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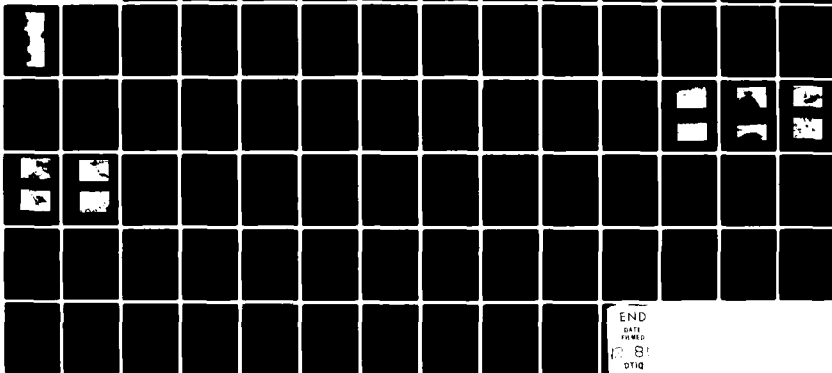
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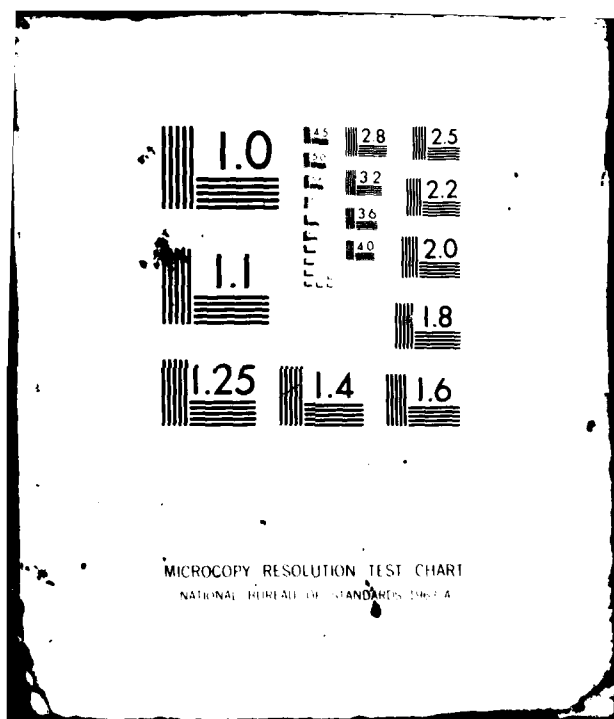
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SPARKLE LAKE DAM

WESTCHESTER COUNTY, NEW YORK
INVENTORY NO. N.Y. 1330

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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LOWER HUDSON RIVER BASIN

SPARKLE LAKE DAM

**WESTCHESTER COUNTY, NEW YORK
INVENTORY NO. N.Y. 1330**

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



NEW YORK DISTRICT CORPS OF ENGINEERS

SEPTEMBER 1981

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of Sparkle Lake Dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life		

or property. However, the dam has some deficiencies which require further investigation and remedial action.

Using Corps of Engineers screening criteria for initial review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding 48 percent of Probable Maximum Flood (PMF). The overtopping of the dam could cause the erosion of both abutments and the downstream face of the dam resulting in dam failure, thus significantly increasing the hazard to life and property downstream. The pipe 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, however, that based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to life and property downstream of the dam.

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C., 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, and analyses involving topographic mapping, sub-surface 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 aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
 NATIONAL DAM SAFETY PROGRAM
 SPARKLE LAKE DAM
 I.D. NO. N.Y. 1330
 D.E.C. NO. 213D-4463
 LOWER HUDSON RIVER BASIN
 WESTCHESTER COUNTY, NEW YORK

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NAME OF DAM: Sparkle Lake Dam (I.D.No. NY-1330)
STATE LOCATED: New York
COUNTY LOCATED: Westchester County
STREAM: Unnamed (TR of Hallocks Mill Brook)
BASIN: Lower Hudson River
DATE OF INSPECTION: 6 May 1981

ASSESSMENT

The examination of documents and visual inspection of Sparkle Lake Dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

Using Corps of Engineers screening criteria for initial review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding 48 percent of Probable Maximum Flood (PMF). The overtopping of the dam could cause the erosion of both abutments and the downstream face of the dam resulting in dam failure, thus significantly increasing the hazard to life and property downstream. The pipe 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, however, that based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to life and property downstream of the dam.

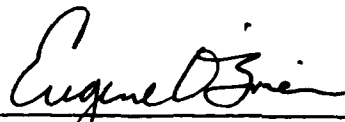
It is, therefore, recommended that within 3 months of notification to the owner, detailed hydrological-hydraulic investigations of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their affect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow of at least the one-half PMF. Within twelve months of the date of notification to the owner, modifications to the structure, deemed necessary as a result of the studies, should have been completed. In the interim, a detailed emergency action plan must be developed. Also around-the-clock surveillance of the structure must be provided during these periods.

In addition, the dam has a number of problem areas which, if left uncorrected, have the potential for the development of hazardous conditions and must be corrected within 12 months:

1. The results of the aforementioned analysis will determine the appropriate remedial measures required.
2. The buried portion of the spillway outlet pipe should be exposed. The discharge from the pipe should be diverted away from the toe of the dam.
3. The seepage occurring at the downstream toe should be monitored and observations recorded. Construction of weirs and monitoring of flow at bi-weekly intervals should be performed to properly ascertain the nature of the seepage.
4. Erosion areas at the contact between upstream slope and the crest should be refilled, compacted and reseeded.
5. The trees, bushes and saplings should be removed from the upstream and downstream slopes and crest. A program of periodic cutting and mowing of the embankment surfaces should be provided.
6. The longitudinal and transverse cracks at the crest should be repaired.
7. A program of periodic inspection and maintenance of the dam and appurtenances should be provided including yearly operation and lubrication of the reservoir drain system. This information should be documented for future reference. The emergency action plan

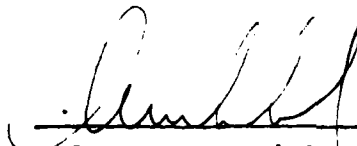
described in Section 7.1d should be maintained and updated periodically during the life of the structure.

8. Extension of reservoir drain control stem located in the manhole should be considered.



Eugene O'Brien, P.E.
New York No. 29823

Approved by:



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

Date:

14 Aug 81



1. OVERVIEW OF DAM.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
SPARKLE LAKE DAM
I.D. NO. N.Y. 1330
D.E.C. NO. 213D-4463
LOWER HUDSON RIVER BASIN
WESTCHESTER 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 Contract No. DACW 51-81-C-0008 in a letter dated 14 December 1980 in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367 dated 8 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing condition 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 and Appurtenant Structures

The Sparkle Lake Dam is an earth embankment approximately 310 feet long of which about 100 feet from the right abutment constitutes the original dam cross section and the remainder a modified cross section. From observations the original dam cross section has a crest width of about 15 feet; and downstream slope of 1(V) to 1.5(H). The modified section has a crest width varying from 15 to 150 feet; and the downstream slope varying from 1(V):1.5(H) to 1(V):2.5(H). The maximum height of the dam is 10 feet. The upstream slope at both cross sections is vertical, protected by a hand placed stone wall for a length of 220 feet from the right abutment; and stepped concrete-stone walkway for the remainder of the embankment. The concrete stone walkway serves as landing for small boats.

A 15-inch diameter corrugated metal pipe (CMP) located approximately in the middle of the dam serves as the principal spillway of the dam. The discharge through the pipe is ungated and empties into a 10 feet circular manhole which is located in

the wider portion of the crest of the dam. There is another corrugated metal pipe emptying at the bottom of the manhole. (referred on drawings in Appendix A as "Existing"). The purpose and extent of the pipe is unknown. The discharges from the manhole flow into two outlet drains which are 15-inch diameter corrugated metal pipes. The outlets are at different elevations; the lower outlet drain (referred as "Existing" on drawing) exits at the downstream toe in the vicinity of the reservoir drain outlet. The higher outlet drain also exits at the downstream toe further downstream of the lower outlet drain.

A 15-inch diameter corrugated metal pipe (CMP) which serves as a reservoir drain is located 100 feet from the right abutment. Discharge through the pipe is controlled by a manually operated gate valve located about 20 feet downstream from the upstream face of the dam and at the bottom of a 10 foot diameter concrete manhole. The outlet from the manhole is a 15-inch diameter corrugated metal pipe which exits at the downstream toe into a natural channel. According to a drawing the inlet of the drain is about 40 feet from the upstream face of the dam. It is reported that the concrete structure, shown on the drawing, around the inlet was not constructed.

b. Location

The dam is located at the south end of Sparkle Lake, about 750 feet north of the junction of Granite Springs Road and Broadway, and north of Yorktown Heights in Westchester County, New York.

c. Size Classification

The dam is 10 feet high and has a storage capacity of 84 acre-feet and is therefore classified as a small dam.

d. Hazard Classification

The dam is in the "high" hazard potential category because of several homes located about 750 feet downstream from the dam and the town of Yorktown Heights which is about 2 miles downstream from the dam.

e. Ownership

The Sparkle Lake Dam is owned by the Town of Yorktown. The address is Town Hall, 363 Underhill Avenue, Yorktown Heights, New York 10598. The telephone number is 914-962-5722. At present the person to contact is Mr. John Goldstein, the Town Engineer. The maintenance of the dam is carried out by the Highway Department, Town of Yorktown.

f. Purpose of Dam

The impoundment provided by the dam is used for recreational purposes.

g. Design and Construction History

The original design and the construction records are not available. The exact date of construction of the dam and the contractor's name are unknown. It is reported that in 1976 the reservoir drain and its control were installed. The design and supervision of construction was done by the Town Engineer. The plan and details of the reservoir drain and its control are shown on the drawings included in Appendix A.

h. Normal Operating Procedures

Lake level is maintained at the invert of the pipe spillway except in winter when the lake is lowered to kill algae growth.

1.3 PERTINENT DATA

a. <u>Drainage Area</u>	(square miles)	0.16
b. <u>Discharge at Dam</u>	(cfs)	
Maximum Known Flood at Site		Unknown
Pipe Spillway, Ungated at		
Maximum Pool (El 489.3)		7.7
Reservoir Drain at Maximum		
Pool (El 489.3)		10
c. <u>Elevation</u>	(feet above MSL USGS Datum)	
Top of Dam		489.3
Spillway Invert		485.0
Minimum Pool		485.0
Maximum Pool		489.3
d. <u>Reservoir</u>		
Length of Normal Pool (feet)		5,000
Surface Area of Maximum Pool (acres)		22.8
Surface Area of Normal Pool (acres)		17.45
e. <u>Storage</u>	(acre-feet)	
Spillway Invert		84
Top of Dam		171

f. Dam

Type
Length (feet)
Height (feet)
Crest Width (feet)

Earth
310
10
Varies from 15
to 150 feet

Side Slopes:
Upstream
Downstream

Vertical
Varies from
1(V):1.5(H) to
1(V):2.5(H)

g. Spillway

Type

Uncontrolled,
Corrugated Metal
Pipe (CMP)

Diameter (inches)

15

h. Reservoir Drain

Type
Control

15-inch CMP
Manually operated
gate valve which
is located at the
bottom of a con-
crete manhole.
The manhole is
located about 20
feet downstream
from upstream face
of the dam.

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

The records of the owner contain no data on site geology. However, there is data available in the literature on the general geology of the area (Ref. 4). Sparkle Lake Dam is located in the Hudson Highlands section of the New England Uplands physiographic province. The province is characterized by a low, but rugged mountain range consisting primarily of igneous and metamorphic rock. The rock underlying the area of the dam is Precambrian biotite-quartz-plagioclase paragneiss with subordinate biotite granitic gneiss, amphibolite and calcilicate rock.

2.2 SUBSURFACE INVESTIGATIONS

There are no records of subsurface investigations available. It is known that the surficial soils in the vicinity of the dam and reservoir are coarse grained glacial till material.

2.3 DESIGN RECORDS

There are no design data, construction drawings or design memoranda available for the dam. However, there are two drawings prepared by the owner (see Appendix A) showing the plan of the dam, the pipe spillway; and the plan and details of the reservoir drain and its control.

2.4 CONSTRUCTION RECORDS

Records of the original construction or subsequent modifications are not available for the project.

2.5 OPERATION RECORDS

There are no records of operation of the dam. There is no formal operation and maintenance manual for the project. No records of reservoir levels and rainfall have been kept.

2.6 EVALUATION OF DATA

Information was made available by the New York State Department of Environmental Conservation and the owner. The information obtained from the available data, personal interviews and the visual inspection is considered adequate for this Phase I Inspection and Evaluation.

The drawings in the appendix shows that a concrete structure was recommended at the reservoir drain inlet.

However it is reported by the owner's engineer that the concrete structure was not constructed at the time of installation of the reservoir drain. In addition the datum for the elevations shown on the drawings could not be determined. For the purpose of this report the USGS datum shown on the Mohegan Lake Quadrangle is used and elevations of the dam and the appurtenant structures are converted as follows:

USGS El 485 = El 396.5 (Shown on the
drawing. See Apendix A)

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The visual inspection of the Sparkle Lake Dam was performed on 6 May 1981. The weather was sunny with the temperature ranging between 70° and 75° F. The reservoir level at the time of the inspection was at El 485.7, about 8 inches above the invert of the pipe spillway.

b. Dam

The dam appears to be in good condition. The horizontal and vertical alignments of the crest are generally good. The asphalt walkway on the crest has several longitudinal and transverse cracks, located about 100 feet from the right abutment (see Photograph 4). The size of the cracks varies from hairline to 1/8 inch wide. In addition there are newly planted trees at a wider section of the crest.

It is reported that in the vicinity of the principal spillway pipe and about the middle of the crest a "blow off" occurred and was repaired by plugging it with clay. The repaired area appears to be in good condition.

The upstream slope, including the stone protection, appears to be in good condition except where erosion has occurred near the crest at two locations (see Photographs 9 and 10). In addition there are bushes, saplings and trees growing through the stones in the vicinity of the right abutment (Photograph 3).

The downstream slope of the dam is in good condition except for the existence of heavy vegetation consisting of the trees, saplings, bushes and overgrown grass. In addition 50 feet from the toe, near the right abutment, the area is wet and spongy with standing water resulting from minor seepage (see Photograph 11).

c. Spillway

The condition of the pipe spillway (15-inch CMP) from the upstream face of the dam to the manhole and the two 15-inch CMP outlet drains from the manhole to the downstream toe of the dam could not be observed. The outlet of one of the outlet drains which is located in the vicinity of the reservoir drain is buried (see Photograph 7).

d. Appurtenant Structures

The reservoir drain and the control which is located at the base of the manhole were not operated during the inspection. It is reported that the drain and the control are in operating condition.

e. Abutments

There are no signs of seepage or other unusual conditions at both abutments.

f. Downstream Channel

The discharge from the reservoir drain and the pipe spillway outlets flows into a natural channel. Although the channel contains natural vegetation including large trees, saplings and overgrown grass, its present condition would not impede discharges from the spillway and the reservoir drain.

g. Reservoir Area

In the vicinity of the dam there is no evidence of sloughing, potentially unstable slopes or other unusual conditions which would adversely affect the dam. No evidence of excessive sedimentation was observed. The reservoir water was relatively clean.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the inspection did not reveal serious problems which would adversely affect the adequacy of the dam and the appurtenant facilities. The following summarizes the encountered problem areas in order of importance with the recommended remedial action.

1. The buried portion of the spillway outlet pipe should be exposed. The discharge from the pipe should be diverted away from the toe of the dam.
2. The seepage occurring at the downstream toe should be monitored and observations recorded. Construction of weirs and monitoring of flow at bi-weekly intervals should be performed to properly ascertain the nature of the seepage.
3. Erosion areas at the contact between upstream slope and the crest should be refilled, compacted and reseeded.
4. The trees, bushes and saplings should be removed from the upstream and downstream slopes and crest. A program of periodic cutting and mowing of the embankment surfaces should be provided.

5. The longitudinal and transverse cracks at the crest should be repaired.
6. A program of periodic inspection and maintenance of the dam and appurtenances should be provided including yearly operation and lubrication of the reservoir drain system. This information should be documented for future reference. The emergency action plan described in Section 7.1d should be maintained and updated periodically during the life of the structure.
7. Extension of reservoir drain control stem located in the manhole should be considered.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

There are no operating procedures for regulating the discharge. Flow is discharged through an ungated pipe spillway and the regulated reservoir drain. The lake is generally kept at the level of the pipe spillway invert except in the winter when the lake is lowered to kill algae growth.

4.2 MAINTENANCE OF DAM AND SPILLWAY

The presence of undesirable vegetation on the downstream face of the dam; the erosion at the upstream edge of the crest; clogging at the outlet end of one of the spillway drain outlets (near the reservoir drain) indicates that the dam is not adequately maintained.

4.3 WARNING SYSTEM IN EFFECT

There is no warning system in effect or in preparation.

4.4 EVALUATION

The maintenance of the Sparkle Lake Dam is inadequate in the following areas:

- 1) The clogging at the outlet end of the principal spillway.
- 2) Control of vegetation on the crest and downstream and upstream slopes of the dam.
- 3) Maintenance of the upstream face of slopes where erosion has occurred.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Sparkle Lake Dam is located on an unnamed tributary of Hallocks Mill Brook, about two miles north of Yorktown Heights, Yorktown Township, Westchester County (Hydrologic Unit Code No. 02030101). The drainage basin of 0.16 square miles is about 60 percent urbanized (primarily in the vicinity of the lake), with the remainder wooded. Oriented in a primarily north-south direction, the basin at its widest point is approximately 1/4 miles.

Moderate slopes characterize the drainage basin.

Sparkle Lake encompasses about 17 acres (0.027 square miles) at its normal pool elevation of 485 feet, which represents 17 percent of the drainage area.

5.2 ANALYSIS CRITERIA

The analysis of the adequacy of the spillway was performed by developing a design flood, using the unit hydrograph method and the Probable Maximum Precipitation (PMP). The all season 200 square mile 24 hours PMP for the Yorktown area, taken from Weather Bureau sources, is 22 inches. The unit hydrographs were computed by the Snyder method using coefficients of 2 and 0.625 for C_T and C_p , respectively. The inflow hydrograph was developed by the U.S. Army Corps of Engineers HEC-1DB computer program. Loss rates of 1.0 inch initial loss and 0.1 inch/hour constant loss were estimated as representative of the basin for the design storm.

In accordance with the Corps recommended guidelines for Safety Inspection of Dam (Ref. 3), the adequacy of the spillway was analyzed using the Probable Maximum Flood (PMF). A multi-plan analysis was performed for the full, 0.75, 0.50 and 0.25 PMF.

5.3 SPILLWAY CAPACITY

The ungated 15-inch corrugated metal pipe (CMP) serves as the principal spillway and is located at about the middle of the dam. The invert of the spillway is at El 485.0 which is about 4.3 feet from the top of the dam (El 489.3). The computed maximum discharge with lake surface at El 489.3 is 7.7 cfs.

5.4 RESERVOIR CAPACITY

The normal reservoir capacity is listed as 84 acre-feet. The computed surcharge storage of 87 acre-feet is equivalent to approximately 10.2 inches of runoff over the entire basin.

5.5 FLOODS OF RECORD

There are no records available of floods or maximum lake elevation.

5.6 OVERTOPPING POTENTIAL

The potential of the dam being overtopped was investigated on the basis of the spillway discharge capacity and the available surcharge storage to meet the selected design flood inflows.

The analysis was performed using the HEC-1DB computer package and assuming that the water surface in the reservoir was at spillway crest elevation at the start of the flood event. The computed PMF peak inflow was 601 cfs. Following is a summary table of the HEC-1DB analysis.

TABLE 1

<u>RATIO OF PMF (%)</u>	<u>PEAK INFLOW (cfs)</u>	<u>PEAK OUTFLOW (cfs)</u>	<u>OVERTOPPING (ft)</u>
1.00	601	480	0.62
0.75	450	250	0.40
0.50	300	21	0.06
0.25	150	5	0.00

The HEC-1DB analysis indicated that floods greater than 48 percent of the PMF would overtop the dam.

5.7 EVALUATION

The dam does not have sufficient spillway capacity to pass either the PMF or one-half (1/2) PMF without overtopping of the dam. The overtopping could cause the failure of the dam, thus significantly increasing the hazard to life downstream. Therefore, the spillway is assessed as "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 did not indicate either existing or potential problems with the dam. The observed seepage at the downstream toe of the dam in the vicinity of the right abutment is not considered to represent an unstable or otherwise dangerous condition at the present time. However, if left uncorrected it could lead to a hazardous condition.

b. Design and Construction Data

There exist no design computations or other data regarding the stability of the dam. There are no records of the original construction and subsequent modifications.

c. Stability Analysis

Since the dam is an embankment, the stability analysis of the dam is beyond the scope of work for the Phase I Inspection. There are no gravity structures at the dam.

d. Operation Records

There are no records of the regulating gate operation.

e. Post-Construction Changes

It is reported that since the construction of the dam, the area at and beyond the downstream toe were used as a dump area and has resulted in widening of the crest except for about 100 feet at the right abutment.

f. Seismic Analysis

The dam is located in Zone 1 in accordance with the guidelines set forth by the Corps of Engineers. However, based on the past earthquake history in the vicinity of the project, the New York State Geological Society recommends that the dam be considered in Zone 2.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of available documents and a visual inspection of the dam and the appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

Using Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 48 percent of the PMF. The overtopping of the dam could cause the erosion of the abutments and the downstream face of the dam resulting in dam failure, thus significantly increasing the hazard for loss of life downstream. 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, however, that based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam.

In addition to "seriously inadequate" spillway, the dam has a number of deficiencies which if left uncorrected, have the potential for the development of hazardous conditions. These deficiencies are:

1. Seepage occurring at the downstream toe at the right abutment.
2. Erosion areas at the contact between the upstream slope and the crest.

b. Adequacy of Information

The information and data available were adequate for performance of this investigation.

c. Need for Additional Investigations

Since the spillway is considered to be "seriously inadequate", additional hydrologic/hydraulic investigations are required to more accurately determine the site specific characteristics of the watershed. After the in-depth hydrologic/hydraulic investigations have been completed, remedial measures must be initiated to provide spillway capacity sufficient to discharge the outflow from the one-half (1/2) PMF event.

d. Urgency

The additional hydrologic/hydraulic investigations which are required must be initiated within 3 months from the date of notification. Within 12 months of notification, remedial measures as a result of these investigations must be initiated, with completion of these measures during the following year. In the interim, develop an emergency action plan for the notification of downstream residents and proper governmental authorities in the event of overtopping, and provide around-the-clock surveillance of the dam during periods of extreme runoff. The other problem areas listed below must be corrected within one year from notification.

7.2 RECOMMENDED MEASURES

The following are the recommended measures:

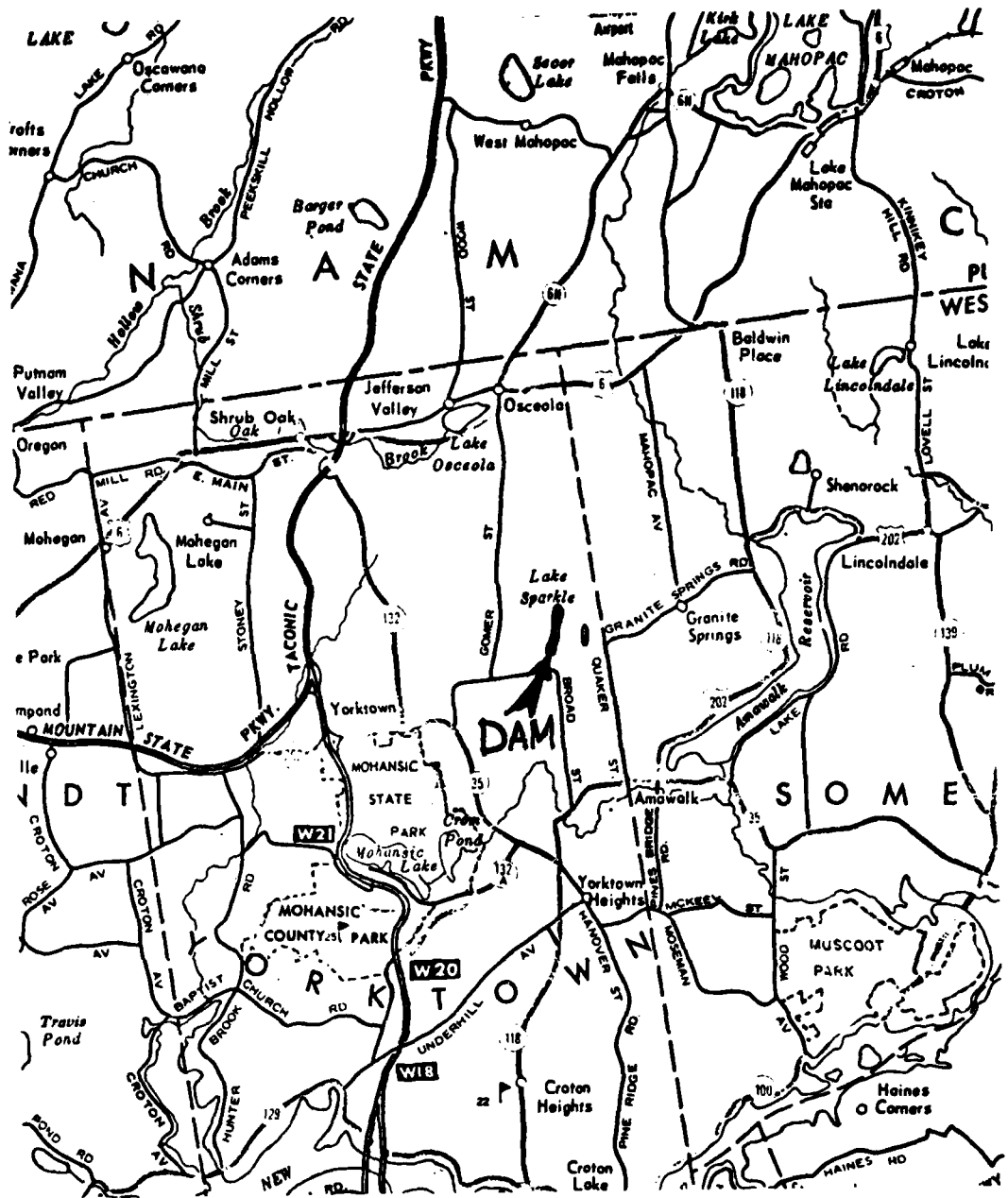
1. The results of the aforementioned analysis will determine the appropriate remedial measures required.
2. The buried portion of the spillway outlet pipe should be exposed. The discharge from the pipe should be diverted away from the toe of the dam.
3. The seepage occurring at the downstream toe of the right abutment should be monitored and observations recorded. Construction of weirs and monitoring of flow at bi-weekly intervals should be performed to properly ascertain the nature of the seepage.
4. Erosion areas at the contact between the upstream slope and the crest should be refilled, compacted and reseeded.
5. The trees, bushes and saplings should be removed from the upstream and downstream slopes and crest. A program of periodic cutting and mowing of the embankment surfaces should be provided.
6. The longitudinal and transverse cracks at the crest should be repaired.

7. A program of periodic inspection and maintenance of the dam and appurtenances should be provided including yearly operation and lubrication of the reservoir drain system. This information should be documented for future reference. The emergency action plan described in Section 7.1d should be maintained and updated periodically during the life of the structure.

8. Consideration should be given to extending the reservoir drain valve stem.

DRAWINGS

APPENDIX A

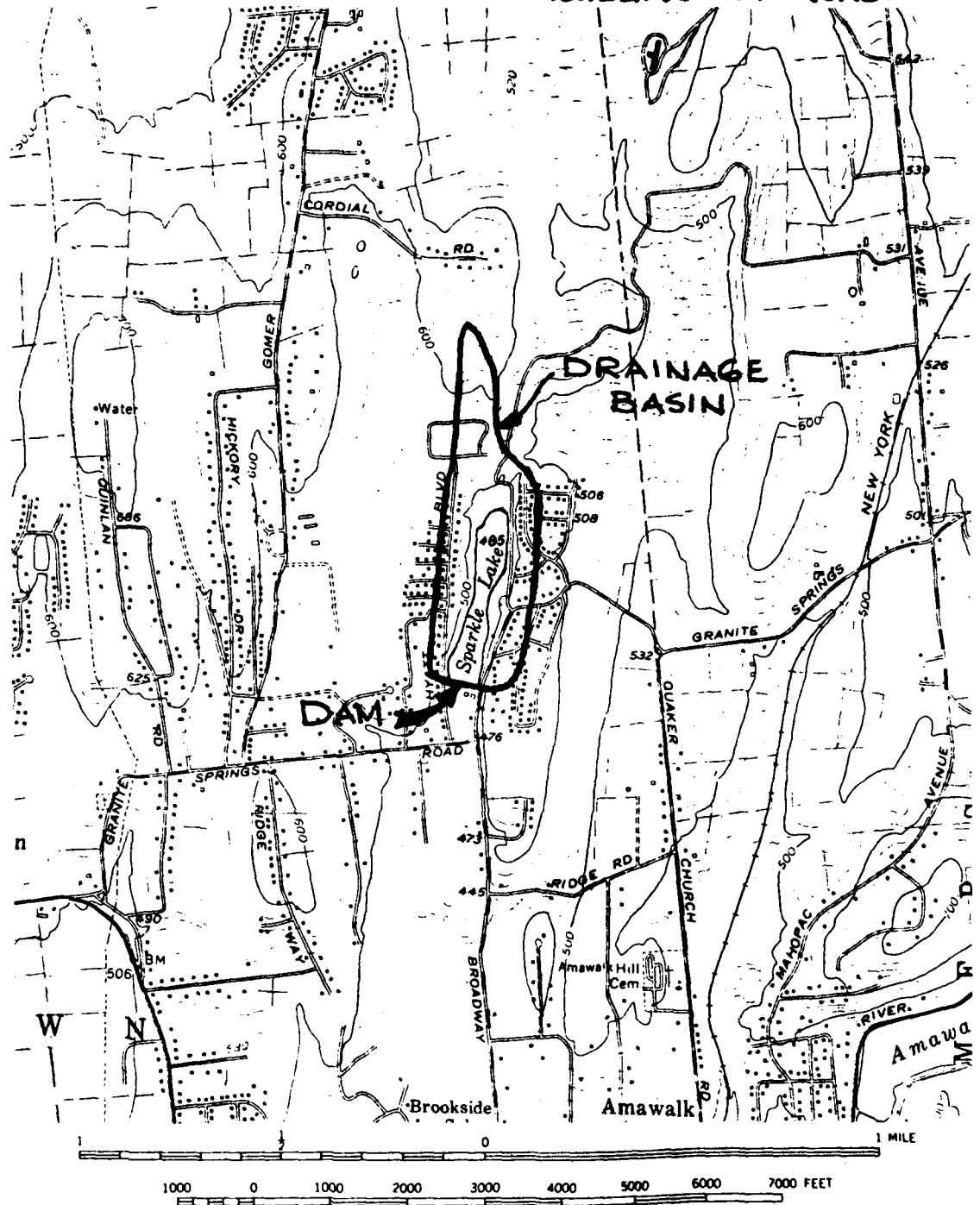


SCALE



VICINITY MAP
SPARKLE LAKE DAM

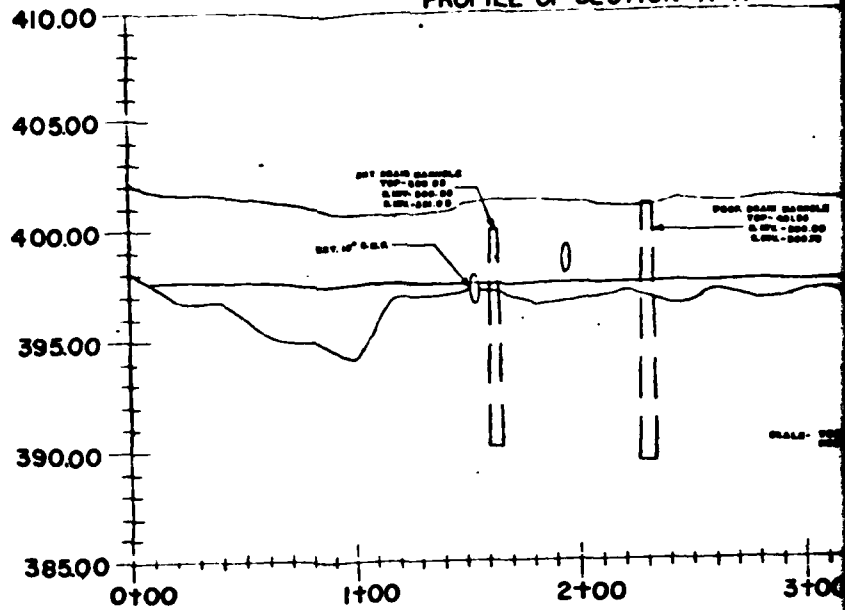
MOHEGAN LK. QUAD.



SCALE 1:24:000

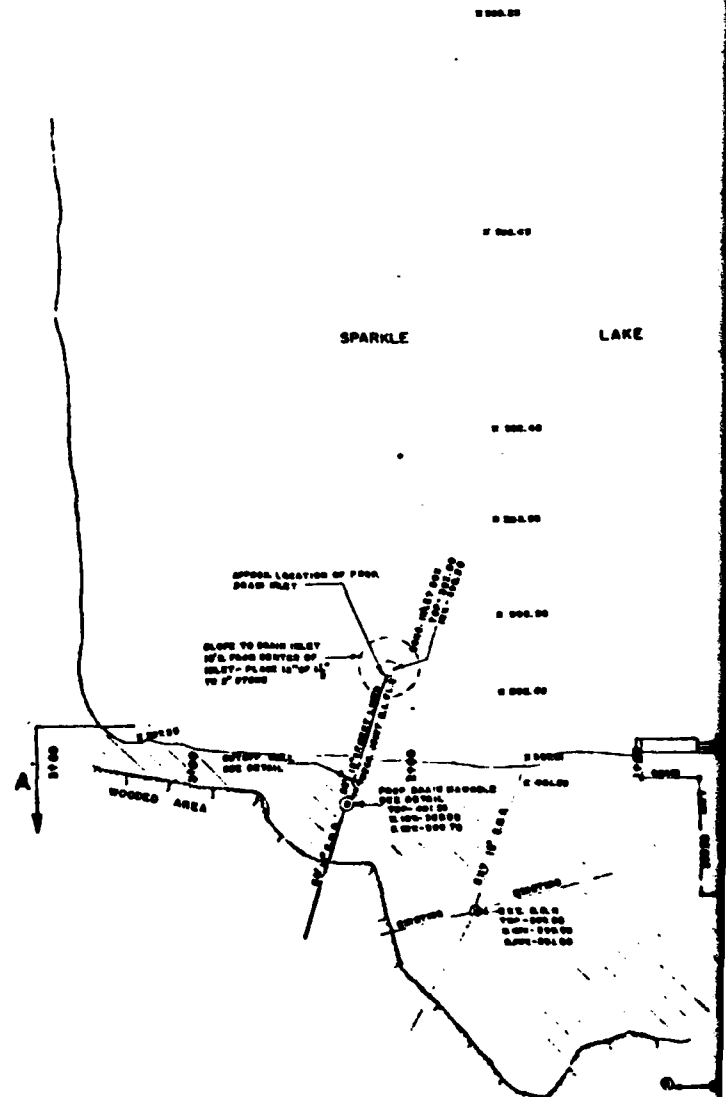
TOPOGRAPHIC MAP
SPARKLE LAKE DAM

PROFILE OF SECTION A-A

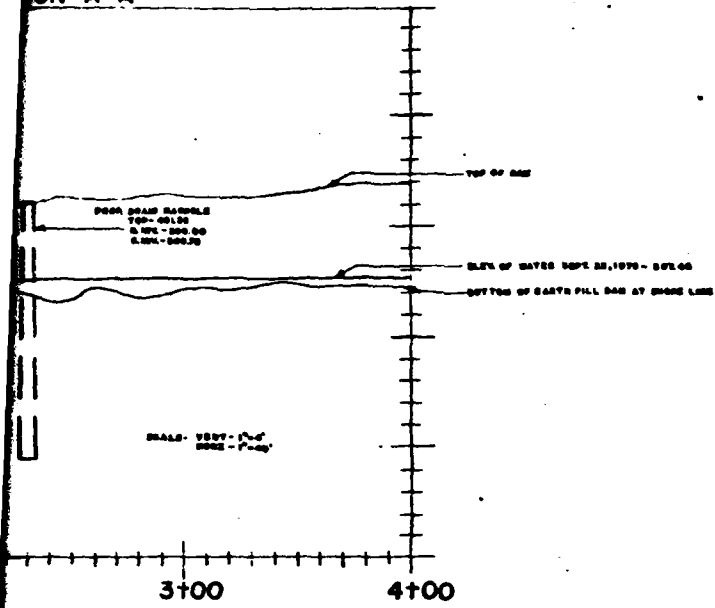


NOTE:
 1. ALL PIPE TO BE LAYED IN ONE 12" TO 18" STONE
 2. CONCRETE FOR BUTT WALL SHALL MEET A.C.C. & C.T. SECTION
 3. PROFILE CORRECT AND SECTION FOR INSPECTION CORRECT.
 4. DATE TO BE A.C.C. 1754 001.00 (10.00.00)

EARTH DAM AREA



ON A-A



LAKE

BEACH AREA

REC. BLDG.

APPROVED BY *Robert J. [Signature]*
TOWN ENGINEER

DATE 10/22/75



TOWN PROJECT

INSTALLATION OF DRAIN
FOR SPARKLE LAKE

PREPARED BY ENGINEERING DEPARTMENT
TOWN OF YORKTOWN

SHEET NO. 1 OF 2
SCALE 1" = 40'
DATE - 10-16-75

PLAN & PROFILE
BY E.B.N.

2

PHOTOGRAPHS

APPENDIX B



2. VIEW OF DOWNSTREAM SLOPE OF DAM.
(NOTE: Vegetation)



3. VIEW OF UPSTREAM SLOPE OF DAM.
(NOTE: Vegetation at Left Side of the Dam)



4. VIEW OF CREST LOOKING LEFT. (NOTE: Widening of Crest, Vegetation and Cracks)



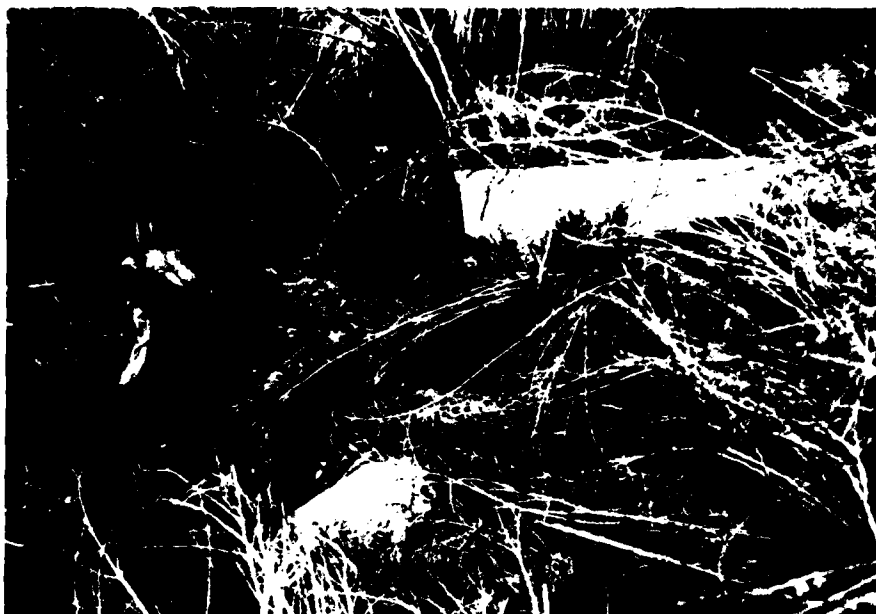
5. VIEW OF CREST LOOKING RIGHT.
(NOTE: Recreational Building)



6. VIEW OF UPSTREAM SLOPE AND PIPE SPILLWAY
SPILLWAY



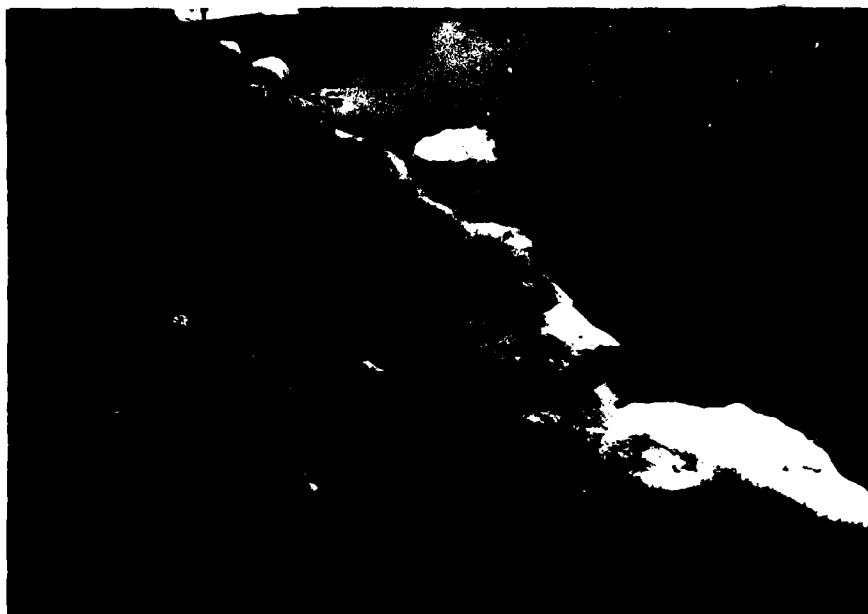
7. VIEW OF OUTLET OF RESERVOIR DRAIN.
(NOTE: Flow Discharge is from Burried
Pipe Spillway Outlet)



8. CLOSEUP VIEW OF OUTLET OF RESERVOIR DRAIN.



9. VIEW OF EROSION AT UPSTREAM FACE.



10. VIEW OF EROSION AT UPSTREAM FACE.



11. VIEW AT DOWNSTREAM TOE IN VICINITY OF
RIGHT ABUTMENT. (NOTE: Seepage)

VISUAL INSPECTION CHECKLIST

APPENDIX C

VISUAL INSPECTION CHECKLIST

Basic Data

a. General

Name of Dam SPARKLE LAKE DAM
 Fed. I.D. # 1330 DEC Dam No. 213D-4463
 River Basin HUDSON RIVER
 Location: Town YORK TOWN County WESTCHESTER
 Stream Name TR - HALLOCKS MILL BROOK
 Tributary of HUDSON RIVER
 Latitude (N) 41°-18.2' Longitude (W) 73°-47.0'
 Type of Dam EARTH
 Hazard Category HIGH (1)
 Date(s) of Inspection MAY 6, 1981
 Weather Conditions SUNNY; 70°-75° F
 Reservoir Level at Time of Inspection about EL 485.7 Ft. (USGS)
8" above Invert of Pipe Spillway.

b. Inspection Personnel HARVEY FELDMAN & JYOTINDRA PATEL

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

MR. John Goldstein, Town Engineer, Town of Yorktown
TOWN HALL, 363 Underhill Avenue
Yorktown Heights, New York 10598
914-962-5722

d. History:

Date Constructed 1940 ** Date(s) Reconstructed 1976 -
 ** as reported in the inventory sheet. addition of the reservoir drain
 Designer UNKNOWN
 Constructed By UNKNOWN
 Owner TOWN OF YORKTOWN

* See sheet No. 6.

Sheet 1

2. Embankment

a. Characteristics

- (1) Embankment Material Earth fill; classification of Earth fill is unknown. (see also #5)
- (2) Cutoff Type Unknown
- (3) Impervious Core Unknown
- (4) Internal Drainage System Unknown
- (5) Miscellaneous It is reported dam downstream slope and downstream area near toe was used as dump area. Consisting of manmade fill.

b. Crest

- (1) Vertical Alignment Good
- (2) Horizontal Alignment Good
- (3) Surface Cracks Asphalt pavement about 100' ft from right abutment has transverse and longitudinal cracks otherwise none observed on rest of the crest.
- (4) Miscellaneous At left abutment contact there is a recreation building; Several small to large trees; some recently planted.

c. Upstream Slope

Protected by stone wall.

- (1) Slope (Estimate) (V:H) Vertical
- (2) Undesirable Growth or Debris, Animal Burrows none observed
- (3) Sloughing, Subsidence or Depressions some sloughing about 10 ft along crest/slope contact.

(4) Slope Protection Stone wall. Condition good.

(5) Surface Cracks or Movement at Toe Unobservable - below
Water level

d. Downstream Slope

(1) Slope (Estimate - V:H) Varies from 1V:1.5 H to 1V:2 H

(2) Undesirable Growth or Debris, Animal Burrows Entire slope
'covered with brushes, shrubs, garbage, and small to large sizes
trees.

(3) Sloughing, Subsidence or Depressions minor sloughing
near the trees. No subsidence or depression
were observed.

(4) Surface Cracks or Movement at Toe Where observable
None exists.

(5) Seepage 50 ft of toe from right abutment is
wet but no observable running water. In this
area swamps like vegetation observed

(6) External Drainage System (Ditches, Trenches; Blanket)
none observed except downstream
channel for principal/reservoir drain.

(7) Condition Around Outlet Structure During 1976 modification
of dam outlet structure was proposed but was not
constructed.

(8) Seepage Beyond Toe Seepage along toe extends
beyond toe. (see # d.5.)

e. Abutments - Embankment Contact

Both abutment contacts is natural ground.

(1) Erosion at Contact None observed.

(2) Seepage Along Contact None observed.

3) Drainage System

a. Description of System appears to be none

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) None

) Reservoir

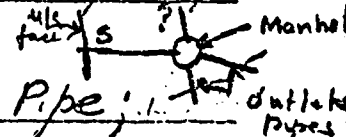
- a. Slopes Steep slopes, stable and at both abutment roadway exits
- b. Sedimentation Could not be ascertained; however lake water is clear.
- c. Unusual Conditions Which Affect Dam None

b) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) several homes, town of York town Heights and State routes.
- b. Seepage, Unusual Growth No seepage or unusual growth observed.
- c. Evidence of Movement Beyond Toe of Dam None was observed.
- d. Condition of Downstream Channel Filled with debris i.e garbage, Vegetation such as trees, brushes, shrubs and overgrown grass

) Spillway(s) (Including Discharge Conveyance Channel)

- Spillway is 15" ϕ Corrugated Metal Pipe; Uncontrolled; intake near upstream face of the Dam
- a. General The CMP pipe is interrupted by a drop manhole located within the crest of dam. Discharge for spillway and an other pipe whose intake could not be determined collect in the manhole. Discharges from manhole flow via two outlets located at the bottom of manhole.
- b. Condition of Service Spillway Structural Condition; Could not be ascertain.



c. Condition of Auxiliary Spillway NO Auxiliary spillway

d. Condition of Discharge Conveyance Channel Spillway outlet
is in vicinity of Reservoir Drain Outlet. The
Channel is overgrown with bushes, saplings,
trees and debris. The channel is a natural
channel.

e) Reservoir Drain/Outlet

Type: Pipe ☒ Conduit _____ Other _____

Material: Concrete ☒ Metal _____ Other _____

Size: 12" ϕ from Intake to Manhole
18" ϕ " Manhole to Outlet Length about 116' (Gate valve located at
midway along the pipe in a
manhole)

Invert Elevations: * Entrance 479.0' Exit 477.5'
at D/S toe

Physical Condition (Describe): _____ Unobservable ☒

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: reported good; the gate operated
during winter to lower lake.

Means of Control: Gate _____ Valve ☒ Uncontrolled _____

Operation: Operable ☒ Inoperable _____ Other _____

Present Condition (Describe): Good condition; reported
in operating condition. Gate was not operated
during the inspection.

* Elevation MSL • USGS DATUM.

DWGS IN APPENDIX SHOW OTHER DAM

ASSUMES USGS 485' = 396.5' (DWGS).

9) Structural

No Structural Items

a. Concrete Surfaces

b. Structural Cracking

c. Movement - Horizontal & Vertical Alignment (Settlement)

d. Junctions with Abutments or Embankments

e. Drains - Foundation, Joint, Face

f. Water Passages, Conduits, Sluices

g. Seepage or Leakage

h. Joints - Construction, etc. _____

i. Foundation _____

j. Abutments _____

k. Control Gates _____

l. Approach & Outlet Channels _____

m. Energy Dissipators (Plunge Pool, etc.) _____

n. Intake Structures _____

o. Stability _____

p. Miscellaneous _____

10) Appurtenant Structures (Powerhouse, Lock, Gatehouse, Other)

a. Description and Condition

There are

none. The manholes for the reservoir
drain and pipe spillway (located at
the crest) are in good condition.

HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX D

1579-18 → SPARKLE LAKE DAM

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

1

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>489.3</u> *	<u>22.71</u>	<u>1171</u>
2) Design High Water (Max. Design Pool)	<u>Unknown</u>	<u>—</u>	<u>—</u>
3) Auxiliary Spillway Crest	<u>None</u>	<u>—</u>	<u>—</u>
4) Pool Level with Flashboards	<u>None</u>	<u>—</u>	<u>—</u>
5) Service Spillway Crest	<u>485</u>	<u>17.45</u>	<u>84</u>

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>UNKNOWN</u>
2) Spillway @ Maximum High Water (PMF)	<u>727</u>
3) Spillway @ Design High Water	<u>UNKNOWN</u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>NONE</u>
5) Low Level Outlet (Reservoir Drain)	<u>10</u>
6) Total (of all facilities) @ Maximum High Water (PMF)	<u>4737</u>
7) Maximum Known Flood	<u>UNKNOWN</u>
8) At Time of Inspection	<u>UNKNOWN</u>

* Based on USGS DATUM.

USGS 485 = 396.5
(topographic sheet) (Drawing).

CREST: DAM

ELEVATION: 489.3

Type: Earth Fill

Width: Varies 15'-150' Length: 310'

Spillover Pipe spillway

Location (Spillway) middle of Dam

SPILLWAY:

SERVICE

AUXILIARY

485 (INV.)

Elevation NONE

CORRUGATED METAL PIPE

Type

15" DIA.

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)

HYDROMETEROLOGICAL GAGES: NONE USED

Type : _____

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM: NONE

Warning System: _____

Method of Controlled Releases (mechanisms):

DRAINAGE AREA: 103.76 ac. = 0.16 sq mi

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: _____

Terrain - Relief: ROLLING

Surface - Soil: UNKNOWN

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

Unknown

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

NONE OBSERVED IN VICINITY OF DAM

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: NONE

Location: _____

Elevation: _____

Reservoir:

Length @ Maximum Pool 0.45 (Miles)
TOP OF DAM.

Length of Shoreline (@ Spillway Crest) 0.95 (Miles)

TAMS

Job No. _____ Sheet 1 of 17
 Project SPARKLE LAKE DAM Date JUNE 23, 81
 Subject HYDROLOGIC/HYDRAULIC COMPUTATIONS By D. L. C.
 Ch'k. by JMD

SNYDER COEF

$$C_T = 2$$

$$640 C_p = 400$$

$$L = 0.47 \text{ mi}$$

$$L_{CA} = 0.11 \text{ mi}$$

$$T_p = C_1 (L L_{CA})^{0.3} = 2 (0.47 \times 0.11)^{0.3} = 0.82 \text{ hours.}$$

$$T_R = 0.82 / 5.5 = 0.149 \text{ hrs.}$$

$$\text{for } T_R = 0.23 \text{ hrs}$$

$$T_{PR} = T_p + 0.25(T_R - T_p) = 0.82 + 0.25(0.181) = 0.865$$

$$\text{USE } T_{PR} = 0.87 \text{ hours.}$$

$$\text{Percent impervious } 17.45 / 103.76 \times 100 = 16.8\% \quad (0.17)$$

Hydromet # 33:

ALL SEASONS 24 Hour 2.00 SQ MILES PMP. = 22

DURATION (HRS)	% INDEX RAINFALL
6	112
12	123
24	133
48	141

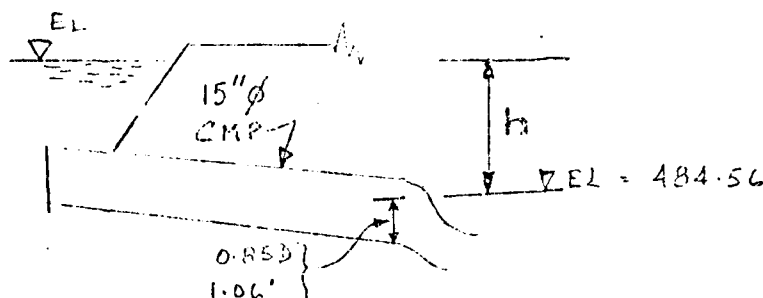
TAMS

Job No. _____
 Project SPARKLE LAKE DAM
 Subject HYDROLOGIC/HYDRAULIC COMPUTATIONS

Sheet 2 of 17
 Date JUNE 23, 81
 By DLC
 Ch'k. by JMD

DAM LENGTH 310' @ EL. 489.3.
 SPILLWAY (15" ϕ CMP) INVERT EL. = 485.0
 LENGTH TO MANHOLE = 75.0'
 CMP INVERT EL AT MANHOLE = 483.5'

Assuming



DISCHARGE WITH LAKE EL AT TOP OF DAM EL 489.3

$$h = 489.3 - 484.56 = 4.74'$$

using $K_c = 0.5$

$$Q = 7.7 \text{ cfs.}^* \quad \text{(Design of Small Dams, (Fig B-11 288-D-291))}$$

$$@ h = 10.44$$

$$Q_{\text{MAX}} = 11.2$$

$$@ h = 2.0'$$

$$Q = 5.0 \text{ cfs.}^*$$

Discharge Capacity of 15" ϕ CMP :

EL	Q
485	0
487	5.0
489.3	7.7
495.0	11.2

TAMS

Job No. _____

Project SPARKLE LAKE DAM

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS

Sheet 3 of 17

Date JUNE 23, 81

By D.L.C.

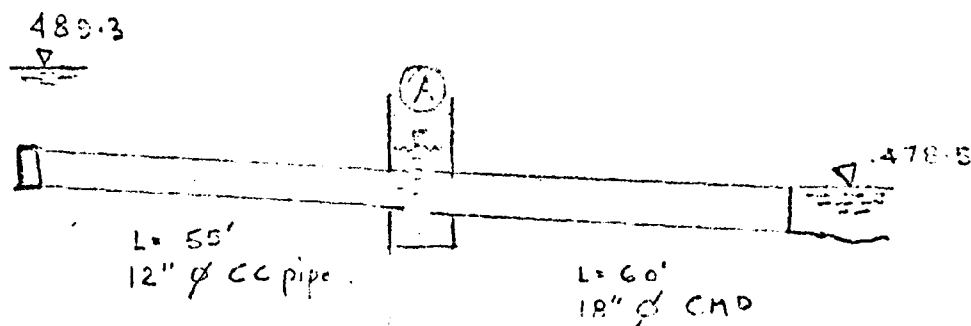
Ch'k. by JMD

DISCHARGE OF 12" cement pipe (low level outlet)

Assume 0.5 Entrance loss coef.

pipes flowing full

and tailwater at top of outlet @ E_L.



With $Q = 10$ cfs

h needed for 18" $\phi = 2.6'$

(Fig B-11)

i.e. headwater E_L = $478.5 + 2.6 = 481.1$ @ (A)

for 12" pipe with $h = 489.3 - 481.1 = 8.2'$

$Q = 10.2$ cfs (Fig B-10)

therefore with water surface at E_L 489.3

MAX LOW LEVEL OUTLET FLOW = 10 cfs.

OUTLET ASSUMED CLOSED DURING PMF Analysis.

TAMS

Job No. 1579-1B

Project SPARKLE LAKE DAM

Subject HYDROLOGIC HYDRAULIC COMPUTATIONS

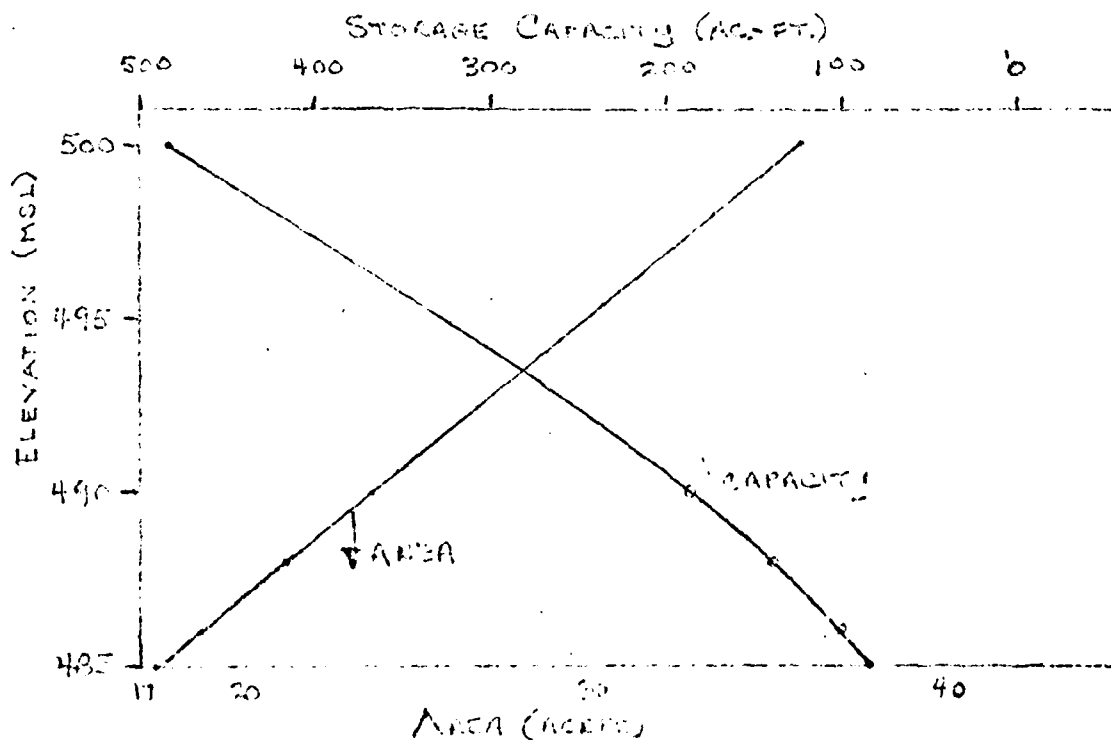
Sheet 4 of 17

Date JUNE 23, '81

By DLC

Ch'k. by J. M. D.

EL.	(ft.) ΔH	(ac.) AREA	MEAN AREA	(ac.-ft.) $\Delta VOL.$	(ac.-ft.) STORAGE.
485		17.45			84
486	1	18.67	18.06	18.06	102.1
488	2	21.12	19.895	39.79	141.9
490	2	23.57	22.345	44.69	186.5
500	10	35.51	29.69	296.9	483.4



 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 11 APR 80

		SPARKLE LAKE DAM					PHASE 1 SAFETY INSPECTION				
		HEC-1 PMF ANALYSIS (NO DAM BREAK)									
		0	20	0	0	0	0	0	0	0	0
1	A1										
2	A2										
3	A3										
4	B	150									
5	P1	5									
6	J	1									
7	J1	1	0.75	0.5	0.25						
8	K	0									
9	K1		1 SPARKLE LAKE BASIN RUNOFF								
10	M	1	0.16	0.16	0.16						
11	P		22	112	123	133	141				
12	T										
13	Y	0.87	0.625								
14	X	-1	-0.1	1.5							
15	K	1	2								
16	K1		2 ROUTE HYDROGRAPH THROUGH SPARKLE LAKE								
17	Y		1	1							
18	Y1	1									
19	Y4	485	487	489.3	495						
20	Y5	3	5	7.70	11.20						
21	SS	84	102.1	141.9	186.5	483.6					
22	SE	485	486	488	490	500					
23	SS	485									
24	SS	489.3	3.1	1.5	310						
25	K	99									

.....
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 OLM SAFETY VERSION JULY 1978
 LAST MODIFICATION 01 APR 82

RUN DATE 01/07/707.
 TIME 10:52:33.

SPARKLE LAKE DAM
 PHASE 1 SAFETY INSPECTION
 HEC 1 PMF ANALYSIS (NO DAM BREAK)

JOB SPECIFICATION
 NO NH2 NMIN IDAY IMR IMTU METPC IPLI IPRT NSTAN
 150 0 20 0 0 0 0 0 0 0
 JOBER NAT LROPT TRACE
 5 0 0 0

MULTI-PLAN ANALYSES TO BE PERFORMED
 NELLAN=1 NR10=4 LR10=1
 RTIOS= .25 .50 .75 1.00

.....

SUB-AREA RUNOFF COMPUTATION

1 SPARKLE LAKE BASIN RUNOFF

ISTAG ICOMP IECOV ITAPE UPLY UJPT INAME ISTAGE IAUFG
 1 0 0 0 0 0 0 0 0
 HYDROGRAPH DATA
 INYDD 1UMH TAREA SNAP TSDA TRPCD RATIO ISNOW ISAVE LOCAL
 1 .16 0.00 .16 0.00 0.000 0 1 0

PRECIP DATA
 SPFE PVS H6 R12 R24 R48 R72 F95
 0.00 22.00 112.00 123.00 133.00 141.00 0.00 0.00
 TRPCD COMPUTED BY THE PROGRAM IS .800

LOSS DATA
 LROST STIRKS OLIAK RILOK ERAIN STIRKS RTIOK STRIL CNSTL ALSWA RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 1.00 .10 0.00 .17

UNIT HYDROGRAPH DATA
 TP= .87 CP= .63 NTA= 0

RECESSION DATA
 STRO= -1.00 GRCSN= -.10 RTIOS= 1.50
 APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TCR= 2.91 AND R= 2.39 INTERVALS

UNIT HYDROGRAPH IS END-OF-PERIOD ORIGINATES, LAG= .86 HOURS, CP= .63 VOL= 1.00
 15. 51. 71. 39. 26. 17. 11. 7. 5.

MO,DA	HR,MIN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW	COMP 0	MO,DA	HR,MIN	PERIOD	RAIN	EXCS	LOSS	COMP 0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.01	.20	1	.00	.00	.00	0.	0.	1.02	1.20	76	.04	.01	.03	2.
1.01	.40	2	.00	.00	.00	0.	0.	1.02	1.40	77	.04	.01	.03	3.
1.01	1.00	3	.00	.00	.00	0.	0.	1.02	2.00	78	.04	.01	.03	3.
1.01	1.20	4	.00	.00	.00	0.	0.	1.02	2.20	79	.04	.01	.03	3.
1.01	1.40	5	.00	.00	.00	0.	0.	1.02	2.40	80	.04	.01	.03	3.
1.01	2.00	6	.00	.00	.00	0.	0.	1.02	3.00	81	.04	.01	.03	3.
1.01	2.20	7	.00	.00	.00	0.	0.	1.02	3.20	82	.04	.01	.03	3.
1.01	2.40	8	.00	.00	.00	0.	0.	1.02	3.40	83	.04	.01	.03	3.
1.01	3.00	9	.00	.00	.00	0.	0.	1.02	4.00	84	.04	.01	.03	3.
1.01	3.20	10	.00	.00	.00	0.	0.	1.02	4.20	85	.04	.01	.03	3.

2 ROUTE HYDROGRAPH THROUGH SPARKLE LAKE

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ISTAG2  ---ICOMP---ICCON  :TAPF  -- JPLT-----JPRT-----IPIAME-----ISTAGE  ---IAUTD  ---
2        1        0        0        0        0        0        1        0        0

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ROUTING DATA							
CLASS	CLASS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

INSTPS	NSTOL	LAG	AMSK	X	TSX	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	84.	-1

STAGE	85.00	87.00	89.30	95.00
1				
2				
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9				
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100				

FLC	0.00	5.00	7.70	11.20
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CAPACITY	84.	102.	142.	187.	483.
ELEVATION	495.	486.	488.	490.	500.

CREL	SPWID	COGW	EXPW	ELEV	COOL	CAPEA	EXPL
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TOBEL	COOD	EXP	DAMVID
489.3	3.1	1.5	310.

STATION.....2. PLAN 1. RATIO 1.

END-OF-PERIOD HYDROGRAPH ORIGINATES

0074100

[illegible]

STORAGE...

	STORAGE					
A.	84.	84.	84.	84.	84.	84.
B.	84.	84.	84.	84.	84.	84.
C.	84.	84.	84.	84.	84.	84.
D.	84.	84.	84.	84.	84.	84.
E.	84.	84.	84.	84.	84.	84.
F.	84.	84.	84.	84.	84.	84.
G.	84.	84.	84.	84.	84.	84.
H.	84.	84.	84.	84.	84.	84.
I.	84.	84.	84.	84.	84.	84.
J.	84.	84.	84.	84.	84.	84.
K.	84.	84.	84.	84.	84.	84.
L.	84.	84.	84.	84.	84.	84.
M.	84.	84.	84.	84.	84.	84.
N.	84.	84.	84.	84.	84.	84.
O.	84.	84.	84.	84.	84.	84.
P.	84.	84.	84.	84.	84.	84.
Q.	84.	84.	84.	84.	84.	84.
R.	84.	84.	84.	84.	84.	84.
S.	84.	84.	84.	84.	84.	84.
T.	84.	84.	84.	84.	84.	84.
U.	84.	84.	84.	84.	84.	84.
V.	84.	84.	84.	84.	84.	84.
W.	84.	84.	84.	84.	84.	84.
X.	84.	84.	84.	84.	84.	84.
Y.	84.	84.	84.	84.	84.	84.
Z.	84.	84.	84.	84.	84.	84.
AA.	84.	84.	84.	84.	84.	84.
AB.	84.	84.	84.	84.	84.	84.
AC.	84.	84.	84.	84.	84.	84.
AD.	84.	84.	84.	84.	84.	84.
AE.	84.	84.	84.	84.	84.	84.
AF.	84.	84.	84.	84.	84.	84.
AG.	84.	84.	84.	84.	84.	84.
AH.	84.	84.	84.	84.	84.	84.
AI.	84.	84.	84.	84.	84.	84.
AJ.	84.	84.	84.	84.	84.	84.
AK.	84.	84.	84.	84.	84.	84.
AL.	84.	84.	84.	84.	84.	84.
AM.	84.	84.	84.	84.	84.	84.
AN.	84.	84.	84.	84.	84.	84.
AO.	84.	84.	84.	84.	84.	84.
AP.	84.	84.	84.	84.	84.	84.
AQ.	84.	84.	84.	84.	84.	84.
AR.	84.	84.	84.	84.	84.	84.
AS.	84.	84.	84.	84.	84.	84.
AT.	84.	84.	84.	84.	84.	84.
AU.	84.	84.	84.	84.	84.	84.
AV.	84.	84.	84.	84.	84.	84.
AW.	84.	84.	84.	84.	84.	84.
AX.	84.	84.	84.	84.	84.	84.
AY.	84.	84.	84.	84.	84.	84.
AZ.	84.	84.	84.	84.	84.	84.
BA.	84.	84.	84.	84.	84.	84.
BB.	84.	84.	84.	84.	84.	84.
BC.	84.	84.	84.	84.	84.	84.
BD.	84.	84.	84.	84.	84.	84.
BE.	84.	84.	84.	84.	84.	84.
BF.	84.	84.	84.	84.	84.	84.
BG.	84.	84.	84.	84.	84.	84.
BH.	84.	84.	84.	84.	84.	84.
BI.	84.	84.	84.	84.	84.	84.
BJ.	84.	84.	84.	84.	84.	84.
BK.	84.	84.	84.	84.	84.	84.
BL.	84.	84.	84.	84.	84.	84.
BM.	84.	84.	84.	84.	84.	84.
BN.	84.	84.	84.	84.	84.	84.
BO.	84.	84.	84.	84.	84.	84.
BP.	84.	84.	84.	84.	84.	84.
BQ.	84.	84.	84.	84.	84.	84.
BR.	84.	84.	84.	84.	84.	84.
BS.	84.	84.	84.	84.	84.	84.
BT.	84.	84.	84.	84.	84.	84.
BU.	84.	84.	84.	84.	84.	84.
BV.	84.	84.	84.	84.	84.	84.
BW.	84.	84.	84.	84.	84.	84.
BX.	84.	84.	84.	84.	84.	84.
BY.	84.	84.	84.	84.	84.	84.

Sheet 91 of 17

84.	85.	86.	87.	88.	89.	90.	91.	92.	93.	94.	95.	96.	97.	98.	99.	100.	101.	102.	103.	104.	105.	106.	107.	108.	109.	110.	111.	112.	113.	114.	115.	116.	117.	118.	119.	120.	121.	122.	123.	124.	125.	126.	127.	128.	129.	130.	131.	132.	133.	134.	135.	136.	137.	138.	139.	140.	141.	142.	143.	144.	145.	146.	147.	148.	149.	150.	151.	152.	153.	154.	155.	156.	157.	158.	159.	160.	161.	162.	163.	164.	165.	166.	167.	168.	169.	170.	171.	172.	173.	174.	175.	176.	177.	178.	179.	180.	181.	182.	183.	184.	185.	186.	187.	188.	189.	190.	191.	192.	193.	194.	195.	196.	197.	198.	199.	200.	201.	202.	203.	204.	205.	206.	207.	208.	209.	210.	211.	212.	213.	214.	215.	216.	217.	218.	219.	220.	221.	222.	223.	224.	225.	226.	227.	228.	229.	230.	231.	232.	233.	234.	235.	236.	237.	238.	239.	240.	241.	242.	243.	244.	245.	246.	247.	248.	249.	250.	251.	252.	253.	254.	255.	256.	257.	258.	259.	260.	261.	262.	263.	264.	265.	266.	267.	268.	269.	270.	271.	272.	273.	274.	275.	276.	277.	278.	279.	280.	281.	282.	283.	284.	285.	286.	287.	288.	289.	290.	291.	292.	293.	294.	295.	296.	297.	298.	299.	300.	301.	302.	303.	304.	305.	306.	307.	308.	309.	310.	311.	312.	313.	314.	315.	316.	317.	318.	319.	320.	321.	322.	323.	324.	325.	326.	327.	328.	329.	330.	331.	332.	333.	334.	335.	336.	337.	338.	339.	340.	341.	342.	343.	344.	345.	346.	347.	348.	349.	350.	351.	352.	353.	354.	355.	356.	357.	358.	359.	360.	361.	362.	363.	364.	365.	366.	367.	368.	369.	370.	371.	372.	373.	374.	375.	376.	377.	378.	379.	380.	381.	382.	383.	384.	385.	386.	387.	388.	389.	390.	391.	392.	393.	394.	395.	396.	397.	398.	399.	400.	401.	402.	403.	404.	405.	406.	407.	408.	409.	410.	411.	412.	413.	414.	415.	416.	417.	418.	419.	420.	421.	422.	423.	424.	425.	426.	427.	428.	429.	430.	431.	432.	433.	434.	435.	436.	437.	438.	439.	440.	441.	442.	443.	444.	445.	446.	447.	448.	449.	450.	451.	452.	453.	454.	455.	456.	457.	458.	459.	460.	461.	462.	463.	464.	465.	466.	467.	468.	469.	470.	471.	472.	473.	474.	475.	476.	477.	478.	479.	480.	481.	482.	483.	484.	485.	486.	487.	488.	489.	490.	491.	492.	493.	494.	495.	496.	497.	498.	499.	500.	501.	502.	503.	504.	505.	506.	507.	508.	509.	510.	511.	512.	513.	514.	515.	516.	517.	518.	519.	520.	521.	522.	523.	524.	525.	526.	527.	528.	529.	530.	531.	532.	533.	534.	535.	536.	537.	538.	539.	540.	541.	542.	543.	544.	545.	546.	547.	548.	549.	550.	551.	552.	553.	554.	555.	556.	557.	558.	559.	560.	561.	562.	563.	564.	565.	566.	567.	568.	569.	570.	571.	572.	573.	574.	575.	576.	577.	578.	579.	580.	581.	582.	583.	584.	585.	586.	587.	588.	589.	590.	591.	592.	593.	594.	595.	596.	597.	598.	599.	600.	601.	602.	603.	604.	605.	606.	607.	608.	609.	610.	611.	612.	613.	614.	615.	616.	617.	618.	619.	620.	621.	622.	623.	624.	625.	626.	627.	628.	629.	630.	631.	632.	633.	634.	635.	636.	637.	638.	639.	640.	641.	642.	643.	644.	645.	646.	647.	648.	649.	650.	651.	652.	653.	654.	655.	656.	657.	658.	659.	660.	661.	662.	663.	664.	665.	666.	667.	668.	669.	670.	671.	672.	673.	674.	675.	676.	677.	678.	679.	680.	681.	682.	683.	684.	685.	686.	687.	688.	689.	690.	691.	692.	693.	694.	695.	696.	697.	698.	699.	700.	701.	702.	703.	704.	705.	706.	707.	708.	709.	710.	711.	712.	713.	714.	715.	716.	717.	718.	719.	720.	721.	722.	723.	724.	725.	726.	727.	728.	729.	730.	731.	732.	733.	734.	735.	736.	737.	738.	739.	740.	741.	742.	743.	744.	745.	746.	747.	748.	749.	750.	751.	752.	753.	754.	755.	756.	757.	758.	759.	760.	761.	762.	763.	764.	765.	766.	767.	768.	769.	770.	771.	772.	773.	774.	775.	776.	777.	778.	779.	780.	781.	782.	783.	784.	785.	786.	787.	788.	789.	790.	791.	792.	793.	794.	795.	796.	797.	798.	799.	800.	801.	802.	803.	804.	805.	806.	807.	808.	809.	810.	811.	812.	813.	814.	815.	816.	817.	818.	819.	820.	821.	822.	823.	824.	825.	826.	827.	828.	829.	830.	831.	832.	833.	834.	835.	836.	837.	838.	839.	840.	841.	842.	843.	844.	845.	846.	847.	848.	849.	850.	851.	852.	853.	854.	855.	856.	857.	858.	859.	860.	861.	862.	863.	864.	865.	866.	867.	868.	869.	870.	871.	872.	873.	874.	875.	876.	877.	878.	879.	880.	881.	882.	883.	884.	885.	886.	887.	888.	889.	890.	891.	892.	893.	894.	895.	896.	897.	898.	899.	900.	901.	902.	903.	904.	905.	906.	907.	908.	909.	910.	911.	912.	913.	914.	915.	916.	917.	918.	919.	920.	921.	922.	923.	924.	925.	926.	927.	928.	929.	930.	931.	932.	933.	934.	935.	936.	937.	938.	939.	940.	941.	942.	943.	944.	945.	946.	947.	948.	949.	950.	951.	952.	953.	954.	955.	956.	957.	958.	959.	960.	961.	962.	963.	964.	965.	966.	967.	968.	969.	970.	971.	972.	973.	974.	975.	976.	977.	978.	979.	980.	981.	982.	983.	984.	985.	986.	987.	988.	989.	990.	991.	992.	993.	994.	995.	996.	997.	998.	999.	1000.
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PEAK CUTFLOW IS 480. AT TIME 41.00 HOURS

CFS	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
480.	14.	194.	56.	27.	4026.
INCHES		5.	2.	1.	11.
MM		11.27	12.97	13.00	13.00
AC-FT		286.26	329.34	330.30	330.30
THOUS CU M		96.	111.	111.	111.
		119.	136.	137.	137.

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

OPERATION STATION AREA PLAN RATIO 1 RATIO 2 RATIO 3 RATIO 4 RATIOS APPLIED TO FLOWS
 .25 .50 .75 1.00

HYDROGRAPH AT 1 .16 1 150. 300. 450. 601.
 .411 4.251 12.751 17.011

ROUTED TO 2 .16 1 5. 21. 250. 480.
 .411 .151 591 7.071 13.531

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 INITIAL VALUE SPILLWAY CREST TOP OF DAM
 485.00 485.00 489.30
 STORAGE 84. 84. 171.
 OUTFLOW 0. 0. 8.

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1													
ELEVATION		INITIAL VALUE		SPILLWAY CREST		TOP OF DAM							
STORAGE		485.00		+85.00		489.30							
OUTFLD		84.		64.		171.							
		0.		0.		0.							
RATIO OF PME	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF							
						MAX OUTFLOW		TIME OF					
												FAILURE	
												HOURS	
.25	487.36	0.00	129.	5.	0.00	50.00	0.00	0.00	0.00				
.50	488.36	.06	172.	21.	5.87	46.87	0.30	0.30	0.30				
.75	488.78	.40	180.	250.	9.33	41.57	0.60	0.60	0.60				
1.00	489.92	.62	185.	480.	10.00	41.00	0.00	0.00	0.00				

.....
 FLOOD HYDROGRAPH PACKAGE (MFC-1)
 - DAM SAFETY VERSION - JULY 1978
 - LAST MODIFICATION 01 APR 80

STABILITY ANALYSIS

APPENDIX E

Since there are no concrete gravity structures
at the damsite, no stability analysis is performed (Ref. 3).

REFERENCES

APPENDIX F

REFERENCES

1. "Flood Hydrograph Package (HEC-1) Users Manual for Dam Safety Investigations", U. S. Army Corps of Engineers, Hydrologic Engineering Center, September 1979.
2. "Seasonal Variation of the Probable Maximum Precipitation, East of the 105th Meridian for Areas from 10 to 1,000 Square Miles, and Durations of 6, 12, 24 and 48 Hours", Hydrometeorological Report No. 33. Weather Bureau, U.S. Department of Commerce, April 1956.
3. "Recommended Guidelines for Safety Inspection of Dams", Department of the Army, Office of the Chief of Engineers, Appendix B.
4. The University of the State of New York, The State Education Department State Museum and Science Service Geological Survey - MAP and Chart Series No. 5, Geologic MAP of New York 1961, Lower Hudson Sheet.
5. "Design of Small Dams," United States Department of the Interior, Bureau of Reclamation, 1974.

