

AD-A086 266

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/8 13/13  
NATIONAL DAM SAFETY PROGRAM. REXMERE DAM (INVENTORY NUMBER NY 5--ETC(1))  
FEB 80 6 KOCH

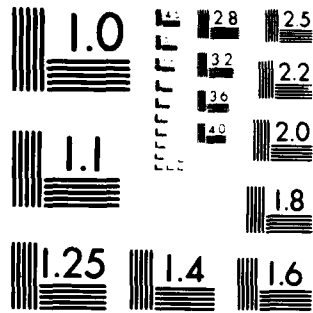
DACWS1-79-C-0001

NL

UNCLASSIFIED

1 of 1  
ALL INFORMATION  
CONTAINED  
HEREIN IS UNCLASSIFIED

END  
DATE  
FILMED  
8-80  
DTIC



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

ADA 086266

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       | READ INSTRUCTIONS<br>BEFORE COMPLETING FORM                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------|
| 1. REPORT NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2. GOVT ACCESSION NO. | 3. RECIPIENT'S CATALOG NUMBER                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | AD-A086266            |                                                                                                |
| 4. TITLE (and Subtitle)<br>Phase I Inspection Report<br>Rexmere Dam<br>Delaware River Basin, Delaware County, NY<br>Inventory No. NY 524                                                                                                                                                                                                                                                                                                                                                                                                                                |                       | 5. TYPE OF REPORT & PERIOD COVERED<br>Phase I Inspection Report<br>National Dam Safety Program |
| 7. AUTHOR(s)<br>George/Koch P.E. (12) 94 (15)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       | 6. PERFORMING ORG. REPORT NUMBER                                                               |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>New York State Department of Environmental<br>Conservation 50 Wolf Road<br>Albany, NY 12233                                                                                                                                                                                                                                                                                                                                                                                                                              |                       | 8. CONTRACT OR GRANT NUMBER(s)<br>DACW 51-79-C-0001                                            |
| 11. CONTROLLING OFFICE NAME AND ADDRESS<br>New York State Department of Environmental Con-<br>servation/ 50 Wolf Road<br>Albany, New York 12233                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | 10. PROGRAM ELEMENT, PROJECT, TASK<br>AREA & WORK UNIT NUMBERS<br>(11) Feb 80                  |
| 14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)<br>Department of the Army<br>26 Federal Plaza/ New York District, CofE<br>New York, New York 10007                                                                                                                                                                                                                                                                                                                                                                                          |                       | 12. REPORT DATE<br>14 April 1980 Feb. 1980                                                     |
| 15. DISTRIBUTION STATEMENT (of this Report)<br>Approved for public release; Distribution unlimited                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       | 13. NUMBER OF PAGES                                                                            |
| (6) National Dam Safety Program.<br>Rexmere Dam<br>(Inventory Number NY 524)<br>Delaware River Basin, Delaware<br>County, New York, Phase I<br>Inspection Report.                                                                                                                                                                                                                                                                                                                                                                                                       |                       | 15. SECURITY CLASS. (of this report)<br>UNCLASSIFIED                                           |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in the report)<br>(Inventory Number NY 524)<br>Delaware River Basin, Delaware<br>County, New York, Phase I<br>Inspection Report.                                                                                                                                                                                                                                                                                                                                                                                    |                       | 15a. DECLASSIFICATION/DOWNGRADING<br>SCHEDULE                                                  |
| 18. SUPPLEMENTARY NOTES<br>THIS DOCUMENT IS BEST QUALITY PRACTICABLE.<br>THE COPY FURNISHED TO DDC CONTAINED A<br>SIGNIFICANT NUMBER OF PAGES WHICH DO NOT<br>REPRODUCE FAITHFULLY.                                                                                                                                                                                                                                                                                                                                                                                     |                       |                                                                                                |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)<br>Dam Safety<br>National Dam Safety Program<br>Visual Inspection<br>Hydrology, Structural Stability.                                                                                                                                                                                                                                                                                                                                                                                |                       | Rexmere Dam<br>Delaware County<br>Stamford                                                     |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>This report provides information and analysis on the physical condition of<br>the dam as of the report date. Information and analysis are based on visual<br>inspection of the dam by the performing organization.<br><br>Examination of available documents and a visual inspection of the dam<br>did not reveal conditions which constitute an immediate hazard to human<br>life or property. However, the dam has some deficiencies which need to be<br>evaluated and remedied. |                       |                                                                                                |

DDC FILE COPY

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED  
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

393970

Jim

ORIGINAL CONTAINS COLOR PLATES: ALL DDC  
REPRODUCTIONS WILL BE IN BLACK AND WHITE

Additional hydrologic investigations are required to more accurately determine the site specific characteristics of the watershed. Using the Corps of Engineer's Screening criteria for an initial review of spillway adequacy, it has been determined that the spillway would be overtopped by all storms which exceed 14% of the Probable Maximum Flood (PMF) inflow. A flood wave analysis, assuming a breach of the dam, indicates that water surface levels downstream of the dam could reach depths which would pose significant danger to residents. The spillway is, therefore, adjudged as seriously inadequate and the dam is classified as unsafe, non-emergency. K

The classification of "unsafe" applied to a dam because of a seriously inadequate spillway is not meant to confer the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

In addition to the spillway inadequacy, there is a wet area on the natural slope beyond the toe of the embankment near the west abutment. Further investigation is required to determine the cause of the wet area. If it is found to be necessary, a method of treatment of the wet area should be devised. Other deficiencies noted include brush and small trees growing on the embankment, undermined riprap at the downstream end of the spillway outlet channel, minor joint separations and deterioration on the spillway pipe-arches, and deterioration of the valve box.

It is recommended that within 3 months of the date of the notification of the owner, a hydrologic investigation of the structure should be undertaken. Investigation into the wet area near the west abutment should also be commenced within 3 months. Within 18 months of the date of notification, appropriate

remedial measures for the spillway inadequacy should be taken. If it is found to be necessary, treatment of the wet area should be completed within 12 months. Other deficiencies outlined above should also be corrected within 12 months. A detailed emergency operation plan and warning system should be developed within 3 months of notification.

AT 726 1980  
per J. Lombardi

# **DELAWARE RIVER BASIN**

## **REXMERE DAM**

DELAWARE COUNTY, NEW YORK  
INVENTORY NO. N.Y. 524

### **PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM**



**APPROVED FOR PUBLIC RELEASE;  
DISTRIBUTION UNLIMITED  
CONTRACT NO. DACW-51-79-C0001**

**NEW YORK DISTRICT CORPS OF ENGINEERS**

**FEBRUARY, 1980**

**80 7 3 108**

## **DISCLAIMER NOTICE**

**THIS DOCUMENT IS BEST QUALITY  
PRACTICABLE. THE COPY FURNISHED  
TO DTIC CONTAINED A SIGNIFICANT  
NUMBER OF PAGES WHICH DO NOT  
REPRODUCE LEGIBLY.**

## 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.

Accession For

NTIS GRA&I

DDC TAB

Unannounced

Justification:

1

23

HA

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
REXMERE DAM  
I.D. No. NY 524  
DELAWARE RIVER BASIN  
DELAWARE COUNTY, NEW YORK

TABLE OF CONTENTS

|                                        | <u>PAGE NO.</u> |
|----------------------------------------|-----------------|
| - ASSESSMENT                           | -               |
| - OVERVIEW PHOTOGRAPH                  | -               |
| 1 PROJECT INFORMATION                  | 1               |
| 1.1 GENERAL                            | 1               |
| 1.2 DESCRIPTION OF PROJECT             | 1               |
| 1.3 PERTINENT DATA                     | 2               |
| 2 ENGINEERING DATA                     | 4               |
| 2.1 GEOTECHNICAL DATA                  | 4               |
| 2.2 DESIGN RECORDS                     | 4               |
| 2.3 CONSTRUCTION RECORDS               | 4               |
| 2.4 OPERATION RECORDS                  | 4               |
| 2.5 EVALUATION OF DATA                 | 4               |
| 3 VISUAL INSPECTION                    | 5               |
| 3.1 FINDINGS                           | 5               |
| 3.2 EVALUATION OF OBSERVATIONS         | 6               |
| 4 OPERATION AND MAINTENANCE PROCEDURES | 7               |
| 4.1 PROCEDURE                          | 7               |
| 4.2 MAINTENANCE OF DAM                 | 7               |
| 4.3 WARNING SYSTEM IN EFFECT           | 7               |
| 4.4 EVALUATION                         | 7               |

|                                        | <u>PAGE NO.</u> |
|----------------------------------------|-----------------|
| 5 HYDROLOGIC/HYDRAULIC                 | 8               |
| 5.1 DRAINAGE AREA CHARACTERISTICS      | 8               |
| 5.2 ANALYSIS CRITERIA                  | 8               |
| 5.3 SPILLWAY CAPACITY                  | 8               |
| 5.4 RESERVOIR CAPACITY                 | 8               |
| 5.5 FLOODS OF RECORD                   | 8               |
| 5.6 OVERTOPPING POTENTIAL              | 8               |
| 5.7 DOWNSTREAM EFFECTS                 | 9               |
| 5.8 EVALUATION                         | 9               |
| 6 STRUCTURAL STABILITY                 | 10              |
| 6.1 EVALUATION OF STRUCTURAL STABILITY | 10              |
| 7 ASSESSMENT/RECOMMENDATIONS           | 11              |
| 7.1 ASSESSMENT                         | 11              |
| 7.2 RECOMMENDED MEASURES               | 11              |

#### APPENDIX

- A. PHOTOGRAPHS
- B. VISUAL INSPECTION CHECKLIST
- C. HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS
- D. APPLICATION FOR PERMIT AND PERTINENT CORRESPONDENCE
- E. REFERENCES
- F. DRAWINGS

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Rexmere Dam (I.D. No. NY 524)  
State Located: New York  
County: Delaware  
Stream: Unnamed Tributary of Delaware River  
Date of Inspection: November 1, 1979

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which need to be evaluated and remedied.

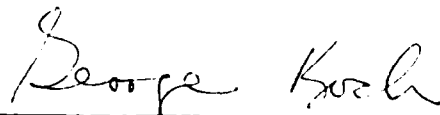
Additional hydrologic investigations are required to more accurately determine the site specific characteristics of the watershed. Using the Corps of Engineer's Screening criteria for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped by all storms which exceed 14% of the Probable Maximum Flood (PMF) inflow. A flood wave analysis, assuming a breaching of the dam, indicates that water surface levels downstream of the dam could reach depths which would pose significant danger to residents. The spillway is, therefore, adjudged as seriously inadequate and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a seriously inadequate spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

In addition to the spillway inadequacy, there is a wet area on the natural slope beyond the toe of the embankment near the west abutment. Further investigation is required to determine the cause of the wet area. If it is found to be necessary, a method of treatment of the wet area should be devised. Other deficiencies noted include brush and small trees growing on the embankment, undermined riprap at the downstream end of the spillway outlet channel, minor joint separations and deterioration on the spillway pipe-arches, and deterioration of the valve box.

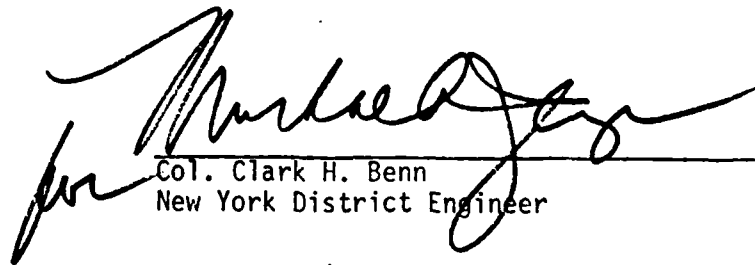
It is recommended that within 3 months of the date of the notification of the owner, a hydrologic investigation of the structure should be undertaken. Investigation into the wet area near the west abutment should also be commenced within 3 months. Within 18 months of the date of notification, appropriate

remedial measures for the spillway inadequacy should be taken. If it is found to be necessary, treatment of the wet area should be completed within 12 months. Other deficiencies outlined above should also be corrected within 12 months. A detailed emergency operation plan and warning system should be developed within 3 months of notification.



---

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



---

Col. Clark H. Benn  
New York District Engineer

Date:

14 Apr 80

---



OVERVIEW  
Rexmere Dam  
I.D. No. NY 524

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
REXMERE DAM  
I.D. No. NY 524  
#160A-3493  
DELAWARE RIVER BASIN  
DELAWARE 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

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam

The Rexmere Dam is an earth dam with two ungated pipe arches which form the spillway.

The embankment is 27 feet high and 350 feet long. The crest is 30 feet wide. The embankment slopes are 1V on 3.25H on the upstream slope and 1V on 2.75H on the downstream slope. The upstream slope is lined with heavy stone riprap.

The spillway consists of two 40 inch by 65 inch bituminous coated corrugated metal pipe-arches located in the upper portion of the embankment. The pipe arches are both 30 feet long and there are headwalls at each end. The channel on the downstream slope of the dam is lined with concrete for the first 30 feet and is concreted riprap for the remainder of its length.

The dam has a 12 inch diameter cast iron pipe for a reservoir drain. There is a concrete box covered by a trash grill at the inlet to this pipe. An eleven foot high valve box on the downstream slope of the dam houses the valve which controls flow in this pipe. The pipe extends for 15 feet beyond the valve box to a headwall at the outlet to the pipe. This headwall and outlet pipe are submerged by the water of Churchill Lake, which is located downstream of the Rexmere Dam.

b. Location

The Rexmere Dam is located on Windemere Road which is off NY Route 23 in the Town of Harpersfield. The dam is approximately one quarter mile north of the Route 23 - Route 10 intersection near Stamford.

c. Size Classification

The dam is 27 feet high and has a maximum storage capacity of 104 acre feet. Therefore, the dam is in the small size category as defined by the Recommended Guidelines for the Safety Inspection of Dams.

d. Hazard Classification

The dam is classified as "high" hazard due to the presence of a small dam, N.Y. Routes 23 and 10, a mobile home park containing 12 trailers, and 6 homes downstream of the dam.

e. Ownership

The dam is owned by the Village of Stamford, New York. Mr. Cecil Ballard, Superintendent of Public Works for the village was contacted at the time of the inspection. The phone number for the village offices of Stamford is (607) 652-6671.

f. Purpose of Dam

The primary purpose for this dam is to maintain the level of the lake for recreational purposes.

g. Design and Construction History

This dam was constructed in 1965 and 1966. It replaced several smaller dams which had been located in the area flooded by the new pond. The dam was designed by Floyd E. Snyder, P.E. The plans for the dam prepared by Mr. Snyder in 1965 were available and have been included in Appendix F.

h. Normal Operating Procedures

Water flows through the ungated pipe-arches. There are no regular operating procedures.

1.3

PERTINENT DATA

a. Drainage Area (acres) 654

b. Discharge at Dam

Pipe-Arches water surface at Elev. 1864 242

Reservoir Drain-water surface at  
elev. 1864 11

c. Elevation(USGS Datum)

Top of Dam 1864.0

Invert of Pipe-Arches 1859.0

Invert of Reservoir Drain Pipe 1838.38

d. Reservoir-Surface Area (acres)

Top of Dam 13.3

Invert of Pipe-Arches(Elevation 1859.0) 8.26

e. Storage Capacity (acre-feet)

Top of Dam 104

Invert of Pipe-Arches (Elevation 1859.0) 51

f. Dam

Embankment Type-Earth fill with riprap on upstream face.

Embankment Length (feet) - 350  
Slopes (V:H) Upstream 1 on 3.25  
Downstream 1 on 2.75  
Crest Width (feet) 30

g. Spillway

Type: Two 40 inch by 65 inch bituminous coated corrugated metal pipe arches, each 30 feet long. Concrete headwalls on both ends of pipes. Concrete lined outlet channel for first 30 feet, concreted riprap to end of channel.

h. Reservoir Drain

Type: 12 inch diameter cast iron pipe (181 ft. long) with inlet box covered by trash grill. Concrete headwall at pipe's outlet.

Control: Armco Model 50-10 Valve-located in 11 foot high valve box on downstream slope.

## SECTION 2: ENGINEERING DATA

### 2.1 GEOTECHNICAL DATA

#### a. Geology

The Rexmere Dam is located in the Catskill Mountain physiographic province of New York State. This province is a part of the Appalachian Plateau. The area is underlain by a great thickness of sedimentary rocks from the Devonian Era which lie almost horizontal. Glaciation and the action of streams have carved deep valleys in the flat lying rock. Summit elevations rise to between 3,000 and 4,000 feet. A review of the "Brittle Structures Map of the State of New York" indicated that there are no faults in the immediate vicinity of the dam. The surficial soils and features of the area are the result of glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation.

#### b. Subsurface Investigations

The application for the construction of the dam filed in 1965 stated that modified undisturbed soil samples were obtained from test borings. The application further stated that the foundation soil was hardpan and boulders. However, the actual logs of the soil borings were not available.

### 2.2 DESIGN RECORDS

The design records which were available consisted of the plans prepared by Floyd E. Snyder, P.E., the application for the construction of the dam, and computations which were performed by staff engineers from the Department of Public Works during the review of the application. Selected sheets from the plans have been included in Appendix F.

### 2.3 CONSTRUCTION RECORDS

The plans prepared by Floyd Snyder were the primary construction records available. Reports from two field inspections conducted during construction by representatives of the Department of Public Works were also available. These reports included a series of photographs taken during construction. Some of these photos have been included in Appendix A.

### 2.4 OPERATION RECORDS

No operation records were available

### 2.5 EVALUATION OF DATA

The data presented in this report was obtained from the Department of Environmental Conservation files. The information available appears to be adequate and reliable for Phase 1 inspection purposes.

### SECTION 3: VISUAL INSPECTION

#### 3.1 FINDINGS

##### a. General

Visual inspection of the Rexmere Dam was conducted on November 1, 1979. The weather was sunny and the temperature was in the fifties. At the time of the inspection, water was flowing to a depth of less than 1 inch in each of the spillway pipes.

##### b. Embankment

Inspection of the embankment revealed one potentially serious deficiency and several minor defects. There was a wet area on the natural slope near the west abutment. While no points of concentrated seepage were observed, the ground was saturated on the hillside beyond the toe of slope. The top of this wet area was at approximately the same level as the water surface in the reservoir and the area extended to the base of the hill. The vegetation in the area was indicative of wet conditions.

The minor deficiencies noted included some brush and small trees growing on the embankment in several locations and several minor irregularities on the embankment crest caused by the road which runs along the crest.

##### c. Spillway

Several deficiencies were observed on the spillway section. There was an inward bulge on the crown of each of the pipe arches. These bulges were located approximately at the midpoint of each pipe. There were a number of places where the bituminous coating material had worn off the pipes resulting in discoloration and corrosion of the metal. There were joint separations on both of the pipes. The separations on the eastern pipe were along the invert and had been filled with joint sealing material. On the western pipe, there was a separation at the crown of the pipe. This separation was 1 inch wide and about 12 inches long.

Other deficiencies observed were on the downstream portion of the spillway. The downstream headwall was cracked above and to the right (looking upstream) of the eastern pipe arch. Finally, there were three areas where the concrete and riprap at the end of the channel had been undermined, resulting in subsidence of the riprap. Water was entering these areas from the spillway channel and was flowing beneath these depressed sections.

##### d. Reservoir Drain

Most of the components of the reservoir drain were unobservable; however, several defects were noted on the portions which were inspected. The valve box on the downstream toe of the dam was in poor condition. The exposed concrete on this box was seriously deteriorated and leaking. The well formed by the box was full of water at the time of the inspection. The source of this water could not be determined. The outlet of the drain pipe was submerged by the water from the downstream lake.

e. Downstream Area

The downstream area is flooded by Churchill Lake. The dam on Churchill Lake is approximately 900 feet downstream of the Rexmere Dam.

f. Reservoir

There were no signs of soil instability in the reservoir area.

3.2

EVALUATION OF OBSERVATIONS

Visual inspection revealed several deficiencies on this structure. The following items were noted:

1. A wet area on the natural slope near the west abutment of the dam.
2. Some brush and small trees growing on the embankment.
3. Minor surface irregularities on the embankment crest.
4. Bulges on the spillway pipe-arches.
5. Spots on the pipe-arches where the bituminous coating material had worn off.
6. A joint separation on the crown of the western pipe arch.
7. Cracks on the headwall at the outlet end of the pipe-arches.
8. Undermined riprap at the downstream end of the spillway channel.
9. Deteriorated concrete on the valve box for the reservoir drain.
10. Water fills the well containing the reservoir drain's valve.

#### SECTION 4: OPERATION AND MAINTENANCE PROCEDURE

4.1 Procedure

There are no established operating procedures for this structure. The reservoir has been drained several times since its construction, but this is not done on a regular basis.

4.2 Maintenance of Dam

The dam is maintained by the Village of Stamford. The embankment is mowed regularly and other maintenance is performed as required.

4.3 Warning System In Effect

No apparent warning system is present.

4.4 Evaluation

The operation and maintenance procedures for this dam appear to be generally satisfactory. Increased maintenance efforts are required to correct the deficiencies which exist.

## SECTION 5: HYDROLOGIC/HYDRAULIC

### 5.1 Drainage Area Characteristics

Delineation of the watershed draining into the reservoir pool area was made using the USGS 7.5 minute quadrangles for Harpersfield and Stamford, New York. The drainage area is 654 acres and consists of open fields and wooded land. A portion of the drainage area lies to the southwest of N.Y. Route 23. This one hundred seventy five acre segment has been included in the drainage area of the dam based on the assumption that culverts exist which will carry runoff under the state highway. Relief in the drainage area is moderate to steep with slopes of up to 16 per cent in the northern portion of the area.

### 5.2 Analysis Criteria

The analysis of the floodwater retarding capability of this dam was performed using the Corps of Engineers HEC-1 computer program, Dam Safety version. This program develops an inflow hydrograph using the "Clark Unit Hydrograph" method and then uses the "Modified Puls" flood routing procedure. The spillway design flood selected was the PMF in accordance with the Recommended Guidelines of the U.S. Army Corps of Engineers.

### 5.3 Spillway Capacity

The dam has two pipe-arches located in the center of the upper portion of the embankment. These pipe arches operate as culverts under inlet control conditions. A reservoir drain pipe could provide a small amount of additional discharge capacity. The discharge capacity of this drain was neglected during the analysis since operation of the valve would be required to permit this discharge.

The spillway pipe-arches do not have sufficient capacity for discharging the peak outflow from either the Probable Maximum Flood (PMF) or one half the PMF. For the PMF, the peak inflow is 3009 cfs and the peak outflow is 3009 cfs. For one half the PMF, the peak inflow is 1505 cfs and the peak outflow is 1505 cfs. The computed spillway capacity for a water surface elevation at the top of dam is 242 cfs.

### 5.4 Reservoir Capacity

Storage capacity of the reservoir between the invert of the pipe arches (elevation 1859.0) and the top of the dam (elevation 1864.0) is 53 acre feet, which is equivalent to a runoff depth of 0.97 inches over the drainage area. The total storage capacity of the dam is 104 acre feet.

### 5.5 Floods of Record

No records were available regarding the occurrence of the maximum known flood. Mr. Ballard, Superintendent of Public Works estimated that the maximum depth of flow in the pipe-arches has been about 1 foot. The discharge resulting from this water level would be 28 cfs.

### 5.6 Overtopping Potential

Analysis using the PMF and one half the PMF indicates that the dam does not have sufficient spillway capacity. For a PMF peak outflow of 3009 cfs, the dam would be overtopped to a computed depth of 1.88 feet. For the peak outflow from one half the PMF, the depth of overtopping would be 1.11 feet. The dam would be overtopped by all storms exceeding 14% of the PMF inflow.

### 5.7 Downstream Effects

Downstream of the Rexmere Dam is another dam which forms a pond known as Churchill Lake, and a highway embankment for NY Route 23, which forms a third dam. Beyond that embankment is a group of mobile homes which are close to the stream channel. These trailers are the first dwellings which would be affected by a dam failure.

The analysis of Rexmere Dam indicates that the peak outflow from either the PMF or one half the PMF would result in the Rexmere Dam and the Churchill Lake Dam as well as the Route 23 highway embankment being overtopped. The table below shows the maximum flow and water surface elevation which will occur in the vicinity of the trailers under several conditions.

| <u>PERCENTAGE<br/>OF PMF</u> | <u>(MAX.<br/>RESERVOIR<br/>ELEV.</u> | <u>DEPTH OF OVERTOPPING<br/>(IF NO BREACH)(FT)</u> | <u>OCCURANCE<br/>OF BREACH</u> | <u>MAXIMUM FLOW<br/>AT TRAILER<br/>PARK (CFS)</u> | <u>MAX. WATER<br/>ELEV. AT<br/>TRAILER PARK</u> |
|------------------------------|--------------------------------------|----------------------------------------------------|--------------------------------|---------------------------------------------------|-------------------------------------------------|
| 14                           | 1863.91                              | 0                                                  | NO                             | 233                                               | 1796.1                                          |
| 15                           | 1864.06                              | -                                                  | YES                            | 2019                                              | 1800.8                                          |
| 50                           | 1865.11                              | 1.11                                               | NO                             | 1502                                              | 1800.6                                          |
| 50                           | 1864.31                              | -                                                  | YES                            | 2583                                              | 1801.0                                          |
| 100                          | 1865.88                              | 1.88                                               | NO                             | 3019                                              | 1801.1                                          |
| 100                          | 1864.44                              | -                                                  | Yes                            | 3026                                              | 1801.1                                          |

Several facts about the water surface elevation at the trailer park should be noted. First, when the area is subjected to flows from either the PMF or one half the PMF, the effect of dam breaching on the water surface elevation at the trailer park is minimal. This means that under either of these conditions, the entire area would be flooded and the additional effect of dam failure would not be dramatic. In contrast, a dam failure under a lesser flow would result in a more noticeable rise in water surface elevation. This difference can be noted by comparing the elevations resulting from 14% and 15% of the PMF. Therefore, failure of the dam would significantly increase the hazard to loss of life downstream of the dam.

### 5.8 Evaluation

Using the Corps of Engineers screening criteria for initial review of spillway adequacy, it has been determined that the dam would be overtopped by all storms exceeding 14% of the PMF inflows. A flood wave analysis, assuming a complete breaching of the dam, indicates that the water surface levels downstream of the dam could reach depths which pose a significant danger to residents.

The spillway is, therefore, adjudged to be seriously inadequate and the dam is assessed as unsafe, non-emergency.

## SECTION 6: STRUCTURAL STABILITY

### 6.1 Evaluation of Structural Stability

#### a. Visual Observations

Visual observations of the structure revealed a number of deficiencies. A wet area on the slope just beyond the downstream toe of the embankment was observed. Since the top of this wet area is at approximately the same elevation as the water level in the reservoir, seepage through the abutment would seem to be the cause. Among the other deficiencies noted were bulging of the spillway pipe-arches, undermining of riprap at the end of the spillway channel, and deteriorating concrete on the reservoir drain valve box.

#### b. Design and Construction Data

Construction plans for this structure, prepared by Floyd E. Snyder P.E., were available and have been included in Appendix F. Additional data available included the application for the construction of the dam and photographs taken during construction.

#### c. Seismic Stability

The dam is located in Seismic Zone 1. Since the seismic coefficient is small, a seismic stability analysis is not performed.

## SECTION 7: ASSESSMENT/RECOMMENDATIONS

### 7.1 Assessment

#### a. Safety

The Phase 1 inspection of the Rexmere Dam revealed that the spillway is seriously inadequate and all storms which exceed 14% of the inflow from the PMF would overtop the dam. This overtopping could cause breaching of the dam and the resulting floodwave would significantly increase the hazard to downstream residents. For this reason, the dam has been assessed as unsafe non-emergency.

The other potentially serious deficiency on this structure is a wet area beyond the toe of the slope at the west abutment. This area should be investigated to determine if it is caused by seepage through the dam and appropriate remedial actions should be taken.

#### b. Adequacy of Information

The information which was available for the preparation of this report was adequate.

#### c. Need for Additional Investigations

Since the spillway was assessed as seriously inadequate, additional hydrologic/hydraulic investigations are required to more accurately determine the site specific characteristics of the watershed.

An investigation into the cause of the wet area on the slope near the west abutment of the embankment is also required.

#### d. Urgency

The additional hydrologic/hydraulic investigations which are needed should be commenced within 3 months of the date of notification of the owner. Within 18 months, appropriate remedial mitigating measures should have been completed.

The investigation of the wet area should also be commenced within 3 months. Remedial actions on the wet area which are deemed necessary based on the results of these investigations should be taken within 12 months of the date of notification of the owner.

The other deficiencies indicated below should also be corrected within 12 months.

### 7.2 Recommended Measures

- a. After the hydrological investigations have been completed, mitigating measures dealing with the seriously inadequate spillway capacity should be determined.
- b. The wet area on the slope near the west abutment should be investigated and if it is found necessary, appropriate remedial measures should be taken.
- c. Brush and small trees growing on the embankment should be cut.
- d. The undermined riprap at the downstream end of the spillway channel should be repaired.

- e. A monitoring program should be established to periodically inspect the cracks on the spillway outlet headwall as well as the bulges on the pipe-arches and determine whether these conditions are worsening.
- f. Surface irregularities on the crest should be repaired and measures should be taken to prevent unnecessary traffic from crossing the crest.
- g. Minor deficiencies with the spillway pipe-arches such as the joint separations and the spots where the bituminous coating has worn off should be monitored and repaired if the conditions become more serious.
- h. The reservoir drain should be made operable. The valve box for the reservoir drain should be repaired. The major defects which must be addressed are the deterioration of the concrete on the box and the fact that the box is full of water.
- i. An emergency action plan for the dam should be developed.

APPENDIX A

PHOTOGRAPHS



Reservoir Drain Valve Box and Outlet During Construction (December, 1965)



Spillway Outlet Channel and Downstream Slope During Construction (June, 1966)



Overview of Rexmere Dam with Churchill Lake Dam Downstream



Upstream Slope of Dam



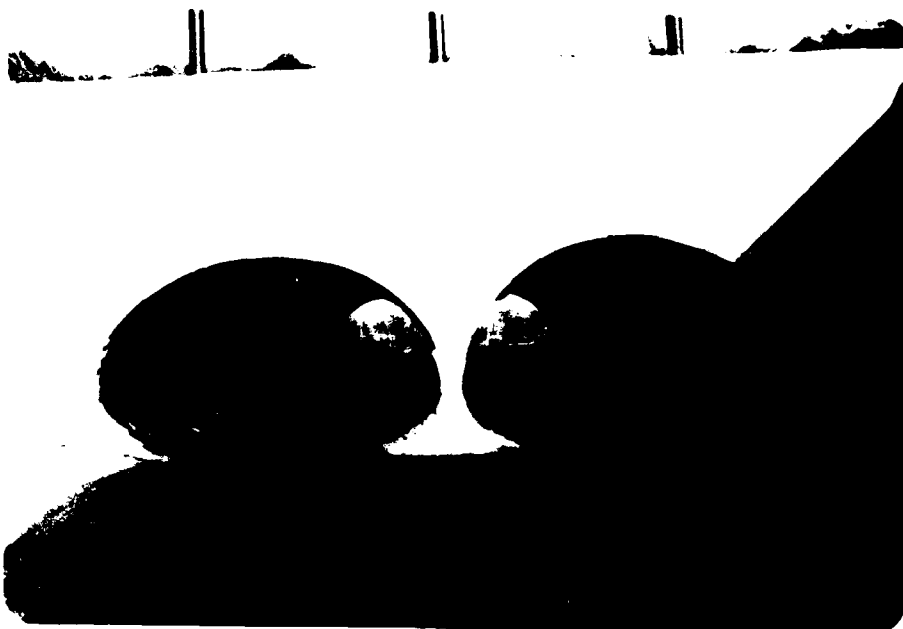
Downstream Slope of Dam; Wet Area at Far End of Embankment



Wet Area Beyond Toe of Slope on Western End of Embankment



Inward Bulge on Eastern Pipe-Arch



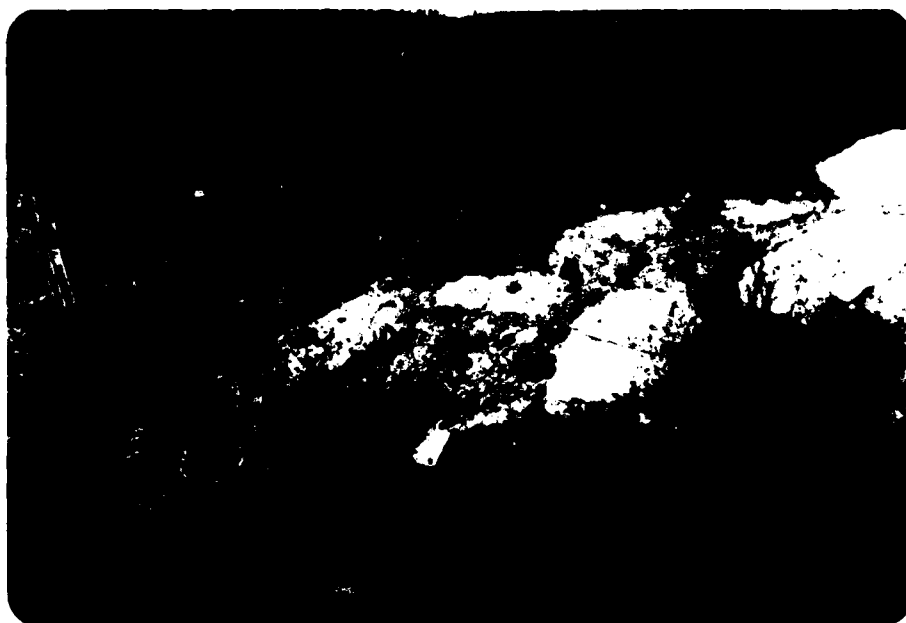
Headwall at Outlet of Pipe-Arches - Note Cracks in Wall above Right Pipe-Arch



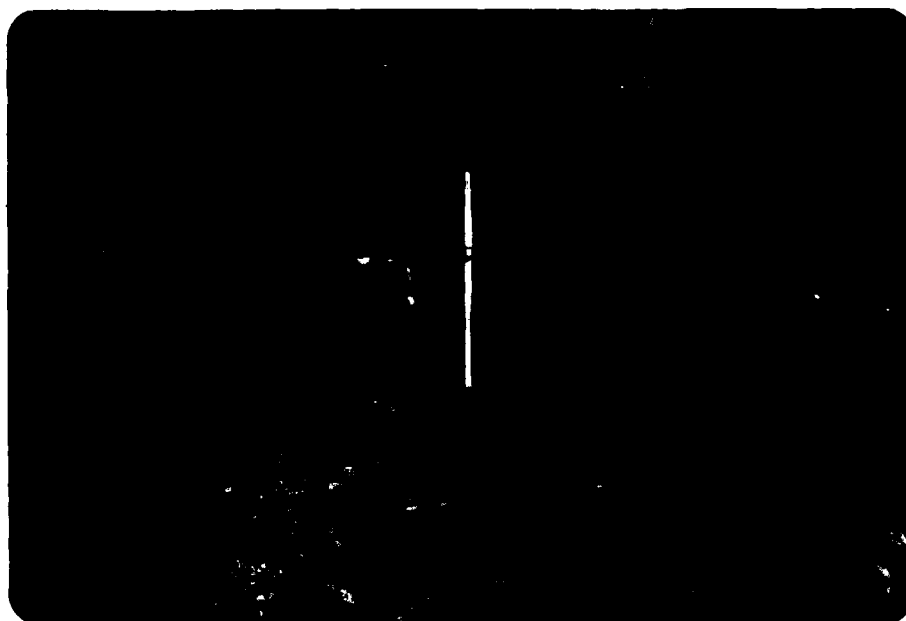
Outlet Channel for Spillway



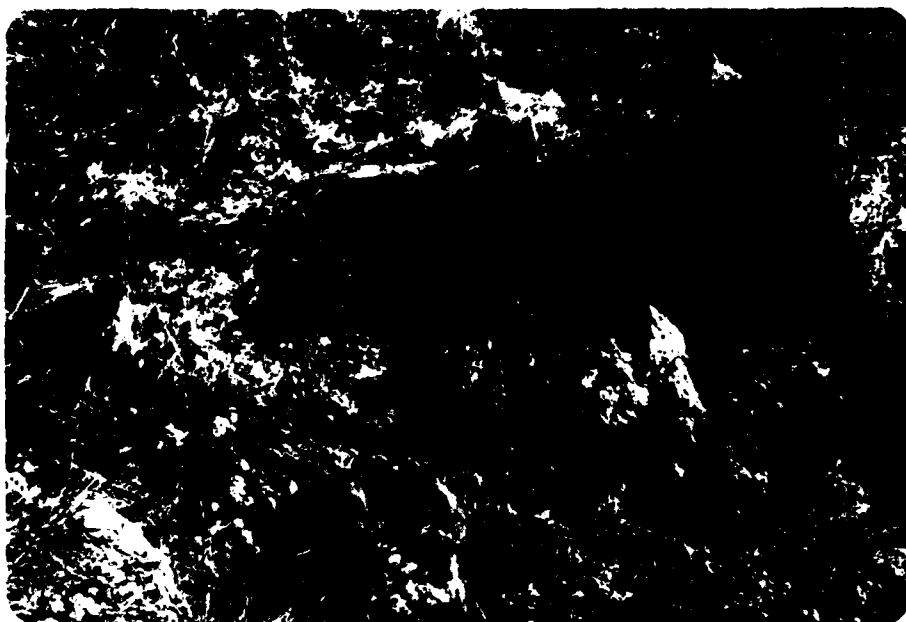
Lower Portion of Outlet Channel



Undermined Rip-rap near Lower End of Outlet Channel



Settlement of Undermined Riprap on Outlet Channel



Deteriorated Concrete on Reservoir Drain Valve Box



Reservoir Drain Valve Box with Cover Partially Removed, Note  
Water which Fills Box

APPENDIX B  
VISUAL INSPECTION CHECKLIST

# VISUAL INSPECTION CHECKLIST

## 1) Basic Data

### a. General

Name of Dam REXMERE DAM  
 Fed. I.D. # 524 DEC Dam No. 160A-3493  
 River Basin DELAWARE  
 Location: Town HARPERSFIELD County DELAWARE  
 Stream Name UNNAMED TRIBUTARY  
 Tributary of DELAWARE RIVER  
 Latitude (N) 42° 24.8' Longitude (W) 74° 37.8'  
 Type of Dam EARTH  
 Hazard Category C  
 Date(s) of Inspection 11/1/79  
 Weather Conditions 50° SUNNY  
 Reservoir Level at Time of Inspection 1/2" DEEP ABOVE LEVEL APRON AT INLET

b. Inspection Personnel R. WARRENDER W. LYNICK

c. Persons Contacted (Including Address & Phone No.) \_\_\_\_\_

CECIL BALLARD - SUPERINTENDENT OF PUBLIC WORKS

VILLAGE OF STAMFORD, N.Y.

VILLAGE OFFICES - (607) 652-6671

### d. History:

Date Constructed 1966 Date(s) Reconstructed \_\_\_\_\_

Designer FLOYD E. SNYDER, P.E.

Constructed By \_\_\_\_\_ MONEY PROVIDED BY MURPHY FOUNDATION

Owner VILLAGE OF STAMFORD

2) Embankment

a. Characteristics

- (1) Embankment Material \_\_\_\_\_  
\_\_\_\_\_  
(2) Cutoff Type NONE  
\_\_\_\_\_  
(3) Impervious Core NONE  
\_\_\_\_\_  
(4) Internal Drainage System NONE  
\_\_\_\_\_  
(5) Miscellaneous \_\_\_\_\_  
\_\_\_\_\_

b. Crest

- (1) Vertical Alignment SATISFACTORY - SOME SMALL DEPRESSIONS  
IN ROAD - POTHOLES  
(2) Horizontal Alignment SATISFACTORY  
\_\_\_\_\_  
(3) Surface Cracks NONE APPARENT  
\_\_\_\_\_  
(4) Miscellaneous \_\_\_\_\_  
\_\_\_\_\_

c. Upstream Slope

- (1) Slope (Estimate) (V:H) 1 ON 3  
(2) Undesirable Growth or Debris, Animal Burrows BRUSH AT WEST  
ABUTMENT  
(3) Sloughing, Subsidence or Depressions NONE  
\_\_\_\_\_  
\_\_\_\_\_

(4) Slope Protection HEAVY STONE RIPRAP - UNIFORM SLOPE

(5) Surface Cracks or Movement at Toe NONE

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 ON 2.5

(2) Undesirable Growth or Debris, Animal Burrows SEVERAL SMALL TREES.

(3) Sloughing, Subsidence or Depressions NONE

(4) Surface Cracks or Movement at Toe NONE

(5) Seepage DOWNSTREAM OF TOE - ALONG RIGHT ABUTMENT & NATURAL GROUND CONTACT - WET AREA BEGINS AT SAME ELEVATION AS LAKE LEVEL, EXTENDS FROM THERE DOWN TO TOE

(6) External Drainage System (Ditches, Trenches; Blanket) NONE

(7) Condition Around Outlet Structure SATISFACTORY

(8) Seepage Beyond Toe NOTED ABOVE UNDER SEEPAGE

e. Abutments - Embankment Contact

(1) Erosion at Contact NONE

(2) Seepage Along Contact YES - AT WEST ABUTMENT - SEE Z-d-5

3) Drainage System

a. Description of System NONE

b. Condition of System \_\_\_\_\_

c. Discharge from Drainage System \_\_\_\_\_

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) \_\_\_\_\_

NONE

5) Reservoir

- a. Slopes \_\_\_\_\_
- b. Sedimentation NONE APPARENT
- c. Unusual Conditions Which Affect Dam NONE

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) CHURCHILL LAKE DAM, RTE 23, TRAILER PARK WITH 12 TRAILERS, RTE 10, 6 HOMES
- b. Seepage, Unusual Growth NONE
- c. Evidence of Movement Beyond Toe of Dam NONE
- d. Condition of Downstream Channel SPILLWAY CHANNEL FLOWS INTO CHURCHILL LAKE DAM

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

- 2 PIPE-ARCHES. CONCRETE & CONCRETED RIPRAP DISCHARGE CHANNEL.
- a. General SATISFACTORY - DOWNSTREAM HEADWALL AT EASTERN PIPE ARCH HAS 1 VERTICAL & 1 DIAGONAL CRACK ALONG ENTIRE FACE.
- b. Condition of Service Spillway BOTH PIPES BITUMINOUS COATED  
BOTH HAVE SOME COATING MISSING & DISCOLORATION & CORROSION IN THOSE SPOTS. BOTH PIPES HAVE AN INWARD BULGE NEAR THE CENTER. WESTERN PIPE ARCH HAS A JOINT SEPARATION (1" x 12") AT THE CROWN IN THE UPSTREAM 1/3 OF PIPE. EASTERN PIPE ARCH HAS SEVERAL JOINT SEPARATIONS ALONG INVERT WHICH HAVE BEEN PLUGGED WITH JOINT SEALER.

c. Condition of Auxiliary Spillway N/A

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

d. Condition of Discharge Conveyance Channel CONCRETE SECTION SATISFACTORY  
BELOW CONCRETE - HEAVY RIPRAP IMBEDDED IN CONCRETE, THREE  
AREAS WHERE IT HAS BEEN UNDERMINED. WATER IS FLOWING  
BENEATH RIPRAP & IS EMERGING NEAR THE END OF THE  
CHANNEL

8) Reservoir Drain/Outlet

Type: Pipe X Conduit \_\_\_\_\_ Other \_\_\_\_\_

Material: Concrete \_\_\_\_\_ Metal \_\_\_\_\_ Other CAST IRON

Size: 12' Length 181'

Invert Elevations: Entrance 1838.38 Exit 1834.5

Physical Condition (Describe): \_\_\_\_\_ Unobservable X

Material: WELL IS CONCRETE & IS HIGHLY DETERIORATED.

Joints: \_\_\_\_\_ Alignment \_\_\_\_\_

Structural Integrity: \_\_\_\_\_

Hydraulic Capability: \_\_\_\_\_

Means of Control: Gate \_\_\_\_\_ Valve X Uncontrolled \_\_\_\_\_

Operation: Operable X Inoperable \_\_\_\_\_ Other \_\_\_\_\_

Present Condition (Describe): VALVE WELL IS FULL OF WATER  
HAS BEEN PUMPED OUT IN PAST BUT IT FILLS RIGHT BACK UP.  
NO POINT OF SEEPAGE WAS OBSERVED. THE COVER FOR THE  
WELL WAS NOT FASTENED DOWN & COULD EASILY BE  
REMOVED. MR. BALLARD SAID DRAIN WAS OPERABLE.

9) Structural

- a. Concrete Surfaces SATISFACTORY EXCEPT FOR THE TOP OF THE RISER FOR THE RESERVOIR DRAIN - CONCRETE THERE WAS SERIOUSLY DETERIORATED
- b. Structural Cracking EASTERN PIPE ARCH - THERE ARE SEVERAL CRACKS IN DOWNSTREAM HEADWALL - 1 VERTICAL 1 HORIZONTAL
- c. Movement - Horizontal & Vertical Alignment (Settlement) NONE APPARENT
- d. Junctions with Abutments or Embankments
- e. Drains - Foundation, Joint, Face PIPE DRAINS THROUGH CONCRETE WALLS ON DOWNSTREAM SPILLWAY CHANNEL - NO FLOW IN PIPES
- f. Water Passages, Conduits, Sluices
- g. Seepage or Leakage NONE

- h. Joints - Construction, etc. ALL SATISFACTORY - EXCEPT FOR  
TOP OF RESERVOIR DRAIN OUTLET WELL
- i. Foundation SATISFACTORY
- j. Abutments N/A
- k. Control Gates SATISFACTORY
- l. Approach & Outlet Channels SOME UNDERMINING ON DOWNSTREAM  
END OF CHANNEL
- m. Energy Dissipators (Plunge Pool, etc.) NONE
- n. Intake Structures
- o. Stability
- p. Miscellaneous

APPENDIX C  
HYDROLOGIC/HYDRAULIC  
ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS  
HYDROLOGIC AND HYDRAULIC --  
ENGINEERING DATA

1

AREA-CAPACITY DATA:

|                                   | <u>Elevation</u><br>(ft.) | <u>Surface Area</u><br>(acres) | <u>Storage Capacity</u><br>(acre-ft.) |
|-----------------------------------|---------------------------|--------------------------------|---------------------------------------|
| 1) Top of Dam                     | <u>1864.0</u>             | <u>13.26</u>                   | <u>104</u>                            |
| 2) Invert-Eastern<br>Pipe-Arch    | <u>1859.04</u>            | <u>          </u>              | <u>51</u>                             |
| 3) Invert-Western<br>Pipe-Arch    | <u>1858.92</u>            | <u>          </u>              | <u>          </u>                     |
| 4) Pool Level with<br>Flashboards | <u>          </u>         | <u>          </u>              | <u>          </u>                     |
| 5) Service Spillway<br>Crest      | <u>          </u>         | <u>          </u>              | <u>          </u>                     |

DISCHARGES

|                                                   | <u>Volume</u><br>(cfs) |
|---------------------------------------------------|------------------------|
| 1) Average Daily                                  | <u>          </u>      |
| 2) Spillway @ Maximum High Water                  | <u>242</u>             |
| 3) Spillway @ Design High Water                   | <u>          </u>      |
| 4) Spillway @ Auxiliary Spillway Crest Elevation  | <u>          </u>      |
| 5) Low Level Outlet                               | <u>11</u>              |
| 6) Total (of all facilities) @ Maximum High Water | <u>28</u>              |
| 7) Maximum Known Flood                            | <u>          </u>      |

CREST:

ELEVATION: 1864.0Type: EARTH - GRAVAD CRESTED WEIRWidth: 30 FT Length: 350 FTSpillover 2- PIPE ARCHESLocation CENTER OF EMBANKMENT

SPILLWAY:

PRINCIPAL

EMERGENCY

1859.0

Elevation

2- PIPE ARCHES 40" X 65"

Type

NONEFULLY BITUMINOUS COATED CULVERTS

Width

Type of Control

✓

Uncontrolled

Controlled:

Type

(Flashboards; gate)

Number

Size/Length

Invert Material

Anticipated Length  
of operating service

Chute Length

Height Between Spillway Crest  
& Approach Channel Invert  
(Weir Flow)

## OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES:

Type: Gate ✓ Sluice \_\_\_\_\_ Conduit \_\_\_\_\_ Penstock \_\_\_\_\_Shape: CIRCULARSize: 12 INCHElevations: Entrance Invert 1838.38Exit Invert 1834.5

Tailrace Channel: Elevation \_\_\_\_\_

## HYDROMETEROLOGICAL GAGES:

Type: NONE

Location: \_\_\_\_\_

Records: \_\_\_\_\_

Date - \_\_\_\_\_

Max. Reading - \_\_\_\_\_

## FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

Method of Controlled Releases (mechanisms):

OPERATION OF GATE ON RESERVOIR DRAIN

DRAINAGE AREA: 654 ACRES

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: \_\_\_\_\_

Terrain - Relief: STEEP - FORESTED TO RESERVOIR EDGE

Surface - Soil: \_\_\_\_\_

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

NONE

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

NONE

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

NONE

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

Location: NONE

Elevation: \_\_\_\_\_

Reservoir:

Length @ Maximum Pool \_\_\_\_\_ (Miles)

Length of Shoreline (@ Spillway Crest) \_\_\_\_\_ (Miles)

PROJECT GRID

|                                                     |                       |                           |                        |
|-----------------------------------------------------|-----------------------|---------------------------|------------------------|
| JOB<br><b>REXMERE DAM</b>                           | SHEET NO.<br><b>1</b> | CHECKED BY                | DATE                   |
| SUBJECT<br><b>HYDROLOGIC/HYDRAULIC COMPUTATIONS</b> |                       | COMPUTED BY<br><b>RLW</b> | DATE<br><b>1/24/80</b> |

**DRAINAGE AREA**

|                         |                      |
|-------------------------|----------------------|
| HARPERSFIELD QUADRANGLE | 6.17 IN <sup>2</sup> |
| STAMFORD QUADRANGLE     | .95 IN <sup>2</sup>  |
|                         | 7.12 IN <sup>2</sup> |

$(7.12 \text{ IN}^2)(91.83 \text{ AC/IN}^2) = 653.83 \text{ ACRES} = 1.02 \text{ mi}^2$

**CLARK HYDROGRAPH COEFFICIENTS**

$L = 9064 \text{ ft} - 1454 \text{ ft} = 8510 \text{ ft} = 1.61 \text{ mi.}$

$S_t = .5\%$

$S_{b/85} = \frac{2000 \times 1047 \text{ ft}}{1.42 \text{ mi}} = 100.7 \text{ ft/mi}$

$TTC = \frac{(5.33)(L^{.602})(S_t^{.231})}{S_{b/85}^{.448}} = \frac{5.33(1.61^{.602})(.5^{.231})}{100.7^{.448}} = .766$

$R = \frac{17.6(L^{.389})(S_t^{.258})}{S_{b/85}^{.36}} = \frac{17.6(1.61^{.389})(.5^{.258})}{100.7^{.36}} = .328$

**TP-90 PMP RAINFALL**

PMP RAINFALL (6 HOUR - 1050 MI) = 23 IN

|              |              |
|--------------|--------------|
| 6 HR = 100%  | 24 HR = 115% |
| 12 HR = 107% | 48 HR = 123% |

$TRSPC = 1 - \frac{.300}{(1.02)^{.14718}} = .70$

LOSS DATA: 1.0" CONTINUOUS = .1"

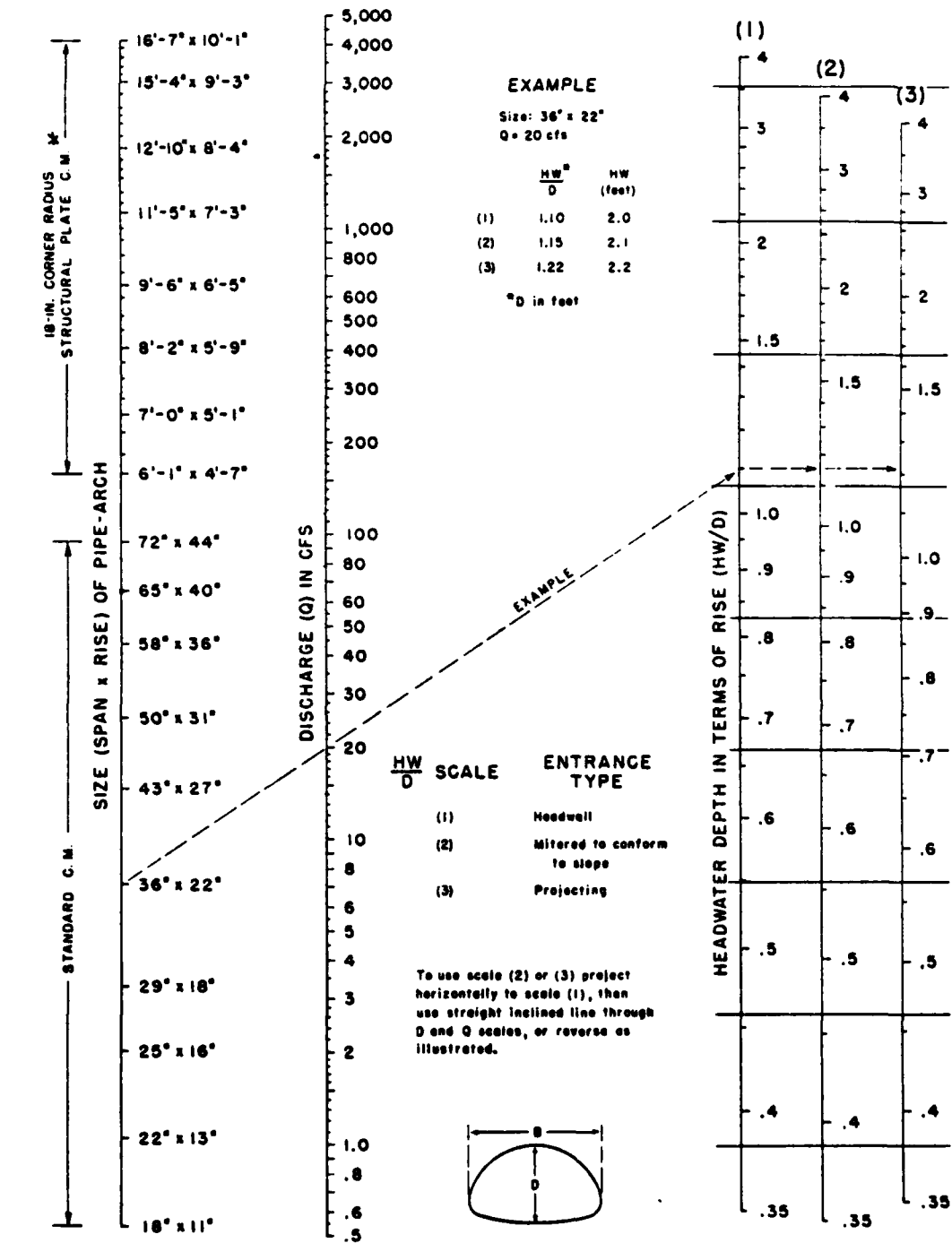
PROJECT GRID

|                                                                          |                                               |                                                                       |                 |
|--------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------|-----------------|
| JOB<br>REXMERE DAM                                                       | SHEET NO.<br>2                                | CHECKED BY                                                            | DATE            |
| SUBJECT<br>HYDROLOGIC / HYDRAULIC COMPUTATIONS                           |                                               | COMPUTED BY<br>RLW                                                    | DATE<br>1/24/80 |
| BASE FLOW = 2 CFS                                                        |                                               |                                                                       |                 |
| ELEVATIONS -                                                             |                                               |                                                                       |                 |
| TOP OF DAM 1864.0                                                        |                                               |                                                                       |                 |
| INVERT OF PIPE ARCHES 1859.0 *                                           |                                               | * ACTUAL INVERT ELEVATIONS<br>1858.92 & 1859.04<br>AVERAGED TO 1859.0 |                 |
| INVERT OF RES. DRAIN 1838.38                                             |                                               |                                                                       |                 |
| SURFACE AREAS AT VARIOUS ELEVATIONS - TAKEN FROM SNYDER PLANS            |                                               |                                                                       |                 |
| ELEVATION                                                                | SURFACE AREA (ACRES)                          |                                                                       |                 |
| 1862                                                                     | 11.13                                         |                                                                       |                 |
| 1856                                                                     | 5.83                                          |                                                                       |                 |
| 1850                                                                     | 1.97                                          |                                                                       |                 |
| 1840                                                                     | 0.03                                          |                                                                       |                 |
| EXTRAPOLATE SURFACE AREA TO TOP OF DAM                                   |                                               |                                                                       |                 |
| USE CONIC PROJECTION                                                     |                                               |                                                                       |                 |
|                                                                          |                                               | ELEVATION                                                             |                 |
| $A_1 = 11.13$                                                            | $R_1 = \sqrt{\frac{(11.13)(1862-1856)}{\pi}}$ | $= 392.8$                                                             | 1862            |
| $A_2 = 5.83$                                                             | $R_2 = \sqrt{\frac{(5.83)(1856-1850)}{\pi}}$  | $= 284.3$                                                             | 1856            |
| $\frac{AH}{\Delta Y} = \frac{392.8 - 284.3}{1862 - 1856} = 18.08$        |                                               |                                                                       |                 |
| $R_3 = 392.8 + 18.08(2) = 428.9$                                         |                                               |                                                                       |                 |
| $A_3 = \pi R^2 = \pi (428.9)^2 = 13.26 \text{ ACRES AT ELEVATION } 1864$ |                                               |                                                                       |                 |

PROJECT GRID

|                                                                             |             |                           |                                          |                        |
|-----------------------------------------------------------------------------|-------------|---------------------------|------------------------------------------|------------------------|
| JOB<br><b>REX MERE DAM</b>                                                  |             | SHEET NO.<br><b>3</b>     | CHECKED BY                               | DATE                   |
| SUBJECT<br><b>HYDROLOGIC / HYDRAULIC COMPUTATIONS</b>                       |             | COMPUTED BY<br><b>RLW</b> |                                          | DATE<br><b>1/24/80</b> |
| <b>DISCHARGE CAPACITY CALCULATIONS</b>                                      |             |                           |                                          |                        |
| <b>DETERMINE CAPACITY WITH NOMOGRAPH (SEE FOLLOWING PAGE)</b>               |             |                           |                                          |                        |
| <b>ELEVATION</b>                                                            | <b>HW/D</b> | <b>DISCHARGE (cfs)</b>    | <b>TOTAL DISCHARGE (TWO PIPES) (cfs)</b> |                        |
| 1859.0                                                                      | 0           | 0                         | 0                                        |                        |
| 1862.33                                                                     | 1.0         | 78                        | 156                                      |                        |
| 1863.83                                                                     | 1.45        | 118                       | 236                                      |                        |
| 1864.0                                                                      | 1.5         | 121                       | 242                                      |                        |
| <br><b>RESERVOIR DRAIN CAPACITY</b>                                         |             |                           |                                          |                        |
| WATER SURFACE AT ELEVATION                                                  |             | 1864.0                    |                                          |                        |
| CENTER LINE AT OUTLET = 1835                                                |             | $A = \pi (.5)^2 = .78$    |                                          |                        |
| $Q = .78 \sqrt{\frac{2(32.2)(29)}{1 + .5 + .043(181)}} = 11.17 \text{ cfs}$ |             |                           |                                          |                        |
| <b>MAXIMUM KNOWN FLOOD - ESTIMATE 1' DEEP</b>                               |             |                           |                                          |                        |
| FROM NOMOGRAPH                                                              |             | HW/D = .35                | Q = 14 cfs                               |                        |
| TOTAL DISCHARGE = (14 cfs)(2) = 28 cfs                                      |             |                           |                                          |                        |

# CHART 6



\*ADDITIONAL SIZES NOT DIMENSIONED ARE LISTED IN FABRICATOR'S CATALOG

BUREAU OF PUBLIC ROADS JAN. 1965

PROJECT GRID

|                                                                                        |                                     |                                                       |   |             |     |      |         |
|----------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------|---|-------------|-----|------|---------|
| JOB                                                                                    | REXMERE DAM                         | SHEET NO.                                             | 4 | CHECKED BY  |     | DATE |         |
| SUBJECT                                                                                | HYDROLOGIC / HYDRAULIC COMPUTATIONS |                                                       |   | COMPUTED BY | RLW | DATE | 1/29/80 |
| CHURCHILL LAKE DAM - VITAL STATISTICS OBTAINED FROM FLOYD SNYDER PLANS FROM 1966       |                                     |                                                       |   |             |     |      |         |
| DRAINAGE AREA - 654 ACRES + 106 ACRES = 760 ACRES                                      |                                     |                                                       |   |             |     |      |         |
| ↓<br>FROM REXMERE                                                                      |                                     |                                                       |   |             |     |      |         |
| HOWEVER ADDED DRAINAGE AREA WILL NOT SIGNIFICANTLY INCREASE FLOW SO IT WILL BE IGNORED |                                     |                                                       |   |             |     |      |         |
| <u>ELEVATION</u>                                                                       |                                     | <u>SURFACE AREA (ACRES) - FROM FLOYD SNYDER PLANS</u> |   |             |     |      |         |
| 1821                                                                                   |                                     | 0                                                     |   |             |     |      |         |
| 1838                                                                                   |                                     | 3.3                                                   |   |             |     |      |         |
| 1842                                                                                   |                                     | 4.1                                                   |   |             |     |      |         |
| 1843                                                                                   |                                     | 4.4                                                   |   |             |     |      |         |
| SPILLWAY DISCHARGE CAPACITY                                                            |                                     |                                                       |   |             |     |      |         |
| $Q = CLH^{3/2} = (3.087) (15.75) H^{3/2}$                                              |                                     |                                                       |   |             |     |      |         |
| <u>ELEVATION</u>                                                                       |                                     | <u>DISCHARGE (CFS)</u>                                |   |             |     |      |         |
| 1838                                                                                   |                                     | 0                                                     |   |             |     |      |         |
| 1843                                                                                   |                                     | 544                                                   |   |             |     |      |         |

PROJECT GRID

|                                                   |                                     |                      |   |             |     |      |         |
|---------------------------------------------------|-------------------------------------|----------------------|---|-------------|-----|------|---------|
| JOB                                               | REXNERE DAM                         | SHEET NO.            | 5 | CHECKED BY  |     | DATE |         |
| SUBJECT                                           | HYDROLOGIC / HYDRAULIC COMPUTATIONS |                      |   | COMPUTED BY | RLW | DATE | 1/29/80 |
| DAM FORMED BY ROUTE 23 EMBANKMENT                 |                                     |                      |   |             |     |      |         |
| INFORMATION TAKEN FROM SNYDER PLANS FROM CHORCYLL |                                     |                      |   |             |     |      |         |
| LAKE DAM.                                         |                                     |                      |   |             |     |      |         |
| ELEVATION                                         |                                     | SURFACE AREA (ACRES) |   |             |     |      |         |
| 1818                                              |                                     | 0                    |   |             |     |      |         |
| 1825                                              |                                     | .63                  |   |             |     |      |         |
| 1830                                              |                                     | .79                  |   |             |     |      |         |
| DISCHARGE CAPACITY - 5'x5' BOX CULVERT            |                                     |                      |   |             |     |      |         |
| $Q = CAYZH = (6)(25)\sqrt{2/322}H$                |                                     |                      |   |             |     |      |         |
| ELEVATION                                         |                                     | DISCHARGE            |   |             |     |      |         |
| 1818                                              |                                     | 0                    |   |             |     |      |         |
| 1830                                              |                                     | 417                  |   |             |     |      |         |

NEW YORK STATE  
DEPT OF ENVIRONMENTAL CONSERVATION  
FLOOD PROTECTION BUREAU

FLUO HYDROGRAPH PACKAGE (HGC-1)  
DAN SAFETY VERSION JULY 1973  
TEST MODIFICATION 26 FEB 79  
MODIFIED FOR HYDROGRAPH 79

AL FLOODING DAY  
A PIS FLOODING - ANALYSIS  
A PIS FLOODING

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

33 30 1300

34 30 1300 3.0 1.5 300

35 K 1 1200

36 K1 RTJ2222 CONVERT 1

37 V 1 1

38 V1 1 -1025 -1

39 V3 1010 1020

40 V3 0 617

41 SA 0 503 779

42 32 1010 1025 1730

43 33 1316

44 30 1300 3.0 1.5 200

45 K 1 1750

46 K1 LOCATION, THE OF HIGHWAY FROM KENT

47 V 1 1

48 V1 1

49 V6 005 005 1000 1340 20 1.5

50 V7 0 1360 100 170 130 1505 130 1800 135 1800

51 V7 132 1705 500 102 1000 1840

52 K 1 2000 1

53 K1 LOCATION TEARLED PARK

54 1 1 1

55 V1 1

56 V6 005 005 1705 1000 150 003

57 0 1900 600 1800 635 1800 685 1795 700 1795

58 V7 001 1800 720 100 1600 1040

59 K 00

60 A

61 A

62 A

63 A

64

PEAK FLOOD AND SPILLAGE (FOR THE PERIOD) SUMMARY FIVE-MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

FLOW IN CUBIC FEET PER SECOND (CULIC METERS PER SECOND)  
AREA IN SQUARE FEET (SQ. METER)

RATIOS APPLIED TO FLOWS

| OPERATION     | STATION | AREA               | PLAN RATIO | 1                 | RATIO 2            | RATIO 3            |
|---------------|---------|--------------------|------------|-------------------|--------------------|--------------------|
|               |         |                    |            | 0.14              | 0.50               | 1.00               |
| HYDROGRAPH AT | 1       | 1.02<br>(0.10E 10) | 1          | 421.<br>( 11.97)( | 1505.<br>( 42.61)( | 3009.<br>( 35.22)( |
| ROUTED TO     | 1       | 1.02<br>(0.10E 10) | 1          | 236.<br>( 6.76)(  | 1509.<br>( 42.67)( | 3020.<br>( 35.31)( |
| ROUTED TO     | 1       | 1.02<br>(0.10E 10) | 1          | 236.<br>( 6.76)(  | 1509.<br>( 42.67)( | 3020.<br>( 35.31)( |
| ROUTED TO     | 1200    | 1.02<br>(0.20E 13) | 1          | 233.<br>( 6.59)(  | 1503.<br>( 42.55)( | 3014.<br>( 35.35)( |
| ROUTED TO     | 1550    | 1.02<br>(0.20E 13) | 1          | 233.<br>( 6.59)(  | 1503.<br>( 42.55)( | 3015.<br>( 35.36)( |
| ROUTED TO     | 2000    | 1.02<br>(0.40E 13) | 1          | 233.<br>( 6.59)(  | 1502.<br>( 42.56)( | 3016.<br>( 35.36)( |

# KEXMERE DAM

## CURVE OF QUALITY ANALYSIS

| PLAN 1 ..... | ELEVATION |         | INITIAL VALUE |     | SPILLWAY CREST |     | TOP OF DAM |      |
|--------------|-----------|---------|---------------|-----|----------------|-----|------------|------|
|              | STORAGE   | OUTFLOW | 1000.00       | 51. | 1000.00        | 51. | 1004.00    | 104. |
|              |           |         | 0.            | 0.  |                | 0.  |            | 242. |

| RATIO<br>IF<br>P IF | MAXIMUM<br>RESERVOIR<br>ELEV |         | MAXIMUM<br>STORAGE<br>AC-FT |      | MAXIMUM<br>OUTFLOW<br>CFS |       | DURATION<br>OVER TOP<br>HOURS |       | TIME OF<br>MAX OUTFLOW<br>HOURS |    | TIME OF<br>FAILURE<br>HOURS |    |
|---------------------|------------------------------|---------|-----------------------------|------|---------------------------|-------|-------------------------------|-------|---------------------------------|----|-----------------------------|----|
|                     | 0.14                         | 1003.91 | 103.                        | 103. | 250.                      | 250.  | 0.                            | 42.00 | 42.00                           | 0. | 0.                          | 0. |
|                     | 0.50                         | 1003.11 | 120.                        | 120. | 1500.                     | 1500. | 4.75                          | 41.00 | 41.00                           | 0. | 0.                          | 0. |
|                     | 1.00                         | 1005.81 | 131.                        | 131. | 3020.                     | 3020. | 6.25                          | 41.00 | 41.00                           | 0. | 0.                          | 0. |

# SUMMARY OF DAM SAFETY ANALYSIS      CHURCHILL LAKE DAM

|              |           |               |                |            |
|--------------|-----------|---------------|----------------|------------|
| PLAT 1 ..... | ELEVATION | INITIAL VALUE | SPILLWAY CREST | TOP OF DAM |
|              | STORAGE   | 1570.00       | 1530.00        | 1843.00    |
|              | OUTFLOW   | 19.           | 19.            | 39.        |
|              |           | 0.            | 0.             | 544.       |

| WATER<br>DE<br>PIE | MAXIMUM<br>SPILLWAY<br>FLOW | MAXIMUM<br>DEPTH<br>OVER DAM | MAXIMUM<br>STORAGE<br>AC-FT | MAXIMUM<br>OUTFLOW<br>CFS | DURATION<br>OVER TOP<br>HOURS | TIME OF<br>MAX OUTFLOW<br>HOURS | TIME OF<br>FAILURE<br>HOURS |
|--------------------|-----------------------------|------------------------------|-----------------------------|---------------------------|-------------------------------|---------------------------------|-----------------------------|
| 0.14               | 1560.15                     | 0.                           | 28.                         | 234.                      | 0.                            | 42.50                           | 0.                          |
| 0.50               | 1343.97                     | 0.97                         | 42.                         | 1506.                     | 3.25                          | 41.00                           | 0.                          |
| 1.00               | 1344.80                     | 1.86                         | 40.                         | 3020.                     | 5.25                          | 41.00                           | 0.                          |

TO GUY OF DUT SAFETY ANALYSIS INVOICE TO SOLVENT

PLAT 1 .....

PERCENTAGE  
ST. 1.5  
OUTFLOW

INITIAL VALUE  
1425.10  
1.  
243.

SPILLWAY CREST  
1418.00  
0.  
0.

TOP OF DAM  
1430.00  
5.  
417.

| RATIO | MAXIMUM<br>AT 50% FLOW | MAXIMUM<br>DEPTH<br>OVER DAM | MAXIMUM<br>STORAGE<br>AC-FT | MAXIMUM<br>OUTFLOW<br>CFS | DURATION<br>OVER TOP<br>HOURS | TIME OF<br>MAX OUTFLOW<br>HOURS | TIME OF<br>FAILURE<br>HOURS |
|-------|------------------------|------------------------------|-----------------------------|---------------------------|-------------------------------|---------------------------------|-----------------------------|
| 0.10  | 1424.70                | 0.                           | 1.                          | 243.                      | 0.                            | 0.                              | 0.                          |
| 0.50  | 1431.44                | 1.44                         | 3.                          | 1503.                     | 4.00                          | 41.00                           | 0.                          |
| 1.00  | 1432.50                | 2.50                         | 7.                          | 3014.                     | 5.75                          | 41.00                           | 0.                          |

PLAT 1 STATION 1850

| RATIO | MAXIMUM<br>FLOW, CFS | MAXIMUM<br>STAGE, FT | TIME<br>HOURS |
|-------|----------------------|----------------------|---------------|
| 0.10  | 233.                 | 1801.2               | 42.75         |
| 0.50  | 1503.                | 1804.9               | 41.00         |
| 1.00  | 3015.                | 1806.4               | 41.00         |

PLAT 1 STATION 2000

| RATIO | MAXIMUM<br>FLOW, CFS | MAXIMUM<br>STAGE, FT | TIME<br>HOURS |
|-------|----------------------|----------------------|---------------|
| 0.10  | 233.                 | 1796.1               | 42.75         |
| 0.50  | 1502.                | 1800.6               | 41.00         |
| 1.00  | 3019.                | 1801.1               | 41.00         |

\*\*\*\*\*  
 NEW YORK STATE  
 DEPT OF ENVIRONMENTAL CONSERVATION  
 FLOOD PROTECTION BUREAU  
 \*\*\*\*\*

\*\*\*\*\*  
 FLOOD HYDROGRAPH PACKAGE (HEC-1)  
 DAM SAFETY VERSION JULY 1978  
 LAST MODIFICATION 26 FEB 79  
 MODIFIED FOR HONEYWELL APR 79  
 \*\*\*\*\*

1 A1 REXIERE DAM  
 2 A PMF WITH RATIOS - ANALYSIS  
 3 A3 DATE  
 4 B 200 0 15 0 0 0 0 0 0  
 5 B1 5

6 J 1 3 1  
 7 J1 .15 .5 1.0  
 8 K 0 1  
 9 K1

INFLOW HYDROGRAPH

1

.7

123

107

100

23

0

1.02

1

123

107

100

23

0

1.02

1

123

107

100

23

0

1.02

1

123

107

100

23

0

1.02

1

123

107

100

23

0

1.02

1

K1 ROUTED HYDROGRAPH BREACH

1

1

1

1

1

1

1

1

-1

-1859

1

1

1

1

1

1

1

1

1864

1863.83

156

236

242

11.13

13.26

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

K1 CHURCHILL LAKE DAM

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

1864

1862

1856

1850

1840

1859

1864

1864

|    |     |                                    |      |      |           |                        |
|----|-----|------------------------------------|------|------|-----------|------------------------|
| 33 | \$E | 1821                               | 1838 | 1842 | 1843      |                        |
| 34 | \$S | 1838                               |      |      |           |                        |
| 35 | \$D | 1843                               | 3.0  | 1.5  | 300       |                        |
| 36 | \$B | 10                                 | .5   | 1825 | 2         | 1838 1843              |
| 37 | K   | 1                                  | 1200 |      |           | 1                      |
| 38 | K1  | ROUTE 23 CULVERT                   |      |      |           |                        |
| 39 | Y   |                                    |      |      | 1         | 1                      |
| 40 | Y1  | 1                                  |      |      |           | -1825 -1               |
| 41 | Y4  | 1818                               | 1830 |      |           |                        |
| 42 | Y5  | 0                                  | 417  |      |           |                        |
| 43 | \$A | 0                                  | .63  | .79  |           |                        |
| 44 | \$E | 1818                               | 1825 | 1830 |           |                        |
| 45 | \$S | 1818                               |      |      |           |                        |
| 46 | \$D | 1830                               | 3.0  | 1.5  | 200       |                        |
| 47 | \$B | 10                                 | .5   | 1818 | 2         | 1820 1830              |
| 48 | K   | 1                                  | 1850 |      |           | 1                      |
| 49 | K1  | LOCATION TOE OF HIGHWAY EMBANKMENT |      |      |           |                        |
| 50 | Y   |                                    |      |      | 1         | 1                      |
| 51 | Y1  | 1                                  |      |      |           |                        |
| 52 | Y6  | .05                                | .05  | .05  | 1800 1840 | 20 1.5                 |
| 53 | Y7  | 0                                  | 1840 | 100  | 1820 130  | 1805 130 1800 135 1800 |
| 54 | Y7  | 135                                | 1805 | 500  | 1820 1000 | 1840                   |
| 55 | K   | 1                                  | 2000 |      |           | 1                      |
| 56 | K1  | LOCATION TRAILER PARK              |      |      |           |                        |
| 57 | Y   |                                    |      |      | 1         | 1                      |
| 58 | Y1  | 1                                  |      |      |           |                        |
| 59 | Y6  | .05                                | .05  | .05  | 1795 1900 | 150 .03                |
| 60 | Y7  | 0                                  | 1900 | 600  | 1800 665  | 1800 685 1795 700 1795 |
| 61 | Y7  | 700                                | 1800 | 720  | 1800 1600 | 1840                   |
| 62 | K   | 99                                 |      |      |           |                        |
| 63 | A   |                                    |      |      |           |                        |
| 64 | A   |                                    |      |      |           |                        |

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 KILOMETERS)

| OPERATION     | STATION | AREA               | PLAN | RATIOS APPLIED TO FLOWS |                  |                  |
|---------------|---------|--------------------|------|-------------------------|------------------|------------------|
|               |         |                    |      | RATIO 1                 | RATIO 2          | RATIO 3          |
|               |         |                    |      | 0.15                    | 0.50             | 1.00             |
| HYDROGRAPH AT | 1       | 1.02<br>(0.30E 19) | 1    | 451.<br>( 12.78)(       | 1505.<br>42.61)( | 3009.<br>85.22)( |
| ROUTED TO     | 1       | 1.02<br>(0.30E 19) | 1    | 1970.<br>( 55.78)(      | 2583.<br>73.15)( | 3024.<br>89.64)( |
| ROUTED TO     | 880     | 1.02<br>(0.30E 19) | 1    | 1991.<br>( 56.37)(      | 2574.<br>72.89)( | 3001.<br>84.99)( |
| ROUTED TO     | 1200    | 1.02<br>(0.23E 18) | 1    | 1984.<br>( 56.19)(      | 2567.<br>72.70)( | 2997.<br>84.85)( |
| ROUTED TO     | 1850    | 1.02<br>(0.23E 18) | 1    | 1985.<br>( 56.20)(      | 2568.<br>72.73)( | 2998.<br>84.90)( |
| ROUTED TO     | 2000    | 1.02<br>(0.42E 18) | 1    | 2013.<br>( 57.01)(      | 2605.<br>73.78)( | 3047.<br>86.27)( |

# REXMERE DAM

**PLAN 1 . . . . .**

**ELEVATION  
STORAGE  
OUTFLOW**

INITIAL VALUE  
1059.00  
51.  
0.

SPILLWAY CREST  
1859.00  
51.  
0.

TOP OF DAM  
1864.00  
104.  
242.

**RATIO**  
**UF**  
**PMF**  
**0.15**  
**0.50**  
**1.00**

MAXIMUM  
RESERVOIR  
W.S. ELEV  
1864.06  
1864.31  
1864.44

MAXIMUM  
DEPTH  
OVER DAM  
0.06  
0.31  
0.44

**MAXIMUM  
STORAGE  
AC-FT**  
105.  
108.  
110.

MAXIMUM  
OUTFLOW  
CFS  
2019.  
2583.  
3026.

| DURATION<br>EVER TOP<br>HOURS | 0.37 | 0.48 | 0.56 |
|-------------------------------|------|------|------|
| 1                             | 1.00 | 1.00 | 1.00 |
| 2                             | 0.99 | 0.99 | 0.99 |
| 3                             | 0.97 | 0.97 | 0.97 |
| 4                             | 0.94 | 0.94 | 0.94 |
| 5                             | 0.90 | 0.90 | 0.90 |
| 6                             | 0.86 | 0.86 | 0.86 |
| 7                             | 0.81 | 0.81 | 0.81 |
| 8                             | 0.76 | 0.76 | 0.76 |
| 9                             | 0.71 | 0.71 | 0.71 |
| 10                            | 0.66 | 0.66 | 0.66 |
| 11                            | 0.61 | 0.61 | 0.61 |
| 12                            | 0.56 | 0.56 | 0.56 |
| 13                            | 0.51 | 0.51 | 0.51 |
| 14                            | 0.46 | 0.46 | 0.46 |
| 15                            | 0.41 | 0.41 | 0.41 |
| 16                            | 0.37 | 0.37 | 0.37 |
| 17                            | 0.33 | 0.33 | 0.33 |
| 18                            | 0.29 | 0.29 | 0.29 |
| 19                            | 0.25 | 0.25 | 0.25 |
| 20                            | 0.21 | 0.21 | 0.21 |
| 21                            | 0.18 | 0.18 | 0.18 |
| 22                            | 0.15 | 0.15 | 0.15 |
| 23                            | 0.12 | 0.12 | 0.12 |
| 24                            | 0.09 | 0.09 | 0.09 |
| 25                            | 0.07 | 0.07 | 0.07 |
| 26                            | 0.05 | 0.05 | 0.05 |
| 27                            | 0.04 | 0.04 | 0.04 |
| 28                            | 0.03 | 0.03 | 0.03 |
| 29                            | 0.02 | 0.02 | 0.02 |
| 30                            | 0.01 | 0.01 | 0.01 |

TIME UP  
MAX OUTFLOW  
HOURS 42.17  
39.75  
38.73

| TIME OF<br>FAILURE<br>HOURS | TIME OF<br>FAILURE<br>HOURS | TIME OF<br>FAILURE<br>HOURS |
|-----------------------------|-----------------------------|-----------------------------|
| 41.50                       | 39.00                       | 38.00                       |

## SUMMARY OF DAM SAFETY ANALYSIS

## PLAN 1 ..... 1

**ELEVATION  
STORAGE  
OUTFLOW**

INITIAL VALUE  
1838.00  
19.  
0.

SPILLWAY CREST  
1838.00  
19.  
0.

TOP OF DAM  
1843.00  
38.  
544.

| RATIO<br>OF<br>PMF | PMF |
|--------------------|-----|
| 0.15               |     |
| 0.50               |     |
| 1.00               |     |

**MAXIMUM  
RESERVOIR  
W.S. ELEV**  
1844.18  
1844.48  
1844.70

| MAXIMUM<br>DEPTH<br>OVER DAM |
|------------------------------|
| 1.18                         |
| 1.48                         |
| 1.70                         |

| MAXIMUM<br>STORAGE<br>AC-FT | 43. | 45. | 46. |
|-----------------------------|-----|-----|-----|
| 1                           | 1   | 1   | 1   |
| 2                           | 2   | 2   | 2   |
| 3                           | 3   | 3   | 3   |
| 4                           | 4   | 4   | 4   |
| 5                           | 5   | 5   | 5   |
| 6                           | 6   | 6   | 6   |
| 7                           | 7   | 7   | 7   |
| 8                           | 8   | 8   | 8   |
| 9                           | 9   | 9   | 9   |
| 10                          | 10  | 10  | 10  |
| 11                          | 11  | 11  | 11  |
| 12                          | 12  | 12  | 12  |
| 13                          | 13  | 13  | 13  |
| 14                          | 14  | 14  | 14  |
| 15                          | 15  | 15  | 15  |
| 16                          | 16  | 16  | 16  |
| 17                          | 17  | 17  | 17  |
| 18                          | 18  | 18  | 18  |
| 19                          | 19  | 19  | 19  |
| 20                          | 20  | 20  | 20  |
| 21                          | 21  | 21  | 21  |
| 22                          | 22  | 22  | 22  |
| 23                          | 23  | 23  | 23  |
| 24                          | 24  | 24  | 24  |
| 25                          | 25  | 25  | 25  |
| 26                          | 26  | 26  | 26  |
| 27                          | 27  | 27  | 27  |
| 28                          | 28  | 28  | 28  |
| 29                          | 29  | 29  | 29  |
| 30                          | 30  | 30  | 30  |
| 31                          | 31  | 31  | 31  |
| 32                          | 32  | 32  | 32  |
| 33                          | 33  | 33  | 33  |
| 34                          | 34  | 34  | 34  |
| 35                          | 35  | 35  | 35  |
| 36                          | 36  | 36  | 36  |
| 37                          | 37  | 37  | 37  |
| 38                          | 38  | 38  | 38  |
| 39                          | 39  | 39  | 39  |
| 40                          | 40  | 40  | 40  |
| 41                          | 41  | 41  | 41  |
| 42                          | 42  | 42  | 42  |
| 43                          | 43  | 43  | 43  |
| 44                          | 44  | 44  | 44  |
| 45                          | 45  | 45  | 45  |
| 46                          | 46  | 46  | 46  |
| 47                          | 47  | 47  | 47  |
| 48                          | 48  | 48  | 48  |
| 49                          | 49  | 49  | 49  |
| 50                          | 50  | 50  | 50  |
| 51                          | 51  | 51  | 51  |
| 52                          | 52  | 52  | 52  |
| 53                          | 53  | 53  | 53  |
| 54                          | 54  | 54  | 54  |
| 55                          | 55  | 55  | 55  |
| 56                          | 56  | 56  | 56  |
| 57                          | 57  | 57  | 57  |
| 58                          | 58  | 58  | 58  |
| 59                          | 59  | 59  | 59  |
| 60                          | 60  | 60  | 60  |
| 61                          | 61  | 61  | 61  |
| 62                          | 62  | 62  | 62  |
| 63                          | 63  | 63  | 63  |
| 64                          | 64  | 64  | 64  |
| 65                          | 65  | 65  | 65  |
| 66                          | 66  | 66  | 66  |
| 67                          | 67  | 67  | 67  |
| 68                          | 68  | 68  | 68  |
| 69                          | 69  | 69  | 69  |
| 70                          | 70  | 70  | 70  |
| 71                          | 71  | 71  | 71  |
| 72                          | 72  | 72  | 72  |
| 73                          | 73  | 73  | 73  |
| 74                          | 74  | 74  | 74  |
| 75                          | 75  | 75  | 75  |
| 76                          | 76  | 76  | 76  |
| 77                          | 77  | 77  | 77  |
| 78                          | 78  | 78  | 78  |
| 79                          | 79  | 79  | 79  |
| 80                          | 80  | 80  | 80  |
| 81                          | 81  | 81  | 81  |
| 82                          | 82  | 82  | 82  |
| 83                          | 83  | 83  | 83  |
| 84                          | 84  | 84  | 84  |
| 85                          | 85  | 85  | 85  |
| 86                          | 86  | 86  | 86  |
| 87                          | 87  | 87  | 87  |
| 88                          | 88  | 88  | 88  |
| 89                          | 89  | 89  | 89  |
| 90                          | 90  | 90  | 90  |
| 91                          | 91  | 91  | 91  |
| 92                          | 92  | 92  | 92  |
| 93                          | 93  | 93  | 93  |
| 94                          | 94  | 94  | 94  |
| 95                          | 95  | 95  | 95  |
| 96                          | 96  | 96  | 96  |
| 97                          | 97  | 97  | 97  |
| 98                          | 98  | 98  | 98  |
| 99                          | 99  | 99  | 99  |
| 100                         | 100 | 100 | 100 |

|                           |                         |
|---------------------------|-------------------------|
| MAXIMUM<br>OUTFLOW<br>CFS | 1991:<br>2578:<br>3018: |
|---------------------------|-------------------------|

| DURATION<br>OVER TOP<br>HOURS |
|-------------------------------|
| 0.83                          |
| 1.08                          |
| 1.17                          |

|             |  |
|-------------|--|
| TIME OF     |  |
| MAX OUTFLOW |  |
| HOURS       |  |
| 42.25       |  |
| 39.79       |  |
| 38.79       |  |

|                             |       |       |       |
|-----------------------------|-------|-------|-------|
| TIME OF<br>FAILURE<br>HOURS | 42.00 | 39.50 | 38.50 |
|-----------------------------|-------|-------|-------|

# ROUTE 23 CULVERT

**PLAN 1 .....**

| RATIO<br>OF<br>PWF | MAXIMUM<br>RESERVOIR<br>W.S.ELEV | MAXIMUM<br>DEPTH<br>OVER DAM | MAXIMUM<br>STORAGE<br>AC-FT | MAXIMUM<br>OUTFLOW<br>CFS | DURATION<br>OVER TOP<br>HOURS | TIME OF<br>MAX OUTFLOW<br>HOURS | TIME OF<br>FAILURE<br>HOURS |
|--------------------|----------------------------------|------------------------------|-----------------------------|---------------------------|-------------------------------|---------------------------------|-----------------------------|
| 0.15               | 1831.68                          | 1.68                         | 6.                          | 1984.                     | 1.04                          | 42.25                           | 42.00                       |
| 0.50               | 1832.11                          | 2.11                         | 7.                          | 2567.                     | 1.92                          | 39.75                           | 39.50                       |
| 1.00               | 1832.39                          | 2.39                         | 7.                          | 2997.                     | 3.50                          | 38.75                           | 38.50                       |

PLAN 1 STATION 1050

| RATIN | MAXIMUM<br>FLOW,CFS | MAXIMUM<br>STAGE,FT | TIME<br>HOURS |
|-------|---------------------|---------------------|---------------|
| 0.15  | 1985.               | 1805.6              | 42.25         |
| 0.50  | 2568.               | 1806.3              | 39.75         |
| 1.00  | 2998.               | 1806.4              | 38.75         |

**PLAN 1 STATION 2000**

| RATIO | MAXIMUM<br>FLOW,CFS | MAXIMUM<br>STAGE,FT | TIME<br>HOURS |
|-------|---------------------|---------------------|---------------|
| 0.15  | 2013.               | 1800.8              | 42.25         |
| 0.50  | 2605.               | 1801.0              | 39.75         |
| 1.00  | 3047.               | 1801.1              | 38.75         |

APPENDIX D

APPLICATION FOR PERMIT AND PERTINENT CORRESPONDENCE

## STATE OF NEW YORK



DEPARTMENT OF PUBLIC WORKS  
DIVISION OF CONSTRUCTION  
BUREAU OF WATERWAYS  
ALBANY

Received August 16, 1965 Dam No. 160A-3493 <sup>Orig.</sup> #710 E & F  
Disposition Design approved Nov. 15, 1965 Watershed Delaware River  
Foundation inspected \_\_\_\_\_  
Structure inspected \_\_\_\_\_

## Application for the Construction or Reconstruction of a Dam

Application is hereby made to the Superintendent of Public Works, Albany, N. Y., in compliance with the provisions of Section 948 of the Conservation Law (Chapter 602, Laws of 1959) for the approval of specifications and detailed drawings, marked The Rextmere Dam, The Murphy Foundation  
Town of Stamford, Delaware County

herewith submitted for the { construction } of a dam herein described. All provisions of law will be complied with in the erection of the proposed dam. It is intended to complete the work covered by the application about December 1st., 1965

(Date)

1. The dam will be on a tributary creek flowing into East Branch of Delaware River in the town of Stamford Harpersfield County of Delaware and is located 600' north of Route #10 and 300' east of Route #23

(Give exact distance and direction from a well-known bridge, dam, village, main cross-roads or mouth of a stream)

2. Location of dam is shown on the attached map or overlay of the Harpersfield quadrangle of the United States Geological Survey at latitude 42°25' longitude 74° 30'

3. The name of the owner is Wred P. Murphy, The Murphy Foundation

4. The address of the owner is Stamford N.Y.

5. The impounded water will be used for recreation

6. Will any part of the dam be built upon or its pond flood any State lands? No

7. Does Section 179 of the Conservation Law (~~Section 179 of the Conservation Law~~) apply to the above named stream? Yes.....; No X..... If answer is yes, give Conservation Department's assigned number for permit to change or modify the stream .....

8. The area draining into the proposed pond or lake is 380 acres; 0.59 square miles.

9. The computed 50 year peak rate of runoff used in the design is 400 cu. ft. per sec.

State criterion of method used in determining the peak rate of runoff .....

$$Q = C.I.A. \quad I (50 \text{ yr.}) = 2.55 \quad T = 64 \text{ M.} \quad C = .40$$

10. The maximum height of the proposed dam above the bed of the stream will be 27' 6" feet ..... inches.

11. The designed maximum high water elevation above the spillcrest is computed to be 3' 6" feet ..... inches; the designed freeboard as measured from the maximum high water elevation to the top of the proposed dam will be 1' 0" feet ..... inches.

12. The open spillway of the proposed dam that will control the designed flood flow will be of .....

Reinf. Concrete with Corr. Pipe Archa

(State type, such as: vegetated earth, concrete, masonry, timber, rock filled crib, etc.)

The width of the control section of the spillway, measured normal to the flow of water at the crest, will be 16' feet ..... inches in the clear; facing down stream, the waters will be held at the right end by a Reinf. Conc. Walls the top of which will be 4' 8" feet ..... inches above the spillcrest, and have a top width of 16' feet ..... inches; and at the left end by a Reinf. Conc. Walls the top of which will be 4' 8" feet ..... inches above the spillcrest and have a top width of 16' feet ..... inches. The slope of the sides of the spillway will be Vert on ..... (left) Vert on ..... (right).

13. The spillway is designed to safely discharge 460 220 cu. ft. per sec.

14. The surface area of the proposed pond or lake will be 9.44 acres at the normal water elevation and 10.6 acres at the spillcrest elevation; the volume of the water impounded in the pond or lake will be 18.6 M gallons at the normal water elevation and 29.1 M gallons at the spillcrest elevation.

15a. The normal water elevation of the proposed pond or lake will be 3' feet ..... inches below the spillway crest, and will be maintained by means of a Concrete Spillway the pond or lake will be drained by means of a 12" C.I.P. provision will be made for supplying water to riparian owners downstream, during dry seasons, by means of 12" C.I.P.

15b. In addition to normal water control, provision must be made for a bottom draw-off if the pond is on a trout stream of constant flow. The draw-off will be by means of a 12" C.I.P., designed to maintain an outflow of one-half of the minimum inflow of the stream of 0.20 cu. ft. per sec. up to a maximum outflow of one cu. ft. per sec.

16. The maximum discharge through the spillway that controls the normal water elevation will be 460 cu. ft. per sec. during maximum high water.

17. If flashboards are to be used to control flood flow they must be of the automatic or self-tilting type, designed to fall or otherwise permit full discharge through the spillway when the flood waters reach a height of ..... feet ..... inches above the spillcrest.

18. If an overfall structure is used as a spillway, it shall be provided with an apron constructed of **Reinf. Concrete**; the thickness of the **Apron** will be **0** feet **6"** inches, the width **16'** feet ..... inches across the stream and the length **43'** feet ..... inches parallel to the stream.

19. Facing downstream, what is the nature of material composing the right bank? .....  
**Hardpan and boulders**

20. Facing downstream, what is the nature of the material composing the left bank? .....  
**Ditto**

21. The natural material of the bed on which the proposed dam will rest is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) .....  
**Hardpan and boulders**

22. Are there any porous seams or fissures beneath the foundation of the proposed dam? .....  
**none**

23. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. ....  
**uniformly hardpan impervious**

24. Was the above soil information obtained from soil borings? **Yes** .....; test pits? .....  
**Type - modified undisturbed samples**

25. State how much above the spillcrest elevation is the lowest part of the immediate upstream adjoining property or properties, **20 to 60 feet** ..... inches.

26. Does this proposed pond or lake constitute any part of a public water supply? .....  
**no**

27. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam .....  
**Washout Routes #10 and 23**

28. The design, plans and specifications have been prepared under the supervision of: (Sign on applicable line below).

(a)  ..... P. E. License No. **21929**  
(Signature) (Title: Engineer or Conservationist)  
Address **16 Clinton Circle Cobleskill N.Y. Phone Cobleskill AF-4-7164**

(b) ..... U. S. D. A. Soil Conservation Service  
(Signature) (Title: Engineer or Conservationist)

(c) ..... N. Y. S. Conservation Department Engineer  
(Signature) (Title)

(d) ..... Other qualified engineer.  
(Signature) (Title)

29. The construction will be under the supervision of: (Sign on applicable line below).  
(State which: Erection, Reconstruction or Repair)

(a) [Signature] P. E. License No. 21929

Address 16 Clinton Circle, Cobleskill N.Y.

(b) [Signature] U. S. D. A. Soil Conservation Service  
(Title: Engineer or Conservationist)

(c) [Signature] N. Y. S. Conservation Department Engineer  
(Title)

(d) [Signature] Other qualified engineer.  
(Title)

The foregoing information is correct to the best of my knowledge and belief, and the construction will be carried out in accordance with the approved plans and specifications.

[Signature] Owner

By [Signature], authorized agent of owner.

Address of signer Stamford N.Y. Date Aug 1, 14th 1965

### INSTRUCTIONS

Read carefully, the law setting forth the requirements to be complied with in order to construct or reconstruct a dam.

Determine first whether the stream, across which the dam is to be erected or from which water for the proposed pond or lake is to be diverted, is under the jurisdiction of the Conservation Department. This information may be obtained upon request from the manager of the District Fisheries Office of the Conservation Department which has jurisdiction in the County where the stream is located, the Conservation Department, Bureau of Fish, State Campus Site, Albany 1, New York or the New York State Department of Public Works, Bureau of Waterways, Albany 1, New York.

Before a dam may be erected across a natural water-course, the riparian rights of other land owners (both upstream and downstream) must be considered and customarily their consent be obtained as such rights have been adjudged by the civil courts to be inalienable and inviolate.

The elevation of the impounded water should be maintained at a suitable level below the lowest contour of the adjoining properties thereby preventing inundation of the properties during the highest stage of the waters.

Each application for the construction or reconstruction of a dam must be made on this standard form, copies of which will be furnished upon request to the New York State Department of Public Works, Bureau of Waterways, Albany 1, New York. The application, properly executed, must be accompanied by three sets of plans and specifications. The plans must contain the following information:

- A topographical plan (with contours) of the impounded area drawn to a suitable scale.
- A profile and transverse section of the impounded area showing the proposed excavation, the normal water and possible high water elevations. A 1'-0" minimum of freeboard is to be provided between the top of the dam and the possible high water.
- A longitudinal elevation and transverse section of the dam with all the necessary details of the related appurtenances, spillways, drains, etc.
- A log of the soil information. Samples of the materials to be used in the dam and of the material upon which the dam is to be founded may be asked for, but need not be furnished unless requested.

No work of construction, reconstruction or repairs of the structure or structures shall be started until after the plans and specifications have been formally approved by the New York State Department of Public Works.

If the dam constitutes a part of a public water supply, application should also be made to the Water Resources Commission under Article V of the Conservation Law, as amended.

An application for the construction or reconstruction of a dam must be signed by the prospective owner of the dam or his duly authorized agent. The address of the signer and the date must be given as provided for in this application form.

September 29, 1965

Re: Rextmere Dam  
Town of Harpersfield  
County of Delaware

Mr. Floyd E. Snyder, P.E.  
16 Clinton Circle  
Cobleskill, New York

Dear Sir:

Acknowledgement is made of the receipt of an application Form E-61A1 and three sets of plans and specifications for the construction of the above referenced dam.

The plans have been reviewed. In investigating the design of the structure we prepared independent computations, copies of which are enclosed and your perusal of same is requested.

If you are in agreement with our suggestions it is requested ~~that~~ three sets of the revised sheets be sent this office for review and approval.

Since the proposed dam is to replace the four existing dams, please mark on the enclosed map the location of the structure and return same to us.

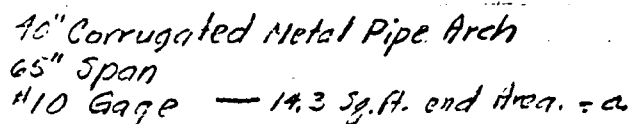
Very truly yours,

E. C. Hudowalski, P.E.

By: \_\_\_\_\_  
A. Dickinson  
Director of Engineering

JEP:fs

## INVESTIGATION OF RAILWAY SECTION



Assume  $K_c = 0.5$  for <sup>square</sup> edged entry; Manning's 'n' for corr. metal pipe = 0.025

$$3.5' + 1.0' - 3.33' = (0.5 + \frac{0.0774 \times 30.0'}{3.33'} + 1.0) \frac{V^2}{2 \times 32.2}$$

$$1.17 \times 64.4 = (0.5 + 0.7 + 1.0) V^2$$

$$2.2 \text{ V}^2 = .75,345$$

$$V^2 = 34.25$$

$$V = 5.86 \text{ feet per sec.}$$

$$Q = V_A = 5.86 \times 14.3 = 83.65 \text{ cu. ft. per sec per pipe}$$

$$83.65 \times 2 = 167.3 \text{ cfs. for 2 pipes.}$$

If top of dam is raised 1'-0" to Elev. 65.0' then a Max. high water of Elev. 64.0' may be assumed.

Using same formula as above with  $H = 4$ :-

$$4.5' + 1.0' - 3.33' = \frac{(0.5 + 0.7 + 1.0)^2}{2 \times 32.2}$$

$$2.17 \times 694 = 2.2 V^2$$

$$2.2 V^2 = 139.748$$

$$v^2 = 63.52$$

$V = 7.96 \text{ feet per Sec.}$

$$G = V_g = 7.96 \times 14.3^{D'} = 113.83 \text{ cu. ft. per second per pipe}$$

$$113.83 \times 2 = 227.66 \text{ cfs for 2 pipes.}$$

Some results may be obtained  
if invert

S.G.S. #160

Drainage Area

654 Acres

1.025 mi

El. 1900.0

El. 1860.0

# PROPOSED DAM AT REXIMERE LAKE Town of Harpersfield - County of Delaware

Latitude = 42° 25' 19"

Longitude = 74° 32' 37"

Drainage Area = 654 Acres = 0.654 - 1000 Acres

Length of Stream = 1.025 miles

0.3 point at Stream = 1.025 x 0.3 = 0.3075 miles

1.025 - 0.3075 = 0.7175 miles

Refer to USDA Bureau of Public Roads booklet  
entitled: "Peak Rates of Runoff from Small Watersheds."

Dam Located in Zone 1

Elev. at Headwater = El. 1900.0

Elev. at 0.3L = El. 1860.0

100.0' Difference

El. at 0.3L = El. 1860.0

El. at Crossing = El. 1840.0

20.0' Difference

## STEP A

$$\begin{aligned} &= 100.0' \div 0.3075 \text{ mi.} = 308.5 \text{ ft./per mi.}; \sqrt{308.5} = 17.56 \quad T = \left( \frac{0.324}{17.56} + \frac{0.756}{5.14} \right) \\ &= 20.0' \div 0.7175 \text{ mi.} = 26.45 \text{ ft./per mi.}; \sqrt{26.45} = 5.14 \quad = (0.0189 + 0.1969) = 0.125 \end{aligned}$$

## STEP B

Zone = #1, P = 1.6"

## STEP C

Zone = #1; P = 1.6", A = 0.654 - 1000 Acres; T = 0.1285

$\bar{Q}_{10(1P)} = 0.152 - 1000 \text{ cfs.}$

## STEP D

Zone = #1; P = 1.6; T = 0.1285 then  $\bar{T}_{1P} = 0.068$

$$\text{Error} = \frac{0.068 - 0.1285}{0.068} \times 100 = -89\% \text{ exceeds } 30\%$$

## STEP E

Error = -89%

Zone = #1; T = 0.1285;  $\bar{T}_{1P} = 0.068$   $\bar{Q}_{10(1P)} = 0.152 - 1000 \text{ cfs.}$

$$\frac{0.1285}{0.068} = 1.89 \text{ Refer to Figure E-1}$$

Coeff. 'C' = 2.5

$$\bar{Q}_{10(C)} = (0.152 - 1000 \text{ cfs.}) \times 2.5 = 0.38 - 1000 \text{ cfs.}$$

From Chart E-3

$$\text{For } \bar{Q}_{10(C)} = 0.38 - 1000 \text{ cfs.}; \bar{Q}_{10} = 0.55 - 1000 \text{ cfs.}$$

= 550 cfs.

P-40 25" R 30 MIN

RLD 1/15/53

August 1, 1900

Re: Dam #180A-3493  
at Reservoir Lake  
Town of Harpersfield  
County of Delaware

Mr. Floyd M. Snyder, P.E.  
10 Clinton Circle  
Catskill, New York

Dear Sir:

This office, after review of a recent inspection report concerning the above referenced dam submitted to us by our District Office representative, wishes to inform you that the structure and its appurtenances appear to have been constructed in accordance with the approved plans and are therefore acceptable to us insofar as the safety and stability of same are concerned.

In order to provide for an unimpeded flow of water from the 12" dia. outlet pipe, it is suggested the obstructing sands and gravels be removed and a riprapped channel 10.0 ± long be formed.

Very truly yours,

E. C. Hudowalski, P.E.

By: \_\_\_\_\_  
A. Dickinson  
Director of Engineering

JEP:fs  
CC: Mr. J. C. Federick

APPENDIX E

REFERENCES

## APPENDIX E

### REFERENCES

- 1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.
- 2) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.
- 3) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.
- 4) Elwyn E. Seelye, Design, 3rd edition, John Wiley and Sons, Inc., 1960
- 5) U.S. Department of the Interior, Bureau of Reclamation; Design of Small Dams, 2nd edition (rev. reprint), 1977.

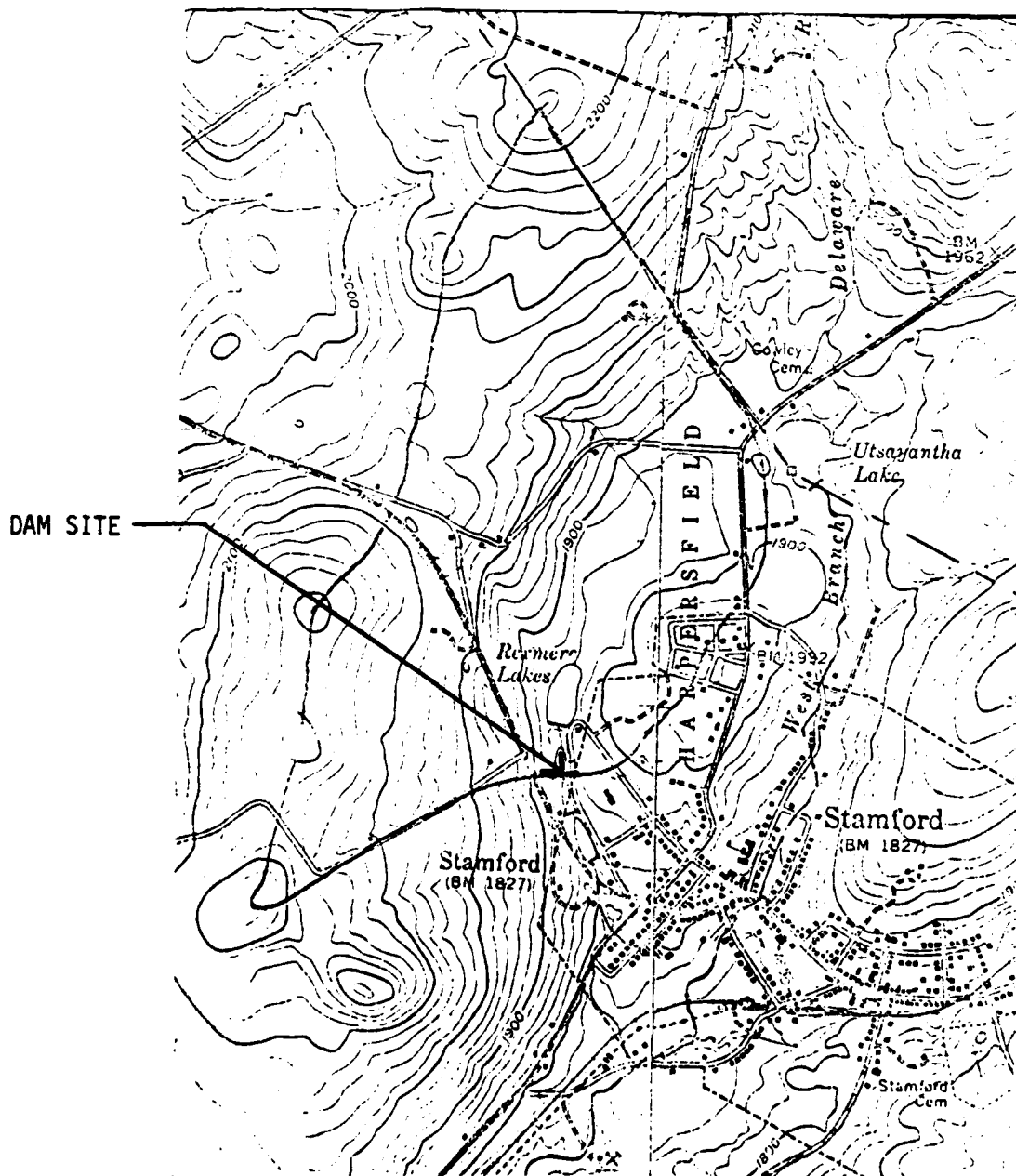
APPENDIX F

DRAWINGS

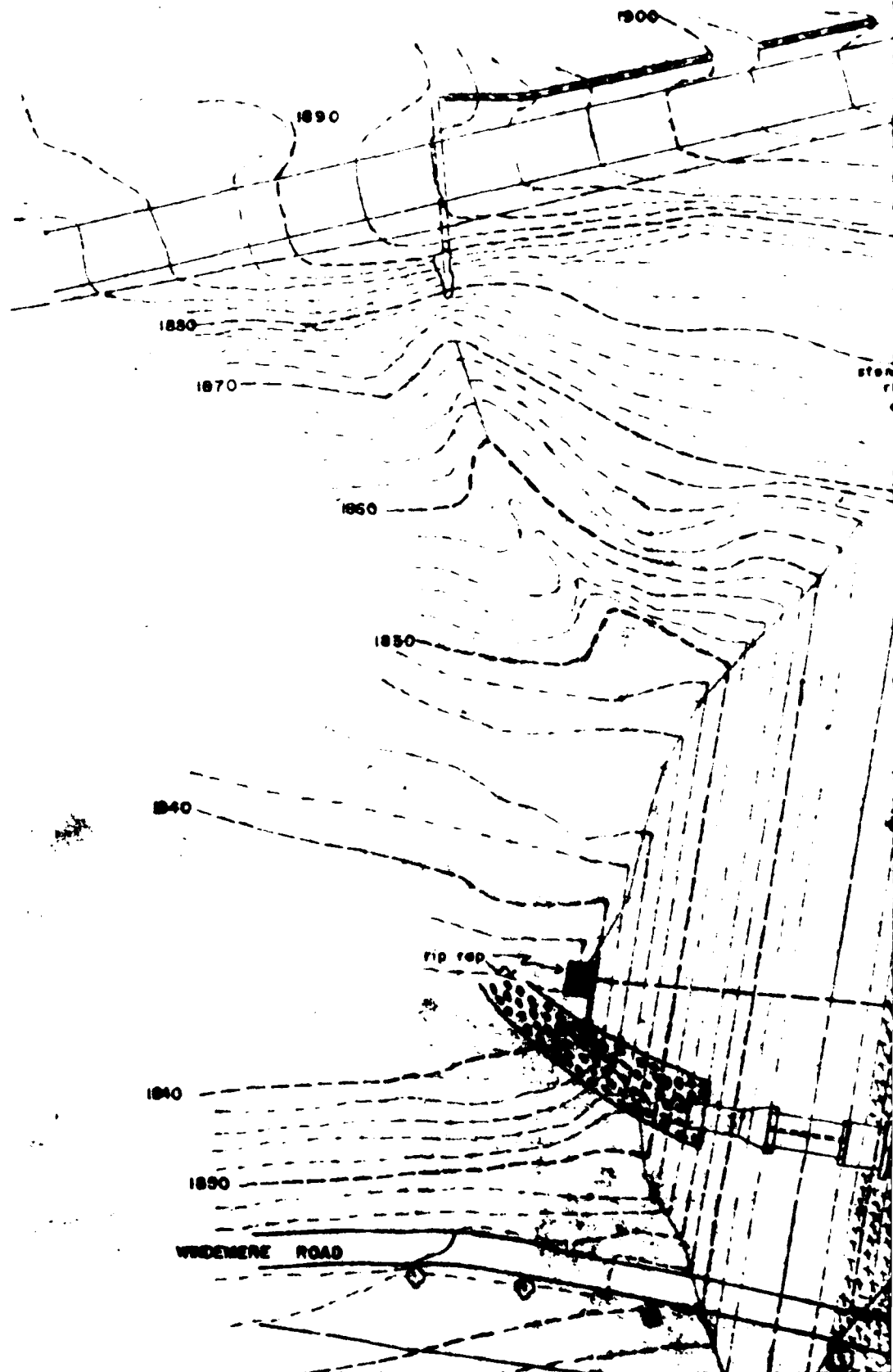
DAM SITE



VICINITY MAP  
 REXMERE DAM  
 I.D. No. NY 524



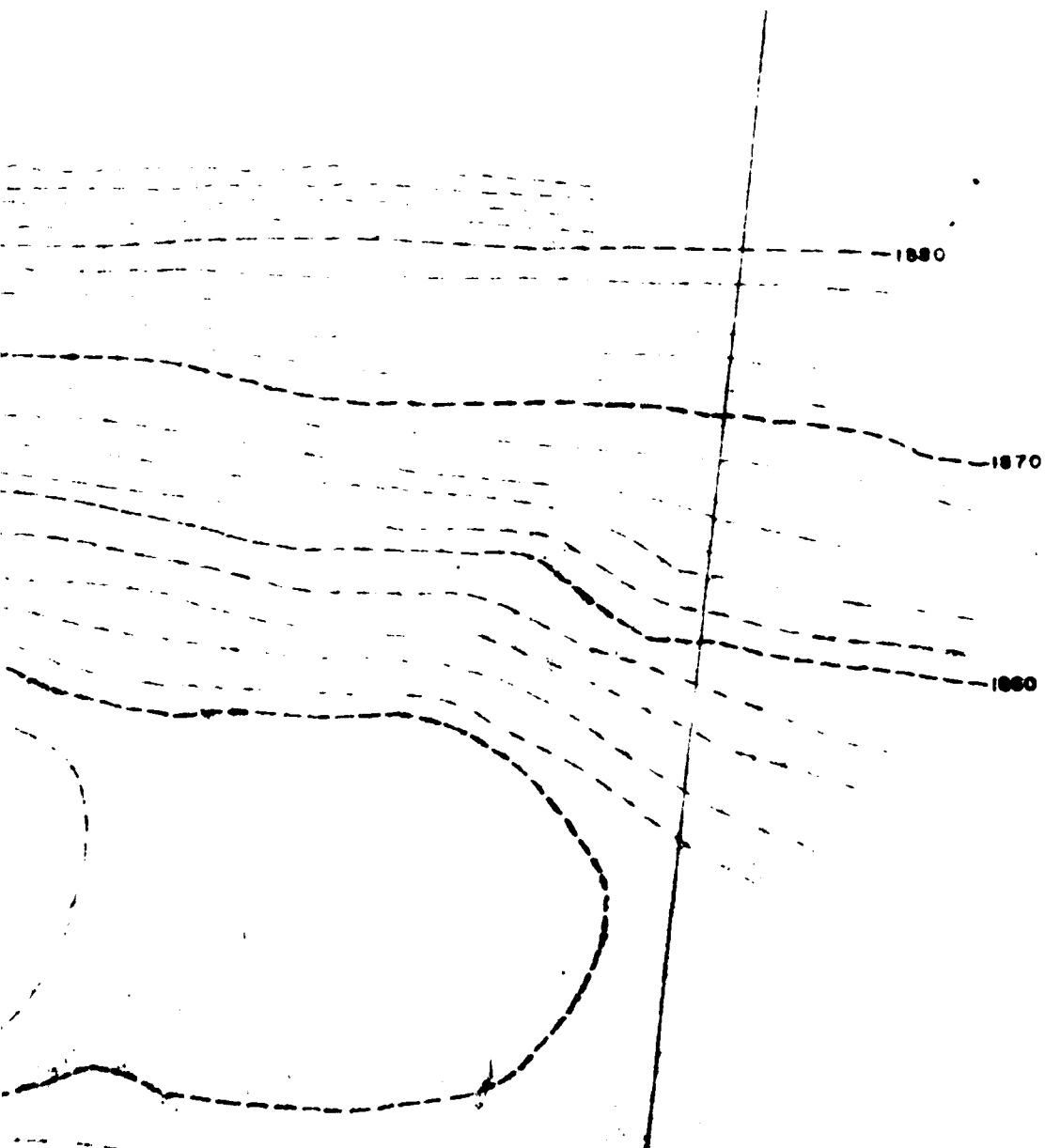
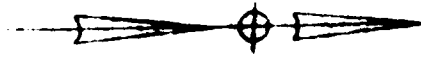
TOPOGRAPHIC MAP  
REXMERE DAM  
I.D. No. NY 524

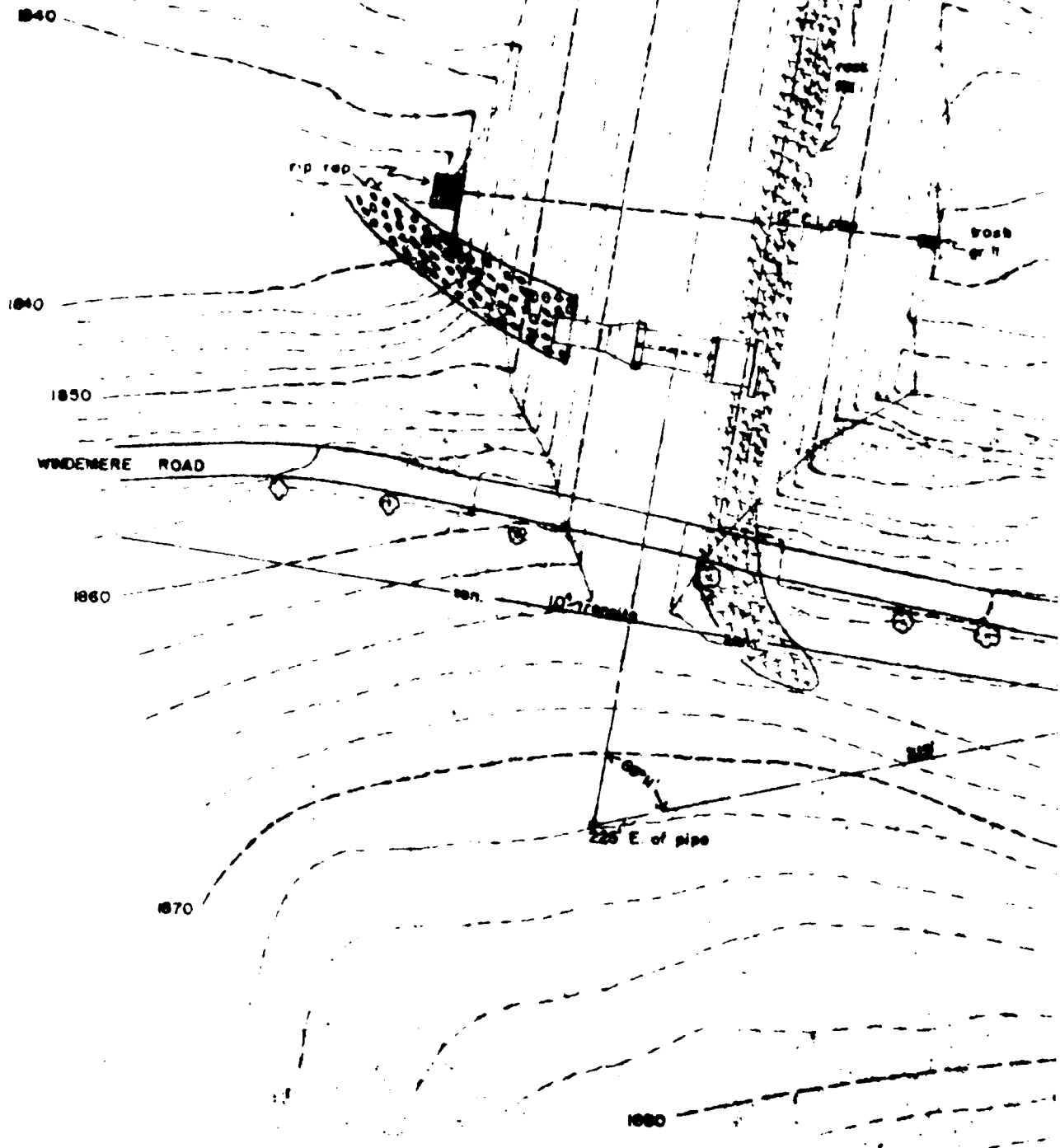


2

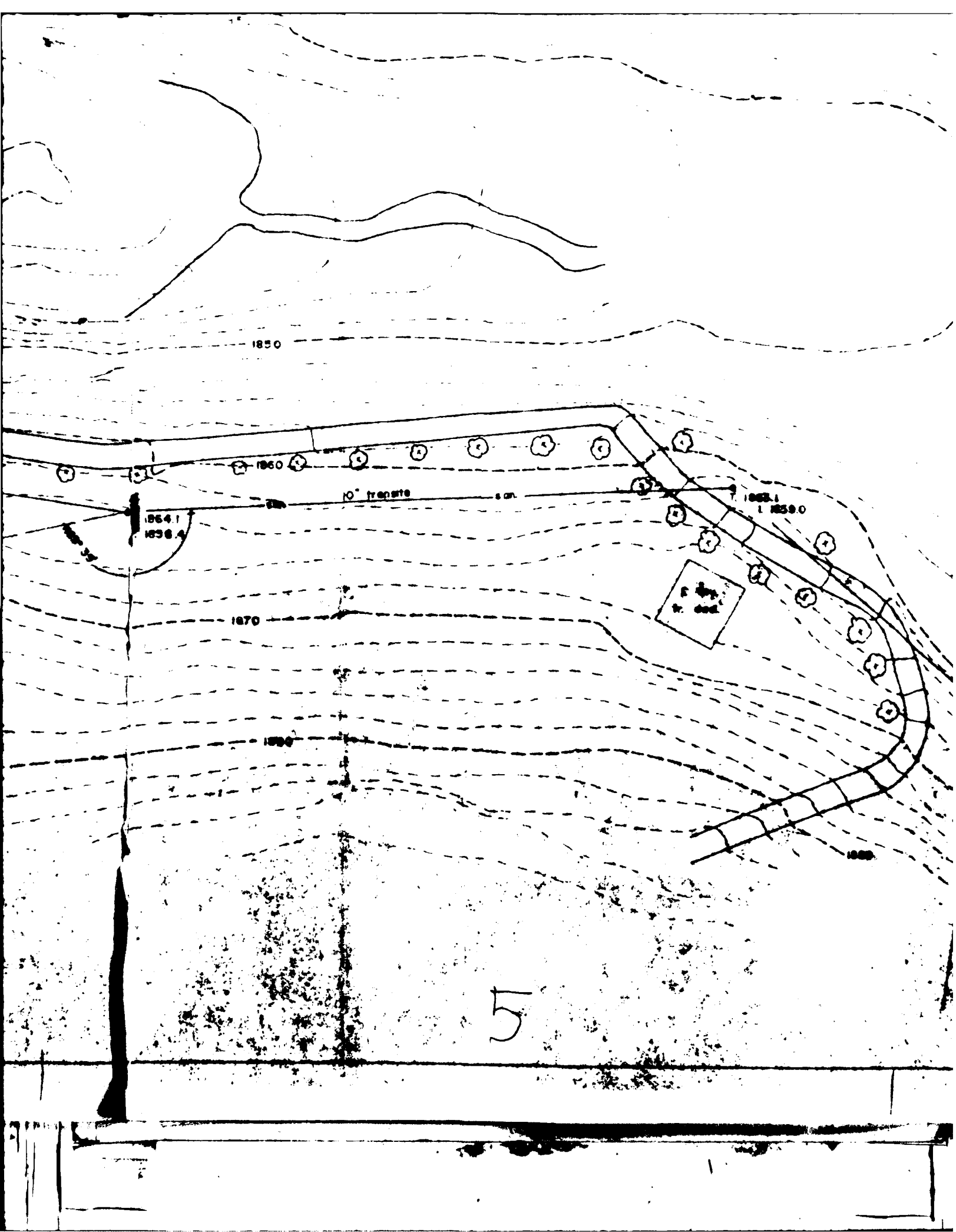


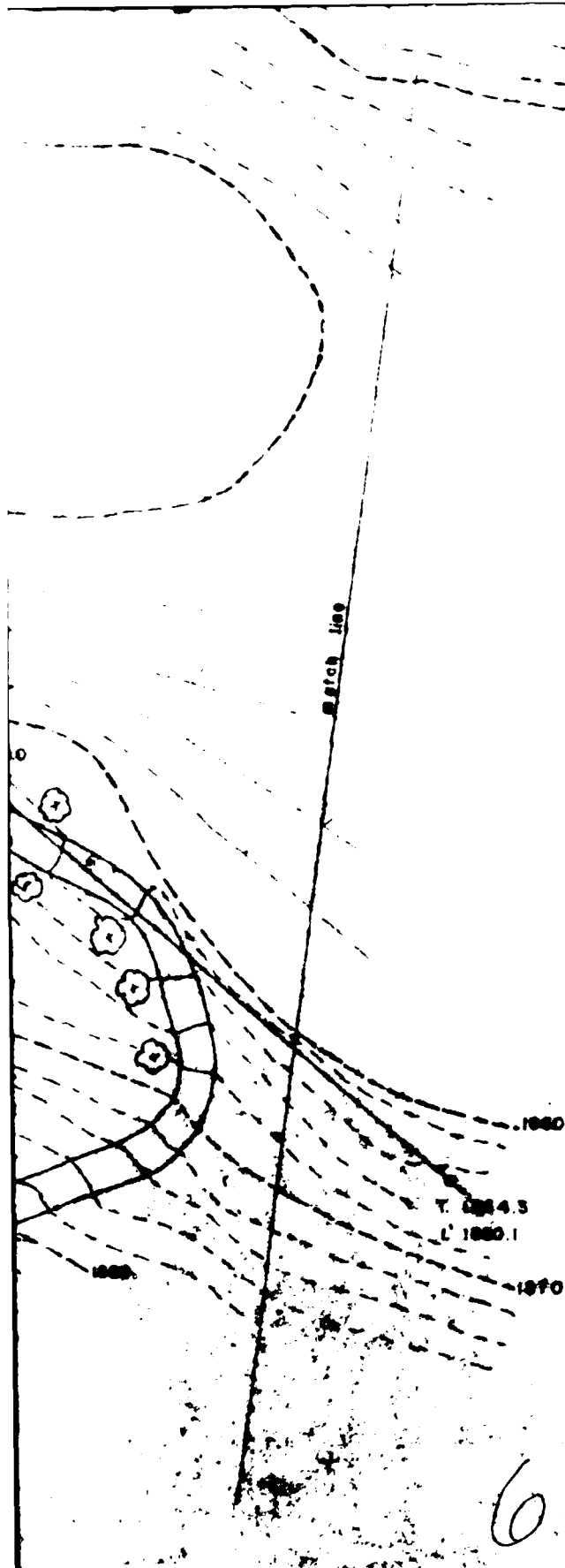
SHEET 2 OF 8





Map  
Contours show the high spots  
around the top of the hill.





# REXMEDE DAM - MURPHY FOUNDATION

VILLAGE OF STAMFORD, COUNTY OF DELAWARE,  
STATE OF NEW YORK

SCALE: 1" = 40'

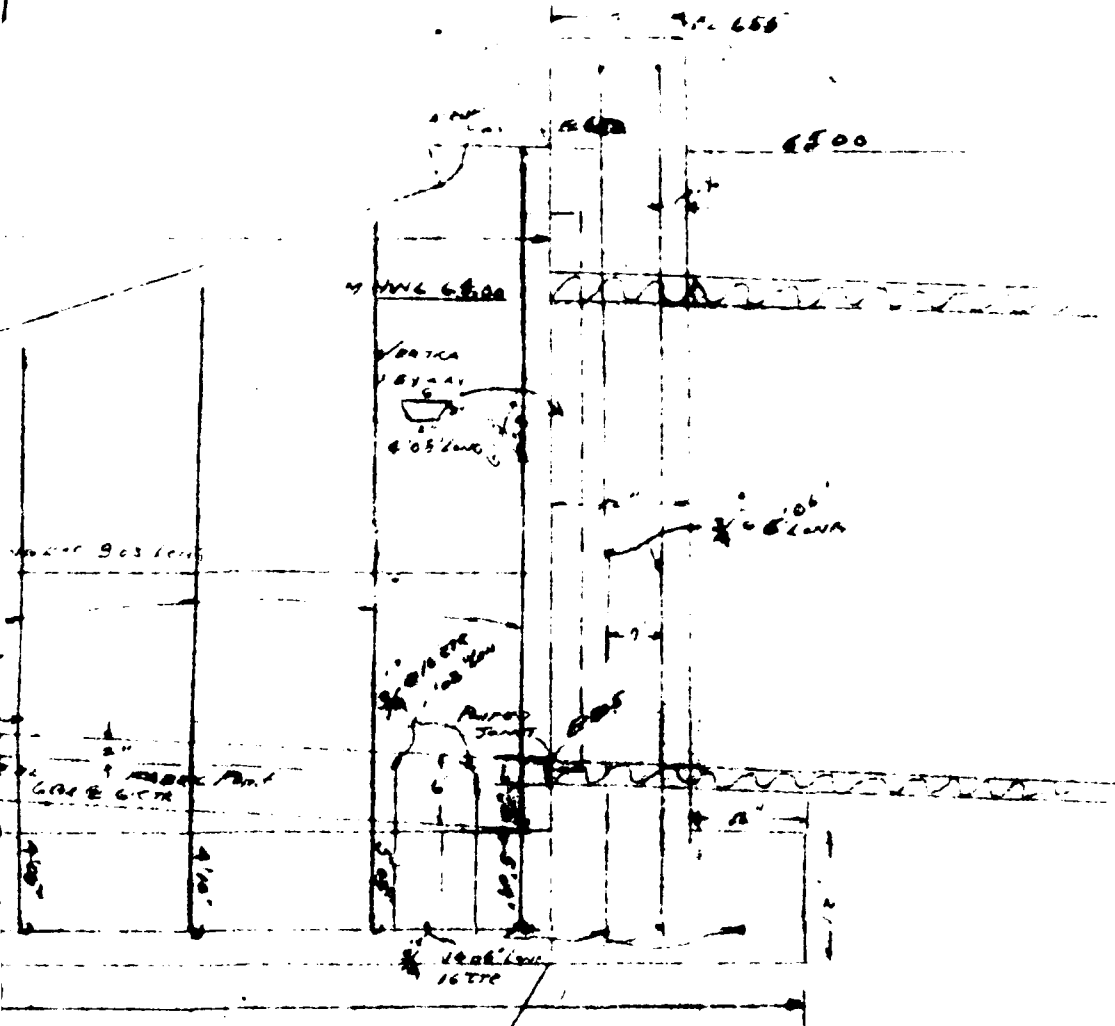
JULY 23, 1963

BY FLOYD E. REYNOLDS, L.S., 1963

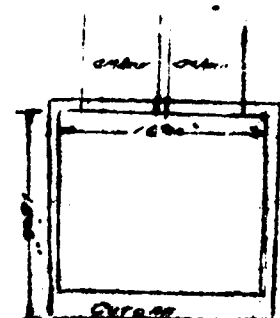
R.E. REYNOLDS



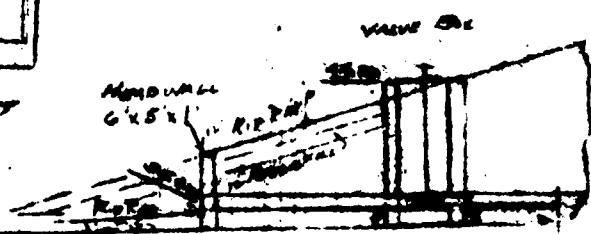
2



ILET  
ENTICAL  
HIRE  
1957

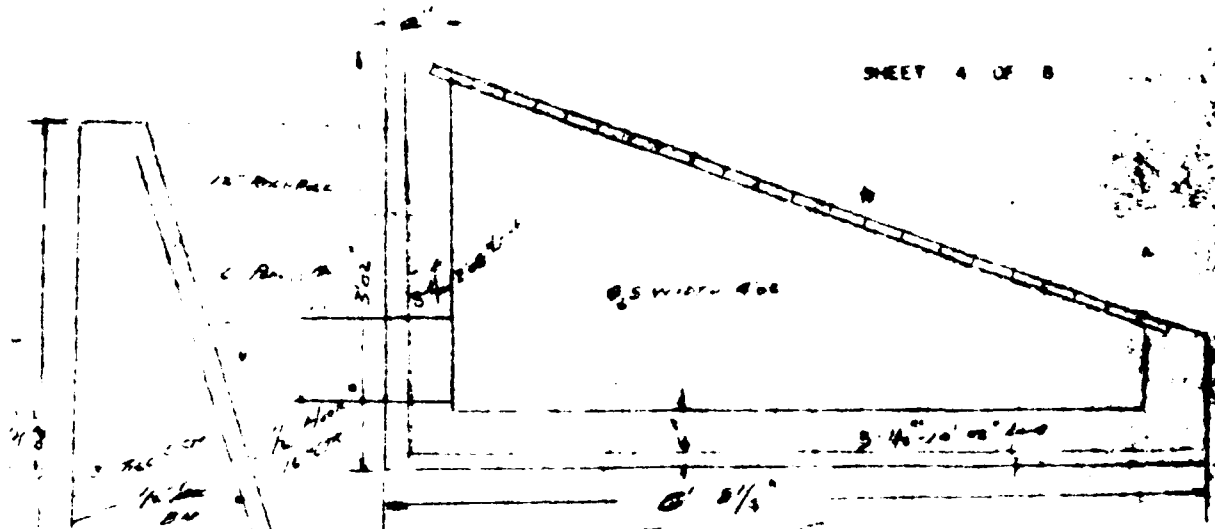


PLANT  
SPRINGWAY  
SCALE 1"=10'

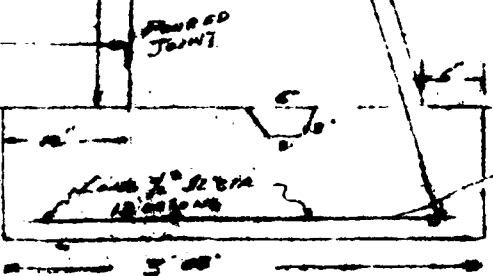


2.1/2 16.0000

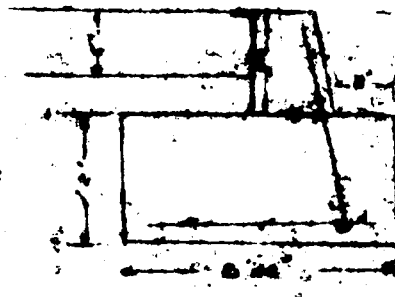
ARCHES  
E 10



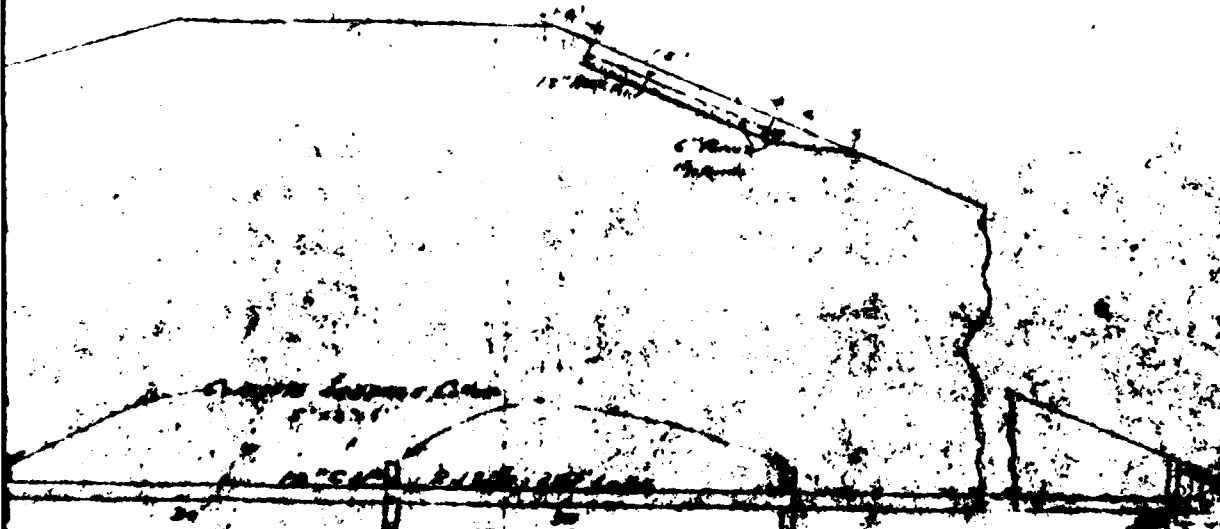
TRUSS SECTION  
SCALE 1" = 15' 0"



SECTION D-D  
SCALE 1" = 15' 0"



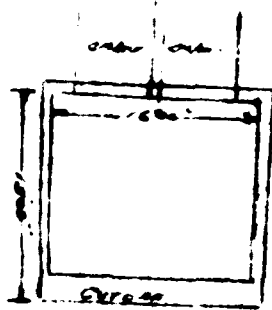
SECTION E-E  
SCALE 1" = 15' 0"



BRIDGE ELEVATION  
SCALE 1" = 15' 0"

**200**

100' HORIZ  
100'



PLANT  
SPILLWAY INVERT  
SCALE 1"=10'

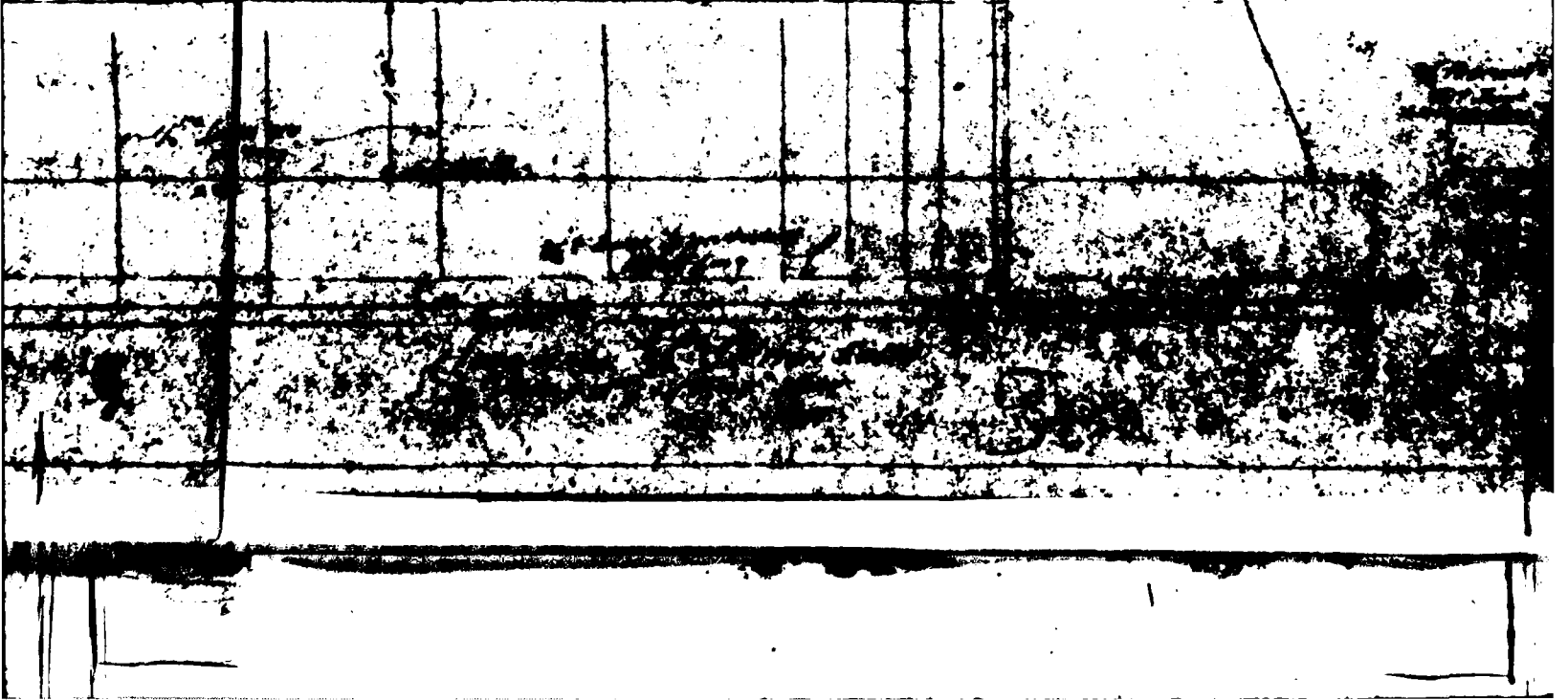
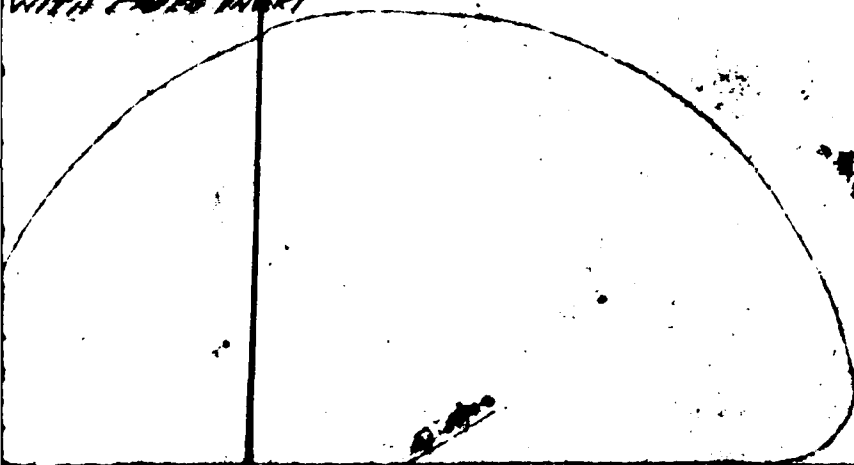
HANDWALL  
6' 5"

VALVE CH

RIP RAP

2' to 16' deep

PIPE ARCHES  
GRADE TO  
EACH  
ANCHOR  
WITH PLANT INVERT



CHANCE LANDING CANAL  
5'10"

10'0" 2'10" 10'0" 10'0"

PROPOSED 12" DIAMETER

SCALE 1" = 10' HORIZ. 1" = 10' VERT.

6'0"

6'0" TYPICAL SPACING

1/2" RADIUS

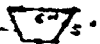
WATER VARIATION VALUE BY ANALYSIS OF POND  
10'0" 12'0" 12'0" 12'0"

1

2" to 3" Spacing B.C.  
10 20 10

10'00"

INTERNAL KEYWAY



6:5 SLOPE

1/2" to 1" Spacing

STEEL  
604.9

6" BRASS  
B.C. FILL

6" BRASS  
B.C. FILL

1/2" to 1" Spacing  
B.C. FILL

3'00"  
Long  
5'00"

1/2" to 1" Spacing

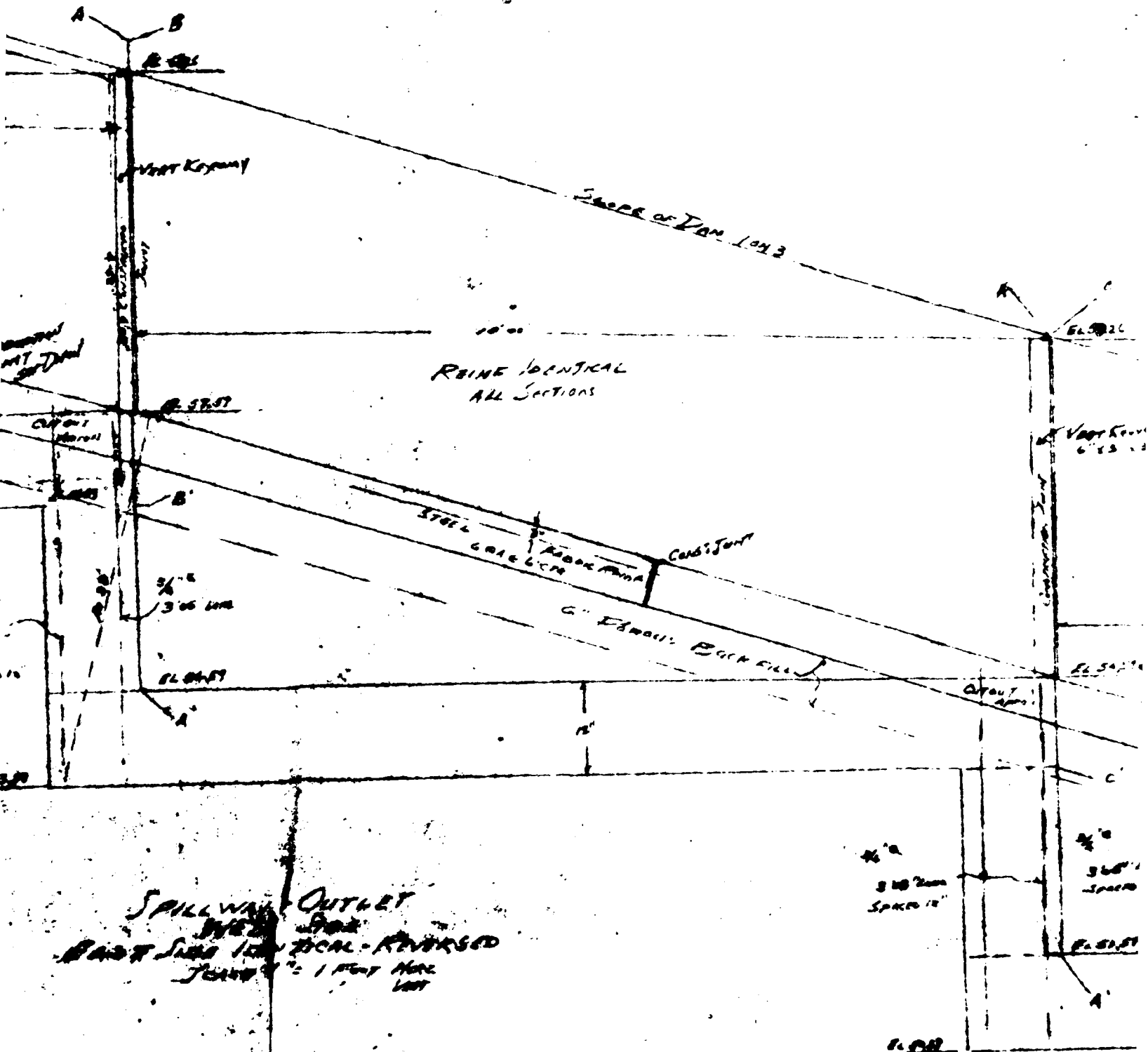
SECTIONS 3-A-A'

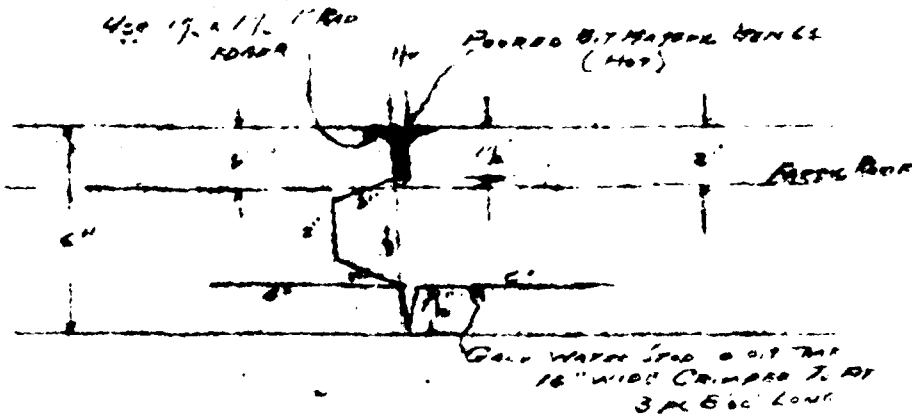
(DETAILS)

Scale 1" = 1'00"

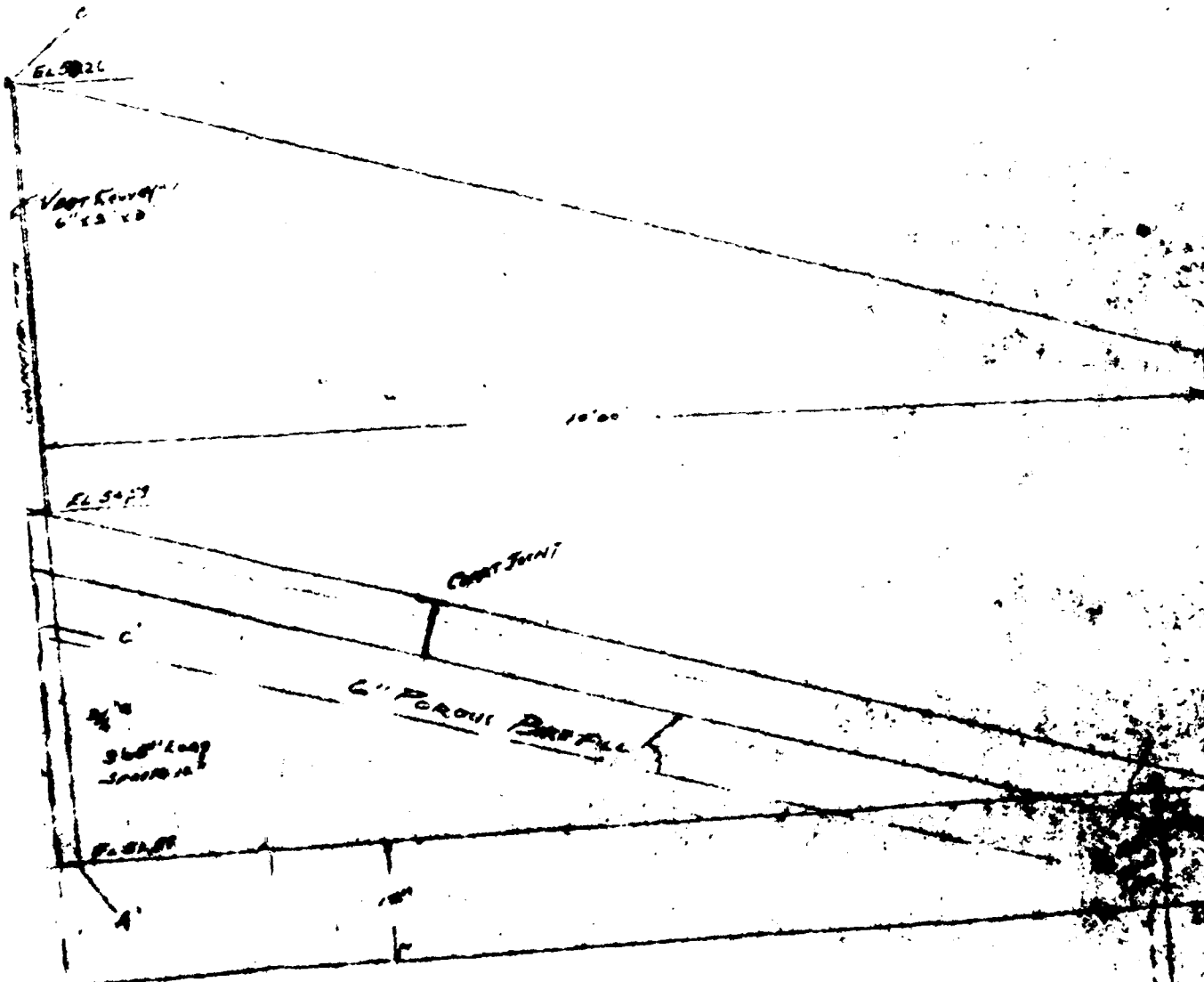
1/2" to 1" Spacing

2





DETAIL - CONSTRUCTION JOINT IN ADJUST  
Scale 1" = 3'



Long Hole  
 10" dia  
 10' deep

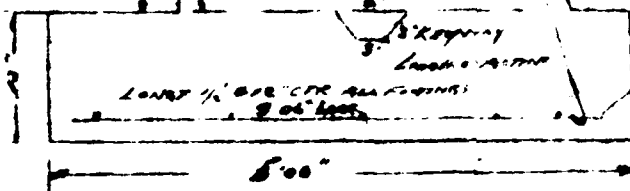
1" Radius Rupture

SECTIONS 3-A-A'  
 IDENTICAL  
 SCALE 1" = 1 FOOT HORIZ  
 VERT

1/2" Hole 16" dia

Apex 6"

12" 3' 6"



1/2" Hole 16" dia

SECTIONS B-B', C-C', D-D'  
 IDENTICAL  
 SCALE 1" = 1 FOOT HORIZ  
 VERT

1" Hole 16" dia

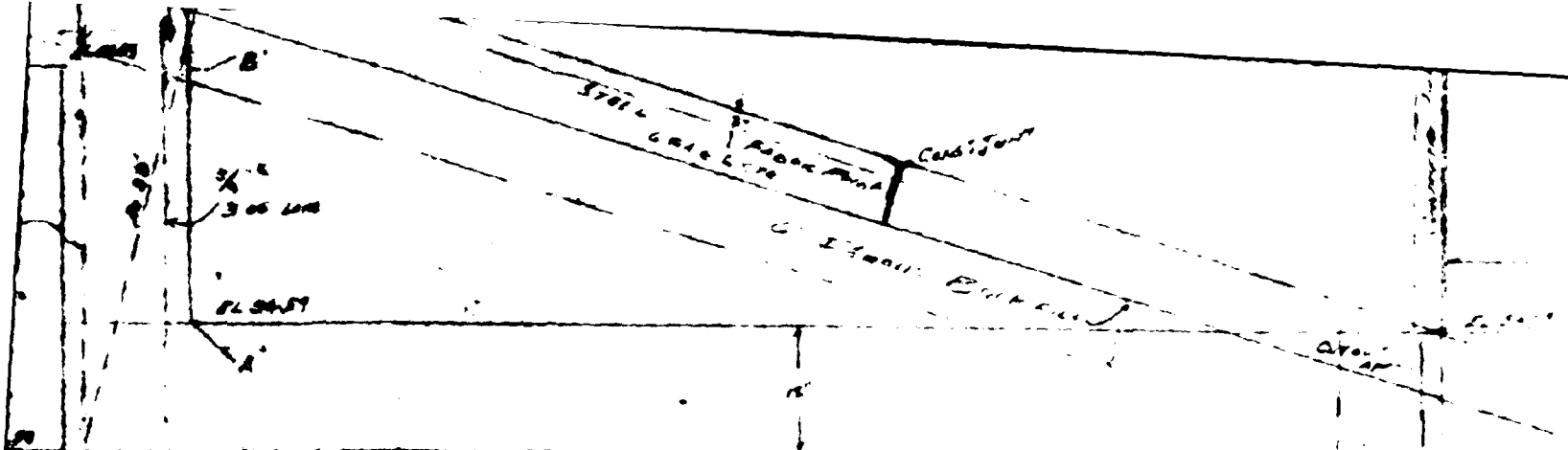
1/2" Hole 16" dia

12" 3' 6"

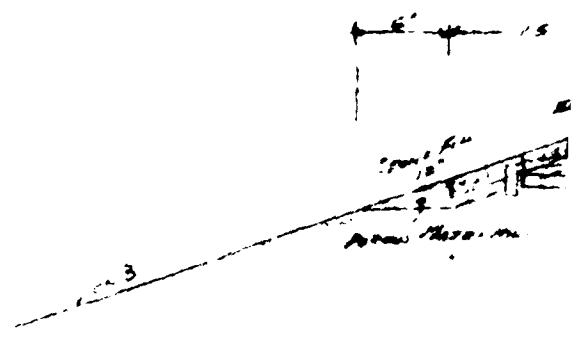
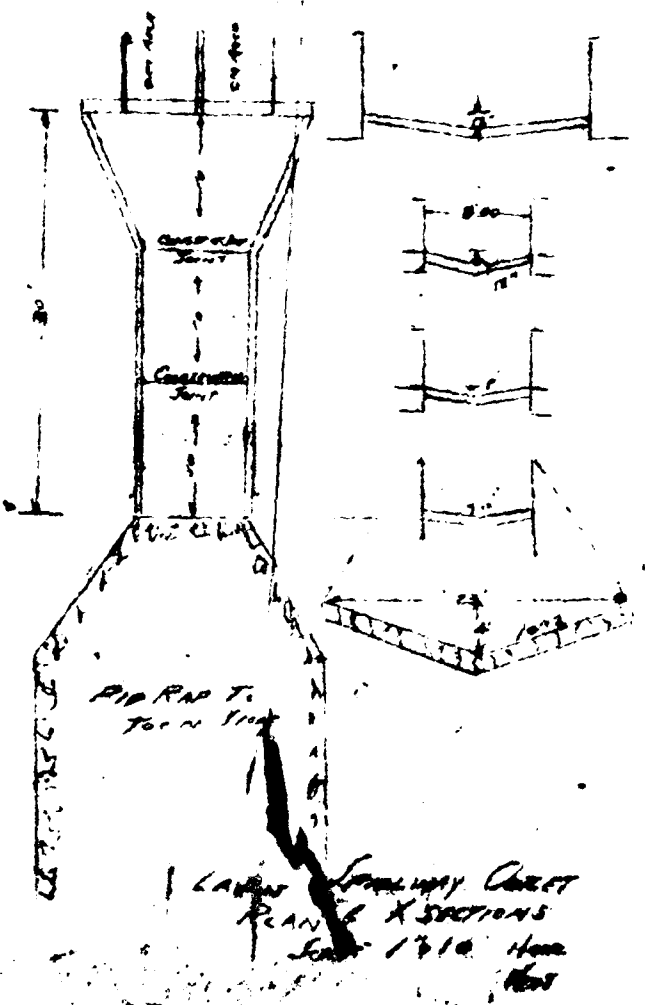
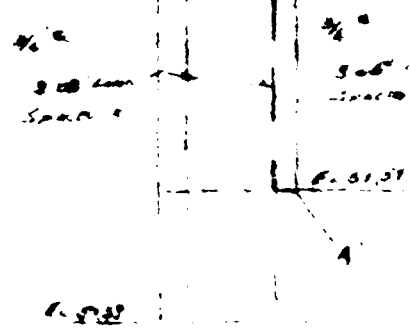


1/2" Hole 16" dia

4

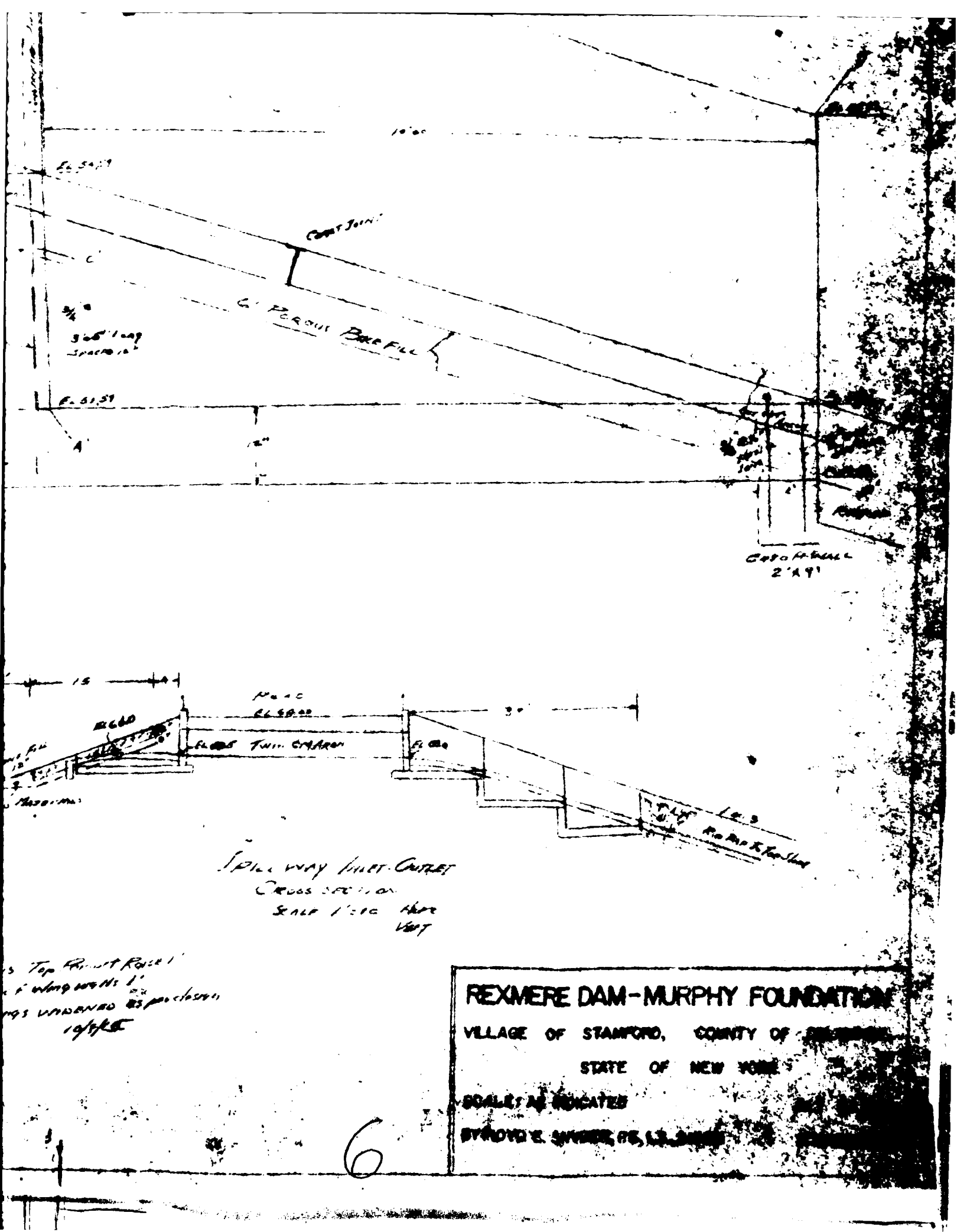


SPILLWAY OUTLET  
 WEST SIDE  
 EAST SIDE IDENTICAL - REVERSED  
 SCALE 1" = 1 FOOT HORIZ  
 1911



Note ELEVATIONS Top of  
 1911 Top of wing wall  
 Footings under  
 1911

5



SPILLWAY PILOT-OUTLET  
CROSS SECTION  
SCALE 1"=10' HORIZ  
VERT

Top Right Pier 1'  
Wing walls 1'  
was widened 25' per pier  
10/1/55

REXMERE DAM-MURPHY FOUNDATION  
VILLAGE OF STAMFORD, COUNTY OF ALBANY  
STATE OF NEW YORK  
SCALE AS INDICATED  
BYRON E. SMITH, P.E., L.S. 2000

6

DATE  
FILMED  
8-8