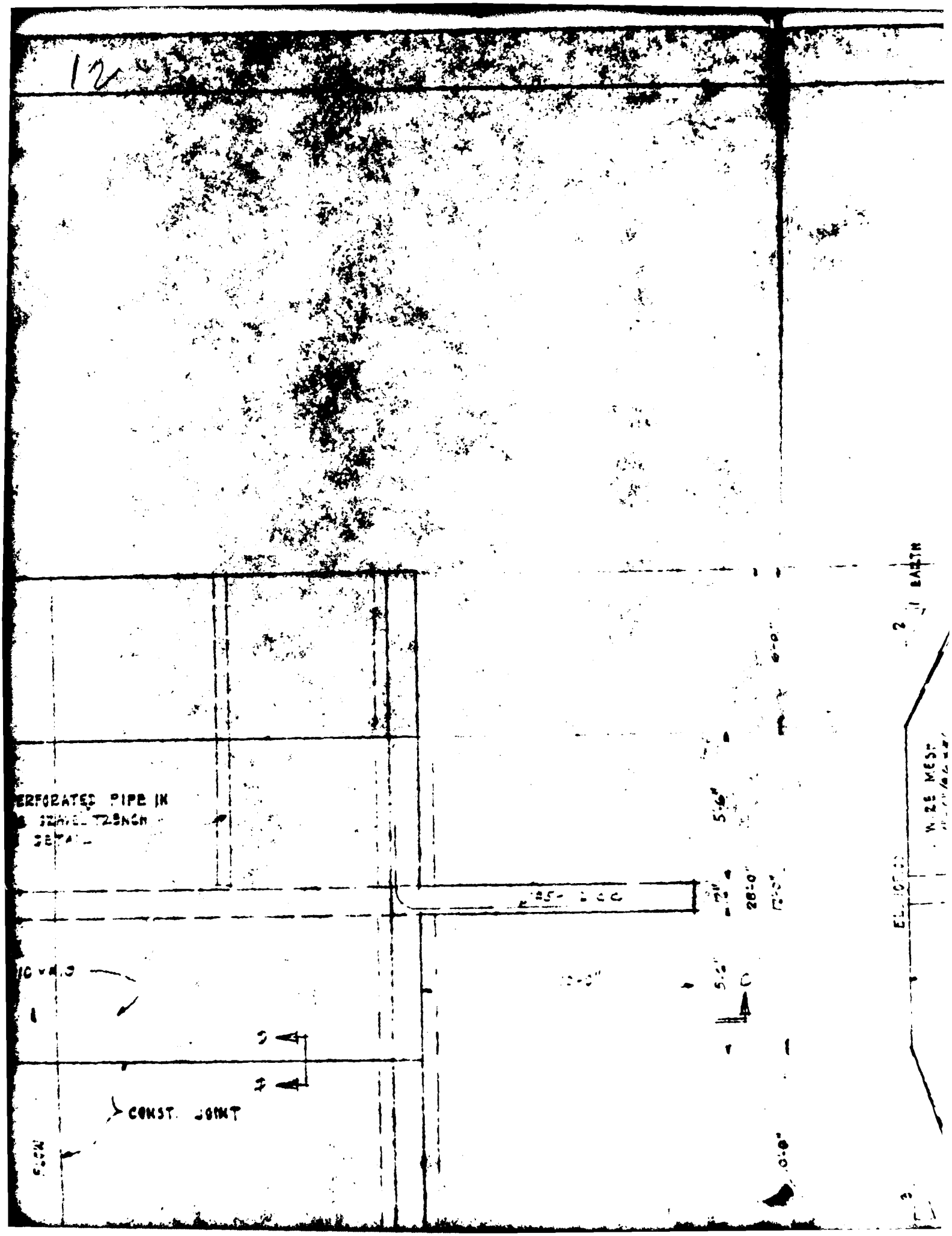
STORAGE CAPACITY RESERVOIR FOR ORANGE COUNTY, N.Y.

MAY 13, 1963

CRUMAZE & McGOUGH
CONSULTING ENGINEERS
4 FAIRLAWN AVE.
MIDDLETOWN, N.Y.

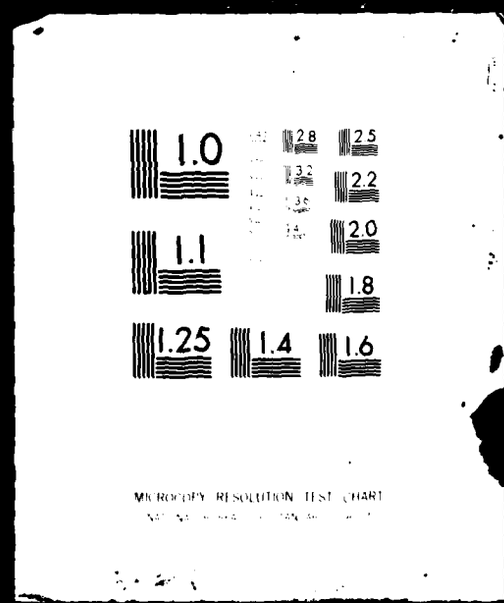
10

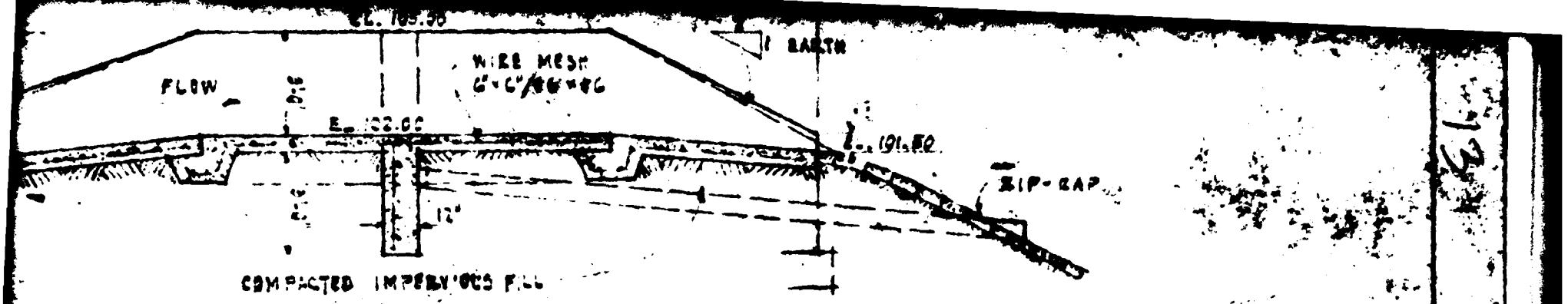

6" PERFORATED
SEE DETAIL
6" CONCRETE SLAB
10'-0"


12
ERFORATED PIPE IN
CONST. JOINT
28'-0"
2 EASTN

AD-A109 838 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. GOSHEN RESERVOIR NUMBER 1 DAM (INV--ETC(U)
AUG 81 G KOCH DACW51-79-C-0001

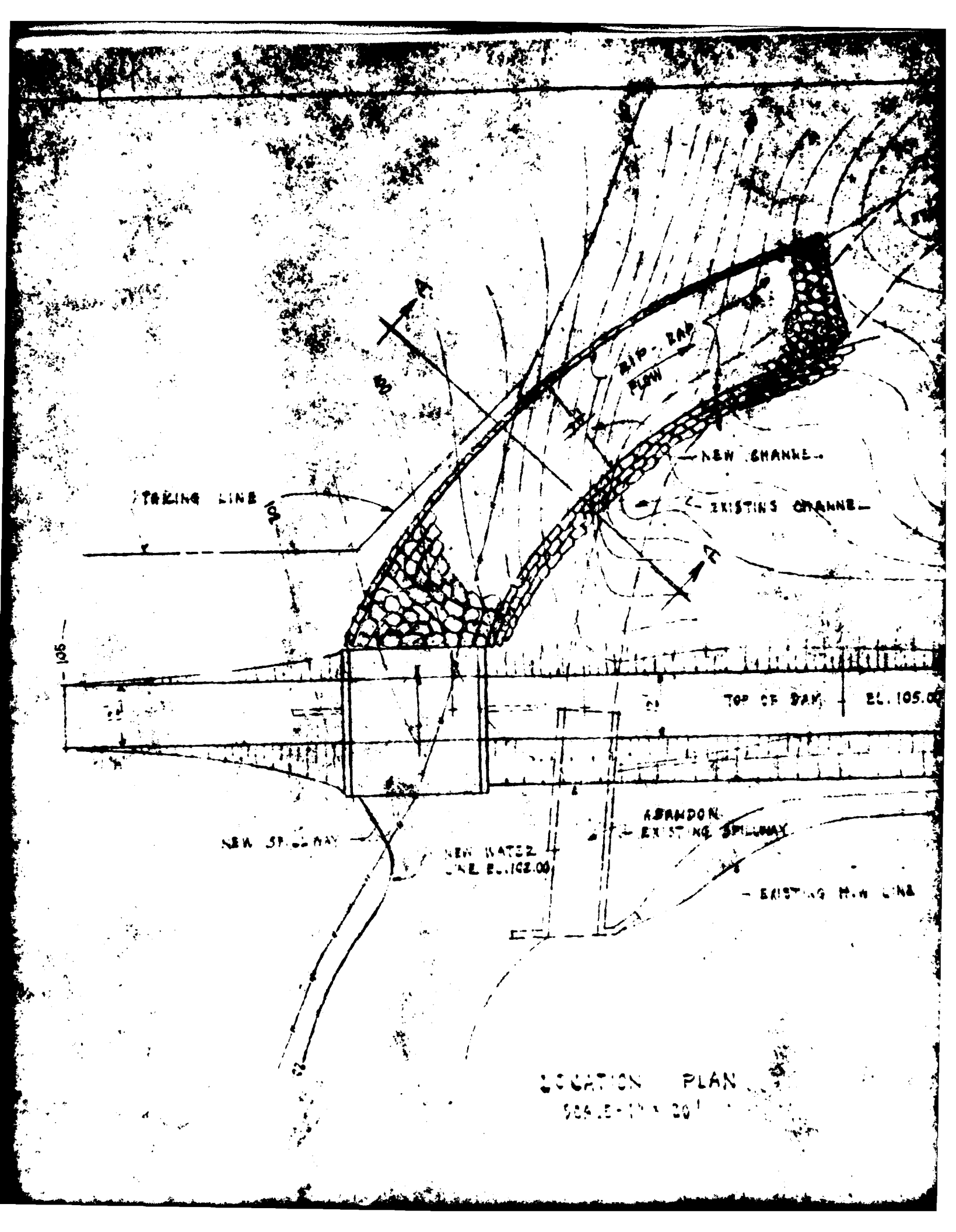
UNCLASSIFIED NL

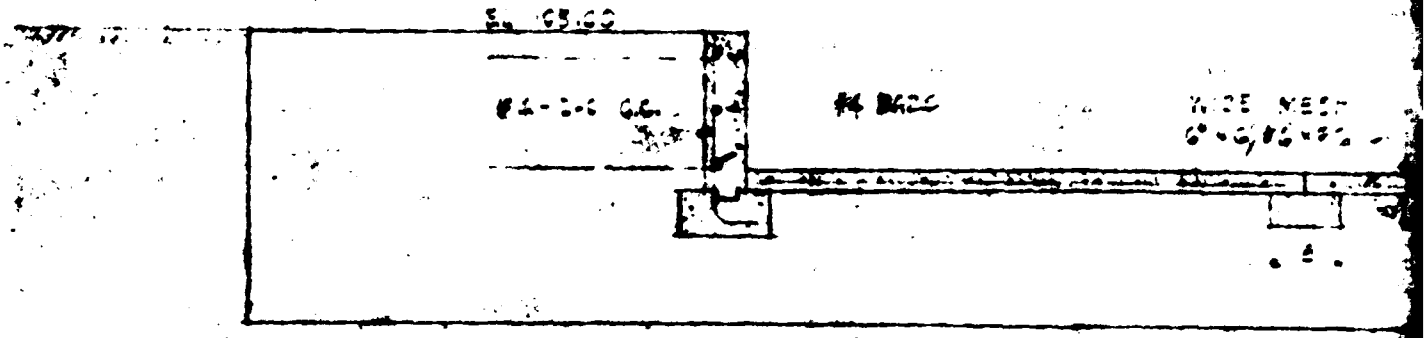


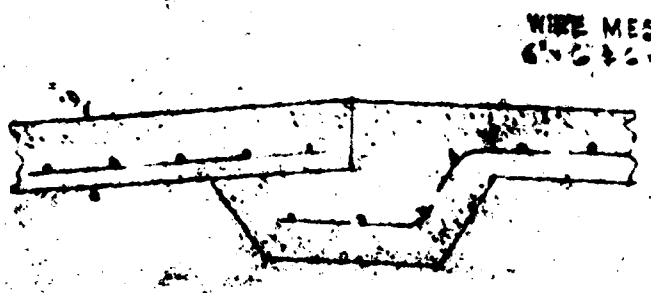


SECTION B-B

105


RIP-RAP
FLOW
NEW CHANNEL
EXISTING CHANNEL
TREELINE
TOP OF DAM
EL. 105.0
ABANDON
EXISTING SPILLWAY
NEW SPILLWAY
NEW WATER
LINE EL. 102.00
EXISTING H.W. LINE
LOCATION PLAN



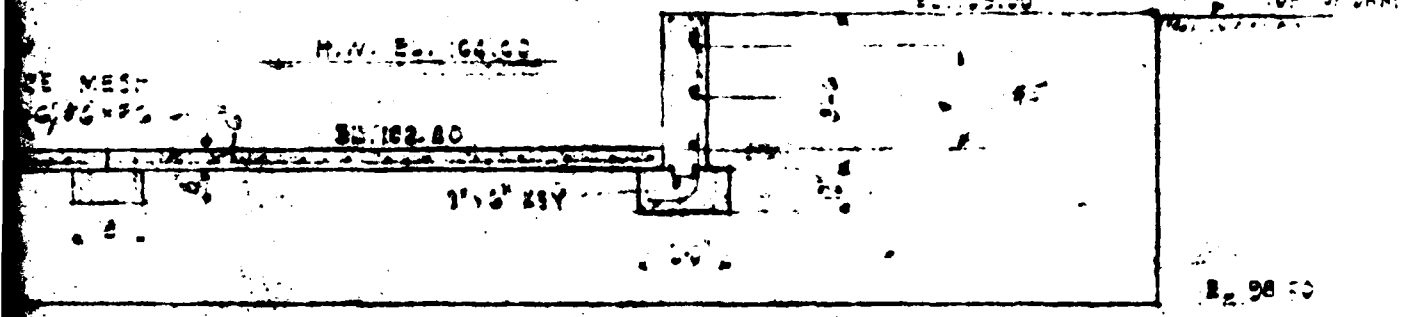


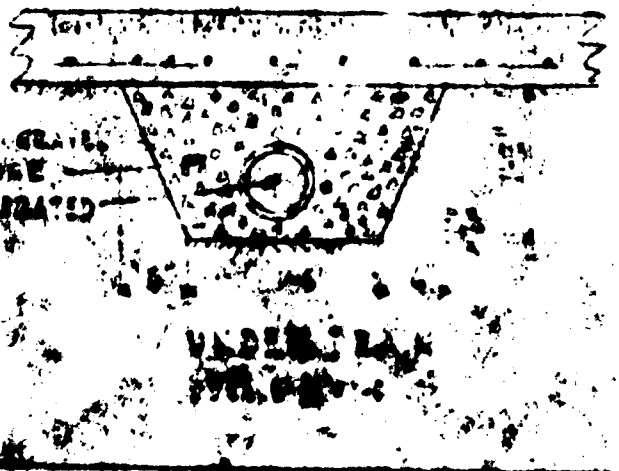
SECTION

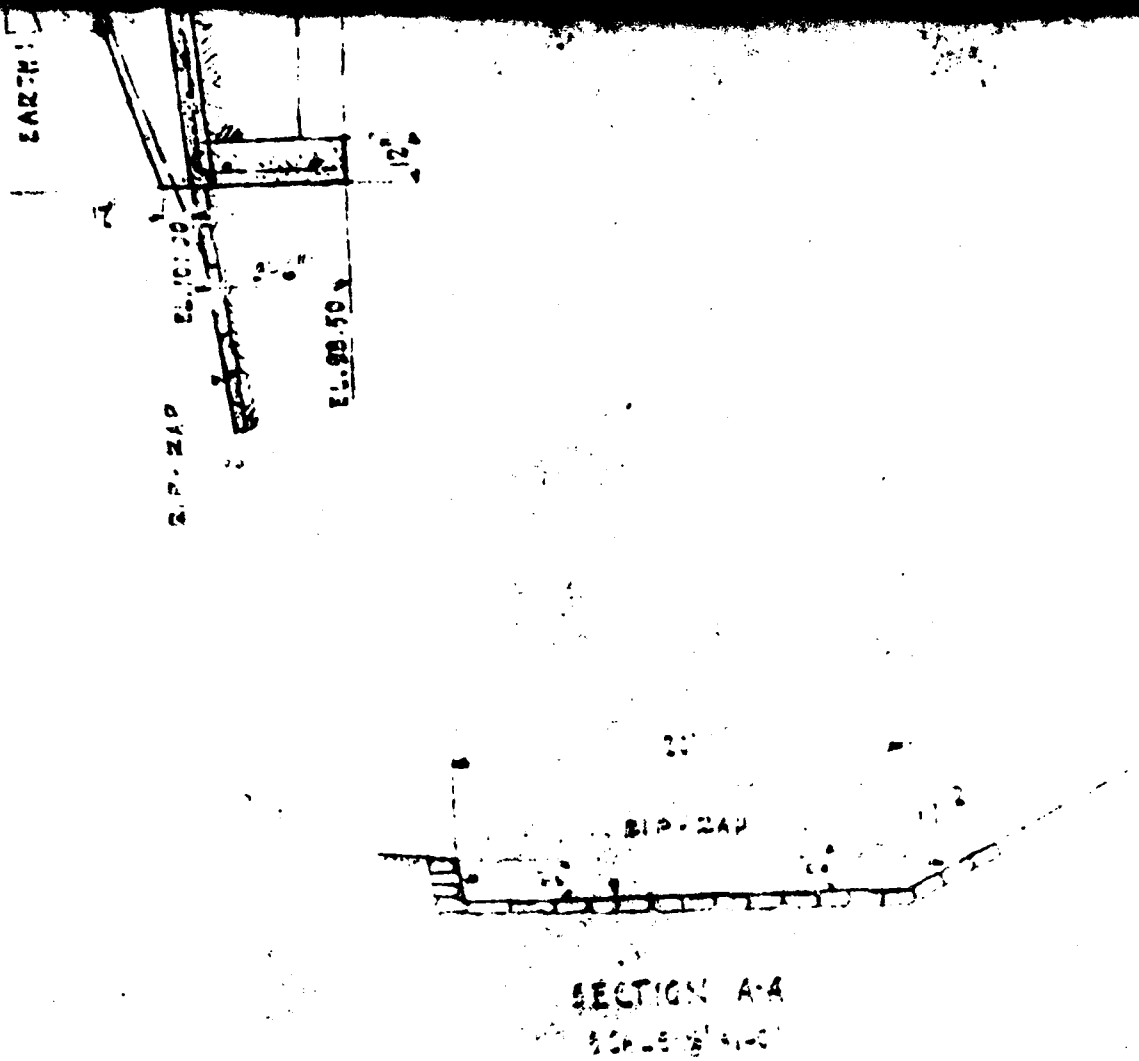
EARTH

SCALE

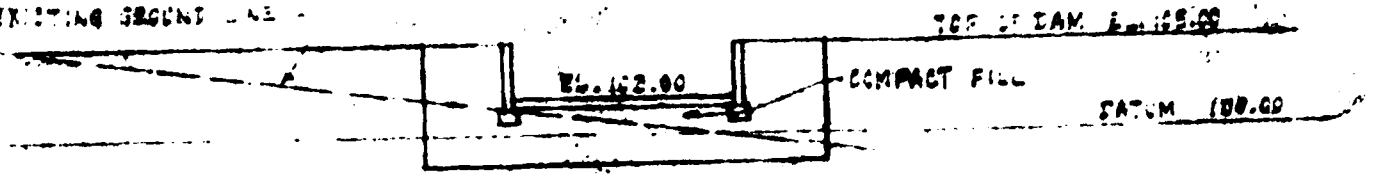
TOP OF DAM







SECTION A-A



SECTION ALONG ℄ DAM

SCALE - 1" = 20'

HORIZ. 1" = 20'

INCREASING STORAGE CAPACITY

PROSPECT RESERVOIR

VILLAGE OF GOSHEN ORANGE COUNTY

SCALE - STATED

ASSOCIATE - JOSEPH A. KESTNER JR.
CONSULTING ENGINEER
TROY, N.Y.

CHUMA
CONSU
& TA
MID

REF. N. BL. 17
ENGR. BL. 5

SHEET 2 OF 5

DATUM 100.00

CAPACITY
ERVOIR
NGE COUNTY, N.Y.

JUNE 1963

CHUMAZ & MC GOUGH
CONSULTING ENGINEERS
4 FINLAW AVE.
MIDDLETOWN N.Y.