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NATIONAL DAM SAFETY PROGRAM. LOWER MOUNT GLEN LAKE DAM (NJ00011--ETC(U)
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PASSAIC RIVER BASIN

WEST BROOK, PASSAIC COUNTY

NEW JERSEY

LEVEL II

LOWER MOUNT GLEN LAKE DAM

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

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

AUGUST 1978

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

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

26 SEP 1978

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Lower Mount Glen Lake Dam in Passaic 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, Lower Mount Glen Lake Dam, a high hazard potential structure, is judged to be in fair overall condition. Also, the spillway is considered seriously inadequate since 40 percent of the Probable Maximum Flood (PMF) would overtop the dam. In addition, this structure probably could not withstand the effects of the failure of the Upper Mount Glen Lake Dam which is immediately upstream and also has a seriously inadequate spillway. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant, engaged by the owner, using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be

initiated within calendar year 1979. In the interim, a detailed emergency operation plan and warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to determine the dam and spillway foundation condition and structural stability. This should include test borings to determine material properties relative to stability and seepage and installation of piezometers to facilitate seepage studies. In addition, the condition of the outlet pipe and box culvert should be determined and any necessary repairs made. Any remedial measures found necessary should be initiated within calendar year 1979.

c. Within one month from the date of approval of this report a program should be initiated to remove all brush and trees from the downstream slope 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.

d. Within one year from the date of approval of this report, the following actions should be completed:

(1) The outlet valve vault should be dewatered and any existing drain line should be unplugged, or a new drain line should be installed if none exists. The leakages into the valve vault should be repaired.

(2) A formulated program of periodic inspection by an experienced party should be initiated.

(3) The erosion which has occurred downstream of the spillway wall should be repaired. An effective method of protecting the abutment from erosion by spillway discharges should be implemented.

(4) The crest should be restored to the elevation called for in the 1965 plans. Properly compacted suitable fill material should be replaced upstream and downstream of the core wall at the slopes defined in the 1933 plan.

(5) The existing dam plans and drawings should be annotated and updated to form a coherent as-built set within a 6 month period.

NAPEN-D
Honorable Brendan T. Byrne

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 Robert A. Roe of the Eighth District. Under the provisions 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.

An important aspect of the Dam Safety 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 yours,

JOEL T. CALLAHAN
Lieutenant Colonel, Corps of Engineers
Acting District Engineer

1 Incl
As stated

Cy furn:
Mr. Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N. J. Dept. of Environmental Protection
P.O. Box 2809
Trenton, NJ 08625

LOWER MOUNT GLEN LAKE DAM (NJ00011)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 26 June and 7 July 1978 by Harris-ECI 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.

The Lower Mount Glen Lake Dam, a high hazard potential structure, is judged to be in fair overall condition. Also, the spillway is considered seriously inadequate since 40 percent of the Probable Maximum Flood (PMF) would overtop the dam. In addition, this structure probably could not withstand the effects of the failure of the Upper Mount Glen Lake Dam which is immediately upstream and also has a seriously inadequate spillway. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

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b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to determine the dam and spillway foundation condition and structural stability. This should include test borings to determine material properties relative to stability and seepage and installation of piezometers to facilitate seepage studies. In addition, the condition of the outlet pipe and box culvert should be determined and any necessary repairs made. Any remedial measures found necessary should be initiated within calendar year 1979.

c. Within one month from the date of approval of this report a program should be initiated to remove all brush and trees from the downstream slope 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.

d. Within one year from the date of approval of this report, the following actions should be completed:

(1) The outlet valve vault should be dewatered and any existing drain line should be unplugged, or a new drain line should be installed if none exists. The leakages into the valve vault should be repaired.

(2) A formulated program of periodic inspection by an experienced party should be initiated.

(3) The erosion which has occurred downstream of the spillway wall should be repaired. An effective method of protecting the abutment from erosion by spillway discharges should be implemented.

(4) The crest should be restored to the elevation called for in the 1965 plans. Properly compacted suitable fill material should be replaced upstream and downstream of the core wall at the slopes defined in the 1933 plan.

(5) The existing dam plans and drawings should be annotated and updated to form a coherent as-built set within a 6 month period.

APPROVED: Joel T. Callahan

JOEL T. CALLAHAN
Lieutenant Colonel, Corps of Engineers
Acting District Engineer

DATE: 26 September

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Lower Mount Glen Lake Dam, I.D. NJ00011
State Located:	New Jersey
County Located:	Passaic
Stream:	West Brook, Wanaque River Basin
Date of Inspection:	June 26, and July 7, 1978

Assessment of General Condition

Lower Mount Glen Lake Dam is in fair condition with seepage areas along the downstream toe for about two-thirds of the length of the dam and the downstream slopes heavily overgrown with brush and trees. Erosion has occurred on the downstream side of the emergency spillway wall. The downstream slope is heavily overgrown with brush and trees. The concrete core wall is exposed above the embankment due to wave action on the upstream face and erosion and recreation foot traffic on the downstream face. A low level outlet pipe is operational, but the valve vault is flooded and the outlet valve is submerged. Surveillance and maintenance is in the inexperienced hands of a few volunteer members of the owner association.

At present, the engineering data available is not sufficient to make a definitive statement on the stability of the earth embankment. Seepage sources in the right embankment section could affect the stability adversely and should be studied.

The evaluation of the spillway adequacy was based on the Corps of Engineers guidelines and additional guidance provided by the Philadelphia District Corps of Engineers. The spillway is

capable of passing a flood of approximately 39 percent of the PMF without overtopping the dam. Thus, the general safety of Lower Mount Glen Lake Dam is considered questionable in view of its lack of spillway capacity to pass the PMF, or even one-half of the PMF without overtopping of the dam.

The following remedial actions, therefore, are suggested along with a timetable for their completion.

1. Studies to augment the spillway discharge capacity should be undertaken within six months.

2. Observation wells or piezometers should be installed in the downstream embankment, immediately above the zone of seepage near the right abutment, to determine the location of the phreatic surface. The borings should be logged according to the Unified Soil Classification system by qualified personnel. This information should be evaluated immediately upon aquisition and compared with the assumptions used in this report to determine if further, more detailed stability analyses are necessary.

3. The existing dam plans and drawings should be annotated and updated to form a coherent as-built set within a 6 month period.

Furthermore, while of a less urgent nature, the following additional action is recommended and should be carried out within a reasonable period of time.

1. All brush and trees should be removed from the downstream slope 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.

2. A formulated program of periodic inspection by an experienced party should be initiated.

3. The erosion which has occurred downstream of the spillway wall should be repaired. An effective method of protecting the abutment from erosion by spillway discharges should be implemented.

4. The crest should be restored to the elevation called for in the 1965 plans. Properly compacted suitable fill material should be replaced upstream and downstream of the core wall at the slopes defined in the 1933 plan.

Robert Gershowitz

Robert Gershowitz, P.E.





LOWER MOUNT GLEN LAKE
Exposed core wall and embankment from lake shore near left abutment.

June 26, 1978

TABLE OF CONTENTS

ASSESSMENT OF GENERAL CONDITION

		Page
SECTION 1	PROJECT INFORMATION	1
	1.1 General	1
	1.2 Description of Project	2
	1.3 Pertinent Data	5
SECTION 2	ENGINEERING DATA	9
	2.1 Design	9
	2.2 Construction	9
	2.3 Operation	9
	2.4 Evaluation	10
SECTION 3	VISUAL INSPECTION	11
	3.1 Findings	11
	3.2 Evaluation	15
SECTION 4	OPERATION PROECEDURES	16
	4.1 Procedures	16
	4.2 Maintenance of Dam	16
	4.3 Maintenance of Operating Facilities	17
	4.4 Evaluation	17
SECTION 5	HYDRAULIC/HYDROLOGIC	18
	5.1 Evaluation of Features	18
SECTION 6	STRUCTURAL STABILITY	21
	6.1 Evaluation of Structural Stability	21

TABLE OF CONTENTS

(Continued)

		Page
SECTION 7	ASSESSMENT/REMEDIAL MEASURES	25
	7.1 Dam Assessment	25
	7.2 Remedial Measures	27
	7.3 Recommendations	27

PLATES

	No.
VICINITY MAP	1
GEOLOGIC MAP	2
PLANS AND DETAILS OF DAM	3-4

APPENDICES

APPENDIX A - CHECK LIST - VISUAL OBSERVATIONS

CHECK LIST - ENGINEERING, CONSTRUCTION MAINTENANCE DATA

APPENDIX B - PHOTOGRAPHS

APPENDIX C - SUMMARY OF ENGINEERING DATA

APPENDIX D - HYDROLOGIC COMPUTATIONS

APPENDIX E - STABILITY CALCULATIONS

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

LOWER MOUNT GLEN LAKE DAM, ID. NJ00011

SECTION 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.

b. Purpose of Inspection

The visual inspection of the Lower Mount Glen Lake and Dam was made on June 26, and July 7, 1978. 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

This report summarizes available pertinent data relating to the project; presents a summary of visual observations made during the Field Inspection; 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

Lower Mount Glen Lake Dam is an earth embankment with vertical core wall. The dam has a curvilinear axis with an overall length of about 465 feet, and an embankment height of about 15 feet. The top 1-1/2 to 4 feet of the core wall is exposed above the earth fill. The top of the dam is about 5 to 6 feet wide downstream of the exposed core wall, and is used as a foot path. The upstream and downstream slopes are irregular with slopes from 1-1/2 to 2 horizontal to 1 vertical. The downstream slope is heavily overgrown with brush and vines.

The original dam was constructed of earthfill with a core wall. A severe storm in 1932 caused overtopping of the original dam, resulting in extensive damage to the downstream slope and failure of a large section of the dam. The dam was repaired and raised in 1933 by extending the core wall and adding additional earthfill over the entire section.

The dam apparently is founded on granite and gneiss bedrock. Rock outcrops occur in both abutments.

The outlet works are located in the central portion of the dam. The control valve is located in a concrete vault at the upstream edge of the dam crest. The downstream portion of the outlet works is a 2′ by 2′-8" concrete box culvert under the downstream embankment.

Normal lake discharge is over an unregulated spillway on the left abutment.

The emergency spillway is an ungated broad-crested concrete wall 3 feet wide and about 120 feet long. The weir is located on the left abutment. The spillway discharges into a natural rocky channel.

b. Location

Lower Mount Glen Lake Dam is located in Passaic County, New Jersey. It is accessible by way of Otterhole Road and Broadway Street. The damsite is surrounded by private property with roadway access to a swimming beach on the left abutment.

c. Size and Hazard Classification

Lower Mount Glen Lake Dam is classified in the dam size category as being "small", since its storage is less than 1,000 acre-feet and its height is less than 40 feet. Flood waters from failure of both dams could result in loss of life by flooding of a KOA campground located a short distance downstream from the dam. Therefore, we concur with the "High" hazard classification, in the National Inventory of Dams, for Lower Mount Glen Lake Dam.

d. Ownership

Lower Mount Glen Lake Dam is owned by the Mount Glen Lakes Association, an association of local residents in Passaic County, New Jersey.

e. Purpose of Dam

The lake is used only for recreation, mostly swimming, boating and fishing.

f. Design and Construction History

It was reported orally by the owner's representative that the dam was built in about 1927 for a land developer, Mr. Shipper. The dam was repaired and raised in 1933 after it had failed during a storm in 1932. A drawing prepared by L. Alfred Jenny & Co., Consulting Engineers, that shows the repairs and modifications that were to be made to the dam and spillway is available from the State of New Jersey. The spillway was modified in 1933 in conjunction with the raising of the dam. A drawing was prepared in 1965 for the Mount Glen Lake Association showing details for spillway modification and rehabilitation of the embankment, however, the work has never been undertaken.

No computations for the design of the original or modified dam and spillway are available for review.

g. Normal Operational Procedures

The discharge from the lake is normally unregulated. However, the water level in the lake is very stable. It was orally reported that the level normally varies not more than 6 inches. The owner's representative orally reported that the water flows about 3 inches deep over the emergency spillway during severe storms. It was also reported that the water level is lowered about 2 feet in October to get the water level below boat docks during the winter. The water level is allowed to return to its normal level each spring.

1.3 Pertinent Data

a. Drainage Area - 1.0 square mile

b. Discharge at Damsite

Maximum known flood at damsite	Not Applicable
Low level outlet pipe	Not Applicable
Warm water outlet at pool elevation	Not Applicable
Diversion tunnel low pool outlet at pool elevation	Not Applicable
Diversion tunnel outlet at pool elevation	Not Applicable
Gated spillway capacity at pool elevation	Not Applicable
Gated spillway capacity at maximum pool elevation	Not Applicable
Ungated spillway capacity at maximum pool elevation	600 cfs (El. 915.4) Includes Discharge
Total spillway capacity at maximum pool elevation	600 cfs (El. 915.4)

c. Elevation (Feet above MSL)

Top of dam	916.10
Maximum pool-design surcharge	915.40
Full flood control pool	Not Applicable
Recreation pool	914.10
Spillway crest	914.1
Low level outlet pipe	Not Available
Upstream portal invert diversion tunnel	Not Applicable
Downstream portal invert diversion tunnel	Not Applicable
Streambed at centerline of dam	903′ ±
Maximum tailwater	Not Available

d. Reservoir

Length of maximum pool	0.28 mile (Estimate)
Length of recreation pool	0.24 mile (Estimate)
Length of flood control pool	Not Applicable

e. Storage (Acre-Feet)

Recreation pool	208 acre-feet (El. 914.10)
Flood control pool	Not Applicable
Design surcharge	228 acre-feet (El. 915.40)
Top of dam	239 acre-feet (El. 916.10)

f. Reservoir Surface (Acres)

Top of dam	16 ± acres (El. 916.10)
Maximum pool	15 ± acres (El. 915.40)
Flood control pool	Not Applicable
Recreation pool	15 ± acres (El. 914.10)
Spillway crest	15 ± acres (El. 914.10)

g. Dam

Type	Embankment
Length	465 feet
Height	15 feet
Top width	5 feet
Side slopes - Upstream	1-1/2 horizontal to 1 vertical
- Downstream	2.0 horizontal to 1 vertical
Zoning	Corewall with earthfill shells
Impervious core	Core wall
Cutoff	Core wall
Grout curtain	None

h. Diversion and Regulating Tunnel (Not Applicable)

i. Spillway

Type	Overflow
Width of weir	120 feet plus 5 feet (lower service spillway)
Crest elevation	914.10

Gates	None
Upstream channel	Lake
Downstream channel	Eroded downstream channel with minimal riprap

j. Regulating Outlets - (Low Level Outlet)

Type	18-inch diameter steel pipe from inlet to valve, 2′ x 2′-8" box culvert from valve to outlet
Length	Not Available
Inlet elevation	Not Available
Outlet elevation	Not Available
Control	18-inch gate valve

SECTION 2: ENGINEERING DATA

2.1 Design

No drawings or computations pertaining to original construction could be found. No data from soil borings, soil tests or other geotechnical data is available. Drawings showing modifications to the dam were obtained from the New Jersey Department of Environmental Protection and are included in this report. Letters are on file pertaining to spillway capacities and required modifications.

2.2 Construction

No records have been found as to the construction history of the dam. The owner's representative has no knowledge of, and does not know of anyone having knowledge of, the construction history of the dam.

2.3 Operation

No records of operation of the lake are kept by the owner. The only operating rule is to lower the lake each fall to protect boat docks during the winter. Otherwise, the lake is allowed to operate naturally without regulation.

2.4 Evaluation

a. Availability

The availability of engineering data is very poor. The only data available are drawings pertaining to modification to the dam and spillway, which can be obtained from the New Jersey Department of Environmental Protection.

b. Adequacy

The available engineering data is not sufficient to draw a reliable conclusion on the stability of the embankment.

Reduced size copies of available drawings and a list of engineering construction and maintenance data is included in Appendix A.

c. Validity

Erosion of the crest and slopes has altered the detailed shape of the dam. The plans and sections of the few available drawings do not appear to be valid at present.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

The visual inspection made of Lower Mount Glen Lake Dam revealed that the dam and appurtenances were in serviceable condition, but a regular program of inspection and repair is required to maintain its serviceability.

b. Dam

The drawing prepared in 1933 indicates an earth embankment with a core wall. Observations indicate that the outer shells of the embankment are a well-graded silty sand and gravel. It is reasonable to assume, based on geologic observations, that the foundation extends to bedrock. No significant deviations in vertical or horizontal alignment were apparent. No evidence of cracking in the embankment or downstream of the toe could be found.

The embankment slopes are 1.5 to 1 upstream, and 2.0 to 1 downstream, and there are no signs of past or present downstream slope instability. Upstream slopes showed no evidence of instability above the waterline. Downstream slopes were heavily overgrown with brush and small trees. No evidence of holes dug by burrowing animals was found.

The dam appears to be founded on granite and gneiss bedrock. Exposures occur in the spillway channel and at the right abutment. Joints in the right abutment outcrop have broken the mass into elongated blocks averaging over 3 feet in the longest direction. One joint strikes N3^{O}E, about at right angles to the right abutment wing wall and dips to nearly vertical.

Seepage was observed all along the toe of the embankment from the right abutment to about 150 feet left of the bottom outlet. In some areas the seepage was observed to be flowing, however, the extent of the seep made it impossible to estimate the quantity. The seepage appeared to be clean.

The seep at the extreme right abutment of the dam very likely originates through bedrock fractures. Hence, it is very probable that the other seeps can be attributed to under-dam seepage through bedrock fractures.

c. Appurtenant Structures

1. Spillway

The spillway was constructed over the rock outcrop in the left abutment and is about 125 feet wide. A 3 foot wide concrete wall was constructed over the rock to achieve a uniform elevation. Some erosion has occurred in the soil placed downstream of this wall as a result of discharge over the spillway. A 5 foot wide, 31-inch high rectagular weir, fitted with side stoplogs is located at the right end of the spillway and handles lake discharges.

2. Low Level Outlet

The low level outlet line consists of an 18-inch diameter pipe which leads to a concrete valve chamber located on the upstream face of the core wall. Within the valve vault is an 18-inch gate valve. The outlet of this line is located at the toe of the embankment behind the valve chamber, and is a 2-foot wide by 2-foot, 6-inch high rectangular concrete box culvert.

At the time of inspection, the valve vault was partially flooded, one or two feet above the valve, obscuring it from view. However, the 90^{o} bevel gear reduction drive for the valve was visible beneath the surface. Water was leaking into the valve vault through a joint between the vault wall and the core wall of the dam. There may have been leakage into the vault from other locations which were below the water level. There was a small flow, estimated at about 1 gallon per minute, discharging from the box culvert outlet. However, it was not possible to determine whether this flow is leakage from the valve or from the joint between the outlet line and the core wall. There was also an additional small leakage from around the box culvert discharge. This is believed most likely to be seepage through the dam at the point where the outlet line passes through the core wall. At the time of the inspection, all leakages were clear water containing no soil fines.

Because of the flooded condition of the valve vault, it was not possible to inspect the condition or test the operation of the valve. It was reported by Sy Larkin, President of the Mount Glen Lakes Association, that the valve is partially opened once each fall, usually in October or November, to lower the lake for the winter months to prevent ice damage to docks and shoreline structures and to allow beach cleaning.

The upstream valve is manually operated and is normally left in the closed position.

d. Reservoir Area

The reservoir rim is gently sloped and no indications of instability were readily apparent. The slopes above the reservoir are heavily wooded. No buildings or dwellings are built on or near the shoreline, with only a few boat docks on the shoreline. The property around the lake is privately owned and it was reported that access to the lake is limited to members of the Mount Glen Lakes Association.

e. Downstream Channel

The downstream channel is well defined in a broad, gently sloping valley. The right side of the channel is heavily wooded while the left side is clear with good grass coverage. A garage is the only building next to the channel. All residences are at higher elevations.

3.2 Evaluation

At the time of the inspection the condition of the dam did not present cause for undue alarm. It is felt that the seepage observed along the embankment toe does warrent further investigation. While some erosion has occured owing to spillway discharges, the overall assessment of the spillway is adequate. The abutments appeared to be in good condition. Reservoir slopes show no apparent signs of instability and are not believed a potential hazard to the dam.

A further assessment of the dam appears in subsequent sections and recommendations appear at the end of Section 7.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

Lower Mount Glen Lake Dam is used to impound water for recreation uses. The policy is to maintain a nearly constant lake level at close to the elevation of the spillway crest. The lake level is normally maintained by unregulated discharge through three small outlets. The spillway releases excess flow during storms.

The lake level is lowered late in each fall by releasing water through the outlet pipes. The lake is usually lowered and kept about 2 feet below the normal level during the winter and is allowed to refill in the early spring.

4.2 Maintenance of the Dam

There is no program of regular inspection and maintenance of the dam and appurtenant structures. The Mount Glen Lakes Association is severely limited in ability to obtain funds from its members for financing maintenance and repair of its facilities. The president of the Association reported that they have been unsuccessful in collecting from some members even after winning a court law suit. Operation and maintenance is done by volunteer members of the Association on an unscheduled basis. Records of operation and maintenance consist only of those reported in the minutes of the meetings of the board of directors of Mount Glen Lakes Association.

4.3 Maintenance of Operating Facilities

The low level outlet gate valve is opened annually for the fall lowering of the lake level. Maintenance of the valve is made on an infrequent basis, as required, to keep valve operable. The outlet pipe has not received maintenance.

4.4 Evaluation

Surveillance and maintenance is in the hands of a few volunteer members of the owner association. At present, the owner association appears to face severe difficulty in obtaining the necessary funds to establish an effective program for maintenance and repairs. A formalized program of periodic inspection by an experienced party should be initiated, and documentation recorded to assist the owner association. A program for control of growth of trees and brush on the embankment and downstream channel should be initiated immediately.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design

The drainage area above the Lower Mount Glen Lake Dam on the West Brook is approximately 1 square mile. A drainage map of the watershed of Lower Mount Glen Lake damsite is presented on Plate 1, Appendix D.

The topography within the basin is hilly type terrain. Elevations range from approximately 918 feet above mean sea level at the damsite to over 985 feet above mean sea level in the upper end of the watershed.

Land use patterns within the watershed are mostly urban with some forested lands in the upper elevations of the basin. Most of the urban areas are located near the rim of the reservoir and in the lower elevation portion of the watershed.

The evaulation of the hydraulic and hydrologic features of Lower Mount Glen Lake Dam was based on criteria set forth in the Corps guidelines and additional guidance provided by the Philadelphia District, Corps of Engineers. The Probable Maximum Flood (PMF) was calculated from the Probable Maximum Precipitation using Hydrometeorological Report No. 33 with standard reduction factors. Due to the small drainage area of Lower Mount Glen Lake, the SCS triangular hydrograph, transformed to a curvilinear hydrograph, was adopted for developing the unit hydrograph. The derived unit hydrograph is presented in Appendix D.

Initial and infiltration loss rates were applied using SCS procedure to the Probable Maximum Storm rainfall to obtain rainfall excess. The rainfall excess was then applied to the unit hydrograph to obtain the PMF hydrograph utilizing program HEC-1.

The computed peak discharge of the PMF and one-half the PMF are 5,446 cfs and 2,723 cfs, respectively.

Both the PMF and one-half the PMF inflow hydrographs were routed through the reservoir by the Modified Puls Method, also utilizing computer program HEC-1. The peak outflow discharges for the PMF and one-half the PMF are 5,339 cfs and 2,509 cfs, respectively. Both the PMF and one-half the PMF result in overtopping of the dam.

The stage-outflow relation for the spillway was prepared from field notes, sketches and limited construction drawings. The reservoir stage-capacity data were based on the U.S.G.S. quadrangle topographic maps in combination with data given in the National Dam Safety Inventory Table. The reservoir storage capacity curve includes surcharge levels exceeding the top of the dam and the spillway rating curve is based on assuming that the dam remains intact during routing. In the routing computations, the discharge through outlet facilities was excluded due to its insignificant magnitude as compared to the spillway discharge and the PMF. The spillway rating curve and the reservoir capacity curve are presented in Plates 2 and 3 of Appendix D, respectively.

b. Experience Data

No records of reservoir stage or spillway discharge are maintained for this site. However, according to the owner, the maximum reservoir level was never higher than the dam crest.

c. Visual Observations

Considerable erosion was observed in the emergency spillway discharge channel which was constructed without any surface protection.

According to the owner, camps are set very close to the river banks downstream of the Lower Mount Glen Lake Dam.

d. Overtopping Potential

As indicated in Section 5.1-a., both the Probable Maximum Flood and one-half the Probable Maximum Flood, when routed through Lower Mount Glen Lake result in overtopping the dam. The PMF and one-half the PMF overtopped the dam by 1.5 feet and 0.7 feet, respectively.

The spillway is only capable of passing a flood equal to approximately thirty-nine percent of the PMF without overtopping the dam. Since one-half the PMF is the minimum 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 Lower Mount Glen Lake Dam is considered "Inadequate".

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

There are no signs of embankment sloughing, local slides or slumps on the downstream side. The upstream side of the embankment was almost completely under water and was not accessible for visual inspection. The seepage in the area of the right abutment, described in Section 3.1-b., has not been monitored by the owner and no information was uncovered concerning its age or flow rate.

The spillway exhibits no visual evidence of slide failure, undermining or misalignment.

The exposed concrete box culvert end of the low level outlet is in good condition. The condition of the pipe under the upstream portion of the embankment could not be observed and is unknown.

b. Design and Construction Data

No design computations were uncovered during the report preparation phase. 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. According to the owner's representative, the embankment has served satisfactorily since it was raised in 1933.

d. Post-Construction Changes

It is not clear, from available drawings, just what the original section consisted of. A storm in 1932 overtopped the dam and washed out a section. A plan for the reconstruction shows an original core wall with sand and gravel upstream. It is reasonable to assume that a sand and gravel shell downstream was also a part of the original section. Clay was apparently placed on the upstream side of the core wall along the original ground surface. The dam was reconstructed and raised in 1933. The core wall was raised 1 foot and earthfill was placed on slopes of 1.5 to 1 upstream and 2.0 to 1 downstream over the existing slopes. The fill extended an additional 1 foot above the corewall. Total crest width about is 5 feet.

At the time of the inspection, the core wall was exposed. Upstream fill material was apparently eroded away and the water surface contacted the core wall. Downstream, the embankment fill was about 2 feet below the top of the core wall. This indicates a total loss of freeboard of about 1 foot relative to the 1933 design.

The inspection team was informed that the dam had not yet been repaired according to a plan for reconstruction and repairs prepared in 1965.

e. Static Stability

A static stability analysis was performed on a section, as defined in the 1933 Plan of Dams at Upper and Lower Mount Glen Lakes to better assess the adequacy of the structure. Bishops method of slices was used with assumed parameters for the embankment and foundation materials. The phreatic surface was taken at normal water surface elevation upstream and assumed horizontal at ground elevation from the downstream toe back to the core wall. No failure circles were passed through the core wall. The validity of the results are, of course, a function of the assumptions made. The results, which are given in Appendix E, did indicate that deep failure arcs appeared less likely than shallow surface sloughing, with an adequate margin of safety. The visual inspection did not reveal any signs of such sloughing, tending to indicate that the assumptions used in the analysis were conservative. The following parameters were assumed:

Fill Material and Foundation

Friction Angle = 30^{o}

Moist Unit Weight = 125 p.c.f.

Saturated Unit Weight = 130 p.c.f.

f. Seismic Stability

A fault, mapped by others, occurs about 3,500 feet west of the dam. The dam is located in Seismic Zone 1, as defined in Recommended Guidelines For Safety Inspection of Dams as 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.

SECTION 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 I report.

The safety of Lower Mount Glen Lake Dam is in question because the dam does not have adequate spillway capacity to pass the PMF or even one-half of the PMF without overtopping. Overtopping of the dam carries with it the danger of possible progressive failure of the dam or spillway. The dam's present spillway capacity can pass only about 39 percent of the PMF.

No definitive statement pertaining to the safety of the embankment can be made without acquisition of embankment and foundation material engineering properties and determination of phreatic levels in the downstream part of the embankment. The present embankment, however, has performed adequately since the 1933 modification without failure or evidence of instability. The stability analysis, with its limitations, does not reveal potential for serious slope failure. The possibility of minor sloughing may exist, particularly in the event of seismic excitation.

b. Adequacy of Information

The information and data uncovered is not adequate to perform a comprehensive, definitive evaluation of the dam's stability. Nevertheless, in view of the past performance of the dam, its present condition, and in light of the stability calculations performed, it is not felt that additional information on the engineering properties of the embankment and foundation materials is necessary at this time. The seepage at the toe of the downstream embankment, however, does call for an additional study to determine the actual location of the phreatic surface. Such an investigation will also yield information pertaining to the nature of the material in the embankment.

c. Urgency

Studies to augment the spillway discharge capacity should be undertaken within six months.

Observation wells or piezometers should be installed in the downstream embankment, immediately above the zone of seepage near the right abutment, to determine the location of the phreatic surface. The borings should be logged according to the Unified Soil Classification system by qualified personnel. This information should be obtained within 6 months. This information should be evaluated immediatley upon aquisition and compared with the assumptions used in this report to determine if further, more detailed stability analyses are necessary.

The existing dam plans and drawings should be annotated and updated to form a coherent as-built set within a 6 month period.

7.2 Remedial Measures

a. Alternatives

The alternatives available for increasing the spillway capacity are:

1. Increasing the dam height, thus permitting a higher discharge to pass over the spillway without overtopping.

2. Widening the existing spillway to accommodate a flood peak of at least one-half the PMF.

3. A combination of any of the above alternatives.

7.3 Recommendations

Based on the visual inspection and data evaluation presented herein, the following action is recommended.

1. All brush and trees should be removed from the downstream slope 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 immediately.

2. A program should be undertaken to gather engineering data and to monitor the seepage through the embankment. This data should include:

   a. Subsurface information at the damsite, including engineering properties and parameters.

   b. Soil properties of the embankment.

   c. Data of the phreatic line, from observation wells, within the dam section at several cross-section lines including the maximum section and at the seepage area in the left abutment area.

   Depending on the information provided by the program, the need for corrective measures can be considered and, if necessary, undertaken.

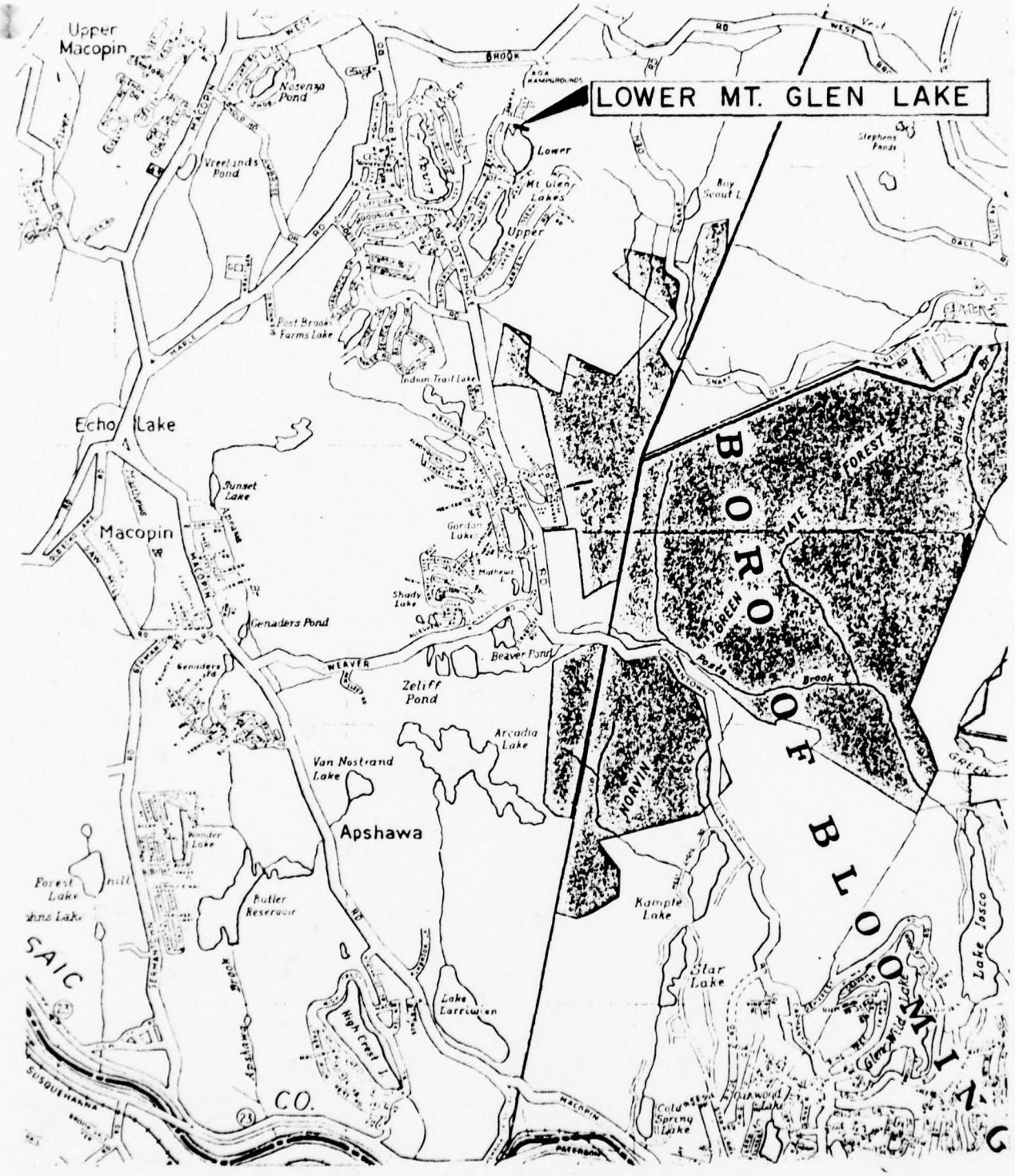
3. The erosion which has occured downstream of the spillway wall should be repaired. An effective method of protecting the abutment from erosion by spillway discharges should be implemented. This work should be completed within 12 months.

4. The crest should be restored to the elevation called for in the 1965 plans. Properly compacted suitable fill material should be placed upstream and downstream of the core wall at the slopes defined in the 1933 plan. This work should be completed within 12 months.

5. The outlet valve vault should be unwatered and any existing drain line should be unplugged, or a new drain line should be installed if none exists. The leakages into the valve vault should be repaired. The condition of the outlet pipe and box culvert should be determined and any necessary repairs made. This work should be completed within 12 months.

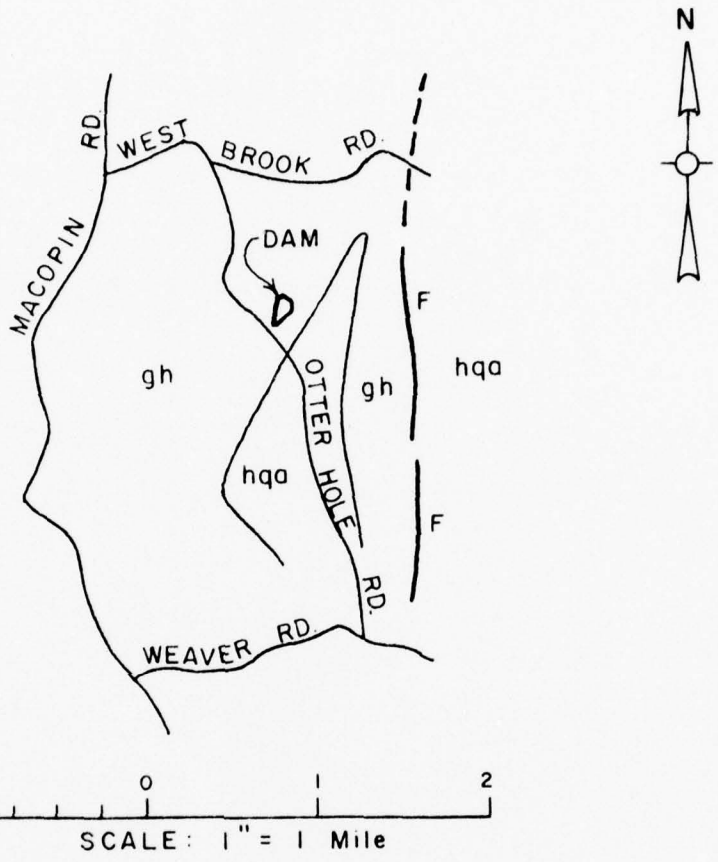
6. O & M Procedures. The owner should initiate a formalized program of annual inspections of the dam, by an experience party, utilizing the standard visual check list in this report. Headwater and tailwater gages should be installed in the dam, and read out during severe rainstorms and at routine operating and maintenance visits to the dam. A permanent log should be kept of all maintenance and operating events of the dam, the lake and the outlet passages.

PLATES



VICINITY MAP

PLATE 1

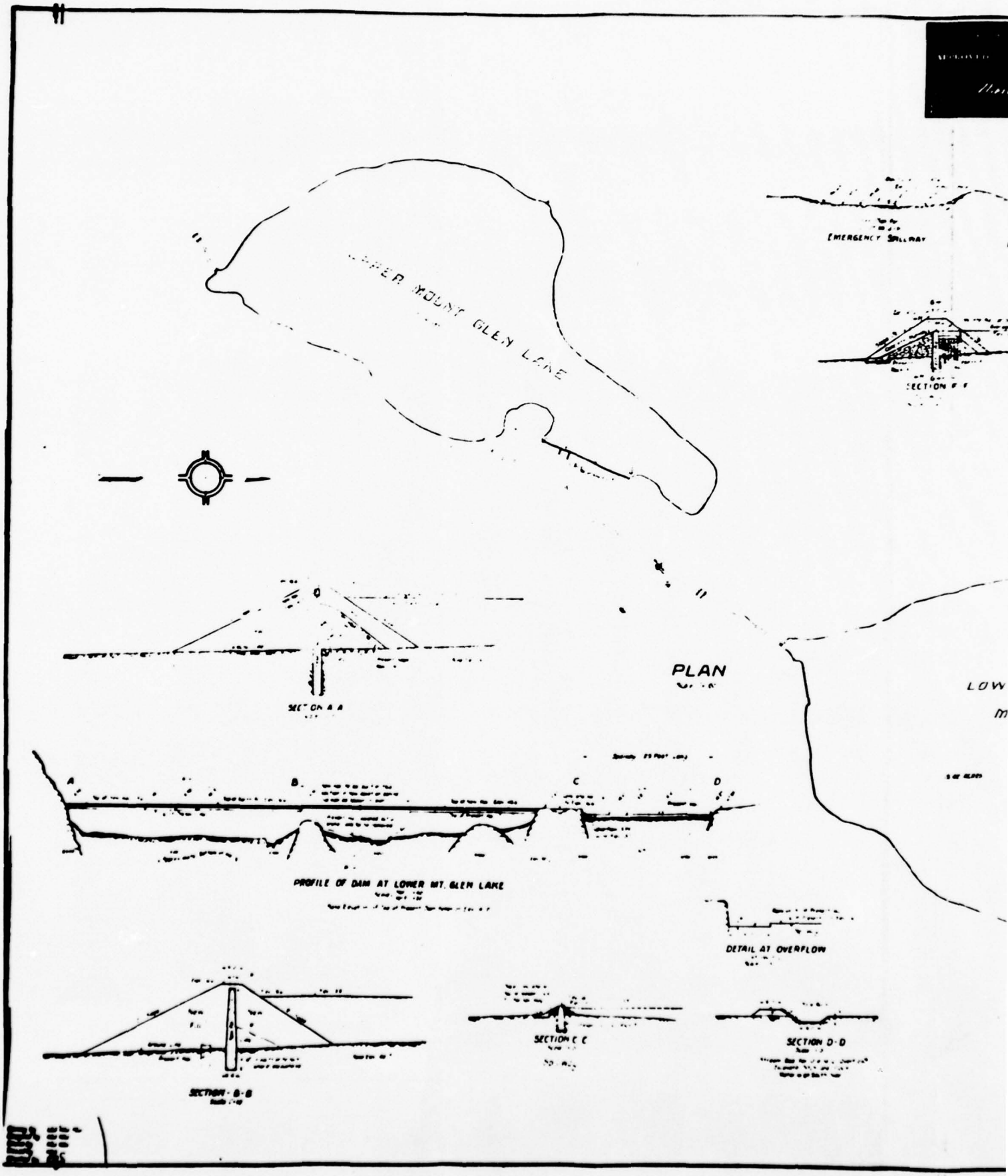


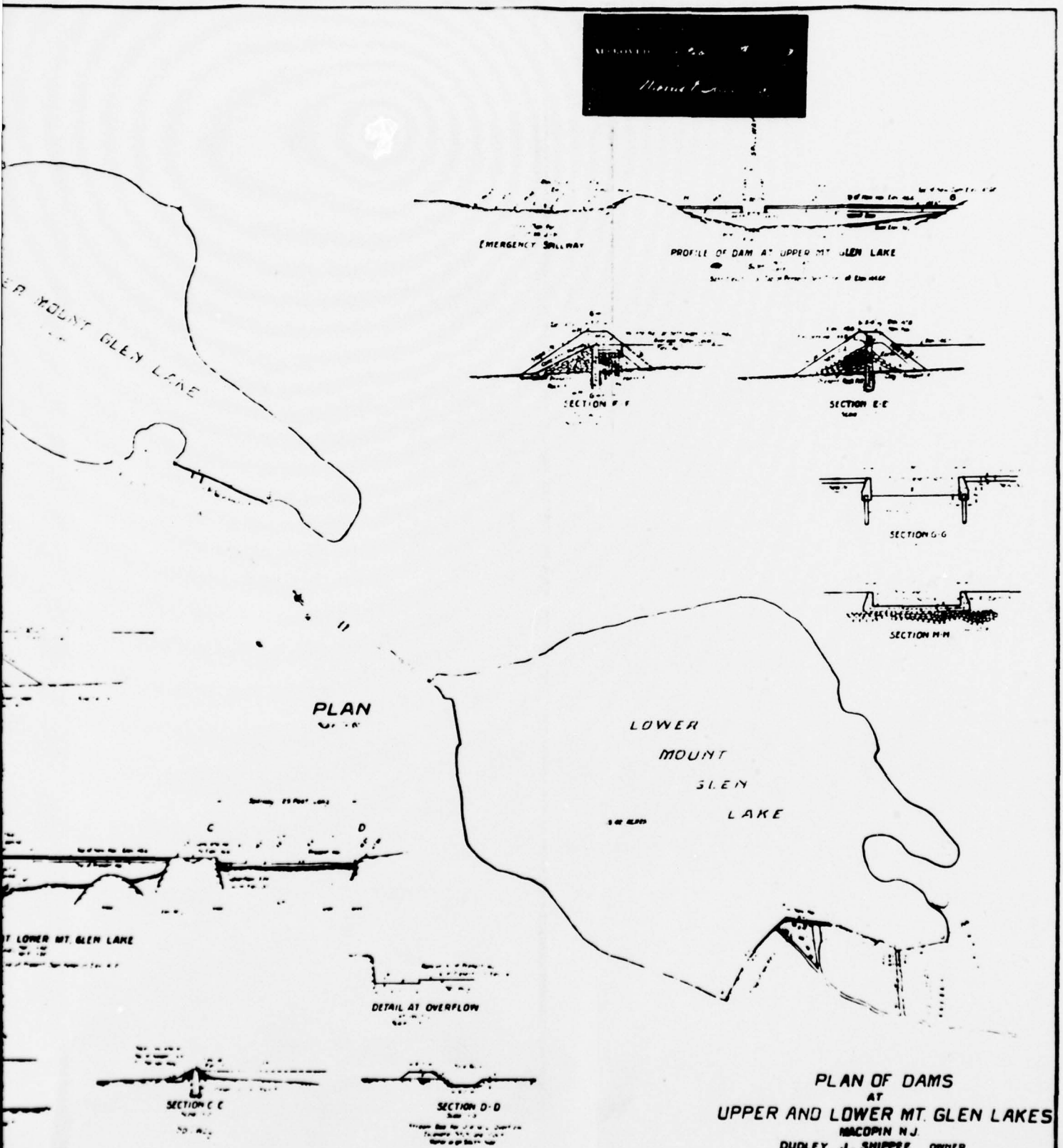
LEGEND

gh	MOSTLY HORNBLENDE GRANITE AND GNEISS
hqa	HYPERSTHENE - QUARTZ - ANDESINE GNEISS
F	FAULT

GEOLOGIC MAP
LOWER MT. GLEN DAM

PLATE 2

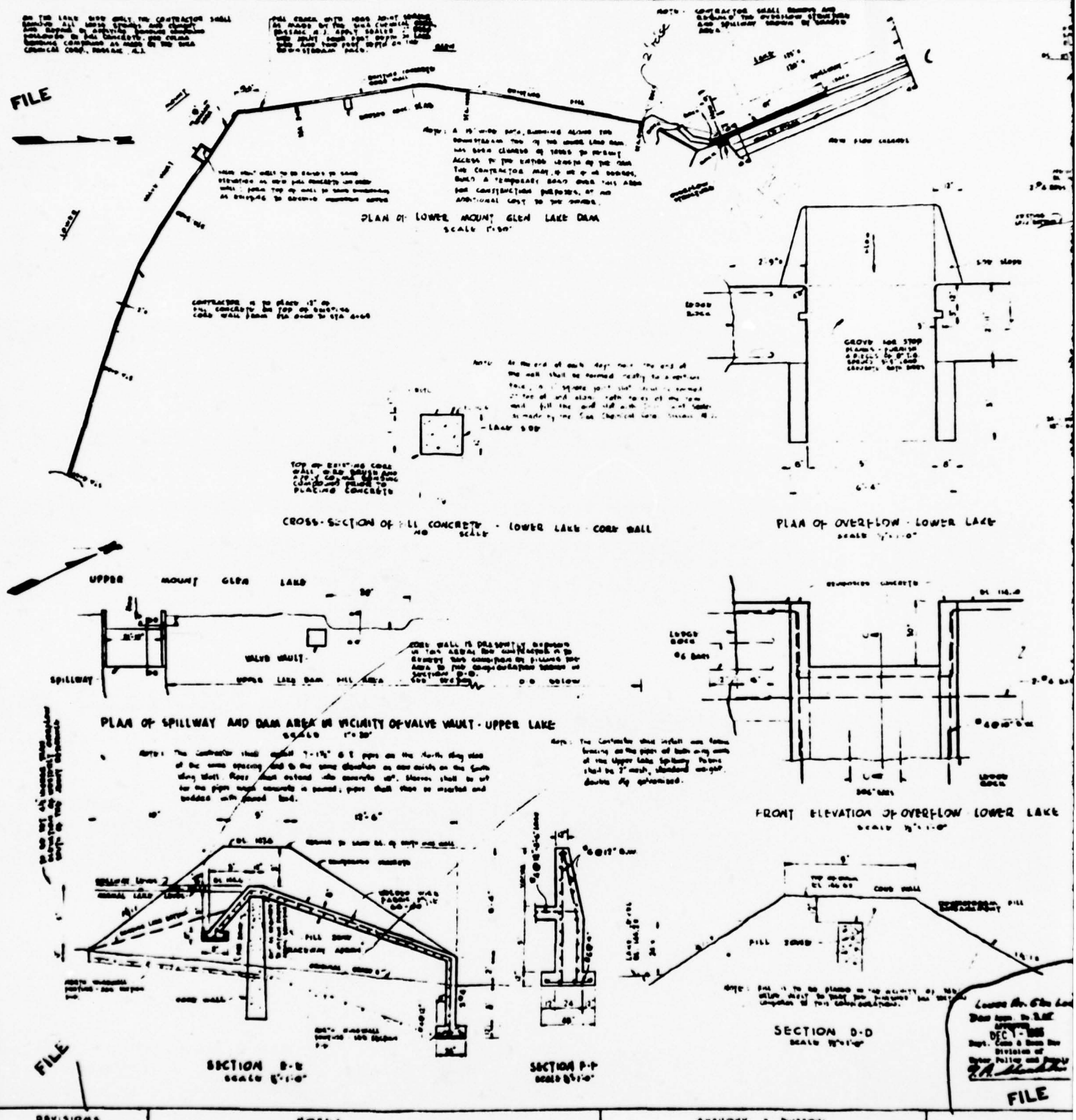

UPPER MOUNT GLEN LAKE
EMERGENCY SPILLWAY
SECTION A-A
PLAN
PROFILE OF DAM AT LOWER MT. GLEN LAKE
DETAIL AT OVERFLOW
SECTION B-B
SECTION C-C
SECTION D-D

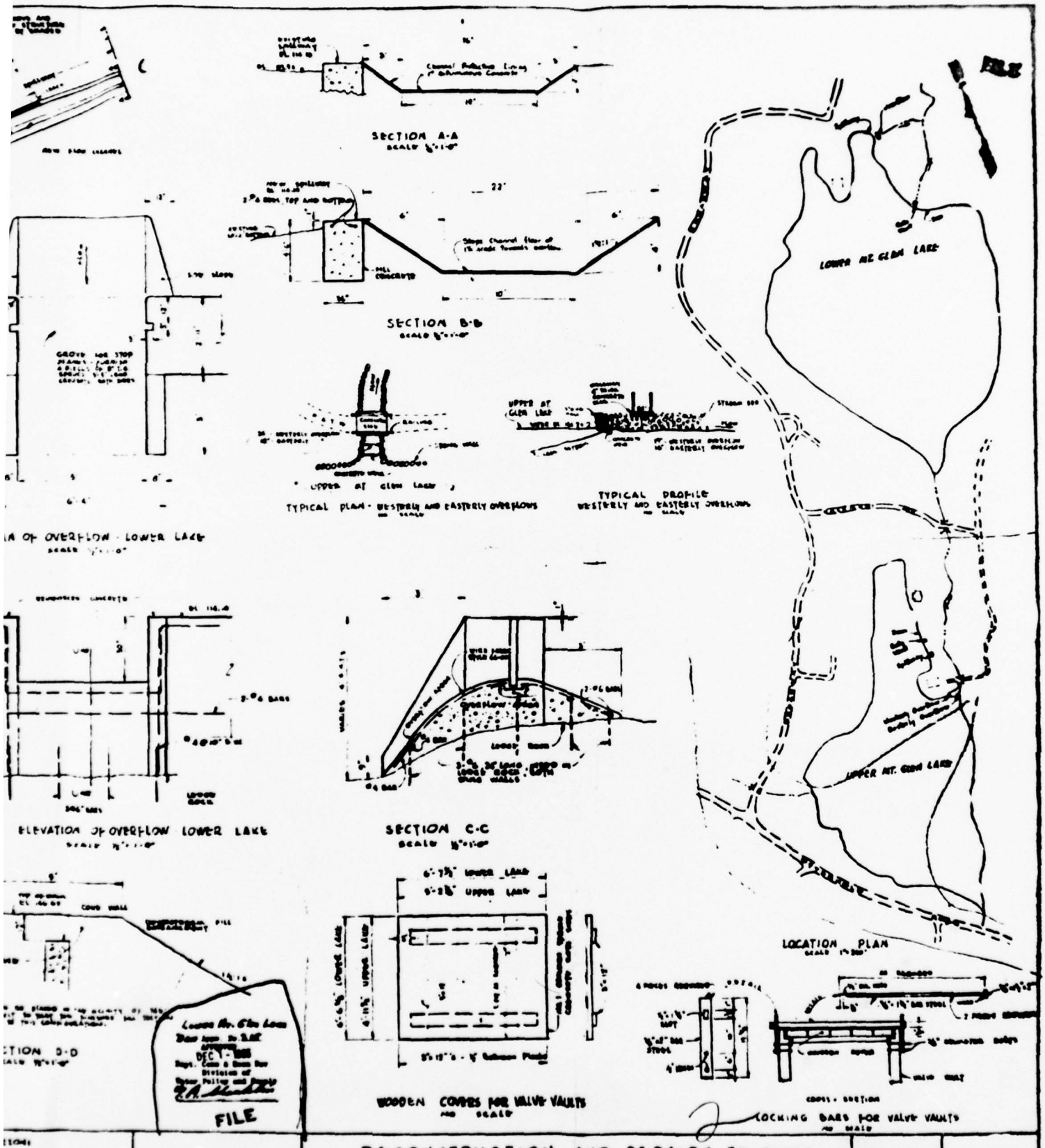


PLAN OF DAMS
AT
UPPER AND LOWER MT. GLEN LAKES
MACOPIN N.J.
DUDLEY J. SHIPPEE OWNER

ALFRED JENNY & CO
Consulting Engineers
60 John Street, New York
January 20

PLATE 3


FILE
PLAN OF LOWER MOUNT GLEN LAKE DAM
CROSS-SECTION OF FILL CONCRETE - LOWER LAKE - CORE WALL
PLAN OF OVERFLOW - LOWER LAKE
UPPER MOUNT GLEN LAKE
SPILLWAY
VALVE VAULT
PLAN OF SPILLWAY AND DAM AREA IN VICINITY OF VALVE VAULT - UPPER LAKE
FRONT ELEVATION OF OVERFLOW LOWER LAKE
SECTION D-E
SECTION F-F
SECTION D-D
FILE
REVISIONS
NOTES
ANTHONY T. BUZZONI
CONSULTING ENGINEER
SCALE AS SHOWN



	SCALE AS SHOWN	RECONSTRUCTION AND REPAIRS TO DAMS UPPER AND LOWER LAKE MOUNT GLEN LAKE ASSOCIATION	PLAN NO. 69-42 MAY 1969	1 FILE

PLATE 4

APPENDIX A

CHECK LIST - VISUAL OBSERVATIONS

CHECK LIST - ENGINEERING, CONSTRUCTION
MAINTENANCE DATA

CHECK LIST

Visual Inspection
Phase I

Name Dam Lower Mount Glen Lake County Passaic State New Jersey Coordinators _____

Date(s) Inspection June 26, 1978 Weather Cool-Cloudy
Rain at 1645 hrs. Temperature 70°F

Pool Elevation at Time of Inspection _____ M.S.L. Tailwater at Time of Inspection _____ M.S.L.

Inspection Personnel:

(June 26, 1978)	(July 7, 1978)	(July 7, 1978)
Joe Sirianni	Yin Au-Yeung	Wm. Flynn
Henry King	Lynn Brown	
David Kerkes		

Robert B. Campbell Recorder

Owner Representative:

(June 26, 1978)

Simon Larkin, President
Mount Glen Lakes Association

CONCRETE/MASONRY DAMS

Lower Mount Glen Lake

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEEPAGE OR LEAKAGE	N.A. (Not Applicable)	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N.A.	
DRAINS	N.A.	
WATER PASSAGES	N.A.	
FOUNDATION		

CONCRETE/MASONRY DAMS

Lower Mount Glen Lake

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N.A.	
STRUCTURAL CRACKING	N.A.	
VERTICAL AND HORIZONTAL ALIGNMENT	N.A.	
MONOLITH JOINTS	N.A.	
CONSTRUCTION JOINTS	N.A.	

EMBANKMENT

Lower Mount Glen Lake

Type - Earth Embankment with Vertical Concrete Core Wall

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Embankment heavily covered with brush and vines. No evidence of surface cracking can be found. Core wall eroded near outlet vault exposing rock masonry core.	Remove brush and vines from slope and toe of embankment. Repair core wall and backfill both sides of core wall.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	No surficial evidence of movement or cracking at or beyond toe.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Wave erosion appears to have eroded upstream embankment to around plus or minus six inches of reservoir water surface. Downstream slope about 30 degrees. Irregular upstream and downstream. Maximum height of slope about 15 feet.	Backfill both sides of core wall and regrade crest.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	No evidence of movement found.	
RIPRAP FAILURES	No riprap.	

EMBANKMENT

Lower Mount Glen Lake

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
Concrete Core Wall	Concrete core wall appears to tie into both abutments. Wall is 10 inches wide at top and has no apparent cracks.	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Right Abutment is massive rock. Core wall extends to rock. Erosion due to overtopping, maximum 2-1/2 ft. in immediate area left of spillway where dam was overtopped.	See Ungated Spillway.
ANY NOTICEABLE SEEPAGE	Seepage commences near the right abutment where flow is estimated to be more than 5 gpm and continues past outlet works for about 2/3 of embankment length.	Channelize seepage and inspect monthly for indicated changes in quantity or clarity.
STAFF AND GAGE RECORDER	None.	
DRAINS	None.	

OUTLET WORKS

Lower Mount Glen Lake

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Outlet discharge conduit is precast concrete rectangular box culvert 2'-0" by 2'-6". Concrete is in good condition. Valve vault flooded and leakage into vault through joint within corewall. Handwheel missing from valve operator.	Vault should be unwatered and drain unplugged or installed. Leakage into vault should be repaired.
INTAKE STRUCTURE	Submerged and not visible. Can not be inspected.	
OUTLET STRUCTURE	None.	
OUTLET CHANNEL	Natural - initially steep walled with some erosion, no riprap slope protection. Flattens out about 100 feet downstream.	Flatten slopes and add riprap to stop erosion.
EMERGENCY GATE	None.	

UNGATED SPILLWAY

Lower Mount Glen Lake

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Service spillway entirely on rock. Emergency spill is over long low concrete wall. Concrete is in good condition. Erosion behind overflow wall. (See Junction of Embankment section.)	Spillway should be enlarged to provide adequate capacity to prevent overtopping of wall and eroded area should be backfilled and graded.
APPROACH CHANNEL	None - Approach is from full reservoir.	
DISCHARGE CHANNEL	Natural rocky creek channel.	
BRIDGE AND PIERS	Very small wooden foot bridge with handrailing. No piers.	

GATED SPILLWAY

(None)

Lower Mount Glen Lake

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

INSTRUMENTATION

Lower Mount Glen Lake

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

RESERVOIR

Lower Mount Glen Lake

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Shoreline protected by hand placed rock masonry. Upper slopes are gentle and stable.	
SEDIMENTATION	Reservoir not drawn down. Sedimentation rate not known but does not appear to be a problem. Caretaker states reservoir does get muddy during severe storm flooding. However, caretaker claims lake is fed largely by springs.	
Shoreline Structures	Shores are entirely owned by private home owners. All homes are well elevated above dam. Only structures near water level are docks and boat houses.	
Use	Sole use for recreation (boating, fishing, much swimming). Lake access is supposedly limited to home owners belonging to mount Glen Lakes Association.	
Operation	Water level is held very uniform through summer. Reservoir drawn down each fall with outlet works. Usually drawn down about 5 feet in October to protect docks.	

DOWNSTREAM CHANNEL

Lower Mount Glen Lake

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Well defined with flat sideslopes.	
SLOPES	Flat at about 100 feet downstream of spillway.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	None in immediate area.	

CHECK LIST
ENGINEERING DATA

DESIGN, CONSTRUCTION, OPERATION

Lower Mount Glen Lake

ITEM	REMARKS
PLAN OF DAM	Original construction plan is not available. Plan of Dams at Upper and Lower Mount Glen Lakes, dated January, 1933, is available. Plans and details for Reconstruction and Repairs to Dams, Upper and Lower Lake, Mount Glen Lakes Association is available.
REGIONAL VICINITY MAP	Available.
CONSTRUCTION HISTORY	Original construction history not available. Post construction history since owned by Mount Glen Lakes Association is available in the form of letters and minutes of meetings by the Board of Directors.
TYPICAL SECTIONS OF DAM	Available on plans listed above.
HYDROLOGIC/HYDRAULIC DATA	None available.
OUTLETS - PLAN	)
- DETAILS	) None Available.
- CONSTRAINTS	)
- DISCHARGE RATINGS	)
RAINFALL/RESERVOIR RECORDS	None Available.

CHECK LIST
ENGINEERING DATA

DESIGN, CONSTRUCTION, OPERATION
(Continued)

Lower Mount Glen Lake

ITEM	REMARKS
DESIGN REPORTS	None available.
GEOLOGY REPORTS	None available.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None available.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None available.
POST-CONSTRUCTION SURVEYS OF DAM	Lower Mount Glen Dam surveyed and drawing prepared in 1965, for purpose of designing repairs and reconstruction of spillway. Repairs and reconstruction not completed.
BORROW SOURCES	Unknown. Appear to be from local sources.
SPILLWAY - PLAN - SECTIONS - DETAILS	None available for existing spillway.

CHECK LIST
ENGINEERING DATA

DESIGN, CONSTRUCTION, OPERATION
(Continued)

Lower Mount Glen Lake

ITEM	REMARKS
OPERATING EQUIPMENT PLANS AND DETAILS	None available.
MONITORING SYSTEMS	None available.
MODIFICATIONS	Core wall and embankment raised in 1933.
HIGH POOL RECORDS	None available. Orally reported that the dam has never been overtopped.
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Dam inspected and report prepared by State of New Jersey in 1961.
PRIOR ACCIDENTS OR FAILURE OF DAM - DESCRIPTION - REPORTS	A severe storm in 1932 washed out a large section of embankment and core wall in central portion of dam.
MAINTENANCE, OPERATION RECORDS	It is reported that minutes of the Board of Directors meetings record major maintenance and repairs. No operation records are available.

APPENDIX B

PHOTOGRAPHS

(All photos were taken on July 26, 1978.)

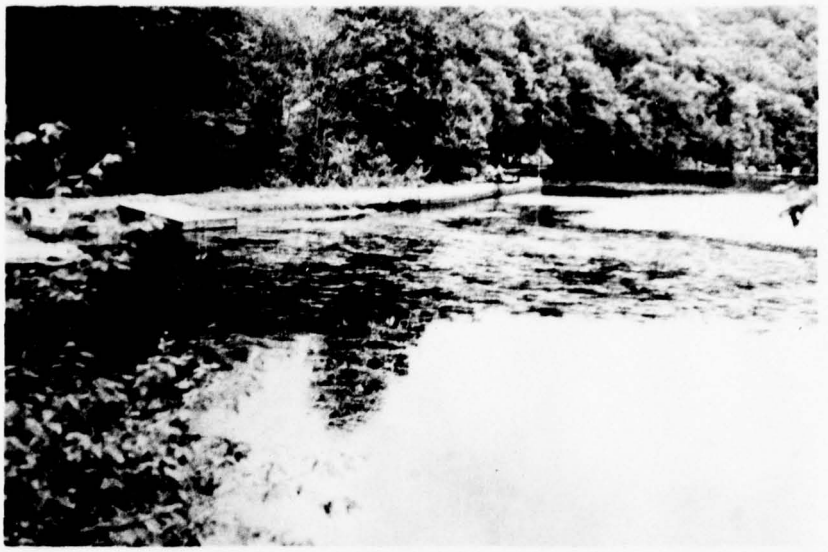


Photo 1 - View of dam from upstream near left abutment.



Photo 2 - View of top of core wall and crest of dam.



Photo 3 - View of downstream slope of dam showing heavy growth of shrubs and trees.



Photo 4 - End of concrete box culvert discharge for low level outlet works.

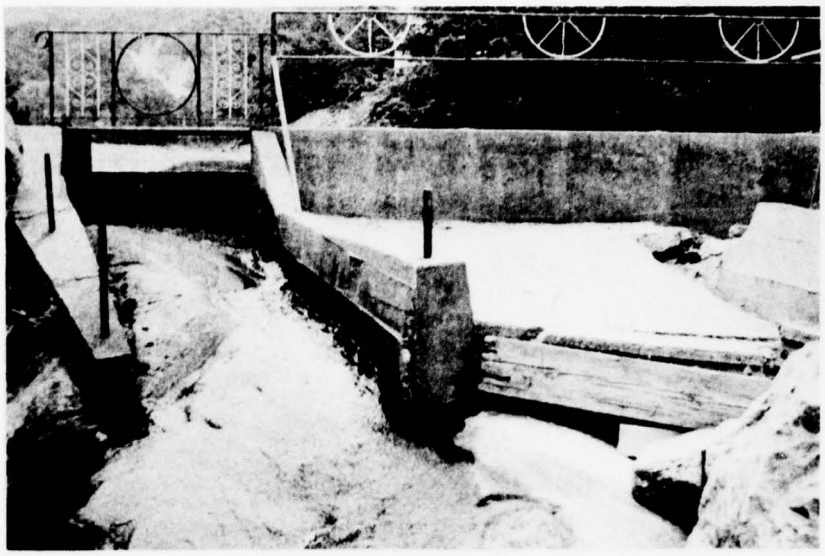


Photo 5 - Service spillway from downstream channel.

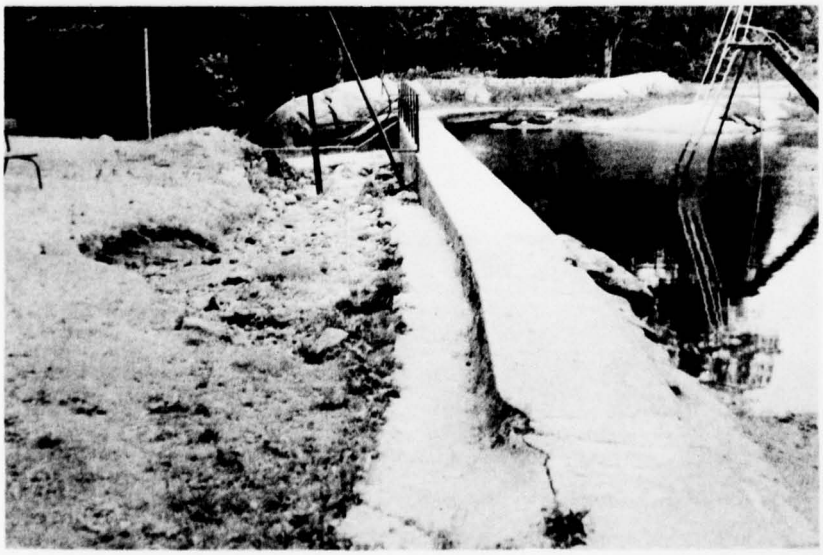


Photo 6 - Erosion behind low wall due to overtopping. Service spillway is at end of wall.



Photo 7 - View showing end of service spillway and discharge channel.



Photo 8 - View of discharge channel downstream from spillway.



Photo 9 - View of lake with dam on left side of picture.

APPENDIX C

SUMMARY OF ENGINEERING DATA

CHECK LIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

Name of Dam: Lower Mount Glen Lake Dam

Drainage Area: 1.0 square miles

Elevation Top Normal Pool (Storage Capacity): 914.10 (208 AF)

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

Elevation Maximum Design Pool: 915.40

Elevation Top of Dam: 916.10

SPILLWAY CREST:

a. Elevation: 914.10

b. Type: Overflow

c. Width: 2.9 feet

d. Length: 125 feet (including lowest overflow section)

e. Location Spillover: Left side of the dam

f. Number and Type of Gates: None

LOW LEVEL OUTLET WORKS:

a. Type: 18" diameter steel pipe with 2′ x 2′-6" culvert discharge

b. Location: Under dam on left side

c. Entrance Inverts: Not applicable

d. Exit Inverts: Not applicable

e. Emergency Draindown Facilities: None

HYDROMETEOROLOGICAL GAGES: (None)

a. Type:

b. Location:

c. Records:

MAXIMUM NON-DAMAGING DISCHARGE: 600 cfs (Estimated)

APPENDIX D

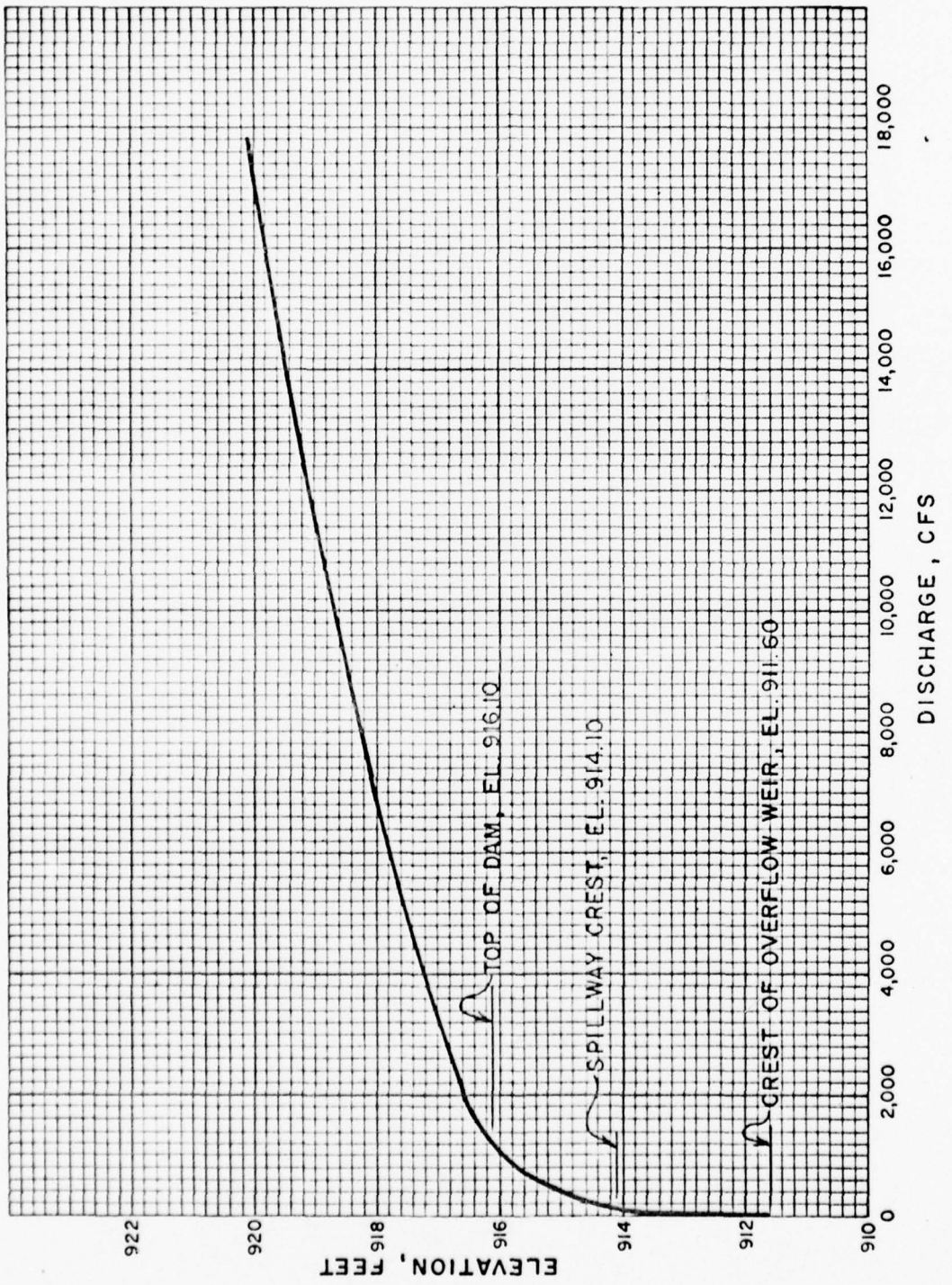
HYDROLOGIC COMPUTATIONS

PLATE I APPENDIX D



LOWER MOUNT. GLEN LAKE DAM
DRAINAGE BASIN

PLATE 2 APPENDIX D

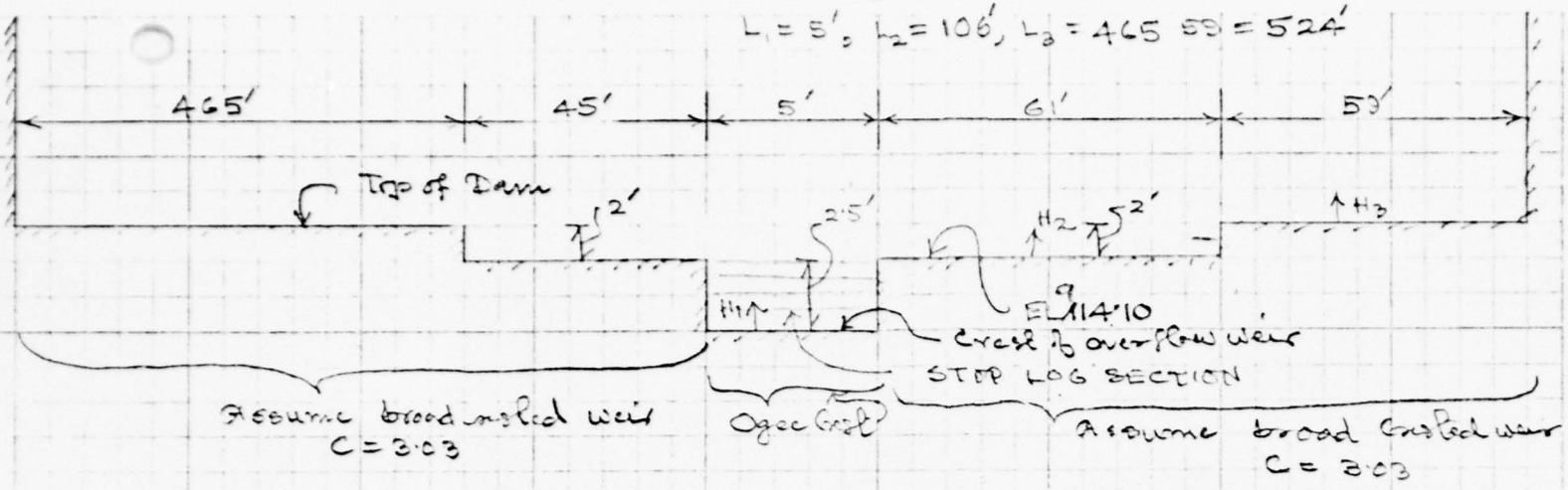


LOWER MT. GLEN LAKE DAM
SPILLWAY & OVERTOP RATING CURVE

NEW JERSEY (STATE) DAM SAFETY INSPECTION SHEET NO. 4 OF 5

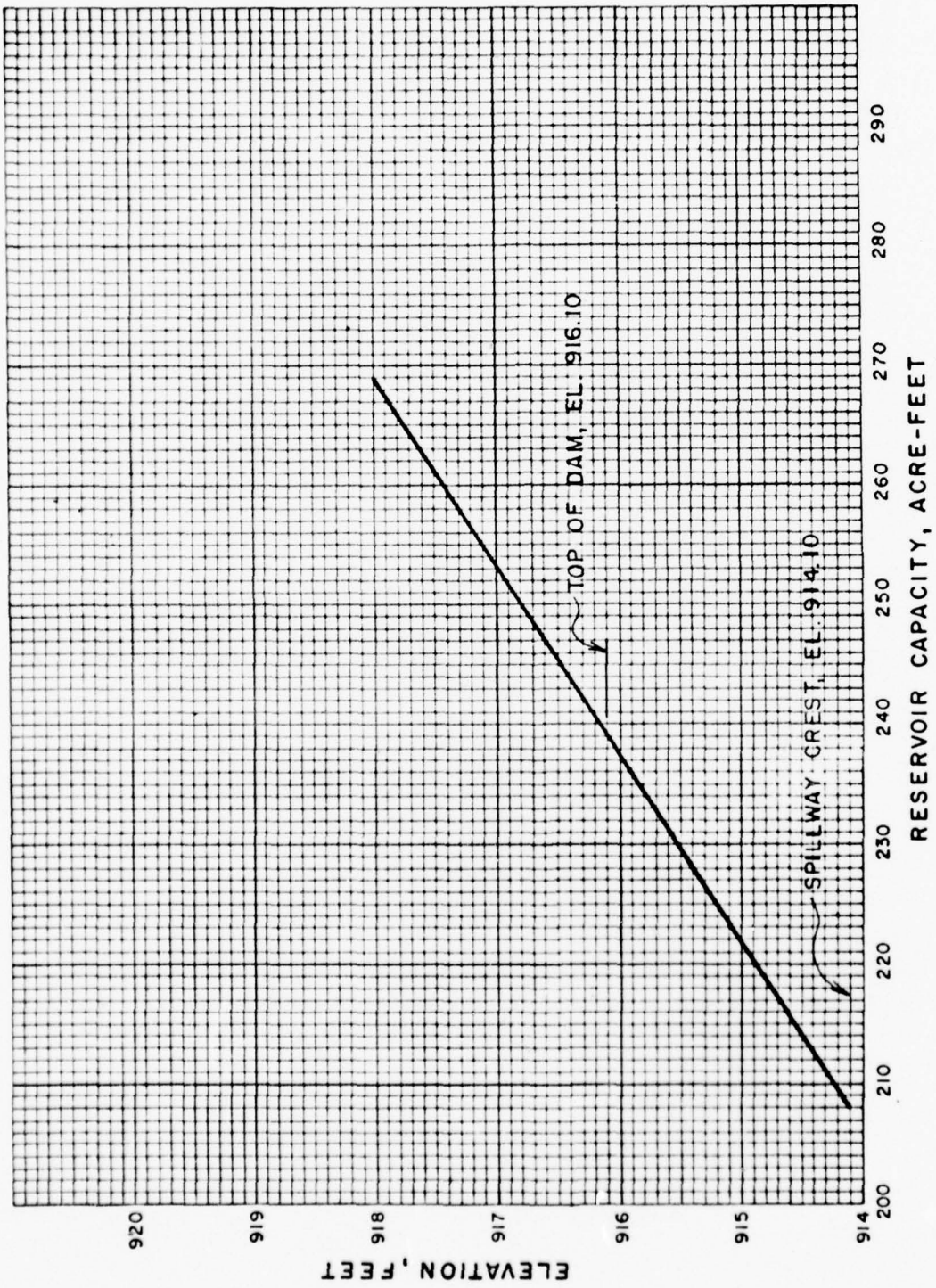
LOWER MT. GLEN LAKE DAM JOB NO. 1212-001

SPILLWAY & OVERTOP RATING CURVE (W/ STOP LOGS REMOVED) BY MAS DATE 7-12-



ELEV. ft	Head on overflow weir ft	H_1	H_2	H_3	L_1	L_2	L_3	C_1	C_2	C_3	$Q = \sum_{i=1}^{3} C_i L_i H_i^{1.5}$
111.60	0	0									
112.60	1	1			5			3.2			16
113.10	2.5	2.5			5			3.4			67
115.10	3.5	3.5	1		5	106		3.6	3.03		439
116.10	4.5	4.5	2	0	5	106		3.7	3.03		1084
117.10	5.5	5.5	3	1	5	106	524	3.8	3.03	3.03	3502
118.10	6.5	6.5	4	2	5	106	524	3.9	3.03	3.03	7375
120.10	8.5	8.5	6	4	5	106	524	3.9	3.03	3.03	17393
121.60	10.0	10.0	7.5	5.5	5	106	524	3.9	3.03	3.03	27677

PLATE 3 APPENDIX D



LOWER MOUNT GLEN LAKE DAM
RESERVOIR CAPACITY CURVE

ECI-4 **ENGINEERING CONSULTANTS, INC.**

NEW JERSEY (STATE) DAM SAFETY INSPECTION — SHEET NO. 1 OF
LOWER MOUNT GLEN LAKE DAM — JOB NO. 1212-001
RESERVOIR AREA - CAPACITY DATA — BY JMAS DATE 7-17

LOWER MOUNT GLEN LAKE DAM
RESERVOIR AREA-CAPACITY DATA

Maximum Storage = 239 A-F, Elev.

Normal Storage = 208 A-F, Elev.

Reservoir Surface Area = 15.42 Acres (from dwg. dated Jan. 1933)

Reservoir Surface Area = 14.32 Acres at an approximate elev of 914 (USGS 7½ minute topo map).

ELEV. (MSL) Feet	Area Acres	Volume AC-FT	Remarks
914.10	15.42	208	Assuming the normal volume of 208 A-F is to be at spillway crest elevation & spillway crest El. is to be 914.10 MSL (114.1 reference El. in dwg.). Similarly reservoir area of 15.42 is assumed at spillway crest.
915.40	15.42±	228	The volume curve is extended by assuming a constant area of 15.42 Acres and thus the maximum storage is found to be at El 915.40
916.10	16±	239	
918.00	16±	269	

CI- ENGINEERING CONSULTANTS, INC.

NEW JERSEY (STATE) DAM SAFETY INSPECTION — SHEET NO. 1 OF
LOWER MT. GLEN LAKE DAM, #9 — JOB NO. 1212 001
UNIT HYDROGRAPH — BY SAS DATE 7-10-

UNIT HYDROGRAPH – LOWER MT. GLEN LAKE DAM

a) Drainage Area, $A = 1.00$ sq. miles (from page 2)

b) $L = 0.42$ miles (from page 2)

c) $T_c = 0.40$ hrs (from page 2)

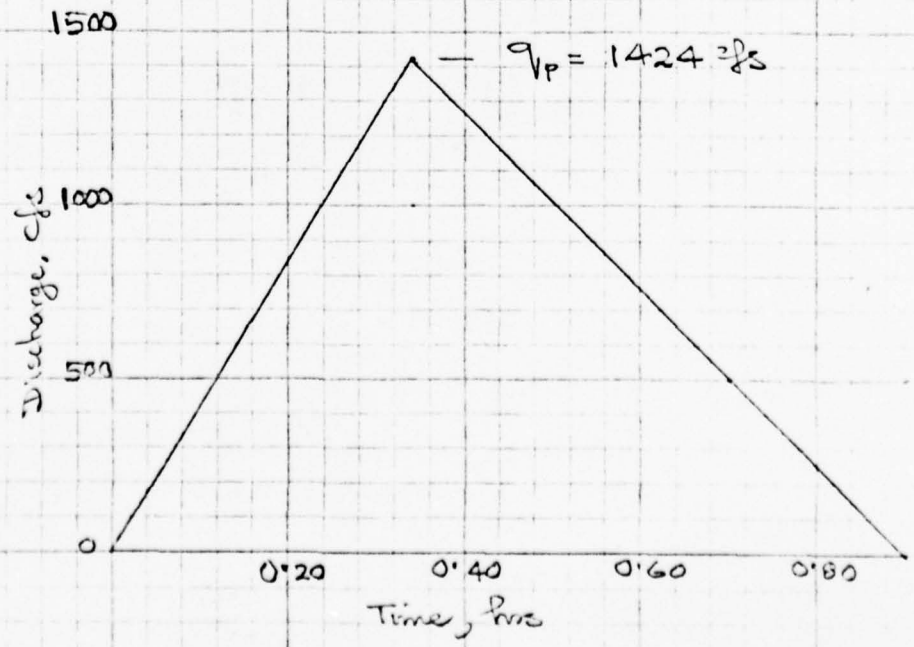
d) Assume $D \simeq \frac{1}{2} T_c \simeq 0.20$ hrs.

e) $T_p = \frac{D}{2} + 0.6\,T_c$

$= 0.10 + 0.6 \times (.40) = 0.34$ hrs

f) $T_b = 2.67\,T_p = 0.91$ hrs

g) $q_p\,(cfs) = \frac{484\,A\,(sq.mi)}{T_p\,(hrs)} = \frac{484 \times 1}{0.34} = 1424$ cfs



ECI-4 ENGINEERING CONSULTANTS, INC.

NEW JERSEY (STATE) DAM INSPECTION — SHEET NO. 12 OF ____
DAM #9: LOWER MT. GLEN LAKE — JOB NO. 1212-001
BASIN PARAMETERS — BY JMS DATE 6-23-

DRAINAGE AREA

Calibration: 447 units / sq. mi.

D.A.

Drainage area of Dam #9 = Drainage area of Dam #10 + the following area

1430
1490 (60, 60) $\frac{60}{447}$ = 0.139 sq. mi = 85.9 Acres
1550

∴ D.A = D.A. of Dam #10 + 0.13 sq. mi
= 0.87 + 0.13 = 1.00 sq. mi
= 640 Acres

RESERVOIR SURFACE AREA

Surface area of the reservoir as shown on topo map (Ed ~)

1510
1520 (10, 10) $\frac{10}{447}$ = 0.022 sq. mi = 14.32 Ac
1530

NEW JERSEY (STATE) - DAM SAFETY INSPECTION SHEET NO. 3 OF

BASIN PARAMETERS JOB NO. 1212-001

DAM #9 BY KLB DATE

CHK

DETERMINE LENGTH OF STREAM

FROM USGS QUAD MAP.

$$L = 2.11'' \times \frac{2400}{12 \times 5280} = \underline{0.799 \text{ miles}} = \underline{4220 \text{ FT}}$$

DETERMINE BASIN SLOPE

$$\Delta H = 985 - 918 = \underline{67 \text{ FT}}$$

DETERMINE TIME OF CONCENTRATION

$$T_c = \left(\frac{11.9 L^3}{\Delta H}\right)^{0.385} = \left(\frac{11.9 \times .799^3}{67}\right)^{0.385}$$

$$= \underline{0.40 \text{ HR}}$$

ECI-4 ENGINEERING CONSULTANTS, INC.

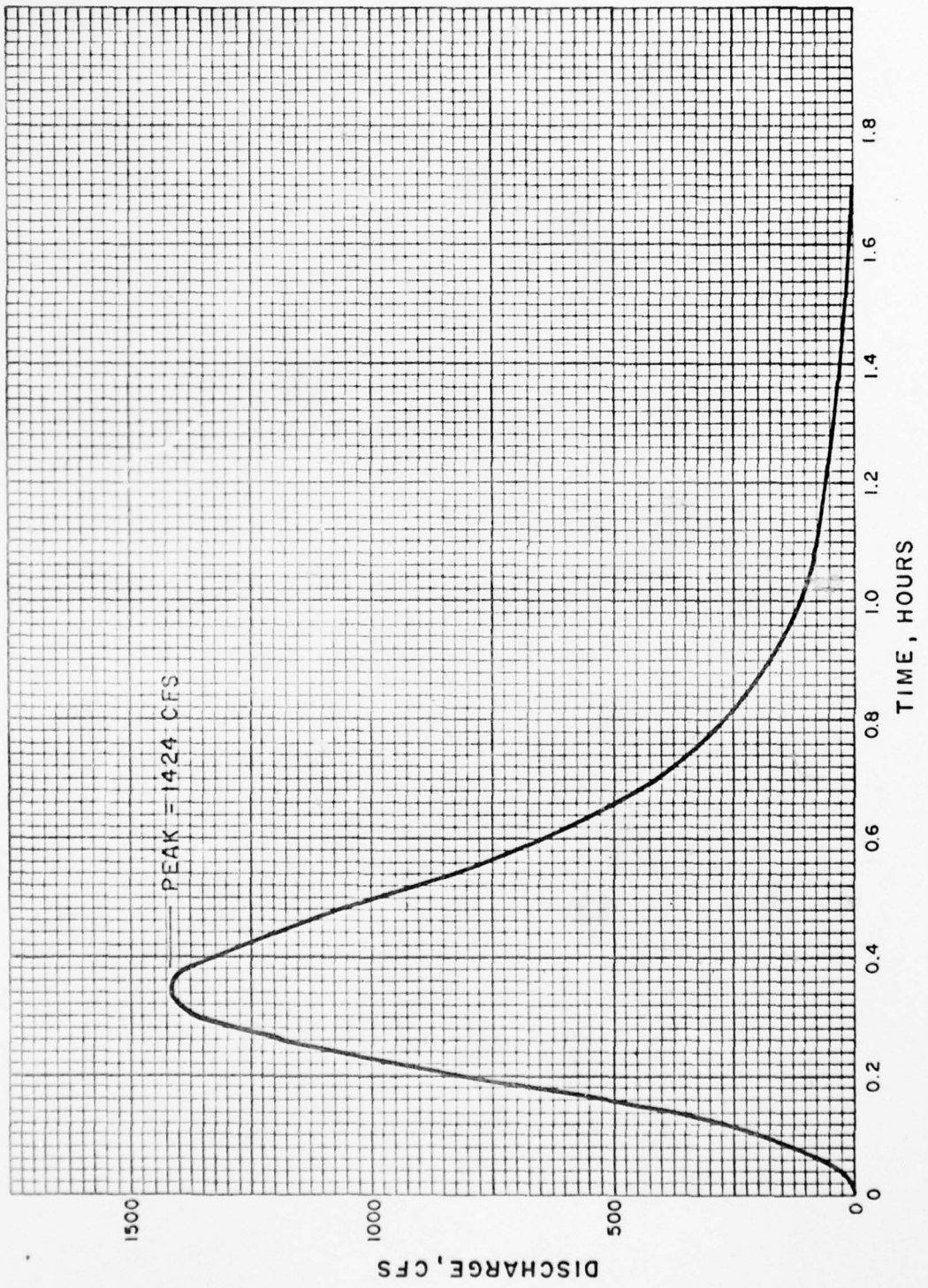
NEW JERSEY (STATE) DAM SAFETY INSPECTION SHEET NO. 4 OF ____

LOWER SYL. GLEN LAKE DAM, #5 JOB NO. 1212-001

UNIT HYDROGRAPH BY SAS DATE 7-17

b) Draw a curvilinear unit hydrograph.

Time Ratio T/T_p	Disch. Ratio q/q_p	UNIT GRAPH	
		Time, T hrs	Disch. Q. cfs
0	0	0	0
0.1	0.015	0.034	22
0.2	0.075	0.068	107
0.3	0.16	0.102	228
0.4	0.28	0.136	399
0.5	0.43	0.17	612
0.6	0.60	0.20	854
0.7	0.77	0.24	1096
0.8	0.89	0.28	1267
0.9	0.97	0.30	1381
1.0	1.00	0.34	1424
1.1	0.98	0.38	1395
1.2	0.92	0.40	1310
1.3	0.84	0.44	1196
1.4	0.75	0.48	1068
1.5	0.66	0.52	939
1.6	0.56	0.54	797
1.8	0.42	0.62	598
2.0	0.32	0.68	456
2.2	0.24	0.74	342
2.4	0.18	0.82	256
2.6	0.13	0.88	185
2.8	0.098	0.96	140
3.0	0.075	1.02	57
3.5	0.036	1.20	51
4.0	0.018	1.36	26
4.5	0.009	1.54	13
5.0	0.004	1.70	6



LOWER MT. GLEN LAKE DAM
0.20 HR. UNIT HYDROGRAPH

NEW CANEY DAM SAFETY INSPECTION
PMF Derivation Lower Mt. Glen Lake Dam
Probable Maximum Precipitation

SHEET NO. ____ OF ____
JOB NO. 1222
BY JJN DATE 7-14-82

PROBABLE MAXIMUM FLOOD CALCULATION (PMF)

DRAINAGE = 1.00 sq. mi.

From Hydrometeorological Report "23" Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Duration of 6, 12, 24 and 48 Hours" 1956

For D.A. = 10 sq mi.
6 Hour rain fall duration.
PMP = 24.5" for Zone 6 at this Basin.

Since D.A. < 10 sq mi. No area reduction to be applied
PMP Values for varies rain fall duration

Duration	PMP (inch)
6 Hr	1 × 24.5 = 24.5"
12 Hr	1.09 × 24.5 = 26.7
24 Hr	1.17 × 24.5 = 28.7
48 Hr	1.26 × 24.5 = 30.9

PMP Values are reduced by 20% to account for misalignment of Basin and storm boundaries

Duration	PMP
6 Hr	19.6 ←
12 Hr	21.4
24 Hr	23.0 } Can be neglected.
48 Hr	24.7

PMF DERIVATION - LOWER M. Glen Lake Dam — JOB NO. 1212-01

PROBABLE MAXIMUM PRECIPITATION — BY YIN — DATE

PMP. PMF DERIVATION.

1) SOIL GROUP "C", & AMC = II

2) CN = 85.

MIN LOSS RATE FOR ABOVE CONDITION IS 0.12"/hr.

or $\frac{0.03}{}$ "/¼ hr.

or 0.02"/.20 hr

FOR CN = 85,

S = 1.76 in the

Eq. $Q = (P - 0.2S)^2 / P + 0.8S$.

or $Q = (P - 0.352)^2 / P + 1.408$.

ENGINEERING CONSULTANTS, INC.

NEW JERSEY DAM SAFETY INSPECTION - (DEP) SHEET NO. 2 OF 2
PMF DERIVATION - LOWER MT. GLENN LAKE DAM JOB NO. 1212-001-1
DIRECT RUNOFF BY KLB DATE 7-24-79

DIRECT RUNOFF FOR COMPUTING PMF.

TIME ENDING (HR)	INCREMENTAL DESIGN RAINFALL (IN)	ACCUMULATIVE DESIGN RAINFALL (IN)	DIRECT RUNOFF ACCUMULATIVE	DIRECT RUNOFF INCREMENTAL	INCREMENTAL LOSS
0.20	0.39	0.39	0.00	0.00	0.39
0.40	0.39	0.78	0.08	0.08	0.31
0.60	0.39	1.17	0.26	0.18	0.21
0.80	0.39	1.56	0.49	0.23	0.16
1.00	0.39	1.95	0.76	0.27	0.12
1.20	0.47	2.42	1.12	0.36	0.11
1.40	0.47	2.89	1.50	0.38	0.09
1.60	0.47	3.36	1.90	0.40	0.07
1.80	0.47	3.83	2.31	0.41	0.06
2.00	0.47	4.30	2.73	0.42	0.05
2.20	0.59	4.89	3.27	0.54	0.05
2.40	0.59	5.48	3.82	0.55	0.04
2.60	0.59	6.07	4.37	0.55	0.04
2.80	0.59	6.66	4.93	0.56	0.03
3.00	0.59	7.25	5.50	0.57	0.02 *
3.20	1.30	8.55	6.75	1.28	0.02
3.40	1.30	9.85	8.01	1.28	0.02
3.60	1.31	11.16	9.29	1.28	0.02
3.80	2.24	13.40	11.50	2.22	0.02
4.00	1.30	14.70	12.78	1.28	0.02
4.20	0.55	15.25	13.32	0.53	0.02
4.40	0.55	15.80	13.87	0.53	0.02
4.60	0.55	16.35	14.41	0.53	0.02
4.80	0.55	16.90	14.96	0.53	0.02
5.00	0.55	17.45	15.50	0.53	0.02
5.20	0.43	17.88	15.93	0.41	0.02
5.40	0.43	18.31	16.36	0.41	0.02
5.60	0.43	18.74	16.78	0.41	0.02
5.80	0.43	19.17	17.21	0.41	0.02
6.00	0.43	19.60	17.64	0.41	0.02

* MINIMUM LOSS RATE = 0.12"/HR = 0.024"/.2HR, SAY 0.02"/.2 HR
(AFTER THIS RATE IS REACHED, ABANDON CURVE FOR CONSTANT LOSS)

HEC-1 - COMPUTATIONS

ECI-4 ENGINEERING CONSULTANTS, INC.

LOWER ANT GLENN LAKE SHEET NO. 1 OF

JOB NO. RIZ-001-1

BY KLB DATE 7-17-92

CM

INPUT TO HEC-1

	N	ELEV (FT)	Y2 STORAGE (AC-FT)	Y3 DISCHARGE (CFS)
CREST OVERFLOW	1	911.60	0.	0.
	2	912.9	104.0	30.
SPILLWAY CREST	3	914.10	208.0	100.
	4	914.60	215.8	200.
	5	915.1	223.5	450.
	6	915.6	231.0	750.
TOP OF DAM	7	916.1	238.8	1100.
	8	916.6	246.6	2000.
	9	917.5	260.7	5000.
	10	920.0	300.	17450.

****
HEC-1 VERSION DATED JAN 1973

****

DAM SAFETY INSPECTION - NEW JERSEY STATE
LOWER MT. GLENN DAM
PMF FLOOD ROUTING

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
50	0	12	0	0	0	0	0	0	0

JOPER	NWT
5	0

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

SUB-AREA RUNOFF COMPUTATION

INPUT UNIT HYDROGRAPH DERIVED BY SCS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
9	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.00	0.00	1.00	0.00	0.000	0	0	0

PRECIP DATA

NP	STORM	DAJ	DAK
30	0.00	0.00	0.00

PRECIP PATTERN

0.00	0.08	0.18	0.23	0.27	0.36	0.38	0.40	0.41	0.42
0.54	0.55	0.55	0.56	0.57	1.28	1.28	1.28	2.22	1.28
0.53	0.53	0.53	0.53	0.53	0.41	0.41	0.41	0.41	0.41

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

GIVEN UNIT GRAPH, NUHGQ= 10

0.	805.	1400.	650.	225.	110.	50.	25.	8.	0.

UNIT GRAPH TOTALS 3273. CFS OR 1.01 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.00	0.00	0.
2	0.08	0.08	0.
3	0.18	0.18	64.
4	0.23	0.23	256.
5	0.27	0.27	489.
6	0.36	0.36	674.
7	0.38	0.38	866.
8	0.40	0.40	1060.

9	0.41	0.41	1185.
10	0.42	0.42	1264.
11	0.54	0.54	1317.
12	0.55	0.55	1447.
13	0.55	0.55	1638.
14	0.56	0.56	1739.
15	0.57	0.57	1779.
16	1.28	1.28	1817.
17	1.28	1.28	2417.
18	1.28	1.28	3423.
19	2.22	2.22	3889.
20	1.28	1.28	4807.
21	0.53	0.53	5446.
22	0.53	0.53	4173.
23	0.53	0.53	2741.
24	0.53	0.53	2191.
25	0.53	0.53	1926.
26	0.41	0.41	1820.
27	0.41	0.41	1670.
28	0.41	0.41	1476.
29	0.41	0.41	1392.
30	0.41	0.41	1365.
31	0.00	0.00	1351.
32	0.00	0.00	1015.
33	0.00	0.00	438.
34	0.00	0.00	171.
35	0.00	0.00	79.
36	0.00	0.00	34.
37	0.00	0.00	13.
38	0.00	0.00	3.
39	0.00	0.00	0.
40	0.00	0.00	0.
41	0.00	0.00	0.
42	0.00	0.00	0.
43	0.00	0.00	0.
44	0.00	0.00	0.
45	0.00	0.00	0.
46	0.00	0.00	0.
47	0.00	0.00	0.
48	0.00	0.00	0.
49	0.00	0.00	0.
50	0.00	0.00	0.
SUM	17.54	17.54	57408.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5446.	1901.	1148.	1148.	57408.
INCHES		17.68	17.80	17.80	17.80
AC-FT		943.	949.	949.	949.

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HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THRU MT. GLENN LAKE DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
9	1	0	0	2	0	1

1001 SOUTH NAVAJO, DENVER, COLORADO 80223

ROUTING DATA

GLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.000	0.00	1	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA
0	0	0	0.000	0.000	0.000	-1.

STORAGE=	0.	104.	208.	215.	225.	231.	238.	246.	260.	300.
OUTFLOW=	0.	30.	100.	200.	450.	750.	1100.	2000.	5000.	17450.

TIME	EOP STOR	AVG IN	EOP OUT
1	0.	0.	0.
2	0.	0.	0.
3	0.	32.	0.
4	3.	160.	0.
5	9.	373.	2.
6	18.	581.	5.
7	31.	770.	9.
8	47.	963.	13.
9	65.	1122.	18.
10	85.	1224.	24.
11	106.	1291.	31.
12	128.	1382.	46.
13	153.	1542.	63.
14	179.	1686.	81.
15	207.	1757.	99.
16	230.	1798.	721.
17	244.	2117.	1775.
18	252.	2920.	3166.
19	255.	3656.	3791.
20	258.	4348.	4502.
21	261.	5127.	5339.
22	258.	4809.	4623.
23	251.	3457.	3136.
24	247.	2446.	2256.
25	246.	2039.	1984.
26	245.	1873.	1876.
27	244.	1745.	1748.
28	242.	1573.	1577.
29	241.	1434.	1437.
30	241.	1376.	1379.
31	241.	1356.	1359.
32	239.	1183.	1188.
33	234.	727.	899.
34	227.	305.	591.
35	221.	125.	373.
36	217.	56.	239.
37	213.	23.	176.
38	211.	8.	144.
39	209.	1.	116.
40	207.	0.	99.
41	205.	0.	98.
42	204.	0.	97.
43	202.	0.	96.
44	201.	0.	95.
45	199.	0.	94.
46	197.	0.	93.
47	196.	0.	92.
48	194.	0.	91.
49	193.	0.	90.
50	191.	0.	89.

SUM 45840.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5339.	1499.	916.	916.	45840.
INCHES		13.95	14.21	14.21	14.21
AC-FT		744.	758.	758.	758.

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	9	5446.	1901.	1148.	1148.	1.00
ROUTED TO	9	5339.	1499.	916.	916.	1.00

1901 SOUTH DAVIAO, DENVER, COLORADO 80223

****
HEC-1 VERSION DATED JAN 1973

****

DAM SAFETY INSPECTION - NEW JERSEY STATE
LOWER MT. GLENN DAM
ONE HALF PMF FLOOD ROUTING

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
50	0	12	0	0	0	0	0	0	0

JOPER	NWT
5	0

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

SUB-AREA RUNOFF COMPUTATION

INPUT UNIT HYDROGRAPH DERIVED BY SCS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
9	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.00	0.00	1.00	0.00	0.500	0	0	0

PRECIP DATA

NP	STORM	DAD	DAK
30	0.00	0.00	0.00

PRECIP PATTERN

0.00	0.08	0.18	0.23	0.27	0.36	0.38	0.40	0.41	0.42
0.54	0.55	0.55	0.56	0.57	1.28	1.28	1.28	2.22	1.28
0.53	0.53	0.53	0.53	0.53	0.41	0.41	0.41	0.41	0.41

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

GIVEN UNIT GRAPH, NUMGQ= 10

0.	805.	1400.	650.	225.	110.	50.	25.	8.	0.

UNIT GRAPH TOTALS 3273. CFS OR 1.01 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.00	0.00	0.
2	0.08	0.08	0.
3	0.18	0.18	64.
4	0.23	0.23	256.
5	0.27	0.27	489.
6	0.36	0.36	674.
7	0.38	0.38	866.
8	0.40	0.40	1060.

EQL
1001 SOUTH NAVAJO, DENVER, COLORADO 80223

9	0.41	0.41	1185.
10	0.42	0.42	1264.
11	0.54	0.54	1317.
12	0.55	0.55	1447.
13	0.55	0.55	1638.
14	0.56	0.56	1735.
15	0.57	0.57	1779.
16	1.28	1.28	1817.
17	1.28	1.28	2417.
18	1.28	1.28	3423.
19	2.22	2.22	3889.
20	1.23	1.28	4807.
21	0.53	0.53	5446.
22	0.53	0.53	4173.
23	0.53	0.53	2741.
24	0.53	0.53	2151.
25	0.53	0.53	1926.
26	0.41	0.41	1820.
27	0.41	0.41	1670.
28	0.41	0.41	1476.
29	0.41	0.41	1392.
30	0.41	0.41	1365.
31	0.00	0.00	1351.
32	0.00	0.00	1015.
33	0.00	0.00	438.
34	0.00	0.00	171.
35	0.00	0.00	79.
36	0.00	0.00	34.
37	0.00	0.00	15.
38	0.00	0.00	5.
39	0.00	0.00	0.
40	0.00	0.00	0.
41	0.00	0.00	0.
42	0.00	0.00	0.
43	0.00	0.00	0.
44	0.00	0.00	0.
45	0.00	0.00	0.
46	0.00	0.00	0.
47	0.00	0.00	0.
48	0.00	0.00	0.
49	0.00	0.00	0.
50	0.00	0.00	0.
SUM	17.54	17.54	57408.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5446.	1901.	1148.	1148.	57408.
INCHES		17.68	17.80	17.80	17.80
AC-FT		943.	949.	949.	949.

RUNOFF MULTIPLIED BY 0.50

0.	0.	32.	128.	244.	537.	433.	530.	592.	632.
658.	723.	819.	867.	889.	908.	1208.	1711.	1944.	2403.
2723.	2086.	1370.	1075.	963.	910.	835.	738.	696.	682.
675.	507.	219.	85.	39.	17.	6.	1.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2723.	950.	574.	574.	28704.
INCHES		8.84	8.90	8.90	8.90
AC-FT		471.	474.	474.	474.

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

HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THRU MT. GLENN LAKE DAM

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
9	1	0	0	2	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.000	0.00	1	0

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

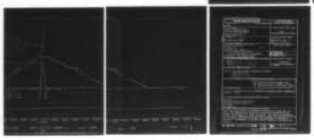
STORAGE=	0.	104.	208.	215.	223.	231.	238.	246.	260.	300.
OUTFLOW=	0.	30.	100.	200.	450.	750.	1100.	2000.	5000.	17450.

TIME	EOP STOR	AVG IN	EOP OUT
1	0.	0.	0.
2	0.	0.	0.
3	0.	16.	0.
4	1.	80.	0.
5	4.	186.	1.
6	9.	290.	2.
7	15.	385.	4.
8	23.	481.	6.
9	32.	561.	9.
10	42.	612.	12.
11	53.	645.	15.
12	64.	691.	18.
13	76.	771.	22.
14	90.	843.	26.
15	104.	878.	30.
16	118.	899.	39.
17	135.	1058.	51.
18	150.	1460.	66.
19	167.	1628.	86.
20	219.	2174.	334.
21	244.	2563.	1788.
22	248.	2404.	2509.
23	243.	1728.	1627.
24	239.	1223.	1232.
25	237.	1019.	1058.
26	236.	936.	992.
27	234.	872.	927.
28	233.	786.	851.
29	231.	717.	778.
30	230.	689.	751.
31	229.	679.	705.
32	228.	591.	649.
33	224.	863.	507.
34	220.	152.	348.
35	216.	62.	227.
36	213.	28.	174.
37	211.	11.	143.
38	209.	4.	116.

AD-A060 011 HARRIS ECI ASSOCIATES WOODBRIDGE NJ F/G 13/2
NATIONAL DAM SAFETY PROGRAM. LOWER MOUNT GLEN LAKE DAM (NJ00011--ETC(U)
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2 OF 2
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12-78
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39	207.	0.	99.	
40	205.	0.	98.	
41	204.	0.	97.	
42	202.	0.	96.	
43	201.	0.	95.	
44	199.	0.	94.	
45	197.	0.	93.	
46	196.	0.	92.	
47	194.	0.	91.	
48	193.	0.	90.	
49	191.	0.	89.	
50	190.	0.	88.	
SUM			17225.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2509.	556.	344.	344.	17225.
INCHES		5.19	5.34	5.34	5.34
AC-FT		276.	284.	284.	284.

TEKDOT
THIS SOUTH NAVAL DEPOT ESTIMATE

RUNOFF SUMMARY: AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	9	2723.	950.	574.	574.	1.00
ROUTED TO	9	2589.	950.	544.	544.	1.00

EOI
1801 SOUTH NAVAJO, DENVER, COLORADO 80223

HEC-1 VERSION DATED JAN 1973

DAM SAFETY INSPECTION - NEW JERSEY STATE
LOWER MT. GLENN DAM
PERCENT OF PMF FLOOD ROUTING

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
50	0	12	0	0	0	0	0	0	0

JOPER NWT
3 0

SUB-AREA RUNOFF COMPUTATION

INPUT UNIT HYDROGRAPH DERIVED BY SCS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
9	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.00	0.00	1.00	0.00	0.390	0	0	0

PRECIP DATA

NP	STORM	DAJ	DAK
30	0.00	0.00	0.00

PRECIP PATTERN

0.00	0.08	0.18	0.23	0.27	0.36	0.38	0.40	0.41	0.42
0.54	0.55	0.55	0.56	0.57	1.28	1.28	1.28	2.22	1.28
0.53	0.53	0.53	0.53	0.53	0.41	0.41	0.41	0.41	0.41

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

GIVEN UNIT GRAPH, NUHGO= 10

0.	805.	1400.	650.	225.	110.	50.	25.	8.	0.

UNIT GRAPH TOTALS 3273. CFS OR 1.01 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.00	0.00	0.
2	0.08	0.08	0.
3	0.18	0.18	64.
4	0.23	0.23	256.
5	0.27	0.27	489.
6	0.36	0.36	674.
7	0.38	0.38	866.
8	0.40	0.40	1060.

1001 SOUTH NAVAJO DENVER, COLORADO 80223

9	0.41	0.41	1185.
10	0.42	0.42	1264.
11	0.54	0.54	1317.
12	0.55	0.55	1447.
13	0.55	0.55	1638.
14	0.56	0.56	1735.
15	0.57	0.57	1779.
16	1.28	1.28	1817.
17	1.28	1.28	2417.
18	1.28	1.28	3423.
19	2.22	2.22	3889.
20	1.28	1.28	4807.
21	0.53	0.53	5446.
22	0.53	0.53	4173.
23	0.53	0.53	2741.
24	0.53	0.53	2151.
25	0.53	0.53	1926.
26	0.41	0.41	1820.
27	0.41	0.41	1670.
28	0.41	0.41	1476.
29	0.41	0.41	1392.
30	0.41	0.41	1365.
31	0.00	0.00	1351.
32	0.00	0.00	1015.
33	0.00	0.00	458.
34	0.00	0.00	171.
35	0.00	0.00	79.
36	0.00	0.00	34.
37	0.00	0.00	13.
38	0.00	0.00	3.
39	0.00	0.00	0.
40	0.00	0.00	0.
41	0.00	0.00	0.
42	0.00	0.00	0.
43	0.00	0.00	0.
44	0.00	0.00	0.
45	0.00	0.00	0.
46	0.00	0.00	0.
47	0.00	0.00	0.
48	0.00	0.00	0.
49	0.00	0.00	0.
50	0.00	0.00	0.
SUM	17.54	17.54	57408.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5446.	1901.	1148.	1148.	57408.
INCHES		17.68	17.80	17.80	17.80
AC-FT		943.	949.	949.	949.

RUNOFF MULTIPLIED BY 0.39

0.	0.	25.	100.	190.	262.	337.	413.	462.	493.
513.	564.	638.	676.	694.	709.	942.	1335.	1517.	1875.
2125.	1627.	1069.	839.	751.	709.	651.	575.	542.	532.
527.	396.	171.	66.	30.	13.	5.	1.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2123.	741.	447.	447.	22389.
INCHES		6.89	6.94	6.94	6.94
AC-FT		367.	370.	370.	370.

1901 SOUTH NAVAJO DENVER COLORADO 80223

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

HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THRU MT. GLENN LAKE DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
9	1	0	0	0	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.000	0.00	1	0

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

STORAGE=	0.	104.	206.	215.	223.	231.	238.	246.	260.	300.
OUTFLOW=	0.	30.	100.	200.	450.	750.	1100.	2000.	5000.	17450.

TIME	LOP STOR	AVG IN	LOP OUT
1	0.	0.	0.
2	0.	0.	0.
3	0.	12.	0.
4	1.	62.	0.
5	3.	145.	1.
6	7.	226.	2.
7	12.	300.	3.
8	18.	375.	5.
9	25.	437.	7.
10	33.	477.	9.
11	41.	505.	11.
12	50.	539.	14.
13	59.	601.	17.
14	70.	657.	20.
15	81.	685.	23.
16	92.	701.	26.
17	105.	825.	31.
18	123.	1139.	43.
19	146.	1426.	58.
20	173.	1696.	76.
21	205.	1999.	98.
22	229.	1875.	694.
23	237.	1348.	1043.
24	236.	954.	995.
25	234.	795.	886.
26	232.	750.	802.
27	230.	680.	737.
28	229.	613.	675.
29	227.	559.	618.
30	226.	537.	578.
31	226.	529.	554.
32	224.	461.	508.
33	222.	283.	404.
34	218.	118.	283.
35	215.	48.	192.
36	212.	22.	160.
37	210.	9.	131.
38	208.	3.	106.

1901 SOUTH NAVAJO DENVER, COLORADO 80223

39	206.	0.	99.
40	205.	0.	98.
41	203.	0.	97.
42	201.	0.	95.
43	200.	0.	94.
44	198.	0.	93.
45	197.	0.	92.
46	195.	0.	91.
47	194.	0.	90.
48	192.	0.	89.
49	191.	0.	88.
50	189.	0.	87.
SUM			10946.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1043.	353.	218.	218.	10946.
INCHES		3.28	3.39	3.39	3.39
AC-FT		175.	181.	181.	181.

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

EOT
NO SOUTH CHEYENNE AVENUE DENVER COLORADO 80223

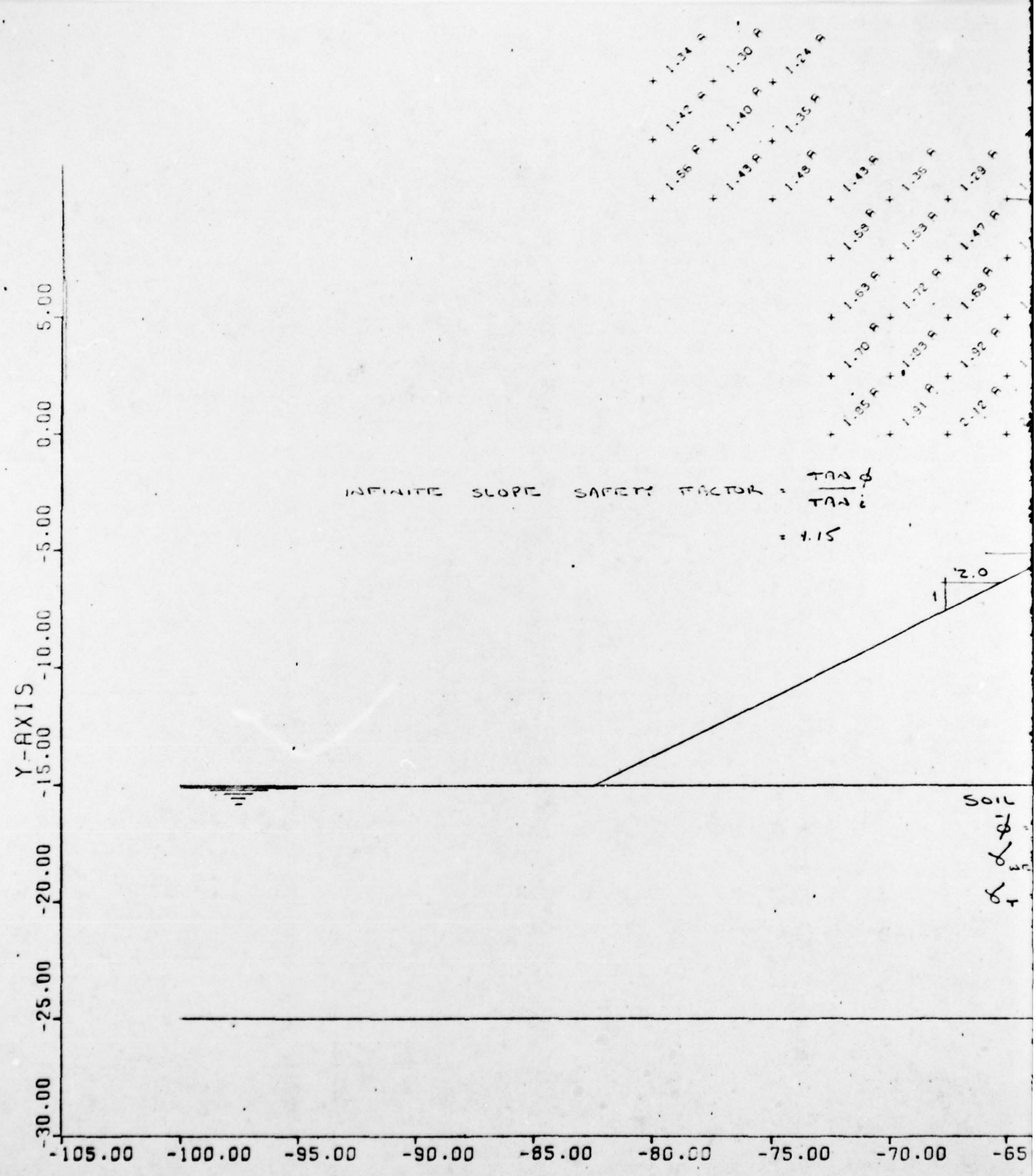
RUNOFF SUMMARY. AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	9	2123.	791.	447.	447.	1.00
ROUTED TO	9	1043.	553.	218.	218.	1.00

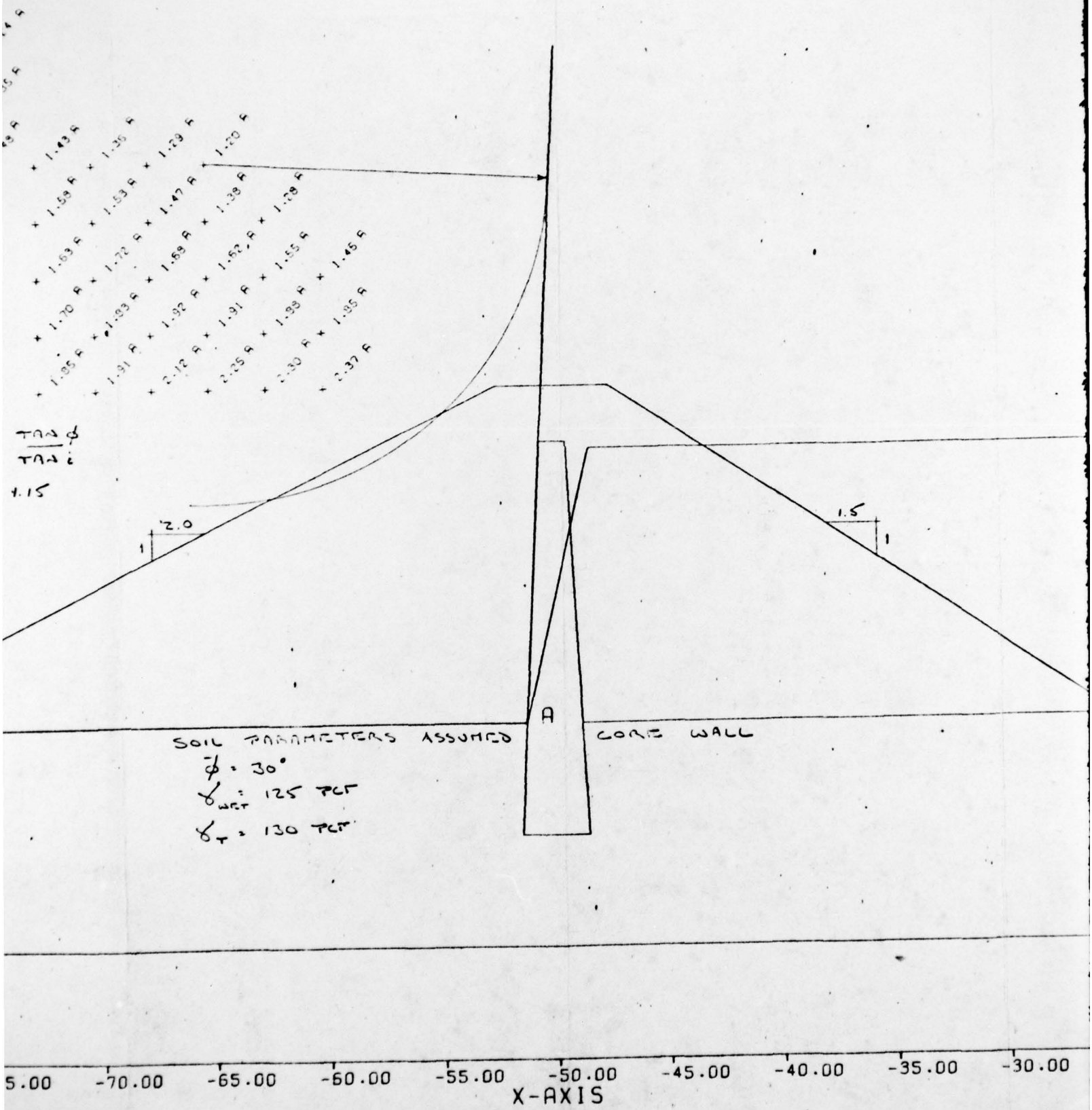
1991 SOUTH NAVAJO, DENVER, COLORADO 80223

APPENDIX E

STABILITY CALCULATIONS

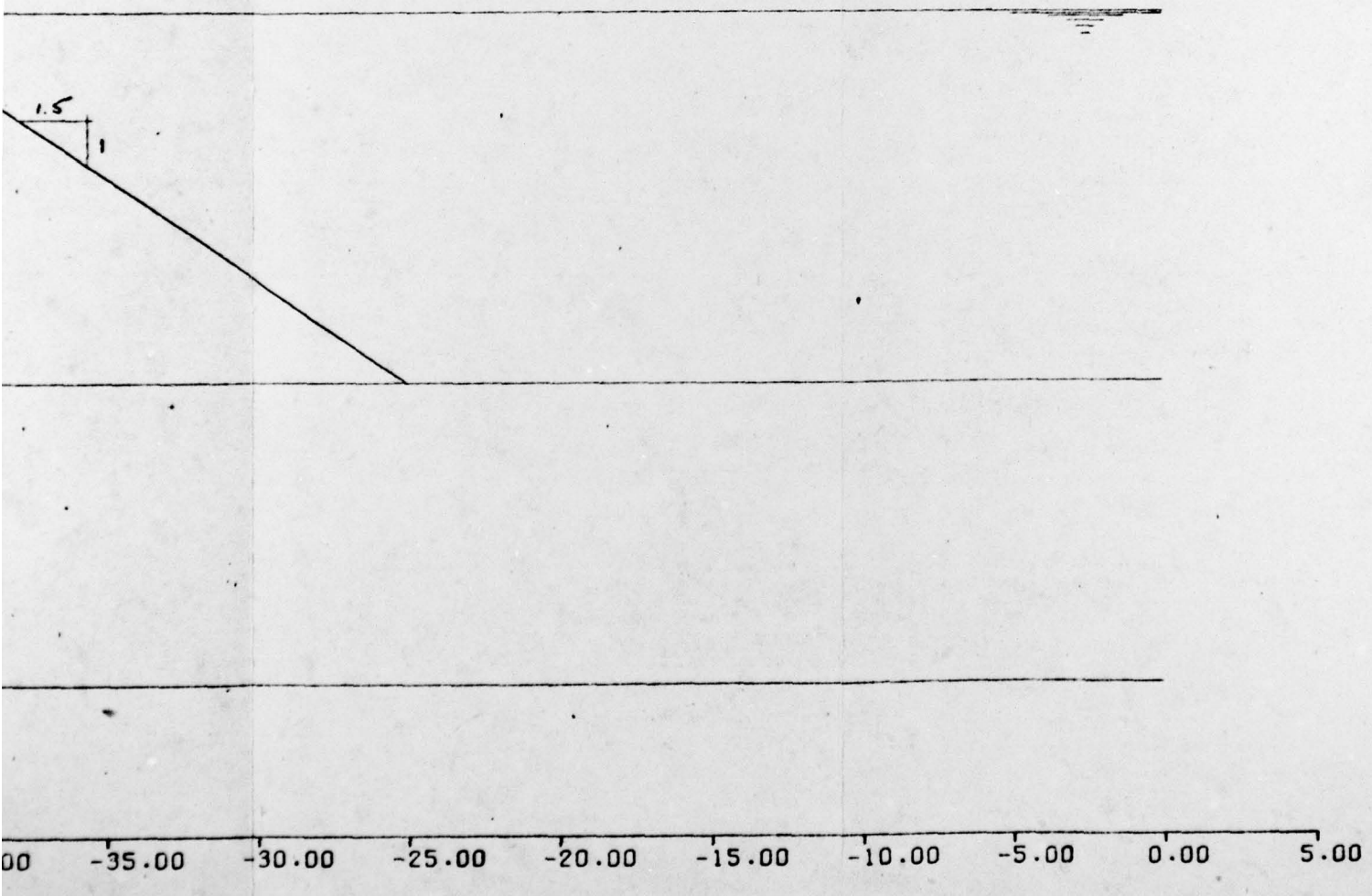


LOWER MOUNT GLEN DAM SAFETY INSPECTI



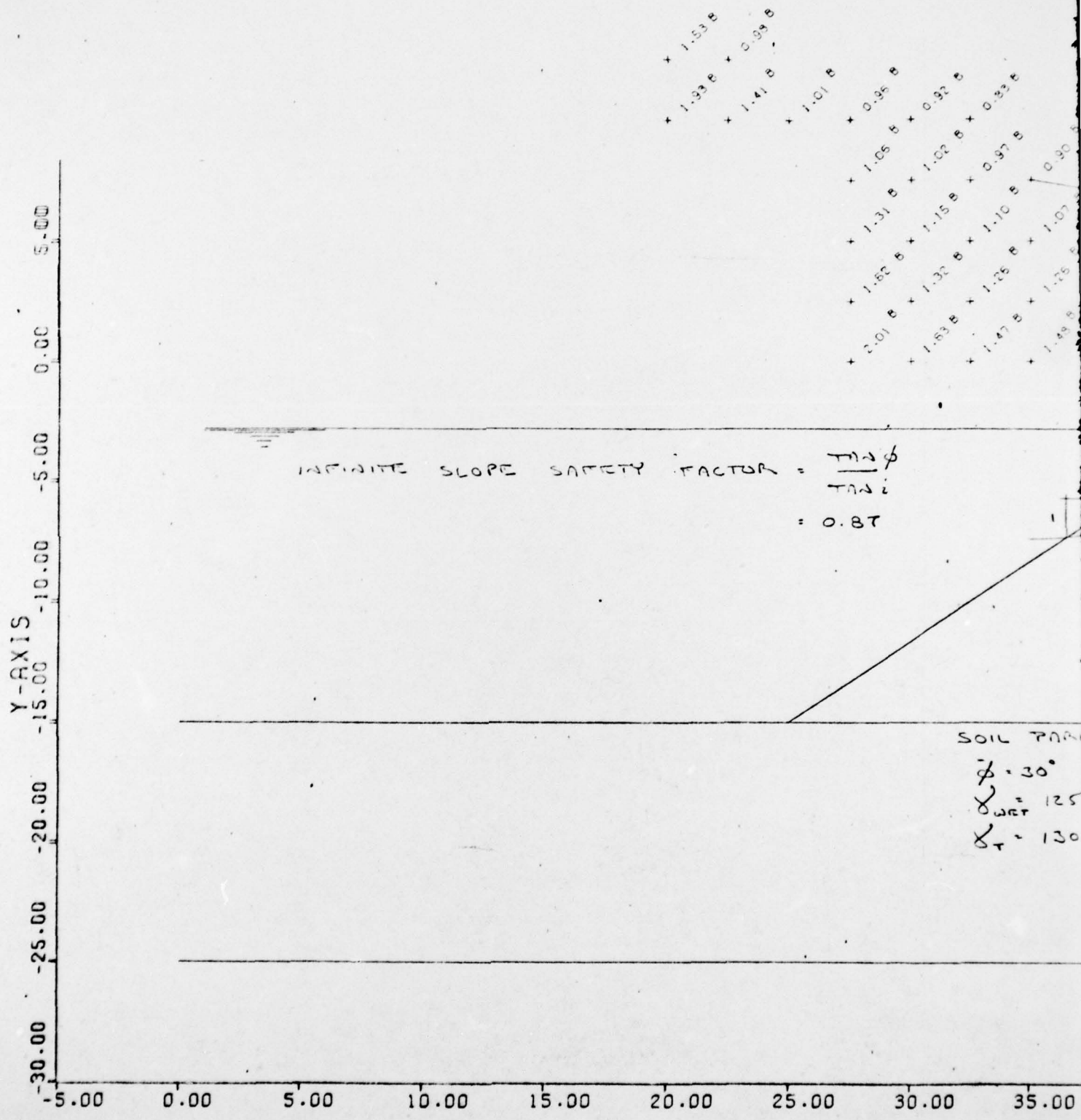
Y INSPECTION NEW JERSEY GROUP 2 JULY 19

8

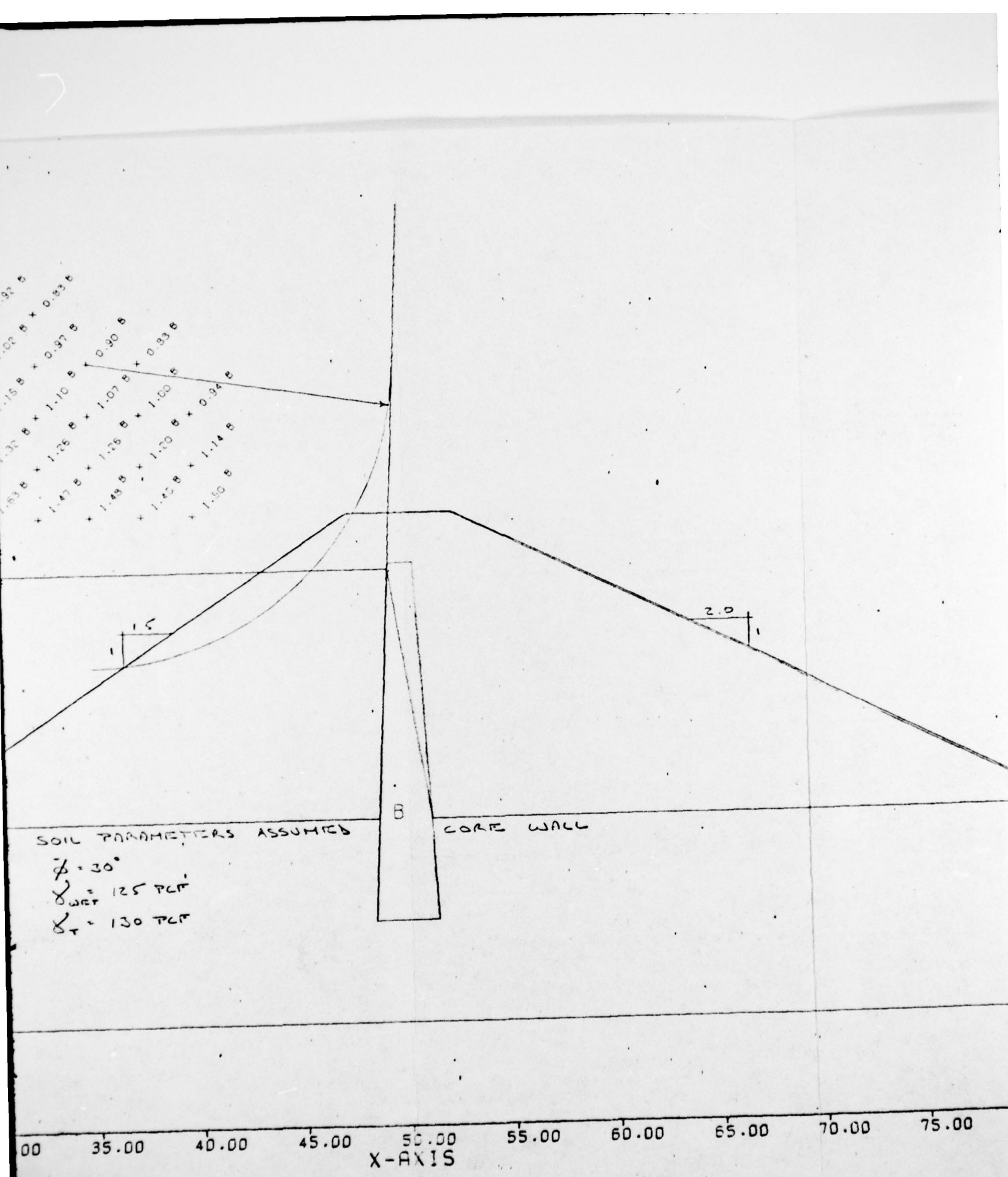


JULY 1978

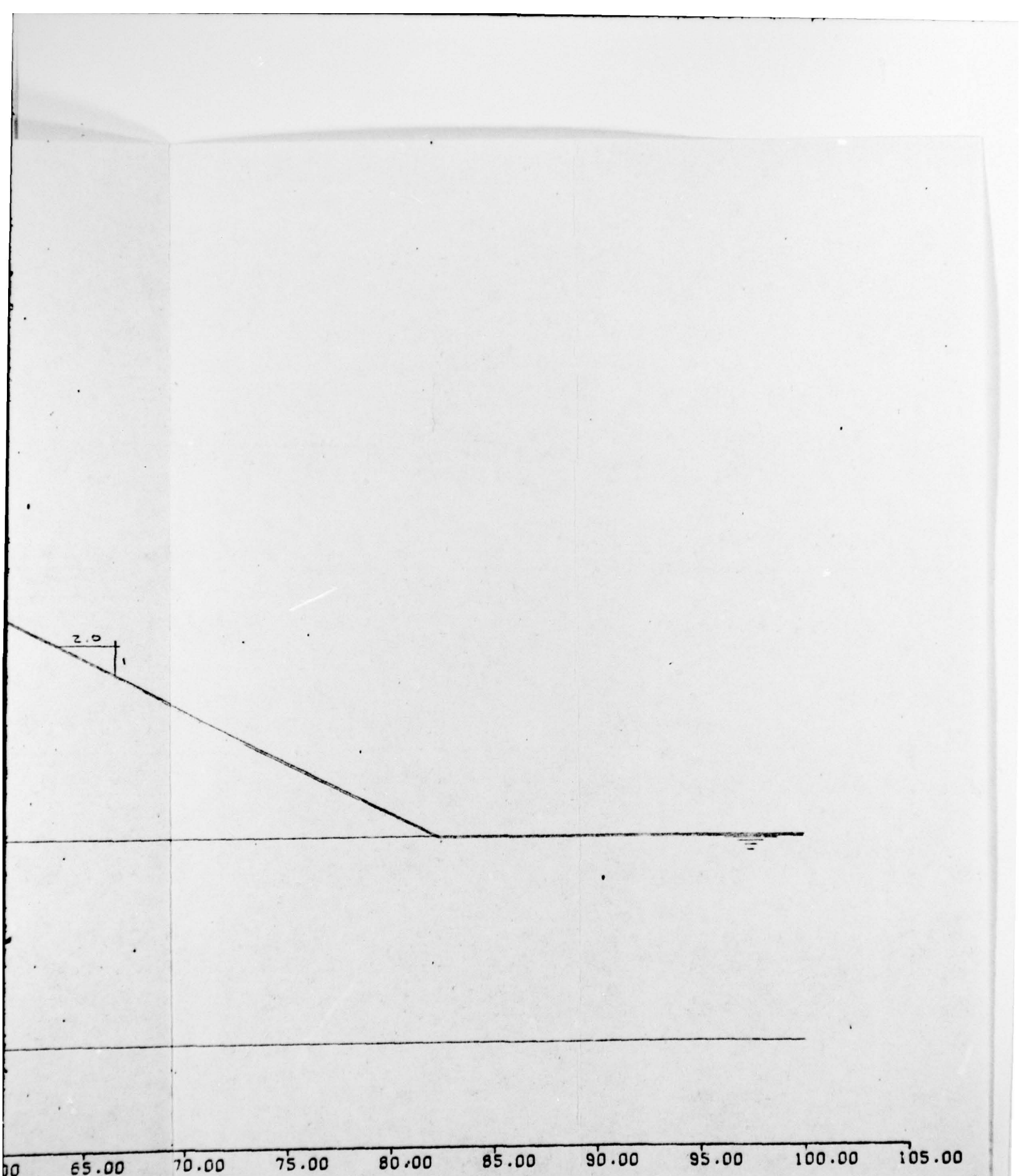
SCALE 1" = 5'



LOWER MOUNT GLEN DAM SAFETY INSPECTION



PECTION NEW JERSEY GROUP 2 JULY 1978



2 JULY 1978

SCALE 1" = 5'

3

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NJ00011	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report National Dam Safety Program Lower Mount Glen Lake Dam Passaic County, N.J.		5. TYPE OF REPORT & PERIOD COVERED FINAL 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) (10) Robert Gershowitz, P.E.		8. CONTRACT OR GRANT NUMBER(s) (15) DACW61-78-C-0124
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harris-ECI Associates 453 Amboy Ave. Woodbridge, N.J. 07095		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Philadelphia Custom House, 2d & Chestnut Streets Philadelphia, Pennsylvania 19106		(11) 12. REPORT DATE August, 1978 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) (9) Final Rept's		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

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(12) 111 p.

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(6) National Dam Safety Program. Lower Mount Glen Lake Dam (NJ00011), Passaic River Basin, West Brook, Passaic County, New Jersey. Phase I Inspection 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--N.J.
National Dam Safety Program Phase I
Lower Mount Glen Lake Dam, N.J.
Dam Safety
Dam Inspection

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.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

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