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NATIONAL DAM SAFETY PROGRAM. HIGHLAND PARK RESERVOIR DAM (INVEN--ETC(U)
SEP 81 L D ANDERSEN

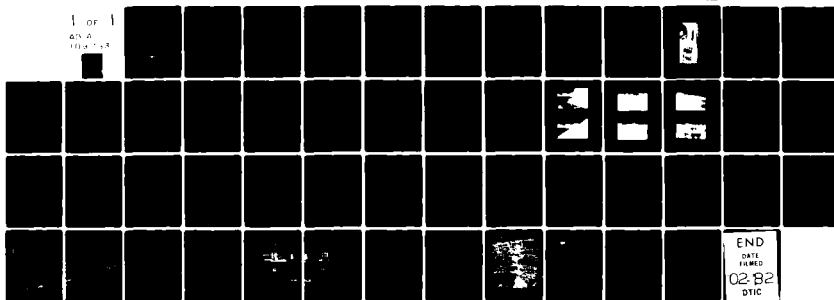
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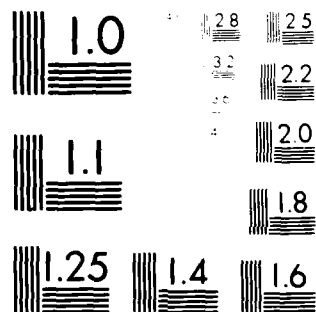
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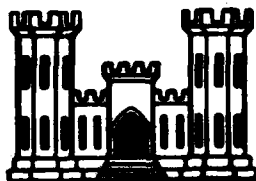
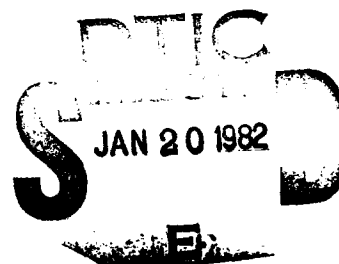
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GENESEE RIVER BASIN

HIGHLAND PARK RESERVOIR DAM

MONROE COUNTY, NEW YORK

INVENTORY NO. N.Y. 790



PREPARED FOR

NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST 1981

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report contains information and analysis on the physical condition of the dam as of the inspection date. Information and analysis are based on visual inspection by the performing organization. Based on the evaluation of the existing conditions, the condition of the Highland Park Reservoir Dam is considered to be good. The examination of documents and visual observations did not reveal conditions which are considered to constitute a hazard to human life or property.		

The dam impounds an offstream reservoir which has no drainage area other than the surface area of the reservoir. The reservoir has no uncontrolled spillway. However, under normal operating conditions, the dam would impound the total Probable Maximum Precipitation with maximum pool level at about three feet below the dam crest level. Therefore, the dam has adequate surcharge storage capacity.

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 investigation 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. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide 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.

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HIGHLAND PARK RESERVOIR DAM
N.Y. 790

DEC I.D. NO. 40B-4450
GENESEE RIVER BASIN
MONROE COUNTY, NEW YORK

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*Not included due to lack of pertinent data.

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*Not included due to lack of pertinent data.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Highland Park Reservoir Dam
N.Y. 790

State Located: New York

County Located: Monroe

Stream: Offstream reservoir

Date of Inspection: June 3, 1981 and June 26, 1981

ASSESSMENT

Based on the evaluation of the existing conditions, the condition of the Highland Park Reservoir Dam is considered to be good. The examination of documents and visual observations did not reveal conditions which are considered to constitute a hazard to human life or property.

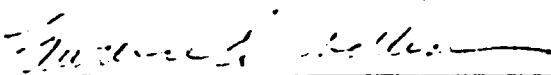
The dam impounds an offstream reservoir which has no drainage area other than the surface area of the reservoir. The reservoir has no uncontrolled spillway. However, under normal operating conditions, the dam would impound the total Probable Maximum Precipitation with maximum pool level at about three feet below the dam crest level. Therefore, the dam has adequate surcharge storage capacity.

The following recommendation should be implemented within three months from notification to the owner:

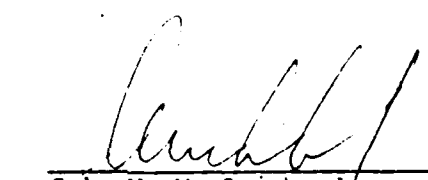
1. An emergency action plan should be developed, including a formal warning system to alert the downstream residents in the event of an emergency.

Assessment - Highland Park Reservoir Dam




Lawrence D. Andersen, P.E..
Vice President
D'Appolonia Consulting Engineers, Inc.
Pittsburgh, Pennsylvania

Approved by:


Col. W. M. Smith, Jr.
New York District Engineer

Date:

14 Sept 61

HIGHLAND PARK RESERVOIR DAM

N.Y. 790

DEC 1, D. 40B-4450

JUNE 3, 1981



OVERVIEW

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HIGHLAND PARK RESERVOIR DAM
N.Y. 790
DEC I.D. NO. 40B-4450
GENESEE RIVER BASIN
MONROE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

The purpose of the inspection was to evaluate the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property, and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Dam and Appurtenances

The Highland Park Reservoir Dam is an earth embankment forming three sides of a hillside reservoir. Two of the sides have a straight alignment and are normal to each other, while the third side has a circular arc. The perimeter of the reservoir at the dam crest level is about 2,000 feet. The crest length of the embankment portion is about 1,800 feet. The maximum height is 42 feet. The embankment has a crest width which varies between 18 and 22 feet, and an inside slope of 2 horizontal to 1 vertical. The outer embankment slope varies from 2.0 to 2.3 horizontal to 1 vertical. The inside slopes are protected with riprap and the side faces are covered with grass.

The dam impounds an offstream reservoir as a storage facility for a municipal water distribution system. Inflow and outflow is controlled at two gatehouses adjacent to the embankment. One gatehouse, located at the northwest corner of the dam, contains three 24-inch-diameter pipes which connect the reservoir to the distribution system. The second gatehouse, located at the northeast corner of the dam, contains a 30-inch-diameter and two 36-inch-diameter cast iron pipes which also connect the reservoir to the distribution system. The pipes from the two gatehouses to the reservoir can be used to fill or empty the reservoir.

b. Location

The dam is located offstream in Highland Park, in Rochester, Monroe County, New York. Plate 1 illustrates the location of the dam.

c. Size Classification

The dam is classified to be of intermediate size based on its 42-foot height.

d. Hazard Classification

The dam is classified to be in the high hazard category. The reservoir is located within a heavily populated residential area of Rochester, New York.

It is estimated that failure of the dam under maximum pool level would cause loss of more than a few lives and appreciable property damage in this residential area.

e. Ownership

The dam is owned and operated by the Water Department, City of Rochester, New York. (Address: Mr. Roger C. McPhearson, Director, Water Department, City of Rochester, 10 Felix Street, Rochester, New York 14608, 716-428-7509)

f. Purpose of Dam

The dam impounds a municipal water storage reservoir.

g. Design and Construction History

The dam was designed and built around 1875.

h. Normal Operating Procedure

The reservoir is normally maintained at approximately five feet below the crest of the dam.

1.3 PERTINENT DATA

Elevations referred to in this section and subsequent sections of the report were obtained from design drawings.

a. Drainage Area (acres)

4.6

b. Discharge at Dam (cfs)

The dam has no uncontrolled spillway.

c. Elevation (USGS Datum) (feet)

Top of dam

640.0

Normal pool

635.0

d. Reservoir (acres)

Surface area at top of dam

5.1

Surface area at normal pool

4.6

e. Storage Capacity (acre-feet)

Top of dam	83
Normal pool	58

f. Dam

Type	Earth embankment
Length	1,800 $\pm$ feet
Height	42 feet
Top width	18 to 22 feet
Side slopes	Inner: 2.0 to 2.3H:1V Outer: 2H:1V
Zoning	No
Impervious core	Yes
Cutoff	Yes
Grout curtain	No

g. Primary Spillway

None

h. Emergency Spillway

None

i. Reservoir Drain

No formal reservoir drain; however, the reservoir can be drained through the water distribution system via the inlet/outlet facilities. Plate 2 illustrates the layout of the water distribution system associated with the reservoir. Flow through the inlet/outlet pipes are controlled by valves. The inlet/outlet pipes consist of three 24-inch pipes located at the northwest corner of the reservoir and one 30-inch and two 36-inch pipes located at the northeast end of the reservoir.

SECTION 2: ENGINEERING DATA

2.1 DATA AVAILABLE

Available information was obtained from the New York State Department of Environmental Conservation, Dam Safety Division files, and from the files of the City of Rochester, Water Department. Available information includes two design drawings.

2.2 GEOLOGY

The Highland Park Reservoir Dam lies in the Eastern Lake section of the Central Lowland Physiographic Province. This area is characterized by low relief and various glacial related features, such as moraines, lakes, and lacustrine plains.

The dam site is located on the Pinnacle Hills Moraine, which is a line of hills tending roughly east-west, and extending from the Genesee River eastward for some two miles. The moraine deposits consist largely of poorly sorted sands and gravels which can attain thicknesses of approximately 100 feet. This unit is underlain by approximately 30 feet of glacial till and lacustrine deposits. Bedrock, which is estimated to be 130 feet below the surface, consists of the Silurian Age Lockport Dolomite.

2.3 SUBSURFACE INVESTIGATION

The available information includes no reference to a subsurface investigation. Because of the age of the dam (built around 1875), it does not appear likely that any subsurface investigation was conducted.

2.4 EMBANKMENT AND APPURTENANT STRUCTURES

Plate 2 shows the typical cross section of the dam and the details of the supply pipe connections. The dam is a homogeneous embankment incorporating a centrally located clay puddle core. The embankment is shown to have a crest width of 16 feet and side slopes of 2.5 horizontal to 1 vertical on the outside face and 2 horizontal to 1 vertical on the inside face. A three-foot berm is located on the inside face about five feet below the dam crest level. As shown in Plate 2, the supply pipes are located on a timber and rubble masonry foundation equipped with masonry cutoff walls. Plate 3 shows the watermain connecting the reservoir to the distribution system.

2.5 CONSTRUCTION RECORDS

No construction records are available. Based on visual observations, the existing embankment is in general conformance with the design drawings.

2.6 OPERATING RECORDS

None available.

2.7 EVALUATION OF DATA

The information obtained from the City of Rochester, Water Department files is considered to be adequate for Phase I inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspections of the dam were conducted on June 3 and June 26, 1981. On both dates, the pool level was approximately at Elevation 635.

b. Embankment

No signs of distress, seepage, or misalignment were observed. The faces of the dam and the crest are covered with grass and were found to be adequately maintained. The top of the dam was surveyed relative to the water elevation and was found to be in the range of 0.2 to 1.5 feet above the design level.

c. Primary Spillway

The reservoir has no uncontrolled overflow spillway. The reservoir level is controlled by the inlet and outlet facilities which connect the reservoir to the water distribution system. Components of the inlet and outlet facilities were found to be in satisfactory condition.

d. Emergency Spillway

There is no emergency spillway.

e. Reservoir Drain

The inlet and outlet facilities can be used to drain the reservoir. It is reported that if the reservoir is not supplied, it would empty within one day under normal water usage conditions.

f. Downstream Channel

There is no downstream channel.

g. Reservoir

There are no visible signs of instability problems within the reservoir area.

3.2 EVALUATION

The dam was found to be in good condition. At this time, no conditions were observed that would require remedial action.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The reservoir is normally maintained at approximately five feet below the embankment crest level. Reservoir inflows and outflows are controlled as part of the operation of the municipal water distribution system.

4.2 MAINTENANCE OF THE DAM

The dam is maintained by the City of Rochester, Water Department. The maintenance condition of the dam is considered to be satisfactory.

4.3 WARNING SYSTEM IN EFFECT

No formal warning system exists for the dam.

4.4 EVALUATION

The maintenance condition of the dam is considered to be good. Development of an emergency action plan is advisable.

SECTION 5: HYDRAULIC/HYDROLOGY

5.1 DRAINAGE AREA CHARACTERISTICS

Highland Park Reservoir Dam has no drainage area other than the reservoir surface area.

5.2 ANALYSIS CRITERIA

As previously stated, Highland Park Reservoir Dam is classified as an intermediate dam in the high hazard category. According to the recommended criteria for evaluating emergency spillway discharge capacities, such impoundments are required to pass and/or impound the full PMF.

Since the reservoir drainage area is equal to the reservoir surface area, the runoff volume associated with the PMF event is directly equal to the rainfall volume associated with the Probable Maximum Precipitation (PMP). The 21.5-inch PMP depth to be expected in the vicinity of the impoundment will increase the reservoir elevation by 21.5 inches (1.8 feet). This 1.8-foot maximum pool level increase is well within the five feet of freeboard normally available.

5.3 SPILLWAY CAPACITY

The dam has no uncontrolled overflow spillways.

5.4 RESERVOIR CAPACITY

The dam impounds a reservoir with a storage capacity of 58 acre-feet at normal pool level (Elevation 635.0), and 83 acre-feet at the top of the dam (Elevation 640.2).

5.5 FLOODS OF RECORD

No data available.

5.6 OVERTOPPING POTENTIAL

The dam can store 100 percent of the PMF. During the PMF event, the reservoir will rise from normal pool Elevation 635.0 to a maximum level at Elevation 636.8, leaving about 3.2 feet of freeboard to the design dam crest level (Elevation 640.0).

5.7 EVALUATION

The reservoir can retain the recommended design flood of full PMF without overtopping the embankment; therefore, the surcharge storage capacity is classified to be adequate according to the recommended criteria.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

As discussed in Section 3, the field observations did not reveal any signs of distress that would significantly affect the stability of the dam at this time.

b. Design and Construction Data

Available information includes two design drawings. In view of the age of the dam (built around 1875), it is not likely any materials testing or analysis was conducted in conjunction with the construction of the dam. Based on visual observations, static stability of the dam is considered to be adequate.

c. Postconstruction Changes

None reported.

d. Seismic Stability

The dam is located in Seismic Zone 3. In this zone, a horizontal acceleration of 0.1g is typically used for preliminary analysis. No data is available relative to the character of the embankment material. Therefore, the adequacy of seismic stability of the embankment could not be assessed.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Visual observations indicate that the Highland Park Reservoir Dam is in good condition. No conditions were observed that would significantly affect the overall performance of the structure at this time.

It was found that the reservoir could retain the required design flood of full PMF without overtopping the embankment. Therefore, the surcharge storage capacity is classified to be adequate.

b. Adequacy of Information

Available information, in conjunction with visual observations, is considered to be sufficient to make a Phase I evaluation.

c. Need for Additional Investigations

No additional investigation is considered to be required at this time.

d. Urgency

The action recommended below should be implemented within three months from notification to the owner.

7.2 RECOMMENDATION

1. An emergency action plan should be developed, including a formal warning system to alert the downstream residents in the event of an emergency.

APPENDIX A
PHOTOGRAPHS



PHOTOGRAPH NO. 1
Downstream Face of the North Embankment
(looking west)



PHOTOGRAPH NO. 2
Crest of the North Embankment
(looking west)
(Note: gatehouse background)



PHOTOGRAPH NO. 3
Crest and Upstream Face
(looking south)



PHOTOGRAPH NO. 4
Reservoir (looking northeast)
(Note: gatehouse background)



PHOTOGRAPH NO. 5
Reservoir (looking east)



PHOTOGRAPH NO. 6
Downstream Residential Area
(south of reservoir)

APPENDIX B
VISUAL INSPECTION CHECKLIST

APPENDIX B
VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Highland Park Reservoir Dam

Fed. I.D. # N.Y. 790 DEC Dam No. 40B-4450

River Basin Genesee River Basin

Location: Highland Park, City of Rochester, Monroe County

Stream Name Offstream reservoir

Tributary of N/A

Latitude (N) 43° 08.1' Longitude (W) 77° 36.0'

Type of Dam Earth

Hazard Category High

Date(s) of Inspection June 3, 1981 and June 26, 1981

Weather Conditions Cloudy, Rain, Temp. 50 degrees

Reservoir Level at Time of Inspection El. 635.0 ±

b. Inspection Personnel Lawrence Andersen, P.E.; James Poellot,
P.E.; Bilgin Erel, P.E.; and Michael Bort

c. Persons Contacted (Including Address & Phone No.) _____
Mr. Roger C. McPhearson, Water Department, City of Rochester,
10 Felix Street, Rochester, NY 14608 (716) 428-7509

d. History:

Date Constructed Around 1875 Date(s) Reconstructed N/A
Designer Unknown
Constructed by Unknown
Owner Water Department, City of Rochester, New York

2) Embankment

a. Characteristics

(1) Embankment Material Earth
(2) Cutoff Type Unknown
(3) Impervious Core Clay puddle.
(4) Internal Drainage System None
(5) Miscellaneous --

b. Crest

(1) Vertical Alignment Good (0.2 to 1.5 feet above design
dam crest level, El. 640.0)
(2) Horizontal Alignment Good
(3) Surface Cracks None
(4) Miscellaneous --

c. Inner Slope

(1) Slope (Estimate) 2H:1V (as measured)
(2) Undesirable Growth or Debris, Animal Burrows None
(3) Sloughing, Subsidence or Depressions None

(4) Slope Protection Riprapped slope, in good condition.

(5) Surface Cracks or Movement at Toe None

d. Outer Slope

(1) Slope (Estimate) 2.0 to 2.3H:1V

(2) Undesirable Growth or Debris, Animal Burrows None

(3) Sloughing, Subsidence or Depressions None

(4) Surface Cracks or Movement at Toe None

(5) Seepage None

(6) External Drainage System (Ditches, Trenches, Blanket)
None

(7) Condition Around Outlet Structure N/A

(8) Seepage Beyond Toe None

e. Abutments - Embankment Contact

N/A

(1) Erosion at Contact N/A

(2) Seepage Along Contact N/A

3) Drainage System (Embankment has no drainage system.)

a. Description of System _____

b. Condition of System _____

c. Discharge from Drainage System _____

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, etc.) _____

None

5) Reservoir

a. Slopes Moderate slope on one side, no problems observed.

b. Sedimentation No problems observed.

c. Unusual Conditions Which Affect Dam None

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) Residential areas of Rochester, New York, surround the embankment.

b. Seepage, Unusual Growth None

c. Evidence of Movement Beyond Toe of Dam None

d. Condition of Downstream Channel N/A

7) Spillway(s) (Including Discharge Conveyance Channel)

Impoundment has no spillway.

a. General _____

b. Condition of Service Spillway _____

c. Condition of Auxiliary Spillway N/A

d. Condition of Discharge Conveyance Channel N/A

8) Reservoir Drain/Outlet

Type: Pipe X Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other Three cast
iron pipes.

Size: Two 36-inch-diameter and
one 24-inch-diameter Length N/A

Invert Elevations: Entrance 623.5⁽¹⁾ Exit N/A

Physical Condition (Describe): Not observable.

Material: --

Joints: -- Alignment --

Structural Integrity: --

Hydraulic Capability: --

Means of Control: Gate X Valve _____ Uncontrolled _____

Operation: Operable X Inoperable _____ Other _____

Present Condition (Describe): The outlets from the
reservoir are connected to the city water distribution
system and are operable.

(1) For 24-inch-diameter outlet.

9) Structural

a. Concrete Surfaces The concrete screen wells appear to
be in good condition.

b. Structural Cracking None

c. Movement - Horizontal & Vertical Alignment (Settlement)
No problems observed.

d. Junctions with Abutments or Embankments
No problems observed.

e. Drains - Foundation, Joint, Face
No problems observed.

f. Water Passages, Conduits, Sluices
N/A

g. Seepage or Leakage None observed.

- h. Joints - Construction, etc. N/A
- i. Foundation Not visible.
- j. Abutments N/A
- k. Control Gates Good
- l. Approach & Outlet Channels N/A
- m. Energy Dissipators (Plunge Pool, etc.) N/A
- n. Intake Structures Submerged
- o. Stability N/A
- p. Miscellaneous ---

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition Gatehouses in good condition.

2

APPENDIX C
ENGINEERING DATA CHECKLIST

1

APPENDIX C
ENGINEERING DATA CHECKLIST
NAME OF DAM: HIGHLAND PARK RESERVOIR DAM

AREA-CAPACITY DATA:

	<u>Elevation</u> (feet)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-feet)
1) Top of Dam	<u>640.2</u>	<u>5.1</u>	<u>83.0</u>
2) Design High Water	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
3) Auxiliary Spillway Crest	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
4) Service Spillway Crest	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
5) Normal Pool	<u>635.0</u>	<u>4.6</u>	<u>58.0</u>

DISCHARGES

	<u>Discharge</u> (cfs)
1) Average Daily	<u>N/A</u>
2) Spillway at Maximum High Water (Top of Dam)	<u>N/A</u>
3) Spillway at Design High Water	<u>N/A</u>
4) Principal Spillway at Dam Crest Elevation	<u>N/A</u>
5) Low Level Outlet	<u>N/A</u>
6) Total of All Facilities at Maximum High Water (Top of Dam)	<u>N/A</u>
7) Maximum Known Flood	<u>Unknown</u>
8) At Time of Inspection	<u>N/A</u>

Hydrometeorological Gages:

Type: None

Location: N/A

Records:

Date - N/A

Max. Reading - N/A

FLOODWATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (Mechanisms):

Through water distribution system.

DRAINAGE AREA: Highland Park Reservoir Dam has no drainage area
other than the reservoir surface area.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: N/A

Terrain - Relief: N/A

Surface: N/A

Runoff Potential (existing or planned extensive alterations to
existing surface or subsurface conditions)

100 percent runoff.

Potential Sedimentation Problem Areas (natural or man-made;
present or future)

No sediment problem.

Potential Backwater Problem Areas for Levels at Maximum Storage
Capacity Including Surcharge Storage:

None

Dikes - Floodwalls (overflow and nonoverflow) - Low Reaches Along
the Reservoir Perimeter:

Location: None

Elevation: _____

Reservoir:

Length at Maximum Pool: 800⁺ feet

Length of Shoreline at Normal Pool: 2,060⁺ feet

APPENDIX E

PLATES

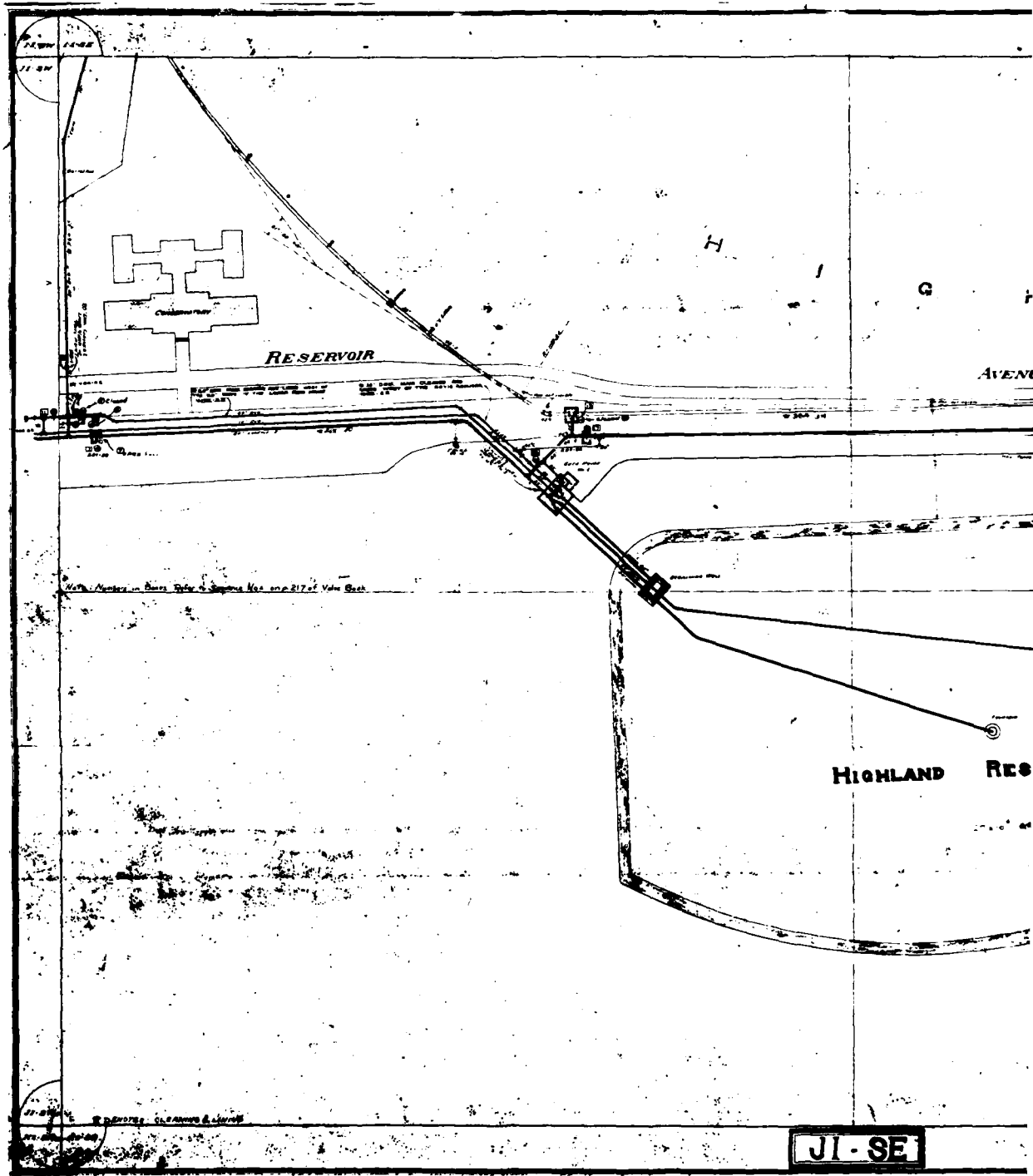
DRAWN BY A Smith
CHECKED BY B/S
8-4-81 APPROVED BY B/P
DRAWING NUMBER 80-778-B58





DIAPYLOLONLA

DRAWN BY	A Smith 8-5-81	CHECKED BY JHP	8-1-81	DRAWING NUMBER 80-778-B59



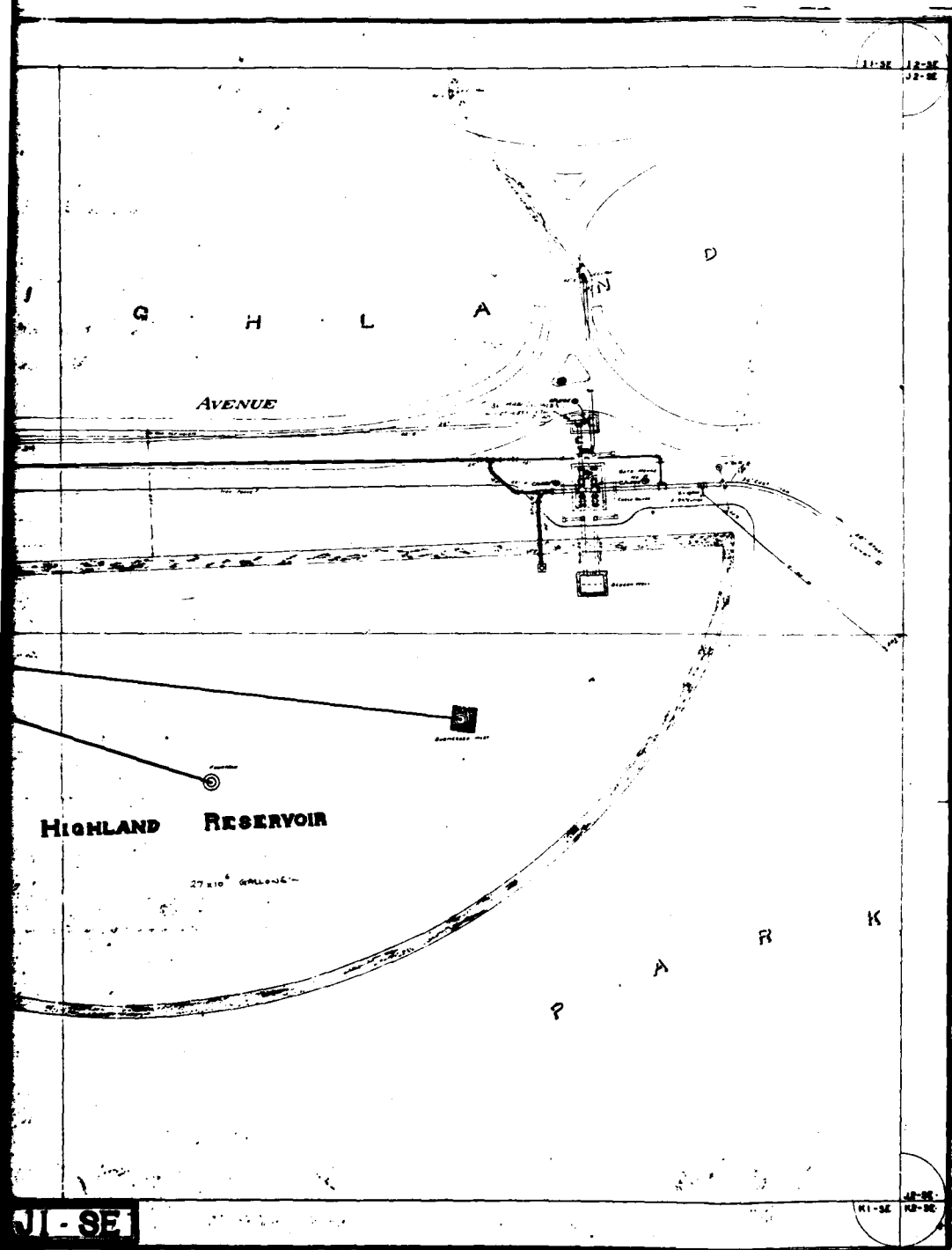
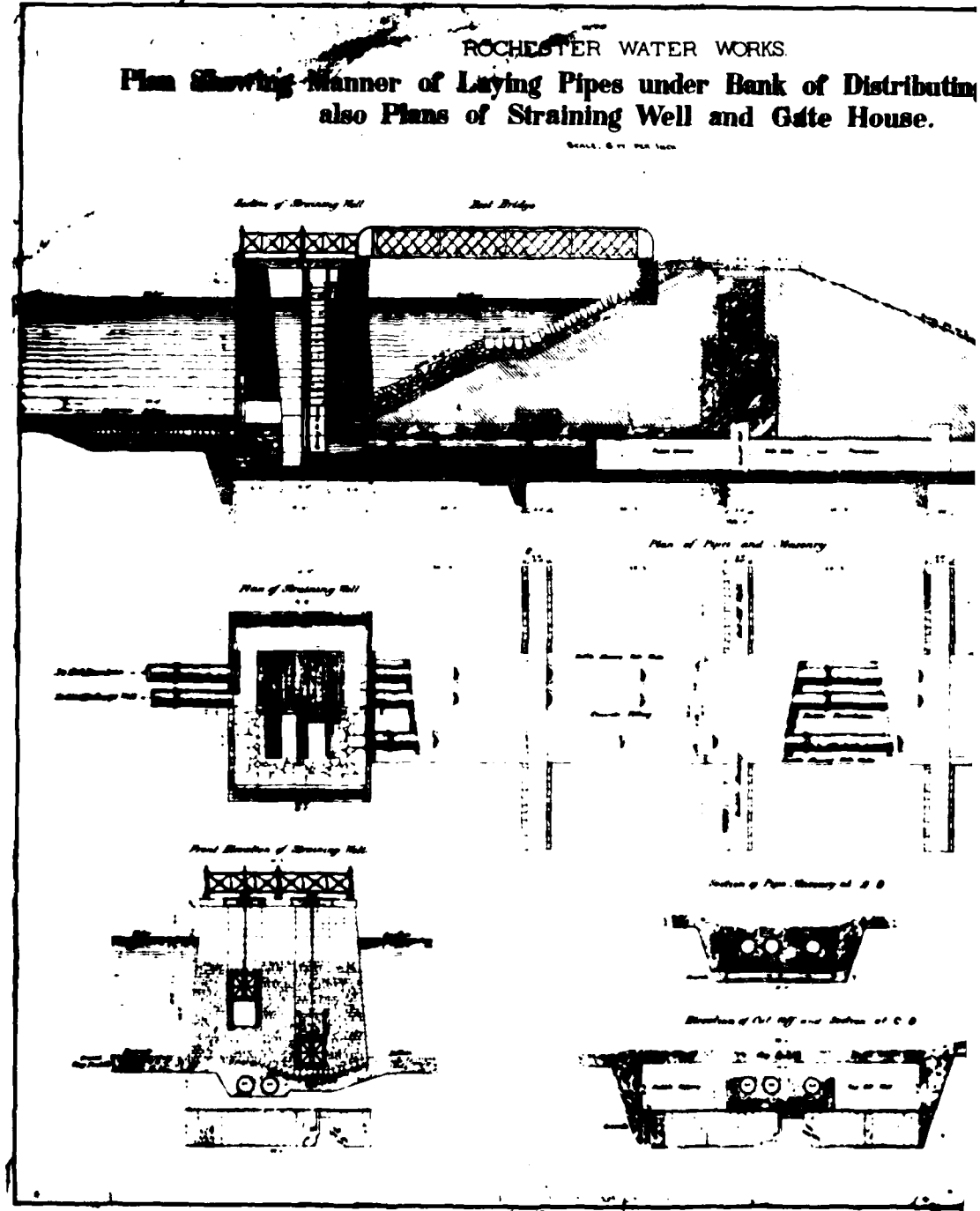


PLATE 2

D'APPOLONIA

12

DRAWN BY	A Smith 8-5-81	CHECKED BY JHP	APPROVED BY	2-1-82	DRAWING NUMBER 80-778-B60
				8/1/81	



WORKS.

**Bank of Distributing Reservoir,
and Gate House.**

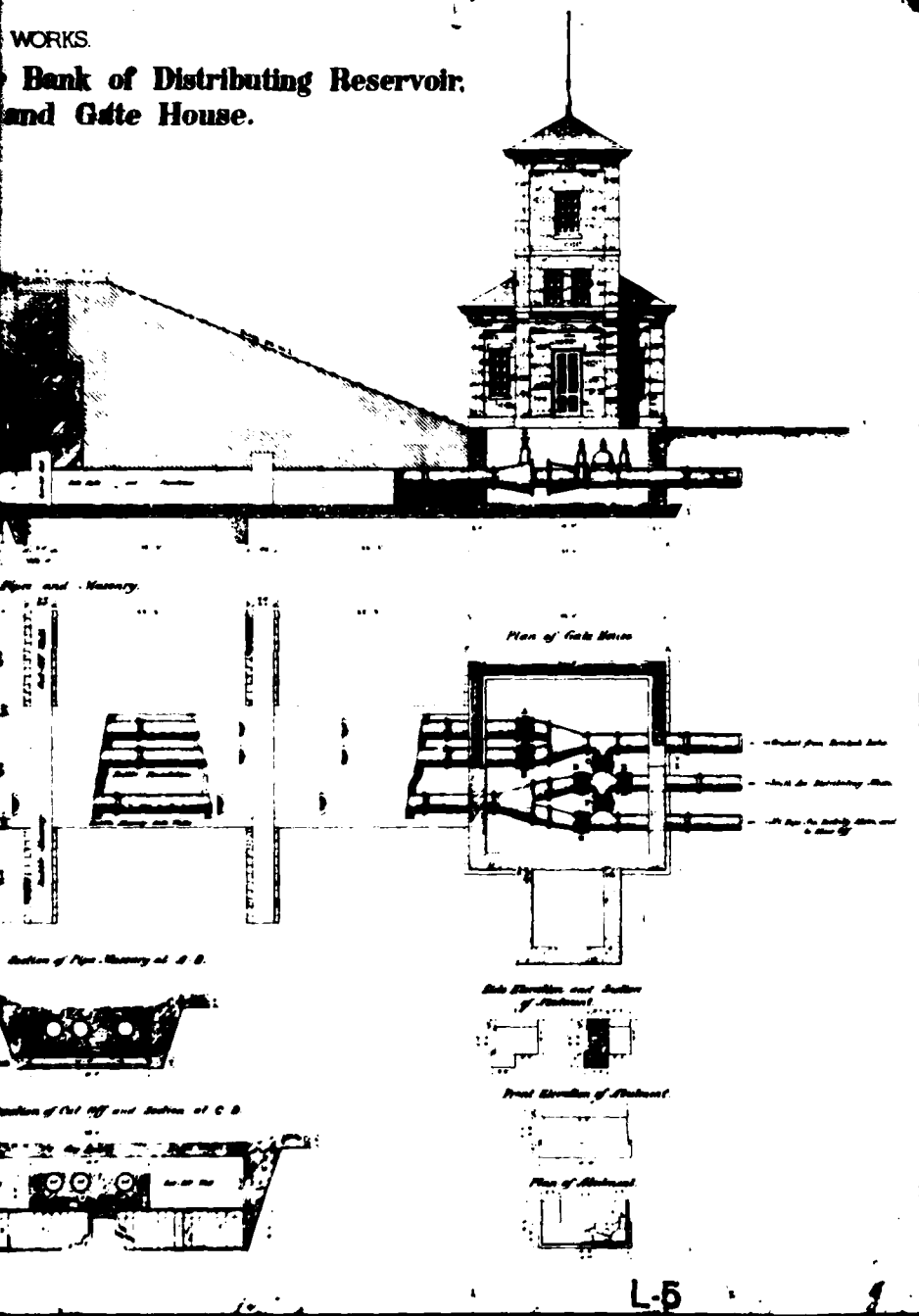
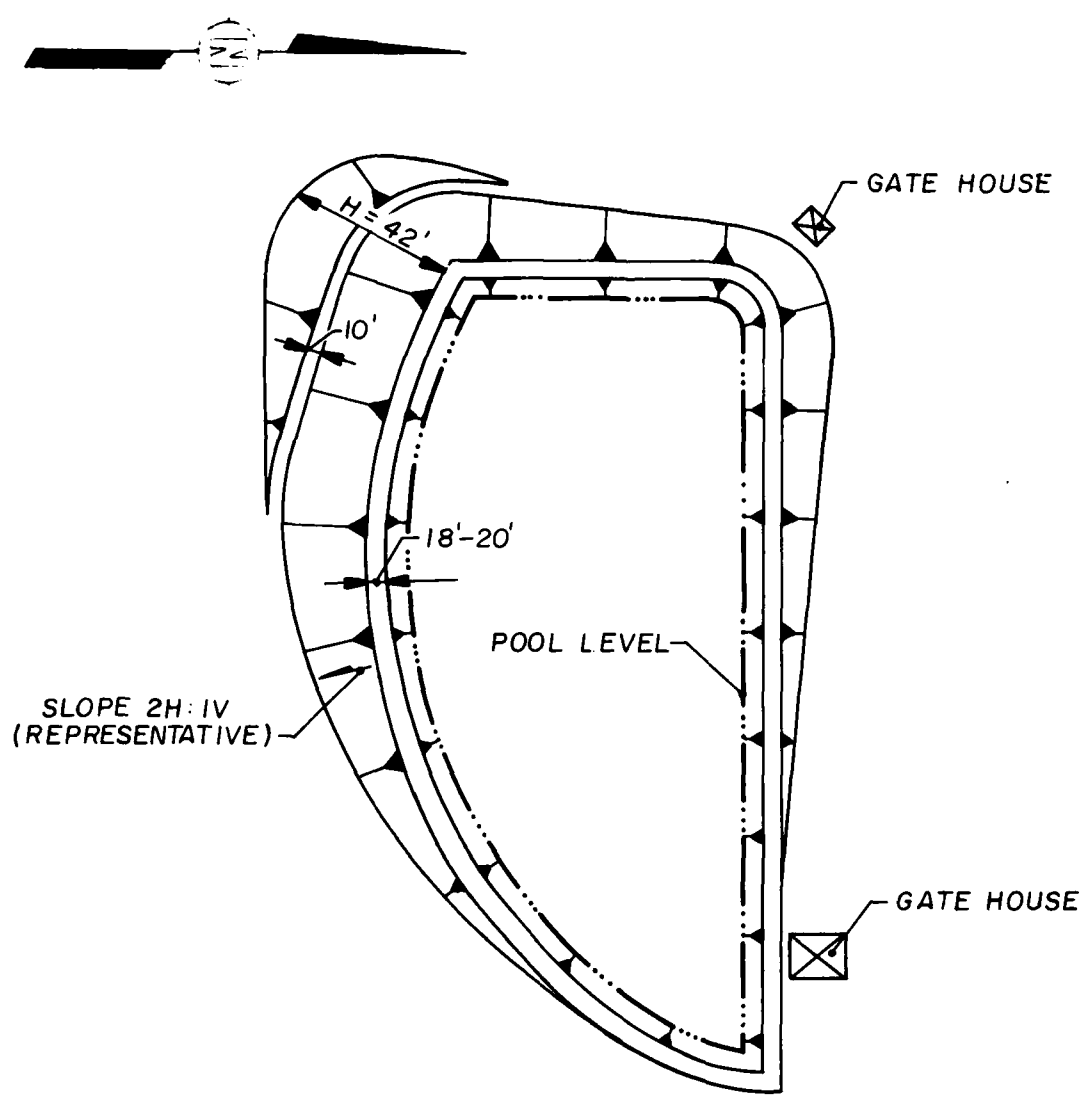


PLATE 3

D'APOLONIA

12

DRAWN BY	A Smith	8-4-81	CHECKED BY	8-5-81	DRAWING 80-778-A13
			APPROVED BY	8/5/81	



NO COMMENTS

NOTE :
 POOL LEVEL AT DATE OF
 INSPECTION: 5 FT. BELOW
 DAM CREST.

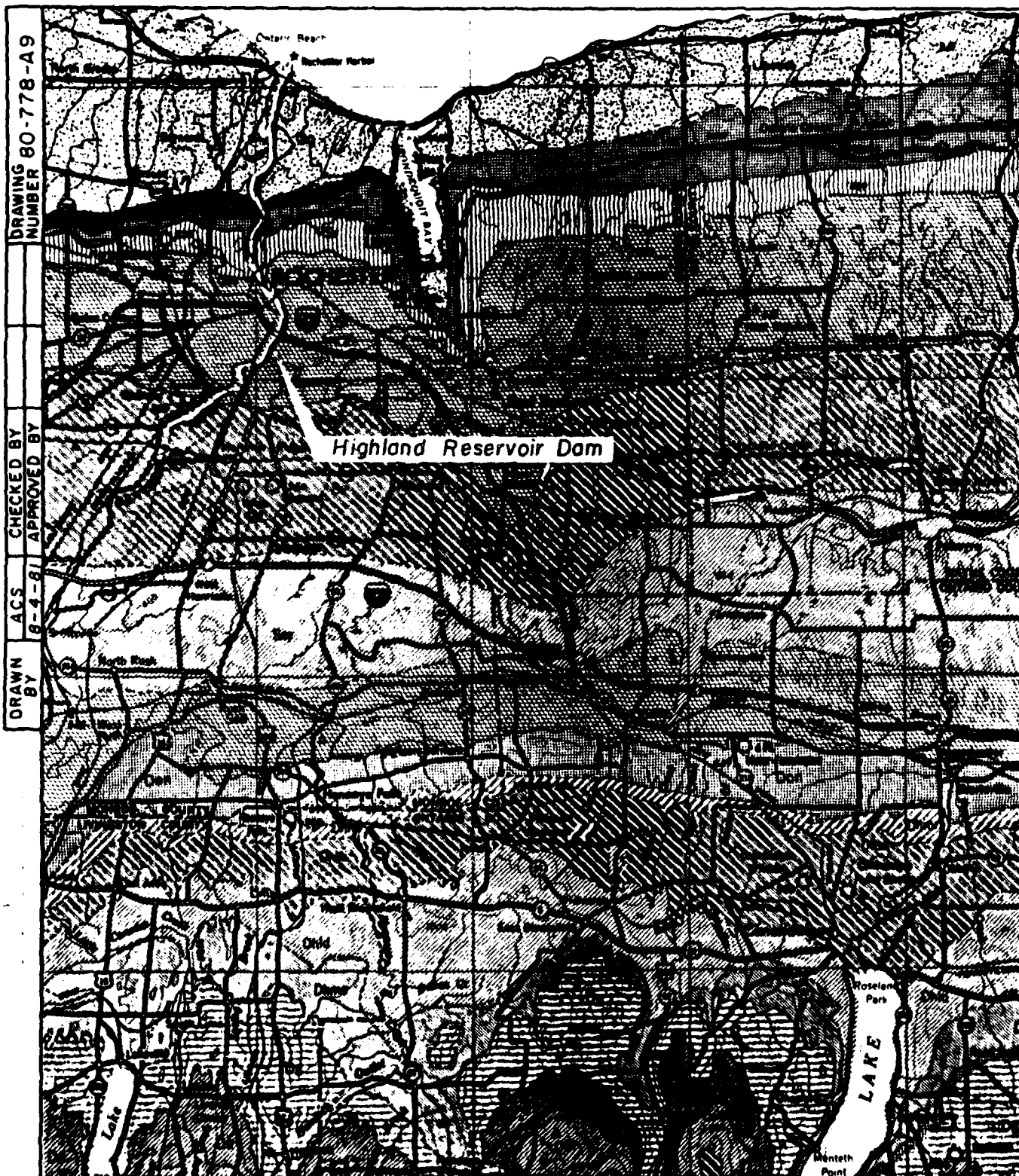
PLATE 4
 HIGHLAND PARK RESERVOIR DAM
 GENERAL PLAN
 FIELD INSPECTION NOTES
 FIELD INSPECTION DATE: JUNE 26, 1981

D'APPOLONIA

"NOT TO SCALE"

APPENDIX F

GEOLOGY MAP



LEGEND

CANADAWAY GROUP

800-1200 ft. (240-370 m.)



Dry Machias Formation—shale, siltstone; Rushford Sandstone; Caneadea, Canisteo, and Hume Shales. Canaseraga Sandstone; South Wales and Dunkirk Shales. In Pennsylvania: Towanda Formation—shale sandstone.

JAVA GROUP

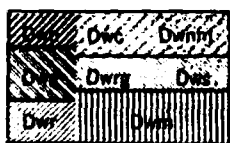
300-700 ft. (90-210 m.)



Di Wiscoy Formation—sandstone, shale, Hanover and Pipe Creek Shales.

WEST FALLS GROUP

1100-1600 ft. (340-490 m.)



Dwn Nunda Formation—sandstone, shale.
 Dwrg West Hill and Gardeau Formations—shale, siltstone; Roricks Glen Shale; upper Beers Hill Shale; Grimes Siltstone.
 Dwr lower Beers Hill Shale; Dunn Hill, Millport, and Moreland Shales.
 Dwnm Nunda Formation—sandstone, shale; West Hill Formation—shale, siltstone; Corning Shale
 Dwnm "New Milford" Formation—sandstone, shale
 Dwrg Gardeau Formation—shale, siltstone; Roricks Glen Shale.
 Dwr Slide Mountain Formation—sandstone, shale, conglomerate.
 Dwnm Beers Hill Shale; Grimes Siltstone; Dunn Hill, Millport, and Moreland Shales

SONYEA GROUP

200-1000 ft. (60-300 m.)



Ds In west: Cashaqua and Middlesex Shales. In east: Rye Point Shale; Rock Stream ("Enfield") Siltstone; Pulteney, Sawmill Creek, Johns Creek, and Montour Shales.

GENESEE GROUP AND TULLY LIMESTONE

200-1000 ft. (60-300 m.)



Dg West River Shale; Genundewa Limestone; Penn Yan and Genesee Shales; all except Genesee replaced eastwardly by Ithaca Formation—shale, siltstone and Sherburne Siltstone
 Dgo Oneonta Formation—shale, sandstone.
 Dgu Unadilla Formation—shale, siltstone
 Dt Tully Limestone

LOCKPORT GROUP

80-175 ft. (25-55 m.)



Sl Oak Orchard and Penfield Dolostones, both replaced eastwardly by Sconodoo Formation—limestone, dolostone.

GEOLOGY MAP LEGEND

REFERENCE

GEOLOGIC MAP OF NEW YORK, FINGER LAKES SHEET
 DATED: 1970, SCALE 1:250,000

D'APOLONIA

APPENDIX I

REFERENCES

APPENDIX I

REFERENCES

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