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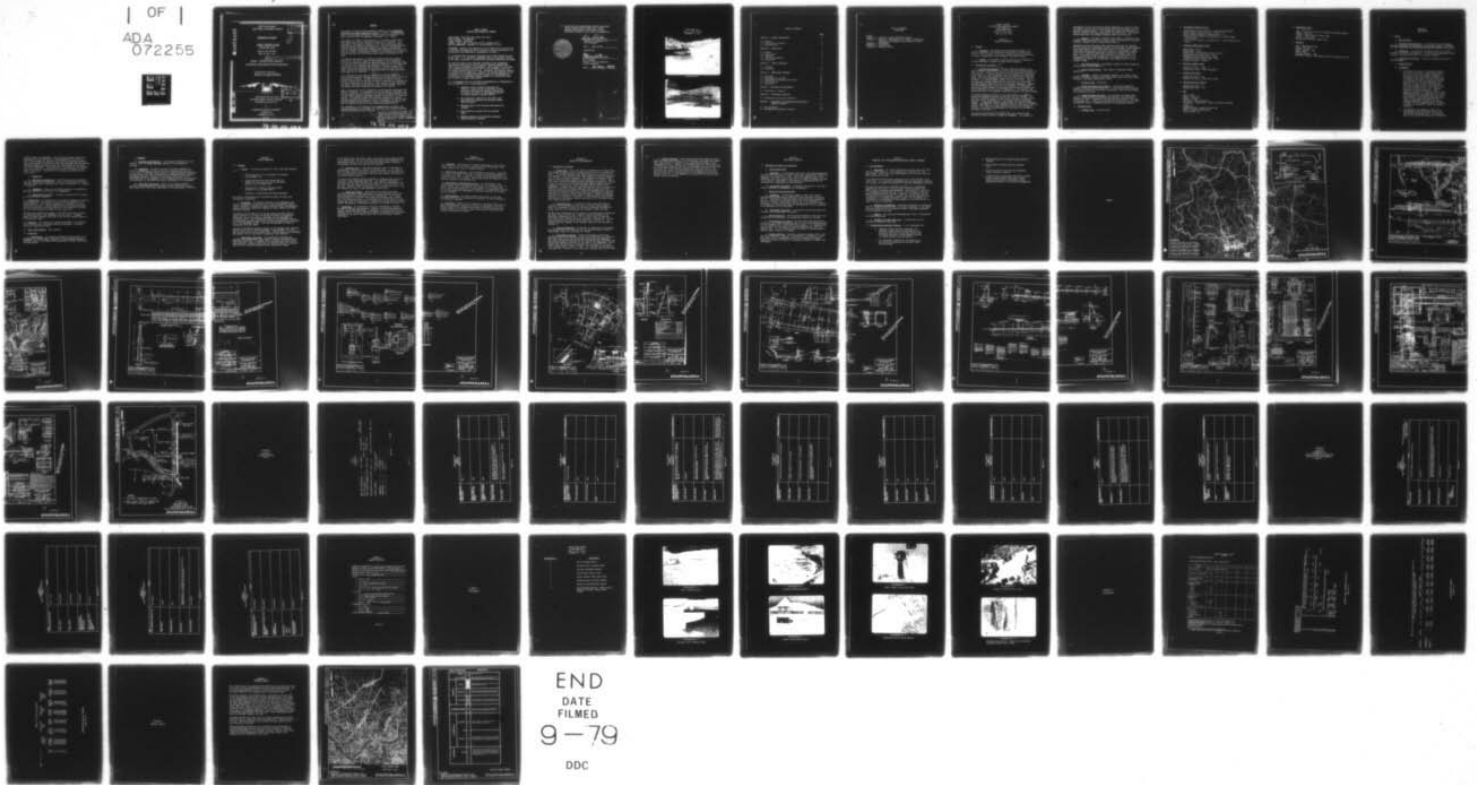
D'APPOLONIA CONSULTING ENGINEERS INC PITTSBURGH PA
NATIONAL DAM INSPECTION PROGRAM. PINE CREEK DAM (NORTH PARK LAK--ETC(U)
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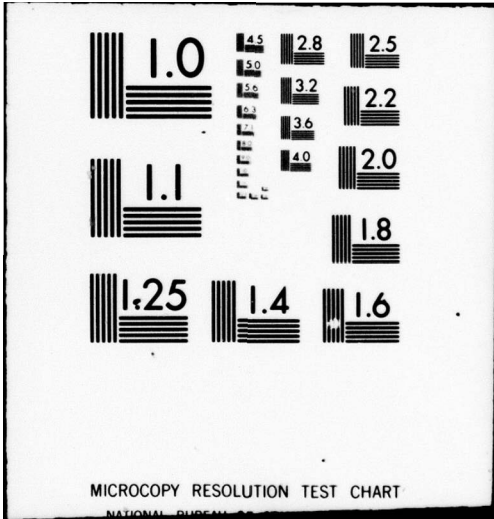
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PINE CREEK DAM
(North Park Lake)

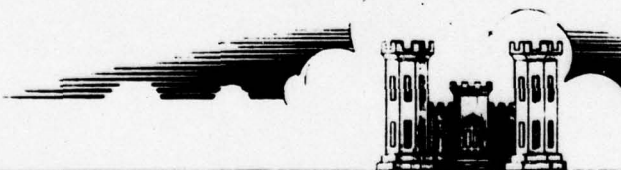
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DER I.D. NO: 2-26

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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PREPARED FOR

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
BALTIMORE, MARYLAND 21203

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D'APPOLONIA CONSULTING ENGINEERS
10 DUFF ROAD
PITTSBURGH, PA. 15235

MAY 1979

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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 Department of the Army, 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 visual observations and review of available data. Detailed investigation and analyses involving topographic mapping, subsurface investigations, material testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the inspection is intended to identify any need for such studies which should be performed by the owner.

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 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.

10 Lawrence D. Anderson

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external factors which are 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.

The assessment of the conditions and recommendations was made by the consulting engineer in accordance with generally and currently accepted engineering principles and practices.

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National Dam Inspection Program. Pine Creek Dam (North Park Lake) (NDI I.D. Number PA-467, DER I.D. Number 2-26), Ohio River Basin, Pine Creek, Allegheny County, Pennsylvania. Phase I Inspection Report,

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**PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM**

NAME OF DAM: Pine Creek Dam (North Park Lake)
STATE LOCATED: Pennsylvania
COUNTY LOCATED: Allegheny
STREAM: Pine Creek, a tributary of the Allegheny River
DATE OF INSPECTION: December 15, 1978 and April 16, 1979

ASSESSMENT: Based on the evaluation of the conditions as they existed on the dates of inspection and as revealed by visual observations, the condition of Pine Creek Dam is considered to be good.

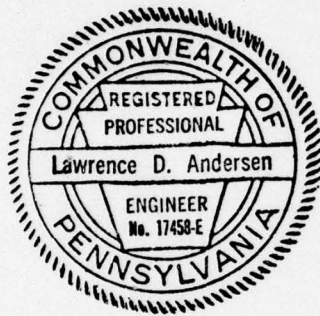
It is reported that the outlet pipe gate has not been operated in the recent past. It is therefore recommended that the operating condition of the outlet pipe gate be evaluated and necessary maintenance performed.

The spillway capacity was evaluated according to the recommended procedure and was found to pass 30 percent probable maximum flood (PMF) without overtopping the embankment. This capacity is less than the recommended spillway capacity of full PMF according to the size and hazard classification of the dam. Therefore, the spillway capacity is classified to be inadequate. However, the spillway capacity is not considered to be seriously inadequate because it is estimated that overtopping of the embankment during passage of 50 percent PMF would not be likely to cause a dam failure.

It is recommended that the following recommendations be implemented as soon as possible or on a continuing basis:

1. Immediate further detailed hydrologic and hydraulic studies should be performed to more accurately ascertain the spillway capacity and the nature and extent of improvements required to provide adequate spillway capacity.
2. The operational condition of the outlet pipe gate should be evaluated and necessary maintenance performed.
3. Missing riprap on the upstream slope should be replaced.
4. Brush should be removed from the upstream slope.
5. Spalling concrete in the spillway discharge channel should be repaired.

6. Around-the-clock surveillance should be provided during unusually heavy runoff and a formal warning system should be developed to alert downstream residents in the event of emergencies.



Lawrence D. Andersen

Lawrence D. Andersen, P.E.
Vice President

Date: May 3, 1979

Approved By:

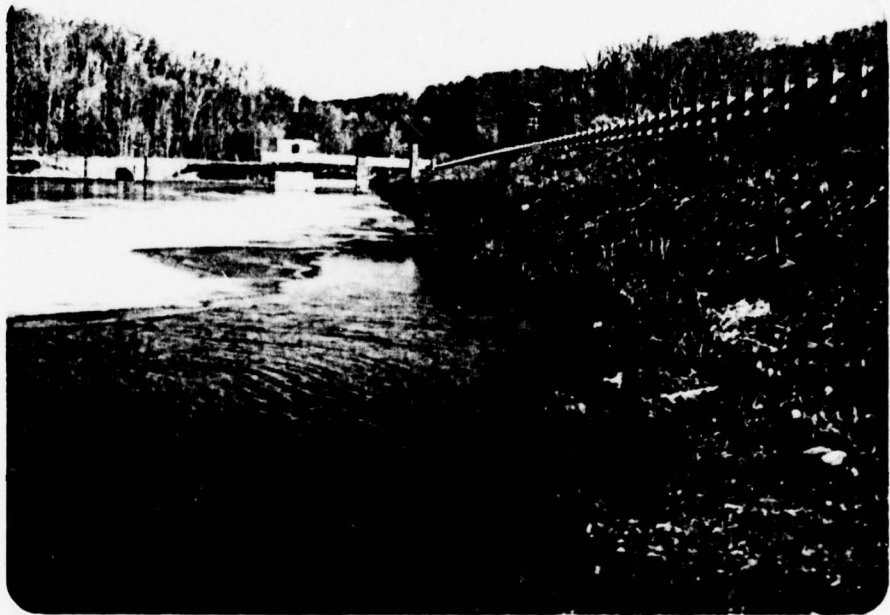
G. K. Withers

G. K. WITHERS
Colonel, Corps of Engineers
District Engineer

DATE: 20 May 1979

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PINE CREEK DAM
NDI I.D. NO. PA-467
DECEMBER 15, 1978



Upstream Face



Downstream Face

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PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
PINE CREEK DAM
(NORTH PARK LAKE)
NDI I.D. NO. PA-467
DER I.D. NO. 2-26

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. The inspection was performed pursuant to the authority granted by The National Dam Inspection Act, Public Law 92-367, to the Secretary of the Army, through the Corps of Engineers, to conduct 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 or property.

1.2 Description of Project

a. Dam and Appurtenances. The Pine Creek Dam consists of an earth embankment approximately 1130 feet long with a maximum height of about 33 feet. As built, the crest of the dam was 60 feet wide with a 2 horizontal to 1 vertical slope on both the upstream and downstream faces. Over the years, significant fill has been placed on the downstream side of the embankment, increasing the crest width to 300 to 400 feet. A two-lane roadway crosses the crest of the dam. Near the left abutment (looking downstream) the side slope of the spillway discharge channel defines the toe of the present embankment. However, for the remaining major portion of the embankment, no discernible demarcation exists between the embankment and the natural ground that can be identified as the toe of the embankment. Fill placed on the downstream side of the embankment gradually merges to the right abutment.

The flood discharge facilities for the dam consist of a combined primary and emergency spillway located near the left abutment. The spillway structures include an ogee overflow section, circular arc in plan view, which discharges into a rectangular concrete discharge channel. A single-span highway bridge crosses the spillway discharge channel, approximately 70 feet downstream from the crest of the overflow section. The crest of the ogee overflow section of the spillway is located at an elevation approximately 10 feet below the low point on the crest of the dam.

The outlet works consist of an intake tower and a 560-foot-long reinforced concrete conduit through the embankment. The conduit is

rectangular in cross section with inside dimensions of 5 feet by 5 feet. The conduit receives flow from the intake tower and discharges into the spillway discharge channel. Flow through the conduit is controlled by a manually operated sluice gate located at the intake tower. This outlet system constitutes the emergency drawdown facility for the dam.

b. Location. The dam is located on Pine Creek, a tributary of the Allegheny River, approximately 10 miles north of Pittsburgh in McCandless Township, Allegheny County, Pennsylvania (Plate 1).

Downstream from the dam, Pine Creek initially flows east for one mile and then turns south, meandering through a narrow valley for approximately three miles where it flows under State Route 8 at Allison Park. Downstream from Allison Park, the stream continues to flow south, crossing State Route 8 numerous times before joining the Allegheny River near Etna. In the last five-mile reach downstream from Allison Park, the stream goes through urban, residential, and commercial areas. It is estimated that failure of the dam would cause large loss of life and property damage.

c. Size Classification. Intermediate (based on 33-foot height and 1950 acre-feet storage capacity).

d. Hazard Classification. High (based on downstream damage potential).

e. Ownership. County of Allegheny (address: Mr. James D. Bell, Director of Parks, Recreation, and Conservation, Room 345, County Office Building, Pittsburgh, Pennsylvania 15219).

f. Purpose of Dam. Recreation.

g. Design and Construction History. The dam was designed by Allegheny County personnel during 1935. It was constructed by Harrison Construction Company of Pittsburgh, Pennsylvania, under the WPA Program with completion in 1936.

h. Normal Operating Procedure. The reservoir is normally maintained at Elevation 960, the uncontrolled spillway crest elevation, leaving 10.3 feet of freeboard to the low spot on the crest of the dam at Elevation 970.3. Inflow occurring when the lake level is at or above the spillway level is discharged through the uncontrolled spillway.

1.3 Pertinent Data

a. Drainage Area - 25 square miles

b. Discharge at Dam Site (cfs)

Maximum known flood at dam site - 600 (estimated 1972)
Outlet conduit at maximum pool - Unknown
Gated spillway capacity at maximum pool - N/A
Ungated spillway capacity at maximum pool - 10,500 (ogee section only)
Total spillway capacity at maximum pool - 10,500 (ogee section only)

c. Elevation (USGS Datum) (feet)

Top of dam - 970.3
Maximum pool - 970.3
Normal pool - 960 (spillway crest elevation)
Upstream invert outlet works - 938.5
Downstream invert outlet works - 936.5
Streambed at center line of dam - 936+
Maximum tailwater - Unknown

d. Reservoir Length (feet)

Normal pool level - 6000
Maximum pool level - 9000 (estimated)

e. Storage (acre-feet)

Normal pool level - 570
Maximum pool level - 1950 (top of dam)

f. Reservoir Surface (acres)

Normal pool level - 75
Maximum pool level - 190

g. Dam

Type - Earth
Length - 1130 feet
Height - 33 feet
Top width - 300 to 400 feet
Side slopes - Downstream: 10H:1V or flatter; Upstream:
2H:1V
Zoning - No
Impervious core - Concrete cutoff wall
Cutoff - Concrete cutoff wall
Grout curtain - No.

h. Regulating Outlet

Type - Five-foot by five-foot reinforced concrete conduit
Length - 570+ feet
Closure - Sluice gate at intake tower
Access - Intake tower
Regulating facilities - Sluice gate

i. Spillway

Type - Ogee-crested weir
Length - 83 feet
Crest elevation - 960
Gates - None
Upstream channel - Lake
Downstream channel - Rectangular concrete discharge channel

SECTION 2
DESIGN DATA

2.1 Design

a. Data Available

(1) Hydrology and Hydraulics. A state report entitled, Report Upon the Application of Commissioners of Allegheny County, dated August 22, 1935, summarizes the available hydrologic and hydraulic information.

(2) Embankment. The available information consists of design drawings and various correspondence. The 1935 permit application report includes a detailed description of the design features.

(3) Appurtenant Structures. Available information consists of design drawings.

b. Design Features

(1) Embankment

a. As designed, the dam is a homogeneous embankment with a reinforced concrete cutoff wall on the center line of the original embankment, extending for the full length of the dam. At the bottom of the valley, the core wall starts at Elevation 930, which is about 8 to 10 feet below the base of the earth embankment and extends to a level 7 feet above the normal pool level (Elevation 967). The width of the core wall is shown to be 4 feet 7 inches at Elevation 930, which reduces to 1 foot 6 inches at elevation 967 (Plates 2 and 3). The embankment material is classified to be "select fill" beneath the downstream slope and on the upstream side of the concrete core wall and as "fill" for the remaining portion of the original embankment. The 1935 state report indicates that the embankment was to be placed in layers not exceeding 6 inches and properly compacted.

b. The embankment was designed to have 2 to 1 (horizontal to vertical) slopes on both the upstream and downstream faces. The upstream face of the dam was protected with 15-inch-thick

conduit through the embankment. The reinforced concrete conduit is rectangular in cross section with inside dimensions of 5 feet by 5 feet. Flow through the conduit is controlled by a manually operated sluice gate located at the intake tower and discharges into the spillway discharge channel approximately 500 feet downstream from the center line of the embankment. The intake tower is equipped for the installation of stop logs on the upstream side to permit draining the intake tower when required. Plates 8 and 9 illustrate the details of the outlet works.

c. Design Data

(1) Hydrology and Hydraulics. The 1935 state report indicates that the spillway was designed for a flow of 450 cubic feet per second (cfs) per square mile of drainage area, which corresponded to a capacity of 11,250 cfs.

(2) Embankment. Other than the design drawings, no engineering data are available on the design of the embankment.

(3) Appurtenant Structures. No design calculations are available on the appurtenant structures.

2.2 Construction. The construction of the dam was apparently conducted in accordance with the drawings and specifications prepared by the design engineers. Very limited information is available on the construction of the dam. A state inspection which was conducted shortly after the completion of the dam referred to the condition of the dam as "(the dam) possessed all marks of first class job."

The major post-construction change at the dam site was the filling of the downstream side of the embankment over the years. Allegheny County personnel indicated that most of the fill was placed during the 1950s and early 1960s.

2.3 Operation. The reservoir is normally maintained at the spillway crest elevation by the discharge through the spillway. No formal records of operation are kept.

2.4 Other Investigations. None reported.

2.5 Evaluation

a. Availability. The available information was provided by the Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER), and by the Allegheny County Department of Parks, Recreation, and Conservation.

b. Adequacy

(1) Hydrology and Hydraulics. The available information is very limited. Only the design discharge capacity of the spillway is reported.

(2) Embankment. In view of the age of the dam (completed in 1936), the design approach and construction techniques are not likely to have been in conformance with currently accepted engineering practices. Although design lacks such considerations as embankment slope stability and seepage analysis, in view of the extensive fill placed on the downstream side of the embankment, such considerations are not considered to be pertinent to the future structural performance of the embankment.

(3) Appurtenant Structures. Review of the design drawings indicates that as designed no significant design deficiencies existed that should affect the overall performance of the appurtenant structures.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The on-site inspection of Pine Creek Dam consisted of:

1. Visual inspection of the embankment, abutments, and embankment toe.
2. Visual examination of the spillway and its components, the downstream end of the outlet conduit, and the intake tower.
3. Observations of factors affecting runoff potential of the drainage basin.
4. Evaluation of downstream area hazard potential.

The specific observations are illustrated in Plate 10 and in the photographs in Appendix C.

b. Embankment. The general inspection of the embankment consisted of searching for indications of structural distress, such as cracks, subsidence, bulging, wet areas, seeps and boils, and observing general maintenance conditions, vegetative cover, erosion, and other surficial features.

In general, the condition of the dam was found to be good, with no signs of distress. The crest of the dam was found to be generally undulating, but with no signs of distress, such as settlement or surficial cracks. The fill material placed on the downstream side of the embankment gradually merges into the natural ground and no definable toe of the embankment exists. This area was searched for signs of seepage and none were found.

The top of the dam was surveyed relative to the spillway crest elevation and was found to be on descending grades on each abutment to a low spot in the vicinity of the outlet works. The low point on the embankment was found to be 10.3 feet above the spillway crest elevation.

c. Appurtenant Structures. The appurtenant structures were examined for deterioration, other signs of distress, and obstructions that would limit flow. In general, the structures were found to be in good condition. Concrete was found to be spalling only in an isolated section of the spillway discharge channel beneath the bridge.

It is reported that the outlet conduit sluice gate has not been operated in the recent past. Due to the siltation problem in the reservoir, the operational condition of the sluice gate was questionable; therefore, the operation of the sluice gate was not observed.

d. Reservoir Area. A map review indicates that the watershed is predominantly covered with suburban residential areas. It is reported that the lake receives significant sediment load from the watershed, and it is estimated that the storage volume has been reduced to one-third of the design storage capacity.

A review of the regional geology (Appendix E) indicates that the dam is situated in Lower Conemaugh formations. The available information indicates that the Upper Freeport coal seam, which is approximately 207 feet below the dam elevation, has been mined to a point just east of the dam site. However, visual observations in the area below the toe of the dam indicated no signs of mine subsidence at this time.

e. Downstream Channel. Downstream from the dam, Pine Creek initially flows east, then turns south, and joins Allegheny River near Etna, Pennsylvania, approximately 10 miles downstream. In the lower six-mile reach of its course, Pine Creek flows through urban, residential, and commercial areas. It is estimated that in the event of a dam failure more than 100 residential or commercial buildings may be affected. Further description of downstream conditions is included in Section 1.2b.

3.2 Evaluation. The condition of the dam is considered to be good. No signs of distress were observed. However, the following conditions require repairs and maintenance: replacement of missing riprap on the upstream face of the dam at several locations, evaluating the operational condition of the outlet conduit sluice gate, and performing necessary maintenance.

SECTION 4
OPERATIONAL FEATURES

4.1 Procedure. The reservoir is normally maintained at the spillway crest level with excess inflows discharging over the spillway. The outlet conduit sluice gate is normally closed.

4.2 Maintenance of the Dam. The maintenance of the dam is considered to be fair. The crest of the dam is covered with grass and appears to be periodically mowed. At several locations on the upstream face, the riprap was found to be missing. This riprap should be replaced to avoid erosion problems on the upstream face.

4.3 Maintenance of Operating Facilities. The maintenance of the operating facilities is considered to be poor. It is reported that the outlet conduit sluice gate has not been operated in the recent past. Due to the siltation problems in the reservoir, the operational condition of the sluice gate was questionable; therefore, operation of the gate was not observed.

4.4 Warning System. No formal warning system exists for the dam. Telephone communication facilities are available via park buildings in the vicinity of the dam.

4.5 Evaluation. Except for the condition of the outlet conduit sluice gate, the maintenance condition of the dam is considered to be fair. Missing riprap on the upstream slope should be replaced and the operational condition of the outlet conduit sluice gate be evaluated and necessary maintenance performed.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

a. Design Data. Pine Creek Dam has a watershed of 25 square miles and impounds a reservoir with a surface area of 75 acres at normal pool level. The combined emergency and primary spillway is located on the left abutment. The capacity of the ogee spillway section was determined to be 10,500 cfs with no freeboard. This capacity is slightly lower than the reported design capacity of the spillway of 11,250 cfs, apparently due to different assumed spillway discharge coefficients. The top of the side walls of the spillway discharge channel upstream from the embankment are located at a lower elevation than the crest of the embankment. Although flow over these sections will tend to increase the spillway capacity by providing additional overflow area, this flow entering the discharge channel at a direction perpendicular to the main flow direction from the ogee section will tend to reduce the hydraulic efficiency of the ogee section, thereby tending to reduce the discharge capacity of the spillway. Therefore, for the purpose of this preliminary analysis, the spillway capacity was based on the discharge rating of the ogee section only.

b. Experience Data. As previously stated, Pine Creek Dam is classified as an intermediate size dam in the high hazard category. Under the recommended criteria for evaluating emergency spillway discharge capacity, such impoundments are required to pass full PMF.

The PMF inflow hydrograph for the reservoir was determined utilizing the Dam Safety Version of the HEC-1 computer program developed by the Hydrologic Engineering Center of the U.S. Army, Corps of Engineers. Data used for the computer input are presented in Appendix D. The PMF inflow hydrograph was found to have a peak flow of 29,215 cfs. The computer input and summary of the computer output are also included in Appendix D.

c. Visual Observations. On the date of inspection, no conditions were observed that would indicate that the spillway capacity would be significantly reduced in the event of a flood.

d. Overtopping Potential. Various percentages of PMF inflow hydrograph were routed through the reservoir to determine the percent of PMF inflow that the dam can pass without overtopping the embankment. The computer analyses indicate that the spillway can pass 30 percent PMF without overtopping the low spot on the crest of the embankment. For 50 percent PMF, the dam would be overtopped for a duration of 5.5 hours with a maximum depth of about 1.3 feet. For full PMF, the dam would be overtopped for a duration of 13.0 hours with a maximum depth of 3.8 feet.

e. Spillway Adequacy. Since the spillway cannot pass the recommended spillway design flood of full PMF without overtopping the embankment, the spillway is classified to be inadequate according to the recommended criteria. However, the spillway capacity is not considered to be seriously inadequate because it is estimated that the dam can pass 50 percent PMF without posing a significant breach potential. This conclusion was based on the observation that extensive fill material has been placed on the downstream side of the embankment and that the paving on the crest of the embankment would provide protection against erosion during overtopping.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

(1) Embankment. As discussed in Section 3, the field observations did not reveal any signs of distress that would significantly affect the stability of the dam at this time. Due to the extensive size of the embankment (the crest width is about 10 to 15 times the height over most of its length), conventional slope stability considerations are not considered to be applicable to this structure.

(2) Appurtenant Structures. Structural performance of the appurtenant structures is considered to be satisfactory.

b. Design and Construction Data

(1) Embankment. The dam was designed in 1935, when limited understanding of geotechnical behavior of earth retention structures existed. Consequently, available design and construction information does not provide any quantitative data to aid in the assessment of stability. However, as previously noted, due to the extensive size of the embankment, conventional stability considerations are not considered to be applicable to this structure.

(2) Appurtenant Structures. No design and construction data are available on the appurtenant structures.

c. Operating Records. The structural stability of the dam is not considered to be affected by the operational features of the dam.

d. Post-Construction Changes. The major post-construction modification to the original design consisted of filling the downstream side of the embankment with unclassified fill material. It is reported that over the years the area below the original embankment was used as a disposal area. As it presently exists, the crest of the dam is 300 to 400 feet wide for most of its length.

e. Seismic Stability. The dam is located in Seismic Zone 1, and the static stability of the dam is considered to be adequate. Therefore, based on the recommended criteria for evaluation of seismic stability of dams, the structure is presumed to present no hazard from earthquakes.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

a. Assessment. The visual observations indicate that Pine Creek Dam is in good condition. No conditions were observed that would significantly affect the overall performance of the structure and none were reported in the past.

It is reported that the outlet pipe gate has not been operated in the recent past. It is therefore recommended that the operational condition of the outlet pipe gate be evaluated and necessary maintenance performed.

The spillway capacity was evaluated according to the recommended procedure and was found to pass 30 percent probable maximum flood (PMF) without overtopping the embankment. This capacity is less than the recommended spillway capacity of full PMF according to size and hazard classification for the dam. Therefore, the spillway capacity is classified to be inadequate. However, the spillway capacity is not considered to be seriously inadequate because it is estimated that overtopping of the embankment during passage of 50 percent PMF is not likely to cause a dam failure.

b. Adequacy of Information. Available information in conjunction with the visual observations and the previous experience of the inspectors are considered to be sufficient to make a reasonable assessment of the condition of the dam.

c. Urgency. The following recommendations should be implemented on a continuing basis.

d. Necessity for Additional Data. No additional data are considered required at this time.

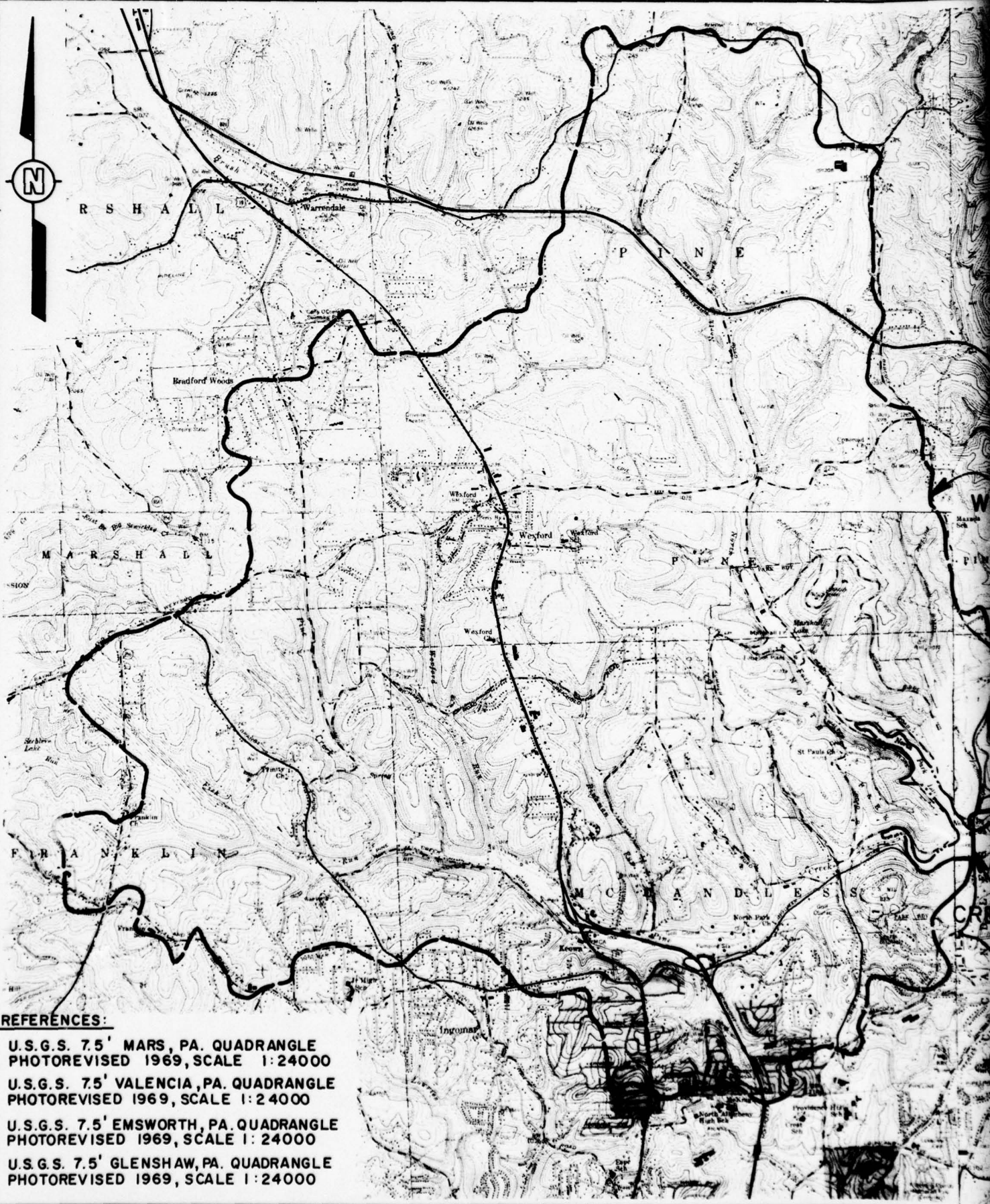
7.2 Recommendations/Remedial Measures. It is recommended that:

1. Immediate further detailed hydrologic and hydraulic studies should be performed to more accurately ascertain the spillway capacity and the nature and extent of improvements required to provide adequate spillway capacity.
2. The operational condition of the outlet pipe gate should be evaluated and necessary maintenance performed.

3. Missing riprap on the upstream slope should be replaced.
4. Brush should be removed from the upstream slope.
5. Spalling concrete in the spillway discharge channel should be repaired.
6. Around-the-clock surveillance should be provided during unusually heavy runoff and a formal warning system should be developed to alert downstream residents in the event of emergencies.

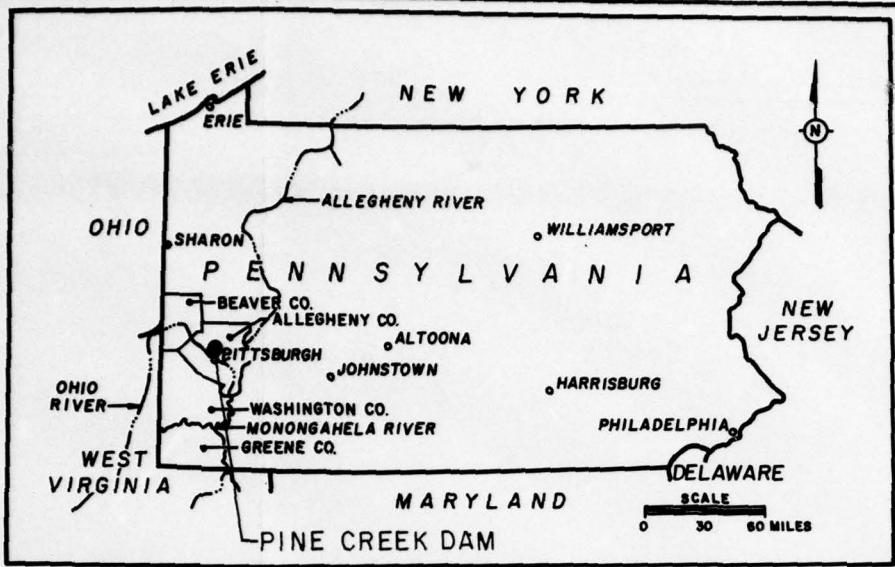
PLATES

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REFERENCES:

- U.S.G.S. 7.5' MARS, PA. QUADRANGLE
PHOTOREVISED 1969, SCALE 1:24000
- U.S.G.S. 7.5' VALENCIA, PA. QUADRANGLE
PHOTOREVISED 1969, SCALE 1:24000
- U.S.G.S. 7.5' EMSWORTH, PA. QUADRANGLE
PHOTOREVISED 1969, SCALE 1:24000
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KEY PLAN

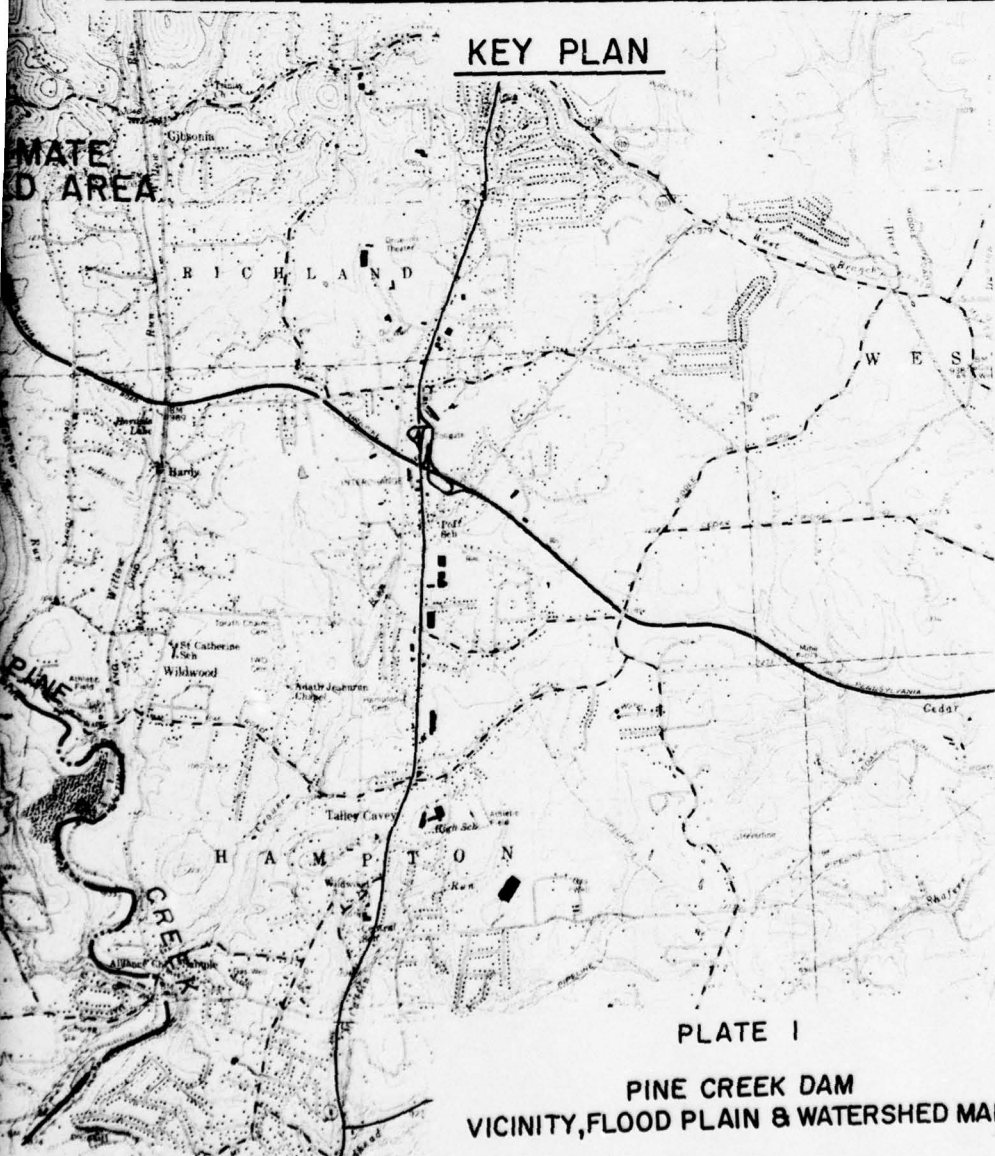


PLATE I

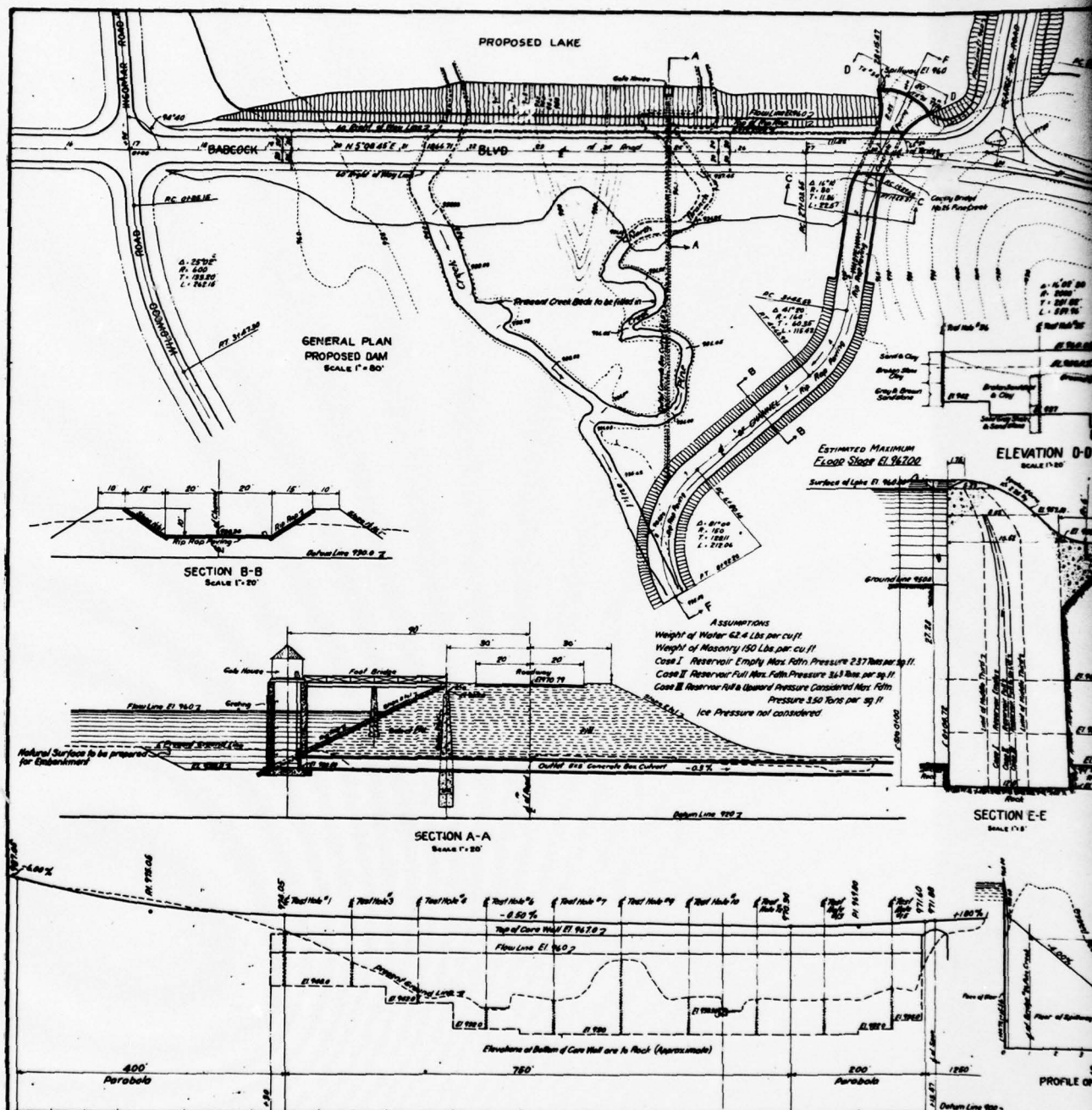
PINE CREEK DAM
VICINITY, FLOOD PLAIN & WATERSHED MAP

D'APPOLONIA

2

2

DRAWN BY RDB CHECKED BY BE 4-7-77 DRAWING NUMBER 78-367-B89
 APPROVED BY [Signature] 4-17-77

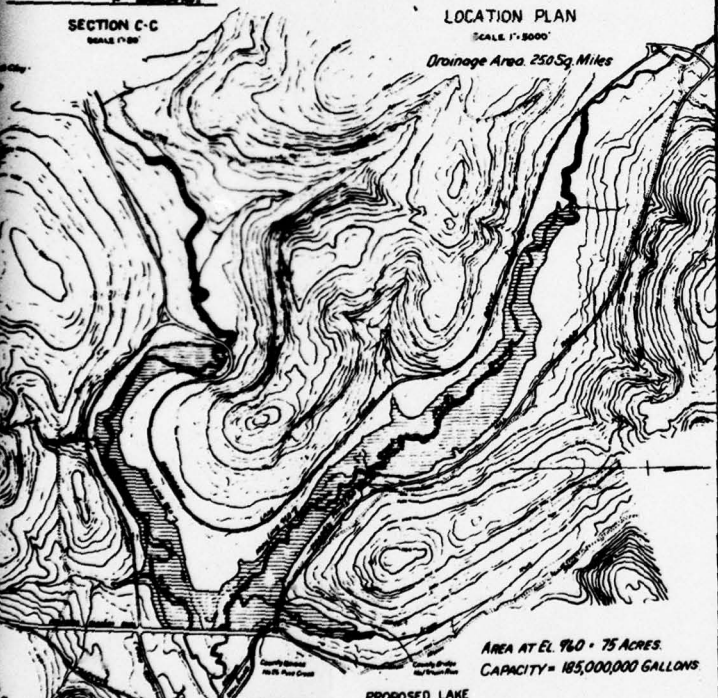
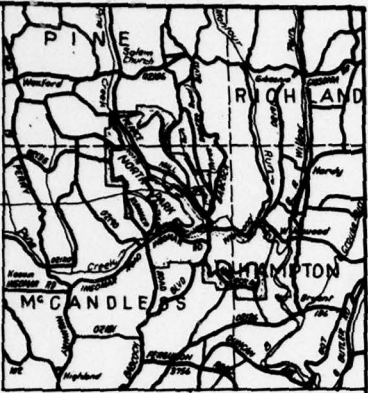
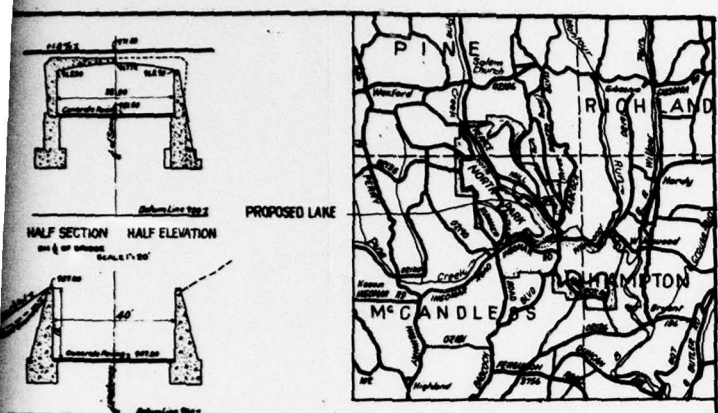


ASSUMPTIONS
 Weight of Water 62.4 Lbs per cu ft
 Weight of Masonry 150 Lbs per cu ft
 Case I Reservoir Empty Max. Fohn Pressure 237 lbs per sq ft
 Case II Reservoir Full Max. Fohn Pressure 343 lbs per sq ft
 Case III Reservoir Full & Upward Pressure Considered Max. Fohn Pressure 330 lbs per sq ft
 Ice Pressure not considered

IN CHARGE		DRAWN		CHECKED		DATE	
[Signature]		[Signature]		[Signature]		[Date]	
REVISIONS							
NO.	ORDERED	MADE	DATE	CHECKED	REMARKS	NOTE BOOKS	

PROFILE ON E OF BABCOCK BLVD & PROPOSED DAM
 SCALE 1" = 40'

PLAN SUBMITTED TO:
 UNITED AND POWER DEVELOPMENT BOARD OF PENNSYLVANIA
 UNDER DATE OF MAY 2, 1932
 STATE ANY CONSIDERATION OF PENNSYLVANIA
 UNDER DATE OF MAY 2, 1932



APPROVED	
DEPARTMENT OF PLANNING <i>Earl K. Williams</i> PLANNING COMMISSION DATE	
COUNTY PLANNING COMMISSION <i>John J. [unclear]</i> DATE	
DEPARTMENT OF WORKS AND AVIATION <i>A. [unclear]</i> DATE	
DEPARTMENT OF HIGHWAYS BRIDGES & TUNNELS <i>R. O. [unclear]</i> DATE	
COUNTY COMMISSIONERS <i>[unclear]</i> DATE	

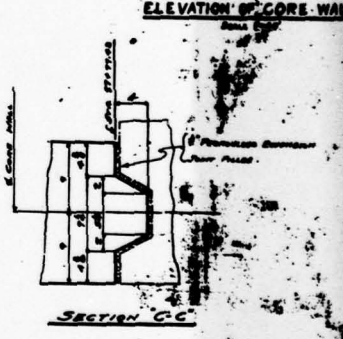
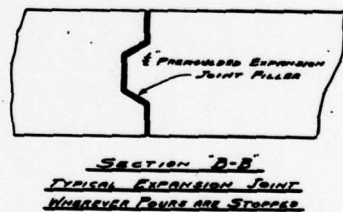
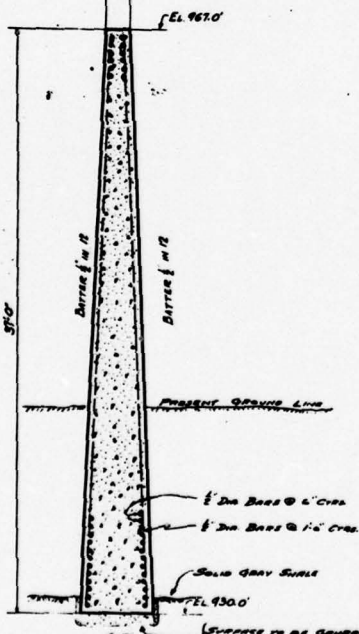
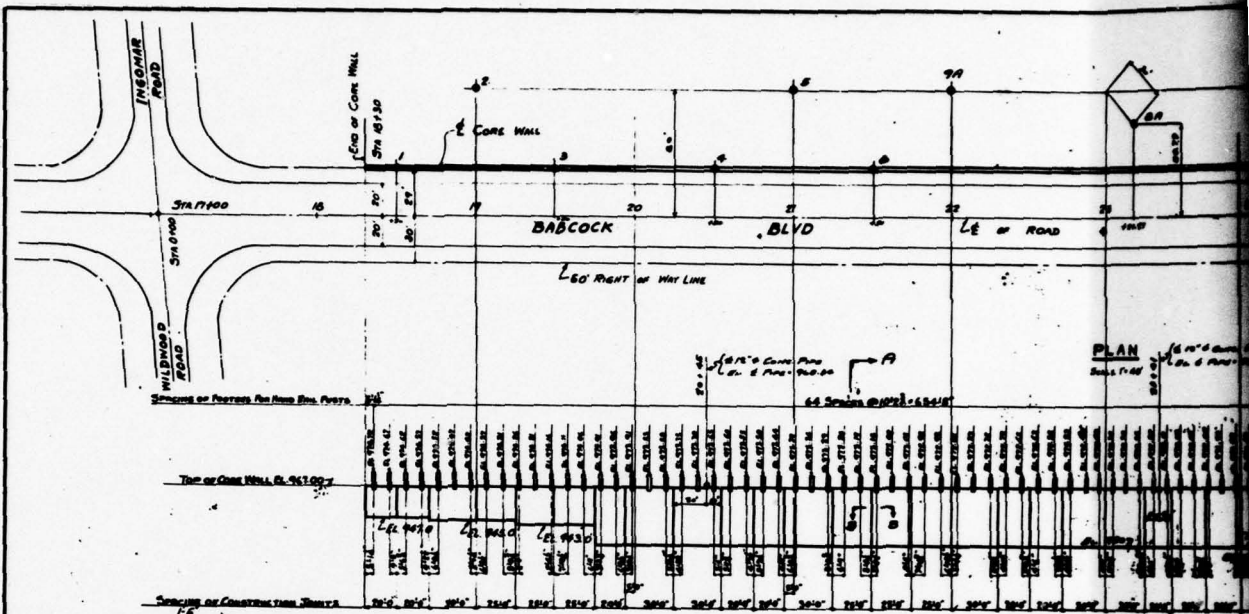
COUNTY OF ALLEGHENY
PITTSBURGH, PA.

SABCOCK BOULEVARD
BRIDGE NO. 26 & DAM
PINE CREEK
 NORTH PARK, MCCANDLESS TOWNSHIP
LOCATION PLAN & GENERAL DETAILS
 SCALES AS SHOWN MAY 15, 1938

2 PLATE 2

D'APPOLONIA

DRAWN BY **RDB** CHECKED BY **BE** DRAWING NUMBER **78-367-B90**
 1-4-79 APPROVED BY **SP** 4-17-79



NOTE: ELEVATIONS FOR BOTTOM OF CORE WALL ARE PRELIMINARY. FINAL ELEVATIONS SHALL BE DETERMINED IN FIELD.

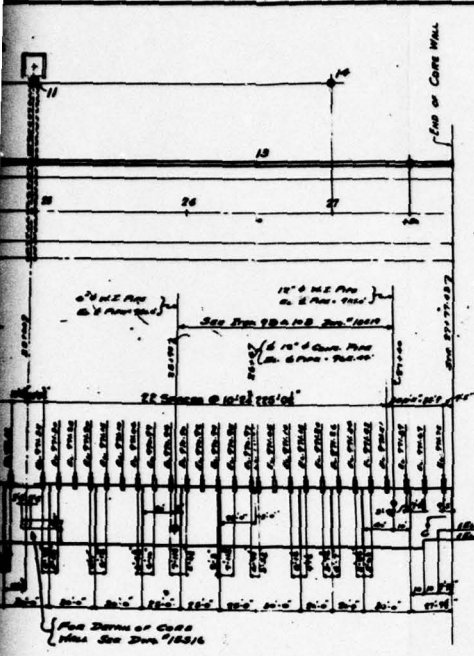
SECTION A-A
Scale 1/4" = 1'-0"

SECTION B-B
TYPICAL EXPANSION JOINT
WHEREVER FOURS ARE STOPPED

SECTION C-C
ELEVATION OF CORE WALL

BY CHARGE		DRAWN		CHECKED	
NO.		DATE		REMARKS	

PLAN CONVENIENT BUT NOT SURE



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ESTIMATED QUANTITIES.

ITEM	DESCRIPTION	UNIT	QUANTITY
1B	CONCRETE IN WALL INCLUDING REINFORCING	CYTH	3900
2B	REINFORCING STEEL INCLUDING DOWELS & CHAIRS	LSB	164,000
3B	PREPARED BITUMINOUS EST. JOINT FILLER	LSB	500

FOR GENERAL NOTES SEE DWG 1550I

APPROVED

DEPARTMENT OF PLANNING
Robert White JUN 6 1936
 COUNTY PLANNING COMMISSION

DEPARTMENT OF PUBLIC WORKS AND AVIATION
[Signature] JUN 25 1936

DEPARTMENT OF HIGHWAYS BRIDGES & TUNNELS
[Signature] JUN 17 1936
 COUNTY COMMISSIONERS

COUNTY OF ALLEGHENY
 PITTSBURGH, PA.

BABCOCK BOULEVARD
 CORE WALL
 NORTH PARK DAM
 NORTH PARK, SPENCER TOWNSHIP
 GENERAL PLAN & ESTIMATED QUANTITIES
 SCALES AS SHOWN
 SHEET 1 OF 2 SHEETS

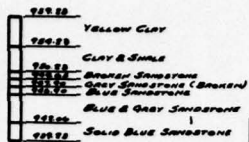
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PLATE 3

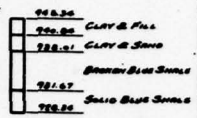
D'APPOLONIA

2

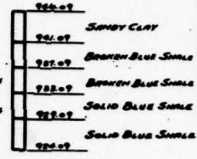
DRAWING 78-367-B91
 CHECKED BY BE 4-17-79
 APPROVED BY SPW 4-17-79
 DRAWN BY RDB 1-4-79



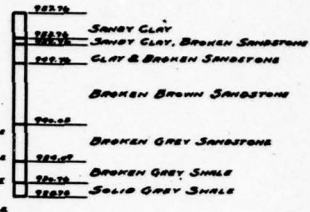
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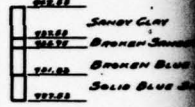
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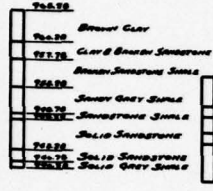
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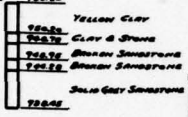
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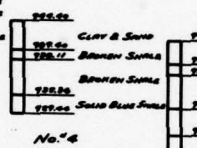
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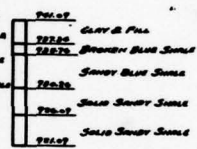
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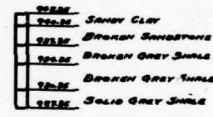
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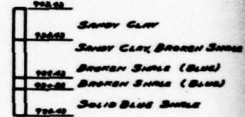
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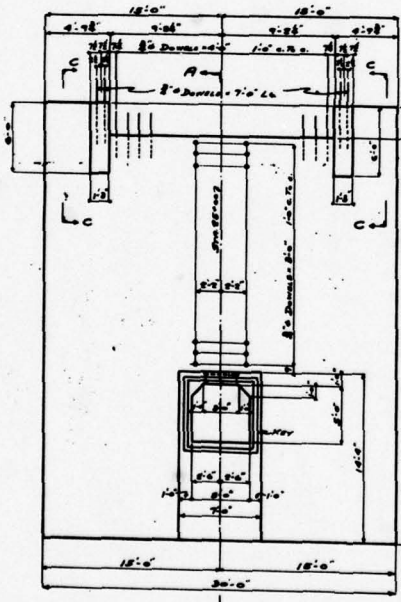
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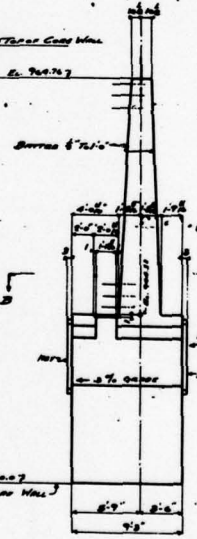
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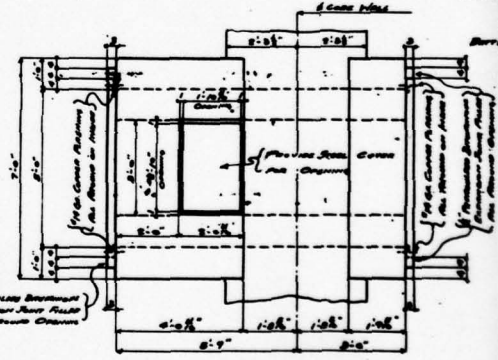
No. 10



ENLARGED DETAIL CORE WALL OF 574 92.00
SCALE 1/2" = 1'-0"



SECTION A-A
SCALE 1/2" = 1'-0"



SECTION B-B
SCALE 1/2" = 1'-0"

TEST HOLES
TABLE 17-12
FOR LOCATION SEE DIV. 15515

NO.	ORDERED	MADE	DATE	CHECKED	REMARKS

225.09	SANDY CLAY BROWN SANDSTONE
225.07	BROWN GRAY SHALE
225.05	SOLID BLUE SHALE

No. 14

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225.04	BLUISH CLAY
225.03	SANDY CLAY & BROWN SHALE
225.02	BROWN GRAY SHALE
225.01	BROWN GRAY SHALE
225.00	SOLID GRAY SHALE

No. 13



SECTION C-C
Scale 1/4"

COUNTY OF ALLEGHENY
PITTSBURGH, PA.

**BABCOCK BOULEVARD
COREWALL
NORTH PARK DAM**

NORTH PARK, IN CARELESS TOWNSHIP

SECTIONS & DETAILS

SCALE AS SHOWN JUNE 6, 1938

SHEET 2 OF 2 SHEETS

SUBMITTED JUNE 6, 1938

[Signature]
DESIGN ENGINEER

APPROVED

[Signature]
REGISTERED ENGINEER

2

PLATE 4

D'APPOLONIA

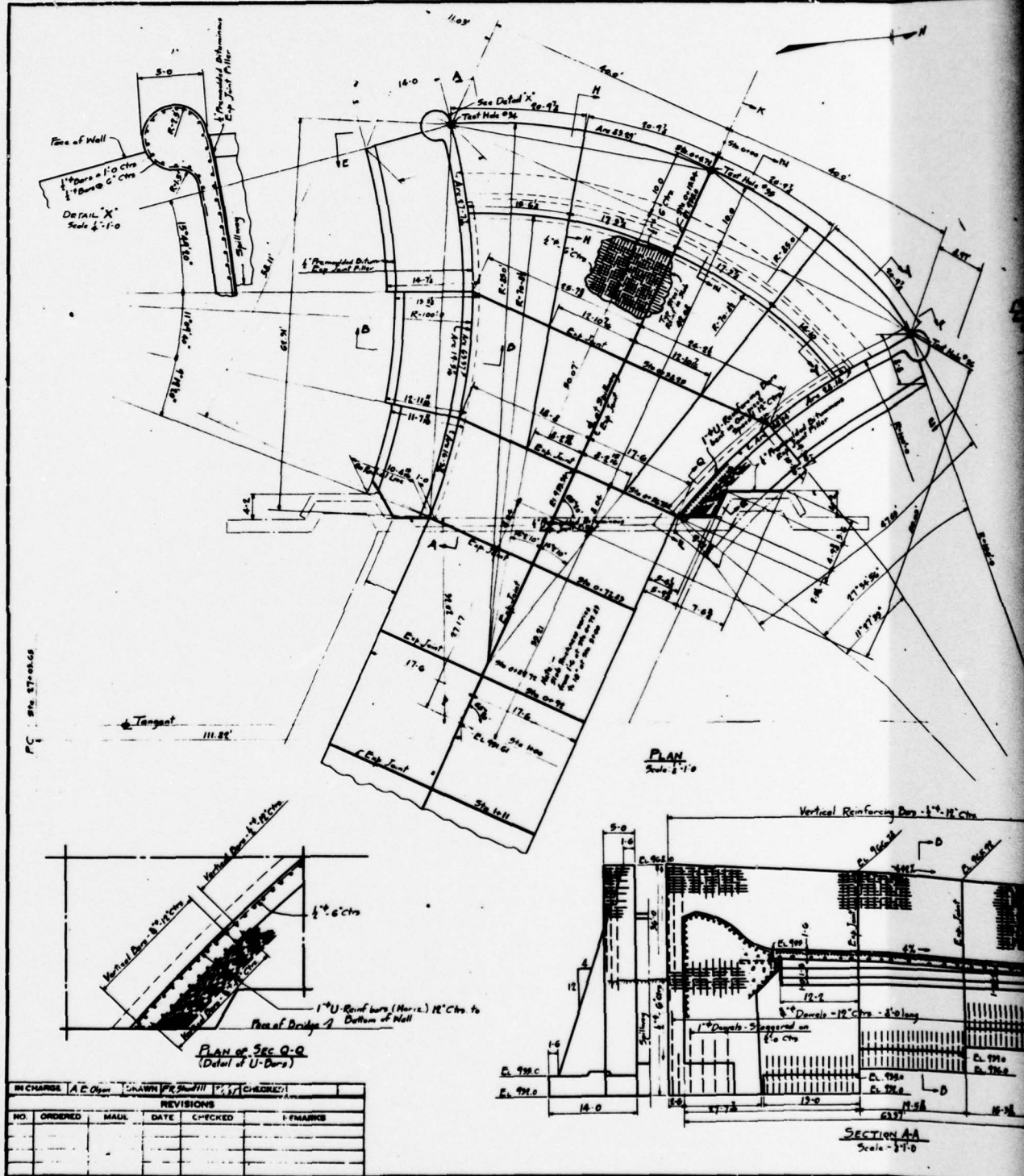
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DRAWING NUMBER 78-367-B92

CHECKED BY BE 4-17-79

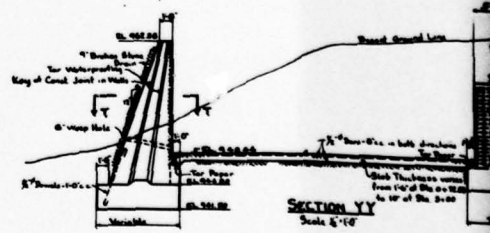
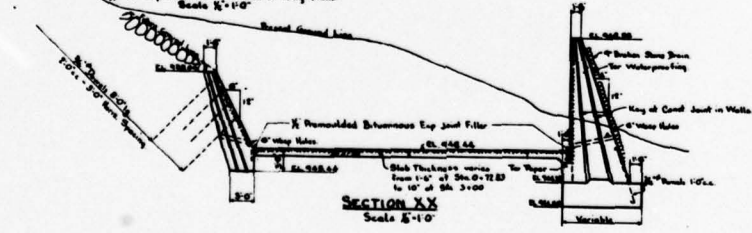
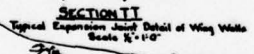
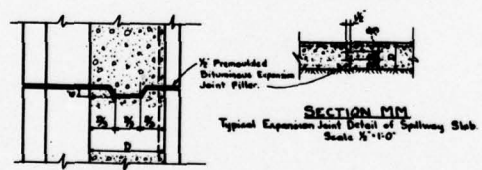
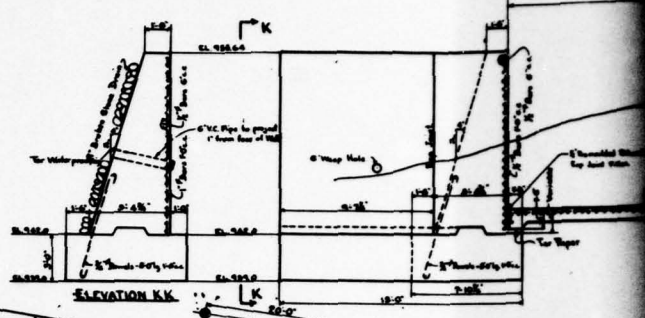
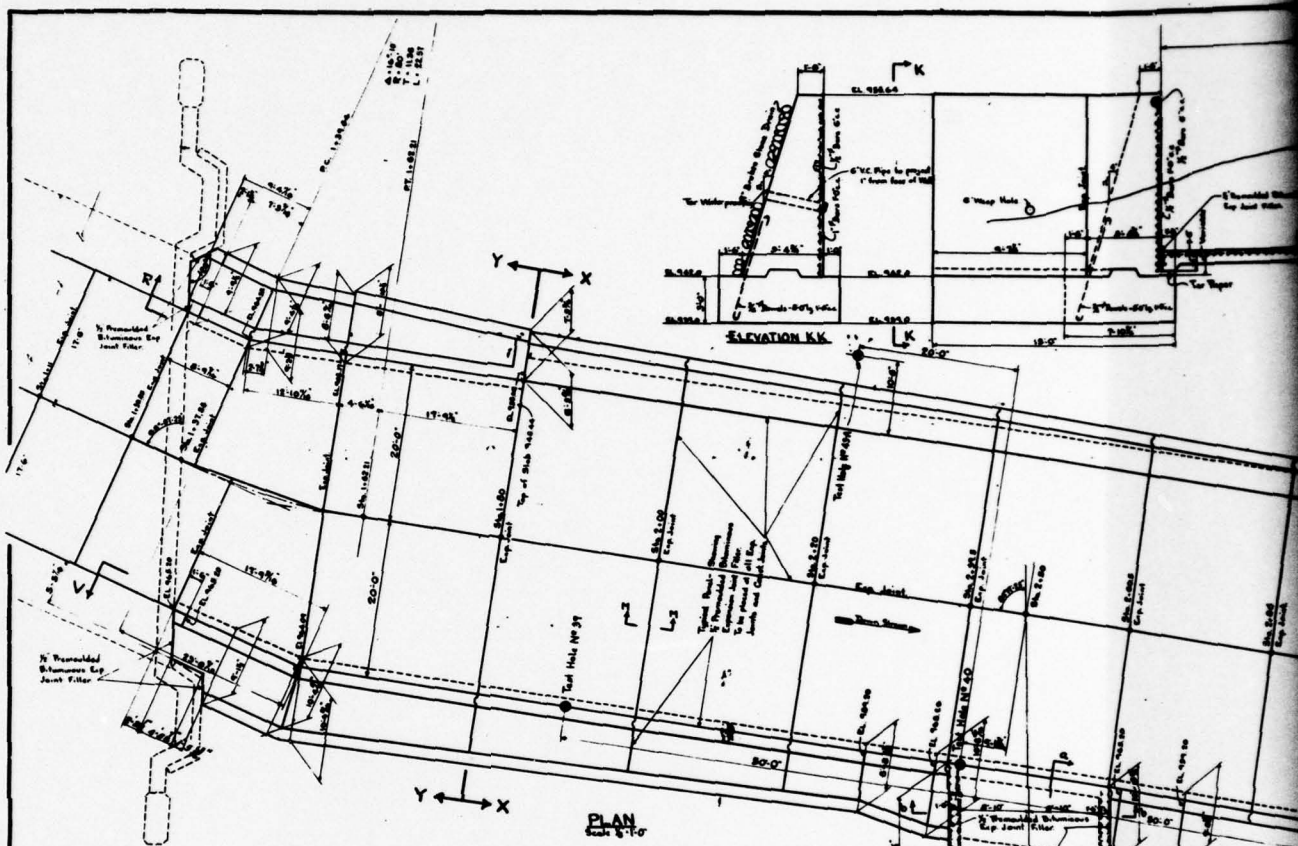
APPROVED BY JMD 4-17-79

DRAWN BY RDB

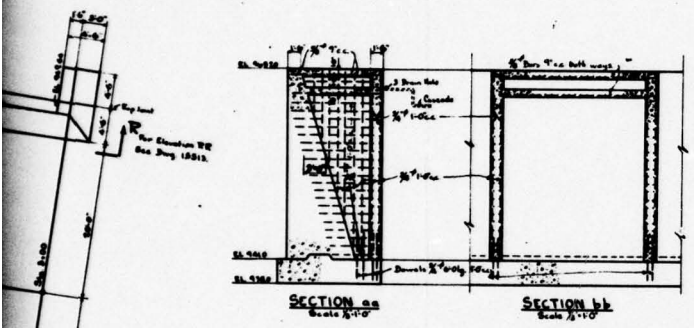
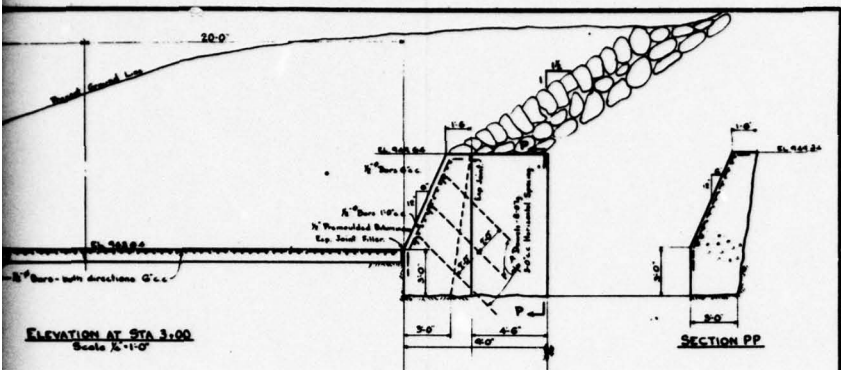


IN CHARGE		DRAWN		CHECKED	
NO.	ORDERED	MAIL	DATE	CHECKED	REMARKS

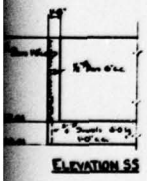
DRAWN BY **RDB** CHECKED BY **BC** 4-17-79 DRAWING NUMBER 78-367-B93
 APPROVED BY **SPD** 4-17-79



IN CHARGE		DRAWN		CHECKED	
A. C. [Signature]		[Signature]		[Signature]	
REVISIONS					
NO	ORDERED	MADE	DATE	CHECKED	REMARKS



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COUNTY OF ALLEGHENY
PITTSBURGH, PA.

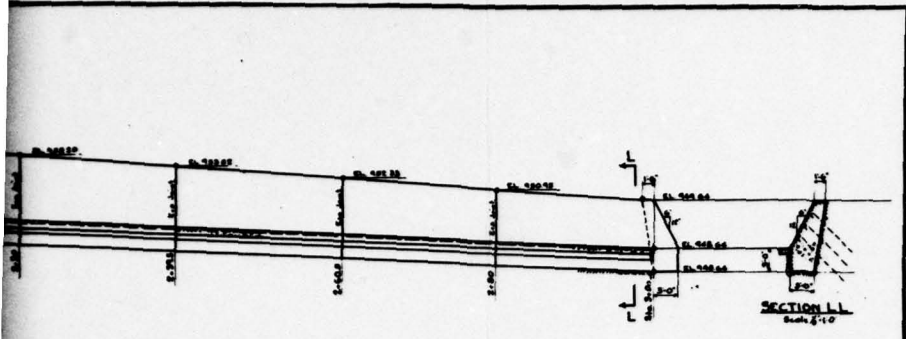
BABCOCK BOULEVARD
SPILLWAY
NORTH PARK DAM
NORTH PARK, MCCANLESS TOWNSHIP
PAVING & SECTIONS OF SPILLWAY
SCALES AS SHOWN JUNE 6, 1925
SHEET 4 OF 4 SHEETS

SUBMITTED JUNE 6, 1925
APPROVED
PLANNING ENGINEER

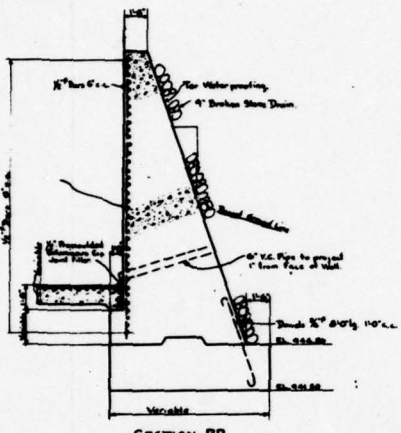
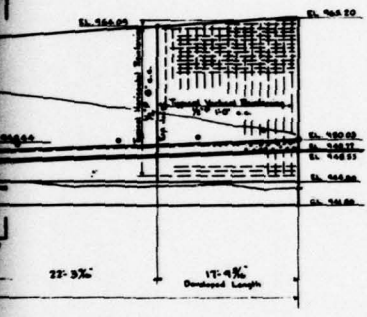
2 PLATE 6

D'APPOLONIA

2



13944



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N^o 3C

135.50	Solid Sand & Clay
136.14	Broken Stone & Clay
137.50	Broken Stone & Clay
140.00	Broken Stone & Clay
140.00	Broken Stone (Bottom)
142.00	Gray & Brown Sandstone
142.00	Gray Sandstone Solid
142.00	Shanks of Clay

COUNTY OF ALLEGHENY
PITTSBURGH, PA.

BABCOCK BOULEVARD
SPILLWAY
NORTH PARK DAM
NORTH PARK, M'CARDLESS TOWNSHIP
ELEVATIONS OF SPILLWAY CHANNEL
SCALES AS SHOWN JUNE 6, 1933

SHEET 3 OF 4 SHEETS

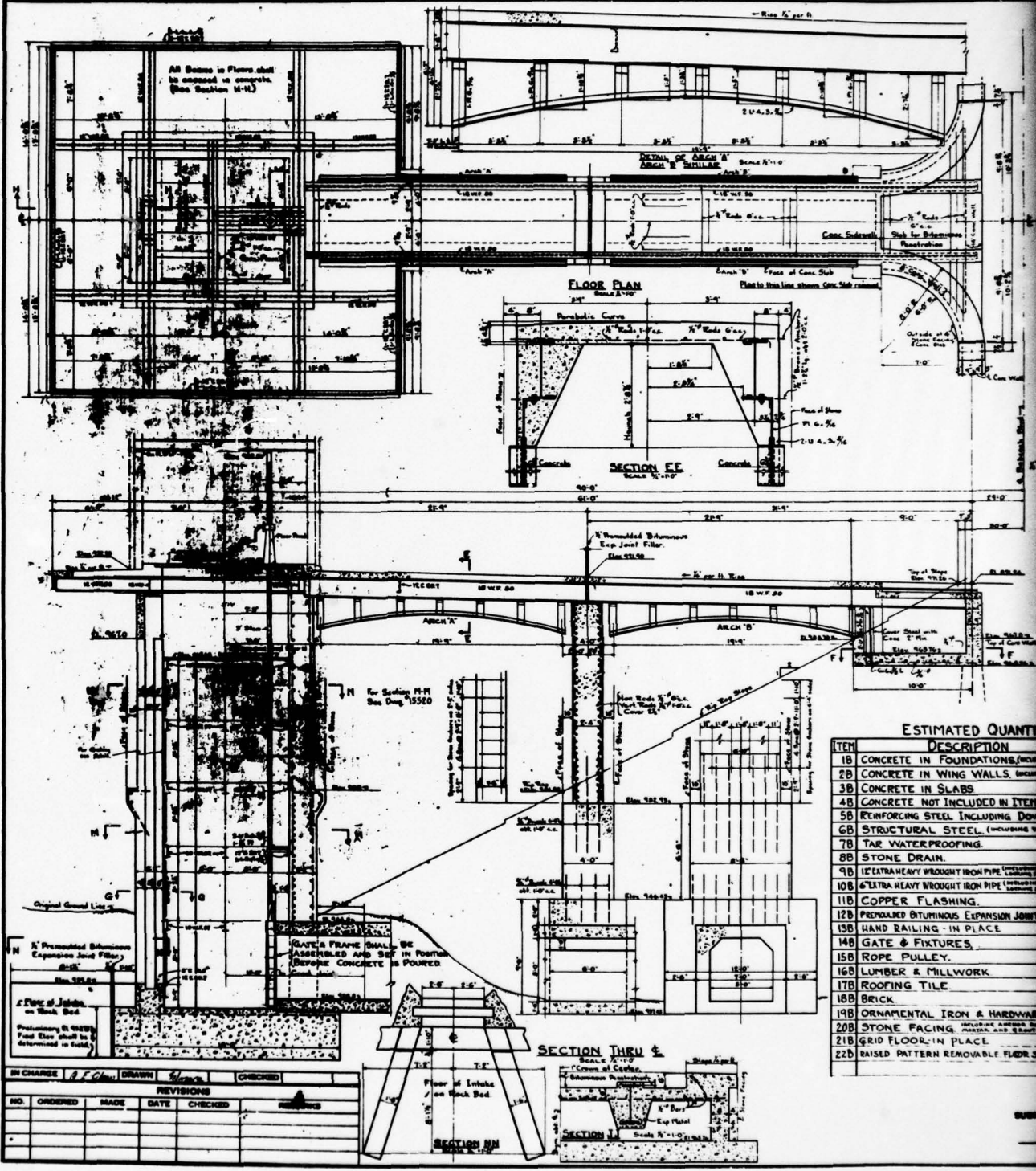
SUBMITTED JUNE 6, 1933
[Signature]
ENGINE DESIGN ENGINEER
APPROVED
[Signature]
PLANNING ENGINEER

7 PLATE 7

D'APPOLONIA

2

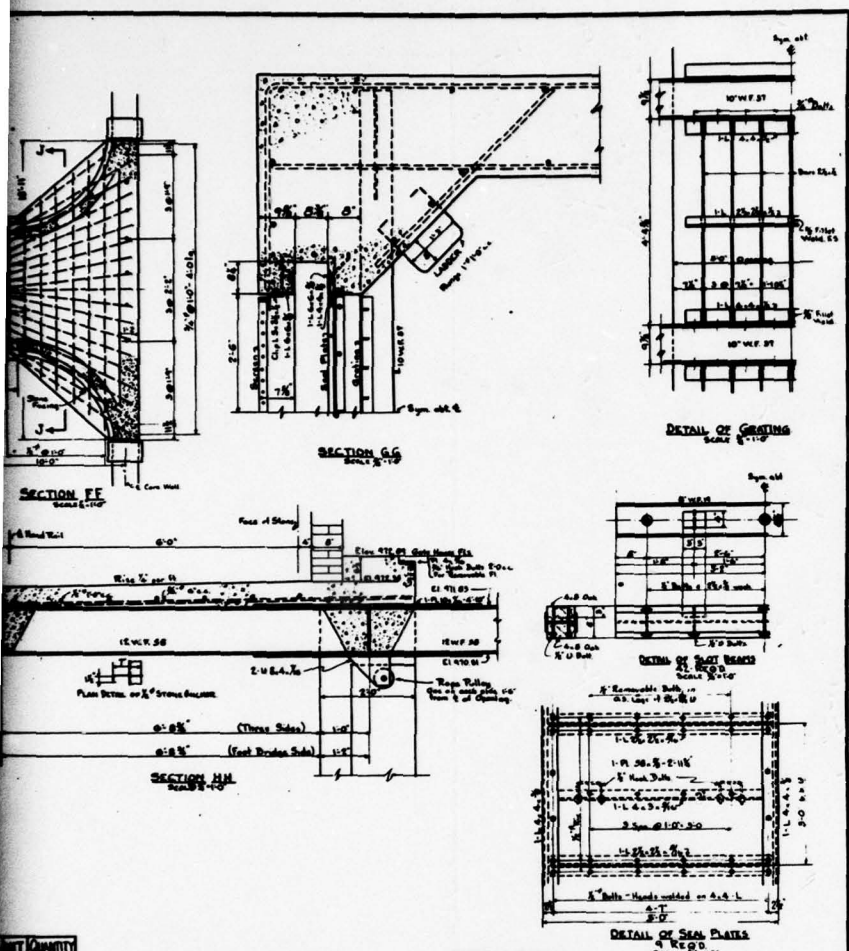
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 APPROVED BY [Signature] 4-17-79



ESTIMATED QUANTITIES

ITEM	DESCRIPTION
1B	CONCRETE IN FOUNDATIONS, (excavated)
2B	CONCRETE IN WING WALLS, (excavated)
3B	CONCRETE IN SLABS
4B	CONCRETE NOT INCLUDED IN ITEMS 1B, 2B, 3B
5B	REINFORCING STEEL INCLUDING DOWN
6B	STRUCTURAL STEEL, (including rivets)
7B	TAR WATERPROOFING
8B	STONE DRAIN
9B	1" EXTRA HEAVY WROUGHT IRON PIPE (including
10B	6" EXTRA HEAVY WROUGHT IRON PIPE (including
11B	COPPER FLASHING
12B	PREMOLDED BITUMINOUS EXPANSION JOINT
13B	HAND RAILING - IN PLACE
14B	GATE & FIXTURES
15B	ROPE PULLEY
16B	LUMBER & MILLWORK
17B	ROOFING TILE
18B	BRICK
19B	ORNAMENTAL IRON & HARDWARE
20B	STONE FACING
21B	GRID FLOOR - IN PLACE
22B	RAISED PATTERN REMOVABLE FLOOR SLAB

IN CHARGE	R.D.B.	DRAWN	[Signature]	CHECKED	[Signature]
REVISIONS					
NO.	ORDERED	MADE	DATE	CHECKED	REVISIONS



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QUANTITY	UNIT
250	
100	
55	
6000	
250000	
550000	
1500	
15	
140	
200	
1700	
60	
200	
3	
600	
10	
4500	
110	
5	

All work under this Contract shall be done in accordance with the Standard Specifications for Construction of Steel Highway Bridges issued Nov. 1, 1939; the Standard Specifications for Construction of Bridges, viaducts, trestles, & Approaches, dated March 1, 1932; the Standard Specifications for Piers dated Jan. 1, 1932; and the Rules and Regulations of the Federal Government.

All Material shall be inspected by the Pittsburgh Testing Laboratory which shall be specified by the National Highway Bureau, and all welding equipment shall be subject to its approval.

GENERAL NOTES
 For General Plan & Elevation of Gate House See July 8, 1935.
 For Architectural Details of Gate House See July 8, 1935.
 Cast-in-place concrete (1:2:4) for Item 1-B.
 Cast-in-place concrete (1:2:4) for all other items.
 For additional information see Supplemental Instructions to Bidders & Approaches for Item 1-B.
 Reinforcement for Foundation shown on Plans are approved. The Director as his discretion may order some Job as a lower design elevation if ground conditions warrant it.
 Plans & Details for Arch Centering, Structural Steel Framing, & Reinforcing Steel shall be submitted for approval by the Director.
 All steel shown shall be equal in quality to steel specified in the Specifications or otherwise. Quality conditions of steel to be approved by the Director before use. (See Supplemental Instructions Paragraph "STEELWORK") Steel to be hot-rolled with low level in reinforcement. Minimum yield point shall be 36,000 psi.
 For Location of Bolts and Other Concrete Details See Drawings 10210, 10211 & 10212.
 The Contractor shall provide all engineering & inspection facilities as specified in the Standard Specifications for Construction of Bridge, Viaducts, Trestles, & Approaches, and shall provide as approved office of telephone, and shall have all telephone calls.
 Parts of structure which are to be welded in the field shall not be shop painted. All structural steel which is embedded in concrete shall not be painted.
 All steel brought on site shall have a coat of paint - Red Lead on P & S Rod Lead. Field Coat of Red Lead on P & S Rod Lead. Field Coat of 9 H Aluminum on P & S Rod Lead.
 All steel shall be machine open heavy, copper-bearing, carbon steel & shall conform to the A.S.T.M. general requirements for steel structures. A 7/8" dia. bolts to be 50,000 psi yield strength.
 Details of piping & valves for the Director's approval.

APPROVED

DEPARTMENT OF PLANNING
Robert M. ... July 17, 1935

COUNTY PLANNING COMMISSION
A. ... July 17, 1935

DEPARTMENT OF PUBLIC WORKS AND AVIATION
... 7-9-35

DEPARTMENT OF HIGHWAYS BRIDGES & TUNNELS
... July 17, 1935

COUNTY COMMISSIONERS
... July 17, 1935

**COUNTY OF ALLEGHENY
 PITTSBURGH, PA.**

**BABCOCK BOULEVARD
 GATE HOUSE
 NORTH PARK DAM**

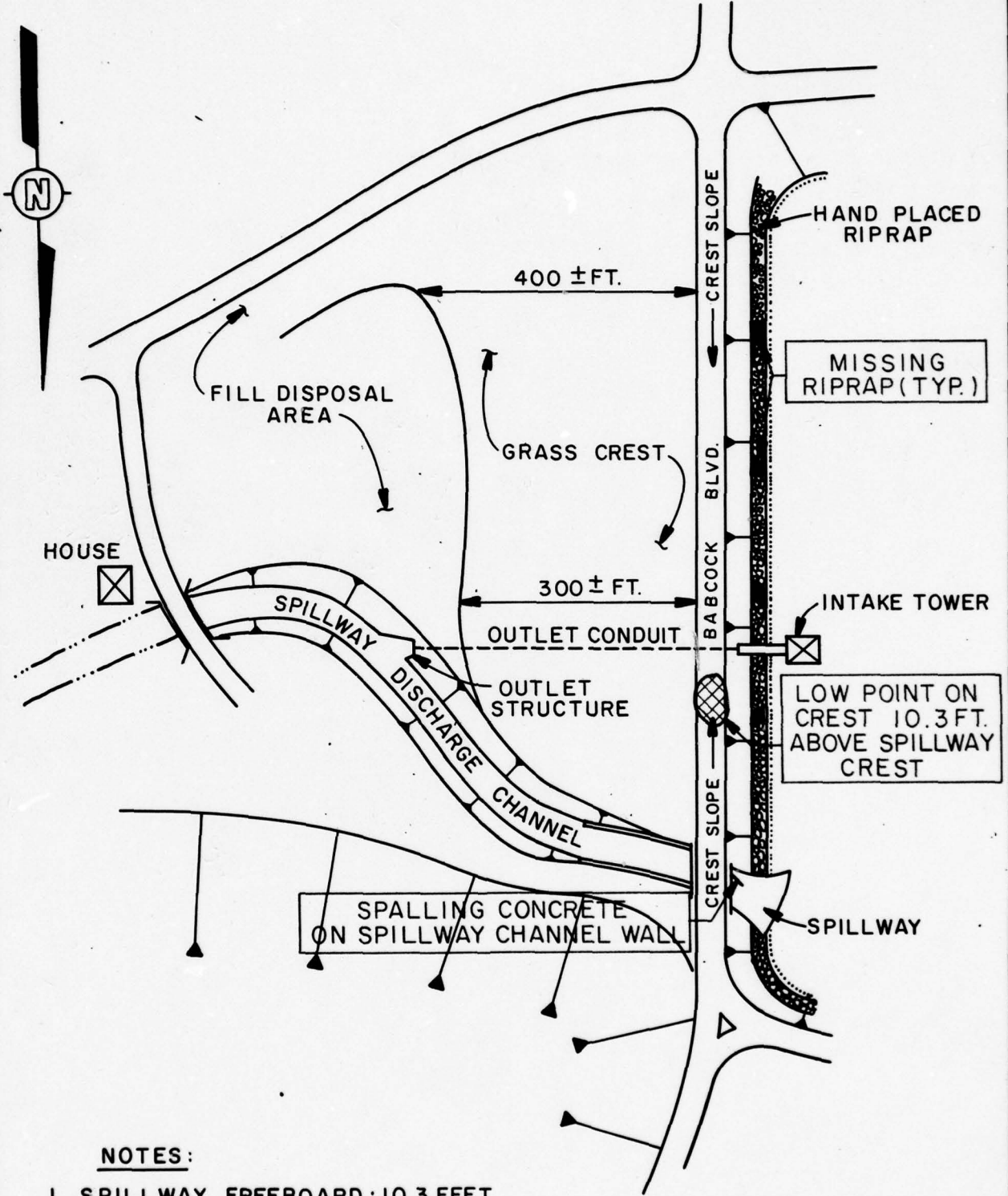
NORTH PARK, M'CARDLESS TOWNSHIP
GENERAL PLAN & ESTIMATED QUANTITIES
 SCALES AS SHOWN JUNE 6, 1935
 SHEET 1 OF 4 SHEETS

PLATE 9

D'APPOLONIA

2

DRAWN BY ACS 4-16-79 CHECKED BY BE 4-17-79 DRAWING NUMBER 367-A11
 APPROVED BY JAP 4-17-79



NOTES:

1. SPILLWAY FREEBOARD: 10.3 FEET
2. POOL LEVEL DATE OF INSPECTION
0.2 ABOVE SPILLWAY CREST

PLATE 10
 PINE CREEK DAM
 GENERAL PLAN
 FIELD INSPECTION NOTES
 FIELD INSPECTION DATE: 12-15-79

D'APPOLONIA

APPENDIX A
CHECKLIST
VISUAL INSPECTION
PHASE I

APPENDIX A
CHECKLIST
VISUAL INSPECTION
PHASE I

NDI I.D. PA-467
ID# DER I.D. 2-26

NAME OF DAM Pine Creek Dam COUNTY Allegheny STATE Pennsylvania

TYPE OF DAM Earth HAZARD CATEGORY High

DATE(S) INSPECTION December 15, 1978 WEATHER Sunny TEMPERATURE 30s

POOL ELEVATION AT TIME OF INSPECTION 960.2 M.S.L. TAILWATER AT TIME OF INSPECTION 936+ M.S.L.

INSPECTION PERSONNEL:
REVIEW INSPECTION PERSONNEL:
(April 16, 1979)

Bilgin Erel J. D. Andersen

Wah-Iak Chan J. H. Poellot

B. Erel

RECORDER Bilgin Erel

VISUAL INSPECTION
 PHASE I
 EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None.	
SLOUCHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	As designed, the crest of the dam is on descending grades between the right and left abutments to a low spot near the left abutment. The low spot is 10.3 feet above the spillway crest level.	
RIPRAP FAILURES	Most of the riprap is in good condition. There are areas of missing riprap.	The missing riprap should be replaced.

VISUAL INSPECTION
 PHASE I
 EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	No signs of distress.	
ANY NOTICEABLE SEEPAGE	None.	
STAFF GAGE AND RECORDER	None.	
DRAINS	None.	

VISUAL INSPECTION
 PHASE I
 OUTLET WORKS

VISUAL EXAMINATION OF CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
INTAKE STRUCTURE	The outlet conduit is not accessible for inspection. Only the downstream end was visible. No distress was observed.	
OUTLET STRUCTURE	Submerged.	
OUTLET CHANNEL	Outlet conduit would directly discharge into the spillway discharge channel.	
EMERGENCY GATE	No obstructions in the outlet channel that would significantly affect discharge capacity of the outlet works.	Operational condition of the outlet conduit sluice gate should be evaluated and necessary maintenance performed.
	Park personnel reported that the outlet conduit sluice gate has not been operated in the recent past. Due to a siltation problem in the reservoir, the operational condition of the outlet conduit sluice gate was questionable. Operation of the gate was not observed.	

VISUAL INSPECTION
 PHASE I
 UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	83-foot-wide concrete ogee weir. In good condition.	
APPROACH CHANNEL	Submerged. Appears to be free of debris.	
DISCHARGE CHANNEL	Rectangular concrete channel. In good condition.	
BRIDGE AND PIERS	A single-span bridge crosses the spillway discharge channel approximately 70 feet downstream from the overflow section.	

VISUAL INSPECTION
 PHASE I
 GATED SPILLWAY

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

VISUAL INSPECTION
 PHASE I
 INSTRUMENTATION

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

VISUAL INSPECTION
PHASE I
RESERVOIR
OBSERVATIONS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Gentle.	
SEDIMENTATION	Park personnel reported that the reservoir receives significant sediment load from the reservoir and the storage capacity of the reservoir has been reduced to one third.	
UPSTREAM RESERVOIRS	Marshall Lake Dam which impounds a reservoir with a surface area of about 12 acres is located immediately upstream of the Pine Creek Dam reservoir. The storage capacity of the Marshall Lake Dam is reported to be approximately 60 acre-feet.	

VISUAL INSPECTION
 PHASE I
 DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	No apparent obstructions immediately downstream from the dam that would affect the discharge capacity of the spillway.	
SLOPES	No apparent instability (immediately downstream from the dam).	
APPROXIMATE NUMBER OF HOMES AND POPULATION	Over most of its course, Pine Creek flows through urban, residential, and commercial areas. Population: Over 1000 (estimated).	

APPENDIX B
CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
AND HYDROLOGIC AND HYDRAULIC
PHASE I

APPENDIX B
 CHECKLIST
 ENGINEERING DATA
 DESIGN, CONSTRUCTION, OPERATION
 PHASE I

NAME OF DAM Pine Creek Dam
 ID# NDI I.D. No. PA-467
 DER I.D. No. 2-26

ITEM	REMARKS
AS-BUILT DRAWINGS	The design drawings are available in state files.
REGIONAL VICINITY MAP	See Plate 1.
CONSTRUCTION HISTORY	The dam was designed by Allegheny County personnel during 1935. It was constructed by Harrison Construction Company of Pittsburgh, Pennsylvania, under the WPA program with completion in 1936.
TYPICAL SECTIONS OF DAM	See Plates 2 and 3.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See Plates 8 and 9.

**CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I**

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	Not available.
DESIGN REPORTS	None available.
GEOLOGY REPORTS	None available.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Not available.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	See Plate 4.

**CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I**

ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	None reported.
BORROW SOURCES	Unknown.
MONITORING SYSTEMS	None.
MODIFICATIONS	Downstream side of the embankment has been filled over the years and presently the crest of the dam is over 300 feet wide.
HIGH POOL RECORDS	Not recorded.

**CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I**

ITEM	REMARKS
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None reported.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None reported.
MAINTENANCE OPERATION RECORDS	Not available.
SPILLWAY PLAN SECTIONS DETAILS	See Plate 5.
OPERATING EQUIPMENT PLANS AND DETAILS	See Plate 9.

CHECKLIST
ENGINEERING DATA
HYDROLOGIC AND HYDRAULIC

DRAINAGE AREA CHARACTERISTICS: 25 square miles (suburban residential areas)
ELEVATION; TOP NORMAL POOL AND STORAGE CAPACITY: 960 (570 acre-feet)
ELEVATION; TOP FLOOD CONTROL POOL AND STORAGE CAPACITY: 970.3 (950 acre-feet)
ELEVATION; MAXIMUM DESIGN POOL: 970.3
ELEVATION; TOP DAM: 970.3 (measured low spot)

SPILLWAY:

- a. Elevation 960
- b. Type Ogee
- c. Width 83 feet (perpendicular to flow)
- d. Length N/A
- e. Location Spillover Low spot on crest near left abutment
- f. Number and Type of Gates None

OUTLET WORKS:

- a. Type 5-foot by 5-foot reinforced concrete conduit
- b. Location About 300 feet from left abutment
- c. Entrance Inverts 938.5
- d. Exit Inverts 936.5
- e. Emergency Draindown Facilities Outlet conduit

HYDROMETEOROLOGICAL GAGES:

- a. Type None
- b. Location None
- c. Records None

MAXIMUM NONDAMAGING DISCHARGE: Spillway capacity

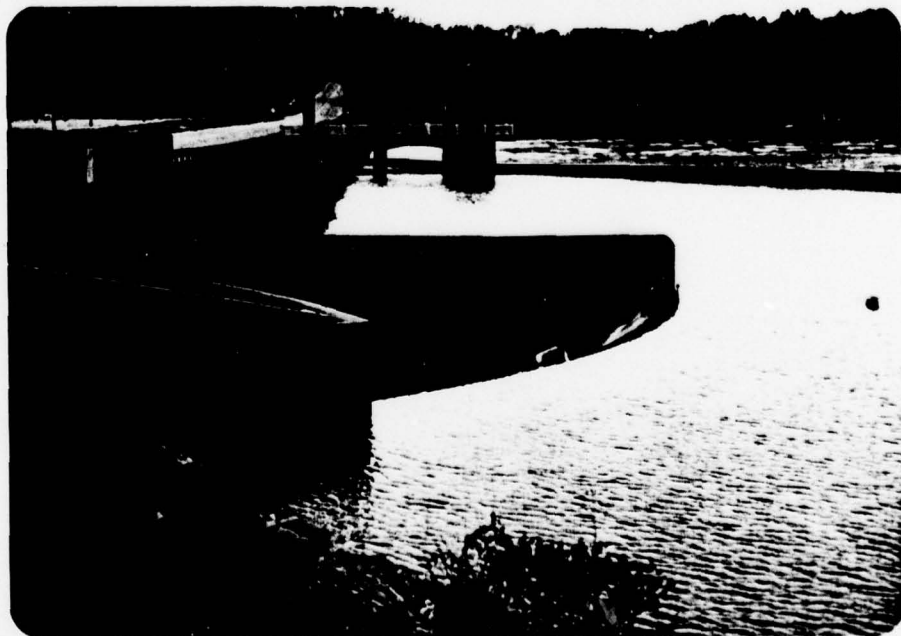
APPENDIX C
PHOTOGRAPHS

LIST OF PHOTOGRAPHS
PINE CREEK DAM
NDI I.D. NO. PA-467
DECEMBER 15, 1978

<u>PHOTOGRAPH NO.</u>	<u>DESCRIPTION</u>
1	Crest (looking north).
2	Spillway crest (looking south).
3	Spillway discharge channel.
4	Outlet works control tower.
5	Outlet conduit sluice gate hoist.
6	Downstream end of outlet conduit.
7	Erosion on upstream face riprap.
8	Deteriorating concrete. Right side of spillway discharge channel under bridge.



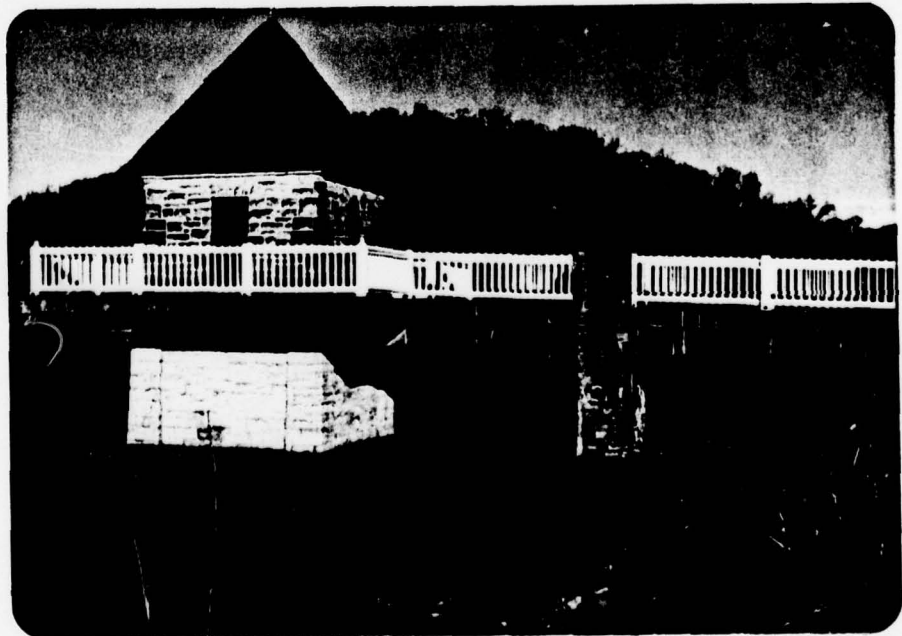
Photograph No. 1
Crest (looking north).



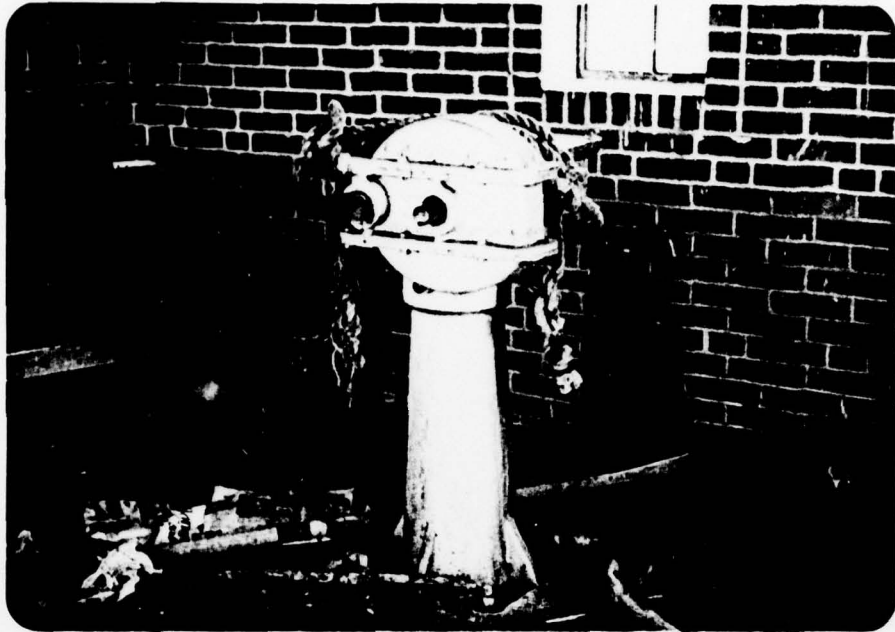
Photograph No. 2
Spillway crest (looking south).



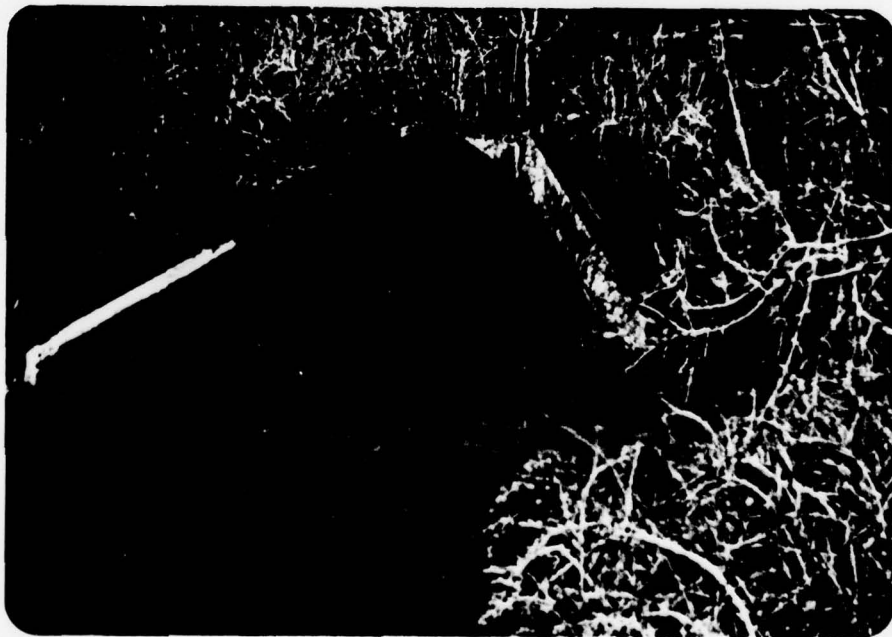
Photograph No. 3
Spillway discharge channel.



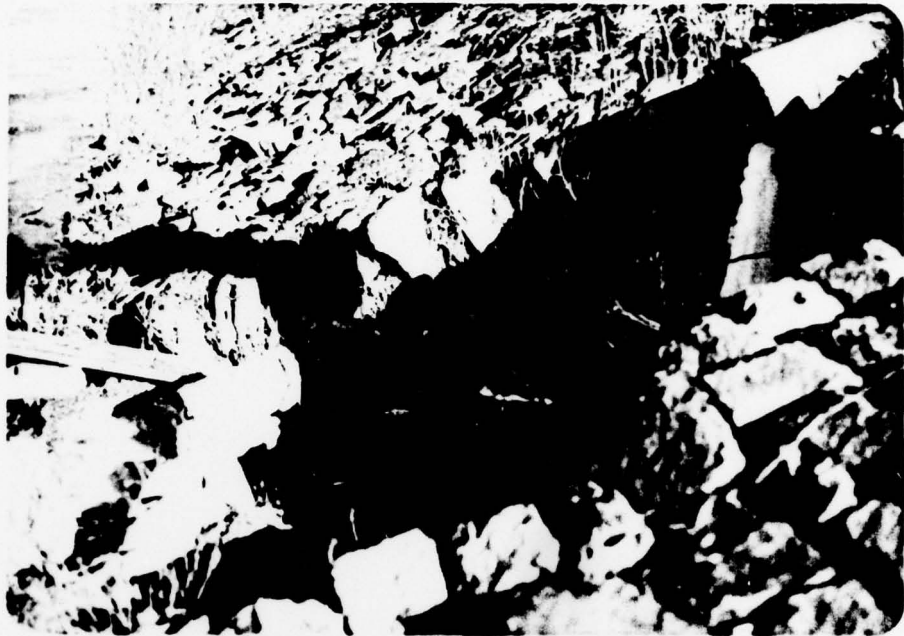
Photograph No. 4
Outlet works control tower.



Photograph No. 5
Outlet conduit sluice gate hoist.



Photograph No. 6
Downstream end of outlet conduit.



Photograph No. 7
Erosion on upstream face riprap.



Photograph No. 8
Deteriorating concrete. Right side of spillway
discharge channel under bridge.

APPENDIX D
CALCULATIONS

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: Pine Creek (NDI I.D. PA-467)

PROBABLE MAXIMUM PRECIPITATION (PMP) = 24.0 INCHES/24 HOURS⁽¹⁾

STATION	1	2	3	4	5
Station Description	North Hill Lake	Pine Creek Dam			
Drainage Area (square miles)	25.0	0			
Cumulative Drainage Area (square miles)	25.0	25.0			
Adjustment of PMP for Drainage Area (%) ⁽²⁾					
6 Hours	93	-			
12 Hours	111	-			
24 Hours	121	-			
48 Hours	131	-			
72 Hours	-	-			
Snyder Hydrograph Parameters					
Zone ⁽³⁾	24	-			
C_p/C_t ⁽⁴⁾	0.45/1.6	-			
L (miles) ⁽⁵⁾	7.2	-			
L_{ca} (miles) ⁽⁵⁾	4.0	-			
$t_p = C_t(L_{ca})^{0.3}$ (hours)	4.4	-			
Spillway Data					
Crest Length (ft)	-	83.3			
Freeboard (ft)	-	10.3			
Discharge Coefficient	-	3.8			
Exponent	-	1.5			

(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.

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS										
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9		
				.20	.30	.40	.50	.60	.70	.80	.90	1.00		
HYDROGRAPH AT	1	25.00 (64.75)	1	5843. (165.46)	8764. (248.18)	11486. (330.91)	14607. (413.64)	17529. (496.37)	20450. (579.09)	23372. (661.82)	26293. (744.55)	29215. (827.28)		
ROUTED TO	2	25.00 (64.75)	1	5383. (152.43)	8202. (232.26)	11157. (315.92)	14015. (396.86)	17013. (481.74)	20097. (568.89)	23090. (653.83)	26045. (737.52)	28979. (820.59)		

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

INITIAL VALUE 940.00
 SPILLWAY CREST 960.00
 TOP OF DAM 970.30
 567. C. 1885.
 0. 10466.

MAXIMUM RESERVOIR W.S.ELEV 966.61
 STORAGE 968.76
 OUTFLOW 970.65

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FI	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	966.61	0.00	1411.	5383.	0.00	45.50	0.00
.30	968.76	0.00	1688.	6202.	0.00	45.00	0.00
.40	970.65	.35	1930.	11157.	2.00	45.00	0.00
.50	971.59	1.29	2142.	14015.	5.50	45.00	0.00
.60	972.27	1.97	2308.	17013.	7.50	45.00	0.00
.70	972.83	2.53	2445.	20090.	9.50	44.50	0.00
.80	973.29	2.99	2557.	23090.	11.00	44.50	0.00
.90	973.69	3.39	2655.	26045.	12.00	44.50	0.00
1.00	974.05	3.75	2743.	28979.	13.00	44.50	0.00

OVERTOPPING ANALYSIS SUMMARY

PAGE D4 of 4

APPENDIX E
REGIONAL GEOLOGY

APPENDIX E
REGIONAL GEOLOGY

Pine Creek Dam and the associated North Park Lake are located just east of the crest of the north-northeast trending Bradys Bend Syncline. The strata dip approximately 60 feet per mile to the east and consist of the lower portion of the Conemaugh Group (Pennsylvanian Age).

The strata consist of interbedded shales, claystones ("red bed" material), and sandstone with a few coal and limestone seams. The strata in the slopes above the reservoir consist of "red bed" claystone with the Pine Creek Limestone seam located at the base of the rock layer. The Pine Creek Limestone is thin but may be susceptible to solutioning. The Buffalo Sandstone, a 30- to 40-foot seam, is located below the Pine Creek Limestone. Below the sandstone seam is interbedded limestone, claystone, and the Brush Creek coal seam. The stratum below the Brush Creek coal is the Mahoning Sandstone, a seam of interbedded sandy shale and sandstone approximately 100 feet thick. Below the Mahoning Sandstone is the Upper Freeport coal seam.

The Upper Freeport coal seam, which is located approximately 270 feet below the dam, is reported to have been mined east of the dam almost to the site. Surface subsidence due to mining has been reported in an area southeast of the dam.

The slopes above the reservoir are considered to be susceptible to shallow landsliding and soil creep due to the presence of "red bed" claystone weathering to a low strength material. However, major landslides which may significantly affect the storage volume of the reservoir are not considered to be likely.

DRAWING 78-307-A20
NUMBER

ACCS CHECKED BY
2-5-79 APPROVED BY

DRAWN BY



PINE CREEK DAM
GEOLOGY MAP

REFERENCE:
GREATER PITTSBURGH REGION GEOLOGIC MAP
COMPILED BY W. R. WAGNER, J. L. CRAFT, L. HEYMAN
AND J. A. HARPER, DATED 1975, SCALE 1:125 000

DAIPILODLONLA

DRAWN BY: **ACS** 2-5-79
 CHECKED BY: **BE** 2-4-79
 APPROVED BY: **BA** 2-4-79
 DRAWING NUMBER: **367-A22**

GROUP FORMATION

DESCRIPTION

Alluvium		Qt	Sand, gravel, clay.
Terrace deposits			Sand, clay, gravel on terraces above present rivers; includes Carmichaels Formation.
DUNKARD	Greene		Cyclic sequences of sandstone, shale, red beds, thin limestones and coals.
	Washington	Pw	Cyclic sequences of sandstone, shale, limestone, and coal; contains Washington coal bed at base.
	Waynesburg	PPw	Cyclic sequences of sandstone, shale, limestone and coal; contains Waynesburg coal bed at base.
MONONGAHELA		Pm	Cyclic sequences of shale, limestone, sandstone and coal; contains Pittsburgh coal bed at base.
P: CONEWAUGH	Casselman	Pcc	Cyclic sequence of sandstone, shale, red beds and thin limestone and coal.
	Ames		
	Glenshaw	Pcg	Cyclic sequences of sandstone, shale, red beds and thin limestone and coal; several fossiliferous limestone; Ames limestone bed at top.
ALLEGHENY	Vanport		Cyclic sequences of shale, sandstone, limestone, and coal; contains Brookville coal at base and Upper Freeport coal at top; within group are the commercial Vanport limestone and Kittanning and Clarion coals.
		Pa	

GEOLOGY MAP LEGEND

REFERENCE:

GREATER PITTSBURGH REGION GEOLOGIC MAP
 COMPILED BY W.R. WAGNER, J.L. CRAFT, L. HEYMAN
 AND J.A. HARPER, DATED 1975, SCALE 1:125 000

INDIANAPOLIS