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NATIONAL DAM INSPECTION PROGRAM. MAMMOTH LAKE DAM (NDI ID NUMBE--ETC(U)
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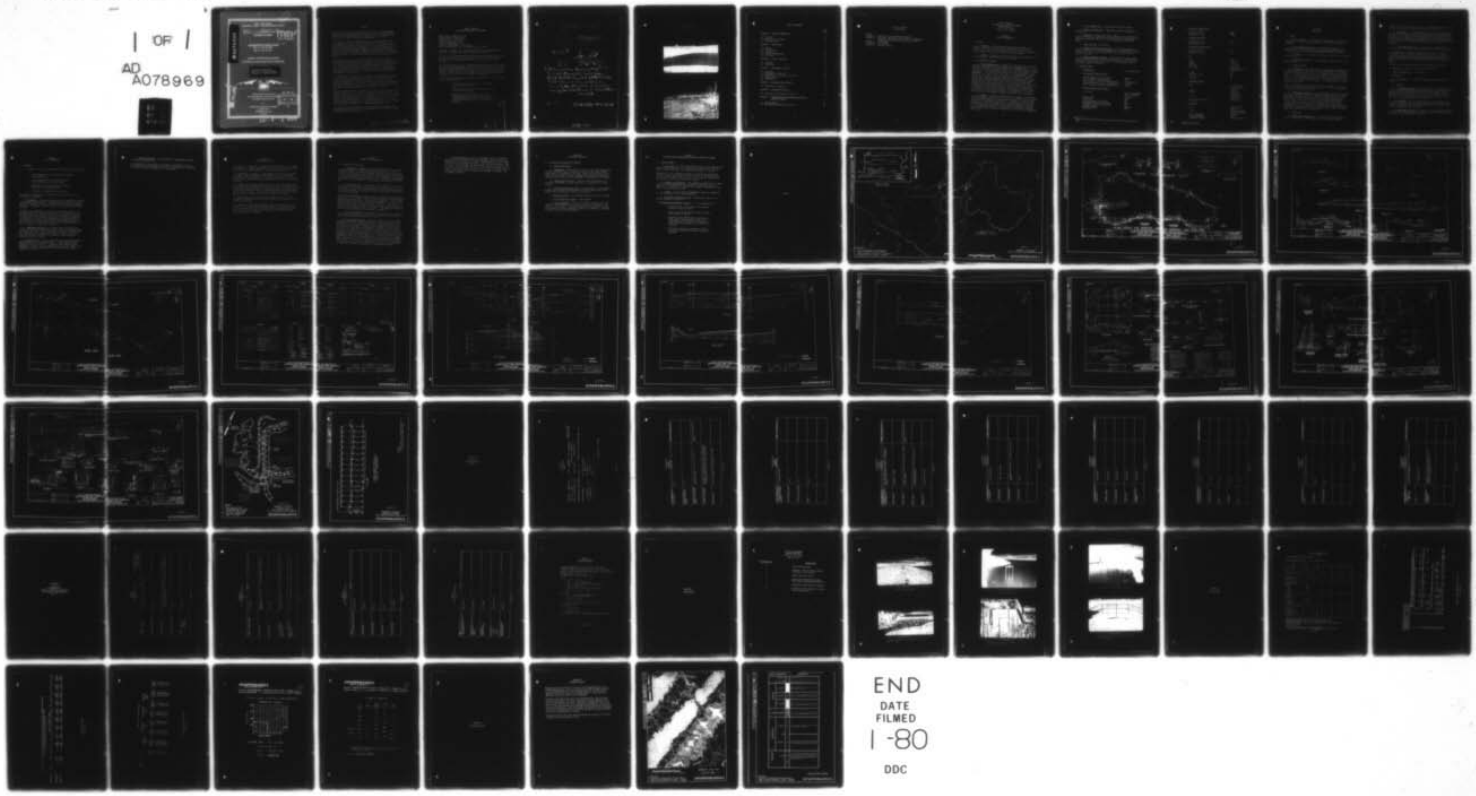

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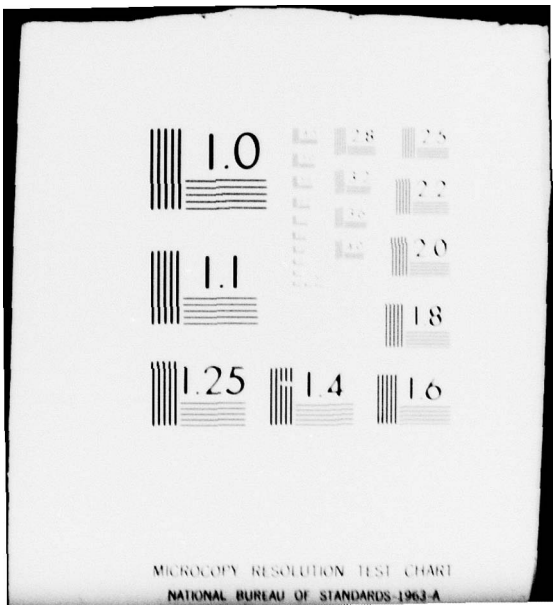
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OHIO RIVER BASIN
SEWICKLEY CREEK , WESTMORELAND COUNTY

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LEVEL II

AD A078969

MAMMOTH LAKE DAM

NDI I.D. NO: PA-466
DER I.D. NO: 65-130

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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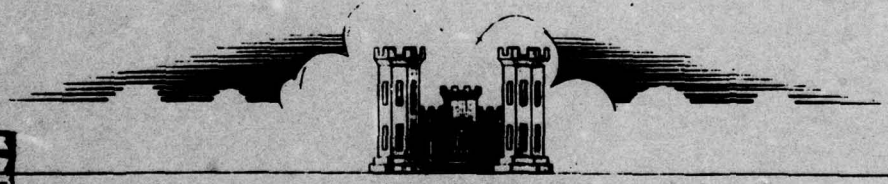

PREPARED FOR

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

BY

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

JUNE 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.

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.

ORIGINAL CONTAINS COLOR PLATES: ALL DDC REPRODUCTIONS WILL BE IN BLACK AND WHITE

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

NAME OF DAM: Mammoth Lake Dam
STATE LOCATED: Pennsylvania
COUNTY LOCATED: Westmoreland
STREAM: Sewickley Creek
SIZE CLASSIFICATION: Small
HAZARD CLASSIFICATION: Significant
DATE OF INSPECTION: April 9, 1979 and May 25, 1979

ASSESSMENT: Based on the evaluation of the existing conditions, the condition of Mammoth Lake Dam is considered to be good.

The only two conditions noted which would require attention at this time are the filling of the erosion ditches on each side of the spillway structure and cleaning the debris from the outlet works discharge structure.

The flood discharge capacity of Mammoth Lake Dam was found to be within the recommended capacity range of the 100-year flood to one-half of the probable maximum flood (PMF) relative to its size and hazard classification. Considering the 15-foot height of the dam is within the middle one-third of the zero to 25-foot height size classification range, the spillway capacity of 4770 cfs is rated to be adequate.

The following recommendations should be implemented as soon as possible or on a continuing basis:

1. Erosion ditches on each side of the spillway structure should be filled.

2. Debris in the outlet works discharge stilling basin should be removed.

3. 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 an emergency.

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4. The dam and appurtenant structures should be inspected regularly and necessary maintenance performed.

(10) Lawrence D. Andersen, P.E.
Vice President

9 AUG 1979
Date

Approved by:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

11 Sep 79
Date

(11) Jun 79

Number

(6) National Dam Inspection Program, Mammoth Lake Dam (NDI ID PA-466, DER ID 65-130), Ohio River Basin, Sewickley Creek, Westmoreland County, Pennsylvania, Phase I Inspection Report,

Number

(12) 76

(15) DACW31-79-C-0014

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MAMMOTH LAKE DAM
NDI I.D. NO. PA-566
APRIL 9, 1979

Upstream Face

Downstream Face

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PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
MAMMOTH LAKE DAM
NDI I.D. NO. PA-466
DER I.D. NO. 65-130

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. Mammoth Lake Dam consists of an earth embankment approximately 1100 feet long with a maximum height of 15 feet from the streambed. The maximum height of the embankment occurs in the vicinity of the spillway, which is located on the left abutment (looking downstream). For the remaining portion of the dam, the height of the embankment is 10 feet or less. The crest of the embankment is approximately 40 feet wide. The flood discharge facilities for the dam consist of a combined primary and emergency spillway and outlet works. The spillway structures include a 65-foot-wide concrete ogee-crested overflow section and a 65-foot-wide, 44-foot-long, stilling basin. Reinforced concrete retaining walls are provided along each side of the overflow section and stilling basin. The outlet works consist of a 27-inch-diameter reinforced concrete pipe equipped with an impact-type stilling basin at the downstream end. Flow through the outlet pipe is controlled by a sluice gate located on the upstream end. The outlet works constitute the emergency drawdown facilities for the reservoir.

b. Location. The dam is located across a tributary of Sewickley Creek approximately one mile north of the town of Mammoth in Mt. Pleasant Township, Westmoreland County, Pennsylvania (Plate 1). Below the dam, the stream flows through a wide valley. A farmhouse and several farm buildings are located approximately 1/4 mile downstream from the dam. Further downstream, the stream flows through the community of Calumet. It is estimated that failure of the dam would cause property damage. However, because the flood plain is wide, loss of life is not considered to be likely.

c. Size Classification. Small (based on 15-foot height).

d. Hazard Classification. Significant (based on downstream conditions).

e. Ownership. Westmoreland County (address: Mr. Carl Mancuso, Director of Parks and Recreation, Westmoreland County Department of Parks and Recreation, Box 21C, R. D. 8, Greensburg, Pennsylvania 15601).

f. Purpose of Dam. Recreation.

g. Design and Construction History. The dam was designed by General Analytics, Inc., Consulting Engineers, of Monroeville, Pennsylvania in 1968, and it was constructed by a local contractor with completion in 1969.

h. Normal Operating Procedure. The reservoir is normally maintained at Elevation 1003, the uncontrolled spillway crest elevation. The inflow occurring when the lake is at or above spillway level is discharged through the spillway.

1.3 Pertinent Data

a. Drainage Area — 8.5 square miles

b. Discharge at Dam Site (cfs)

Maximum known flood at dam site	Unknown
Outlet conduit at maximum pool	30±
Gated spillway capacity at maximum pool	Not applicable
Ungated spillway capacity at maximum pool	4770(1)
Total spillway capacity at maximum pool	4770(1)

c. Elevation (USGS Datum) (feet)

Top of dam	1012 (as designed) 1010.2 (measured low spot)
Maximum pool	1010.2
Normal pool	1003
Upstream invert outlet works	996
Downstream invert outlet works	995.5
Streambed at center line of dam	994
Maximum tailwater	Unknown
Downstream toe	997

(1) Based on available head relative to the low spot on the crest of the dam.

d. Reservoir Length (feet)

Normal pool level	1800
Maximum pool level	2000+

e. Storage (acre-feet)

Normal pool level	129
Maximum pool level	342

f. Reservoir Surface (acres)

Normal pool level	27
Maximum pool level	32+

g. Dam

Type	Earth
Length	1100 feet
Height	15 feet
Top width	10 feet[2]
Side slopes	Downstream: 3H:1V; Upstream: 3H:1V[2]
Zoning	Yes
Impervious core	No
Cutoff	No
Grouting	No

h. Regulating Outlet

Type	27-inch reinforced concrete conduit
Length	136 feet
Closure	Sluice gate upstream
Access	Accessible by boat only
Regulating facilities	Sluice gate

i. Spillway

Type	Ogee overflow section
Length	65 feet (perpendicular to flow)
Crest elevation	1003 feet
Upstream channel	Lake
Downstream channel	Stilling basin

[2] See Plates 2 and 3.

SECTION 2
DESIGN DATA

2.1 Design

a. Data Available. The available information was provided by the Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER).

(1) Hydrology and Hydraulics. The available information is summarized in the state report entitled, Report Upon the Application of the Commissioners of Westmoreland County, dated April 1, 1968.

(2) Embankment. The available information includes design drawings and boring logs.

(3) Appurtenant Structures. The available information consists of design drawings.

b. Design Features

(1) Embankment. The dam consists of a homogeneous embankment with an internal drainage system built on the upstream side of a previously existing six-foot-high dam. Plate 2 shows the plan view of the embankment. The typical cross sections of the embankment are illustrated in Plate 3. The internal drainage system consists of a sand drain along the toe of the previously existing fill. The design required all the waste fill to be placed directly against the downstream face of the dam, forming a wide crest.

Plate 4 illustrates the boring locations for the subsurface investigation. The boring logs are included in Plate 5 and Plates 6 through 8 illustrate the subsurface profiles.

(2) Appurtenant Structures. The appurtenant structures of the dam consist of a combined primary and emergency spillway and outlet works. The primary spillway structures include a 65-foot-wide concrete ogee overflow section and a 65-foot-wide, 44-foot-long, stilling basin. Plates 9 and 10 illustrate the details of the spillway structures. A 27-inch reinforced concrete conduit equipped with an impact-type stilling basin at the downstream end constitutes the outlet works facilities for the dam. The pipe is supported on a reinforced concrete cradle and is equipped with concrete cutoff collars. Plate 11 illustrates the details of the outlet works.

d. Design Data

(1) Hydrology and Hydraulics. The 1968 state report indicates that the spillway was sized according to the Pennsylvania design

criteria in effect at the time (C curve). The discharge capacity of the spillway is reported to be 7180 cubic feet per second (cfs).

(2) Embankment. The dam was designed based on the evaluation of the subsurface conditions and engineering analyses conducted by General Analytics, Inc., Consulting Engineers, of Monroeville, Pennsylvania. Although no slope stability and seepage analyses were reported, in view of the broad crest and shallow downstream slope of the dam, such analyses are not considered to be required to evaluate the stability of the embankment.

(3) Appurtenant Structures. It appears that the structural design of the outlet works structures was based on standard SCS designs.

2.2 Construction. The available information consists of various construction progress reports submitted by the owner to the state. A state memorandum dated October 8, 1969, indicates that the dam was constructed according to the plans and specifications submitted to the state. The dam was constructed under the supervision of a county engineer.

The available information indicates no post-construction changes.

2.3 Operation. No records of operation have been kept.

2.4 Other Investigations. None reported.

2.5 Evaluation

a. Availability. The available information was obtained from PennDER.

b. Adequacy

(1) Hydrology and Hydraulics. The available information indicates that the spillway was designed in conformance with the Pennsylvania spillway design criteria applicable at the time of design. Only the design capacity was reported. Therefore, this information is not adequate to assess the conformance of the spillway capacity in accordance with the current spillway design criteria.

(2) Embankment. The design was based on the evaluation of the subsurface conditions and engineering analyses. In the review of the design, no conditions were noted that would significantly affect the overall performance of the embankment.

(3) Appurtenant Structures. Review of the design drawings indicates that no 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 Mammoth Lake Dam consisted of:

1. Visual inspection of the embankment, abutments, and embankment toe.

2. Visual examination of the spillway and the visible portions of the outlet works.

3. Observation of factors affecting the runoff potential of the drainage basin.

4. Evaluation of downstream hazard potential.

The specific observations are illustrated in Plate 12 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 is considered to be good. Two erosion ditches were located on each side of the spillway structure on the downstream face of the dam. A portion of the upstream slope on the right side of the spillway structure was found to be eroding due to wave action. The top of the embankment was surveyed relative to the spillway crest and was found to be generally below the design crest elevation. The low area occurred near the right abutment. The dam crest profile is illustrated on Plate 13.

c. Appurtenant Structures. The appurtenant structures were examined for deterioration or other signs of distress and obstructions that would limit flow. Both the spillway and the outlet works structures were found to be structurally in good condition. The outlet pipe stilling basin was found to be blocked by rocks and debris apparently placed by vandals.

d. Reservoir Area. A map review indicates that the watershed is predominantly covered with pasturelands. A small portion of the watershed has been strip mined. A review of the regional geology (Appendix D) indicates that the reservoir slopes are not likely to be susceptible to massive landslides which would affect the storage volume of the reservoir.

e. Downstream Channel. The description of downstream conditions is included in Section 1.2b.

3.2 Evaluation. The condition of the dam is considered to be good. Filling of the erosion ditches on each side of the spillway and cleaning of the outlet conduit stilling basin is recommended.

SECTION 4
OPERATIONAL FEATURES

4.1 Procedure. There are no formal operating procedures for the dam. The reservoir is normally maintained at the crest level of the spillway with excess inflow discharging over the uncontrolled spillway.

4.2 Maintenance of the Dam. The maintenance of the dam is considered to be good. Both the downstream and upstream faces of the dam are covered with grass and appear to be periodically mowed. Two erosion ditches which require filling were observed on each side of the spillway structure.

4.3 Maintenance of Operating Facilities. The only operational feature of the dam is the reservoir outlet sluice gate, which is operated by a hoist located within the lake. The stilling basin at the downstream end of the outlet pipe was found to be blocked with rocks and debris apparently placed by vandals. The operational condition of the sluice gate was not observed. The gate hoist is accessible by boat only.

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

4.5 Evaluation. While the maintenance condition of the dam is considered to be good, the maintenance condition of the operating facilities is assessed to be poor. Filling of the erosion ditches on each side of the spillway structure and cleaning of the outlet conduit stilling basin are recommended.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

a. Design Data. Mammoth Lake Dam has a watershed of 8.5 square miles and impounds a reservoir with a surface area of 27 acres at normal pool level. The flood discharge facilities for the dam consist of a 65-foot-wide ogee-crested concrete overflow section. Based on the available head relative to the low spot on the embankment, the capacity of the spillway was calculated to be 4770 cfs. Based on design maximum pool level, the full capacity of the spillway was reported to be 7180 cfs.

b. Experience Data. As previously stated, Mammoth Lake Dam is classified as a small dam in the significant hazard category. Under the recommended criteria for evaluating emergency spillway discharge capacity, such impoundments are required to pass a flow between the 100-year flood and one-half PMF.

The PMF inflow hydrograph for the reservoir was determined using the Dam Safety Version of the HEC-1 computer program developed by the Hydrologic Engineering Center of the U.S. Army, Corps of Engineers. The data used for the computer analysis are presented in Appendix D. One half of the PMF inflow was found to have a peak flow of 7838 cfs. The 100-year flood was calculated according to a procedure developed by Pennsylvania State University and was found to be 2100 cfs. The computer outputs and 100-year flood calculations are included in Appendix D.

c. Visual Observations. On the dates 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 the PMF inflow hydrograph were routed through the reservoir, starting from the normal pool elevation. It was found that the dam can pass approximately 30 percent of the PMF without overtopping the embankment. For 40 percent of the PMF, the dam would be overtopped for a duration of about three hours with a maximum depth of 0.8 foot over the low spot on the crest of the dam. For 50 percent of the PMF, the overtopping depth would be 1.3 feet and overtopping duration would be 4.7 hours. The low spot over the embankment is near the right abutment over a distance of 300 to 400 feet, approximately 800 feet from the spillway. At this section, the embankment is less than 5 feet high, with a shallow downstream slope (approximately 5H:1V). Therefore, overtopping of this section by approximately 1.3 feet during the passage of 50 percent of the PMF is not considered to constitute a significant potential for embankment breaching.

e. Spillway Adequacy. The flood discharge capacity of Mammoth Lake Dam was found to be within the recommended capacity range of the 100-year flood to one-half of the PMF. Considering the 15-foot height of the dam is in the middle one-third of the size classification range of zero to 250-foot height and the available spillway capacity of 4770 cfs, which is in the middle one-third of the required spillway capacity range of the 100-year flood (2100 cfs) and one-half of the PMF (7838 cfs), the spillway capacity is rated to be adequate according to the recommended criteria.

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 at this time that would significantly affect the stability of the dam. Review of the available information indicates that the dam was designed and constructed adequately. Therefore, the stability of the embankment is considered to be adequate.

(2) Appurtenant Structures. Based on visual observations, the structural performance of these structures is considered to be satisfactory.

b. Design and Construction Data. The dam appears to be adequately designed and no unusual construction difficulties were reported that would affect the structural stability of the dam.

c. Operating Records. No operating records are kept for the dam.

d. Post-Construction Changes. None reported.

e. Seismic Stability. The dam is located in Seismic Zone 1 and based on visual observations, 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 Mammoth Lake Dam is in good condition. No conditions were noted at this time that would significantly affect the structural performance of the dam.

The capacity of the spillway was found to be within the recommended capacity range of the 100-year flood to one-half of the PMF, relative to its size and hazard classification. As discussed in Section 5.1e, the spillway capacity was noted to be adequate.

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

c. Urgency. The following recommendations should be implemented as soon as possible or 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. Erosion ditches on each side of the spillway structure should be filled.

2. Debris in the outlet works discharge stilling basin should be removed.

3. 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 an emergency.

4. The dam and appurtenant structures should be inspected regularly and necessary maintenance performed.

PLATES

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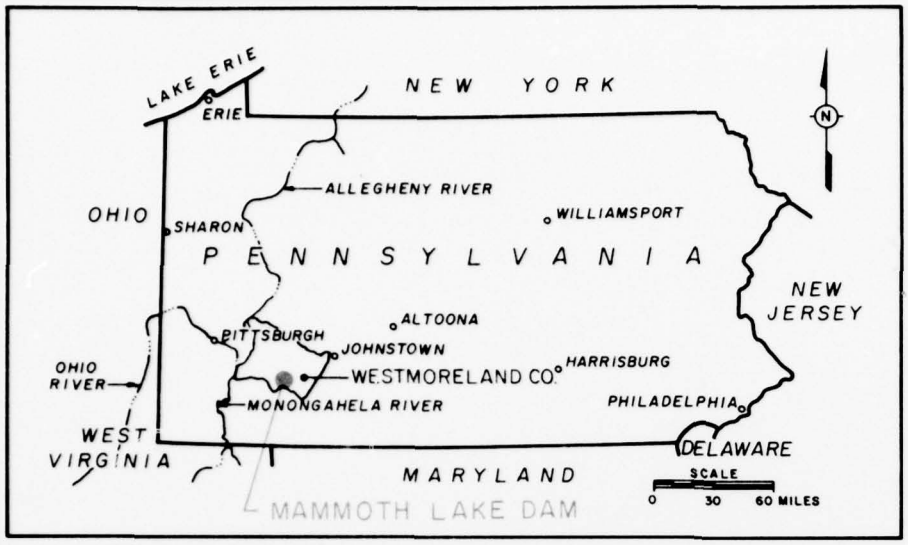

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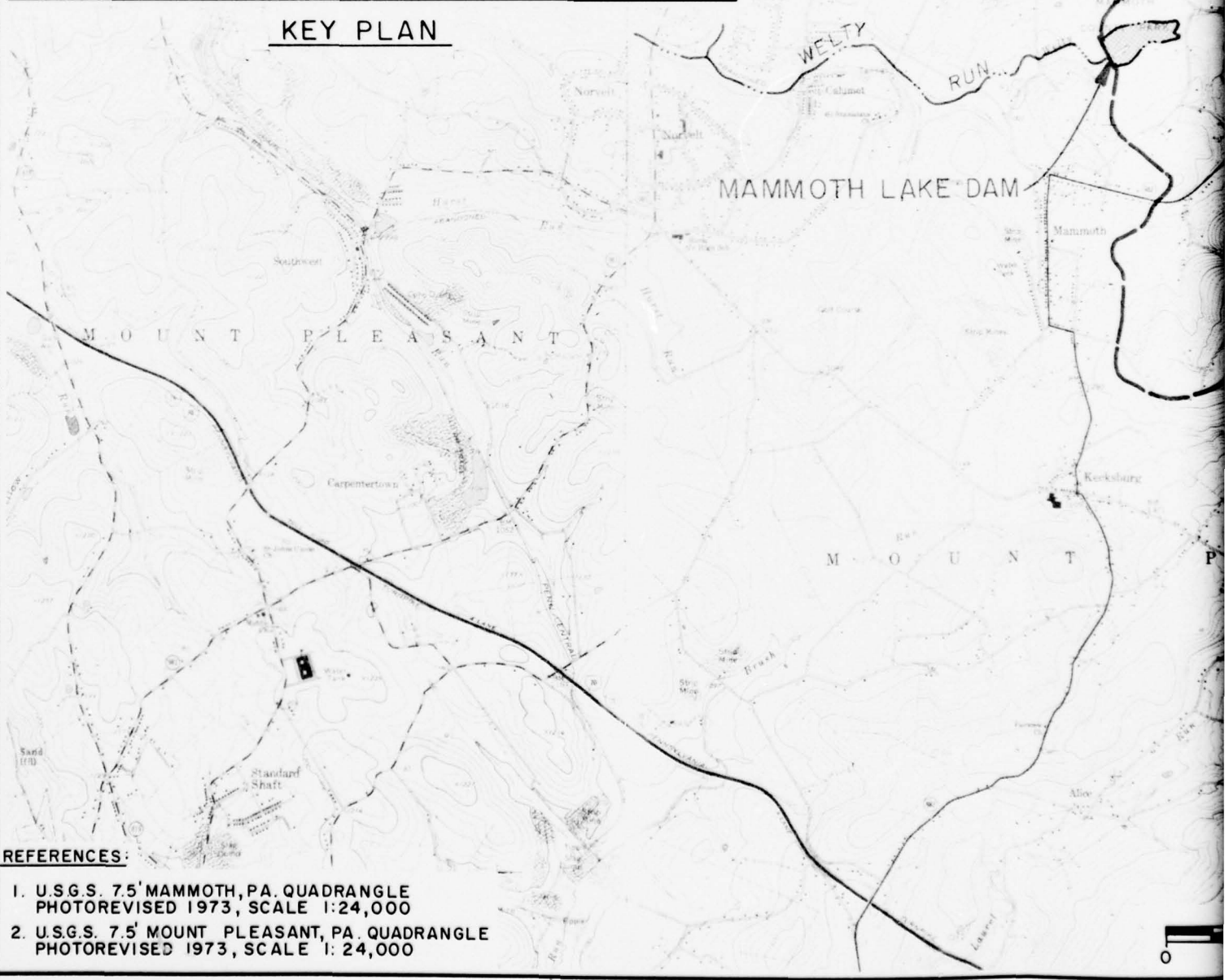

REFERENCES:

1. U.S.G.S. 7.5' MAMMOTH, PA. QUADRANGLE PHOTOREVISED 1973, SCALE 1:24,000
2. U.S.G.S. 7.5' MOUNT PLEASANT, PA. QUADRANGLE PHOTOREVISED 1973, SCALE 1: 24,000

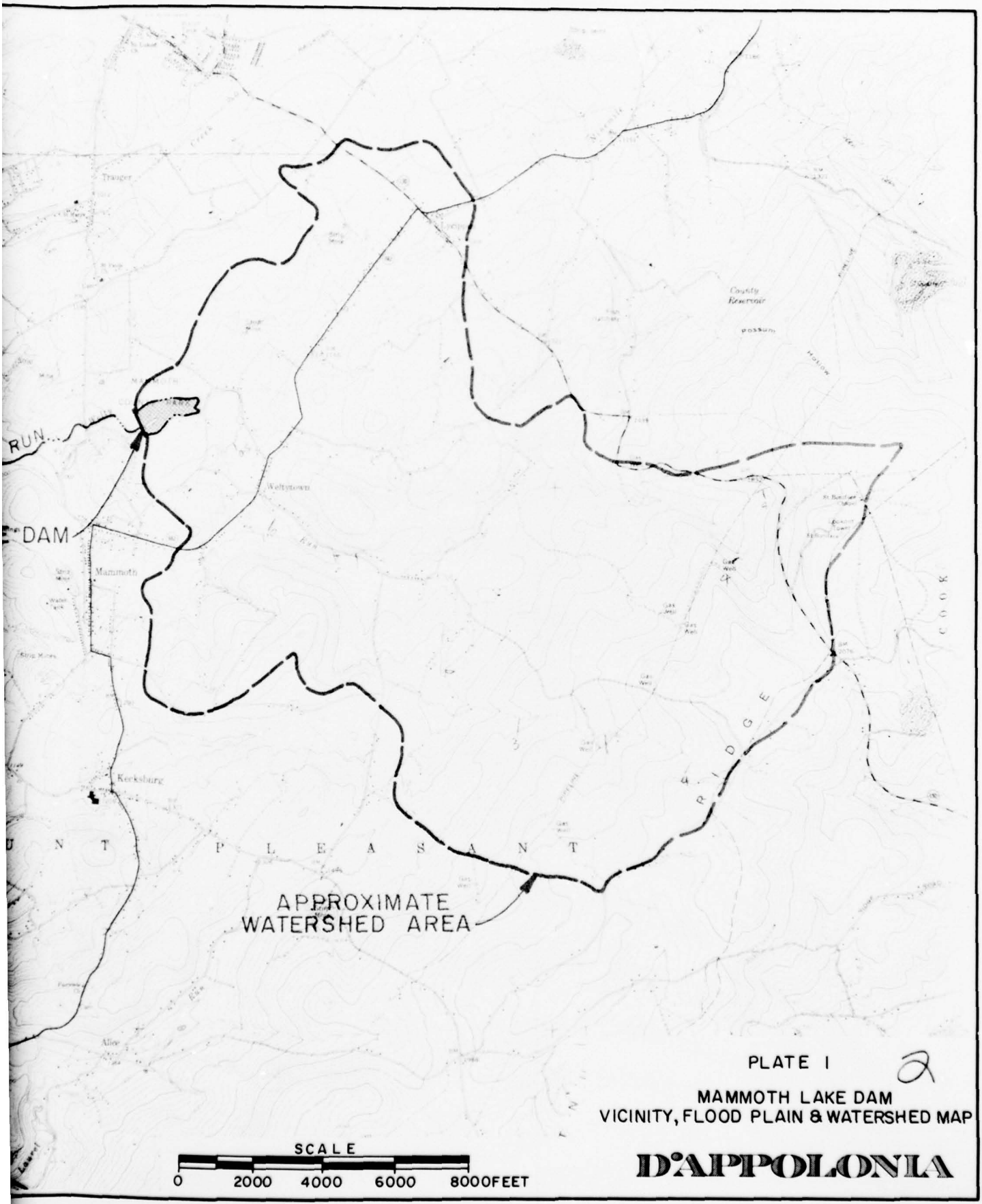

PLATE 1

MAMMOTH LAKE DAM
VICINITY, FLOOD PLAIN & WATERSHED MAP

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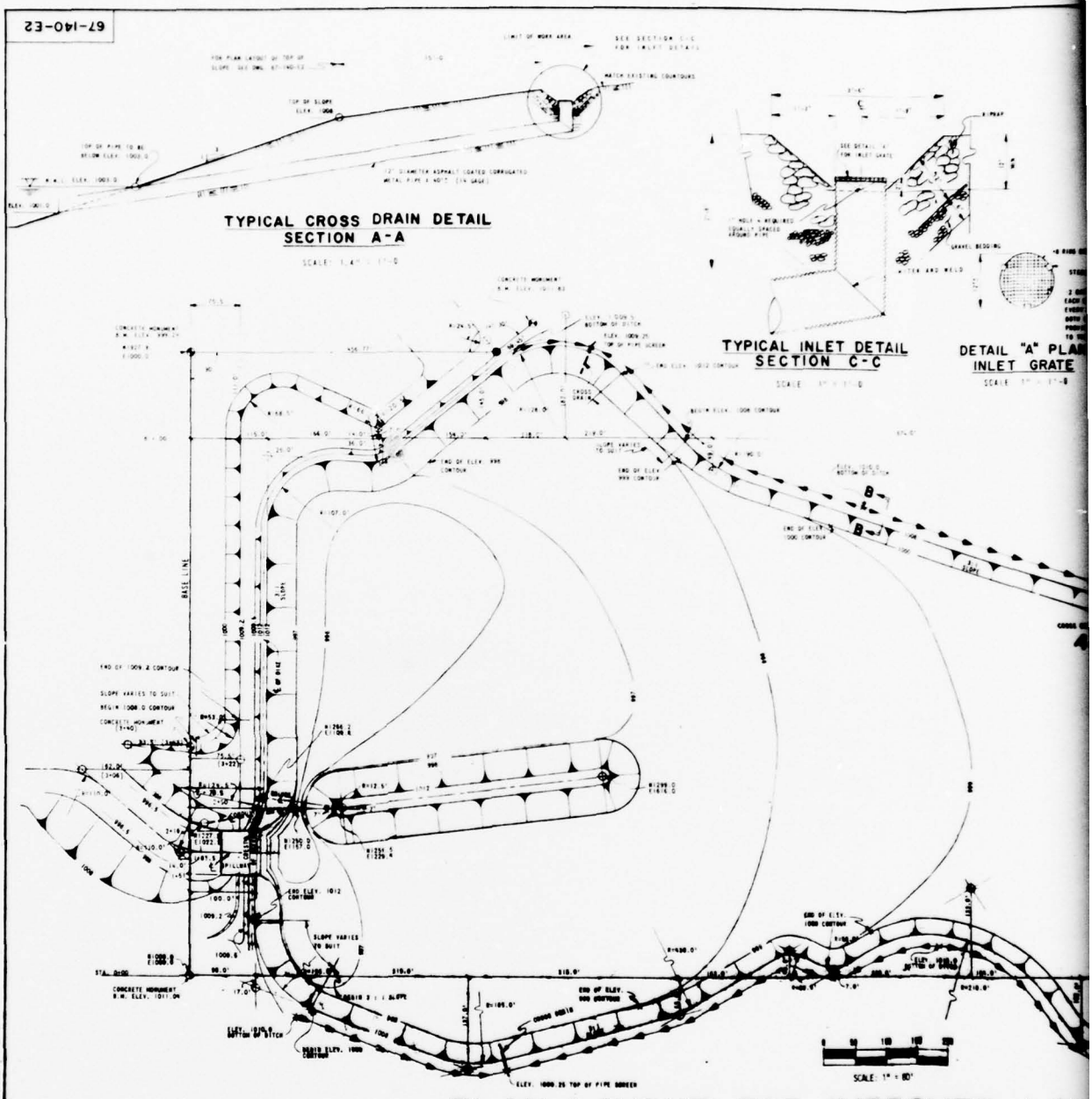
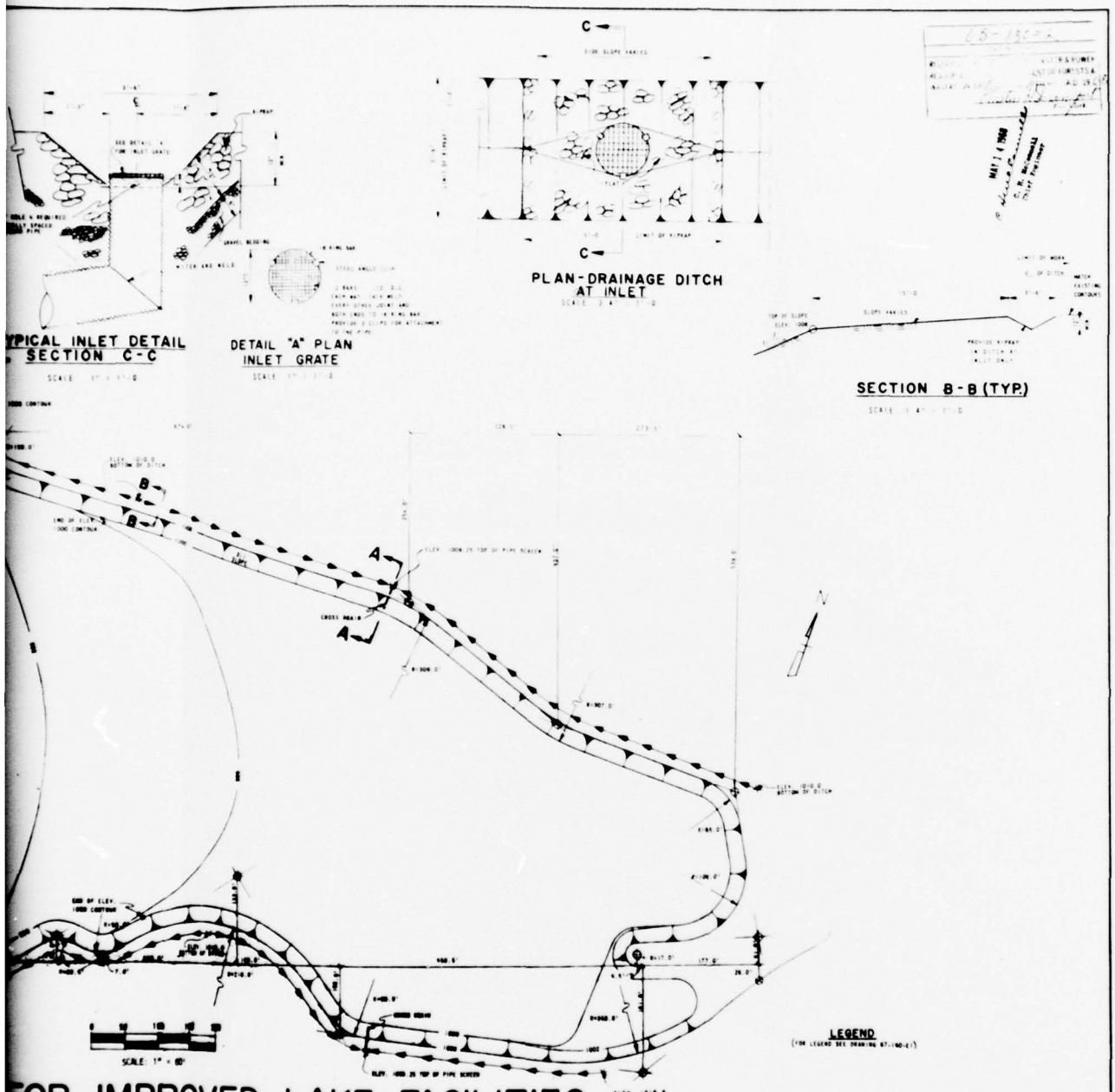


PLAN LAYOUT FOR IMPROVED LAK

APPROVED	DATE

REFERENCE DRAWINGS

COUNTY OF WESTMORELAND, PENNSYLVANIA
RECREATION AND PARKS COMMISSION
MAMMOTH PARK LAKE
MOUNT PLEASANT TOWNSHIP
ENLARGEMENT OF LAKE AND RELATED IMPROVEMENTS



FOR IMPROVED LAKE FACILITIES

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MAMMOTH PARK LAKE
MOUNT PLEASANT TOWNSHIP
EMENT OF LAKE AND RELATED IMPROVEMENTS

B-P ENGINEERS			GENERAL ANALYTICS, INC.	PLAN AND GENERAL ARRANGEMENT FOR LAYOUT OF PROPOSED LAKE IMPROVEMENTS			
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PLATE 2

D'APPOLONIA

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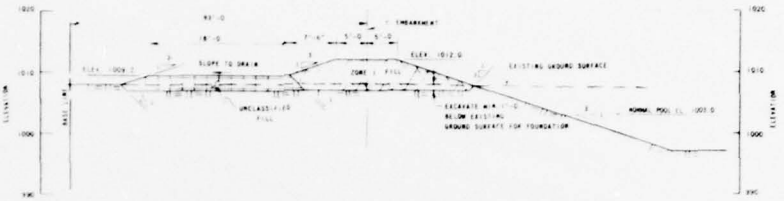
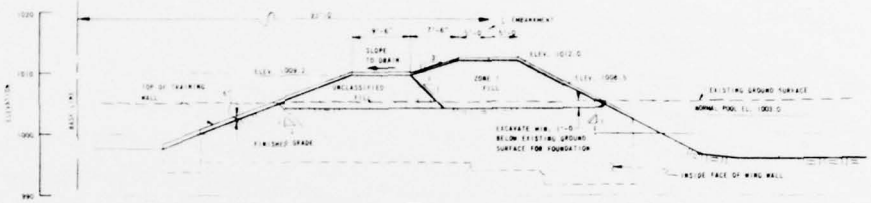
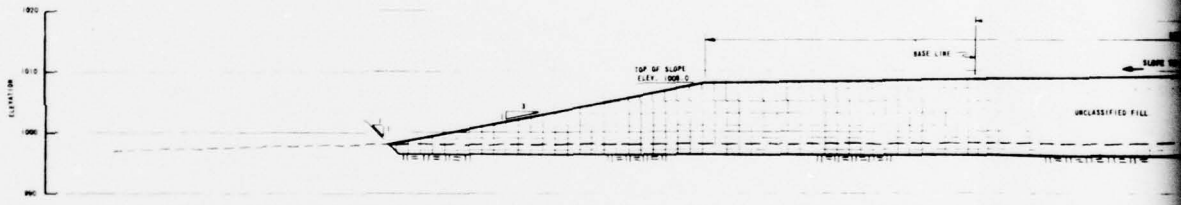


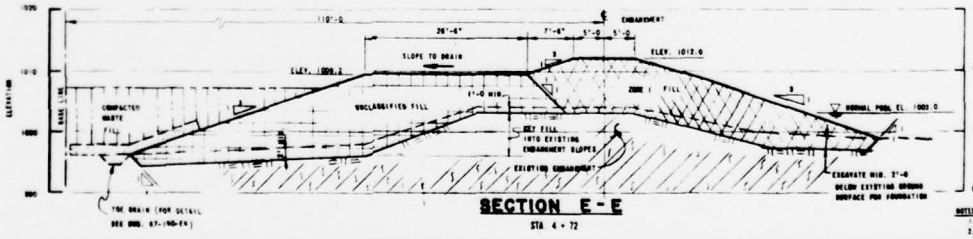
SECTION A-A
STA 0 + 82



SECTION B-B
STA 1 + 32



SECTION D-D
STA 3 + 12

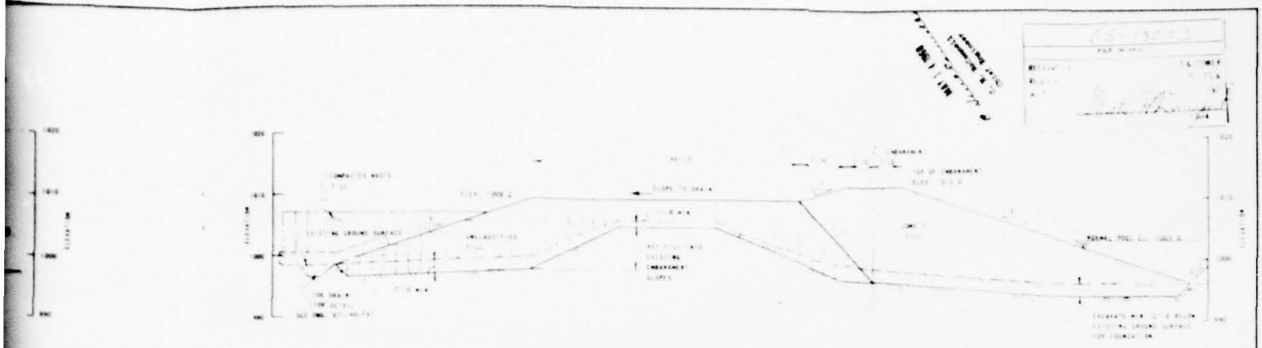


SECTION E-E
STA 4 + 72

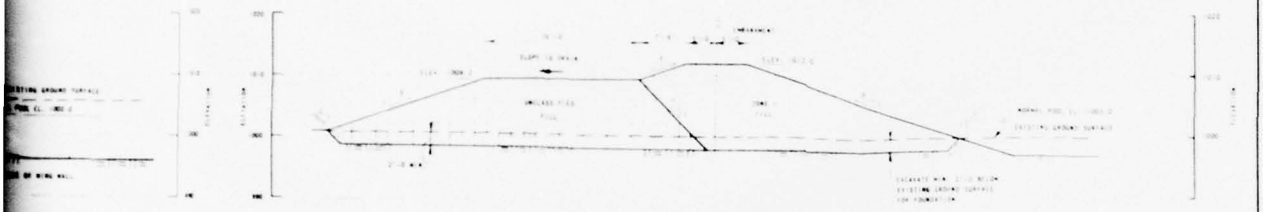
NOTES:
1. FOR PLAN LOCATION OF SECTIONS SEE DWG. 67-140-E2
2. FOR LEGEND SEE DWG. 67-140-E4

REFERENCE DRAWINGS	APPROVED	DATE
	BOARD OF COUNTY COMMISSIONERS	
	RECREATION AND PARKS DEPARTMENT	
	ENGINEER	

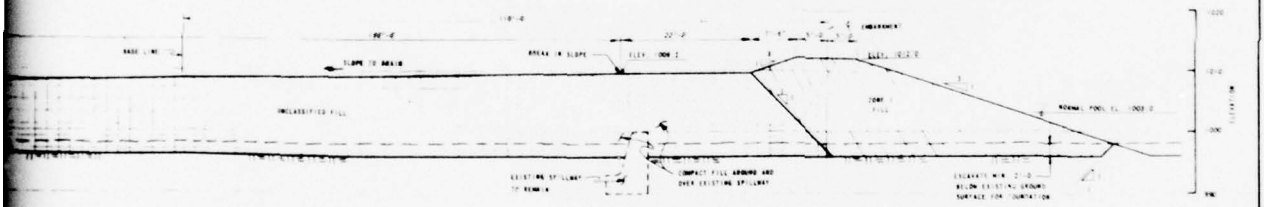
COUNTY OF WESTMORELAND, PENNSYLVANIA
RECREATION AND PARKS COMMISSION
MAMMOTH PARK LAKE
MOUNT PLEASANT TOWNSHIP
ENLARGEMENT OF LAKE AND RELATED IMPROVEMENTS



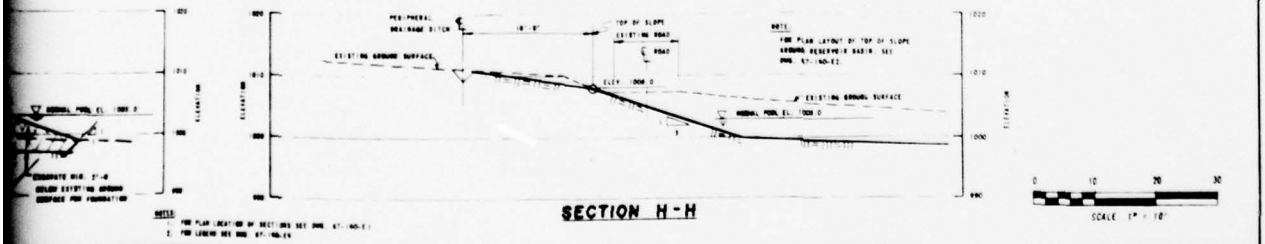
SECTION F - F



SECTION G - G



SECTION D - D



SECTION H - H

SCALE 1" = 10'

TY OF WESTMORELAND, PENNSYLVANIA
TION AND PARKS COMMISSION
MAMMOTH PARK LAKE
MOUNT PLEASANT TOWNSHIP
MENT OF LAKE AND RELATED IMPROVEMENTS

B-F ENGINEERS
ST. THOMAS LANE
GREENSBURG, PENNSYLVANIA

DRAWN BY
CHECKED BY
APPROVED BY
SCALE
DRAWING NO.

GENERAL ANALYTICS, INC.
CONSULTING ENGINEERS
MONROEVILLE, PENNSYLVANIA

REVISION
DATE

EARTHWORK CROSS SECTIONS-
SECTIONS A-A, B-B AND D-D
THROUGH H-H

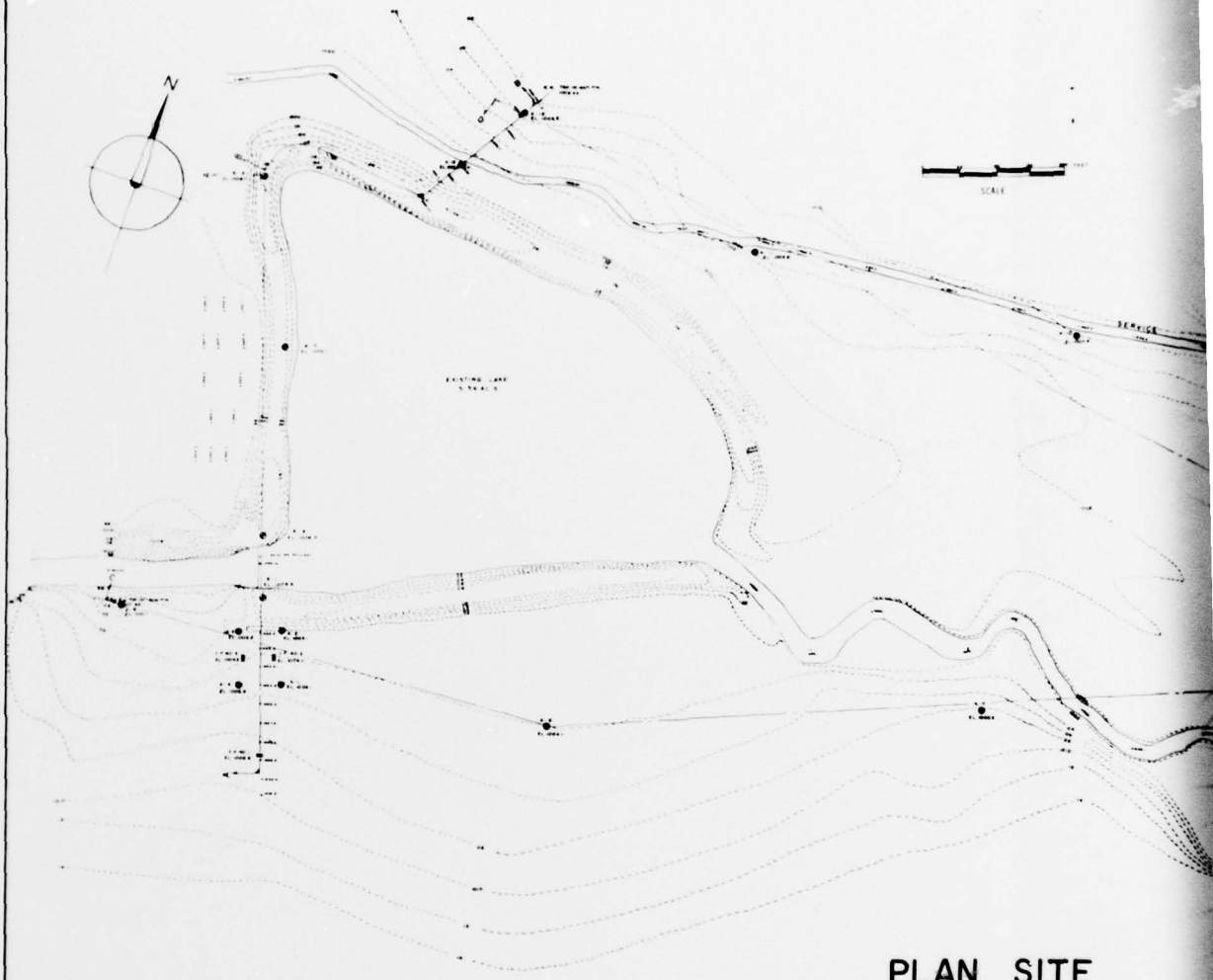
DRAWN BY	BGN	1-2-68	SCALE: AS SHOWN
CHECKED BY			DRAWING NO. 67-140-E3
APPROVED BY	REK	3-4-68	

PLATE 3

DTIC

DRAWN BY	ACS	CHECKED BY	[illegible]	7-24-79	DRAWING NUMBER	78-67-B163
	5-22-79	APPROVED BY	[illegible]	7/24/79		

67-140-E9



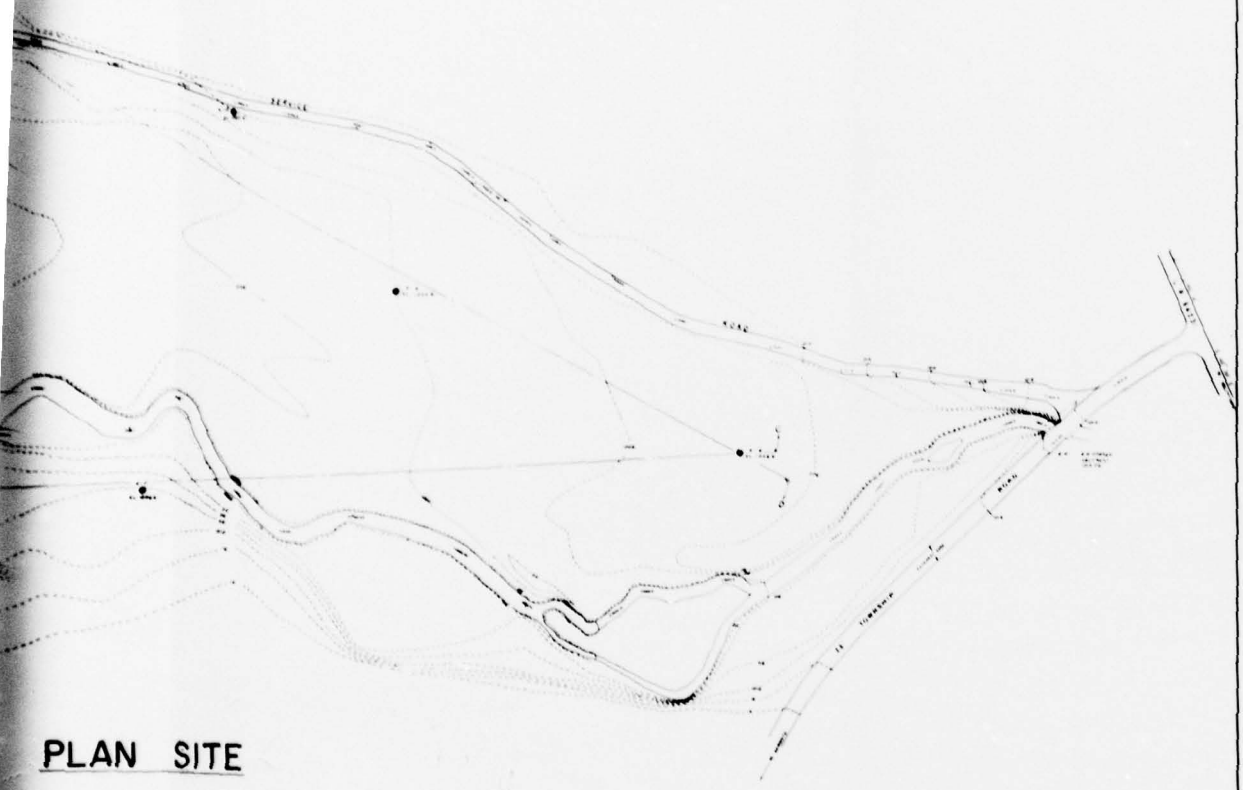
PLAN SITE

APPROVED	DATE
[illegible]	
[illegible]	
[illegible]	
[illegible]	
[illegible]	

REFERENCE DRAWINGS

COUNTY OF WESTMORELAND, PENNSYLVANIA
RECREATION AND PARKS COMMISSION
MAMMOTH PARK LAKE
MOUNT PLEASANT TOWNSHIP
ENLARGEMENT OF LAKE AND RELATED IMPROVEMENTS

GENERAL NOTES - SUBSURFACE INVESTIGATION



PLAN SITE

...TY OF WESTMORELAND, PENNSYLVANIA
...TION AND PARKS COMMISSION
MAMMOTH PARK LAKE
MOUNT PLEASANT TOWNSHIP
...MENT OF LAKE AND RELATED IMPROVEMENTS

B-P ENGINEERS
GREENSBURG, PENNSYLVANIA

GENERAL ANALYTICS, INC.
MONROEVILLE, PENNSYLVANIA

PLAN AND LOCATION OF BORINGS, AUGERS AND TEST PITS

DRAWN BY	RGN	2-68	SCALE: AS SHOWN
CHECKED BY			DRAWING NO.
APPROVED BY	RBP	3-4-68	67-140-E9

PLATE 4

DAPPOLONIA

DRAWN BY	ACS	CHECKED BY	BE	7-24-79	DRAWING NUMBER	67-B164
	5-22-79	APPROVED BY	JMD	7/24/79		

67-140-E10

BORING 1

ELEVATION FEET	DEPTH FEET	PROFILE	DESCRIPTION: SOIL DENSITY, CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: MATERIAL	USCS	SAMPLE TYPE	BLOWS PER SIX INCHES OR PER CENT RECOVERY
1008.3	GROUND SURFACE						
				TOP SOIL			3 2 6 7
	5		MEDIUM	BROWN CLAYEY SILT W/ SANDSTONE AND SHALE FRAGMENTS, GRAVEL, SOME SILTY CLAY AND DECAYED VEGETATION	CL-ML		2 3 4 5
1000.0	8.3						3 4 5 5
	2-4-66						3 2 3 2
	10		MEDIUM TO STIFF	GRAY CLAYEY SILT W/SHALE, COAL AND SANDSTONE FRAGMENTS AND SOME DECAYED VEGETATION - MOIST	CL-ML		1 2 3 3
				SMALL SHALE FRAGMENTS			2 2 3 5
			STIFF	BROWN AND GRAY CLAYEY SILT - TRACE OF COAL FRAGMENTS - MOIST	CL-ML		5 6 6 8
990.0	15		STIFF	BROWN AND GRAY CLAYEY SILT W/SANDSTONE SHALE FRAGMENTS	CL-ML		4 5 5 6
			VERY STIFF	BROWN CLAYEY SILT W/SANDSTONE AND SHALE FRAGMENTS - WET	CL-ML		6 7 8 8
	20		SOFT	BROWN SHALE, HIGHLY WEATHERED			7 8 13 16
			SOFT	GRAY SHALE - HIGHLY WEATHERED			6 8 12 21
	25		SOFT	LIGHT AND DARK GRAY SHALE, HIGHLY WEATHERED			6 12 9 6
980.0			VERY SOFT	GRAY SILTY SHALE, HIGHLY WEATHERED AND DECOMPOSED			0 33 50/3
	30		MEDIUM HARD	GRAY SHALE - HIGHLY WEATHERED			50/4
972.3	35.7			BOTTOM OF BORING			50/3

BORING 2

ELEVATION FEET	DEPTH FEET	PROFILE	DESCRIPTION: SOIL DENSITY, CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: MATERIAL
1005.4	GROUND SURFACE			
			MEDIUM TO STIFF	BROWN CLAYEY SILT W/ SANDSTONE AND SHALE FRAGMENTS, TRACE OF COAL FRAGMENTS, MOIST
1000.0	5.4		MEDIUM TO STIFF	BROWN SILT W/ SHALE FRAGMENTS, TRACE OF COAL FRAGMENTS, MOIST
	2-4-66			
	10			WOOD - PARTIALLY DECOMPOSED
			MEDIUM TO STIFF	BROWN AND GRAY CLAYEY SILT W/ SHALE AND COAL FRAGMENTS, WOOD AND DECAYED VEGETATION - WET
990.0	15.4			
	20		STIFF TO VERY STIFF	BROWN AND GRAY SILTY W/ SANDSTONE AND SHALE FRAGMENTS, TRACE OF COAL FRAGMENTS, VERY MOIST
			SOFT	BROWN SHALE, HIGHLY WEATHERED
			SOFT TO MEDIUM HARD	GRAY SHALE, HIGHLY WEATHERED
980.0	25.4			
			SOFT TO MEDIUM HARD	DARK GRAY SHALE, WEATHERED
976.0	30			BOTTOM OF BORING

BORING 4

ELEVATION FEET	DEPTH FEET	PROFILE	DESCRIPTION: SOIL DENSITY, CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: MATERIAL	USCS	SAMPLE TYPE	BLOWS PER SIX INCHES OR PER CENT RECOVERY
1006.7	GROUND SURFACE						
			STIFF TO VERY STIFF	BROWN CLAYEY SILT W/SANDSTONE AND SHALE FRAGMENTS - MOIST TO VERY MOIST	CL-ML		4 4 6 7
	5						4 5 8 8
							7 8 2 13
1000.0			HARD	NOTE: MATERIAL BECOMING VERY MOIST AT 10.0'			15 22 20 20
	10						16 23 26 20
			MEDIUM DENSE	GRAY SILT W/SANDSTONE, SHALE AND COAL FRAGMENTS, SOME DECAYED VEGETATION - VERY MOIST	ML		9 10 9 7
				LENSE OF VERY SMALL COAL FRAGMENTS			7 9 8 7
	15		VERY STIFF	GRAY CLAYEY SILT W/DECAYED VEGETATION - VERY MOIST	CL-ML		7 10 10 14
	2-3-66						4 10 10 14
990.0			DENSE	BROWN AND GRAY SILTY SAND W/ SOME SANDSTONE AND SHALE FRAGMENTS - WET	SW		4 10 22 26
	20		MEDIUM DENSE TO DENSE	BROWN SILTY SAND W/SANDSTONE AND SHALE FRAGMENTS - WET	SW		10 14 10 10
							7 9 15 22
983.7	23		SOFT	GRAY SHALE, WEATHERED BOTTOM OF BORING			33 50/3

LEGEND

- CLAY
- SAND
- SILT
- SHALE
- ROCK FRAGMENTS
- SANDSTONE
- SANDY SHALE
- VEGETATION
- GRAVEL
- SILTY SHALE
- COAL FRAGMENTS
- FILL OR TOPSOIL
- 3" DIA AUGER BORING - JAR SAMPLE OF CUTTINGS
- 2" O.D. SPLIT BARREL SAMPLE
- GROUND WATER LEVEL AND DATE OF OBSERVATION
- APPEARS IN PER CENT RECOVERY COLUMN INDICATING DIAMETER OF CORE RECOVERED
- INDICATES 60 BLOWS REQUIRED FOR SAMPLER TO PENETRATE 3 INCHES
- PER CENT OF CORE RECOVERED AND LIMITS OF DRILL RUN
- APPROXIMATE TOP OF ROCK

APPROVED	DATE
BOARD OF COUNTY COMMISSIONERS	
CHAIRMAN	
RECREATION AND PARKS COMMISSION	
CHAIRMAN	
SECRETARY	

REFERENCE DRAWINGS

COUNTY OF WESTMORELAND, PENNSYLVANIA

RECREATION AND PARKS COMMISSI

MAMMOTH PARK LAKE

MOUNT PLEASANT TOWNSHIP

ENLARGEMENT OF LAKE AND RELATED IMPROVEMENT

BORING 2

DEPTH FEET	PROFILE	DESCRIPTION: SOIL DENSITY, CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: MATERIAL	USCS	SAMPLE TYPE	BLOWS PER SIX INCHES OR PER CENT RECOVERY
			GROUND SURFACE			
		MEDIUM TO STIFF	BROWN CLAYEY SILT W. SANDSTONE AND SHALE FRAGMENTS, TRACE OF COAL FRAGMENTS, MOIST	ML	○	5 6 8 5
					○	6 8 8 8
		MEDIUM TO STIFF	BROWN SILT W. SHALE FRAGMENTS, TRACE OF COAL FRAGMENTS, MOIST	ML	○	8 7 8 8
					○	7 6 7 5
			WOOD, PARTIALLY DECOMPOSED			6 60
		MEDIUM TO STIFF	BROWN AND GRAY CLAYEY SILT W. SHALE AND COAL FRAGMENTS, WOOD AND DECAYED VEGETATION, WET	CL-ML	○	2 5 5 5
					○	5 6 5 12
					○	5 5 5 12
		STIFF TO VERY STIFF	BROWN AND GRAY SILT W. SANDSTONE AND SHALE FRAGMENTS, TRACE OF COAL FRAGMENTS, VERY MOIST	ML	○	7 7 10 11
		SOFT	BROWN SHALE, HIGHLY WEATHERED		○	7 8 8 11
		SOFT TO MEDIUM HARD	GRAY SHALE, HIGHLY WEATHERED		○	9 52 60/5"
		SOFT TO MEDIUM HARD	GRAY GRAY SHALE, WEATHERED		○	60/3"
			BOTTOM OF BORING			

BORING 3

ELEVATION FEET	DEPTH FEET	PROFILE	DESCRIPTION: SOIL DENSITY, CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: MATERIAL	USCS	SAMPLE TYPE	BLOWS PER SIX INCHES OR PER CENT RECOVERY
				GROUND SURFACE			
			STIFF	BROWN SILT W. SANDSTONE AND SHALE FRAGMENTS, MOIST		○	4 5 5 6
						○	5 5 6 6
1000.0	5		STIFF TO VERY STIFF	BROWN AND GRAY SILT W. SHALE FRAGMENTS AND DECAYED VEGETATION, MOIST	ML	○	6 6 7 8
						○	5 5 6 6
	10		STIFF	GRAY SILT W. SHALE FRAGMENTS AND DECAYED VEGETATION, MOIST TO VERY MOIST	ML	○	5 5 5 6
						○	3 3 4 5
			MEDIUM DENSE	GRAY SILTY SAND, WET	SM	○	5 6 6 12
990.0	15		MEDIUM DENSE	BROWN SILTY SAND W. SANDSTONE AND SHALE FRAGMENTS, WET	SM	○	5 6 9 15
						○	5 6	
	20		DENSE TO VERY DENSE	GRAY SILTY SAND W. SANDSTONE AND SHALE FRAGMENTS, MOIST	SM	○	10 50
						○	6 10 50
980.0	25		SOFT TO MEDIUM HARD	GRAY SHALE, WEATHERED		○	7 60
970	30		HARD	GRAY SHALE W. STONE WEATHERED ZONES			
				BOTTOM OF BORING			

63-140-10
FILE NUMBER
RECEIVED IN THE OFFICE OF THE [illegible]
RESOURCES [illegible] DEPARTMENT OF [illegible]
WATERS ON THE [illegible] DAY OF [illegible] 19 [illegible]
[illegible]
MAY 1 1968
[illegible]

LEGEND

- CLAY
- SAND
- SILT
- SHALE
- ROCK FRAGMENTS
- SANDSTONE
- SANDY SHALE
- VEGETATION
- GRAVEL
- SILTY SHALE
- COAL FRAGMENTS
- FILL OR TOPSOIL
- 3" DIA AUGER BORING - JAR SAMPLE OF CUTTINGS
- 2" O.D. SPLIT BARREL SAMPLE
- GROUND WATER LEVEL AND DATE OF OBSERVATION
- INDICATES 60 BLOWS REQUIRED FOR SAMPLER TO PENETRATE 5 INCHES
- APPROXIMATE TOP OF ROCK
- APPEARS IN PER CENT RECOVERY COLUMN INDICATING DIAMETER OF CORE RECOVERED
- PER CENT OF CORE RECOVERED AND LIMITS OF DRILL RUN

NOTES

1. UNIFIED SOIL CLASSIFICATION SYSTEM USED

GROUP SYMBOL	TYPICAL NAME
GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURE
SM	SILTY SANDS, SAND SILT MIXTURES
SC	CLAYEY SANDS, SAND CLAY MIXTURES
ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
CL	ORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, OR SILTY CLAYS

2. SOIL DENSITY

SOIL DENSITY, AS USED IN THE DESCRIPTION COLUMN FOR [illegible] AND [illegible] IS BASED ON STANDARD PENETRATION RESISTANCE

DESIGNATION	STANDARD PENETRATION RESISTANCE (BLOWS/FOOT)
VERY LOOSE	0 TO 4
LOOSE	5 TO 10
MEDIUM DENSE	11 TO 30
DENSE	31 TO 50
VERY DENSE	OVER 50

3. SOIL CONSISTENCY

SOIL CONSISTENCY IS BASED PRIMARILY ON FIELD AND/OR LABORATORY TESTS USING THE STANDARD PENETRATION RESISTANCE AS A GUIDELINE

CONSISTENCY	UNCONFINED COMPRESSION STRENGTH TONS/SQ.FT.	FIELD IDENTIFICATION	STANDARD PENETRATION RESISTANCE (BLOWS/FT.)
SOFT	0.25 TO 0.50	EASILY PENETRATED SEVERAL INCHES BY THUMB	2 TO 4
MEDIUM STIFF	0.50 TO 1.0	PENETRATED SEVERAL INCHES BY THUMB WITH MODERATE EFFORT	4 TO 8
STIFF	1.0 TO 2.0	READILY INDENTED BY THUMB, BUT PENETRATED ONLY WITH GREAT EFFORT	8 TO 15
VERY STIFF	2.0 TO 4.0	READILY INDENTED BY THUMBNAIL	15 TO 30
HARD	OVER 4.0	INDENTED WITH DIFFICULTY BY THUMBNAIL	OVER 30

4. STANDARD PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE, N, THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2" O.D. SPLIT BARREL SAMPLER 12 INCHES USING A 140 POUND HAMMER FALLING FREELY THROUGH A HEIGHT OF 30 INCHES

THE PENETRATION OF THE SAMPLER WAS DRIVEN A FIRST SET OF 6 INCHES AND THE NUMBER OF BLOWS RECORDED. THE SAMPLER WAS THEN DRIVEN A SECOND SET OF 6 INCHES AND THE NUMBER OF BLOWS RECORDED. THE SAMPLER WAS THEN DRIVEN A FINAL SET OF 6 INCHES AND THE NUMBER OF BLOWS RECORDED. THE SUM OF THE BLOWS RECORDED DURING THE SECOND AND THIRD INCREMENTS OF PENETRATION IS DESIGNATED AS THE STANDARD PENETRATION RESISTANCE, N.

RELATIVE DENSITY OF GRANULAR SOILS AND CONSISTENCY OF COHESIVE SOILS IS OBTAINED BY APPLYING THE NUMBER OF BLOWS REQUIRED TO PENETRATE THE LAST 12 INCHES OF EACH BORING A GENERALLY ACCEPTED STANDARD PENETRATION RESISTANCE, SERVED PRIMARILY AS A GUIDELINE TO DETERMINE THE CONSISTENCY OF COHESIVE SOILS, WITH OR COMPARED TO VALUES OF SHEARING AND PLATE BEARING TESTS PERFORMED.

5. ELEVATIONS

ALL ELEVATIONS ARE BASED ON USGS DATUM

6. ADDITIONAL TERMS TO DESCRIBE SOILS

TERM	DEFINITION
WITH	SHOWN AS W. INDICATES A SIGNIFICANT AMOUNT OF THE SECONDARY MATERIAL (EXAMPLE: SAND W. GRAVEL / FRAGMENTS)
TRACE	INDICATES AN INSIGNIFICANT AMOUNT OF THE SECONDARY MATERIAL (EXAMPLE: MEDIUM DENSE SILTY SAND, TRACE OF SEDIMENTARY FRAGMENTS)

THE PLAN LOCATION OF BORINGS
SEE DWG. NO. 67-140-E9

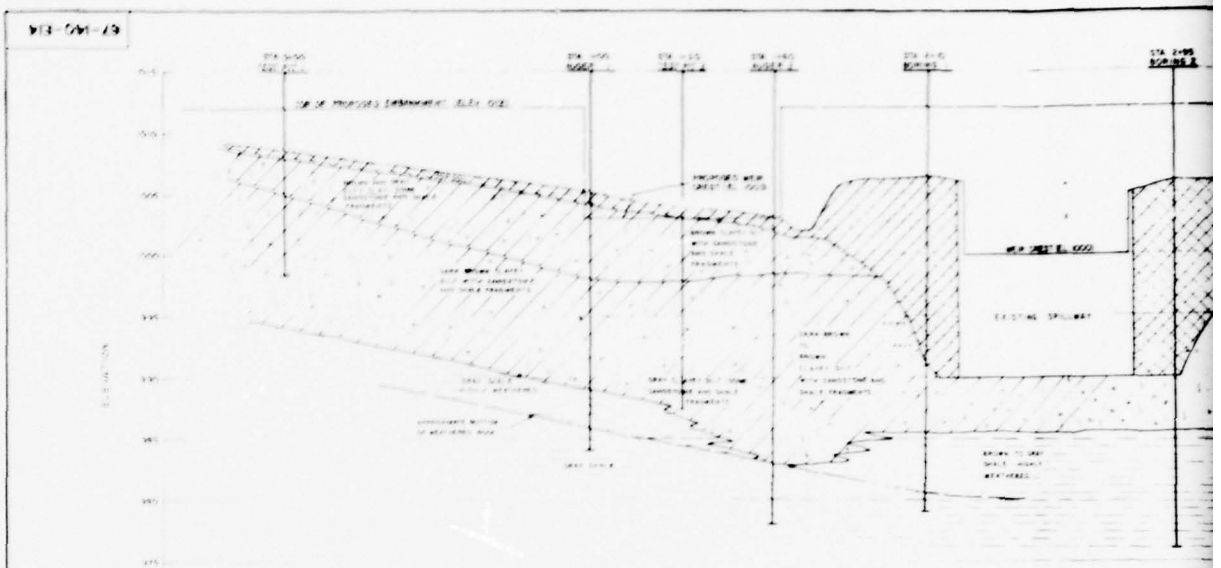
	B-P ENGINEERS	GENERAL ANALYTICS, INC.	BORING LOGS - BORINGS 1 THROUGH 4
	507 THOMAS LANE, GREENSBURG, PENNSYLVANIA	MONROEVILLE, PENNSYLVANIA	
DRAWN BY			RGN 2/20/68 SCALE AS SHOWN
CHECKED BY	SCALE		JWS 2/23/68 DRAWING NO.
APPROVED BY	DRAWING NO.	REVISION DATE	REK 3/4/68 67-140-E10

TY OF WESTMORELAND, PENNSYLVANIA
TION AND PARKS COMMISSION
MAMMOTH PARK LAKE
MOUNT PLEASANT TOWNSHIP
MENT OF LAKE AND RELATED IMPROVEMENTS

PLATE 5

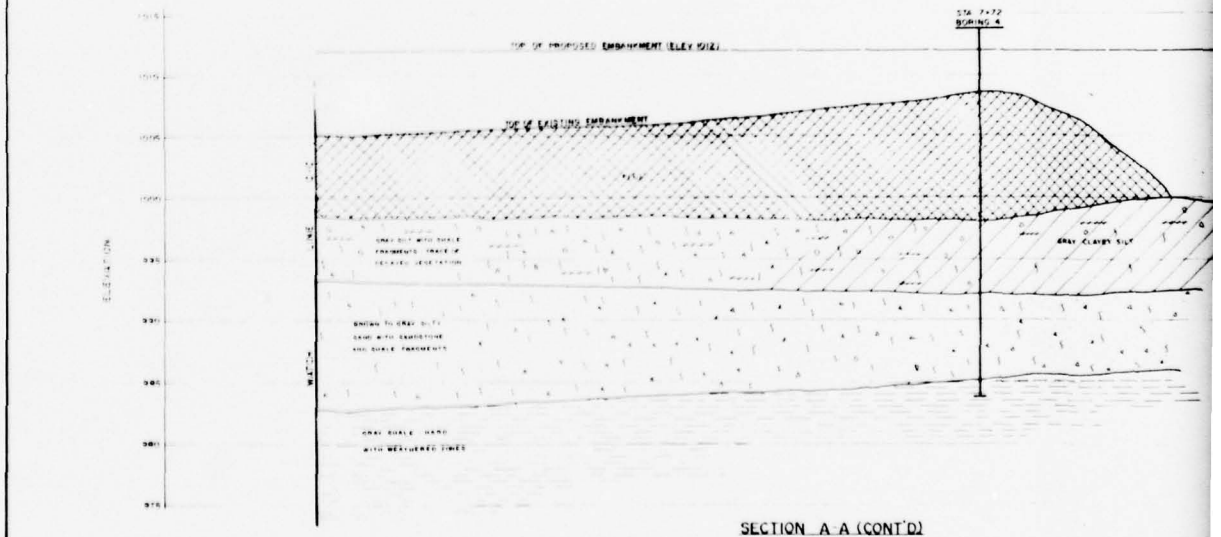
DAPPOLONIA

DRAWN BY	ACS	CHECKED BY		APPROVED BY		DRAWING NUMBER
	5-22-79					



SECTION A-A

SCALE HORIZ 1"=20'
VERT 1"=5'



SECTION A-A (CONT'D)

SCALE HORIZ 1"=20'
VERT 1"=5'

APPROVED	DATE

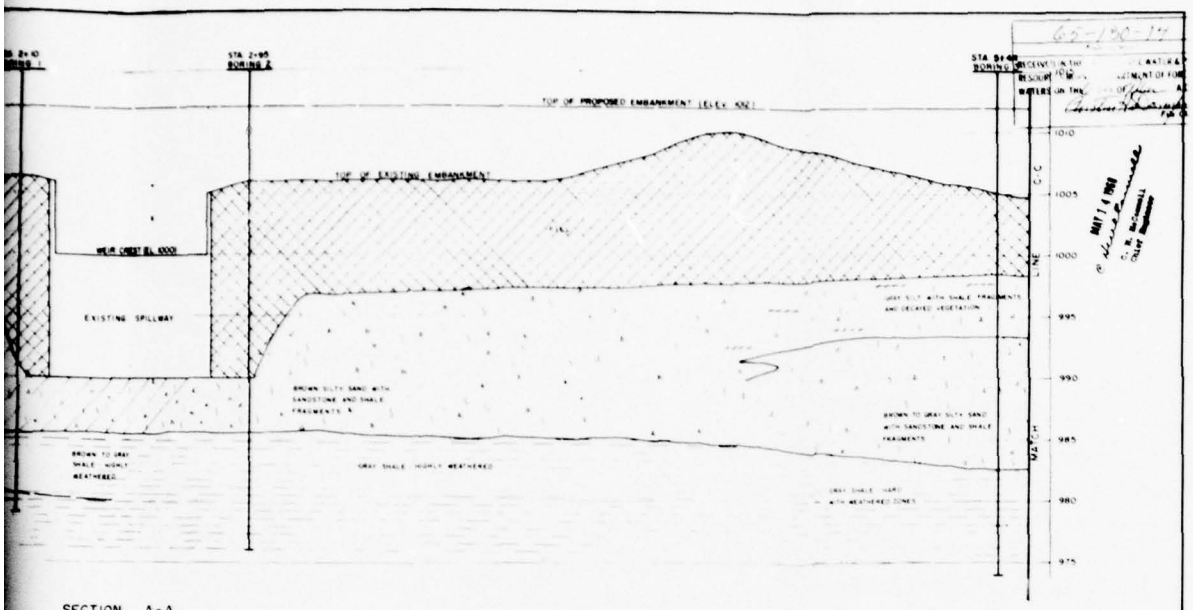
COUNTY OF WESTMORELAND, PENNSYLVANIA

RECREATION AND PARKS COMMISSI

MAMMOTH PARK LAKE

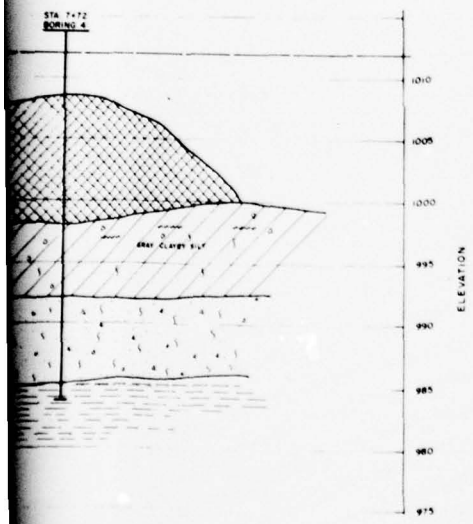
MOUNT PLEASANT TOWNSHIP

ENLARGEMENT OF LAKE AND RELATED IMPROVEMENT



SECTION A-A

SCALE HORIZ. 1"=20'
VERT. 1"=5'



1. FOR PLAN LOCATION OF SECTION A-A SEE DWG. NO. 67-140-E9
2. FOR LOGS OF AUGERS SEE DWG. NO. 67-140-E11
3. FOR LOGS OF BORINGS SEE DWG. NO. 67-140-E10
4. FOR LOGS OF TEST PITS SEE DWG. NO. 67-140-E12

HORIZONTAL SCALE 0 5 10 20 FEET

VERTICAL SCALE 0 5 10 FEET

...TMORELAND, PENNSYLVANIA ...ND PARKS COMMISSION ...OTH PARK LAKE ...PLEASANT TOWNSHIP ...AKE AND RELATED IMPROVEMENTS	B-P ENGINEERS 507 THOMAS LANE GREENSBURG, PENNSYLVANIA	GENERAL ANALYTICS, INC. CONSULTING ENGINEERS MONROEVILLE, PENNSYLVANIA	SUBSURFACE PROFILE-SECTION A-A

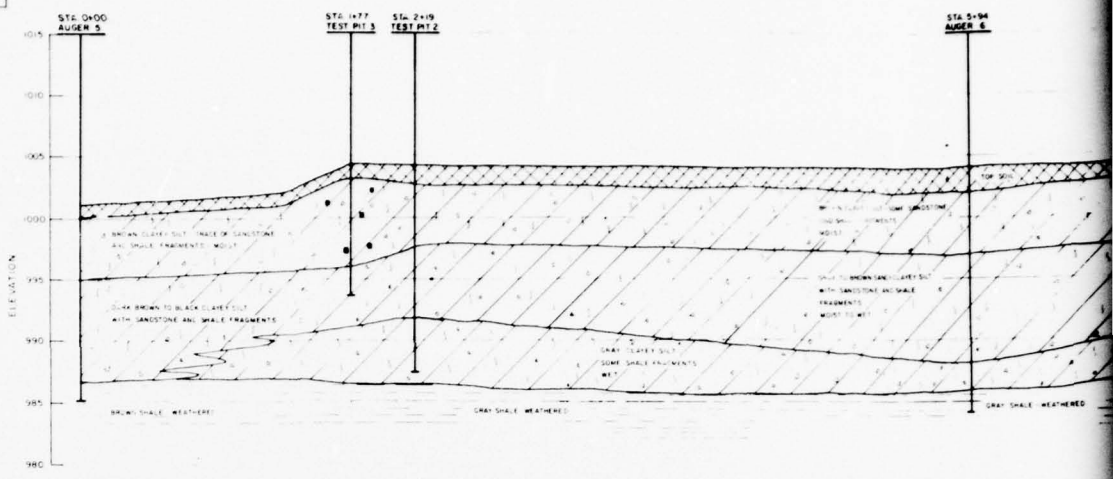
DRAWN BY		SCALE		DRAWN BY	RGN 2 25 68
CHECKED BY		DRAWING NO.		CHECKED BY	JWS 2 29 68
APPROVED BY				APPROVED BY	REK 3 4 68
		REVISION	DATE	SCALE	AS SHOWN
				DRAWING NO.	67-140-E14

PLATE 6

D'APPOLONIA

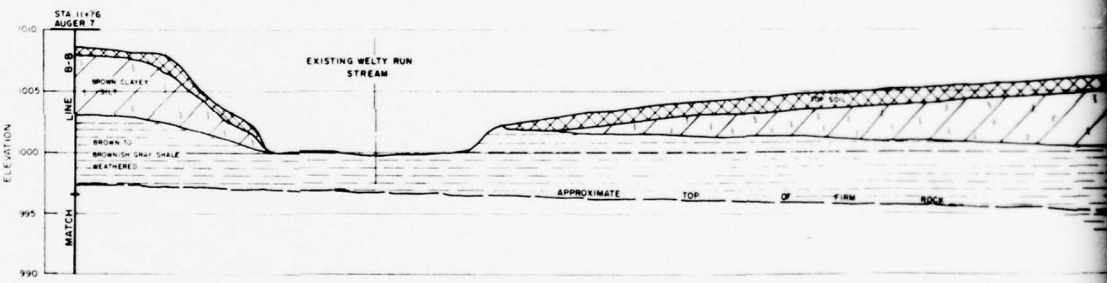
DRAWN BY	ACS	CHECKED BY		2-24-77	DRAWING NUMBER 76-567-B165
	5-22-79	APPROVED BY		7/20/79	

67-140-E16



SECTION C - C

SCALE HORIZ 1"=40'
VERT 1"=5'



SECTION C-C (CONT'D)

SCALE HORIZ 1"=40'
VERT 1"=5'

REFERENCE DRAWINGS

APPROVED	DATE
BOARD OF COUNTY COMMISSIONERS	
CHAIRMAN	
RECREATION AND PARKS COMMISSION	
CHAIRMAN	
SECRETARY	

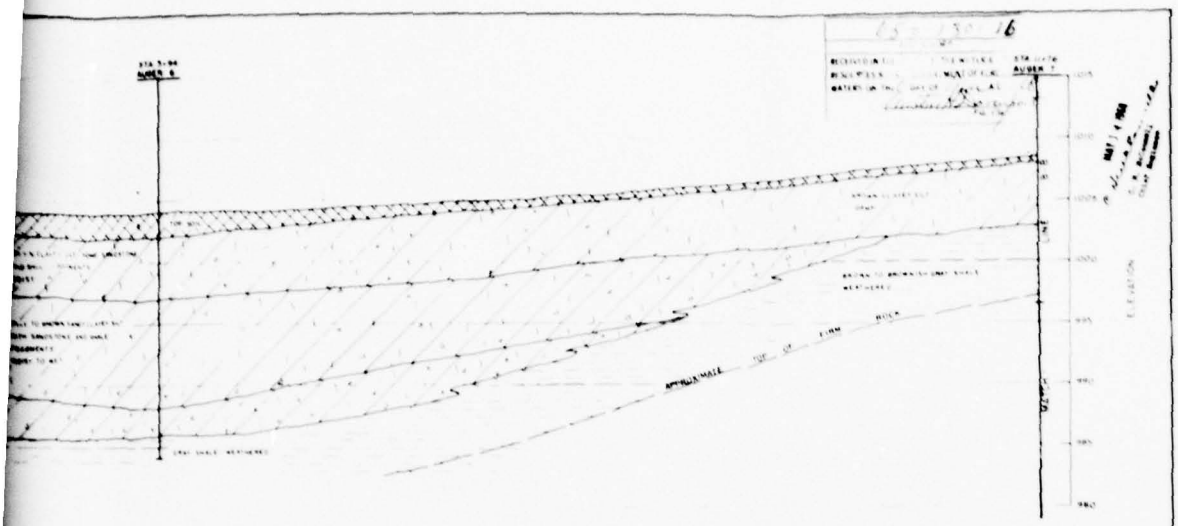
COUNTY OF WESTMORELAND, PENNSYLVANIA

RECREATION AND PARKS COMMISSION

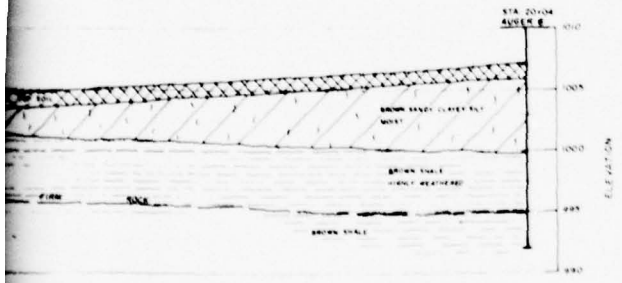
MAMMOTH PARK LAKE

MOUNT PLEASANT TOWNSHIP

ENLARGEMENT OF LAKE AND RELATED IMPROVEMENTS



SECTION C-C



C (CONT'D)

HORIZONTAL SCALE

VERTICAL SCALE

WESTMORELAND, PENNSYLVANIA
PARKS AND PARKS COMMISSION
SMOTH PARK LAKE
NT PLEASANT TOWNSHIP
LAKE AND RELATED IMPROVEMENTS

B. P. ENGINEERS

GENERAL ANALYTICS, INC.

SUBSURFACE PROFILE - SECTION C-C

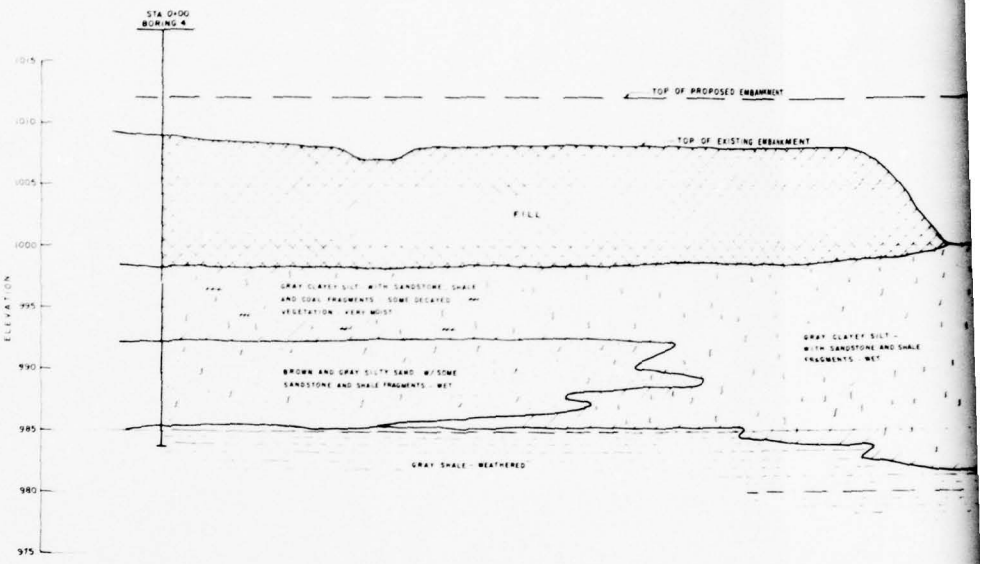
DRAWN BY	KSN	7-25-68	
CHECKED BY	JWS	7-29-68	
APPROVED BY	REK	8-4-68	67-140-E16

PLATE 7

DiAPPOLONIA

DRAWN BY	ACS	CHECKED BY	RE	7-24-79	DRAWING NUMBER	76-67-B167
	5-22-79	APPROVED BY	JMP	7/24/79		

67-140-E15



SECTION B - B

SCALE HORIZ 1"=20'
VERT 1"=5'

REFERENCE DRAWINGS	APPROVED	DATE
	BOARD OF COUNTY COMMISSIONERS	
	CHAIRMAN	
	RECREATION AND PARKS COMMISSION	
	CHAIRMAN	
	SECRETARY	

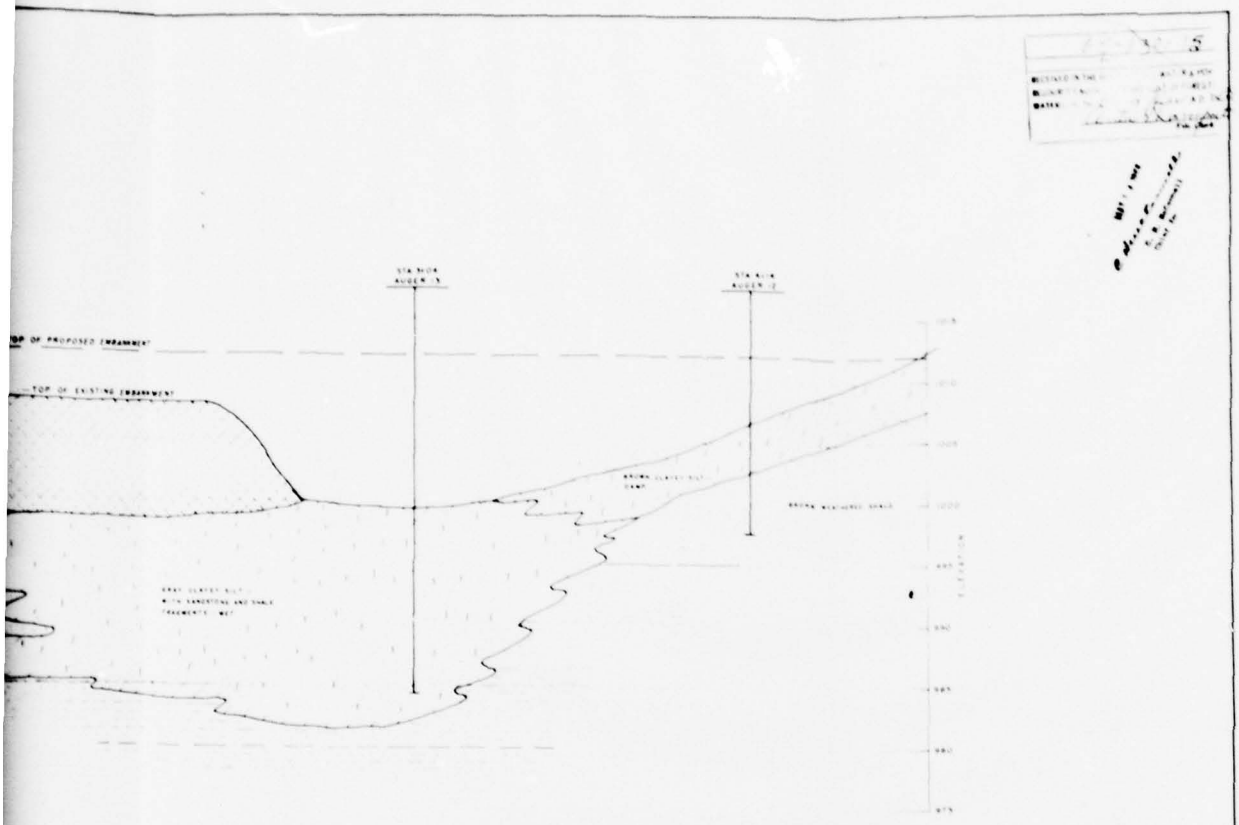
COUNTY OF WESTMORELAND, PENNSYLVANIA

RECREATION AND PARKS COMMISS

MAMMOTH PARK LAKE

MOUNT PLEASANT TOWNSHIP

ENLARGEMENT OF LAKE AND RELATED IMPROVEMEN



SECTION B-B

SCALE HORIZ 1"=20'
VERT 1"=5'

HORIZONTAL SCALE

VERTICAL SCALE

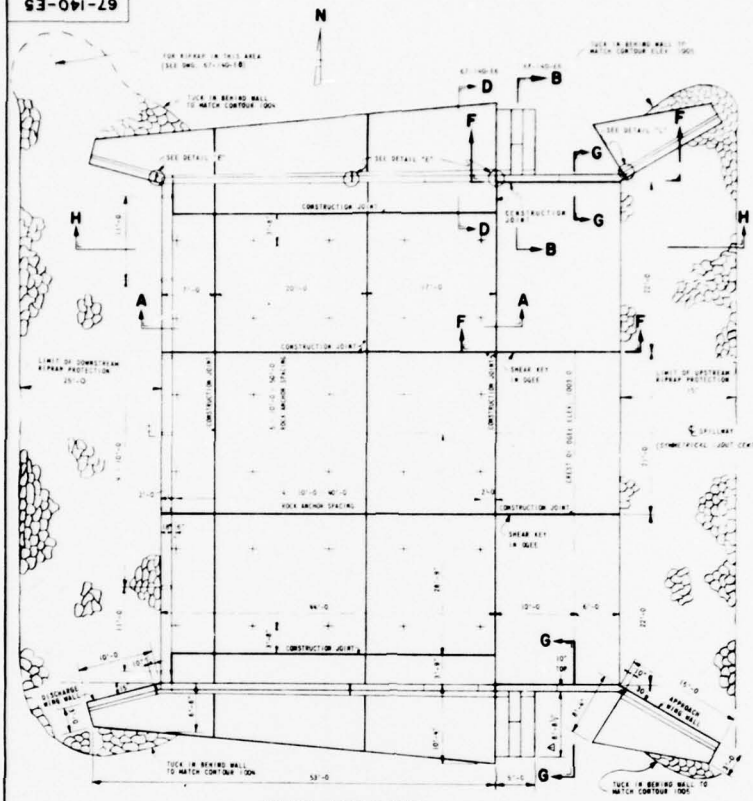
OF WESTMORELAND, PENNSYLVANIA ION AND PARKS COMMISSION MAMMOTH PARK LAKE MOUNT PLEASANT TOWNSHIP ENT OF LAKE AND RELATED IMPROVEMENTS	B-P ENGINEERS GREENSBURG, PENNSYLVANIA	GENERAL ANALYTICS, INC. MONROEVILLE, PENNSYLVANIA	SUBSURFACE PROFILE - SECTION B-B JWS / REK 67-140-E15

PLATE 8

DAPPOLONIA

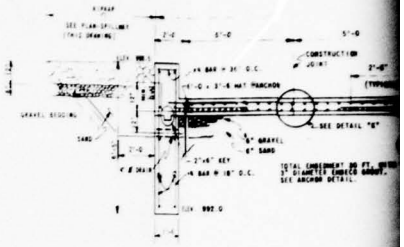
DRAWN BY	ACS	CHECKED BY	JBF	12-24-79	DRAWING NUMBER	76 367-B168
	5-22-79	APPROVED BY	JMP	1/24/79		

67-140-E5



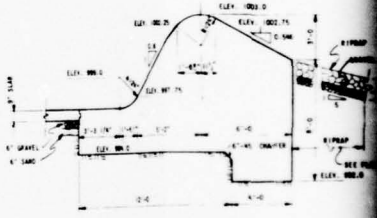
PLAN - SPILLWAY

SCALE 1" = 10'-0



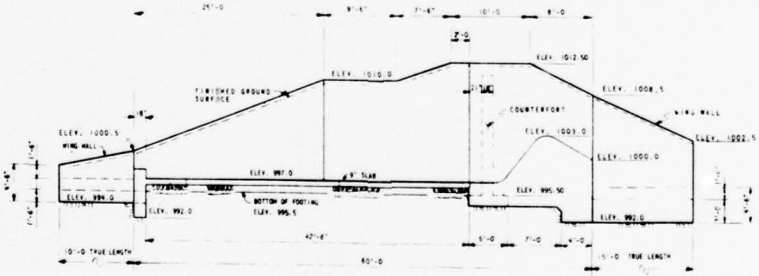
DETAIL "K" CONSTRUCTION JOINT

SCALE 1" = 1'-0



OGEE GEOMETRY

SCALE 1/4" = 1'-0



SECTION H-H

SCALE 1" = 1'-0

(NORTH WALL AS SHOWN - SOUTH WALL OPPOSITE HAND)

GENERAL STRUCTURAL NOT

1. ALL CONCRETE TO HAVE A MINIMUM
OF 3000 POUNDS PER SQUARE INCH
2. REINFORCING STEEL SHALL HAVE A
POUNDS PER SQUARE INCH AND SHALL
BARS CONFORM TO ASTM STANDARD
STEEL BARS FOR CONCRETE REINFORCE
REINFORCEMENT SHALL CONFORM TO
SHALL BE STEEL WIRE SMOOTHLOED
SIZE AND SPACING INDICATED.
3. EACH FOOTING OR OTHER CONCRETE
AND FREE OF SOIL, ROCK DEBRIS AND
4. ALL CONCRETE WORK SHALL BE CONSTR
ELEVATIONS AND DIMENSIONS AS SHO
BY THE ENGINEER.
5. REINFORCEMENT SHALL BE FREE FROM
OTHER COATINGS THAT WILL DESTROY
6. CONCRETE FOR THE TRAINING WALLS
STEMS SHALL BE PLACED AGAINST A
PIPE (WITH A MINIMUM 12-INCH DIA
THE POUR AND SUBSEQUENTLY BACKFI
7. ALL CONCRETE MUST BE THOROUGHLY
HEIGHT OF THE POUR, BEGINNING FRO

REFERENCE DRAWINGS

APPROVED	DATE
BOARD OF COUNTY COMMISSIONERS	
ENGINEER	
RECREATION AND PARKS COMMISSION	
ENGINEER	
SURVEYOR	

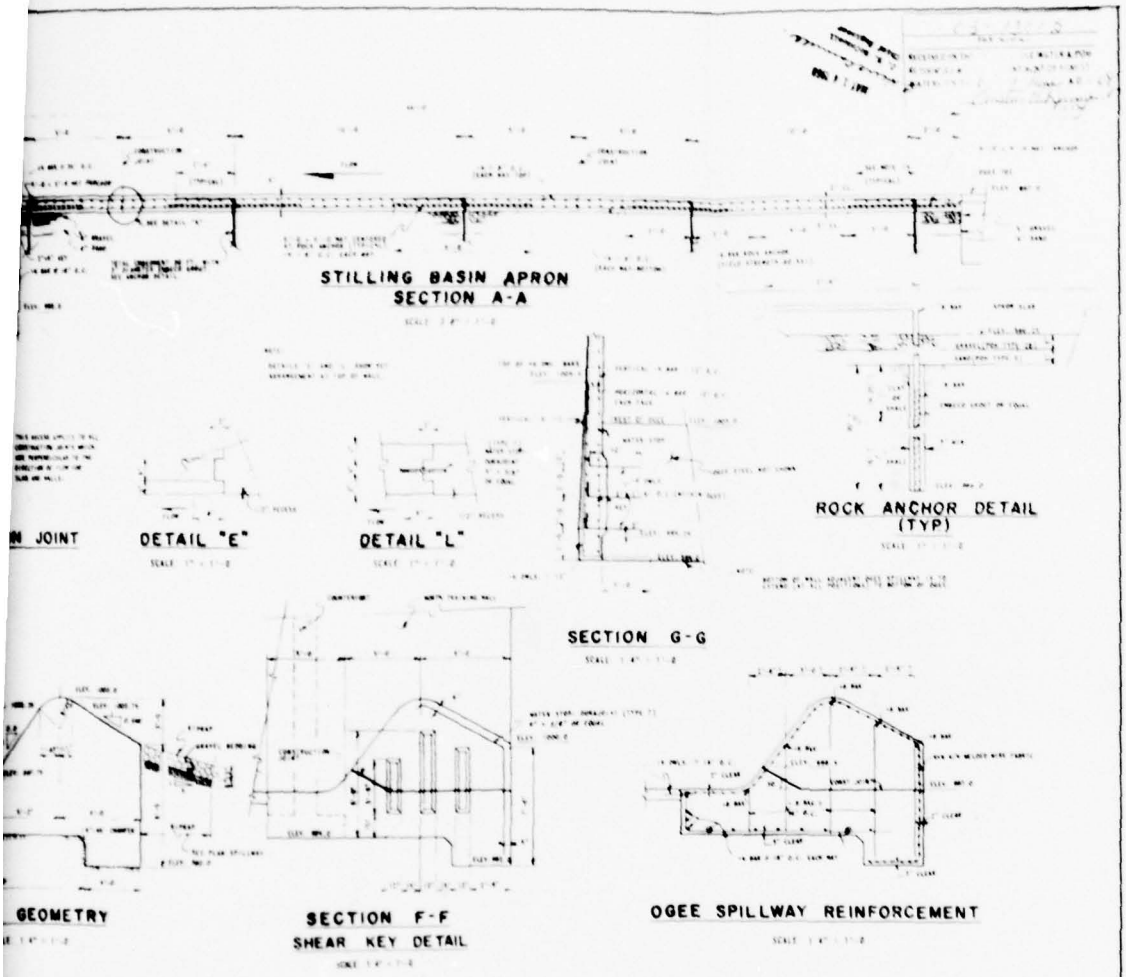
COUNTY OF WESTMORELAND, PENNSYLVANIA

RECREATION AND PARKS COMMISSIO

MAMMOTH PARK LAKE

MOUNT PLEASANT TOWNSHIP

ENLARGEMENT OF LAKE AND RELATED IMPROVEMENTS



NERAL STRUCTURAL NOTES

ELAND, PENNSYLVANIA
PARKS COMMISSION
PARK LAKE
SANT TOWNSHIP
ND RELATED IMPROVEMENTS

B-P ENGINEERS

GENERAL ANALYTICS, INC.

NEW SPILLWAY AND STILLING BASIN-
PLAN, SECTIONS AND DETAILS

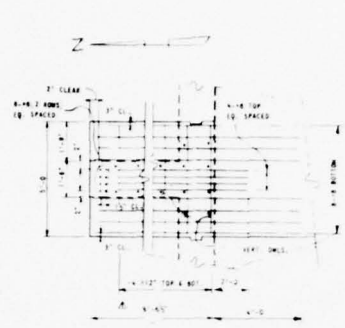
67-140-E5

PLATE 9

DTIC

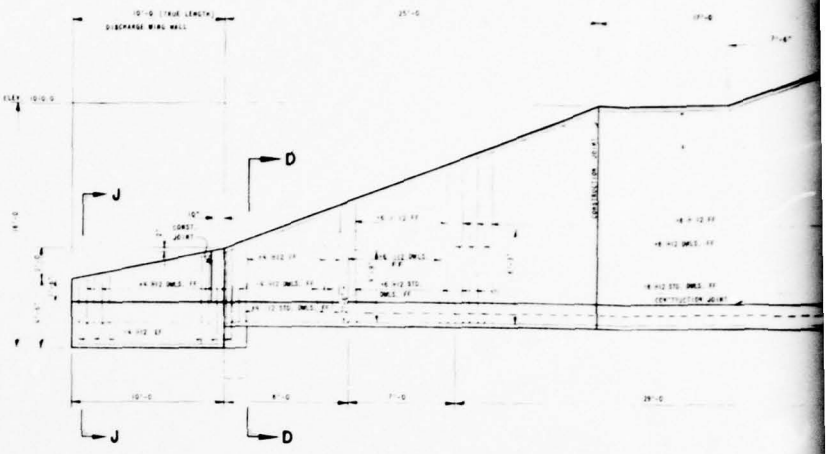
DRAWN BY	ACS	CHECKED BY	JEC	7-24-79	DRAWING NUMBER	78-367-B169
	5-22-79	APPROVED BY	JHP	7/24/79		

67-140-E6



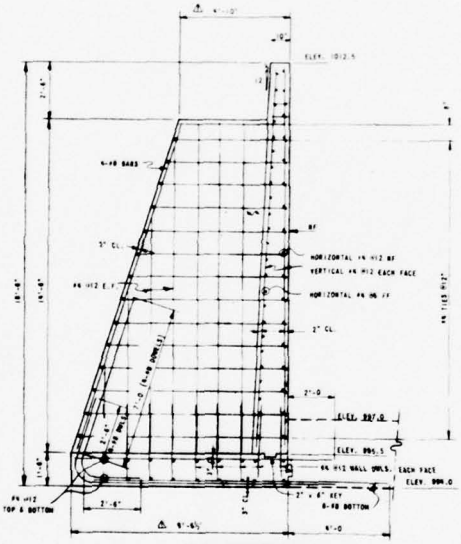
DETAIL X - PLAN
COUNTERFORT
FOUNDATION

SCALE 3/8" = 1'-0



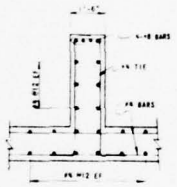
ELEVATION - NORTH TRAINING WALL

SCALE 1/4" = 1'-0"



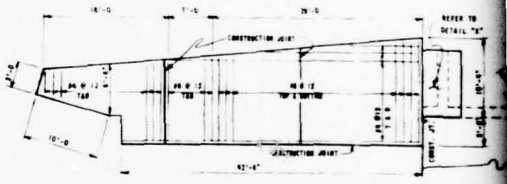
COUNTERFORT
SECTION B-B

SCALE 3/8" = 1'-0"



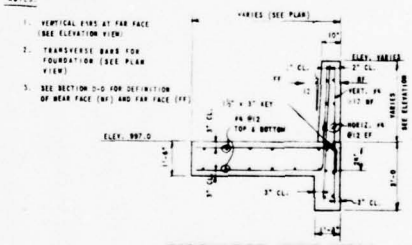
SECTION C-C

SCALE 3/8" = 1'-0



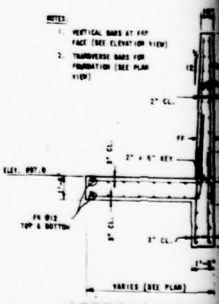
PLAN - NORTH TRAINING WALL FOUNDATI

SCALE 1/8" = 1'-0"



DISCHARGE WING WALL
SECTION J-J (TYP.)

SCALE 3/8" = 1'-0



APPROACH WING
SECTION K-K

SCALE 1/4" = 1'-0

REFERENCE DRAWINGS	APPROVED	DATE
	BOARD OF COUNTY COMMISSIONERS	
	CHAIRMAN	
	RECREATION AND PARKS BOARD	
	CHAIRMAN	
	SECRETARY	

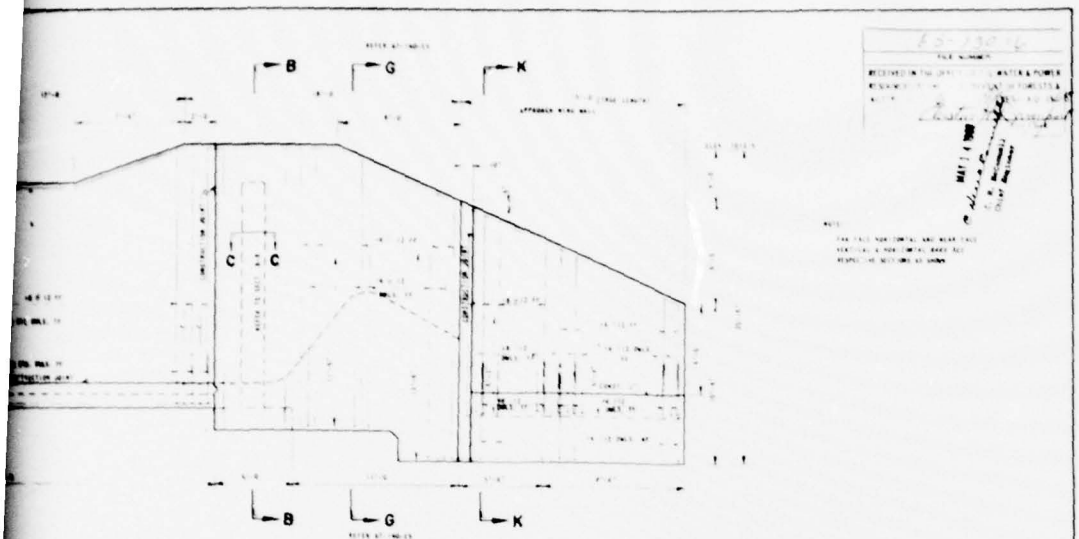
COUNTY OF WESTMORELAND, PENNSYLVANIA

RECREATION AND PARKS COMMISSIO

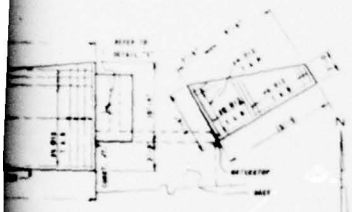
MAMMOTH PARK LAKE

MOUNT PLEASANT TOWNSHIP

ENLARGEMENT OF LAKE AND RELATED IMPROVEMENTS

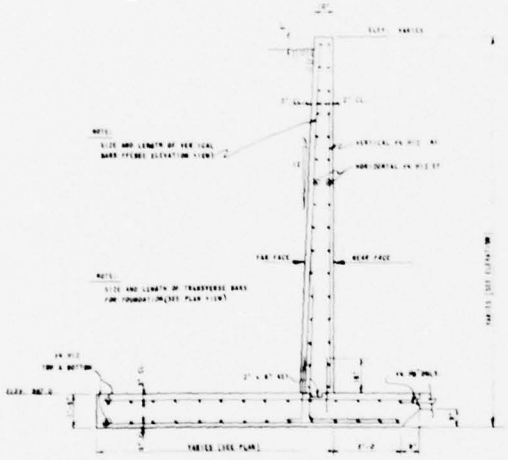


TRAINING WALL



WALL FOUNDATION

APPROACH WING WALL
SECTION K-K (TYP.)



SECTION D-D
(TYP)

, PENNSYLVANIA KS COMMISSION RK LAKE TOWNSHIP LATED IMPROVEMENTS	B-P ENGINEERS GREENSBURG, PENNSYLVANIA DRAWN BY CHECKED BY APPROVED BY SCALE DRAWING NO.	GENERAL ANALYTICS, INC. MONROEVILLE, PENNSYLVANIA RELEASED FOR CONSTRUCTION REVISION DATE	NEW SPILLWAY AND STILLING BASIN - REINFORCEMENT DETAILS DRAWN BY RLN CHECKED BY JWS APPROVED BY REK SCALE 67-140-E8

PLATE 10

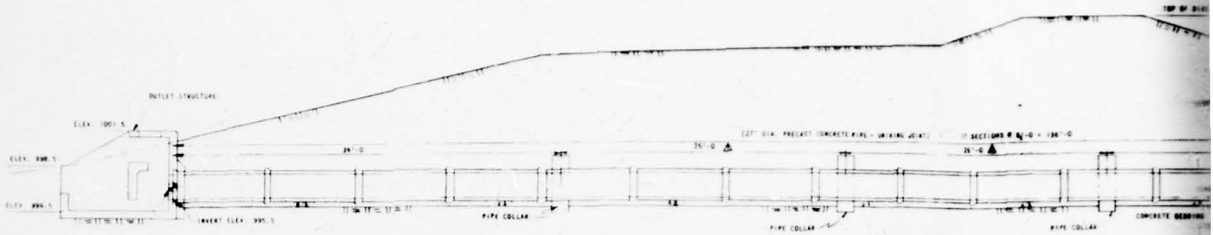
DTIC

DRAWN BY	ACS	CHECKED BY	BE	7-24-79	DRAWING NUMBER 78-67-B170
	5-22-79	APPROVED BY	JMD	7/26/79	

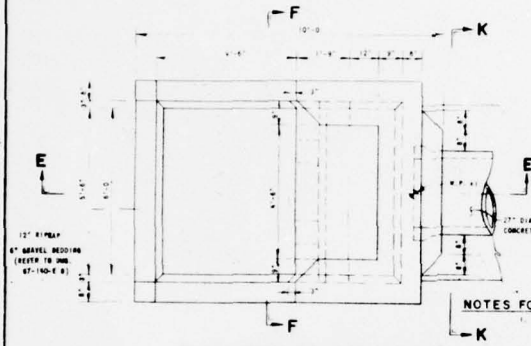
67-140-E7

NOTES.

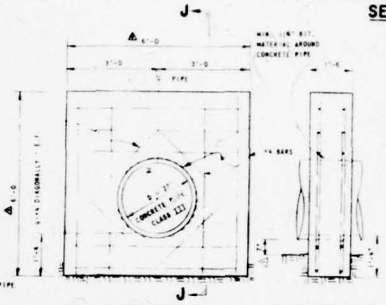
1. FOR PLAN LOCATION OF SECTION [illegible] SEE DWG. 67-140-E8
2. FOR GENERAL PLAN LOCATION OF DRAINAGE SYSTEM SEE DWG. 67-140-E2
3. EMBANKMENT SECTIONS ARE SHOWN ON DWGS. 67-140-E3 AND 67-140-E4



PROFILE ALONG DRAINAGE CONDUIT CENTERLINE
SECTION I-I (SEE PLAN 67-140-E8)
SCALE 3/16" = 1'-0



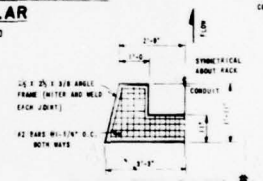
PLAN-OUTLET STRUCTURE
SCALE 1/2" = 1'-0



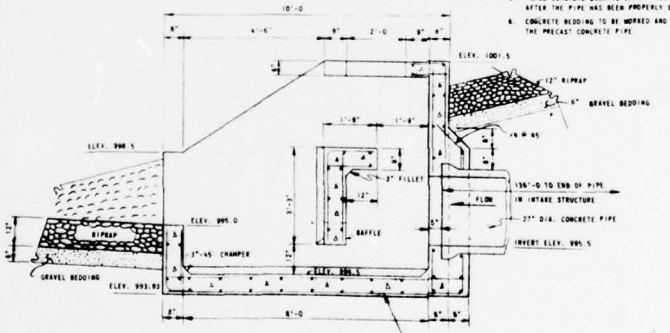
ELEVATION (TYP) SECTION J-J
PIPE COLLAR
SCALE 1/2" = 1'-0

NOTES FOR DRAINAGE SYSTEM:

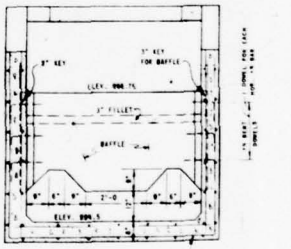
1. ALL CONCRETE FOR INTAKE AND OUTLET STRUCTURES TO HAVE #4 DEFORMED BAR REINFORCEMENT PLACED AT 12" CENTERS, EACH FACE, AS SHOWN AND UNLESS OTHERWISE NOTED.
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 1" CHAMFER UNLESS OTHERWISE NOTED.
3. PROVIDE 6-#4 BARS PLACED DIAGONALLY AT 45° AROUND THE PIPE COLLARS AND THE OPENINGS IN THE INTAKE AND OUTLET STRUCTURES.
4. CONCRETE COLLARS TO BE CONSTRUCTED PRIOR TO PLACEMENT OF CONCRETE BEDDING.
5. PLACE CONCRETE BEDDING UNDER PRECAST CONCRETE PIPE AFTER THE PIPE HAS BEEN PROPERLY SET AND ALIGNED.
6. CONCRETE BEDDING TO BE WORKED AND VIBRATED UNDER THE PRECAST CONCRETE PIPE.



PLAN-FISH RACK #1
SCALE 1/2" = 1'-0



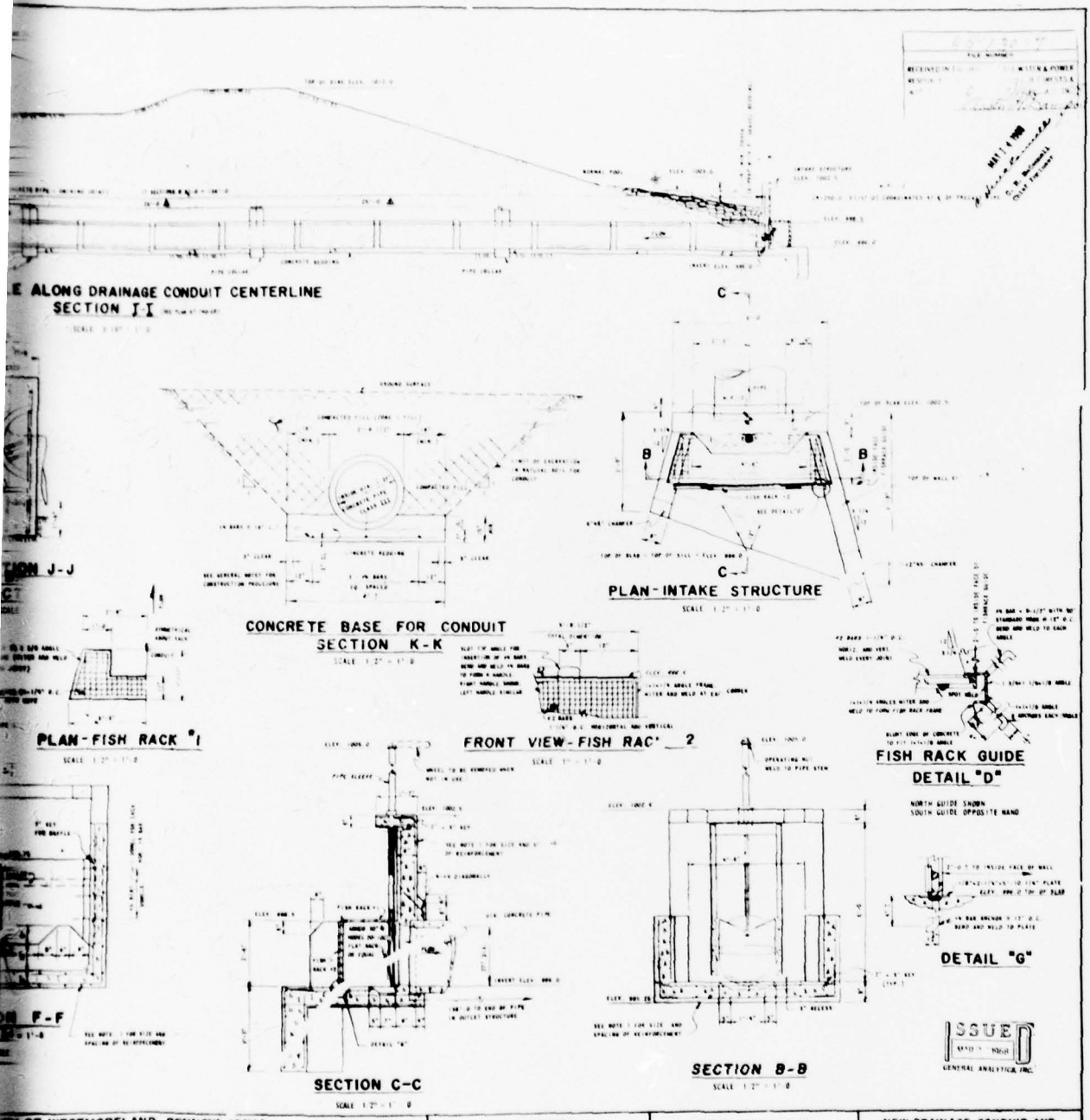
SECTION E-E
SCALE 1/2" = 1'-0



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

REFERENCE DRAWINGS	APPROVED	DATE
	BOARD OF COUNTY COMMISSIONERS	
	CHAIRMAN	
	RECREATION AND PARKS COMMISSION	
	CHAIRMAN	
	SECRETARY	

COUNTY OF WESTMORELAND, PENNSYLVANIA
RECREATION AND PARKS COMMISSION
MAMMOTH PARK LAKE
MOUNT PLEASANT TOWNSHIP
ENLARGEMENT OF LAKE AND RELATED IMPROVEMENTS

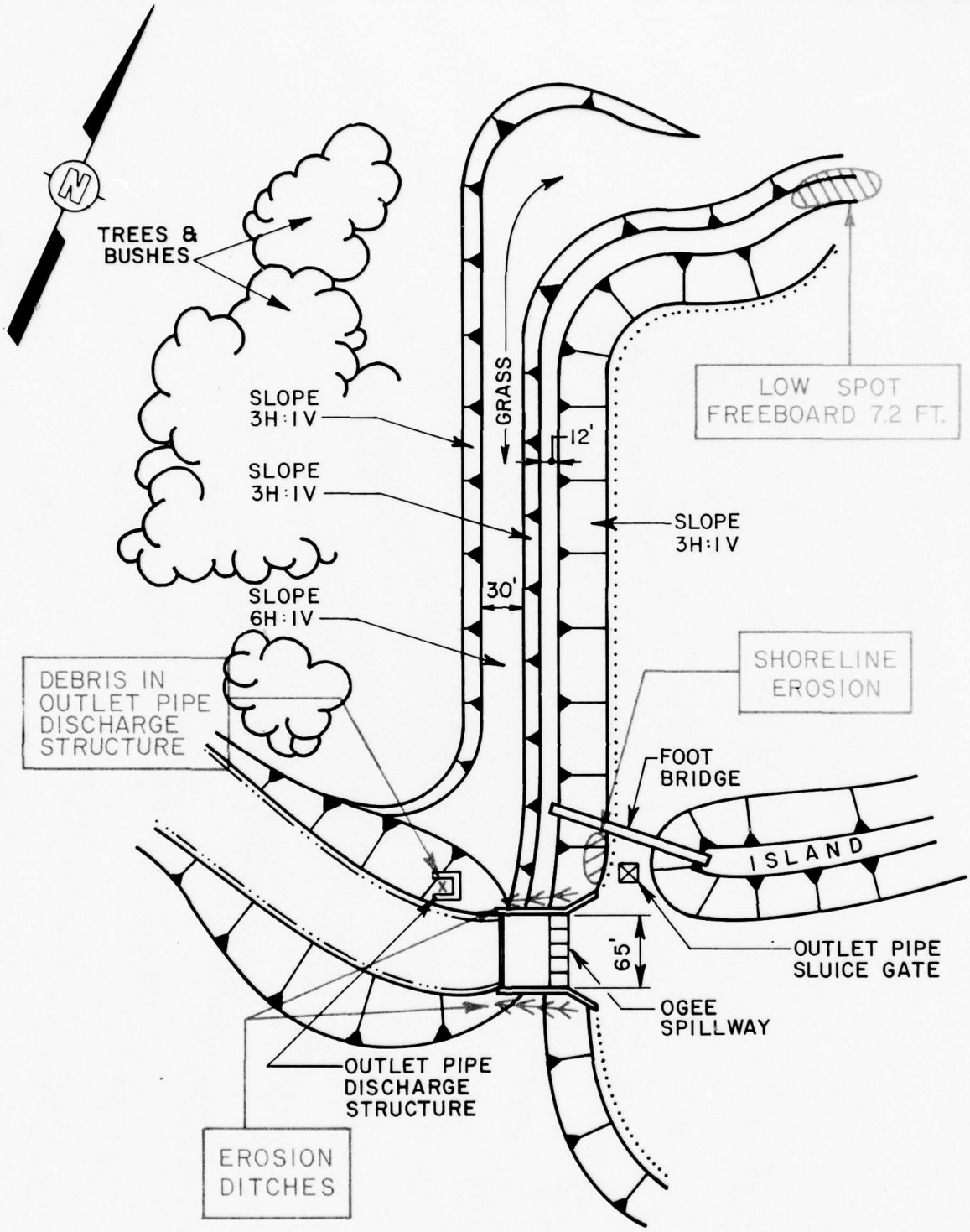


TY OF WESTMORELAND, PENNSY VANIA TION AND PARKS COMMISSION MAMMOTH PARK LAKE MOUNT PLEASANT TOWNSHIP MENT OF LAKE AND RELATED IMPROVEMENTS	B-P ENGINEERS GREENSBURG, PENNSYLVANIA	GENERAL ANALYTICS, INC MONROEVILLE PENNSYLVANIA	NEW DRAINAGE CONDUIT AND APPURTENANT STRUCTURES - PLAN, SECTIONS AND DETAILS DRAWN BY RGN 1/25/80 SCALE CHECKED BY JWS 2-22-80 DRAWING NO. APPROVED BY REK 3-4-80 67-140-E7

PLATE 11

DTIC AVAILABILITY NOTICE

DRAWN BY	MBM	CHECKED BY	BE	DRAWING NUMBER	67-A36
	5-22-79	APPROVED BY	JHD		



NOTES

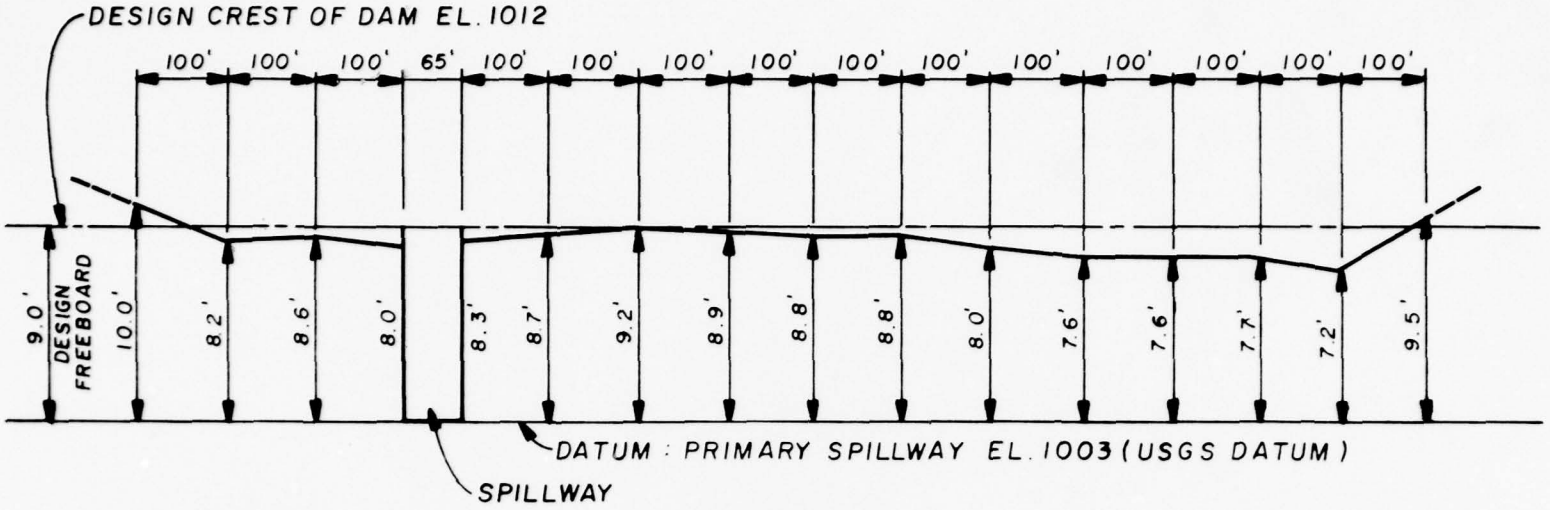
1. POOL LEVEL DATE OF INSPECTION: 0.2 FEET ABOVE SPILLWAY CREST
2. SPILLWAY FREEBOARD (MIN.) : 7.2 FEET

PLATE 12

MAMMOTH LAKE DAM
GENERAL PLAN
FIELD INSPECTION NOTES
FIELD INSPECTION DATE: APR 9, 79

D'APPOLONIA

DRAWN BY	ACS	CHECKED BY	BE	7-30-79	DRAWING NUMBER 78-367-A45
	6-28-79	APPROVED BY	JHP	7/24/79	



DAM CREST PROFILE

(LOOKING DOWNSTREAM)

NOTE:

DAM CREST IS SURVEYED RELATIVE TO THE SPILLWAY CREST LEVEL.

PLATE 13

MAMMOTH LAKE DAM
DAM CREST SURVEY
FIELD INSPECTION DATE: APRIL 9, 1979

CALIFORNIA

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

NAME OF DAM Mammoth Lake COUNTY Westmoreland STATE Pennsylvania ID# NDI I.D. PA-466 DER I.D. 65-130

TYPE OF DAM Earth HAZARD CATEGORY Significant

DATE(S) INSPECTION April 9, 1979 WEATHER Rainy TEMPERATURE 50s

POOL ELEVATION AT TIME OF INSPECTION 1003.2 M.S.L. TAILWATER AT TIME OF INSPECTION 996± M.S.L.

INSPECTION PERSONNEL:	REVIEW INSPECTION PERSONNEL: (May 25, 1979)
Bilgin Erel	L. D. Andersen
Wah-Tak Chan	J. H. Poellot
	B. Erel

Bilgin Erel RECORDER

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.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Toe erosion ditches are located on each side of the spillway structure.	The erosion ditches should be filled.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	The crest of the dam is generally below the design crest elevation. A low spot, which is about 1.8 feet below the design elevation, was found near the right abutment.	
RIPRAP FAILURES	There is no riprap on the upstream side of the dam.	

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	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	The outlet conduit was not accessible for inspection. Only the downstream end was visible. No distress was observed.	
INTAKE STRUCTURE	Submerged, not visible.	
OUTLET STRUCTURE	The structure is filled with rocks and debris, apparently placed by vandals.	The rocks and debris should be removed.
OUTLET CHANNEL	The outlet structure would directly discharge into the natural stream channel.	
EMERGENCY GATE	Accessible by boat only.	

VISUAL INSPECTION
PHASE I
UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	In good condition.	
APPROACH CHANNEL	Lake. Free of debris.	
DISCHARGE CHANNEL	Trapezoidal earth channel. No significant erosion was noted.	
BRIDGE AND PIERS	None.	

VISUAL INSPECTION
PHASE I
GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not applicable.	
APPROACH CHANNEL	Not applicable.	
DISCHARGE CHANNEL	Not applicable.	
BRIDGE PIERS	Not applicable.	
GATES AND OPERATION EQUIPMENT	Not applicable.	

VISUAL INSPECTION
PHASE I
INSTRUMENTATION

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

VISUAL INSPECTION
PHASE I
RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Gentle. No significant shoreline erosion.	
SEDIMENTATION	Unknown.	
UPSTREAM RESERVOIRS	None.	

VISUAL INSPECTION
PHASE I
DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	There are no obstructions that would affect the discharge capacity of the spillway.	
SLOPES	No apparent instability.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	Approximately five homes are likely to be affected. However, loss of life is not anticipated. Population: approximately 20.	

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 Mammoth Lake Dam

ID# NDI I.D. PA-466
DER I.D. 65-130

ITEM	REMARKS
AS-BUILT DRAWINGS	The drawings are available in the state files.
REGIONAL VICINITY MAP	See Plate 1.
CONSTRUCTION HISTORY	The dam was designed by General Analytics, Inc., Consulting Engineers, of Monroeville, Pennsylvania, in 1968. It was constructed by a local contractor with completion in 1969.
TYPICAL SECTIONS OF DAM	See Plate 3.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See Plate 11.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	Not recorded.
DESIGN REPORTS	Prepared by General Analytics, Inc., Consulting Engineers, of Monroeville, Pennsylvania.
GEOLOGY REPORTS	Not available.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	The results of hydrology and hydraulic analyses are reported in a state report dated April 1, 1968.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	See Plate 5 for boring logs and Plates 6 through 8 for subsurface profiles.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	None reported.
BORROW SOURCES	Lake area.
MONITORING SYSTEMS	None.
MODIFICATIONS	None.
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 recorded.
SPILLWAY PLAN SECTIONS DETAILS	See Plates 9 and 10.
OPERATING EQUIPMENT PLANS AND DETAILS	See Plate 11.

CHECKLIST
ENGINEERING DATA
HYDROLOGIC AND HYDRAULIC

DRAINAGE AREA CHARACTERISTICS: 8.5 square miles (pasturelands)

ELEVATION; TOP NORMAL POOL AND STORAGE CAPACITY: 1003 (129 acre-feet)

ELEVATION; TOP FLOOD CONTROL POOL AND STORAGE CAPACITY: 1012 (396 acre-feet)

ELEVATION; MAXIMUM DESIGN POOL: 1012

ELEVATION; TOP DAM: 1010.2 (measured low spot)

SPILLWAY:

a. Elevation 1003

b. Type ogee overflow section

c. Width 65 feet (perpendicular to flow direction)

d. Length Not applicable

e. Location Spillover Adjacent to right abutment

f. Number and Type of Gates None

OUTLET WORKS:

a. Type 27-inch reinforced concrete conduit

b. Location Adjacent to the spillway

c. Entrance Inverts 996

d. Exit Inverts 995.5

e. Emergency Draindown Facilities 27-inch pipe

HYDROMETEOROLOGICAL GAGES:

a. Type None

b. Location None

c. Records None

MAXIMUM NONDAMAGING DISCHARGE: Spillway discharge capacity (4700± cfs)

APPENDIX C

PHOTOGRAPHS

LIST OF PHOTOGRAPHS
MAMMOTH LAKE DAM
NDI I.D. NO. PA-466
APRIL 9, 1979

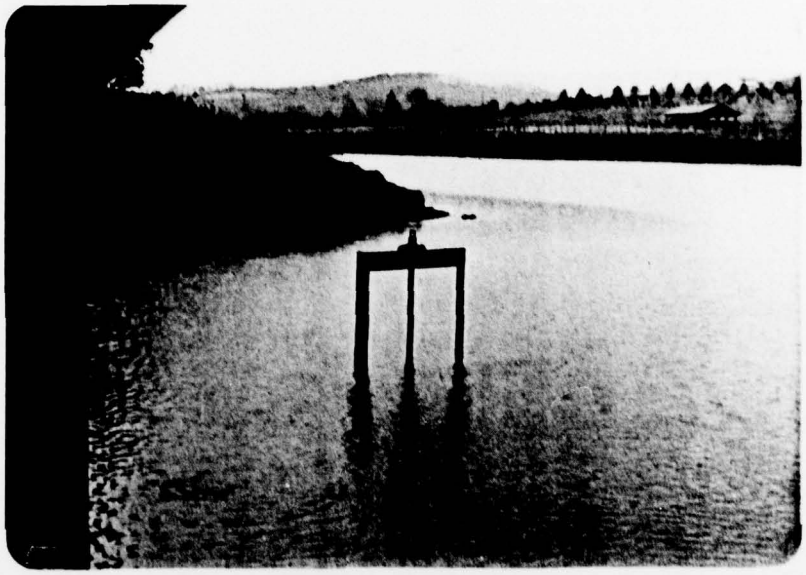
PHOTOGRAPH NO.	DESCRIPTION
1	Crest looking north.
2	Spillway. Outlet works discharge structure left of center.
3	Outlet pipe gate stem.
4	Outlet pipe discharge structure. Note debris blocking the structure.
5	Shoreline erosion right of spillway.
6	Erosion on crest (adjacent to spillway structure only).

Photograph No. 1

Crest looking north.

Photograph No. 2

Spillway. Outlet works discharge structure left of center.

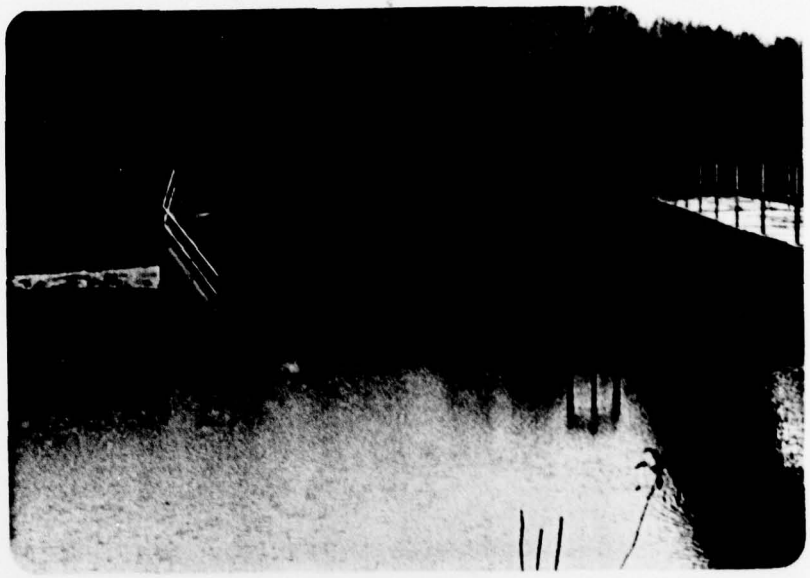


Photograph No. 3

Outlet pipe gate stem.

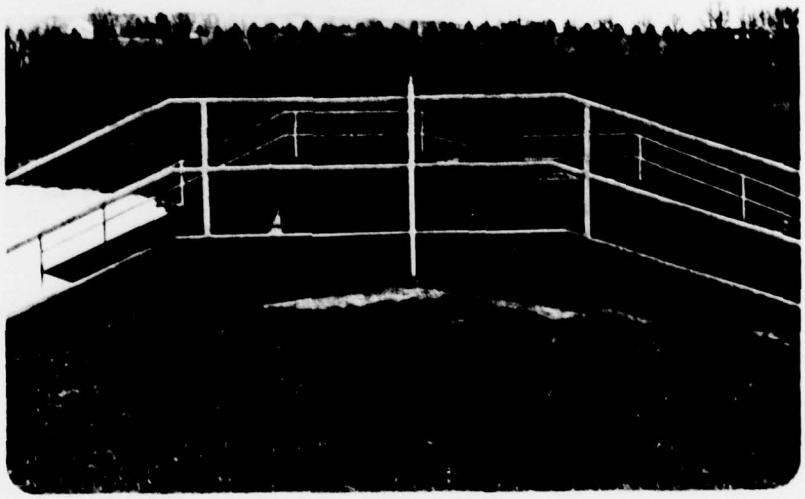
Photograph No. 4

Outlet pipe discharge structure. Note debris blocking the structure.



Photograph No. 5

Shoreline erosion right of spillway.



Photograph No. 6

Erosion on crest (adjacent to spillway structure only).

APPENDIX D
CALCULATIONS

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: Mammoth Lake Dam (NDI I.D. PA-466)

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

STATION	1	2	3	4	5
Station Description	Lake	Dam			
Drainage Area (square miles)	8.5	-			
Cumulative Drainage Area (square miles)	8.5	8.5			
Adjustment of PMF for Drainage Area (%)[2]					
6 Hours	102	-			
12 Hours	120	-			
24 Hours	130	-			
48 Hours	140	-			
72 Hours	-	-			
Snyder Hydrograph Parameters					
Zone[3]	25	-			
C_p/C_t[4]	0.40/1.0	-			
L (miles)[5]	4.8	-			
L_{ca} (miles)[5]	2.2	-			
$t_p = C_t(L \cdot L_{ca})^{0.3}$ (hours)	2.0	-			
Spillway Data					
Crest Length (ft)	-	65			
Freeboard (ft)	-	7.2			
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.

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********
    1                 A1    .  SNYDER UNIT HYDROGRAPH,FLOOD ROUTING   DAM OVERTOPPING ANALYSES
    2                 A2       MAMMOTH LAKE DAM,WESTMORELAND COUNTY,NDI-I.D.PA.466 PROJECT NO.78-367-17
    3                 A3       FOR 20%,30%,40%,50%,60%,70%,80%,90%,AND 100% PMF
    4                 B     300         0        10         0         0         0         0         0        -4         0
    5                 B1      5
    6                 J       1         9         1
    7                 J1   0.20      0.30      0.40      0.50      0.60      0.70      0.80      0.90      1.00
    8                 K       0         1                                                 1
    9                 K1       CALCULATION OF SNYDER INFLOW HYDROGRAPH TO MAMMOTH LAKE (NDI-I.D.PA.466)
   10                 M       1         1       8.5                 8.5                                       1
   11                 P                24.0       102       120       130       140
   12                 I                                                                 1.0       .05                 0.005
   13                 W    2.03      0.40
   14                 X     1.0     -0.05       2.0
   15                 K       1         2                                                 1
   16                 K1       ROUTING FLOW THROUGH MAMMOTH LAKE DAM (NDI-I.D.PA.466)
   17                 Y                                    1         1
   18                 Y1      1                                                    129.2
   19                 SS    0.0       3.1      11.7      27.2      49.1     129.2     395.7     672.6
   20                 SE  996.0     997.0     998.0     999.0    1000.0    1003.0    1012.0    1020.0
   21                 SS 1003.0      65.0      3.80       1.5
   22                 SD1  10.2      3.08       1.5    1400.0
   23                 SL  100.0     300.0     400.0     550.0     700.0     900.0    1200.0    1300.0    1350.0    1400.0
   24                 SV1  10.2    1010.6    1010.7    1011.0    1011.2    1011.6    1011.8    1012.2    1012.5    1013.0
   25                 K      99
```

COMPUTER INPUT OVERTOPPING ANALYSIS

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 .20	RATIO 2 .30	RATIO 3 .40	RATIO 4 .50	RATIO 5 .60	RATIO 6 .70	RATIO 7 .80	RATIO 8 .90	RATIO 9 1.00
HYDROGRAPH AT	1	8.50	1	3135.	4703.	6270.	7838.	9406.	10973.	12541.	14108.	15676.
		(22.01)		(88.78)(	133.17)(	177.56)(	221.95)(	266.34)(	310.73)(	355.12)(	399.50)(	443.89)
ROUTED TO	2	8.50	1	3062.	4615.	6249.	7832.	9403.	10971.	12539.	14107.	15674.
		(22.01)		(86.72)(	130.68)(	176.95)(	221.77)(	266.28)(	310.67)(	355.07)(	399.46)(	443.85)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1003.00	1003.00	1010.20
STORAGE	129.	129.	342.
OUTFLOW	0.	0.	4772.

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
.20	1008.36	0.00	288.	3162.	0.00	42.33	0.00
.30	1010.04	0.00	339.	4615.	0.00	42.33	0.00
.40	1 11.02	.82	367.	6249.	3.33	41.83	0.00
.50	1 11.48	1.28	380.	7832.	4.67	41.83	0.00
.60	1 11.81	1.61	390.	9403.	5.83	41.83	0.00
.70	1 12.06	1.86	398.	10971.	7.00	41.83	0.00
.80	1 12.29	2.09	406.	12539.	7.83	41.83	0.00
.90	1 12.49	2.29	413.	14107.	8.67	41.83	0.00
1.00	1 12.67	2.47	419.	15674.	9.50	41.83	0.00

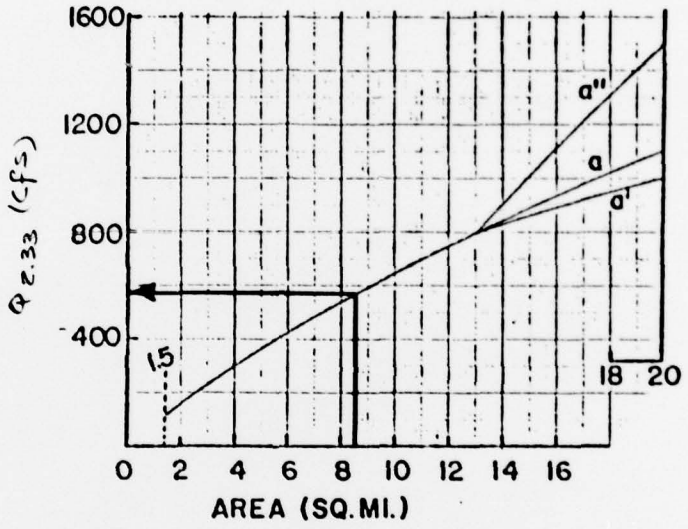
OVERTOPPING ANALYSIS SUMMARY

D'APPOLONIA
CONSULTING ENGINEERS, INC

By BE Date 7/24/79 Subject MAMMOTH LAKE DAM Sheet No. 1 of 1
Chkd. By WTC Date 7/25/79 HYDROLOGY & HYDRAULICS Proj. No. 79-367-17

100-YEAR FLOOD ACCORDING TO PSU. NO III METHOD.

APPALACHIAN PLATEAU



DRAINAGE AREA : 8.5 SQ. MILES.

$Q_{2.33} \approx 600$ CFS

$Q_{100} = Q_{2.33} \times 3.5$

$Q_{100} = \underline{2100 \text{ CFS}}$

DAMPOLONIA
CONSULTING ENGINEERS, INC

By EE Date 8/7/79 Subject MAMMOTH LAKE DAM Sheet No 1 of 1
Chkd. By [illegible] Date [illegible] STORAGE VS ELEVATION Proj. No 78-267-7

STORAGE VS ELEVATION

	ELEV	Δ ELEV.	AREA (1) ACRES	ΔV (2) AC-FT	ΣV AC-FT
	996		1.8		0
		1		3.1	
	997		4.6		3.1
		1		8.9	
	998		13.2		11.7
		1		15.5	
	999		17.7		27.2
		1		21.9	
	1000		26.4		49.1
		3		80.1	
SPILLWAY	1003		27.0		129.2
		9		266.5	
T/ DAM	1012		32.3		395.7
		8		277.0	
	1020		37.0		672.6

(1) APPROXIMATE MEASUREMENTS FROM A DESIGN DRAWING AND U.S.G.S MAP

(2) $V = \frac{H}{3}\left(A_1 + A_2 + \sqrt{A_1 A_2}\right)$

APPENDIX E

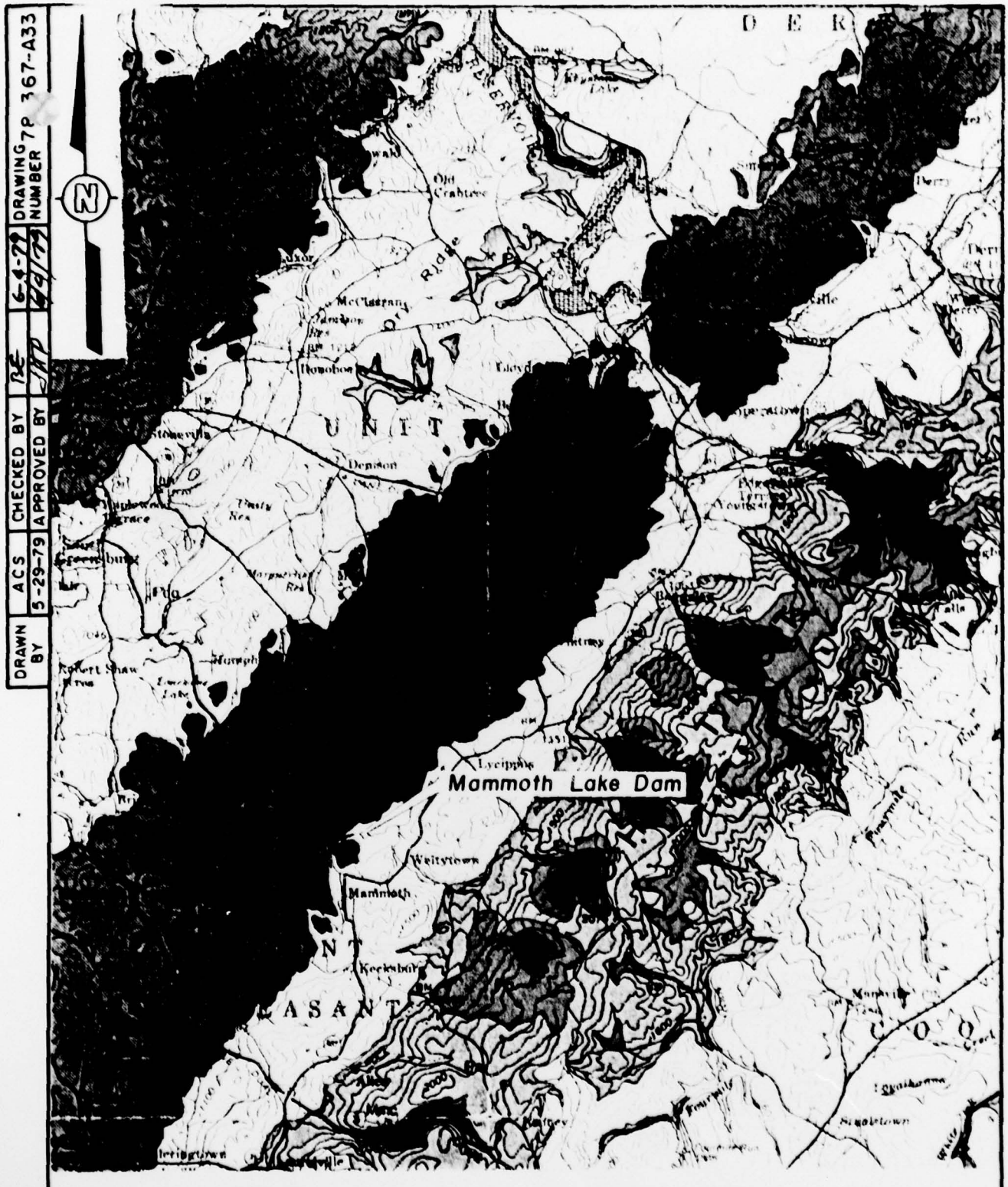
REGIONAL GEOLOGY

APPENDIX E
REGIONAL GEOLOGY

Mammoth Lake Dam is located on strata of the Conemaugh Group of the Pennsylvanian System. Strata at the site are from the upper division of the Conemaugh, known as the Casselman Formation, which contains sandstone, siltstone, shale, and claystone units. A few thin coal seams may also occur locally in the Casselman.

The major coal seam in the area, the Pittsburgh coal, has been strip mined and deep mined in the area. Structure contours indicate that the coal outcrops near the crest elevation of the dam and dips to the west at about 250 feet per mile. During the enlargement of the reservoir, an old mine heading was encountered which necessitated alteration of the north shoreline. This old heading was probably in the Pittsburgh coal, which substantiates the belief that the coal lies near Elevation 1012, the crest elevation of the dam.

The Upper Freeport coal lies several hundred feet beneath the site and probably has not been mined to date.



MAMMOTH LAKE 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 1:125000

DAPPOLONIA

DRAWN BY	ACS	CHECKED BY	BE	DRAWING NUMBER	7 867-A22
	2-5-79	APPROVED BY	[illegible]		2 of 2

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.
DUNKARD	Washington	Pw	Cyclic sequences of sandstone, shale, limestone, and coal; contains Washington coal bed at base.
DUNKARD	Waynesburg		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? CONEMAUGH	Casselman	Pcc	Cyclic sequence of sandstone, shale, red beds and thin limestone and coal.
P? CONEMAUGH	Ames		
P? CONEMAUGH	Glenshaw	Pcg	Cyclic sequences of sandstone, shale, red beds and thin limestone and coal; several fossiliferous limestone; Ames limestone bed at top.
ALLEGHENY	Vanport	Pa	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.

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 1:125000

PENNSYLVANIA