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O'BRIEN AND GERE ENGINEERS INC PHILADELPHIA PA JUSTIN--ETC F/G 13/2
NATIONAL DAM INSPECTION PROGRAM. WILSON CREEK DAM (NDI-PA 00318--ETC(U)
MAY 79

DACW31-79-C-0010

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DELAWARE RIVER BASIN
WILSON CREEK, PIKE COUNTY

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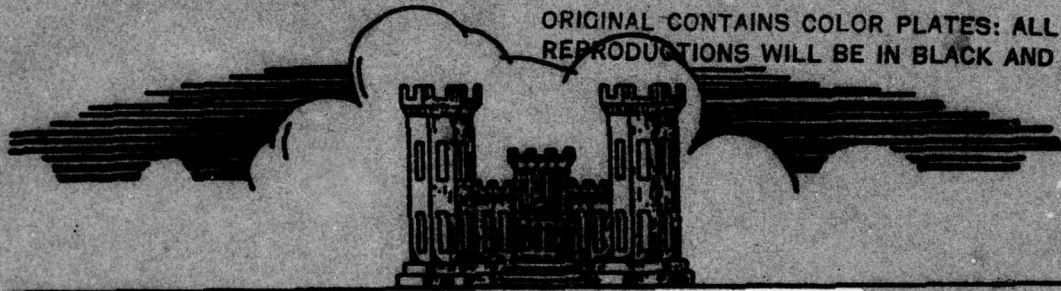
PENNSYLVANIA

WILSON CREEK DAM

NDI - PA 00318
PA DER 52-154
SCS PA - 440

PHASE I INSPECTION REPORT NATIONAL DAM INSPECTION PROGRAM

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Prepared By
O'BRIEN & GERE
Justin & Courtney Division
PHILADELPHIA, PENNSYLVANIA
19103

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

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11 May 79

DELAWARE RIVER BASIN

Name of Dam: Wilson Creek Dam

County and State: Pike County, Pennsylvania

Inventory Number: PA 00318

15 DACW31-79-C-0010

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

6 National Dam Inspection Program.
Wilson Creek Dam (NDI-PA 00318, PA
DER 52-154, SCS PA-440), Delaware River
Basin, Wilson Creek, Pike County,
Pennsylvania. Phase I Inspection Report.

Prepared by:

O'BRIEN & GERE ENGINEERS, INC.
JUSTIN & COURTNEY DIVISION

For:

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

410 760

Jul

PREFACE

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

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

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

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

ACQUISITION FOR	
NTIS Grant	
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Unannounced Justification	
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PHASE I REPORT

NATIONAL DAM INSPECTION

Name of Dam: Wilson Creek Dam ID # PA 00318
State Located: Pennsylvania
County Located: Pike
Stream: Wilson Creek
Coordinates: Latitude 41° 17.4', Longitude 75° 14.4'
Date of Inspection: December 5, 1978

ASSESSMENT

Wilson Creek Dam, is a zoned compacted earth embankment approximately 600 feet long and 32 feet high at its maximum section. The level of the reservoir is controlled by means of a single stage, drop inlet, closed conduit spillway (Principal Spillway). A grass covered spillway (Emergency Spillway) is located at the left (looking downstream) abutment.

Examination of the results of the hydrologic and hydraulic analyses indicates that the spillway system is able to pass approximately 84 percent of the Probable Maximum Flood (PMF) without the dam being overtopped. The Spillway Design Flood (SDF) for this "High" hazard structure is the PMF. Therefore, the spillway system is classified as "Inadequate", but not "Seriously Inadequate" because it passes more than 50 percent of the PMF.

Based on visual observations and review of the information obtained from the Pennsylvania Department of Environmental Resources, Wilson Creek Dam is in good condition. However, certain items require attention:

1. There is slight seepage around the Principal Spillway conduit where the conduit projects from the downstream face of the dam. It is recommended that minor excavation be performed at the outlet to examine the filter drain and determine if a riprap cover would be appropriate.
2. There is some erosion at the downstream end of the stilling basin. Riprap should be added to prevent further erosion.
3. The operating condition of the reservoir drain sluice gate should be assessed. The owner should provide access to the riser in order to operate and maintain the gate system.

4. A warning system should be developed. During periods of heavy rainfall, the dam should be monitored and downstream residents alerted in the event of an impending failure.

O'BRIEN & GERE ENGINEERS, INC.
JUSTIN & COURTNEY DIVISION

Will M. Heiser

Will M. Heiser, P.E.
Vice-President
Pennsylvania Registration #000235

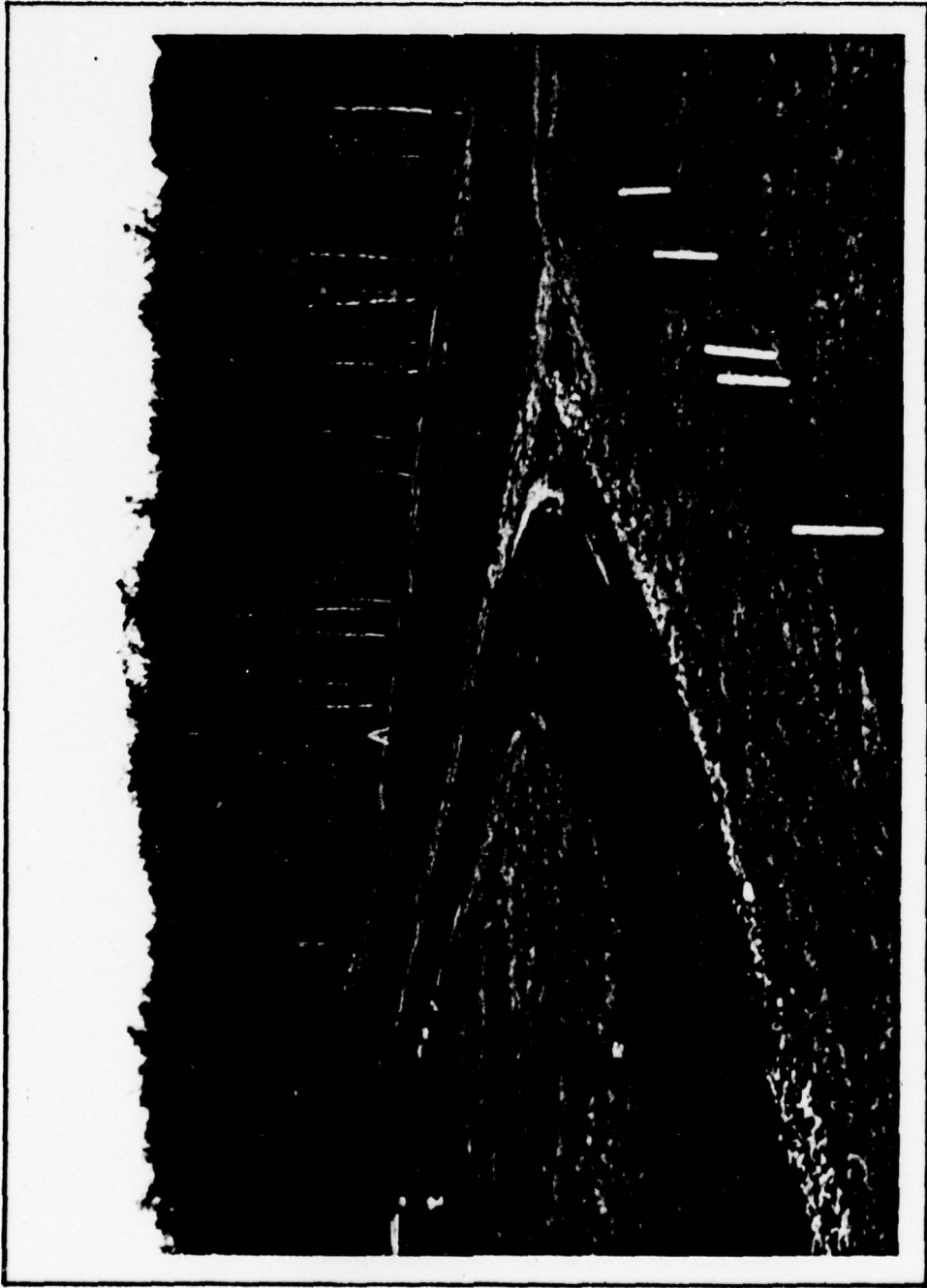


Date: JUNE 8, 1979

James W. Peck
Approved By

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 16 JUL 1979



*OVERVIEW
WILSON CREEK DAM
PIKE COUNTY, PENNSYLVANIA*

TABLE OF CONTENTS

	<u>PAGE</u>
SECTION 1 - PROJECT INFORMATION	
1.1 General	1
1.2 Description of Project	1
1.3 Pertinent Data	3
SECTION 2 - ENGINEERING DATA	
2.1 Design	6
2.2 Construction	6
2.3 Operation	6
2.4 Evaluation	6
SECTION 3 - VISUAL INSPECTION	
3.1 Findings	7
SECTION 4 - OPERATIONAL FEATURES	
4.1 Procedures	8
4.2 Maintenance of the Dam	8
4.3 Maintenance of Operating Facilities	8
4.4 Warning System in Effect	8
4.5 Evaluation of Operational Adequacy	8
SECTION 5 - HYDRAULICS AND HYDROLOGY	
5.1 Evaluation of Features	9
SECTION 6 - STRUCTURAL STABILITY	
6.1 Evaluation of Structural Stability	10
SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND PROPOSED REMEDIAL MEASURES	
7.1 Dam Assessment	11
7.2 Recommendations and Proposed Remedial Measures	11

TABLE OF CONTENTS
(Continued)

APPENDIX A -	CHECKLIST, ENGINEERING DATA, DESIGN CONSTRUCTION, OPERATION, PHASE I
APPENDIX B -	CHECKLIST, VISUAL INSPECTION, PHASE I
APPENDIX C -	HYDROLOGIC & HYDRAULIC DATA
APPENDIX D -	PHOTOGRAPHS
APPENDIX E -	DRAWINGS
APPENDIX F -	SITE GEOLOGY

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
WILSON CREEK DAM
NDI I.D. NO. PA-00318
DER # 52-154

SECTION 1

PROJECT INFORMATION

1.1 General

- a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.
- b. Purpose of Inspection. The purpose of this inspection is to evaluate the structural and hydraulic conditions at Wilson Creek Dam and to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project (Supplemented by information obtained from the Pennsylvania Department of Environmental Resources (DER), Division of Dam Safety, Harrisburg, Pennsylvania.)

- a. Description of Dam and Appurtenances. ^{ABSTRACT} Wilson Creek Dam is a zoned earth embankment with a foundation cutoff trench. The cut-off trench has a base width of 12 feet and extends into the foundation. The cut-off trench is backfilled with a zone of silty sand and silt of low permeability. The central core of the dam is composed of silty sand and silt to an elevation 9.5 feet below the top of the dam. The remainder of the dam is a pervious zone of silty gravel. The earth embankment has side slopes of 3 horizontal to 1 vertical (3H:1V) on the upstream side and 2H:1V on the downstream side. Berms exist on the upstream and downstream slopes of the dam. The berm on the upstream side is 8 feet wide and slopes towards the reservoir on a 12.5 percent grade; its lowest elevation is at the normal pool 1708.4. The berm on the downstream slope is 36 feet wide and slopes downstream on a 1.4 percent grade. This berm is used as a roadway with its lowest elevation at 1710. ^{← ABSTRACT}

There is a foundation drain trench located at the downstream toe of the impervious core. The 3-foot wide trench is excavated into the foundation, backfilled with filter material, and capped with a filter blanket 8 feet wide and 2 feet thick. The foundation drain trench intercepts the Principal Spillway conduit trench which is backfilled with filter material. The filter material in the conduit trench extends from the toe of the

impervious core to near the end of the conduit. There is a 6-inch perforated bituminous coated corrugated steel pipe on both sides of the principal spillway conduit in this trench.

The Principal Spillway consists of a 24-inch prestressed reinforced concrete conduit and an 18.4-foot high reinforced concrete riser which has a crest Elevation of 1708.4 (normal pool). The Principal Spillway conduit is laid on a concrete cradle in a 10-foot wide trench excavated into natural ground. Selected material was used to backfill around the conduit. Four (4) reinforced concrete anti-seep collars are located along the Principal Spillway conduit spaced at 22 foot centers. The two end sections of the Principal Spillway conduit are supported by a reinforced concrete cradle and a reinforced concrete "Bent" which consists of a cross beam and two 2-foot diameter piles driven to a minimum of 2 feet below the bottom of the stilling basin.

The inside dimensions of the riser are 2 feet by 6 feet. There is an orifice (crest Elev. 1708.4) on two sides of the structure. Anti-vortex walls are incorporated into the top of the riser. An 18-inch diameter bituminous coated corrugated steel draw-down pipe is provided at the base of the riser along with an 18 inch diameter sluice gate.

An Emergency Spillway is located at the left abutment of the dam. The spillway is a trapezoidal section formed by excavation of the natural material at the left abutment. The spillway has a bottom width of 82 feet, side slopes of 3H:1V, and is grass lined. There is a 30-foot long level section located just downstream from the centerline of the dam. The Elevation of the level section is 1715.2. A 350-foot long forebay channel slopes upward on a 2 percent grade to the level section. Downstream from the level section the channel slopes downward on a 3.2 percent grade for about 350 feet before blending in with the natural ground.

- b. Location. Wilson Creek Dam is located on Wilson Creek at a point about $\frac{1}{2}$ mile upstream and northeast of Roemersville, in Green township, Pike County, Pennsylvania. The dam site is shown on the USGS Quadrangle entitled "Promised Land, Pennsylvania" at coordinates N 41° 17.4', W 75° 14.4'. A regional location plan of Wilson Creek Dam is enclosed as Plate 1, Appendix E.
- c. Size Classification. Wilson Creek Dam has a maximum height of 32 feet and a maximum storage capacity of 917 acre feet of the top of dam. The structure is in the "Small" size category.
- d. Hazard Classification. There are five homes located on the shores of Wynooska Lake about $\frac{3}{4}$ of a mile downstream from Wilson Creek Dam. The topography downstream of the dam is such that flood waters would be directed towards these homes resulting in probable loss of lives and extensive property damage. Therefore, the dam is in the "High" hazard category.

- e. Ownership. The dam is owned by the Pike County Commissioners, County Court House, Milford, Pennsylvania, 18337.
- f. Purpose of Dam. The primary purpose of the dam is flood control. The 13 acre normal pond is used for private recreation.
- g. Design and Construction History. The application to construct Wilson Creek Dam was submitted on January 21, 1963, by the Pike County Commissioners. The "Report Upon the Application of the Pike County Commissioners" was prepared on May 9, 1963, by the Commonwealth of Pennsylvania. The permit to construct Wilson Creek Dam was issued by the Commonwealth of Pennsylvania on May 14, 1963.

The dam was designed by the engineering staff of the Soil Conservation Service (SCS). The Emergency Spillway width of 70 feet on the original SCS design of October 1962 was increased to 82 feet in May 1963 to satisfy the "C" curve requirements of DER.

Construction began in July, 1963, and the dam was officially completed on July 22, 1964. Final inspection was made on October 23, 1964.

- h. Normal Operating Procedures. For this type of structure, the reservoir is normally maintained at the crest of the Principal Spillway, Elevation 1708.4. A representative of the Pike County Commissioners was not available to operate the reservoir drain sluice gate during the inspection.

1.3 Pertinent Data

- a. Drainage Area. The drainage area for Wilson Lake Dam is 1.80 square miles, as taken from information provided by the DER and verified on topographic maps.
- b. Discharge at Dam Site. In a phone conversation, Frank Razney, Pike County Dam Inspector, stated that no high pool or discharge records are kept for this site. The combined capacity of the Principal and Emergency Spillways, with the water level at the design top of dam (Elevation 1719.5), is approximately 2,070 cfs.
- c. Elevation (Feet above MSL).

Principal Spillway Crest (Normal Pool)	1708.4
Emergency Spillway Crest (Flood Control Pool)	1715.2
Top of Dam	1719.5
Reservoir Drain Invert (Inlet)	1690.5
Reservoir Drain Invert (Outlet) & Principal Spillway Invert (Outlet)	1688.0
Streambed at Centerline of Dam	1692.0+
Maximum Tailwater	1687.0+

d. Reservoir (Miles).

Length of Normal, Recreation Pool, Elev. 1708.4	0.51
Length of Flood Control Pool, Elev. 1715.2	0.97
Length of Maximum Pool, Top of Dam, Elev. 1719.5	1.01

e. Total Storage (Acre-feet).

Normal, Recreation Pool, Elev. 1708.4	45
Flood Control Pool, Elev. 1715.2	403
Top of Dam, Elev. 1719.5	917

f. Reservoir Surface Area (Acres).

Normal, Recreation Pool, Elev. 1708.4	13
Flood Control Pool, Elev. 1715.2	85
Top of Dam, Elev. 1719.5	140

g. Dam Data.

Type	Compacted Earth Embankment
Length	600 feet +
Height	32 feet (maximum)
Top Width	14.0 feet
Side Slopes	3H:1V (Upstream); 2H:1V (downstream)
Zoning	Yes, refer to Section 1.2.a
Impervious Core	Yes, refer to Section 1.2.a
Cutoff	Yes, refer to Section 1.2.a
Grout Curtain	No

h. Spillways.

Principal

Type	Drop Inlet Closed Conduit
Length of Weir	12 Feet
Crest Elevation	1708.4
Gates	18-inch sluice gate on the upstream endwall. This is part of the reservoir drain system.
Upstream Channel	N/A
Downstream Channel	8 foot bottom width, 2H:1V side slopes.

Emergency

Type	Vegetated earth cut
Length of Weir	82 feet
Crest Elevation	1715.2
Gates	None
Upstream Channel	Refer to Section 1.2.a
Downstream Channel	Refer to Section 1.2.a

i. Diversion and Regulating Tunnel

None

j. Outlet Works

Type

18-inch bituminous coated
corrugated steel pipe.

Length

34 feet

Closure

18-inch diameter sluice gate
mounted on upstream face of
upstream endwall of riser.

Access

Submerged unless reservoir is
drawn down.

Regulating Facilities

Sluice gate hoist mounted on
top slab of riser.

SECTION 2
ENGINEERING DATA

2.1 Design

- a. Data Available. The information available for review of Wilson Creek Dam includes the following information obtained from the Pennsylvania DER, Dam Safety Division, Harrisburg, Pennsylvania:
1. Complete set of SCS "as-built" drawings.
 2. Complete SCS Design Folder.
 3. Application, Report on the Application, and Permit to build the dam.
 4. Dam inspection reports through the years.
 5. Construction progress reports.
 6. Miscellaneous correspondence.
 7. One photograph from 1964.
- b. Design Features. The design features are discussed in Section 1.2.a and shown on Plates 3, 4, 5 and 6 of Appendix E.

2.2 Construction

According to progress reports, construction began in July, 1963, and the dam was officially completed on July 22, 1964. Final inspection was made on October 23, 1964.

2.3 Operation

Operation procedures appear to be limited to those necessary to draw down the reservoir by means of the sluice gate located on the upstream face of the upstream endwall of the riser. Frank Razney, Pike County Dam Inspector, stated that there are no written operating procedures for this structure.

2.4 Evaluation

- a. Availability. The SCS design material and a complete set of SCS "as-built" drawings are available from DER.
- b. Adequacy. Available information concerning design and construction is adequate for a Phase I investigation.
- c. Validity. There is no reason to question the validity of the data available from DER.

SECTION 3
VISUAL INSPECTION

3.1 Findings

- a. General. The field inspection of the Wilson Creek Dam took place on December 5, 1978. The reservoir water surface elevation was approximately 1708.5 during the inspection. The observations and comments of the field inspection team are in the checklist which is Appendix B of this reports. The appearance of the facility indicates that the dam and its appurtenances are well maintained.
- b. Dam. The dam is in good condition. There are minor undulations (+ 0.5 feet) along the top of the dam and along both the upstream and downstream earth embankment slopes. There is slight seepage on the downstream earth embankment slope around the principal spillway conduit.
- c. Appurtenant Structures. The visible portions of the Principal Spillway system appear to be in good condition. The operating condition of the reservoir drain sluice gate could not be appraised. The owners representative was not available on the day of inspection, there was no operating wheel for the hoist mechanism, and the operating mechanism was located on top of the riser which was inaccessible from the shoreline.

The Emergency Spillway appears to be in good condition with adequate grass cover. There was no evidence of erosion or slope instability on the day of inspection.
- d. Reservoir. Area reconnaissance of the reservoir disclosed no evidence of excessive siltation, slope instability, or other features that would significantly affect the storage capacity of the reservoir. The slopes along the perimeter of the reservoir are vegetated and on gradients of less than ten percent.
- e. Downstream Channel. Approximately 2,500 feet downstream of the dam, Wilson Creek flows under the state route 390 bridge. Approximately 500 feet downstream of the bridge, Wilson Creek flows into Wyooska Lake. The channel gradient averages about 4 percent for the entire 3,000 feet from Wilson Creek Dam to Wyooska Lake. There are 5 homes within the potential damage area along the shores of Wyooska Lake.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures

Operational procedures have been covered in Section 1.2.a. According to Frank Razney, Pike County Dam Inspector, there are no written operating procedures for this structure.

4.2 Maintenance of the Dam

Annual inspection reports by SCS are available in the DER files for 1968 and 1970 through 1977. Maintenance of the dam is performed in accordance with requirements specified in these yearly reports. In general, the required maintenance has consisted of cutting the grass and removal of debris from the spillway areas. It is not known if inspections were performed prior to 1968 or in 1969.

4.3 Maintenance of Operating Facilities

The reservoir drain system sluice gate is maintained by the Pike County Commissioners. For further discussion of the sluice gate, refer to Section 3.1.c.

4.4 Warning System in Effect

According to Frank Razney, Pike County Dam Inspector, there is no formal warning system or procedures to be followed during periods of exceedingly heavy rainfall.

4.5 Evaluation of Operational Adequacy

The operation and maintenance procedures appear to be satisfactory for the Wilson Creek Dam.

A formal warning system should be implemented because of the probability of loss of life and extensive property damage downstream in the event of a failure of the dam.

The dam is accessible under all weather conditions for inspection and emergency action.

SECTION 5

HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

- a. Design Data. The complete SCS hydrologic and hydraulic design was reviewed. A summary of the SCS hydrologic and hydraulic design is enclosed in Appendix C, Sheet 8.

The drainage basin contributing to Wilson Creek Dam is about 1.1 miles long and averages about 1.7 miles wide. Ground elevations range from 1880 to 1708. Most of the slopes of the drainage basin adjacent to the reservoir are less than ten percent. The drainage basin is nearly 100 percent wooded. The runoff characteristics of the drainage basin may undergo change in the future as a result of development.

- b. Experience Data. According to Frank Razney, Pike County Dam Inspector, no rainfall or water level records are kept for this dam.

- c. Visual Observations. The spillway system which consists of the Principal Spillway and the Emergency Spillway, is in good condition. Further observations are given in Appendix B.

- d. Overtopping Potential. The spillway system is capable of handling a discharge of 2,070 cfs. without overtopping of the dam. The recommended Spillway Design Flood (SDF) for this "Small" size dam, with a "High" hazard classification is the range between 50 percent PMF and PMF. Because of the high hazard downstream, the PMF should be used to evaluate the dam. The PMF hydrograph was routed through the reservoir with the starting water surface elevation at the crest of the Principal Spillway, Elevation 1708.4. The peak inflow and the peak outflow for the PMF are 4,220 cfs. and 3,180 cfs. respectively. The maximum water surface elevation in the reservoir resulting from the PMF routing would be 4.8 feet above the Emergency Spillway crest and 0.5 feet above the design top of dam elevation.

Examination of the results of the hydrologic and hydraulic analysis indicate that the spillway system is capable of passing 84 percent of the PMF without exceeding the design top of dam elevation.

- e. Spillway Adequacy. Since the spillway system passes 84 percent of the PMF without exceeding the design top of dam elevation, the spillway system is classified as "Inadequate", but not "Seriously Inadequate" because it passes more than 50 percent of the PMF.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

- a. Visual Observations. There are minor undulations (+ 0.5 feet) along the top of the dam and along both the upstream and downstream earth embankment slopes. Slight seepage (1 to 2 gpm) is evident on the downstream earth embankment slope around the principal spillway conduit. Neither of these situations appear to threaten the stability of the dam.

Based on the field inspection, the Principal Spillway and the Emergency spillway show no visible signs of structural instability.

- b. Design and Construction Data. The earth embankment cross section geometry shown on the drawings was verified during the field inspection. The embankment and foundation design is consistent with SCS criteria and the recommendations of the Soils Mechanics Laboratory Report.

SCS inspection personnel were reported to be present on the job site during the entire construction operation.

- c. Operating Records. According to Frank Razney, Pike County Dam Inspector, there are no operating records maintained for this structure.
- d. Post Construction Changes. No reported post construction changes are included in the information provided by DER.
- e. Seismic Stability. The dam is located within Seismic Risk Zone 1 of the Seismic Zone Map of Contiguous States. A dam located in Seismic Zone 1 is generally considered to be safe under any expected Zone 1 earthquake loading conditions if it is safe under static loading conditions.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

- a. Safety. The visual observations and review of available information indicate that the Wilson Creek Dam is in good condition.

As stated in Section 5.1.d the SDF selected is the PMF for this "Small" size, "High" hazard dam. Examination of the results of hydrologic and hydraulic analyses indicate that the spillway system is capable of passing 84 percent of the PMF without exceeding the design top of dam elevation. Therefore, the spillway system is classified as "Inadequate" but not "Seriously Inadequate" because it passes more than 50 percent of the PMF.

- b. Adequacy of Information. The information available from DER and observation made during the field inspection, are adequate to make a Phase I evaluation of the dam.
- c. Urgency. The recommendations in Section 7.2 should be implemented as soon as possible.
- d. Necessity for Further Investigation. No further investigations are recommended at this time.

7.2 Recommendations and Proposed Remedial Measures

a. Facilities.

1. There is slight seepage around the Principal Spillway conduit where the conduit projects from the downstream face of the dam. According to the plans, a trench backfilled with filter material is located along the conduit. Apparently the filter was capped with an earth cover at the downstream toe. It is recommended that minor excavation be performed at the outlet to examine the filter drain and determine if a riprap cover would be appropriate.
2. There is some erosion at the downstream end of the stilling basin. Riprap should be added to prevent further erosion.
3. The operating condition of the reservoir drain sluice gate should be assessed. The owner should provide access to the riser in order to operate and maintain the gate system.

b. Operation and Maintenance Procedures.

1. A warning system should be developed. During periods of heavy rainfall, the dam should be monitored and downstream residents alerted in the event of an impending failure.

APPENDIX

A

Check List Engineering Data
Design, Construction, Operation

Phase I

NAME OF DAM Wilson Creek Dam

ID # PA 00318

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

Sheet 1 of 4

ITEM

REMARKS

AS-BUILT DRAWINGS

A complete set of as-built drawings prepared U.S.D.A., Soil Conservation Service (SCS) has been provided for our use by the Pennsylvania Dept. of Environmental Resources (DER)

REGIONAL VICINITY MAP

Sheet 1 of 10 of the SCS as-built drawings has a regional vicinity map for the site. Plate 1, Appendix E of this report is a regional vicinity map prepared from a USGS Quad sheet.

CONSTRUCTION HISTORY

Construction was commenced on 6/20/63 and completed on 7/22/64
Final inspection was made on 10/27/64

TYPICAL SECTIONS OF DAM

Refer to Plates 4 and 6, Appendix E of this report

OUTLETS - PLAN

Refer to Plates 3 and 6 Appendix E of this report

DETAILS

CONSTRAINTS

SCS Design Folder, Hydraulics and Hydrology Section, Item 4 Discharge Computations and Appendix C of this report.

DISCHARGE RATINGS

RAINFALL/RESERVOIR RECORDS

None kept

ITEM	REMARKS
MONITORING SYSTEMS	<i>None</i>
MODIFICATIONS	<i>None</i>
HIGH POOL RECORDS	<i>None</i>
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	<i>None</i>
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	<i>None</i>
MAINTENANCE OPERATION RECORDS	<i>SAS has records</i>

REMARKS

ITEM

SPILLWAY PLAN

SECTIONS

DETAILS

Principal Spillway, Plates 3 and 6, Appendix E of this report
 Emergency Spillway, Plates 3 and 4, Appendix E of this report

OPERATING EQUIPMENT
 PLANS & DETAILS

The sluice gate is the only operational item on this structure.
 Refer to Plate 6, Appendix E of this report

MISCELLANEOUS Material in DER Files

1. Complete set of SCS As-Built drawings.
2. Complete SCS Design Folder
3. Application, Report on the Application, and Permit to build the dam
4. Dam inspection reports through the years.
5. Construction progress reports.
6. Miscellaneous correspondence.
7. One photograph from 1964

APPENDIX

B

Check List

Visual Inspection

Phase I

CHECK LIST
VISUAL INSPECTION
PHASE I

Sheet 1 of 11

Name Dam Wilson Creek Dam County Pike State Pennsylvania National ID # PA 00318

Type of Dam Compacted Earth Fill Hazard Category _____

Date(s) Inspection Dec 5, 1978 Weather Cloudy, Cool Temperature ~40°F

Pool Elevation at Time of Inspection 1708.5 ± M.S.L. Tailwater at Time of Inspection 1686.0 ± M.S.L.

Inspection Personnel:

Leonard R. Beck _____ George C. Elias _____
Robert Bowers _____ Dana Pizarro _____
David Campbell _____ Leonard R. Beck _____ Recorder

Remarks:

A representative of the Pike County Commissioners did not accompany us during the inspection even though it was understood a representative of the Commissioners would be present.

CONCRETE/MASONRY DAMS

Sheet 2 of 11

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

ANY NOTICEABLE SEEPAGE

N/A

STRUCTURE TO
ABUTMENT/EMBANKMENT
JUNCTIONS

N/A

DRAINS

N/A

WATER PASSAGES

N/A

FOUNDATION

N/A

CONCRETE/MASONRY DAMS

Sheet 3 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N/A	
STRUCTURAL CRACKING	N/A	
VERTICAL AND HORIZONTAL ALIGNMENT	N/A	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	N/A	

EMBANKMENT

Sheet 4 of 11

REMARKS OR RECOMMENDATIONS

OBSERVATIONS

VISUAL EXAMINATION OF

SURFACE CRACKS

None observed

None

UNUSUAL MOVEMENT OR
CRACKING AT OR BEYOND
THE TOE

None observed

None

SLOUGHING OR EROSION OF
EMBANKMENT AND ABUTMENT
SLOPES

None observed

None

VERTICAL AND HORIZONTAL
ALIGNMENT OF THE CREST

No problems with alignment

None

RIPRAP FAILURES

No riprap on dam

None

EMBANKMENT

Sheet 5 of 11

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

JUNCTION OF EMBANKMENT
AND ABUTMENT, SPILLWAY
AND DAM

No problems

None

ANY NOTICEABLE SEEPAGE

*Slight seepage on downstream
embankment slope around
principal spillway abutment*

*slope could be
rapped with
riprap in this
area.*

STAFF GAGE AND RECORDER

None

None

DRAINS

*Slight discharge from the
drainage system conduits*

None

OUTLET WORKS

Sheet 6 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None	None
INTAKE STRUCTURE	No problems	None
OUTLET STRUCTURE	No problems	None
OUTLET CHANNEL	Some erosion on the downstream side of the scour hole	No real problem... the just the continuing adjustment of the scour hole configuration
EMERGENCY GATE	Sluice gate was not operated because the hoist wheel was not on the hoist.	Could have asked the county commissioners representative to operate it if he had been present

GATED SPILLWAY

Sheet 8 of 11

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

INSTRUMENTATION

VISUAL EXAMINATION OBSERVATIONS REMARKS OR RECOMMENDATIONS

MONUMENTATION/SURVEYS

None Observed

OBSERVATION WELLS

None Observed

WEIRS

None Observed

PIEZOMETERS

None Observed

OTHER

N/A

RESERVOIR

Sheet 10 of 11

VISUAL EXAMINATION OF

OBSERVATIONS

REMARKS OR RECOMMENDATIONS

SLOPES

Mostly the slopes
surrounding the
reservoir are less
than 10%

None

SEDIMENTATION

Reconnaissance of the reservoir
disclosed no evidence of significant
silting, slope instability, or other
features that would significantly
affect the storage capacity of
the reservoir.

The dam is
designed to
impound the
50 gr. sediment
accumulation as
part of the
permanent pool.

DOWNSTREAM CHANNEL

Sheet 11 of 11

REMARKS OR RECOMMENDATIONS

Route 370 bridge may be a problem for higher discharges.

OBSERVATIONS

Approximately 2500 feet downstream of the dam Wilson Creek flows through the state route 370 bridge. About 3000 feet downstream of the dam Wilson Creek flows into Wynooska Lake.

VISUAL EXAMINATION OF

CONDITION
(OBSTRUCTIONS,
DEBRIS, ETC.)

SLOPES

The channel gradient averages about 4% for the entire 3000 feet from Wilson Creek Dam to Wynooska Lake.

None

APPROXIMATE NO.
OF HOMES AND
POPULATION

There are 5 homes and approximately 25 people.

A formal warning system should be developed and implemented when needed.

APPENDIX

C

Hydrologic & Hydraulic Data

SUBJECT	WILSON CREEK DAM	SHEET	BY	DATE	JOB NO.
			JG	3/29/79	52-154

Table of Contents APPENDIX C

PMP calculations _____ Sh 1
Snyder coefficients _____ Sh 1
Stage - Storage Values _____ Sh 2
Stage - Discharge Values _____ Sh 2
HEC-I Dam Safety Version _____ Sh 3-7
 Computer Printout.
Summary of Soil Conservation _____ Sh 8
Service's Hydrologic & Hydraulic Design



SUBJECT	WILSON CREEK DAM	SHEET	1	BY	RRB	DATE	3/28/79	JOB NO.	
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LF 3/29/79

HYDROLOGY CALCS.

DRAWAGE AREA : 1.8 SQUARE MILES

PMP CALCULATIONS (HMS REPORT 33)

AREA IS IN ZONE 1

24 HR. 200 SQ. MI. RAINFALL = 21.5"

HR.	%	RAINFALL	ΔRF
6	111	23.9"	23.9"
12	123	26.4"	2.5"
24	133	28.6"	2.2"

SNYDER COEFFICIENTS

FROM INFO. PROVIDED BY COE FOR THE DELAWARE RIVER BASIN, ZONE 1 :

$C_A = 0.45$

AND $C_T = 1.23$

$t_A = C_T (L \cdot L_{ca})^{0.3}$

$L = 1.9$ miles

$L_{ca} = 0.9$ miles

$t_A = 1.23 (1.9 \cdot 0.9)^{0.3} = 1.44$ HRS.

3/29/79

STAGE-STORAGE CURVE VALUES (OBTAINED FROM SCS INFORMATION)

<u>ELEVATION</u>	<u>STORAGE (A-F.T.)</u>
1708.4	0
1710.0	42.7
1715.0	346.7
1717.3	579.9
1720.0	937.9

STAGE-DISCHARGE CURVE VALUES (OBTAINED FROM SCS INFORMATION)

WEIR FLOW → $Q_w = C L H_w^{3/2} = 3.1(12) H_w^{3/2} = 37.2 H_w^{3/2}$
 PIPE FLOW → $Q_p = 12.13 H_p^{1/2}$

EMERGENCY SPILLWAY → CALCULATIONS OBTAINED FROM SCS WERE FOR A 70' WIDE SPILLWAY, HOWEVER IT WAS REVISED TO 82' WIDE.

$Q_{ES} = 9.0 C (Z d_c + L)$ See Note Below

<u>STAGE</u>	<u>H_w</u>	<u>Q_w</u>	<u>H_p</u>	<u>Q_p</u>	<u>H_{ES}</u>	<u>Q_{ES}</u>	<u>Q_{TOTAL}</u>
1708.4	0	0					0
1709.0	0.6	17.3					17.3
1709.7	1.3	55.2	21.9	56.8			55.2
1712.0			24.2	59.7			59.7
1715.2			27.4	63.5	0	0	63.5
1716.96			29.14	65.5	1.76	423.8	489.3
1717.85			30.05	66.5	2.65	863.8	930.3
1718.59			30.79	67.3	3.39	1316.0	1383.3
1719.24			31.44	68.1	4.04	1779.2	1847.3
1720.34			32.54	69.2	5.14	2734.5	2803.7

NOTE SCS, TR #3 Earth Spillways, ES-9B & ES-12A

SA 3

 FLOOD HYDROGRAPH
 DAM SERIES NO. 1
 LAST MODIFIED 1/74

NATIONAL DAM INSPECTION PROGRAM
 WILSON CREEK DAM
 PAF HYDROGRAPH

TIME	INFL	OUTFL	RES	RES	RES	RES	RES
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

INFLON

OUTFLO

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

RES

 FLOOD HYDROGRAPH PACKAGE (MFC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 25 SEP 78

RUN DATE 03/29/79
 TIME 08.01.17.

St 4

NATIONAL DAM INSPECTION PROGRAM
 WILSON CREEK DAM
 PMF HYDROGRAPH

JOB SPECIFICATION
 NQ NHR MMIN IDAY IHW IMIN METRC IPLT IPRT NSTAN
 150 0 30 0 0 0 0 0 0 0
 JOPEL MWT LROPT TRACE
 5 0 0 0

MULTI-PLAN ANALYSES TO BE PERFORMED

RTIOS= .20 .30 .40 .50 .60 .70 .80 .90 1.00
 NPLAN# 1 NRTIO# 1 LRTIO# 1

SUB-AREA RUNOFF COMPUTATION

RUNOFF TO WILSON CREEK RESERVOIR

ISTAO ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
 INFLOW 0 0 0 0 0 0 0 0 0 0

HYDROGRAPH DATA
 INYDG IUMG TAREA SNAP TRSDA THSPC RATIO ISHOW ISAME LOCAL
 1 1 1.00 0.00 1.00 0.00 0.00 0.00 0 0 1 0

PRECIP. DATA

SPFE PHS R6 R12 R24 R48 R72 R96
 0.00 21.50 111.00 123.00 133.00 0.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT STKR DLTKB RTIOL ERAIN STMS RTIOK STIRL CNSIL ALSML RIIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 1.00 0.05 0.00 0.00

UNIT HYDROGRAPH DATA

TP= 1.00 CP= .05 NTA= 0

RECESSION DATA

STRTO= -1.50 GRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH DATA

MO.ADA MR.MN RERIOR RAIN EXCS LOSS COMP Q MO.DA MR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 22.00 21.02 1.05 50941.
 (501.) (536.) (47.) (1442.49)

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)

PH 6

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS								
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9
				.20	.30	.40	.50	.60	.70	.80	.90	1.00
HYDROGRAPH AT INFLOW	(	1.00 4.66)	1 (	843. 23,881)	1265. 35,821)	1687. 47,771)	2109. 59,711)	2530. 71,651)	2952. 83,591)	3374. 95,531)	3795. 107,471)	4217. 119,411)
ROUTED TO	OUTFLO	(	1 4.66)	63. 1,781)	278. 7,881)	544. 15,531)	882. 24,981)	1224. 36,771)	1594. 44,851)	2006. 56,811)	2523. 71,431)	3181. 90,081)

SUMMARY OF DAM SAFETY ANALYSIS

SH 2

PLAN 1

RATIO OF PHF	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	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	1714.75	1700.40	1700.40	1719.50	0.00	332.	63.	0.00	25.00	0.00
.30	1716.04	0.	0.	872.	0.00	457.	278.	0.00	22.00	0.00
.40	1717.04	0.	0.	0.	0.00	556.	546.	0.00	21.00	0.00
.50	1717.75	0.	0.	0.	0.00	640.	882.	0.00	20.50	0.00
.60	1718.34	0.	0.	0.	0.00	717.	1228.	0.00	20.00	0.00
.70	1718.87	0.	0.	0.	0.00	788.	1584.	0.00	20.00	0.00
.80	1719.36	0.	0.	0.	0.00	853.	2006.	0.00	19.50	0.00
.90	1719.73	0.	0.	0.	.23	903.	2523.	2.00	19.50	0.00
1.00	1720.00	0.	0.	0.	.50	936.	3181.	3.00	19.00	0.00



SUBJECT	Witoni Creek Dam	SHEET	8	BY	JG	DATE	6/8/79	JOB NO	
---------	------------------	-------	---	----	----	------	--------	--------	--

*Summary of the Soil Conservation Service's
Hydrologic & Hydraulic design*

1. The normal pool or crest elevation of the orifice in the riser unit of the principal spillway was set by the land owner, however, it exceeds the 50 year sediment requirement. (1708.4 feet)
2. A runoff in excess of a 100 year frequency storm (4 inches of runoff) determines the crest elevation of the emergency spillway. (1715.2 feet).
3. 0.94 x 6 hour point rainfall (7.71 inches of runoff) determines the maximum design high water. (1717.3 feet)
4. 1.25 x 6 hour point rainfall (10.17 inches of runoff) sets the elevation of the top of the dam. (1719.5 feet). In this case the "C" Curve requirements for the emergency spillway governed its size so that the top of the dam will be above the Soil Conservation freeboard storm.

11 C = 2.7 used by C. H. ZINN of the Dept. of Forests & Waters - DIV. of Flood Control (Now DER)

APPENDIX

D

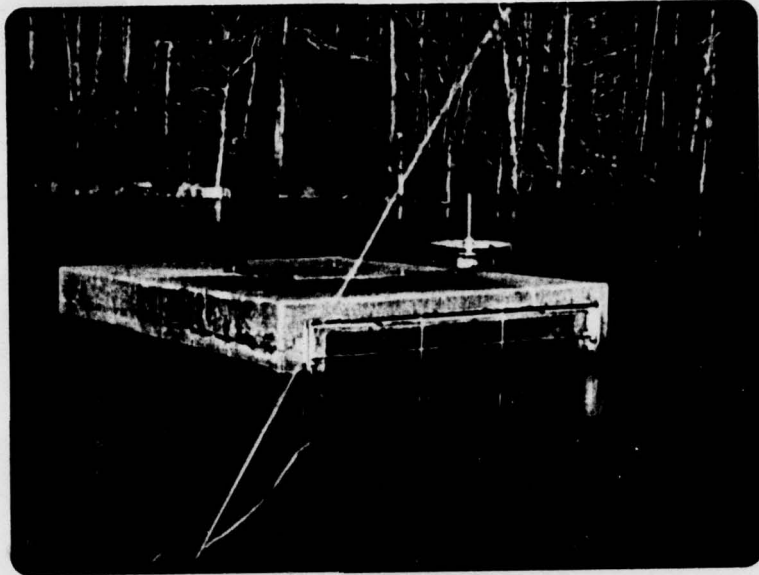
Photographs



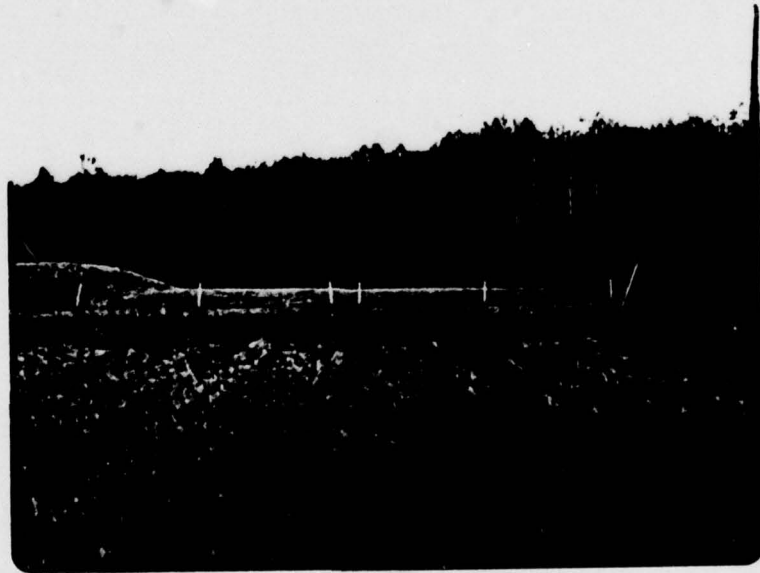
*VIEW LOOKING ACROSS THE TOP OF THE DAM FROM
THE RIGHT ABUTMENT*



*DOWNSTREAM FACE OF THE DAM WITH
THE EMERGENCY SPILLWAY IN THE BACKGROUND*



*DETAILS OF THE SINGLE STAGE DROP INLET
OF THE PRINCIPAL SPILLWAY*



*LOOKING UPSTREAM ALONG THE CENTERLINE
OF THE EMERGENCY SPILLWAY*



*PRINCIPAL SPILLWAY OUTLET SHOWING
THE PLUNGE POOL AND OUTLET CHANNEL*



*CLOSE UP OF THE PRINCIPAL SPILLWAY OUTLET
SHOWING A DRAINAGE SYSTEM OUTLET PIPE*



*TOKEN SEEPAGE DOWNSTREAM OF THE
RIGHT ABUTMENT*



*NATURAL STREAM ABOUT 100 YARDS
DOWNSTREAM OF THE DAM*

APPENDIX

E

Drawings

SUBJECT <i>Wilson Creek Dam</i>	SHEET	BY <i>B</i>	DATE <i>3/7/79</i>	JOB NO
------------------------------------	-------	----------------	-----------------------	--------

APPENDIX E

Table of Contents

<i>Regional Vicinity Map</i>	_____	<i>Plate 1</i>
<i>Plan of Storage Area</i>	_____	" 2
<i>Plan of Dam site</i>	_____	" 3
<i>Profile of Dam & Emergency Spillway</i>	_____	" 4
<i>Foundation Drain Details</i>	_____	" 5
<i>Plan Profile of Principal Spillway</i>	_____	" 6
<i>Plan View of Dam Showing Problem Areas</i>	_____	" 7
<i>Top of Dam Profile</i>	_____	" 8

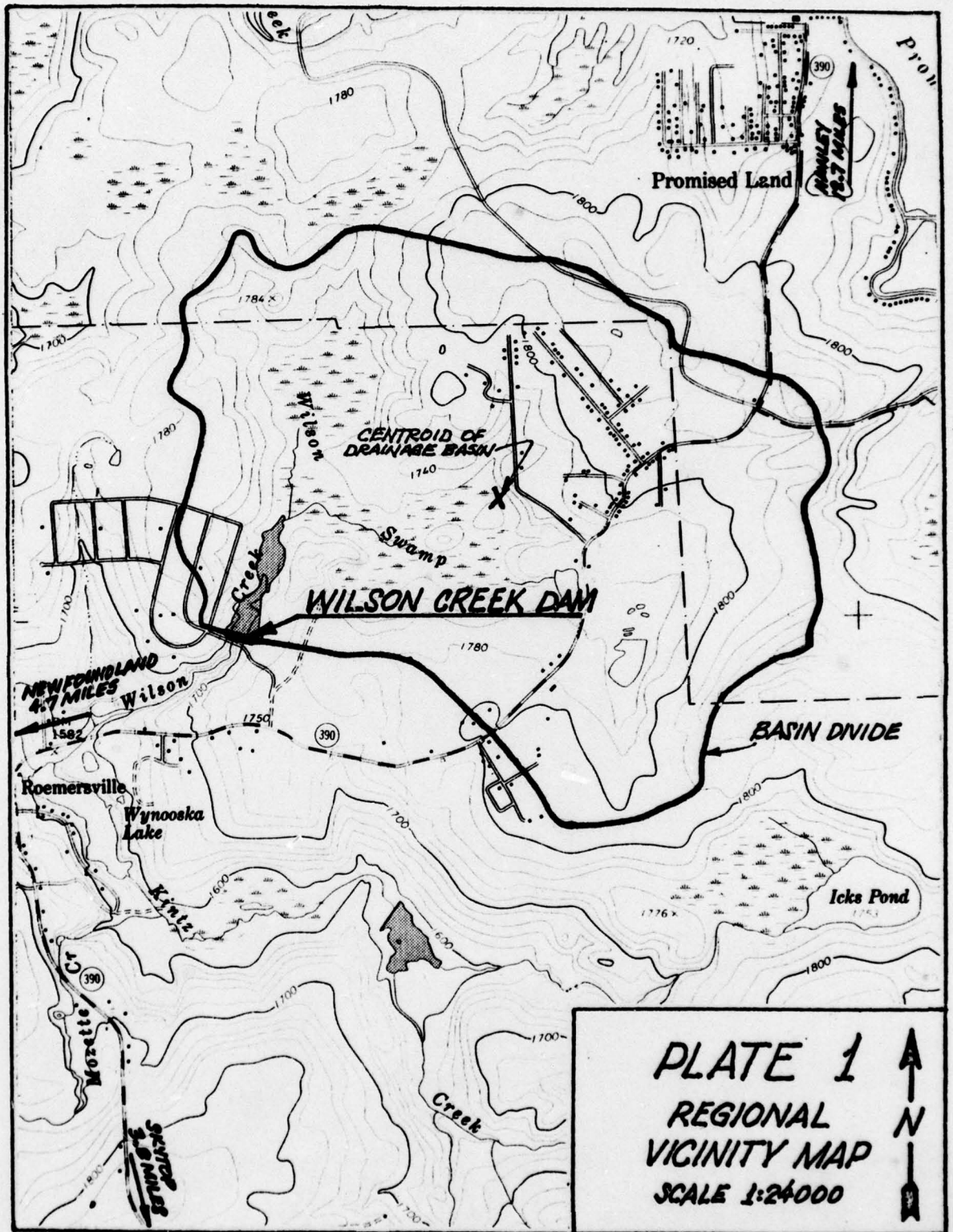
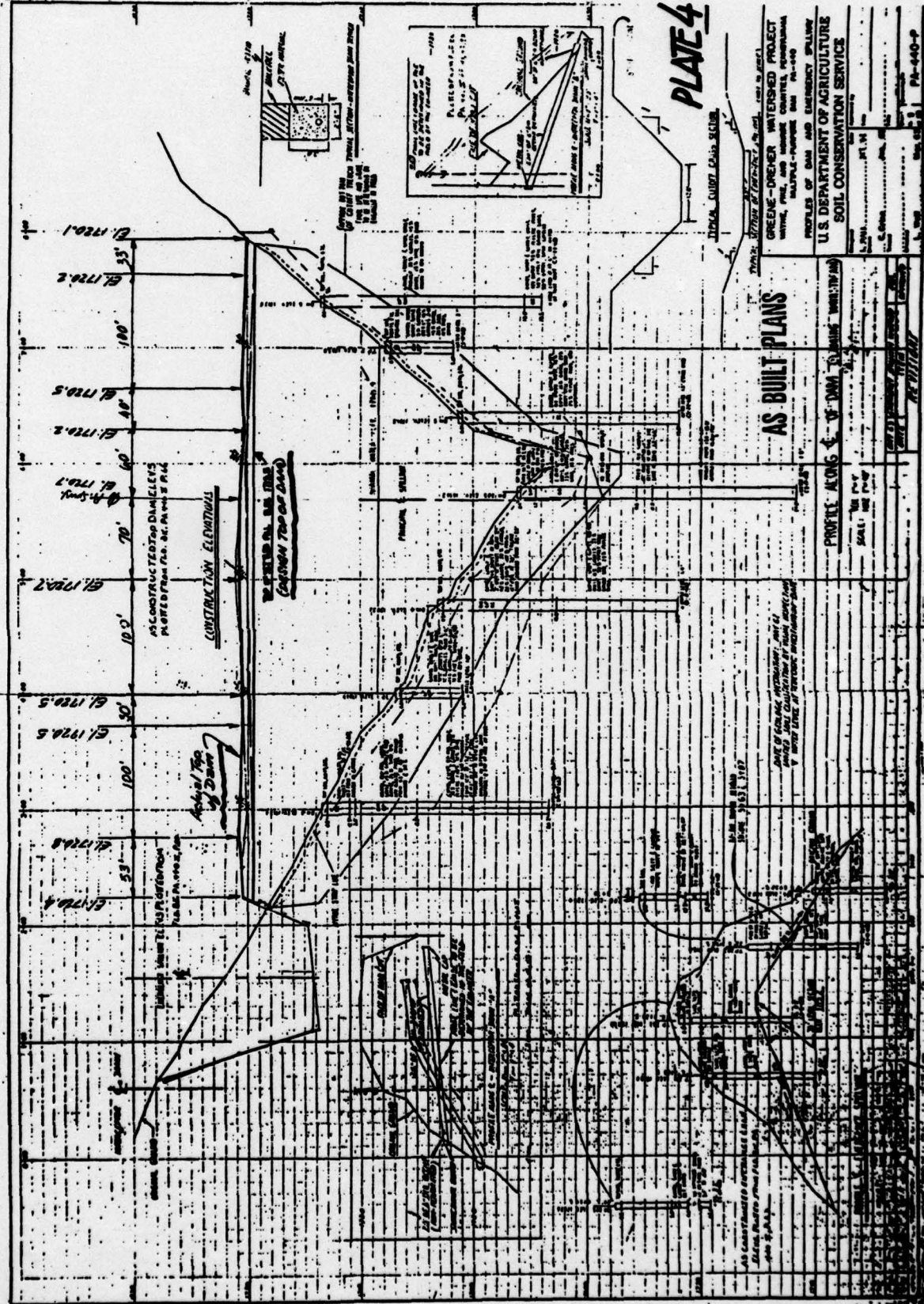


PLATE 4

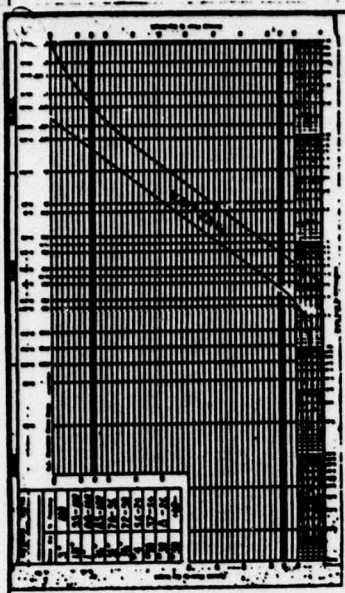


GREENE-DREHER WATERSHED PROJECT
WATER, FUEL, AND MINERAL QUARTERS, MOONSHANA
RAILROAD-ROCKWELL DAM NO. 100
PEOPLE OF DAM AND EMERGENCY RELIEF
SOIL CONSERVATION SERVICE

AS BUILT PLANS
PROFILE ALONG C-C OF DAM TO DAM CENTERLINE

DATE OF FIELD SURVEY: 1951
DATE OF CONSTRUCTION: 1951
SCALE: 1" = 100'

AS CONSTRUCTED ELEVATIONS
DATE: 1951
SCALE: 1" = 100'



3/4" PERFORATED PIPE INSTALLED
SECONDARY PA 410 BK 2 PP 415

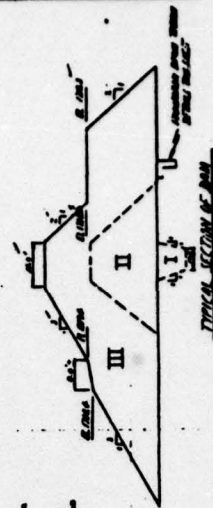
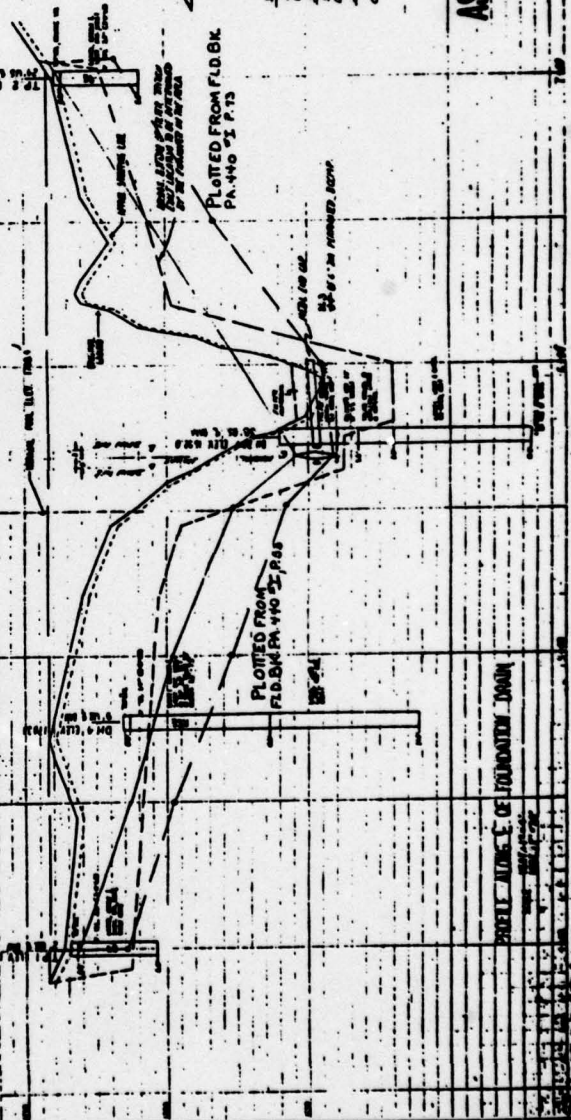
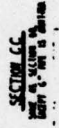
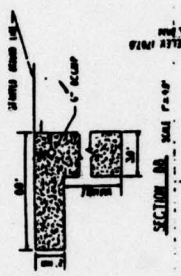
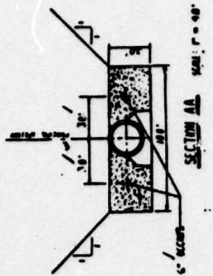
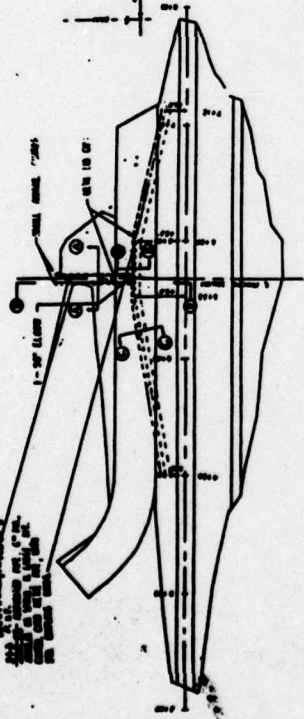
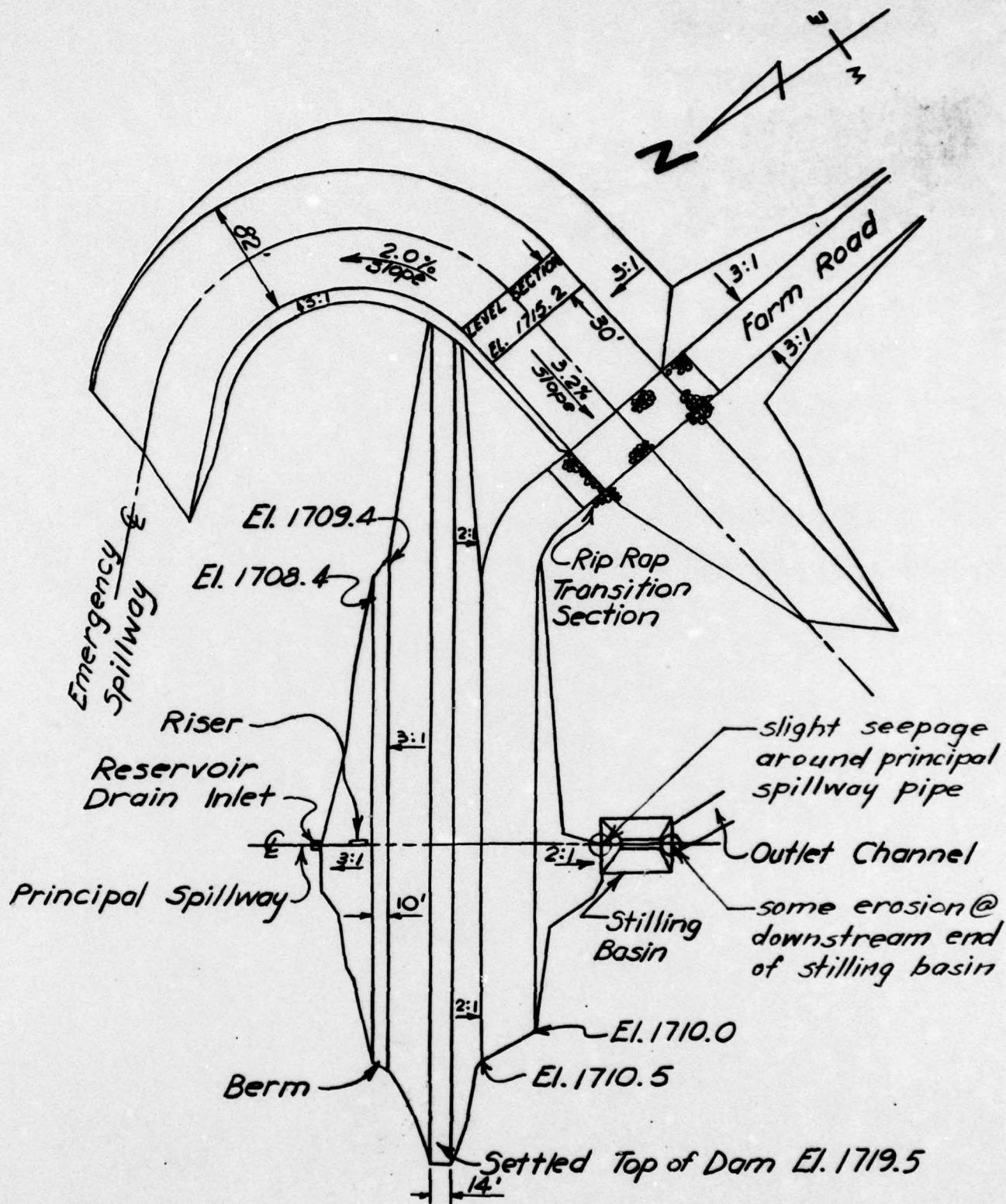


PLATE 5

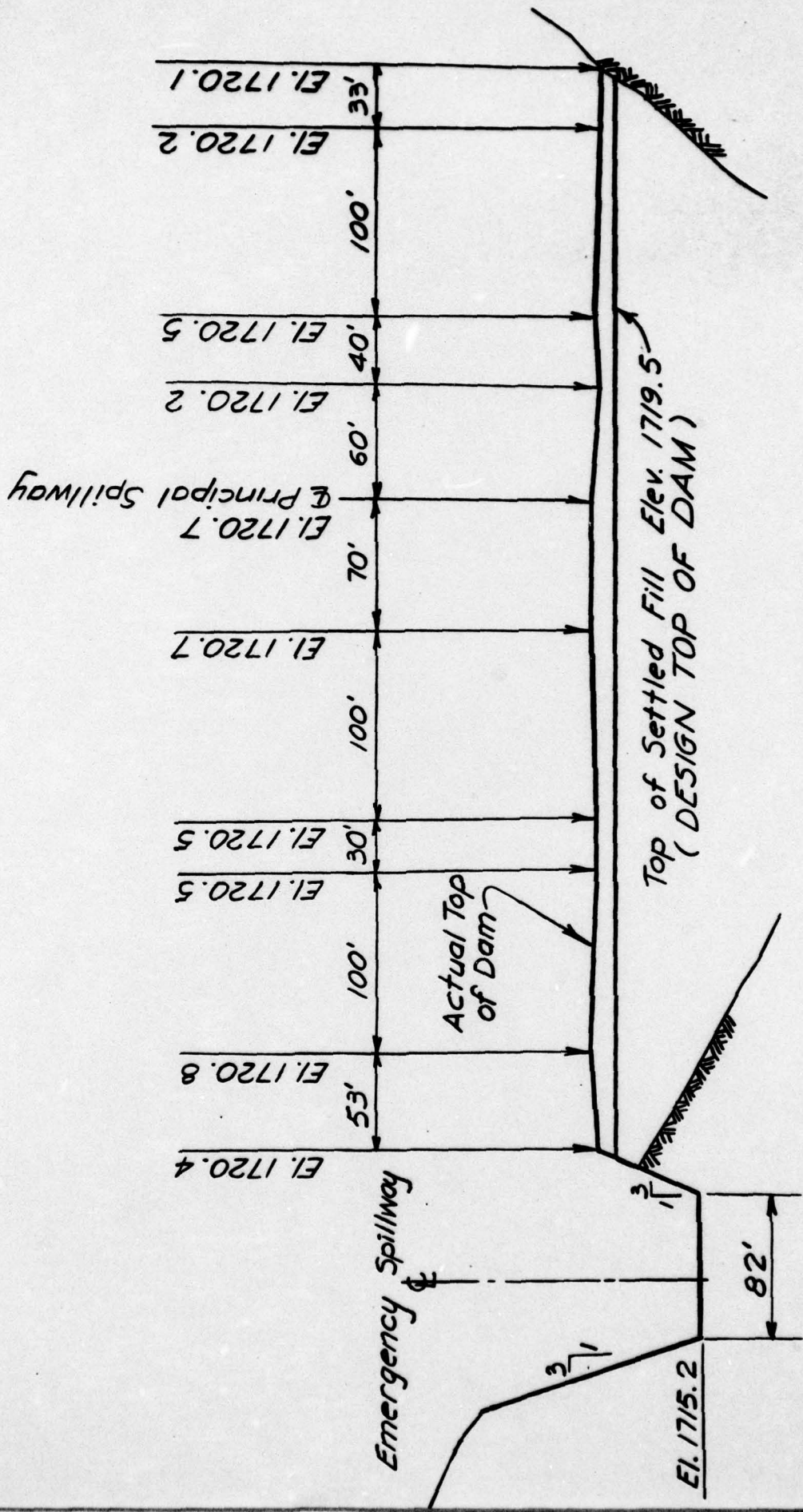
SECTION 2, CHINA IS CONSTRUCTED FOR THE CITY OF WASHINGTON AND DISTRICT OF COLUMBIA, AS SHOWN ON THE PLANS AND SPECIFICATIONS FOR THE FOUNDATION DRAIN, U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, WASHINGTON, D.C., 20250.

CRENE-DRENCH WATERED PROJECT	
FOUNDATION DRAIN DETAILS	
U.S. DEPARTMENT OF AGRICULTURE	
SOIL CONSERVATION SERVICE	
DATE	1941
BY	E. Green
APP'D	Feb. 1941
NO.	PA-440-P

AS BUILT PLANS



**PLAN VIEW OF DAM
SHOWING PROBLEM AREAS**



TOP OF DAM PROFILE

APPENDIX

F

Site Geology

SITE GEOLOGY
WILSON CREEK DAM

Wilson Lake Dam is situated in Pike County and within the limits of the Eastern Glaciated section of the Appalachian Plateau physiographic province. Thick deposits of glacially derived debris and till cover the nearly horizontally bedded, red, gray and green shale and sandstone units of the Devonian Catskill group of continental sediments. The dam and lake both rest on glacial till and ground moraine deposits which are dense, compact and relatively impermeable. Prior to construction of the lake the area was covered with high valley swamps and bogs, attesting somewhat to the compactness and impervious nature of the dense, glacial till mantle.

No known faults or major structural defects occur in the bedrock in the vicinity of the dam and lake.

