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NATIONAL DAM INSPECTION PROGRAM. SCS DAM PA-451 (NDI NUMBER PA---ETC(U)
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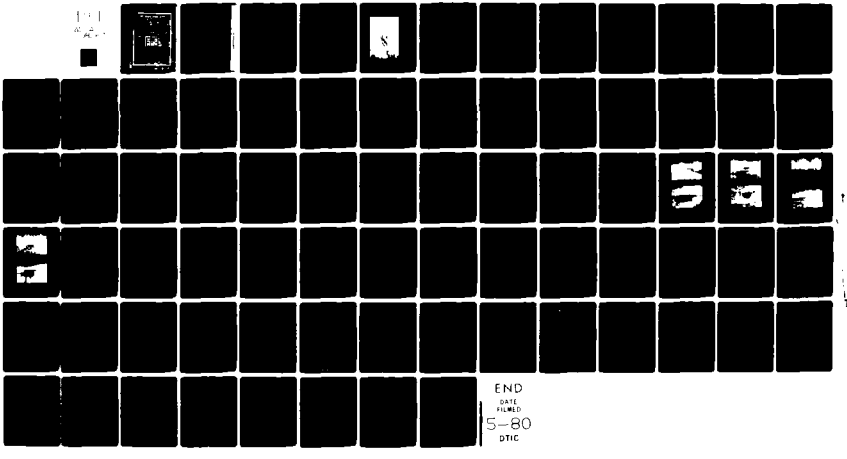

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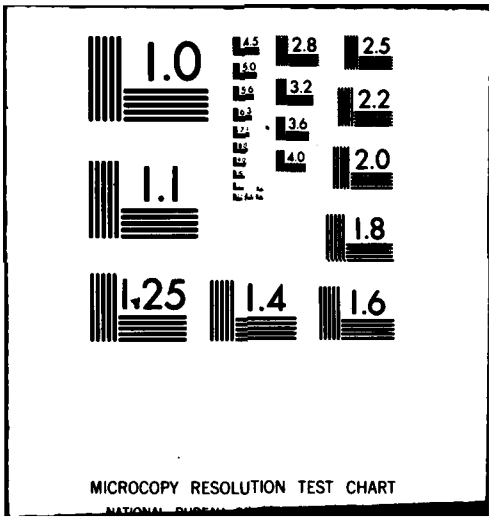
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PREFACE

This report has been prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I esti-gations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

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

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

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway 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.

A 22

PHASE I REPORT

NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITIONS
AND RECOMMENDATIONS

Name of Dam:	SCS DAM PA-451
State & State No.:	PENNSYLVANIA, 64-197
County:	WAYNE
Stream:	NEVIN CREEK
Date of Inspection:	November 6, 1979

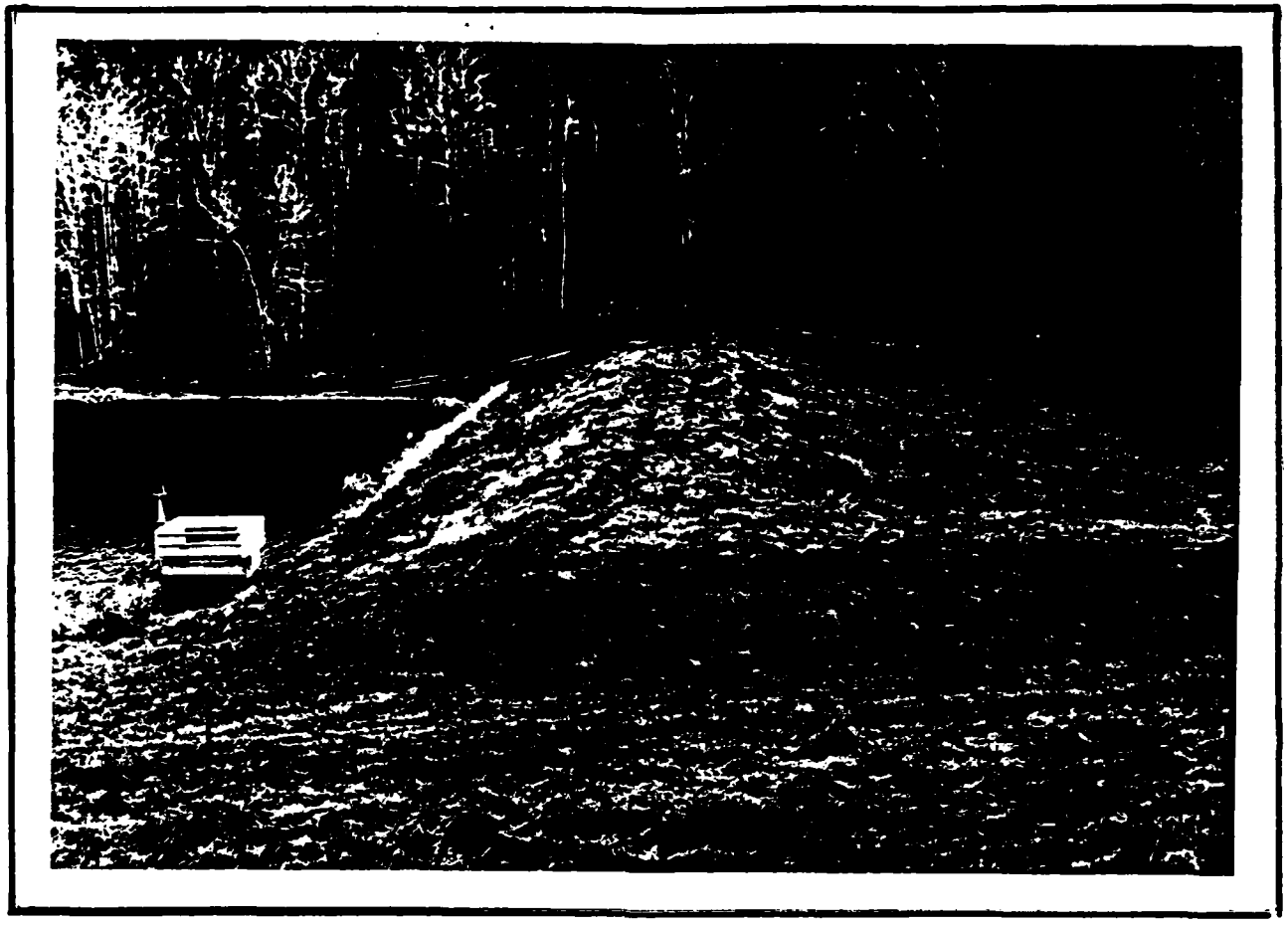
Based on the visual inspection, past performance and the available engineering data, the dam and its appurtenant structures appear to be in good condition.

In accordance with the Corps of Engineers' evaluation guidelines, the size classification of this dam is small and the hazard classification is high. For this dam the recommended Spillway Design Flood (SDF) is the Probable Maximum Flood (PMF). The spillway capacity is able to pass the full PMF peak inflow without overtopping the dam, and is considered to be adequate.

The following recommendations are presented for immediate action by the owner:

1. That the fence in the emergency spillway be removed.

2. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.



OVERVIEW

SCS DAM PA-451

Photograph No. 1

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

SCS DAM PA-451

NDI-ID NO. PA-01031
DER-ID NO. 64-197

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 inspections of dams throughout the United States.

B. Purpose

The purpose of this inspection is to determine if the dam constitutes a hazard to human life and property.

1.2 DESCRIPTION OF PROJECT

A. Description of Dam and Appurtenances

This flood control dam was designed by the United States Soil Conservation Service (SCS) and is known to its owners as SCS Dam PA-451. The facilities, completed in 1972, consist of a 300 foot long, zoned earthfill embankmment with a maximum height of 15 feet above the streambed. The structure has two spillways. The principal spillway is a drop inlet structure and discharges through a 30-inch diameter pipe. An emergency spillway is constructed in the right abutment. This spillway consists of a grassed earth channel with a bottom channel width of 60 feet. The emergency spillway crest was designed to be 5 feet below the top of the dam.

B.	Location:	Dreher Township, Wayne County U.S.G.S. Quadrangle - Newfoundland, Pa. Latitude 41°-17.7', Longitude 75°-21.7' Appendix E, Plates I & II
C.	Size Classification:	Small (Height 15 feet Storage 190 acre-feet)

D. Hazard Classification: High (Refer to Section 3.1.E)

E. Ownership (Maintenance): Wayne County Commissioners
Wayne County Court House
Honesdale, PA 18431

F. Purpose: Flood control

G. Design and Construction History

The flood control dam was designed by the U.S.D.A. Soil Conservation Service. An application for a permit to construct the dam was filed by the Wayne County Commissioners and approved by the Pennsylvania Department of Environmental Resources (PennDER) on March 18, 1971. The contractor, Giffin Construction Company of LeRaysville, PA, started work on July 6, 1971. After a long winter shutdown, construction was completed in August 1972.

H. Normal Operating Procedures

The facilities were constructed to retard storm water runoff. Both spillways are uncontrolled. All inflow is discharged through the principal spillway until the pool level reaches the level of the emergency spillway crest.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

From files:	0.5
Computes for this report:	0.5
Use:	0.5

B. Discharge at Dam Site (cubic feet per second)
See Appendix D for hydraulic calculations

Maximum estimated inflow, based on records of the U.S.G.S. gaging station on Mill Creek at nearby Mountainhome, Pa.	120
Principal spillway at pool Elev. 1896.4 (Emergency spillway elevation)	68
Principal spillway at pool level Elev. 1901.1 (Low point of dam)	85
Emergency spillway capacity at pool Elev. 1901.1 (Low point of dam)	1966

	Total spillway capacity	2051
C.	Elevation (feet above mean sea level)	
	Top of dam (low point as surveyed)	1901.1
	Top of dam (design)	1901.8
	Emergency spillway crest (as surveyed)	1896.4
	Emergency spillway crest (design)	1896.8
	Upstream orifice opening invert, normal pool (top of stoplog)	1890.7
	Downstream outlet invert	1886.1
	Streambed at centerline of dam - estimate	1888.0
D.	Reservoir (miles)	
	Length of normal pool	.3
	Length of maximum pool	.4
E.	Storage (acre-feet)	
	Sediment pool spillway crest (Elev. 1890.7)	2.8
	Emergency spillway crest (Elev. 1896.4)	98
	Top of dam (Elev. 1901.1)	190
F.	Reservoir Surface (acres)	
	Top of dam (Elev. 1901.1)	21
	Emergency spillway crest (Elev. 1896.4)	18
	Sediment pool spillway crest (Elev. 1890.7)	15

G. Dam

Refer to Plates III through IX in Appendix E for plan and section.

Type: Zoned earthfill.

Length: 300 feet.

Height: 15 feet.

Top Width: Design - 12 feet; Surveyed - 13 feet.

Side Slopes:	Design	Surveyed
Upstream	3H to 1V	2.75H to 1V
Downstream	3H to 1V	2.75H to 1V

Zoning: Central core section of impervious material. Coarser material placed on the upstream and downstream sections. (See Plate VI, Appendix E).

Cutoff: Cutoff trench excavated to varying depth across the valley (Plate IV, Appendix E).

Grouting: None.

H. Outlet Facilities

One 16 inch diameter orifice and sluice gate in principal spillway drop inlet structure, discharging through 30 inch diameter principal spillway conduit. Invert elevation is 1887.05.

I. Spillway

Sediment Pool

Type: 9 inch high by 24 inch wide orifice.

Location: Drop inlet structure.

Invert: 1890.2 (stoplog to 1890.7)

Principal

Type: Drop inlet structure. Riser has 2 side weirs, however, weirs become submerged with very little flow. Orifice of discharge conduit provides control.

Location: Upstream toe, center of dam.

Crest of Drop Inlet Structure: 1893.8

Invert of Orifice: 1886.8

Discharge Conduit: 30 inch diameter pipe through embankment.

Emergency

Type: Uncontrolled, sod-lined broad crested weir and channel.

Location: Right abutment.

Crest Elevation: 1896.4

Width: 60' on bottom with side slopes of 3H to 1V on both sides.

J. Regulating Outlet

See Section 1.3.H above.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The engineering design data for this dam are found in two principal documents: A design report and the construction drawings. Both documents were prepared by the S.C.S., the design agency. The design report is a comprehensive documentary report with hydrologic and hydraulic data, soils investigation information, including field and laboratory results, geologic report, structural design calculations and specifications. This report and full size drawings are available in the PennDER files. Several of the drawings have been reduced and are included in Appendix E of this report. Reference is made to Section 5.1.A. and 6.1.B. of this report for discussion of some of the available design criteria.

2.2 CONSTRUCTION

The available construction data is limited to progress reports, indicating percentage of completion of major work items and a set of "As Built Plans." The plans shown in Appendix E are reproduced from this set. There are no records of any construction problems.

A copy of the project specifications as proposed in February 1971 is included in the design report.

2.3 OPERATION

There are no formal records of operation with the owner, PennDER or S.C.S. The purpose of the facility is flood control and besides an annual maintenance inspection program, there are no other operational procedures.

2.4 EVALUATION

A. Availability

Copies of the design report, as built drawings and specifications are available in the files of PennDER. Duplicate information is available in the files of the S.C.S. office in Harrisburg, PA.

B. Adequacy

The available engineering data is considered sufficiently adequate for a reasonable assessment of the design of the dam.

C. Operating Records

Operating records, including maximum pool levels, are not maintained by the County, the agency responsible for maintenance of the project.

D. Post Construction Changes

There have been no modifications made to this facility since the completion of construction in 1972, except that a barbed wire fence has been placed in the emergency spillway.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

A. General

The general appearance of SCS Dam PA-451 is good. The dam, completed in 1972, was designed by the Soil Conservation Service as a flood control structure and is located on privately owned property. The County Commissioners of Wayne County are responsible for the maintenance of the dam and its appurtenant structures. An access easement agreement exists between the owners of the property and the Commissioners. The contributing drainage area is small.

The visual inspection check list and sketches of the general plan and profile of the dam, as surveyed during the inspection, are presented in Appendix A of this report. Photographs made on the day of inspection are reproduced in Appendix C.

B. Embankment

The function of this dam is to detain storm water runoff and to release it slowly, thus, reducing the peak discharge in the downstream area. Storage, therefore, is its prime function. Most of its upstream slope is exposed at normal pool level.

The condition of the upstream and downstream embankment slopes appear to be good. There were no signs of slippage or sloughage. A heavy growth of field grass and crown vetch prevented close observation. Seepage was not observed; however, the normal pool level is close to the elevation of the downstream toe. Twelve-inch diameter CMP pipe drains are located in the downstream toe and are visible adjacent to the outlet pipe on each side.

The horizontal alignment of the dam is good. The vertical profile of the dam is apparently close to the design elevation. (Refer to Plate A-II, Appendix A). The crest of the embankment is covered with thick field grass.

C. Appurtenant Structures

There are two spillways; the principal spillway and an emergency spillway. The principal spillway consists of a drop inlet type structure with an orifice opening and an open top (See Photograph Plate C-II). The orifice was partially blocked by a piece of lumber (stoplog). Water discharges from this structure through a 30-inch pipe

under the embankment. At the outlet end of the pipe, there is an impact basin (Photograph No. 5). Twelve inch pipes discharge into the impact basin structure. These pipes are the outlet of an embankment drain.

The emergency spillway is located in the right abutment and consists of a grassed earth channel. Beyond the centerline of the dam, the channel curves to the left and joins the downstream channel of the principal spillway. A fence has been placed in the spillway, and could impede the flow.

D. Reservoir Area

This dam is located in the headwaters of the stream. The banks of the reservoir are stable. Most of the drainage area is wooded.

E. Downstream Channel

The immediate downstream area of the outlet pipe is natural woodlands. About 2,500 feet downstream from the dam are two homes. There is a potential for loss of life due to floodwaters downstream from the dam if the dam would fail. The hazard classification, therefore, is therefore considered to be "High."

3.2 EVALUATION

The overall visual evaluation of the facilities indicates that the dam is in good condition. The emergency spillway has a good grass mat for protection against erosion. The fence in the emergency spillway could impede the flow and should be removed. Although the small orifice opening (9 by 24 inches) has been blocked (to 3 by 24 inches), the drop inlet is an open type structure and considered to be adequate. The embankment has a thick growth of field grass and crown vetch, preventing close observation. There was no evidence of stability or seepage problems.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

This dam is a flood control dam maintained by Wayne County. All inflow is discharged through the uncontrolled principal spillway until the pool level reaches the elevation of the emergency spillway. The dam and facilities are regularly inspected by the County for possible maintenance requirements.

4.2 MAINTENANCE OF DAM

The embankment has a thick growth of field grass and crown vetch and apparently is not mowed. Brush or heavy weeds are not evident at the present time.

4.3 MAINTENANCE OF OPERATING FACILITIES

The only operating facility is a drawdown opening in the principal spillway. This opening is controlled by an 18-inch slide gate. Although the gate control was chained at the time of inspection, it was apparent that the mechanism is well maintained.

4.4 WARNING SYSTEM

There is no formally organized surveillance or downstream warning system in operation for this dam.

4.5 EVALUATION

Although the operational procedures for this dam are minimal, the facilities are in good condition. A formal surveillance plan and downstream warning system should be developed for implementation during periods of heavy or prolonged precipitation.

SECTION 5 - HYDROLOGY/HYDRAULICS

5.1 EVALUATION OF FEATURES

A. Design Data

The hydrologic and hydraulic analyses available from PennDER and SCS for SCS Dam PA-451 were extensive. A spillway rating curve, stage-storage curve, stage-area curve, design flood hydrograph and flood routing were all contained in the PennDER files. The computations contained in Appendix D of this report were made as a check on the designer's calculations. The designer's computations are in reasonably close agreement with those in the Appendix.

The design flood hydrograph used by the designer was based on SCS freeboard hydrograph having 24.5 inches of rainfall and producing a peak inflow of 2936 cfs. When routed through the reservoir, this flood caused the pond water level to rise to about 5 feet above the emergency spillway crest.

Since the design flood was not the Probable Maximum Flood (PMF), computations are shown in Appendix D to evaluate the routing of a PMF through this project.

B. Experience Data

There are no records of pool levels for SCS Dam PA-451. Based on discharge records of the U.S.G.S. stream gaging station for Mill Creek at nearby Mountainhome, Pa., the maximum discharge at the gage, since construction of the dam, occurred in June 1973. It is estimated that this storm produced a peak inflow to SCS Dam PA-451 of 120 cfs. This storm was passed without difficulty.

C. Visual Observations

On the date of the inspection, no conditions were observed that would indicate that the appurtenant structures of the dam could not operate satisfactorily during a flood event, until the dam is overtopped.

D. Overtopping Potential

SCS Dam PA-451 has a total storage capacity of 190 acre-feet and the overall height is 15 feet above the streambed. These dimensions indicate a size classification of "Small." The hazard classification for this dam is "High" (See Section 3.1.E).

The recommended Spillway Design Flood (SDF) for a dam having the above classification is in the range of one-half PMF to full PMF Since this dam is a flood control structure, the recommended SDF is

equal to the full PMF. For this dam the PMF peak inflow is 1345 cfs (See Appendix D for hydraulic calculations).

Comparison of the estimated PMF peak inflow of 1345 cfs with the estimated total discharge capacity of 2051 cfs indicates that a potential for overtopping of the SCS Dam PA-451 by the PMF does not exist.

An estimate of the storage effect of the reservoir and routing of the computed inflow hydrograph through the reservoir shows that the spillway-reservoir system can pass a flood event equal to 100% of a PMF with about 1.3 feet of freeboard.

E. Spillway Adequacy

The small size and high hazard categories, in accordance with the Corps of Engineers criteria and guidelines, indicates that the Spillway Design Flood (SDF) for this dam is in the range of one-half the PMF to the full PMF. Since the dam is a flood control structure, the recommended SDF is the PMF.

Calculations show that the spillway discharge capacity and reservoir storage capacity combine to handle 100% of the PMF (Refer to Appendix D).

Since the spillway discharge and reservoir storage capacity can pass the full PMF without overtopping, the spillway is considered to be adequate.

The hydrologic analysis for this investigation was based upon existing conditions of the watershed. The effects of future development were not considered.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

A. Visual Observations

1. Embankment

The visual inspection of SCS Dam PA-451 did not detect any signs of embankment instability. The field survey indicates that the embankment slopes are approximately 2.75H to 1V, rather than the design slope of 3H to 1V. The existing slopes are considered to be adequate for the height of dam under consideration.

2. Appurtenant Structures

The emergency spillway in the right abutment appeared to be in good condition with a good grass mat for erosion protection. The side slopes are stable and the flow of water is directed away from the toe of dam with a spur dike constructed from soil (Appendix A, Plate A-I). The principal spillway was in good condition.

B. Design and Construction Data

The information contained in the design report and the "As Built Plans" indicate that this dam was designed using current and acceptable engineering procedures. Although stability calculations for the embankment were not located, the slopes of 2.75H to 1V are considered adequate for a 15 foot high flood control dam, constructed with zoned earthfill. A cutoff trench was excavated to suitable material (Plate IV, Appendix E) and a drain was constructed about 25 feet downstream of the centerline dam. This drain consists of a 12-inch perforated pipe in a filter and outlets in the impact basin. Three antiseep collars have been placed on the outlet pipe (Plate VIII, Appendix E).

C. Operating Records

Operating records for this dam have not been maintained.

D. Post Construction Changes

There have been no changes or modifications made to the dam since its completion in 1972.

E. Seismic Stability

This dam is located in Seismic Zone 1 and it is considered that the static stability is sufficient to withstand minor earthquake-induced dynamic forces. No studies or calculations have been made to confirm this assumption.

SECTION 7 - ASSESSMENT AND RECOMMENDATIONS

7.1 DAM ASSESSMENT

A. Safety

The visual inspection, the review of the design report, construction drawings and specifications indicate that SCS Dam PA-451 is in good condition and has been designed in accordance with current engineering practices. The field inspection did not detect any signs of instability or seepage that could be considered to endanger the safety of the dam.

The hydrologic and hydraulic computations indicate that the combination of storage capacity and the discharge of both spillways are adequate to handle 100 percent of the PMF. The spillway is considered to be adequate.

B. Adequacy of Information

The design information contained in the files are considered adequate for making a reasonable assessment of this dam. The conclusions reached, that this dam is adequately designed and constructed, is supported by the visual appearance of the entire facility.

C. Urgency

The recommendations presented below should be implemented as soon as possible.

D. Additional Studies

Additional studies are not required at this time.

7.2 RECOMMENDATIONS

In order to assure the continued satisfactory operation of this dam, the following recommendations are presented for implementation by the owner:

1. That the fence in the emergency spillway be removed.

2. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.

3. That a program be developed for regular maintenance and inspection of the dam and its appurtenant structures.

APPENDIX A

CHECKLIST OF VISUAL INSPECTION REPORT

CHECK LIST

PHASE I - VISUAL INSPECTION REPORT

PA DER # 64-197 NDI NO. PA- 01031

NAME OF DAM SCS PA-451 HAZARD CATEGORY High

TYPE OF DAM Earthfill

LOCATION Dreher TOWNSHIP Wayne COUNTY, PENNSYLVANIA

INSPECTION DATE 11/6/79 WEATHER Cloudy, windy TEMPERATURE Low 40's

INSPECTORS: R. Houseal(Recorder) OWNER'S REPRESENTATIVE(s):

H. Jongsma

R. Shireman

A. Bartlett

NORMAL POOL ELEVATION: 1890.7 (stoplog) AT TIME OF INSPECTION:

BREAST ELEVATION: 1901.8 (design) POOL ELEVATION: 1890.8±

SPILLWAY ELEVATION: 1896.8 (emergency) TAILWATER ELEVATION:

MAXIMUM RECORDED POOL ELEVATION:

GENERAL COMMENTS: The general appearance of this dam is good.

NDI NO. PA- 01031

VISUAL INSPECTION
EMBANKMENT

	OBSERVATIONS AND REMARKS
A. SURFACE CRACKS	None observed.
B. UNUSUAL MOVEMENT BEYOND TOE	None observed.
C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES	No evidence of distress on upstream or downstream slopes. The slopes are fairly flat and appear to be stable.
D. ALIGNMENT OF CREST: HORIZONTAL: VERTICAL:	Embankment crest has a straight horizontal alignment. See Surveyed profile for vertical alignment (Plate A-II).
E. RIPRAP FAILURES	No riprap on exposed upstream slope. Appears stone protection below flow line.
F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY	Left abutment is good. Right end of embankment curves and forms left side of emergency. (Plate A-I).
G. SEEPAGE	None detected.
H. DRAINS	Toe drains discharge into outlet structure through the concrete wing walls. 12-inch diameter pipes (C.C.M.).
J. GAGES & RECORDER	Staff gage painted on primary inlet structure.
K. COVER (GROWTH)	The crest and slopes have a heavy cover of field grass. The upstream and downstream slopes have a growth of crown vetch and weeds.

NDI NO. PA- 01031

VISUAL INSPECTION
OUTLET WORKS
PRINCIPAL SPILLWAY

	OBSERVATIONS AND REMARKS
A. INTAKE STRUCTURE	The intake structure is the primary drop inlet type structure with a 30-inch concrete pipe outlet. The structure has an orifice opening and 2 ogee weirs on the side. The orifice closed down to a 3-inch opening with wooden log.
B. OUTLET STRUCTURE	Concrete structure with wing walls, concrete impact baffel, basin and sill overflow. 12-inch toe drain into outlet structure.
C. OUTLET CHANNEL	The outlet channel is formed by the left outside slope of the emergency spillway embankment and the immediate downstream area from the main embankment. The first 20'± d/s from the outlet structure is protected by dumped rock. The channel further d/s is a grassed swale for several hundred feet where it forms a natural stream channel.
D. GATES	The gate located in the intake structure. The gate control stand is exposed - mounted on the top of the inlet structure. This gate was chained and locked. It was not operated at this time. The control stand and the gate stem appeared to be in good condition.
E. EMERGENCY GATE	Same as above, not accessible during high pool levels.
F. OPERATION & CONTROL	No records.
G. BRIDGE (ACCESS)	None. Access during low pool levels from the upstream toe of embankment.

NDI NO. PA- 01031

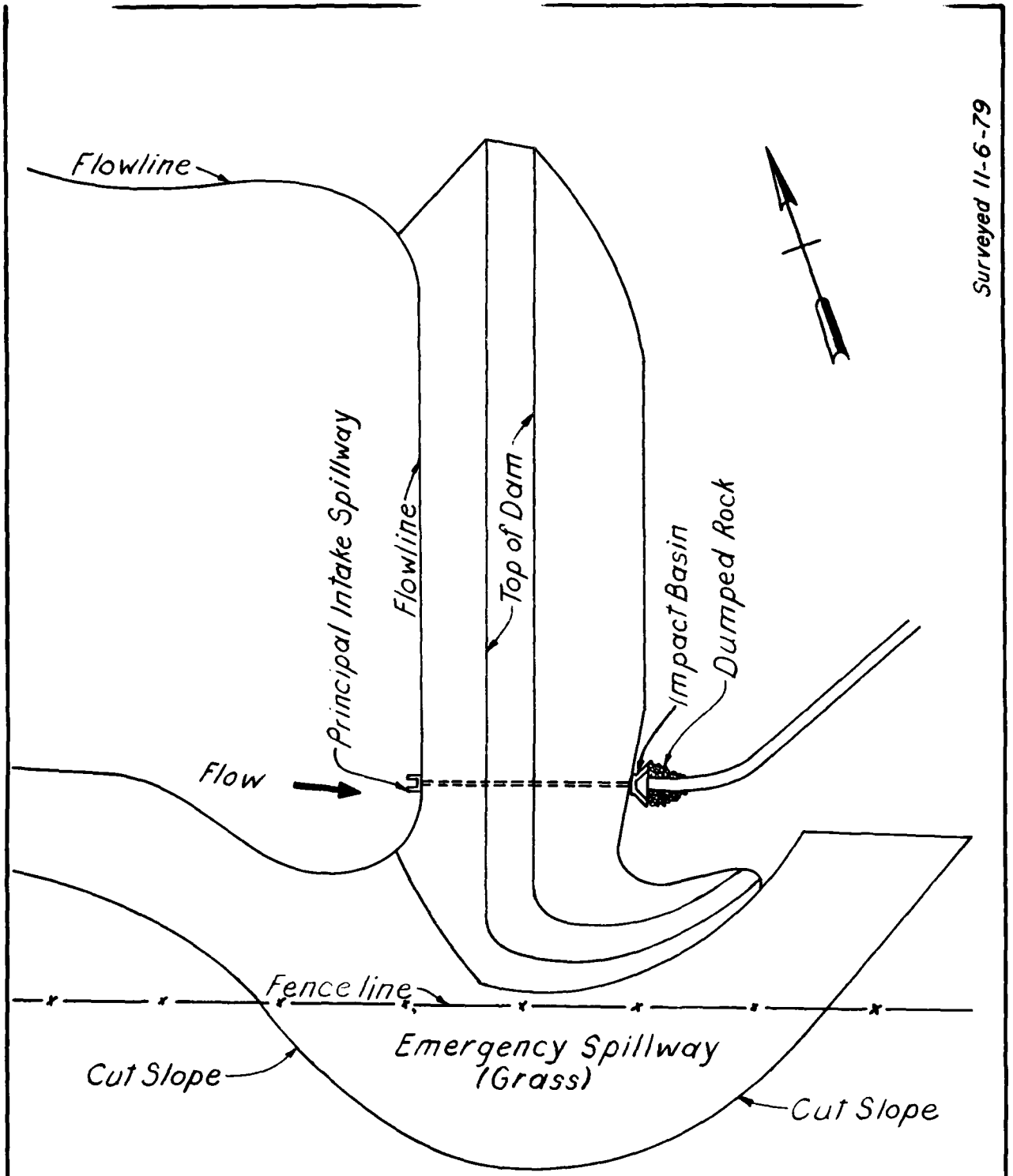
VISUAL INSPECTION
SPILLWAY

	OBSERVATIONS AND REMARKS
A. APPROACH CHANNEL	Emergency spillway is a grass covered earth facility at the right end of the main embankment.
B. WEIR: Crest Condition Cracks Deterioration Foundation Abutments	Grassed.
C. DISCHARGE CHANNEL: Lining Cracks Stilling Basin	The emergency spillway is grassed on the bottom and on both side slopes. A 4'± high fence crosses this spillway and could impede its effectiveness.
D. BRIDGE & PIERS	None.
E. GATES & OPERATION EQUIPMENT	None.
F. CONTROL & HISTORY	Unknown.

NDI NO. PA- 01031

VISUAL INSPECTION

	OBSERVATIONS AND REMARKS
INSTRUMENTATION	
Monumentation	None.
Observation Wells	None.
Weirs	None.
Piezometers	None.
Staff Gauge	On principal inlet structure.
Other	None.
RESERVOIR	
Slopes	Wooded flat banks, stable.
Sedimentation	None reported.
Watershed Description	Wooded.
DOWNSTREAM CHANNEL	
Condition	Wooded natural stream.
Slopes	Slopes are relatively flat and stable.
Approximate Population	6.
No. Homes	At least two homes within 2,500 feet.

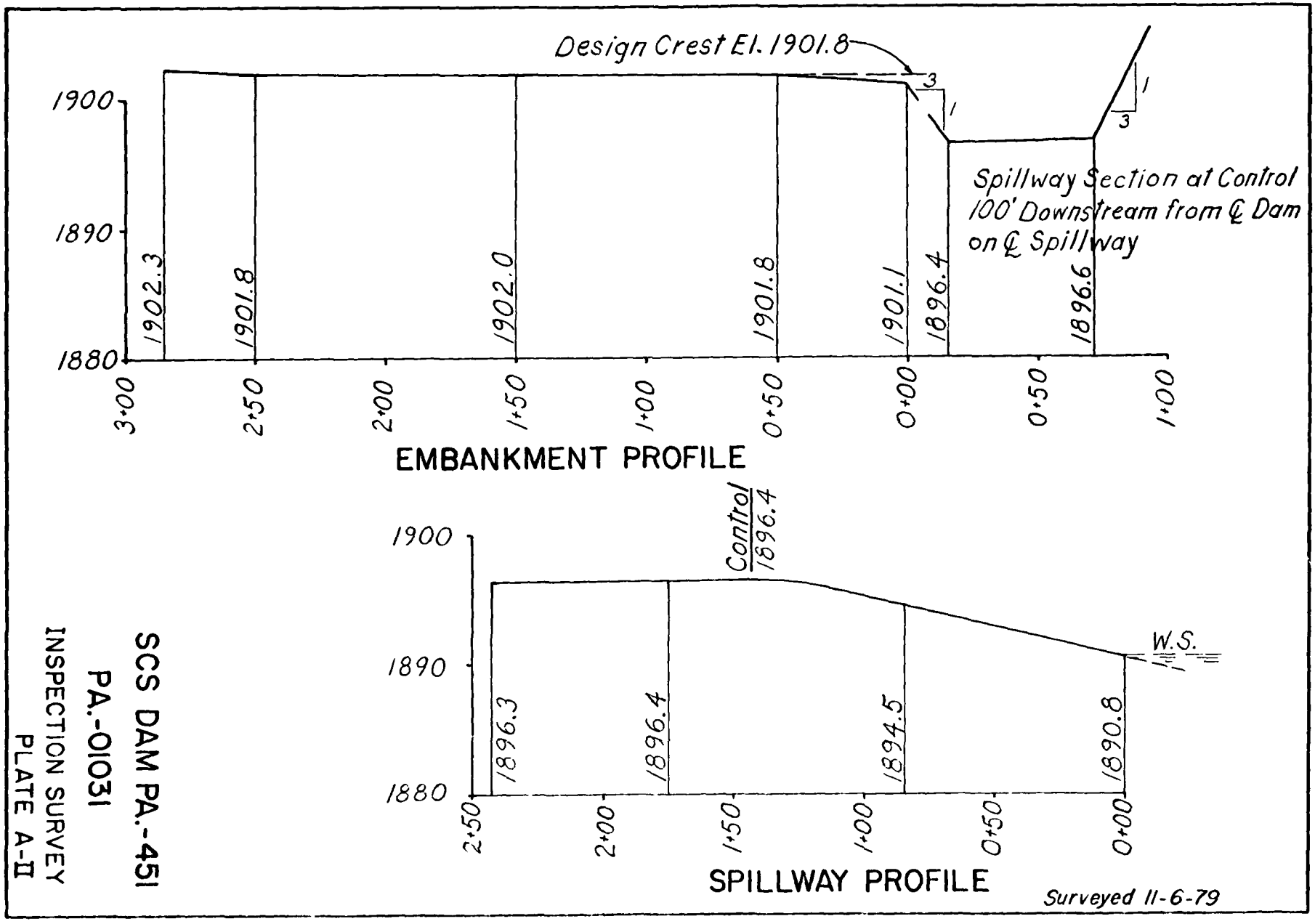


SCS DAM PA.-451

PA.-01031

INSPECTION SURVEY

PLATE A-I


Design Crest El. 1901.8
3
1
1
3
1900
1890
1880
1902.3
1901.8
1902.0
1901.8
1901.1
1896.4
1896.6
Spillway Section at Control
100' Downstream from ℄ Dam
on ℄ Spillway
3+00
2+50
2+00
1+50
1+00
0+50
0+00
0+50
1+00
EMBANKMENT PROFILE
Control
1896.4
1900
1890
1880
1896.3
1896.4
1894.5
1890.8
W.S.
2+50
2+00
1+50
1+00
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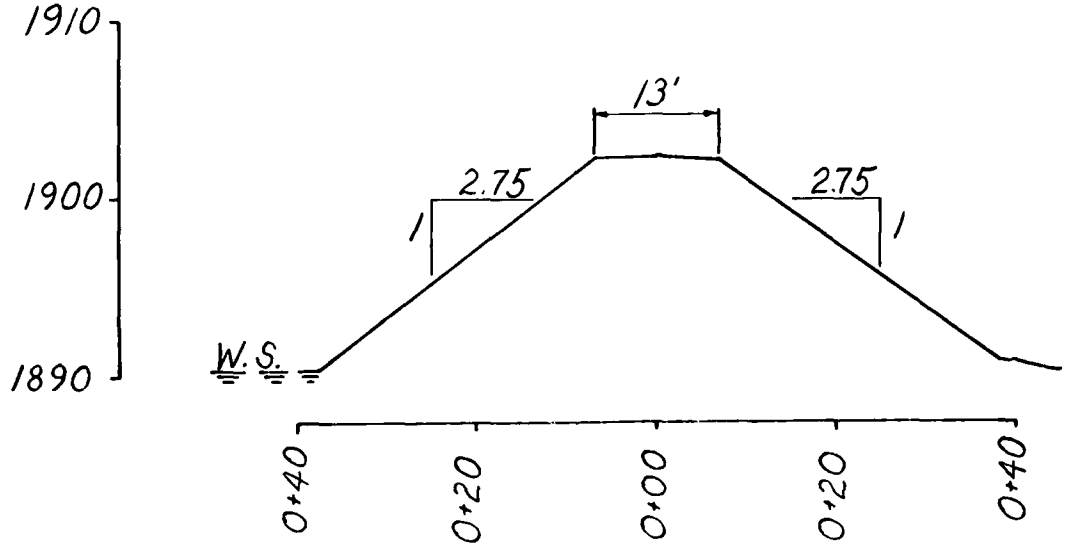
SPILLWAY PROFILE
Surveyed 11-6-79
SCS DAM PA.-451
PA.-01031
INSPECTION SURVEY
PLATE A-II



EMBANKMENT SECTION

SCS DAM PA.-451

PA.-01031

INSPECTION SURVEY

PLATE A-III

Surveyed 11-6-79

APPENDIX B

CHECKLIST OF ENGINEERING DATA

CHECK LIST
ENGINEERING DATA

PA DER # 64-197 NDI NO. PA- 01031

NAME OF DAM SCS DAM PA-451

ITEM	REMARKS
AS-BUILT DRAWINGS	In PennDER files.
REGIONAL VICINITY MAP	U.S.G.S. Quadrangle Newfoundland, Pa. See Plate II, Appendix E
CONSTRUCTION HISTORY	Construction started July 1971, completed August 1972. Contractor: Giffin Construction Company, LeRaysville, Pa. No problems reported.
GENERAL PLAN OF DAM	Plate III, Appendix E.
TYPICAL SECTIONS OF DAM	Plate III, Appendix E.
OUTLETS: PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	Two outlets: principal spillway and emergency spillway. See Plates III through IX, Appendix E. In Design Report (PennDER files).

NDI NO. PA- 01031

ENGINEERING DATA

ITEM	REMARKS
RAINFALL & RESERVOIR RECORDS	No records.
DESIGN REPORTS	S.C.S. Design Report. Copy in PennDER files.
GEOLOGY REPORTS	See Design Report.
DESIGN COMPUTATIONS: HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	See Design Report. No stability analysis in Design Report. No seepage studies. Permeability of borrow material.
MATERIALS INVESTIGATIONS: BORING RECORDS LABORATORY FIELD	See Design Report.
POST CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	Excavation of emergency spillway was used in embankment.

NDI NO. PA- 01031

ENGINEERING DATA

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	None.
HIGH POOL RECORDS	No records.
POST CONSTRUCTION ENGINEERING STUDIES & REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM Description: Reports:	None.
MAINTENANCE & OPERATION RECORDS	Annual inspection records.
SPILLWAY PLAN, SECTIONS AND DETAILS	Refer to Appendix E, Plates III through IX.

NDI NO. PA- 01031

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT, PLANS & DETAILS	Only operational equipment is gate on principal spillway to lower pond 3 feet below orifice opening.
CONSTRUCTION RECORDS	Percentage of completion. No records of construction problems.
PREVIOUS INSPECTION REPORTS & DEFICIENCIES	No reports.
MISCELLANEOUS	

NDI NO. PA- 01031

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 100% woodlands

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 1890.2 Acre-Feet 3

TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev. 1901.1 Acre-Feet 190

MAXIMUM DESIGN POOL: Elev. 1901.1

TOP DAM: Elev. 1901.1

SPILLWAY:	EMERGENCY	PRINCIPAL	SEDIMENT POOL
a. Elevation	1896.8	Crest: 1893.8 Invert: 1886.8	1890.2
b. Type	Broad crested weir	30" dia. orifice	9" x 2' orifice
c. Width	60 feet		
d. Length			
e. Location Spillover	Right abutment	drop inlet structure	drop inlet structure
f. Number and Type of Gates	None	None	None

OUTLET WORKS:

a. Type 16" dia. orifice with sluice gate

b. Location Drop inlet structure

c. Entrance inverts 1887.05

d. Exit inverts 1886.1

e. Emergency drawdown facilities Same

HYDROMETEOROLOGICAL GAGES:

a. Type None

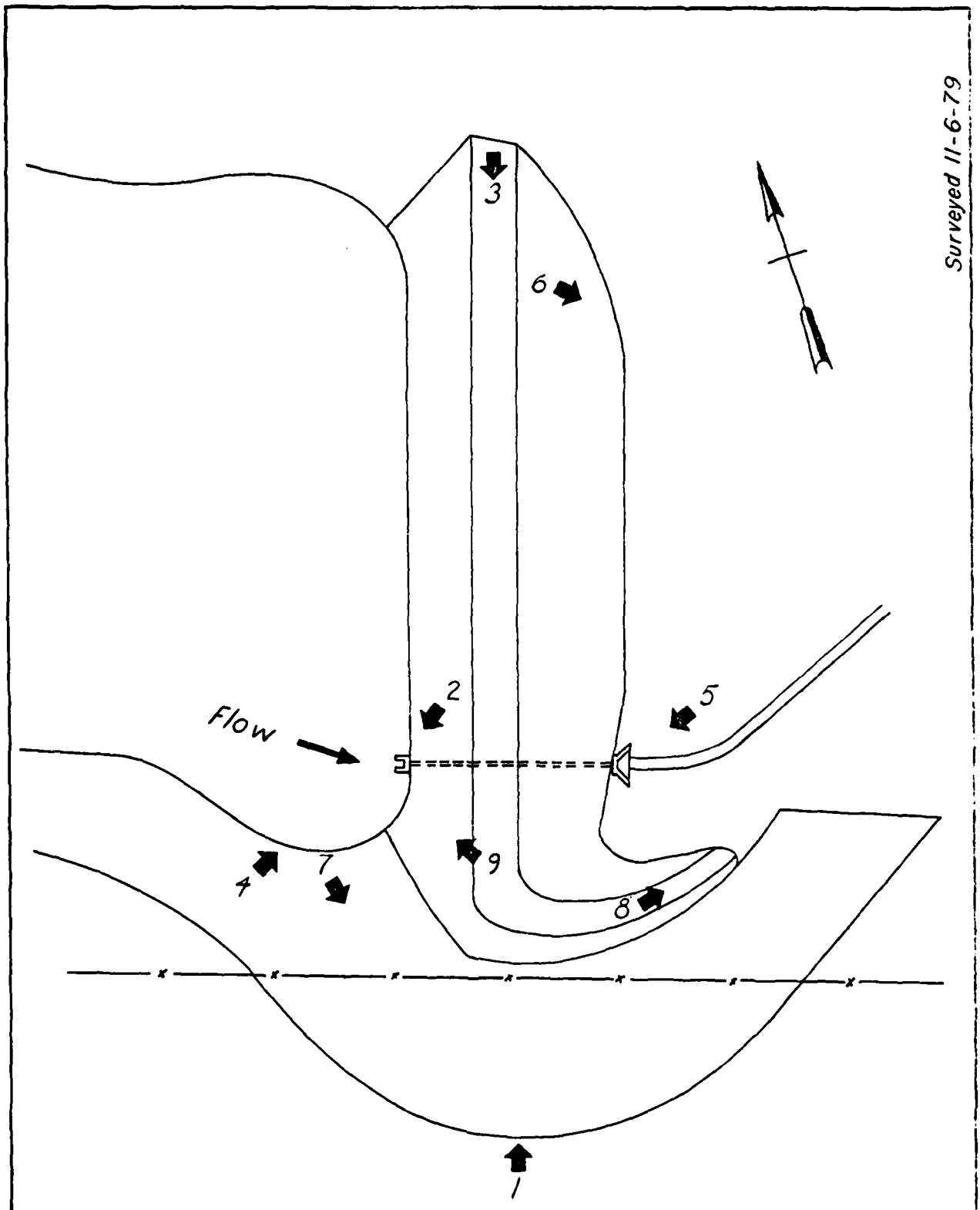
b. Location

c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 2051

APPENDIX C

PHOTOGRAPHS

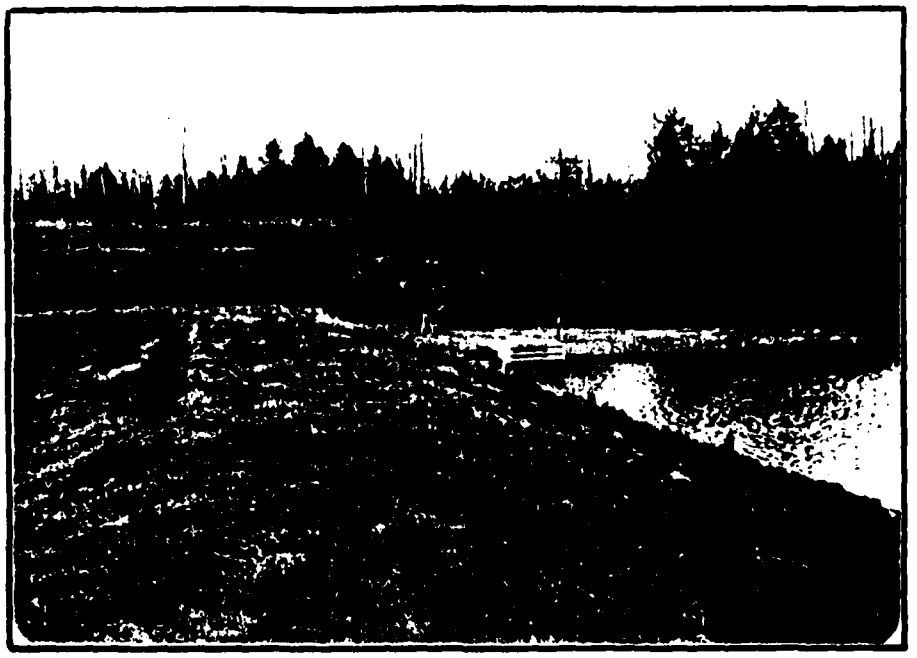


SCS DAM PA.-451

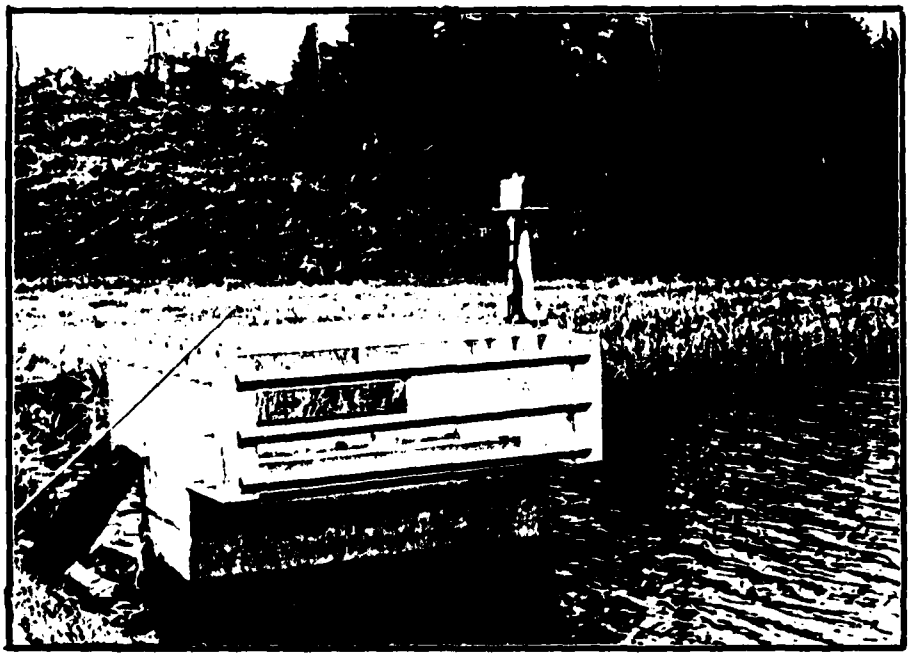
PA.-01031

KEY MAP OF PHOTOGRAPHS

PLATE C-I



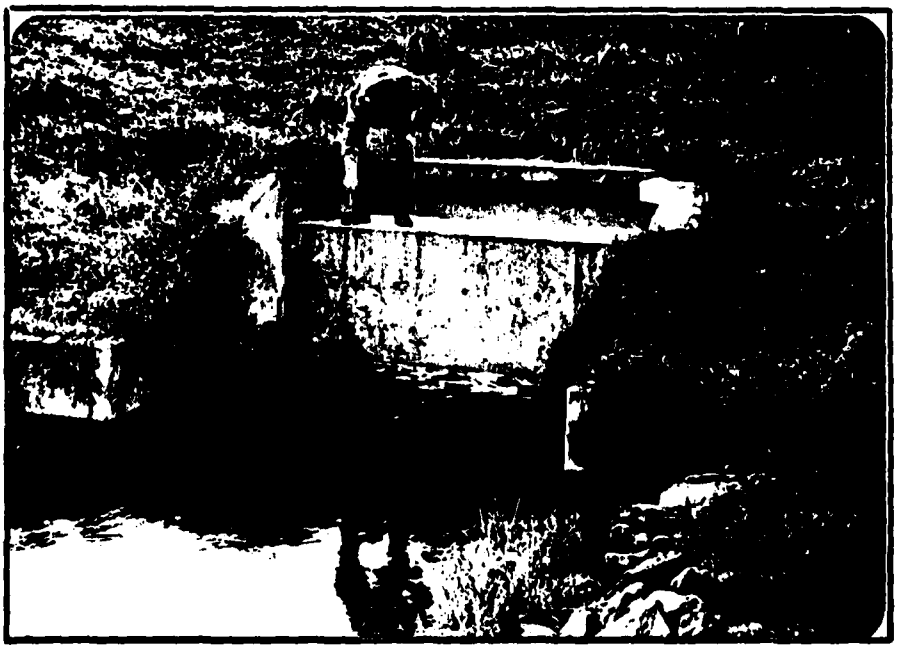
RIGHT END OF EMBANKMENT WITH DROP INLET
STRUCTURE - NOTE EMERGENCY SPILLWAY IN BACKGROUND - NO. 2



DETAIL DROP INLET STRUCTURE OR PRINCIPAL SPILLWAY - NO. 3

PA-01031
Plate C-II

UPSTREAM SLOPE & INLET STRUCTURE - NO. 4



ENERGY DISSIPATION STRUCTURE ON OUTLET PIPE - NO. 5

PA-01031
Plate C-III

DOWNSTREAM CHANNEL - NO. 6

EMERGENCY SPILLWAY LOOKING DOWNSTREAM
NOTE: FENCE ACROSS SPILLWAY - NO. 7

PA-01031
Plate C-IV

LOCATION WHERE EMERGENCY SPILLWAY JOINS NATURAL STREAM - NO. 8

RESERVOIR AREA - NO. 9

PA-01031
Plate C-V

APPENDIX D

HYDROLOGY AND HYDRAULIC CALCULATIONS

SUMMARY DESCRIPTION
OF
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION

The hydrologic and hydraulic evaluation for this inspection report has employed computer techniques using the Corps of Engineers computer program identified as the Flood Hydrograph Package (HEC-1) Dam Safety Version.

The program has been designed to enable the user to perform two basic types of hydrologic analyses: (1) the evaluation of the overtopping potential of the dam, and (2) the capability to estimate the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. A brief summary of the computation procedures typically used in the dam overtopping analysis is shown below.

- Development of an inflow hydrograph to the reservoir.
- Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.
- Routing of the outflow hydrograph(s) of the reservoir to desired downstream locations. The results provide the peak discharge and maximum stage of each routed hydrograph at the outlet of the reach.

The output data provided by this program permits the comparison of downstream conditions just prior to a breach failure with that after a breach failure and the determination as to whether or not there is a significant increase in the hazard to loss of life as a result of such a failure.

The results of the studies conducted for this report are presented in Section 5.

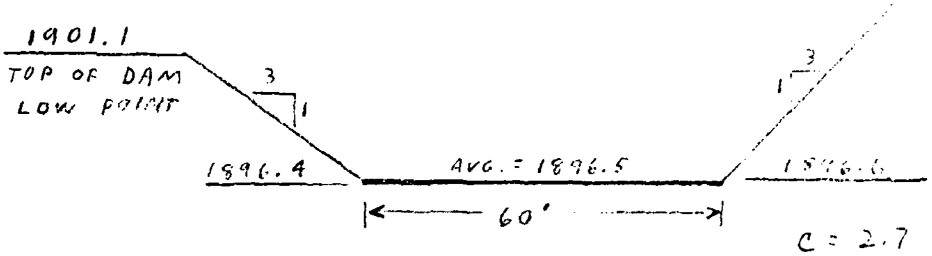
For detailed information regarding this program refer to the Users Manual for the Flood Hydrograph Package (HEC-1) Dam Safety Version prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California.

BY RLS DATE 2/8/80 **BERGER ASSOCIATES** SHEET NO. 1 OF

CHKD. BY ______ DATE ______ PROJECT 09650

SUBJECT PA - 431

EMERGENCY SPILLWAY RATING



C = 2.7 (KING, HBK)

$$L = (60 + 60 + 2(3H))/2$$

$$Q = C L H^{3/2}$$

$$H = 1901.1 - 1896.5 = 4.6'$$

$$L = (60 + 60 + 2(3 \times 4.6))/2 = 73.8'$$

$$Q = 2.7 \times 73.8 \times (4.6)^{1.5}$$

$$= 1966 \text{ CFS}$$

BY RLS DATE 2/11/86 **BERGER ASSOCIATES** SHEET NO. 2 OF
CHKD. BY DATE PROJECT D.965.2
SUBJECT PA-451

PRINCIPAL SPILLWAY RATING

ORIFICE 30" DIA C = 0.6

INVERT = 1886.8

$Q = CA\sqrt{2gH}$

AT POOL ELEV. 1896.4

$H = 1896.4 - 1888.05 = 8.35$

$Q = 0.6 \times \pi \times \frac{(2.5)^2}{4} \times (2 \times 32.2 \times 8.35)^{0.5}$

$= 68$ CFS

AT POOL ELEV. 1901.1

$H = 1901.1 - 1888.05 = 13.05$

$Q = 0.6 \times \pi \times \frac{(2.5)^2}{4} \times (2 \times 32.2 \times 13.05)^{0.5}$

$= 85$ CFS

SEDIMENT POOL SPILLWAY

ORIFICE 3" HIGH x 2' WIDE,

INVERT = 1890.7

$Q = CA\sqrt{2gH}$

AT POOL ELEV. 1893.8

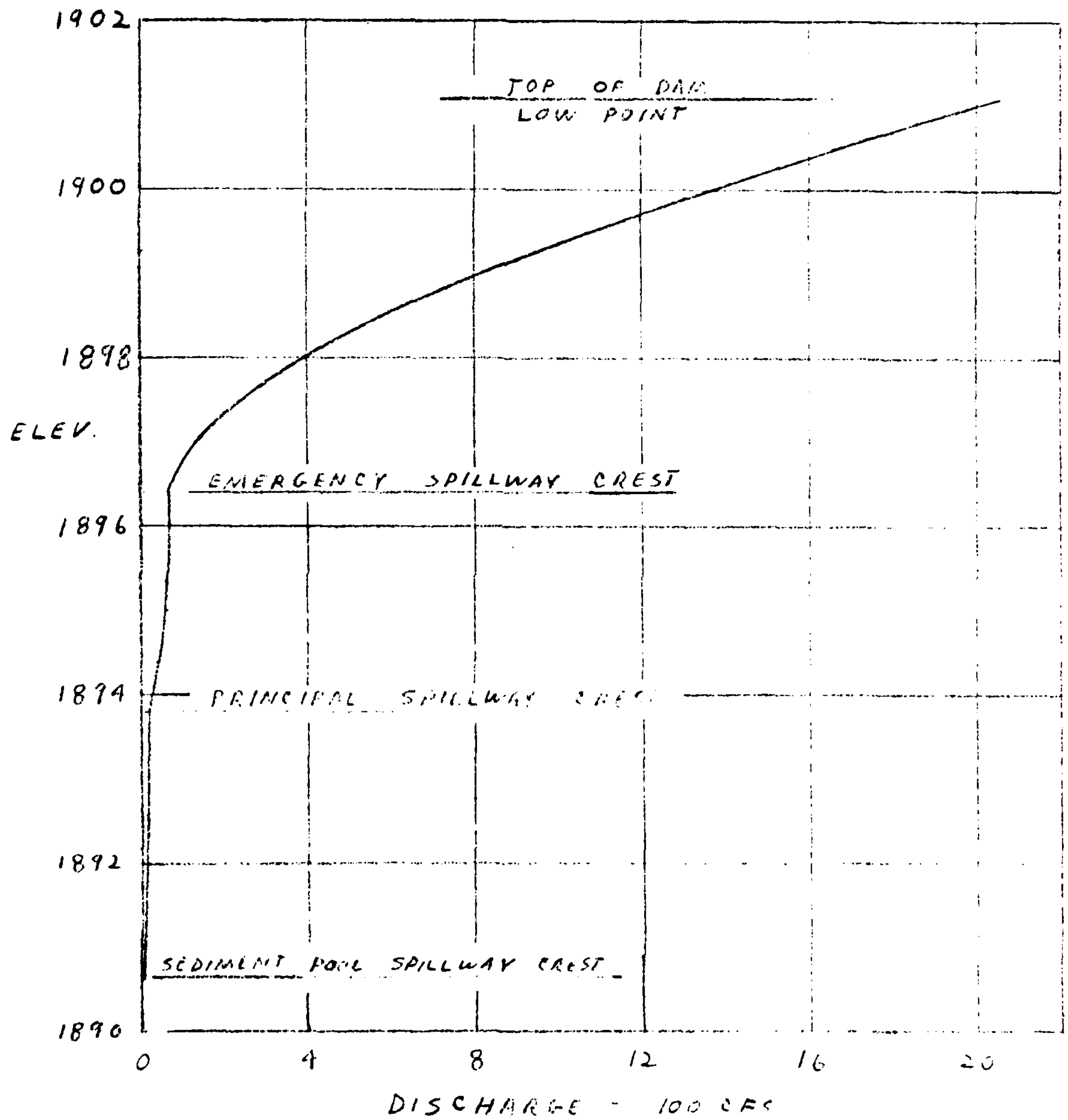
$H = 1893.8 - 1890.83 = 2.97$

$Q = 0.6 \times .25 \times 2 \times (2 \times 32.2 \times 2.97)^{0.5}$

$= 1$ CFS

BY RLS DATE 2/11/8? **BERGER ASSOCIATES** SHEET NO. 3 OF
CHKD. BY DATE PROJECT ...
SUBJECT PA 431

DISCHARGE RATING CURVE



DISCHARGE THRU POND DRAIN

ORIFICE 16" DIA C = 0.6

INVERT = 1887.05

$Q = CA\sqrt{2gH}$

AT POOL ELEV. 1890.7

$H = 1890.7 - 1887.72 = 2.98$

$Q = 0.6 \times \pi \times (1.33)^2/4 \times (2 \times 32.2 \times 2.98)^{0.5}$

$= 11.5$ CFS

AT LOW POOL ELEV. 1888.5

$H = 1888.5 - 1887.72 = .78$

$Q = 0.6 \times \pi \times (1.33)^2/4 \times (2 \times 32.2 \times .78)^{0.5}$

$= 5.9$ CFS

BY RLS DATE 2/11/80 **BERGER ASSOCIATES** SHEET NO. 5 OF
CHKD. BY DATE PROJECT D765C
SUBJECT PA - 451

MAXIMUM KNOWN FLOOD AT DAMSITE

THERE ARE NO RECORDS OF POOL LEVELS FOR THIS DAM. BASED ON THE RECORDS OF THE GAGE STATION FOR MILL CREEK AT NEARBY MOUNTAINHOME, PA. (D.A. = 5.84 SQ. MI.) THE MAXIMUM DISCHARGE AT THE GAGE OCCURRED IN JUNE 1973 WHEN A DISCHARGE OF 855 CFS WAS OBSERVED. THE MAXIMUM INFLOW TO SCS DAM PA-451 IS ESTIMATED TO BE:

$$Q = \left(\frac{.5}{5.84}\right)^{0.8} \times 855$$

$$= 120 \text{ CFS}$$

DESIGN FLOOD

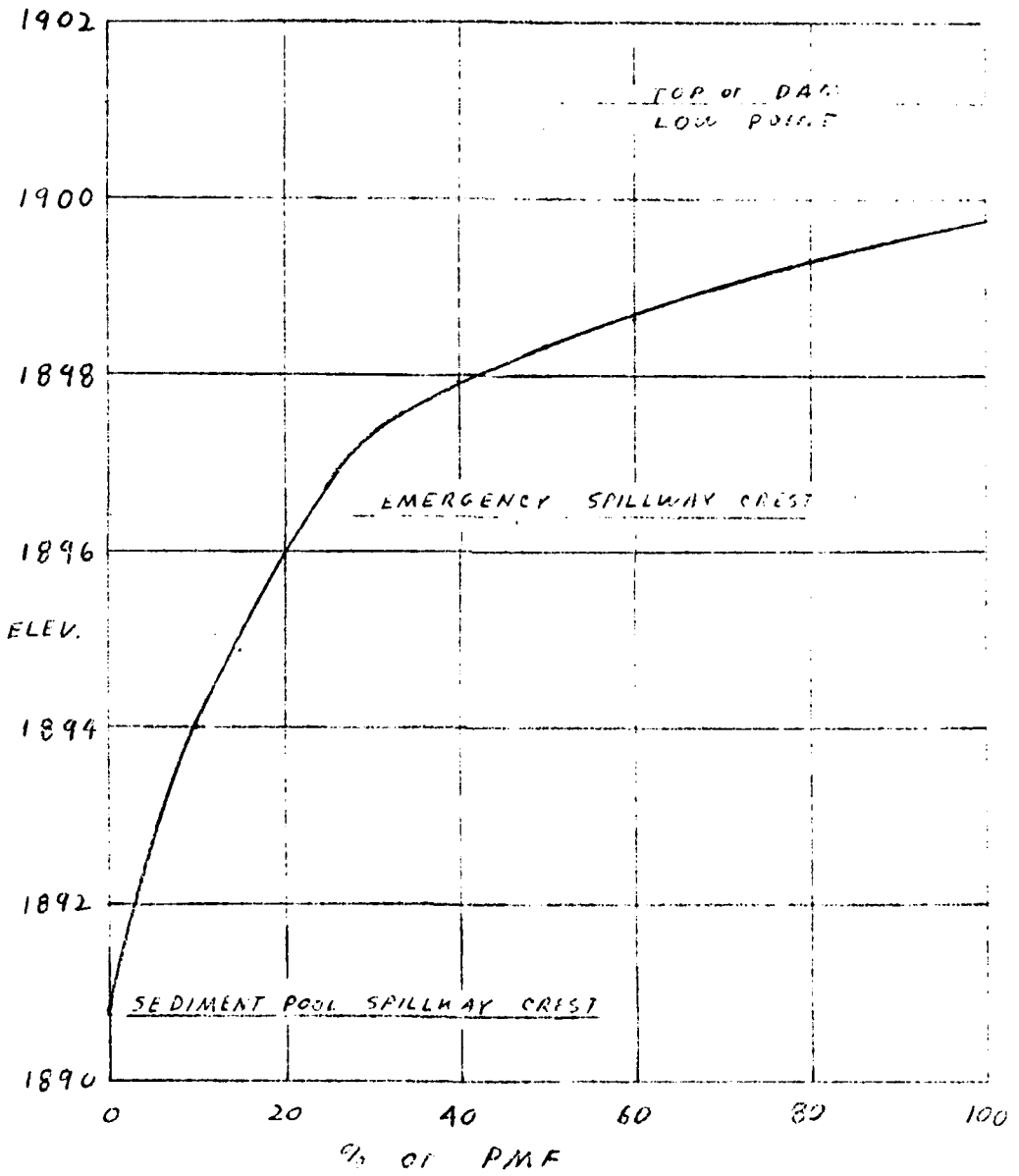
SIZE CLASSIFICATION
MAXIMUM STORAGE = 190 ACRE-FEET
MAXIMUM HEIGHT = 15 FEET
SIZE CLASSIFICATION IS 'SMALL'

HAZARD CLASSIFICATION
SEVERAL HOUSES ARE LOCATED ALONG THE DOWNSTREAM CHANNEL.
USE "HIGH"

RECOMMENDED SPILLWAY DESIGN FLOOD
THE ABOVE CLASSIFICATIONS INDICATE USE OF AN SDF EQUAL TO ONE-HALF PMF TO THE PROBABLE MAXIMUM FLOOD.

BY RLS DATE 2/11/80 **BERGER ASSOCIATES** SHEET NO. 6 OF
CHKD. BY DATE PROJECT
SUBJECT PA 431

SPILLWAY CAPACITY CURVE



HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: SCS DAM PA-451 RIVER BASIN: DELAWARE

PROBABLE MAXIMUM PRECIPITATION (PMP) = 21.9 INCHES/24 HOURS[1]

(FOR FOOTNOTES SEE NEXT PAGE)

STATION		1	2	3	4
STATION DESCRIPTION		LAKE	DAM		
DRAINAGE AREA (SQUARE MILES)		.5			
CUMULATIVE DRAINAGE AREA (SQUARE MILE)		.5	.5		
ADJUSTMENT OF PMP FOR DRAINAGE AREA (%)[2]	6 HOURS	111			
	12 HOURS	123			
	24 HOURS	133			
	48 HOURS	142			
	72 HOURS	–			
		Zone 1			
SNYDER HYDROGRAPH PARAMETERS	ZONE[3]	1			
	C_p / C_t[4]	.45/1.23			
	L (MILES)[5]	1.1			
	L_{ca} (MILES)[5]	.67			
	$T_p = C_t (L \cdot L_{ca})^{0.3}$ (hours)	1.12			
SPILLWAY DATA	CREST LENGTH (FT.)		SEDIMENT POOL 9" x 2'	PRINCIPAL 30" dia.	EMERGENCY 60'
	FREEBOARD (FT.)		10.9	7.3	4.7
	DISCHARGE COEFFICIENT		0.6	0.6	2.7
	EXPONENT				1.5
	ELEVATION		1890.2	Crest: 1893.8 Invert: 1886.8	1896.4
AREA[6] (ACRES)	NORMAL POOL (1890.7)		15.1		
	ELEV. 1895		17.5		
	ELEV. 1905		23.3		
STORAGE (ACRE-FEET)	NORMAL POOL[7] (1890.7)		2.8		
	ELEV. 1889.6[8]		0		
	ELEV. ____[8]				
	ELEV ____[8]				

(1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.

(2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.

(3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).

(4) Snyder's Coefficients.

(5) L = Length of longest water course from outlet to basin divide.
L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.

(6) Planimetered area encompased by contour upstream of dam.

(7) PennDER files.

(8) Computed by conic method.

1/4

```
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
 LAST MODIFICATION  26 FEB 79
******************************
     1               A1      SCS DAM  PA-451   ****   NEVIN CREEK
     2               A2      DREHER TWP., WAYNE COUNTY, PA.
     3               A3      NDI # PA-01031     PA DER # 64-197
     4               B    300       0      15       0       0       0       0       0      -4       0
     5               B1     5
     6               J      1       9       1
     7               J1     1      .8      .6      .5      .4      .3      .2     .15      .1
     8               K              1                                       1
     9               K1               INFLOW  HYDROGRAPH
    10               M      1       1      .5
    11               P           21.9     111     123     133     142
    12               T                                                      1     .05
    13               W   1.12     .45
    14               X   -1.5     .05       2
    15               K      1       2                                       1
    16               K1               RESERVOIR  ROUTING
    17               Y                                1
    18               Y1     1                                             2.8      -1
    19               Y41890.7  1893.8    1895  1896.4    1897    1898  1899.3  1901.1
    20               Y5     0       4      62      68     129     395     944    2051
    21               $A     0    15.1    17.5    18.8    20.2    23.3
    22               $E1890.1  1890.7    1895  1897.2    1900    1905
    23               $$1896.4
    24               $D1901.1
    25               K     99
1                             PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                    RUNOFF HYDROGRAPH AT            1
                                    ROUTE HYDROGRAPH TO             2
                                    END OF NETWORK


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

 RUN  DATE* 80/03/05.
      TIME* 07.52.18.


                              SCS DAM  PA-451   ****   NEVIN CREEK
                              DREHER TWP., WAYNE COUNTY, PA.
                              NDI # PA-01031     PA DER # 64-197

                                          JOB SPECIFICATION
                          NQ     NHR    NMIN    IDAY     IHR    IMIN   METRC    IPLT    IPRT   NSTAN
                         300       0      15       0       0       0       0       0      -4       0
                                                 JOPER     NWT   LROPT   TRACE
                                                     5       0       0       0


                                       MULTI-PLAN ANALYSES TO BE PERFORMED
                                          NPLAN= 1 NRTIO= 9 LRTIO= 1
                             RTIOS=   1.00     .80     .60     .50     .40     .30     .20     .15     .10
```

SCS DAM PA-451 **** NEVIN CREEK
DREHER TWP., WAYNE COUNTY, PA.
NDI # PA-01031 PA DER # 64-197

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
300	0	15	0	0	0	0	0	-4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 9 LRTIO= 1
RTIOS= 1.00 .80 .60 .50 .40 .30 .20 .15 .10

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

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	.50	0.00	.50	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.90	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

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= 1.12 CP= .45 NTA= 0

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

UNIT HYDROGRAPH 41 END-OF-PERIOD ORDINATES, LAG= 1.13 HOURS, CP= .45 VOL= 1.00

12.	43.	83.	116.	127.	118.	103.	89.	78.	68.
59.	51.	45.	39.	34.	29.	26.	22.	19.	17.
15.	13.	11.	10.	8.	7.	6.	5.	5.	4.
4.	3.	3.	2.	2.	2.	2.	1.	1.	1.
1.									

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 24.88 22.49 2.39 2870.
(632.)(571.)(61.)(817.69)

HYDROGRAPH ROUTING

RESERVOIR ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	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	0	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	3.	-1

STAGE	1890.70	1893.80	1895.00	1896.40	1897.00	1898.00	1899.30	1901.10
FLOW	0.00	4.00	62.00	68.00	129.00	395.00	944.00	2031.00
SURFACE AREA=	0.	15.	18.	19.	20.	23.		
CAPACITY=	0.	3.	73.	113.	168.	276.		
ELEVATION=	1890.	1891.	1895.	1897.	1900.	1905.		

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1896.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1901.1	0.0	0.0	0.

PEAK OUTFLOW IS 1252. AT TIME 41.25 HOURS

PEAK OUTFLOW IS 968. AT TIME 41.50 HOURS

PEAK OUTFLOW IS 690. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 542. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 376. AT TIME 42.50 HOURS

PEAK OUTFLOW IS 218. AT TIME 43.25 HOURS

PEAK OUTFLOW IS 66. AT TIME 44.75 HOURS

PEAK OUTFLOW IS 56. AT TIME 44.50 HOURS

PEAK OUTFLOW IS 14. AT TIME 46.75 HOURS

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

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	RATIO 1 1.00	RATIO 2 .80	RATIO 3 .60	RATIO 4 .50	RATIO 5 .40	RATIO 6 .30	RATIO 7 .20	RATIO 8 .15	RATIO 9 .10
				RATIOS APPLIED TO FLOWS								
HYDROGRAPH AT	1	.50	1	1345.	1076.	807.	672.	538.	403.	269.	202.	134.
	(	1.29)	(	38.08)(	30.47)(	22.85)(	19.04)(	15.23)(	11.42)(	7.62)(	5.72)(	3.81)
ROUTED TO	2	.50	1	1252.	968.	690.	542.	378.	218.	88.	56.	14.
	(	1.29)	(	35.45)(	27.42)(	19.55)(	15.34)(	10.69)(	6.18)(	2.49)(	1.60)(	.39)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

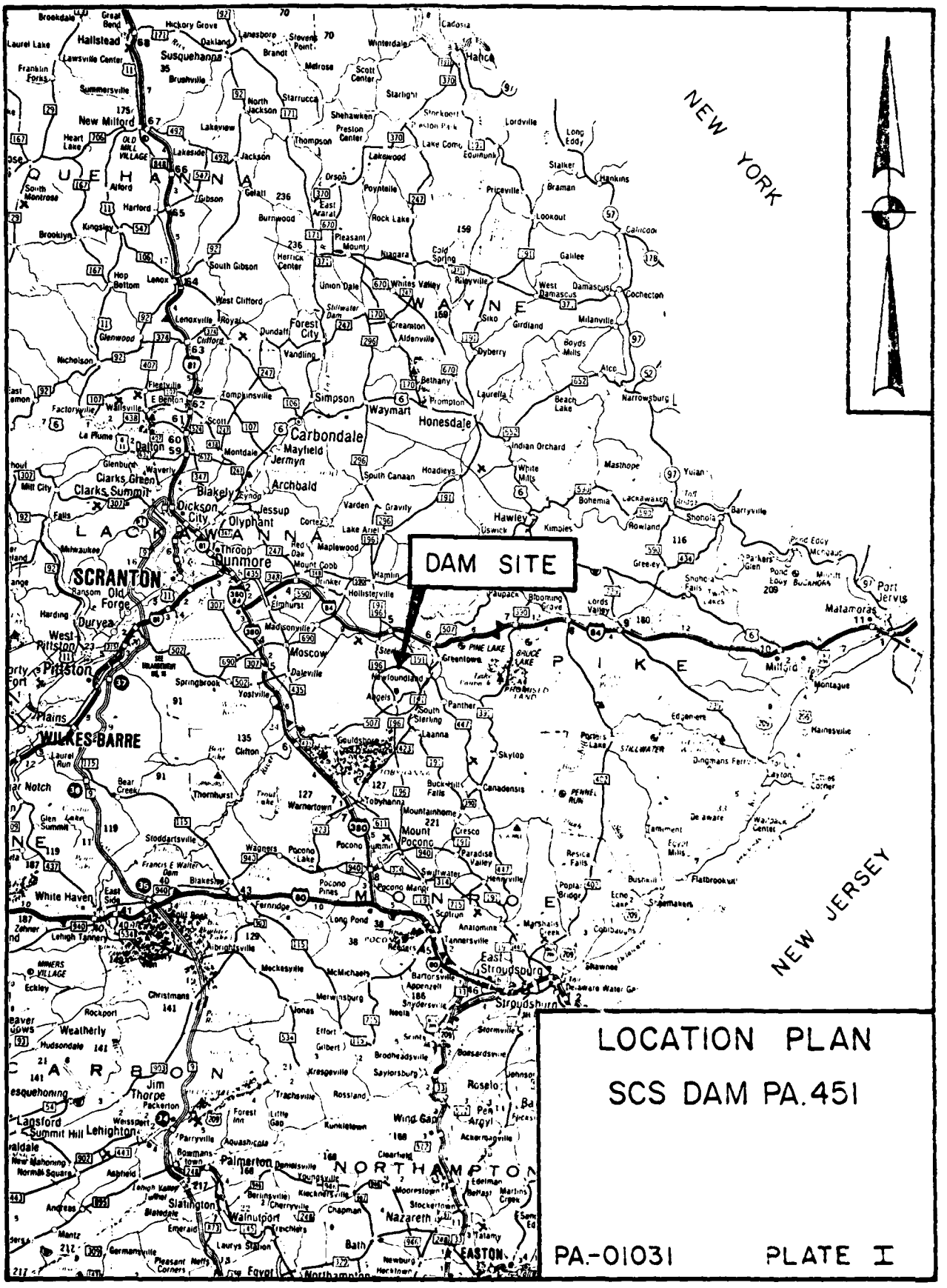
	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1890.66	1896.40	1901.10
STORAGE	2.	96.	190.
OUTFLOW	0.	68.	2091.

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
1.00	1899.80	0.00	164.	1252.	0.00	41.25	0.00
.80	1899.34	0.00	154.	968.	0.00	41.50	0.00
.60	1898.70	0.00	142.	690.	0.00	41.75	0.00
.50	1898.35	0.00	135.	542.	0.00	42.00	0.00
.40	1897.93	0.00	127.	378.	0.00	42.00	0.00
.30	1897.33	0.00	116.	218.	0.00	43.25	0.00
.20	1895.97	0.00	90.	66.	0.00	44.75	0.00
.15	1894.68	0.00	71.	56.	0.00	44.50	0.00
.10	1894.00	0.00	56.	14.	0.00	46.75	0.00

EOI ENCOUNTERED.

APPENDIX E

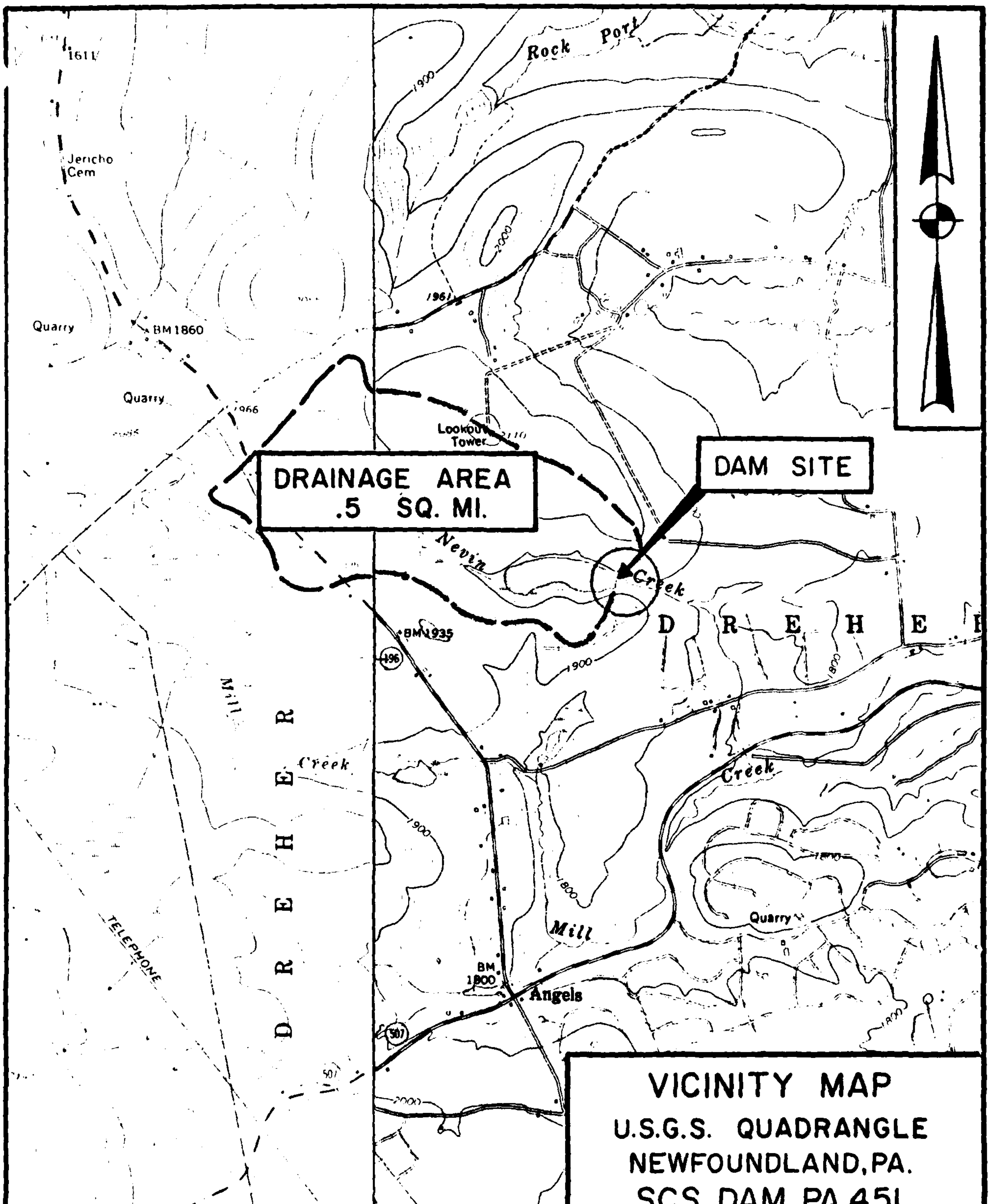
PLATES



LOCATION PLAN

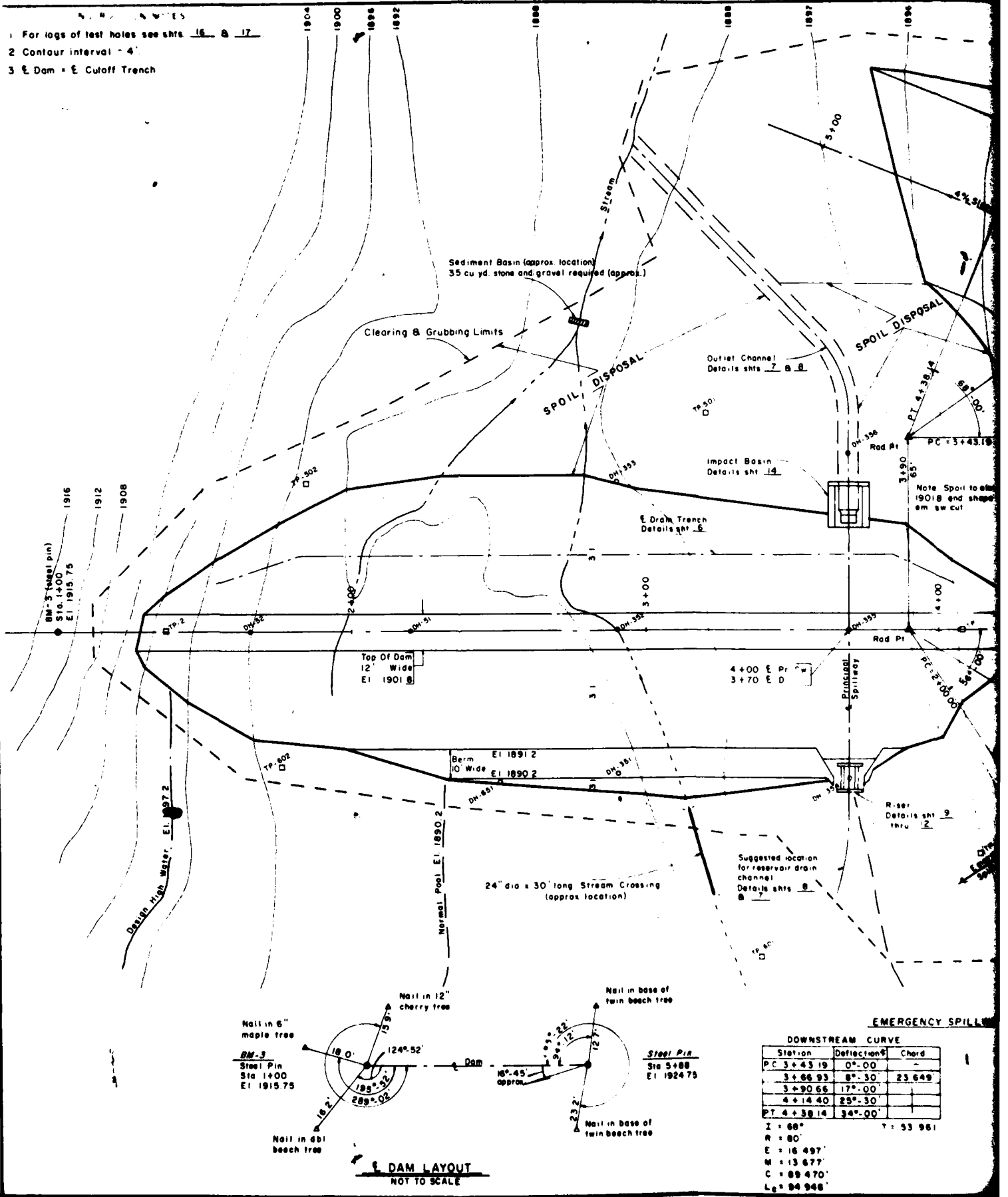
SCS DAM PA.451

PA.-01031 PLATE I


DRAINAGE AREA
.5 SQ. MI.
DAM SITE
Rock Port
Jericho Cem
Quarry
BM 1860
Quarry
Lookout Tower
Nevin Creek
D R E H E R
D R E H E R
Mill Creek
Creek
Mill
Quarry
BM 1935
BM 1800
Angels
TELEPHONE
BM 2095
Radio Tower
H
VICINITY MAP
U.S.G.S. QUADRANGLE
NEWFOUNDLAND, PA.
SCS DAM PA.451
SCALE: 1"=2,000'
PA.-01031
PLATE II

NOTES

1. For logs of test holes see shts. 16 & 17
2. Contour interval = 4'
3. ℄ Dam = ℄ Cutoff Trench



EMERGENCY SPILL

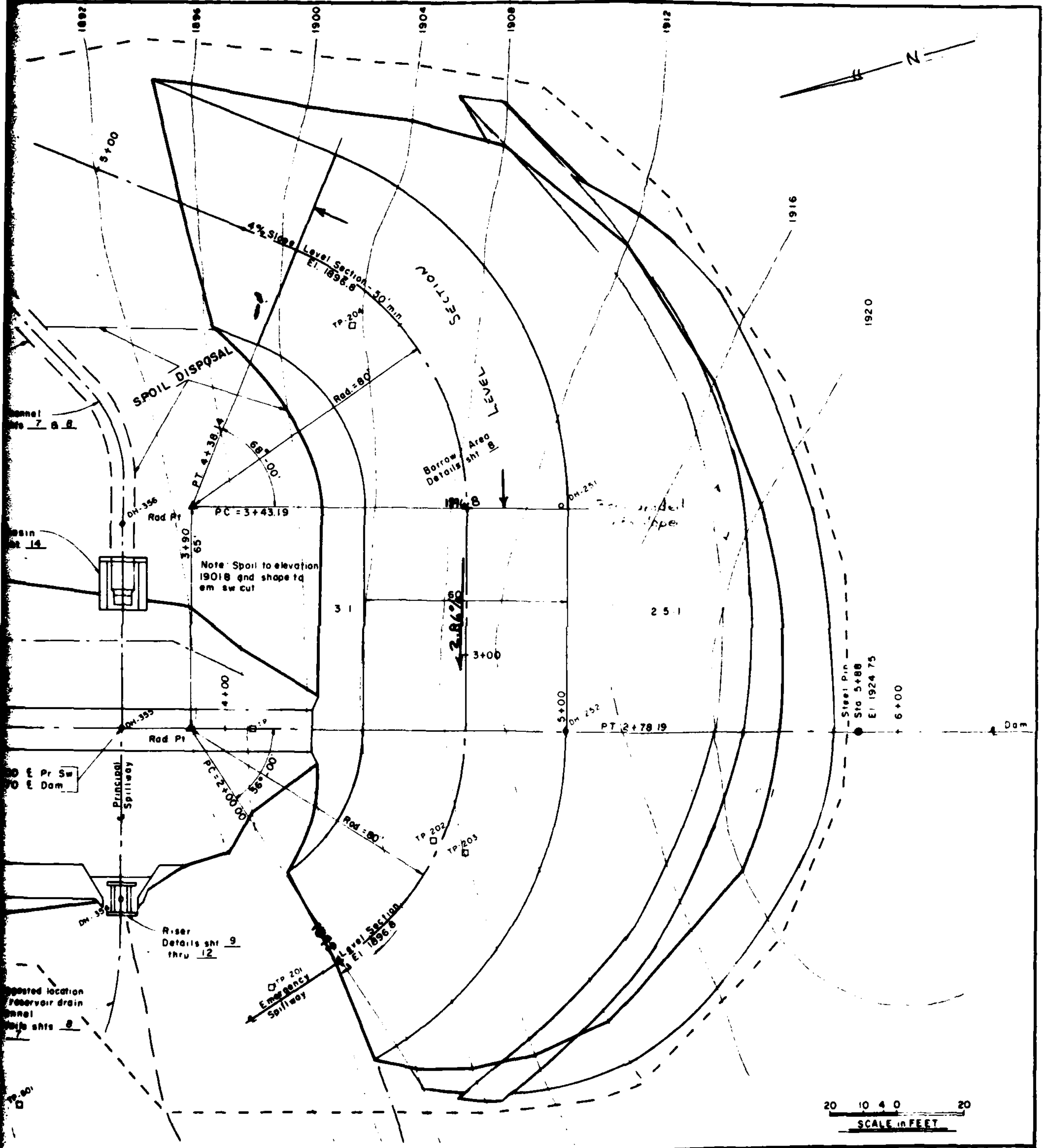
DOWNSTREAM CURVE

Station	Deflection ℄	Chord
PC 3+43.19	0°-00'	-
3+66.93	8°-30'	23.649
3+90.66	17°-00'	
4+14.40	25°-30'	
PT 4+38.14	34°-00'	

I = 68°
R = 80'
E = 16.497'
M = 13.677'
C = 89.470'
L_c = 94.948'
T = 53.961

℄ DAM LAYOUT

NOT TO SCALE



20 10 4 0 20
SCALE in FEET

EMERGENCY SPILLWAY CURVE DATA

DOWNSTREAM CURVE

Station	Deflection ∢	Chord
PC 3+43.19	0°-00'	–
3+66.93	8°-30'	23.649'
3+90.66	17°-00'	
4+14.40	25°-30'	
PT 4+38.14	34°-00'	

I = 68°
R = 80'
E = 16.497'
M = 13.677'
C = 89.470'
L_c = 94.946'
T = 53.961

UPSTREAM CURVE

Station	Deflection ∢	Chord
PC 2+00.00	0°-00'	–
2+19.55	7°-00'	19.499'
2+39.10	14°-00'	
2+58.64	21°-00'	
PT 2+78.19	28°-00'	

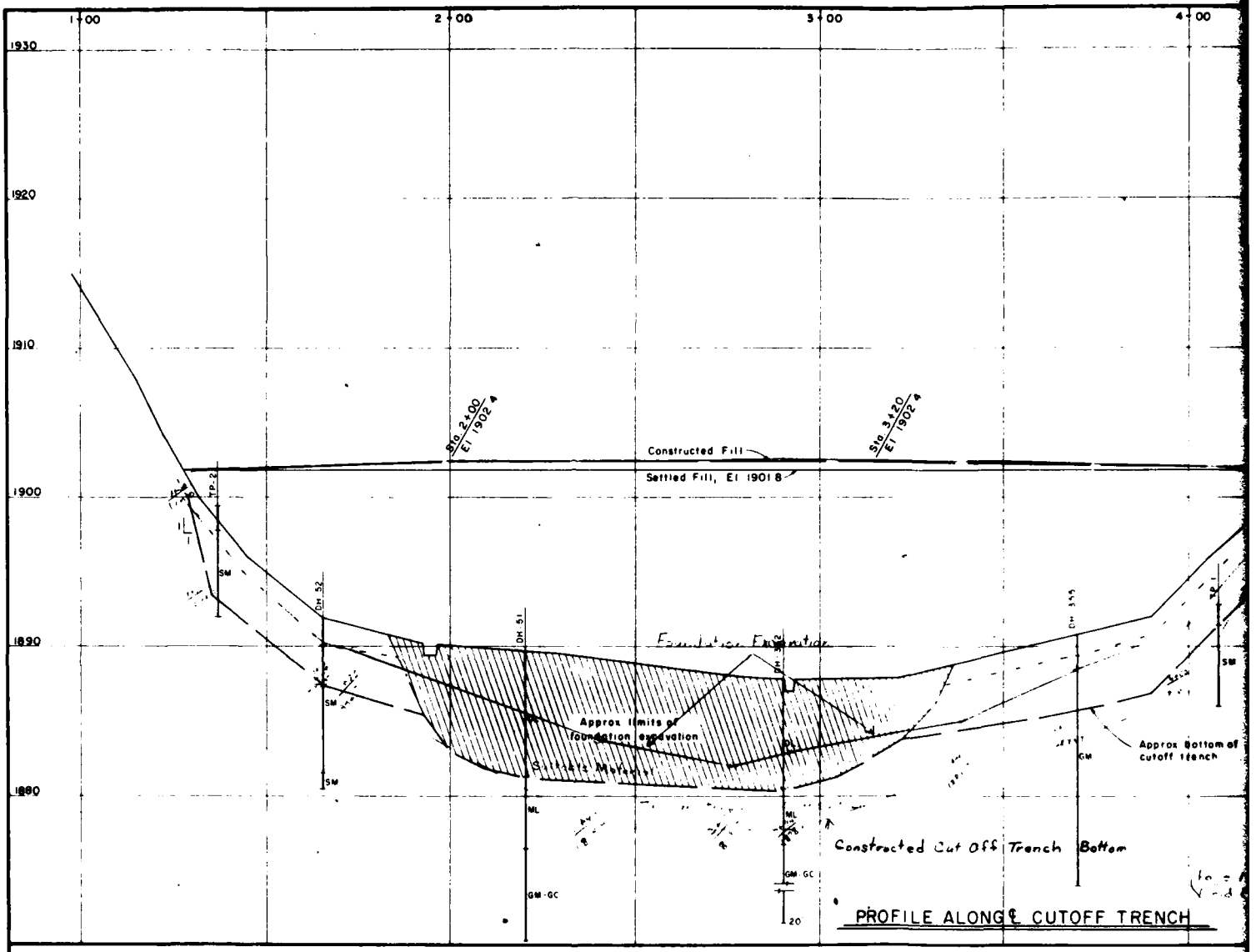
I = 56°
R = 80'
E = 10.605'
M = 9.364'
C = 75.115'
L_c = 78.190'
T = 42.537

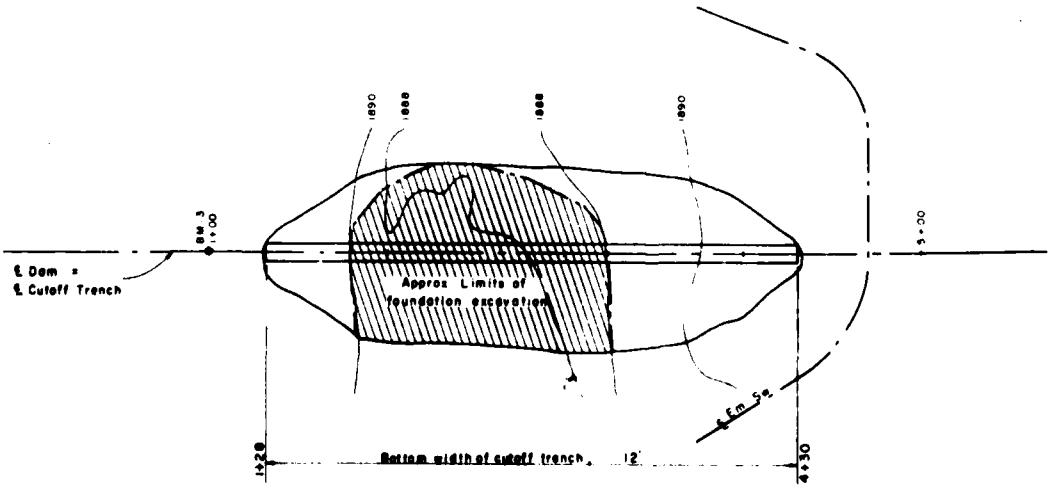
AS BUILT PLANS

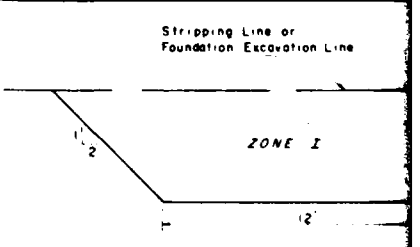
GREENE DREHER WATERSHED
FLOODWATER RETARDING DAM PA-451
WAYNE COUNTY, PENNSYLVANIA
PLAN OF STRUCTURAL WORKS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

S E Van Buskirk 4-70
C CRISE 5-70
J Graham 7-70 3/18 PA-451-P

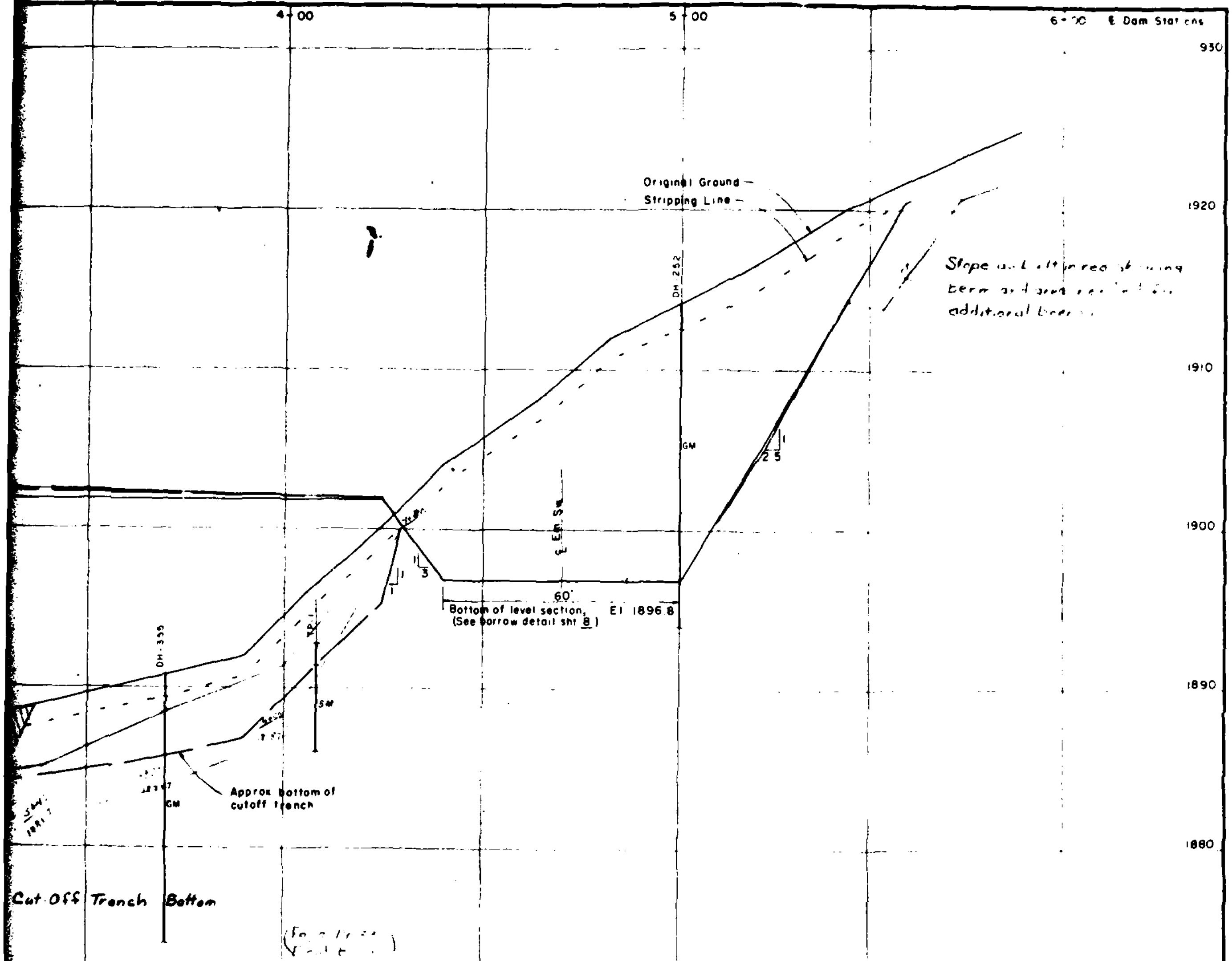
PA-01031
PLATE III



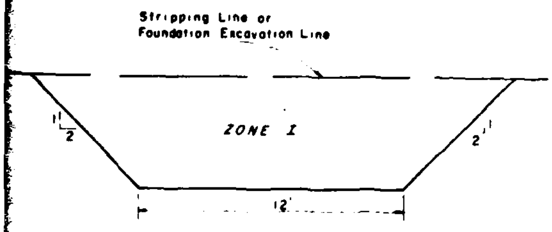




TYPICAL SECTION OF CUTOFF



ALONG ℄ CUTOFF TRENCH



TYPICAL SECTION OF CUTOFF TRENCH

CONSTRUCTION NOTE

For logs of test holes see shts 16 & 17

AS BUILT PLANS

GREENE DREHER WATERSHED
FLOODWATER RETARDING DAM PA-451
WAYNE COUNTY, PENNSYLVANIA
CUTOFF TRENCH

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

C. CRISE 5-70

PA-451-P

PA-0103
PLATE I

TP 1, ELEV. 1892.3, 4+08, Centerline
Logged by: R. C. Page, 2/9/70

0.0	1.5	Topsoil, Max. size 2.5'
1.5	7.0	Gravel, silty Max. 2.0' flaggy sandstone Approx. 10%+6", 5% 3-6", 85% matrix (which is approx. 30% gravel, 40% sand, 30% slightly plastic fines) Orange-brown; moist; slightly permeable; loose; non-stratified; till; SM
7.0		Bottom of hole

NOTES: 1. Very small amount of water entered hole near top of rock.
2. Gray brown at 5.0'.
3. V. stony below 4.0'

TP 2, ELEV. 1869.5, 1+17, Centerline
Logged by: R. C. Page, 2/11/70

0.0	1.5	Topsoil, Very stony , mostly waste
1.5	6.0	Sand, silty Max. 3.0' flaggy sandstone Approx. 15%+6", 85% matrix (which is approx. 20% gravel, 30% sand, and 50% slightly plastic fines) Orange-brown; moist; slow permeability; dense; homogeneous; prob. till; SM D.S. 2.1 Composite
6.0		Bottom of hole - GM *

TP 201, ELEV. 1869.9, 4+14, 75', DS, Emerg. Spwy.
Logged by: R. C. Page, 2/9/70

0.0	1.5	Topsoil
1.5	6.0	Sand, silt; Max. 3.0', flaggy sandstone. Approx. 10% 3-6", 90% matrix (which is approx. 40% gravel, 30% sand, and 30% slightly plastic fines) Mottled brown; moist; slight permeability; dense;homogeneous; till or colluvial; SM
6.0		Bottom of hole-essentially dry

NOTES: 1. Color change at 3.0 to gray-brown.
2. Very little water on top of rock
3 Tillhas sandstone decomposed in it.

TP 202, ELEV. 1907.0, 4+02, 32' US, Emerg. Spwy.
Logged by R. C. Page, 2/11/70

0.0	1.5	Topsoil
1.5	6.0	Gravel, silty Max 3.5', flaggy sandstone Approx. 20%+6", 2% 3-6", 78% matrix (which is approx. 40% gravel, 30% sand, 30% slightly plastic fines); Brown; moist; v. slow permeability; dense; homogeneous; glacial till; GM D. S. 202.1 Composite Sample GC GM *
6.0		Bottom of hole - dry

NOTES: 1. Moisture sample taken
2. Boulders not as large in general.
3 Digging fairly difficult.

TP 203, ELEV. 1909.5, 4+70, 35' US, Emer. Spwy.
Logged by: R. C. Page, 2/12/70

0.0	1.5	Topsoil
1.5	4.0	Gravel, silty, Max. 4.0', flaggy sandstone; Approx. 20%+6", 5% 3-6", 75% matrix (which is approx. 40% gravel, 30% sand, 30% slightly plastic fines; Brown; moist; v. slow permeability; dense; homogeneous; glacial till; GM D. S. 203.1 Composite Sample
4.0		Bottom of hole - dry

NOTES: 1. Very bouldery pieces are generally larger than TP 202.
2. Refusal because of boulders on 3 sides of hole.

TP 204, ELEV. 1907.9, 4+36, 117' DS, Emerg. Spwy.
Logged by R. C. Page, 2/11/70

0.0	1.5	Topsoil
1.5	6.0	Gravel, sandy Max. 3.5 flaggy sandstone Approx. 10%+6", 5% 3-6", 85% matrix (which is approx. 40% gravel, 30% sand, 30% slightly plastic fines). Brown; moist; v. slow permeability; dense; homogeneous; glacial till; GM
6.0		Bottom of hole - dry

TP 501, ELEV. 1886.5, 3+22, [illegible] Line
Logged by: R. C. Page, 2/9/70

0.0	1.5	Topsoil and muck, Max. size 3.0'
1.5	3.5	Gravel, silty Max. 2.0' flaggy, Approx. 15%+6", 5% 3-6", 85% matrix (which is approx. 50% gravel, 25% sand 25% fines Gray; saturated; very permeable, loose; non stratified; alluvium; GM
3.5	6.5	Sand-silty-gravelly Max. 2.0' flaggy sandstone Approx. 5%+6", 5% 3-6", 90% matrix (which is approx. 40% gravel, 25% sand, 35% slightly plastic fines Gray; saturated; v. low permeability; dense; till; SM
6.5		Bottom of hole -

NOTES: 1. Hole took water rapidly
2. Difficult to observe fines wash out during digging

TP 502, ELEV. 1889.1, 1+85, 50' DS, Drain Line
Logged by: R. C. Page, 2/11/70

0.0	1.5	Topsoil
1.5	4.0	Sandy-gravelly, Max. 2.0' Approx. 2%+6", 98% matrix (which is approx. 25% gravel, 50% sand, 15% non-plastic fines Mottled; moist; slow; mod-loose; Residual colluv. SM D. S. 3.5, 502.1 - SM*
4.0	6.5	Sand-silty Max. size 4.0' Approx. 5%+6", 5% 3-6", 90% matrix. (which is approx. 20% gravel, 30% sand, 50% slightly plastic fines) Gray; moist; v. slow permeability; dense; homogeneous; till; SM D.S. 6.0, 502.2 - GC-GM * NOTE: Water entering hole from surface
6.5		Bottom of hole

TP 601, Elev. 1688.0, 3+40, 110' US, Other
Logged by: R. C. Page, 2/9/70

0.0	2.0	Muck 10%+6", 90% matrix (which is approx. 50-75% coarse material) Gray to black; saturated; rapid permeability; loose; alluvium; GM
2.0	6.0	Sand-silty Max. 2.5' flaggy sandstone Approx. 10%+6", 90% matrix (which is 40% gravel, 25% sand, 35% slightly plastic fines) Gray; saturated; v. slow permeability; dense; blocky; till, SM
6.0		Bottom of hole -

NOTES: 1. Hole filled rapidly with water and caved badly.
2. Very difficult to get any sample or idea of material in top 2.0'.

TP 602, ELEV. 1889.7, 1+75, 40' US, Other
Logged by: R. C. Page 2/11/70

0.0	2.5	Topsoil and Fill, Max. 2.5
2.5	3.5	Sand -gravelly Max. 1.0' Approx. 5%+6", 5% 3-6", 90% matrix (which is approx. 25% gravel, 15% sand, 60% slightly plastic fines) Gray; saturated; slow permeability; dense; slightly stratified; lacustrine; ML

TP 602, cont'd.

3.5	7.0	Max. 2.0' 10%+6", 90% matrix (which is approx. 40% gravel, 30% sand, 30% slightly plastic fines) Brown; moist; v. slow permeability; dense; homogeneous; till,
7.0		Bottom of hole

NOTE: 1. Water rapidly filling hole
2. Sides caving badly

DH 51, ELEV. 1889.8, 2+20, Centerline of Dam
Logged by: R. C. Page 2/25/70
Drilling Equipment: Mobile B-30

Hole From	Depth To	Description of Materials	Unif. Soil Class Symb.	STANDARD PENETRATION Blows/6"	N	Type Bit Used	No.
0.0	6.5	Topsoil, litter, muck & fill				Tri	1
6.5	13.5	Silt-sandy; 10% gravel, 25% sand, 65% fines; slightly plastic; odorless; gray; wet; very slow permeability (k=0.0-.04 feet/day); stiff (n=19-43); faint stratification; lacustrine	ML	75/3		S t	1
						Tri	
				27-21-25-6	46	S,t	2
				12-9-10	19		3
				12-16-27	43		4
				15-12-13-19	25		5
13.5	20.0	Gravel-silty-clayey; 40% gravel, 25% sand, 35% fines; slightly plastic (PI=5); odorless; brn; moist; very slowly permeable; dense (n=60-204); non stratified; glacial till.	GM-GC	33-61-65	126		6
				61-63-27	90		7
				27-27-33	60		8
				63-111-93-105	204		9
20.0	-	BOH					

Notes: 1. Poor sample recovery prob. result of the wet or soupy condition
2 Hole caved below 4.0'

WL - 2.5', 2/26/70

DH 52, ELEV. 1692.6, 1+65, Left Abutment - Centerline
Logged by: R. C. Page 2/26/70
Drilling Equipment: Mobile B-30

Hole From	Depth To	Description of Materials	Unif. Soil Class Symb.	STANDARD PENETRATION Blows/6"	N	Type Bit Used	No.
				4-6-16	[illegible]	S t	1
0.0	2.0	Topsoil, boulders, etc		9-10-19	29		2
2.0	10.5	Sand-silty; 20% gravel, 30% sand, 50% fines; slightly plastic; oragne-brown to brown; moist; moderately high permeability (k=17-25'/day); dense (n=29-150), non stratified; glacial till	SM	36-55-95/2	150/.7		3
				13-17-27	44		4
				7-65-61	12[illegible]		5
						Tri	
						S, t	6
10.5	11.5	Sand-silty; 10% gravel, 60% fine and medium sand, 30% fines; non plastic; Lt. brown; wet; moderate permeability; dense; non stratified; old stream channel	SM				
11.5	-	BOH					

Notes: 1. Heavy Boulder content in top 2.0', many colluvial
2. Hole caved below 2.5'

WL - ? Probably around 3.0'

DH 251, ELEV. 1914.2, 4+90, Emergency Spillway, DS
Logged by: R. C. Page 2/24/70
Drilling Equipment: [illegible]

Hole From	Depth To	Description of Materials	Unif. Soil Class Symb.	STANDARD PENETRATION Blows/6"	N	Type Bit Used
0.0	1.5	Topsoil, litter, etc.		4-5-22	27	Spt
1.5	20.0	Gravel-silty; 40% gravel, 30% sand, 30% fines; slightly plastic, brown; moist; very slow permeability; dense (n=35-169); non stratified; glacial till.	GM	17-13-22	35	
				15-20-25	53	
				24-25-44	69	
				24-49-55	104	
				32-77-75	152	
20.0	-	BOH				Tri
				27-64-42	106	Spt
				60-43-62	105	
				90-42-45	87	
				31-32-61	93	
				21-32-125	157	
						Tri
				34-80-89-76	169	Spt

Notes: 1. Till becomes dark brown w/slightly more gravel at 14.5'.
2. May be an old topsoil horizon or decomposed boulders
3. Hole caved below 11.3'

WL - Dry, 2/26/70

Unif. Soil Class Symb.	Blows/6"	N	Type Bit Used	No.	Type	From Ft.	To Ft.	% Rec.
			Tri	1		0.0	5.0	0
	75/3		Spt	1	Jar	5.0	5.3	0
ML			Tri			5.3	6.5	0
	27-21-25-6	46	Spt	2	Jar	6.5	8.5	25
	12-9-10	19		3		8.5	10.0	20
	12-16-27	43		4		10.0	11.5	0
	15-12-13-19	25		5		11.5	13.5	10
	33-61-65	126		6		13.5	15.0	40
	61-63-27	90		7		15.0	16.5	33
GM-GC	27-27-33	60		8		16.5	18.0	40
	63-111-93-105	204		9		18.0	20.0	35

Unif. Soil Class Symb.	Blows/6"	N	Type Bit Used	No.	Type	From Ft.	To Ft.	% Rec.
	4-6-16	22	Spt	1	Jar	[illegible]	1.5	25
SM	9-10-19	29		2		1.5	3.0	33
	36-55-95/2	150/.7		3		3.0	4.3	33
	13-17-27	44		4		4.5	6.0	10
	7-65-61	126		5		[illegible]	7.5	25
			Tri			7.5	10.0	0
			Spt	6	Jar	10.0	11.5	45
SM								

Unif. Soil Class Symb.	Blows/6"	N	Type Bit Used	No.	Type	From Ft.	To Ft.	Rec.
	4-5-22	27	Spt	1	Jar	0.0	1.5	60
	17-13-22	35		2		1.5	3.0	20
	15-26-25	53		3		3.0	4.5	66
GM	24-25-44	69		4		4.5	6.0	70
	24-49-55	104		5		6.0	7.5	70
	32-77-75	152		6		7.5	9.0	66
			Tri			9.0	10.0	0
	27-64-42	106	Spt	7	Jar	10.0	11.5	[illegible]
	60-43-62	105		[illegible]		11.5	13.0	60
	90-42-45	87		9		13.0	14.5	75
	31-32-61	93		10		14.5	16.0	75
	21-32-125	157		11		16.0	17.5	75
			Tri			17.5	19.0	0
	34-80-89-76	169	Spt	12	Jar	18.0	20.0	

[redacted] ELEV. [illegible], 5+00, Emergency Spillway, Centerline
[redacted] R. C. Page, 2/24/70
[redacted] Equipment: SDH 40C

Hole From	Depth To	Description of Materials	Unif. Soil Class Symb.	Blows/6"	N	Type Bit Used	No.	Type	From Ft.	To Ft.	Rec.
0.0	1.5	Topsoil, litter, etc.		[illegible]-3-4	[illegible]	Spt	1	Jar	[illegible]	1.5	20
1.5	20.0	Gravel, silty; 40% gravel; 30%		[illegible]	[illegible]		2		[illegible]	[illegible]	[illegible]
		sand, 30% fines; slightly plastic;		130/.5	130/.5		3		[illegible]	[illegible]	[illegible]
		brown; moist; very slow permeability;				Tri			[illegible]	[illegible]	
		dense (n=59-76); non stratified;	GM	21-24-51	74	Spt	[illegible]	Jar	5.5	7.[illegible]	[illegible]
		glacial till.				Tri			7.0	[illegible]	0
20.0	-	EOH		25-39-31	[illegible]	Spt	[illegible]	Jar	[illegible]	[illegible]	[illegible]
				16-19-40	59				9.5	[illegible]	[illegible]
						Tri			11.0	[illegible]	
				27-57-72-94	129	Spt	[illegible]	Jar	19.0	20.[illegible]	[illegible]

Notes: 1. Last sample was less fines, yet is a poor sample
2. Hole caved below [illegible].5'

WL - Dry, 2/26/70

DH 351, ELEV. [illegible], 2+90, Centerline Principal Spillway Riser Location, 50' US
Logged by: R. C. Page 2/24/70
Drilling Equipment: Mobile B-30

Hole From	Depth To	Description of Materials	Unif. Soil Class Symb.	Blows/6"	N	Type Bit Used	No.	Type	From Ft.	To Ft.	Rec.
0.0	7.5	Topsoil, muck, and fill		4-14-17	31	Spt	[illegible]	Jar	[illegible]	[illegible]	[illegible]
7.5	14.5	Silt-sandy; 10% gravel, 25% sand;		44-75	75/.5		2		[illegible]	2.[illegible]	0
		65% fines; slightly plastic; gray;		[illegible]-2-4	6		3		3.[illegible]	[illegible]	50
		wet; very slow permeability; stiff	ML	27-2-3	5		4		4.5	6.0	0
		(n=15-22); faint stratification;		27-20-12	3[illegible]		5		6.0	7.5	10
		lacustrine.		5-6-7	15		6		7.5	[illegible]	0
14.5	17.[illegible]	Gravel-silty; 45% gravel, 30% sand;		2-3-12	15		7		9.0	10.[illegible]	15
		25% fines; slightly plastic; gray;		5-9-13	22				10.5	12.[illegible]	75
		moist, very slow permeability;	GM	7-9-14	23		[illegible]		12.[illegible]	[illegible]	[illegible]
		dense (n=59-158); non stratified;		10-15-44	59		10		13.5	15.[illegible]	[illegible]
		glacial till.		50-75/.2	75/.2		11		15.[illegible]	1[illegible]	[illegible]
17.6	-	EOH		37-63-95/.3	158/.3		12		[illegible]	[illegible]	[illegible]

Note: 1. Hole caved below 8.5'

WL - 2.0, 2/26/70

DH 352, ELEV. 1659.7, 2 + 90
Logged by: R. C. Page 2/25/70
Drilling Equipment:

Hole From	Depth To	Description of Materials	Unif. Soil Class Symb.	Blows/6"	N	Type Bit Used	No.	Type	From Ft.	To Ft.	[illegible]
0.0	7.5	Topsoil, Muck and fill		[illegible]	4	Spt	1	Jar	[illegible]	[illegible]	[illegible]
7.5	11.2	Silt-sandy; 10% gravel, 25% sand,		10-[illegible]	15		[illegible]		[illegible]	[illegible]	[illegible]
		65% fines; slightly plastic; gray;		4-[illegible]	[illegible]2		3		3.0	[illegible]	[illegible]
		wet; slow permeability (k=1.5-[illegible]	ML	[illegible]-9	1[illegible]		4		4.[illegible]	[illegible]	[illegible]
		'/day); very stiff (n=1[illegible]-20); faint		3-4-[illegible]	13		[illegible]		[illegible]	[illegible]	[illegible]
		stratification; lacustrine		7-[illegible]-10	15		6		7.5	[illegible]	[illegible]
11.2	20.0	Gravel-silty; 45% gravel, 30% sand,		[illegible]-1[illegible]-10	2[illegible]		7		[illegible]	[illegible]	[illegible]
		25% fines; slightly plastic (PI-5);		1[illegible]-1[illegible]-33	[illegible]1		[illegible]		[illegible].5	1[illegible]	[illegible]
		gray; moist; very slowly permeable	GM-	30-[illegible]-[illegible]9	100		[illegible]		[illegible]	1[illegible]	[illegible]
		(k=4-5.3'/day) dense (n=51-166);	GC	92-75/.3	75/.3		10		13.5	[illegible]	[illegible]
		non stratified; glacial till.		37-[illegible]-75/.2	13[illegible].7		11		[illegible]	[illegible]	[illegible]
20.0	-	EOH				Dia		[illegible]	[illegible]	[illegible]	[illegible]

Note: 1. Hole caved below 3.5'

WL - 2.5,' 2/26/70

DH 353, ELEV. 1656.0, 2+90 50' D.S., Principal Spillway - Outlet Location
Logged by: R. C. Page 2/25/70
Drilling Equipment: Mobile B-40

Hole From	Depth To	Description of Materials	Unif. Soil Class Symb.	Blows/6"	N	Type Bit Used	No.	Type	From Ft.	To Ft.	[illegible]
0.0	2.0	Topsoil, litter, etc.		3-2-[illegible]	4	Spt		Jar		[illegible]	
2.0	16.0	Gravel-silty; 40% gravel, 25%		7-15-7	22		2		[illegible]	3.0	[illegible]
		sand, 35% fines, slightly plastic		15-17-14	31		3		3.[illegible]	4.[illegible]	[illegible]
		(PI-5); gray; moist; very slowly		15-17-16	33		4		4.[illegible]	6.[illegible]	[illegible]
		permeable; dense (n=22-93); non	GM	15-14-17	31		5		6.0	[illegible]	[illegible]
		stratified; glacial till		15-30-29	59		6		7.5	[illegible]	[illegible]
16.0	-	EOH		46-35-26	61		7		[illegible]	[illegible]	[illegible]
				40-45-52	97		[illegible]		[illegible]	12.[illegible]	[illegible]
				60-50/.2	50/.2		[illegible]		[illegible]	[illegible]	40
						Tri			[illegible]	13.[illegible]	0
				37-46-45	93	Spt	12	Jar	[illegible]	14	[illegible]
				40-37-43	80		12		[illegible]	[illegible]	40

Note: 1 Hole caved below 5.0'

WL - 2.0; 2/26/70

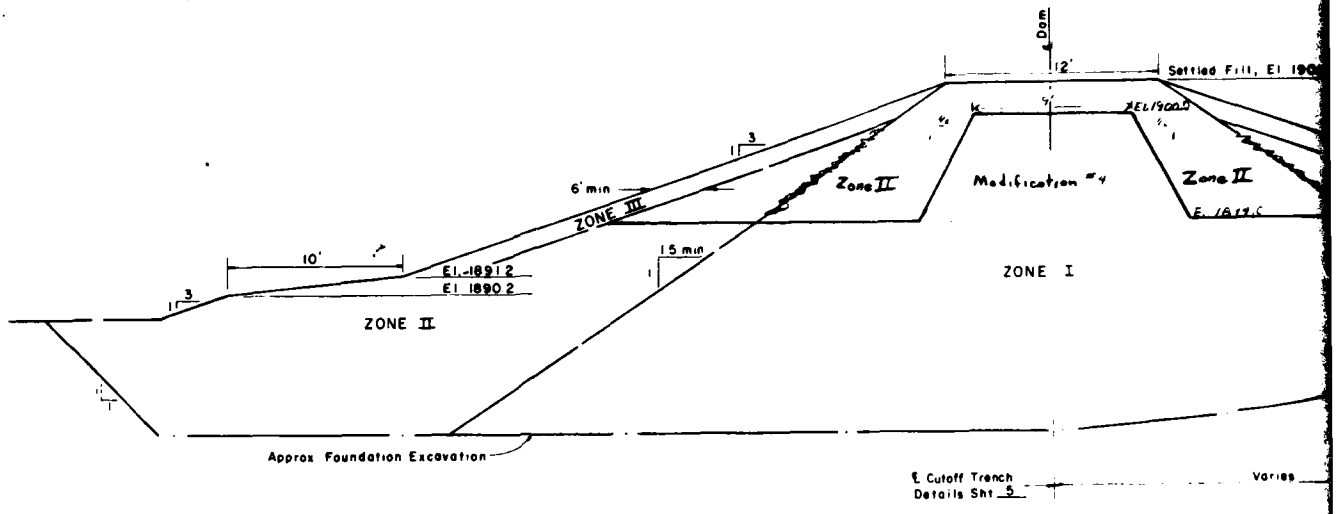
AS BUILT PLANS

* Laboratory Classification

GREENE-DREHER WATERSHED
FLOODWATER RETARDING DAM PA-451
WAYNE COUNTY, PENNSYLVANIA
LOGS OF TEST HOLES
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged [illegible] 2/70 STATE CONS ENGINEER
Typed [illegible] 3/70
[illegible] 3/70 PA-451-P

PA-01031
PLATE V



TYPICAL SECTION OF DAM

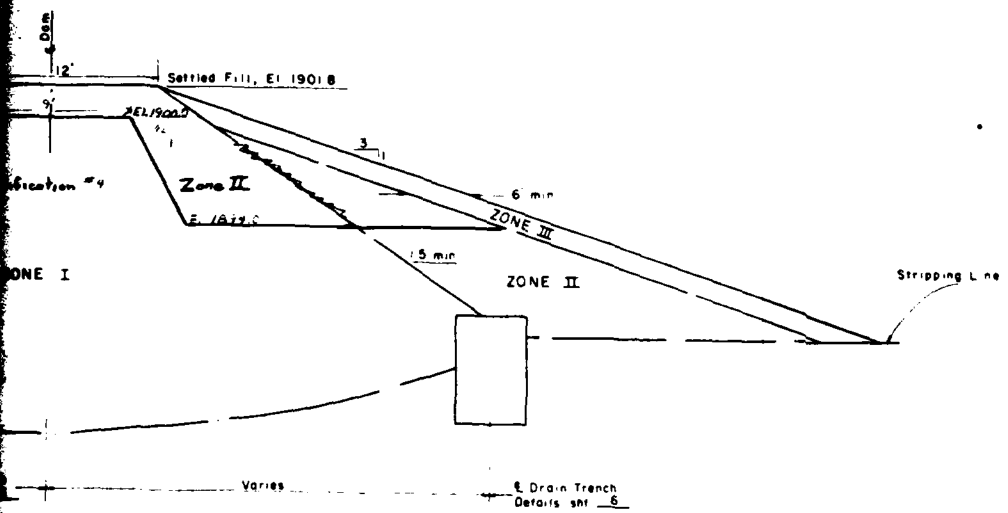
5 3 1 0 5

SCALE in FEET

Zone II: As noted and built in red above El. 1894.0 ft

SELECTIVE PLACEMENT	MATERIAL	MAX ROCK SIZE	MAX LIFT [1]	REQ'D WATER CONTENT [2]	COMPACTION [3]	
					CLASS	DEFINITION
ZONE I	Material as represented by TP-202 1, Classified as GC-GM	6"	9"	Optimum [16] -2% to +3%	A	95% Max density by ASTM D-698, Method "A"
ZONE II [17]	Coarse grained material raked from ZONE I	12" 24"	16" 24"	[4] Compact with min of six passes of 250 PSI sheep foot per lift		
ZONE III	Topsoil or other fine grained material (OL, ML from foundation)	6"	9"	[4] Compact with min. of four passes of 250 PSI sheep foot per lift		

[1] Maximum permissible lift thickness before compaction
[2] Water content of fill matrix at time of compaction
[3] For typical compaction curves see sht 18
[4] Moist content to be approved by the Engineer
[15] Voids will not be permitted between boulders
[16] Variation in moisture content to be approved by Engineer
[17] Changes in rock size and those indicated by notes #5 #6 were permitted by Contract Modification #4 21 X.



ON OF DAM

5

ET

CONSTRUCTION NOTES

For constructed fill elevations see sht 5

2 Constructed slopes are
2.9 Upstream
2.9 Downstream

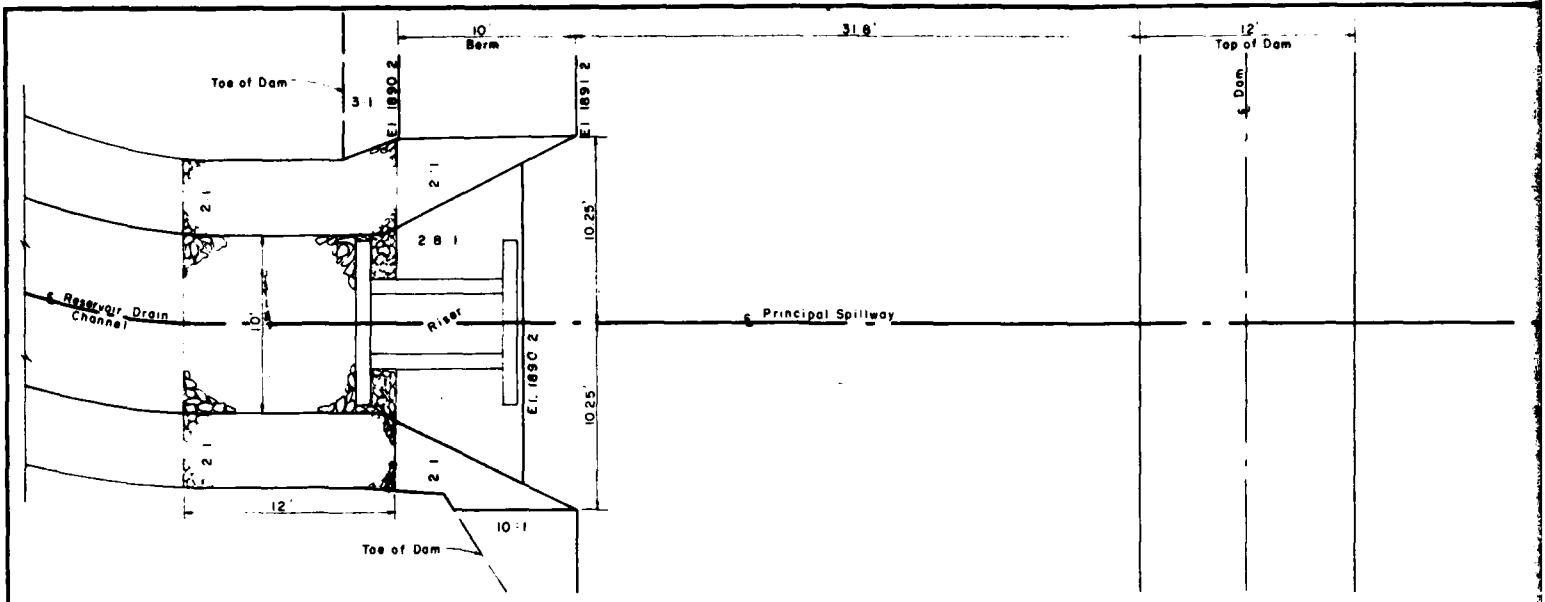
d built in red above El.1894.0 after Contract Modification #4

AS BUILT PLANS

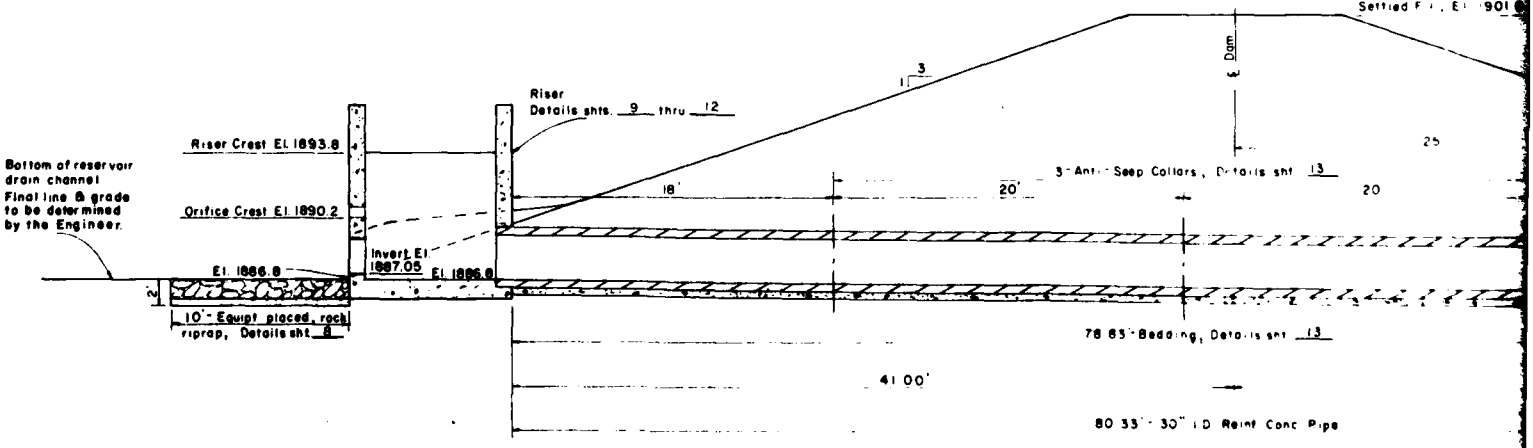
GREENE-DREHER WATERSHED
FLOODWATER RETARDING DAM PA-451
WAYNE COUNTY, PENNSYLVANIA
FILL PLACEMENT
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Wall & Van Buskirk 4-70
C. CRISE 5-70
J. Graham 7-70 4/18 PA-451-P

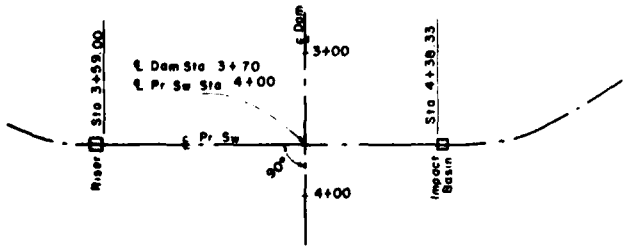
PA-01031
PLATE VI



PLAN VIEW



PROFILE ALONG ℄ PRINCIPAL SPILLWAY

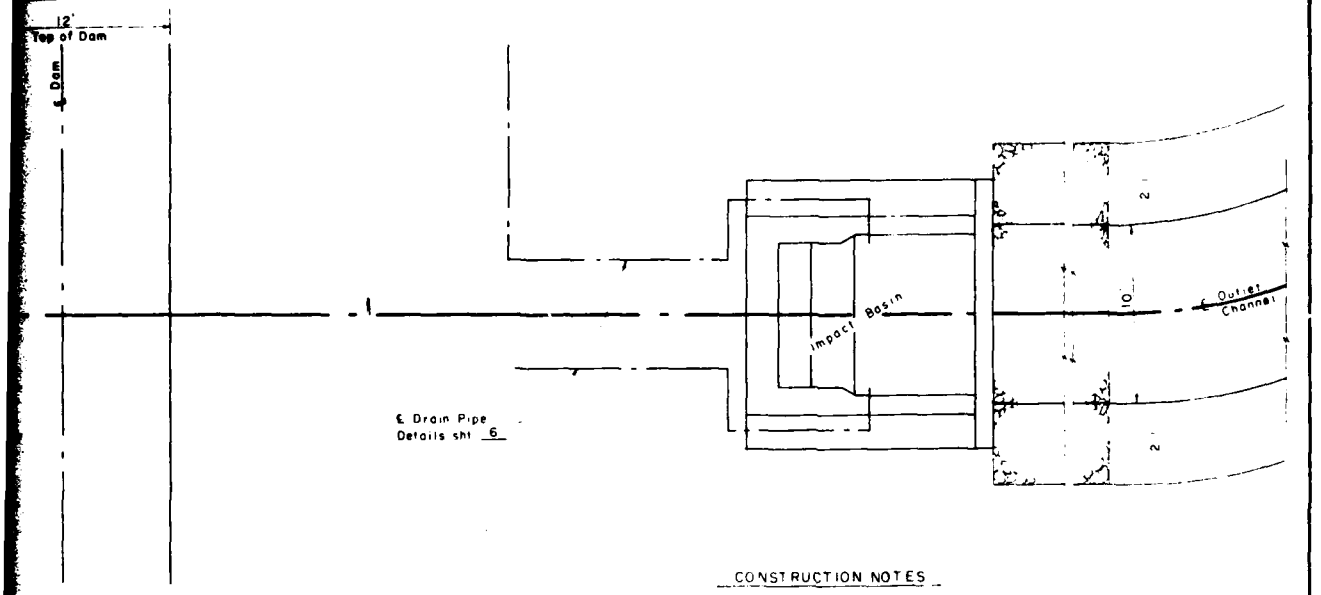


℄ PR SW LAYOUT
NOT TO SCALE

30" I.D. Reinforced Concrete Pressure Pipe Steel Cylinder Type (Spec. 541) - AWWA C-300 or C-301

80' - Straight sections
1 - Spigot ring wall fitting (for 10" wall)
Pressure head = 15'
Load = 9,639 lbs. per lin. ft.
Min. 3 edge bearing strength for:
0.01" Crack non-prestressed pipe = 4,714 lbs. per lin. ft.
0.001" Crack prestressed pipe = 3,544 lbs. per lin. ft.
} Based on O.D. of 2.96
80.33' Total

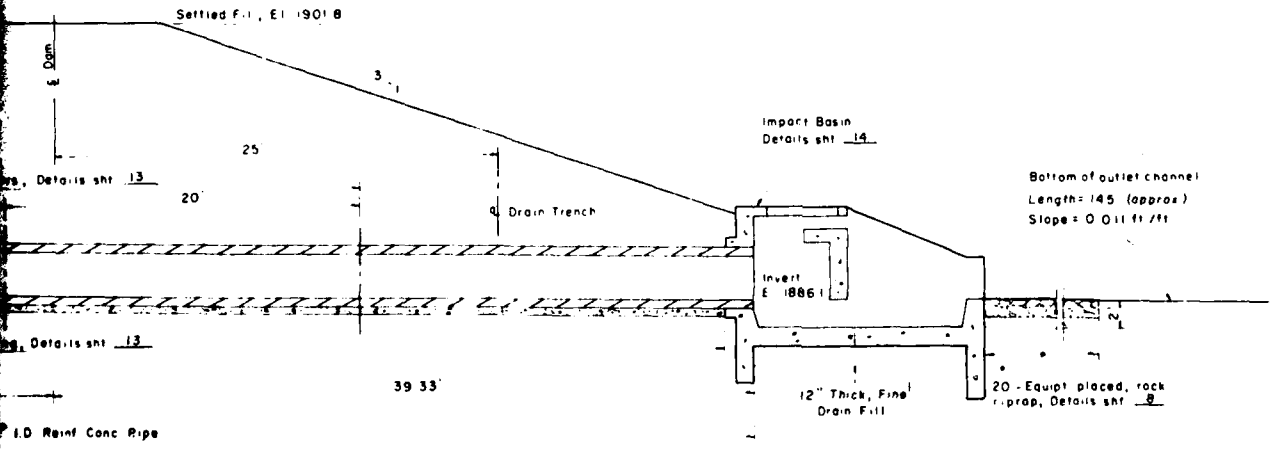
Note Where pipe furnished has an outside diameter greater than that called for on the plans, the 3 edge bearing strength must equal or exceed the specified strength multiplied by the ratio of the outside diameter furnished to the outside diameter specified



LAN VIEW

CONSTRUCTION NOTES

1 Outlet end of pipe to be finished so that no metal is exposed
2 Pipe layout data will be furnished by the Engineer



℄ PRINCIPAL SPILLWAY

Type I (Spec 541) - AWWA C-300 or C-301

Based on O.D of 2.96

30" I.D PIPE JOINT DATA (As Built)

Joint	Dist From Riser Wall	Invert Elevation
[illegible]	0.33'	1886.8
J-1	20.33	1886.7
J-2	40.33	1886.5
J-3	60.33	1886.3
J-4	80.33	1886.1

Collar DATA, FOR 30" PIPE (As Built)

Collar	Dist From Riser Wall	Invert Elevation
1	19	1892.[illegible]
2	39	1891.[illegible]
3	59	1890.[illegible]

AS BUILT PLANS

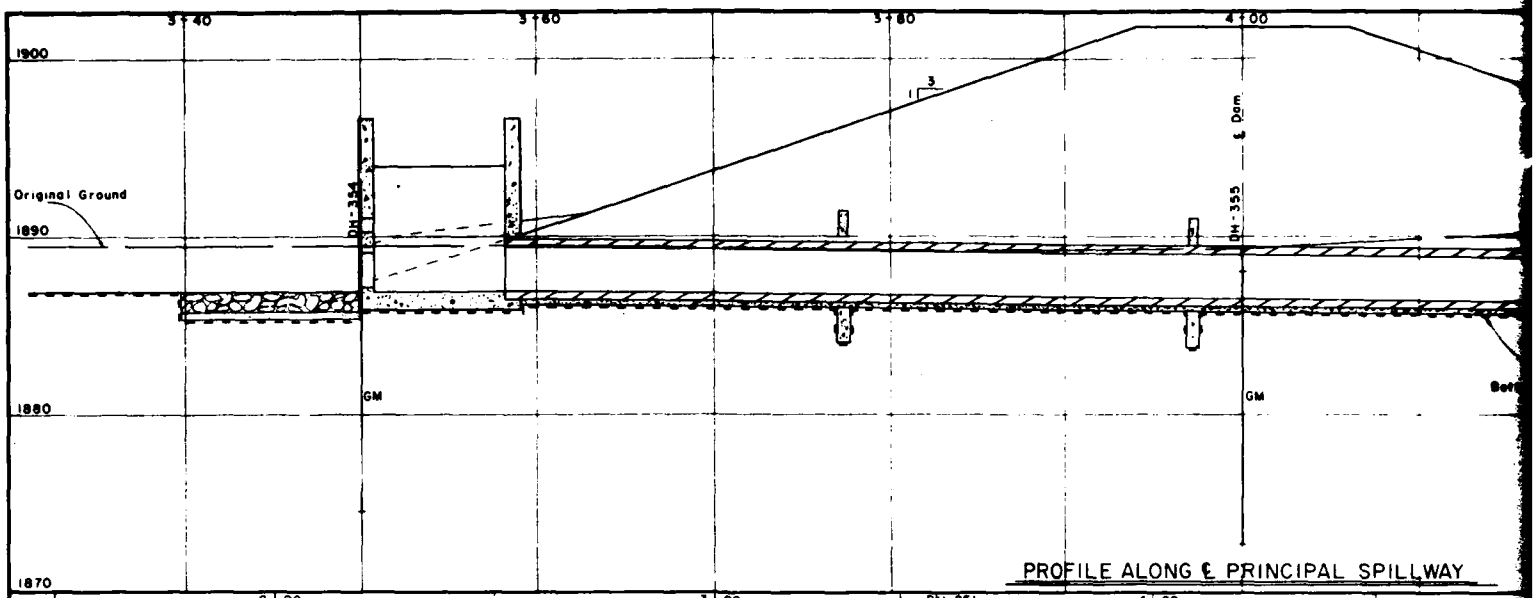
5 3 1 0 5
SCALE in FEET

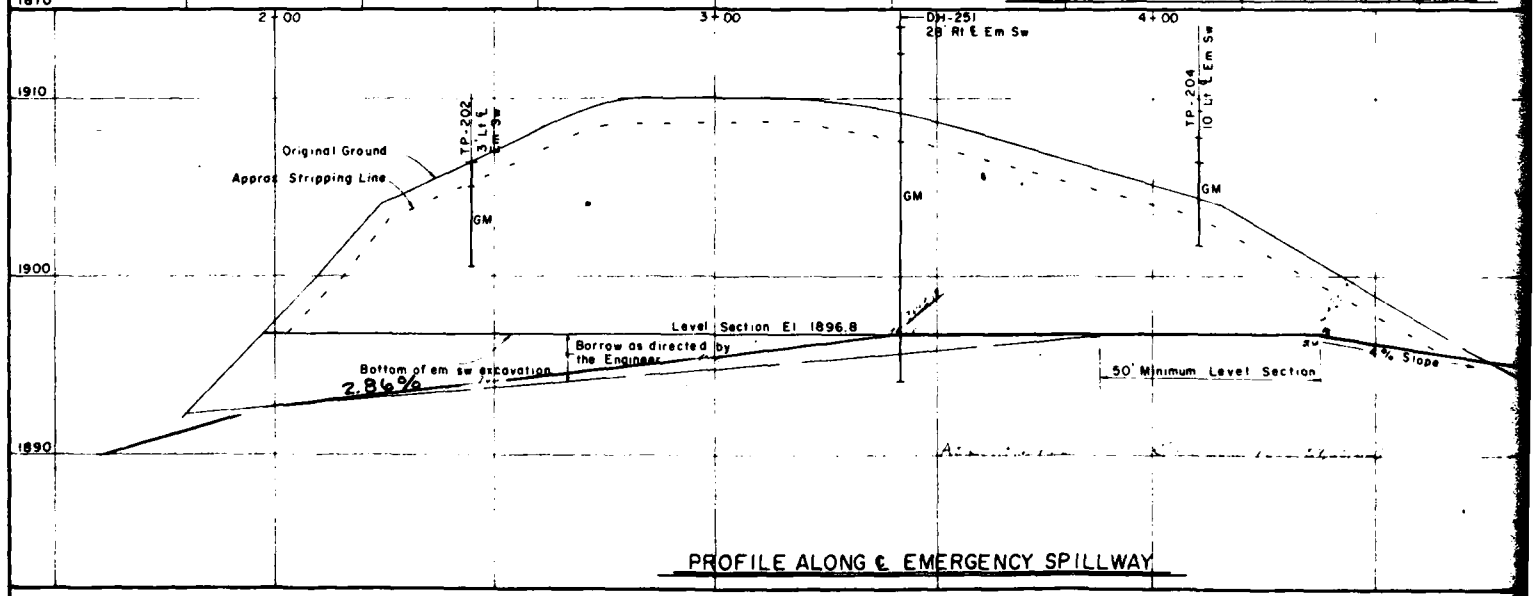
GREENE DREHER WATERSHED
FLOODWATER RETARDING DAM PA-451
WAYNE COUNTY, PENNSYLVANIA
PRINCIPAL SPILLWAY
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

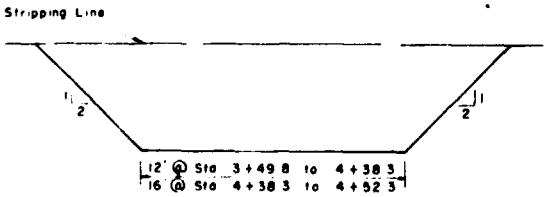
Wall Van Buskirk 4-70
C. CRISE 5-'70
J. Graham 7-70

PA-451-P

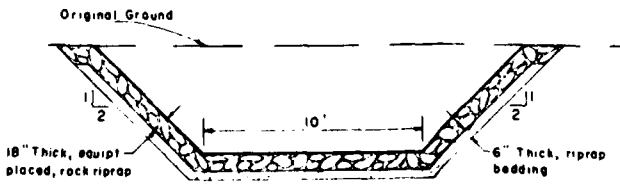
PA-01031
PLATE VII



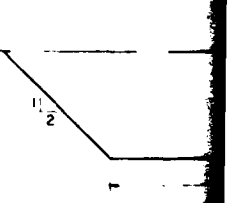




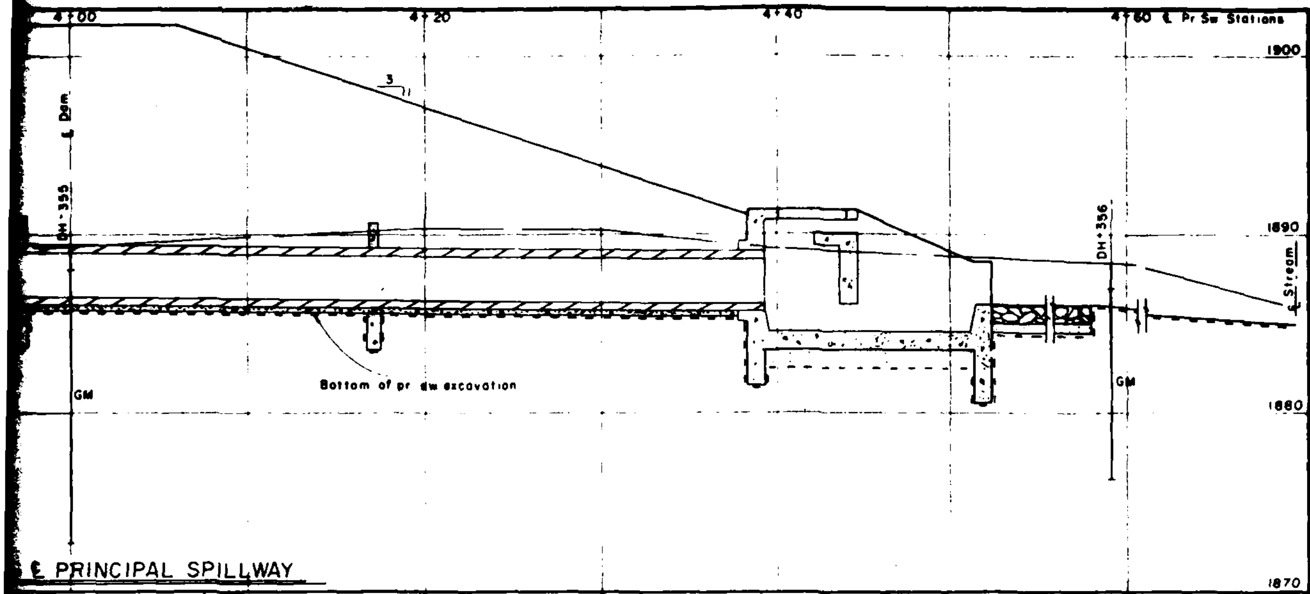
PR. SW DETAIL



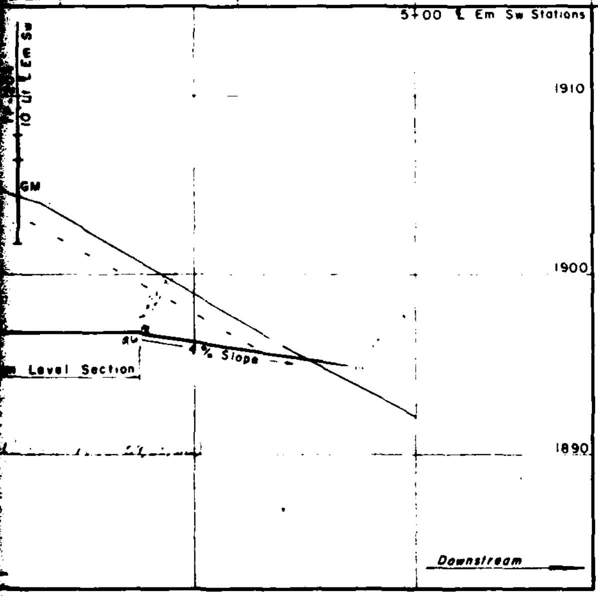
RESERVOIR DRAIN CHANNEL
℄ OUTLET CHANNEL
RIPRAP SECTION DETAIL



RESERVOIR
℄ OUTL

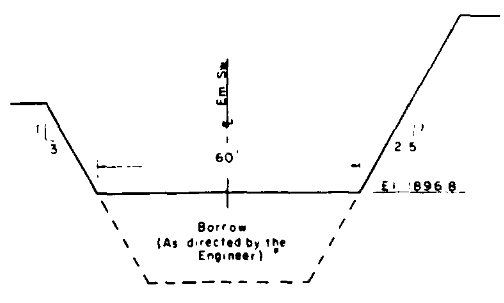


℄ PRINCIPAL SPILLWAY

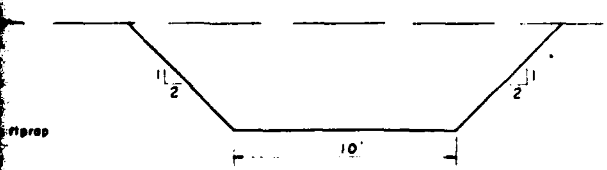


CONSTRUCTION NOTES

1. For logs of test holes see shts 16 & 17
2. For drain fill gradation limits see sht 6
3. Riprap bedding shall meet fine drain fill gradation limits



TYPICAL SECTION
(Emergency Spillway Borrow)



RESERVOIR DRAIN CHANNEL
& OUTLET CHANNEL

AS BUILT PLANS

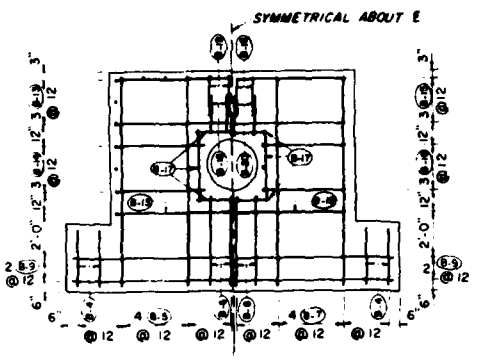
GREENE DREHER WATERSHED
FLOODWATER RETARDING DAM PA-451
WAYNE COUNTY, PENNSYLVANIA
SPILLWAY EXCAVATION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Walt VanBuskirk 4-70
C. CRISE 5-70
J. Graham 8-70

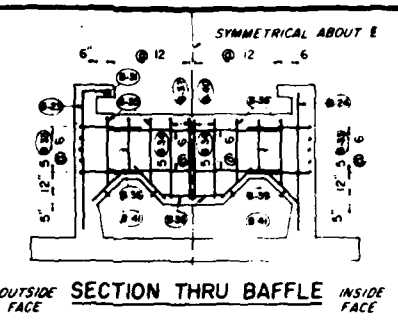
8
18

PA-451-P

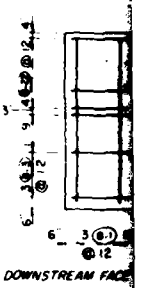
PA-01031
PLATE VIII



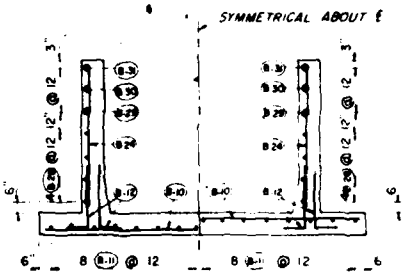
UPSTREAM FACE **SECTION D - D** DOWNSTREAM FACE



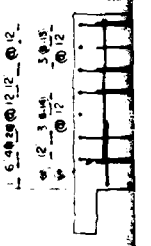
OUTSIDE FACE **SECTION THRU BAFFLE** INSIDE FACE

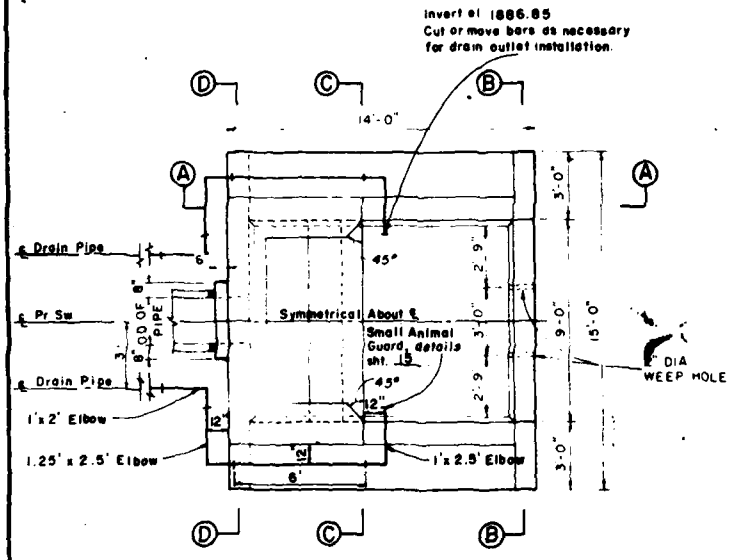


DOWNSTREAM FACE

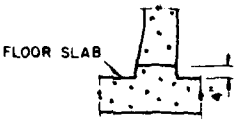


OUTSIDE FACE **SECTION C - C** INSIDE FACE

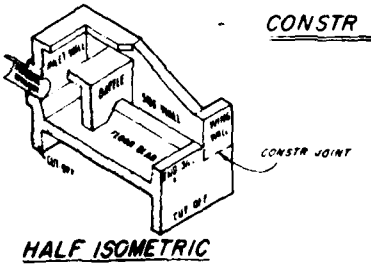




PLAN VIEW

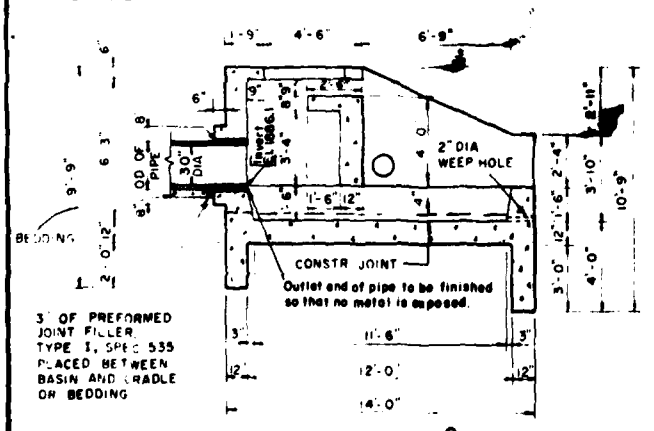


CONSTR JOINT

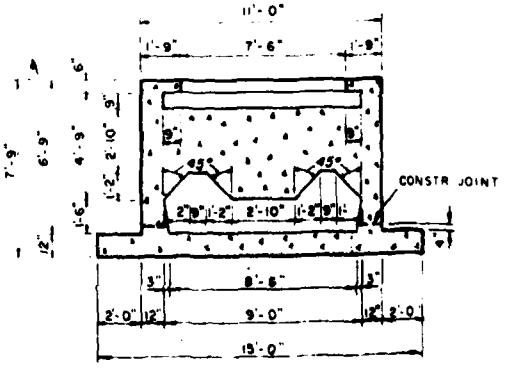


HALF ISOMETRIC

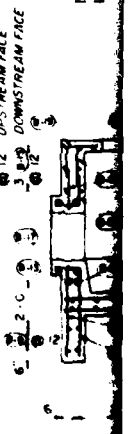
½" PREFORMED JOINT FILLER, TYPE I, SPEC 535 PLACED BETWEEN PIPE AND BASIN



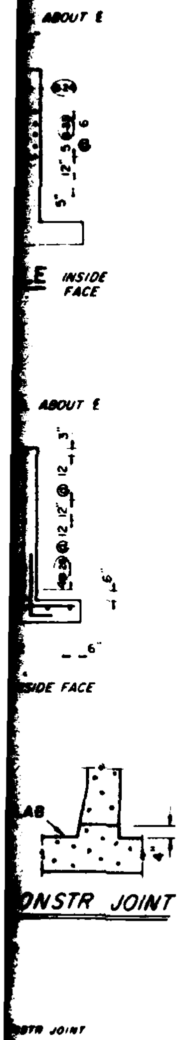
SECTION ON ℄

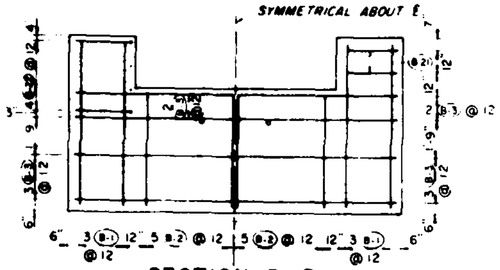


SECTION THRU BAFFLE

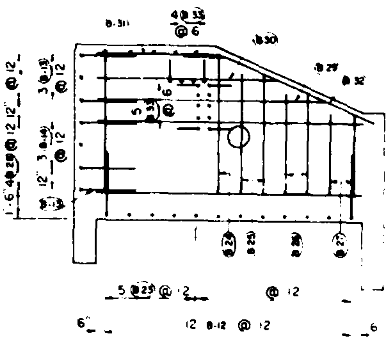


Construction Details, See Sheet 8

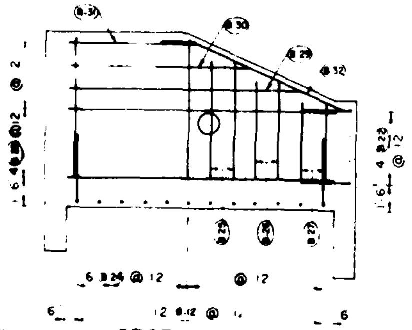




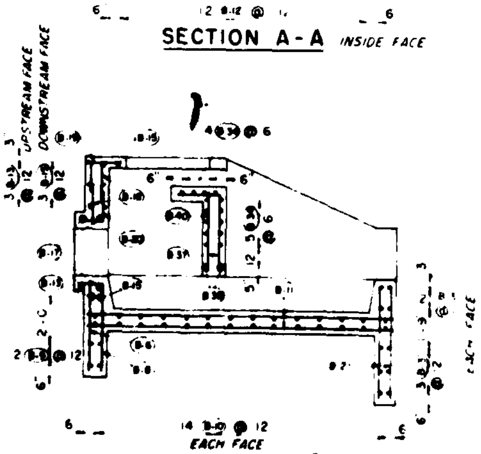
DOWNSTREAM FACE **SECTION B-B** UPSTREAM FACE



SECTION A-A OUTSIDE FACE



SECTION A-A INSIDE FACE

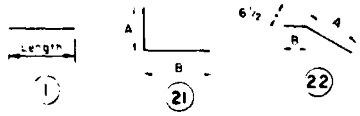


SECTION ON ℄

AS BUILT PLANS

STEEL SCHEDULE

MARK	LOCATION	QUAN	SIZE	LENGTH	TYPE	A	B	TOTAL FT
B-1	CUT OFF	12	5	7-3	1			87 00
2		18	5	5-0	1			90 00
3		10	5	14-6	1			145 00
4		8	5	2-6	1			20 00
B-5		8	5	10-8	21	9-4	1-4	85 33
6		3	5	4-0	1			12 00
7		8	5	9-3	1			74 00
8		3	5	5-0	21	4-0	1-0	15 00
9		4	5	14-6	1			58 00
B-10	FLOOR SLAB	28	5	14-6	1			406 00
11		30	5	13-6	1			405 00
12		48	5	3-10	21	2-10	1-0	184 00
13	INLET WALL	8	5	8-7	21	6-1	2-6	68 67
14		6	5	6-6	21	4-0	2-6	39 00
B-15		4	5	10-6	1			42 00
6		6	5	4-[illegible]	21	3-9	1-0	28 50
17		8	5	3-0	1			24 00
18		6	5	2-3	1			13 50
19		3	5	3-4	21	2-0	1-4	10 00
B-20		3	5	3-0	2	2-0	1-0	9 00
21	WING WALLS	4	5	2-6	1			10 00
22		8	5	5-0	2	2-6	2-6	40 00
23	SIDE WALLS	10	5	7-10	21	6-6	1-4	78 33
24		14	5	6-0	1			84 00
B 25		8	5	5-3	1			42 00
26		8	5	4-3	1			34 00
27		8	[illegible]	3-6				28 00
28		16	5	12-0				192 00
29		4	5	10-3				41 00
B-30		4	5	8-0				32 00
31		[illegible]	5	5-6				33 00
32		4	5	9-[illegible]	22	7 6	1-7	36 33
33	BAFFLE	28	5	4 0	2	3-0	1-0	112 00
34		14	5	8-0	1			112 00
B-35		4	5	5-0	2	3-0	2-0	20 00
36		2	5	4-5	2	2-5	2-0	8 83
37		3	5	5-7	2	3-7	2-0	16 75
38		6	5	3-0				18 00
39		2	5	2-5	1			4 83
B-40		3	5	3-6	1			10 50
41		8	5	2-0	1			16 00



BAR TYPES

QUANTITIES THIS SHEET ONLY

REINFORCING STEEL
NO 5 BARS 2785 57 LIN FT 2905 35 LBS

CONCRETE
[illegible] 219 CU YDS

SCALE

GREENE DREHER WATERSHED
FLOODWATER RETARDING DAM PA-451
WAYNE COUNTY, PENNSYLVANIA
IMPACT BASIN DETAILS
[illegible] DEPARTMENT OF AGRIC[illegible]
[illegible] CONSERVATION [illegible]

Fred A. [illegible] (signature)
[illegible] NIKOLICH
C B FORD
F. O. [illegible] (signature)

14
18
PA-451-P

PA-01031
PLATE IX

APPENDIX F

GEOLOGIC REPORT

GEOLOGIC REPORT

Bedrock - Dam and Reservoir

Formation Name: Poplar Gap Member, Catskill Formation.

Lithology: Predominantly fine to medium-grained, gray sandstone, locally conglomeratic. Some interbeds of red siltstone and shale. Sandstones are generally well cemented with quartz, but calcareous cement is present at the base of some beds.

Structure

The site is within the Pocono Plateau area and the beds are essentially horizontal. Air photo fracture traces trend: N10° to 15°E, N60°W, and N70°W.

Overburden

The site is within the limits of Pleistocene glaciation and is underlain by quite thick deposits of glacial moraine and some lacustrine silts. The site is apparently near where the moraine formerly dammed the valley forming a lake in which the silts were deposited. The silts are composed of about 35% coarse silt and fine sand, the remainder being silt and clay. They are stiff and of low permeability. The till of the moraine is composed of boulders, sand and silt. At least one thin zone of gravel was present.

Some organic muck which had been deposited behind an old mill dam at the site was also present.

Aquifer Characteristics

The rocks of the Catskill Formation are essentially impermeable, ground water movement is entirely along fracture zones and bedding planes. The glacial moraines are composed mostly of till which is relatively impermeable, but also contain sandy or gravel layers which may have fairly high permeability. At least one such zone was found in the test pits.

Discussion

All of the recent organic muck was removed from the embankment foundation. The dam has a four foot deep cut-off trench dug into the till and lacustrine silt. Because of the generally low permeability of these materials, no leakage problems are to be expected at this site.

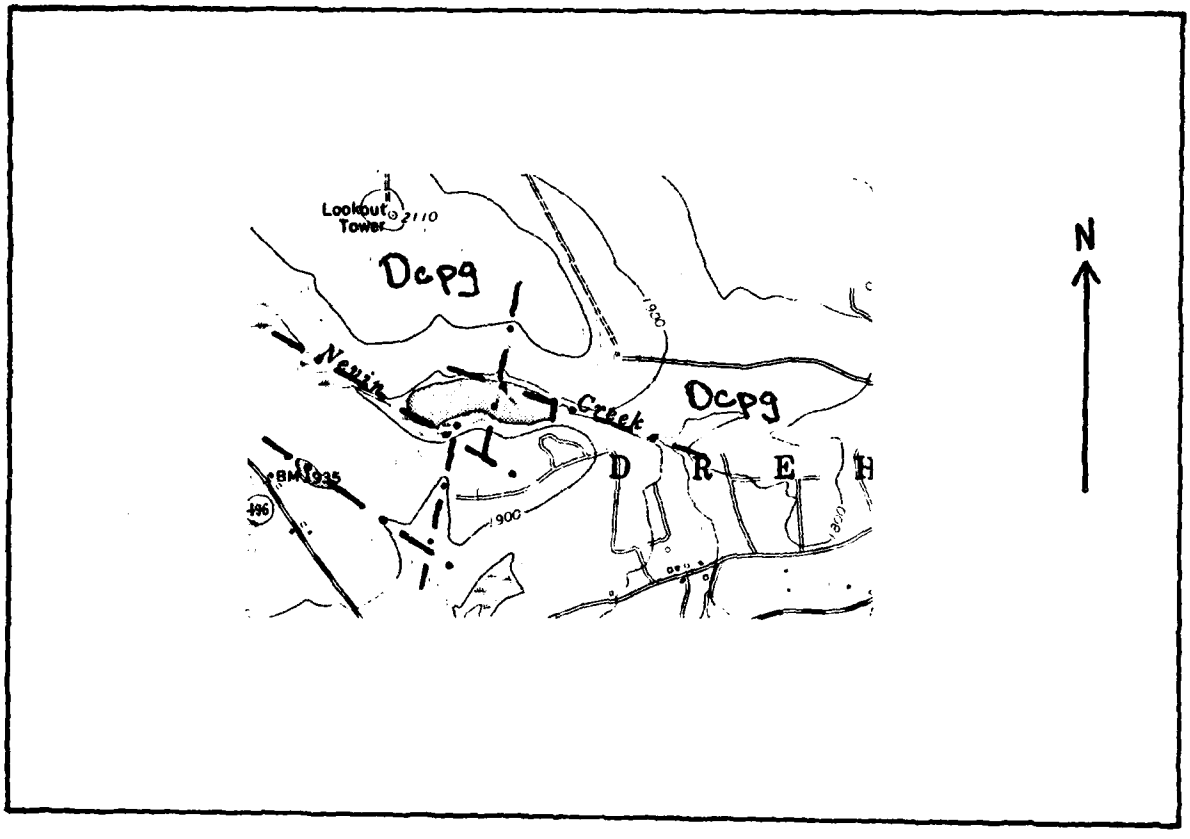
Sources of Information

1. Manuscript Geologic Map of the Newfoundland Quadrangle, in open file, Pa. Geological Survey, Harrisburg, Pa.

2. Geologic report and test pit logs in file.

3. Air photographs, scale 1:40,000. Dated 1973.

GEOLOGIC MAP - [illegible] 451 Dam



Dcpg — Catskill Fm. - Poplar Gap member

— · — · — air photo fracture trace

SCALE 1:24000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET