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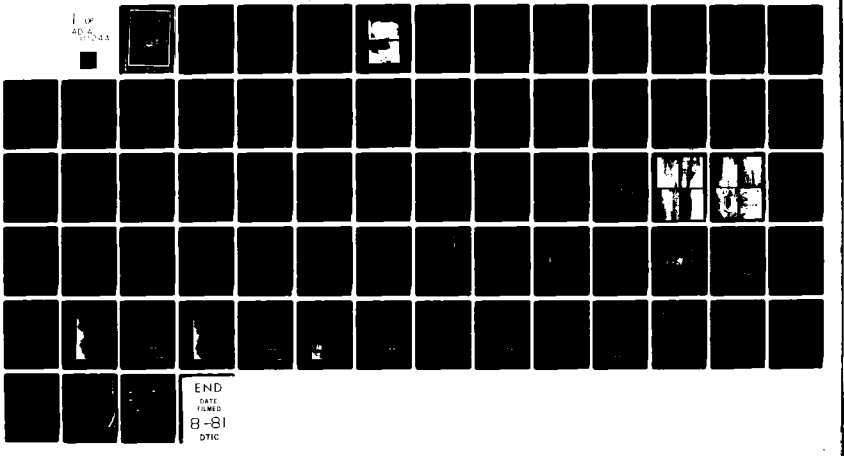

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SUSQUEHANNA RIVER BASIN
THOMAS CREEK, SUSQUEHANNA COUNTY

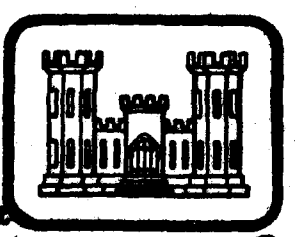
PENNSYLVANIA

LEVEL II

(1) National Dam Inspection Program.
PA-RC & D-105 DAM
(NDI I.D. PA-Ø979,
DER I.D. 058-138), Susquehanna River
~~OWNER: SUSQUEHANNA COUNTY COMMISSIONERS~~
Basin, Thomas Creek, Susquehanna County,
Pennsylvania. PHASE I INSPECTION REPORT,
NATIONAL DAM INSPECTION PROGRAM

(10) Lawrence D. Andersen

(11) 1981
(12) 71



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PREPARED FOR (15) DACW31-81-C-ØØ14

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

BY

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

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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 investigations 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.

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

NAME OF DAM: PA-RC&D-105 Dam
STATE LOCATED: Pennsylvania
COUNTY LOCATED: Susquehanna
STREAM: Thomas Creek, a secondary tributary of the Susquehanna River
SIZE CLASSIFICATION: Small
HAZARD CLASSIFICATION: High
OWNER: Susquehanna County Commissioners
DATE OF INSPECTION: November 13, 1980 and February 5, 1981

ASSESSMENT: Based on the evaluation of the existing conditions, the condition of PA-RC&D-105 Dam is considered to be good.

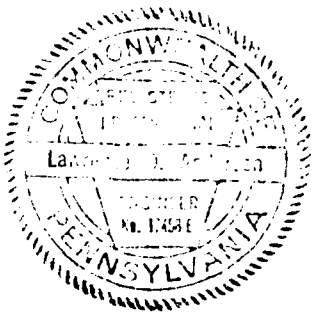
The flood discharge capacity was evaluated according to the recommended criteria and was found to pass full PMF without overtopping the embankment. Therefore, the spillway capacity is rated to be adequate.

The following recommendations should be implemented on a continuing basis.

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

2. The dam and appurtenant structures should continue to be inspected regularly and necessary maintenance performed.

Assessment - PA-RC&D-105 Dam



Lawrence D. Anderson, P.E.
Vice President

June 1, 1981
Date

Approved by:

JAMES W. PECK
Colonel, Corps of Engineers
Commander and District Engineer

1 Jun 1981
Date:

PA-RC&D-105 DAM
NDI I.D. PA-0979
DER I.D. 058-138
NOVEMBER 13, 1980

Upstream Face

Downstream Face

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PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
PA-RC&D-105 DAM
NDI I.D. PA-0979
DER I.D. 058-138

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. PA-RC&D-105 Dam is a part of the Springville Flood Prevention Project. The dam consists of an earth embankment approximately 200 feet long with a maximum height of 24 feet from the downstream toe and a crest width of 12 feet. Both the upstream and downstream slopes of the dam are covered with grass and have slopes of 3H:1V with a 12-foot berm on the upstream slope near normal pool level.

The flood discharge facilities of the dam consist of a drop inlet primary spillway located near the center of the embankment and an emergency spillway located on the right abutment. The primary spillway is a drop inlet structure consisting of a two-stage reinforced concrete riser and a 30-inch-diameter reinforced concrete conduit, terminating at a reinforced concrete impact basin energy dissipating structure at the downstream toe of the dam. The outlet pipe is supported on a concrete cradle equipped with five antiseepage collars spaced at 20-foot intervals along the upstream two-thirds of the pipe. The emergency spillway is a grass-lined trapezoidal channel with a base width of 60 feet. A 30-foot-wide level section extending across the emergency spillway channel constitutes the overflow section.

b. Location. PA-RC&D-105 Dam is located across Thomas Creek approximately one-quarter mile upstream from Springville, in Springville Township, Susquehanna County, Pennsylvania (N41° 42.1', W75° 55.5'). Plate 1 illustrates the location of the dam.

c. Size Classification. Small (based on 24-foot height and 342 acre-feet maximum storage capacity).

d. Hazard Classification. The dam is classified to be in the high hazard category. Below the dam, Thomas Creek flows under a highway (LR57012) approximately 1,000 feet downstream from the dam and shortly thereafter flows through the urban residential area of Springville. It is estimated that failure of the dam under maximum pool level would cause loss of more than a few lives and property damage in the downstream residential areas.

e. Ownership. Susquehanna County Commissioners (address: Mr. James Adams, Chairman, Susquehanna County Commissioners, Court House, Montrose, Pennsylvania 18801).

f. Purpose of Dam. Flood control.

g. Design and Construction History. The dam was designed by the U.S. Department of Agriculture, Soil Conservation Service, during 1974. Construction of the dam was completed in 1978.

h. Normal Operating Procedure. The reservoir is normally maintained at Elevation 1254.9, the crest level of a two-foot-high and one-foot-wide orifice on the upstream face of the drop inlet structure. The crest level of the primary spillway is at Elevation 1260.6. The crest of the emergency spillway is at Elevation 1260.8. Depending on the rate of inflow, the flood would be discharged through the orifice in combination with the primary and emergency spillways.

1.3 Pertinent Data

a. Drainage Area	0.6 square mile
b. Discharge at Dam Site (cfs)	
Maximum known flood at dam site	Unknown
Outlet conduit at maximum pool	118
Gated spillway capacity at maximum pool	Not applicable
Ungated spillway capacity at maximum pool	3580
Total spillway capacity at maximum pool	3580
c. Elevation (USGS Datum) (feet)	
Top of dam	1267.2 (as measured) 1266.8 (as designed)
Maximum pool	1266.8
Normal pool	1254.9
Upstream invert outlet works	1249.1
Downstream invert outlet works	1242.9
Streambed at center line of dam	1243±
Maximum tailwater	Unknown
d. Reservoir Length (feet)	
Normal pool level	1400±
Maximum pool level	1500±

e. Storage (acre-feet)

Normal pool level	50 (estimated)
Maximum pool level	342

f. Reservoir Surface (acres)

Normal pool level	16±
Maximum pool level	30±

g. Dam

Type	Earth
Length	200 feet
Height	24 feet
Top width	12 feet
Side slopes	Downstream: 3H:1V Upstream: 3H:1V
Zoning	No
Impervious core	No
Cutoff	Yes
Grout curtain	No

h. Regulating Outlet

Type	18-inch reinforced concrete pipe
Length	20 feet to drop inlet
Closure	Sluice gate at drop inlet structure
Access	Drop inlet structure
Regulating facilities	Sluice gate

i. Spillway

	Primary:(1)	Emergency:
Type	Drop inlet	Trapezoidal earth channel
Width	15 feet	60 feet
Crest elevation	1260.6	1260.8
Gates	None	None
Upstream channel	Lake	Trapezoidal earth channel
Downstream channel	30-inch outlet reinforced concrete conduit	Trapezoidal earth channel

(1) Normal pool is maintained at the crest level of a two-foot-wide and one-foot-high orifice on the drop inlet at Elevation 1254.9.

SECTION 2
DESIGN DATA

2.1 Design

a. Data Available. The available information was provided by the Pennsylvania Department of Environmental Resources (PennDER), and includes design drawings, reports, and correspondence.

(1) Hydrology and Hydraulics. The available information consists of principal, freeboard, and emergency spillway inflow hydrographs and the results of associated flood routings.

(2) Embankment. The available information consists of design drawings, geology and soils reports, laboratory soils test results, and the results of slope stability and seepage analyses.

(3) Appurtenant Structures. The available information includes design drawings.

b. Design Features

(1) Embankment. Plates 2 and 3 illustrate the plan of the embankment and the appurtenant structures. As shown in Plate 4, the dam consists of a homogeneous earth embankment with a trench drain located beneath the downstream slope.

The dam was designed to have a 3:1 (horizontal to vertical) slope downstream and upstream. A 12-foot-wide berm on the upstream slope is located at approximately the midheight of the dam.

The subsurface investigation conducted for the dam consisted of numerous borings and test pits. The locations of these borings are shown in Plate 3. Plate 5 shows the typical subsurface profile. The typical subsurface profile consists of 20 feet of medium stiff to hard sandy clayey silts on the valley sides and about 15 feet of loose to dense sand and gravel and clayey sands in the valley bottom. The rock beneath the site includes siltstone and sandstones. In the valley bottom, sandstone was encountered to a depth of approximately 15 feet. It is reported that the permeability of the sandy clayey silt was found to be low, ranging from 0.1 to 0.9 foot per day (4×10^{-5} cm/sec to 3×10^{-4} cm/sec). These permeabilities were measured at depths ranging from 4 to 22 feet. Details of the downstream slope trench drain are included in Plate 6.

(2) Appurtenant Structures. The appurtenant structures of the dam consist of a drop inlet primary spillway and an emergency spillway. The primary spillway structures include a two-stage reinforced concrete riser and a 30-inch-diameter reinforced concrete conduit through the embankment terminating at a reinforced concrete impact basin at the downstream toe of the dam (Plates 7, 8, and 9). An 18-inch reinforced concrete pipe

from the upstream toe of the dam, discharging into the drop inlet structure, constitutes the reservoir outlet facilities. Flow through the reservoir outlet pipe is controlled by a sluice gate located in the drop inlet structure. The outlet conduit is supported on a continuous concrete cradle with five reinforced concrete cutoff collars.

The emergency spillway is a trapezoidal earth channel excavated into the right abutment (Plate 2). The bottom width of the trapezoidal channel is 60 feet with side slopes of 3H:1V. A 30-foot-wide level section located at Elevation 1206.8 constitutes the control section of the spillway.

c. Design Data

(1) Hydrology and Hydraulics. Available information indicates that the emergency spillway was designed to pass a freeboard hydrograph with a peak of 4647 cfs, corresponding to 24.3 inches of precipitation in six hours without overtopping the embankment. This hydrograph was routed through the reservoir starting at normal pool (Elevation 1254.9), producing a maximum pool level at Elevation 1266.8 with a peak emergency spillway outflow of 2719 cfs. The top of the dam was established at Elevation 1266.8.

(2) Embankment. Available information indicates that the design of the embankment was based on the evaluation of site geology, subsurface conditions, and laboratory index and strength tests.

(3) Appurtenant Structures. The available information indicates that the appurtenant structures were standard Soil Conservation Service (SCS) designs.

2.2 Construction. As-built drawings and construction progress reports were available for review. To the extent that can be determined, the construction of the dam was in conformance with SCS specifications. No unusual construction difficulties were reported. The dam was constructed under the supervision of an SCS field representative. It is reported that the earthwork was monitored by field density tests. However, the results were not available for review.

Available information indicates no postconstruction changes.

2.3 Operation. No records of operation are kept.

2.4 Other Investigations. None reported.

2.5 Evaluation

a. Availability. Available information was obtained from PennDER.

b. Adequacy

(1) Hydrology and Hydraulics. The available information is considered to be adequate to assess the conformity of the design to the current spillway design criteria.

(2) Embankment. Review of the geotechnical aspects of the design indicates that the design generally followed currently accepted practice for subsurface investigation, laboratory testing, analysis, and construction.

(3) Appurtenant Structures. Review of the design drawings indicates that the appurtenant structures were designed and constructed in conformance with currently accepted engineering practices.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The onsite inspection of PA-RC&D-105 Dam consisted of:

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

2. Visual examination of the emergency spillway and visible portions of the primary spillway.

3. Evaluation of downstream area hazard potential.

The specific observations are illustrated in Plate 10.

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. No seepage or other signs of distress were observed during inspection. Some minor erosion scars were found on the upstream and downstream faces of the dam.

The top of the dam was surveyed relative to the emergency spillway crest elevation and was found to be within 0.2 foot of the design elevation with camber. Plate 11 shows the dam crest profile.

c. Appurtenant Structures. The appurtenant structures were examined for deterioration or other signs of distress and obstructions that would limit flow. The structures were found to be in good condition. No deficiencies were noted at this time.

d. Reservoir Area. A map review indicates that the watershed is predominantly covered with woodlands. A review of the regional geology is included in Appendix F.

e. Downstream Channel. Downstream from the dam, Thomas Creek flows approximately 2,000 feet southeast where it passes through residential areas of Springville. Further description of downstream conditions is included in Section 1.2 d.

3.2 Evaluation. The dam was found to be in good condition and adequately monitored.

SECTION 4
OPERATIONAL FEATURES

4.1 Procedure. The reservoir is normally maintained at the primary spillway orifice level with excess inflow discharging through the orifice. The reservoir outlet pipe can be used to draw down the permanent pool when required. The reservoir outlet pipe gate is normally closed.

4.2 Maintenance of the Dam. The maintenance of the dam is considered to be good. The downstream and upstream faces of the dam are covered with grass and appear to be annually mowed.

4.3 Maintenance of Operating Facilities. The only operational feature of the dam is the reservoir outlet pipe sluice gate operated by a hoist located on the primary spillway drop inlet structure. Since the top of the drop inlet structure was not accessible, this facility could not be closely examined.

4.4 Warning System. No formal warning system exists for the dam. Telephone communication facilities are available via residences at the dam site.

4.5 Evaluation. The maintenance condition of the dam is considered to be good.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

a. Design Data. PA-RC&D-105 Dam has a watershed of 0.6 square mile and impounds a reservoir with a surface area of 16 acres at normal pool level. The emergency spillway of the dam is located on the right abutment. The capacity of the emergency spillway is calculated to be 3580 cfs with no freeboard.

b. Experience Data. As previously stated, PA-RC&D-105 Dam is classified as a small dam in the high hazard catetory. Under the recommended criteria for evaluating emergency spillway discharge capacity, such impoundments are required to pass one-half to full Probable Maximum Flood (PMF). In view of the high downstream drainage potential, full PMF was selected as the spillway design flood.

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 input are presented in Appendix D. The PMF inflow hydrograph was found to have a peak flow of 1590 cfs. The computer outputs are included in Appendix D.

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

d. Overtopping Potential. PMF inflow hydrograph was routed through the reservoir and it was found that the dam can pass 100 percent PMF without overtopping.

e. Spillway Adequacy. The spillway can pass the recommended spillway design flood of full PMF without overtopping the embankment; therefore, the spillway capacity is classified 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 that would significantly affect the stability of the embankment at this time. However, it should be understood that since the dam is a flood control facility and was at normal (low level) pool at the time of inspection, it was not under maximum loading conditions. Maximum loading occurs only during the passage of major floods.

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

b. Design and Construction Data

(1) Embankment. Available information indicates that the stability of the embankment was analyzed for steady seepage and rapid drawdown conditions using the modified Swedish circle and sliding block slope stability analysis procedures. The minimum factor of safety was reported to be 2.1 for the steady-state seepage stability of the downstream slope and 1.4 for the rapid drawdown condition of the upstream slope. Strength parameters for the core material were obtained from consolidated-undrained triaxial shear tests with pore pressure measurements. Assumed strength parameter values were used for the shell materials. Construction progress reports indicate that the dam was constructed under the supervision of an SCS field representative, and the earthwork was monitored by field density tests.

(2) Appurtenant Structures. Review of the design drawings indicates that there are no apparent structural deficiencies that would significantly affect the performance of the appurtenant structures.

c. Operating Records. There are no operating records kept for the dam.

d. Postconstruction 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 PA-RC&D-105 Dam is in good condition. No conditions were observed that would significantly affect the overall performance of the structure at this time. However, as previously noted, the dam was not inspected under its maximum loading condition, which would occur when the reservoir is filled during major storms.

The spillway can pass the required spillway design flood and is, therefore, classified to be adequate according to the recommended criteria.

b. Adequacy of Information. Available information, in conjunction with the visual observations, is considered to be sufficient to make a Phase I evaluation.

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

d. Necessity for Additional Investigation. No additional investigation is considered to be required at this time.

7.2 Recommendations/Remedial Measures. It is recommended that:

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

2. The dam and appurtenant structures should continue to be inspected regularly and necessary maintenance performed.

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

NAME OF DAM PA-RC&D-105 COUNTY Susquehanna STATE Pennsylvania ID# NDI: PA-0979 DER: 058-138

TYPE OF DAM Earth HAZARD CATEGORY High

DATE(S) INSPECTION November 13, 1980 WEATHER Sunny TEMPERATURE 50's

POOL ELEVATION AT TIME OF INSPECTION 1254.6 M.S.L. TAILWATER AT TIME OF INSPECTION 1243 ± M.S.L.

INSPECTION PERSONNEL:	REVIEW INSPECTION PERSONNEL: (February 5, 1981)
Douglas Cosler	Lawrence D. Andersen
Arthur Smith	James H. Poellot
Bilgin Erel	Bilgin Erel

Owner's Representative:
None

Bilgin Erel RECORDER

VISUAL INSPECTION
PHASE I
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None found.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None found.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None found.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	See Plate 2 for dam crest profile. No perceivable horizontal misalignment.	
RIPRAP FAILURES	None	

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	Toe drains discharging to outlet pipe impact basin are dry.	

VISUAL INSPECTION
PHASE I
OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not accessible for inspection.	
INTAKE STRUCTURE	In good condition.	
OUTLET STRUCTURE	In good condition.	
OUTLET CHANNEL	No problems observed.	
EMERGENCY GATE (Reservoir Drainpipe Gate)	Equipment in good condition. Operational condition not observed.	Reservoir drainpipe gate should be periodically observed.

VISUAL INSPECTION
PHASE I
UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Primary Spillway: In good condition. Emergency spillway: No concrete overflow structure.	
APPROACH CHANNEL	Primary Spillway: Lake Emergency Spillway: Lake	
DISCHARGE CHANNEL	Primary Spillway: Concrete pipe. (Not accessible for inspection.) Emergency Spillway: Earth channel in good condition.	
BRIDGE AND PIERS	None	

VISUAL INSPECTION
PHASE I
GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	The dam has no gated spillway.	
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	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

VISUAL INSPECTION
PHASE I
RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	No problems observed.	
SEDIMENTATION	Unknown	
UPSTREAM RESERVOIRS	None	

VISUAL INSPECTION
PHASE I
DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	No problems observed.	
SLOPES	No problems observed.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	Residential areas of Springville - approximately five to ten houses on floodplain. Population: Approximately 50.	

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 PA-RC&D-105

ID# NDI: PA-0979
DER: 058-138

ITEM	REMARKS
AS-BUILT DRAWINGS	Available in Commonwealth of Pennsylvania files.
REGIONAL VICINITY MAP	See Plate 1.
CONSTRUCTION HISTORY	The dam was designed by the Soil Conservation Service. The construction of the dam was completed in 1978.
TYPICAL SECTIONS OF DAM	See Plate 4.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See Plates 7, 8, and 9.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	Not maintained.
DESIGN REPORTS	Available in Commonwealth of Pennsylvania files.
GEOLOGY REPORTS	Available in Commonwealth of Pennsylvania files.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Available in Commonwealth of Pennsylvania files.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Available in Commonwealth of Pennsylvania files.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	None reported.
BORROW SOURCES	Unknown
MONITORING SYSTEMS	None
MODIFICATIONS	None reported.
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 maintained.
SPILLWAY PLAN SECTIONS DETAILS	See Plate 3.
OPERATING EQUIPMENT PLANS AND DETAILS	Included in design drawings.

CHECKLIST
ENGINEERING DATA
HYDROLOGIC AND HYDRAULIC

DRAINAGE AREA CHARACTERISTICS: 0.6 square mile (woodlands)

ELEVATION, TOP OF NORMAL POOL AND STORAGE CAPACITY: 1254.9 (50 acre-feet)

ELEVATION, TOP OF FLOOD CONTROL POOL AND STORAGE CAPACITY: 1266.8 (342 acre-feet)

ELEVATION, MAXIMUM DESIGN POOL: 1266.8

ELEVATION, TOP OF DAM: 1266.8

SPILLWAY: (Emergency)

a. Elevation 1260.8

b. Type Open channel

c. Width 60 feet (base width)

d. Length N/A

e. Location Spillover Adjacent to spillway

f. Number and Type of Gates None

OUTLET WORKS:

a. Type 18-inch reservoir drainpipe

b. Location Discharges into primary spillway riser

c. Entrance Inverts 1245.1

d. Exit Inverts 1245.1

e. Emergency Drawdown Facilities 18-inch reservoir drainpipe

HYDROMETEOROLOGICAL GAGES:

a. Type None

b. Location None

c. Records None

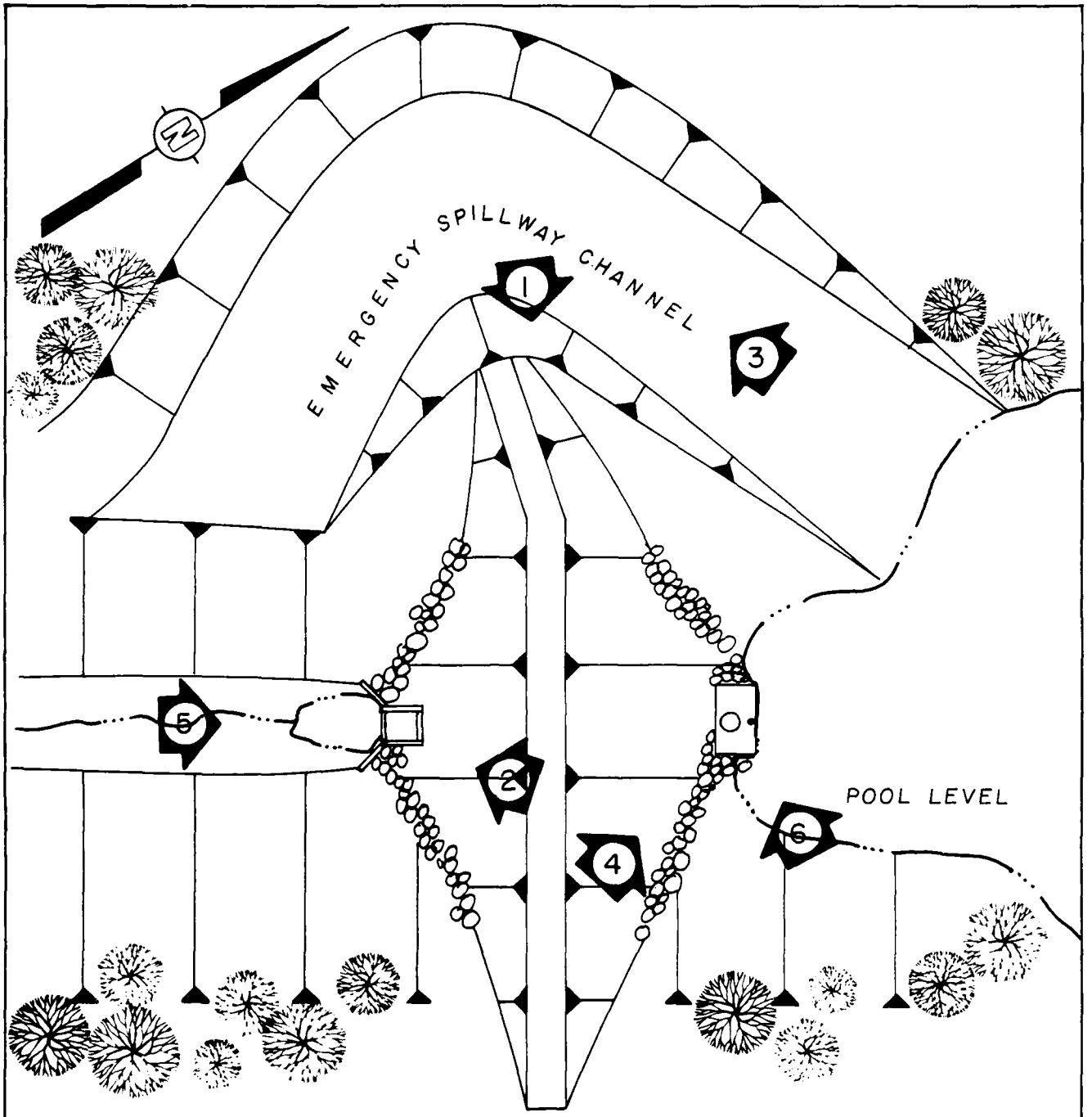
MAXIMUM NONDAMAGING DISCHARGE: 3600 cfs (capacity of emergency spillway)

APPENDIX C

PHOTOGRAPHS

LIST OF PHOTOGRAPHS
PA-RC&D-105 DAM
NDI I.D. NO. PA-0979
NOVEMBER 13, 1980

PHOTOGRAPH NO.	DESCRIPTION
1	Crest (looking southeast).
2	Primary discharge channel (looking downstream).
3	Emergency spillway channel.
4	Primary intake structure.
5	Primary outlet structure.
6	Normal pool orifice.
7 & 8	Houses along Thomas Creek (approximately 0.2 mile downstream from dam).



LEGEND:

2 INDICATES DIRECTION IN WHICH PHOTOGRAPH WAS TAKEN

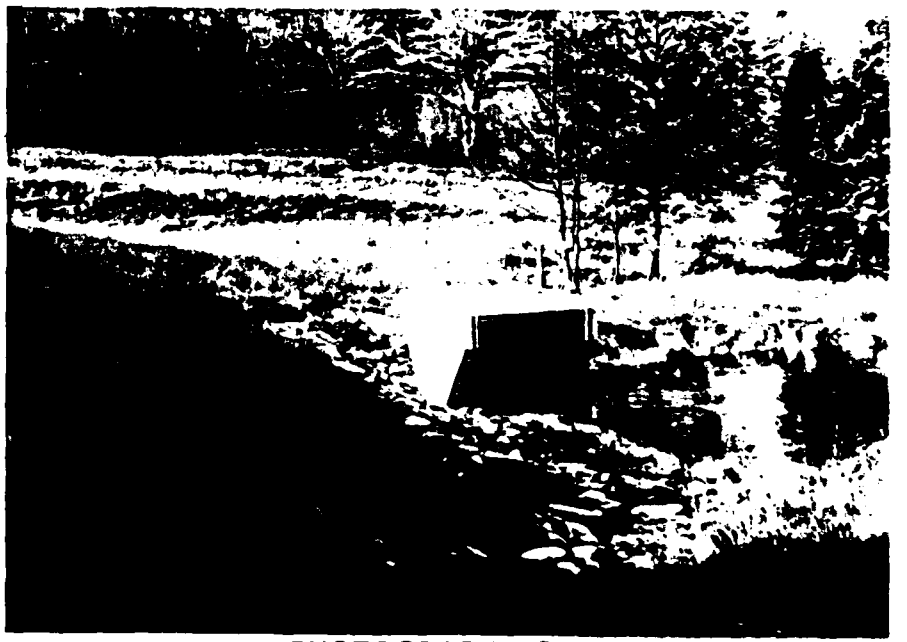
PA-RC & D-105
KEY PLAN OF PHOTOGRAPHS
FIELD INSPECTION DATE: NOV. 13, 1980

DAPPOLONIA

PHOTOGRAPH NO. 1

PHOTOGRAPH NO. 2

PHOTOGRAPH NO. 3



PHOTOGRAPH NO. 4

PHOTOGRAPH NO 5

PHOTOGRAPH NO. 6

PHOTOGRAPH NO 7

PHOTOGRAPH NO 8

APPENDIX D

HYDROLOGY AND HYDRAULICS ANALYSES

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: PA-RC&D-105 Dam

PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.2 INCHES/24 HOURS(1)

STATION	1	2	3	4	5
Station Description	Thomas Creek	PA-RC&D-105 Dam			
Drainage Area (square miles)	0.61	—			
Cumulative Drainage Area (square miles)	0.61	0.61			
Adjustment of PMF for Drainage Area (%)(1)	94%				
6 Hours	117				
12 Hours	127				
24 Hours	136				
48 Hours	142				
72 Hours	145				
Snyder Hydrograph Parameters					
Zone(2)	11				
C_p/C_t(3)	0.62/1.50				
L (miles)(4)	1.14				
L_{ca} (miles)(4)	0.66				
$t_p = C_t(L \cdot L_{ca})^{0.3}$ (hours)	1.38				
Spillway Data		Primary Emergency			
Crest Length (ft)		15.0 60.0			
Freeboard (ft)		6.2 6.0			
Discharge Coefficient		3.2 2.65			
Exponent		1.5 1.5			

(1) Hydrometeorological Report 40, U.S. Weather Bureau, 1965.
(2) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).
(3) Snyder's Coefficients.
(4) 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.

STORAGE VS. ELEVATION

ELEVATION	ΔH, FEET	AREA (1) (acres)	ΔVOLUME (1) (acre-feet)	STORAGE (acre-feet)
1267.8		30.5		360.1
	8.0		215.1	
1259.8		23.0		145.0
	5.0		97.1	
1254.8		15.8		47.9
	5.0		47.9	
1249.8		0.32		0

(1) From DER files, SCS calculations.

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********
    1                A1       SNYDER UNIT HYDROGRAPH, SPILLWAY AND DAM OVERTOPING ANALYSES
    2                A2       PA.RC D 105 DAM,(DER 58-138),SUSQUEHENNA COUNTY,PA. PROJECT NO.80-555-09
    3                A4       FOR 20%,30%,40%,50%,60%,70%,80%,90%,AND 100% PROBABLE MAXIMUM FLOOD(PMF)
    4                B     300        0       15        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 PA.RC D 105 DAM,(DER 58-138)
   10                M       1        1     0.61              0.61                                1
   11                P                20.2      117      127      136      142      145
   12                T                                                    1.0      0.5           0.0410
   13                W    1.38     0.62
   14                X    -1.5    -0.05      2.0
   15                K       1        2                                          1
   16                K1       ROUTING FLOW THROUGH PA.RC D 105 DAM,(DER 58-138)
   17                Y                                         1        1
   18                Y1      1                                          -1254.9       -1
   19                Y41254.9  1256.0   1258.0   1260.6   1260.8   1261.0   1262.0   1263.0   1264.0   1265.0
   20                Y41266.0  1267.0   1268.0
   21                Y5    0.0      7.5     15.5     22.0     26.7     51.7    349.7    755.5   1284.8   1935.0
   22                Y527u2.5  3586.5   4586.1
   23                $A   0.32    10.60    15.85    17.37    20.07    23.02    25.17    26.93    28.70    30.50
   24                $E1249.8  1251.8   1254.8   1255.8   1257.8   1259.8   1261.8   1263.8   1265.8   1267.8
   25                $S1254.9
   26                $D1267.2     2.65      1.5    200.0
   27                $L   12.0     37.0    100.0    125.0    175.0    200.0
   28                $V1267.2  1267.4   1267.6   1267.7   1267.8   1267.9
   29                K      99
```

Note: Design dam crest EL. 1266.8.

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	.61	1	319.	478.	637.	797.	956.	1114.	1275.	1434.	1594.
	(	1.58)	(	9.03)(	13.54)(	18.05)(	22.56)(	27.08)(	31.59)(	36.10)(	40.61)(	45.13)
ROUTED TO	2	.61	1	20.	125.	308.	486.	656.	827.	1002.	1170.	1339.
	(	1.58)	(	.56)(	3.53)(	8.72)(	13.76)(	18.57)(	23.41)(	28.36)(	33.14)(	37.91)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1254.90	1254.90	1267.20
STORAGE	50.	50.	342.
OUTFLOW	0.	0.	3786.

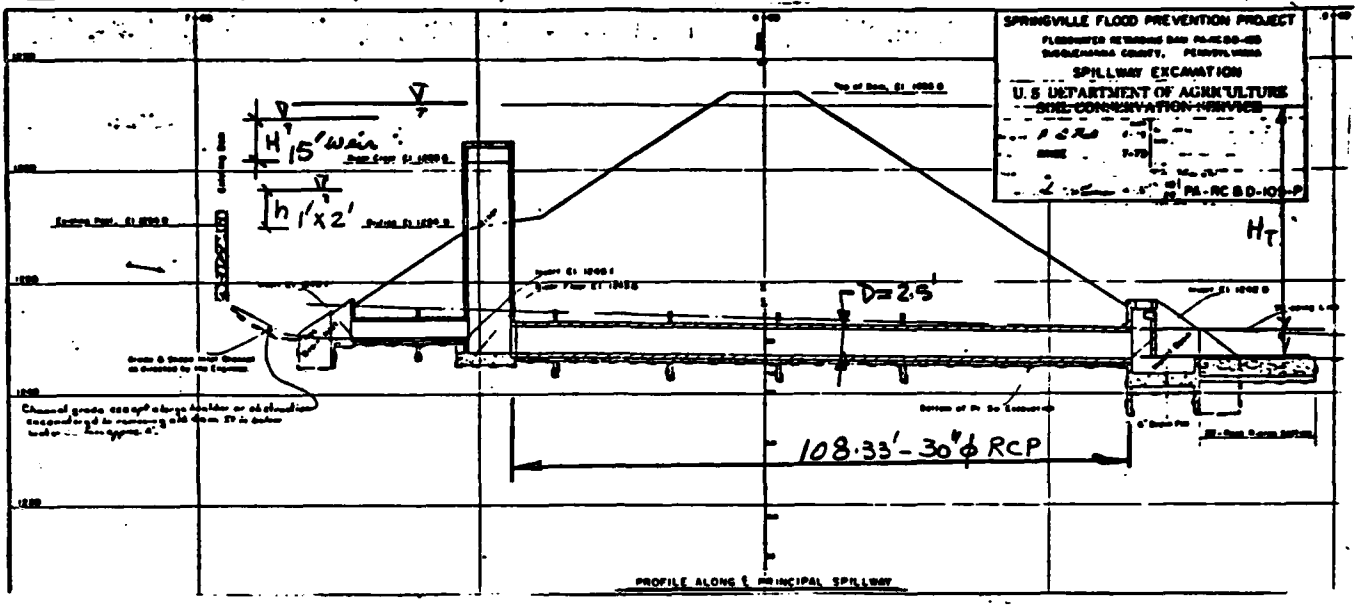
RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1259.72	0.00	143.	20.	0.00	45.75	0.00
.30	1261.24	0.00	179.	125.	0.00	44.00	0.00
.40	1261.86	0.00	195.	308.	0.00	43.00	0.00
.50	1262.34	0.00	207.	486.	0.00	42.50	0.00
.60	1262.75	0.00	218.	656.	0.00	42.25	0.00
.70	1263.13	0.00	228.	827.	0.00	42.00	0.00
.80	1263.47	0.00	236.	1002.	0.00	42.00	0.00
.90	1263.78	0.00	245.	1170.	0.00	41.75	0.00
1.00	1264.08	0.00	253.	1339.	0.00	41.75	0.00

D'APPOLONIA
CONSULTING ENGINEERS, INC.

By WTC Date 1-19-81 Subject PA, RC&D 105 Sheet No. 1 of 2
Chkd. By CMB Date 1/29/81 Proj. No. 80-566-0

PRINCIPAL SPILLWAY CAPACITY

AS BUILT PLANS



FOR ORIFICE FLOW.

$$Q_o = CA\sqrt{2gh} = (0.6)(2\times1)(64.4)^{1/2}\sqrt{h} = 9.63\sqrt{\text{LAKE EL} - 1255.4} \quad \text{(EQ-1)}$$

℄ CENTER OF ORIFICE

FOR WEIR FLOW OF RISER. (Sharp Crested Weir)

$$Q_W = C\,L\,H^{1.5} = (3.22)(15)(H)^{1.5} = 48.3(\text{LAKE EL.} - 1260.6)^{1.5} \quad \text{(EQ-2)}$$

PIPE FLOW OF RISER (REF. DESIGN OF SMALL DAM. 2nd EDITION. P. 567)

$$H_T = \left[\frac{(2.5204)(1+K_e)}{D^4} + \frac{(466.18)(n)^2(L)}{D^{16/3}}\right]\left(\frac{Q_p}{10}\right)^2 = \left[\frac{(2.5204)(1.5)}{(2.5)^4} + \frac{(466.18)(0.012)^2(108)}{(2.5)^{16/3}}\right]\left(\frac{Q_p}{10}\right)^2$$

$$Q_p = 25.69\sqrt{H_T} = 25.69\sqrt{\text{LAKE EL} - 1242.9 - \text{TAILWATER}} = 25.69\sqrt{\text{LAKE EL} - 1246} \quad \text{(EQ-3)}$$

℄ ASSUMED

LAKE LEVEL ELEVATION	EQ 1 Q_o cfs	EQ 2 Q_W cfs	Q_o+Q_W cfs	EQ-3 Q_p cfs	PRIMARY SPILLWAY Q_s cfs
1254.9	0				0
1256.0	7.5				7.5
1258.0	15.5				15.5
1260.6	22.0	0			22.0
1260.8	22.4	4.3	26.7	98.8	26.7
1261.0	22.8	12.2	35.0	99.5	35.0
1261.98	24.7	78.0	102.7	102.7	102.7
1263	26.5	179.6	206.1	105.9	105.9

LAKE LEVEL ELEVATION	PRIMARY SPILLWAY $Q_p = Q_s$ cfs
1264.0	109.0
1265.0	112.0
1266.0	115
1267.0	118
1268.0	120

D'APPOLONIA
CONSULTING ENGINEERS, INC.

C

By WTC Date 1-19-81 Subject PA RC&D 105 Sheet No. 2 of 2
Chkd. By MG Date 1/29/81 Proj. No. 80-556-09

EMERGENCY SPILLWAY CAPACITY

REFERENCE "DESIGN OF SMALL DAM" 2nd ED. PS53

$$V_c = \sqrt{\frac{b+zd_c}{b+2zd_c}\, d_c g} \qquad \text{(EQ-1)}$$

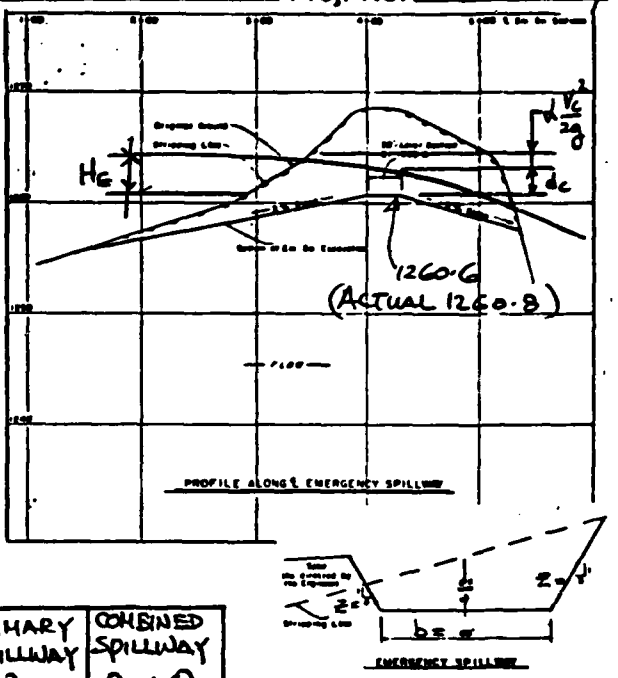
$$H_E = d_c + \frac{V_c^2}{2g} = d_c + \left(\frac{b+zd_c}{b+2zd_c}\right)(d_c g)\left(\frac{1}{2g}\right)$$

$$= \frac{(3b+5zd_c)\,d_c}{2b+4zd_c}$$

$$d_c = \frac{-(3b-4H_E z)+\sqrt{(3b-4H_E z)^2+(4H_E z)(10b)}}{10z} \qquad \text{(EQ-2)}$$

$$A_c = (zd_c + b)\,d_c \qquad \text{(EQ-3)}$$

$$Q_c = (A_c)(V_c) \qquad \text{(EQ-4)}$$



LAKE LEVEL ELEVATION	H_E	EQ 2 d_c	EQ-3 A_c	EQ-1 V_c	EMERGENCY SPILLWAY Q_c	PRIMARY SPILLWAY Q_s	COMBINED SPILLWAY Q_c+Q_s	
	FT	ft	ft^2	fps	cfs	cfs	cfs	
1254.9						0	0	
1256.0						7.5	7.5	
1258.0						15.5	15.5	
1260.6						22.0	22.0	
1260.8	0	0	0	0	0	26.7	26.7	
1261.0	0.2	0.1	8.1	2.1	16.7	35.0	51.7	
1261.98 (1)	1.18	0.8	49.7	5.0	247.0	102.7	349.7	Say EL1262.
1263.0	2.2	1.5	96.7	6.7	649.6	105.9	755.5	
1264.0	3.2	2.2	146.5	8.0	1175.8	109.0	1284.8	
1265.0	4.2	2.9	199.9	9.1	1823.0	112.0	1935.0	
1266.0	5.2	3.6	257.1	10.1	2587.5	115.0	2702.5	
1267.0	6.2	4.4	318.1	10.9	3468.5	118.0	3586.5	← Top/DAM 1267.2
1268.0	7.2	5.1	382.7	11.7	4466.1	120.0	4586.1	

APPENDIX E

PLATES

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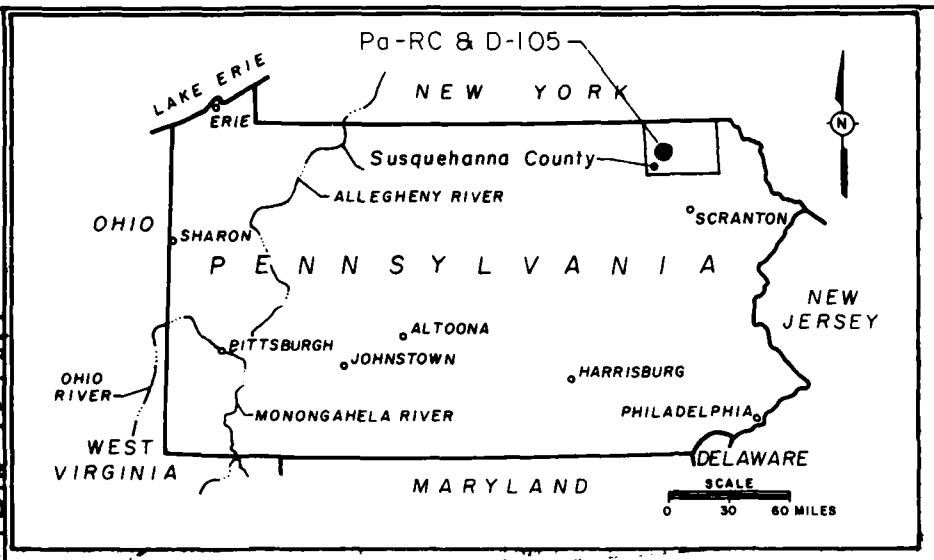
CHECKED BY		
APPROVED BY		

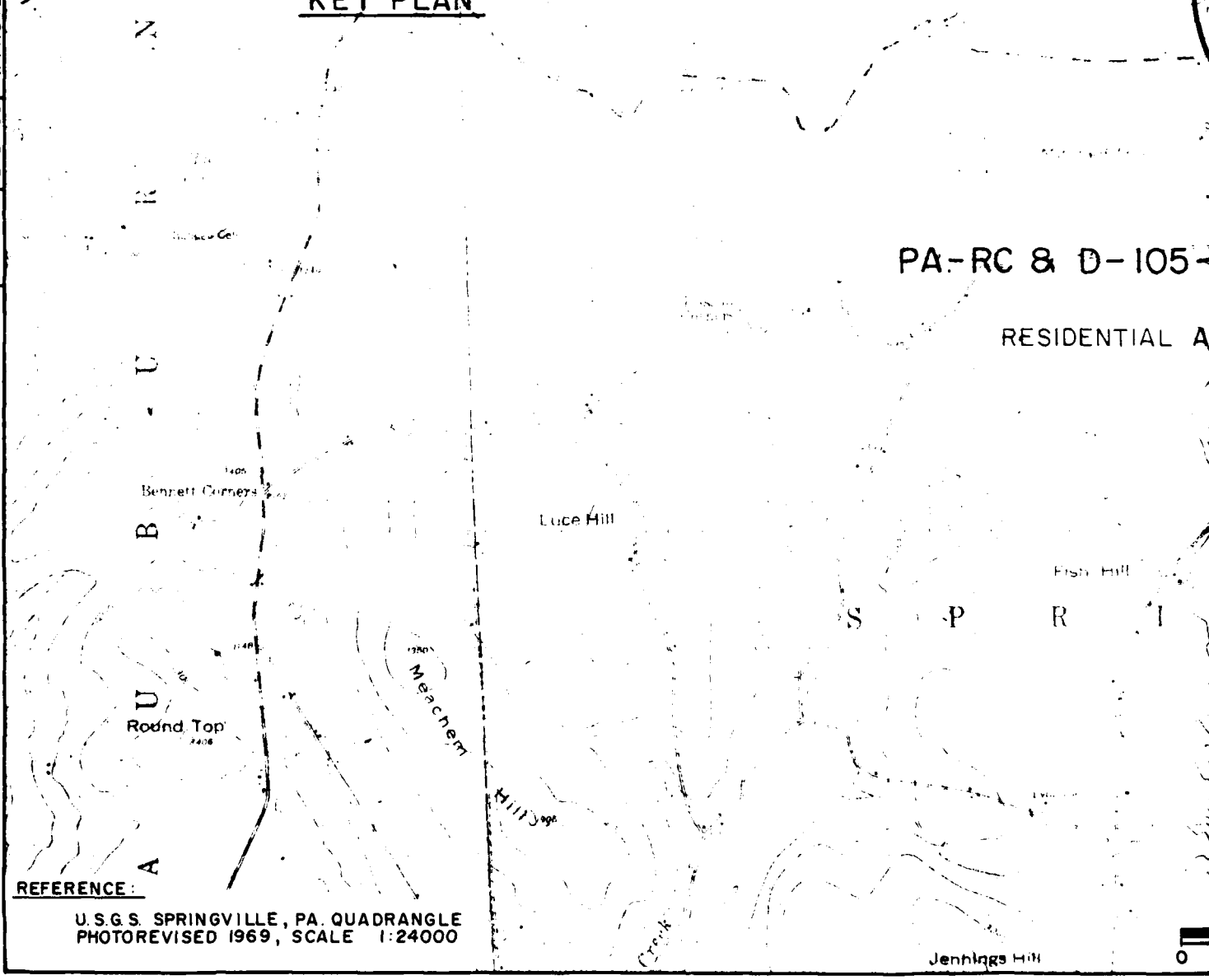
DRAWING NUMBER	80-556-B30
	5-1-81
	5-1-81



KEY PLAN

PA-RC & D-105

RESIDENTIAL AR



REFERENCE:

U.S.G.S. SPRINGVILLE, PA. QUADRANGLE
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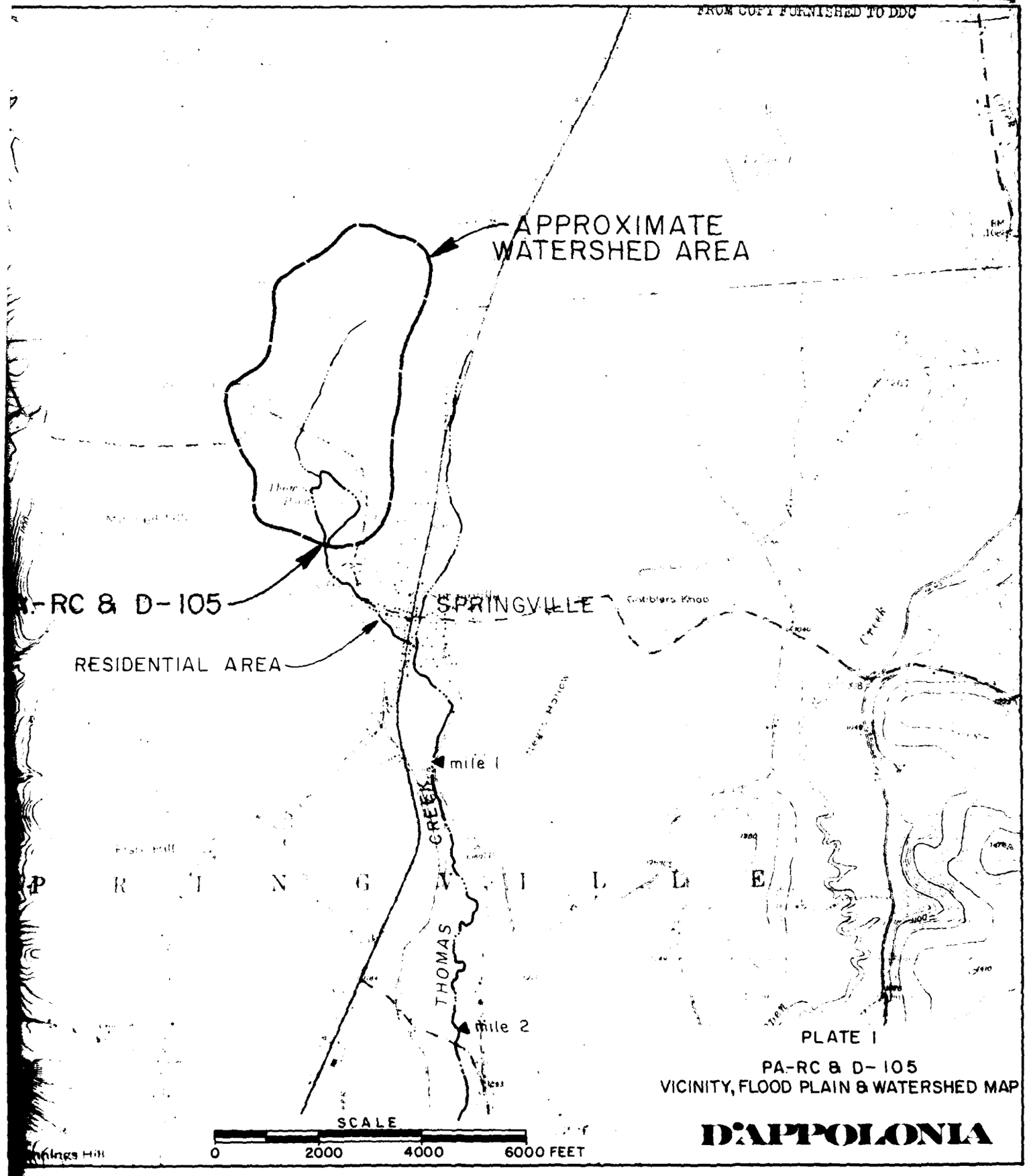

PLATE 1

PA-RC & D-105
VICINITY, FLOOD PLAIN & WATERSHED MAP

D'APPOLONIA

DRAWN BY	CHECKED BY	DRAWING NUMBER
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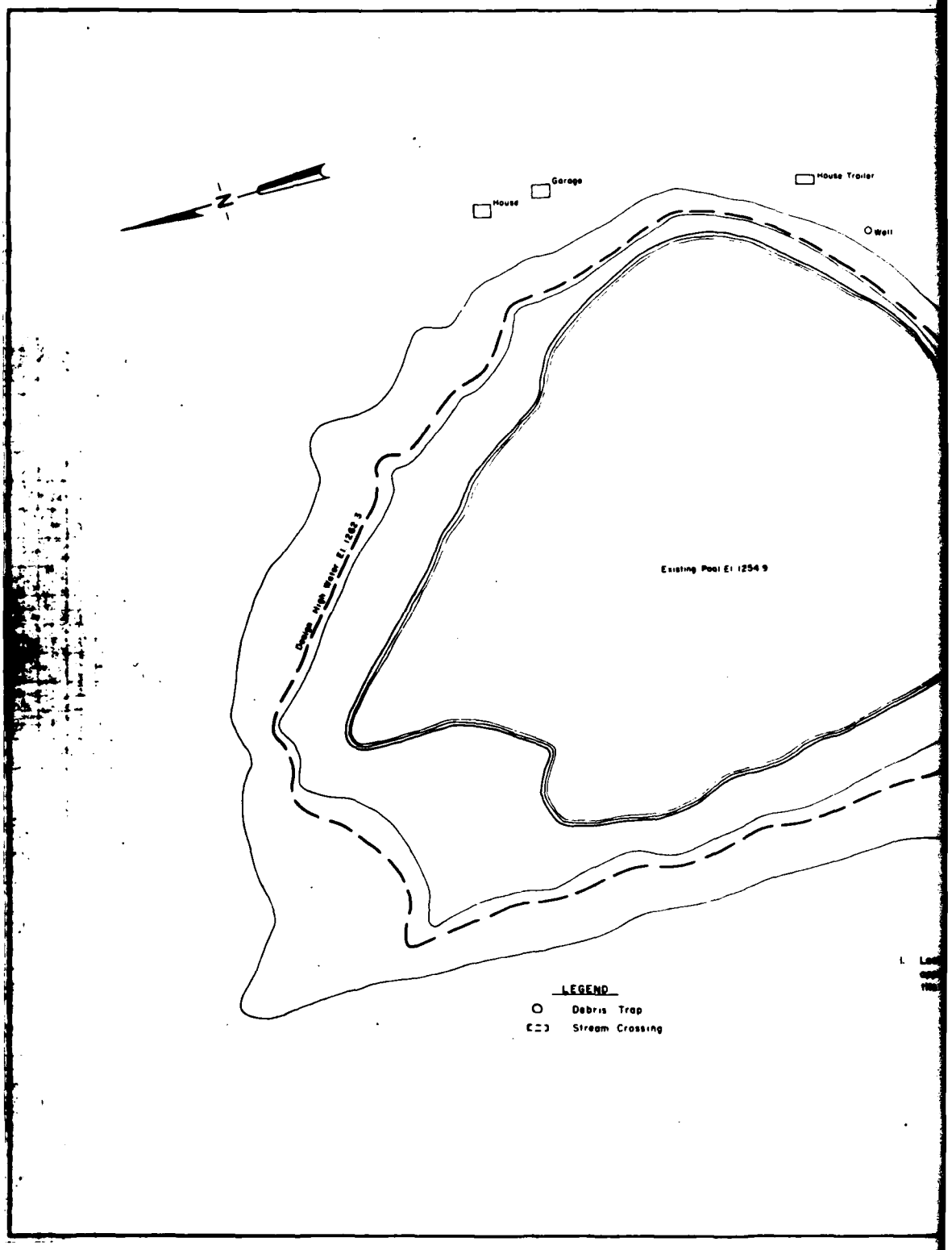
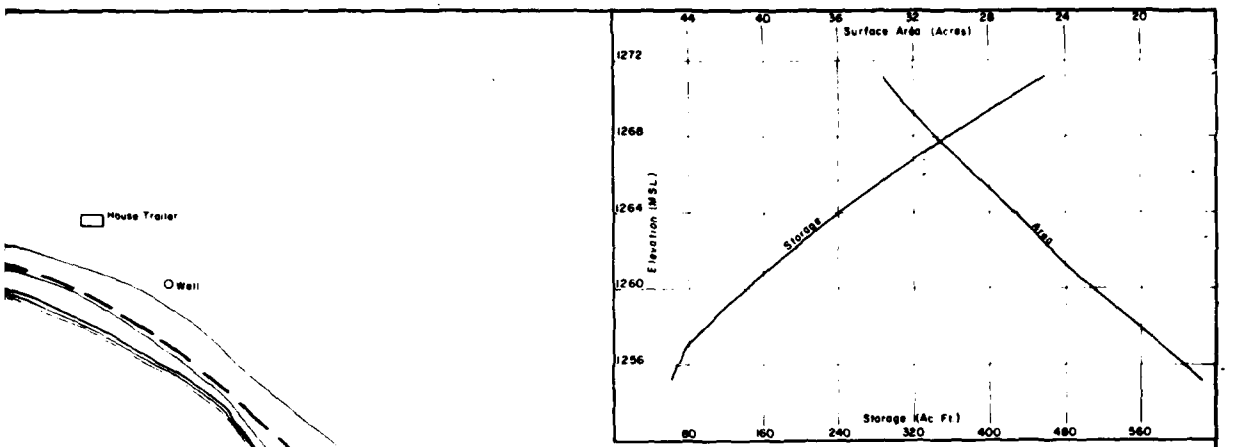
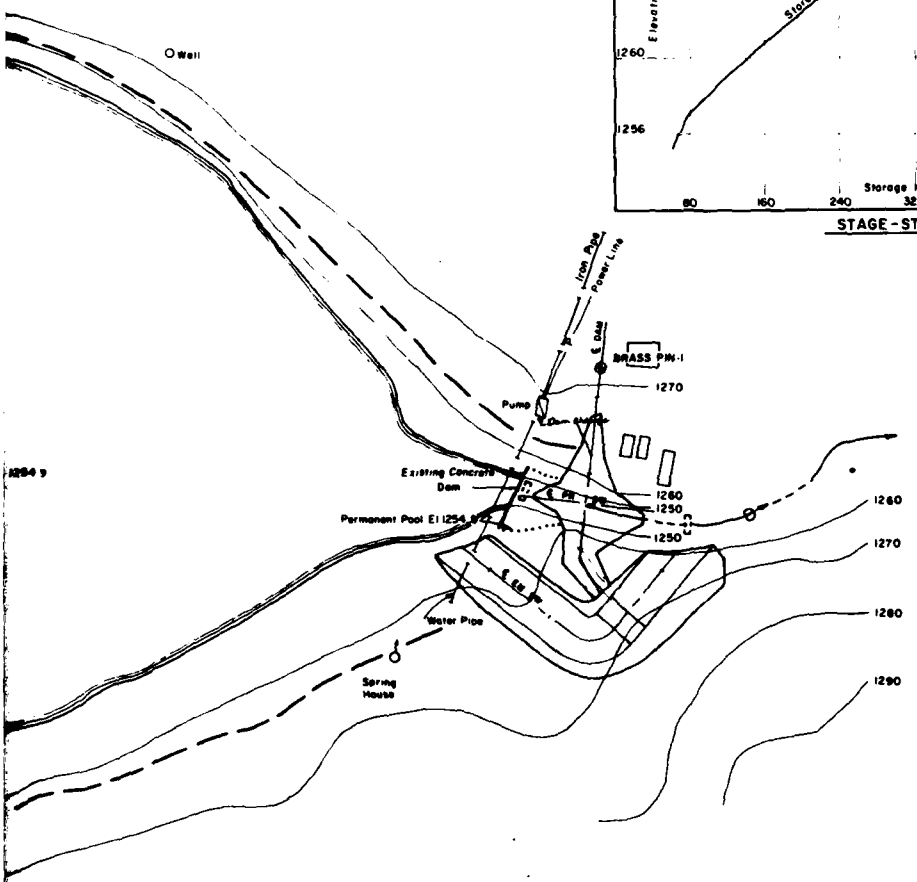
	APPROVED BY	5-1-81
	[illegible]	80-556-B31





STAGE - STORAGE CURVE



CONSTRUCTION NOTE

1. Locations of stream crossings and debris traps are approximate. Final locations to be determined by the Engineer. Details see Sheet 5

AS BUILT PLANS

0 50 100 200
SCALE in FEET

SPRINGVILLE FLOOD PREVENTION PROJECT
FLOODWATER RETARDING DAM PA-RC & D-105
SUSQUEHANNA COUNTY, PENNSYLVANIA
PLAN OF STORAGE AREA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

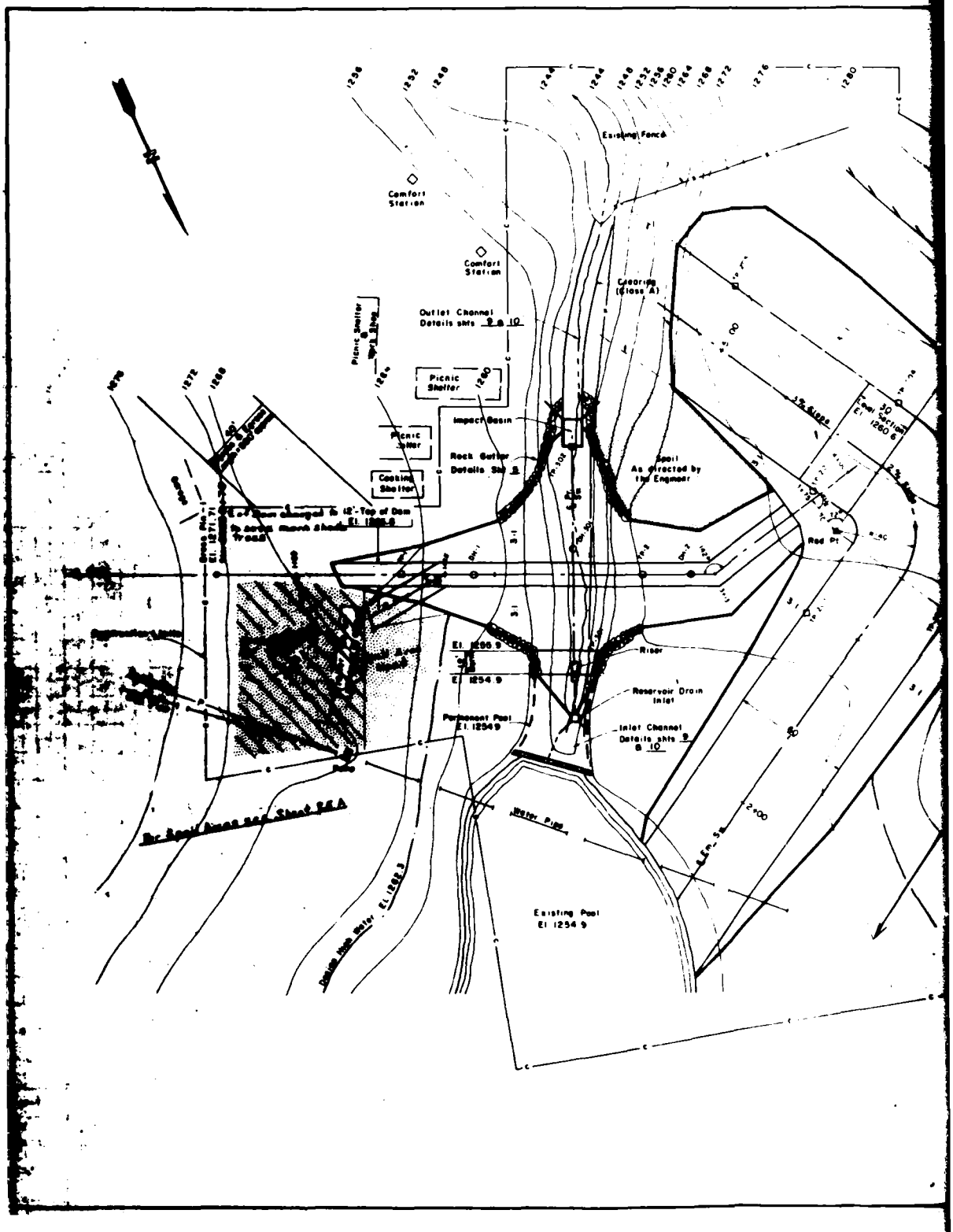
S B DUNN 6-73

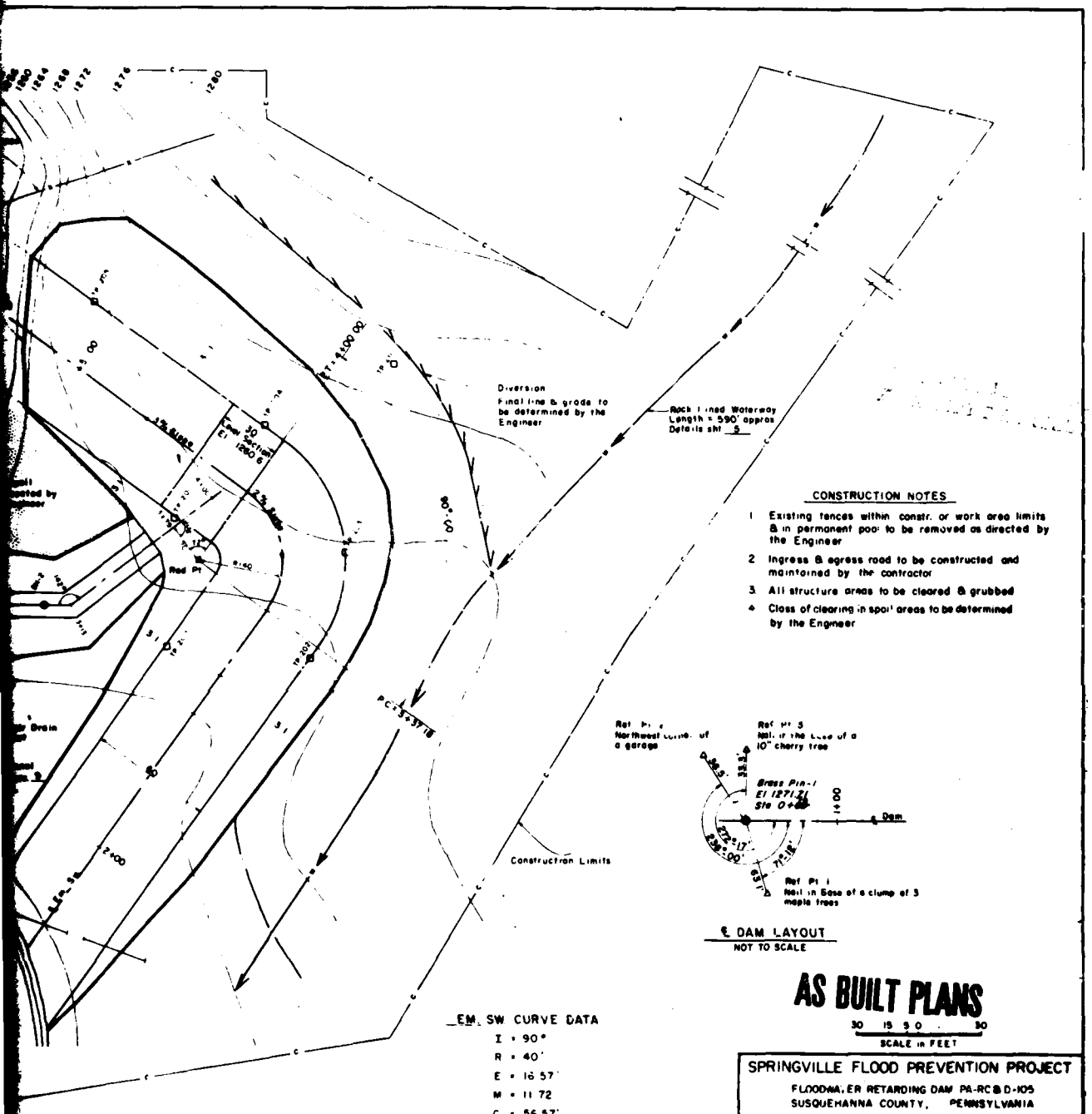
PA-RC & D-105-P

PLATE 2

D'APPOLONIA

DRAWN BY	ACS	CHECKED BY	BE	5-78	DRAWING NUMBER 80-556-B32
	4-80-81	APPROVED BY	JHS	5-81	





CONSTRUCTION NOTES

1. Existing fences within constr. or work area limits & in permanent pool to be removed as directed by the Engineer
2. Ingress & egress road to be constructed and maintained by the contractor
3. All structure areas to be cleared & grubbed
4. Class of clearing in spoil areas to be determined by the Engineer

℄ DAM LAYOUT
NOT TO SCALE

AS BUILT PLANS

30 15 3 0 30
SCALE in FEET

EM. SW CURVE DATA

I	90°
R	40'
E	16 57'
M	11 72
C	56 57'
L	62 83'
T	40 00'
PC	3+37 18
PT	4+00 00

SPRINGVILLE FLOOD PREVENTION PROJECT
FLOODWATER RETARDING DAM PA-RC&D-105
SUSQUEHANNA COUNTY, PENNSYLVANIA
PLAN OF STRUCTURAL WORKS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

CRISE 6-73

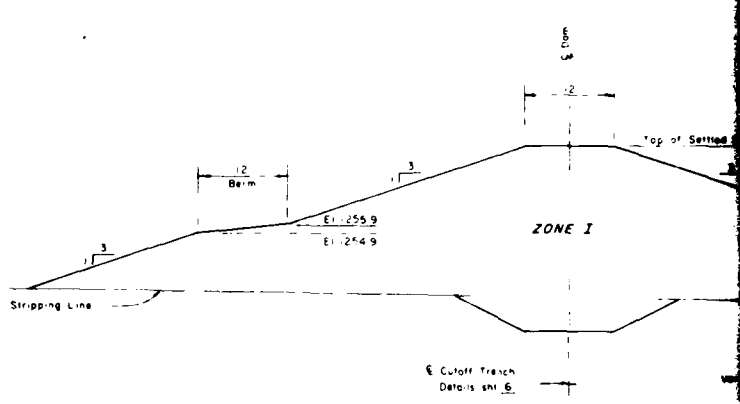
PA-RC&D-105-P

PLATE 3

DAPPOLONIA

1 2

DRAWN BY	ACS	CHECKED BY	BE	5-7-81	DRAWING NUMBER 80-556-B33
	4.30.81	APPROVED BY	JHR	5.1.81	



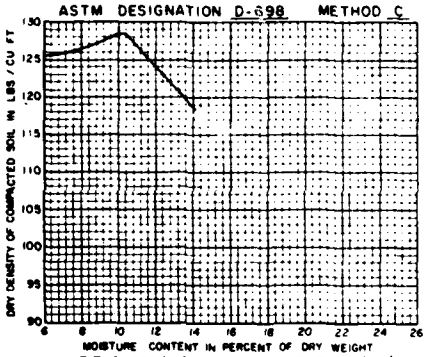
ZONE	MATERIAL	MAX ROCK SIZE	MAX LIFT [1]	REQ'D WATER CONTENT	COMPACTION	
					CLASS	DEFINITION
I	Material as represented by TP-201, depth 3' - 6', classified as SM, SC, TP-204, depth 6' - 10' classified as SM	6"	9"	≥ - 2% of optimum	A	95% max density by ASTM, D-698, Method C

[1] Max permissible lift thickness before compaction

TYPICAL SECTION OF DAM

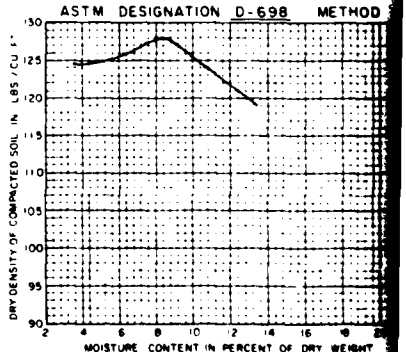
0 5 10 20
SCALE in FEET

COMPACTION CURVE

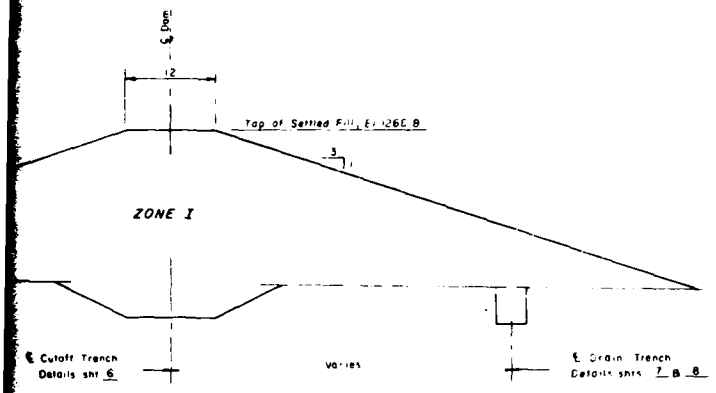


FIELD SAMPLE TP-201 DEPTH 3'-6'
LABORATORY CLASSIFICATION SM,SC

COMPACTION CURVE



FIELD SAMPLE TP-204 DEPTH 6'-
LABORATORY CLASSIFICATION SM



TYPICAL SECTION OF DAM

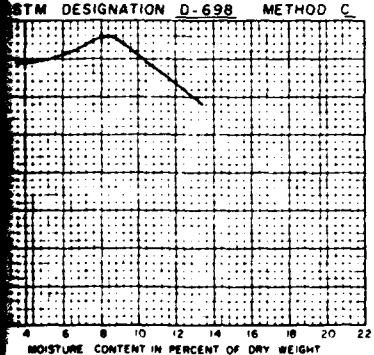
0 5 10 20
SCALE in FEET

CONSTRUCTION NOTES

1 Constructed Slopes are 2 90 1 upstream and downstream

2 For constructed fill elevations see sht 6

COMPACTION CURVE



FIELD SAMPLE TP-204 DEPTH 6'-10'

LABORATORY CLASSIFICATION SM

AS BUILT PLANS

SPRINGVILLE FLOOD PREVENTION PROJECT

FLOODWATER RETARDING DAM PA-RC & D-105
SUSQUEHANNA COUNTY, PENNSYLVANIA

FILL PLACEMENT

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

S B Dunn 7-73

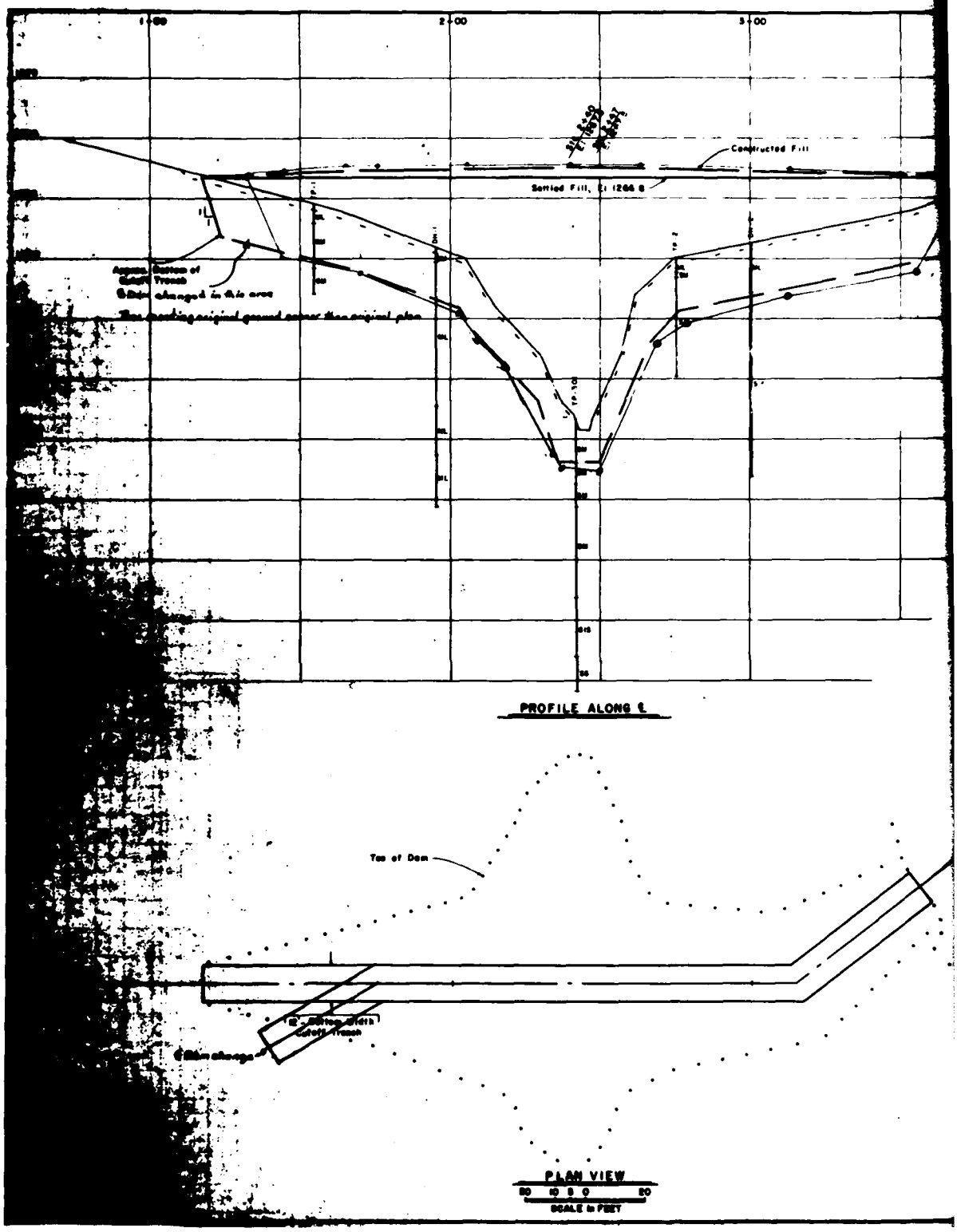
PA-RC & D-105-P

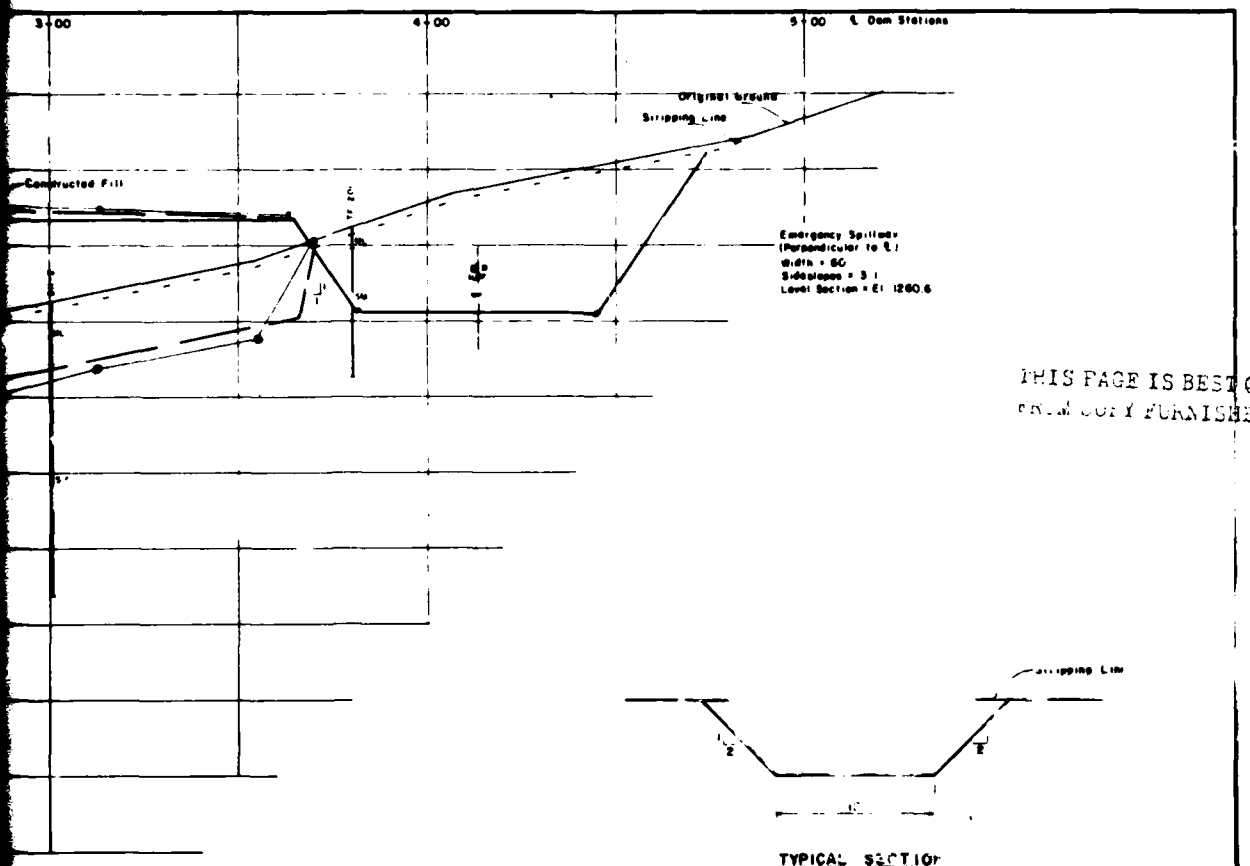
PLATE 4

D'APPOLONIA

12

DRAWN BY	ACS 4-30-81	CHECKED BY	RE 5-1-81	DRAWING NUMBER 80-556-B34
		APPROVED BY	JHR 5-1-81	

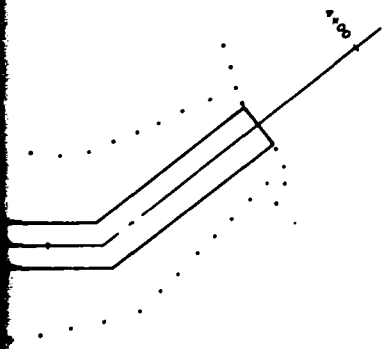




TYPICAL SECTION

CONSTRUCTION NOTE:

1. ℄ Dam = ℄ Cutoff Trench
2. For logs of test holes see shts. 27 & 28.



AS BUILT PLANS

SPRINGVILLE FLOOD PREVENTION PROJECT

FLOODWATER RETARDING DAM PA-RC&D-105
SUSQUEHANNA COUNTY, PENNSYLVANIA

CUTOFF TRENCH

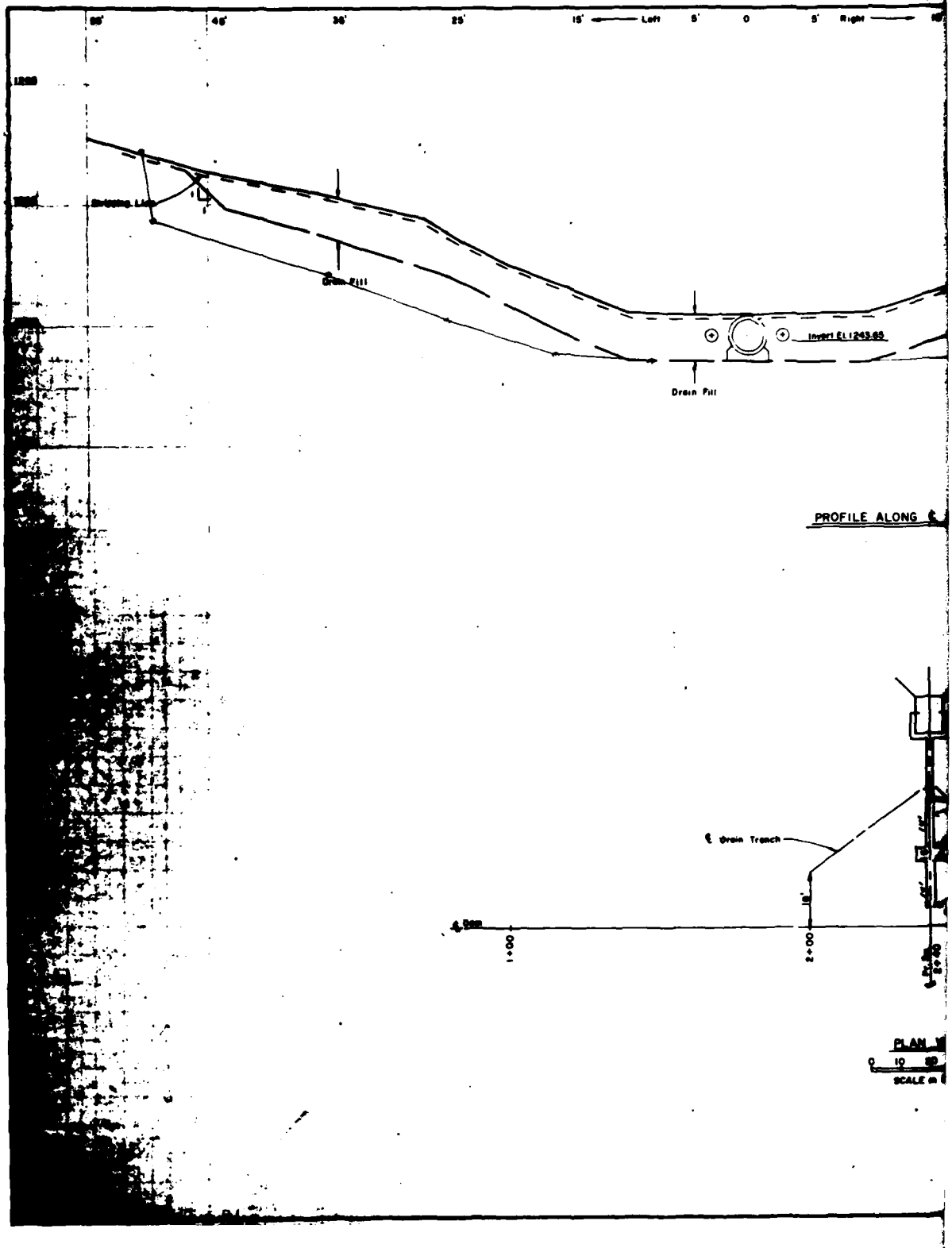
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

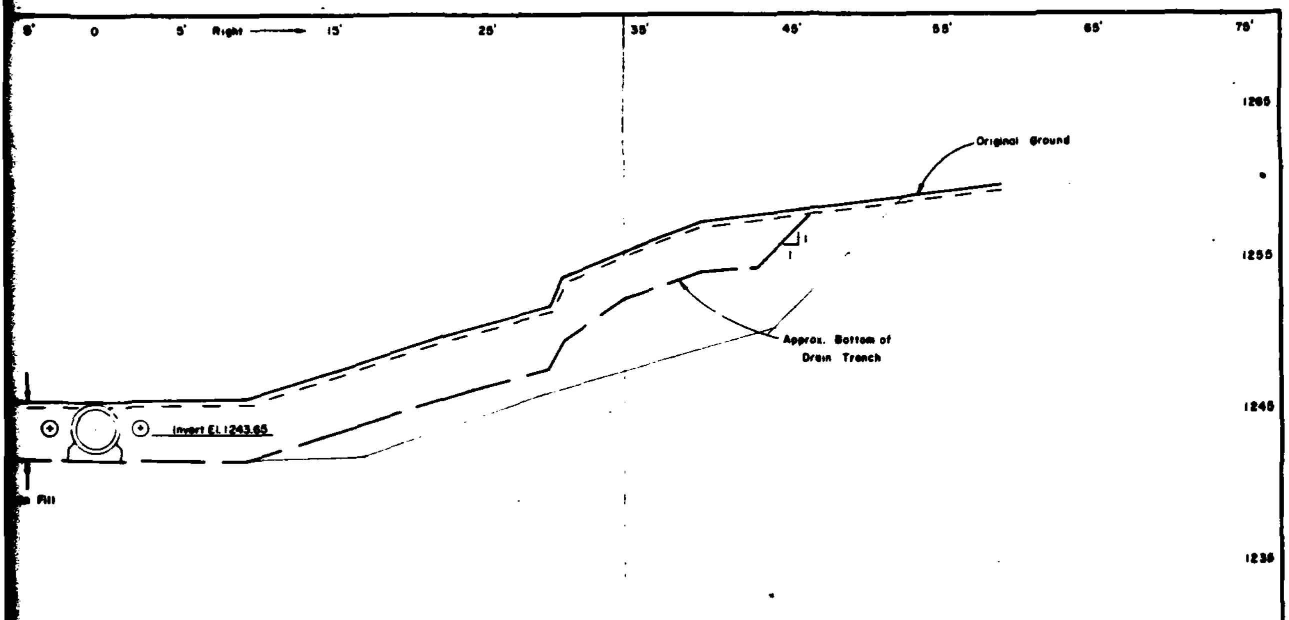
		Date
Designed	[illegible]	5/73
Drawn	CR/SR	6-73
Traced		
Checked	[illegible]	

PLATE 5

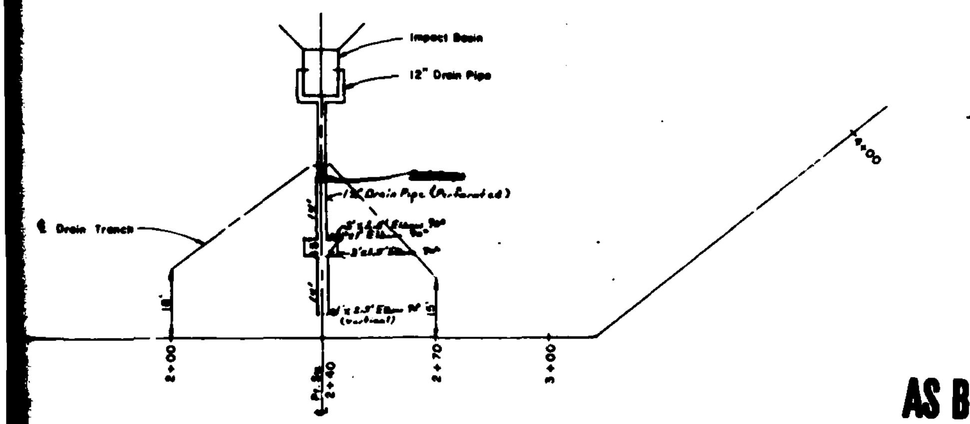
D'APPOLONIA

DRAWN BY	ACS	CHECKED BY		DRAWING NUMBER	80-556-B35
	4.30.81	APPROVED BY			





PROFILE ALONG ℄ DRAIN TRENCH



PLAN VIEW

0 10 20 40
SCALE in FEET

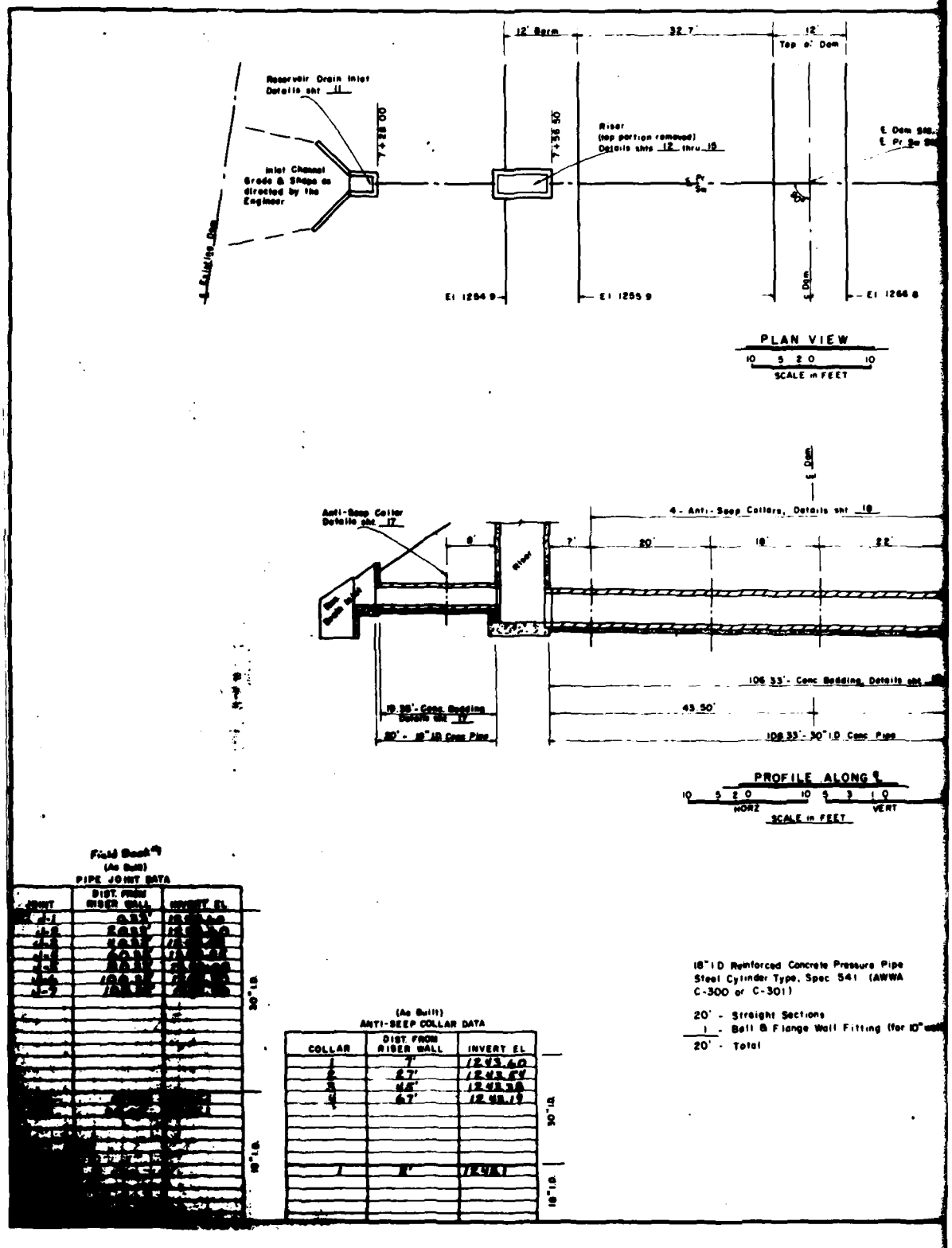
AS BUILT PLANS

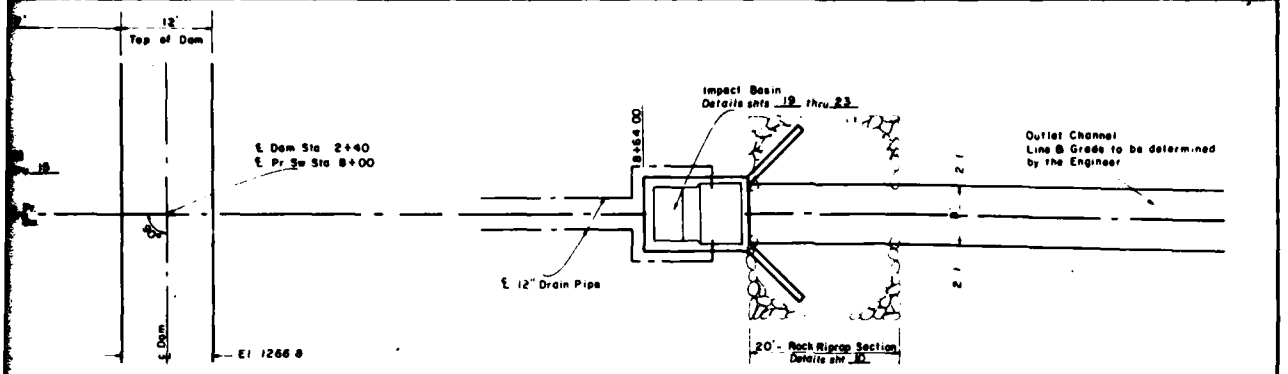
SPRINGVILLE FLOOD PREVENTION PROJECT
FLOODWATER RETARDING DAM PA-RCBD-105 SUSQUEHANNA COUNTY, PENNSYLVANIA
DRAINAGE (PLAN-PROFILE)
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
Designed / Date 2-75
Drawn W.L. POOLE JR. 3-75
Traced
Checked

PLATE 6

D'APPOLONIA

DRAWN BY	CHECKED BY	DRAWING NUMBER
ACS 4.30.81	AC 5-7-81	80-556-B36
	APPROVED BY	
	5.1.81	

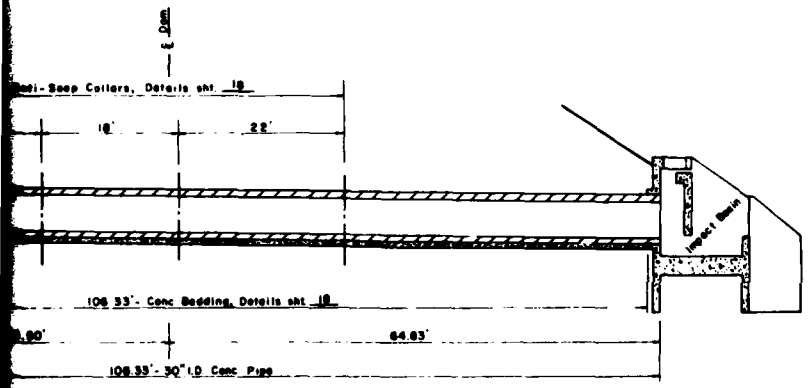




PLAN VIEW

10 5 2 0 10

SCALE in FEET



PROFILE ALONG ℄

5 2 0 10 5 3 1 0 5

HORZ VERT

SCALE in FEET

CONSTRUCTION NOTES

1. Outlet end of 30" pipe and inlet end of 18" pipe to be finished so that no metal is exposed
2. Pipe layout data to be furnished by the Engineer
3. Riprap bedding shall meet gradation limits for fine drain fill, sht 8
4. For logs of test holes see shts 27 & 28
5. For excavation details see sht 10

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

80' - Straight Sections
1 - Bell & Flange Wall Fitting (for 10" wall)
80' - Total

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

108' - Straight Sections
1 - Spigot Ring Wall Fitting (for 10" wall)
108.33' - Total

AS BUILT PLANS

SPRINGVILLE FLOOD PREVENTION PROJECT

FLOODWATER RETARDING DAM PA-RC&D-105

SUSQUEHANNA COUNTY, PENNSYLVANIA

PRINCIPAL SPILLWAY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

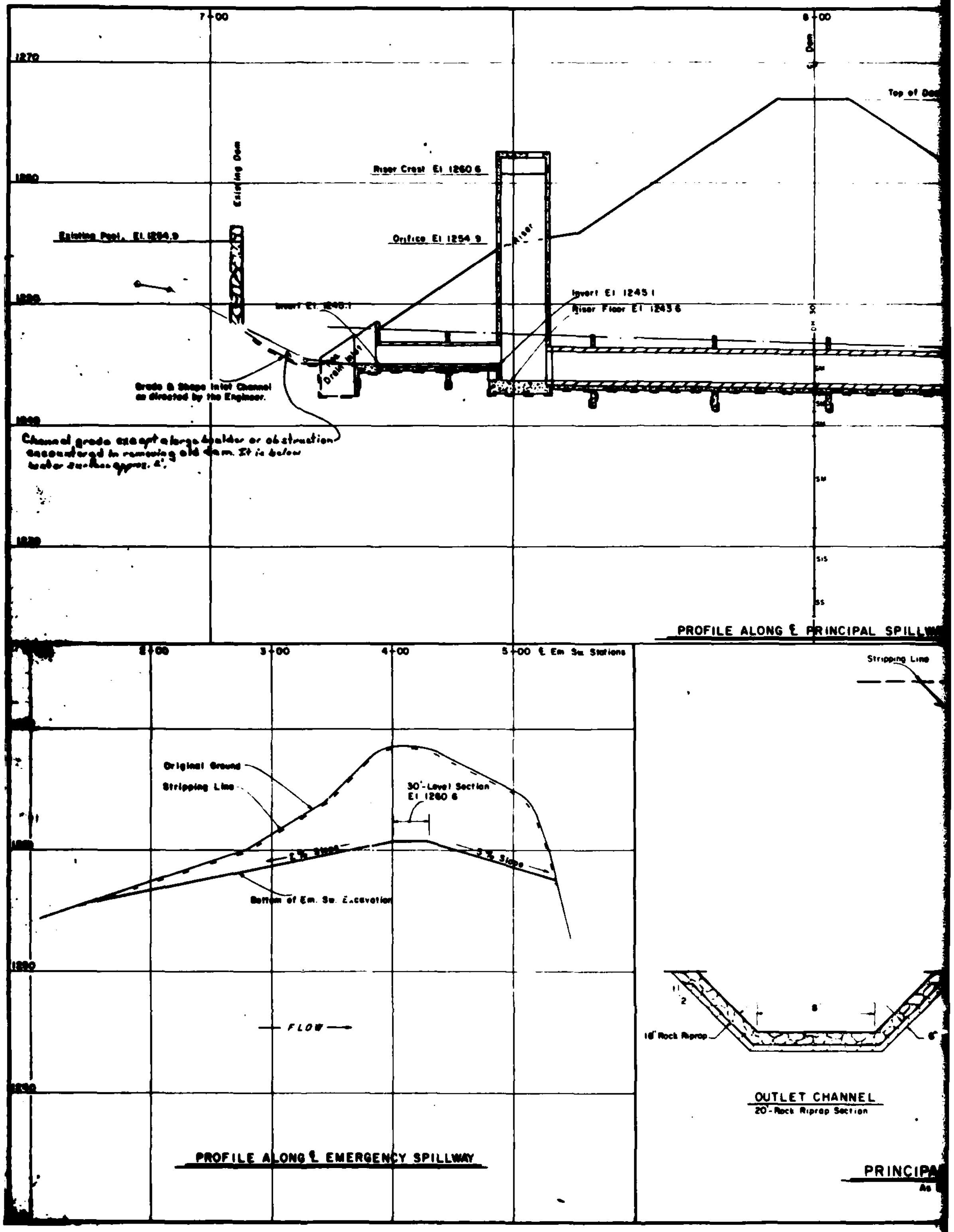
Designed A. A. Hall 5-73
Drawn CRISE 7-73
Traced
Checked 7-73

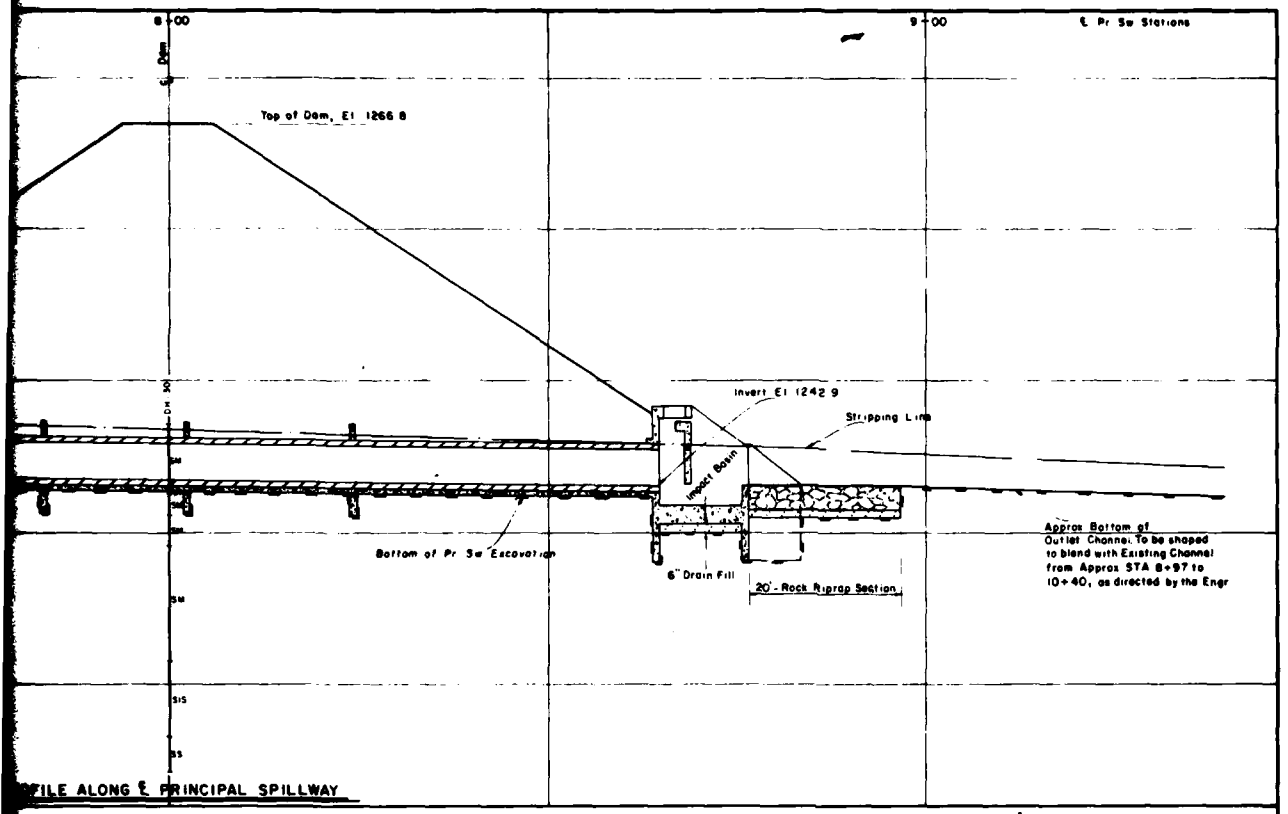
PLATE 7

D'APPOLONIA

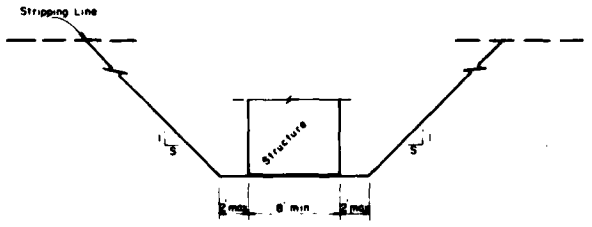
12

DRAWN BY	ACS	4-31-81	CHECKED BY	BE	5-1-81	DRAWING NUMBER 80-556-B37
			APPROVED BY	JRP	5-1-81	

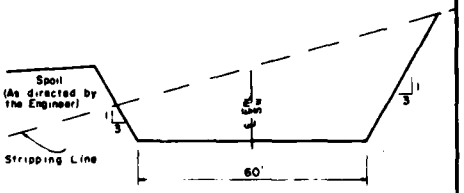




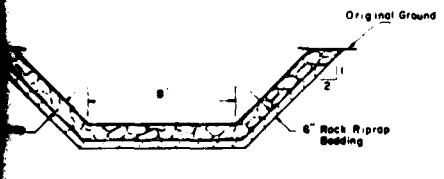
PROFILE ALONG ℄ PRINCIPAL SPILLWAY



PRINCIPAL SPILLWAY



EMERGENCY SPILLWAY



OUTLET CHANNEL
20'-Rock Riprap Section

STATION	S-S
7+28 to 7+50	1 1
7+50 to 7+70	Transition
7+70 to 8+30	2 1
8+30 to 8+50	Transition
8+50 to 8+64	1 1

PRINCIPAL SPILLWAY SECTIONS
As Directed by the Engineer

AS BUILT PLANS

SPRINGVILLE FLOOD PREVENTION PROJECT
FLOODWATER RETARDING DAM PA-RC&D-105
SUSQUEHANNA COUNTY, PENNSYLVANIA
SPILLWAY EXCAVATION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

ORISE 7-73

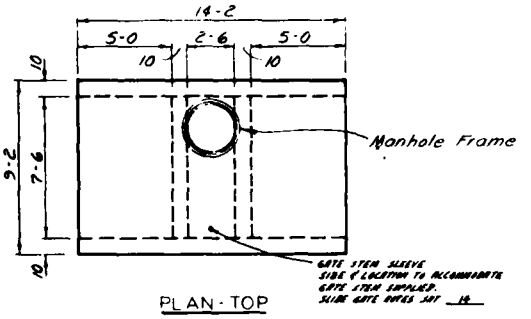
PA-RC&D-105-P

PLATE 8

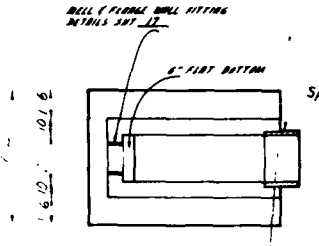
D'APPOLONIA

12

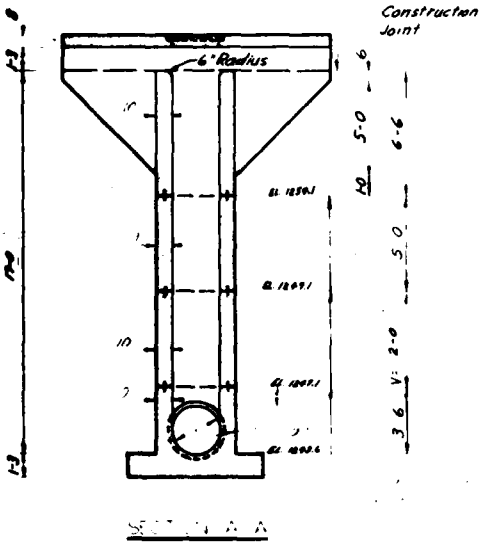
DRAWN BY	CHECKED BY		DRAWING NUMBER
ACS	BE	5-1-81	80-556-B38
4-30-81	JHH	5-1-81	
	APPROVED BY		



PLAN - TOP



1/4 x 6 Carbon
to conform to
Continuous Thru
Splices Shall
1 Butt Welded
2 Lapped 3"
3 Lapped 3"



SECTION A-A

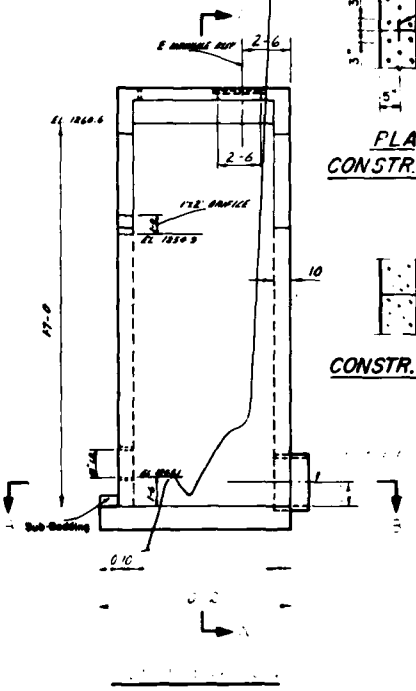


PLATE
CONSTR. J
CONSTR. J

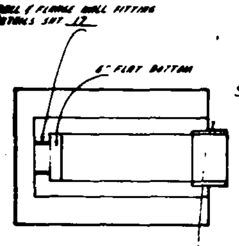
STANDARD COVERED RISER	
DESIGN CONSTANTS f'_c = 4000 psi, f_c = 1600 psi, n = 8, f_s = 20,000 psi	
STANDARD DWG. NO. ES-3030-2015E	
DATE 7-65	SHEET 1 OF 4

Steel

#4 Bars	353-6 Lin. Ft.		Lbs.
#5 Bars	2000-9 Lin. Ft.	4,304	Lbs.
#6 Bars	963-9 Lin. Ft.	633	Lbs.
#7 Bars	306-0 Lin. Ft.	6	Lbs.
	Total	4,943	Lbs.

Length of #5 Bars = (1,887-9)+(Length of Bars 21, 23, F-1, A5 and A16)
Length of #6 Bars = (413-6)+(Length of Bar A2).

Total Concrete = (20.33)+(0.72) = 21.0 Cu. Yds.



1/4 x 6 Carbon steel plate, to conform to Spec 581
Continuous Thru Constr Joint
Splices Shall Be Either:
1 Butt Welded
2 Lapped 3" And Bolted
3 Lapped 3" And Fillet Welded

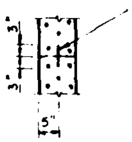
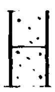
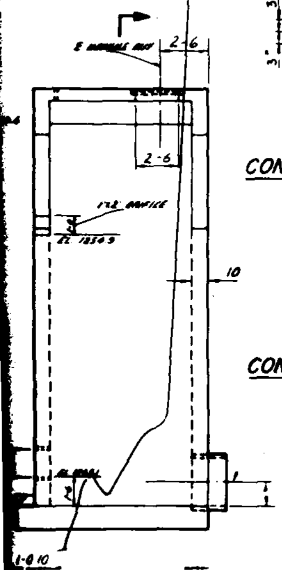


PLATE
CONSTR. JOINT



CONSTR. JOINT

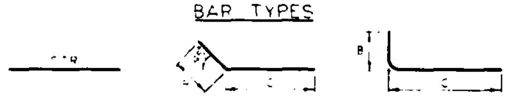


STEEL SCHEDULE

Mark	Size	Quantity	Length	Type	B	C	Total Length
[illegible]	# [illegible]	[illegible]	6 3				74 3
B[illegible]	# [illegible]	8	[illegible]	[illegible]			18-0
B3	# 7	[illegible]	3-0	21	3-0	6-0	306-0
B4	# [illegible]	8	3-9	1			78 0
B5	# 6	[illegible]	[illegible] 3	1			67-6
B6	# 6		[illegible]-3	1			5-6
[illegible]	# 5	5	7-0	21	1-1	5-11	35-0
B8	# 6	3	7-0	21	1-1	5-11	21-0
B9	# 5	14	7-0	21	1-1	5-11	98-0
[illegible]	6	10	8-3	1			82 6
B11	5	4	3-3	1			13-[illegible]
B12	6	3	[illegible]-3	1			6-9
B13	# 5	3	[illegible]-3	1			6-9
B14	# 5	10	5-9	21	0-6	5-3	57-6
B15	# 5	18	8-0	21	2-9	5-3	144-0
B16	# 5	8	2-9	1			22-0
R1	# [illegible]	20	8-9	1			175-0
R2	# 6	6	8 3	1			49-6
R3	# 5	4	3-3	1			13-0
R4	# 5	20	8-9	1			175-0
R5	# 5	16	8-0	21	2-9	5-3	128-0
R[illegible]	# 5	10	8-3	1			82-6
R7	# 5	8	3-3	1			26-0
R8	# 5	28	8-0	21	2-9	5-3	224-0

Mark	Size	Quantity	Length	Type	B	C	Total Length
T1	# 5	18	6-0	1			108-0
T2	# 5	6	8-0	1			48-0
T3	# 5	4	4-9	1			19-0
T4	# 5	4	3-6	1			14-0
T5	# 5	4	2-3	1			9-0
T6	# 5	4	9-0	19	2-0	7-0	36-0
T7	# 5	12	8-3	1			99-0
T8	# 5	2	3-3	1			6-6
T9	# 5	2	5-9	1			11-6
T10	# 5	2	10-9	1			21-6
T11	# 5	2	13 3	1			26-6
T12	# 5	14	6-3	1			87-6
T13	# 5	6	8-0	1			48-0
T14	# 5	4	6-0	1			24-0
T15	# 5	4	4-9	1			19-0
T16	# 5	4	3-6	1			14-0
T17	# 5	4	2-3	1			9-0
T18	# 5	4	9-0	19	2-0	7-0	36-0
T19	# 5	24	8-0	21	2-9	5-3	192-0
T20	# 5	2	3-3	1			6-6
T21	# 5	2	5-9	1			11-6
T22	# 5	2	8-3	1			16-6
T23	# 5	2	10-9	1			21-6
T24	# 5	2	13-3	1			26-6
T25	# 5	4	13-9	1			55-0
T26	# 5	4	13-9	1			55-0
T27	# 4	14	8-3	1			115-6
T28	# 4	2	4-9	1			9-6
T29	# 4	7	13-9	1			96-3
T30	# 4	4	5-3	1			21-0
T31	# 5	24	6-9	21	1-6	5-3	162-0
T32	# 5	2	6-6	21	1-6	5-0	13-0
T33	# 5	2	2-6	21	1-6	1-0	5-0
T34	# 4	7	13-9	1			96-3
T35	# 4	4	5-3	1			21-0

BAR TYPES



TYPE 1 TYPE 19 TYPE 21

Notes:
1. Bar dimensions are out to out of bar
2. Radius of bends equals 3 bar diameters for sizes equal to or less than #7.
3. The 2" and 3" dimensions from face of concrete to steel are clear distances.
4. Portland cement Type I-A or I with an air-entraining admixture shall be used.
5. All exposed edges of concrete to have a 1" chamfer, unless otherwise noted
6. For Manhole Cover and Frame, See Detail Sheet 14
7. For Spigot Wall Fitting, See Detail Sheet 18
8. For Trash Rack, Grating, Sleeves and Bolts, See Detail Sheet 16
9. For Construction Joints, See Detail

0 2 4 6
Scale in Feet

2,308 LBS.
633 LBS.
[illegible] LBS.
4,065 LBS.
21, 23, R[illegible], R5 and B16)
R2).
22.0 Cu. Yd.

AS BUILT PLANS

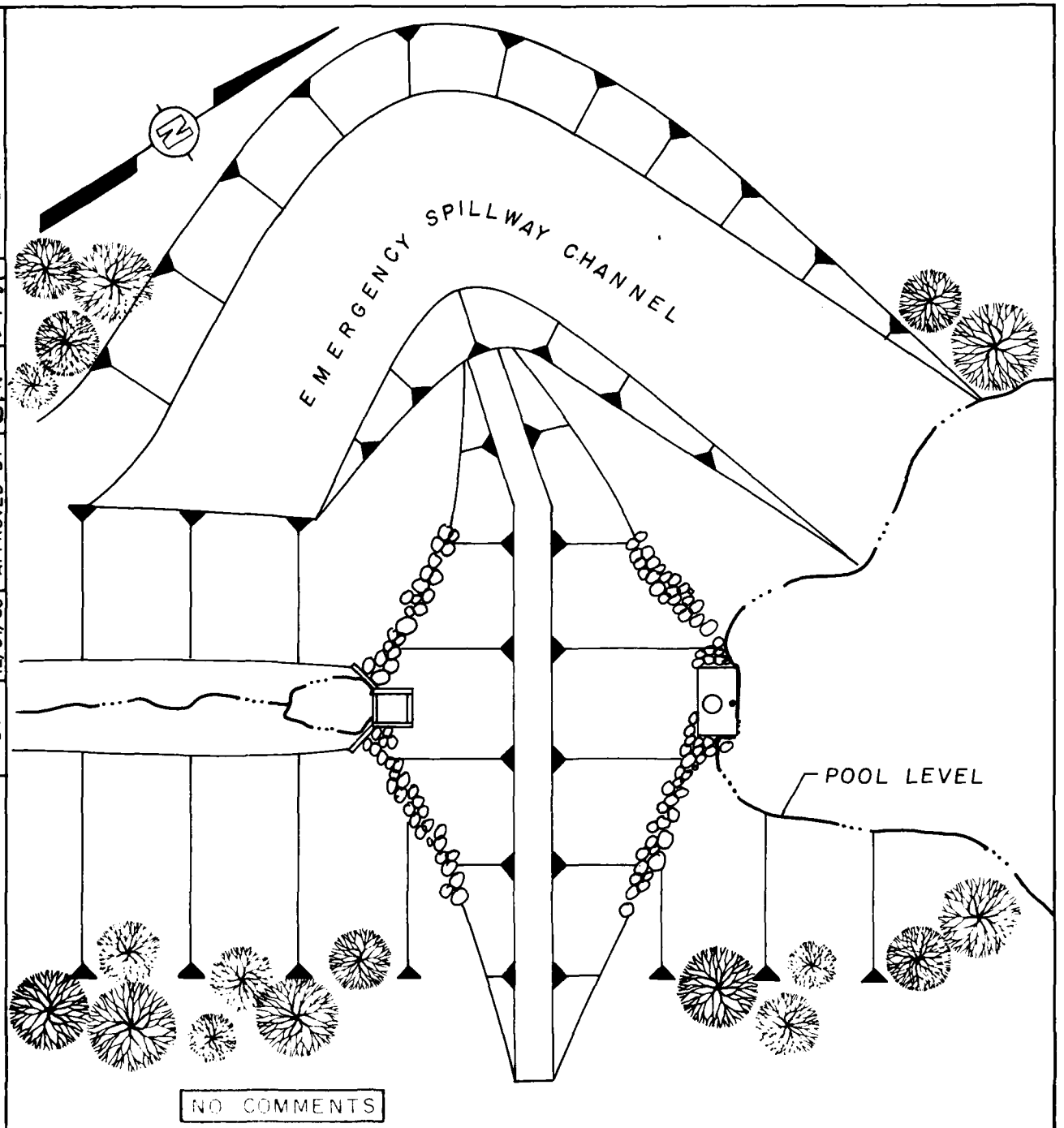
SPRINGVILLE FLOOD PREVENTION PROJECT
FLOODWATER RETARDING DAM PA-RC&D-105
SUSQUEHANNA COUNTY, PENNSYLVANIA
RISER
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Adopted H. L. Hall 4/73
4-76 12/28 PA-RC&D-105-P

PLATE 9

D'APPOLONIA

12

DRAWN BY	CHECKED BY	DRAWING NUMBER
sh 12/31/80	APPROVED BY	80-556-A 33



NO COMMENTS

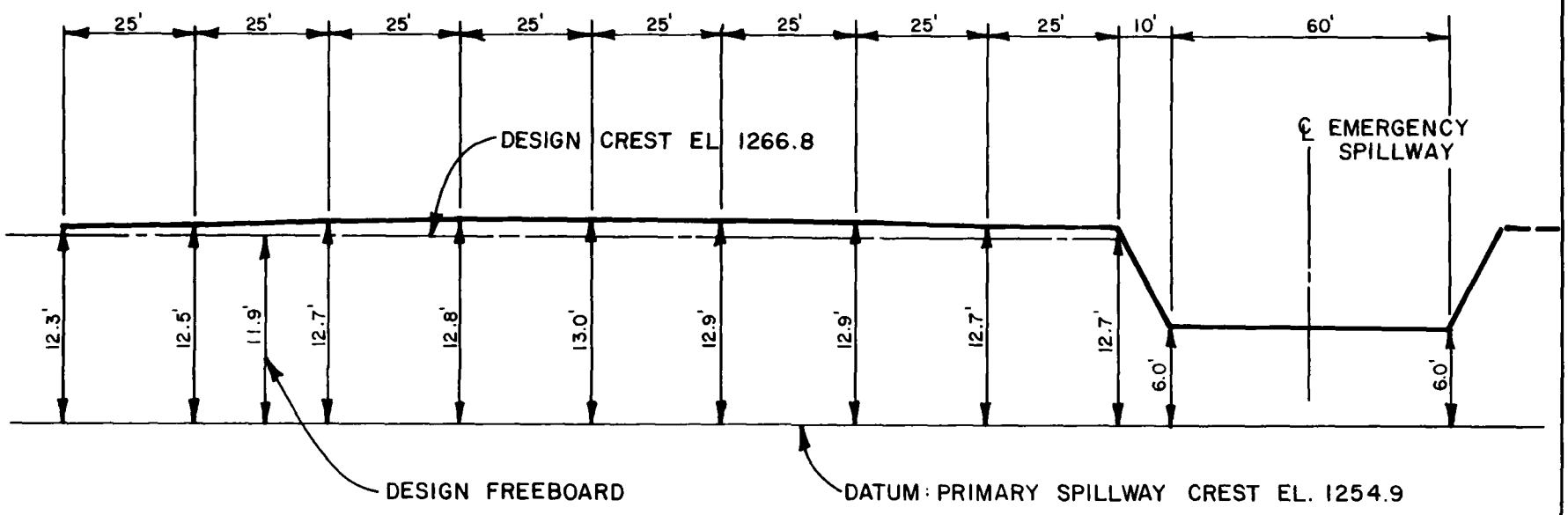
NOTE:
DAM CREST AT DATE OF INSPECTION
WATER LEVEL ~4" BELOW ORIFICE.

PLATE 10

PA-RC & D-105
GENERAL PLAN
FIELD INSPECTION NOTES
FIELD INSPECTION DATE: NOV. 13, 1980

D'APPOLONIA

DRAWN BY	MBM	CHECKED BY	BE	5-1-81	DRAWING NUMBER	80-556-A34
	12-23-80	APPROVED BY	JRP	5-1-81		



DAM CREST PROFILE
(LOOKING DOWNSTREAM)

NOTES

1. DAM CREST WAS SURVEYED RELATIVE TO SPILLWAY CREST LEVEL
2. DATUM ELEVATION PER U.S.G.S. MAP

PLATE 11

PA-RC& D-105
DAM CREST SURVEY
FIELD INSPECTION DATE: NOV. 13, 1980

D'APPOLONIA

APPENDIX F

REGIONAL GEOLOGY

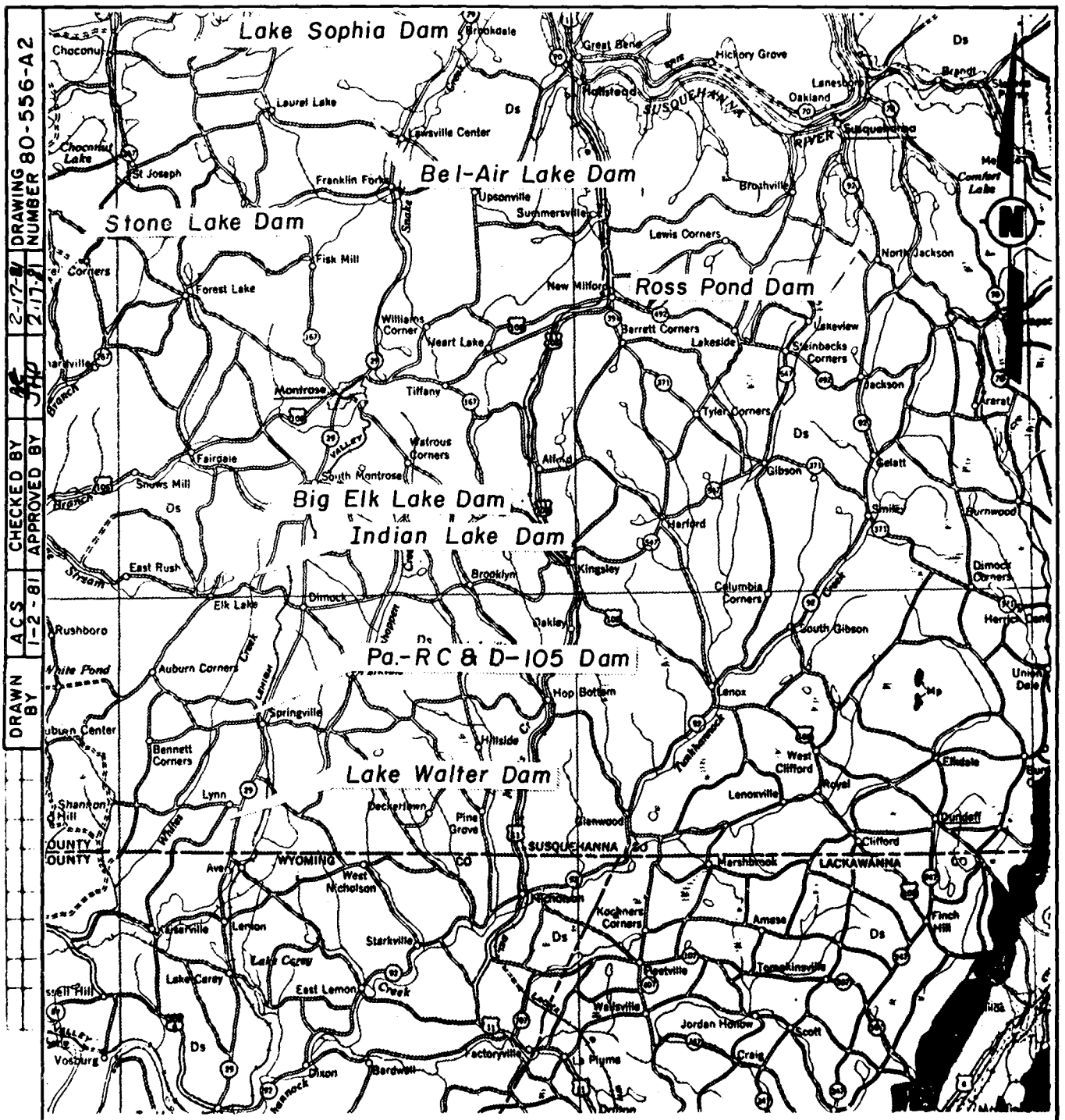
REGIONAL GEOLOGY
PA-RC&D-105 DAM

The PA-RC&D-105 Dam is located in the glaciated low plateaus section of the Appalachian Plateau physiographic province, characterized as a mature glaciated plateau of moderate relief.

The geologic structure consists of a series of northeast trending folds (approximately N70°E) which plunge gently to the southwest. The dip of the limbs of the folds in the vicinity of the PA-RC&D-105 Dam is less than two degrees, with the southeast limb steeper than the northwest limb. The dam is located on the axis of the Wilmot Anticline. In general, the discontinuity trends are northeast and northwest.

The stratigraphy consists of glacial till which will range in thickness from very thin to approximately 200 feet. The glacial till is underlain by the Devonian Catskill Formation, which is approximately 1,800 feet thick in this area. The Catskill Formation is continental in origin, consisting of red shale, cross-bedded red and green sandstone and siltstone. The shale strata tend to weather rapidly when exposed.

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER 80-556-A2
A.C.S.	AC	JHD	2-17-81
1-2-81			2-17-81



GEOLOGY MAP

REFERENCE:

GEOLOGIC MAP OF PENNSYLVANIA PREPARED BY COMMONWEALTH OF PENNA, DEPARTMENT OF ENVIRONMENTAL RESOURCES, DATED: 1960
SCALE 1:250,000

D'APPOLONIA

DRAWN BY	ACS	CHECKED BY		DRAWING NUMBER 80-556-A4
	1-2-81	APPROVED BY	2-17-81 / 2-17-81	

PENNSYLVANIAN

APPALACHIAN PLATEAU

Allegheny Group
Cyclic sequences of sandstone, shale, limestone and coal, numerous commercial coals; limestones thicken westward; Vanport Limestone in lower part of section; includes Freeport, Kittanning, and Clarion Formations.

Pottsville Group
Predominantly sandstones and conglomerates with thin shales and coals; some coals mineable locally.

ANTHRACITE REGION

Ppo

Post-Pottsville Formations
Brown or gray sandstones and shales with some conglomerate and numerous mineable coals.

Pottsville Group
Light gray to white, coarse grained sandstones and conglomerates with some mineable coal; includes Sharp Mountain, Schuylkill, and Tumbling Run Formations.

MISSISSIPPIAN

Mauch Chunk Formation
Red shales with brown to greenish gray flaggy sandstones, includes Greenbrier Limestone in Fayette, Westmoreland, and Somerset counties, Loyalhanna Limestone at the base in southwestern Pennsylvania.

Pocono Group
Predominantly gray, hard, massive, cross-bedded conglomerate and sandstone with some shale; includes in the Appalachian Plateau Burgoon, Shenango, Cuyahoga, Cussewago, Corry, and Knapp Formations, includes part of "Oswayo" of M. L. Fuller in Potter and Tioga counties.

DEVONIAN

UPPER

CENTRAL AND EASTERN PENNSYLVANIA

Oswayo Formation
Brownish and greenish gray, fine and medium grained sandstones with some shales and scattered calcareous lenses; includes red shales which become more numerous eastward. Relation to type Oswayo not proved.

Dck

Catskill Formation
Chiefly red to brownish shales and sandstones; includes gray and greenish sandstone tongues named Elk Mountain, Honesdale, Shohola, and Delaware River in the east.

Dm

Marine beds
Gray to olive brown shales, graywackes, and sandstones; contains "Chemung" beds and "Portage" beds including Burket, Brallier, Harrell, and Trimmers Rock; Tully Limestone at base.

Ds

Susquehanna Group

Barbed line is "Chemung-Catskill" contact of Second Pennsylvania Survey County reports; barbs on "Chemung" side of line.

GEOLOGY MAP LEGEND

REFERENCE:

GEOLOGIC MAP OF PENNSYLVANIA PREPARED BY COMMONWEALTH OF PENNA., DEPARTMENT OF ENVIRONMENTAL RESOURCES, DATED: 1960
SCALE 1 : 250,000

D'APPOLONIA


DAT
FILM