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NATIONAL DAM SAFETY PROGRAM. ELECTRIC LIGHT POND DAM (NJ00245),--ETC(U)
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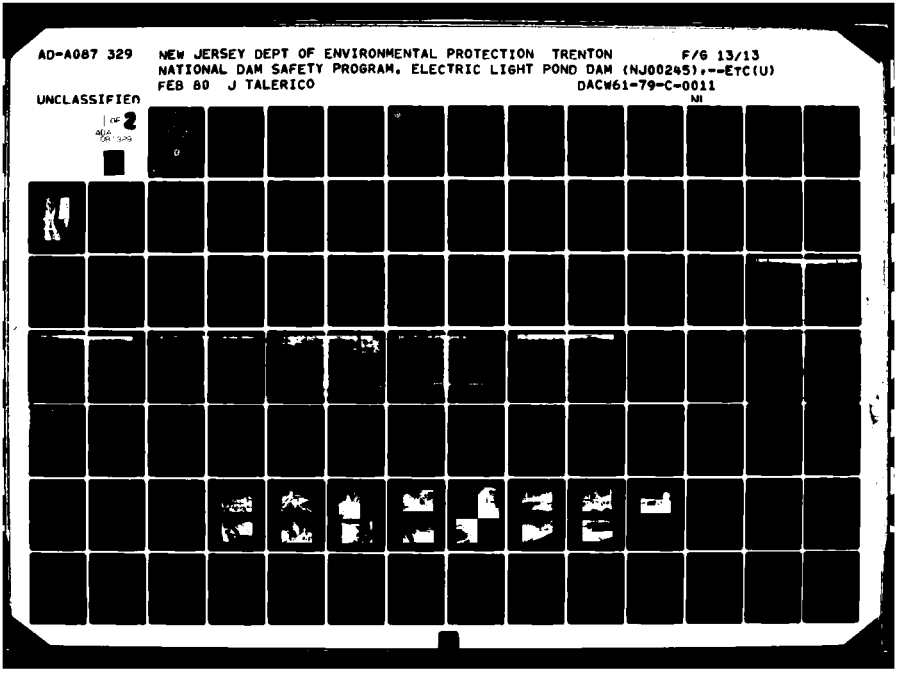

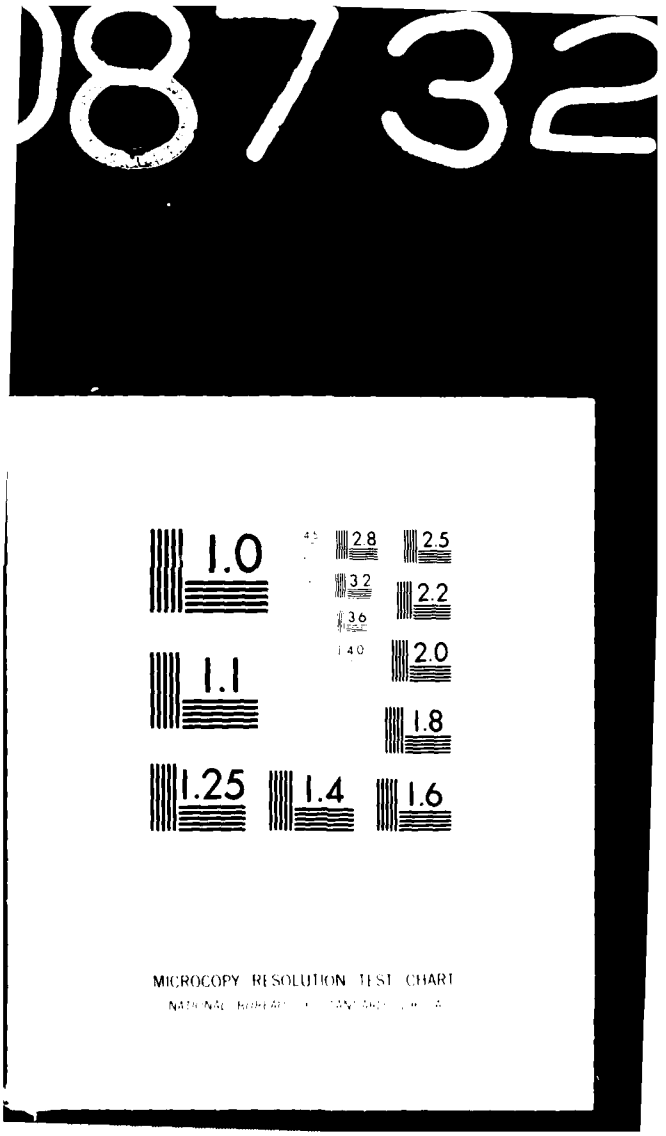
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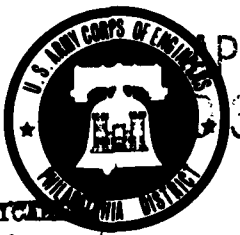
LEVEL II

HACKENSACK RIVER BASIN
PASCACK BROOK, BERGEN COUNTY
NEW JERSEY

ELECTRIC LIGHT POND DAM

NJ 00245

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



DEPARTMENT OF THE ARMY
Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

FEBRUARY 1980

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: NJ00245
2. GOVT ACCESSION NO.: AD-A087329
3. RECIPIENT'S CATALOG NUMBER:

4. TITLE (and Subtitle): ~~Phase I Inspection Report~~ National Dam Safety Program. Electric Light Pond Dam (NJ00245) ~~Bergen County, New Jersey~~ Hackensack River Basin, Pascack Brook, Bergen County, New Jersey. Phase I Inspection Report.
5. TYPE OF REPORT & PERIOD COVERED: (9) FINAL rept.
6. PERFORMING ORG. REPORT NUMBER:
7. AUTHOR(s): ~~John Talerico~~ (15)
8. CONTRACT OR GRANT NUMBER(s): DACW61-79-C-0011
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Fredric R. Harris, Inc. 453 Amboy Ave. Woodbridge, NJ 07095
10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: (12) 118
11. CONTROLLING OFFICE NAME AND ADDRESS: NJ Department of Environmental Protection, Division of Water Resources, P.O. Box CN029, Trenton, NJ 08625
12. REPORT DATE: (11) Feb 80
13. NUMBER OF PAGES: 101
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): U.S. Army Engineer District, Philadelphia, Custom House, 2d & Chestnut Streets, Philadelphia, PA 19106 (10) John Talerico
15. SECURITY CLASS. (of this report): Unclassified
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

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

18. SUPPLEMENTARY NOTES

Copies are obtainable from National Technical Information Service, Springfield, Virginia 22151.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dams
Dam Safety
Visual Inspection
Structural analysis
Spillways
National Dam Safety Program
Electric Light Pond Dam, NJ

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

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO
NAPEN-N

21 JUL 1980

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Electric Light Pond Dam in Bergen County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Electric Light Pond Dam, a high hazard potential structure, is judged to be in fair overall condition. The dam's three spillways are considered inadequate because a flow equivalent to 91 percent of the Spillway Design Flood -SDF- would cause the dam to be overtopped. The SDF, in this instance, is one half of the Probable Maximum Flood (PMF). The decision to consider the spillways inadequate instead of seriously inadequate is based on the determination that overtopping of the dam would not significantly increase the hazard to loss of life downstream from that which would exist just before overtopping failure. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillways' adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within twelve months from the date of approval of this report. This should include the installation of a tailwater gage and a determination of the ability of the dam to withstand overtopping. Within three months of the consultant's findings, remedial measures to ensure spillway adequacy should be initiated.

b. The following remedial actions should be completed within twelve months from the date of approval of this report:

(1) Investigate the embankment for animal burrows and fill in the burrows with an impervious material.

(2) Repair all eroded, cracked and spalled concrete with epoxy cement.

(3) Clean and repaint all the steel-work on the operating mechanisms. Repair the stem stand concrete support and install a new valve at the west spillway.

(4) Install new discharge conduit at the west spillway.

(5) Install an access bridge across the east spillway and install a new sluice gate with the operating mechanism located on the access bridge.

(6) All brush and trees should be removed from the downstream slope and emergency spillway to avoid problems which may develop from their roots. The embankment should then be seeded to develop a growth of grass for surface erosion protection.

(7) The owner should inspect the dam for seepage during the refilling operation.

c. The owner should develop an emergency action plan (if one is not already available) outlining actions to be taken by the operator to minimize downstream effects of an emergency and establish a flood warning system for the downstream communities within three months from the date of approval of this report.

d. Within one year from the date of approval of this report the owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Harold Hollenbeck of the Ninth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

NAPEN-N
Honorable Brendan T. Byrne

An important aspect of the Dam Inspection Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

1 Incl
As stated

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

Copies furnished:
Mr. Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

Mr. John O'Dowd, Acting Chief
Bureau of Flood Plain Regulation
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

ELECTRIC LIGHT POND DAM (NJ00245)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 12 November and 3 December 1979 by Harris-ECI Associates, Inc., under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Electric Light Pond Dam, a high hazard potential structure, is judged to be in fair overall condition. The dam's three spillways are considered inadequate because a flow equivalent to 91 percent of the Spillway Design Flood -SDF- would cause the dam to be overtopped. The SDF, in this instance, is one half of the Probable Maximum Flood (PMF). The decision to consider the spillways inadequate instead of seriously inadequate is based on the determination that overtopping of the dam would not significantly increase the hazard to loss of life downstream from that which would exist just before overtopping failure. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillways' adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within twelve months from the date of approval of this report. This should include the installation of a tailwater gage and a determination of the ability of the dam to withstand overtopping. Within three months of the consultant's findings, remedial measures to ensure spillway adequacy should be initiated.

b. The following remedial actions should be completed within twelve months from the date of approval of this report:

(1) Investigate the embankment for animal burrows and fill in the burrows with an impervious material.

(2) Repair all eroded, cracked and spalled concrete with epoxy cement.

(3) Clean and repaint all the steel-work on the operating mechanisms. Repair the stem stand concrete support and install a new valve at the west spillway.

(4) Install new discharge conduit at the west spillway.

(5) Install an access bridge across the east spillway and install a new sluice gate with the operating mechanism located on the access bridge.

(6) All brush and trees should be removed from the downstream slope and emergency spillway to avoid problems which may develop from their roots. The embankment should then be seeded to develop a growth of grass for surface erosion protection.

(7) The owner should inspect the dam for seepage during the refilling operation.

c. The owner should develop an emergency action plan (if one is not already available) outlining actions to be taken by the operator to minimize downstream effects of an emergency and establish a flood warning system for the downstream communities within three months from the date of approval of this report.

d. Within one year from the date of approval of this report the owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

APPROVED: James G. Ton

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE: 7 July 1980

HACKENSACK RIVER BASIN

PASCACK BROOK, BERGEN COUNTY

NEW JERSEY

ELECTRIC LIGHT POND DAM

NJ00245

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

DEPARTMENT OF THE ARMY

PHILADELPHIA DISTRICT, CORPS OF ENGINEERS

PHILADELPHIA, PENNSYLVANIA 19106

JANUARY, 1980

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name:	Electric Light Pond Dam, I.D. NJ 00245
State Located:	New Jersey
County Located:	Bergen
Stream:	Pascack Brook
River Basin:	Hackensack River
Date of Inspection:	November 12 and December 3, 1979

Assessment of General Condition

Electric Light Pond Dam is an earthfill embankment dam containing a west spillway, an east spillway, and just right of the east spillway, an emergency spillway. The overall condition of the dam is considered fair. There is no major sign of distress or instability of the embankment although minor surface cracks were noted in the emergency spillway. The operating mechanism for the east spillway low level outlet is missing, and at the time of inspection, the west spillway outlet control was not operative. The hazard potential is rated as "high".

The adequacy of Electric Light Pond Dam is considered questionable in view of its lack of spillway capacity to pass the SDF (1/2 PMF) without overtopping the dam. The spillway is capable of passing a flood equal to 45 percent of the PMF (90 percent of the 1/2 PMF), and is rated "inadequate".

At present, the engineering data available is not sufficient to make a definitive statement on the stability of the dam. The following actions, therefore, are recommended along with a timetable for their completion. All recommended studies should be conducted by an engineer qualified in the design and construction of dams.

1. Carry out a more precise hydrologic and hydraulic analysis of the dam within twelve months, to determine the need and type of mitigating measures necessary. Based on the results of these studies, remedial measures should be instituted. This should include the installation of a tailwater gage.

2. Investigate embankment for animal burrows and fill in the burrows with an impervious material.

3. Repair all eroded, cracked and spalled concrete with epoxy cement, within twelve months.

4. Clean and repaint all the steel-work on the operating mechanisms. Repair stem stand concrete support and install a new valve at the west spillway. This work should be completed within twelve months.

5. Install new discharge conduit at west spillway, within twelve months.

6. Install access bridge across east spillway and install new sluice gate with operating mechanism located on access bridge, within twelve months.

7. All brush and trees should be removed from the downstream slope and emergency spillway to avoid problems which may develop from their roots. The embankment should then be seeded to develop a growth of grass for surface erosion protection. This program should be started within twelve months.

8. The owner should develop an emergency action plan (if one is not already available) outlining actions to be taken by the operator to minimize downstream effects of an emergency and establish a flood warning system for the downstream communities within three months.

9. The owner should inspect the dam for seepage during the refilling operation.

Furthermore, while of a less urgent nature, the following additional action is recommended and should be carried out within twenty-four months.

The owner should develop within one (1) year after formal approval of the report, written operating procedures and a periodic maintenance plan to insure the safety of the dam.

John P. Talerico

John P. Talerico, P.E.
HARRIS-ECI ASSOCIATES

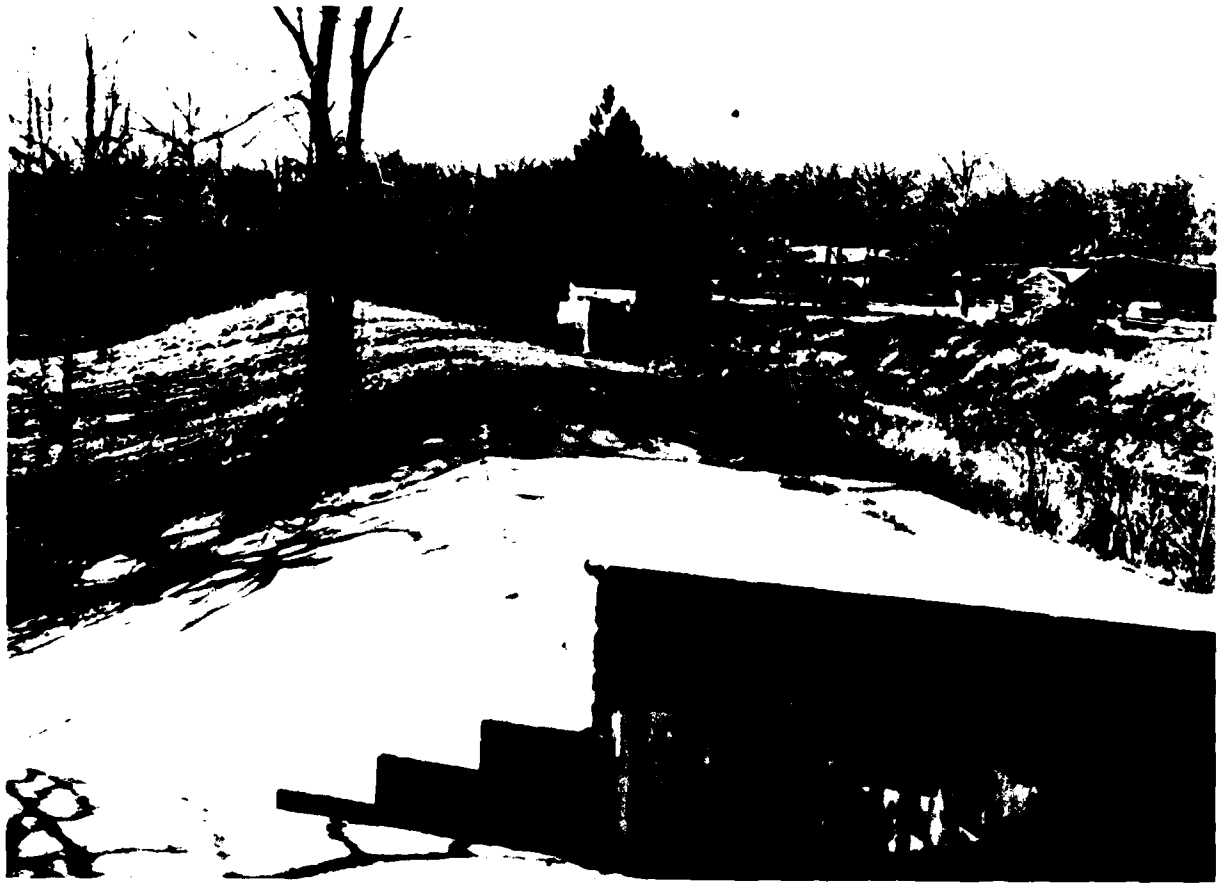

Photo taken on February 8, 1980

E L E C T R I C L I G H T P O N D D A M

View from East spillway (portion of right abutment in foreground) toward Emergency spillway, embankment, West spillway and abandoned powerhouse to its right. Water in the reservoir, right, has been drained for dry dredging operations.

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 theChief 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 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. 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 continued care and inspection can there be any chance that unsafe conditions be detected.

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. 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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NATIONAL DAM SAFETY PROGRAM

ELECTRIC LIGHT POND DAM, I.D. NJ00245

SECTION 1

1. PROJECT INFORMATION

1.1 General

a. Authority

The National Dam Inspection Act (Public Law 92-367, 1972) provides for the National Inventory and Inspection Program by the U.S. Army Corps of Engineers. This inspection was made in accordance with this authority under Contract C-FPM No. 35 with the State of New Jersey who, in turn, is contracted to the Philadelphia District of the Corps of Engineers, and was carried out by the engineering firm of Harris-ECI Associates, Woodbridge, New Jersey.

b. Purpose of Inspection

The visual inspection of Electric Light Pond Dam was made on November 12, 1979. The purpose of the inspection was to make a general assessment as to the structural integrity and operational adequacy of the dam embankment and its appurtenant structures.

c. Scope of Report

The report summarizes available pertinent data relating to the project; presents a summary of visual observations made during the field inspections; presents an evaluation of hydrologic and hydraulic conditions at the site; presents an evaluation as to the structural adequacy of the various project features; and assesses the general condition of the dam with respect to safety.

1.2 Description of Project

a. Description of Dam and Appurtenances

Electric Light Pond Dam is an earthfill dam approximately 588 feet long and 20.6 feet high with two main spillways and one emergency spillway. The main spillways are located at the east and west end of the dam with the emergency spillway located immediately west of the east spillway. The top of the embankment is 12 feet wide and the upstream and downstream faces are sloped at 2.5H: 1V and 2H: 1V, respectively. A 12-inch wide concrete core wall extends from the west spillway 94 feet into the embankment.

The main spillways are ungated modified concrete ogee overflows with crest elevations 5.6 feet below the top of the embankment. The east spillway is 20.0 feet wide while the west spillway is 47 feet wide and is reinforced by two concrete buttresses. The emergency concrete spillway which was constructed over the section of embankment that failed in 1945, is 66 feet wide with a crest elevation 2.5 feet above the main spillways. A steel sheeting cutoff wall is located under the emergency spillway and extends 21 feet into the embankment.

Two 48-inch concrete pipes located at the east and west spillways are used to lower the lake. They are controlled by sluice gates on the upstream face of the dam. The discharge through the east spillway is directly into the downstream channel while the discharge through the west spillway goes through an abandoned power house before entering the channel. The gate at the west spillway is a hand operated rising stem steel gate. There is no operating mechanism at the east spillway and the gate must be removed manually to open it.

Two boring programs were performed for this dam. In 1946, Riley Engineering and Drilling Co. drilled six holes along the dam's crest (Plate 9). An additional program was performed in 1951. A Hobelmon, Argenti, and Kuhn construction plan (Plate 10), shows four toe borings. The driller was not identified.

The six crest borings classify the embankment as sand and gravel with the foundation, generally, clay, fine sand and gravel. Rock, indentified as sandstone, is greater than 20 feet below the dam's toe.

A generalized description of soil conditions is contained in Report No. 4, Bergen and Hudson Counties, Engineering Soil Survey of New Jersey, by Rutgers University. The report describes the downstream area as recent alluvium. The remaining portions of the lake is classified as stratified drift.

Recent alluvium are soils transported to their present location by surface water and stream flow. The soils range in size from clayey silt to gravelly silt and sand. They have been altered from their parent material by alluvial action and sedimentation. Stratified drift is non-residual materials deposited by the Wisconsin glacier. The drift is assorted, relatively homogeneous material, mainly sand sizes, with varying amounts of silt and gravel. The underlying rock is deep and is described on Geologic Overlay Sheet 23 as the Brunswick Formation. This formation is primarily shale with interbedded sandstone.

b. Location

Electric Light Pond Dam is located on Pascack Brook in the Borough of Park Ridge, Bergen County, New Jersey. It is approximately 1,300 ft. upstream from the Park Avenue Bridge and is accessible from Mill Avenue.

c. Size Classification

According to the "Recommended Guidelines for Safety Inspection of Dams" by the U.S. Department of the Army, Office of the Chief of Engineers, the dam is classified in the dam size category as being "small", since its storage area of 65 acre-feet is less than 1,000 acre-feet. The dam is also classified as small because its height of 20.6 feet is less than 40 feet. The overall size classification of Electric Light Pond is small.

d. Hazard Classification

A hazard potential classification of "high" has been assigned to the dam on the basis that a hypothetical failure would result in excessive damage to commercial and borough owned property downstream of the dam. In addition, the immediate downstream area is used for recreational purposes with a park, pool, and tennis courts so that the possibility exists of the loss of more than a few lives in the event of dam failure.

e. Ownership

Electric Light Pond Dam is owned by:

Borough of Park Ridge
55 Park Avenue
Park Ridge, New Jersey 07656

Attention: Mr. Charles E. Gasior
Borough Administrator
(201) 573-1800

f. Purpose

Electric Light Pond Dam is presently used for recreational and esthetic purposes only. It was originally used to generate electricity.

g. Design and Construction History

Information concerning the original dam, which was constructed around 1900, is very limited. During the July, 1945 flood, the dam was overtopped and a section of embankment failed. The extent of the damages caused by the failure are not available. In 1952, modifications and reconstruction of the existing dam began with the intention of increasing the overflow capacity. To accomplish this the two existing spillways were lowered and an emergency spillway was provided at the area of embankment failure. Construction was completed in 1954, and since then there have not been any additional modifications.

h. Normal Operation Procedures

The discharge from the pond is normally unregulated and is allowed to naturally balance discharge with inflow into the pond. There are two low-level outlets in the pond, one at the east spillway and one at the west spillway. The outlets are controlled by sluice gates which when open discharge the water through 4 ft. concrete openings. The one at the east spillway discharges directly into the downstream channel while the one at the west spillway discharges through the abandoned powerhouse into the downstream channel. The gate through the west spillway is manually operated while the gate at the east spillway is presently inoperative.

1.3 Pertinent Data

a. Drainage Area	14.2 sq.mi.
b. Discharge at Dam Site	
Maximum known flood at dam site:	July 23, 1945. Height of overtop unknown.
Ungated spillway capacity at elevation of top of dam:	4,634 cfs (elev. 137.6) NGVD
Total spillway capacity at maximum pool elevation (SDF):	5,490 cfs (elev. 137.84) NGVD
c. Elevation (Feet above NGVD)	
Top of dam:	137.6
Maximum pool design surcharge (SDF):	137.84
Recreation pool:	132.2
Spillway Crest - East and West:	132.0
Emergency spillway crest:	134.5
Streambed at centerline of dam:	117.0 (estimated)
Maximum tailwater - East:	120.5 (estimated)
- West:	119.5 (estimated)
d. Reservoir	
Length of maximum pool:	1,700 ft.(estimated)
Length of recreation pool:	1,400 ft.(estimated)
e. Storage (acre-feet)	
Recreation pool:	22 (elevation 132.2 NGVD)
Top of dam:	63.0
Maximum pool (SDF):	65.0
f. Reservoir Surface (acres)	
Top of dam:	9
Spillway crest:	7

g. Dam

Type:	Earth fill with three concrete spillways: 2 main (East & West) and one emergency spillway.
Length:	588 ft.
Height:	20.6 ft.
Top width:	12 ft.
Side slopes - Upstream:	2.5H:1V
- Downstream:	2.0H:1V
Zoning:	Unknown
Impervious core:	Concrete = 94± ft; Steel sheeting = 20± ft; and remainder is unknown
Cutoff:	None
Grout curtain:	None

h. Diversion and Regulating Tunnel

N/A

i. Spillway

Type - East and West:	Modified concrete ogee; ungated.
Emergency:	Concrete; trapezoidal; ungated.
Length of weir - East:	20 ft.
- West:	47 ft.
- Emergency:	66 ft.
Crest elevations - East and West:	132 ft. NGVD
Emergency:	134.5 ft. NGVD
Gates:	None
U.S. Channel:	Electric light pond
D/S Channel:	D/S channel from East spillway merges with D/S channel from West spillway at a distance of approx. 800 ft. from East spillway.

j. Regulating Outlets

Low level outlet:	2-48-inch pipes
Controls:	Manually operated gate valve (now, in open position)
Emergency gate:	None
Outlet:	122.2 NGVD

SECTION 2

2. ENGINEERING DATA

2.1. Design

Computations pertaining to the original construction of the dam are not available from the New Jersey Department of Environmental Protection (NJ-DEP) or from the owner. Drawings dated 1940, are on file at the Trenton office of the NJ-DEP. Also on file at the NJ-DEP are plans for reconstruction of the dam in 1952.

Some soil data is available from borings taken through the existing embankment in 1946 and in 1951. The sampling was done as part of the modification and reconstruction of the dam. In addition, other borings were taken within the pond in 1975 for the dredging of the pond. No soil properties were given for any of the borings.

2.2 Construction

No records have been found covering the original construction of the dam. However, there is information available pertaining to the repairs and modifications of the dam during 1952-1954. This information, in the form of the contract drawings, specifications and progress reports, is on microfiche at the NJ-DEP. A brief summary of the reconstruction history has been provided in Section 1.2g.

2.3 Operations

No records of operation of the dam are available. The pond is allowed to operate naturally without regulation.

2.4 Evaluation

a. Availability

The engineering data concerning the reconstruction of the dam and the boring data of the existing embankment is available from the NJ-DEP.

b. Adequacy

The engineering data available was adequate to perform hydrologic and hydraulic computations, but was insufficient to perform stability computations. A preliminary assessment could be made based on visual observations.

c. Validity

Information contained in the drawings and checked by limited field measurements appears to be valid.

SECTION 3

3. VISUAL INSPECTION

3.1 Findings

a. General

The visual inspection of Electric Light Pond Dam revealed the dam and spillways to be in fair condition and in need of repairs.

At the time of the visual inspection water in the reservoir was drained to permit dry dredging operations currently being performed. The reservoir water was being channeled into low-level outlet drains at the abandoned powerhouse near the west spillway and at the east spillway. According to the owner, the reservoir should be refilled during the summer of 1980.

b. Dam

The earth embankment appears to be sound. No surface cracking on the embankment or at the toe was noted. Erosion of the embankment was limited to a worn footpath behind the left abutment of the west spillway. No misalignment of the embankment in the horizontal or vertical plane was observed. Numerous trees, small and medium sized, are growing on top and on both sides of the embankment. No cracks or spalling of the concrete core, or parting of the steel sheeting on top of the embankment, were noticed. No seepage or sloughing was found in any portion of the downstream face of the embankment. No evidence of burrowing by animals was observed; however, at the time of the inspection the embankment was covered with leaves, therefore the possibility does exist that there may be burrow holes in the embankment.

c. Appurtenant Structures

1. Spillways

Three concrete spillways exist-one on the embankment's west side, one on its east side (emergency spillway) and one adjacent to the emergency spillway. No seepage or leakage was noticed at any of the spillways. Severe spalling was noticed at the left interface and at the two buttresses of the west spillway. Minor spalling was noticed at the right interface of the west spillway. A vertical crack was noticed in the retaining wall on the right side of the west spillway. Severe spalling and a horizontal crack were noticed on the right abutment of the east spillway. Surface cracks along the emergency spillway were noticed with trees and shrubs growing in these cracks. A longidutinal crack exists across the east spillway. Horizontal and vertical alignment of the crests of the spillways appeared good.

2. Outlet Works

There was no cracking or spalling of the concrete surfaces in the stilling basins. A four foot diameter concrete sluice way with trash rack , located at the east base of the abandoned powerhouse and west of the west spillway, is in good condition. The sluice gate for this west spillway was open for the above mentioned current dredging operations. Water through the powerhouse exits through two concrete notches (3ft. x 2 ft. & 5 ft. x 3 ft.) at the south base of the powerhouse into the channel. A four foot diameter concrete sluice way, at the west base of the east spillway, is in good condition. No sliding gate and no operating mechanism were present at the sluice way. Water through the sluice way at the east spillway exits onto a concrete apron.

The concrete foundation supporting the operating mechanism is substantially deteriorated and additional bracing (steel channels) have been added to support the stand. Also, at the time of inspection the representatives from the borough were unable to lift the hand wheel over the valve stem to demonstrate the gate operation.

d. Reservoir Area

The reservoirs' side slopes are moderate. There is no indication of slope instability. As previously mentioned, water in the reservoir was drained to permit dry dredging operations for the removal of silt buildup.

e. Downstream Channel

Two downstream channels exist--one from the west spillway and one from the east. These channels meet approximately 800 feet from the east spillway. Channels are in good condition.

Approximately 700 feet from the east spillway, 100 feet before both channels meet, a roadway bridge crosses the east channel.

SECTION 4

4. OPERATIONAL PROCEDURES

4.1 Procedures

There are no formal operating procedures established at Electric Light Pond Dam. It is used to impound water for recreational activities with the level of the lake normally being maintained by unregulated discharge over the spillways. Prior to major storms the level in the pond is lowered by opening the sluice gate in the west spillway to allow for the additional runoff.

4.2 Maintenance of the Dam

The dam is maintained by the Borough of Park Ridge. There is no program of regular inspection and maintenance of the dam and appurtenant structures.

4.3 Maintenance of Operating Facilities

The low-level outlet operating facilities consist of two sluice gates. The operating mechanism for the east gate is missing and the gate is removed manually when they need to open it. The opening and closing of the gates is the responsibility of the Electric and Water Division of the Borough.

4.4 Evaluation

The dam and pond appear to be maintained in a serviceable condition; although the concrete has been allowed to deteriorate without repair. Such repairs as recommended should be undertaken to prevent further deterioration.

S E C T I O N 5

5. HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design

The drainage area above Electric Light Pond Dam is approximately 14.2 square miles. A drainage map of the watershed of the dam site is presented on Plate 1, Appendix D.

The topography within the basin is moderately sloped. Elevations range from approximately 640 feet above NGVD at the north end of the watershed to about 132 feet at the dam site. Land use patterns within the watershed are 50% woodland and 50% residential development scattered around the basin.

The evaluation of the hydraulic and hydrologic features of the dam and lake was based on criteria set forth in the Corps Guidelines and additional guidance provided by the Philadelphia District, Corps of Engineers. The Spillway Design Flood for the dam falls in a range of ½ PMF to PMF. In this case, the lower end of the range, ½ PMF, is chosen since the dam height is at the middle to lower range of the size catagory.

The probable maximum flood (PMF) was calculated from the probable maximum precipitation using Hydrometeorogical Report No. 33 with standard reduction factors.

The unit hydrograph was determined by Snyder's Method. Snyder's peaking coefficient Cp was specified by the COE as 0.83. The synthetic unit hydrograph was developed with the aid of the HEC1-DB program.

Initial and infiltration loss rates were applied to the Probable Maximum Precipitation to obtain rainfall excesses. The rainfall excesses were applied to the unit hydrograph to obtain the PMF and various ratios of PMF utilizing program HEC1-DB.

The SDF peak outflow calculated for the dam is 5490 cfs. This value is derived from the ½ PMF, and results in overtopping of the dam, assuming that the lake was originally at the spillway crest elevation.

The stage-outflow relation for the spillway was determined from the geometry of the spillway and dam utilizing HEC1-DB program.

The reservoir stage-storage capacity relationship was computed directly by the conic method, utilizing the HEC1-DB program. The conic method assumes that the reservoir capacity resembles a series of vertically stacked cones. The reservoir surface areas at various elevations were measured by planimeter from a U.S.G.S. Quadrangle topographic map. Reservoir storage capacity included surcharge levels exceeding the top of the dam, and the spillway rating curve was based on the assumption that the dam remains intact during routing.

A breach analysis indicates that the hazard potential for loss of life downstream, due to dam failure from overtopping, is not significantly greater than that which exists without failure.

Drawdown calculations indicate that to empty the lake to an elevation of approximately 122.2' NGVD through the two low-level sluices would take 0.9 hours, assuming a 2 cfs/square mile inflow.

b. Experience Data

No record of reservoir stage or spillway discharge are maintained for this site.

c. Visual Observation

Two downstream channels exist-one from the west spillway and one from the east-joining approximately 800 feet downstream from the east spillway. Channels are well defined with trees growing on their banks. A roadway bridge crosses the east channel approximately 700 feet from the east spillway. A municipal building, Borough of Park Ridge, a lumber yard and a recreation area are approximately 1200 feet from the east spillway.

The reservoir's side slopes are moderate and do not exhibit signs of instability. At the time of the inspection the water in the reservoir was drained to permit dry dredging operations for the removal of silt buildup.

d. Overtopping Potential

A storm of magnitude equivalent to the SDF would cause overtopping of the dam to a height of 0.27 feet. Computations indicate that the dam can pass approximately 45% of the PMF without overtopping the dam crest. Since one half the PMF is the Spillway Design Flood (SDF) for this dam, according to the Recommended Guidelines for Safety Inspection of Dams by the Corps of Engineers, the spillway capacity of the dam is assessed as "inadequate".

SECTION 6

6. STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The dam structure shows no sign of cracking,settlement or differential movement that would suggest instability. Since the pond was drained for the dredging operation it could not be determined whether or not there is seepage. Trees and brush on the top and both sides of the embankment as well as along the top of the emergency spillway could pose a threat to stability and should be removed.

b. Design and Construction Data

No design computations were uncovered during the report preparation phase. No data was obtained on the type and limits of core between the steel sheet piling and the concrete core sections. No embankment or foundation soil parameters are available for carrying out a conventional stability analysis on the embankment. No construction data or specifications relating to the degree of embankment compaction are available for use in the stability analysis.

c. Operating Records

No operating records are available relating to the stability of the dam. During the July 1945 flood, the dam was overtoppped washing out a portion of the embankment near the east spillway.

d. Post-Construction Changes

A history of the dam is given in Section 1.2g. The principal changes relating to the stability of the dam are: the widening of the embankment, the lowering of the two main spillways and the construction of an emergency spillway in 1952.

e. Static Stability

A static stability analysis was not performed for Electric Light Pond Dam because the lack of data on which to base assumptions of material properties within embankment zones might produce misleading results, but based on the findings of the visual inspection, the preliminary assessment of static stability is that it is satisfactory.

f. Seismic Stability

The dam is located in Seismic Zone 1, as defined in Recommended Guidelines for Safety Inspection of Dams, prepared by the Corps of Engineers. In general, projects located in Seismic Zones 0,1 and 2 may be assumed to present no hazard from earthquake, provided the static stability conditions are satisfactory and conventional safety margins exist. Since static stability safety factors have not been confirmed, it cannot be stated that seismic stability is satisfactory.

SECTION 7

7. ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety

The dam has been inspected visually and a review has been made of the available engineering data. This assessment is subject to the limitations inherent in the visual inspection procedures stipulated by the Corps of Engineers for a Phase 1 report.

The safety of Electric Light Pond dam is in question because the dam does not have adequate spillway capacity to pass the PMF or even ½ of the PMF without overtopping. The dam's present spillway capacity is about 45% of the PMF.

Embankment overtopping will carry with it a high risk of total embankment failure by the erosive action of the overflowing water.

No definitive statement pertaining to structural safety can be made without knowledge of the phreatic surface across the embankment section , the engineering properties of the various embankment and foundation materials and their distribution or zoning throughout the dam's section.

b. Adequacy of Information

The information uncovered was adequate to perform hydrologic and hydraulic computations. The data was insufficient to perform an adequate evaluation of dam stability.

c. Urgency of Studies

Carry out a more precise hydrologic and hydraulic analysis within twelve months, to determine the need and type of mitigating measures necessary. This should include the installation of a tailwatergage, and determination of the ability of the dam to withstand overtopping.

7.2 Remedial Measures

a. Alternatives for increasing Spillway Capacity

Alternatives for increasing spillway capacity are as follows:

1. Increase the embankment height thus permitting a higher discharge to pass over the spillway and reducing the possibility of overtopping.

2. Lower the emergency spillway crest elevation.

3. Widen the emergency spillway structure.

4. A combination of any of the above alternatives

b. Recommendations to be undertaken within 12 months

1. Investigate embankment for animal burrows and fill in the burrows with an impervious material.

2. Repair all eroded, cracked and spalled concrete with epoxy cement.

3. Clean and repaint all the steel-work on the operating mechanisms. Repair stem stand concrete support and install a new valve at the west spillway.

4. Install new discharge conduit at west spillway.

5. Install access bridge across east spillway and install new sluice gate with operating mechanism located on access bridge.

6. All brush and trees should be removed from the downstream slope and emergency spillway to avoid problems which may develop from their roots. The embankment should then be seeded to develop a growth of grass for surface erosion protection.

The following additional actions are recommended:

1. The owner should develop an emergency action plan (if one is not already available) outlining actions to be taken by the operator to minimize downstream effects of an emergency and establish a flood warning system for the downstream communities within three months.

2. The owner should inspect the dam for seepage during the refilling operation.

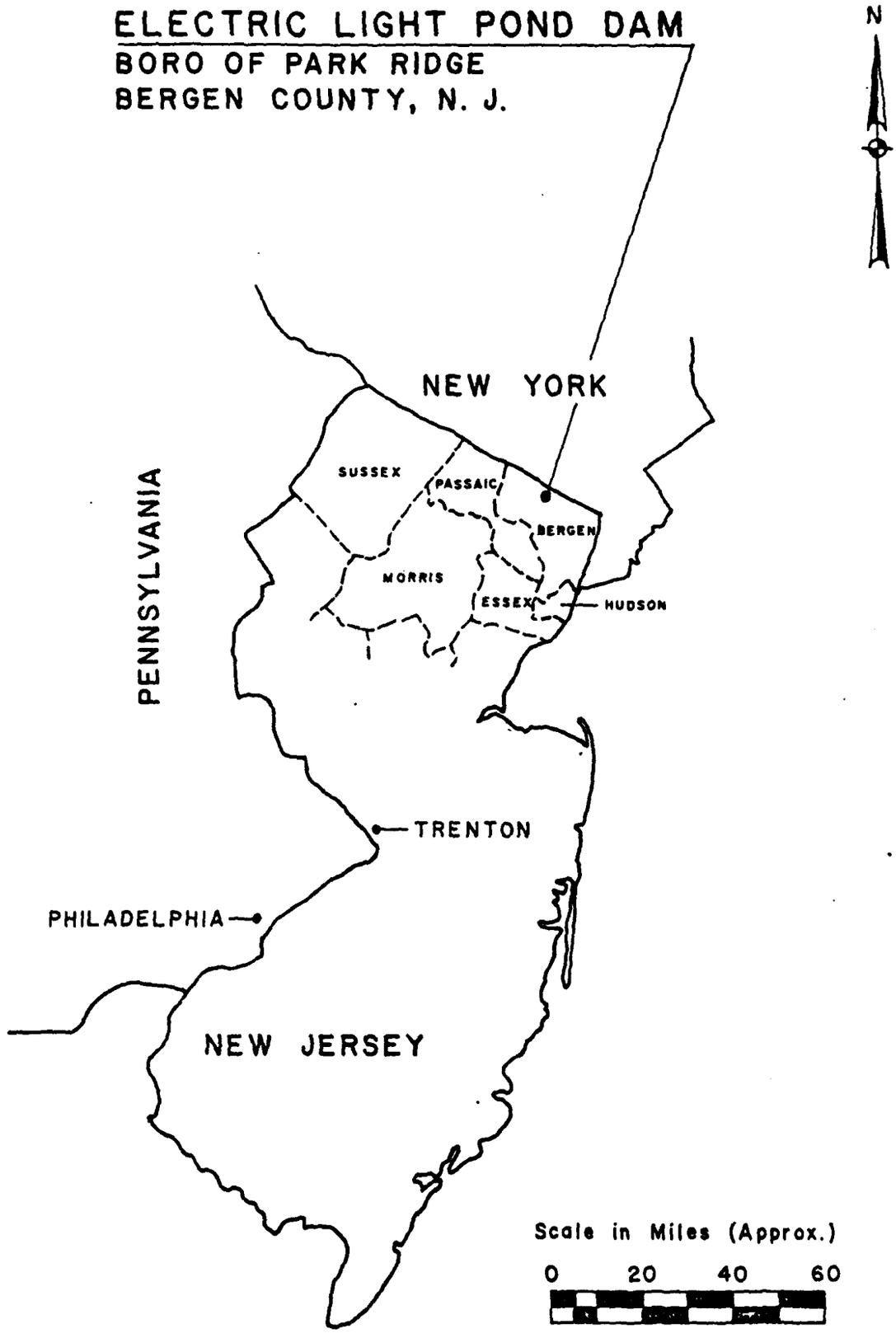
d. O & M Procedures

The owner should develop, within one (1) year after formal approval of the report, written operating procedures and a periodic maintenance plan to insure the safety of the dam.

PLATES

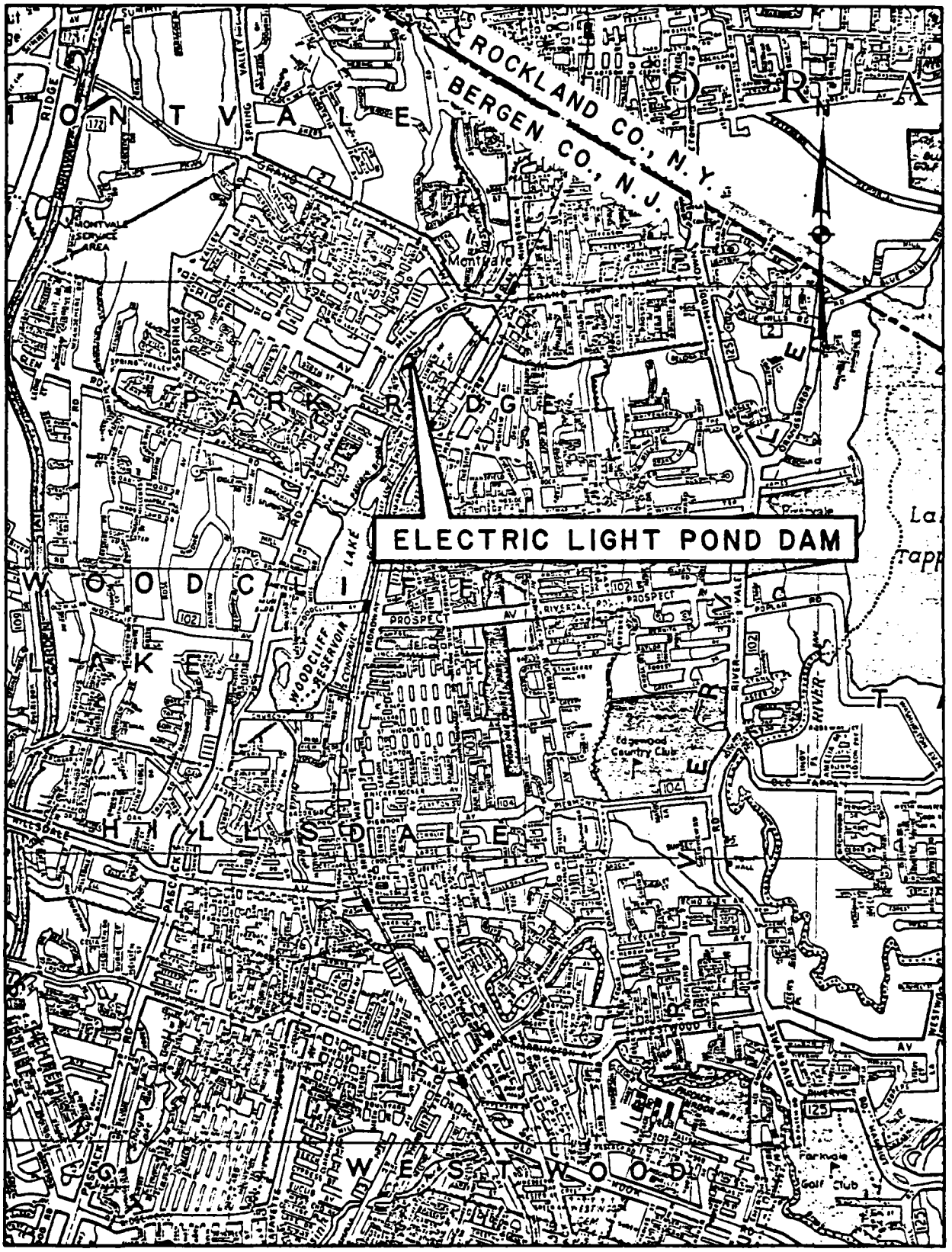
ELECTRIC LIGHT POND DAM

BORO OF PARK RIDGE
BERGEN COUNTY, N. J.



KEY MAP

PLATE I

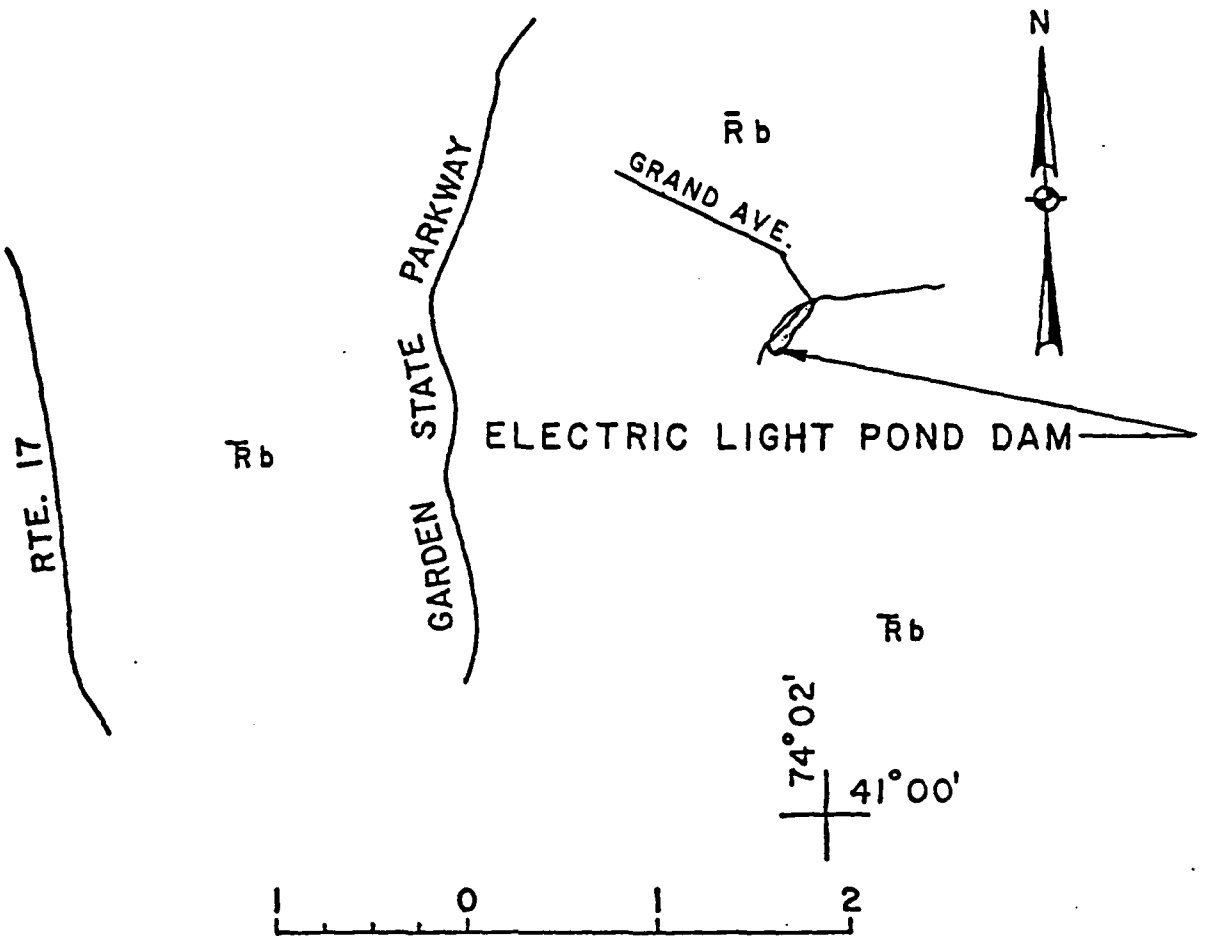


Scale in Feet (Approx.)

2,000 0 2,000 4,000 6,000 8,000 10,000

VICINITY MAP

PLATE IA



LEGEND

TRIASSIC

R̄b Brunswick Formation
Soft Red Shale with Interbeds of Red Sandstone

NOTE: Glacial - Fluvial Sands and Gravels Mantling Bedrock in Pascack Brook Valley not Shown

GEOLOGIC MAP
ELECTRIC LIGHT POND DAM

PLATE 2

MILL

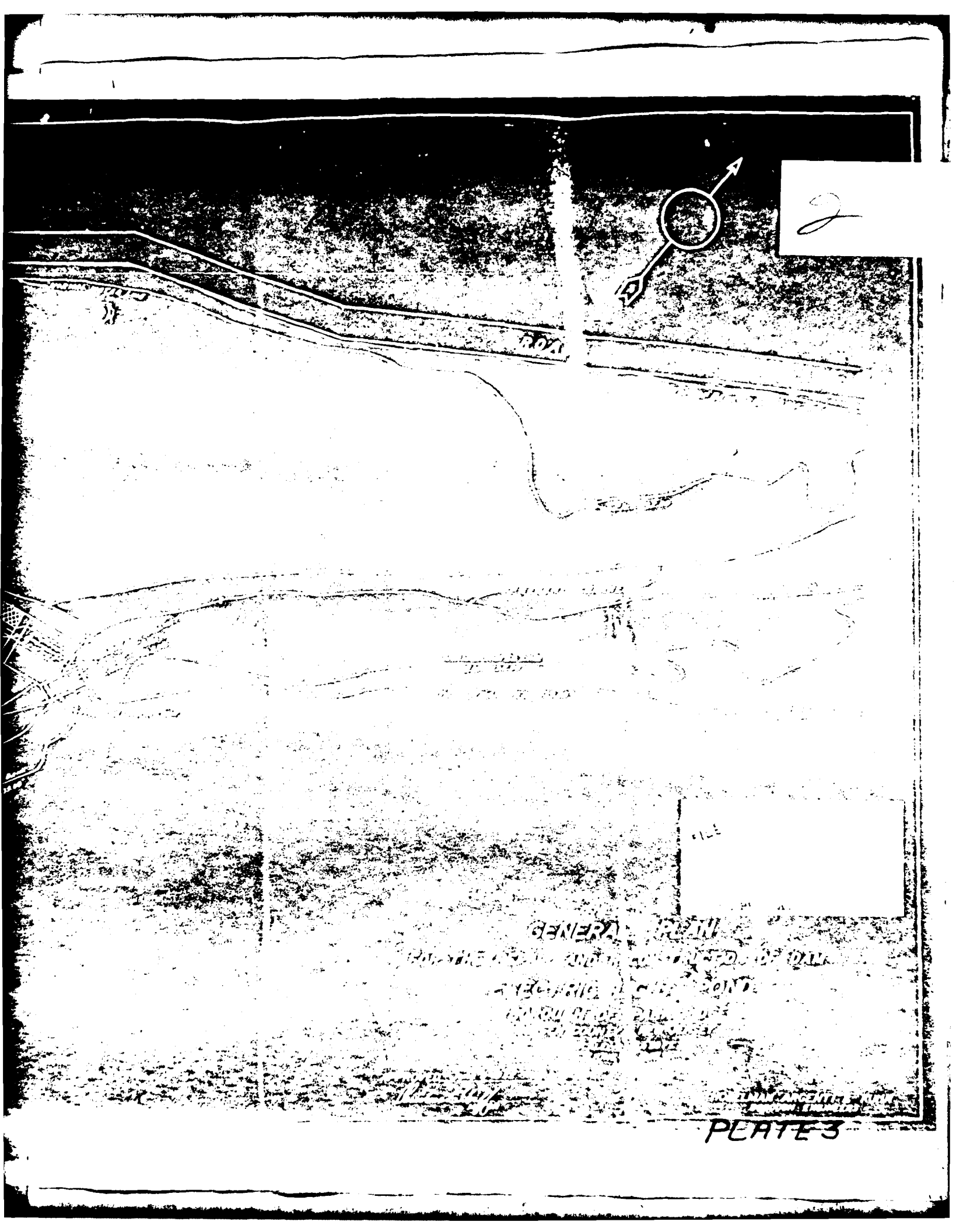
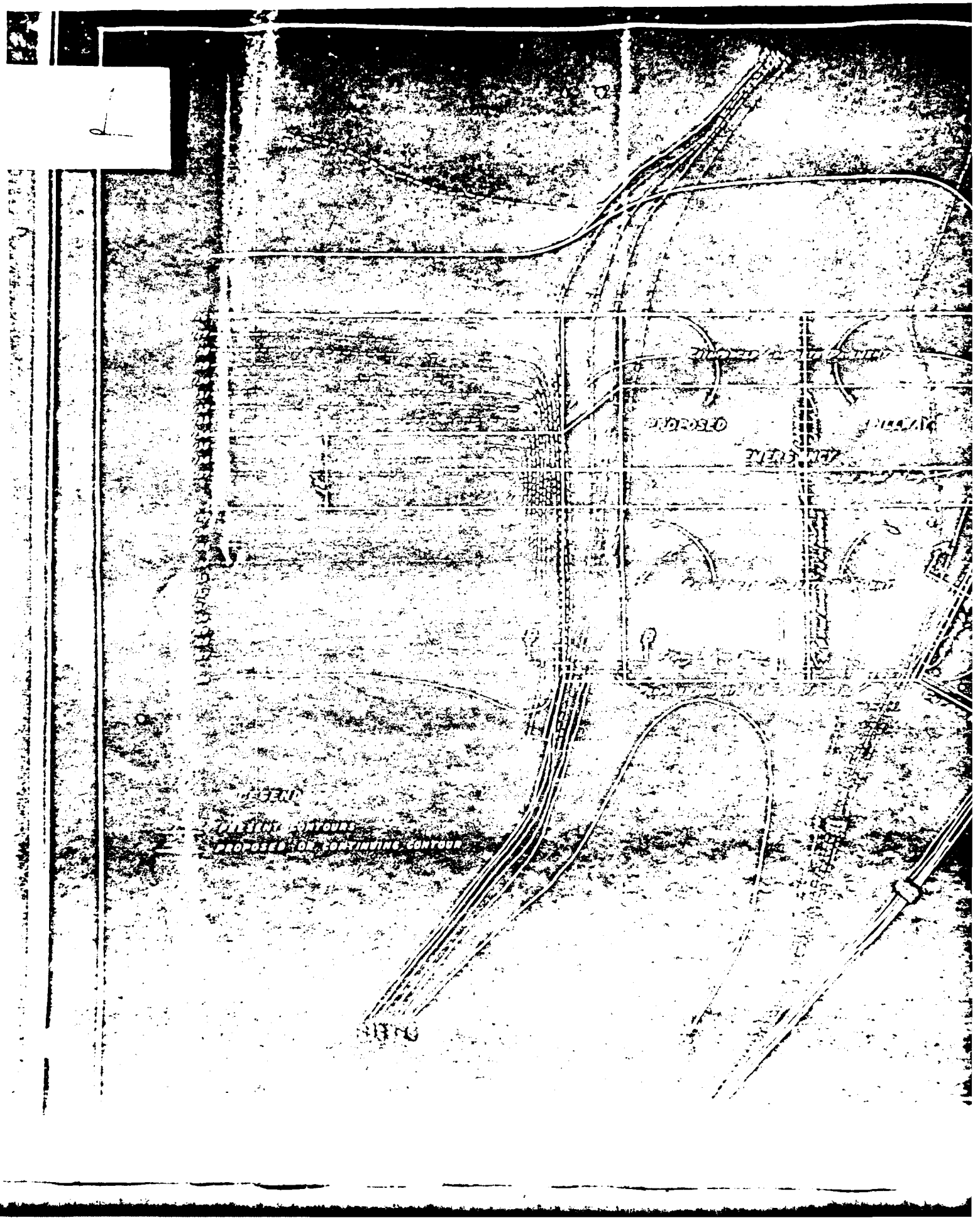


PLATE 3

1

GENERAL PROFILE
FOR THE REPAIR AND RECONSTRUCTION OF DAM
ELECTRIC LIGHT POND
BOROUGH OF PARK RIDGE

PLATE 4


EXISTING CONTOURS
PROPOSED OR CONTINUING CONTOUR

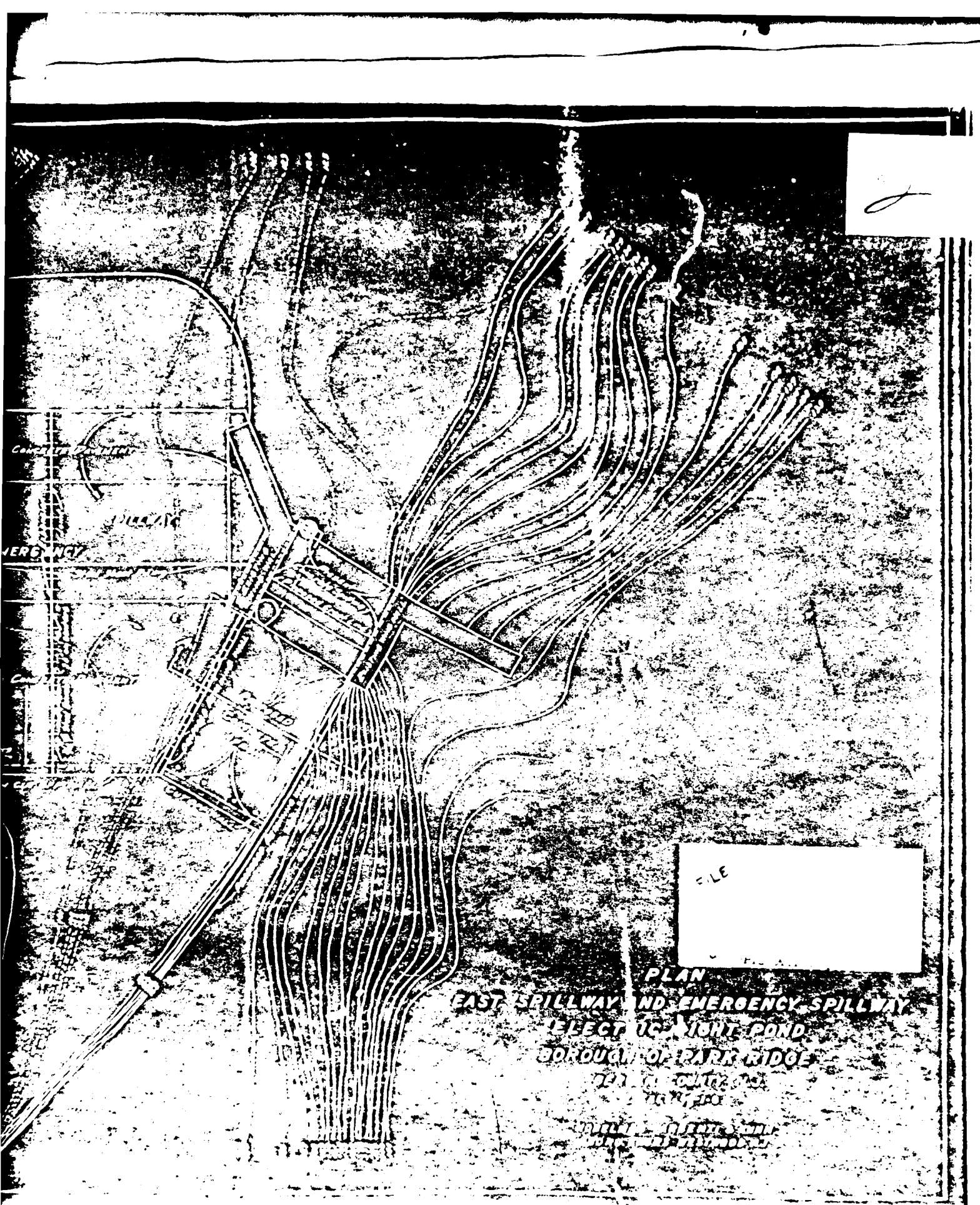
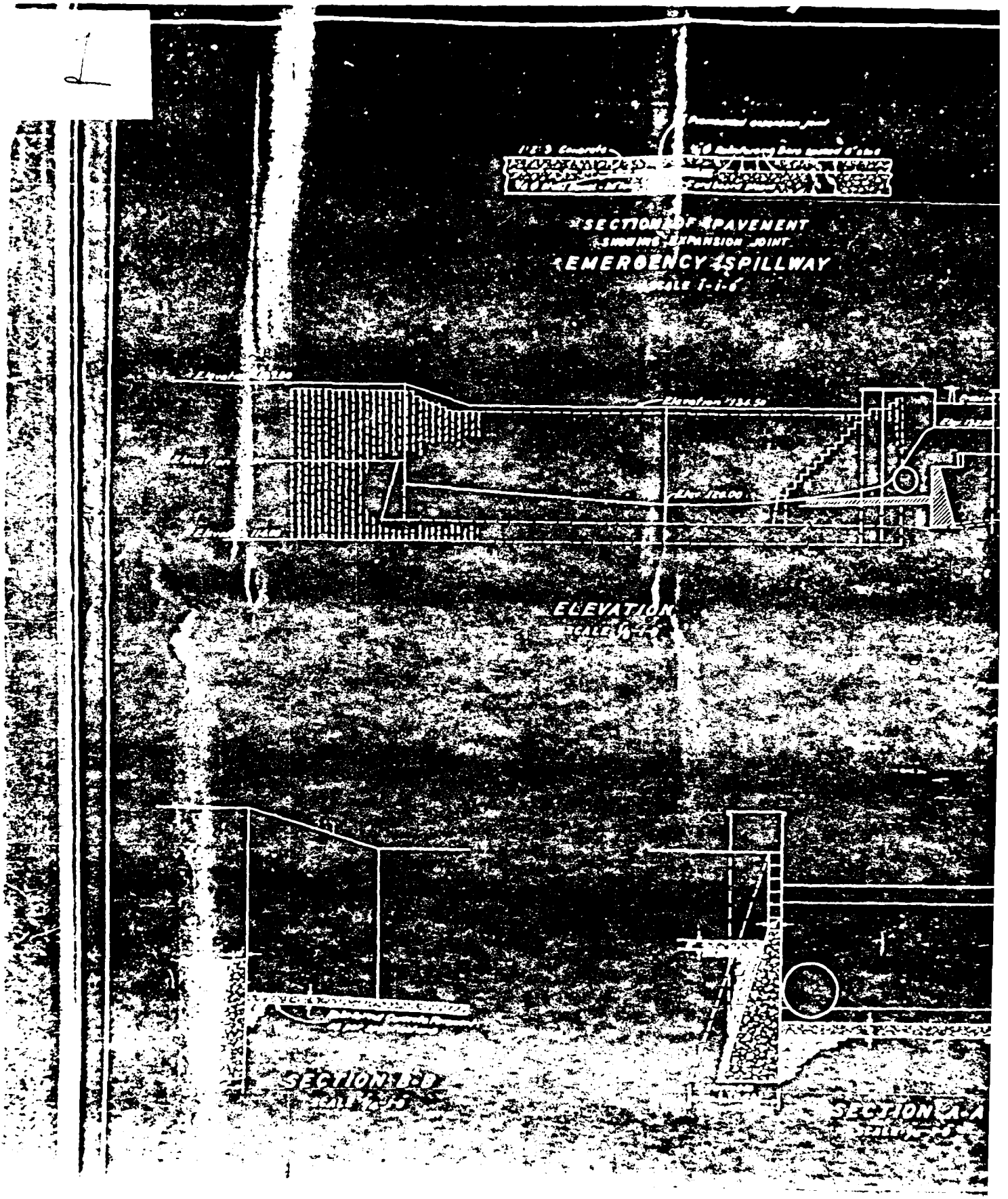

FILE
PLAN
EAST SPILLWAY AND EMERGENCY SPILLWAY
ELECTRIC LIGHT POND
BOROUGH OF PARK RIDGE

PLATE 5


SECTION OF PAVEMENT
SHOWING EXPANSION JOINT
EMERGENCY SPILLWAY
SCALE 1-1-6
ELEVATION
SECTION E-D
SECTION A-A

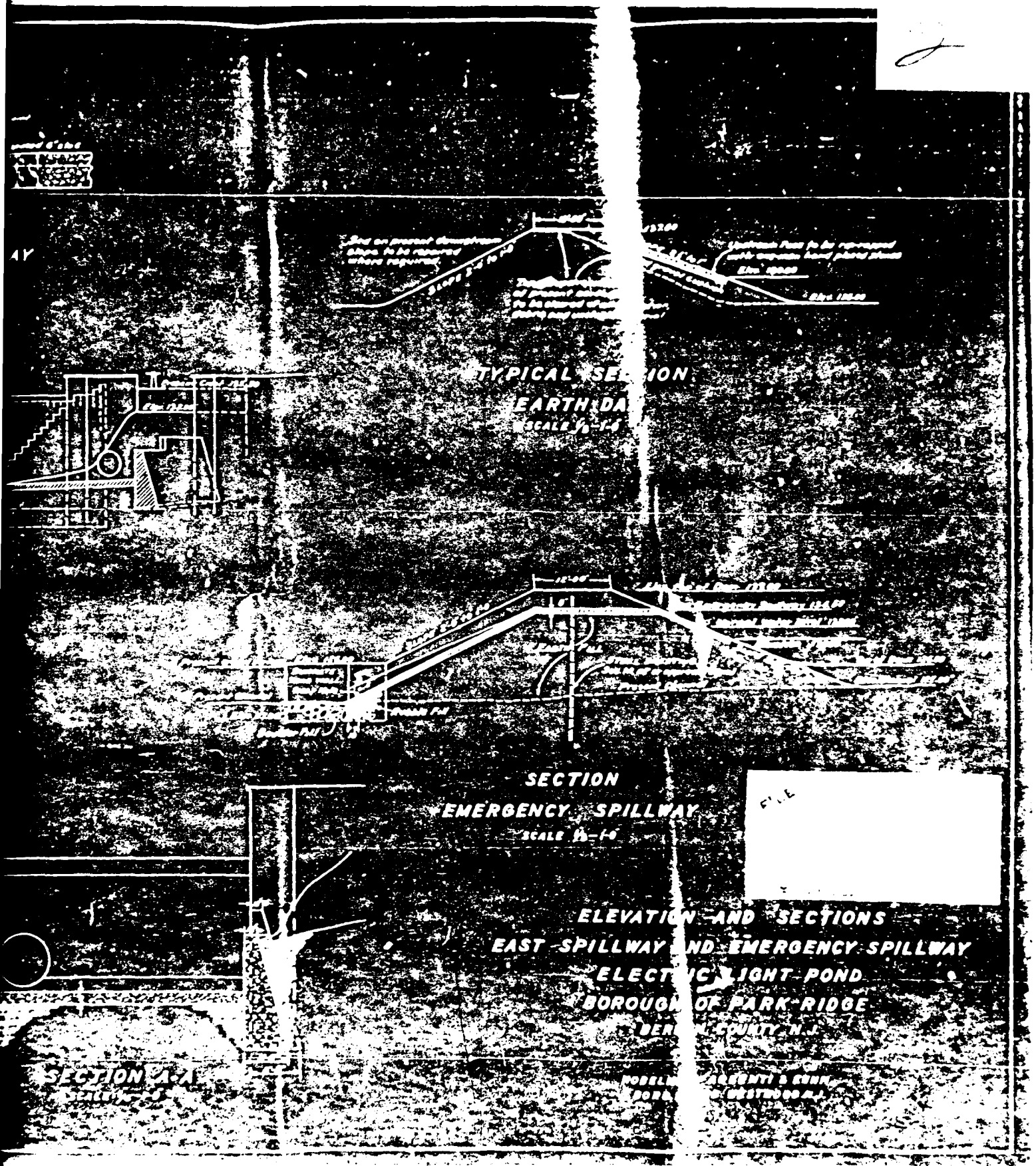
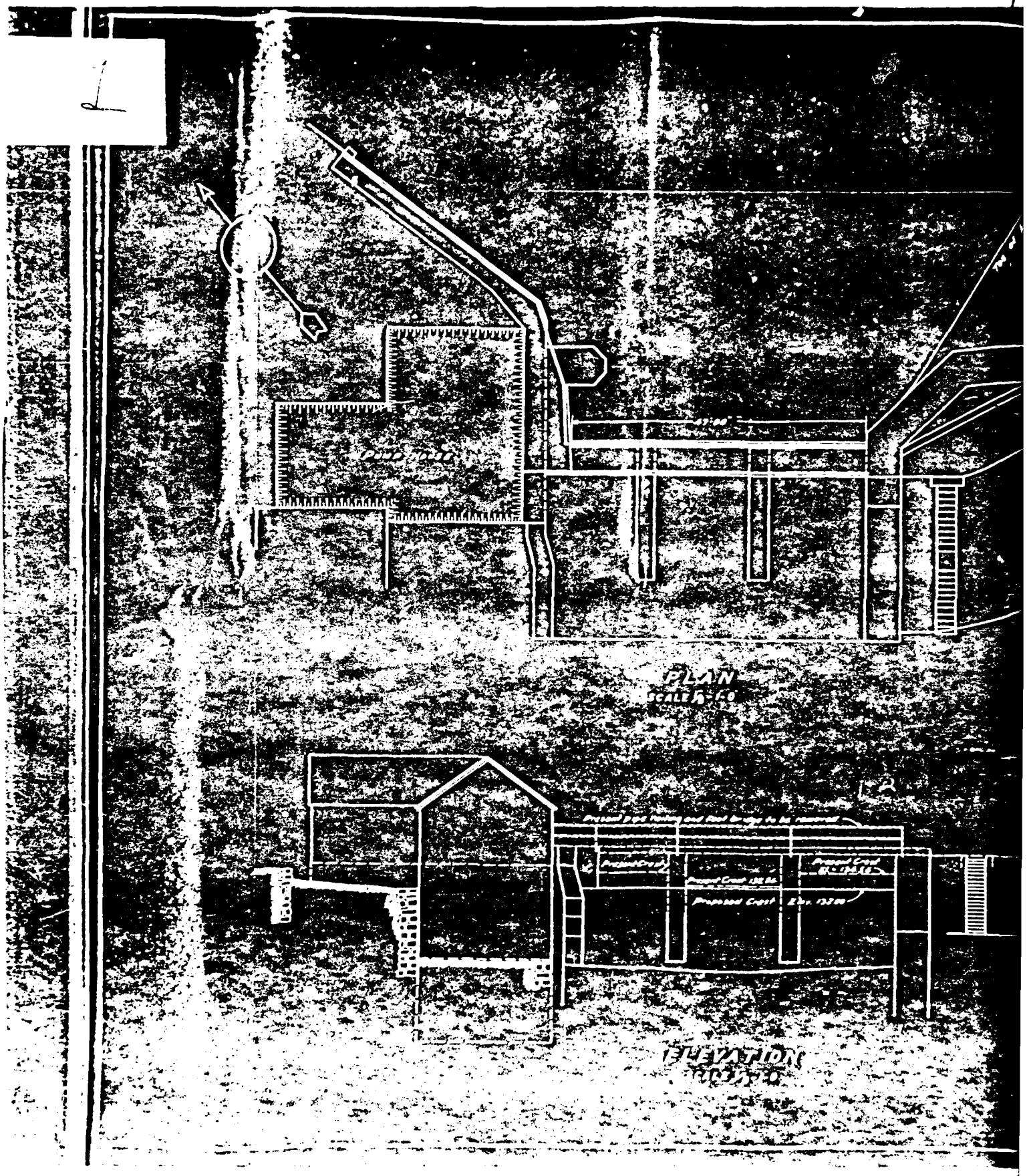

TYPICAL SECTION
EARTH DA
SCALE
SECTION
EMERGENCY SPILLWAY
SCALE
FILE
ELEVATION AND SECTIONS
EAST SPILLWAY AND EMERGENCY SPILLWAY
ELECTRIC LIGHT POND
BOROUGH OF PARK RIDGE
SECTION A-A

PLATE 6


PLAN
ELEVATION

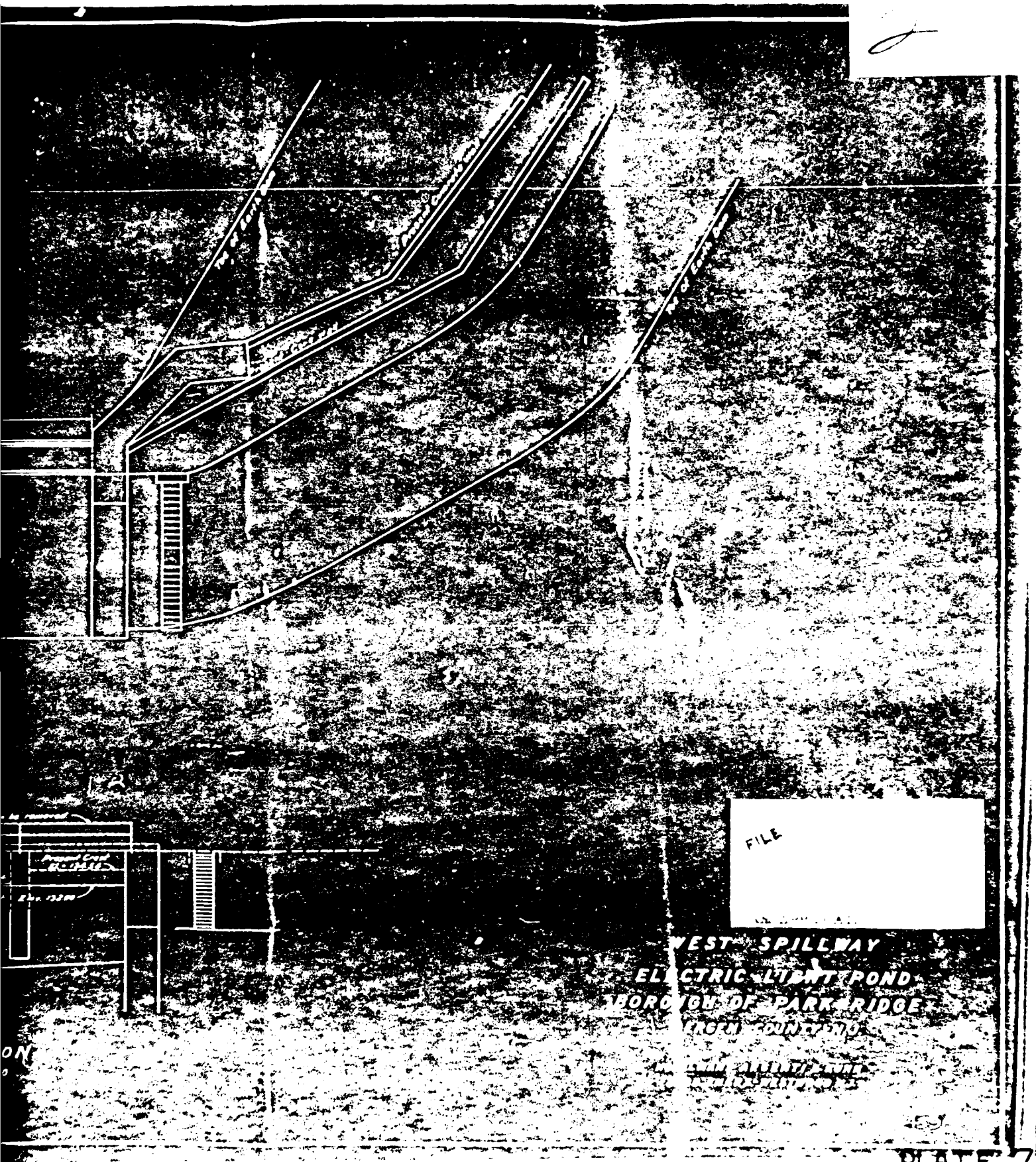
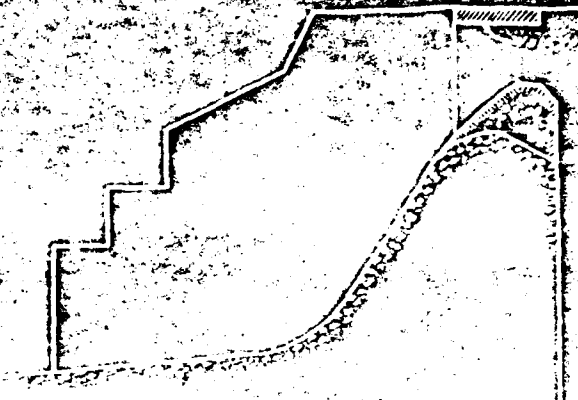

FILE
WEST SPILLWAY
ELECTRIC LIGHT POND
VILLAGE OF PARK RIDGE

PLATE 7

1



2

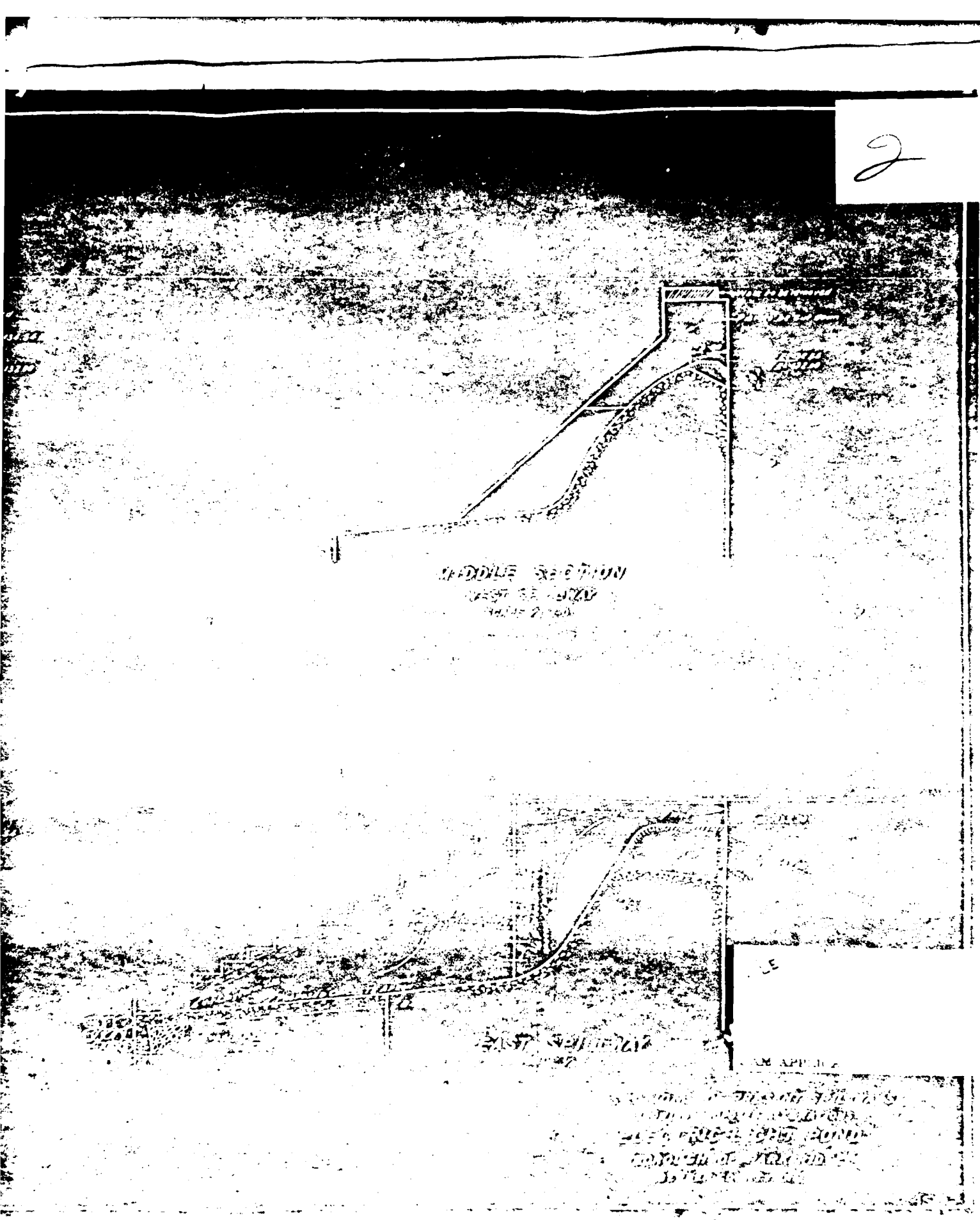
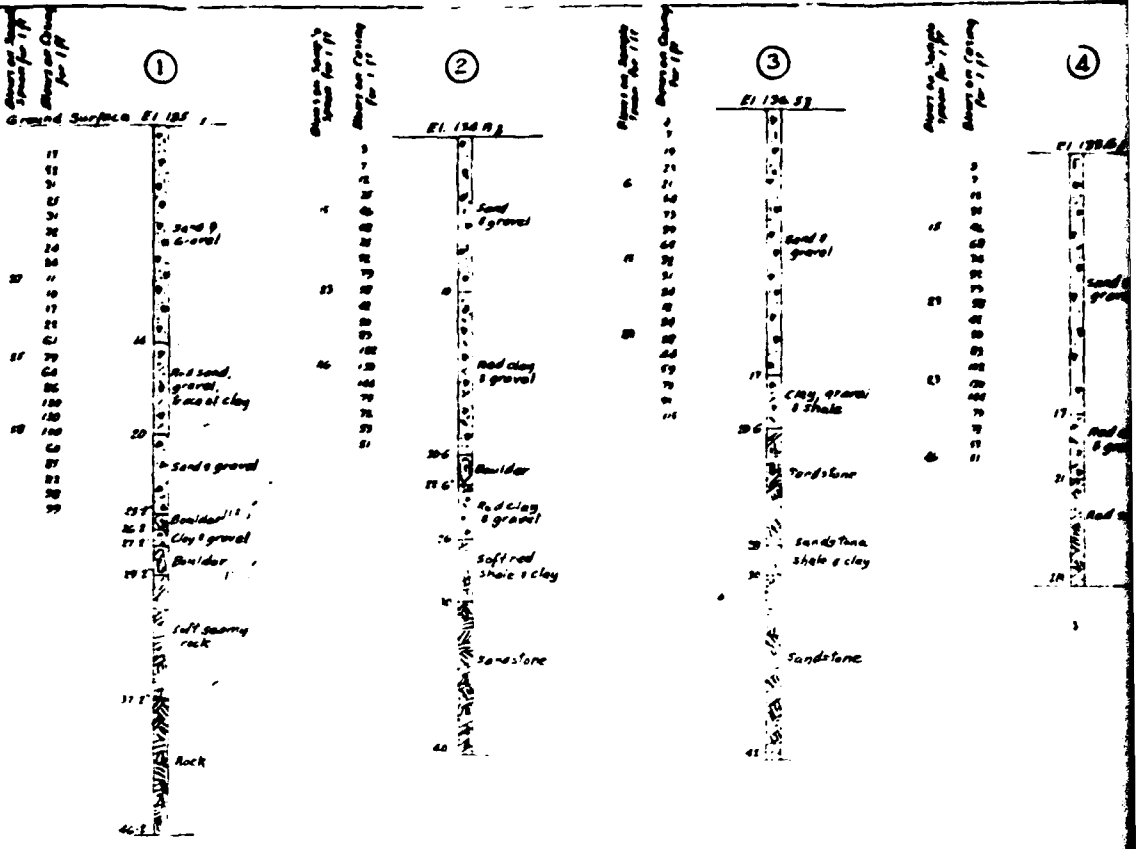
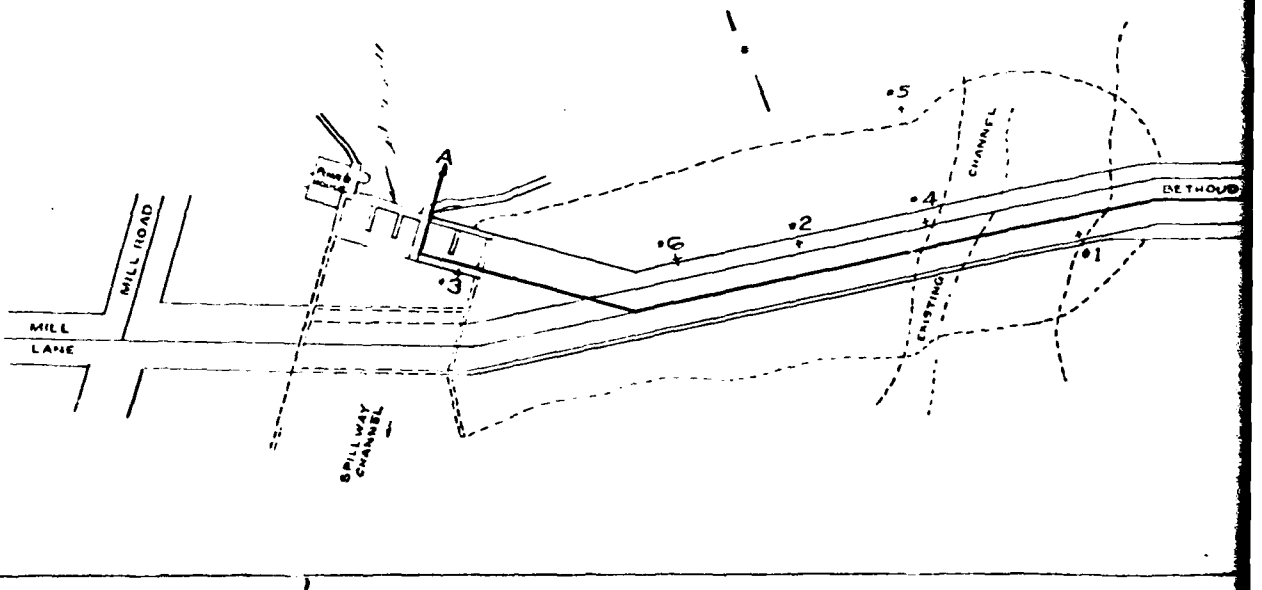
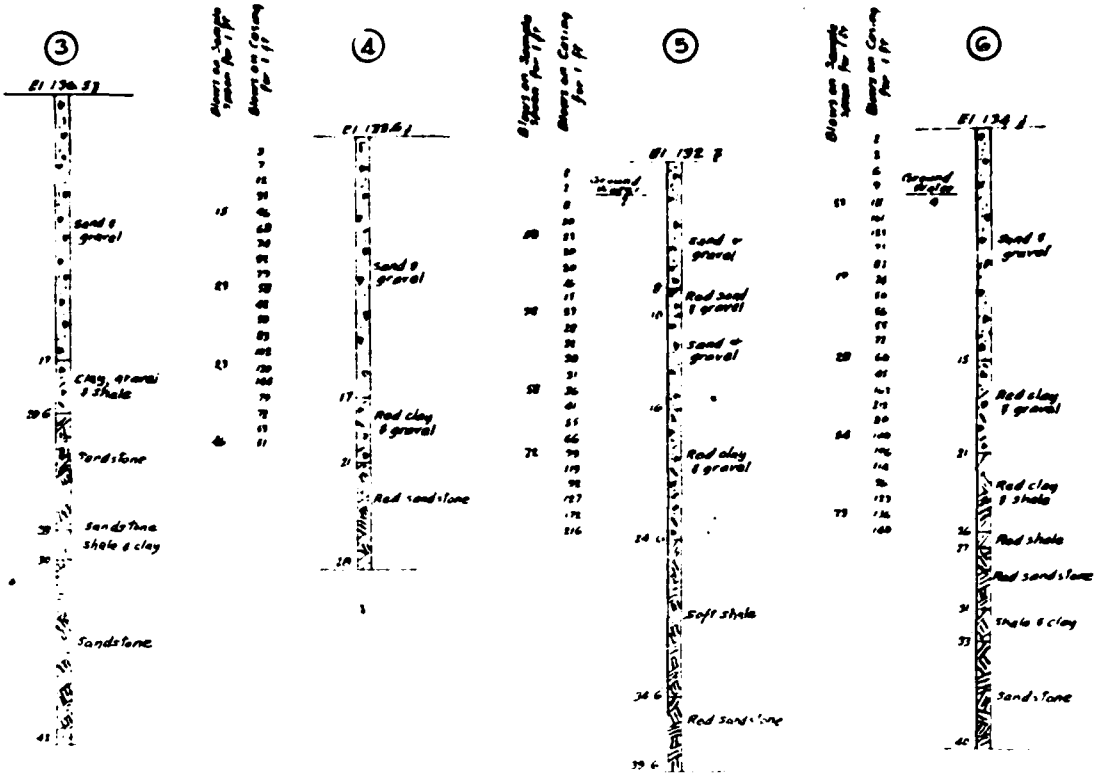


PLATE 8

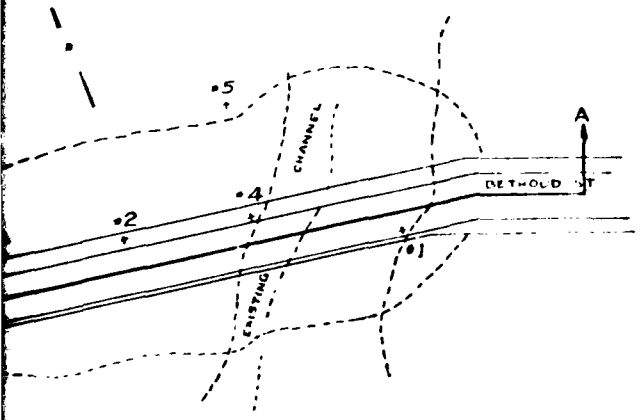
1


①
Ground Surface El 185
Sand & Gravel
Red sand, gravel, trace of clay
Sand & gravel
Boulder
Clay & gravel
Boulder
Soft seamy rock
Rock
②
El. 136 ft.
Sand & gravel
Red clay & gravel
Boulder
Red clay & gravel
Soft red shale & clay
Sandstone
③
El 136.5 ft
Sand & gravel
Clay, gravel & Shale
Sandstone
Sandstone, shale & clay
Sandstone
④


A
MILL ROAD
MILL LANE
SPILLWAY CHANNEL
CHANNEL
EXISTING
BETHOUD
1
2
3
4
5
6



NOTE - 250 Lb Hammer
2 0' Drop



PROPOSED PARK RIDGE DAM
TEST BORING DATA

BOROUGH OF PARK RIDGE, N J

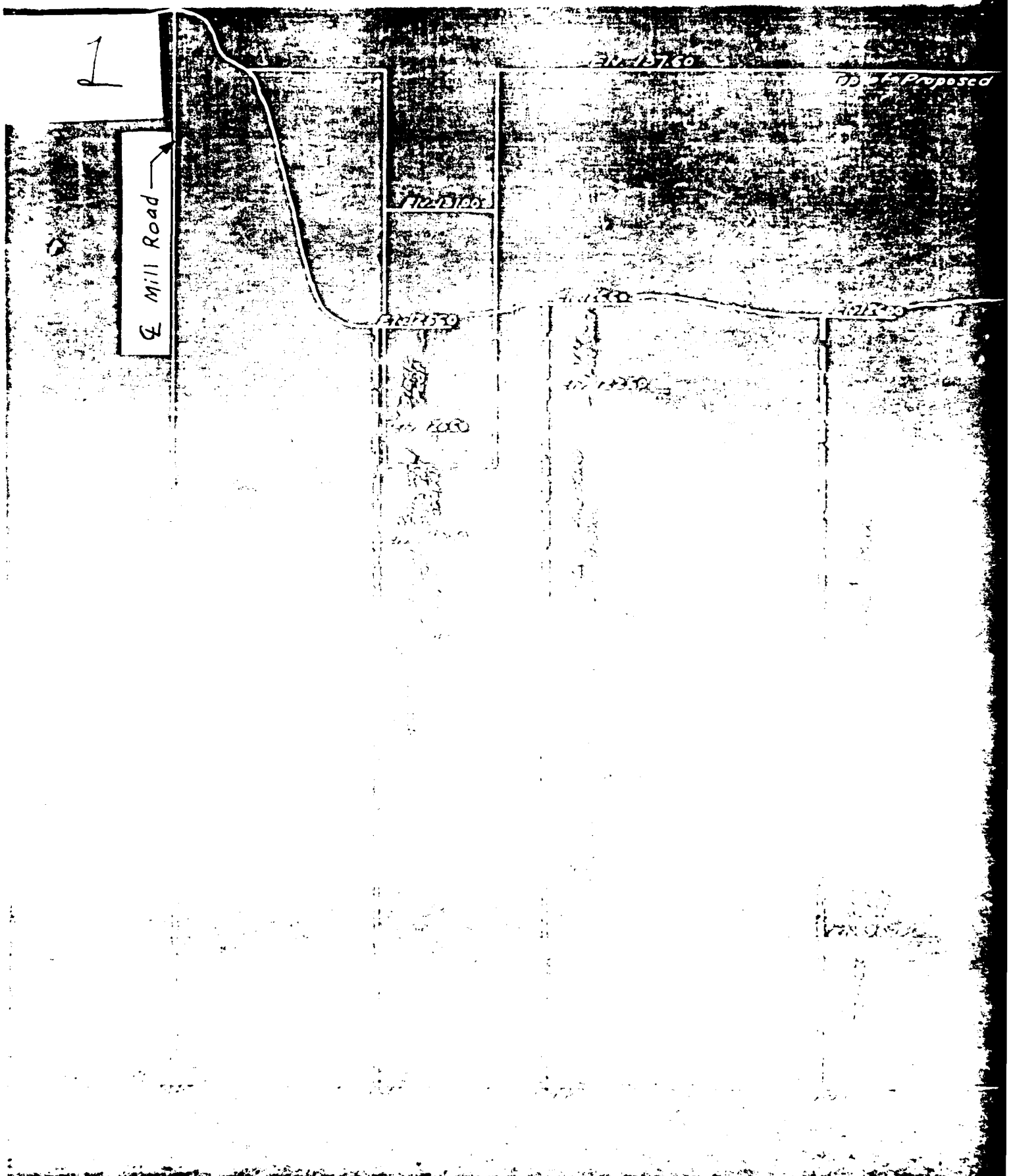
HARLEY & GARLICK, ENGINEERS
FAIRLAWN, N J.

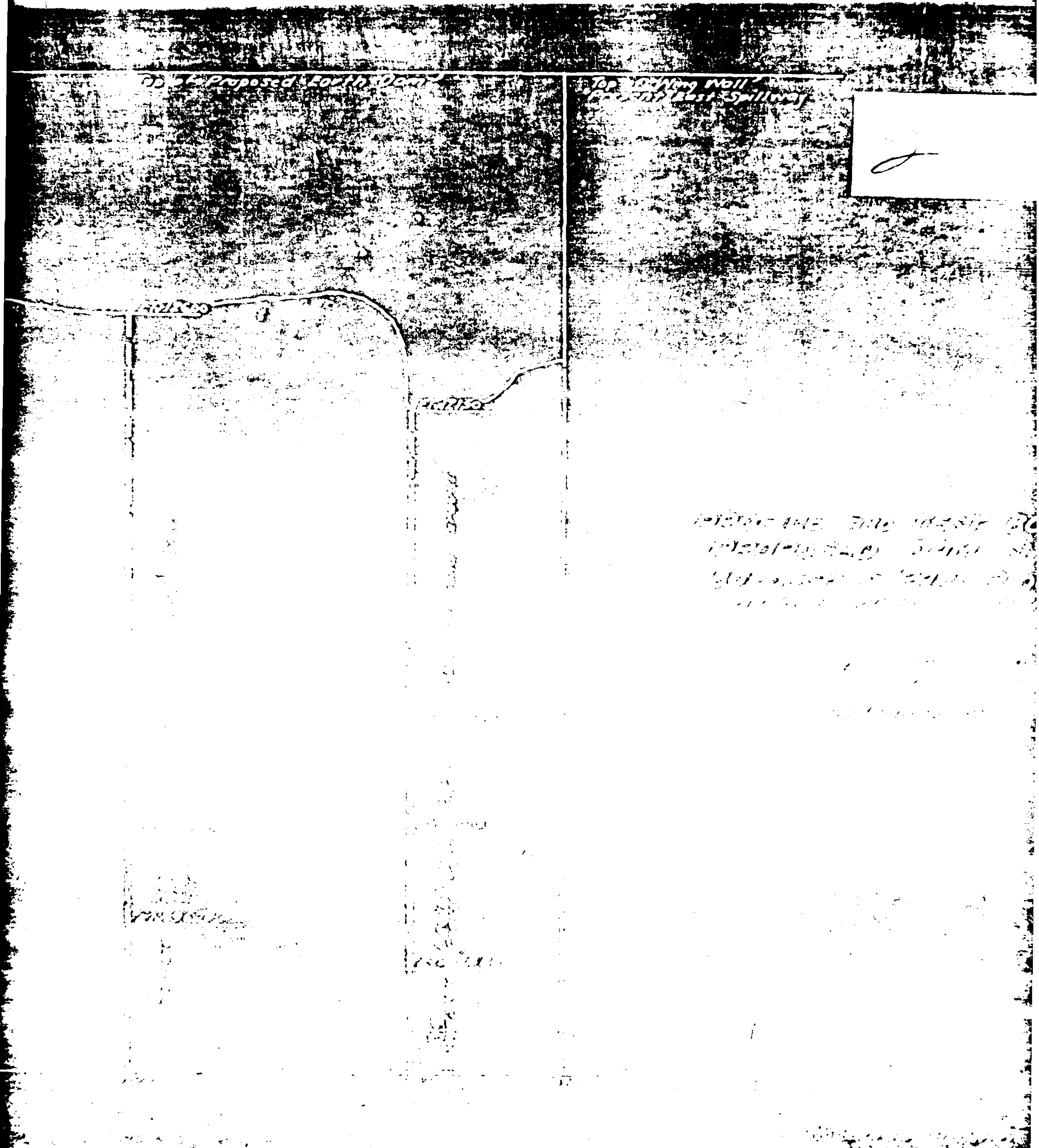
RILEY ENGINEERING & DRILLING CO.
1733 EAST 31ST ST., BROOKLYN 10

DATE - DEC 5, 1946

GENERAL MANAGER

PLATE 9


1
Mill Road
Proposed


Proposed Earth Dam
Top
Wing Wall
East Spillway

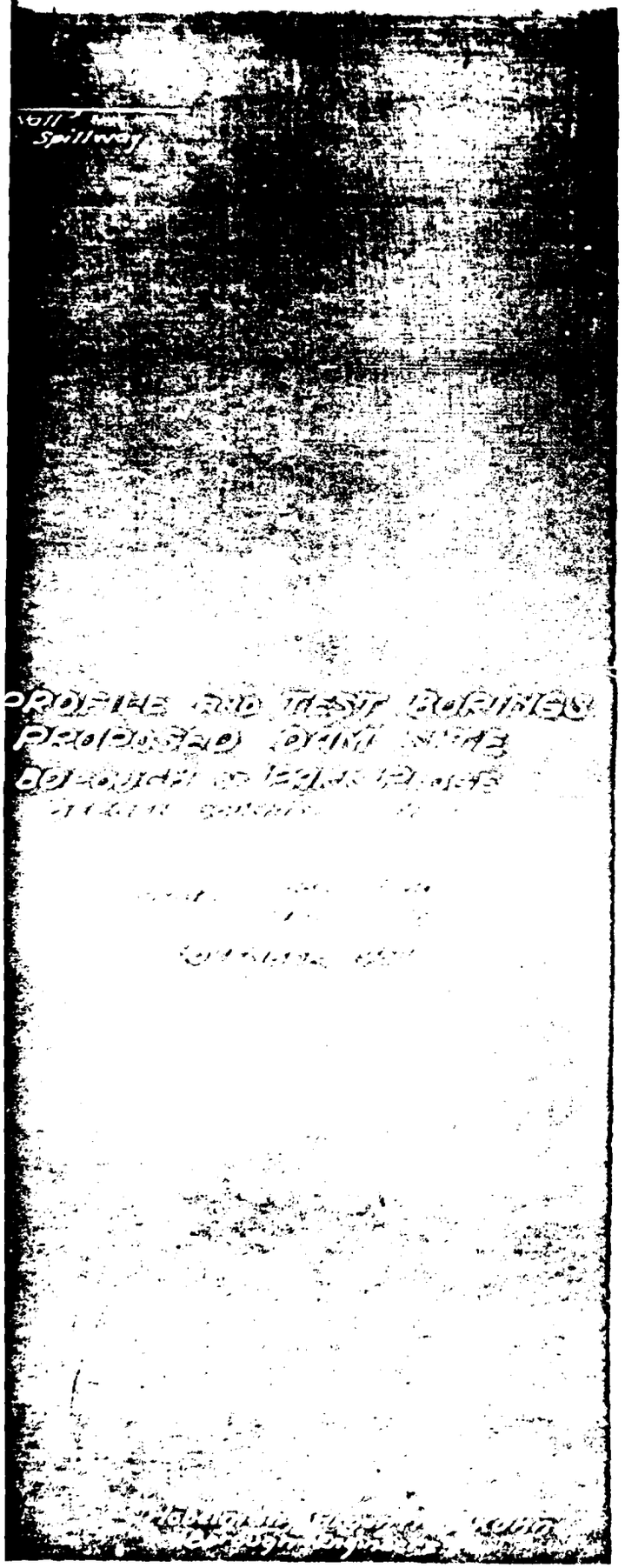


PLATE 10

APPENDIX A

CHECK LIST - VISUAL OBSERVATIONS

CHECK LIST - ENGINEERING, CONSTRUCTION MAINTENANCE DATA

CHECK LIST
VISUAL INSPECTION
PHASE 1

Name Dam ELECTRIC LIGHT POND (AKA MILL POND DAM & SILVER LAKE) County Bergen State New Jersey Coordinators NJ-DEP

Date(s) Inspection November 12, 1979 December 3, 1979 Weather Cloudy Temperature 50°F

Pool Elevation at Time of Inspection * NGVD Tailwater at Time of Inspection 116.5 NGVD

* Water in reservoir was drained for current dredging operations.

Inspection Personnel:

November 12, 1979:

Chuck Chin
Henry King
Thomas Lakovich

December 3, 1979:

Eugene Koo
James McCormick

Owner/Representative:
November 12 and December 3, 1979

Charles E. Gasior, Borough Administrator
Borough Administrator
Borough of Park Ridge
Park Ridge, NJ 05656

CONCRETE SPILLWAYS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
SEEPAGE OR LEAKAGE	None noticed. Water in reservoir drained for current dry dredging operations.	Inspect for seepage during the refilling operation.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Severe spalling at left interface and at two buttresses at the west spillway. Minor spalling was noticed at the right interface of the west spillway. Severe spalling and a horizontal crack were noted on the right abutment of the east spillway.	Repair spalling and crack.
DRAINS	Yes-low level outlet drains-see "OUTLET WORKS".	
WATER PASSAGES	Yes-low level outlet-see "OUTLET DRAINS".	
FOUNDATIONS	Unknown	

CONCRETE SPILLWAYS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Concrete slabs show cracks along emergency spillway, numerous trees growing in these cracks. A longitudinal crack exists across the east spillway.	Remove trees and repair cracks.
STRUCTURAL CRACKING	None visible	
VERTICAL & HORIZONTAL ALIGNMENT	Good	
MONOLITH JOINTS	Good	
CONSTRUCTION JOINTS	Vegetation growing in construction joints at emergency spillway.	Remove vegetation.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
SURFACE CRACKS	None Noticed.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	No visible movement or cracking at or beyond toe was observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	No sloughing or erosion was visible.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Good.	
RIPRAP FAILURES	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
	Numerous Trees, small and medium sized, growing on top of and on both sides of earth embankment and on the emergency spillway. Concrete Core, one foot wide, visible on top of embankment for a distance of 94 feet from west spillway. Steel Sheeting visible for distance of 21 feet from the emergency spillway.	Remove trees.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Minor erosion behind left abutment of west spillway	
ANY NOTICEABLE SEEPAGE	None noticed. Water in reservoir drained for current dry dredging operations.	
STAFF GAGE AND RECORDER	None	
DRAINS	None	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
CRACKING & SPALLING OF CONCRETE SURFACES IN STILLING BASIN	None visible.	
INTAKE STRUCTURE	A four feet diameter concrete sluice way, with trash rack, exists at the east base of abandoned powerhouse west of west spillway. Trash rack has one bar missing and some bars are damaged. A four feet diameter concrete sluice way exists at the base of east spillway. Both sluice ways in good condition.	Repair trash rack.
OUTLET STRUCTURE	Water exits from the four feet diameter concrete sluice way at west way at west base of east spillway on to a concrete apron.	
OUTLET FACILITIES	The rising stem sluice gate at the west sluice was inoperable. The concrete foundation supporting the valve stem was deteriorated. Water from pump house mentioned above exits through two concrete notches (3'± x 2'± & 5' ± x 3'±) at south base of pump house into channel.	Replace valve. Repair stem stand concrete support.
EMERGENCY GATE	Emergency spillway adjacent to east spillway.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
CONCRETE WEIR See "Concrete Spillways".		
APPROACH CHANNEL	Reservoir-water in reservoir was drained for current dry dredging operations.	
DISCHARGE CHANNEL Two in good condition.		
BRIDGE AND PIERS None		

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
CONCRETE SILL N/A		
APPROACH CHANNEL N/A		
DISCHARGE CHANNEL N/A		
BRIDGE AND PIERS N/A		
GATES & OPERATION EQUIPMENT N/A		

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
MONUMENTATION/SURVEYS None		
OBSERVATION WELLS None		
WEIRS None		
PIEZOMETERS None		
OTHER None		

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
SLOPES	Water in reservoir was drained for current dry dredging operations. Moderate side slopes, no indication of slope instability	
SEDIMENTATION	Reservoir is currently being dredged.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Condition of both channels good. A roadway bridge crosses over east channel approximately 700 feet from the east spillway.	
SLOPES	2 horizontal to 1 vertical.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	A municipal building (Borough of Park Ridge), a recreation area and a lumber yard approximately 1200 feet from east spillway.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	Available on microfilm at NJ Department of Environmental Protection (NJ-DEP), 1474 Prospect Street, P.O. Box CN-029 Trenton, NJ 08625
REGIONAL VICINITY MAP	Available--Bergen County Map and U.S.G.S. Quadrangle sheet for Park Ridge, New Jersey-New York
CONSTRUCTION HISTORY	No formal history exists, but it can be deduced from available plans and drawings
TYPICAL SECTIONS OF DAM	Available on microfilm at NJ-DEP
HYDROLOGIC/HYDRAULIC DATA	No hydrologic data. Hydraulic data available on microfilm at NJ-DEP
OUTLETS - PLAN	Available on microfilm (NJ-DEP)
- DETAILS	Available in microfilm (NJ-DEP)
- CONSTRAINTS	None
- DISCHARGE RATINGS	Not available
RAINFALL / RESERVOIR RECORDS	Not available

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
(continued)

ITEM	REMARKS
DESIGN REPORTS	None available.
GEOLOGY REPORTS	Available. U.S.G.S. Geologic Overlay Sheet for Bergen County and Engineering Soil Survey of New Jersey, Report # 4--Bergen and Hudson Counties, by Rutgers University.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None available
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None available Test boring data, dated 1946 & 1951, available on microfilm at NJ-DEP . None available None available
POST-CONSTRUCTION SURVEYS OF DAM	None
BORROW SOURCES	Unknown
SPILLWAY PLAN - SECTIONS - DETAILS	Available on microfilm at NJ-DEP

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
(continued)

ITEM	REMARKS
OPERATING EQUIPMENT PLANS AND DETAILS	None available
MONITORING SYSTEMS	None
MODIFICATIONS	Repair and reconstruction, 1952. Available on microfilm at NJ-DEP.
HIGH POOL RECORDS	Not kept
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Inspection report for Borough of Park Ridge, Bergen County, NJ, 1978 by A.G. Lichtenstein, and Associates, Inc., Teaneck, NJ
PRIOR ACCIDENTS OF FAILURE OF DAM - DESCRIPTION - REPORTS	Available on microfilm at NJ-DEP, which states that failure occurred during July 23, 1945 flood.
MAINTENANCE OPERATION RECORDS	None known to exist

APPENDIX B

PHOTOGRAPHS

(Taken on December 3, 1979)

Note: Water in reservoir was drained for dry dredging operations when photos were taken.

Photo 1 - View of West spillway from downstream. Abandoned power house is at left. Portion of earth embankment is at right.

Photo 2 - Detail showing spalling of the two buttresses, abutment and wingwall of West spillway. View is from downstream.

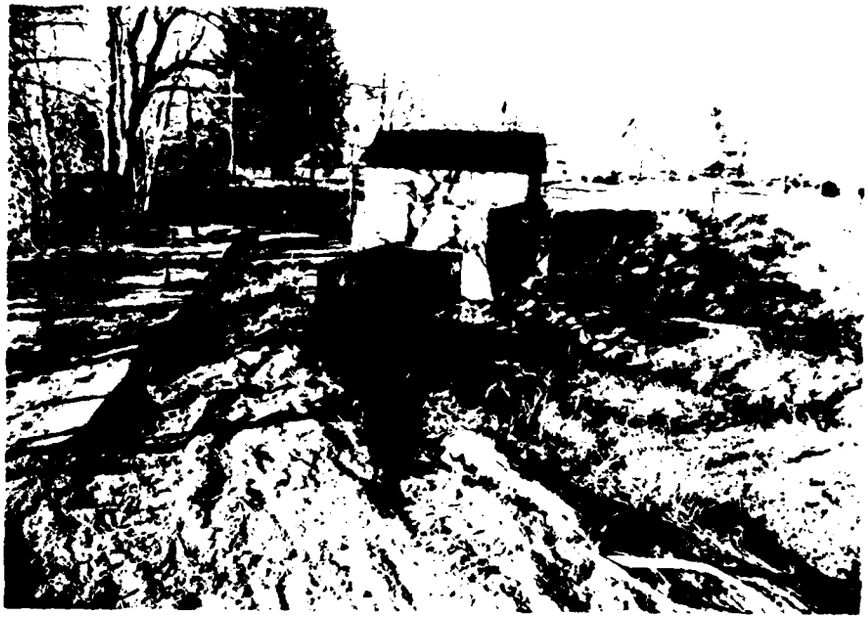


Photo 3 - View from reservoir side with dam and concrete core visible at left. The West spillway, adjacent to the abandoned power house, can be seen in center.

Photo 4 - View of retaining wall at right side of West spillway and base of abandoned tower. Note vertical crack and spalling.

Photo 5 - View of West spillway with reservoir on right. Note sluice way, valve and base of abandoned power house at top.

Photo 6 - Detail of sluice way at reservoir side of West spillway. Note missing bar from trash rack.

Photo 7 - View of the East spillway from reservoir side. Note horizontal crack and spalling of right abutment.

Photo 8 - View of reservoir from East spillway showing current dredging operations.

Photo 9 - Detail showing spalling, exposed rebar and crack in right abutment of East spillway. Portion of emergency spillway is shown at right.

Photo 10 - Detail showing vertical crack in left abutment of East spillway and the crack across spillway.

Photo 11 - View of downstream channel from West spillway (at bottom).

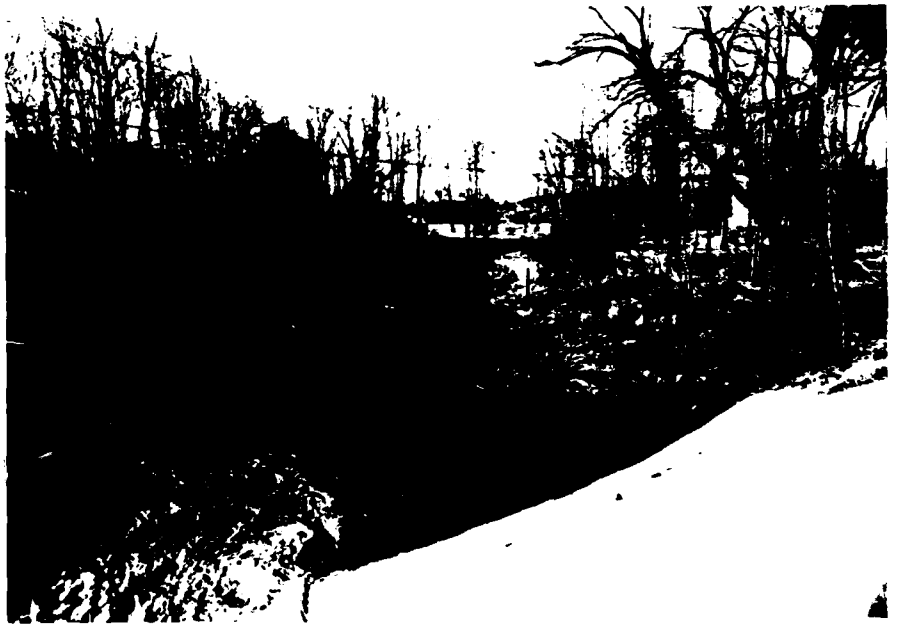


Photo 12 - View of East downstream channel. Sluice way water from under East spillway is shown at left and portion of emergency spillway at right.

Photo 13 - View of East channel, looking downstream, showing roadway bridge approximately 700 feet from the East spillway.

Photo 14 - View, looking upstream, of East and West channels merging approximately 800 feet from the East spillway. East channel is on right.

Photo 15 - View,looking upstream, toward East spillway on right center and portion of emergency spillway adjacent to it, on the left. Note sluiceway under East spillway. Embankment and West spillway is out of photo on viewer's left.

APPENDIX C

SUMMARY OF ENGINEERING DATA

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

Name of Dam: ELECTRIC LIGHT POND DAM

Drainage Area Characteristics: 14.2 square miles

Elevation Top Normal Pool (Storage Capacity): 132.0 NGVD (18 acre-ft.)

Elevation Top Flood Control Pool (Storage Capacity): N/A

Elevation Maximum Design Pool: 137.84 NGVD (SDF pool: 65 acre-feet)

Elevation Top Dam: 137.60 NGVD (63 acre-feet)

SPILLWAY CREST:

a. Elevation 132.0 for east and west, 134.5 for emergency

b. Type Ungraded concrete ogee for East & West, trapezoidal weir for emergency

c. Width 9 ft. (east); 6 ft. (west); 12 ft. (emergency)

d. Length 20 ft. (east), 47 ft. (west), 66 ft. (emergency)

e. Location Spillover Not observed due to drain flow from low level pipes
Water in reservoir drained for dry dredging

f. No. and Type of Gates None

OUTLET WORKS:

a. Type 2-48-inch diameter low level outlet

b. Location One located on the west of west spillway through power-house and other located at the west of east spillway

c. Entrance Inverts 124.3 ft. (NGVD, west) 122.45 (NGVD, east)

d. Exit Inverts 122.3 NGVD (Estimated-opening from power house)
122.07(NGVD East)

e. Emergency Draindown Facilities 2-48-inch pipe with manual operated gate valves

HYDROMETEOROLOGICAL GAGES:

a. Type None

b. Location None

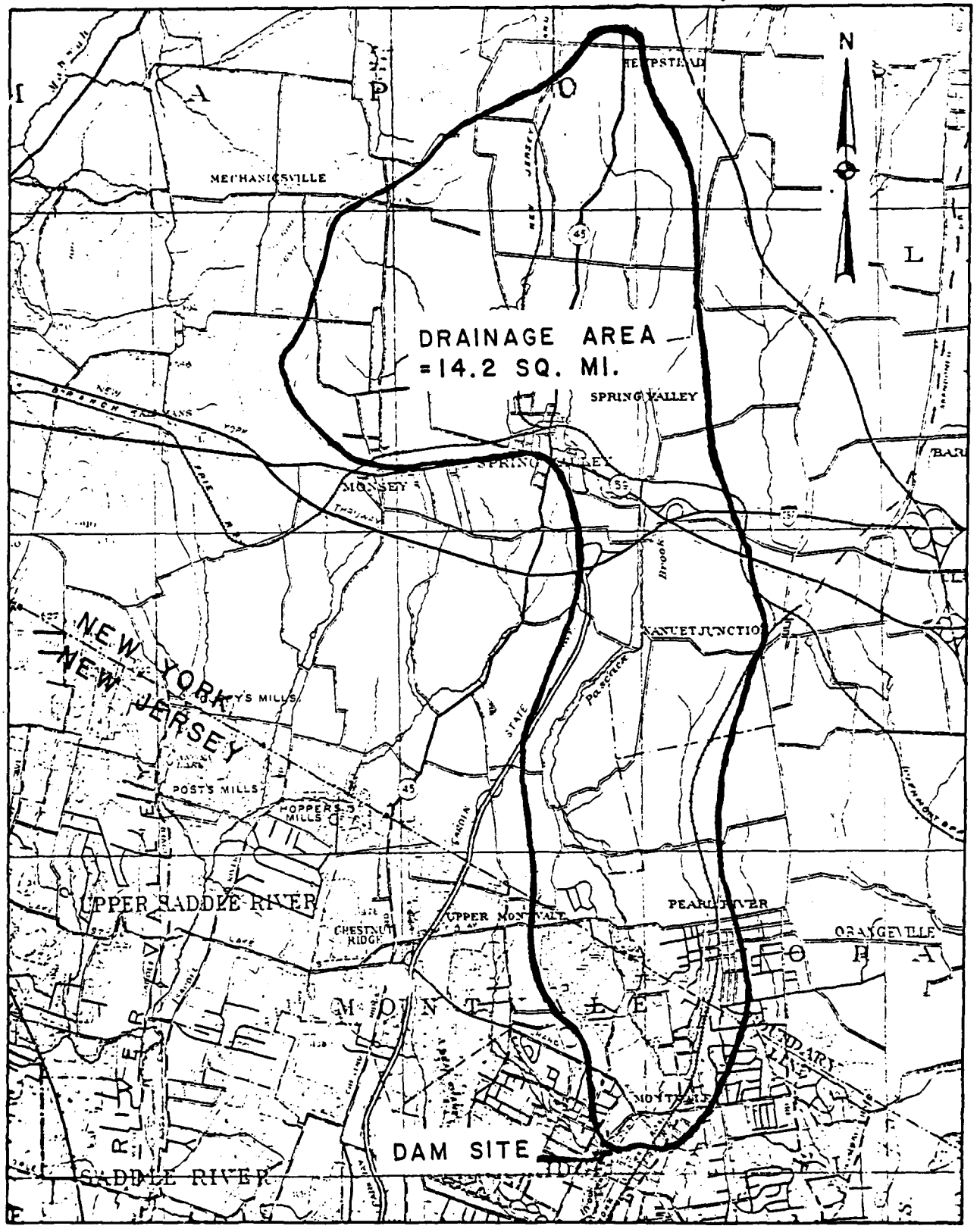
c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: 4,634 cfs @ 137.6 NGVD

APPENDIX D

HYDROLOGIC COMPUTATIONS

PLATE 1, APPENDIX D



Scale 1" = 1 Mile

ELECTRIC LIGHT POND DAM
DRAINAGE BASIN

FREDERIC R. HARRIS, INC. CONSULTING ENGINEERS

Subject: NJ DAM INSP. GROUP [illegible] — [illegible] Lake Dam

Sheet No. 1 of 12

Job No. [illegible]

Computed by: EKG — Checked by: CLC — Date: 12/4/79

SIZE CLASSIFICATION

Surface Area of Main Impoundment	7 Acre
Average Depth	9 ft ±
Structural Height of Dam	20.6 ft
Size Classification	Small

Hazard Potential Classification

Private recreation area & police range [illegible] d/s of the DAM (

Hazard potential classification	High
Recommended SDF	½ PMF

Hydrologic [illegible]

THE HEC-1 DB WILL BE USED TO ROUTE THE

[illegible] [illegible] Snyder Method

$C_t = 4.2$ $640\ C_p = 330$

(Supplied by G. Saul [illegible])

D.A. = 14.2 Sq. mi

FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS

SUBJECT: N.J. [illegible] GROUP XII
Electric Light Pond
COMPUTED BY: [illegible] CHECKED BY: C.L.C.

SHEET No. 2 OF 12
JOB No. [illegible]
DATE: 12/6/79

PRECIPITATION

From Fig. 15, Zone 1 (Ref. Design of Small Dam 1977)

Probable max precipitation = 25 inches for 6 hrs

Duration and 14.2 sq mi Area

Duration (hrs)	% of PMP Zone 1	Zone 6	Average
6	96	97	96.5
12	107	106	106.5
24	116.5	114	115.3
48	124.0	123	123.5

Value are reduced by 19.5% to account for misalignment of storm isohyets

UNIT HYDROGRAPH

$$C_p = \frac{530}{640} = 0.83$$

$$t_p = C_t (L L_c)^{0.3}$$

$$= 4.3 (9.12 \times 5.05)^{0.3} = 13.57 \text{ hrs}$$

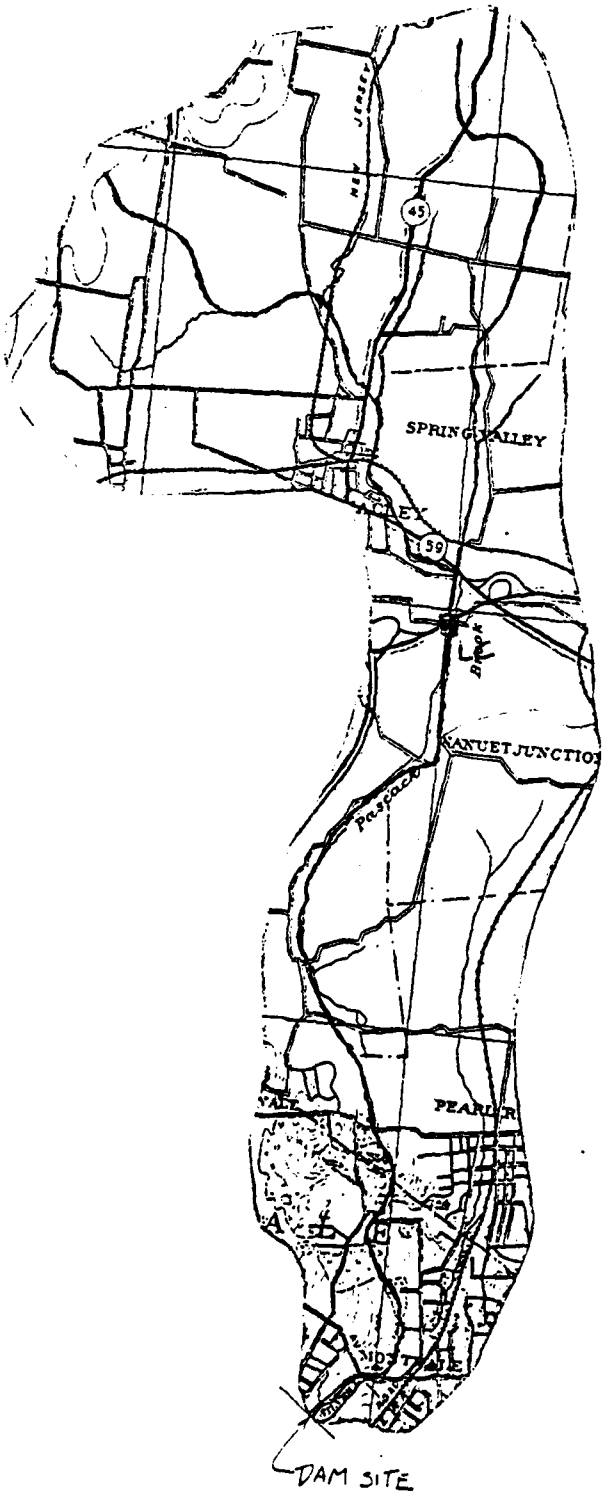
INFILTRATION DATA

LAND USE ~ ½ Urban ~ ½ [illegible]

USE INITIAL INFILTRATION 1.5 inch
CONSTANCE INFILTRATION 0.15 in/hr

FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS

SUBJECT N.J. DAM INSPECTION GROUP XVII — SHEET NO. 3 OF 12
ELECTRIC LIGHT POND — JOB NO. [illegible]
COMPUTED BY B.K.O. — CHECKED BY C.L.C. — DATE 12/6/79



L = Length of stream = 1.12 mile
L_c = the stream length from the outflow at Dam site to a point opposite the center of gravity of the river basin

Scale 1" = 1 mile

ELECTRIC LIGHT POND DAM
DUTCHESS [illegible]

FREDERIC R. HARRIS, INC. CONSULTING ENGINEERS	SUBJECT: NJ DAM INSPECTION GROUP VII ELECTRIC [illegible]	SHEET NO. 4 OF 12
	COMPUTED BY: E Koo CHECKED BY: C.L.C.	JOB NO. [illegible] DATE: 12/6/79

ELEVATION - AREA - CAPACITY RELATIONSHIP

INFORMATION obtained from USGS and General plan of Reconstruction

ELE	124.2*	132.0	137.6	140.	150
Surface Area (ac)	0	7.0	[illegible]	17.5	[illegible]

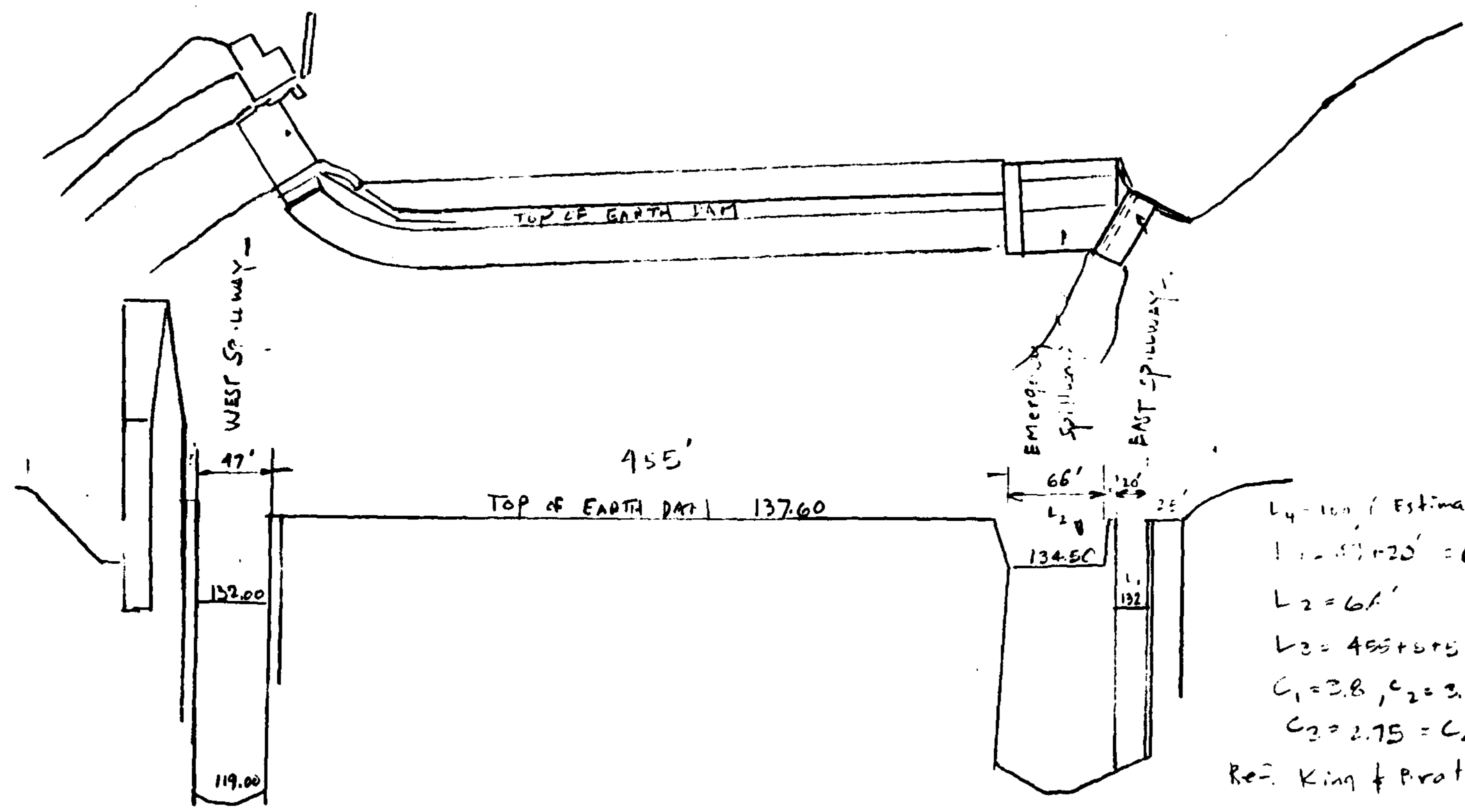
* Weighted elev. of bottom of Lake at [illegible]

HEC 1 DB program will [illegible] storage capacity from surface area and elevation.

Low Level Outlets

Electric [illegible] pond was design with 2 sluice gates controlled 4' ø concrete pipes low level outlet. The two pipes which are located through the east spillway and the [illegible] to the power house are presently [illegible] for draining the pond while dredging operation [illegible].

5



L_4 = 100' (Estimate)

L_1 = [illegible] + 20' = 67'

L_2 = 66'

L_3 = 455 + 5 + 5 + 25 = 490'

C_1 = 3.8, C_2 = 3.5

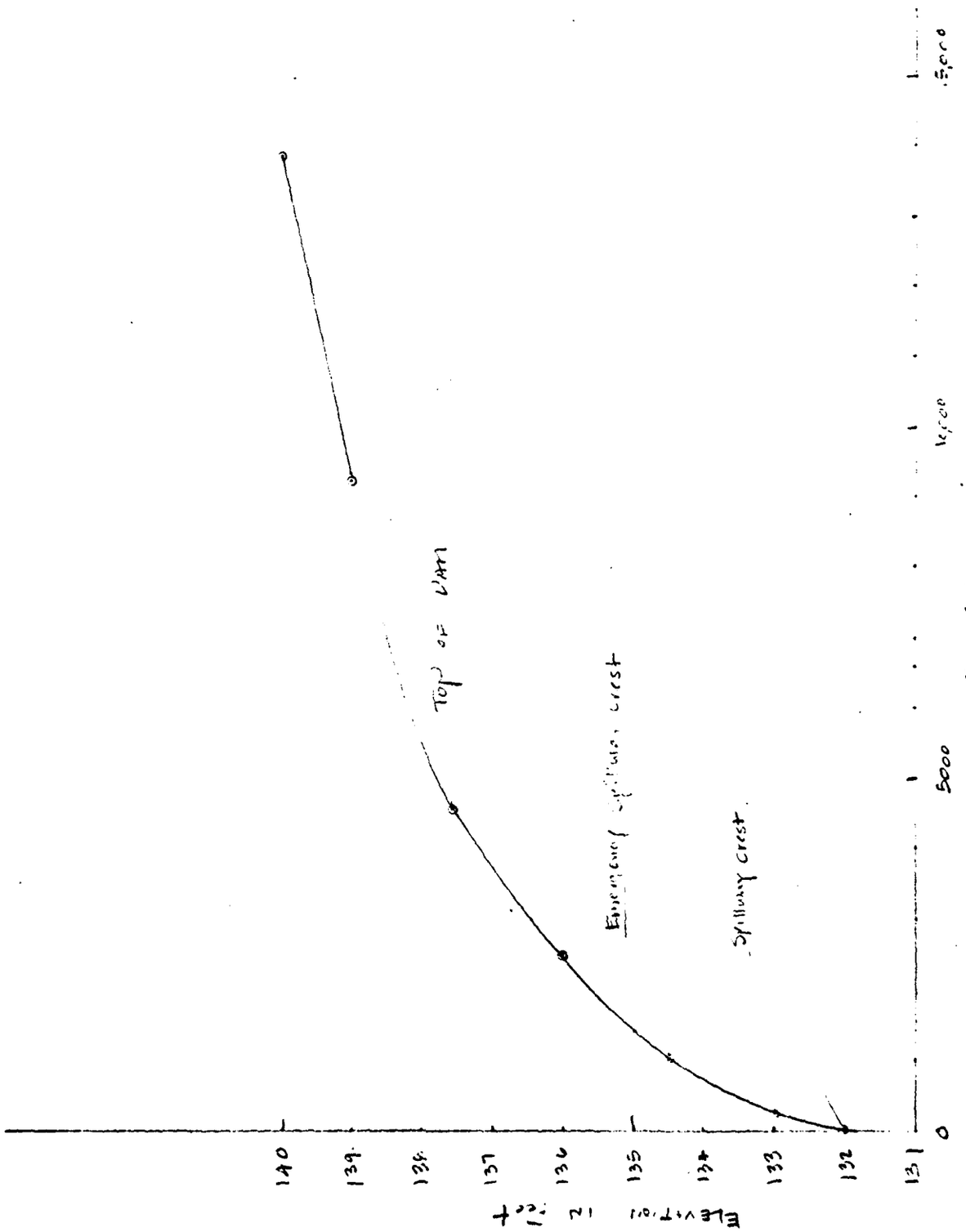
C_3 = 2.75 = C_4

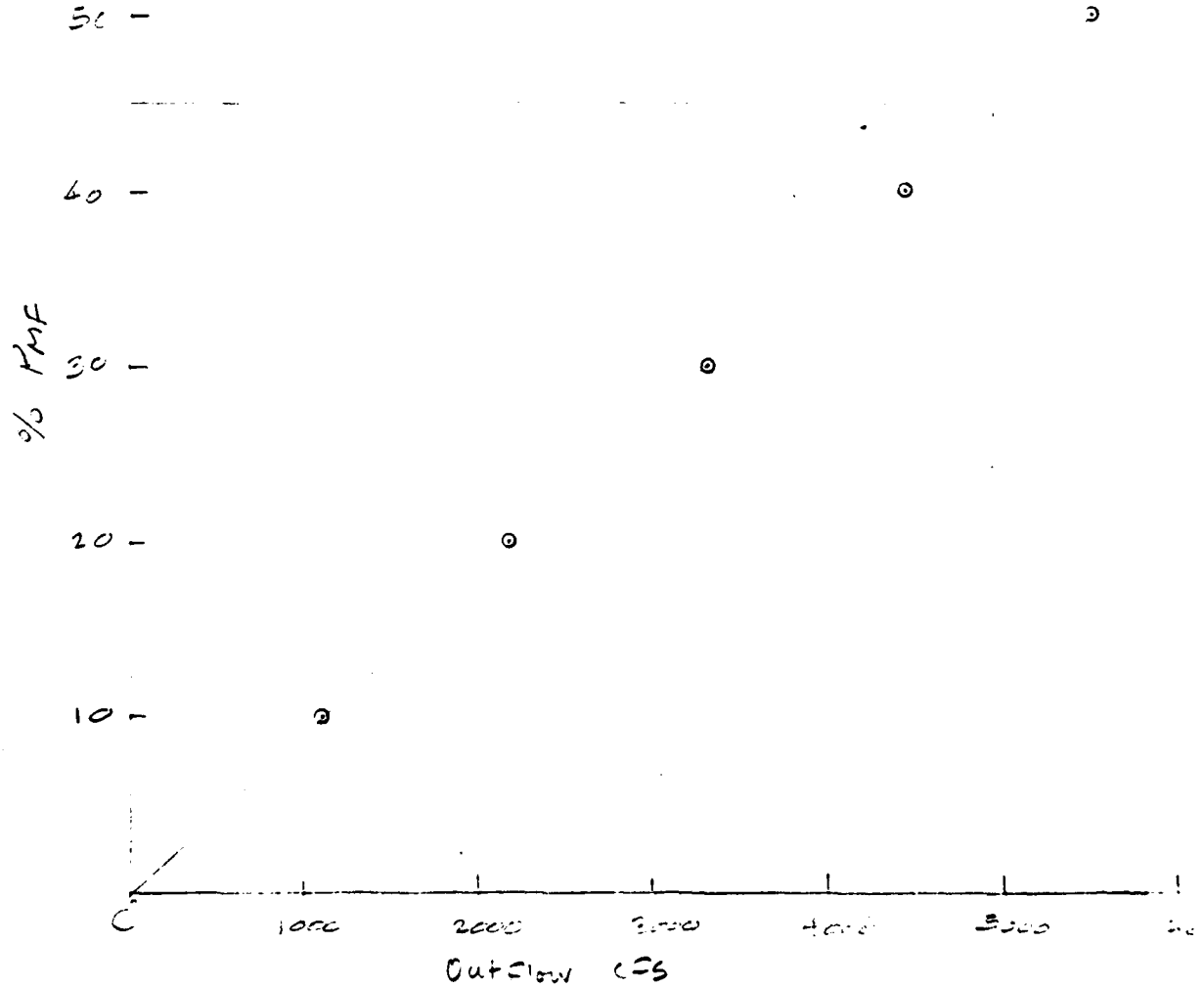
Ref. King & Brater

ELE	H_1	H_2	H_3	H_4	L_1	L_2	L_3	L_4	C_1	C_2	C_3	$Q = C_1L_1H_1^{1.5} + [illegible] + C_3L_3H_3^{1.5}$ (cfs)	
132.													
134.5	2.5				67				3.8			1006	= 1006
136	4.0	1.5			67	66			3.8	3.5		2037 + 424	= 2461
137.[illegible]	5.6	3.1			67	66			3.8	3.5		3374 + 1260	= 4634
139.0	7.0	4.5	1.4		67	66	490		3.8	3.5	2.75	4715 + 22[illegible] + 2272	= 9152
140.0	8	5.5	2.4		67	66	490		3.8	3.5	2.75	5761 + 49[illegible] + [illegible]	= 13751
150.0	18.0	15.5	12.4	11	67	[illegible]	490	100	3.8	3.5	[illegible]	19443 + 1409[illegible] + [illegible] + [illegible]	= 162409

FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS

SUBJECT NJ DAM INV. GROUP VII — SHEET NO. 6 OF 12
ELECTRIC LIGHT POND — JOB NO. 10483-01
COMPUTED BY B.K. CHECKED BY C.L.C. — DATE 12/14/79





Overtopping of Dam occurs at Ele 137.6 with Q = 4845 CFS (~ 45% PMF)

FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS

SUBJECT NJ Dam Fac. Group ~~XVII~~
ELECTRIC LIGHT POND
COMPUTED BY BK CHECKED BY G.L.G.

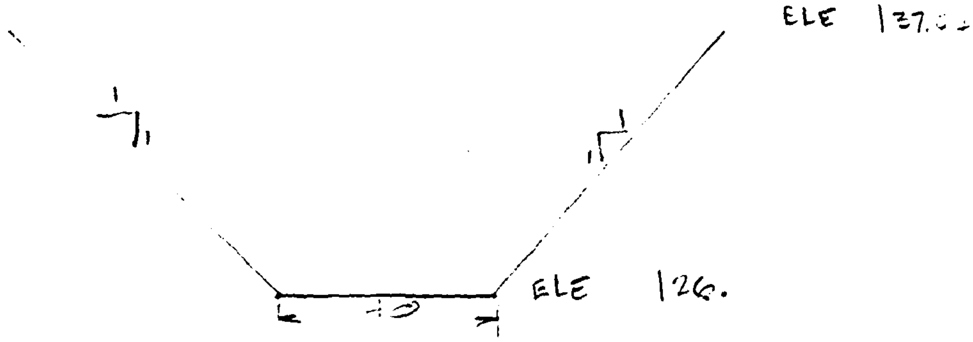
SHEET NO. 8 OF 12
JOB NO. 10-A[illegible]
DATE 2/11/80

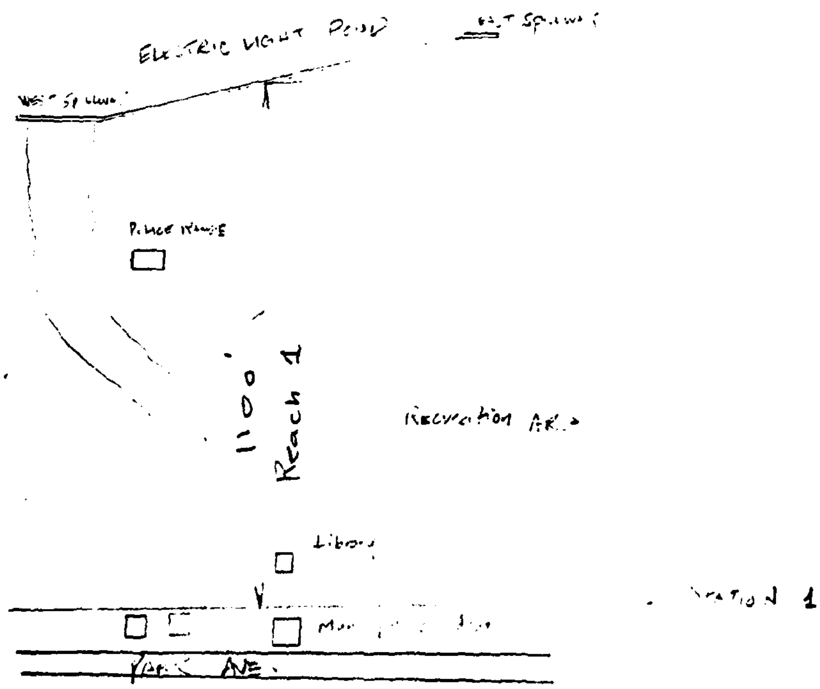
Sensitivity Analysis summary

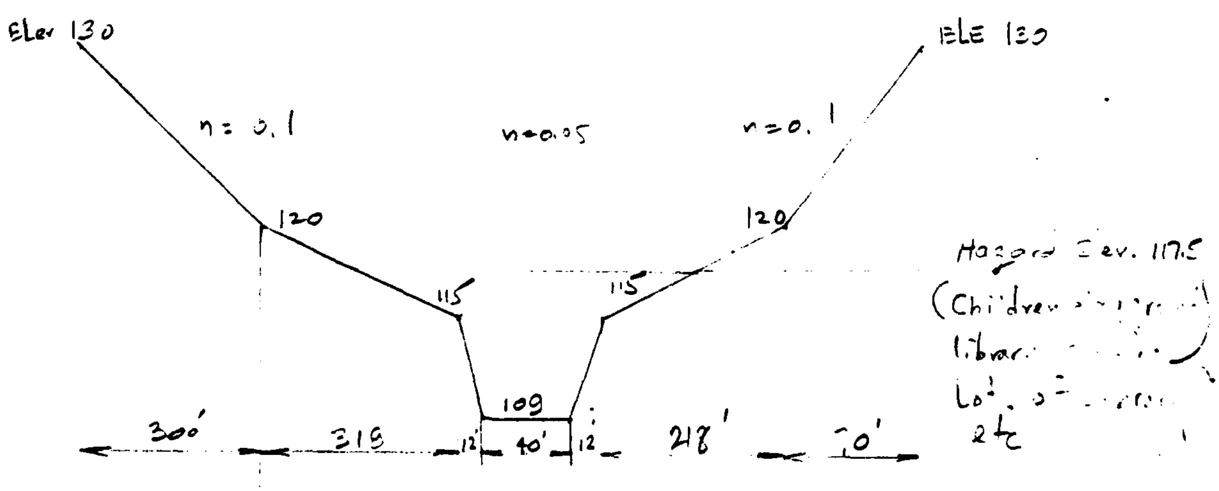
Broad width	Side slope	French bottom Ele.	Fail time hr	Initial water surface	Fail elev.	Max. Peak
40	1	126	0.5	132	137.17	5490
40	1	126	0.5	132	137.84	6381 ←
40	1	126	0.5	132	137.80	6330
40	1	126	0.5	132	137.75	6260

BREACH ANALYSIS

Based on Sensitivity Analysis, the breach begins to develop when the lake stage to reach elevation 137.2 with max. Peak outflow [illegible] than the top of dam.







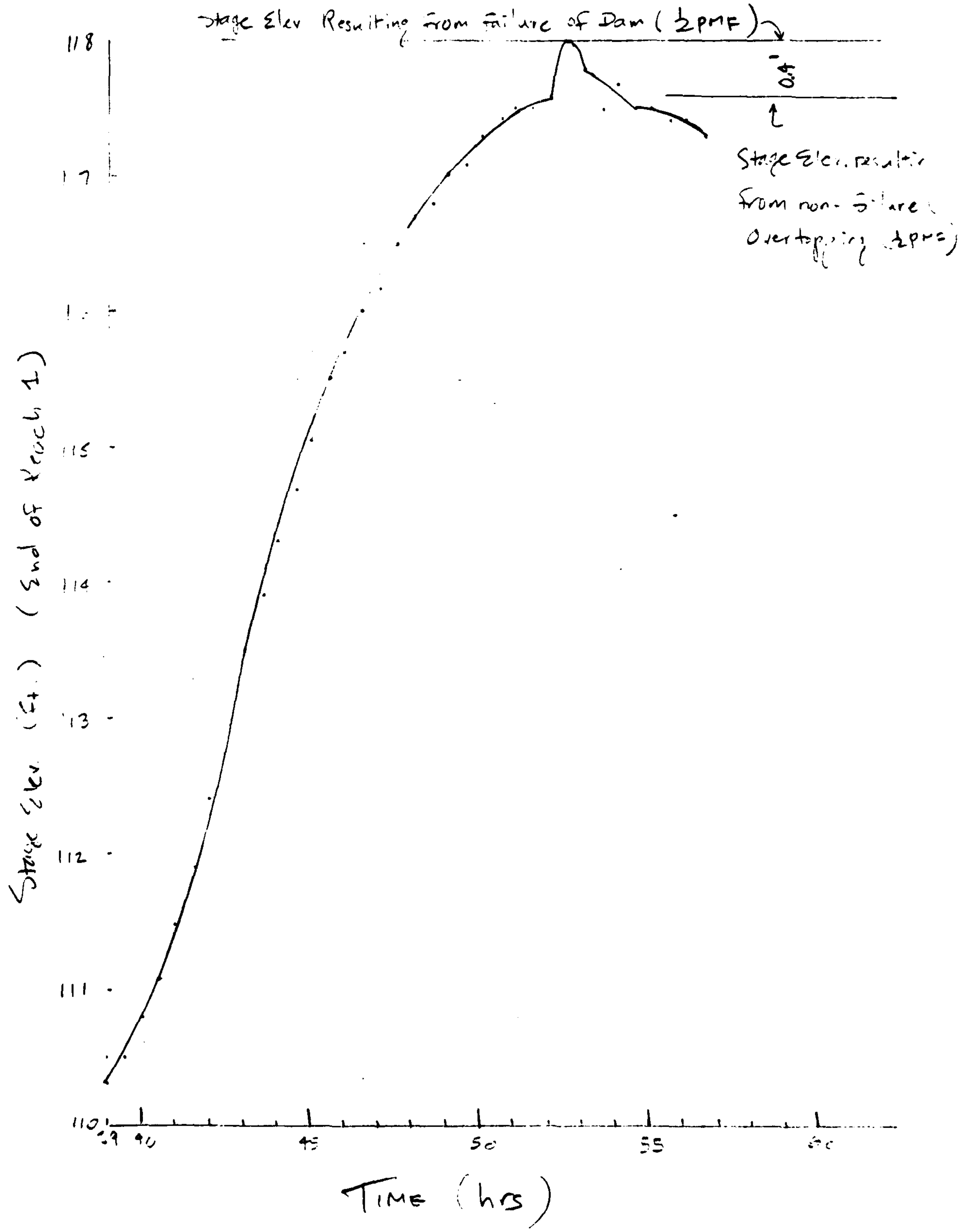
Cross - Section

End of Reach 1 (Sht. 1)

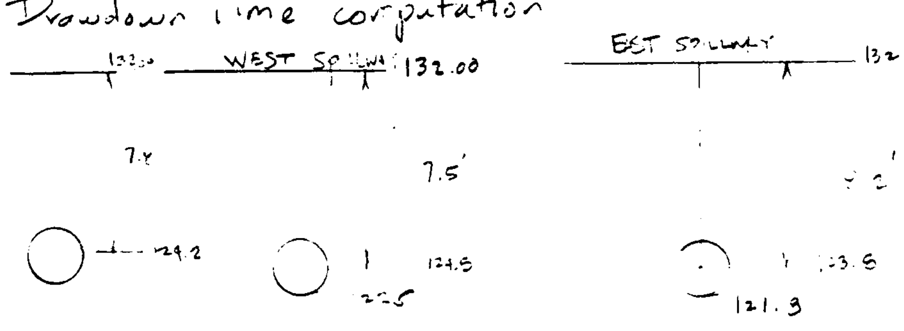
$S = 0.0083$

FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS

SUBJECT NJ Dam Safety Insp Prog. Group XVI
Electric Light Pond
COMPUTED BY GK CHECKED BY CLC
SHEET NO. 11 OF 12
JOB NO. 10-A5...1
DATE 2/19/80



Drawdown Time computation



Normal Elevation To Start 132.0
D.A = 14.2 sq mi
Inflow = [illegible]
= 2[illegible] cfs
Use Fig B-15 of Design of Small dams for Q Ave. outlet discharge

For Simplification, Assume Ave. Invert Elev (122.5+121.9)/2 = 122.2 [illegible]
not [illegible]

Res Ele	Area Acres	Ave Area Ac.	Volume Ac-ft	Ave Res Ele	h/D	Q Ave outlet Discharge	t, hrs Time to Drain Vol × 24 / 1.98 × Q	Cum Time hrs	Time for Inflow [illegible] 28.[illegible] / Q	Cum hrs
132	7.0									
		5.44	10.88	131	2.2	340	0.39	0.39	0.03	0.42
130	3.87									
		2.77	5.54	129	1.7	280	0.24	0.63	0.02	0.65
128	1.66									
		1.02	2.04	127	1.2	200	0.12	0.75	0.02	0.82
126	0.37									
		0.22	0.44	125.5	0.83	120	0.04	0.79	[illegible]	[illegible]7
125	0.07									
		0.04	0.1	125.1	0.73	96	0.01	0.80	0	0.88
124.2	0									
				123.2						
122.2	0									

TIME OF COMPLETE DRAWDOWN WITH NO INFLOW = 0.80 hr.

TIME OF COMPLETE DRAWDOWN WITH INFLOW = 0.88 hr

(ASSUME $A_1 = \frac{A_2}{\left(\frac{h}{H_T}+1\right)^2}$ $A_2 = 7$ Acres $h + H_T = 7.8$)

```
A1              N J DAM SAFETY INSPECTION PROGRAM---GROUP XVII  10A8301
A2              N J 00245 ELECTRIC LIGHT POND, BERGEN COUNTY, NJ
A3              MULT RATIO ROUTING,PRC-HARRIS INC., WOODBRIDGE, N J
B     150         0       30                                    0       0       1
B1      5
J       2         1        1
J1     .5        .4       .3       .2       .1
K       0     LAKE                            0       0       1
K1              INFLOW HYDROGRAPH THROUHG ELECTRIUC LIGHT POND
M       1         1     14.2                14.2   0.805                       1
P                25     96.5    106.5    115.3   123.5
T                                                      1.5    0.15
W    13.6     0.83
X      -1     -.05        2
K       1     DAME                            0       0       1
K1              ROUTING DISCHARGE THROUGH DAM
Y                                       1       1
Y1      1                                                -132      -1
Y4    132    134.5      136    137.6      139      140     150
Y5      0     1006     2461     4634     9152    13751  102409
$A      0        7        9     17.5     57.9
$E  122.0      132    137.6      140      150
$$    132
$D  137.6
$B     40        1      126      0.5      132   137.87
$B     40        1      126      0.5      132      200
K       1   REACH1
K1    U/S OF PARK AVE., PARK RIDGE, N J
Y                                       1       1
Y1      1                                                  -1
Y6    0.1     0.05      0.1      109      130     1100  0.0083
Y7    650      130      950      120     1268      115    1280     109    1320     109
Y7   1332      115     1550      120     1620      130
K      99
^
^
^
^
^
$
```

AD-A087 329 NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION TRENTON F/G 13/13
NATIONAL DAM SAFETY PROGRAM. ELECTRIC LIGHT POND DAM (NJ00245),--ETC(U)
FEB 80 J TALERICO DACW61-79-C-0011

UNCLASSIFIED NL

2 OF 2
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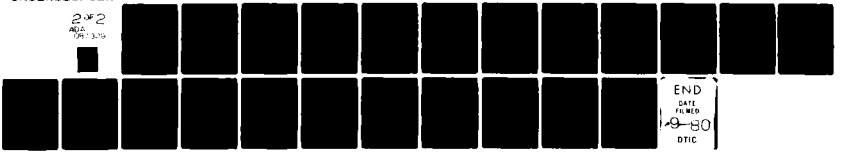

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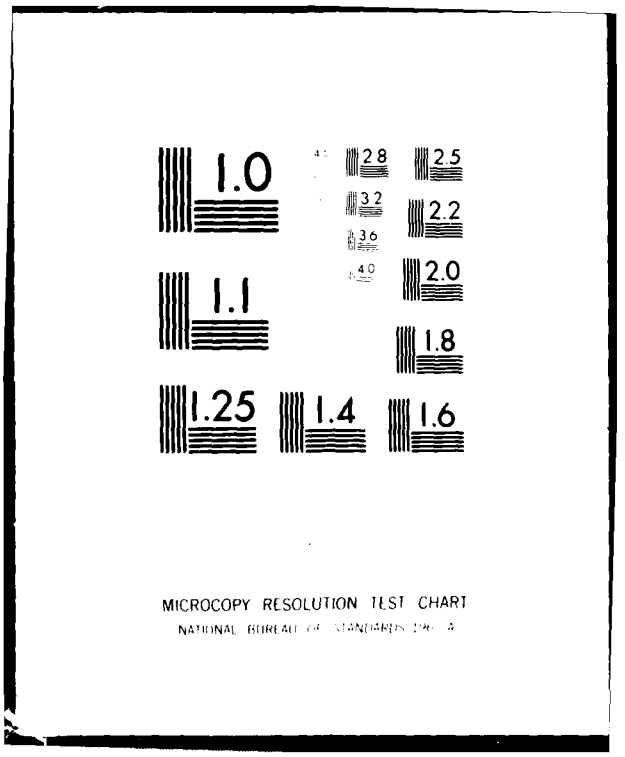
1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

N J DAM SAFETY INSPECTION PROGRAM---GROUP XVII 10A8301
N J 00245 ELECTRIC LIGHT POND, BERGEN COUNTY, NJ
MULT RATIO ROUTING,PRC-HARRIS INC., WOODBRIDGE, N J

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
150	0	30	0	0	0	0	0	1	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

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

RTIOS= .50

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

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH THROUHG ELECTRIUC LIGHT POND

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	14.20	0.00	14.20	.81	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	25.00	96.50	106.50	115.30	123.50	0.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.15	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 13.60 CP= .83 NTA= 0

RECESSION DATA
STRTQ= -1.00 QRCSN= -.05 RTIOR= 2.00

CLARK DID NOT CONVERGE TO GIVEN SNYDER COEFFICIENTS
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=38.47 AND R= 8.85 INTERVALS

UNIT HYDROGRAPH 71 END-OF-PERIOD ORDINATES, LAG= 13.46 HOURS, CP= .82 VOL= 1.00

6.	22.	44.	69.	97.	126.	155.	185.	215.	244.
274.	303.	331.	359.	387.	413.	440.	465.	490.	514.
534.	549.	561.	570.	575.	578.	577.	574.	569.	562.
552.	540.	526.	510.	491.	470.	445.	415.	378.	338.
302.	270.	242.	216.	194.	173.	155.	139.	124.	111.
99.	89.	79.	71.	63.	57.	51.	45.	41.	36.
33.	29.	26.	23.	21.	19.	17.	15.	13.	12.
11.									

0 END-OF-PERIOD FLOW

MO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.30	1	.00	0.00	.00	13.
1.01	1.00	2	.00	0.00	.00	12.
1.01	1.30	3	.00	0.00	.00	12.
1.01	2.00	4	.00	0.00	.00	11.
1.01	2.30	5	.00	0.00	.00	10.
1.01	3.00	6	.00	0.00	.00	9.
1.01	3.30	7	.00	0.00	.00	9.
1.01	4.00	8	.00	0.00	.00	8.
1.01	4.30	9	.00	0.00	.00	8.
1.01	5.00	10	.00	0.00	.00	7.
1.01	5.30	11	.00	0.00	.00	7.
1.01	6.00	12	.00	0.00	.00	6.
1.01	6.30	13	.01	0.00	.01	6.
1.01	7.00	14	.01	0.00	.01	5.
1.01	7.30	15	.01	0.00	.01	5.
1.01	8.00	16	.01	0.00	.01	5.
1.01	8.30	17	.01	0.00	.01	4.
1.01	9.00	18	.01	0.00	.01	4.
1.01	9.30	19	.01	0.00	.01	4.
1.01	10.00	20	.01	0.00	.01	4.
1.01	10.30	21	.01	0.00	.01	3.
1.01	11.00	22	.01	0.00	.01	3.
1.01	11.30	23	.01	0.00	.01	3.
1.01	12.00	24	.01	0.00	.01	3.
1.01	12.30	25	.07	0.00	.07	3.
1.01	13.00	26	.07	0.00	.07	2.
1.01	13.30	27	.08	0.00	.08	2.
1.01	14.00	28	.08	0.00	.08	2.
1.01	14.30	29	.10	0.00	.10	2.
1.01	15.00	30	.10	0.00	.10	2.
1.01	15.30	31	.13	0.00	.13	2.
1.01	16.00	32	.40	0.00	.40	2.
1.01	16.30	33	.10	0.00	.10	1.
1.01	17.00	34	.10	0.00	.10	1.
1.01	17.30	35	.08	0.00	.08	1.
1.01	18.00	36	.08	.00	.08	1.
1.01	18.30	37	.01	0.00	.01	1.
1.01	19.00	38	.01	0.00	.01	1.
1.01	19.30	39	.01	0.00	.01	1.
1.01	20.00	40	.01	0.00	.01	1.
1.01	20.30	41	.01	0.00	.01	1.
1.01	21.00	42	.01	0.00	.01	1.
1.01	21.30	43	.01	0.00	.01	1.
1.01	22.00	44	.01	0.00	.01	1.
1.01	22.30	45	.01	0.00	.01	1.
1.01	23.00	46	.01	0.00	.01	1.
1.01	23.30	47	.01	0.00	.01	1.
1.02	0.00	48	.01	0.00	.01	1.
1.02	.30	49	.06	0.00	.06	1.
1.02	1.00	50	.06	0.00	.06	1.
1.02	1.30	51	.06	0.00	.06	1.
1.02	2.00	52	.06	0.00	.06	1.
1.02	2.30	53	.06	0.00	.06	1.
1.02	3.00	54	.06	0.00	.06	1.
1.02	3.30	55	.06	0.00	.06	1.
1.02	4.00	56	.06	0.00	.06	1.
1.02	4.30	57	.06	0.00	.06	1.
1.02	5.00	58	.06	0.00	.06	1.
1.02	5.30	59	.06	0.00	.06	1.
1.02	6.00	60	.06	0.00	.06	1.
1.02	6.30	61	.17	.09	.08	1.
1.02	7.00	62	.17	.09	.08	3.
1.02	7.30	63	.17	.09	.08	7.
1.02	8.00	64	.17	.09	.08	14.
1.02	14.00	76	1.17	1.09	.08	418.
1.02	14.30	77	1.46	1.38	.08	547.
1.02	15.00	78	1.46	1.38	.08	710.
1.02	15.30	79	1.77	1.70	.08	914.
1.02	16.00	80	5.61	5.53	.08	1183.
1.02	16.30	81	1.36	1.28	.08	1536.
1.02	17.00	82	1.36	1.28	.08	1953.
1.02	17.30	83	1.07	.99	.08	2420.
1.02	18.00	84	1.07	.99	.08	2928.
1.02	18.30	85	.09	.01	.08	3464.
1.02	19.00	86	.09	.01	.08	4014.
1.02	19.30	87	.09	.01	.08	4569.
1.02	20.00	88	.09	.01	.08	5123.
1.02	20.30	89	.09	.01	.08	5673.
1.02	21.00	90	.09	.01	.08	6214.
1.02	21.30	91	.09	.01	.08	6746.
1.02	22.00	92	.09	.01	.08	7265.
1.02	22.30	93	.09	.01	.08	7768.
1.02	23.00	94	.09	.01	.08	8252.
1.02	23.30	95	.09	.01	.08	8712.
1.03	0.00	96	.09	.01	.08	9145.
1.03	.30	97	0.00	0.00	0.00	9547.
1.03	1.00	98	0.00	0.00	0.00	9914.
1.03	1.30	99	0.00	0.00	0.00	10236.
1.03	2.00	100	0.00	0.00	0.00	10504.
1.03	2.30	101	0.00	0.00	0.00	10712.
1.03	3.00	102	0.00	0.00	0.00	10860.
1.03	3.30	103	0.00	0.00	0.00	10949.
1.03	4.00	104	0.00	0.00	0.00	10981.
1.03	4.30	105	0.00	0.00	0.00	10960.
1.03	5.00	106	0.00	0.00	0.00	10888.
1.03	5.30	107	0.00	0.00	0.00	10769.
1.03	6.00	108	0.00	0.00	0.00	10605.
1.03	6.30	109	0.00	0.00	0.00	10397.
1.03	7.00	110	0.00	0.00	0.00	10143.
1.03	7.30	111	0.00	0.00	0.00	9842.
1.03	8.00	112	0.00	0.00	0.00	9491.
1.03	8.30	113	0.00	0.00	0.00	9095.
1.03	9.00	114	0.00	0.00	0.00	8658.
1.03	9.30	115	0.00	0.00	0.00	8182.
1.03	10.00	116	0.00	0.00	0.00	7670.
1.03	10.30	117	0.00	0.00	0.00	7121.
1.03	11.00	118	0.00	0.00	0.00	6533.
1.03	11.30	119	0.00	0.00	0.00	5938.
1.03	12.00	120	0.00	0.00	0.00	5370.
1.03	12.30	121	0.00	0.00	0.00	4835.
1.03	13.00	122	0.00	0.00	0.00	4338.
1.03	13.30	123	0.00	0.00	0.00	3887.
1.03	14.00	124	0.00	0.00	0.00	3482.
1.03	14.30	125	0.00	0.00	0.00	3119.
1.03	15.00	126	0.00	0.00	0.00	2794.
1.03	15.30	127	0.00	0.00	0.00	2503.
1.03	16.00	128	0.00	0.00	0.00	2242.
1.03	16.30	129	0.00	0.00	0.00	2007.
1.03	17.00	130	0.00	0.00	0.00	1797.
1.03	17.30	131	0.00	0.00	0.00	1608.
1.03	18.00	132	0.00	0.00	0.00	1439.
1.03	18.30	133	0.00	0.00	0.00	1286.
1.03	19.00	134	0.00	0.00	0.00	1150.
1.03	19.30	135	0.00	0.00	0.00	1028.
1.03	20.00	136	0.00	0.00	0.00	918.
1.03	20.30	137	0.00	0.00	0.00	821.
1.03	21.00	138	0.00	0.00	0.00	733.
1.03	21.30	139	0.00	0.00	0.00	655.

1.02	8.30	65	.17	.09	.08	23.	1.03	22.00	140	0.00	0.00	0.00	585.
1.02	9.00	66	.17	.09	.08	34.	1.03	22.30	141	0.00	0.00	0.00	533.
1.02	9.30	67	.17	.09	.08	49.	1.03	23.00	142	0.00	0.00	0.00	498.
1.02	10.00	68	.17	.09	.08	66.	1.03	23.30	143	0.00	0.00	0.00	464.
1.02	10.30	69	.17	.09	.08	86.	1.04	0.00	144	0.00	0.00	0.00	433.
1.02	11.00	70	.17	.09	.08	108.	1.04	.30	145	0.00	0.00	0.00	404.
1.02	11.30	71	.17	.09	.08	134.	1.04	1.00	146	0.00	0.00	0.00	377.
1.02	12.00	72	.17	.09	.08	162.	1.04	1.30	147	0.00	0.00	0.00	352.
1.02	12.30	73	.97	.90	.08	197.	1.04	2.00	148	0.00	0.00	0.00	328.
1.02	13.00	74	.97	.90	.08	248.	1.04	2.30	149	0.00	0.00	0.00	306.
1.02	13.30	75	1.17	1.09	.08	320.	1.04	3.00	150	0.00	0.00	0.00	286.
									SUM	24.85	19.80	5.06	361785.
										(631.)	(503.)	(128.)	(10244.61)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10981.	10657.	7057.	2511.	361630.
CMS	311.	302.	200.	71.	10240.
INCHES		6.98	18.49	19.74	19.74
MM		177.33	469.70	501.36	501.44
AC-FT		5285.	13997.	14941.	14943.
THOUS CU M		6519.	17266.	18430.	18432.

HYDROGRAPH AT STA LAKE FOR PLAN 1, RTIO 1

7.	6.	6.	5.	5.	5.	4.	4.	4.	4.
3.	3.	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.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	2.	4.	7.	11.	17.	24.	33.	43.	54.
67.	81.	99.	124.	160.	209.	273.	355.	457.	592.
768.	977.	1210.	1464.	1732.	2007.	2285.	2562.	2836.	3107.
3373.	3632.	3884.	4126.	4356.	4573.	4774.	4957.	5118.	5252.
5356.	5430.	5475.	5491.	5480.	5444.	5384.	5302.	5198.	5072.
4921.	4745.	4548.	4329.	4091.	3835.	3560.	3267.	2969.	2685.
2417.	2169.	1943.	1741.	1560.	1397.	1251.	1121.	1004.	898.
804.	719.	643.	575.	514.	459.	410.	367.	327.	292.
267.	249.	232.	217.	202.	189.	176.	164.	153.	143.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5491.	5329.	3529.	1255.	180815.
CMS	155.	151.	100.	36.	5120.
INCHES		3.49	9.25	9.87	9.87
MM		88.67	234.85	250.68	250.72
AC-FT		2642.	6999.	7471.	7472.
THOUS CU M		3259.	8633.	9215.	9216.

PLAN 2 SAME AS PLAN 1

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HYDROGRAPH ROUTING

ROUTING DISCHARGE THROUGH DAM

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

ALL PLANS HAVE SAME
ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-132.	-1

STAGE	132.00	134.50	136.00	13 .30	139.00	140.00	150.00
FLOW	0.00	1006.00	2461.00	4634.00	9152.00	13751.00	102409.00
SURFACE AREA=	0.	7.	9.	18.	58.		
CAPACITY=	0.	23.	68.	99.	457.		
ELEVATION=	122.	132.	138.	140.	150.		

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
132.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
137.6	0.0	0.0	0.

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
40.	1.00	126.00	.50	132.00	137.87

STATION DAME, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

7.	6.	6.	6.	5.	5.	4.	4.	4.	
3.	3.	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.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	3.	5.	9.	15.	21.	29.	39.	49.
61.	75.	91.	113.	144.	187.	245.	319.	412.	531.
687.	880.	1137.	1423.	1672.	1953.	2226.	2508.	2802.	3063.
3334.	3591.	3846.	4088.	4320.	4539.	4760.	4945.	5107.	5243.
5349.	5425.	5472.	5490.	5481.	5447.	5390.	5309.	5207.	5082.
4932.	4758.	4572.	4370.	4127.	3877.	3604.	3313.	3014.	2727.
2457.	2226.	1986.	1782.	1595.	1429.	1279.	1146.	1026.	943.
848.	758.	678.	606.	541.	483.	432.	386.	345.	308.
278.	256.	239.	223.	208.	194.	181.	169.	158.	147.

STORAGE

23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	24.	24.	24.	24.	24.
24.	25.	25.	25.	26.	27.	28.	29.	31.	33.
36.	39.	43.	45.	47.	50.	52.	54.	56.	58.
60.	61.	63.	64.	66.	67.	68.	69.	69.	70.
70.	70.	70.	71.	70.	70.	70.	70.	70.	69.
69.	68.	68.	66.	65.	63.	61.	59.	58.	56.
54.	52.	50.	48.	47.	45.	44.	43.	42.	41.
39.	37.	36.	34.	33.	32.	31.	30.	29.	29.
28.	28.	28.	27.	27.	27.	27.	26.	26.	26.

STAGE

132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.2	132.2	132.2	132.3	132.4	132.5	132.6	132.8	133.0	133.3
133.7	134.2	134.6	134.9	135.2	135.5	135.8	136.0	136.3	136.4
136.6	136.8	137.0	137.2	137.4	137.5	137.6	137.7	137.7	137.8
137.8	137.8	137.9	137.9	137.9	137.9	137.8	137.8	137.8	137.7
137.7	137.6	137.6	137.4	137.2	137.0	136.8	136.6	136.4	136.2
136.0	135.8	135.5	135.3	135.1	134.9	134.8	134.6	134.5	134.3
134.1	133.9	133.7	133.5	133.3	133.2	133.1	133.0	132.9	132.8
132.7	132.6	132.6	132.6	132.5	132.5	132.5	132.4	132.4	132.4

PEAK OUTFLOW IS 5490. AT TIME 52.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5490.	5328.	3528.	1255.	180756.
CMS	155.	151.	100.	36.	5118.
INCHES		3.49	9.24	9.87	9.87
MM		88.65	234.81	250.60	250.64
AC-FT		2642.	6998.	7468.	7469.
THOUS CU M		3259.	8631.	9212.	9213.

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
40.	1.00	126.00	.50	132.00	200.00

STATION DAME, PLAN 2, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

7.	6.	6.	6.	5.	5.	5.	4.	4.	4.
3.	3.	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.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	3.	5.	9.	15.	21.	29.	39.	49.
61.	75.	91.	113.	144.	187.	245.	319.	412.	531.
687.	880.	1137.	1423.	1672.	1953.	2226.	2508.	2802.	3063.
3334.	3591.	3846.	4088.	4320.	4539.	4760.	4945.	5107.	5243.
5349.	5426.	5472.	5490.	5481.	5447.	5389.	5309.	5206.	5081.
4932.	4758.	4572.	4369.	4127.	3877.	3604.	3313.	3014.	2727.
2457.	2226.	1986.	1782.	1595.	1429.	1279.	1146.	1026.	943.
848.	758.	678.	606.	541.	483.	432.	386.	345.	308.
278.	256.	239.	223.	208.	194.	181.	169.	158.	147.

STORAGE

23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	24.	24.	24.	24.	24.
24.	25.	25.	25.	26.	27.	28.	29.	31.	33.
36.	39.	43.	45.	47.	50.	52.	54.	56.	58.
60.	61.	63.	64.	66.	67.	68.	69.	69.	70.
70.	70	70	71	70	70	70	70	70	69

69.	68.	68.	66.	65	63.	61.	[illegible]	[illegible]	[illegible]
54.	52.	50.	48.	47.	45.	44.	43.	42.	41.
39.	37.	36.	34.	33.	32.	31.	30.	29.	29.
28.	28.	28.	27.	27.	27.	27.	26.	26.	26.

STAGE

132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.1	132.1	132.1	132.1
132.2	132.2	132.2	132.3	132.4	132.5	132.6	132.8	133.0	133.3
133.7	134.2	134.6	134.9	135.2	135.5	135.8	136.0	136.3	136.4
136.6	136.8	137.0	137.2	137.4	137.5	137.6	137.7	137.7	137.8
137.8	137.8	137.9	137.9	137.9	137.9	137.8	137.8	137.8	137.7
137.7	137.6	137.6	137.4	137.2	137.0	136.8	136.6	136.4	136.2
136.0	135.8	135.5	135.3	135.1	134.9	134.8	134.6	134.5	134.3
134.1	133.9	133.7	133.5	133.3	133.2	133.1	133.0	132.9	132.8
132.7	132.6	132.6	132.6	132.5	132.5	132.5	132.4	132.4	132.4

PEAK OUTFLOW IS 5490. AT TIME 52.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5490.	5328.	3528.	1255.	180756.
CMS	155.	151.	100.	36.	5118.
INCHES		3.49	9.24	9.87	9.87
MM		88.65	234.81	250.60	250.64
AC-FT		2642.	6998.	7468.	7469.
THOUS CU M		3259.	8631.	9212.	9213.

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HYDROGRAPH ROUTING

U/S OF PARK AVE., PARK RIDGE, N J

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
REACH1	1	0	0	0	0	0	0	0

ALL PLANS HAVE SAME
ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0500	.1000	109.0	130.0	1100.	.00830

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

```
650.00  130.00  950.00  120.00 1268.00  115.00 1   .00  109.00 1320.00  109.00
1332.00  115.00 1550.00  120.00 1620.00  130.00
```

STORAGE	0.00	1.18	2.48	3.90	5.45	7.12	9.44	14.77	23.41	35.35
	50.60	67.97	86.48	106.14	126.93	148.87	171.95	196.17	221.53	248.03
OUTFLOW	0.00	129.86	418.71	837.91	1380.25	2044.14	2912.13	4131.64	5830.06	8142.37
	11201.54	15361.10	20293.25	25990.66	32455.25	39694.27	47718.30	56540.07	66173.75	76634.58
STAGE	109.00	110.11	111.21	112.32	113.42	114.53	115.63	116.74	117.84	118.95
	120.05	121.16	122.26	123.37	124.47	125.58	126.68	127.79	128.89	130.00
FLOW	0.00	129.86	418.71	837.91	1380.25	2044.14	2912.13	4131.64	5830.06	8142.37
	11201.54	15361.10	20293.25	25990.66	32455.25	39694.27	47718.30	56540.07	66173.75	76634.58

STATION REACH1, PLAN 1, RTIO 1

OUTFLOW

7.	7.	6.	6.	5.	5.	5.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	2.	1.	1.	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.	1.	2.	5.	8.	13.	20.	27.	36.	47.
59.	72.	87.	108.	138.	184.	237.	311.	400.	521.
672.	864.	1118.	1404.	1661.	1931.	2212.	2487.	2784.	3037.
3303.	3566.	3818.	4064.	4291.	4513.	4731.	4925.	5087.	5229.
5337.	5418.	5468.	5490.	5484.	5453.	5398.	5320.	5220.	5098.
4952.	4781.	4595.	4395.	4160.	3901.	3636.	3343.	3047.	2744.
2475.	2238.	2003.	1791.	1608.	1436.	1291.	1153.	1035.	946.
857.	764.	685.	611.	547.	488.	436.	390.	349.	311.
281.	258.	241.	225.	210.	196.	183.	171.	159.	148.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	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.	2.	2.	2.	3.
3.	4.	5.	6.	6.	7.	8.	8.	9.	10.
11.	12.	13.	14.	16.	17.	18.	19.	20.	20.
21.	21.	22.	22.	22.	21.	21.	21.	20.	20.
19.	18.	17.	16.	15.	14.	13.	11.	10.	9.
8.	8.	7.	6.	6.	6.	5.	5.	4.	4.
4.	4.	3.	3.	3.	3.	3.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.

STAGE

109.1	109.1	109.1	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.1	109.1	109.2	109.2	109.3	109.4
109.5	109.6	109.7	109.9	110.1	110.3	110.5	110.8	111.1	111.5
111.9	112.4	112.9	113.5	113.9	114.3	114.7	115.1	115.5	115.7
116.0	116.2	116.5	116.7	116.8	117.0	117.1	117.3	117.4	117.5
117.5	117.6	117.6	117.6	117.6	117.6	117.6	117.5	117.4	117.4
117.3	117.2	117.0	116.9	116.8	116.5	116.3	116.0	115.8	115.4
115.1	114.8	114.5	114.1	113.8	113.5	113.2	113.0	112.7	112.5
112.4	112.1	111.9	111.7	111.5	111.4	111.3	111.1	110.9	110.8

110.7	110.6	110.5	110.5	110.	110.4	110.3	110.3	110.2	110.2

	PEAK	6-HOUR	24-HOUR	72-HOUR.	TOTAL VOLUME
CFS	5490.	5328.	3528.	1255.	180727.
CMS	155.	151.	100.	36.	5118.
INCHES		3.49	9.24	9.86	9.87
MM		88.65	234.80	250.56	250.60
AC-FT		2642.	6997.	7467.	7468.
THOUS CU M		3259.	8631.	9210.	9212.

MAXIMUM STORAGE = 22.

MAXIMUM STAGE IS 117.6

STATION REACH1, PLAN 2, RTIO 1

OUTFLOW

7.	7.	6.	6.	5.	5.	5.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	2.	1.	1.	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.	1.	2.	5.	8.	13.	20.	27.	36.	47.
59.	72.	87.	108.	138.	184.	237.	311.	400.	521.
672.	864.	1118.	1404.	1661.	1931.	2212.	2487.	2784.	3037.
3303.	3566.	3818.	4064.	4291.	4513.	4731.	4926.	5087.	5229.
5337.	5418.	5468.	5490.	5484.	5453.	5398.	5320.	5220.	5098.
4952.	4781.	4595.	4395.	4159.	3901.	3636.	3343.	3047.	2744.
2475.	2238.	2003.	1791.	1608.	1436.	1291.	1153.	1035.	946.
857.	764.	685.	611.	547.	488.	436.	390.	349.	311.
281.	258.	241.	225.	210.	196.	183.	171.	159.	148.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	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.	2.	2.	2.	3.
3.	4.	5.	6.	6.	7.	8.	8.	9.	10.
11.	12.	13.	14.	16.	17.	18.	19.	20.	20.
21.	21.	22.	22.	22.	21.	21.	21.	20.	20.
19.	18.	17.	16.	15.	14.	13.	11.	10.	9.
8.	8.	7.	6.	6.	6.	5.	5.	4.	4.
4.	4.	3.	3.	3.	3.	3.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.

STAGE

109.1	109.1	109.1	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.1	109.1	109.2	109.2	109.3	109.4
109.5	109.6	109.7	109.9	110.1	110.3	110.5	110.8	111.1	111.5
111.9	112.4	112.9	113.5	113.9	114.3	114.7	115.1	115.5	115.7
116.0	116.2	116.5	116.7	116.8	117.0	117.1	117.3	117.4	117.5
117.5	117.6	117.6	117.6	117.6	117.6	117.6	117.5	117.4	117.4
117.3	117.2	117.0	116.9	116.8	116.5	116.3	116.0	115.8	115.4

115.1	114.8	114.5	114.1	113.8	113.5	113.2	113.0	112.7	112.5
112.4	112.1	111.9	111.7	111.5	111.4	111.3	111.1	110.9	110.8
110.7	110.6	110.5	110.5	110.4	110.4	110.3	110.3	110.2	110.2

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5490.	5328.	3528.	1255.	180727.
CMS	155.	151.	100.	36.	5118.
INCHES		3.49	9.24	9.86	9.87
MM		88.65	234.80	250.56	250.60
AC-FT		2642.	6997.	7467.	7468.
THOUS CU M		3259.	8631.	9210.	9212.

MAXIMUM STORAGE = 22.

MAXIMUM STAGE IS 117.6

1 ********** ********** ********** ********** **********

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 .50
HYDROGRAPH AT	LAKE	14.20	1	5491.
		(36.78)		(155.48)(
			2	5491.
				(155.48)(
ROUTED TO	DAME	14.20	1	5490.
		(36.78)		(155.47)(
			2	5490.
				(155.47)(
ROUTED TO	REACH1	14.20	1	5490.
		(36.78)		(155.45)(
			2	5490.
				(155.45)(

1

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	132.00	132.00	137.60
STORAGE	23.	23.	68.
OUTFLOW	0.	0.	4634.

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
.50	137.87	.27	71.	5490.	8.00	52.00	0.00

PLAN 2

	ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
	STORAGE	132.00	132.00	137.60
	OUTFLOW	23.	23.	68.
		0.	0.	4634.

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
.50	137.87	.27	71.	5490.	8.00	52.00	0.00

PLAN 1 STATION REACH1

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
.50	5490.	117.6	52.00

PLAN 2 STATION REACH1

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
.50	5490.	117.6	52.00

```
A1              N J DAM SAFETY INSPECTION PROGRAM---GROUP XVII   10A8301
A2              N J 00245 ELECTRIC LIGHT POND, BERGEN COUNTY, NJ
A3              MULT RATIO ROUTING,PRC-HARRIS INC., WOODBRIDGE, N J
B     150         0       30                                    0       0       1
B1      5
J       2         1        1
J1     .5        .4       .3       .2       .1
K       0     LAKE                            0       0       1
K1              INFLOW HYDROGRAPH THROUHG ELECTRIUC LIGHT POND
M       1         1     14.2                14.2   0.805                           1
P                25     96.5    106.5    115.3   123.5
T                                                        1.5    0.15
W    13.6     0.83
X      -1     -.05        2
K       1     DAME                            0       0       1
K1              ROUTING DISCHARGE THROUGH DAM
Y                                       1       1
Y1      1                                                -132      -1
Y4    132    134.5      136    137.6      139     140     150
Y5      0     1006     2461     4634     9152   13751  102409
$A      0        7        9     17.5     57.9
$E  122.0      132    137.6      140      150
$$    132
$D  137.6
$R     40        1      126      0.5      132  137.84
$B     40        1      126      0.5      132     200
K       1   REACH1
K1    U/S OF PARK AVE., PARK RIDGE, N J
Y                                       1       1
Y1      1                                                  -1
Y6    0.1     0.05      0.1      109      130    1100  0.0083
Y7    650      130      950      120     1268     115    1280     109    1320     109
Y7   1332      115     1550      120     1620     130
K      99
A
A
A
A
A
$
```

N J DAM SAFETY INSPECTION PROGRAM---GROUP XVII 10A8301
N J 00245 ELECTRIC LIGHT POND, BERGEN COUNTY, NJ
MULT RATIO ROUTING.PRC-HARRIS INC., WOODBRIDGE, N.J

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
150	0	30	0	0	0	0	0	1	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

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

RTIOS= .50

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

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH THROUHG ELECTRIUC LIGHT POND

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	14.20	0.00	14.20	.81	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	25.00	96.50	106.50	115.30	123.50	0.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.15	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 13.60 CP= .83 NTA= 0

RECESSION DATA
STRTQ= -1.00 QRCSN= -.05 RTIOR= 2.00

CLARK DID NOT CONVERGE TO GIVEN SNYDER COEFFICIENTS
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=38.47 AND R= 8.85 INTERVALS

UNIT HYDROGRAPH 71 END-OF-PERIOD ORDINATES, LAG= 13.46 HOURS, CP= .82 VOL= 1.00

6.	22.	44.	69.	97.	126.	155.	185.	215.	244.
274.	303.	331.	359.	387.	413.	440.	465.	490.	514.
534.	549.	561.	570.	575.	578.	577.	574.	569.	562.
552.	540.	526.	510.	491.	470.	445.	415.	378.	330.
302.	270.	242.	216.	194.	173.	155.	139.	124.	111.
99.	89.	79.	71.	63.	57.	51.	45.	41.	36.
33.	29.	26.	23.	21.	19.	17.	15.	13.	12.
11.									

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.30	1	.00	0.00	.00	13.	1.02	14.00	76	1.17	1.09	.08	410.
1.01	1.00	2	.00	0.00	.00	12.	1.02	14.30	77	1.46	1.38	.08	547.
1.01	1.30	3	.00	0.00	.00	12.	1.02	15.00	78	1.46	1.38	.08	710.
1.01	2.00	4	.00	0.00	.00	11.	1.02	15.30	79	1.77	1.70	.08	914.
1.01	2.30	5	.00	0.00	.00	10.	1.02	16.00	80	5.61	5.53	.08	1183.
1.01	3.00	6	.00	0.00	.00	9.	1.02	16.30	81	1.36	1.28	.08	1536.
1.01	3.30	7	.00	0.00	.00	9.	1.02	17.00	82	1.36	1.28	.08	1953.
1.01	4.00	8	.00	0.00	.00	8.	1.02	17.30	83	1.07	.99	.08	2420.
1.01	4.30	9	.00	0.00	.00	8.	1.02	18.00	84	1.07	.99	.08	2928.
1.01	5.00	10	.00	0.00	.00	7.	1.02	18.30	85	.09	.01	.08	3464.
1.01	5.30	11	.00	0.00	.00	7.	1.02	19.00	86	.09	.01	.08	4014.
1.01	6.00	12	.00	0.00	.00	6.	1.02	19.30	87	.09	.01	.08	4569.
1.01	6.30	13	.01	0.00	.01	6.	1.02	20.00	88	.09	.01	.08	5123.
1.01	7.00	14	.01	0.00	.01	5.	1.02	20.30	89	.09	.01	.08	5673.
1.01	7.30	15	.01	0.00	.01	5.	1.02	21.00	90	.09	.01	.08	6214.
1.01	8.00	16	.01	0.00	.01	5.	1.02	21.30	91	.09	.01	.08	6746.
1.01	8.30	17	.01	0.00	.01	4.	1.02	22.00	92	.09	.01	.08	7265.
1.01	9.00	18	.01	0.00	.01	4.	1.02	22.30	93	.09	.01	.08	7768.
1.01	9.30	19	.01	0.00	.01	4.	1.02	23.00	94	.09	.01	.08	8252.
1.01	10.00	20	.01	0.00	.01	4.	1.02	23.30	95	.09	.01	.08	8712.
1.01	10.30	21	.01	0.00	.01	3.	1.03	0.00	96	.09	.01	.08	9145.
1.01	11.00	22	.01	0.00	.01	3.	1.03	.30	97	0.00	0.00	0.00	9547.
1.01	11.30	23	.01	0.00	.01	3.	1.03	1.00	98	0.00	0.00	0.00	9914.
1.01	12.00	24	.01	0.00	.01	3.	1.03	1.30	99	0.00	0.00	0.00	10236.
1.01	12.30	25	.07	0.00	.07	3.	1.03	2.00	100	0.00	0.00	0.00	10504.
1.01	13.00	26	.07	0.00	.07	2.	1.03	2.30	101	0.00	0.00	0.00	10712.
1.01	13.30	27	.08	0.00	.08	2.	1.03	3.00	102	0.00	0.00	0.00	10860.
1.01	14.00	28	.08	0.00	.08	2.	1.03	3.30	103	0.00	0.00	0.00	10949.
1.01	14.30	29	.10	0.00	.10	2.	1.03	4.00	104	0.00	0.00	0.00	10981.
1.01	15.00	30	.10	0.00	.10	2.	1.03	4.30	105	0.00	0.00	0.00	10960.
1.01	15.30	31	.13	0.00	.13	2.	1.03	5.00	106	0.00	0.00	0.00	10888.
1.01	16.00	32	.40	0.00	.40	2.	1.03	5.30	107	0.00	0.00	0.00	10769.
1.01	16.30	33	.10	0.00	.10	1.	1.03	6.00	108	0.00	0.00	0.00	10605.
1.01	17.00	34	.10	0.00	.10	1.	1.03	6.30	109	0.00	0.00	0.00	10397.
1.01	17.30	35	.08	0.00	.08	1.	1.03	7.00	110	0.00	0.00	0.00	10143.
1.01	18.00	36	.08	.00	.08	1.	1.03	7.30	111	0.00	0.00	0.00	9842.
1.01	18.30	37	.01	0.00	.01	1.	1.03	8.00	112	0.00	0.00	0.00	9491.
1.01	19.00	38	.01	0.00	.01	1.	1.03	8.30	113	0.00	0.00	0.00	9095.
1.01	19.30	39	.01	0.00	.01	1.	1.03	9.00	114	0.00	0.00	0.00	8658.
1.01	20.00	40	.01	0.00	.01	1.	1.03	9.30	115	0.00	0.00	0.00	8182.
1.01	20.30	41	.01	0.00	.01	1.	1.03	10.00	116	0.00	0.00	0.00	7670.
1.01	21.00	42	.01	0.00	.01	1.	1.03	10.30	117	0.00	0.00	0.00	7121.
1.01	21.30	43	.01	0.00	.01	1.	1.03	11.00	118	0.00	0.00	0.00	6533.
1.01	22.00	44	.01	0.00	.01	1.	1.03	11.30	119	0.00	0.00	0.00	5938.
1.01	22.30	45	.01	0.00	.01	1.	1.03	12.00	120	0.00	0.00	0.00	5370.
1.01	23.00	46	.01	0.00	.01	1.	1.03	12.30	121	0.00	0.00	0.00	4835.
1.01	23.30	47	.01	0.00	.01	1.	1.03	13.00	122	0.00	0.00	0.00	4338.
1.02	0.00	48	.01	0.00	.01	1.	1.03	13.30	123	0.00	0.00	0.00	3887.
1.02	.30	49	.06	0.00	.06	1.	1.03	14.00	124	0.00	0.00	0.00	3482.
1.02	1.00	50	.06	0.00	.06	1.	1.03	14.30	125	0.00	0.00	0.00	3119.
1.02	1.30	51	.06	0.00	.06	1.	1.03	15.00	126	0.00	0.00	0.00	2794.
1.02	2.00	52	.06	0.00	.06	1.	1.03	15.30	127	0.00	0.00	0.00	2503.
1.02	2.30	53	.06	0.00	.06	1.	1.03	16.00	128	0.00	0.00	0.00	2242.
1.02	3.00	54	.06	0.00	.06	1.	1.03	16.30	129	0.00	0.00	0.00	2007.
1.02	3.30	55	.06	0.00	.06	1.	1.03	17.00	130	0.00	0.00	0.00	1797.
1.02	4.00	56	.06	0.00	.06	1.	1.03	17.30	131	0.00	0.00	0.00	1608.
1.02	4.30	57	.06	0.00	.06	1.	1.03	18.00	132	0.00	0.00	0.00	1439.
1.02	5.00	58	.06	0.00	.06	1.	1.03	18.30	133	0.00	0.00	0.00	1286.
1.02	5.30	59	.06	0.00	.06	1.	1.03	19.00	134	0.00	0.00	0.00	1150.
1.02	6.00	60	.06	0.00	.06	1.	1.03	19.30	135	0.00	0.00	0.00	1028.
1.02	6.30	61	.17	.09	.08	1.	1.03	20.00	136	0.00	0.00	0.00	918.
1.02	7.00	62	.17	.09	.08	3.	1.03	20.30	137	0.00	0.00	0.00	821.
1.02	7.30	63	.17	.09	.08	7.	1.03	21.00	138	0.00	0.00	0.00	733.
1.02	8.00	64	.17	.09	.08	14.	1.03	21.30	139	0.00	0.00	0.00	655.

1.02	8.30	65	.17	.09	.08	23.	1.03	22.00	140	0.00	0.00	0.00	585.
1.02	9.00	66	.17	.09	.08	34.	1.03	22.30	141	0.00	0.00	0.00	533.
1.02	9.30	67	.17	.09	.08	49.	1.03	23.00	142	0.00	0.00	0.00	490.
1.02	10.00	68	.17	.09	.08	66.	1.03	23.30	143	0.00	0.00	0.00	464.
1.02	10.30	69	.17	.09	.08	86.	1.04	0.00	144	0.00	0.00	0.00	433.
1.02	11.00	70	.17	.09	.08	108.	1.04	.30	145	0.00	0.00	0.00	404.
1.02	11.30	71	.17	.09	.08	134.	1.04	1.00	146	0.00	0.00	0.00	377.
1.02	12.00	72	.17	.09	.08	162.	1.04	1.30	147	0.00	0.00	0.00	352.
1.02	12.30	73	.97	.90	.08	197.	1.04	2.00	148	0.00	0.00	0.00	328.
1.02	13.00	74	.97	.90	.08	248.	1.04	2.30	149	0.00	0.00	0.00	306.
1.02	13.30	75	1.17	1.09	.08	320.	1.04	3.00	150	0.00	0.00	0.00	286.
									SUM	24.85	19.80	5.06	361785.
										(631.)	(503.)	(128.)	(10244.61)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10981.	10657.	7057.	2511.	361630.
CMS	311.	302.	200.	71.	10240.
INCHES		6.98	18.49	19.74	19.74
MM		177.33	469.70	501.36	501.44
AC-FT		5285.	13997.	14941.	14943.
THOUS CU M		6519.	17266.	18430.	18432.

HYDROGRAPH AT STA LAKE FOR PLAN 1, RTIO 1

7.	6.	6.	5.	5.	5.	4.	4.	4.	4.
3.	3.	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.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	2.	4.	7.	11.	17.	24.	33.	43.	54.
67.	81.	99.	124.	160.	209.	273.	355.	457.	592.
768.	977.	1210.	1464.	1732.	2007.	2285.	2562.	2836.	3107.
3373.	3632.	3884.	4126.	4356.	4573.	4774.	4957.	5118.	5252.
5356.	5430.	5475.	5491.	5480.	5444.	5384.	5302.	5198.	5072.
4921.	4745.	4548.	4329.	4091.	3835.	3560.	3267.	2969.	2685.
2417.	2169.	1943.	1741.	1560.	1397.	1251.	1121.	1004.	898.
804.	719.	643.	575.	514.	459.	410.	367.	327.	292.
267.	249.	232.	217.	202.	189.	176.	164.	153.	143.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5491.	5329.	3529.	1255.	180815.
CMS	155.	151.	100.	36.	5120.
INCHES		3.49	9.25	9.87	9.87
MM		88.67	234.85	250.68	250.72
AC-FT		2642.	6999.	7471.	7472.
THOUS CU M		3259.	8633.	9215.	9216.

PLAN 2 SAME AS PLAN 1

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

HYDROGRAPH ROUTING

ROUTING DISCHARGE THROUGH DAM

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

ALL PLANS HAVE SAME
ROUTING DATA

GLOSS	CLOSS	AVG	IRES	I..ME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-132.	-1

STAGE	132.00	134.50	136.00	137.60	139.00	140.00	150.00
FLOW	0.00	1006.00	2461.00	4634.00	9152.00	13751.00	102409.00
SURFACE AREA=	0.	7.	9.	18.	58.		
CAPACITY=	0.	23.	68.	99.	457.		
ELEVATION=	122.	132.	138.	140.	150.		

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
132.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
137.6	0.0	0.0	0.

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
40.	1.00	126.00	.50	132.00	137.84

STATION DAME, PLAN 1, RATIO 1

BEGIN DAM FAILURE AT 51.00 HOURS

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

7.	6.	6.	6.	5.	5.	5.	4.	4.	4.
3.	3.	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.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	3.	5.	9.	15.	21.	29.	39.	49.
61.	75.	91.	113.	144.	187.	245.	319.	412.	531.
687.	880.	1137.	1423.	1672.	1953.	2226.	2508.	2802.	3063.
3334.	3591.	3846.	4088.	4320.	4539.	4760.	4945.	5107.	5243.
5349.	5425.	6381.	5489.	5483.	5449.	5393.	5313.	5211.	5087.
4939.	4767.	4572.	4374.	4131.	3882.	3609.	3320.	3021.	2734.
2464	2212.	1989.	1807.	1610.	1442.	1290.	1155.	1033.	924.
827.	739.	661.	590.	527.	471.	421.	376.	336.	300.
272.	252.	236.	220.	205.	191.	179.	167.	156.	145.

STORAGE

23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	24.	24.	24.	24.	24.
24.	25.	25.	25.	26.	27.	28.	29.	31.	33.
36.	39.	43.	45.	47.	50.	52.	54.	56.	58.
60.	61.	63.	64.	66.	67.	68.	69.	69.	70.
70.	70.	51.	46.	46.	46.	46.	45.	45.	44.
44.	43.	42.	40.	39.	37.	35.	33.	31.	29.
27.	25.	23.	21.	18.	16.	14.	13.	12.	10.
9.	9.	8.	7.	7.	6.	6.	5.	5.	4.
4.	4.	4.	4.	4.	4.	3.	3.	3.	3.

ST...

132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.1	132.1	132.1	132.1
132.2	132.2	132.2	132.3	132.4	132.5	132.6	132.8	133.0	133.3
133.7	134.2	134.6	134.9	135.2	135.5	135.8	136.0	136.3	136.4
136.6	136.8	137.0	137.2	137.4	137.5	137.6	137.7	137.7	137.8
137.8	137.8	135.6	135.0	135.0	135.0	135.0	134.9	134.9	134.8
134.7	134.6	134.5	134.3	134.1	133.9	133.6	133.3	133.0	132.7
132.5	132.2	131.9	131.6	131.2	130.9	130.5	130.2	129.9	129.7
129.4	129.2	128.9	128.7	128.6	128.4	128.2	128.0	127.9	127.8
127.7	127.6	127.5	127.4	127.4	127.3	127.3	127.2	127.2	127.1

PEAK OUTFLOW IS 6381. AT TIME 51.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6381.	5405.	3550.	1261.	181629.
CMS	181.	153.	101.	36.	5143.
INCHES		3.54	9.30	9.91	9.92
MM		89.93	236.27	251.81	251.85
AC-FT		2680.	7041.	7504.	7505.
THOUS CU M		3306.	8685.	9256.	9258.

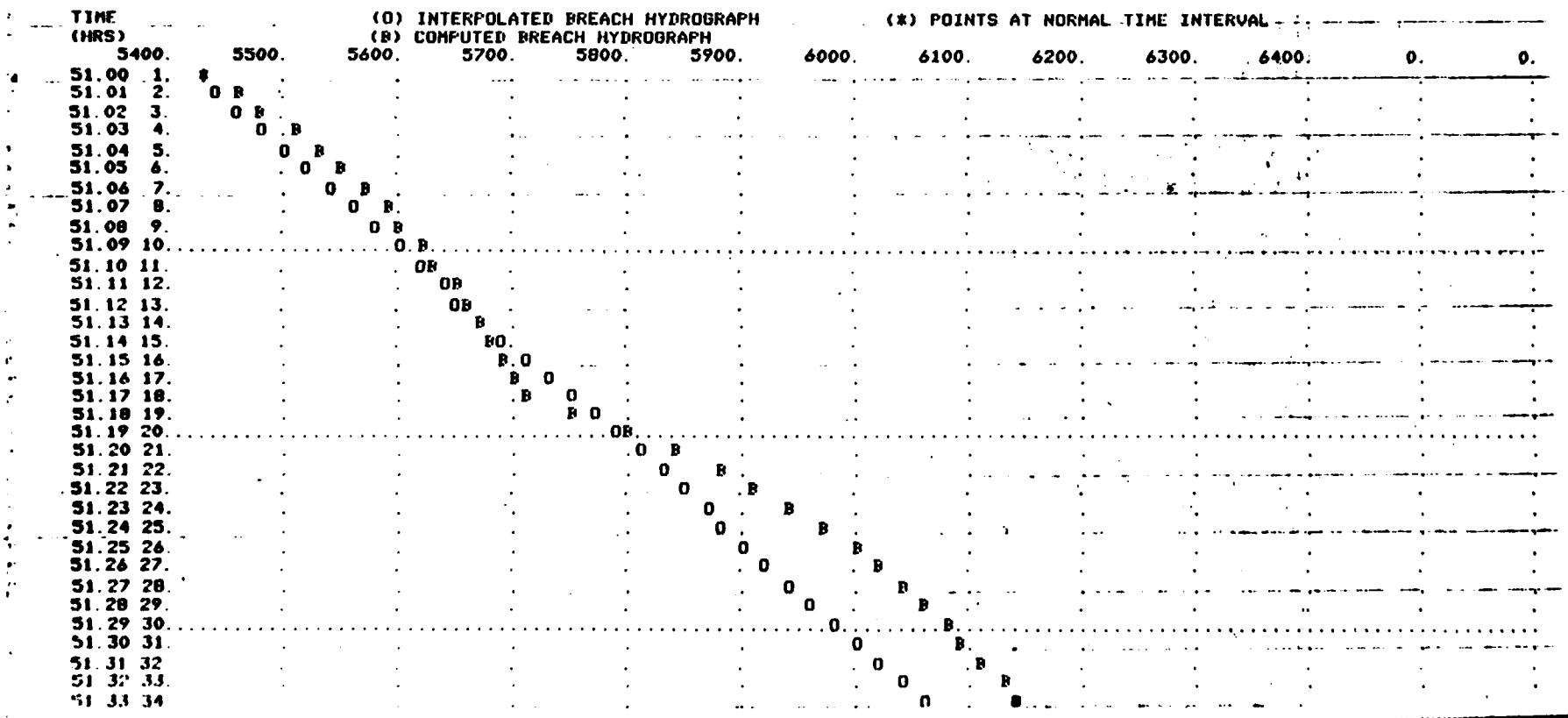
1THE DAM BREACH HYDROGRAPH WAS DEVELOPED USING A TIME INTERVAL OF .010 HOURS DURING BREACH FORMATION.
DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF .500 HOURS.
THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPUTED BREACH HYDROGRAPH.
INTERMEDIATE FLOWS ARE INTERPOLATED FROM END-OF-PERIOD VALUES.

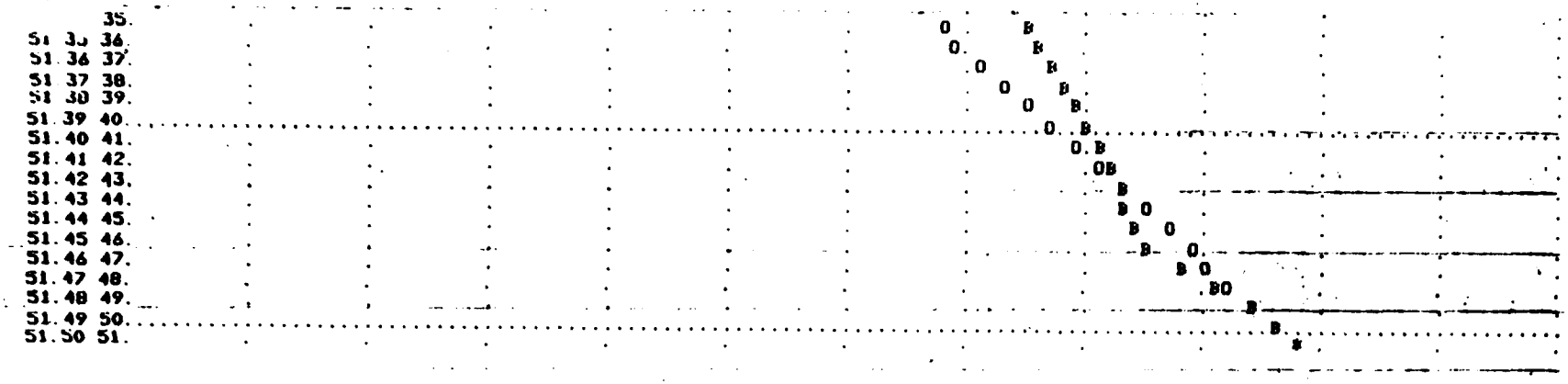
TIME (HOURS)	TIME FROM BEGINNING OF BREACH (HOURS)	INTERPOLATED BREACH HYDROGRAPH (CFS)	-	COMPUTED BREACH HYDROGRAPH (CFS)	=	ERROR (CFS)	ACCUMULATED ERROR (CFS)	ACCUMULATED ERROR (AC-FT)
51.000	0.000	5425.		5425.		0.	0.	0.
51.010	.010	5445.		5463.		-18.	-18.	-0.
51.020	.020	5464.		5484.		-21.	-39.	-0.
51.030	.030	5483.		5506.		-23.	-62.	-0.
51.040	.040	5502.		5528.		-26.	-88.	-0.
51.050	.050	5521.		5548.		-27.	-115.	-0.
51.060	.060	5540.		5567.		-27.	-142.	-0.
51.070	.070	5559.		5585.		-26.	-167.	-0.
51.080	.080	5578.		5602.		-24.	-191.	-0.
51.090	.090	5597.		5618.		-20.	-211.	-0.
51.100	.100	5617.		5632.		-16.	-227.	-0.
51.110	.110	5636.		5646.		-11.	-238.	-0.
51.120	.120	5655.		5659.		-4.	-242.	-0.
51.130	.130	5674.		5671.		3.	-240.	-0.
51.140	.140	5693.		5683.		10.	-229.	-0.
51.150	.150	5712.		5693.		19.	-210.	-0.
51.160	.160	5731.		5703.		28.	-182.	-0.
51.170	.170	5750.		5713.		38.	-144.	-0.
51.180	.180	5769.		5746.		23.	-121.	-0.
51.190	.190	5789.		5796.		-7.	-128.	-0.
51.200	.200	5808.		5838.		-31.	-159.	-0.
51.210	.210	5827.		5876.		-50.	-208.	-0.
51.220	.220	5846.		5911.		-65.	-273.	-0.
51.230	.230	5865.		5942.		-77.	-350.	-0.
51.240	.240	5884.		5970.		-86.	-436.	-0.
51.250	.250	5903.		5996.		-92.	-529	-0

51.260	.260	5922.	6019.	-97.	-625.	-1.
51.270	.270	5941.	6040.	-99.	-724.	-1.
51.280	.280	5961.	6060.	-99.	-823.	-1.
51.290	.290	5980.	6078.	-98.	-921.	-1.
51.300	.300	5999.	6095.	-96.	-1017.	-1.
51.310	.310	6018.	6111.	-93.	-1110.	-1.
51.320	.320	6037.	6125.	-88.	-1198.	-1.
51.330	.330	6056.	6138.	-82.	-1280.	-1.
51.340	.340	6075.	6151.	-75.	-1356.	-1.
51.350	.350	6094.	6162.	-68.	-1424.	-1.
51.360	.360	6113.	6173.	-59.	-1483.	-1.
51.370	.370	6133.	6183.	-50.	-1533.	-1.
51.380	.380	6152.	6192.	-41.	-1574.	-1.
51.390	.390	6171.	6201.	-31.	-1605.	-1.
51.400	.400	6190.	6210.	-20.	-1624.	-1.
51.410	.410	6209.	6218.	-9.	-1633.	-1.
51.420	.420	6228.	6226.	2.	-1631.	-1.
51.430	.430	6247.	6233.	14.	-1617.	-1.
51.440	.440	6266.	6240.	26.	-1591.	-1.
51.450	.450	6285.	6250.	35.	-1556.	-1.
51.460	.460	6305.	6284.	21.	-1535.	-1.
51.470	.470	6324.	6313.	10.	-1525.	-1.
51.480	.480	6343.	6339.	4.	-1521.	-1.
51.490	.490	6362.	6361.	0.	-1520.	-1.
51.500	.500	6381.	6381.	0.	-1520.	-1.

1OVF

STATION DAME





1*OVN*

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
40.	1.00	126.00	.50	132.00	200.00

STATION DAME, PLAN 2, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

7.	6.	6.	6.	5.	5.	5.	4.	4.	4.
3.	3.	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.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	3.	5.	9.	15.	21.	29.	39.	49.
61.	75.	91.	113.	144.	187.	245.	319.	412.	531.
687.	880.	1137.	1423.	1672.	1953.	2226.	2508.	2802.	3063.
3334.	3591.	3846.	4088.	4320.	4539.	4760.	4945.	5107.	5243.
5349.	5426.	5472.	5490.	5481.	5447.	5389.	5309.	5206.	5081.
4932.	4758.	4572.	4369.	4127.	3877.	3604.	3313.	3014.	2727.
2457.	2226.	1986.	1782.	1595.	1429.	1279.	1146.	1026.	943.
848.	758.	678.	606.	541.	483.	432.	386.	345.	308.
278.	256.	239.	223.	208.	194.	181.	169.	158.	147.

STORAGE

23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	24.	24.	24.	24.	24.
24.	25.	25.	25.	26.	27.	28.	29.	31.	33.
36.	39.	43.	45.	47.	50.	52.	54.	56.	58.
60.	61.	63.	64.	66.	67.	68.	69.	69.	70.
70.	70.	70.	71.	70.	70.	70.	70.	70.	69.
69.	68.	68.	66.	65.	63.	61.	59.	58.	56.
54.	52.	50.	48.	47.	45.	44.	43.	42.	41.
39.	37.	36.	34.	33.	32.	31.	30.	29.	29.
28.	28.	28.	27.	27.	27.	27.	26.	26.	26.

STAGE

132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0

132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0
132.0	132.0	132.0	132.0	132.0	132.0	132.1	132.1	132.1	132.1
132.2	132.2	132.2	132.3	132.4	132.5	132.6	132.8	133.0	133.3
133.7	134.2	134.6	134.9	135.2	135.5	135.8	136.0	136.3	136.4
136.6	136.8	137.0	137.2	137.4	137.5	137.6	137.7	137.7	137.8
137.8	137.8	137.9	137.9	137.9	137.9	137.8	137.8	137.8	137.7
137.7	137.6	137.6	137.4	137.2	137.0	136.8	136.6	136.4	136.2
136.0	135.8	135.5	135.3	135.1	134.9	134.8	134.6	134.5	134.3
134.1	133.9	133.7	133.5	133.3	133.2	133.1	133.0	132.9	132.8
132.7	132.6	132.6	132.6	132.5	132.5	132.5	132.4	132.4	132.4

PEAK OUTFLOW IS 5490. AT TIME 52.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5490.	5328.	3528.	1255.	180756.
CMS	155.	151.	100.	36.	5118.
INCHES		3.49	9.24	9.87	9.87
MM		88.65	234.81	250.60	250.64
AC-FT		2642.	6998.	7468.	7469.
THOUS CU M		3259.	8631.	9212.	9213.

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HYDROGRAPH ROUTING

U/S OF PARK AVE., PARK RIDGE, N J

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
REACH1	1	0	0	0	0	0	0	0

ALL PLANS HAVE SAME
ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0500	.1000	109.0	130.0	1100.	.00830

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

650.00	130.00	950.00	120.00	1268.00	115.00	1280.00	109.00	1320.00	109.00
1332.00	115.00	1550.00	120.00	1620.00	130.00				

STORAGE	0.00	1.18	2.48	3.90	5.45	7.12	9.44	14.77	23.41	35.35
	50.60	67.97	86.48	106.14	126.93	148.87	171.95	196.17	221.53	248.03
OUTFLOW	0.00	129.86	418.71	837.91	1380.25	2044.14	2912.13	4131.64	5830.06	8142.37

	11201.54	15361.10	20293.25	25990.66	32455.25	39694.27	47718.30	56540.07	66173.75	76634.58
STAGE	109.00	110.11	111.21	112.32	113.42	114.53	115.63	116.74	117.84	118.95
	120.05	121.16	122.26	123.37	124.47	125.58	126.68	127.79	128.89	130.00
FLOW	0.00	129.86	418.71	837.91	1380.25	2044.14	2912.13	4131.64	5830.06	8142.37
	11201.54	15361.10	20293.25	25990.66	32455.25	39694.27	47718.30	56540.07	66173.75	76634.58

STATION REACH1, PLAN 1, RTIO 1

OUTFLOW

7.	7.	6.	6.	5.	5.	5.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	2.	1.	1.	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.	1.	2.	5.	8.	13.	20.	27.	36.	47.
59.	72.	87.	108.	138.	184.	237.	311.	400.	521.
672.	864.	1118.	1404.	1661.	1931.	2212.	2487.	2784.	3037.
3303.	3566.	3818.	4064.	4291.	4513.	4731.	4925.	5087.	5229.
5337.	5418.	6196.	5778.	5309.	5561.	5336.	5363.	5201.	5118.
4950.	4794.	4594.	4400.	4163.	3906.	3642.	3349.	3054.	2752.
2481.	2228.	2003.	1816.	1624.	1450.	1302.	1162.	1042.	931.
834.	746.	666.	596.	532.	476.	425.	381.	340.	304.
274.	254.	238.	222.	207.	193.	180.	168.	157.	146.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	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.	2.	2.	2.	3.
3.	4.	5.	6.	6.	7.	8.	8.	9.	10.
11.	12.	13.	14.	16.	17.	18.	19.	20.	20.
21.	21.	25.	23.	21.	22.	21.	21.	20.	20.
19.	18.	17.	16.	15.	14.	13.	11.	10.	9.
8.	8.	7.	7.	6.	6.	5.	5.	4.	4.
4.	4.	3.	3.	3.	3.	2.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.

STAGE

109.1	109.1	109.1	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.1	109.1	109.2	109.2	109.3	109.4
109.5	109.6	109.7	109.9	110.1	110.3	110.5	110.8	111.1	111.5
111.9	112.4	112.9	113.5	113.9	114.3	114.7	115.1	115.5	115.7
116.0	116.2	116.5	116.7	116.8	117.0	117.1	117.3	117.4	117.5
117.5	117.6	118.0	117.8	117.5	117.7	117.5	117.5	117.4	117.4
117.3	117.2	117.0	116.9	116.8	116.5	116.3	116.0	115.8	115.4
115.1	114.8	114.5	114.1	113.8	113.5	113.3	113.0	112.7	112.5
112.3	112.1	111.9	111.7	111.5	111.4	111.2	111.1	110.9	110.8
110.7	110.6	110.5	110.5	110.4	110.3	110.3	110.3	110.2	110.2

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6196.	5405.	3550.	1261.	181600.
CMS	175.	153.	101.	36.	5142.
INCHES		3.54	9.30	9.91	9.91
.MM		89.94	236.26	251.77	251.81

AC-FT	.	2680.	70	7503.	7504.
THOUS CU M		3306.	8685.	9255.	9256.

MAXIMUM STORAGE = 25.

MAXIMUM STAGE IS 118.0

STATION REACH1, PLAN 2, RTIO 1

OUTFLOW

7.	7.	6.	6.	5.	5.	5.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	2.	1.	1.	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.	1.	2.	5.	8.	13.	20.	27.	36.	47.
59.	72.	87.	108.	138.	184.	237.	311.	400.	521.
672.	864.	1118.	1404.	1661.	1931.	2212.	2487.	2784.	3037.
3303.	3566.	3818.	4064.	4291.	4513.	4731.	4926.	5087.	5229.
5337.	5418.	5468.	5490.	5484.	5453.	5398.	5320.	5220.	5098.
4952.	4781.	4595.	4395.	4159.	3901.	3636.	3343.	3047.	2744.
2475.	2238.	2003.	1791.	1608.	1436.	1291.	1153.	1035.	946.
857.	764.	685.	611.	547.	488.	436.	390.	349.	311.
281.	258.	241.	225.	210.	196.	183.	171.	159.	148.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	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.	2.	2.	2.	3.
3.	4.	5.	6.	6.	7.	8.	8.	9.	10.
11.	12.	13.	14.	16.	17.	18.	19.	20.	20.
21.	21.	22.	22.	22.	21.	21.	21.	20.	20.
19.	18.	17.	16.	15.	14.	13.	11.	10.	9.
8.	8.	7.	6.	6.	6.	5.	5.	4.	4.
4.	4.	3.	3.	3.	3.	3.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.

STAGE

109 1	109.1	109.1	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
109.0	109.0	109.0	109.0	109.1	109.1	109.2	109.2	109.3	109.4
109.5	109.6	109.7	109.9	110.1	110.3	110.5	110.8	111.1	111.5
111.9	112.4	112.9	113.5	113.9	114.3	114.7	115.1	115.5	115.7
116.0	116.2	116.5	116.7	116.8	117.0	117.1	117.3	117.4	117.5
117.5	117.6	117.6	117.6	117.6	117.6	117.6	117.5	117.4	117.4
117.3	117.2	117.0	116.9	116.8	116.5	116.3	116.0	115.8	115.4
115.1	114.8	114.5	114.1	113.8	113.5	113.2	113.0	112.7	112.5
112.4	112.1	111.9	111.7	111.5	111.4	111.3	111.1	110.9	110.8
110.7	110.6	110.5	110.5	110.4	110.4	110.3	110.3	110.2	110.2

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5490.	5328.	3528.	1255.	180727.
CMS	155.	151.	100	36	5118

INCHES	3.49	9.24	9.86	9.87
MM	88.65	234.80	250.56	250.60
AC-FT	2642.	6997.	7467.	7468.
THOUS CU M	3259.	8631.	9210.	9212.

MAXIMUM STORAGE = 22.

MAXIMUM STAGE IS 117.6

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1

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 .50
HYDROGRAPH AT	LAKE	14.20	1	5491.
		(36.78)		(155.48)(
			2	5491.
				(155.48)(
ROUTED TO	DAME	14.20	1	6381.
		(36.78)		(180.69)(
			2	5490.
				(155.47)(
ROUTED TO	REACH1	14.20	1	6196.
		(36.78)		(175.45)(
			2	5490.
				(155.45)(

1

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	132.00	132.00	137.60
STORAGE	23.	23.	68.
OUTFLOW	0.	0.	4634.

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
.50	137.85	.25	70.	6381.	3.17	51.50	51.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	132.00	132.00	137.60
STORAGE	23.	23.	68.
OUTFLOW	0.	0.	4634.

RATIO	MAXIMUM	MAXIMUM	MAXIMUM	MAXIMUM	DURATION	TIME OF	TIME OF

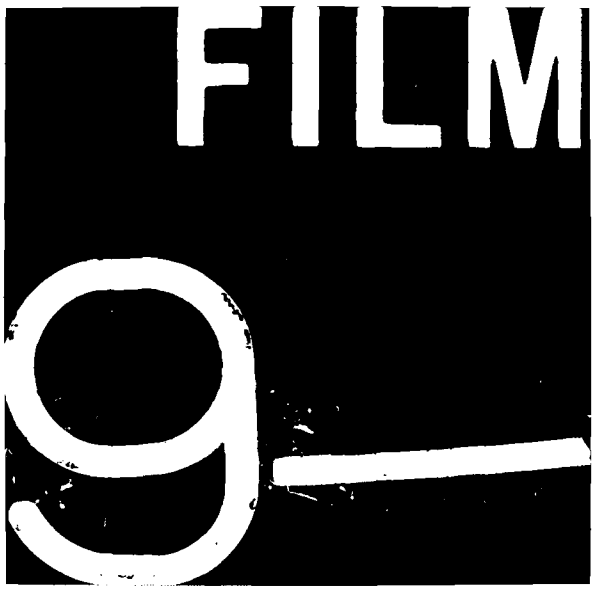
OF PMF	RESERVOIR W.S.ELEV	DEPTH OVER DAM	STORAGE AC-FT	OUTFLOW CFS	OVER TOP HOURS	MAX OUTFLOW HOURS	FAILURE HOURS
.50	137.87	.27	71.	5490.	8.00	52.00	0.00

PLAN 1 STATION REACH1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	6196.	118.0	51.50

PLAN 2 STATION REACH1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	5490.	117.6	52.00


FILM