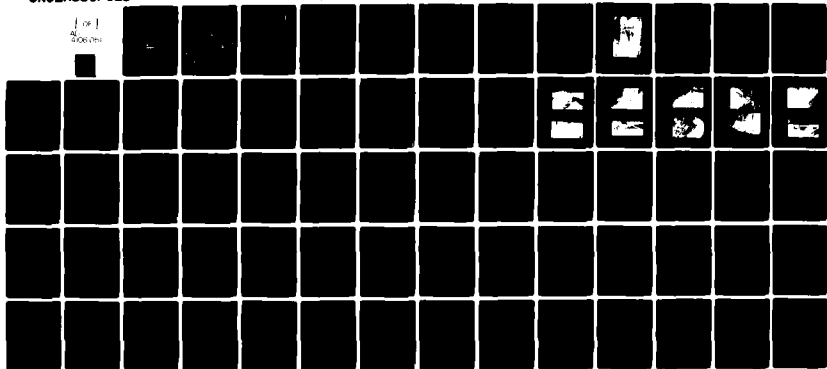


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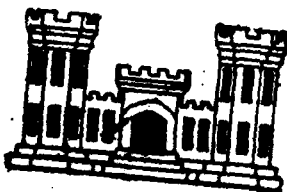
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DELAWARE RIVER BASIN

PORT JERVIS RESERVOIR
NO. 3

ORANGE COUNTY, NEW YORK
INVENTORY NO. N.Y. 495

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



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NEW YORK DISTRICT CORP OF ENGINEERS
APRIL, 1981

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REPORT DOCUMENTATION

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1. REPORT NUMBER	2. G. DISCUSSION NO. AD-A106051	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Port Jervis Reservoir No. 3 Dam Delaware River Basin, Orange County, N.Y. Inventory No. 160		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
7. AUTHOR(s) GEORGE KOCH		6. PERFORMING ORG. REPORT NUMBER
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and the visual inspection of the Port Jervis Reservoir No. 3 did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies to evaluate conditions affecting the dam. -> cont		

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Using the Corps of Engineers' "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 54% of the Probable Maximum Flood (PMF). Therefore, the spillway is adjudged as "adequate". There are several areas where seepage was found. Some point seepage along the toe of the embankment and in the spillway are the major concerns.

It is recommended that within three months of the date of the notification of the owner, additional engineering investigations of the seepage at the toe of the dam and the spillway should be commenced. Remedial actions deemed necessary based on the results of these investigations should be completed within eighteen months of the notification.



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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the 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 Test 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
PORT JERVIS RESERVOIR NO. 3 DAM I.D. No. NY 495
DEC # 164B-38 DELAWARE RIVER BASIN
ORANGE COUNTY

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Port Jervis Reservoir No. 3
(I.D. No. NY 495)

State Located: New York

County Located: Orange

Stream: Unnamed tributary of the
Delaware River

Date of Inspection: November 20, 1980

ASSESSMENT

The examination of documents and the visual inspection of the Port Jervis Reservoir No. 3 did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies to evaluate conditions affecting the dam.

Using the Corps of Engineers' "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 54% of the Probable Maximum Flood (PMF). Therefore, the spillway is adjudged as "inadequate". There are several areas where seepage was found. Some point seepage along the toe of the embankment and in the spillway are the major concerns.

It is recommended that within three months of the date of the notification of the owner, additional engineering investigations of the seepage at the toe of the dam and the spillway should be commenced. Remedial actions deemed necessary based on the results of these investigations should be completed within eighteen months of the notification.

Other deficiencies which should be corrected within 12 months are:

1. Remove tree and brush growth from both slopes of the dam and dike.
2. Backfill areas where erosion has removed material and depressions has resulted.
3. Repair deterioration of the diversion gate house.
4. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.
5. An emergency action plan must be developed.

George Koch

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Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

Approved By:

W.M. Smith, Jr.

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

03 AUG 1981

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PHOTO # 1 OVERVIEW
PORT JERVIS RESERVOIR NO. 3 DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
PORT JERVIS RESERVOIR No. 3 DAM I.D. No. NY 495
DEC # 164B-38 DELAWARE RIVER BASIN
ORANGE COUNTY

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

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to human life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Port Jervis Reservoir No. 3 dam consists of a 500 feet long earth embankment with a 30 foot concrete overflow spillway located at the left abutment. The spillway is tied into rock foundation; the outlet channel is in rock cut and has a laid up stone wall on the embankment side of the channel. The upstream and downstream slopes are 1 vertical to 2.25 horizontal; the crest width is 10 feet. Both upstream and downstream slopes are portected with small rip rap. A gate house is located on the downstream slope of the embankment over the original stream channel. There is a 6" and a 12" cast iron reservoir drain, which are both controlled in the gatehouse. A dike is located on the east side of the reservoir. It is an earth embankment approximately 15 feet high. There is a gate house located at the center of the dike which diverts flow into a natural channel leading to the Port Jervis Reservoir No. 1. The diversion pipe is a 12" cast iron pipe through the embankment.

b. Location

The dam is located on an unnamed tributary of the Delaware River in the Town of Deerpark, Orange County, New York.

c. Size

The dam is approximately 35 feet high and impounds 1223 acre feet at Spillway crest elevation. The dam is classified as "intermediate" in size (1000 to 50,000 acre feet).

d. Hazard Classification

The dam is classified as high hazard due to its location above Sparrow Bush, New York.'

e. Ownership

The dam is owned by the City of Port Jervis, New York. The owner's representative is Mr. Melvin Decker, Water Superintendent, D.P.W. Port Jervis, NY (914) 856-7432.

f. Purpose of the Dam

The dam provides storage for the Port Jervis water supply.

g. Design and Construction History

The dam was constructed in 1912. It was believed to be designed and constructed under the supervision of Irving Righter. The builder was James Duele and Co.

h. Normal Operating Procedures

Water releases from Port Jervis Reservoir No. 3 are normally passed over the spillway. When required, additional reservoir releases through the intake on the dike divert flow to Port Jervis Reservoir No. 1. Reservoir No. 1 is located one mile away, towards and bordering on the City of Port Jervis.

1.3 PERTINENT DATA

a. Drainage area (mi. 2) 1.43

b. Elevations (ft. USGS datum)
Top of Dam 1023.50
Spillway Crest 1019.0

c. Reservoir
Surface area @ Spillway Crest (acres) 105.
Storage @ Top of Dam (acre feet) 1570.
Storage @ Spillway Crest (acre feet) 1223.

d. Dam
Type: Earth fill with rip rap on both slopes.

Length (ft): 500.
Upstream Slope 2.25
Downstream Slope: 2.25
Crest Width (ft): 10.
Height 35.

e. Dike
Type: Earth fill with rip rap on the upstream slope

Length (ft): 750.
Upstream Slope: 2.5:1
Downstream Slope: 2.5:1
Crest Width: 10.
Height 15.

f. Spillway

Type: Concrete weir tied into bedrock. Channel is bedrock with a stone wall on right side.

Weir Length (ft.): 30'

Capacity @ Top of Dam (cfs.): 1000.

g. Reservoir Drain:

Main dam: 6" and 12" cast iron pipe.

Dike: 12" cast iron pipe.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The Port Jervis Reservoir No. 3 Dam is located in the "Appalachian Uplands" physiographic province of New York State. This province (northern extreme of the Appalachian Plateau) was formed by dissection of the uplifted but flat lying sandstones and shales of the Middle and Upper Devonian Catskill Delta. Relief is high to moderate. Maximum dissection occurs in the Catskill Mountain area, where only the mountain peaks approximate the original plateau surface. Drainage is generally south or southwest toward the Delaware River system.

b. Subsurface Investigations

The "General Soil Map of New York State" prepared by Cornell University Agriculture Experiment Station indicates that the surficial soils are Catskill and Wurtsboro of glacial till origin. These moderately well-drained soils are dominant on the less strongly sloping topography, but shallow soils and outcrops are on the steeper areas. Bedrock was observed outcropping in the spillway channel and the left abutment of the spillway.

c. Dam and Appurtenant Structures

The dam was designed by Irving Righter in 1912. There are no drawings or design data available. The design is of earth embankment with concrete overflow spillway tied into bedrock.

2.2 CONSTRUCTION RECORDS

No information regarding the construction of the dam was available other than the year of completion and the builder, 1912 and James Duele and Co.

2.3 OPERATION RECORD

All information concerning operation and maintenance of the dam is on file with the Port Jervis Water Superintendent, D.P.W.

2.4 EVALUATION OF DATA

The data presented in this report is compiled from information made available by the representatives of the City of Port Jervis and the files at New York State Department of Environmental Conservation. This information appears to be adequate and reliable for Phase I Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Port Jervis Reservoir No. 3 dam and surrounding watershed was conducted on November 20, 1980 and March 31, 1981. The weather was cloudy and the temperature ranged in the thirties; there was approximately 3 inches of snow on the ground in November and clear of snow in March. The inspection in November showed a reservoir level 5 feet below normal while the March inspection had a level of 6" below spillcrest.

b. Spillway

The spillway was rebuilt in 1968 and appears to be in good condition. The overflow section is tied into bedrock on the left abutment. The spillway channel floor and left wall is bedrock; the right wall adjacent to the embankment is concrete on the upper portion and stone on the lower portion. When the reservoir was lower than normal there were no signs of seepage, however, the March inspection showed approximately 5 gallons per minute seeping under the spillway weir (Photo #6). Brush was growing in the channel at the crest (Photo #4) and in the downstream channel.

c. Dam

The embankment is in need of maintenance. No evidence of misalignment or instability of slopes was apparent and the rip rap protection on the slopes is well placed and stable. However, the entire downstream slope is heavily vegetated with trees and brush. The crest is showing signs of rounding off and some slight erosion. Several point seepage locations were found in a large boggy area at the downstream toe (Photos # 7 & 8). There was no material buildup at these points, apparently the seepage has been occurring for sometime. The gate house and reservoir drains have been kept in good condition and are operated on an annual basis. The left wall of the outlet channel has collapsed (Photo #9).

d. Dike

The dike on the east side of the reservoir is an earth embankment approximately 15 feet high and 750 feet long. It appears to be in good condition but in need of maintenance. There is some erosion and depressions on both slopes of the embankment. It is heavily vegetated. The gate house is in need of pointing up around the lower portion of the building. The diversion valve which is located in the gate house (Photo 13) and pipe are in good, operational condition.

e. Downstream Channel

The spillway channel bends around the left abutment of the embankment and back into the original stream channel. Natural rock is predominant. There is heavy tree and brush growth in and around the channel. A 24" culvert is located immediately downstream of the dam.

f. Reservoir

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

3.2 EVALUATION

It is felt a further engineering investigation is required concerning the seepage. Other deficiencies listed require regular observations as well as maintenance and improvement work. These deficiencies are:

1. Remove tree and brush growth from both slopes of the dam and dike.
2. Backfill areas where erosion has removed material and depressions has resulted.
3. Repair deterioration of the diversion gate house.
4. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.
5. An emergency action plan must be developed.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The Port Jervis Reservoir No. 3 provides storage for the water supply system. It has the capability of diverting flow into a natural channel leading to the Reservoir No. 1 or passing flows into the natural channel leading through Sparrow Bush. Normally, excess flows are passed over the uncontrolled spillway, the low level outlets through the dam are operated annually to lower the reservoir for the winter. The 12" cast iron diversion pipe to the water supply system has a manually operated valve located in the gate house on the dike. The 12" and 6" low level outlets have manually operated valves located in the gate house at the toe of the dam.

4.2 MAINTENANCE OF THE DAM

Maintenance is on an "as needed" basis for the Reservoir No. 3 dam.

4.3 MAINTENANCE OF OPERATING FACILITIES

Maintenance of the valves and gate houses appears to be adequate. All valves are reported operational. No operations manual is on file.

4.4 WARNING SYSTEM IN EFFECT

There is no warning system in effect or in preparation.

4.5 EVALUATION

These remedial measures are required to provide the proper maintenance. Maintenance has been inadequate as evidenced by the deficiencies indicated in Section 3.2.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Port Jervis Reservoir No. 3 dam is located on an unnamed tributary to the Delaware River. The drainage area of the watershed is 1.43 square miles. The terrain is moderate to high in slope, and the area is primarily wooded. Drainage is generally moderate to well in the glacial till local to the area.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers' HEC-1 Computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph, and the Modified Puls routing procedure was incorporated. The Probable Maxim Precipitation (PMP) was 21.2 inches (24 hrs., 200 sq. miles) from Hydrometeorological Report #33 in accordance with the recommended guidelines of the Corps of Engineers. Several floods %'s of the Probable Maximum Flood (PMF)) were selected for analysis. The full PMF inflow of 3254 was routed through the reservoir and found to produce an outflow of 3221. cfs. The 1/2 PMF inflow was 1629. cfs resulting in an outflow of 990. cfs. Which can be discharged without overtopping.

5.3 SPILLWAY CAPACITY

The spillway is a 30 feet wide uncontrolled concrete weir. The crest elevation is 1019.0 USGS datum with a maximum flow depth of 4.5 feet before overtopping of the dam begins to occur. The maximum capacity of the spillway is 1000 cfs at the top of the dam.

5.4 RESERVOIR CAPACITY

The reservoir capacity is at the crest of the spillway and at the top of the dam are 1223. and 1570. acre feet respectively. Surcharge storage between spillway and top of dam is equivalent to 4.5 inches of runoff from the watershed.

5.5 FLOODS OF RECORD

There are no gaging stations located on or near the dam site, nor are there any accounts of high flows or levels.

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillway before overtopping occurs is 1000 cfs, which is 54 % of the routed PMF outflow of 3221 cfs. The dam is overtopped by 0.68 feet during the full PMF event.

5.7 EVALUATION

The Port Jervis Reservoir No. 3 dam will be overtopped by 0.68 feet during the PMF, based on the Corps of Engineers' screening criteria it is considered inadequate. However, the spillway can safely discharge the routed 1/2 PMF of 990 cfs.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of major distress were observed in connection with the earth portion of the embankment.

b. Design and Construction Data

No information could be located concerning the stability analysis of the earth embankment.

c. Post Construction Changes

The only construction that has been done on the structure was in 1968. The spillway wall and weir had some concrete work performed. No plans are available of the work that was done.

d. Seismic Stability

The dam is located in seismic Zone 1. Seismic forces in this zone are not considered to be of significant magnitude to influence the stability of the structure. A detailed stability analysis of the earth embankment is beyond the scope of this report. The "Preliminary Brittle Structures Map of New York", by Isachsen and McKendree, indicates that no faulting or slides are present within the watershed area or near the dam.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I Inspection of the Port Jervis Reservoir No. 3 dam revealed that the spillway is "Inadequate" based upon the Corps of Engineers' screening criteria. The dam will be overtopped by all storms in excess of 54% of the PMF. The embankment appears stable; however, there is some seepage which will require further engineering investigation.

b. Adequacy of Information

The information reviewed is considered adequate for Phase I inspection purposes.

c. Need for Additional Investigation

Further investigation concerning the seepage should be initiated within three months of the date of notification of the owner. The other areas listed below requiring remedial action should be completed within 18 months of notification to the owner.

1. Based on the results of the seepage investigations, remedial treatment shall be performed.
2. Remove the tree and brush growth from all slopes of the dam and dike.
3. Backfill areas where erosion has removed material and depressions have resulted.
4. Repair deterioration of the diversion gate house.
5. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.
6. An emergency action plan must be developed.

d. Urgency

The engineering investigation concerning the seepage should be initiated within three months of date of notification of the owner. The other areas listed below requiring remedial action should be completed within 18 months of notification to the owner.

7.2 RECOMMENDATIONS

1. Based on the results of the seepage investigations, remedial treatment shall be performed.
2. Remove the tree and brush growth from all slopes of the dam and dike.
3. Backfill areas where erosion has removed material and depressions have resulted.
4. Repair deterioration of the diversion gate house.
5. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.
6. An emergency action plan must be developed.

APPENDIX A

PHOTOGRAPHS



PHOTO #2
UPSTREAM SLOPE OF EMBANKMENT.
NOTE: EROSION AT UPPER LINE OF RIP RAP.



PHOTO #3
DOWNSTREAM SLOPE. NOTE: HEAVY VEGETATION



PHOTO #4.
SPILLWAY CHANNEL LOOKING UPSTREAM.
NOTE: TREE AND BRUSH GROWTH.



PHOTO #5.
SPILLWAY CONTROL SECTION.



PHOTO #6.
SEEPAGE AROUND THE SPILLWAY WEIR.

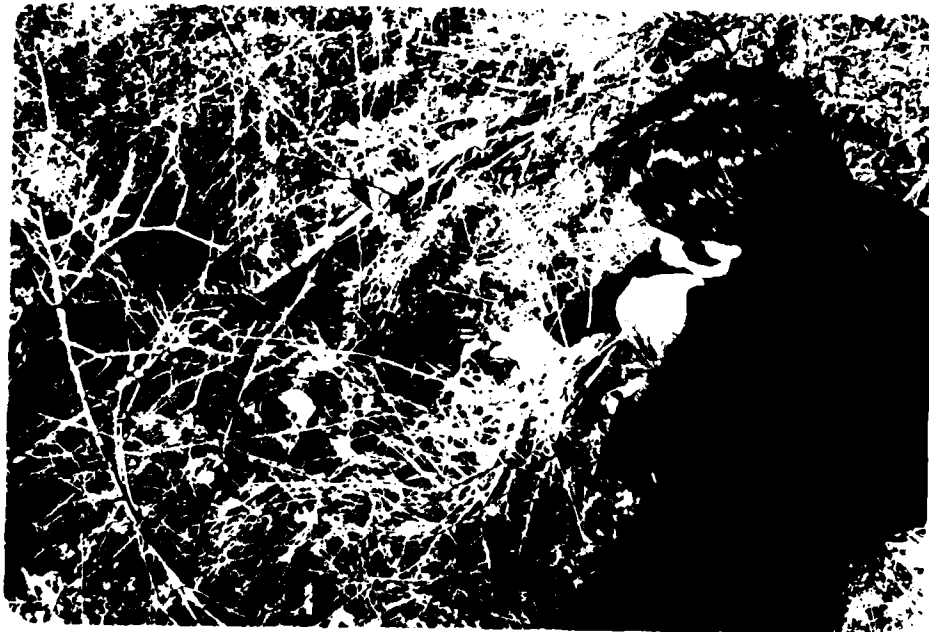


PHOTO #7.
SEEPAGE AT THE TOE OF THE EMBANKMENT.

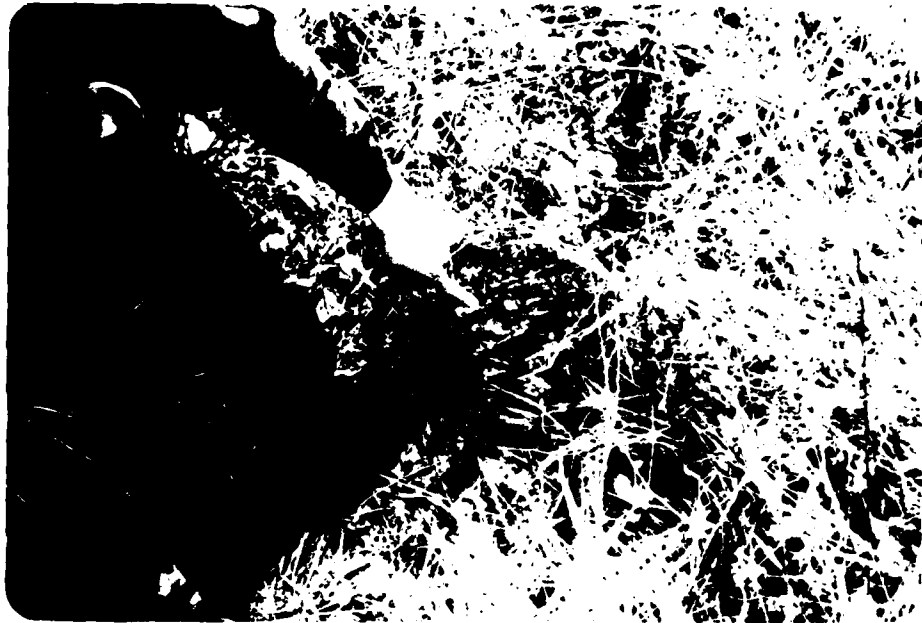


PHOTO #8.
SEEPAGE AT THE TOE OF THE EMBANKMENT.



PHOTO #9.
RESERVOIR DRAIN AND GATE HOUSE. NOTE:
COLLAPSED WALL.



PHOTO # 12.
EAST DIKE. NOTE: VEGETATION ON DOWNSTREAM SLOPE.



PHOTO #13.
GATE HOUSE ON EAST DIKE. NOTE: VEGETATION ON UPSTREAM SLOPE.

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST1) Basic Data

a. General

Name of Dam POET JERVIS RES. NO. 3Fed. I.D. # NY 495 DEC Dam No. 164B-38River Basin DELAWARELocation: Town DEERPARK County ORANGEStream Name UNNAMED TRIB. DELAWARETributary of DelawareLatitude (N) 41° 29.6' Longitude (W) 74° 41.3'Type of Dam EARTH FILL / WATER SUPPLYHazard Category highDate(s) of Inspection NOV 20, 1980 / MAR. 31, 1981Weather Conditions cloudy 30's / clear 50'sReservoir Level at Time of Inspection 5' below spillcrest / 6" below spillcrestb. Inspection Personnel K. Harmer, J. Vertch, R. Durrin

c. Persons Contacted (Including Address & Phone No.) _____

Melvin DeckerWater Superintendent, DPWPoet Jervis NY(914) 856-7432

d. History:

Date Constructed 1912 Date(s) Reconstructed Spring 1980Designer IRVING RIGHTERConstructed By JAMES DUCLE & CO.Owner CITY OF POET JERVIS.

2) Embankment

a. Characteristics

- (1) Embankment Material EARTH
- (2) Cutoff Type UNKNOWN
- (3) Impervious Core UNKNOWN
- (4) Internal Drainage System UNKNOWN
- (5) Miscellaneous _____

b. Crest

- (1) Vertical Alignment good
- (2) Horizontal Alignment good
- (3) Surface Cracks none
- (4) Miscellaneous rounding off / some erosion

c. Upstream Slope

- (1) Slope (Estimate) (V:H) 1:2.25
- (2) Undesirable Growth or Debris, Animal Burrows several pine trees
- (3) Sloughing, Subsidence or Depressions minor sloughing

- (4) Slope Protection rip rap holding up well
- (5) Surface Cracks or Movement at Toe None

d. Downstream Slope

- (1) Slope (Estimate - V:H) 1:2.25
- (2) Undesirable Growth or Debris, Animal Burrows heavy tree growth
- (3) Sloughing, Subsidence or Depressions none
- (4) Surface Cracks or Movement at Toe none
- (5) Seepage several point seepages see photos boggy area @ toe
- (6) External Drainage System (Ditches, Trenches; Blanket) unknown
- (7) Condition Around Outlet Structure good, except for part of wall collapsed
- (8) Seepage Beyond Toe not found

e. Abutments - Embankment Contact

good. rock @ left overburden @ right.

(1) Erosion at Contact None

(2) Seepage Along Contact None

3) Drainage System

a. Description of System UNKNOWN

b. Condition of System UNKNOWN

c. Discharge from Drainage System UNKNOWN

4) Instrumentation (Momentum/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

None

5) Reservoir

- a. Slopes stable, heavily vegetated
- b. Sedimentation NO EXCESSIVE
- c. Unusual Conditions Which Affect Dam None

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) road several homes / Sparrow Bush
- b. Seepage, Unusual Growth several points of heavy seepage @ low reservoir el.
- c. Evidence of Movement Beyond Toe of Dam None
- d. Condition of Downstream Channel well collapsed, generally good

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

- a. General seepage around & under wall - founded on bedrock, walls good condition
- b. Condition of Service Spillway _____

c. Condition of Auxiliary Spillway n/a

d. Condition of Discharge Conveyance Channel heavy vegetation should be cleared

8) Reservoir Drain/Outlet

Type: Pipe Conduit _____ Other _____

Material: Concrete _____ Metal C.I. Other _____

Size: 6" & 12" Length ?

Invert Elevations: Entrance ? Exit ~ 995

Physical Condition (Describe): good Unobservable _____

Material: good

Joints: apparently ok Alignment ok

Structural Integrity: sound

Hydraulic Capability: ?

Means of Control: Gate _____ Valve Uncontrolled _____

Operation: Operable Inoperable _____ Other _____

Present Condition (Describe): good - operated annually

9) Structural

a. Concrete Surfaces good

b. Structural Cracking none

c. Movement - Horizontal & Vertical Alignment (Settlement) _____

none

d. Junctions with Abutments or Embankments good

e. Drains - Foundation, Joint, Face good

f. Water Passages, Conduits, Sluices good

g. Seepage or Leakage previously noted

h. Joints - Construction, etc.

N/A

i. Foundation

Secured and good

j. Abutments

good

k. Control Gates

operable

l. Approach & Outlet Channels

heavily vegetated

m. Energy Dissipators (Plunge Pool, etc.)

1/2

n. Intake Structures

intake on dike need maintenance

o. Stability

good

p. Miscellaneous

—

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

a. Description and Condition gatehouse on dam
good conditions

gatehouse on dike needs
maintenance

11) Operation Procedures (Lake Level Regulation):

regulated by releases through dam
& water supply to Res. No. 2

APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>1023.5</u>	<u>—</u>	<u>1570.</u>
2) Design High Water (Max. Design Pool)	<u>—</u>	<u>—</u>	<u>—</u>
3) Auxiliary Spillway Crest	<u>—</u>	<u>—</u>	<u>—</u>
4) Pool Level with Flashboards	<u>—</u>	<u>—</u>	<u>—</u>
5) Service Spillway Crest	<u>1019.0</u>	<u>105</u>	<u>1223</u>

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>2.±</u>
2) Spillway @ Maximum High Water	<u>1000 cfs.</u>
3) Spillway @ Design High Water	<u>—</u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>—</u>
5) Low Level Outlet	<u>—</u>
6) Total (of all facilities) @ Maximum High Water	<u>1000 cfs</u>
7) Maximum Known Flood	<u>—</u>
8) At Time of Inspection	<u>below crest</u>

CREST: ELEVATION: 1023.50
 Type: EARTH FILL. w/ RIPRAP
 Width: 10' Length: 500
 Spillover NONE
 Location -

SPILLWAY:

SERVICE	AUXILIARY
<u>1019.</u>	Elevation <u>-</u>
<u>concrete weir</u>	Type <u>-</u>
<u>30'</u>	Width <u>-</u>
<u>Type of Control</u>	
<u>uncontrolled</u>	Uncontrolled <u>-</u>
Controlled:	
<u>-</u>	Type <u>-</u>
(Flashboards; gate)	
<u>-</u>	Number <u>-</u>
<u>-</u>	Size/Length <u>-</u>
Invert Material <u>-</u>	
Anticipated Length of operating service <u>-</u>	
<u>150' rock channel</u>	Chute Length <u>-</u>
<u>2' vert. then 3:1 slope.</u>	Height Between Spillway Crest & Approach Channel Invert (Weir Flow) <u>-</u>

HYDROMETEROLOGICAL GAGES:

Type : None
Location: -
Records: -
Date - -
Max. Reading - -

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):
6" x 12" C.I. drain (unknown invert el.)

DRAINAGE AREA: 1.43 sq. mi.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: primarily wooded

Terrain - Relief: moderate slope

Surface - Soil: varies to well drained glacial till

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

No planned or probable changes to watershed

Potential Sedimentation problem areas (natural or man-made; present or future)

none apparent

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

No backwater problems

Dikes - Floodwalls (overflow & non-overflow) - ~~Low reaches along the Reservoir perimeter:~~

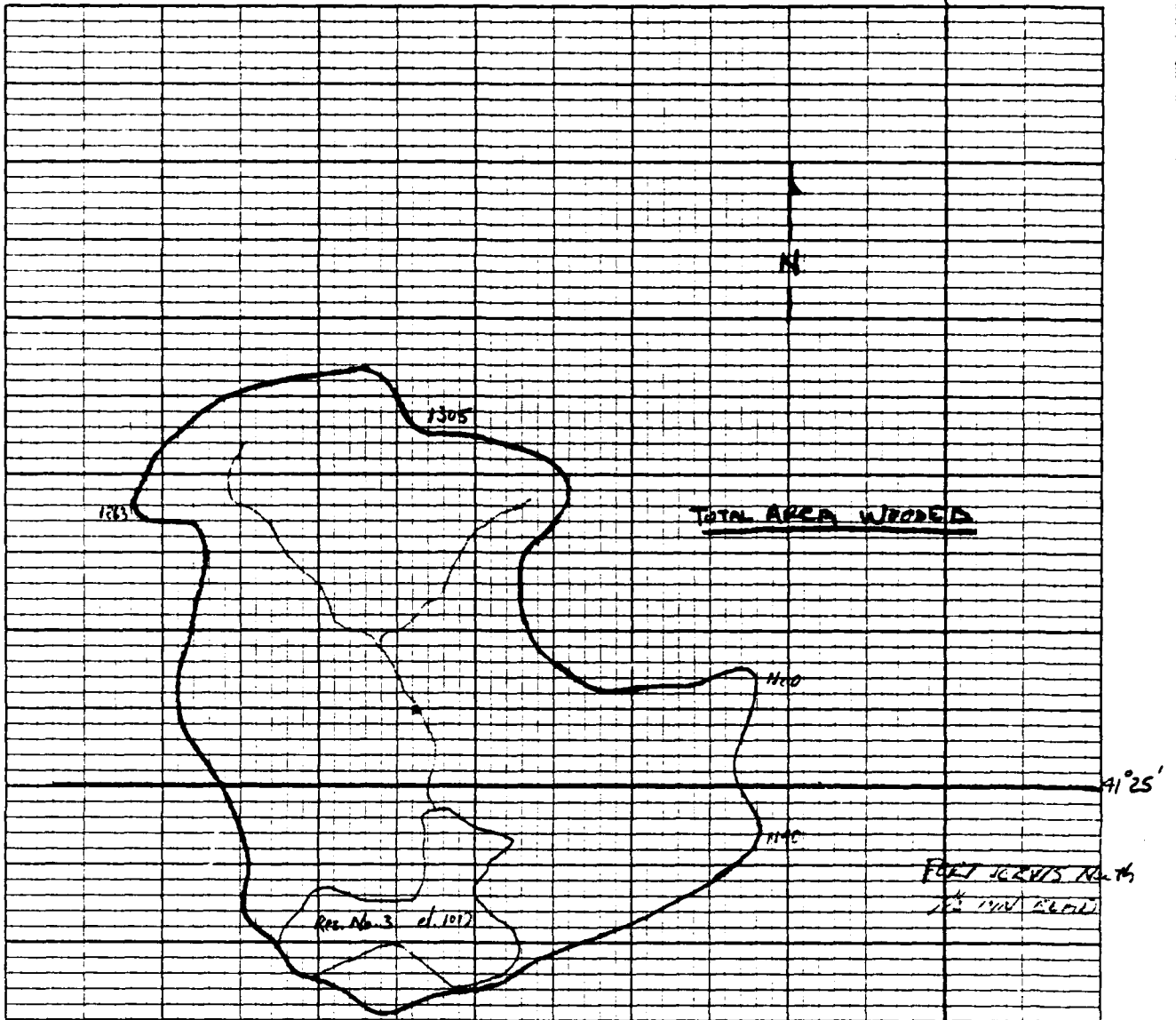
Location: east side of reservoir (750' earth)

Elevation: 1023.5

Reservoir:

Length @ Maximum Pool 0.6 (Miles)

Length of Shoreline (@ Spillway Crest) 1.8 (Miles)



$$DA_{min} = 9.59^{\circ} (24000)^2 \div (1.99 \times 10^3 (100)) = 1.13 \text{ mi.}^2$$

$$A_{contour} = 0.85^{\circ} \dots = 0.12$$

$$S = 0.03$$

$$L_{ca} = 2.1^{\circ} (24000) \div (2 \times 5280) = 0.80 \text{ MI.}$$

$$L = 9.5^{\circ} \quad " \quad = 1.70 \text{ MI.}$$

$$C_p = 2.0 \quad C_r = 0.625$$

$$t_p = C_r (L + L_{ca})^3 = 2.0 (1.8 + 1.7)^3 = 2.19$$

$$t_r = T_p / 55 = 0.39 \quad T_R = 15 \text{ MIN} = .25 \text{ hr.}$$

$$T_p = 2.19 + 0.25(.25 - .39) = 2.16$$

Time interval = 15 MIN

PET Jervis No. 3

Top of DAM = 1023.3

Nov. 20, 1980

Spillway Capacity Weir length = 30' C-Frn King & Brainer, Handbook of Hydr. $Q = CLH^{3/2}$

<u>el.</u>	<u>h.</u>	<u>C</u>	<u>L</u>	<u>Q (cfs)</u>
1019	-	-	30	0
1020	1	3.0	↓	90
1021	2	3.3		280
1022	3	3.32		517
1023	4	3.32		797
1023.3	4.3	3.40		910
1023.5	4.5	3.50		1000

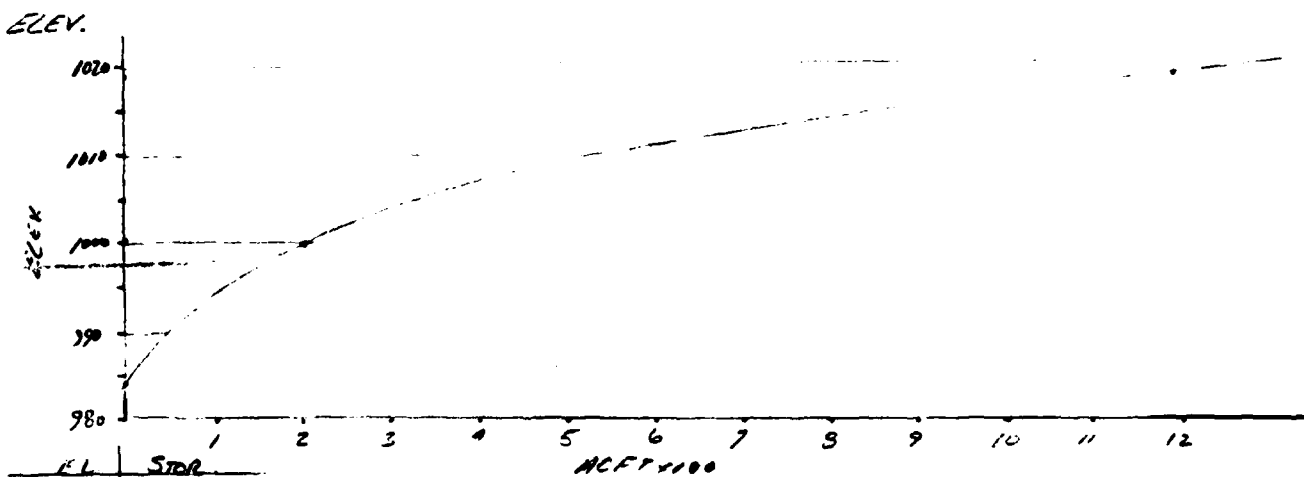
12" DRAIN

NORMAL CAPACITY

6" DRAIN

Reservoir Capacity

NO DATA - INTERPOLATE CONTOURS & MEASURE AREA



<u>EL</u>	<u>STOR</u>
984	0
990	50
1000	205
1010	530
1020	1300

DAM Length MAIN DAM 500'
 EAST DIKE 750'

C = 5.0 1.5

RAINFALL

5" PMP = 21.2"

%	<u>6</u>	<u>12</u>	<u>24</u>	<u>72</u> hr
	111	123	133	142

NEW YORK STATE
 DEPT OF ENVIRONMENTAL CONSERVATION
 FLOOD PROTECTION BUREAU

NY STATE WATERWAY NO. 3
 JULY 1976
 2 13/79
 10/11/79

1	11	0	0	0	0	0	0	0
2	12	0	0	0	0	0	0	0
3	13	230	0	10	0	0	0	0
4	14	1	0	0	0	0	0	0
5	15	0	6	1	0	0	0	0
6	16	0.1	0.9	0.8	1	0	0	0
7	17	1	1	2	1	0	0	0
8	18	MI	INFLW FROM BASIN					
9	19	1	1	1.43				
10	20	21.2	111	123	133	142	1.0	0.1
11	21	0.1	0.25					
12	22	0.1	0.1					
13	23	1	1	2	2	1		
14	24	MI	OUT	INFLW HYDROGRAPH THROUGH RESERVOIR				
15	25	1	1	1	1			
16	26	1	1					
17	27	1020	1001	1020	1023	1023.5		
18	28	90	290	517	910	1000		
19	29	30	200	530	1300			
20	30	970	1000	1010	1010	1020		
21	31	1010						
22	32	017.3	3	1.1	1250			
23	33							
24	34							
25	35							
26	36							
27	37							
28	38							
29	39							
30	40							

-1019 -1

PROJECT - CALCULATION OF STEAM NETWORK CALCULATIONS

1. SHEET HYDROGRAPH AT

2. SHEET HYDROGRAPH TO

3. SHEET NETWORK

NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU

PORT JERVIS RESERVOIR NO. 1
RIVER

JOB SPECIFICATION
IHR IMIN METRC IPLF IPRT VSTAN
0 0 0 0 0
JOPER NWT LROPT TRACE
3 0 0 0

MULTI-PLAN ANALYSES TO BE PERFORMED
MPLAN= 1 RATIO= 6 LRTIO= 1
RTIO= 0.20 0.40 0.60 0.80 1.00

SUB-AREA RUNOFF COMPUTATION

IN-LOG FROM BASIN
ISIA ICCMP IFCON ITAPE JPLT JPRT INAME ISTAGE IAUTO
1 0 0 0 2 0 1 0 0

HYDROGRAPH DATA
IUNG IARGA SWAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL
1 1 1.45 0. 1.45 0. 0. R48 R72 R96
0. 21.00 111.00 123.00 133.00 142.00 0. 0.

PRECIP DATA
R12 R24
0. 21.00 111.00 123.00 133.00 142.00 0. 0.

LOSS DATA
FRAIN STRKS RTIOK STRTL CNSFL ALSMX RTIMP
0. 0. 0. 1.00 1.00 0.10 0. 0.

UNIT HYDROGRAPH DATA
TF= 2.16 CP=0.63 NTA= 0

RECESSION DATA
STAGE= -2.00 ORCSM= -0.10 RTIOK= 1.00
FROM GIVE SWELN CP AND TP ARE ICE= 9.71 AND R= 8.03 INTERVALS

UNIT HYDROGRAPH ABSCISSA OF PERIOD ORDINATES; LAG= 2.14 HOURS; CP= 0.62 VOLE= 1.00

11.	19.	21.	23.	25.	27.	29.	31.	33.	35.	37.	39.	41.	43.	45.	47.	49.	51.	53.	55.
76.	114.	165.	209.	243.	259.	272.	283.	288.	291.	292.	293.	294.	295.	296.	297.	298.	299.	300.	301.
1.05	1.65	1.95	1.28	1.13	1.08	1.05	1.03	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
1.5	4.7	42.	37.	32.	29.	25.	22.	20.	18.	16.	14.	12.	11.	9.	7.	6.	5.	4.	3.

FWD-OFF-PERIOD FLOW
COMP 3 1.00 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01
RAIN EXCS LOSS COMP 0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
PERIOD 1 0.00 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.

1.01	0.95	3	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	1.45	103	0.03	0.00	0.03	8.
1.01	1.00	4	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	2.00	104	0.03	0.00	0.03	8.
1.01	1.15	5	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	2.15	105	0.03	0.00	0.03	9.
1.01	1.30	6	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	2.30	106	0.03	0.00	0.03	10.
1.01	1.45	7	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	2.45	107	0.03	0.00	0.03	10.
1.01	2.00	8	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	3.00	108	0.03	0.00	0.03	11.
1.01	2.15	9	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	3.15	109	0.03	0.00	0.03	11.
1.01	2.30	10	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	3.30	110	0.03	0.00	0.03	12.
1.01	2.45	11	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	3.45	111	0.03	0.00	0.03	12.
1.01	3.00	12	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	4.00	112	0.03	0.00	0.03	12.
1.01	3.15	13	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	4.15	113	0.03	0.00	0.03	12.
1.01	3.30	14	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	4.30	114	0.03	0.00	0.03	13.
1.01	3.45	15	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	4.45	115	0.03	0.00	0.03	13.
1.01	4.00	16	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	5.00	116	0.03	0.00	0.03	13.
1.01	4.15	17	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	5.15	117	0.03	0.00	0.03	13.
1.01	4.30	18	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	5.30	118	0.03	0.00	0.03	13.
1.01	4.45	19	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	5.45	119	0.03	0.00	0.03	14.
1.01	5.00	20	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	6.00	120	0.03	0.00	0.03	14.
1.01	5.15	21	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	6.15	121	0.08	0.06	0.03	14.
1.01	5.30	22	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	6.30	122	0.08	0.06	0.03	17.
1.01	5.45	23	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	6.45	123	0.08	0.06	0.03	21.
1.01	6.00	24	0.00	0.	0.00	0.	0.00	0.	0.00	1.02	7.00	124	0.08	0.06	0.03	28.
1.01	6.15	25	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	7.15	125	0.08	0.06	0.03	37.
1.01	6.30	26	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	7.30	126	0.08	0.06	0.03	49.
1.01	6.45	27	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	7.45	127	0.08	0.06	0.03	63.
1.01	7.00	28	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	8.00	128	0.08	0.06	0.03	78.
1.01	7.15	29	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	8.15	129	0.08	0.06	0.03	93.
1.01	7.30	30	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	8.30	130	0.08	0.06	0.03	108.
1.01	7.45	31	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	8.45	131	0.08	0.06	0.03	122.
1.01	8.00	32	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	9.00	132	0.08	0.06	0.03	134.
1.01	8.15	33	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	9.15	133	0.08	0.06	0.03	144.
1.01	8.30	34	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	9.30	134	0.08	0.06	0.03	154.
1.01	8.45	35	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	9.45	135	0.08	0.06	0.03	162.
1.01	9.00	36	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	10.00	136	0.08	0.06	0.03	169.
1.01	9.15	37	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	10.15	137	0.08	0.06	0.03	175.
1.01	9.30	38	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	10.30	138	0.08	0.06	0.03	181.
1.01	9.45	39	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	10.45	139	0.08	0.06	0.03	186.
1.01	10.00	40	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	11.00	140	0.08	0.06	0.03	190.
1.01	10.15	41	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	11.15	141	0.08	0.06	0.03	194.
1.01	10.30	42	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	11.30	142	0.08	0.06	0.03	198.
1.01	10.45	43	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	11.45	143	0.08	0.06	0.03	201.
1.01	11.00	44	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	12.00	144	0.08	0.06	0.03	203.
1.01	11.15	45	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	12.15	145	0.47	0.45	0.02	210.
1.01	11.30	46	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	12.30	146	0.47	0.45	0.02	226.
1.01	11.45	47	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	12.45	147	0.47	0.45	0.02	257.
1.01	12.00	48	0.01	0.	0.01	0.	0.01	0.	0.01	1.02	13.00	148	0.47	0.45	0.02	305.
1.01	12.15	49	0.03	0.	0.03	0.	0.03	0.	0.03	1.02	13.15	149	0.56	0.54	0.02	371.
1.01	12.30	50	0.03	0.	0.03	0.	0.03	0.	0.03	1.02	13.45	150	0.56	0.54	0.02	456.
1.01	12.45	51	0.03	0.	0.03	0.	0.03	0.	0.03	1.02	14.00	151	0.56	0.54	0.02	558.
1.01	13.00	52	0.03	0.	0.03	0.	0.03	0.	0.03	1.02	14.30	152	0.56	0.54	0.02	672.
1.01	13.15	53	0.04	0.	0.04	0.	0.04	0.	0.04	1.02	14.45	153	0.71	0.68	0.02	795.
1.01	13.30	54	0.04	0.	0.04	0.	0.04	0.	0.04	1.02	14.60	154	0.71	0.68	0.02	922.
1.01	13.45	55	0.04	0.	0.04	0.	0.04	0.	0.04	1.02	14.75	155	0.71	0.68	0.02	1048.
1.01	14.00	56	0.04	0.	0.04	0.	0.04	0.	0.04	1.02	15.00	156	0.71	0.68	0.02	1172.
1.01	14.15	57	0.05	0.	0.05	0.	0.05	0.	0.05	1.02	15.15	157	0.72	0.69	0.02	1293.
1.01	14.30	58	0.05	0.	0.05	0.	0.05	0.	0.05	1.02	15.30	158	1.41	1.41	0.03	1418.
1.01	14.45	59	0.05	0.	0.05	0.	0.05	0.	0.05	1.02	15.45	159	4.01	3.98	0.03	1585.
1.01	15.00	60	0.05	0.	0.05	0.	0.05	0.	0.05	1.02	16.00	160	1.00	0.98	0.02	1813.
1.01	15.15	61	0.05	0.	0.05	0.	0.05	0.	0.05	1.02	16.15	161	0.66	0.63	0.02	2077.
1.01	15.30	62	0.10	0.	0.10	0.	0.10	0.	0.10	1.02	16.30	162	0.66	0.63	0.02	2355.
1.01	15.45	63	0.27	0.06	0.21	0.06	0.21	0.06	0.21	1.02	16.45	163	0.66	0.63	0.02	2631.
1.01	16.00	64	0.07	0.04	0.03	0.04	0.03	0.04	0.03	1.02	17.00	164	0.66	0.63	0.02	2880.
1.01	16.15	65	0.04	0.02	0.03	0.04	0.02	0.03	0.04	1.02	17.15	165	0.52	0.49	0.02	3074.
1.01	16.30	66	0.04	0.02	0.03	0.04	0.02	0.03	0.04	1.02	17.30	166	0.52	0.49	0.02	3200.
1.01	16.45	67	0.04	0.02	0.03	0.04	0.02	0.03	0.04	1.02	17.45	167	0.52	0.49	0.02	3254.
1.01	17.00	68	0.04	0.02	0.03	0.04	0.02	0.03	0.04	1.02	18.00	168	0.52	0.49	0.02	3291.

1-01	17-15	69	0-04	0-01	0-03	35.	1-02	18-15	169	0-04	0-02	0-03	3114.
1-01	17-30	70	0-04	0-01	0-03	42.	1-02	18-30	170	0-04	0-02	0-03	2971.
1-01	17-45	71	0-04	0-01	0-03	47.	1-02	18-45	171	0-04	0-02	0-03	2814.
1-01	18-00	72	0-04	0-01	0-03	51.	1-02	19-00	172	0-04	0-02	0-03	2643.
1-01	18-15	73	0-00	0.	0-00	53.	1-02	19-15	173	0-04	0-02	0-03	2459.
1-01	18-30	74	0-00	0.	0-00	53.	1-02	19-30	174	0-04	0-02	0-03	2263.
1-01	18-45	75	0-00	0.	0-00	52.	1-02	19-45	175	0-04	0-02	0-03	2061.
1-01	19-00	76	0-00	0.	0-00	49.	1-02	20-00	176	0-04	0-02	0-03	1859.
1-01	19-15	77	0-00	0.	0-00	47.	1-02	20-15	177	0-04	0-02	0-03	1663.
1-01	19-30	78	0-00	0.	0-00	43.	1-02	20-30	178	0-04	0-02	0-03	1479.
1-01	19-45	79	0-00	0.	0-00	40.	1-02	20-45	179	0-04	0-02	0-03	1315.
1-01	20-00	80	0-00	0.	0-00	36.	1-02	21-00	180	0-04	0-02	0-03	1167.
1-01	20-15	81	0-00	0.	0-00	33.	1-02	21-15	181	0-04	0-02	0-03	1038.
1-01	20-30	82	0-00	0.	0-00	29.	1-02	21-30	182	0-04	0-02	0-03	924.

1.01	20.45	83	0.00	0.	0.00	25.	1.02	21.45	183	0.04	0.02	0.03	824.
1.01	21.00	84	0.00	0.	0.00	23.	1.02	22.00	184	0.04	0.02	0.03	735.
1.01	21.15	85	0.00	0.	0.00	21.	1.02	22.15	185	0.04	0.02	0.03	656.
1.01	21.30	86	0.00	0.	0.00	19.	1.02	22.30	186	0.04	0.02	0.03	587.
1.01	21.45	87	0.00	0.	0.00	17.	1.02	22.45	187	0.04	0.02	0.03	526.
1.01	22.00	88	0.00	0.	0.00	15.	1.02	23.00	188	0.04	0.02	0.03	472.
1.01	22.15	89	0.00	0.	0.00	14.	1.02	23.15	189	0.04	0.02	0.03	425.
1.01	22.30	90	0.00	0.	0.00	13.	1.02	23.30	190	0.04	0.02	0.03	383.
1.01	22.45	91	0.00	0.	0.00	11.	1.02	23.45	191	0.04	0.02	0.03	346.
1.01	23.00	92	0.00	0.	0.00	10.	1.03	0.	192	0.04	0.02	0.03	325.
1.01	23.15	93	0.00	0.	0.00	10.	1.03	0.15	193	0.	0.	0.	325.
1.01	23.30	94	0.00	0.	0.00	9.	1.03	0.30	194	0.	0.	0.	325.
1.01	23.45	95	0.00	0.	0.00	8.	1.03	0.45	195	0.	0.	0.	325.
1.02	0.	96	0.00	0.	0.00	7.	1.03	1.00	196	0.	0.	0.	325.
1.02	0.15	97	0.03	0.00	0.03	7.	1.03	1.15	197	0.	0.	0.	325.
1.02	0.30	98	0.03	0.00	0.03	7.	1.03	1.30	198	0.	0.	0.	325.
1.02	0.45	99	0.03	0.00	0.03	6.	1.03	1.45	199	0.	0.	0.	325.
1.02	1.00	100	0.03	0.00	0.03	6.	1.03	2.00	200	0.	0.	0.	325.

SUM 24.08 20.38 3.70 75692.
 (612.3)(518.3)(94.3)(2143.36)

	PEAK	5-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3254.	2275.	775.	378.	75523.
CMS	92.	64.	22.	11.	2139.
INCHES		14.80	20.17	20.47	20.47
MM		375.96.	512.21	519.94	519.94
AC-FT		1128.	1537.	1560.	1560.
THOUS CU M		1392.	1896.	1925.	1925.

15.00 601
15.15 611
15.30 621
15.45 631
16.00 641
16.15 651
16.30 661
16.45 6701
17.00 6801
17.15 6901
17.30 7001
17.45 7101
18.00 7201
18.15 7301
18.30 7401
18.45 7501
19.00 7601
19.15 7701
19.30 7801
19.45 7901
20.00 8001
20.15 8101
20.30 8201
20.45 8301
21.00 8401
21.15 8501
21.30 861
21.45 871
22.00 881
22.15 891
22.30 901
22.45 911
23.00 921
23.15 931
23.30 941
23.45 951
0. 961
0.15 971
0.30 981
0.45 991
1.001001
1.151011
1.301021
1.451031
2.001041
2.151051
2.301061
2.451071
3.001081
3.151091
3.301101
3.451111
4.001121
4.151131
4.301141
4.451151
5.001161
5.151171
5.301181
5.451191
6.001201
6.151211
6.301221
6.4512301
7.0012401
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7.301260 I
7.451270 I
8.001280 I
8.151290 I
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8.45131.0 I
9.00132.0 I
9.15133.0 I
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10.15137.0 I
10.30138.0 I
10.45139.0 I

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1.15197.0.....I.....
1.30198.0.....I.....
1.45199.0.....I.....
2.00200.0.....I.....

1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2
1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2
1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.3	1019.3	1019.3	1019.3	1019.3	1019.3	1019.3	1019.3	1019.3	1019.3	1019.3	1019.3	1019.3
1019.6	1019.6	1019.6	1019.6	1019.6	1019.6	1019.6	1019.6	1019.6	1019.6	1019.6	1019.6	1019.6
1020.1	1020.3	1020.4	1020.4	1020.6	1020.6	1020.6	1020.6	1020.6	1020.6	1020.6	1020.6	1020.6
1022.5	1022.9	1023.3	1023.3	1023.7	1023.7	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0
1024.1	1024.1	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0
1023.6	1023.6	1023.5	1023.5	1023.5	1023.5	1023.4	1023.4	1023.4	1023.4	1023.4	1023.4	1023.4
1022.7	1022.6	1022.5	1022.5	1022.4	1022.4	1022.3	1022.3	1022.3	1022.3	1022.3	1022.3	1022.3

PEAK OUTFLOW IS 3221. AT TIME 42.00 HOURS

CFS	3221.	2008.	665.	322.	6448.
CMS	91.	57.	19.	9.	1825.
INCHES		13.06	17.31	17.47	17.47
MM		331.82	439.78	443.70	443.70
AC-FY		996.	1320.	1332.	1332.
THOUS CU M		1228.	1628.	1642.	1642.

15.00 601
15.15 611
15.30 621
15.45 631
16.00 641
16.15 651
16.30 661
16.45 6701
17.00 681
17.15 691
17.30 701
17.45 7101
18.00 7201
18.15 7301
18.30 7401
18.45 7501
19.00 7601
19.15 7701
19.30 7801
19.45 7901
20.00 801
20.15 8101
20.30 821
20.45 8301
21.00 841
21.15 8501
21.30 861
21.45 871
22.00 881
22.15 891
22.30 901
22.45 911
23.00 921
23.15 931
23.30 941
23.45 951
0. 961
0.15 971
0.30 981
0.45 991
1.001001
1.151011
1.301021
1.451031
2.001041
2.151051
2.301061
2.451071
3.001081
3.151091
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4.001121
4.151131
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5.001161
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6.001201
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6.301221
6.4512301
7.0012401
7.1512501

7.3012001
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9.451350 I
10.001360 I
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10.451390 I

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23.15189.0 .....I .....
23.30190.0 .....I .....
23.45191.0 .....I .....
0.152.0 .....I .....
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1.15197.0 .....I .....
1.30198.0 .....I .....
1.45199.0 .....I .....
2.00200.0 .....I .....

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILDMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS					
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
HYDROGRAPH AT	1	1.43	1	0.20	0.40	0.50	0.60	0.80	1.00
	(8343.48)	(18.43)	(1301.)	(651.)	(36.85)	(46.07)	(55.28)	(73.71)	(92.13)
ROUTED TO	1	1.43	1	0.20	0.40	0.50	0.60	0.80	1.00
	(8343.48)	(18.43)	(1301.)	(651.)	(36.85)	(46.07)	(55.28)	(73.71)	(92.13)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

RATIO OF PMF	MAXIMUM RESERVOIR W-S-ELEV	MAXIMUM STORAGE AC-FT OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	1021.15	0.	1389.	316.	0.	44.25	0.
0.40	1022.72	0.	1510.	800.	0.	43.75	0.
0.50	1023.44	0.	1565.	990.	0.	43.75	0.
0.60	1023.78	0.28	1591.	1600.	2.75	43.00	0.
0.80	1024.02	0.52	1610.	2507.	4.00	42.25	0.
1.00	1024.18	0.68	1622.	3221.	5.00	42.00	0.

ELEVATION STORAGE 1019.00
 1223.
 0.

SPILLWAY CREST 1019.00
 1223.
 0.

TOP OF DAM 1023.50
 1570.
 1000.

APPENDIX D

REFERENCES

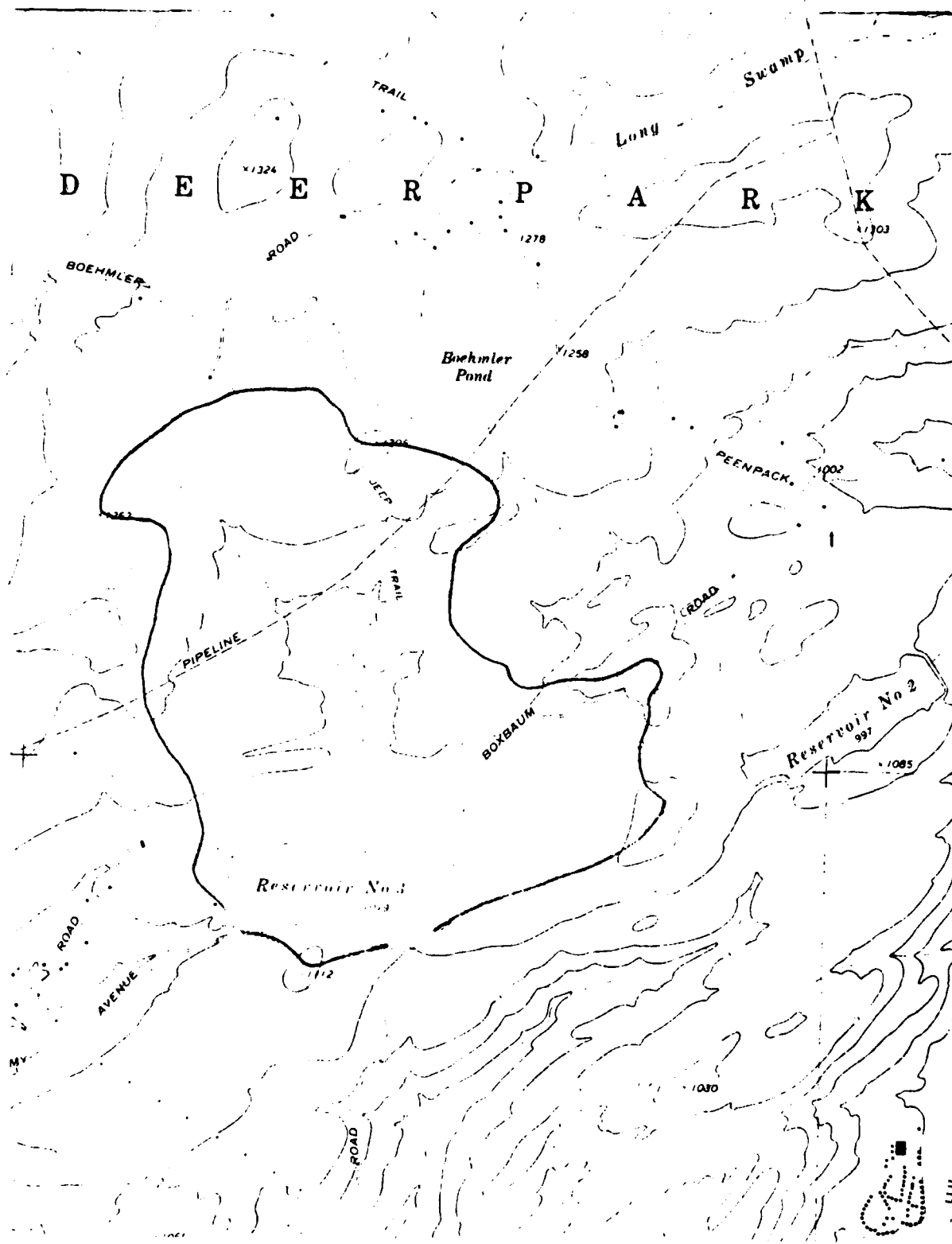
APPENDIX D

REFERENCES

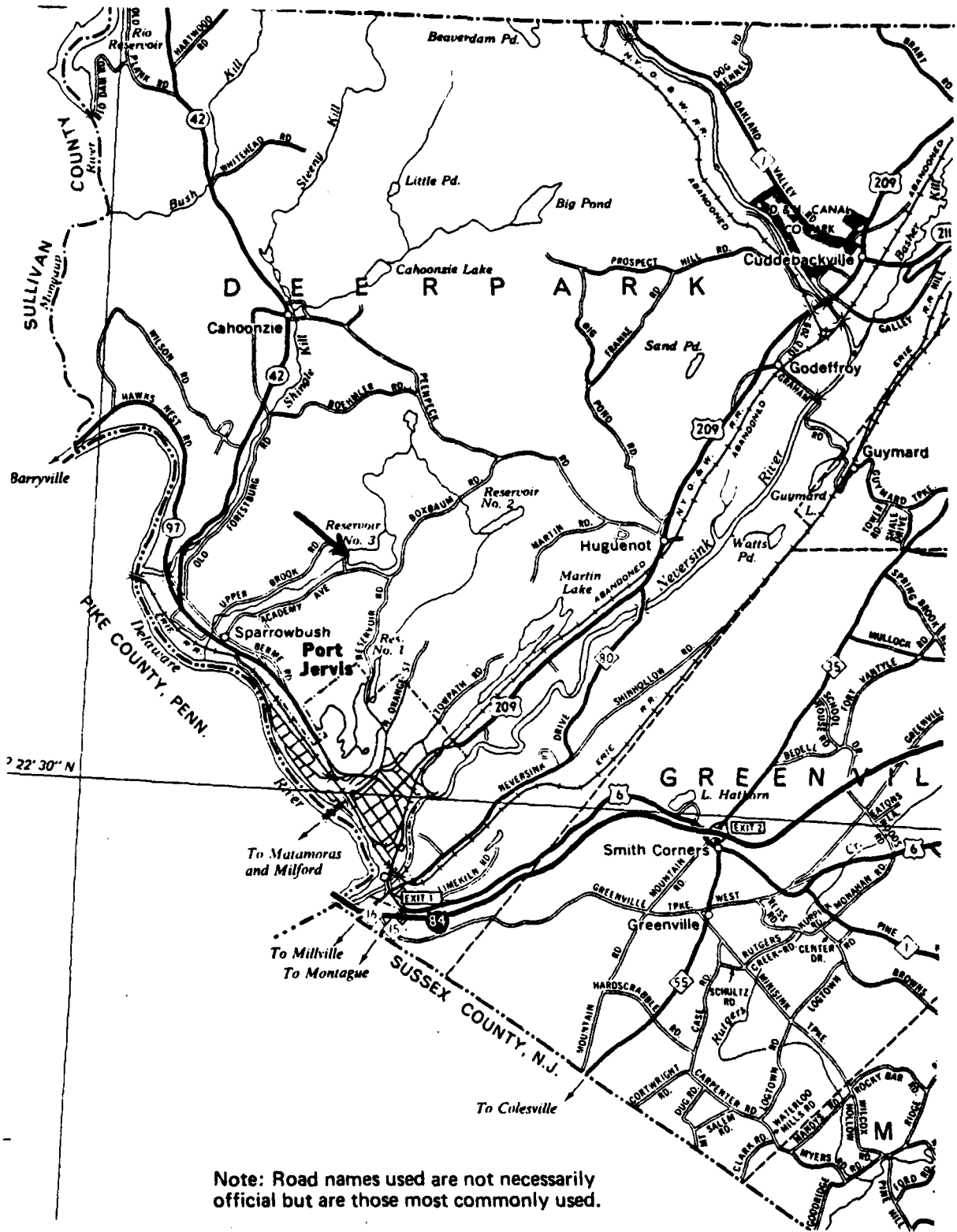
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APPENDIX E

DRAWINGS



TOPOGRAPHIC MAP



VICINITY MAP

