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ARMY ENGINEER DISTRICT PHILADELPHIA PA

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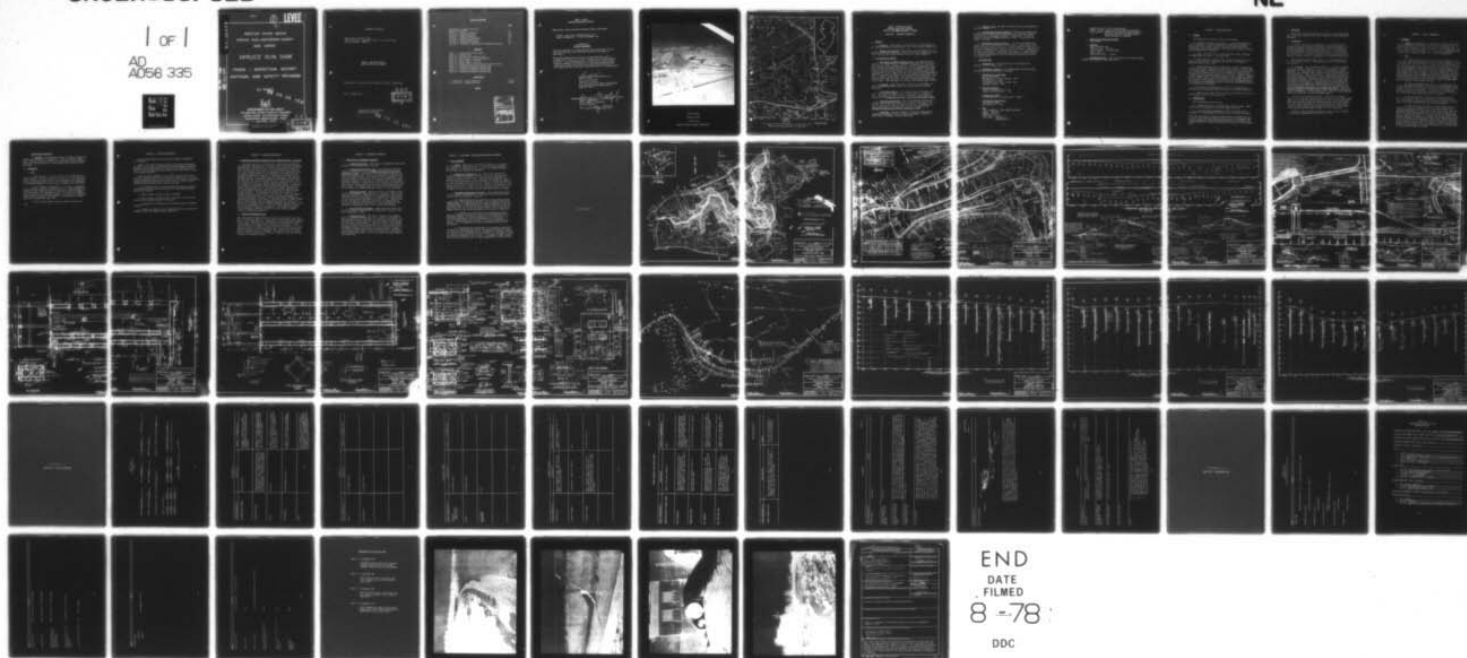
PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM SPRUCE RU--ETC(U)

APR 78

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1 OF 1
AD
A056 335



① LEVEL II

AD A056335

RARITAN RIVER BASIN
SPRUCE RUN, HUNTERDON COUNTY
NEW JERSEY

SPRUCE RUN DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NJ 00132

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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE - 2D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106
25 APRIL 1978

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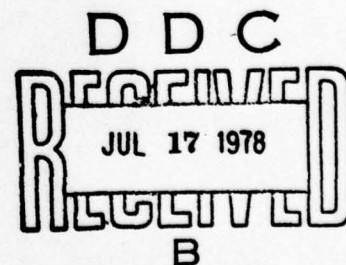
RARITAN RIVER BASIN

Name of Dam: Spruce Run Dam
County and State: Hunterdon County, State of New Jersey
Inventory Number: NJ00132

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Prepared By: United States Army Engineer District, Philadelphia

Date: 25 April 1978



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DISTRICT ENGINEER		DATE	
PROJECT NO.		SHEET NO.	
DRAWN BY		CHECKED BY	
BY		DATE	
DISTRICT ENGINEER		DATE	
Dist.	AVAIL.	REV.	OPEN
A			

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

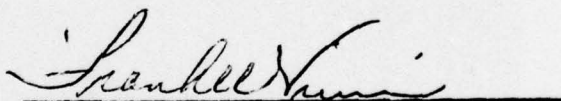
Name of Dam - Spruce Run Dam, Hunterdon County, New Jersey

Stream - Spruce Run and Mulhockaway Creek
Dates of Inspection - 12 and 16 December 1977

ASSESSMENT OF
GENERAL CONDITIONS

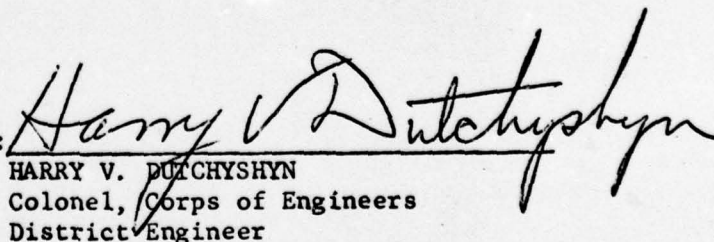
The Spruce Run Dam is a zoned earthfill dam approximately 93 feet high and 5,400 feet long, owned and operated by the State of New Jersey.

The visual inspections and review of engineering data, made in December 1977, indicate no serious deficiencies requiring emergency attention. It is recommended that instrumentation, operating and emergency procedures be provided, and slope protection be rehabilitated by the owner within the time periods noted in Section 7 of this report and other noted minor maintenance work to be accomplished.



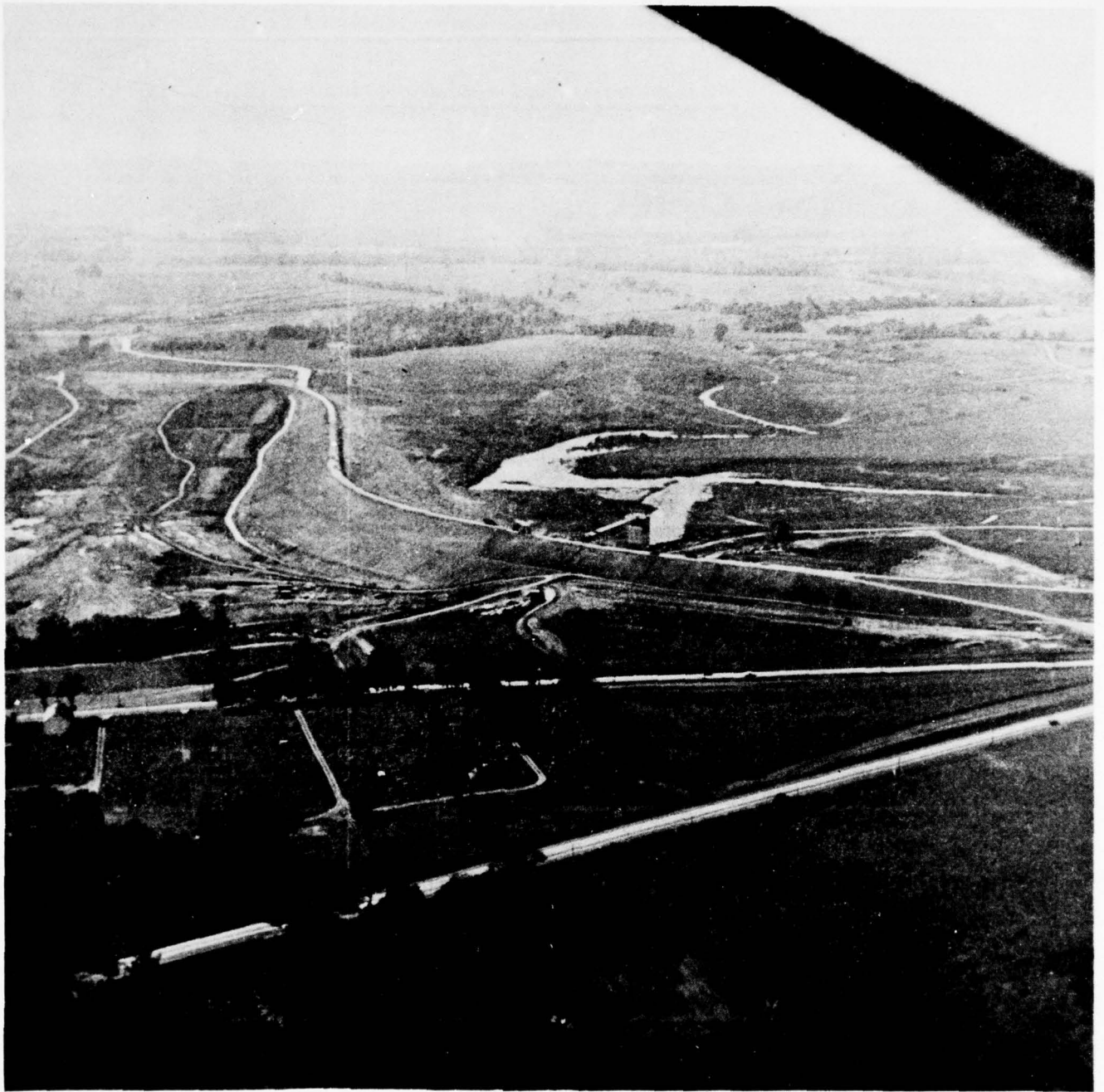
FRANK W. VINCI
Chief, Design Branch
Engineering Division
U.S. Army Engineer District, Philadelphia
Professional Engineer Registration
Maine No. 1897

APPROVED:



HARRY V. DUTCHYSHYN
Colonel, Corps of Engineers
District Engineer

DATE: 17 May 1978

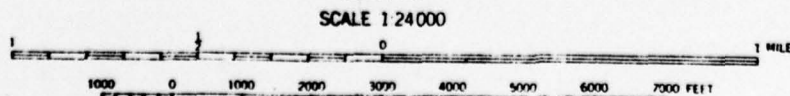
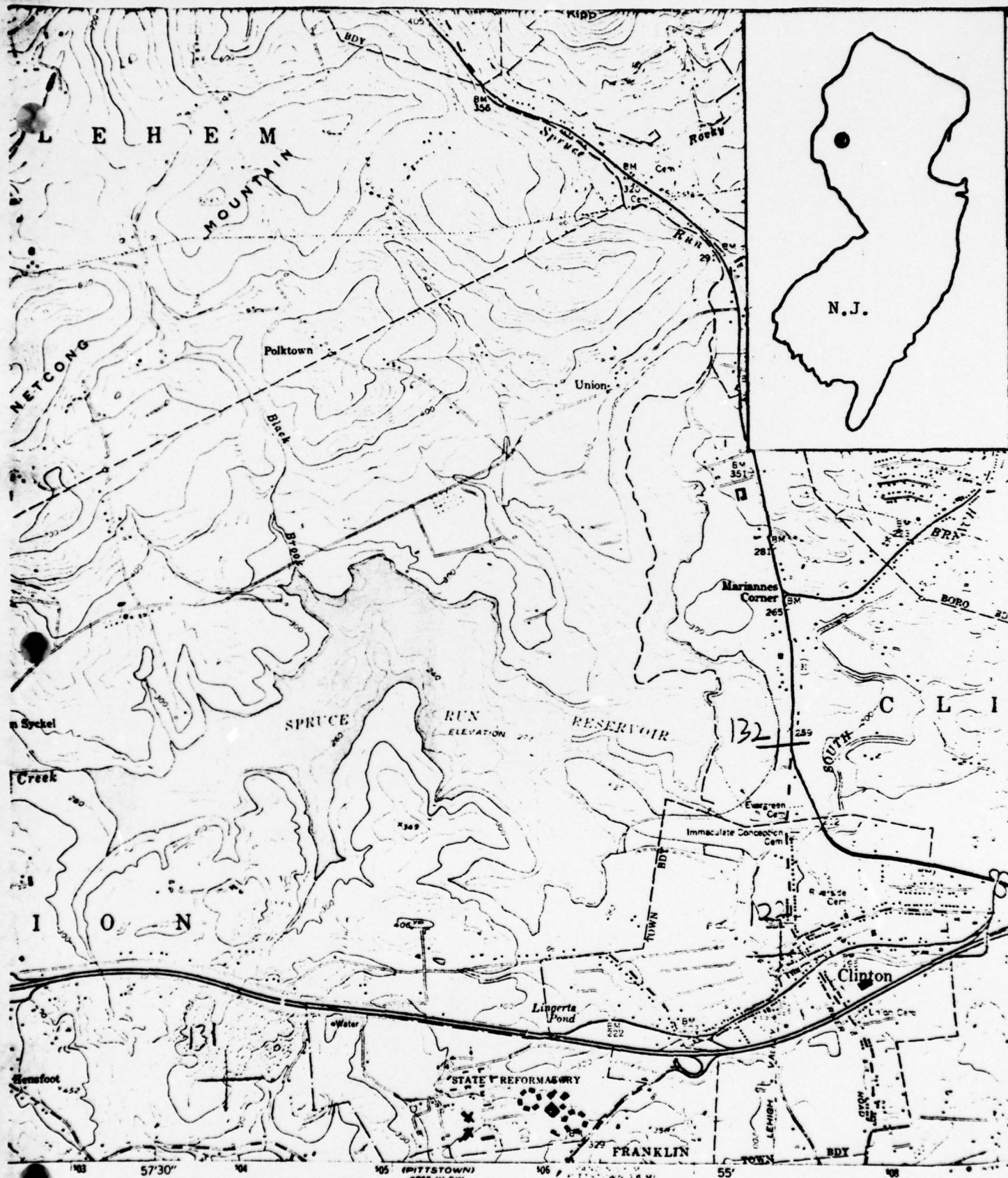


OVERVIEW PHOTO

SPRUCE RUN DAM

AERIAL VIEW

LOOKING UPSTREAM DURING CONSTRUCTION



LOCATION PLAN

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM SPRUCE RUN DAM ID# 00132

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

- a. Authority. This report is authorized by the Dam Inspection Act, Public Law 92-367, 92nd Congress, H.R. 15951 enacted 8 August 1972.
- b. Purpose of Inspection. The purpose of this inspection is to evaluate the general condition of Spruce Run Dam with respect to safety of the facility based upon available data and visual inspection.

1.2 DESCRIPTION OF PROJECT

- a. Description of Dam and Appurtenances. The Spruce Run Dam consists of a zoned earth fill embankment approximately 93 feet high and 5,400 feet long. Seepage control is provided by the impervious core, chimney and blanket drainage zones in the embankment and cutoff trench to rock and deep grout curtain in the foundation. The intake structure and outlet works consist of a wet-well type concrete tower approximately 32 feet square with two 7 foot outlet pipes approximately 500 feet long which neck down to a 30 inch diameter at the outlet end within a control outlet vault. The discharge is controlled by a regulation device near the outlet end, and is operated from within the control vault. The spillway is a 550 foot long concrete ogee section.
- b. Location. Spruce Run Dam is located at the confluence of Spruce Run and Mulhockaway Creek, about 1 mile north of Clinton, New Jersey.
- c. Size Classification. The maximum height of the dam is 94 feet. The reservoir volume to the spillway crest is 33,700 acre feet. Therefore, the dam is in the intermediate size category as defined by the Recommended Guidelines for Safety Inspection of Dams.
- d. Hazard Classification. Due to the proximity of the town of Clinton, New Jersey with a population of about 1,700, many lives could be lost in the event of failure of the dam. Therefore, this dam is considered in the high risk category as defined by the Recommended Guidelines for Safety Inspection of Dams.
- e. Ownership. The dam is owned by the State of New Jersey, Department of Conservation and Economic Development, Division of Water Policy and Supply, Trenton, New Jersey.

f. Purpose of Dam. The dam is used for stream flow regulation and water supply.

g. Design and Construction History. The existing facility was designed for the State by the consulting firm of Whitman, Requardt and Associates of Baltimore, Maryland. The dam was built by the Elmhurst Contracting Company beginning in 1961. Construction was completed in 1964.

h. Normal Operational Procedures. No formal operational procedures have been established for this project. Under normal conditions the water surface elevation is below spillway crest and water is discharged through either or both of the 84 inch pipes. Regulation of the flow is maintained to some degree by three 3' x 5' gated openings for each 84 inch pipe in the intake tower, however, primary control is attained by operation of the flow regulating devices in the outlet control vault.

1.3 PERTINENT DATA

a. Drainage Area. The drainage area of the Spruce Run Reservoir is 41.3 square miles.

b. Discharge at Damsite. The maximum known flow at the dam-site through the 84 inch pipe is 170 mgd.

c. Elevation (ft. above MSL).

Top of dam - 283.0

Maximum pool - design discharge - 278

Recreation pool - N/A

Streambed at centerline of dam - 190

Maximum tailwater - N/A

d. Reservoir (miles).

Length of Maximum Pool - 2.75

Length of Recreation Pool - N/A

e. Storage (acre-feet).

At Spillway Crest - Elevation 273 - 33,670

f. Reservoir Surface (acres).

Top of dam - 1700

Spillway crest - 1290

g. Dam.

Type - earthfill - side channel spillway

Length - 5400 feet

Height - 93 feet

Top width - 25 feet

Side slopes - upstream 3:1

downstream 2½:1

Impervious core - 20 feet wide minimum
Cutoff - Cutoff trench filled with impervious material
Grout curtain - Combination deep grout curtain along the
dam centerline with consolidation and
blanket grouting as required.

h. Diversion and Regulating Tunnel.
None exists

i. Spillway.
Type - concrete ogee
Length of weir - 550 feet
Crest elevation - 273 feet (MSL)
Gates - none
Downstream channel - unlined

j. Regulating Outlets. Two 30 inch pipes with conical shaped,
mechanically operated, regulating devices.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The design data reviewed included the following:

- a. Engineering Report and Appendices - Spruce Run-Round Valley Reservoir Project - prepared by Whitman, Requardt and Associates, August 1958. This report includes hydrology, geology and soils engineering investigations made for the feasibility studies of Spruce Run and Round Valley Reservoirs.
- b. Plans - Contract SR-1 for Spruce Run Dam, Dikes, Spillway and Appurtenant Structures - 31 August 1960.
- c. Specifications - Contract SR-1 for the Construction of the Spruce Run Dam and Dikes and Appurtenant Works in the County of Hunterdon, New Jersey - 1960.
- d. Design Analysis of Earth Embankments - Spruce Run Reservoir, Clinton, New Jersey - Whitman, Requardt and Associates - 1 March 1960. This design analysis contains the investigations and designs performed for the final design of the dam and its foundation. The field investigations, soil testing program and its results, foundation grouting design, seepage studies, settlement analysis, slope stability analysis, design of the slope protection, cofferdam and core trench excavation are included in this volume, along with the final recommendations for the zoning of the embankment section, sources of construction materials and construction requirements.
- e. Other data and correspondence on file at the New Jersey Department of Environmental Protection Office in Clinton, New Jersey.
- f. Hydraulic and slope stability analyses performed by U.S.A.E.D., Philadelphia as part of this inspection.

2.2 CONSTRUCTION

The following data was reviewed:

- a. Compensation Claims - Contract SR-1, Spruce Run Dam - Hagen Industries, Inc., Elmhurst Contracting Company Division.
- b. Other data and correspondence on file at the New Jersey Department of Environmental Protection Office in Clinton, New Jersey.

No further data could be located to assure that the project was constructed as per plans and specifications except for photographs taken during construction, which indicate extensive work in removing soft, irregular pockets in limestone foundation during cutoff trench excavation.

2.3 OPERATION

Operations records reviewed include pool level data and ground water level data from open drill holes immediately downstream of the embankment.

2.4 EVALUATION

a. Files, various design memorandas, and construction and operations data are available at the Clinton, New Jersey Office of the Bureau of Water Facilities Operations, Division of Water Resources, Department of Environmental Protection. A limited amount of information, most of which duplicates portions of the Clinton, New Jersey files, is available in Trenton, New Jersey Office of the Division of Water Resources, Department of Environmental Protection.

The information noted under item 2.1.f. is available at the U.S. Army Engineer District, Philadelphia located in Philadelphia, Pennsylvania.

b. Adequacy. The information available is generally adequate for design review. Exceptions to the foregoing statement were the hydrologic and slope stability analyses. The hydrologic studies available, are concerned almost exclusively with the analysis of low flow augmentation, except for elevation - area/capacity curves for the reservoir and a determination of the required spillway capacity. Additional hydrologic studies were made as part of this inspection to develop a spillway rating curve and determine the probable maximum flood for the location. Slope stability studies available for review were in accordance with standard practice at the time the design was performed (1958-1961), did not meet the requirements given in the Recommended Guidelines for the Inspection of Dams. Additional stability analysis were made as part of this inspection to fulfill the latter requirements. The design data given in the 1961 Design Analysis (See 2.1.d.) was used in these additional studies.

Review of the Construction Claims - Contract SR-1 document (Item 2.2.a.) indicates that certain modifications to the final design, shown in the plans and specifications, were made during construction. These modifications, namely the overexcavation of the cutoff trench in certain areas and deletion of the requirement for a sheet pile cutoff in certain areas, have not been noted on any of the construction plans and specifications available for this inspection.

Review of the construction records revealed a lack of information available regarding construction soils tests.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General. The dam and its appurtenant structures were found to be in good overall condition at the time of inspection. The problems noted during the visual inspection are considered minor and do not require immediate remedial treatment. Note - worthy deficiencies observed are described briefly in the following paragraphs. The complete visual inspection check list is given in Appendix A.

b. Dam.

1) Some soft, wet areas were noted on the downstream face of the dam, most of which had been rutted by moving equipment. Several of the wet areas were located near or above pool level on the date of the inspection. One zone of particular note was observed at the junction of the embankment slope and lower berm in the vicinity of center line Station 40+00. At this point, there is a ponded, swampy area with considerable growth of cattails and other vegetation. The wet zones appear to be local seepage concentrations resulting from rain-water infiltration into the downstream slope caused by less pervious horizontal layers present in that portion of the embankment. None of the areas around the wet spots showed any signs of displacement and all seepage or ponded water was clear.

2) Ground hog burrows were noted in the downstream slope of the embankment and evidence of habitation by ground hogs or other animals were noted at the outlets of the terra cotta drains into the peripheral concrete lined ditches. The needs for continuing the present rodent control program and provisions of screens at the outlet ends of the terra cotta drain pipes are evident.

3) Minor slumping or adjustment of riprap was noted on most of the upstream face of the dam between El. 268 and El. 272. In a few instances, the riprap cover has been reduced and it appears some of the finer embankment materials have been exposed.

4) Near the end of the concrete lined drainage ditch located at the left side downstream toe of the dam, the water disappeared approximately 75 feet from the end of the ditch. The flow reappeared from under the right side of the concrete lining at the end of the ditch and flowed into the inlet of the 54 inch drainage culvert located at that point. It appeared that some erosion of the material beneath the slab has taken place, but the water was running clear on the date of the inspection. The joints or other openings in the concrete lining of the ditch should be sealed to prevent loss of water from the ditch. This is necessary to protect the materials beneath the lining and also to allow observations of the ditch flow at various points along its length.

c. Appurtenant Structures.

1) Spillway. The discharge channel is rough, pocketed and boulder strewn with varying amounts of vegetation therein. Clear water flows were noted in several areas emanating from the limestone floor and from erosional cuts in the bedrock floor caused by spillway flows.

3.2 EVALUATION

a. Dam.

1) The wet spots are not considered to be indicative of conditions which endanger the structural stability of the downstream slope. However, the installation of piezometers in these and other areas to determine phreatic levels in the embankment and foundation is considered essential to provide data to support this conclusion.

2) The slumping or adjustment of the riprap is considered serious enough to require rehabilitation of the stone protection in the worst of the areas noted (in the vicinity of Station 34+00) as soon as possible. The remainder of these areas should be rehabilitated as part of the maintenance program. In addition, the upstream slope should be surveyed to determine if shelves similar to those observed exist below the water line.

3) The spillway channel needs no remedial work at this time.

SECTION 4 - OPERATION PROCEDURES

Operational procedures are generally discussed in paragraph 1.2.h. and 2.3.

There is no formal written procedure for emergency downstream evacuation in the event of impending catastrophe, however, operating personnel interviewed exhibited a keen sense of awareness and have access to good telephone and radio communications with which to alert civil defense and police.

Rapid emergency drawdown is not currently possible due to restriction caused by reduction of the two 84" conduits to 30" and the conical regulating devices. Consideration should be given to developing emergency operating procedures to provide for the removal of these constrictions by the most rapid, possible methods.

It is recommended that a formal emergency procedure be prepared and prominently displayed and furnished to all operating personnel. This should include:

- a. How to operate the dam during an emergency.
- b. Who to notify, including public officials, in case of evacuation from the downstream area is necessary.
- c. Procedures for evaluating inflow during periods of emergency operation.
- d. Methods of removal of flow regulating devices to allow rapid drawdown of the lake under emergency conditions.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 OVERTOPPING POTENTIAL-EVALUATION FOR OVERTOPPING PHASE I CRITERIA

The Spruce Run Dam is classified as a high hazard-intermediate dam requiring evaluation for a spillway design flood equal to Probable Maximum Flood. The spillway is a 550 foot long concrete ogee with a crest elevation of 273.0 ft. SLD. Top of dam elevation is 283.0 ft. SLD. The spillway rating curve was obtained from a method presented in "Design of Small Dams," a U.S. Department of Interior-Bureau of Reclamation Publication (Page 378). Construction drawings and field measurements were used to obtain spillway dimensions. The maximum spillway capacity is considered equal to the discharge developed when the reservoir pool elevation equals the top of dam elevation. For a pool elevation of 283.0 ft. SLD the spillway discharge is 73,000 cfs. An estimate of the probable maximum flood peak discharge was obtained by developing an envelope curve of probable maximum flood peak discharge versus drainage area. Data for the curve was obtained from U.S. Army Engineer District, New York and represents PMF discharges of gage locations. The discharge obtained by this method for a drainage area of 41.3 square miles is 55,000 cfs. Since the capacity exceeds the PMF discharge, the spillway is considered adequate as established by Phase I Criteria. The spillway design discharge was originally developed for the owner, using the formula $Q = 3750 \times \sqrt{D.A.}$. This is found on page 50 of the Engineering Report for Spruce Run-Round Valley Reservoir Project, Whitman, Requardt and Associates, 1958 (Section 2, paragraph 2.1.a). Since use of this formula is not part of the procedure followed by the Corps in calculating the spillway design discharge, a PMF was developed for this inspection report, using the recommended guidelines.

5.2 EMERGENCY DRAWDOWN OF LAKE

The outlet works of Spruce Run Dam consists of two 84 inch steel pipes, both of which bevel down to a venturi meter and an aerator flow control device at the downstream end. No hydraulics calculations were supplied by the owners, but it was disclosed that they have provided a downstream release of 170 mgd to meet contractual requirements. It is beyond the criteria of a Phase I Study to develop a rating curve for the complicated outlet works of Spruce Run Dam. Instead, the 170 mgd was used to estimate the rate of drawdown. Using this flow as the outlet capacity, it would require over 60 days to completely evacuate the lake in case of a structural failure.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations. No structural inadequacies were noted during the visual inspection of the dam.

b. Design and Construction Data. The dam design meets the stability requirements of the Recommended Guidelines for Safety Inspection of Dams. Stability analyses performed as part of this inspection, employed the circular arc method and the design values from the original design. The seepage analysis performed for the original design is satisfactory, but cannot be supported by actual piezometric data due to the lack of instrumentation in the embankment and foundation. Construction records indicate the dam was constructed in accordance with the plans and specifications with some minor changes. No changes from the design sections were necessary for the stability analyses performed as part of this inspection.

c. Operating Records. Operating records are limited to pool levels and groundwater levels, measured in open drill holes in the foundation immediately downstream of the embankment. The records indicate very little fluctuation in groundwater levels and little or no relation between groundwater and pool levels. These records and the satisfactory conditions observed in the downstream toe area do not indicate any deficiencies in the performance of the embankment underseepage control (core trench and grouting).

d. Post Construction Changes. There have been no post construction changes to the dam and its appurtenant structures since their completion in 1964.

e. Seismic Stability. The dam is located in the Piedmont Plain of northwestern New Jersey, and is founded on limestone of Cambrian-Ordovician age and shales of Ordovician and Triassic age. The limestone is highly faulted, fractured and brecciated and has solution cavities and channels. Faults are shown to exist within one mile of the dam site, but appear to be inactive based on the earthquake history of New Jersey. The dam is located in Zone I on the Seismic Zone Map of the Contiguous United States. Adequate safety margins were found to exist in the equivalent static force analyses performed as part of the slope stability studies made for this inspection.

SECTION 7 - ASSESSMENT, RECOMMENDATION/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety. There are no detrimental findings, as a result of this inspection, from which an unsafe assessment can be rendered. The spillway is considered adequate to pass the Probable Maximum Flood without overtopping the embankment.

b. Adequacy of Information. The information available for review was generally adequate, however, due to the lack of instrumentation of the structure, there is no information available regarding piezometric levels in the embankment and foundation, quantity of flow in the peripheral ditches or movement of the dam and embankment as determined by periodic surveys. Because of this lack of information, the conclusion regarding the wet spots on the downstream slope (paragraph 3.2 a.(1)) is based upon the assumption that the interior drainage facilities and cutoff measures are functioning as intended.

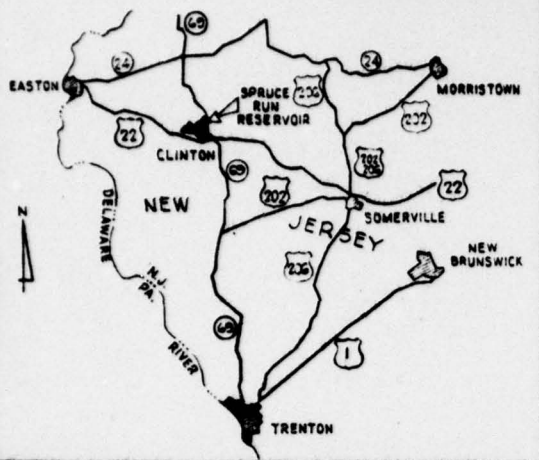
c. Recommendations/Remedial Measures. The inspection revealed certain items of rehabilitation or other work which should be given high priority by the owners. These are:

1) Rehabilitation of rock protection of the upstream slope. In particular, the riprap deficiencies in the vicinity of the service bridge abutment (see page A-8) should be repaired during the 1978 construction season. As an alternative to simply reworking the existing rock protection, use of a better graded, heavier rock to provide more stable protection and reduce maintenance costs should be considered.

2) Installation of instrumentation consisting of embankment and foundation, piezometers, weirs for flow measurements in the peripheral ditches, and survey monumentation of the dam crest, service bridge and intake tower and establishment of a schedule of periodic readings and surveys as part of the normal operational procedures. It is recommended this work be accomplished within a one year period.

3) Development and establishment of an emergency operations procedure to include instructions for dam operations during an emergency; procedures for evaluating inflow; development of evacuation plan for the affected areas downstream of the structure; and development of plans for emergency drawdown of the reservoir. Development of plans should begin as soon as possible and the plans implemented by the end of 1979.

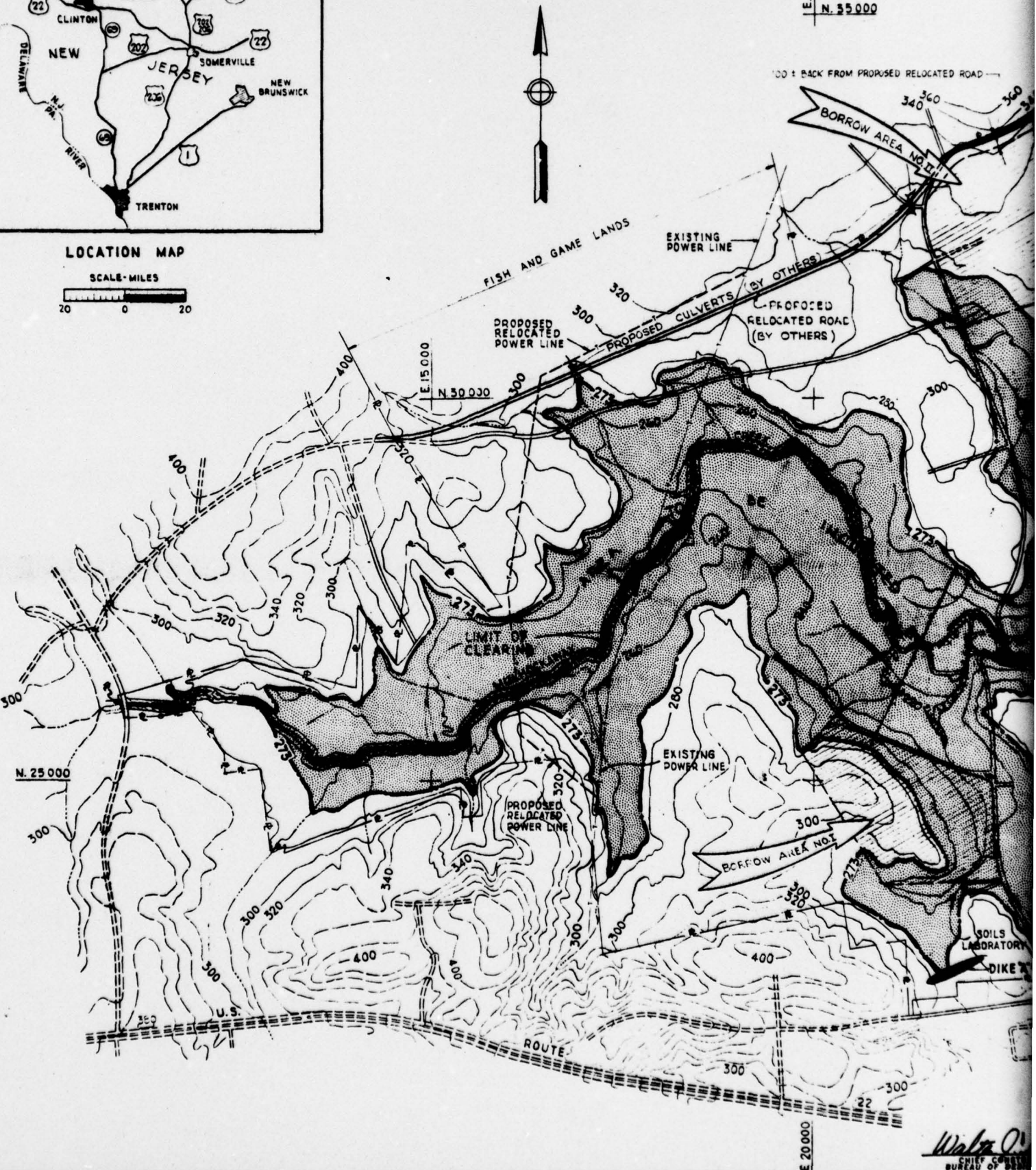
D R A W I N G S



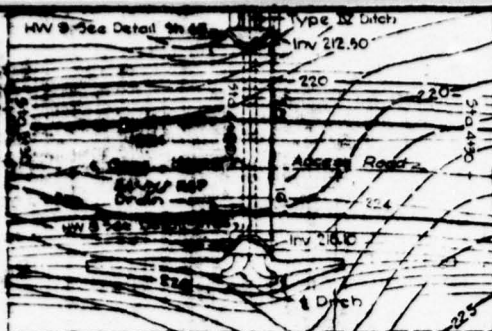
LOCATION MAP



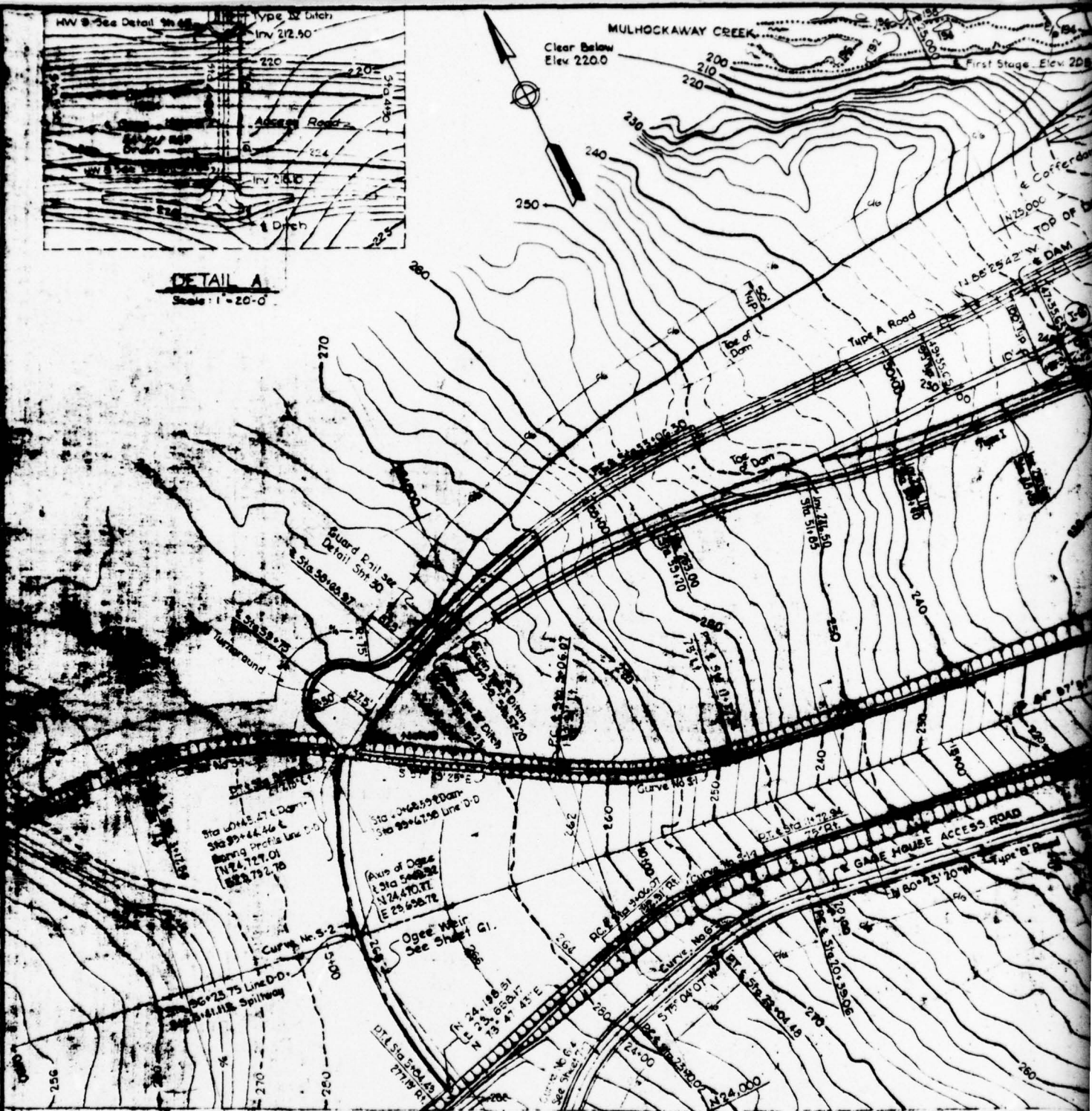
E 20 000
N 35 000



Walter O.
CHIEF OF BUREAU OF SOILS



DETAIL A
Scale: 1" = 20'-0"



GAGE HOUSE ACCESS ROAD CURVE DATA

CURVE NO.	Δ	R	T	L	PI Coord
G-1	62°41'45"	648.64'	595.00'	709.55'	N 83°14'00" E 257.30.00
G-2	12°33'47"	458.97'	50.00'	50.57'	N 24°11'20" E 24.80.50
G-3	84°58'33"	306.19'	64.00'	165.42'	N 24°23'33" E 24.19.00

FLOOD PLAIN ACCESS ROAD CURVE DATA

CURVE NO.	Δ	R	T	L	PI Coord
1	60°00'00"	75.0'	43.30'	78.54'	N 25°04'48" E 26.248.45

NOTES

1. For Drainage Structures Inlet Details and Drainage Profiles see sheets 32, 33, 34 & 35.
2. For Profiles and Sections of Spillway see sheets G1 & G2.
3. All stationing shown on Spillway are referenced to Spillway E.
4. Spot elevations shown on forms are inverts.
5. For Road Details see sheets 50 & 55.
6. For Top of Dam Road Detail see sheet 30.
7. For Access Road Profiles & Details, see sheet 56.
8. For Turnaround Pavement, see sheet 56.
9. Provide 16' opening in guard rail equipped with a single chain having snap catch at one end.
10. For Underdrain System Details See Sheet 7.

FILE

MATCH LINE DAM APPL

Scale: 1" = 40'

DAM APPL

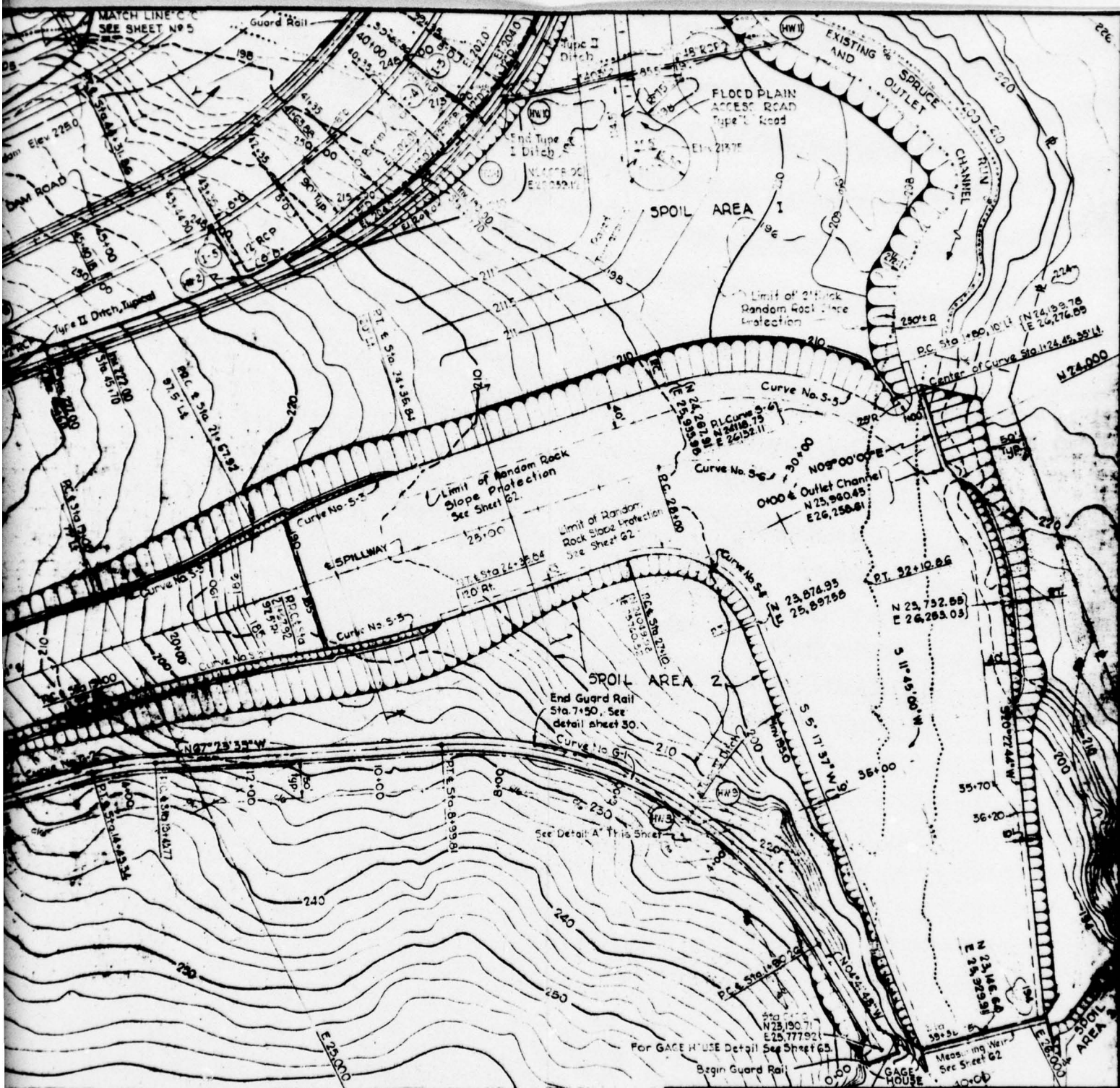
FILE

DEPARTMENT OF AGRICULTURE

FEB 3

APPROVED

Chief, Bureau of Water



SEE SHEET NO 7
LOCATION No. 543

LOCATION No. 543

BY CONSERVATION
AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLY
1961

L. H. Haddaway
Control Engineer and Chief Designer

Walter J. Egan
CHIEF CONSTRUCTION ENGINEER
BUREAU OF DESIGN & CONSTRUCTION



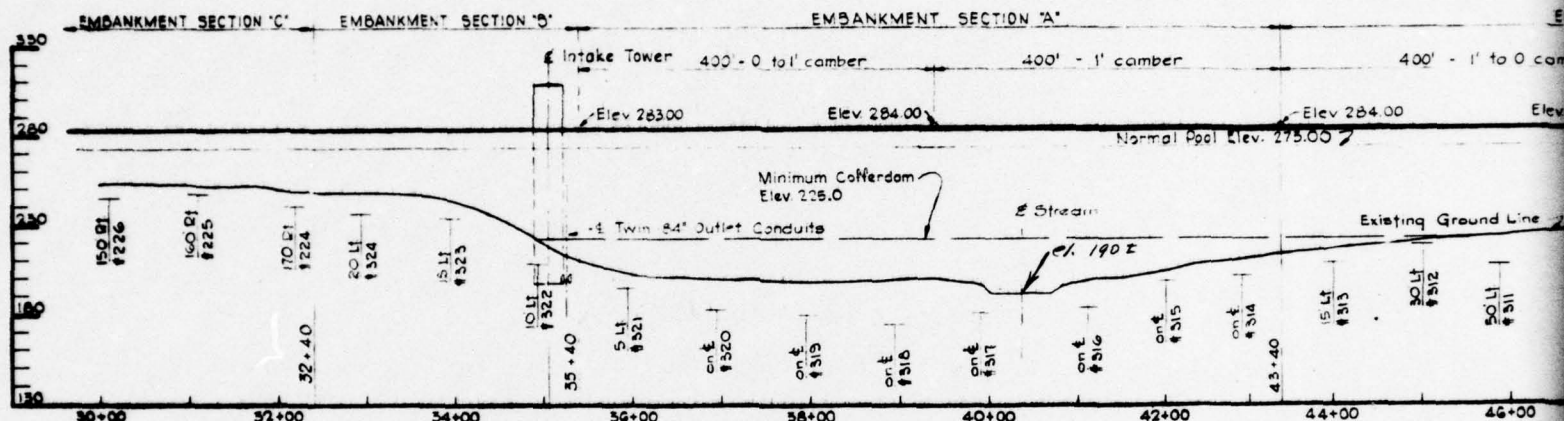
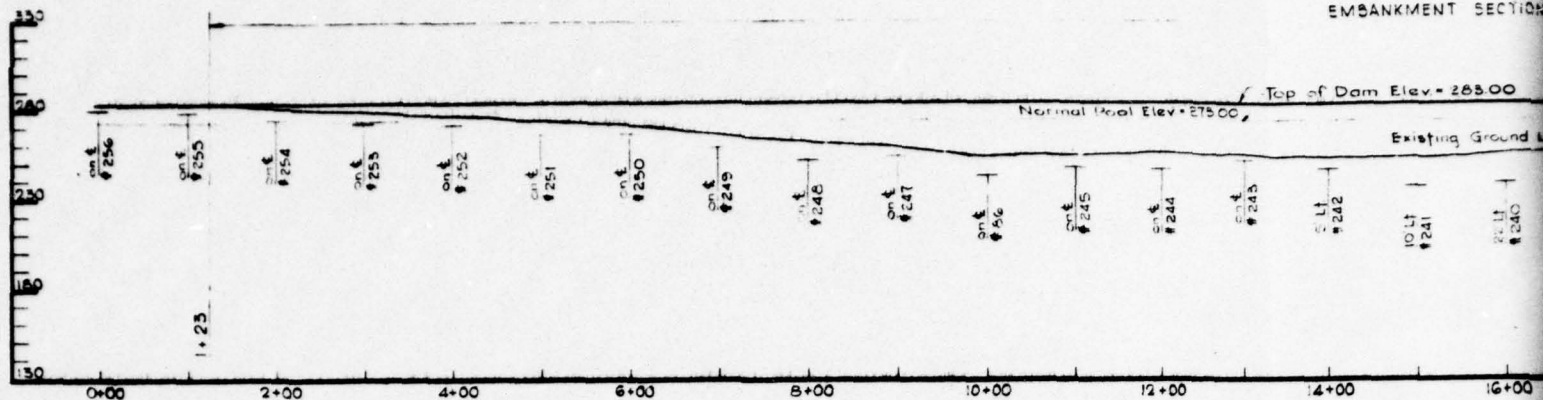
SPILLWAY CURVE DATA				
CURVE NO.	ANGLE	PC	PT	STATION
5-1	24° 12' 26"	260.00	133.58'	275.00'
5-2	43° 23' 52"	260.00	120.00'	380.00'
5-3	3° 36' 05"	160.00	84.00'	160.17'
5-4	8° 16' 22"	160.00	152.00'	240.00'
5-5	102° 20' 55"	400.00	487.00'	114.43'
5-6	93° 42' 51"	251.00	268.03'	410.86'

R. Russell Vallman
WHITMAN, REQUARDT & ASSOCIATES

REVISION	DATE	DESCRIPTION	BY
STATE OF NEW JERSEY DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF WATER POLICY AND SUPPLY SPRUCE RUN RESERVOIR			
CONTRACT SR-1 GENERAL PLAN			
WHITMAN, REQUARDT & ASSOCIATES CONSULTING ENGINEERS BALTIMORE, MARYLAND			
IN CHARGE: J. J. HADDAWAY DRAWN: J.C.S. R.L.S. N.A.L.		SCALE: AS SHOWN DATE: 8/31/60	SHEET 6 OF 66 ACC. WR - 6

Sheet 543

EMBANKMENT SECTION



PROFILE ALONG C OF D

(LOOKING DOWNSTREAM)

SCALE HOR. 1" = 100'

VERT. 1" = 50'

Slope Gravel Toe Drain min 0.5% toward downstream toe. Where existing ground slopes toward reservoir, obtain slope by filling with material specified.

Where Top of Dam is higher than 283.00
warp slope into Typical Embankment
Section in 50' increments.

Top of Dam Elev. -
See Profile this sheet.
Elev. 283.00

Denotes Top of Rock Elevation at the
Distances shown denote location
Left, or Right of C of Dam.

8" VCPX, ASTM C200-57T, cement
joints, drain to extend 12" into
Gravel Toe Drain and through
concrete ditch paving. Spacing
of Drains to be at 100' centers
with invert 6" above invert of ditch.
End of pipe at intersection with ditch
to be provided with 45° bend
discharging downstream.

Sod placed on 4" Topsoil
4" Topsoil,
seed & mulch.

4 Rounding
4' Gravel
4' Bermed

Elev. 250.00
7' Gravel
3' Sand
Core of Dam
Impervious Fill
to rock

Elev. 278.00 Max high water
Elev. 275.00 Normal pool elevation
20' to 30' Rock Slope Protection
Elev. 273.00
Slope Protection
1.5' Gravel

Shell of Dam -
Concrete embankment

Stripping Line

Excavation Payment Line
Core Trench to Rock

Top of Rock

Rock to be blasted off & crushed
with concrete where directed

Existing Ground 2

Payment Limits where
work under Item No. 8
is ordered.

Payment Limits where work under
Item No. 7 is ordered.

Payment Limits where work under Item
No. 7 or Item No. 8 is ordered.

PAYMENT LINES - CORE TRENCH EXCAVATION

EMBANKMENT SECTION 'B'

Station 32+40 to 35+40

Station 43+40 to 45+10

Scale: 1" = 20'

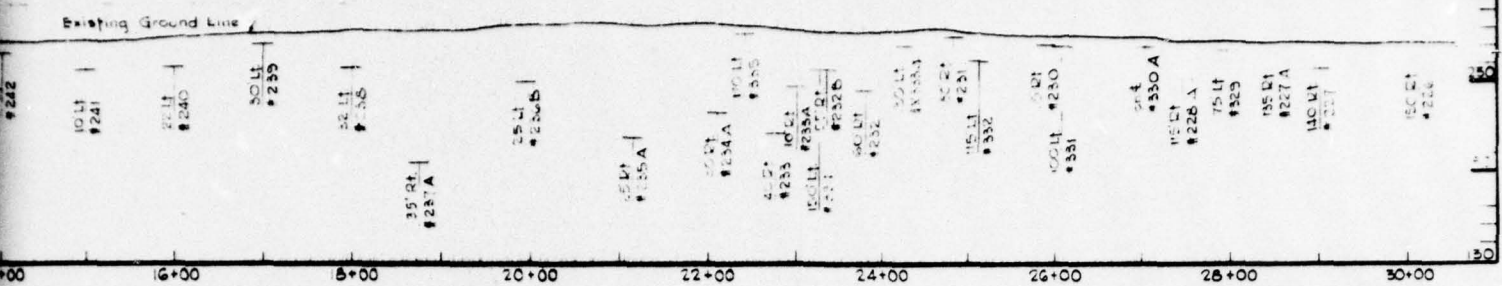
Steel Sheet Piling and
Core Trench exc
rock where direct
Back Fill shall be
Fill. Grouting of T
Quaternary holes
after Sheet Piling
is completed.

Base of
as directed

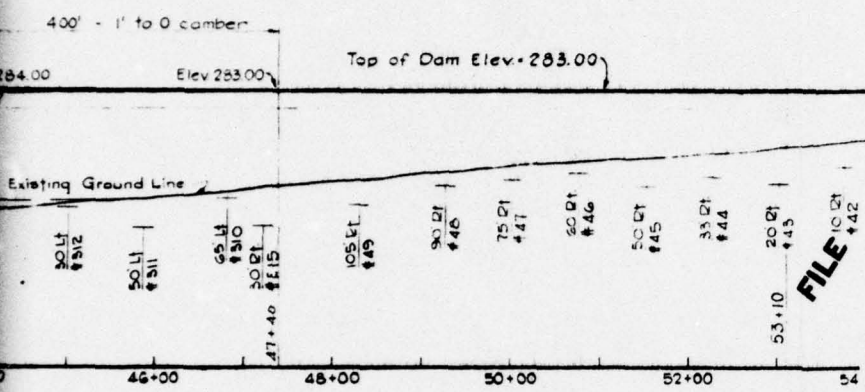
Walter J.
CHIEF ENGINEER
BUREAU OF SOILS

EMBANKMENT SECTION 'C'

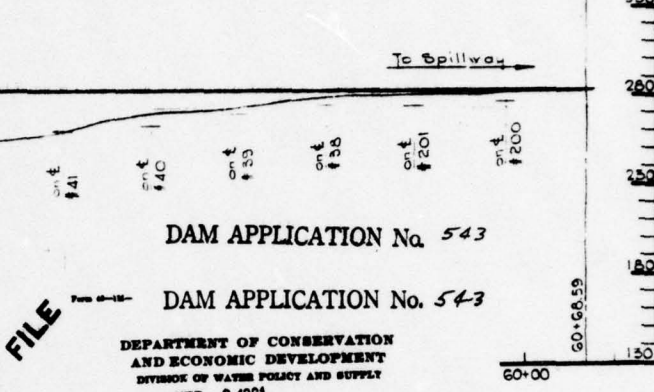
Dam Elev = 283.00



EMBANKMENT SECTION 'B'



EMBANKMENT SECTION 'C'



OF DAM

100
50

DAM APPLICATION No. 543

DAM APPLICATION No. 543

DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLY
FEB 3 1961

APPROVED
Chief, Bureau of Water Control

Top of Rock Elevation at the Boring Now shown
is shown denote location of Boring
Right of 4 of Dam.

water
elevation
Slope Protection
100
50

1.5' Gravel Blanket
For reference to Corridor
Dam, see Appendix
dwgs. B & G.

Existing Overburden

be cleaned off & be pushed
to where directed

Steel Sheet Piling shall be omitted
and Core Trench excavated to
rock where directed by Engineer.
Back Fill shall be Impervious
Fill. Grouting of Tertiary and
Quaternary holes shall be done
after Sheet Piling or Excavation
is completed.

Base of Core Trench, depth
as directed by Engineer

Slope Gravel Toe Drain as
shown on Embankment Sect. B

4' Topsoil seed & mulch
No drainage required. Use
A. Dike B. and C. to
20' RT #212 to
20' RT #210 & C. to
20' RT #208 & D. to

10' Below Top
Line of to Rock,
which will be 10'

CORE TRENCH
Sta. 18+00 to 24+00
Scale: 1"=20'

EMBANKMENT SECTION 'C'

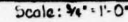
Station 14+00 to 32+40
Station 53+10 to 60+00
DIKE 'A' & DIKE 'B'

For Core Trench Section
Sta. 18+00 to 24+00, See
Detail this Sheet.

REVISION	DATE	DESCRIPTION	BY
STATE OF NEW JERSEY DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF WATER POLICY AND SUPPLY SPRUCE RUN RESERVOIR			
CONTRACT SR - I EMBANKMENT PROFILES AND SECTIONS			
WHITMAN, REQUARDT & ASSOCIATES CONSULTING ENGINEERS BALTIMORE, MARYLAND			
IN CHARGE V. J. HADDADAWAY		SCALE AS SHOWN	SHEET 29 OF 66
DRAWN	TRACED	CHECKED	
CGA	RLS	H.W.J.	
DATE 8 / 31 / 60		ACC. WR - 29	

Walter J. Haddaway
CHIEF CONSTRUCTION ENGINEER
BUREAU OF DESIGN & CONSTRUCTION

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SECTION 46D/42⁵
No Scale

DAM APPLICATION No. 543

FILE

DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLY

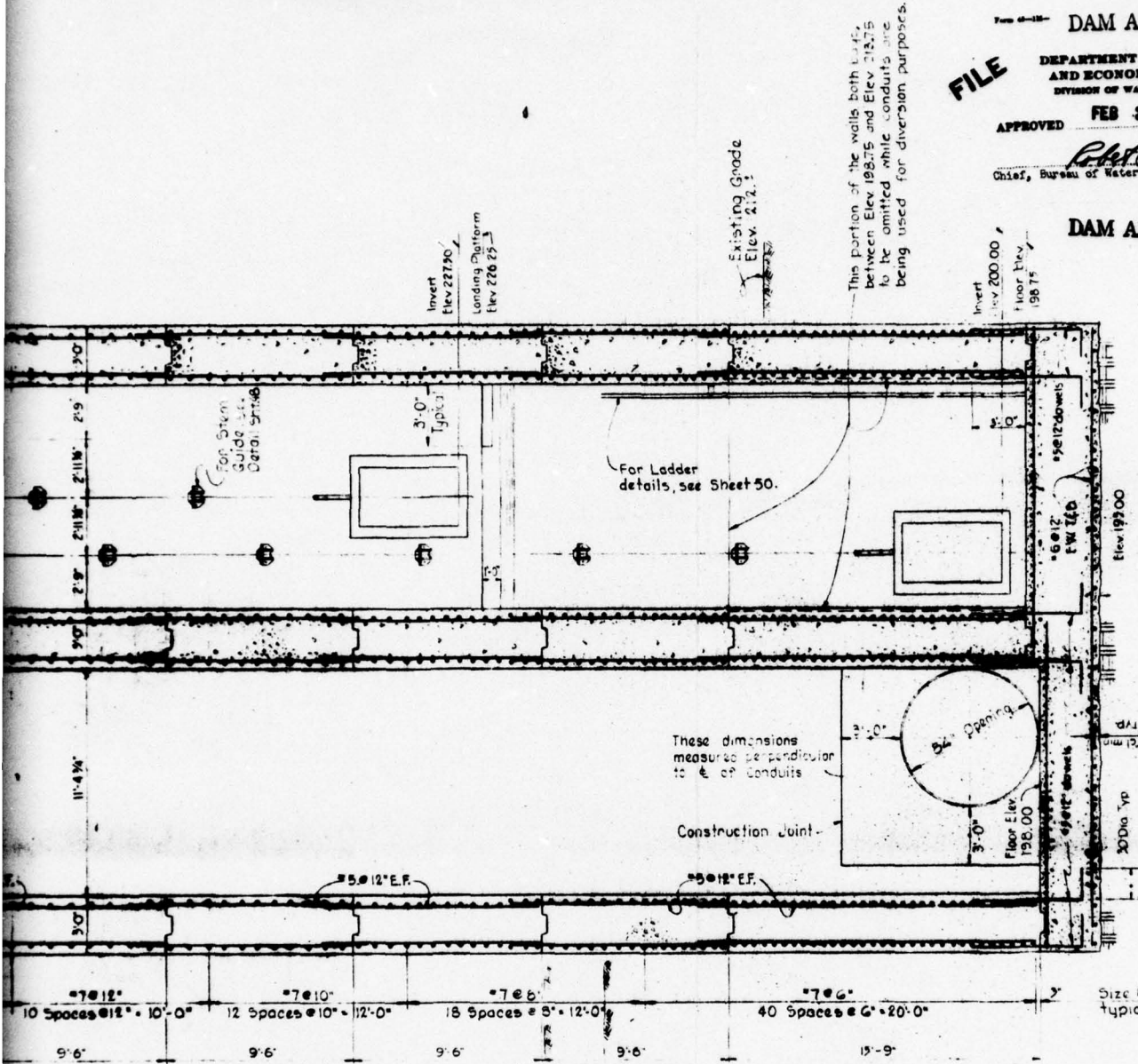
APPROVED FEB 3 1961

Chief, Bureau of Water Control

DAM APPLICATION No. 543

FILE

SECTION 47A/44.45
Scale 1/4" = 1'-0"



TYPICAL SECTION LANDING
PLATFORM
Scale: 1" = 10'

NOTES:
For Structural Notes see
Sheet 45
For Horizontal Sections
see Sheets 44 & 45.

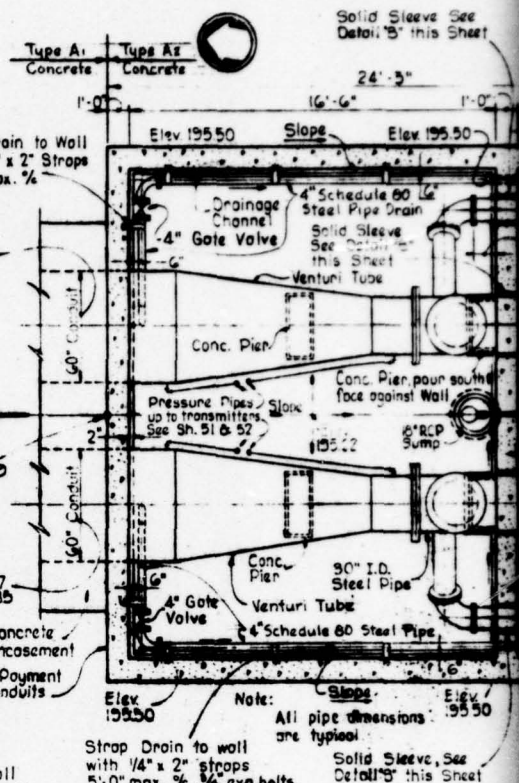
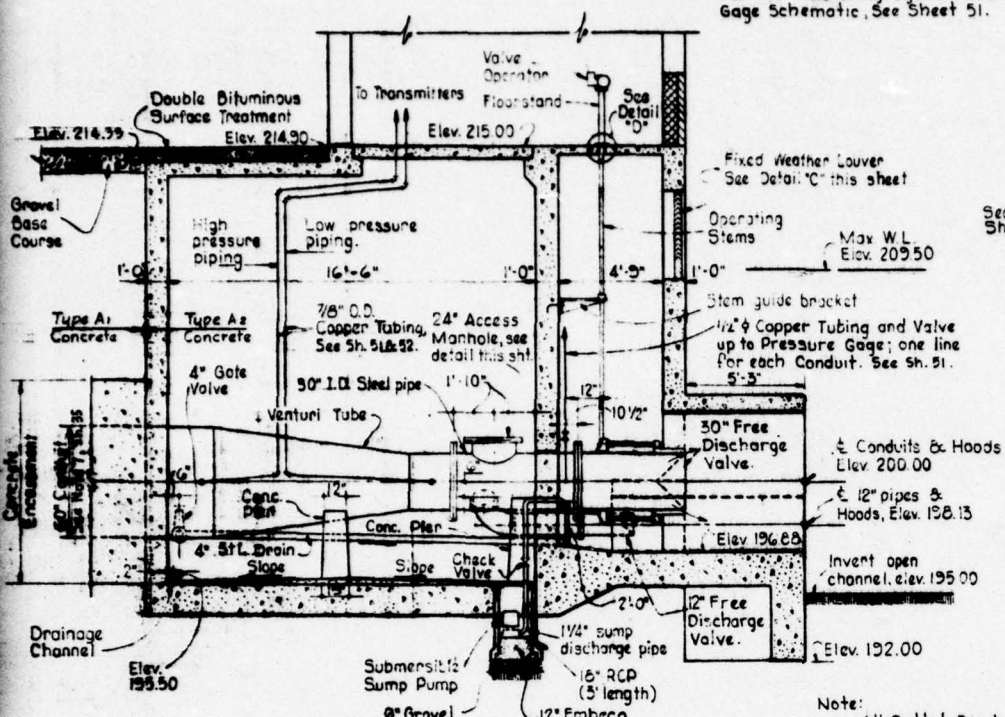
REVISION	DATE	DESCRIPTION	BY
STATE OF NEW JERSEY DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF WATER POLICY AND SUPPLY SPRUCE RUN RESERVOIR			
CONTRACT SR - I OUTLET TOWER VERTICAL SECTIONS			
WHITMAN, REQUARDT & ASSOCIATES CONSULTING ENGINEERS			
IN CHARGE V. J. HADDADWAY		SCALE: AS SHOWN	SHEET
DRAWN	TRACED	CHECKED	DATE: 8 / 31 / 60
EMW	M.D.B.	J.H.	ACC.

Walter O. ...
CHIEF CONSTRUCTION ENGINEER
BUREAU OF DESIGN & CONSTRUCTION

Whitman, Requardt & Associates

2.

Note:
For Flow Metering System and Pressure
Gage Schematic, See Sheet 51.



SECTION 36A/36

OUTLET CONTROL VAULT

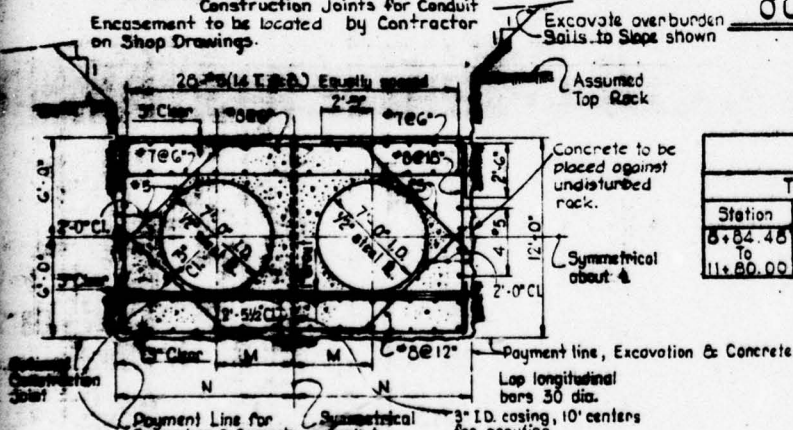
Scale: 1/4" = 1'-0"

CONCRETE ENCASEMENT SCHEDULE								
TYPE I			TYPE II			TYPE III		
Station	M	N	Station	M	N	Station	M	N
8+84.48 To 11+80.00	4'-6"	10'-0"	11+80.00 To 13+35.12	4'-6"	10'-0"	13+35.12 To 13+52.37	4'-0"	8'-6"

See Sheet No. 35 for location of Sections

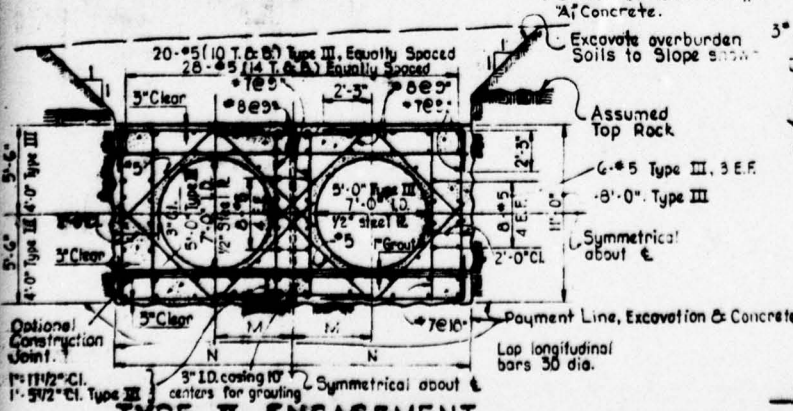
NOTE:

Construction Joints for Conduit
Encasement to be located by Contractor
on Shop Drawings.



TYPE I ENCASEMENT

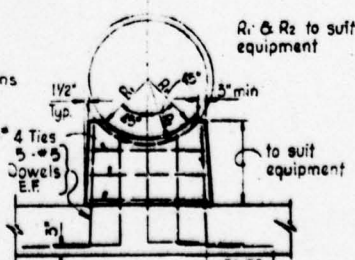
No Scale



TYPE II ENCASEMENT

TYPE III SIMILAR, EXCEPT AS NOTED

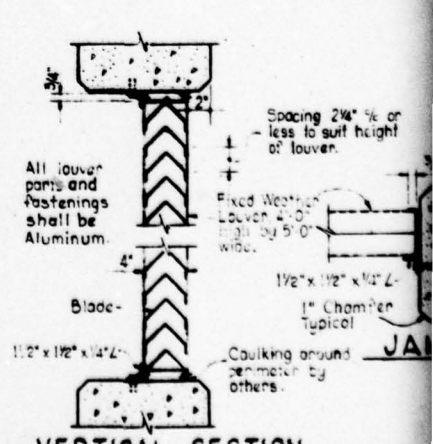
No Scale



ELEVATION

PLAN AT TOP OF PIER CONCRETE PIER

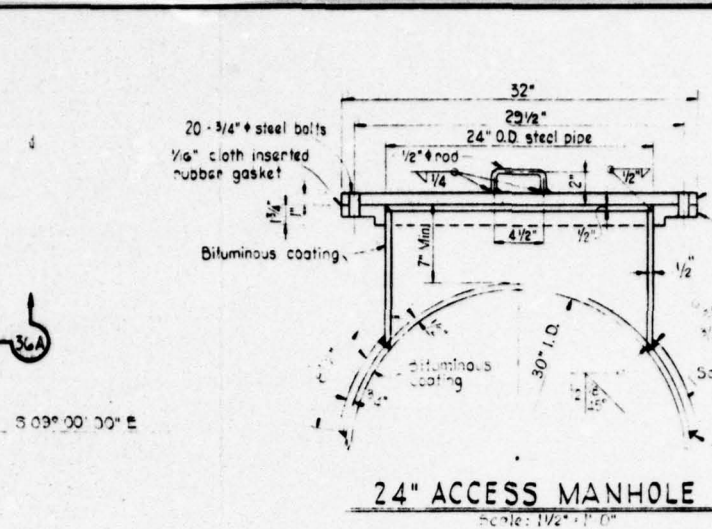
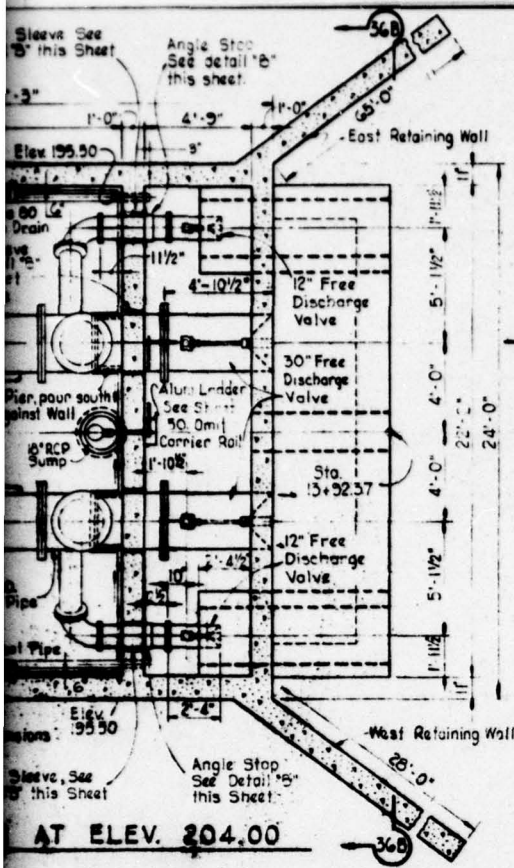
No Scale



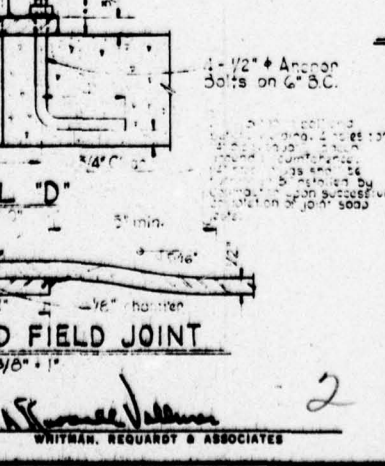
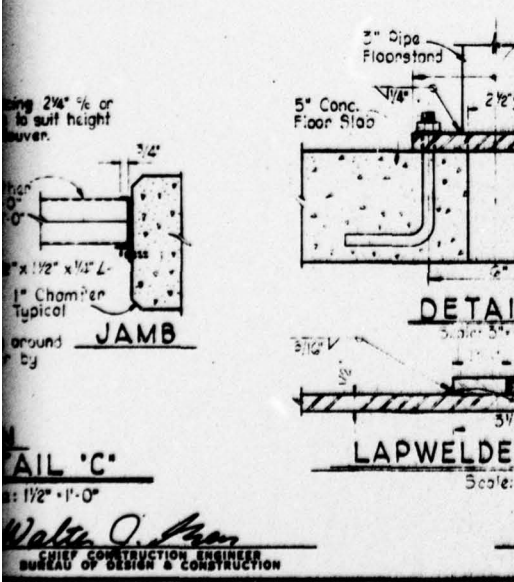
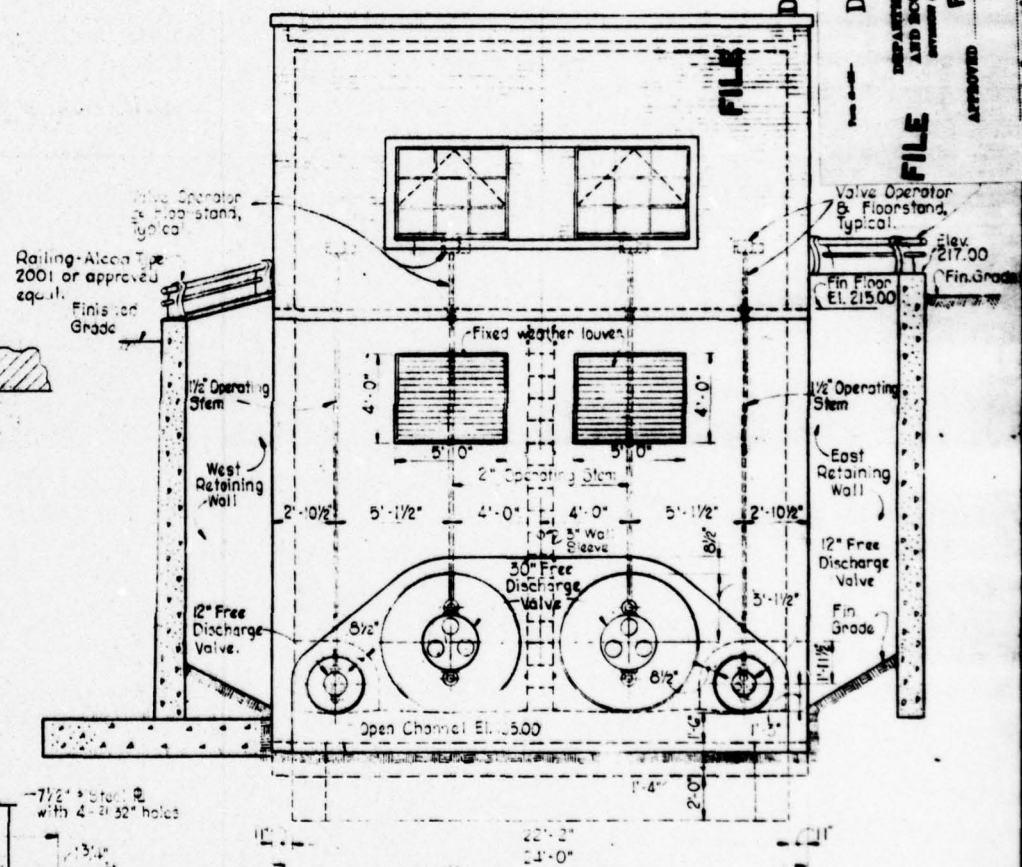
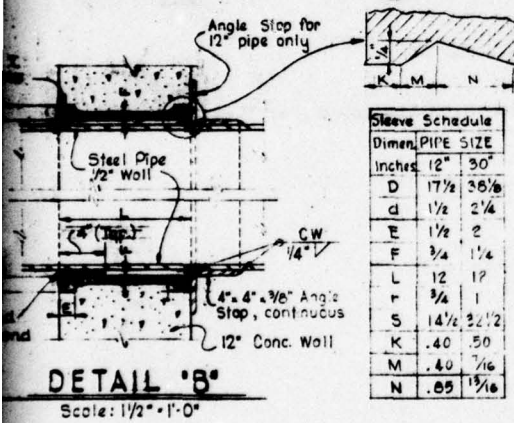
VERTICAL SECTION

Scale: 1/2" = 1'-0"

WATER
BUREAU OF SOILS

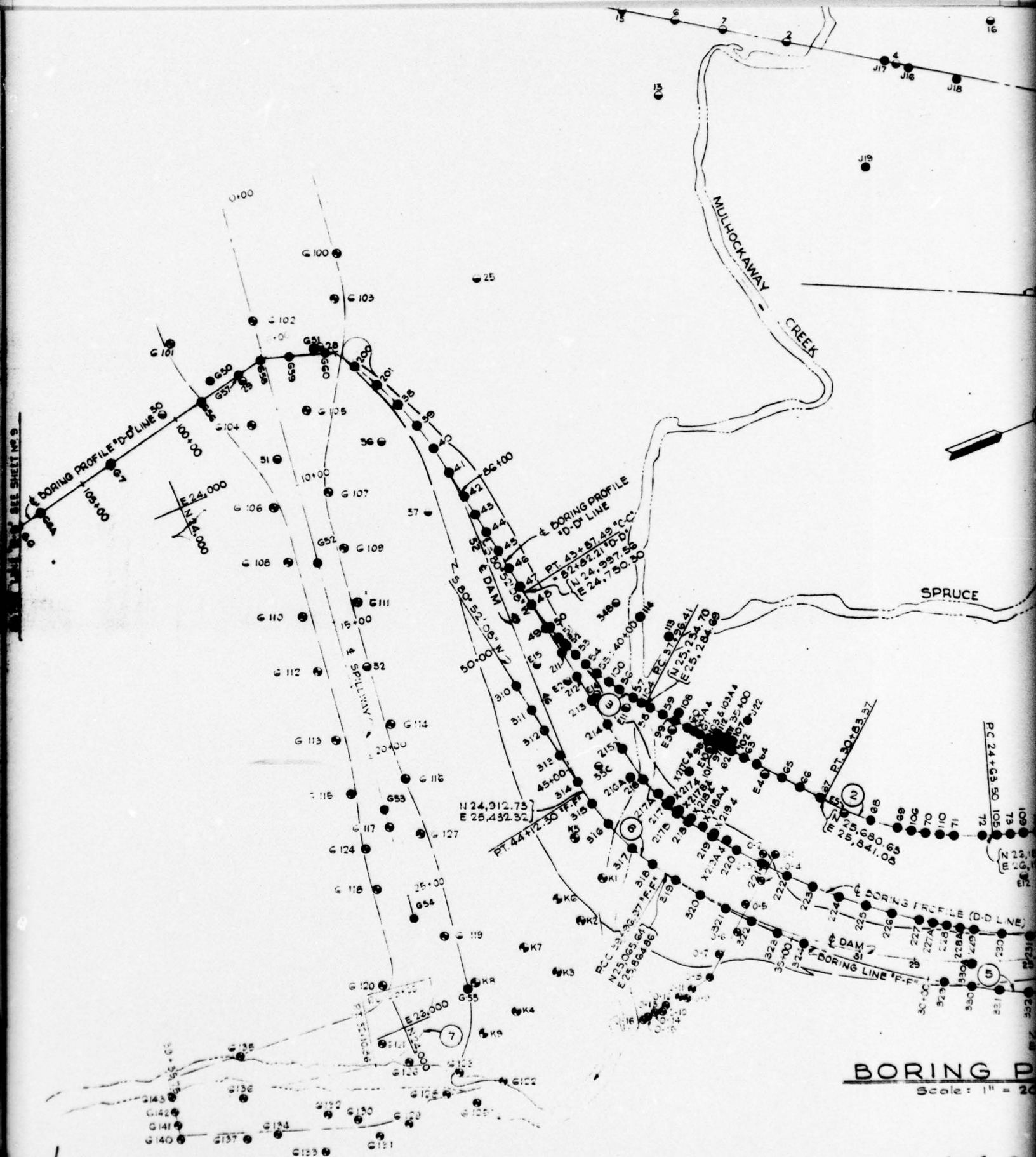


DAM APPLICATION No. 545
DAM APPLICATION No. 543
DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLY
FEB 3 1961
APPROVED



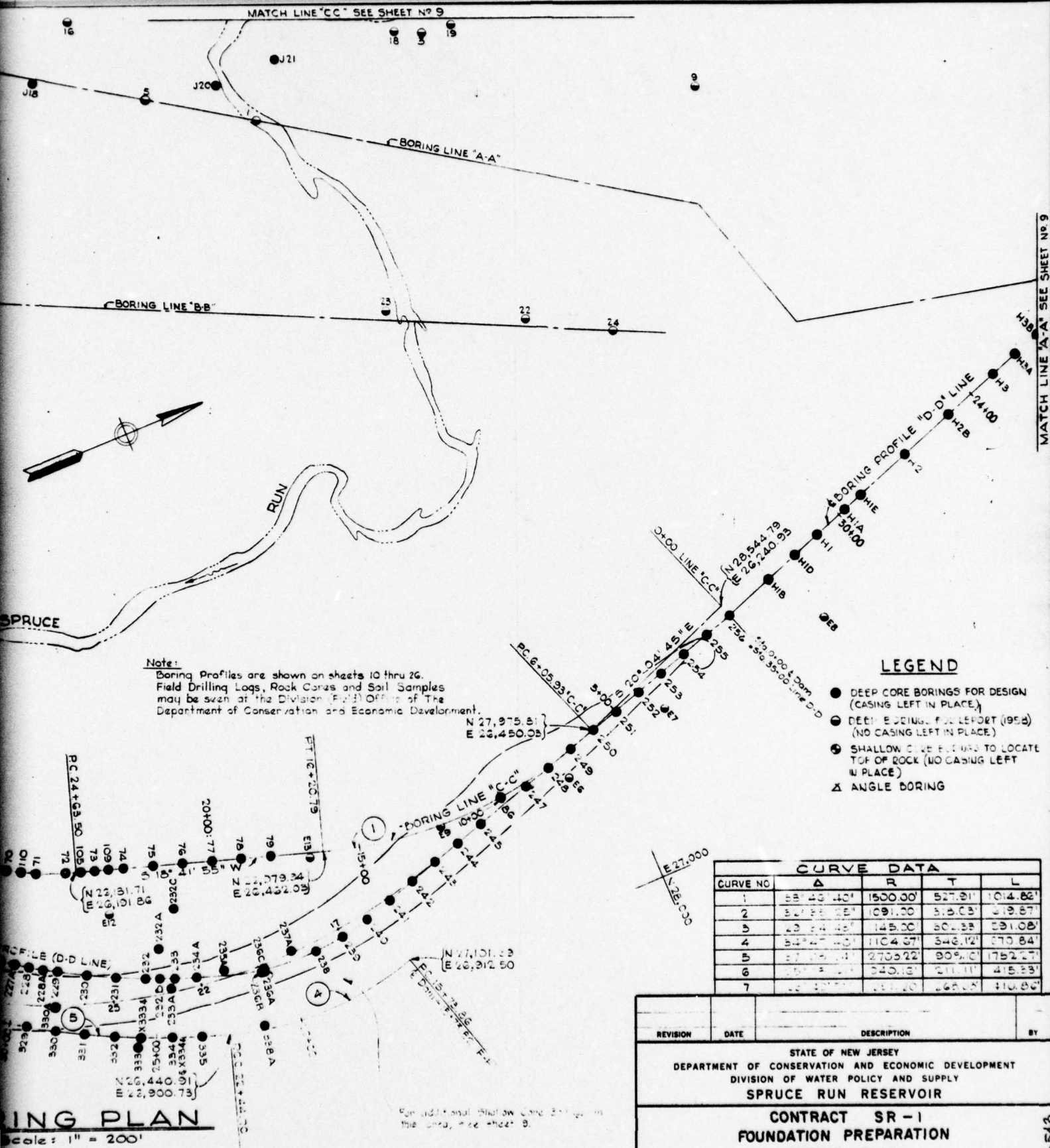
REVISION	DATE	DESCRIPTION	BY
STATE OF NEW JERSEY DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF WATER POLICY AND SUPPLY SPRUCE RUN RESERVOIR			
CONTRACT SR-1 OUTLET WORKS OUTLET CONTROL VAULT AND OUTLET CONDUITS			
WHITMAN, REQUARDT & ASSOCIATES			
CONSULTING ENGINEERS			
IN CHARGE: V. J. HADDADWAY		SCALE: AS SHOWN	SHEET 36 OF 66
DRAWN: J. B. W.	TRACED: J. B. W.	CHECKED: H. A. L.	DATE: 8 / 31 / 60
ACC. WR - 36			

SEE SHEET NO. 9



BORING P
Scale: 1" = 20'

Walter O.
BUREAU OF REVENUE



Note:
Boring Profiles are shown on sheets 10 thru 26.
Field Drilling Logs, Rock Coras and Soil Samples
may be seen at the Division (Field) Office of The
Department of Conservation and Economic Development.

LEGEND

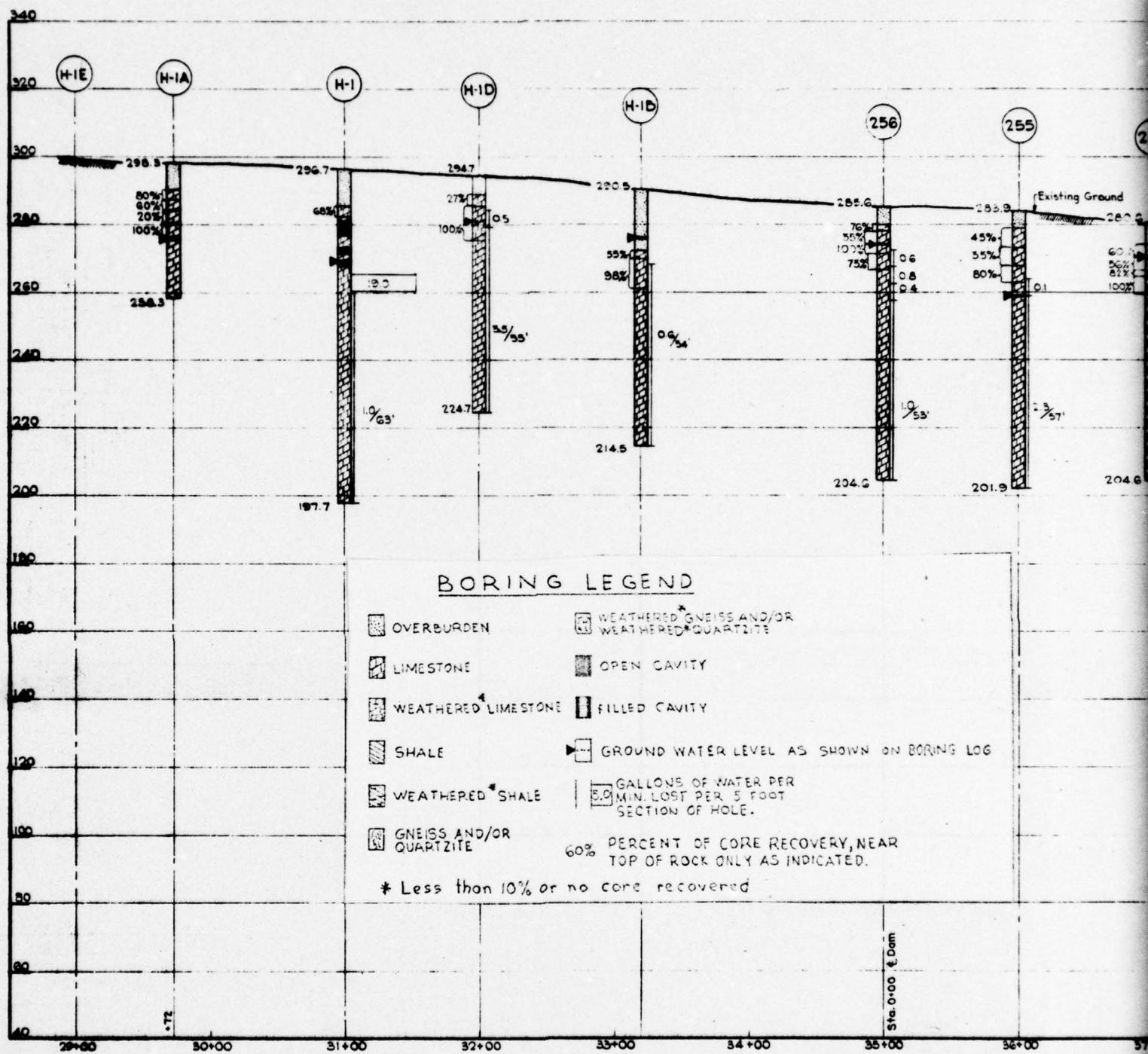
- DEEP CORE BORINGS FOR DESIGN
(CASING LEFT IN PLACE)
- DEEP BORINGS FOR LEFPORT (1953)
(NO CASING LEFT IN PLACE)
- ⊗ SHALLOW CORE BORINGS TO LOCATE
TOP OF ROCK (NO CASING LEFT
IN PLACE)
- △ ANGLE BORING

CURVE DATA				
CURVE NO	Δ	R	T	L
1	55° 20' 40"	1500.00'	527.91'	1014.86'
2	50° 55' 25"	1091.00'	513.03'	819.87'
3	23° 24' 45"	145.00'	80.33'	231.08'
4	54° 27' 10"	1104.07'	348.12'	870.84'
5	27° 15' 14"	2705.22'	809.00'	1752.27'
6	25° 13' 11"	240.13'	211.11'	415.33'
7	23° 10' 11"	231.20'	246.65'	410.85'

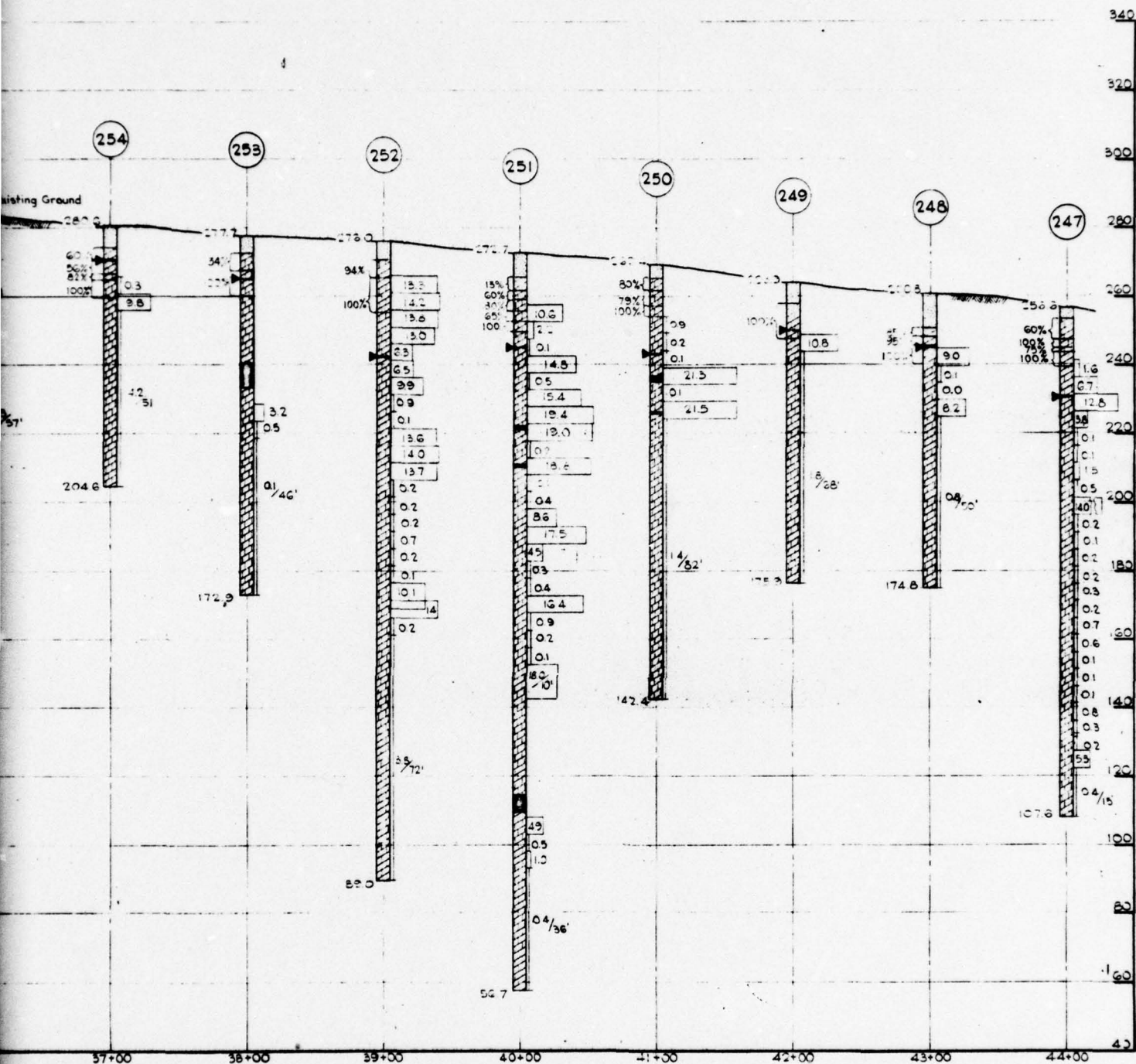
REVISION	DATE	DESCRIPTION	BY
STATE OF NEW JERSEY DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF WATER POLICY AND SUPPLY SPRUCE RUN RESERVOIR CONTRACT SR-1 FOUNDATION PREPARATION BORING PLAN WHITMAN, REQUARDT & ASSOCIATES CONSULTING ENGINEERS BALTIMORE MARYLAND			
IN CHARGE V. J. HADDADY		SCALE: 1" = 200'	SHEET 8 OF 66
DRAWN	TRACED	CHECKED	DATE 8 / 31 / 60
CGA	RLS	NAL	ACC. WR - 8

Walter J. Haddady
CHIEF CONSTRUCTION ENGINEER
BUREAU OF DESIGN & CONSTRUCTION

2
Whitman, Requardt & Associates



BORING PROFILE - LINE 1
(LOOKING DOWNSTREAM)



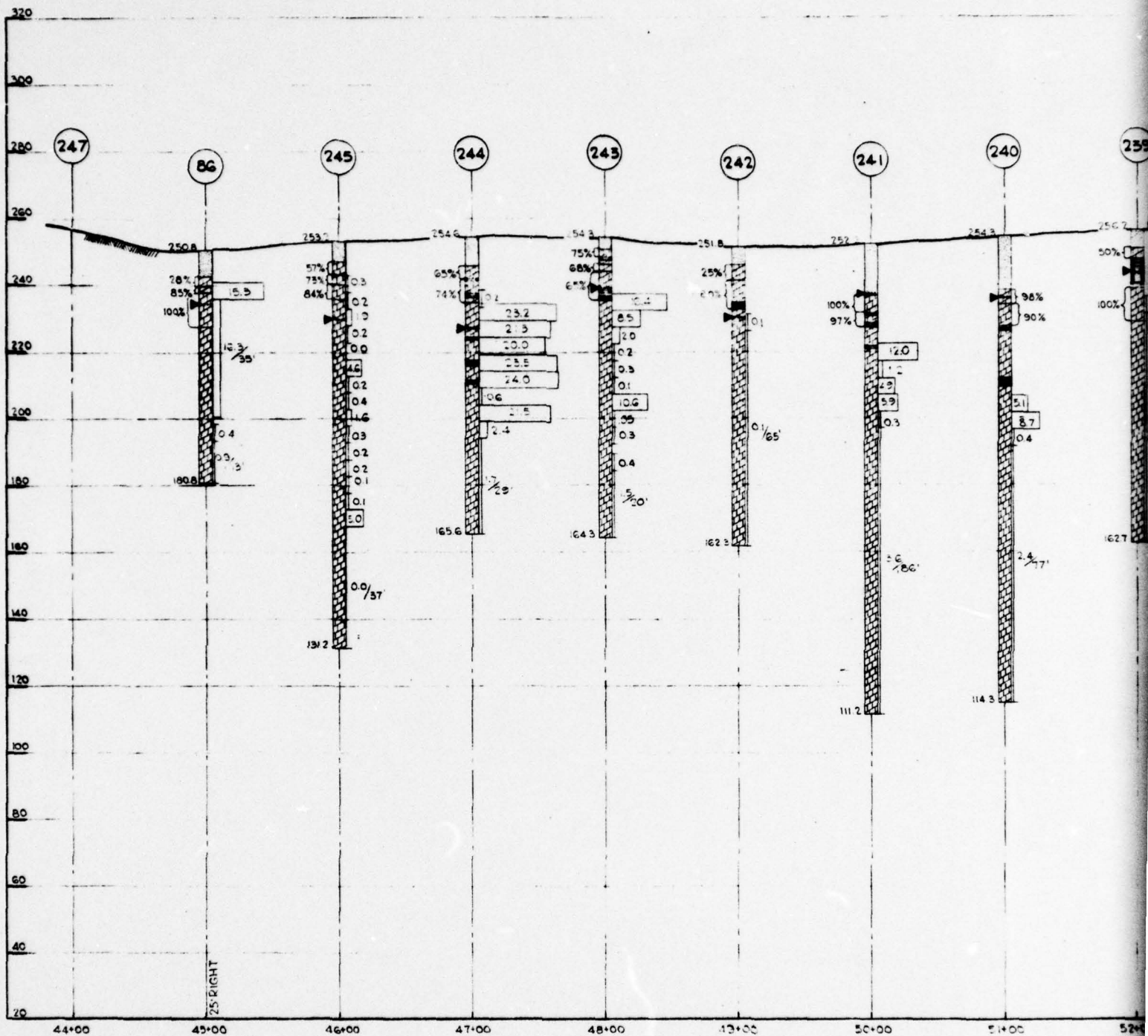
— LINE "D-D"
(STREAM)

Note:
For Boring Legend, See Sheet No. 10
For Plan showing location with
relation to E. Dam, see Sheet No. 8.

Walter J. Green
CHIEF CONSTRUCTION ENGINEER
BUREAU OF DESIGN & CONSTRUCTION

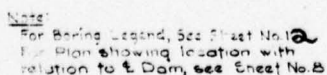
A. Russell Vallentyne 2
WHITMAN, REQUARDT & ASSOCIATES

REVISION	DATE	DESCRIPTION	BY
STATE OF NEW JERSEY DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF WATER POLICY AND SUPPLY SPRUCE RUN RESERVOIR			
CONTRACT SR-1 FOUNDATION PREPARATION BORING LOGS — LINE D-D			
WHITMAN, REQUARDT & ASSOCIATES CONSULTING ENGINEERS BALTIMORE, MARYLAND			
IN CHARGE V.J. HADDADWAY		SCALE: HORIZ. 1" = 50' VERT. 1" = 20'	SHEET 12 OF 13
DRAWN	TRACED	CHECKED	DATE 8 / 31 / 60
CGA	R.S.	NAL	ACC. WR - 12



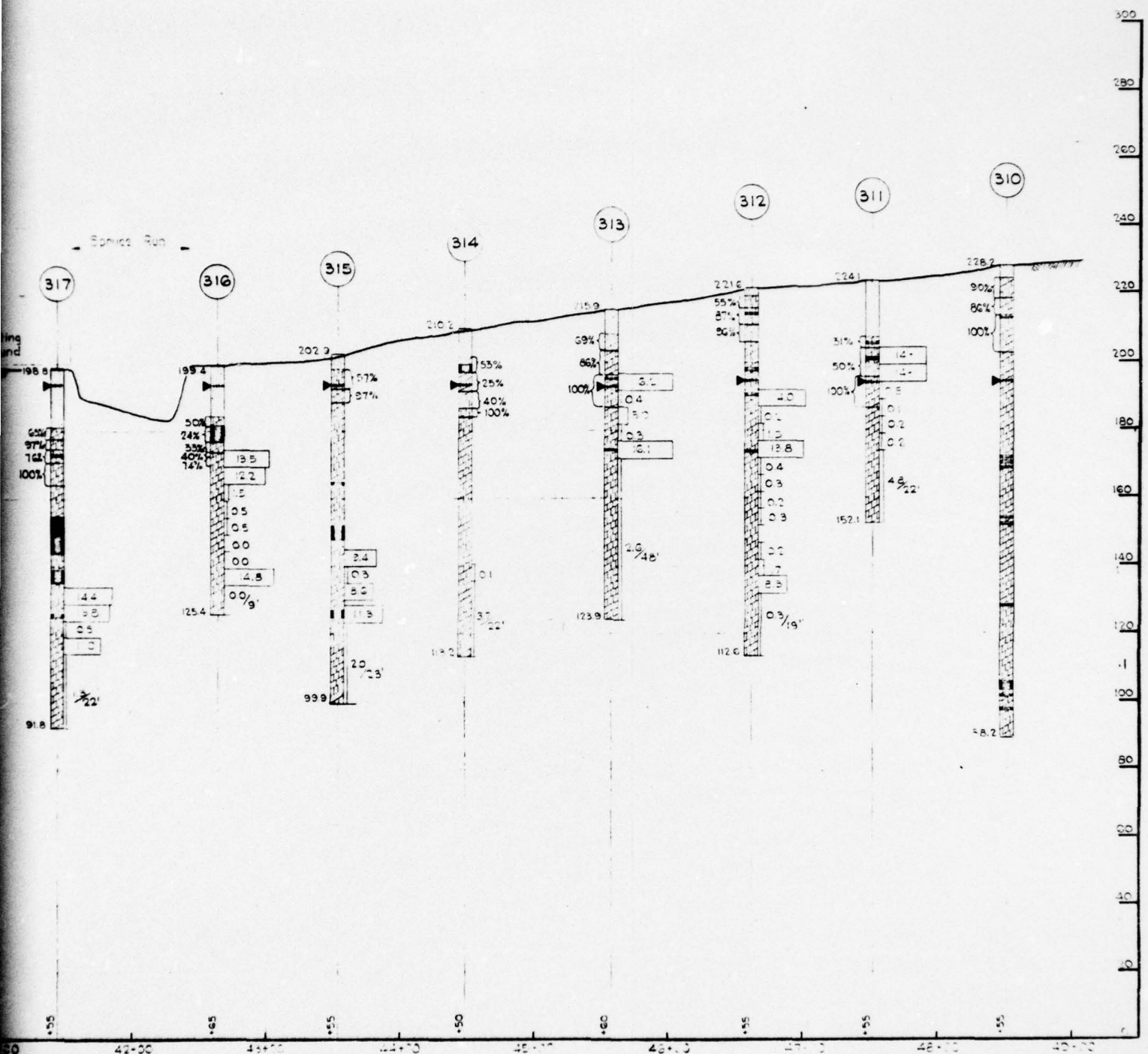
BORING PROFILE — LINE "D-D"
 (LOOKING DOWNSTREAM)

Walter
 CHIEF
 BUREAU OF



A. Russell Volmer
WHITMAN, REQUARDT & ASSOCIATES

REVISION	DATE	DESCRIPTION	BY
STATE OF NEW JERSEY DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF WATER POLICY AND SUPPLY SPRUCE RUN RESERVOIR			
CONTRACT SR - I FOUNDATION PREPARATION BORING LOGS - LINE D-D			
WHITMAN, REQUARDT & ASSOCIATES CONSULTING ENGINEERS			
IN CHARGE ☒ J. HADDADWAY		SCALE: HORIZ 1" = 50' VERT 1" = 20'	SHEET 13 OF 66
DRAWN ☒	TRACED ☒	CHECKED ☒	ACC. WR - 13
C.G.A.	R.W.L.	N.A.L.	



Note
For Boring Legend, See Sheet No. 2
For Plan showing location with
relation to Dam, see Sheet No. 8

REVISION	DATE	DESCRIPTION	BY
STATE OF NEW JERSEY DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF WATER POLICY AND SUPPLY SPRUCE RUN RESERVOIR			
CONTRACT SR-1 FOUNDATION PREPARATION BORING LOGS—LINE F-F			
WHITMAN, REQUARDT & ASSOCIATES CONSULTING ENGINEERS BALTIMORE, MARYLAND			
IN CHARGE V. J. HADDADWAY		SCALE: HORIZ 1"=50'	SHEET 19 OF 66
DRAWN	TRACED	VERT 1"=20'	
C.G.A.	M.A.A.	N.A.L.	
DATE 8 / 31 / 60		ACC. WR-19	

Walter J. Haddaway
CHIEF CONSTRUCTION ENGINEER
BUREAU OF DESIGN & CONSTRUCTION

Whitman, Requardt & Associates
WHITMAN, REQUARDT & ASSOCIATES

2

A P P E N D I X A
C H E C K L I S T - V I S U A L I N S P E C T I O N

Check List
Visual Inspection
Phase 1

Name Dam Spruce Run County Hunterdon State New Jersey Coordinators _____

Date(s) Inspection 12/12/77 Weather Cloudy Temperature 25° +

Pool Elevation at Time of Inspection 270.3 M.S.L. Tailwater at Time of Inspection N/A M.S.L.

Inspection Personnel:

<u>F. Vinci</u>	<u>NAPEN-D</u>	<u>A. Depman</u>	<u>NAPEN-F</u>	<u>Ronald Hassling - N.J.D.E.P.</u>
<u>F. Braun</u>	<u>NAPEN-D</u>	<u>B. Uibel</u>	<u>NAPEN-F</u>	_____
<u>V. Hill</u>	<u>NAPEN-H</u>			_____

F. W. VINCI Recorder

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None installed.	Recommend installation of surface settlement points and periodic surveys to determine horizontal and vertical movements.
OBSERVATION WELLS	Some installed in natural ground on downstream side of dam. Review of records shows no variation in static level in wells despite variation in water levels - readings are taken monthly. No wells in embankment.	Recommend continued reading of observation wells. Recommend pumping of wells to assure functional adequacy and accuracy of ground water levels.
WEIRS	No weirs.	Recommend installation of 2 to 3 weirs in concrete lined ditches on downstream side of dam. Readings on weekly or more frequent basis.
PIEZOMETERS	No piezometers on site.	Recommend installation of piezometers in dam structure to monitor performance.
OTHER	A-2	Do not believe surface indications of dam's performance justify installation of more sophisticated equipment such as inclinometers. Seismographs might be advisable, considering proximity of dam to the Ramapo fault to the north.

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	No problems noted.	
SEDIMENTATION	No problems noted.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS; DEBRIS, ETC.)	No problems noted.	
SLOPES	No problems noted.	
APPROXIMATE POPULATION	1,700	
	A-4	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	General appearance good. Some cracking noted. - Drains on downstream side operative. Some loss of joint filler.	Recommend filling of joints and repairs to cracking.
APPROACH CHANNEL	- Below water - could not observe.	None.
DISCHARGE CHANNEL	Rough. Seepage noted at several points. Some erosion of channel evident with apparent concentration of flows in center third of spillway from mid point of spillway length.	No action necessary.

INTAKE STRUCTURE AND OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
OPERATING ROOM IN INTAKE TOWER	Kept in very good condition.	None
GATE OPERATION	Gates operated mechanically by portable power device driven by small gasoline engines. Process is very slow and subject to vagaries of small gasoline engines.	Permanent type operating mechanism possibly electrically driven with emergency standby generator should be considered. Faster reaction time desirable.
CONNECTING BRIDGE	Generally good condition except for minor concrete spalls.	Concrete spalls should be repaired.
84" CONDUITS	Apparently good condition - no leaks, cracks or breaks observed. Coat of slime did not permit total observation of interior protective coating.	Removal of coat of slime to permit examination of any wear on protective coating. Recoat if necessary.
GATE AND STOP LOGS	Stop logs could not be inspected in place. Extended time required to place stop logs in position. Main gates inspected from downstream side of intake tower and appear to be in very good condition - no leakages noted.	Periodic use of stop logs to insure prompt insertion if required.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS
OUTLET CONTROL VAULT	Kept in good condition. The 30" venturi and conical regulating devices could hamper rapid emergency drawdown. One main free discharge valve operator out of commission, repair part on order	Plan should be prepared to facilitate rapid drawdown in event of an emergency.

EMBANKMENT

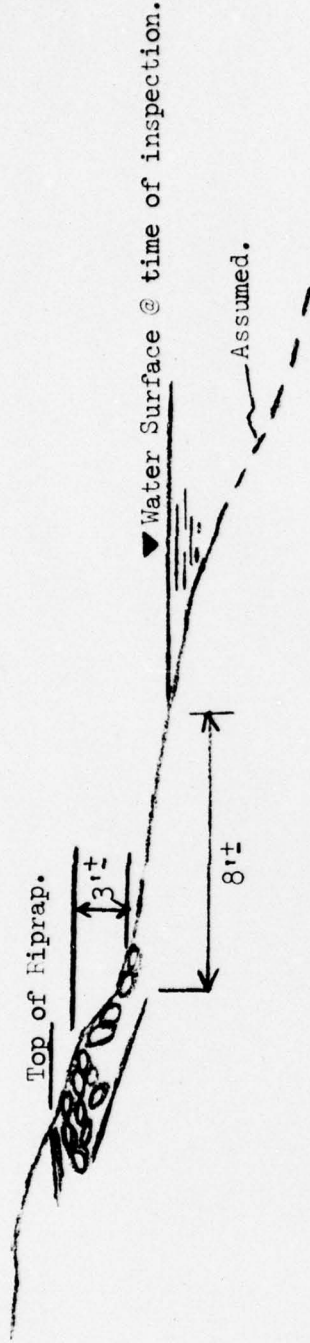
VISUAL EXAMINATION OF	REMARKS
SURFACE CRACKS	None noted.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None noted.
SLOUGHING OR EROSION OF EMBANKMENT AND ADJUTMENT SLOPES	Noted shallow (normally 2-3"), exceptionally up to 5", cutting in certain areas of embankment slope. These are parallel to the top of dam and are caused by a slope mower crossing over soft, wet surface of embankment. State Representative, Mr. Ronald Hassling, indicated this had occurred because of necessity of mowing on wet surfaces during the past fall. Evidence of repair of worst of these. Several small depressions noted on downstream face appear to be built in and not the result of subsidence or sloughing.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	No problems noted.
RIPRAP FAILURES	Several areas show apparent adjustment of riprap to normal wave conditions - Consistent bench section from El. 368t to El. 372t. Areas where riprap has slumped leaving greatly reduced cover - approximately 40' long - El. 372 to top of riprap - 200' from service bridge - See also note under first item - next page. Riprap gradation and placement requirements appear to have provided riprap protection consisting of two basic types of surface: (1) Generally small, 18" and less, stone comprising practically all stone protection and (2) Large, 3' up to 4' stone, with the smaller stone previously noted. The first type of stone, where prevalent in the protection has generally adjusted to the scarp - beach section shown below in profile. The second gradation of stone generally appears to have the larger stone remaining in place with the smaller stone being reworked. This results, in many areas, in the tops of larger stones being from 1½ to 2' higher than the smaller stone surrounding them.

VISUAL EXAMINATION OF

REMARKS

RIPRAP (CONTINUATION)

PROFILE -



Although it is believed the surface is capable of protecting the random fill section for the next 3-5 years, the owner should program a reworking of the stone surface in his maintenance budget within that period to assure that rehabilitation work can be performed when needed. The several areas where slumps or other deficiency of protective cover where noted should be repaired as soon as possible. Further suggest that a number of profiles be run to determine existing shape of slope down to El. 255 and compare with as-built surveys if available. Also determine if photos of slopes as-built are available and, if so, compare with present conditions.

EMBANKMENT

VISUAL EXAMINATION OF		REMARKS OR RECOMMENDATIONS
STA 14+00	Possible slump area; readjustment of riprap of face seepage noted in drainage ditch.	Check WL's in observation holes.

JUNCTION OF EMBANKMENT
AND ABUTMENT, SPILLWAY
AND DAM

No problems noted - amount and type of material in place between dam and spillway slope closest to dam are sufficient to protect dam during abnormal spillway flows.

ANY NOTICEABLE SEEPAGE

- See (2) and (4) under Drains - below.

STAFF GAGE AND RECORDER

DRAINS

- (1) 8" Terra Cotta drains used as fox and small animal burrows - these were clear to 6' - will need screens.
- (2) Considerable growth of cat tails in swampy condition on lower berm @ center line Sta. 40+00 - possible source of water surface runoff or internal seepage. Water temp. @ 43°F. in pool. Pool partly frozen.
- (3) Functional drain @ Sta. 35+00. Water temp. 50° indicating some ground water flow. Flow estimated at 3-5 g.p.m.
- (4) Left side concrete lined ditch near discharge (outlet portal) area. Heavy water flow undermining sloped portion of ditch causing erosion at discharge point.

A P P E N D I X B

C H E C K L I S T - E N G I N E E R I N G D A T A

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

<u>ITEM</u>	<u>REMARKS</u>
PLAN OF DAM	General Plan Sheets 4 thru 7. (Not included in this report)
REGIONAL VICINITY MAP	Location and Vicinity Map - Sheet 2.
CONSTRUCTION HISTORY	None Available.
TYPICAL SECTIONS OF DAM	Sheets 29 - 30. Profiles showing berm drainage - Sheet 32.
HYDROLOGIC/HYDRAULIC DATA	See Next Page.
OUTLETS - PLAN	Sheets 35 and 36.

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 41.3 mi. Typical N. New Jersey Topography

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 270 ft/SLD (29840 AC-Ft)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 273 ft/SLD (33670-AC-Ft)

ELEVATION MAXIMUM DESIGN POOL: 278.9 Ft/SLD

ELEVATION TOP DAM: 283 Ft/SLD

CREST: _____

- a. Elevation 273
- b. Type Earth-fill Dam-Arch Shape
- c. Width Top Width 25' Downstream Slope 2.5:1 Upstream Slope 3:1
- d. Length 5925 Feet
- e. Location Spillover Side Channel
- f. Number and Type of Gates None

OUTLET WORKS: _____

- a. Type Two 84" Conduit Beveling Down to Venuri at Outlet
- b. Location Center of Dam Embankment
- c. Entrance Inverts 198.0 Ft/SLD
- d. Exit Inverts 195.5 Ft/SLD
- e. Emergency Draindown Facilities None

HYDROMETEOROLOGICAL GAGES: D/S Gage

- a. Type Digital Telemark
- b. Location D/S 1800' from Outlet Conduit
- c. Records Kept by USGS Trenton Office

MAXIMUM NON-DAMAGING DISCHARGE (No Freeboard) Not Available

POOL ELEVATION GAGE _____

- a. Type Analog
- b. Location In Tower
- c. Records Kept by N.J. Department of Environmental Protection

ITEM	REMARKS
DESIGN REPORTS	Refer to Section 2 of this Report.
GEOLOGY REPORTS	Refer to Section 2 of this Report.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Refer to Section 2 of this Report.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	See Drawings 8, 12, 13 and 19
POST-CONSTRUCTION SURVEYS OF DAM	None Available.

ITEMS	REMARKS
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SPILLWAY PLAN

SECTIONS

DETAILS

See Drawings 61 and 62.

ITEMS	REMARKS
MONITORING SYSTEMS	Observation wells. Pod Level readings.
MODIFICATIONS	None.
HIGH POOL RECORDS	El. 273.9 maximum elevation recorded to date.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None.
MAINTENANCE OPERATION RECORDS	None.

PHOTOGRAPHIC DESCRIPTION SHEET

Photo 1 - 12 December 1977

Overview of concrete ogee weir structure looking southward from left spillway abutment towards right spillway abutment

Photo 2 - 12 December 1977

View of typical joint of concrete ogee weir indicating open joint and loss of joint filler.

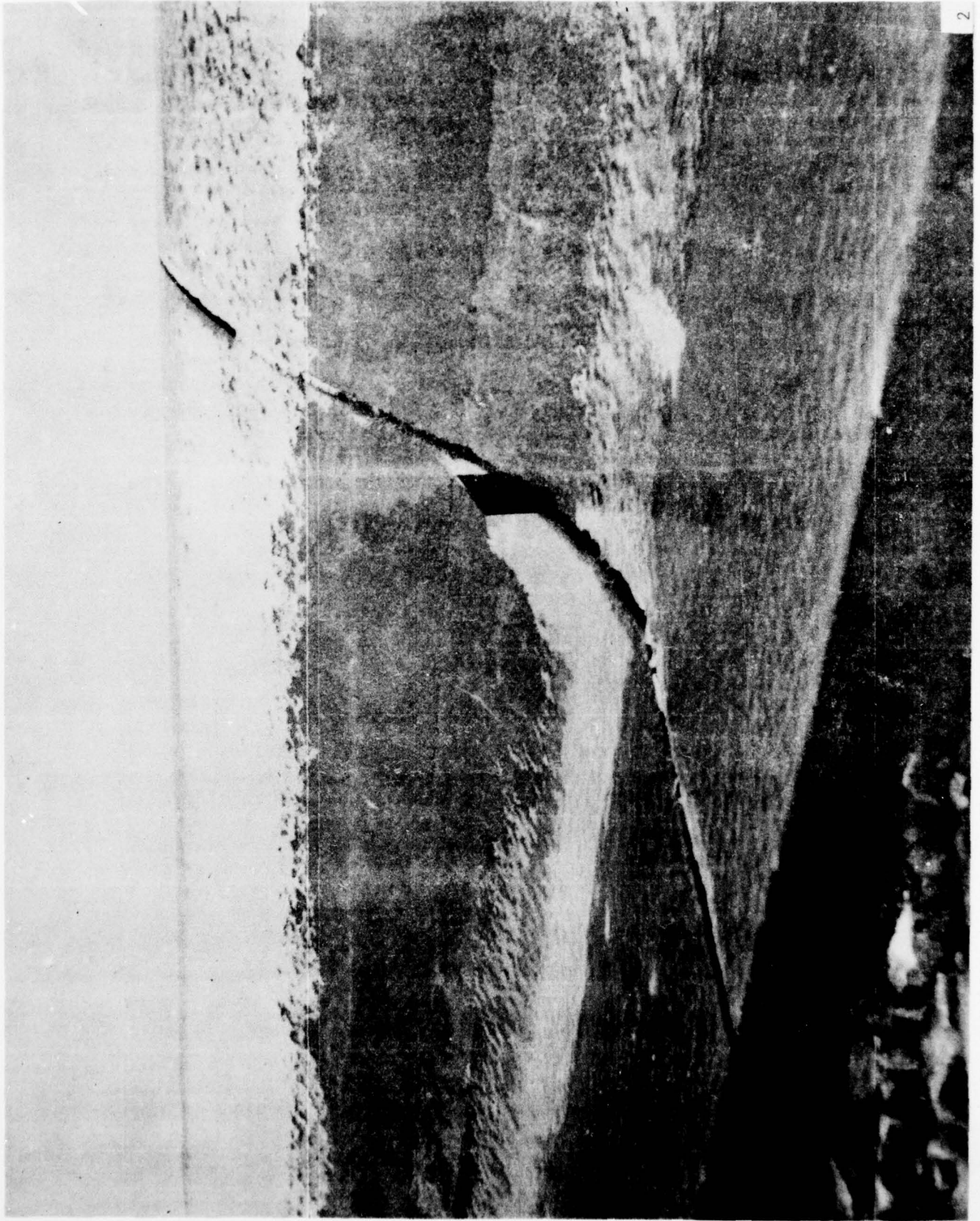
Photo 3 - 12 December 1977

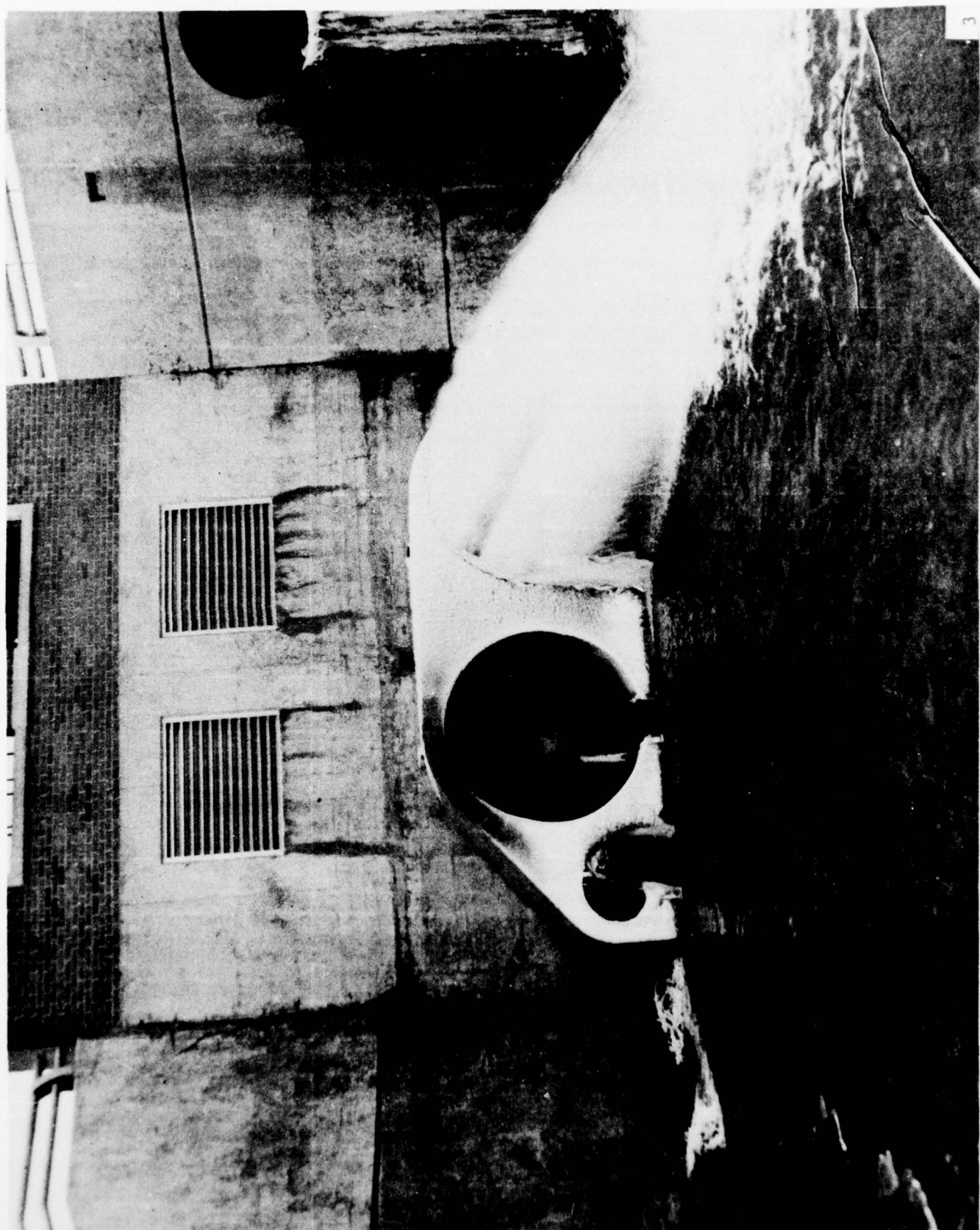
View of two 30" venturi outlets with conical regulating devices, one of which is operational.

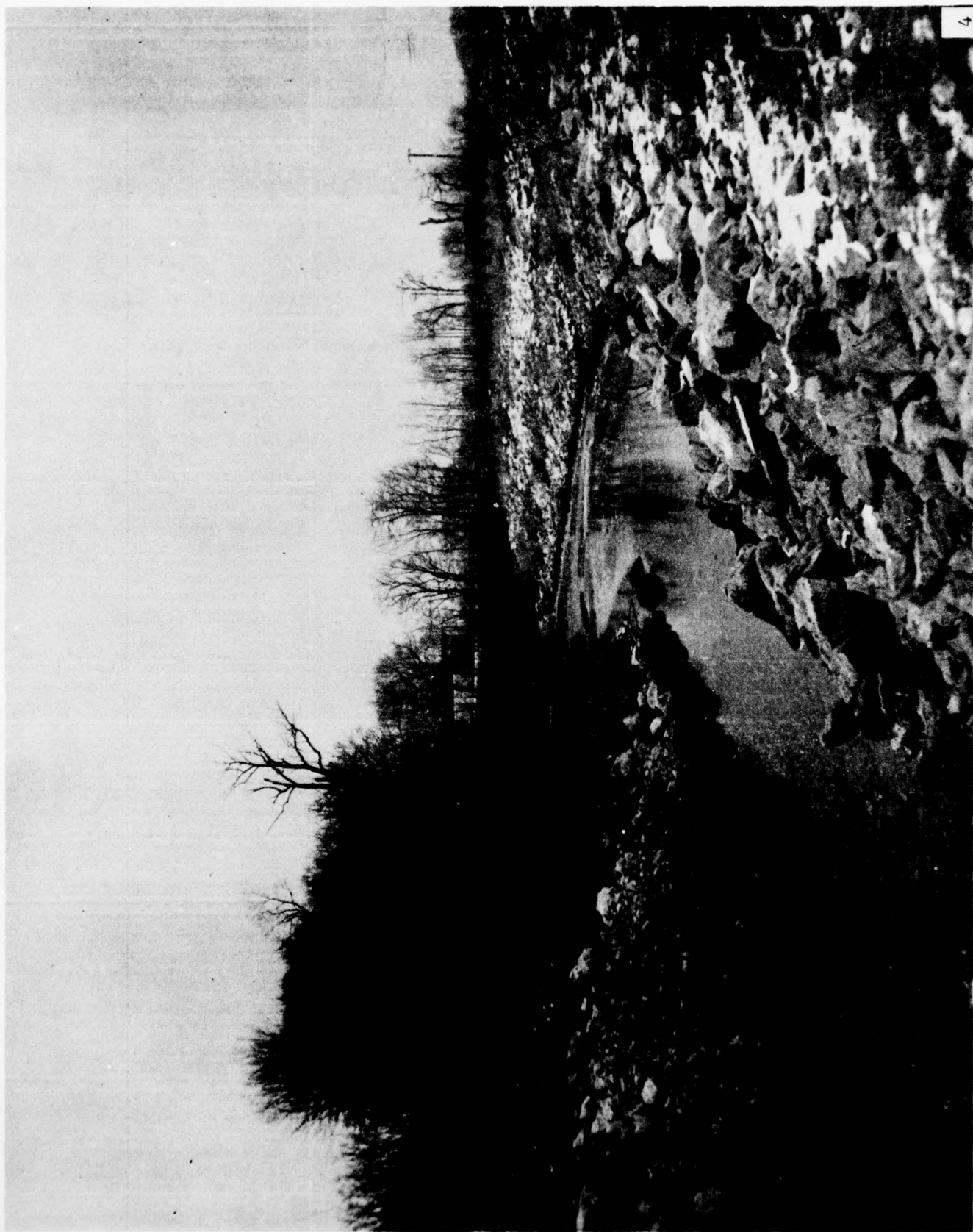
Photo 4 - 12 December 1977

View of downstream channel looking downstream from a point approximately 100 feet downstream of outlet control vault.









REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NJ-00132	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report National Dam Safety Program Spruce Run Dam NJ00132		5. TYPE OF REPORT & PERIOD COVERED ⑨ FINAL rept.
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. Army Corps of Engineers. Philadelphia District		8. CONTRACT OR GRANT NUMBER(s)
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) National Dam Safety Program Dam Inspection Report Phase I Spruce Run Dam, N.J. Dams - N.J.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is in accordance with the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general conditions is included in the report.		