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NATIONAL DAM INSPECTION PROGRAM. POCONO LAKE DAM (NDS I.D. NUMB--ETC(U)
JUL 79 J BOSCHUK, J H FREDERICK DACW31-79-C-0017
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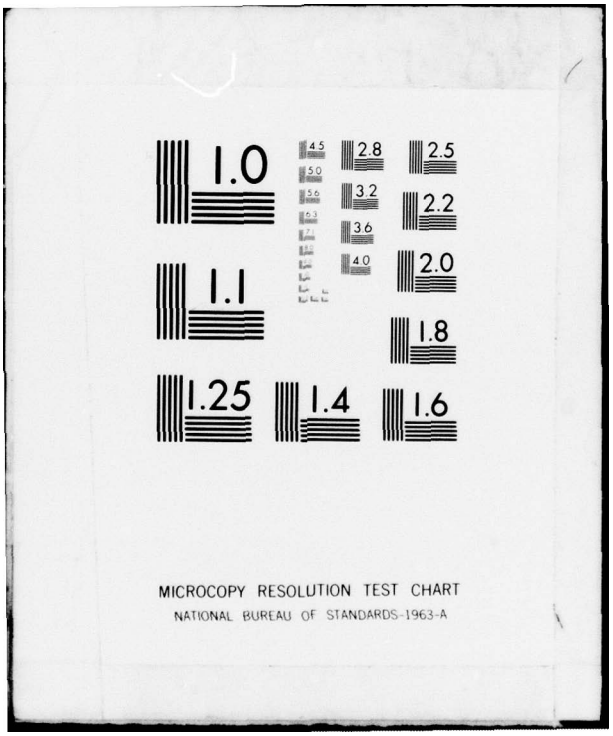
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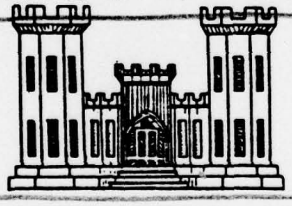
DELAWARE RIVER BASIN

POCONO LAKE DAM
MONROE COUNTY, PENNSYLVANIA

NDS I. D. Number PA 00781
DER I. D. Number 45-222

(6) PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM.

Pocono Lake Dam
Delaware River Basin, Monroe County,
Pennsylvania. Phase I Inspection Report,



(15) DACW31-79-C-0017

Prepared by:

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(12) 98

Submitted to:

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

(11) JULY 1979

394 157

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 the Chief of Engineers, Washington, D. C., 20314. The purpose of a Phase I investigation is to expeditiously identify 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 investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify the need for more detailed studies.

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

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

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam:	Pocono Lake Dam
County Located:	Monroe County
State Located:	Pennsylvania
Stream:	Tobyhanna Creek
Coordinates:	Latitude 41° 5.8'
	Longitude 75° 32.4'
Date of Inspection:	10 May 1979

[cont'd from p. 1]

Pocono Lake Dam, owned by the Pocono Lake Preserve, was built as a result of the failure of the previous timber crib dam in August 1955, during Hurricane Diane. This concrete dam was designed by Justin & Courtney of Philadelphia, Pennsylvania, and was built in 1956 by Reed and Kuhn Contractors. The facility is considered to be in good condition and well maintained. The dam is classified as a "High" hazard structure consistent with its potential for extensive property damage and possible loss of life downstream in the event of failure. The dam is classified as an "Intermediate" size dam by virtue of its 22,430 acre-foot total storage capacity and 47 foot height.

The available documentation, specifications and visual inspection provided sufficient information to evaluate the embankment and appurtenant structures in accordance with the provisions of the Phase I Inspection Program.

The hydrologic and hydraulic calculations presented in Appendix C indicate the dam will pass the Probable Maximum Flood without overtopping. Therefore, the spillway system is considered to be "Adequate".

Visual inspection of the dam and reservoir detected no significant problems with the structure. There was some leakage noted around the stilling basin walls, which was assessed to be drainage from the rock toe. Some minor cracking of the spillway walls was noted and the loss of some joint sealer was noted in the bridge. These conditions are not considered to be critical.

Based on the findings presented in this report, it is recommended that the following measures be taken.

1. Woody vegetation along the downstream slopes of the embankment should be removed on a periodic basis.

2. Seepage around the end walls of the spillway should be monitored, at least visually, for changes in rates or turbidity.

3. Minor cracking noted along the downstream section of the spillway retaining walls should be monitored annually and, if the cracks increase, they should be repaired.

4. The joint sealer beneath the bridge decking should be replaced as soon as practical to prevent collection of foreign material which, when subject to freeze/thaw cycles, would cause spalling.

Due to the location of the dam and the potential for extensive property damage and possible loss of life in the event of failure, a formal procedure of observation and warning during periods of high precipitation should be developed and implemented. This procedure should include a method of warning and possibly evacuating residents along the creek. An operation and maintenance procedure should also be developed to insure that all items are carefully inspected on a regular basis and maintained in the best possible condition.

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Date 7/30/79

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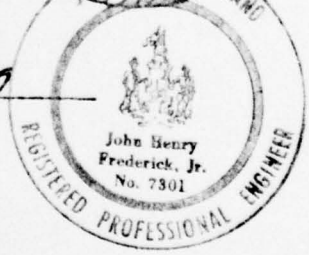
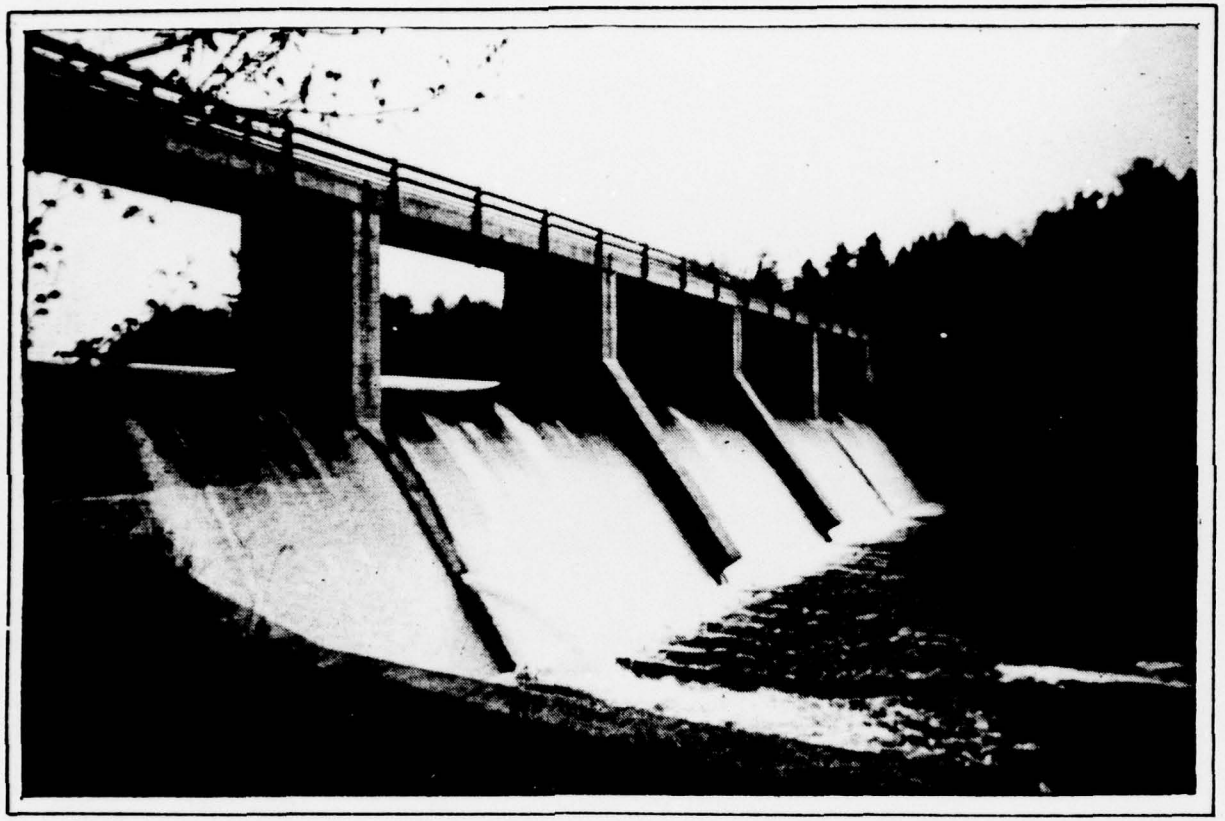
Date 7/30/79



APPROVED BY:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date 11 Sep 79



OVERVIEW
POCONO DAM, MONROE COUNTY, PENNSYLVANIA

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
POCONO LAKE DAM
NATIONAL ID #PA 00781
DER #45-222

SECTION 1
PROJECT INFORMATION

1.1 General.

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Pocono Lake Dam is a concrete ogee spillway with concrete non-overflow sections keyed on each side into a zoned earth embankment. The embankment contains an upstream impervious fill protected with three feet of dumped riprap over a one foot filter bed. The upstream slope below elevation 1,635 is 2.5H:1V, and above elevation 1,635 the slope is 2H:1V. The downstream slope contains an impervious zone against the concrete non-overflow section; a random fill zone; and a rock toe separated from the random zone with one foot of filter stone. The slope is 2H:1V and protected with eight inches of stone having a three inch maximum size. Plan and typical embankment sections are shown on Plates 2 and 5, Appendix E. The right embankment, beyond the concrete non-overflow section, is about 115 feet long with a 25 foot wide crest. The corresponding left embankment is about 130 feet long with a 25 foot wide crest. The concrete overflow and non-overflow sections are founded on rock and both embankments have an impervious core trench excavated to rock. A grout curtain with maximum 20 foot deep holes and 10 foot center to center spacings was installed under the entire structure. Borrow materials for the embankments were obtained within the reservoir area.

The central portion of the dam is the concrete ogee type spillway, 31 feet above the foundation and 216 feet long. A 15 foot wide concrete bridge for one-way vehicular traffic and pedestrians is supported on four concrete piers over the

spillway. The distance between the underside of the bridge to the spillway crest is about 15 feet. Each pier is four feet wide with a semicircular upstream section.

The concrete stilling basin at the downstream toe is 50 feet long and about 4 feet deep. The basin is concrete paved and the downstream end contains a concrete sill four feet above the basin floor. The stilling basin is bounded on each side by concrete training walls which extend 10 feet beyond the end sill. Typical sections of the stilling basin, end sill, chute and baffle blocks and training walls are shown on Plate 4, Appendix E.

The dam contains a 30-inch I.D. drawdown pipe through the spillway at elevation 1,610.25 under each of the two center piers. Each gate can be operated from the upstream side of the pier at bridge level. Trash racks cover both intakes. A gated low flow discharge pipe, 10 inches in diameter under the extreme right pier, discharges through the spillway. Typical sections of the discharge pipe are shown on Plates 4 and 6.

b. Location. The dam is located on Tobyhanna Creek in Tobyhanna Township, Monroe County, Pennsylvania. The site is shown on USGS Quadrangle entitled "Blakeslee, Pennsylvania" at coordinates N 41° 5.8' W 75° 32.4'. A regional location plan of Pocono Lake Dam is enclosed as Plate 1, Appendix E.

c. Size Classification. The dam is classified as an "Intermediate" size dam by virtue of its 22,430 acre-foot total storage capacity and 47 foot height.

d. Hazard Classification. A "High" hazard classification is assigned consistent with the potential for extensive property damage and loss of life along the stream.

e. Ownership. The dam is owned by Pocono Lake Preserve. All correspondence should be sent to Mr. Baldwin Avery, General Manager, Pocono Lake Preserve, Pocono Lake, Pennsylvania 18348.

f. Purpose of Dam. The purpose of this dam is recreational.

g. Design and Construction History. During Hurricane Diane, August 1955, an existing timber crib dam, approximately 250 feet upstream of the present dam, breached. As a result of this failure, Pocono Lake Preserve retained Justin & Courtney*, consulting engineers of Philadelphia,

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* Justin & Courtney, division of O'Brien & Gere, Syracuse, New York.

Pennsylvania, to design the present dam. . On April 6, 1956, the "Report Upon the Application of Pocono Lake Preserve" was prepared and the construction permit issued April 11, 1956. Construction began during the summer of 1956, and Mr. T. W. Beland of Justin & Courtney served as resident engineer. Mr. S. L. Ritchie, of Reed & Kuhn, was the contractor's superintendent.

Limited available records in Department of Environmental Resources' files indicated that all work was performed in a highly satisfactory manner. Details as to specific construction test results, such as in place density tests and concrete testing, were not available. However, monthly inspection reports and job summaries were available, which indicated that all of these tests were satisfactory. By early 1957, the dam was completed and the reservoir was filled between May and July 1957. Throughout this period, the required minimum flow of 11.28 cubic feet per second was maintained downstream.

h. Normal Operating Procedures. Under normal conditions, all excess flow is discharged over the concrete ogee spillway. Minimum flow is maintained through the 10-inch pipe embedded in the ogee section and shown on Plate 6. The original requirement for a minimum 11.28 cfs flow, including measurement, has been waived as no flow is diverted by the structure and two tributaries enter Tobyhanna Creek below the dam within the boundaries of the preserve. The normal operating procedure is to maintain a minimum flow through the 10-inch pipe.

1.3 Pertinent Data.

A summary of pertinent data for Pocono Lake Dam is presented as follows.

a.	Drainage Area (sq miles)	75.4
b.	Discharge at Dam Site (cfs)	
	Spillway	
	Water at Design Elevation	27,750
	Water at Top of Dam	44,525
	Low Flow Discharge	11.28
c.	Elevation (feet above MSL)	
	Top of Dam	1,650
	Spillway Crest	1,633
	Design High Water	1,644
	Stilling Basin End Sill	1,607

	Stilling Basin Floor	1,603
	Minimum Flow Pipe (invert)	1,614.08
	Pond Drain Invert	1,610.25
	Downstream Toe Elevation	1,610±
d.	Reservoir (miles)	
	Length at Normal Pool	2.8
	Fetch at Normal Pool	1.8
e.	Storage (acre-feet)	
	Normal Pool	5,402
	At Top of Dam	22,430
f.	Reservoir Surface Area (acres)	
	Normal Pool	518
g.	Dam Data	
	Type	Concrete nonoverflow section keyed into zoned earth fill w/ downstream rock toe
	Length (including spillway)	580 feet
	Height	47 feet
	Crest Width	25 feet
	Volume	(to be determined)
	Side Slopes	
	Upstream	
	Above Elevation 1,635	2H:1V
	Below Elevation 1,635	2.5H:1V
	Downstream	2H:1V
	Cutoff (under embankment section)	Cutoff trench; 10' base width w/ 1H:1V slopes
	Grout Curtain	Single line grout curtain, 20' deep, 10' hole spacings
h.	Principal Spillway	
	Type	Reinforced concrete ogee crest
	Length	216 feet (including 4 bridge piers)
	Discharge Basin	Concrete stilling basin with baffle & chute blocks

SECTION 2
ENGINEERING DATA

2.1 Design.

a. Availability. A summary of engineering data for Pocono Lake Dam is presented in the checklist attached as Appendix A. Principal documents containing data used for this report include the "Report Upon the Application of Pocono Lake Preserve" dated April 6, 1956, by the State of Pennsylvania; several construction reports; a complete set of design drawings; and other miscellaneous documentation. Documentation specifically pertaining to construction, such as in place density test results, gradation curves and concrete test results, were not available in Department of Environmental Resources' (DER) files. Selected portions of the drawings are included in Appendix E of this report.

b. Design Features. Principal design features are illustrated on the plan, profile and cross-section plates of the embankment and spillway, enclosed as Appendix E, Plates 2 through 6. A description of the design features is presented in Section 1.2 entitled "Description of Project". Under normal pool conditions, the reservoir level is at the crest of the principal spillway, elevation 1,633.

2.2 Construction.

A description of the construction history is presented in Section 1.2, paragraph g.

2.3 Operational Data.

There are no operational records maintained. Minimum flow is maintained by a 10-inch pipe located through the principal spillway section. There are no water level measurements or rainfall records maintained within this watershed by the Owner. A staff gage is located on the right training wall of the stilling basin, but this gage is unserviceable as the letters have faded.

2.4 Evaluation.

a. Availability. All engineering data reproduced in this report and studied for this investigation were provided by either the Pennsylvania DER or the Owner's representatives.

b. Adequacy. The data included in State files and supplemented by discussions with the Owner's representative are considered adequate to evaluate the dam and appurtenant structures.

c. Validity. There is no reason to question the validity of this data.

SECTION 3
VISUAL INSPECTION

3.1 Findings.

a. General. Observations and comments of the field inspection team are contained in the checklist enclosed herein as Appendix E, and are summarized and evaluated as follows. In general, the dam and its appurtenant structures are considered to be in good condition and well maintained. At the time of inspection, the reservoir level was at the spillway crest.

b. Dam. During the visual inspection, there were no surface cracks, unusual movement at or beyond the toe of the dam, unusual sloughing, or erosion of the embankment or abutment slopes. Vertical and horizontal alignments of the crest were checked and found to be in good condition. There were no observed riprap failures. The junction between the embankment and non-overflow section of the spillway is considered in good condition. Some minor woody vegetation was growing along the downstream slope of the embankment, which should be removed during routine maintenance of the structure. Seepage noted at the rock toe of the embankments on either side of the spillway was observed to be discharging into the stilling basin around the training walls. This seepage is considered normal for a rock toe without a perforated collection pipe.

c. Appurtenant Structures.

The concrete ogee spillway section was observed to be in very good condition, with no unusual distortion, cracks or excessive spalling of the concrete. Some minor cracking was observed along the downstream section of the spillway walls, as shown on sheet 5a and on photographs in Appendix D. Vertical and horizontal alignments were checked and found to be satisfactory. The monolith joints were inspected, where possible, and found to be in good condition. Construction joints were also observed to be in good condition. However, some deterioration of the joint sealer was noted beneath the bridge decking joints, resulting in deterioration of pier tops. This should be repaired during normal maintenance.

The minimum flow release gate was exercised and found to operate properly. At the time of inspection, minimum flow was being discharged downstream in addition to excess flow over the spillway crest. Both pond drain gates were exercised and observed to function properly.

d. Reservoir. The reservoir side slopes are generally flat, well vegetated to the water's edge with trees and some homes along the edge of the reservoir. Sedimentation is probably concentrated in the upper reaches of the reservoir and has little or no effect on flood water storage.

e. Downstream Channel. The creek flows through woods and is wide and stable. The creek bed is rocky and there was no debris noted. The valley gradient downstream from the dam is approximately 0.003. Side slopes of the channel are roughly 2H:1V. Approximately 3.2 miles below the dam, Tobyhanna Creek passes under PA Route 115, where there are three or four homes subject to damage in the event of failure. These homes justify the "High" hazard classification.

3.2 Evaluation.

Inspection of the dam and appurtenant facilities disclosed no evidence of apparent past or present movement that would indicate existing instability of the dam or spillway system. All gates were exercised and observed to function properly. All external features of the embankment were inspected and observed to be in very good condition. In summary, the dam and its appurtenant facilities are very well maintained and in good condition.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures.

Operation of the dam does not require a dam tender. All flow discharges directly over the ogee crest of the principal spillway and downstream into Tobyhanna Creek.

4.2 Maintenance of the Dam.

The dam is maintained by the Pocono Lake Preserve employees. Maintenance work includes periodic mowing of the grass, repair of the riprap and removal of debris from embankment slopes.

4.3 Maintenance of Operating Facilities.

Maintenance of the operating facilities is also performed by employees of the Pocono Lake Preserve, which includes clearing the spillway of debris and insuring that all gates are cleaned, well greased and operating properly.

4.4 Warning Systems In Effect.

There are no formal warning systems or procedures established to be followed during periods of exceedingly heavy rainfalls.

4.5 Evaluation.

There are no written operational procedures, maintenance procedures or any type of warning system. Maintenance and operating procedures should be developed, including a checklist of items to be observed, operated and inspected on a regular basis.

Since a formal warning procedure does not exist, one should be developed and implemented during periods of extreme rainfall. This procedure should consist of a detailed method of notifying residents downstream that potentially high flows are imminent or a dangerous condition is developing.

SECTION 5
HYDROLOGY/HYDRAULICS

5.1 Evaluation of Features.

a. Design Data. Readily available design data was limited to statements in the application report prepared by the State and the construction drawings. Hydrologic and hydraulic evaluations performed in conjunction with this inspection are contained in Appendix C.

The 75.4 square mile watershed is predominantly wooded with no major/large towns. The watershed is about 11.7 miles long and averages about 7.6 miles wide. Elevations range from 2,200 feet to 1,633 at normal pool level. There are at least eight upstream dams, the largest of which is Lake Naomi Dam, located 1.8 miles upstream of the headwaters of Pocono Lake or 3.9 miles upstream of Pocono Lake Dam, controlling 19.5 square miles of the watershed. There are four dams upstream of Lake Naomi. Other dams upstream of Pocono Lake are: Tamaqua Lake, 4.8 miles upstream of Pocono Lake Dam; Mill Pond No. 1, 7.6 miles upstream of the dam on Tobyhanna Creek; and Tobyhanna, 9.6 miles upstream of Pocono Lake Dam on Tobyhanna Creek. The watershed also contains several swamps with an estimated area of four to five square miles. While residential development is continuing within the watershed, runoff characteristics are not expected to change significantly in the near future.

The application report indicated a spillway discharge of 29,000 cfs with a design head of 11 feet, and a discharge of 46,100 cfs with the reservoir level at the underside of the bridge, or 15 feet. The spillway capacity was considered adequate by the State.

In accordance with criteria established by Federal (OCE) Guidelines, the recommended spillway design flood for this "Intermediate" size dam and "High" hazard classification is the Probable Maximum Flood (PMF).

b. Experience Data. No reservoir level records or rainfall records are maintained for this dam by the Owner. There are two rain gaging stations within the watershed and one 2.8 miles west of the dam, which report to the National Weather Service.

c. Visual Observations. At the time of inspection, there were no conditions observed that would indicate a reduced spillway capacity during an extreme event. Other

observations regarding the condition of the downstream channel, spillway and reservoir are located in Appendix B and discussed in detail in Section 3.

d. Overtopping Potential. Overtopping potential of this dam was estimated using "HEC-1, Dam Safety Version", computer program. A brief description of the program is included in Appendix C. The upstream dam, Lake Naomi, was also inspected under the National Dam Inspection Act. The results of that investigation were available for evaluation of Pocono Lake Dam. Lake Naomi's spillway is rated as "Inadequate". The computer program was run twice, one assuming Lake Naomi and its upstream dams did not fail and one assuming failure of Lake Naomi and two of its upstream dams. Failure of any other upstream dam is assessed to have little effect on Pocono Lake Dam.

Calculations for this investigation essentially confirm the spillway evaluation made in the application report prepared by the State, with an estimated discharge of about 27,750 cfs at the design head of 11 feet. The HEC-1 program computed the peak PMF inflow to be 50,868 cfs assuming no upstream dam failures and 51,752 cfs assuming upstream failures. As shown in Appendix C, the spillway can pass the PMF under both conditions. The maximum reservoir level is conservative as no allowance has been made for flood storage in Tamaqua Lake, Millpond No. 1, Tobyhanna Lake or the extensive marshy/swamp areas.

e. Spillway Adequacy. As the spillway will pass the PMF without overtopping, the spillway is considered to be "Adequate".

f. Downstream Conditions. Tobyhanna Creek flows through a fairly wide, wooded flood plain for about 3.2 miles until it passes under PA Route 115, where there are three or four homes subject to damage in the event of failure. These residences justify the "High" hazard classification. The creek enters the Lehigh River about 9.8 miles below the dam.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. Visual observations detected no evidence of existing or pending embankment or spillway instability. Upstream and downstream slopes of the embankment appear to be stable, in good condition and well vegetated. Downstream slopes on the right and left embankments contain woody vegetation, which at the present time is not critical, but should be removed during routine maintenance of the structure. Seepage noted around the training walls of the principal spillway is flowing from the rock fill toe drains and is considered normal for this type of structure. The seepage was observed to be clear, with no signs of turbidity. The spillway and bridge deck were inspected and found to be in good condition. There was some minor cracking, but this does not appear to be structural cracking associated with instability or other unsafe conditions.

b. Design and Construction Data. Design and construction data was limited principally to the drawings, of which selected sections are presented in Appendix E. These drawings present in great detail the principal features of both the embankment and the spillway system, as well as several specifications on the various components of the system. There were no stability analyses of the embankments available in the file. Maximum embankment height above rock is less than 40 feet and less than 25 feet above original ground. Therefore, an assessment of the embankment stability is qualitative. For the embankment materials used and specified compaction, the embankment slopes appear to be reasonable. Stability analyses were performed on the concrete overflow and non-overflow sections for design high water and ice load conditions. The sections have adequate factors of safety against sliding and overturning. See Plate 8, Appendix E.

c. Operating Records. There are no operational records for this structure.

d. Post-Construction Changes. There are no reports nor is there any evidence that modifications were made to this dam.

e. Seismic Stability. The dam is located in Seismic Zone 1. Normally it can be considered that if a dam in this zone is stable under static loading conditions, it can be assumed safe for any expected earthquake conditions. Since the embankment static stability analysis was not available for review, the seismic stability could not be assessed.

SECTION 7
ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Evaluation. Visual inspection and review of the design and construction documentation indicates that the dam, foundation and appurtenant structures, including the spillway of Pocono Lake Dam, are in very good condition. The hydrologic and hydraulic computations presented in Appendix C indicate that the structure will pass the Probable Maximum Flood without overtopping. Therefore, the spillway system for this structure is considered to be "Adequate". In the event the dam fails during an extreme event, extreme property damage and probable loss of life would be expected, thus justifying the "High" hazard classification.

b. Adequacy of Information. The information available from DER files and the visual inspection are sufficiently adequate to evaluate the dam and appurtenant structures.

c. Urgency. It is recommended that the suggestions presented in Section 7.2 be implemented during routine maintenance of the dam.

7.2 Remedial Measures.

a. Facilities. It is recommended that the following measures be taken.

1. Woody vegetation along the downstream slopes of the embankment should be removed on a periodic basis. Once they are removed, the area should be reseeded to establish dense grass/Crownvetch vegetation.

2. Seepage around the end walls of the spillway, which emerges from the toe drain of the embankments, should be monitored, at least visually, for changes in rates or the presence of turbidity. Should either occur, this condition should be inspected by a registered professional engineer experienced in the design of dams.

3. Minor cracking noted along the downstream section of the spillway retaining walls should be monitored annually and, if the cracks increase, they should be repaired.

4. The joint sealer beneath the bridge decking should be replaced as soon as practical. If the joint is allowed to remain open and fill with soil or water, spalling at the joints could occur.

b. Operation and Maintenance Procedures. Because of the location of the dam and the potential for extreme property damage and possible loss of life in the event of failure, a formal procedure of observation and warning during periods of high precipitation should be developed and implemented. This procedure should include a method of warning downstream residents that high flows are expected and provisions for evacuating these people in the event of an emergency. In addition, an operation and maintenance procedure should also be developed to insure that all items are carefully inspected on a regular basis and maintained in the best possible condition.

APPENDIX

A

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM *Pocono Lake Dam*

ID # *PA 00781*

ITEM	REMARKS
AS-BUILT DRAWINGS	*Construction drawings were available as prepared by Justin and Courtney and are presented in Appendix E.*
REGIONAL VICINITY MAP	*See Plate 1, Appendix E.*
CONSTRUCTION HISTORY	*Data was not available in DER files.*
TYPICAL SECTIONS OF DAM	*See Plates in Appendix E.*
OUTLETS - PLAN	*See Plates in Appendix E.*
DETAILS	
CONSTRAINTS	
DISCHARGE RATINGS	*- Not available in DER files*
RAINFALL/RESERVOIR RECORDS	*- Records are not maintained in this watershed.*

ITEM	REMARKS
DESIGN REPORTS	*Formal report was not available but boring logs and stability data available in DER files.*
GEOLOGY REPORTS	*No data in DER files. See Appendix F for data collected for this report.*
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS	*Not available in DER files.*
DAM STABILITY	*One page plan (D-1) containing the stability analysis of the structure prepared by Justin and Courtney, Philadelphia, Pennsylvania.*
SEEPAGE STUDIES	*Not available in DER files.*
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	*Boring logs were available and performed by Sprague and Henwood, Company.*
POST-CONSTRUCTION SURVEYS OF DAM	*None*
BORROW SOURCES	*Unknown.*

ITEM	REMARKS
MONITORING SYSTEMS	*None*
MODIFICATIONS	*None*
HIGH POOL RECORDS	*No data in DER files.*
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	*None*
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	*Original dam (250 feet upstream) failed in 1955. The present concrete dam replaced the original timber dam.*
MAINTENANCE OPERATION RECORDS	*No data in DER files.*

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	*See Appendix E.*
OPERATING EQUIPMENT PLANS & DETAILS	*See Appendix E.*
MISCELLANEOUS	1. *Water Resources Inventory Form.* 2. *Pennsylvania State Inspection Reports* 3. *"Report Upon the Application of Pocono Lake Preserve" dated April 6, 1956.* 4. *"Application" dated 28 March 1956.*

1. *Designer of Concrete Dam: Justin and Courtney, Philadelphia, Pennsylvania*
2. *Contractor: Reed and Kuhn*

APPENDIX

B

CHECK LIST
VISUAL INSPECTION
PHASE I

Name Dam *Pocono Lake Dam* County *Monroe* State *Pennsylvania* National ID # *PA 00781*

Type of Dam *Concrete* Hazard Category *I-High*

Date(s) Inspection *10 May '79* *(P.M.)* Weather *Cloudy and Cool* Temperature *60's*

Pool Elevation at Time of Inspection *1633.2* M.S.L. Tailwater at Time of Inspection *1607±* M.S.L.

Inspection Personnel:

John Boschuk, Jr. (Geotechnical) *Raymond Lambert (Geologist)* *John H. Frederick (Geotechnical)*

Mary F. Beck (Hydrologist) *Vincent McKeever (Hydrologist)*

John Boschuk, Jr. Recorder

Remarks:

Mr. Baldwin Avery, General Manager, was on site and provided assistance.

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	*None observed through the concrete structure.*	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	*Good condition.*	
DRAINS	*None*	
WATER PASSAGES	*Not available.*	
FOUNDATION	*No evidence was found to indicate problems associated with the foundation.*	

CONCRETE/MASONRY DAMS

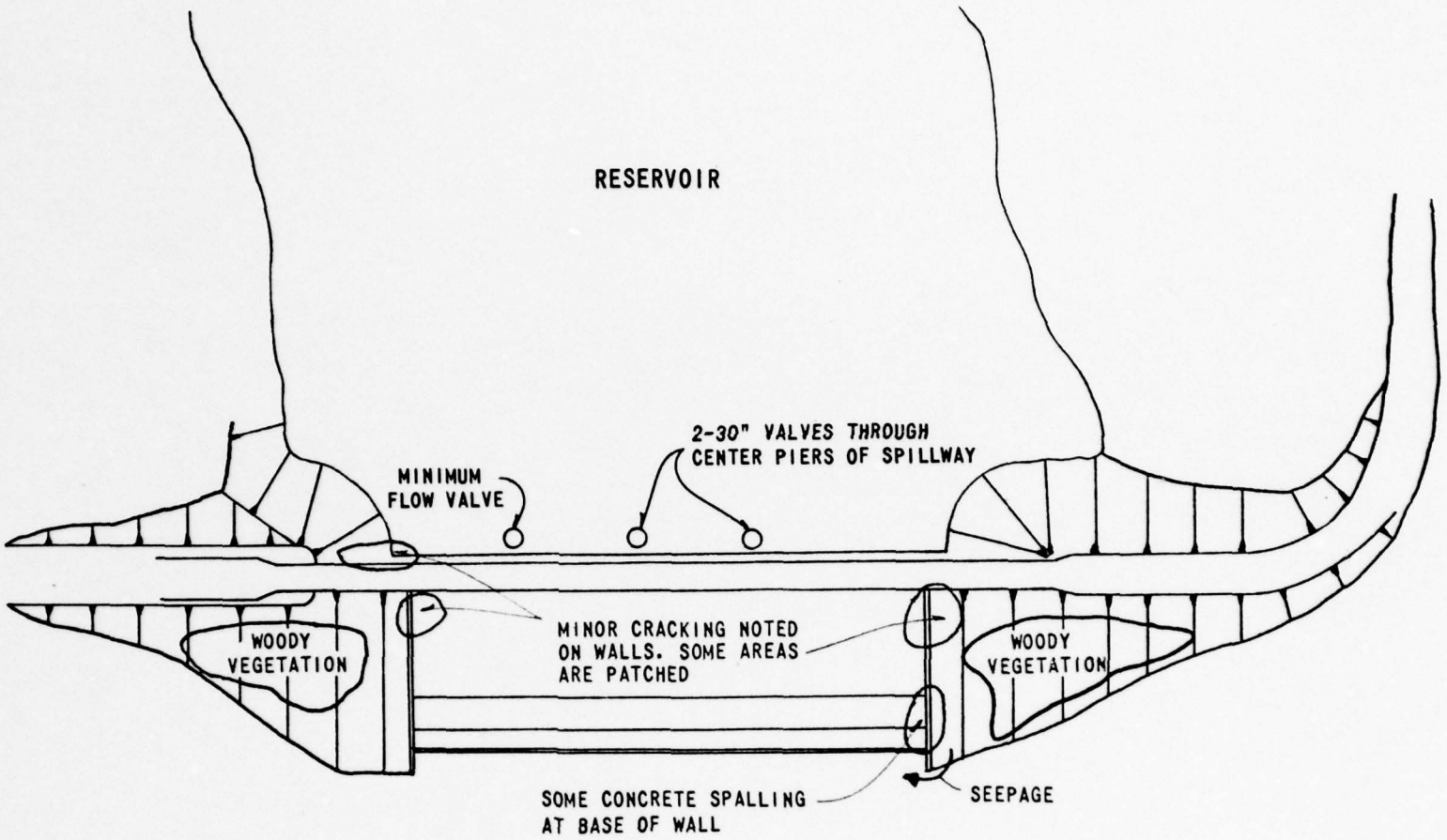
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	*Relatively good condition.*	
STRUCTURAL CRACKING	*No major cracking was observed but minor cracking was noted on the downstream section of the spillway retaining walls. See Sheet 5a and photographs.*	
VERTICAL AND HORIZONTAL ALIGNMENT	*Good*	
MONOLITH JOINTS	*Good condition.*	
CONSTRUCTION JOINTS	*Good condition. Some deterioration of the joint sealer was noted beneath the bridge decking which should be repaired.*	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	*None observed. Crest is asphalt paved.*	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	*None observed.*	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	*None observed.*	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	*Good condition.*	
RIPRAP FAILURES	*None observed.*	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	*Good condition.*	
ANY NOTICEABLE SEEPAGE	*See Sheet 5a, for seepage locations.*	
STAFF GAGE AND RECORDER	*Gage on downstream, right spillway wall is not legible.*	
DRAINS	*None. Downstream rock toe controls embankment seepage.*	



FIELD OBSERVATION PLAN
POCONO DAM

SHEET 5A OF 11

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	*None observed.*	
INTAKE STRUCTURE	*Underwater, could not be observed.*	
OUTLET STRUCTURE	*Observed to be in good condition.*	
OUTLET CHANNEL	*All flows discharge into spillway stilling pool.*	
EMERGENCY GATE	*Gate was exercised and observed to function satisfactorily.*	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	*Good condition.*	
APPROACH CHANNEL	*None*	
DISCHARGE CHANNEL	*Good condition.*	
BRIDGE AND PIERS	*Good condition but joints need some minor repairs.*	
RETAINING WALLS	*Some spalling noted at base of retaining walls as shown on Sheet 5a and photographs. This spalling should be repaired.*	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	*None*	
APPROACH CHANNEL	*None*	
DISCHARGE CHANNEL	*None*	
BRIDGE AND PIERS	*None*	
GATES AND OPERATION EQUIPMENT	*None*	

INSTRUMENTATION

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

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	*The reservoir side slopes are generally flat, well vegetated to water's edge with trees, some homes along edge of reservoir.*	
SEDIMENTATION	*Any sedimentation has little or no effect on flood water storage.*	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	*The creek flows through woods, is wide and stable. The bed is rocky, no debris noted.*	
SLOPES	*The valley gradient is about 0.003. The side slopes are about 2H:IV.*	
APPROXIMATE NO. OF HOMES AND POPULATION	*About 3.2 miles below the dam, Tobyhanna Creek passes under PA. Rt. 115 where there are three or four homes subject to damage in the event of failure.*	

APPENDIX

C

POCONO DAM
CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: *Predominantly wooded, several upstream dams, some residential development.*

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): *1633.06 feet (5402 Acre-Feet).*

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): *1650 feet (22430 Acre-Feet).*

ELEVATION MAXIMUM DESIGN POOL: *1644.0 feet.*

ELEVATION TOP DAM: *1650 feet*

SPILLWAY:

a. Elevation *1633.06 feet.*

b. Type *Concrete ogee weir.*

c. Width *216 feet including four 4 foot wide bridge piers.*

d. Length -------

e. Location Spillover *Center.*

f. Number and Type of Gates *None.*

OUTLET WORKS:

a. Type *2- 30 inch pipes.*

b. Location *Through two center bridge piers.*

c. Entrance inverts *1610.25 feet.*

d. Exit inverts *1610.25 feet.*

e. Emergency drawdown facilities *The above outlet works.*

HYDROMETEOROLOGICAL GAGES:

a. Type *Standard rain gages.*

b. Location *Within watershed.*

c. Records *Weather Service gages maintained by others.*

MAXIMUM NON-DAMAGING DISCHARGE: *Not determined.*

HEC-1, REVISED
FLOOD HYDROGRAPH PACKAGE

The original "Flood Hydrograph Package" (HEC-1), developed by the Hydrologic Engineering Center, Corps of Engineers, has been modified for use under the National Dam Inspection Program. The "Flood Hydrograph Package (HEC-1), Dam Safety Version", hereinafter referred to as, HEC-1, Rev., has been modified to require less detailed input and to include a dam breach analysis. The required input is obtained from the field inspection of a dam, any available design/evaluation data, relatively simple hydraulic calculations, or information from the USGS Quandrangle maps. The input format is flexible in order to reflect any unique characteristics of an individual dam.

HEC-1, Rev. computes a reservoir inflow hydrograph based on individual watershed characteristics such as: area, percentage of impervious surface area, watershed shape, and hydrograph characteristics determined from regional correlation studies by the Corps of Engineers, Baltimore District. The inflow is routed through the reservoir using spillway discharge data obtained from the field inspection or design data. Flood storage capacity is determined from USGS maps or design information and verified by the field inspection. In the event a spillway cannot discharge 0.5 PMF without overtopping and failure of the dam, downstream channel characteristics obtained from the field inspection and USGS maps are inputed and flows are routed downstream to the damage center and a dam breach analysis is performed.

Included in this Appendix are the HEC-1, Rev. pertinent input values and a summary print-out tables.

BY MEB DATE 6/6/79 SUBJECT Pocono Dam Hydrology / Hydraulics SHEET 9 OF 22
CHKD. BY DATE 6/20/79 JOB No.

Classification (Ref. Recommended Guidelines for Safety Inspection of Dams)

1. The hazard classification is "High" as failure would result in loss of life.

2. The size classification is "Intermediate" based on its 47 ft. height and 22,430 Ac-Ft. total storage capacity

3. The spillway design flood, based on size and hazard classification, is the Probable Maximum Flood (PMF).

Hydrology and Hydraulic Analysis

1. Readily available design data was limited to statements in the "Application Report" prepared by the State in 1956. The spillway capacity was considered adequate for the 75.2 sq. mile watershed. Spillway capacity for the 200 ft ogee weir was given as: $H_o \sim 11$ ft.
   $Q = 29,000$ cfs at $H = 11$ ft. (design head)
   $Q = 46,100$ cfs at $H = 15$ ft. (to underside of bridge)

2. Evaluation of structure was by use of computer program. Computer input as follows:

   Inflow Hydrograph
   Drainage Area - total from USGS maps, 75.4 sq. miles ✓
   1.8 miles upstream of Pocono Lake (and 3.9 miles above Pocono Dam) is Lake Naomi, 45-1. There are four dams upstream of Lake Naomi. Lake Naomi Dam has also been inspected under the Nation Dam Inspection Act and the results of that inspection were available for this investigation.

   Rainfall, shown on computer sheets, Ref - Hydrometerological Report No. 33.

   Snyder's hydrograph parameters, tp & Cp
   $tp = C_t (L \cdot L_{ca})^{0.3}$
   $C_t = 2.1$ } Information received from Corps of
   $C_p = 0.45$ } Engineers, Baltimore, for Zone 2.

BY MEB DATE 6/15/79 SUBJECT Pocono Dam SHEET 4 OF 22

CHKD. BY [illegible] DATE 6/28/79 Hydrology / Hydraulics JOB No.

L, Lca & drainage area determined from USGS maps

Sub-area	L (miles)	Lca (miles)	tp	area* (sq. miles)
Lynchwood	2.46	0.95	2.71	3.4
Pocono Summit	4.28	1.61	3.75	3.2
Stillwater	3.03	1.14	3.04	6.6
Lake Naomi North	4.64	2.75	4.51	2.0
Lake Naomi South	4.36	2.65	4.38	4.3
Pocono Lake	14.58	8.05	8.77	55.9

* uncontrolled area above dam, not necessarily total drainage area above dam.

Reservoir Routing

elevation - storage

normal storage of all dams taken from DER Water Resources Bulletin No. 5

flood storage estimated from USGS maps.

normal & total capacity shown on sheets 17, 18 & 19

elevation - discharge

discharges for upstream dams were calculated by the computer using $Q = CLH^{3/2}$ and information given below. Any auxiliary spillway discharge and/or flow over the top was calculated by the computer assuming critical depth. ✓

Lynchwood Lake

C = 2.6 Ref. Table 5-3, King & Brater, Handbook of Hydraulics ✓

L = 24 ft (measured)

auxiliary spillway, 4.5 ft higher, 220 ft long

Pocono Summit (two dams assumed acting as one) ✓

C = 3.3 Ref - Table 5-3

L = 20 ft (measured) ✓

Stillwater Lake ✓

C = 2.7 Ref Table 5-3

L = 60 ft (measured)

BY MFB DATE 6/15/79 SUBJECT Pocono Dam Hydrology / Hydraulics SHEET 5 OF 22

CHKD. BY DATE 6/21/79 JOB No.

Lake Naomi

L = 100 ft. (measured)

discharge calculated by critical depth

auxiliary spillway, 350 ft wide, 0.4 to 0.7 ft higher

Pocono Dam – Ref. Chow, Open Channel Hydraulics, p. 364

$X^n = K H_d^{n-1} Y$ ✓

H_d = design head excluding velocity head of approach

$n = 1.825$

$K = 1.938$

From drawing

u/s face = 3H:1V

elev.	X	Y	calc. Hd
1633.06	0	0	
1632'-6¾"	3'	0.4975'	11.875'
1631'-2¼"	6'	1.8725'	11.036'
1629'-1½"	9'	4.047'	11.037'
1626'-4⅜"	12'	6.66	10.985

use H_d = 11.0 ft ✓

Stage-discharge Ref- Design of Small Dams, USBR, p. 373 ✓

shown on sheet 10.

$L = L' - 2(N K_p + K_a) H_e$

H_e = total head on crest

K_p = pier contraction coefficient = 0.01

N = number of piers = 4

L' = net length = 200

K_a = abutment contraction coefficient = 0.20

assume no velocity of approach & H_d = 11 ft

$L = 200 - 2(4 \cdot 0.01 + 0.20)11$ ✓

= 194.7 ft say 195

using fig 249 & 250, C = 3.9

$Q = 195 \cdot 3.90 \cdot 11^{3/2} = 27,745$ cfs ✓

BY MEB DATE 6/18/79 SUBJECT Pocono Dam Hydrology / Hydraulics SHEET 6 OF 22

CHKD. BY DATE 6/20/79 JOB No.

Overtopping Potential -

The effect of upstream Tamaque Lake Dam, #5-126, 15 ft. high, 4.9 miles above Pocono Dam on Beaver Creek (a tributary of Upper Tunkhannock) was neglected because of its small (1.6 sq miles) drainage area. Millpond No. 1, no DER number, and Tobyhanna Lake, #5-36, located 11.2 and 13.2 miles above Pocono Dam, have also been neglected because of their distance and the several bridge openings and marsh/swamp areas Tobyhanna Creek passes thru.

As shown on sheet 19, the spillway passes the full PMF without overtopping the roadway, assuming no upstream dam failures. A second computer run assumes upstream Lynchwood Lake, Pocono Summit and Lake Naomi Dams to fail. The spillway discharges the PMF without overtopping the bridge (sheet 22).

The following sheet is from the Lake Naomi Inspection report.

Spillway Adequacy

The spillway is rated as "Adequate" as the spillway will pass the PMF without overtopping the dam.

BY MEB DATE 6/11/79 SUBJECT Lake Naomi Dams SHEET 6 OF 27
CHKD. BY DATE JOB No. Hydrology / Hydraulics

Lynchwood Dam is assumed to fail if the reservoir level reaches the top of the dam, 1883 ft. It is estimated a trapezoidal breach, 150 ft wide, will take 4 hours to reach elev. 1881.

Pocono Summit is assumed to fail if the embankment is overtopped by one foot for more than 4 hours. It is estimated a trapezoidal breach, 200 ft. wide, will take 10 hours to reach elev. 1821, 4 ft below spillway elevation.

Stillwater Lake, based on visual inspection, this dam is assessed not to fail.

Lake Naomi Dam, as discussed in the text, the auxiliary spillway appears to have a limited resistance to erosion and failure as a result of flow through the spillway. The auxiliary spillway is assessed to fail if the depth of flow is 2 ft. It is estimated a trapezoidal breach, 150 ft wide, will take 10 hours to reach elev. 1751.4.

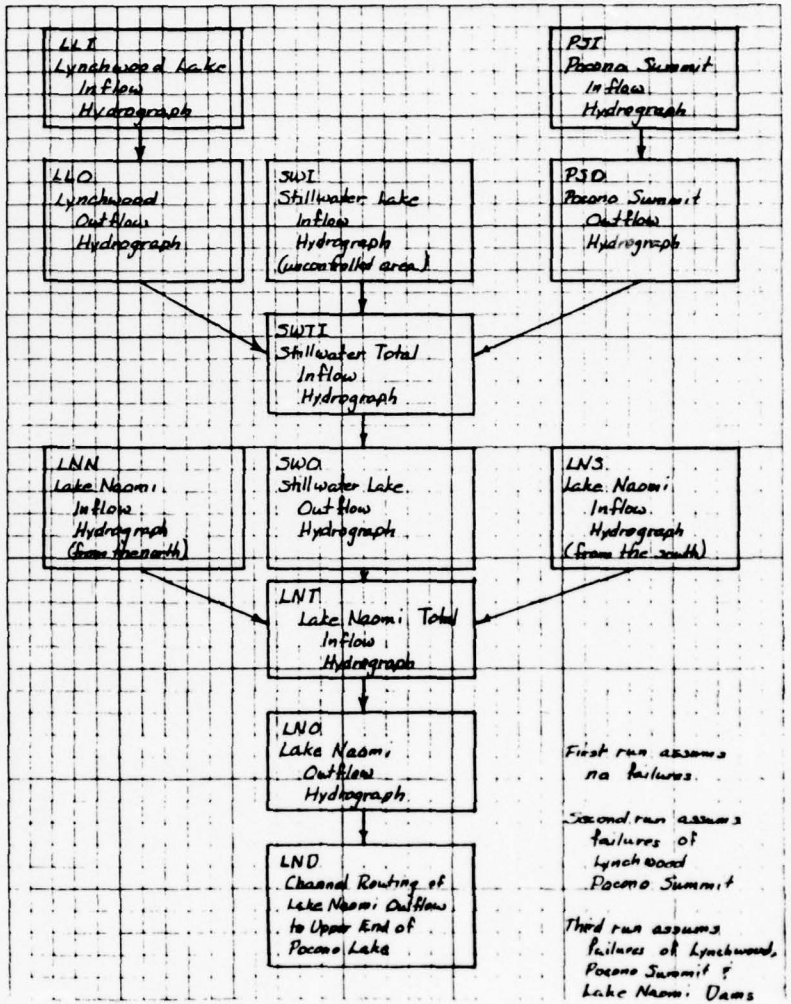
A frequent storm of record for this area is Hurricane Diane, Aug 1955. Hourly precipitation readings are published by the Weather Service for Mt. Pocono and Blakeslee stations. By inspection of the rainfall map of Diane, it is estimated the areal rainfall for Lake Naomi watershed is equal to the average of the reported point rainfalls

	Mt. Pocono	Blakeslee	Ave.	PMP*	% PMP
6 hr	6.97"	4.65"	5.72"	22.97"	24%
12 hr	9.19"	6.89"	8.04"	25.61"	31%
24 hr	9.83"	7.16"	8.49"	27.88"	30%
48 hr	10.47"	8.76"	9.62"	29.80"	32%

Overtopping Potential - as shown on sheet 15, the spillways pass 0.62 PMF without overtopping the embankment, however, the auxiliary spillway is assessed to fail with 0.34 PMF (sheet 19).

* Hydrometeorological Report No. 33

BY MEB DATE 7/31/79 SUBJECT Lake Naomi Dams SHEET 8 OF 27
CHKD. BY DATE JOB No. Hydrology / Hydraulics



First run assumes no failures.

Second run assumes failures of Lynchwood Pocono Summit

Third run assumes Failures of Lynchwood, Pocono Summit & Lake Naomi Dams

SH. 7 OF 221

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	LLI
ROUTE HYDROGRAPH TO	LLO
RUNOFF HYDROGRAPH AT	PSI
ROUTE HYDROGRAPH TO	PSO
RUNOFF HYDROGRAPH AT	SWI
COMBINE 3 HYDROGRAPHS AT	SWTI
ROUTE HYDROGRAPH TO	SWO
RUNOFF HYDROGRAPH AT	LNS
RUNOFF HYDROGRAPH AT	LNN
COMBINE 3 HYDROGRAPHS AT	LNT
ROUTE HYDROGRAPH TO	LNO
ROUTE HYDROGRAPH TO	LND
RUNOFF HYDROGRAPH AT	PLI
COMBINE 2 HYDROGRAPHS AT	PLT
ROUTE HYDROGRAPH TO	PLO
END OF NETWORK	

1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
****

RUN DATE* 79/06/13.
TIME* 13.56.20.

POCONO DAM
NAT ID NO. PA 00781 DER NO. 45-222
OVERTOPPING ANALYSIS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
200	0	30	0	0	0	0	0	-4	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 3 LRTIO= 1

RTIOS= .50 .70 1.00

SUB-AREA RUNOFF COMPUTATION

LYNCHWOOD LAKE INFLOW HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.39	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

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	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.75 CP= .45 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 50 END-OF-PERIOD ORDINATES, LAG= 2.76 HOURS, CP= .45 VOL= 1.00

24.	88.	178.	269.	335.	356.	335.	299.	267.	238.
213.	190.	170.	151.	135.	121.	108.	96.	86.	77.
68.	61.	55.	49.	43.	39.	35.	31.	28.	25.
22.	20.	18.	16.	14.	12.	11.	10.	9.	8.
7.	6.	6.	5.	4.	4.	4.	3.	3.	3.

0 END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.63	20.25	2.38	89942.
										(575.)(514.)(60.)(2546.87)			

HYDROGRAPH ROUTING

LYNCHWOOD LAKE OUTFLOW HYDROGRAPH

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

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	-1881.	0

CAPACITY=	0.	285.	800.
ELEVATION=	1861.	1881.	1890.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1881.0	24.0	2.6	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1883.0	0.0	0.0	0.

CREST LENGTH	220.	370.	1200.
AT OR BELOW ELEVATION	1881.5	1883.0	1884.0

SUB-AREA RUNOFF COMPUTATION

POCONO SUMMIT INFLOW HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.21	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	000	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 3.75 CP= .45 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 68 END-OF-PERIOD ORDINATES, LAG= 3.75 HOURS, CP= .45 VOL= 1.00

11.	40.	81.	129.	177.	217.	243.	251.	240.	221.
203.	187.	172.	158.	145.	134.	123.	113.	104.	96.
88.	81.	74.	68.	63.	58.	53.	49.	45.	41.
38.	35.	32.	30.	27.	25.	23.	21.	20.	18.
17.	15.	14.	13.	12.	11.	10.	9.	8.	8.
7.	7.	6.	6.	5.	5.	4.	4.	4.	3.
3.	3.	3.	2.	2.	2.	2.	2.		

0 END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.63	20.25	2.38	84368.
										(575.)(514.)(60.)(2389.04)			

HYDROGRAPH ROUTING

POCONO SUMMIT OUTFLOW HYDROGRAPH

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPNP	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	-1825.	0

CAPACITY=	0.	215.	1265.
ELEVATION=	1817.	1825.	1832.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1825.0	20.0	3.3	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1826.5	0.0	0.0	0.

CREST LENGTH AT OR BELOW ELEVATION	500. 1826.5	1000. 1830.0

SUB-AREA RUNOFF COMPUTATION

STILLWATER LAKE INFLOW HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	6.56	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

LOSS DATA

LROPT	STRKR	DLTKR	RTIO	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 3.04 CP= .45 NTA= 0

RECESSION DATA
STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 55 END-OF-PERIOD ORDINATES, LAG= 3.05 HOURS, CP= .45 VOL= 1.00

36.	132.	268.	418.	544.	620.	626.	578.	521.	469.
422.	380.	343.	309.	278.	250.	225.	203.	183.	165.
148.	134.	120.	108.	98.	88.	79.	71.	64.	58.
52.	47.	42.	38.	34.	31.	28.	25.	23.	20.
18.	16.	15.	13.	12.	11.	10.	9.	8.	7.
6.	6.	5.	5.	4.					

0 END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.63	20.25	2.38	173605.
										(575.)(	514.)(	60.)(	4915.95)

COMBINE HYDROGRAPHS

TOTAL INFLOW HYDROGRAPH FOR STILLWATER LAKE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
SWTI	3	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

STILLWATER LAKE OUTFLOW HYDROGRAPH

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

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	-1810.	0

CAPACITY=	0.	1335.	9670.
ELEVATION=	1802.	1810.	1820.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1810.0	60.0	2.7	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1811.5	0.0	0.0	0.

CREST LENGTH	140.	1000.
AT OR BELOW ELEVATION	1811.5	1815.0

SUB-AREA RUNOFF COMPUTATION

INFLOW FROM NORTH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	4.27	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

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	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 4.51 CP= .45 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 81 END-OF-PERIOD ORDINATES, LAG= 4.53 HOURS, CP= .45 VOL= 1.00

9.	34.	70.	112.	158.	203.	239.	265.	279.	277.
261.	243.	227.	212.	197.	184.	171.	160.	149.	139.
130.	121.	113.	105.	98.	91.	85.	79.	74.	69.
64.	60.	56.	52.	49.	45.	42.	39.	37.	34.
32.	30.	28.	26.	24.	23.	21.	20.	18.	17.
16.	15.	14.	13.	12.	11.	10.	10.	9.	8.
8.	7.	7.	6.	6.	6.	5.	5.	5.	4.
4.	4.	3.	3.	3.	3.	3.	2.	2.	2.
2.									

0 END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.63	20.25	2.38	111642.
										(575.)	(514.)	(60.)	(3161.35)

SUB-AREA RUNOFF COMPUTATION

INFLOW FROM SOUTH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	2.03	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

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	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 4.38 CP= .45 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 80 END-OF-PERIOD ORDINATES, LAG= 4.42 HOURS, CP= .45 VOL= 1.00

5.	17.	35.	56.	80.	101.	119.	131.	136.	133.
124.	116.	108.	100.	93.	87.	81.	75.	70.	65.
61.	57.	53.	49.	46.	43.	40.	37.	34.	32.
30.	28.	26.	24.	22.	21.	19.	18.	17.	16.
15.	14.	13.	12.	11.	10.	10.	9.	8.	8.
7.	7.	6.	6.	5.	5.	5.	4.	4.	4.
4.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	2.	1.	1.	1.	1.	1.	1.	1.

0 END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.63	20.25	2.38	53103.
										(575.)	(514.)	(60.)	(1503.71)

COMBINE HYDROGRAPHS

LAKE NAOMI TOTAL INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LNT	3	0	0	0	0	0	0	1

HYDROGRAPH ROUTING

LAKE NAOMI OUTFLOW HYDROGRAPH

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

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	-1755.	-1

STAGE	1755.00	1756.00	1757.00	1758.00	1759.00	1761.00	1763.00	1765.00
FLOW	0.00	309.00	874.00	1605.00	2471.00	4540.00	6989.00	9768.00

CAPACITY=	0.	1492.	2832.	4422.
ELEVATION=	1742.	1755.	1760.	1765.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1755.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1755.4	0.0	0.0	0.

CREST LENGTH	0.	350.	650.	2500.	3000.
AT OR BELOW ELEVATION	1755.4	1755.7	1758.9	1760.0	1765.0

HYDROGRAPH ROUTING

CHANNEL ROUTING OF LAKE NAOMI OUTFLOW

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

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	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELMVT	ELMAX	RLNTH	SEL
.0650	.0450	.0650	1720.0	1740.0	9750.	.00800

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1740.00 850.00 1725.00 975.00 1722.00 975.00 1720.00 1025.00 1720.00
1025.00 1722.00 1125.00 1725.00 2000.00 1740.00

STORAGE	0.00	11.78	23.65	46.59	88.14	148.59	234.77	349.48	492.70	664.45
	864.72	1093.51	1350.82	1636.65	1951.00	2293.88	2665.27	3065.19	3493.63	3950.59
OUTFLOW	0.00	156.92	486.58	1027.76	1945.95	3349.68	5381.23	8309.72	12292.42	17477.36
	24003.97	32004.55	41605.45	52928.04	66089.43	81202.97	98378.75	117723.90	139342.94	163337.97
STAGE	1720.00	1721.05	1722.11	1723.16	1724.21	1725.26	1726.32	1727.37	1728.42	1729.47
	1730.53	1731.58	1732.63	1733.68	1734.74	1735.79	1736.84	1737.89	1738.95	1740.00
FLOW	0.00	156.92	486.58	1027.76	1945.95	3349.68	5381.23	8309.72	12292.42	17477.36
	24003.97	32004.55	41605.45	52928.04	66089.43	81202.97	98378.75	117723.90	139342.94	163337.97

SUB-AREA RUNOFF COMPUTATION

POCONO LAKE UNCONTROLLED AREA INFLOW HYDROGRAPH

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

HYDROGRAP DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	55.94	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

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	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 8.77 CP= .45 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH100 END-OF-PERIOD ORDINATES, LAG= 8.84 HOURS, CP= .45 VOL= .96

23.	87.	181.	294.	421.	561.	710.	868.	1032.	1199.
1355.	1493.	1613.	1715.	1797.	1858.	1895.	1904.	1869.	1806.
1743.	1681.	1622.	1565.	1510.	1457.	1405.	1356.	1308.	1262.
1218.	1175.	1133.	1093.	1055.	1018.	982.	947.	914.	882.
851.	821.	792.	764.	737.	711.	686.	662.	639.	616.
594.	573.	553.	534.	515.	497.	479.	462.	446.	430.
415.	401.	387.	373.	360.	347.	335.	323.	312.	301.
290.	280.	270.	261.	251.	243.	234.	226.	218.	210.
203.	196.	189.	182.	176.	169.	163.	158.	152.	147.
142.	137.	132.	127.	123.	118.	114.	110.	106.	103.

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
									SUM	22.63	20.25	2.38	1418356.
										(575.)	(514.)	(60.)	(40163.37)

HYDROGRAPH ROUTING

POCONO LAKE OUTFLOW HYDROGRAPH

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

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	-1633.	-1

STAGE	1633.00	1634.00	1636.00	1638.00	1640.00	1644.00	1646.00	1648.00	1650.00
FLOW	0.00	638.00	3511.00	7843.00	13399.00	27745.00	36153.00	44800.00	44800.00
CAPACITY=	0.	5402.	10100.	34760.					
ELEVATION=	1593.	1633.	1640.	1660.					

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1633.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1650.0	2.5	1.5	200.

PLAN 1 - No Upstream Dam Failures

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	RATIO 2 .70	RATIO 3 1.00
HYDROGRAPH AT	LLI	3.39	1	2385.	3339.	4769.
	(	8.78)	(	67.53)(	94.54)(	135.05)(
ROUTED TO	LLO	3.39	1	2364.	3318.	4740.
	(	8.78)	(	66.95)(	93.97)(	134.24)(
HYDROGRAPH AT	PSI	3.21	1	1851.	2591.	3701.
	(	8.31)	(	52.40)(	73.37)(	104.81)(
ROUTED TO	PSO	3.21	1	1777.	2523.	3636.
	(	8.31)	(	50.33)(	71.46)(	102.95)(
HYDROGRAPH AT	SWI	6.56	1	4369.	6117.	8739.
	(	16.99)	(	123.73)(	173.22)(	247.46)(
3 COMBINED	SWTI	13.16	1	8263.	11720.	16829.
	(	34.08)	(	233.99)(	331.86)(	476.56)(
ROUTED TO	SWO	13.16	1	4978.	8357.	13681.
	(	34.08)	(	140.95)(	236.65)(	387.41)(
HYDROGRAPH AT	LNS	2.03	1	1044.	1462.	2089.
	(	5.26)	(	29.57)(	41.40)(	59.15)(
HYDROGRAPH AT	LNN	4.27	1	2160.	3024.	4319.
	(	11.06)	(	61.16)(	85.62)(	122.31)(
3 COMBINED	LNT	19.46	1	7570.	12407.	19862.
	(	50.40)	(	214.35)(	351.32)(	562.43)(
ROUTED TO	LNO	19.46	1	7419.	12186.	19750.
	(	50.40)	(	210.09)(	345.07)(	559.25)(
ROUTED TO	LND	19.46	1	7360.	12071.	19591.
	(	50.40)	(	208.41)(	341.82)(	554.77)(
HYDROGRAPH AT	PLI	55.94	1	16713.	23398.	33426.
	(	144.88)	(	473.26)(	662.56)(	946.52)(
2 COMBINED	PLT	75.40	1	24064.	35042.	50868.
	(	195.29)	(	681.41)(	992.27)(	1440.43)(
ROUTED TO	PLO	75.40	1	19916.	28564.	42190.
	(	195.29)	(	563.96)(	808.85)(	1194.68)(

PLAN 1

SUMMARY OF DAM SAFETY ANALYSIS

LYNCHWOOD LAKE

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1881.00	1881.00	1883.00
STORAGE	285.	285.	399.
OUTFLOW	0.	0.	1741.

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	1883.28	.28	416.	2364.	4.00	43.00	0.00
.70	1883.60	.60	434.	3318.	7.00	43.00	0.00
1.00	1883.94	.94	453.	4740.	9.00	43.00	0.00

SUMMARY OF DAM SAFETY ANALYSIS

POCONO SUMMIT

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1825.00	1825.00	1826.50
STORAGE	215.	215.	440.
OUTFLOW	0.	0.	121.

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	1827.43	.93	580.	1777.	24.00	44.50	0.00
.70	1827.68	1.18	617.	2523.	28.00	44.00	0.00
1.00	1828.00	1.50	665.	3636.	31.00	44.00	0.00

HEC 6/10/79 Pocono Dam Hydrology / Hydraulics SH. 17 OF 22

PLAN 1

SUMMARY OF DAM SAFETY ANALYSIS
STILLWATER LAKE

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1810.00	1810.00	1811.50
STORAGE	1335.	1335.	2585.
OUTFLOW	0.	0.	298.

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	1813.80	2.30	4503.	4978.	43.00	47.00	0.00
.70	1814.53	3.03	5111.	8357.	46.50	46.00	0.00
1.00	1815.38	3.88	5818.	13681.	49.50	45.00	0.00

SUMMARY OF DAM SAFETY ANALYSIS
LAKE NAOMI

	INITIAL VALUE	SPILLWAY CREST	~~TOP OF DAM~~
ELEVATION	1755.00	1755.00	1755.40
STORAGE	1492.	1492.	1599.
OUTFLOW	0.	0.	124.

auxiliary spillway crest; embankment low point, 1758.9

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	1758.18	2.78	2345.	7419.	64.00	47.00	0.00
.70	1759.11	3.71	2593.	12186.	65.50	46.00	0.00
1.00	1759.96	4.56	2822.	19750.	66.50	45.00	0.00

PLAN 1

PLAN 1 STATION LND

DOWNSTREAM OF LAKE NAOMI

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	7360.	1727.0	47.50
.70	12071.	1728.4	46.50
1.00	19591.	1729.8	45.50

SUMMARY OF DAM SAFETY ANALYSIS

POCONO DAM

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1633.00	1633.00	1650.00
STORAGE	5402.	5402.	22430.
OUTFLOW	0.	0.	44800.

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	1641.82	0.00	12340.	19916.	0.00	51.50	0.00
.70	1644.19	0.00	15272.	28564.	0.00	51.50	0.00
1.00	1647.40	0.00	19220.	42190.	0.00	50.50	0.00

PLAN 2 - Upstream Dam Failures

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	RATIO 2 .70	RATIO 3 1.00
HYDROGRAPH AT	LLI	3.39	1	2385.	3339.	4769.
		(8.78)		(67.53)(	94.54)(	135.05)(
ROUTED TO	LLO	3.39	1	3702.	4509.	5712.
Failure assumed		(8.78)		(104.83)(	127.68)(	161.75)(
HYDROGRAPH AT	PSI	3.21	1	1851.	2591.	3701.
		(8.31)		(52.40)(	73.37)(	104.81)(
ROUTED TO	PSO	3.21	1	1777.	2885.	4014.
Failure assumed		(8.31)		(50.33)(	81.70)(	113.67)(
HYDROGRAPH AT	SWI	6.56	1	4369.	6117.	8739.
		(16.99)		(123.73)(	173.22)(	247.46)(
3 COMBINED	SWTI	13.16	1	9900.	12800.	18281.
		(34.08)		(280.32)(	362.47)(	517.66)(
ROUTED TO	SWO	13.16	1	5326.	9009.	14481.
No failure assumed		(34.08)		(150.82)(	255.10)(	410.04)(
HYDROGRAPH AT	LNS	2.03	1	1044.	1462.	2089.
		(5.26)		(29.57)(	41.40)(	59.15)(
HYDROGRAPH AT	LNN	4.27	1	2160.	3024.	4319.
		(11.06)		(61.16)(	85.62)(	122.31)(
3 COMBINED	LNT	19.46	1	8060.	13128.	20669.
		(50.40)		(228.23)(	371.76)(	585.29)(
ROUTED TO	LNO	19.46	1	8208.	13208.	20761.
Failure assumed		(50.40)		(232.43)(	374.02)(	587.88)(
ROUTED TO	LND	19.46	1	8141.	13111.	20587.
		(50.40)		(230.53)(	371.25)(	582.95)(
HYDROGRAPH AT	PLI	55.94	1	16713.	23398.	33426.
		(144.88)		(473.26)(	662.56)(	946.52)(
2 COMBINED	PLT	75.40	1	24798.	36015.	51752.
		(195.29)		(702.20)(	1019.83)(	1465.45)(
ROUTED TO	PLO	75.40	1	20451.	29547.	43221.
No failure assumed		(195.29)		(579.10)(	836.67)(	1223.90)(

PLAN 2

SUMMARY OF DAM SAFETY ANALYSIS
LYNCHWOOD LAKE - Failure Assumed

	INITIAL VALUE	SPILLWAY CREST	TOP OF ~~DAM~~	Emergency Spillway Crest
ELEVATION	1881.00	1881.00	1881.50	
STORAGE	285.	285.	314.	
OUTFLOW	0.	0.	22.	

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	1883.07	1.57	403.	3818.	11.92	43.17	41.50
.70	1883.03	1.53	401.	4705.	13.17	42.42	40.50
1.00	1883.18	1.68	410.	6031.	14.42	42.25	40.00

SUMMARY OF DAM SAFETY ANALYSIS
POCONO SUMMIT - Failure Assumed

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1825.00	1825.00	1826.50
STORAGE	215.	215.	440.
OUTFLOW	0.	0.	121.

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	1827.43	.93	580.	1777.	24.00	44.50	0.00
.70	1827.58	1.08	601.	2885.	8.00	44.50	42.50
1.00	1827.74	1.24	626.	4018.	9.00	44.25	41.50

SUMMARY OF DAM SAFETY ANALYSIS
STILLWATER LAKE - No Failure Assumed

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1810.00	1810.00	1811.50
STORAGE	1335.	1335.	2585.
OUTFLOW	0.		298.

RATIO OF PF	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	1813.89	2.39	4576.	5326.	42.50	46.50	0.00
.70	1814.65	3.15	5210.	9009.	43.00	46.00	0.00
1.00	1815.49	3.99	5908.	14481.	46.50	45.00	0.00

PLAN 2 SUMMARY OF DAM SAFETY ANALYSIS

LAKE NAOMI DAM - Failure Assumed

	INITIAL VALUE	SPILLWAY CREST	~~TOP OF DAM~~	
ELEVATION	1755.00	1755.00	1755.40	auxiliary spillway crest; embankment low point, 1758.9
STORAGE	1492.	1492.	1599.	
OUTFLOW	0.	0.	124.	

RATIO OF PMF	MAXIMUM RESERVOR 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	1758.06	2.66	2311.	8208.	19.50	47.00	44.00
.70	1758.98	3.58	2560.	13208.	22.50	46.00	43.00
1.00	1759.84	4.44	2790.	20761.	25.50	45.00	41.50

PLAN 1 STATION LND
DOWNSTREAM OF LAKE NAOMI

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	8141.	1727.3	47.50
.70	13111.	1728.6	46.50
1.00	20587.	1730.0	45.50

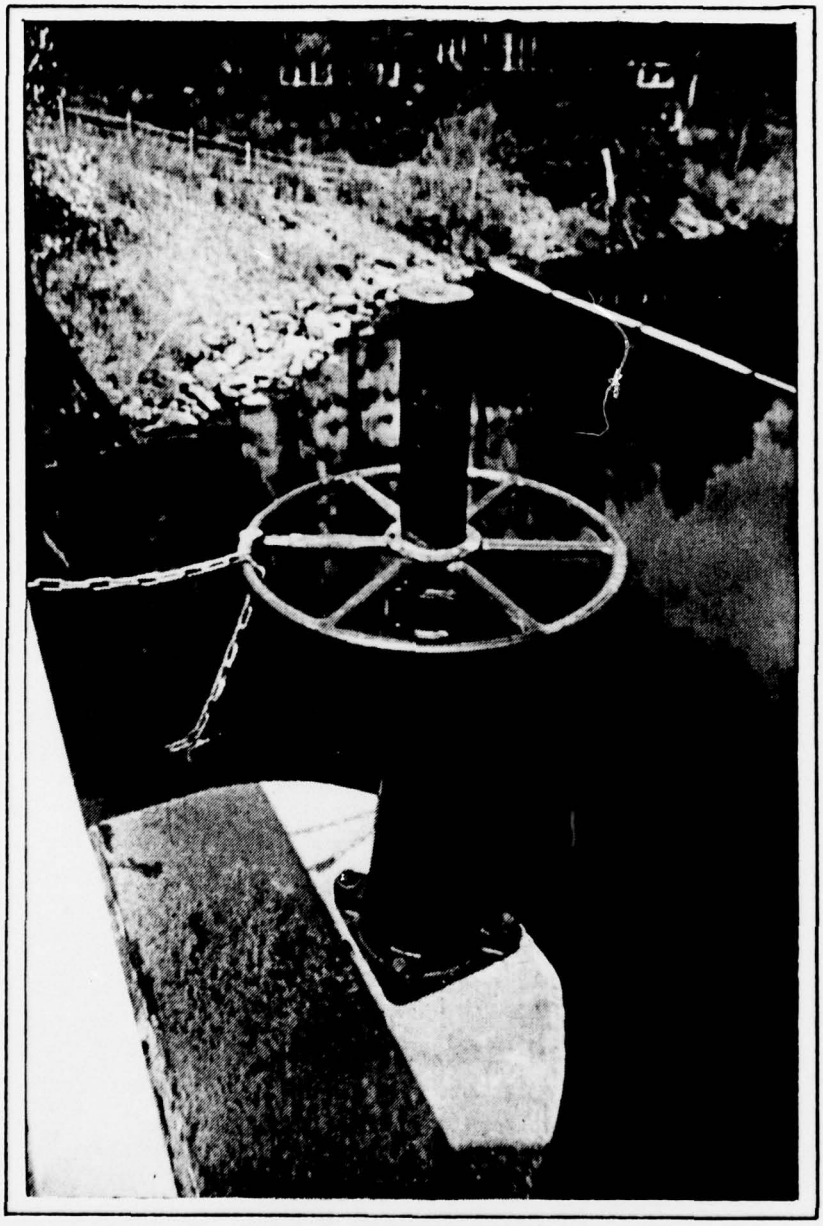
SUMMARY OF DAM SAFETY ANALYSIS
POCONO DAM - No Failure Assumed

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1633.00	1633.00	1650.00
STORAGE	5402.	5402.	22430.
OUTFLOW	0.	0.	44800.

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	1641.97	0.00	12524.	20451.	0.00	51.50	0.00
.70	1644.43	0.00	15560.	29547.	0.00	51.50	0.00
1.00	1647.63	0.00	19514.	43221.	0.00	51.00	0.00

APPENDIX

D

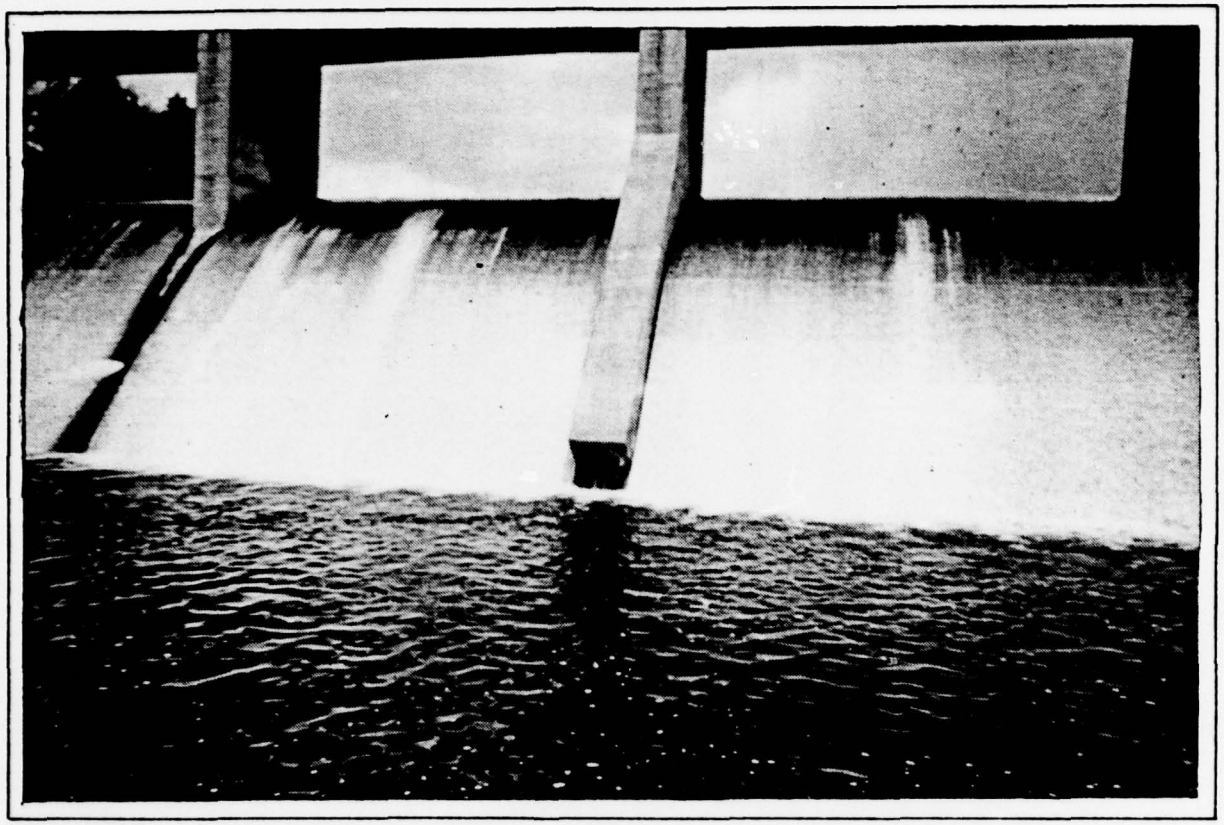


VALVE USED TO CONTROL
MINIMUM FLOW RELEASE.

PHOTOGRAPH NO. 1

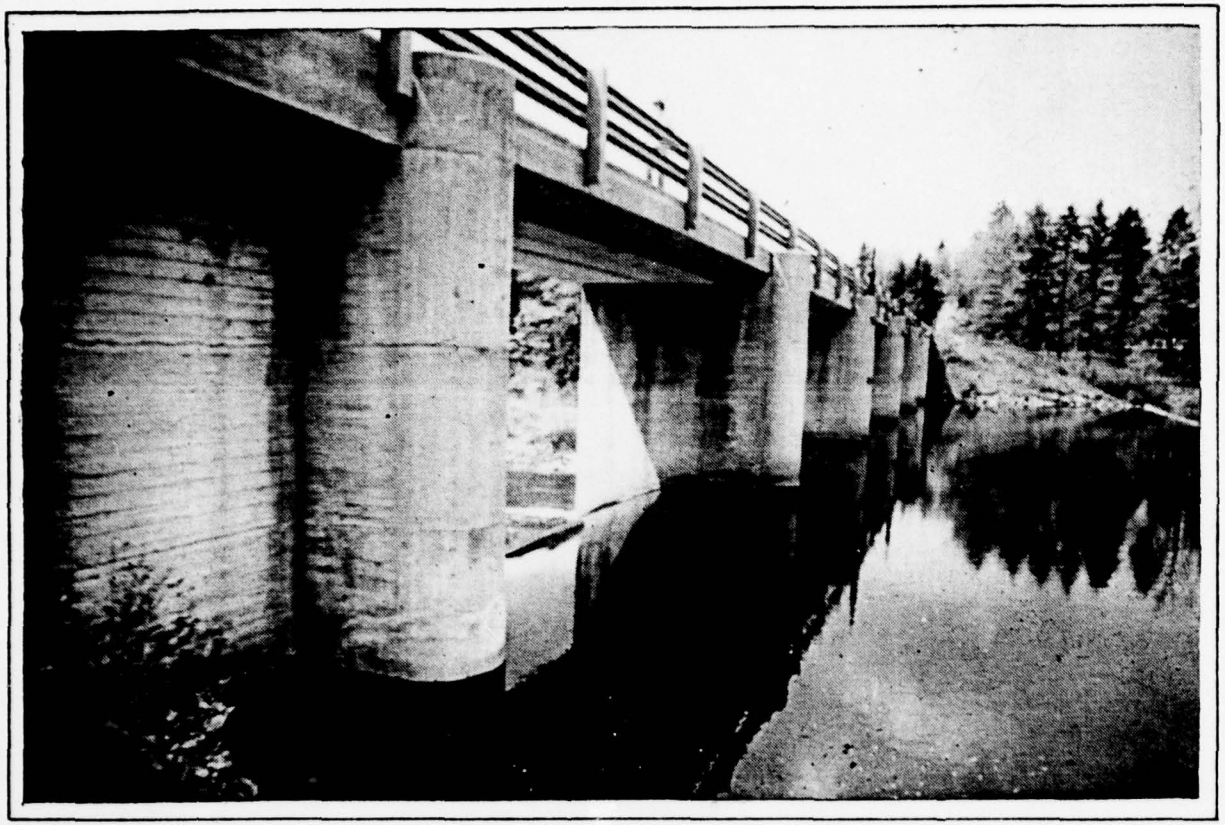
TYPICAL OUTLET CONTROL VALVE.

PHOTOGRAPH NO. 2



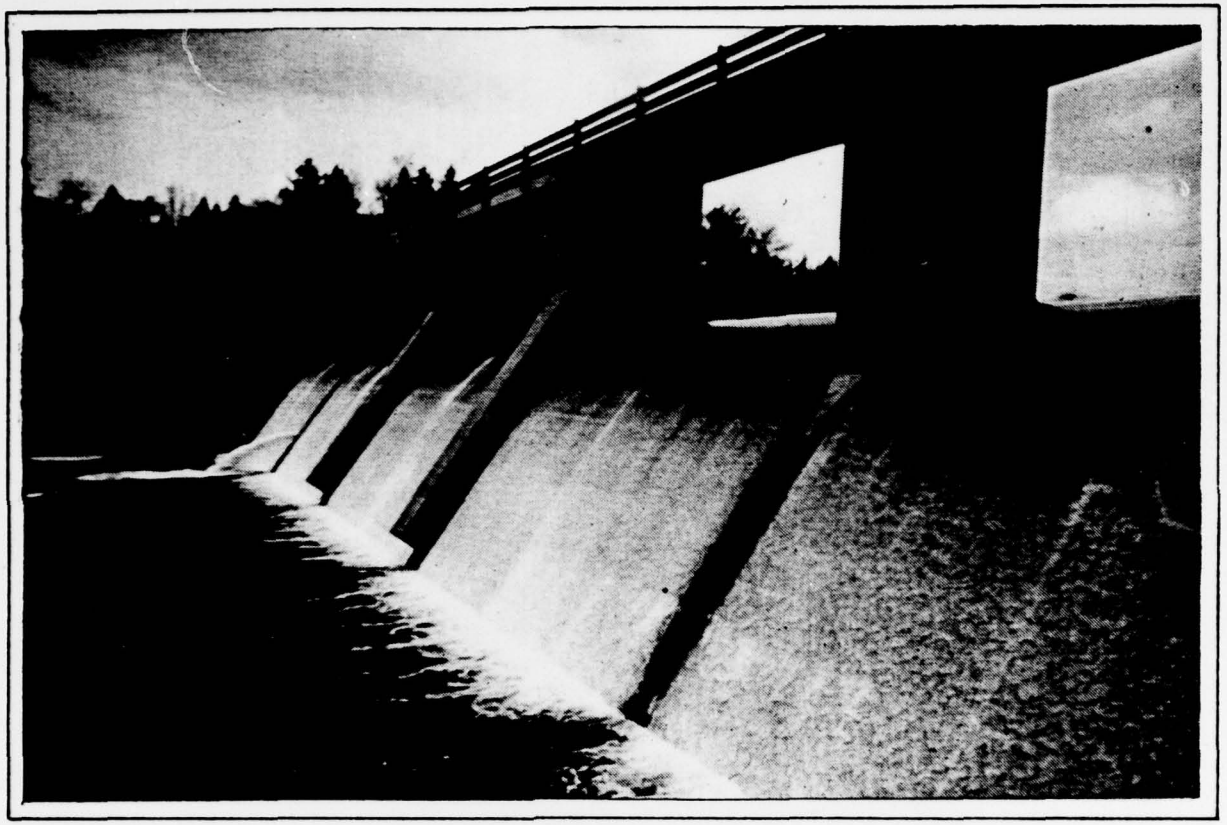
VIEW OF SPILLWAY. NOTE MINIMUM FLOW DISCHARGE OUTLET ON THE LEFT OF PHOTOGRAPH.

PHOTOGRAPH NO. 3



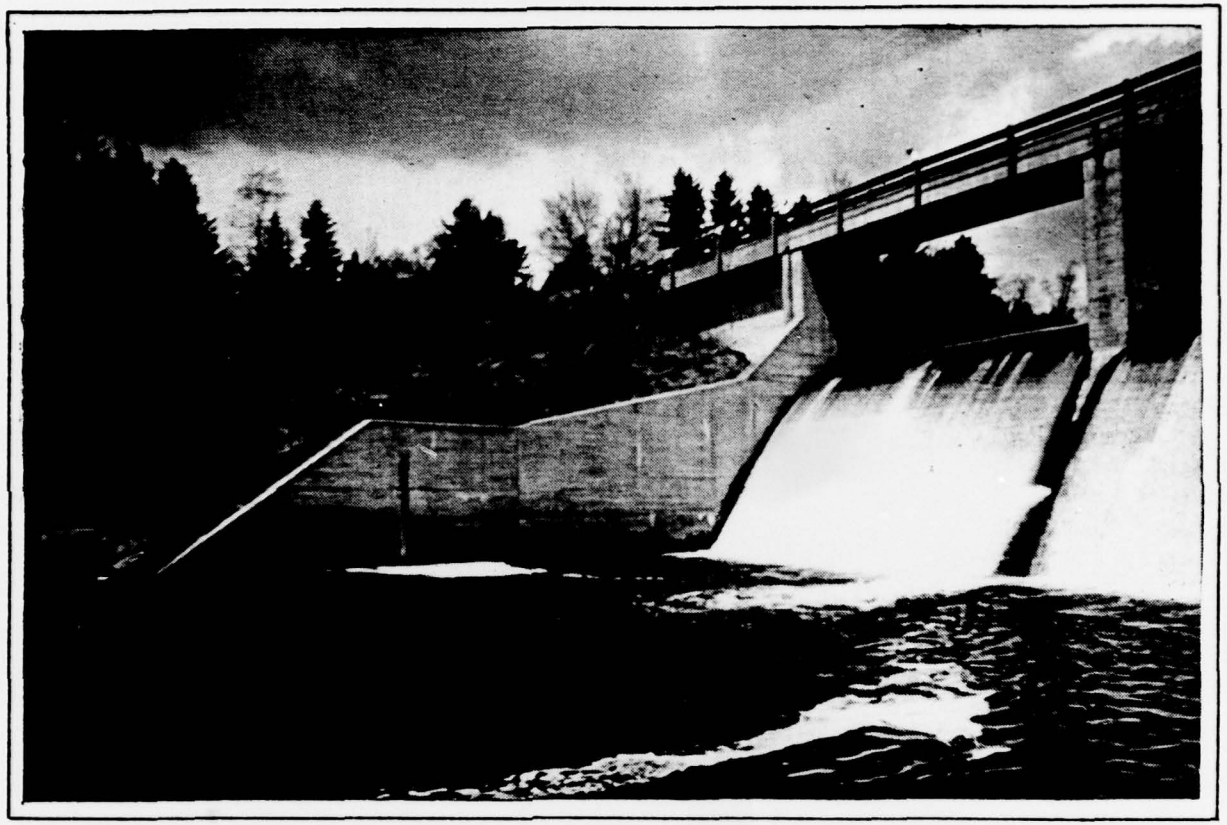
OVERVIEW OF UPSTREAM SIDE OF
SPILLWAY.

PHOTOGRAPH NO. 4



OVERVIEW OF DOWNSTREAM SIDE OF
SPILLWAY.

PHOTOGRAPH NO. 5

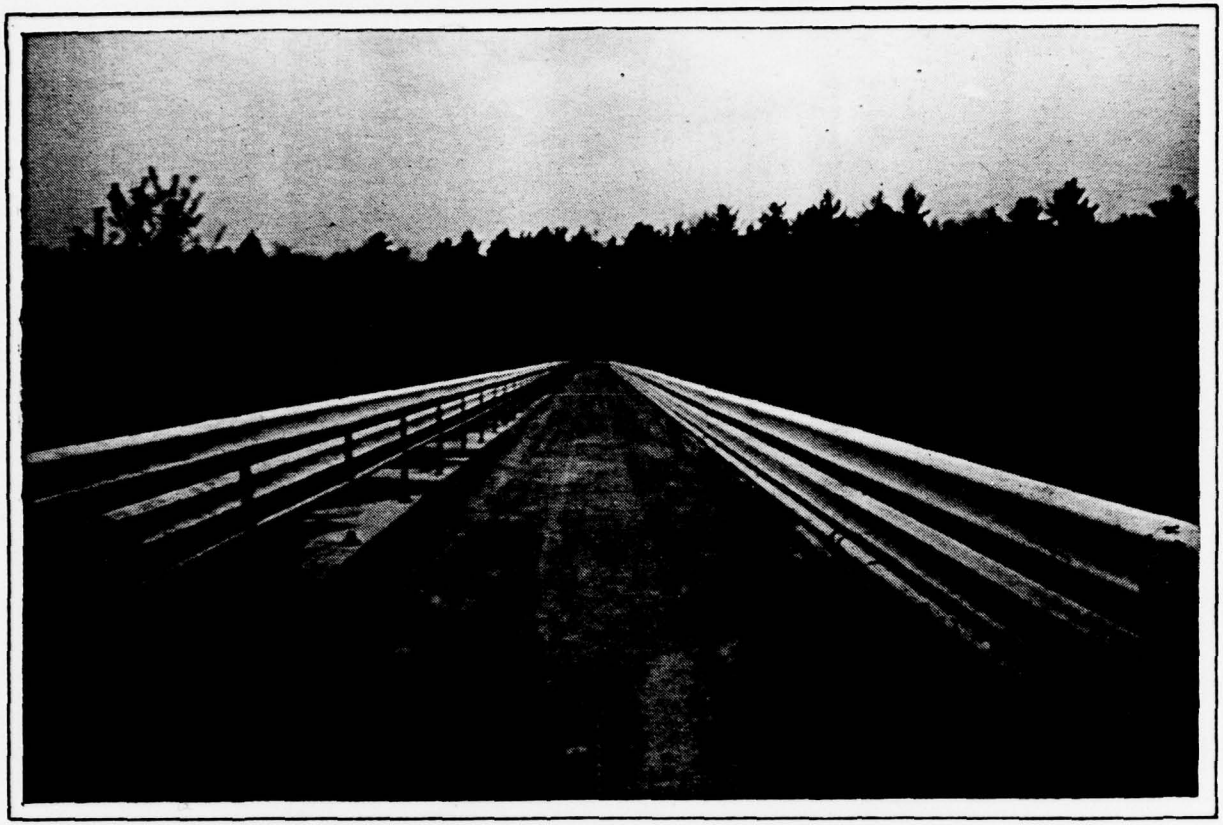


OVERVIEW OF RIGHT WALL OF SPILLWAY.
NOTE STAFF GAGE ON WALL.

PHOTOGRAPH NO. 6

OVERVIEW OF SPILLWAY DISCHARGE
CHANNEL.

PHOTOGRAPH NO. 7



LOOKING AT ROADWAY ACROSS SPILLWAY
FROM THE RIGHT ABUTMENT.

PHOTOGRAPH NO. 8

DIAGONAL CRACKING OF LEFT SPILLWAY WALL.

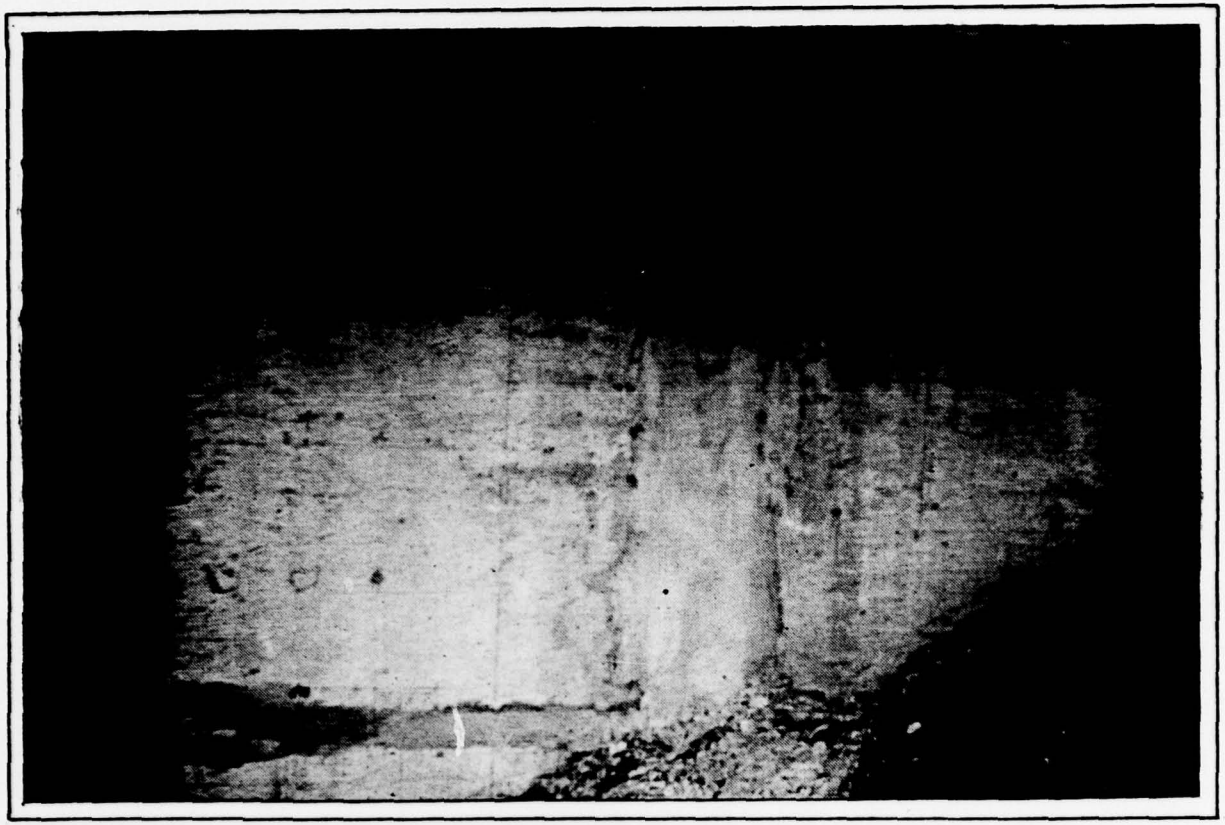
PHOTOGRAPH NO. 9

SPALLING AND GENERAL CONCRETE
DETERIORATION OF LEFT SPILLWAY
WALL AT STILLING POOL ELEVATION.

PHOTOGRAPH NO. 10

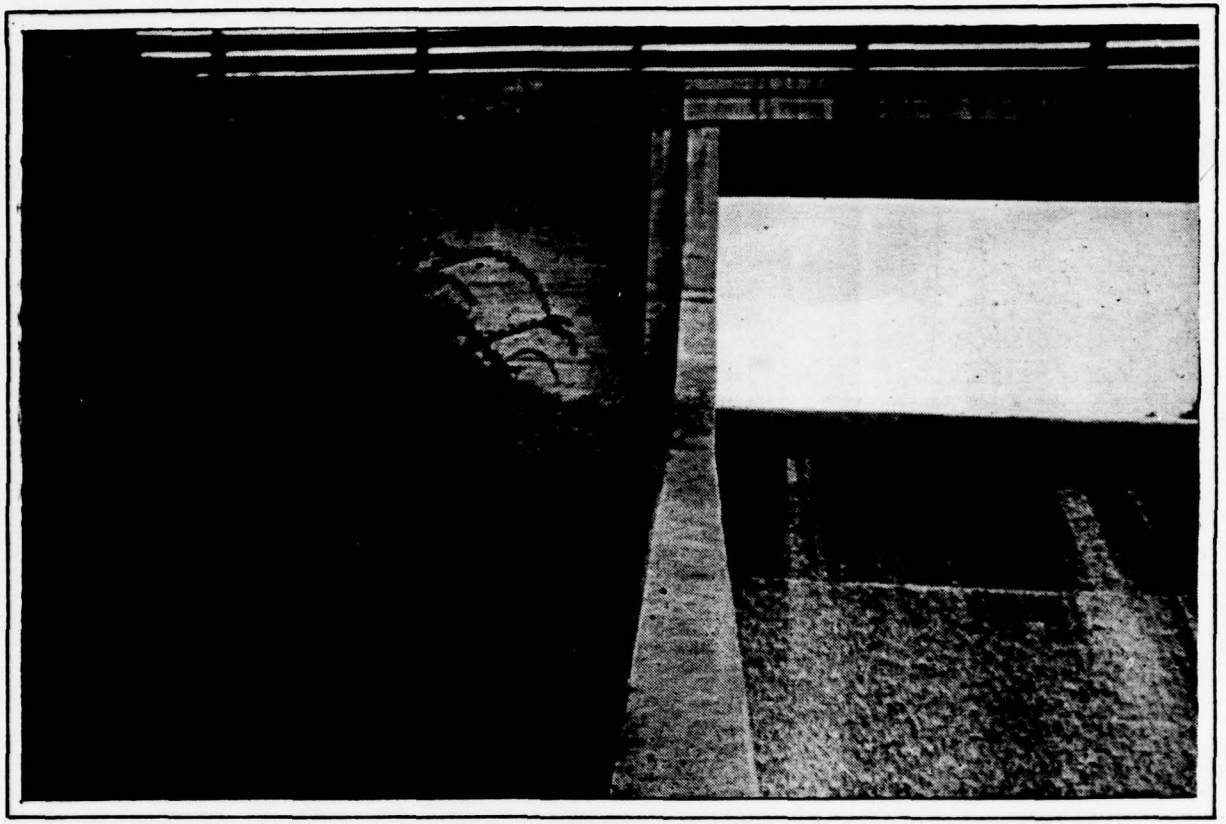
EMBANKMENT SEEPAGE DISCHARGING
AROUND END OF LEFT SPILLWAY WALL.

PHOTOGRAPH NO. 11



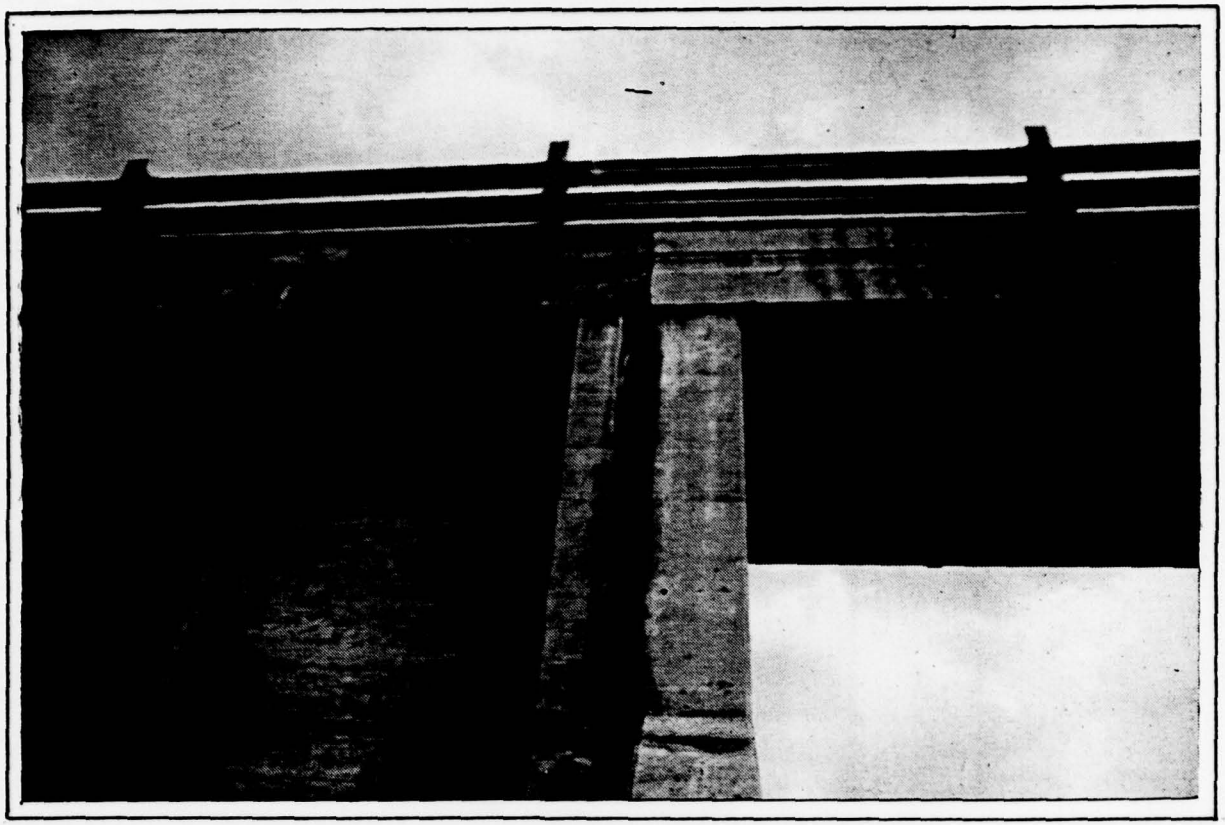
TYPICAL CONCRETE REPAIR WORK
PERFORMED ON DAM.

PHOTOGRAPH NO. 12



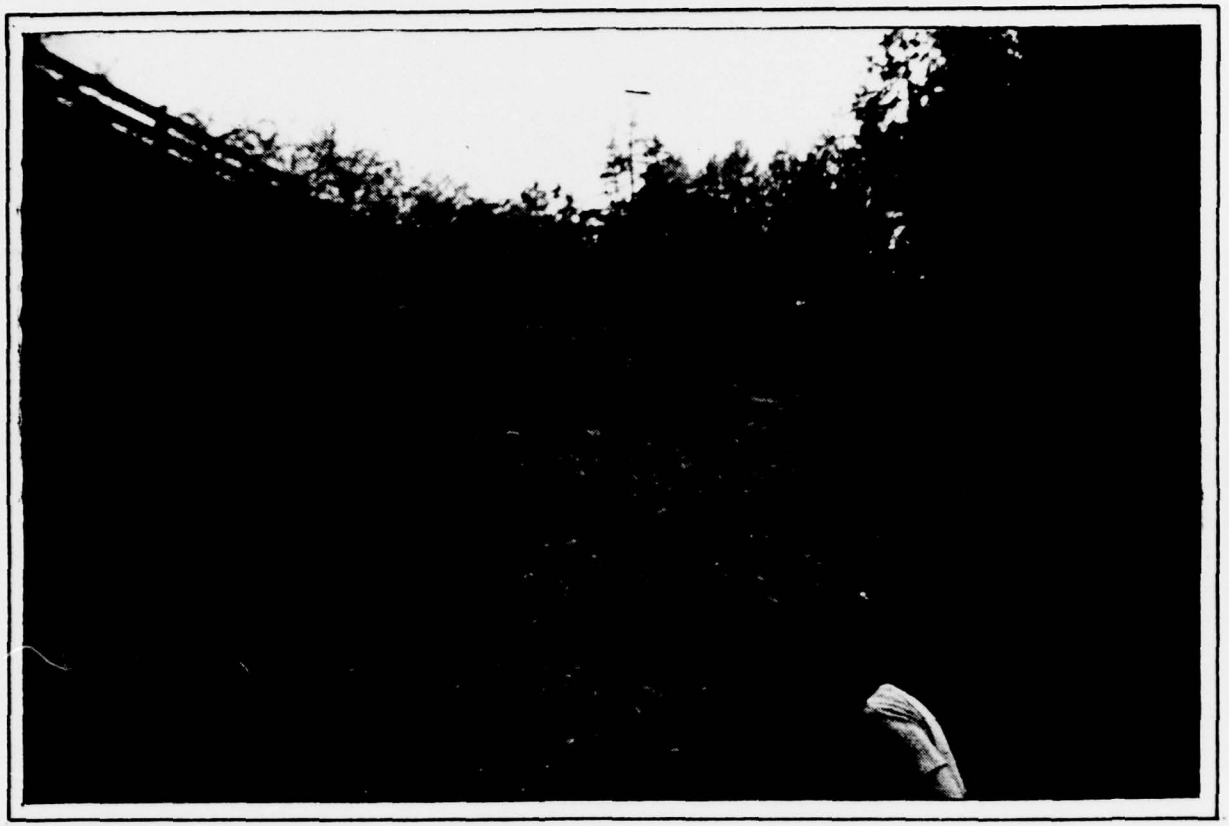
OVERVIEW OF RIGHT SPILLWAY ABUTMENT
LOOKING UPSTREAM.

PHOTOGRAPH NO. 13



NOTE DETERIORATION OF BRIDGE ABUTMENT. REFER TO PHOTOGRAPH NO. 13 FOR LOCATION.

PHOTOGRAPH NO. 14

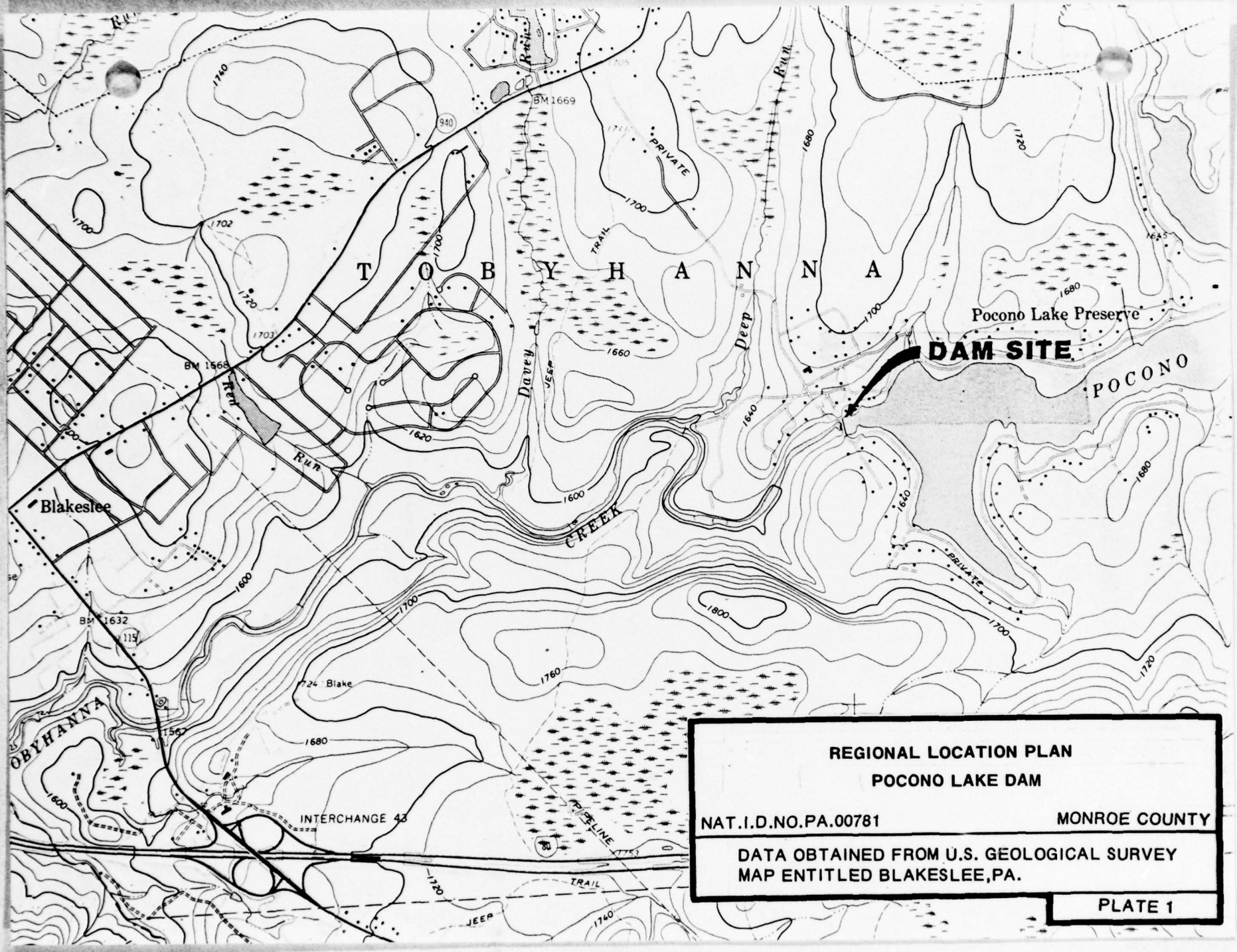


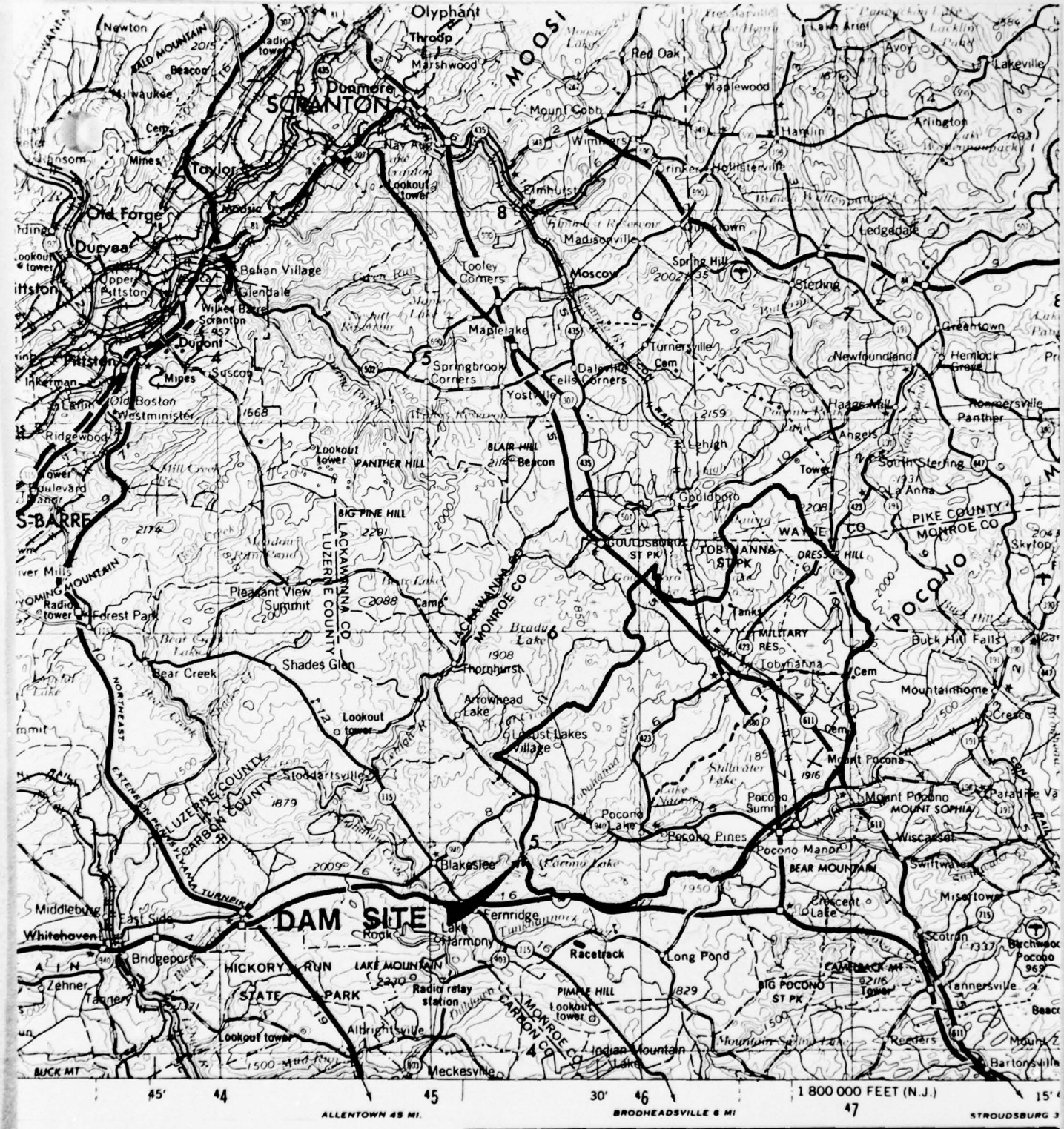
OVERVIEW OF LEFT ABUTMENT EMBANKMENT SLOPE.

PHOTOGRAPH NO. 15

APPENDIX

E


T O B Y H A N N A
Pocono Lake Preserve
DAM SITE
POCONO
Blakeslee
Davey Run
Deep Run
Run
CREEK
PRIVATE
TRAIL
JEEP
BM 1669
BM 1568
BM 1632
INTERCHANGE 43
PIPELINE
1740
1700
1720
1680
1660
1640
1620
1600
1800
1760
940
115
REGIONAL LOCATION PLAN
POCONO LAKE DAM
NAT.I.D.NO.PA.00781
MONROE COUNTY
DATA OBTAINED FROM U.S. GEOLOGICAL SURVEY
MAP ENTITLED BLAKESLEE,PA.
PLATE 1



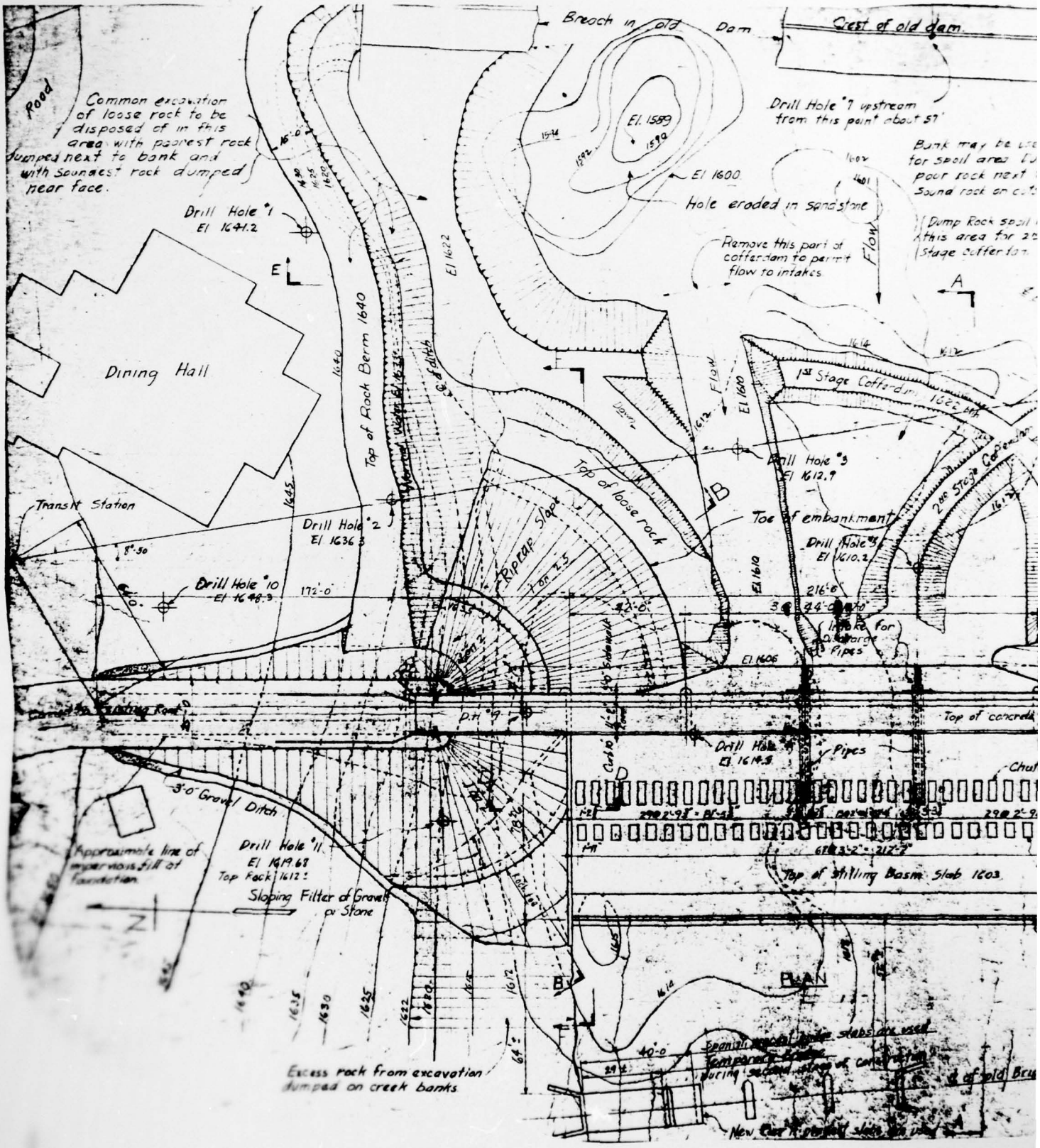
HYDROLOGIC MAP

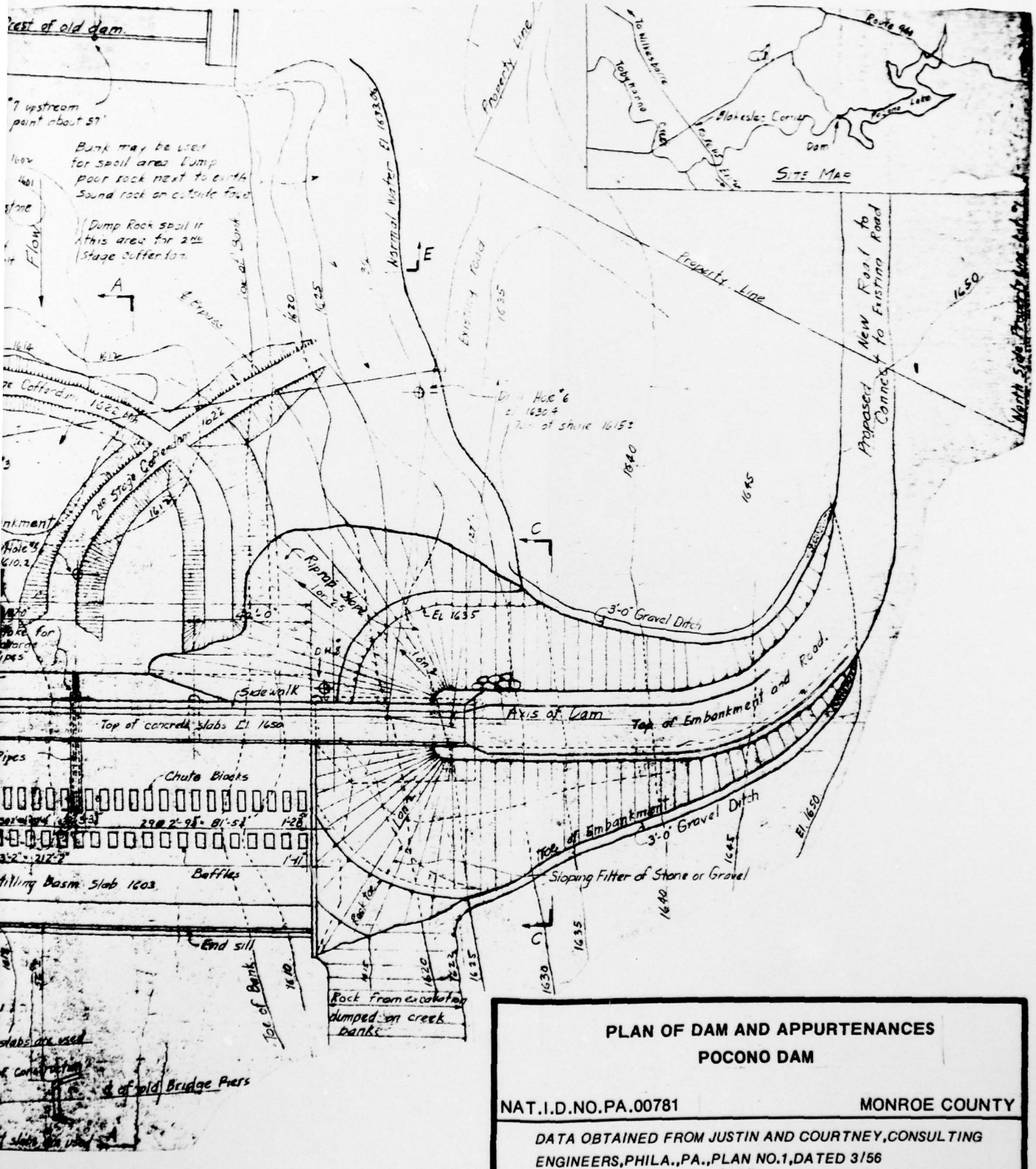
POCONO LAKE DAM

NAT.I.D.NO.PA.00781 MONROE COUNTY

DATA OBTAINED FROM U.S. GEOLOGICAL SURVEY QUAD SHEET ENTITLED SCRANTON,PA.-N.J. 1:250,000 REV.1976

PLATE 1A


Breach in old Dam
Crest of old dam
Road
Common excavation of loose rock to be disposed of in this area with poorest rock dumped next to bank and with soundest rock dumped near face.
Drill Hole "7 upstream from this point about 5'
El. 1589
El 1600
Hole eroded in sandstone
Remove this part of cofferdam to permit flow to intakes
Flow
Drill Hole "1
El 1641.2
Dining Hall
Top of Rock Berm 1640
El 1622
Flow
El 1600
1st Stage Cofferdam
Drill Hole "3
El 1612.9
Transit Station
Drill Hole "2
El 1636.3
Top of loose rock
Riprap Slope
Toe of embankment
Drill Hole "5
El 1610.2
Drill Hole "10
El 1648.3
172'-0"
El 1610
216'-0"
(Invert for 2 Discharge Pipes)
El 1606
Top of concrete
Drill Hole "9
El 1619.8
Pipes
3'-0" Gravel Ditch
Drill Hole "11
El 1619.63
Top Rock 1612±
Approximate line of maximum fill at foundation
Sloping Filter of Gravel or Stone
Top of Stilling Basin Slab 1603
PLAN
Excess rock from excavation dumped on creek banks
40'-0"
29'±
New Channel

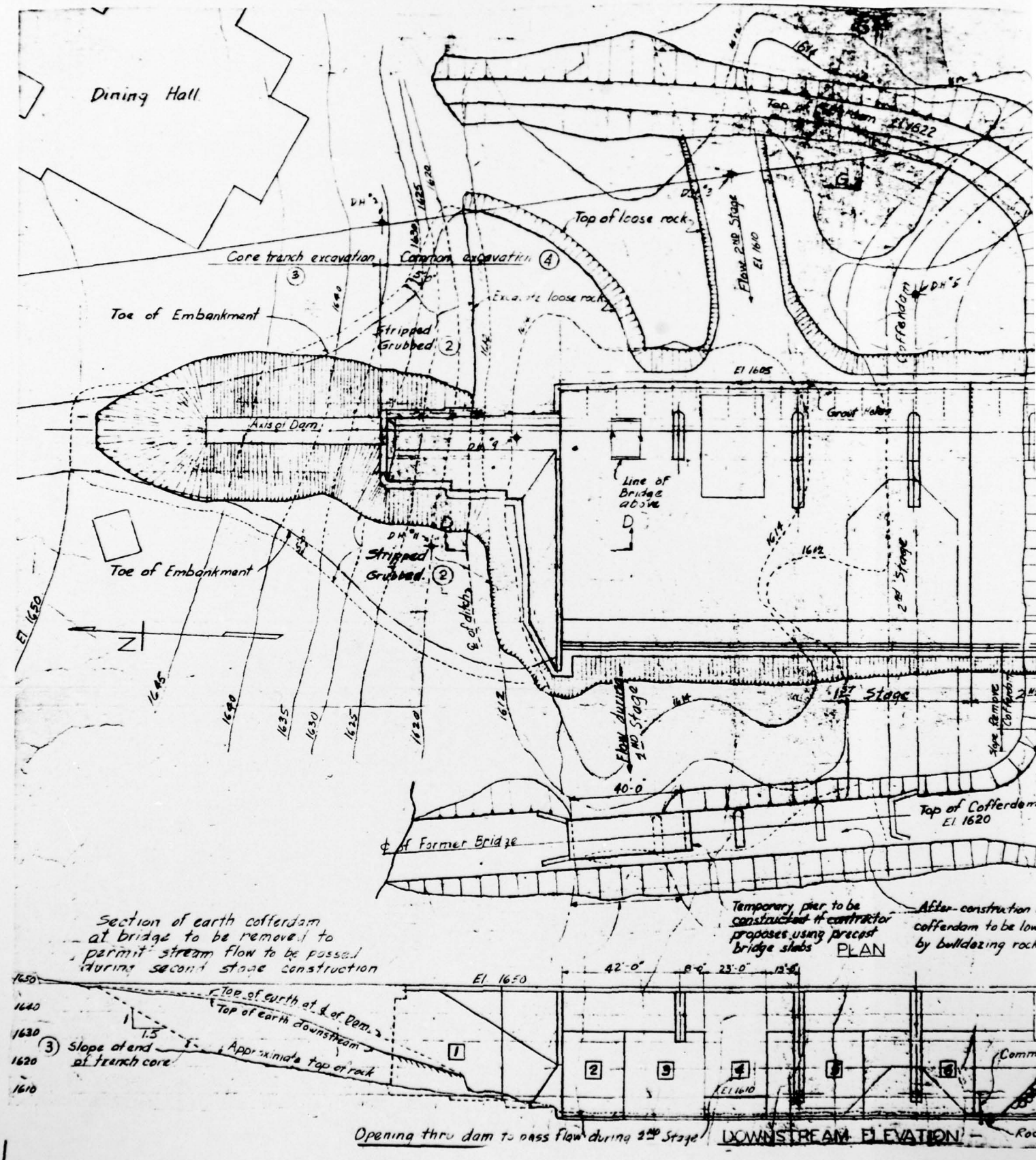


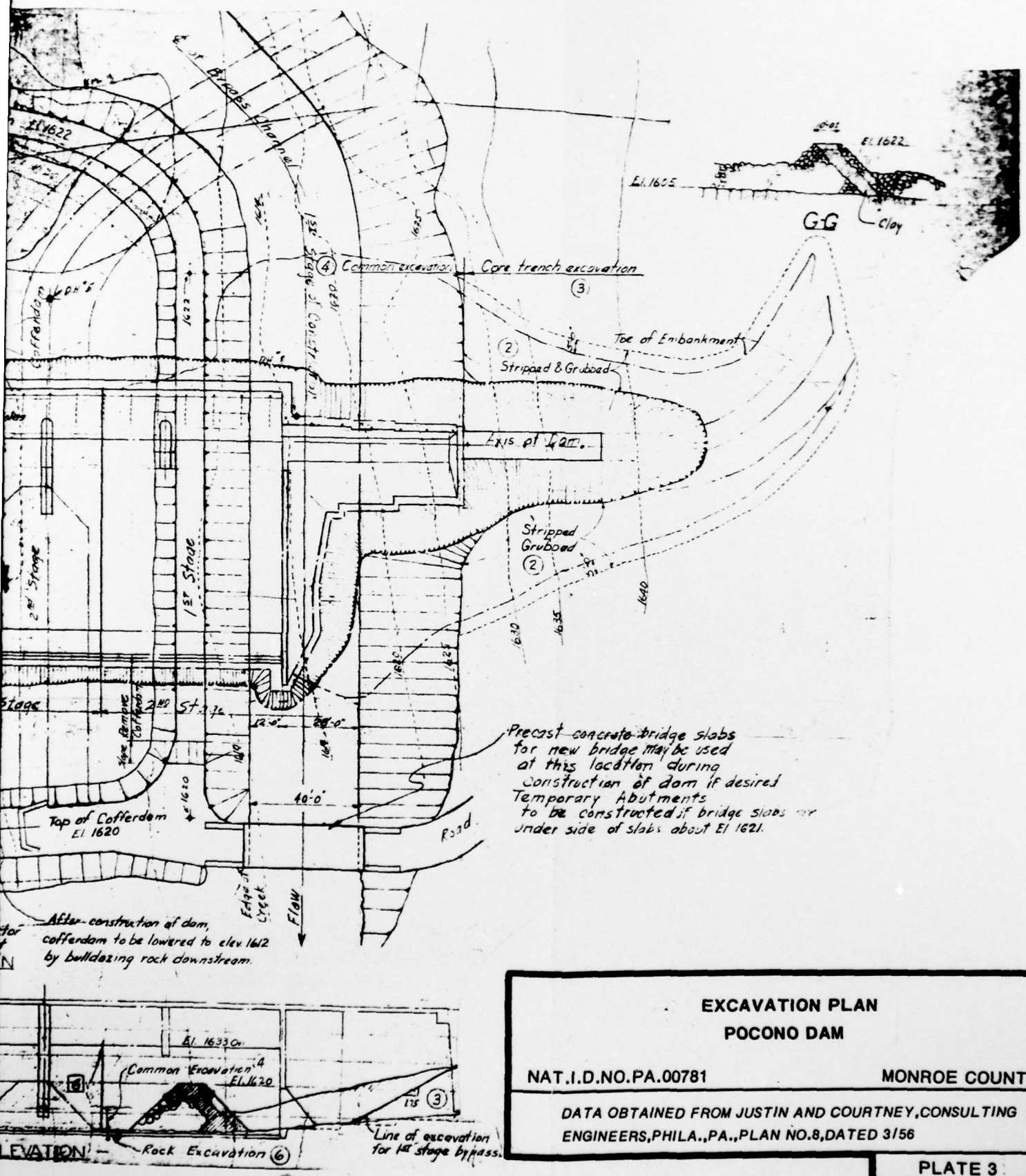
PLAN OF DAM AND APPURTENANCES
POCONO DAM

NAT.I.D.NO.PA.00781 — MONROE COUNTY

DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO.1, DATED 3/56

PLATE 2


Dining Hall
Top of loose rock
Core trench excavation
Common excavation
Toe of Embankment
Stripped
Grubbed
Excavate loose rock
Axis of Dam
Toe of Embankment
Stripped
Grubbed
Line of Bridge above
Grout holes
Flow 2nd Stage
El 1610
Cofferdam
El 1605
2nd Stage
1st Stage
Flow during 2nd Stage
Top of Cofferdam
El 1620
℄ of Former Bridge
Temporary pier to be constructed if contractor proposes using precast bridge slabs
PLAN
Section of earth cofferdam at bridge to be removed to permit stream flow to be passed during second stage construction
Top of earth at ℄ of Dam
Top of earth downstream
Slope at end of trench core
Approximate top of rock
El 1650
42'-0"
8'-0"
25'-0"
13'-6"
El 1610
Opening thru dam to pass flow during 2nd Stage
DOWNSTREAM ELEVATION



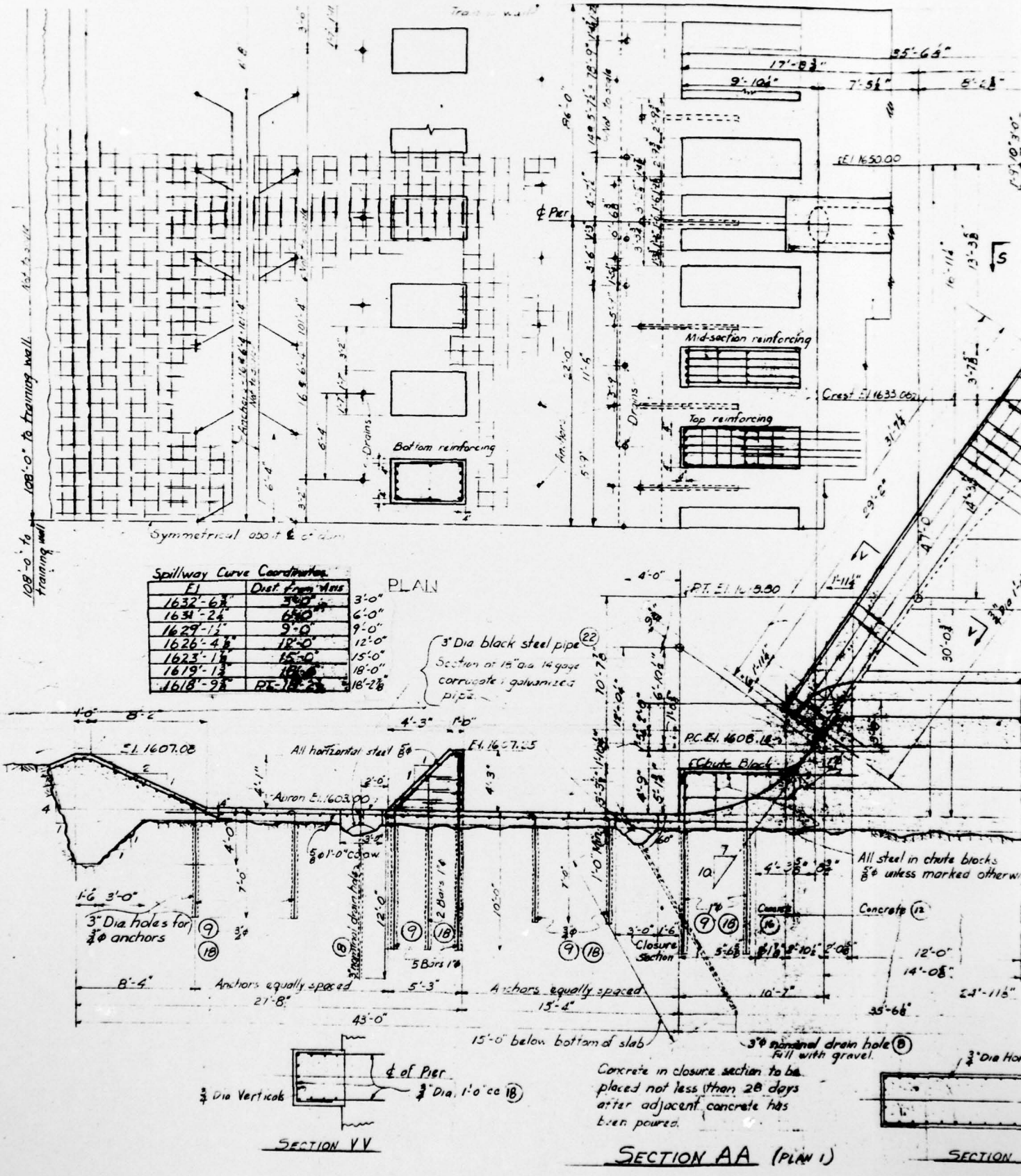
EXCAVATION PLAN
POCONO DAM

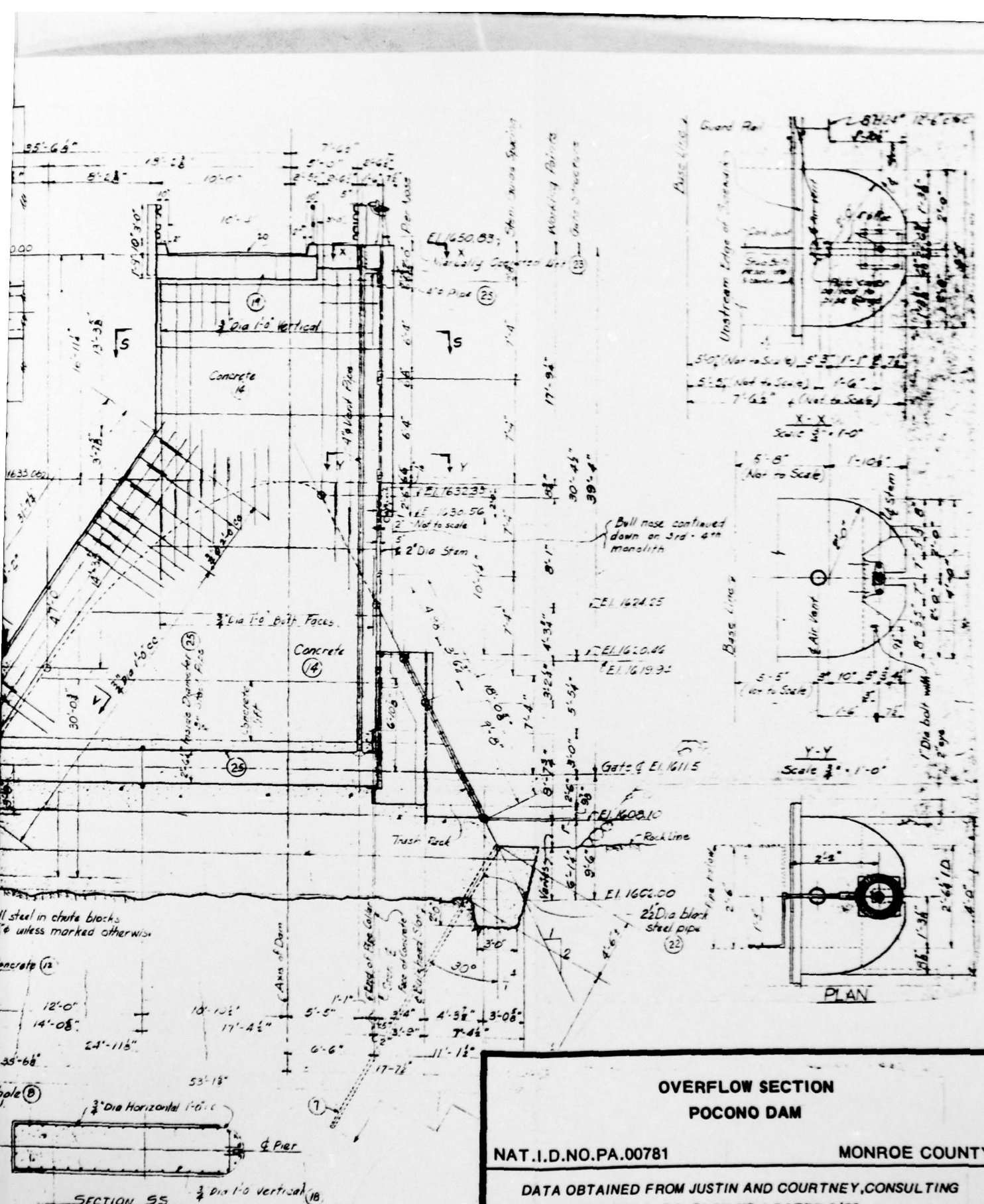
NAT.I.D.NO.PA.00781 — MONROE COUNTY

DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO.8, DATED 3/56

PLATE 3

2


Bottom reinforcing
Mid-section reinforcing
Top reinforcing
Drains
Anchors
¢ Pier
EL 1650.00
Crest El 1633.00
Symmetrical about ¢ of dam
PLAN
Spillway Curve Coordinates
El
Dist. from Axis
1632'-6½"
3'-0"
1631'-2½"
6'-0"
1629'-11"
9'-0"
1626'-4½"
12'-0"
1623'-1½"
15'-0"
1619'-1½"
18'-0"
1618'-9½"
18'-2⅞"
3" Dia black steel pipe (22)
Section at 15" dia 14 gage corrugated galvanized pipe
All horizontal steel ⅝¢
El. 1607.08
El. 1603.00
Apron
¢ Chute Block
P.C. El. 1608.18
P.T. El. 1630.30
5 Bars 1'¢
2 Bars 1'¢
3" Dia holes for ¾¢ anchors (9) (18)
3" nominal drain hole (8)
Anchors equally spaced 21'-8"
Anchors equally spaced 15'-4"
43'-0"
8'-4"
5'-3"
Closure Section
Concrete (12)
All steel in chute blocks ⅝¢ unless marked otherwise
15'-0" below bottom of slab
Full with gravel
¾ Dia Verticals
¾" Dia, 1'-0" cc (18)
¢ of Pier
Concrete in closure section to be placed not less than 28 days after adjacent concrete has been poured.
SECTION V-V
SECTION AA (PLAN 1)
SECTION

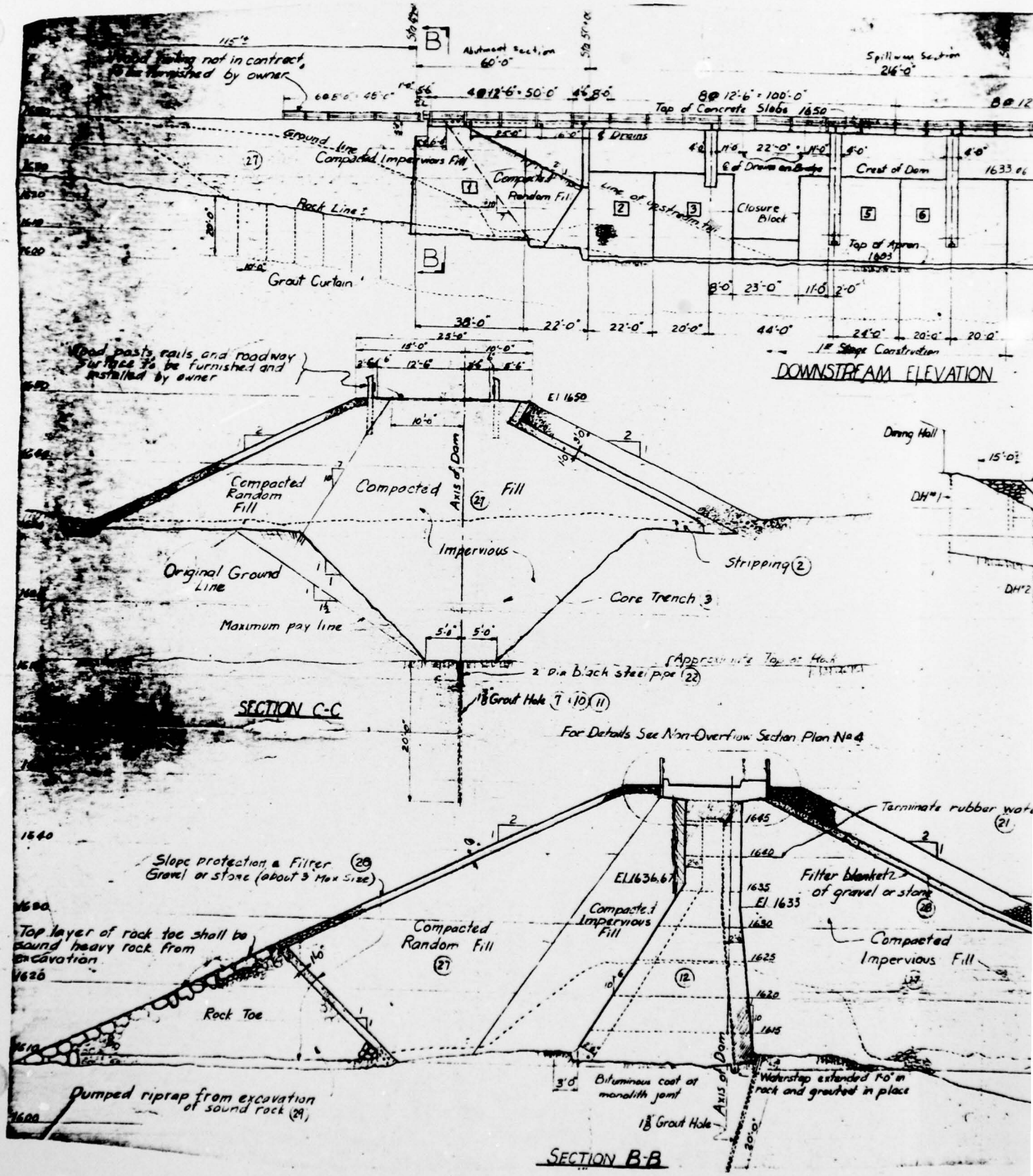


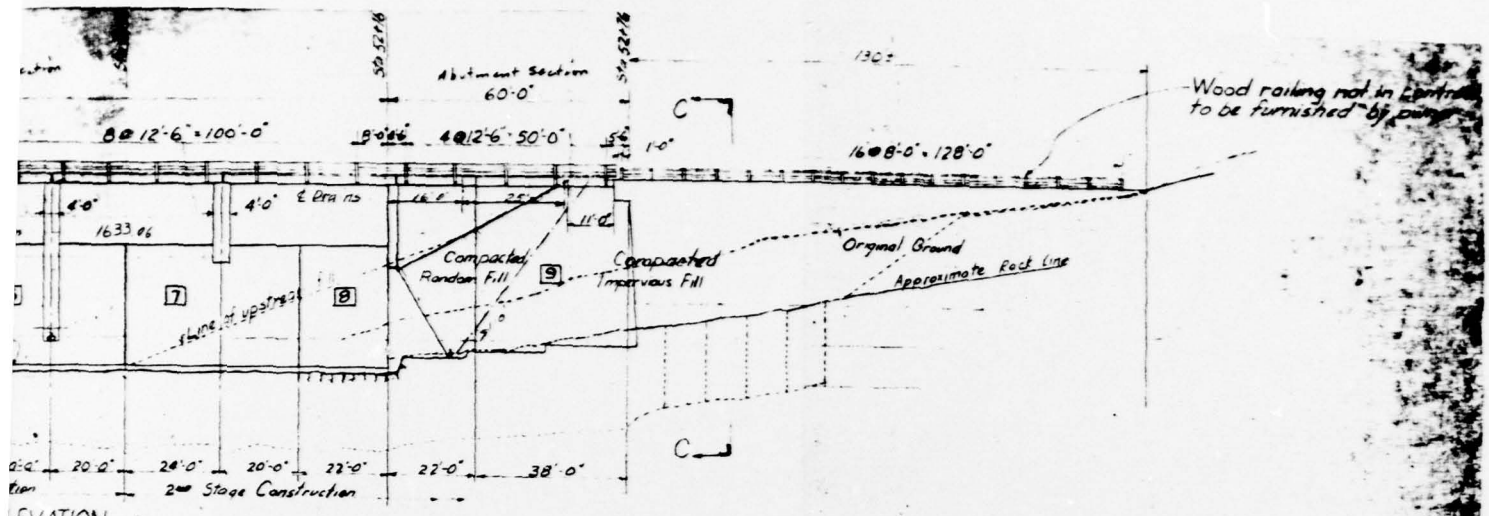
OVERFLOW SECTION
POCONO DAM

NAT.I.D.NO.PA.00781 **MONROE COUNTY**

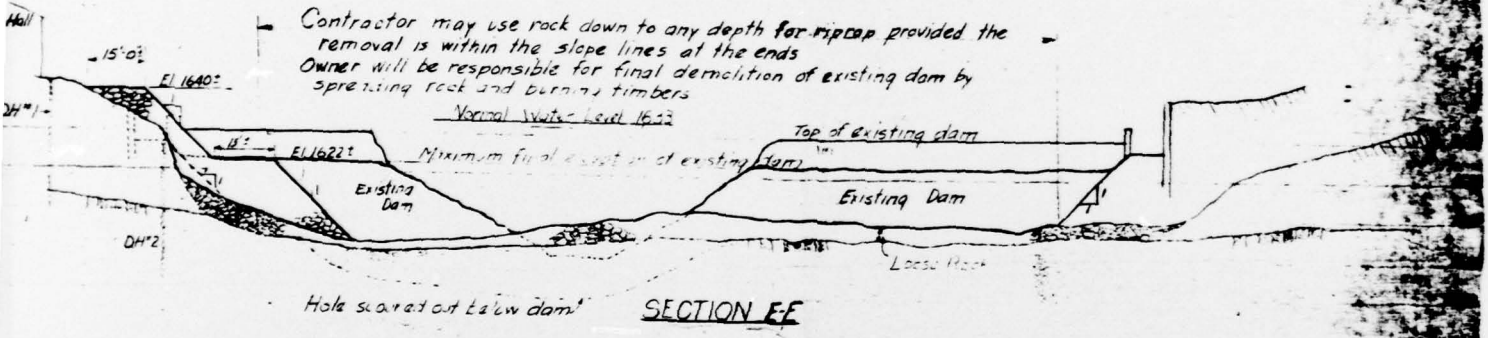
DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO.4, DATED 3/56

PLATE 4


Abutment Section
Spillway Section
Top of Concrete Slabs 1650
Drains
Crest of Dam
1633.06
Compacted Impervious Fill
Compacted Random Fill
Rock Line?
Grout Curtain
Closure Block
Top of Apron
1603
1st Stage Construction
DOWNSTREAM ELEVATION
Road posts, rails, and roadway surface to be furnished and installed by owner
El 1650
Compacted Random Fill
Compacted Fill
Axis of Dam
Impervious
Stripping (2)
Original Ground Line
Core Trench (3)
Maximum pay line
2" Dia Black steel pipe (22)
1 3/8" Grout Hole (7) (10) (11)
SECTION C-C
For Details See Non-Overflow Section Plan No 4
Terminate rubber water
Slope protection & Filter Gravel or stone (about 3" Max Size) (28)
El 1636.67
Filter blanket of gravel or stone
El 1633
Compacted Impervious Fill
Top layer of rock toe shall be sound heavy rock from excavation
Rock Toe
Bituminous coat at monolith joint
Waterstop extended 1'-0" in rock and grouted in place
Dumped riprap from excavation of sound rock (29)
1 3/8" Grout Hole
SECTION B-B
Dining Hall
DH#1
DH#2



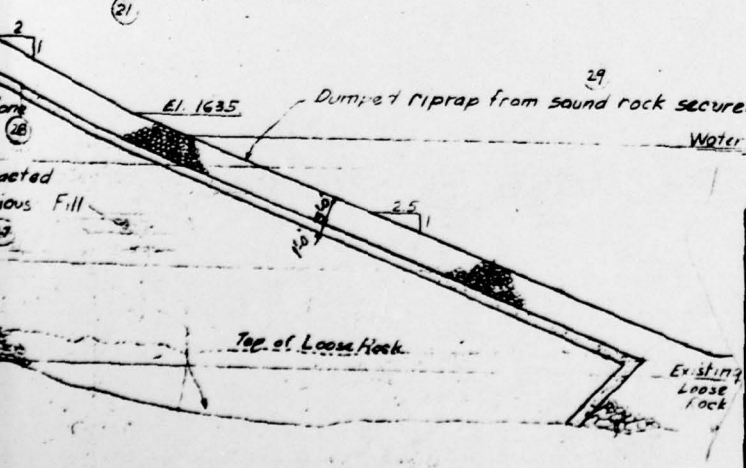
ELEVATION



SECTION E-E

GENERAL NOTES.

Figures in squares indicate monolith numbers.
All exposed edges shall be chamfered.
Distance of reinforcing bars from face
Figures in circles indicate the item
which payment will be made.



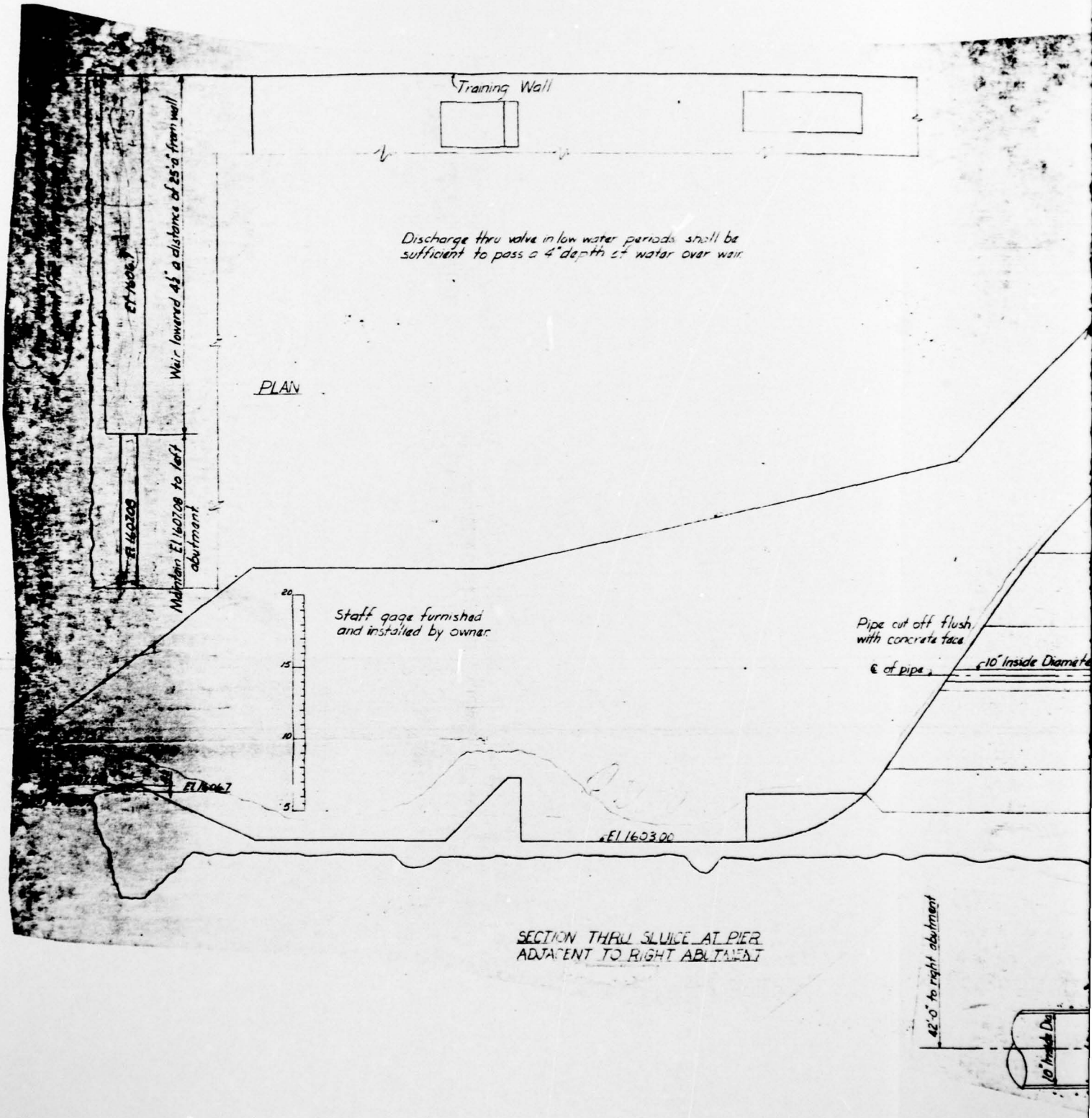
EMBANKMENT SECTIONS

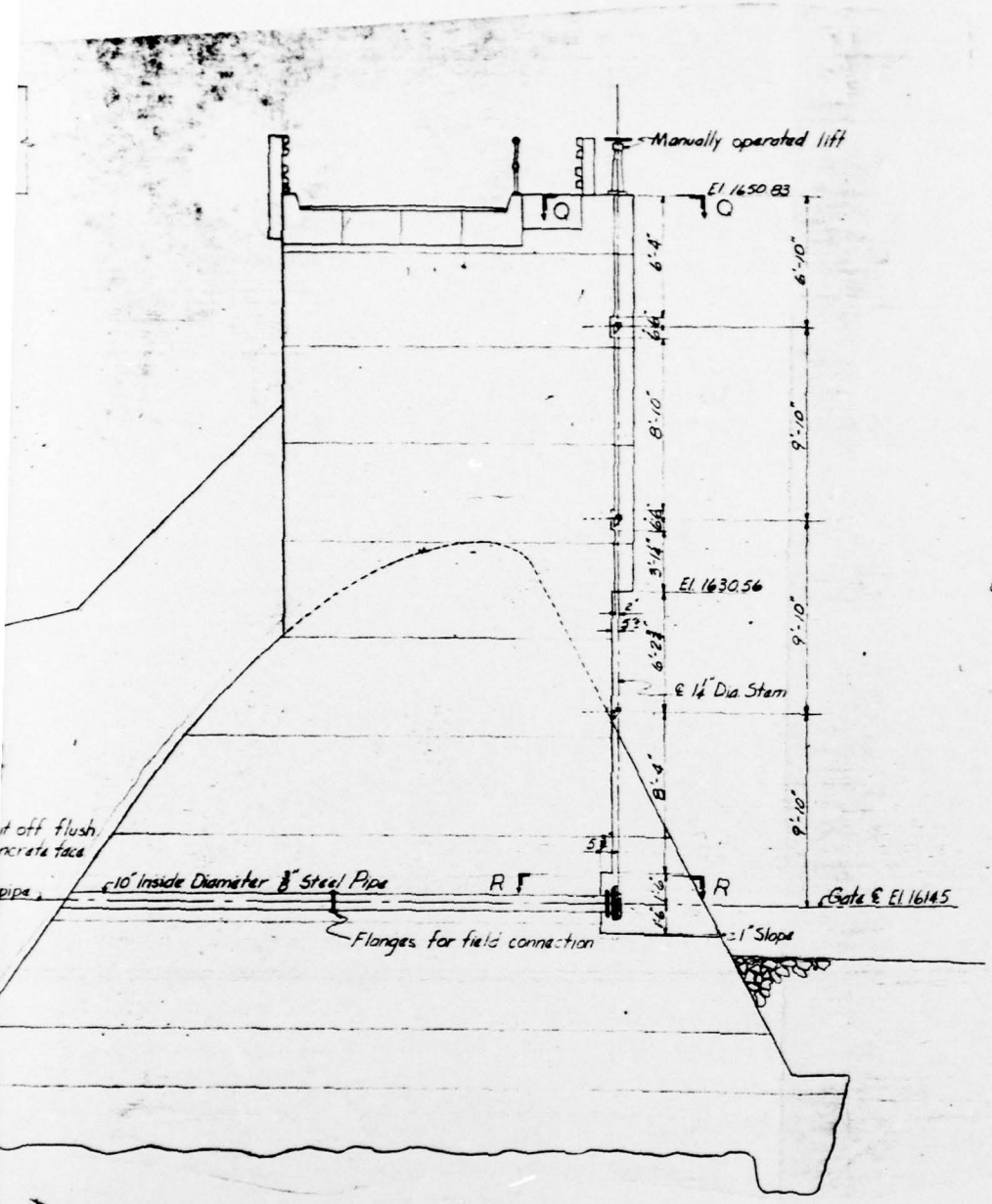
POCONO DAM

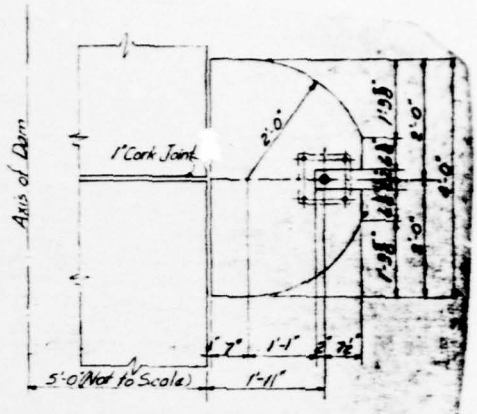
NAT.I.D.NO.PA.00781 — **MONROE COUNTY**

DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO.5, DATED 3/56

PLATE 5


Training Wall
Discharge thru valve in low water periods shall be sufficient to pass a 4" depth of water over weir
Weir lowered 4½" a distance of 25'-0" from wall
El 160708
El 160708
Maintain El 160708 to left abutment
PLAN
Staff gage furnished and installed by owner
20
15
10
5
El 160967
Pipe cut off flush with concrete face
℄ of pipe
10" Inside Diameter
El 160300
SECTION THRU SLUICE AT PIER ADJACENT TO RIGHT ABUTMENT
42'-0" to right abutment
10" Inside Dia

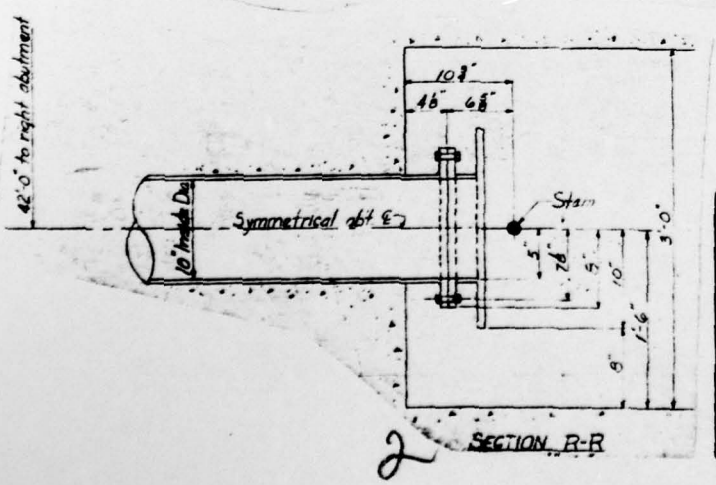




SECTION O-O

Upstream staff gage furnished and installed by owner.

This plan submitted to satisfy condition 13 of Permit (File No. 45-222) issued to Pocono Lake Preserve for a dam across Tobyhanna Creek in Tobyhanna Township, Monroe County



SECTION R-R

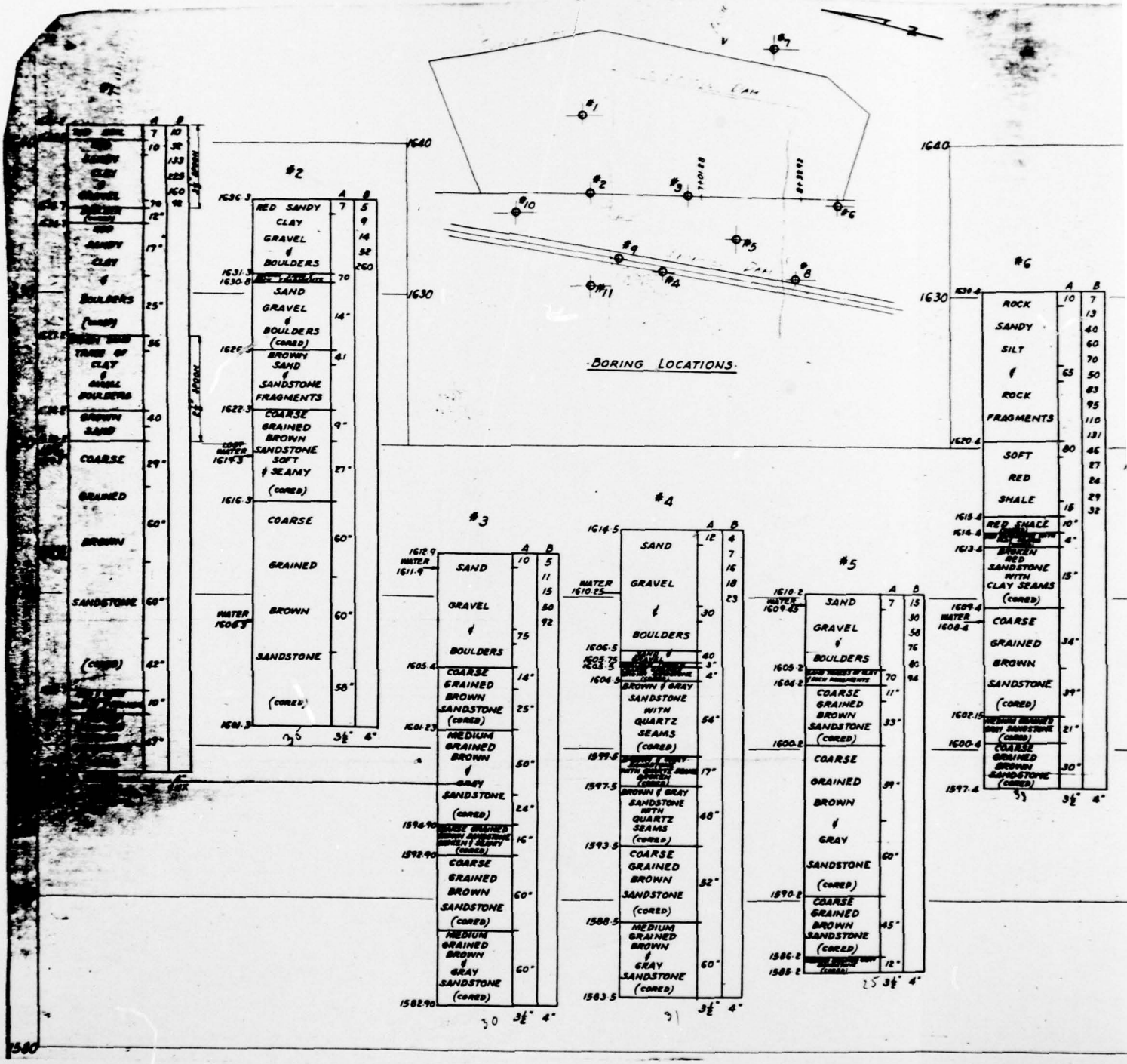
2

OUTLET AND LOW FLOW DISCHARGE
POCONO DAM

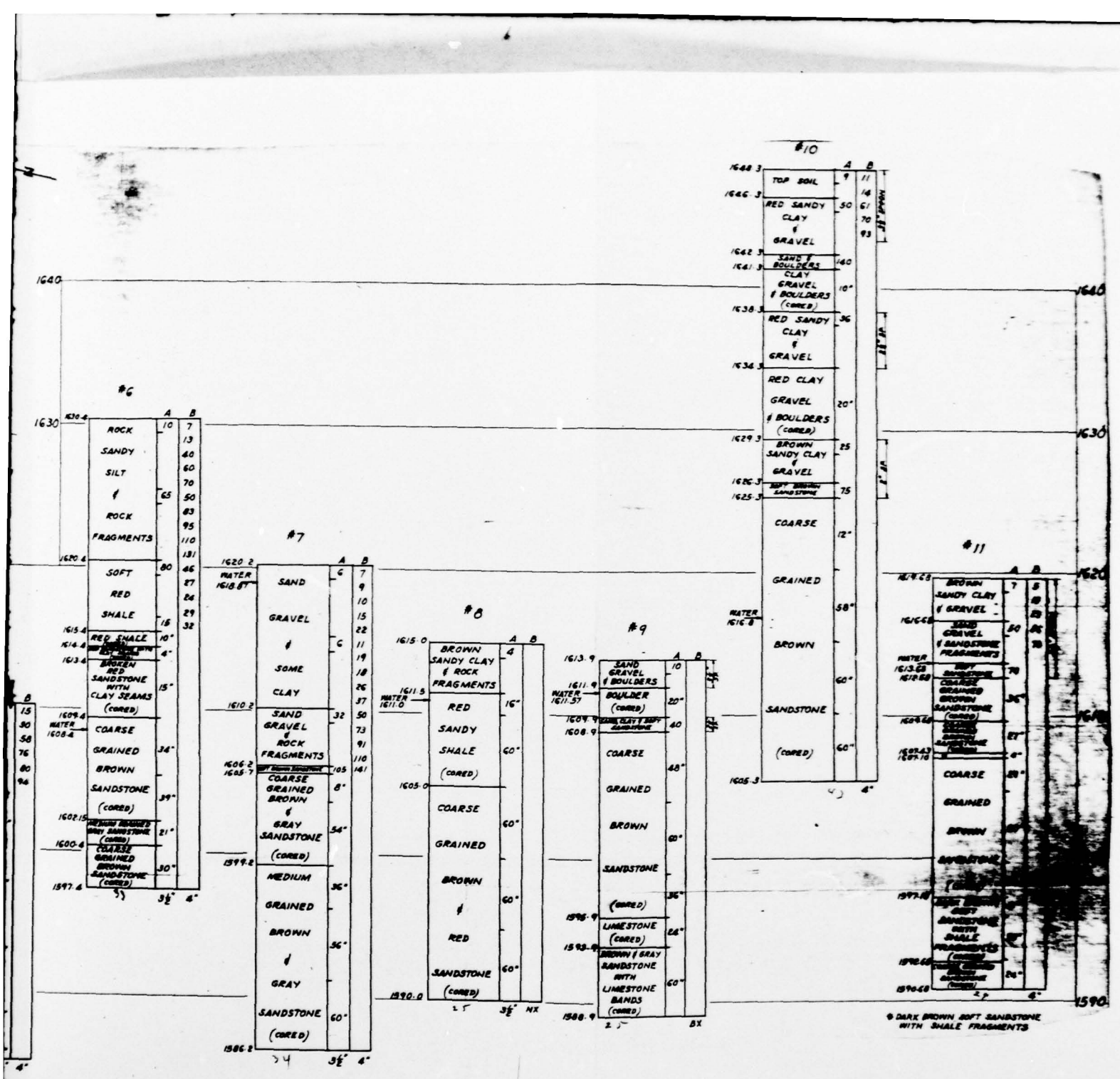
NAT.I.D.NO.PA.00781 **MONROE COUNTY**

DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO.9, DATED 4/25/56

PLATE 6



NOTE:
COLUMN A DENOTES
COLUMN B DENOTE
SPOON & DRIVE HA
SPOON SIZE AS IN
CASING SIZE -
CORE BIT - NX & B



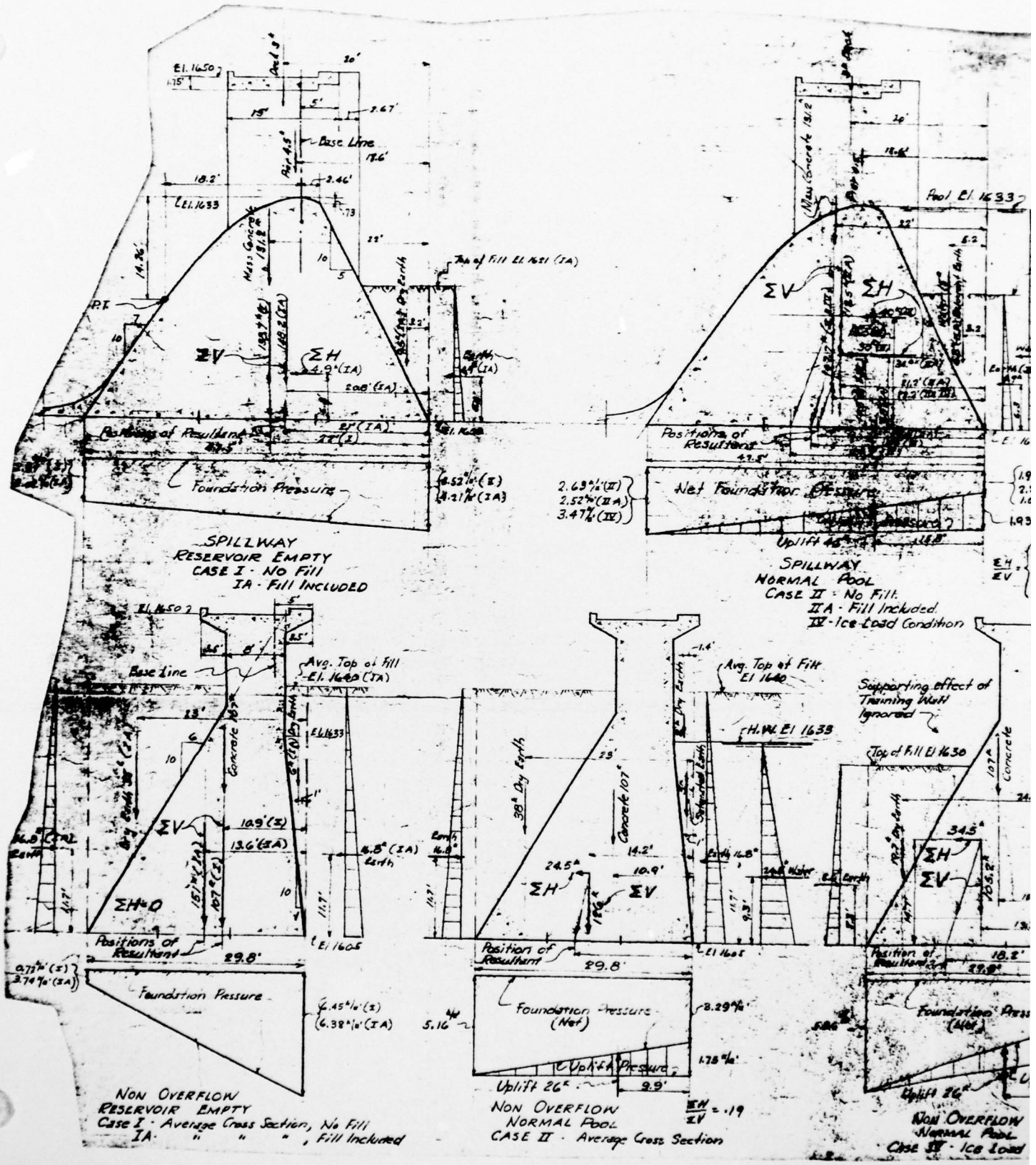
NOTE:
COLUMN A DENOTES SAMPLE BLOWS & CORE RECOVERY
COLUMN B DENOTES CASING BLOWS
SPOON & DRIVE HAMMER = 300 LBS., DROP = 20"
SPOON SIZE AS INDICATED BELOW COLUMN A OR TO RIGHT OF HOLE
CASING SIZE " " " COLUMN B
CORE BIT = NX & BX

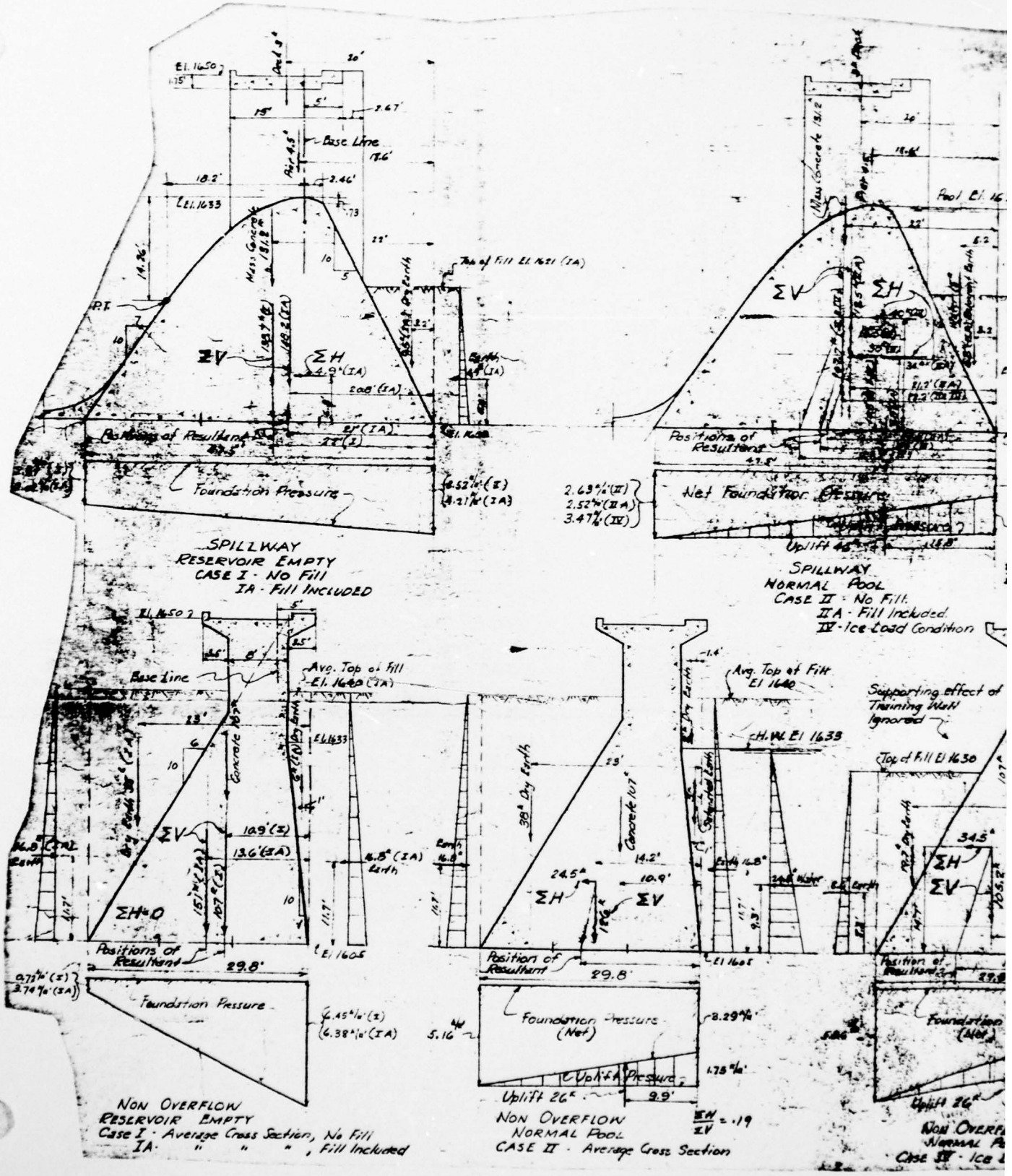
LOGS OF BORINGS
POCONO DAM

NAT.I.D.NO.PA.00781 MONROE COUNTY

DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., DRAWING NO.2, DATED 11/5/55

PLATE 7


SPILLWAY
RESERVOIR EMPTY
CASE I - NO FILL
IA - FILL INCLUDED
SPILLWAY
NORMAL POOL
CASE II - NO FILL
IIA - FILL INCLUDED
IV - ICE LOAD CONDITION
NON OVERFLOW
RESERVOIR EMPTY
Case I - Average Cross Section, No Fill
IA " " " , Fill Included
NON OVERFLOW
NORMAL POOL
CASE II - Average Cross Section
NON OVERFLOW
NORMAL POOL
Case IV - Ice Load
Foundation Pressure
Net Foundation Pressure
Uplift 48'
Uplift 26'
Positions of Resultant
Position of Resultant
Base Line
Avg. Top of Fill
Supporting effect of Training Wall Ignored
Concrete
Earth
Water


SPILLWAY
RESERVOIR EMPTY
CASE I - NO FILL
IA - FILL INCLUDED
Foundation Pressure
SPILLWAY
NORMAL POOL
CASE II - No Fill.
IIA - Fill Included.
IV - Ice Load Condition
Net Foundation Pressure
Uplift
NON OVERFLOW
RESERVOIR EMPTY
Case I - Average Cross Section, No Fill
IA - " " " , Fill Included
NON OVERFLOW
NORMAL POOL
CASE II - Average Cross Section
Foundation Pressure (Net)
Uplift
Supporting effect of Training Wall Ignored
Concrete
Earth

AD-A078 875 WOODWARD-CLYDE CONSULTANTS PLYMOUTH MEETING PA F/G 13/13
NATIONAL DAM INSPECTION PROGRAM. POCONO LAKE DAM (NDS I.D. NUMB--ETC(U)
JUL 79 J BOSCHUK, J H FREDERICK DACW31-79-C-0017
UNCLASSIFIED NL

2 OF 2
AD
A078875

END
DATE
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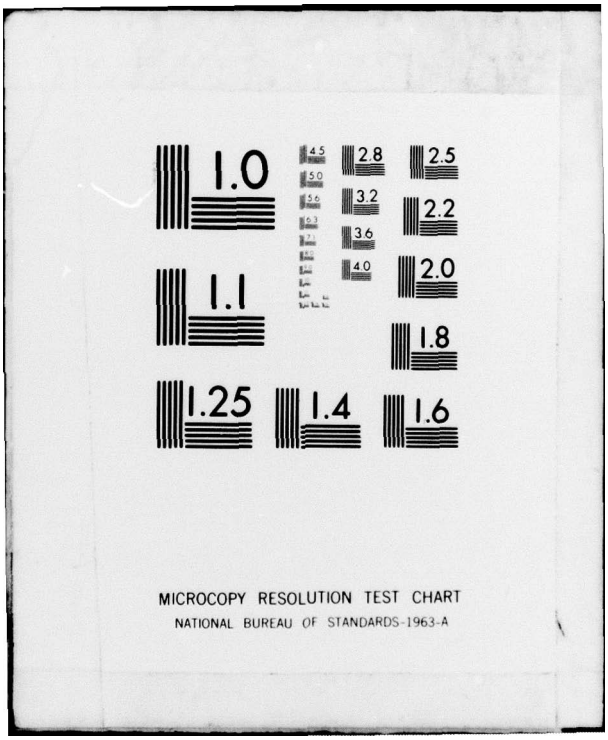
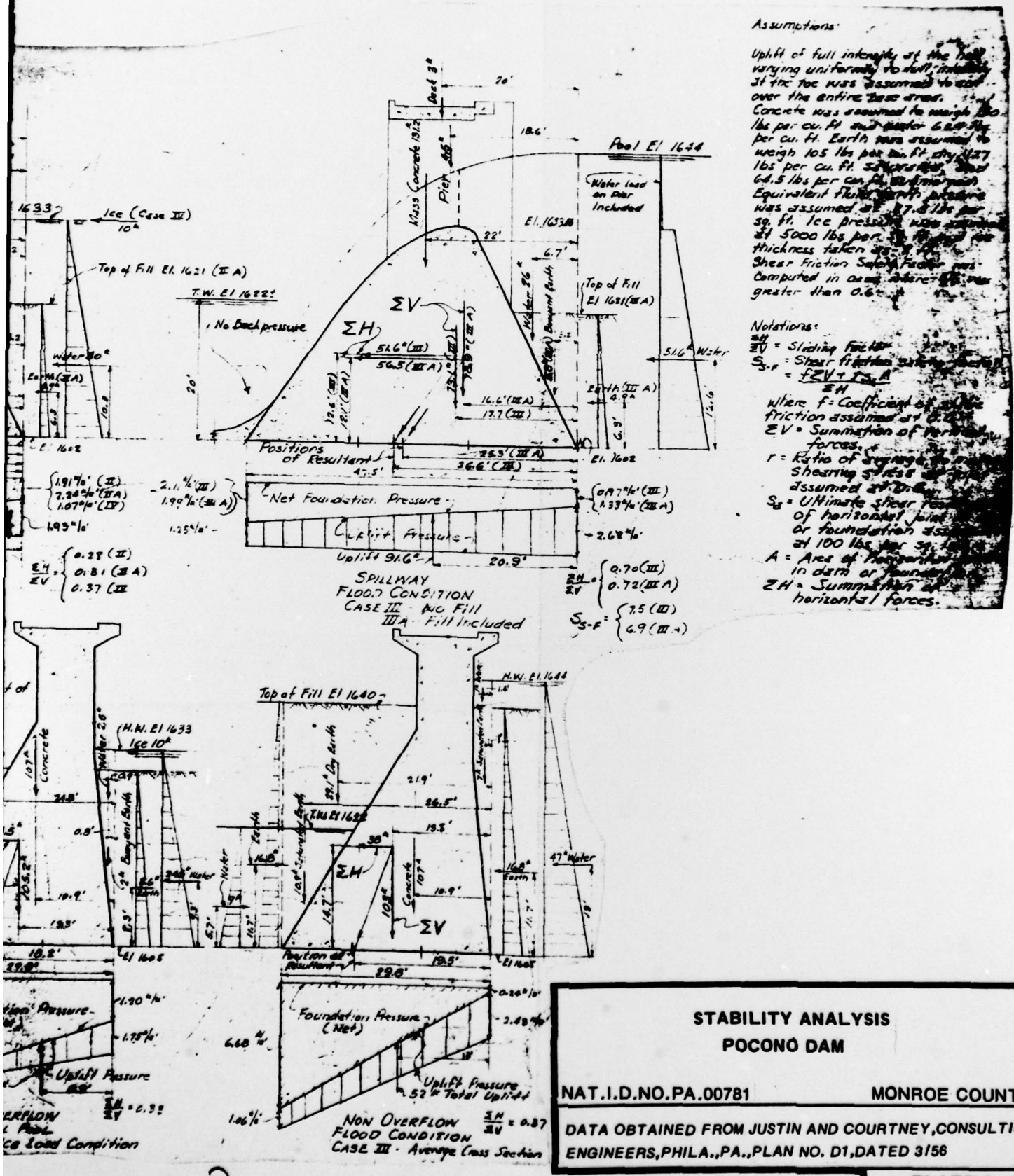
1-80
DDC


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
7.1
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



STABILITY ANALYSIS
POCONO DAM

NAT.I.D.NO.PA.00781 MONROE COUNTY

DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO. D1, DATED 3/56

PLATE 8

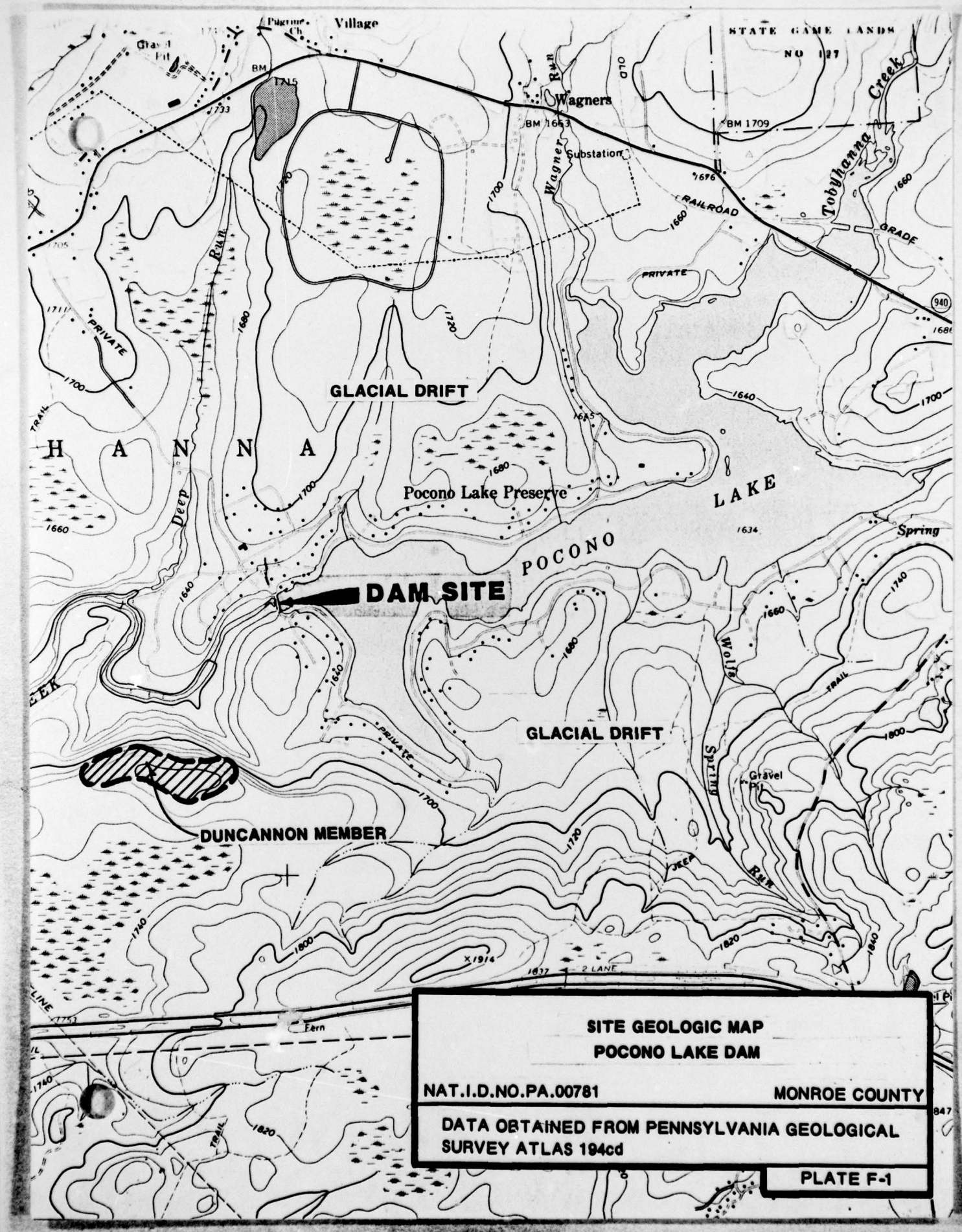
2

APPENDIX

F

SITE GEOLOGY
POCONO DAM

Pocono Dam is located in the Pocono Plateau Section of the Appalachian Plateaus Physiographic Province. As shown on Plate F-1, the dam and surrounding region, as is much of northeastern Pennsylvania, are underlain by the Upper Devonian age Duncannon Member of the Catskill Formation, which is overlain by a partial mantle of Wisconsin age glacial drift. Immediately downstream of the dam is a limited exposure of sandy siltstone which strikes to the northwest and dips approximately 10 degrees to the southwest (downstream direction). A major set of high angle rock jointing strikes near east-west. Conditions favorable to seepage include the downstream direction of bedrock dip and joint pattern in addition to the nearness of bedrock to the ground surface and general character of glacial deposits.



SITE GEOLOGIC MAP
POCONO LAKE DAM

NAT.I.D.NO.PA.00781 **MONROE COUNTY**

DATA OBTAINED FROM PENNSYLVANIA GEOLOGICAL SURVEY ATLAS 194cd

PLATE F-1