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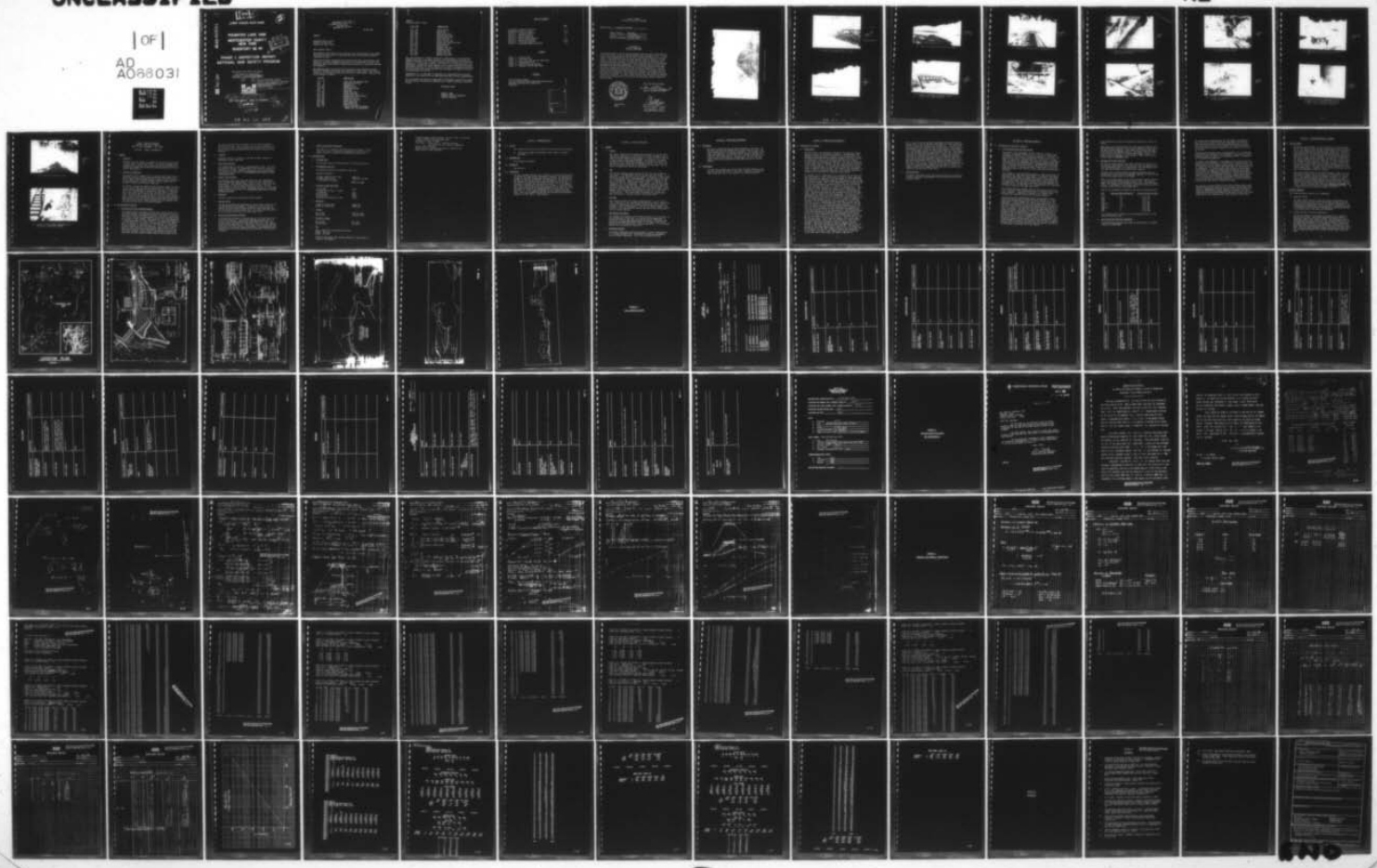

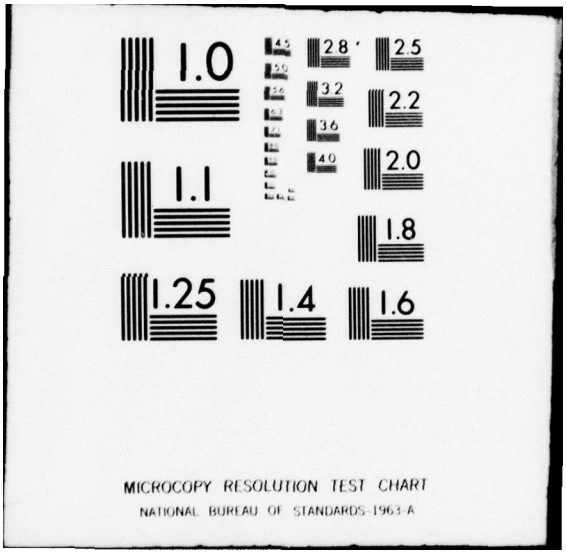
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LOWER HUDSON RIVER BASIN

POCANTICO LAKE DAM
WESTCHESTER COUNTY
NEW YORK
INVENTORY № 49

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

CONTRACT NO. DACW 51-78-C-0035

(15) (6) National Dam Safety Program. Pocantico Lake Dam, Lower Hudson River Basin, Westchester County, New York (Inventory Number 49). Phase I Inspection Report.

(10) John B. Stetson

NEW YORK DISTRICT CORPS OF ENGINEERS

(11) AUGUST 1978

(12) 94 P.

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DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, NEW YORK
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

2 OCT 1978

NANEN-F

Honorable Hugh L. Carey
Governor of New York
Albany, New York 12224

Dear Governor Carey:

The purpose of this letter is to inform you of a clarification of the guidelines used by this office in assessing dams under the National Program of Inspection of Dams.

Office of the Chief of Engineers has recently provided a clarification that dams with seriously inadequate spillways are to be assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The following dams in your state have previously been assessed as having seriously inadequate spillways, with capability to pass safely only the percentage of the probable maximum flood as noted in each report. They are now to be assessed as unsafe:

I.D. NO.	NAME OF DAM
N.Y. 59	Lower Warwick Reservoir Dam
N.Y. 4	Salisbury Mills Dam
N.Y. 45	Amawalk Dam
N.Y. 418	Jamesville Dam
N.Y. 685	Colliersville Dam
N.Y. 6	Delta Dam
N.Y. 421	Oneida City Dam
N.Y. 39	Croton Falls Dam
N.Y. 509	Chadwick Dam (Plattenkill)
N.Y. 66	Boyds Corner Dam
N.Y. 397	Cranberry Lake Dam
N.Y. 708	Seneca Falls Dam
N.Y. 332	Lake Sebago Dam
N.Y. 338	Indian Brook Dam
N.Y. 33	Lower(S) Wiccopee Dam (Lower Hudson W.S. for Peekskill)

NANEN-F
Honorable Hugh L. Carey

I.D. NO.	NAME OF DAM
N.Y. 49	Pocantico Dam
N.Y. 445	Attica Dam
N.Y. 658	Cork Center Dam
N.Y. 153	Jackson Creek Dam
N.Y. 172	Lake Algonquin Dam
N.Y. 318	Sixth Lake Dam
N.Y. 13	Butlet Storage Dam
N.Y. 90	Putnam Lake (Bog Brook Dam)
N.Y. 166	Pecks Lake Dam
N.Y. 674	Bradford Dam
N.Y. 75	Sturgeon Pool Dam
N.Y. 414	Skaneateles Dam
N.Y. 155	Indian Lake Dam
N.Y. 472	Newton Falls Dam
N.Y. 362	Buckhorn Lake Dam

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.

Consequently, it is advisable to implement the recommendations previously furnished in the reports for the above-mentioned dams as soon as practicable.

It is requested that owners of these dams be furnished a copy of this letter and that copies be permanently appended to all reports previously furnished to you.

Sincerely yours,

CLARK H. BENN
Colonel, Corps of Engineers
District Engineer

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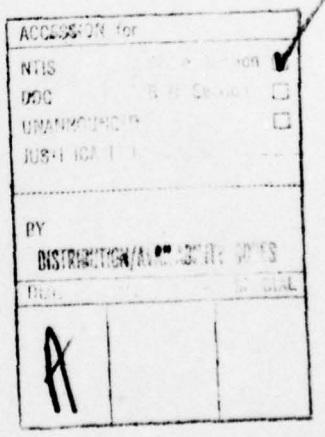
FIGURES

APPENDIX



PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Pocantico Dam NY49

State Located New York
County Located Westchester
Stream Pocantico River
Date of Inspection July 26, 1978

ASSESSMENT OF GENERAL CONDITIONS

The Pocantico Dam is a water supply reservoir which has been discontinued as a source for water supply by the New Rochelle Water Company in 1977. At this time, routine maintenance of the facility is being performed by on-site personnel. The earthen dam does not show physical signs of distress. At the time of inspection, the reservoir water surface level was being kept well below the spillway elevation. A hydrologic investigation has determined the spillway to be seriously inadequate. Steps should be taken to insure the facility is at least capable of passing a 1/2 Probable Maximum Flood (PMF). Since the spillway has been found to be seriously inadequate it is recommended that immediately, during periods of unusually high runoff, the owner should provide around-the-clock surveilance and have a contingency plan in the event of overtopping. The spillway is currently only capable of passing 28 percent of the PMF. A rather sizable tourist area (Sleepy Hollow Restorations) exists downstream of the facility and reportedly receives 1400 visitors per week.

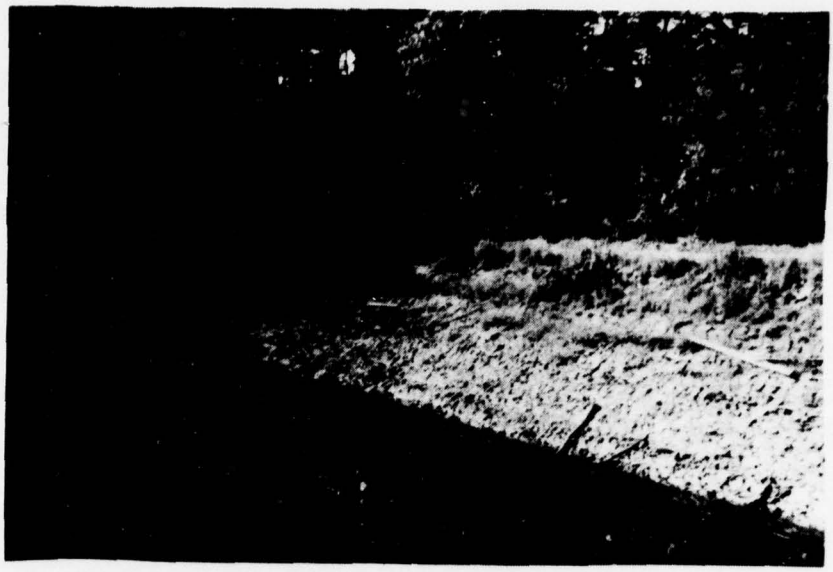
Dale Engineering Company

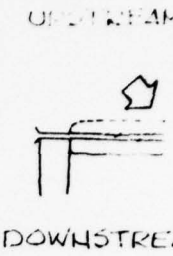
John B. Stetson, President

Approved By:
Date:

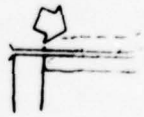
Col. Clark H. Benn
New York District Engineer
19 September 1978

Overview of top of earthen dam.



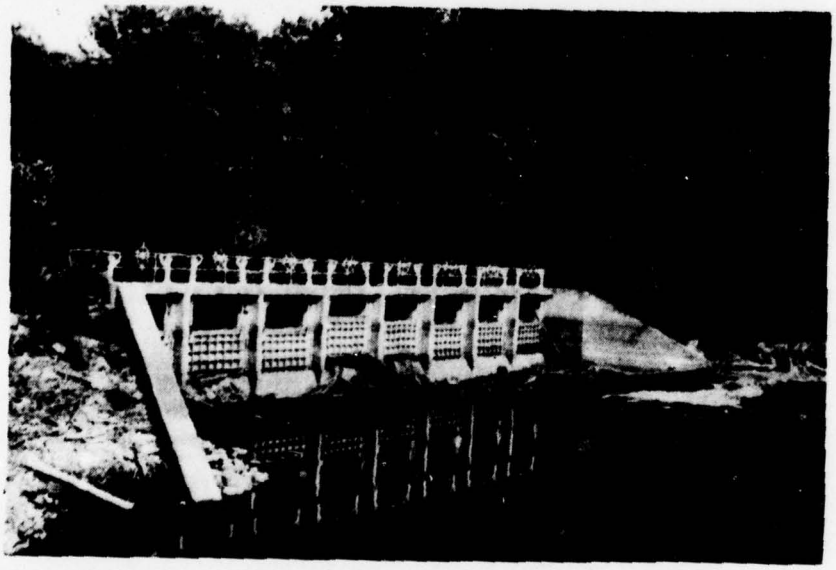


1. View of riprap on face of dam.

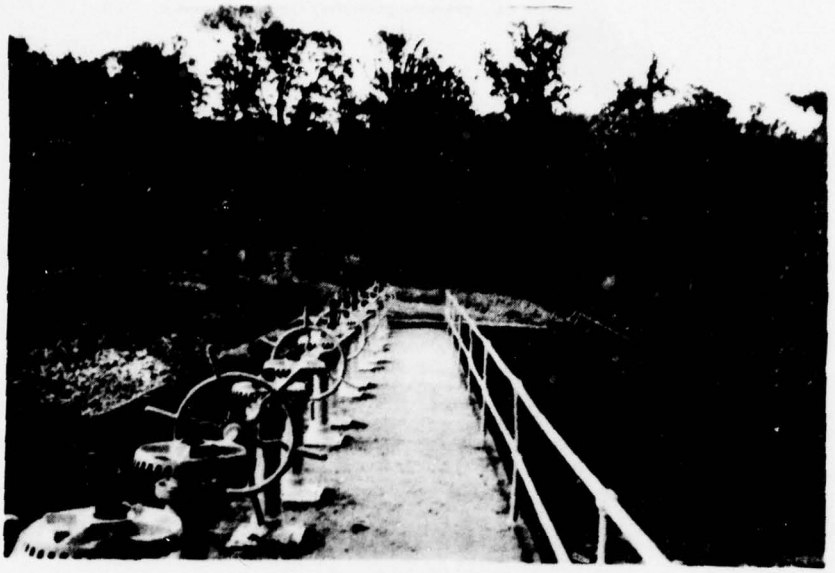


2. View of intake tower on upstream face of dam.

3. View of reservoir upstream of dam.



4. View of spillway structure with eight 8 X 4 sluice gates.

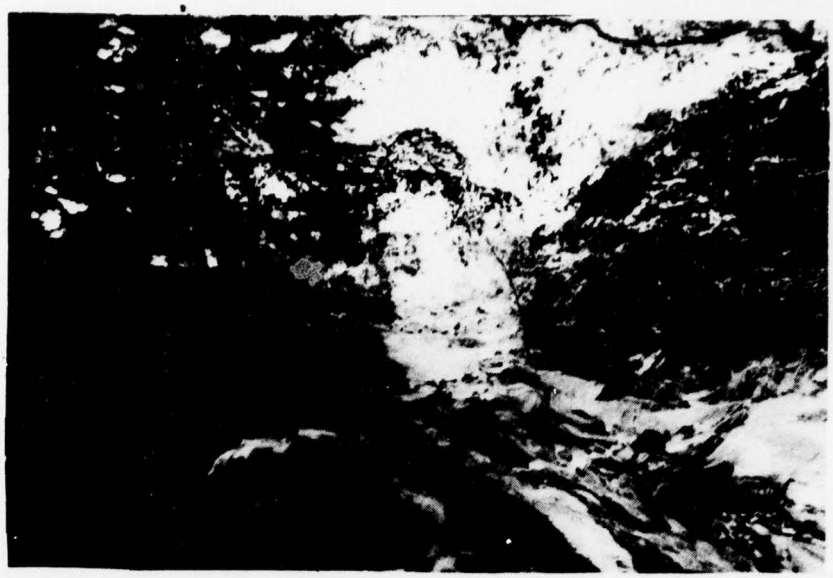


5. Manually operated gate equipment.

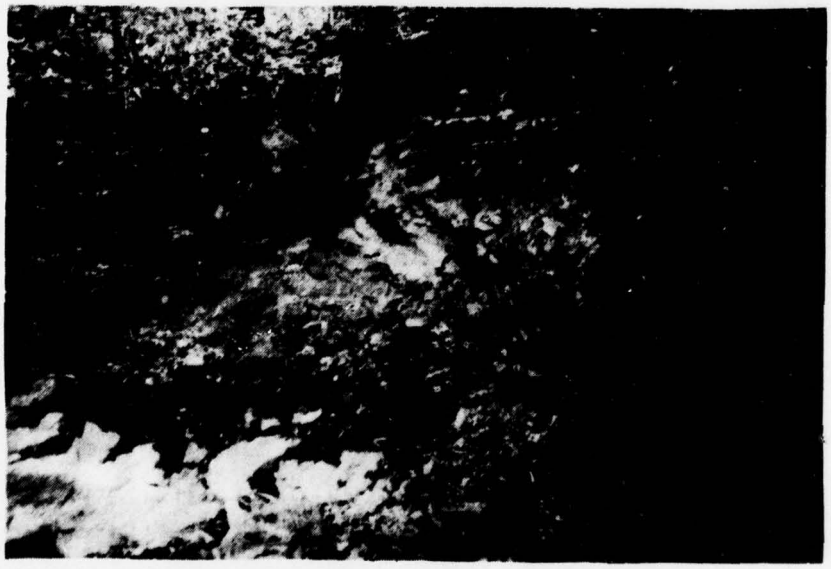
6. View of spillway from downstream channel.

7. Detail of spillway gate dividing wall showing cracks.

8. Detail of spillway floor slab.



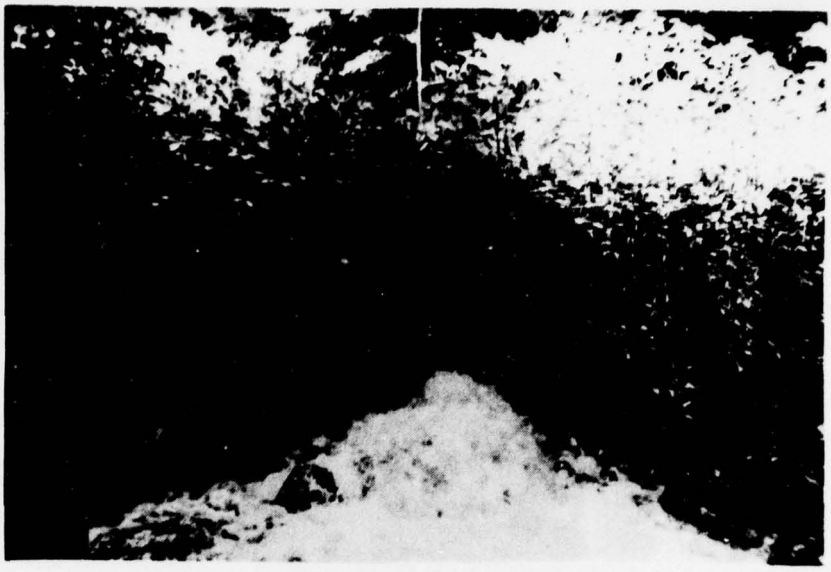
9. Downstream channel.



10. Detail of embankment erosion in downstream channel.

11. Abandoned filtration plant below dam.

12. Cattails at toe of embankment near storage tank. Wetness from either seepage or poor surface drainage.



13. Outflow discharge pipe.

14. Cavity in east abutment embankment area below dam. Some water flowing.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - POCANTICO ID# - NY49

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the structural and hydraulic condition of the Pocantico Dam and appurtenant structures, owned by the New Rochelle Water Company, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Pocantico Dam is an earth fill dam with a short concrete core wall which extends to approximately 14-1/2 feet below the top elevation of the dam. The width of the top of the dam is approximately 12 feet. The dam is approximatley 35 feet high and approximately 300 feet in total length. The upstream slope of the embankment is 2 feet horizontal on 1 foot vertical. The downstream slopes are 1-3/4 horizontal on 1 vertical. The upstream face of the embankment is riprapped at the waterline. The spillway is located near the west abutment of the main structure. The spillway is approximately 75 feet long and is controlled by eight 4 feet high by 8 feet wide sluice gates which are manually operated from a bridge across the spillway. The spillway is constructed on bedrock and discharges through a bedrock channel down to the Pocantico River.

The main drainline for the reservoir is a 24 inch pipe which is controlled from the intake structure and discharges downstream in the Pocantico River. The operator of the dam indicates that this drain is partially obstructed so that full outlet flow can not be obtained.

b. Location

Pocantico Lake Dam is located in the Town of Mount Pleasant in Westchester County, New York.

c. Size Classification

The maximum height of the dam is approximately 35 feet. The storage volume of the dam is approximatley 1,595 acre feet to the top elevation of the dam. Therefore, the dam is in the intermediate size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The Pocantico River, the receiving stream from the impoundment flows through Philipsburgh Manor, a portion of the Sleepy Hollow Restorations. This popular tourist area is open to the public and large numbers of tourist daily move about the area. The site receives 1400 visitors per week. Therefore, the dam is in the high hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the New Rochelle Water Company.

f. Purpose of Dam

The dam has recently been abandoned as a water supply reservoir for the New Rochelle Water Company. Therefore, the facility has at present no useful purpose except to maintain the environment that has existed in the area for many years. No significant recreational use is made of the facility at the present time.

g. Design and Construction History

No information was found to indicate the date of the original construction of the dam. Construction drawings dated May, 1916, indicate a reconstruction which took place during that time. The reconstruction consisted of the raising of the dam and the improvement of the spillway control. This project also indicates the construction of a core wall through the center of the embankment which extends only 14-1/2 feet below the top of the dam as it was reconstructed.

h. Normal Operational Procedures

The dam site is currently staffed by the Water Company. At this time, the status of operational procedures for the dam is not known. The dam is currently not operational (normal use).

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of the Pocantico Dam is 10.48 square miles.

b. Discharge at Dam Site

No discharge records are available at this site.

Computed Discharges:

Spillway capacity, top of dam	4000 cfs
Spillway design flood, (with gates fully open)	6830 cfs (1/2 PMF)
	14000 cfs (PMF)

c. Elevation (feet above MSL)

Top of dam*	225.0
Spillway design flood - 1/2 PMF discharge	226.7
PMF discharge	229.2
Spillway crest	215.0
Stream bed at centerline of dam	185.0

d. Reservoir

Length of maximum pool	10000 feet
Length of normal pool	10000 feet

e. Storage

Top of dam	1595 acre feet
Normal pool	920 acre feet

f. Reservoir Surface

Top of dam	91.0 acre
Spillway pool	67.2 acre

g. Dam

Type - Earth fill with concrete core wall.
Length - 300 feet.
Height - 35 feet.

*Plans in this report show various elevations, some related to proposed improvements.

Freeboard between normal reservoir and top of dam - 6 feet with gates closed, 10 feet with gates open.
Top width - 6 feet, 6 inches.
Side slopes - 2 horizontal to 1 vertical upstream.
1-3/4 horizontal to 1 vertical downstream.
Zoning - None indicated.
Impervious core - Concrete core wall to elevation 223.
Grout curtain - None indicated.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for review for the Pocantico Dam included:

1) The plans reviewed are enclosed in this report in Figures 1 through 6.

2.2 CONSTRUCTION

No information available.

2.3 OPERATION

See Section 4.

2.4 EVALUATION

The data reviewed indicates that a number of structure modifications to the facility were either performed or planned. The construction documents infer that the dam was constructed prior to 1916 whereas the May 10, 1916 plans represent an improvement to the facility. In the information available for review, the dam lacks sufficient information to evaluate the construction records. It is not known if additional information on the dam exists or where it could be located. Due to the present status and condition of the facility, (with consideration given to the recommendations provided herein, See Section 7) it is not deemed necessary to try to locate additional data. The visual examination and the data reviewed were considered adequate for this Phase 1 investigation.

SECTION 3 - VISUAL INSPECTION

3.1 SUMMARY

a. General

The visual inspection of Pocantico Dam took place on July 26, 1978. The dam has functioned as a reservoir for a water treatment facility owned by the New Rochelle Water Company. In 1977 the use of the facility for water supply was abandoned. The property is currently staffed with water department employees utilizing the structure at the facility as a storage and maintenance facility. At time of inspection the water level was six feet below the spillway. See Section 6 for additional narrative information.

b. Dam

The dam and spillway visually conform to the plans as provided in this report. The embankment has tall grasses and small brush. It is generally in good condition with no areas of seepage or erosion found on the downstream face of the embankment. The low head in the reservoir could however, reduce or eliminate evidence of seepage at the time of inspection. Photograph 12 shows cattails at the toe of the embankment near the storage tank. This wetness could be from either seepage or poor surface drainage. Seepage has been noted before by the plant operator when the reservoir has a full normal head. Photograph 14 also shows some water flowing in a cavity or trench area of unknown origin in the east abutment which leads up to a pair of stilling basins. These areas should be checked for seepage again when the reservoir is known to have a significant head.

c. Spillway

The spillway concrete sill shown in Photograph 8 is in fair condition. Some wear of the surface material has taken place. One of the spillway's dividing wall and support frame for the sluice gates is cracked as shown in Photograph 7. The spillway gates, shown in Photograph 5, are reported to be operable but are not well maintained so as to be easily operated.

d. Appurtenant Structures

The drawdown and treatment plant intake structure is in the center of the upstream face of the dam. The rod for the draindown gate is broken off with the gate operating partially open. Therefore, the dam cannot be drawn down without repair of the control rod unless flows are directed through the filtration equipment. It is not known whether this is possible or practical.

e. Downstream Channel

The channel immediately below the spillway is shown in Photograph 6. It is largely exposed rock. Photograph 10 shows some embankment erosion further downstream. This is not considered serious.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

Operational procedures have not been documented or written up by the owner nor were they demonstrated to the inspection team. The lowest drawdown gate is presently inoperable. The spillway sluice gates were reported to be operable but are manually operated and cannot be turned very easily. The use of the dam and reservoir as a water supply source has been discontinued. At this time, the owner has no future intention of using the facility for a water supply.

4.2 MAINTENANCE

The facility currently has on-site staff personnel working in the shop and storage facilities in the plant. Currently, the embankment slopes and level of the reservoir are being maintained.

SECTION 5 - HYDROLOGY AND HYDRAULICS

5.1 EVALUATION OF FEATURES

a. Design Data

For this report, no information relevant to the hydrologic and/or hydraulic design for the dam was available. The hydrologic and hydraulic analysis provided in Appendix C was performed utilizing information obtained from construction documents and other sources of information listed in the reference section of this report. Pocantico Dam is an earthen type dam with a spillway structure containing eight (8) sluice gates. The dam is not readily accessible to the general public. The drainage area contributing to the reservoir is approximately 10.5 square miles including 0.167 square miles of reservoir water surface. The volume of the impoundment is purely a function of natural watershed. For the dams location, no information was available on historical flood events.

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and/or adequacy. This potential was assessed in the development of the Probable Maximum Flood (PMF) for the watershed and a subsequent routing through the reservoir system. PMF is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration runoff of a specific location that is considered reasonably possible for a particular drainage area. Since this dam is in the intermediate category with a high hazard, the guidelines (Ref. 1) require the dam to pass the Probable Maximum Flood. The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. In preparing the hydrograph, both Clark and Snyder coefficients were estimated. For the Clark Method values of Tc = 7.63 and R = 4.88 were computed. For the Snyder Method, values of Tpr = 2.73 and CP = 0.625 were computed. Two unit hydrographs were developed from these parameters and two sets of hydrographs were later computed for the purposes of comparison. The resulting computations were not similar. Since the Snyder parameter produced excessive PMF discharges for this size of a drainage basin, the Clark Method parameters were used for evaluation of the spillway capacity. The Probable Maximum Flood (PMF) hydrograph was determined using Probable Maximum Precipitation rainfall data obtained in Hydrometeorological Report No. 51. An index rainfall of 24 inches for 200 square miles for a period of 24 hours was used in the analysis. Both the PMF and 1/2 PMF were evaluated. The 1/2 PMF was assumed to be approximately the Standard Project Flood (SPF) in utilizing U.S. Army Corps of Engineers, Hydrologic Engineering Centers, Computer Program (UHCOMP). The peak discharges for the Clark Method were 6,831 cfs for the 1/2 PMF (SPF) and 14,000 cfs for the PMF. The peak discharges for the Snyder Method were 11,400 cfs for the 1/2 PMF (SPF) and 23,500 cfs for the PMF. Hydraulic studies were performed at the spillway structure. These computations, which assumed the sluice gates would remain open, are shown in Appendix C.

The U.S. Army Corps of Engineers, Hydrologic Engineering Centers, Program HEC-1 using the Modified Puls Method for flood routing was used to evaluate the structure and the reservoir. The peak flow discharges were not reduced by the storage effect of the reservoir. The spillway capacity with the gates fully opened is about 4000 cfs. The spillway capacity is 28 percent of the PMF. The analysis indicates the dam would be topped by 2 feet with the 1/2 PMF (SPF) event and by 4 feet with the PMF event. Further work should be performed to determine the accuracy of the computed discharges. Since the dam has been abandoned, removal of the spillway sluice gate works may provide sufficient discharge conveyance section to pass the 1/2 PMF (SPF). This investigation has been determined that due to the very small reduction of the peak discharge from the reservoir storage effect, drawing down the reservoir alone as a remedial measure will probably not be sufficient to prevent overtopping of the dam from 1/2 PMF (SPF).

b. Experience Data

The Owner's Representative at the site was not able to provide information relevant to performance of the spillway during extreme rainfall events.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations And Data Review

The reservoir dam (embankment section) shows no evidence of misalignment, sloughing, surface cracks or erosion of significance which would be indicative of structural movement or distress. The condition of riprap on the upstream face is rated fair to good. Some low vegetation, including small trees and shrubs, are growing along the top of the embankment and the upper upstream slope (generally above the riprap elevations). The embankments downstream face is covered with grasses and low vegetation, with a few small trees and shrubs at various locations. Large trees exist on the downstream slope in the vicinity of both the easterly and westerly abutments.

The spillway is a concrete gated structure. Eight sluice gates approximately four feet wide are provided. The reservoir was drawn down some 6 feet below its normal level at the time of the inspection, a condition which revealed the presence of considerable debris (tree branches, other miscellaneous waste items) against the spillway gates. The spillway's structural concrete components are generally in fair to good condition, although spalling is occurring at various locations, and some cracks exist.

The spillway discharge channel floor (to the Pocantico River) consists of bedrock. This discharge channel is provided with laid up stone sidewalls. Vegetation is growing in the channel floor (through rock seams and cracks) and the stone sidewalls.

Concrete water settling/treatment pools, now abandoned, remain immediately downstream of the dams easterly abutment, at a level approximately midway between the top and toe elevations of the embankment. A large ground level steel storage tank exists just below the downstream toe close to the easterly end of the dam, near the toe of slope of the area where the above mentioned settling tanks are located. The reservoir facilities pump house and an adjacent residential building are located immediately below the embankments westerly downstream toe. No water seepage through or beneath the dam was noted on the embankment slope and area below the downstream toe or in the basements of the pump house and residential building. However, cattails exist at the downstream toe of embankment adjacent to the ground level water storage tank. Operating personnel assigned to the reservoir indicate that a dampness/seepage condition typically develops along the westerly section of the embankments downstream toe in wet seasons.

Close examination of the area indicated no evidence of erosion or piping.

Some seepage was noted near the toe of the slope provided for the abandoned concrete settling tanks located immediately downstream of the dams easterly abutment. A low stone retaining wall has been constructed at the seepage location. The seepage condition apparently has been on-going for a considerable number of years. It appears that the seepage is from a spring or other source outside of the reservoir embankment area.

b. Geology and Seismic Stability

The New York State Geologic Map (1970) indicates the reservoir is situated on Fordham Gneiss. This foliated rock is composed of biotite, hornblende, quartz, and plagioclase. The 1916 reports indicate that the spillway is on natural rock, (gneiss).

Although gneiss has considerable strength and bearing capacity, weathering of the biotite and hornblende components of the rock may yield rotted seams conducive to seepage.

There are no known faults in the vicinity of the reservoir according to the New York State Geologic Survey (1977). The closest known fault shown is four miles west of the dam, across the Hudson River. Of earthquakes listed below, most of the epicenters are not located in the vicinity of any known faults.

Some of the earthquakes recorded for the area are tabulated below:

Date	Intensity-Modified Mercalli	Location Relative to Dam
1916	IV	8 mi. SSE
1933	III	8 mi. SSE
1936	IV	8 mi. E
1937	II	6 mi. NNE
1938 (2)	III	8 mi. NE
1941	III	5 mi. ENE
1964 (2)	II	8 mi. NE
1964	V	8 mi. NE
1967	V	6 mi. NNE

The reservoir dam is located in an area designated Zone 1 on the Seismic Probability Map.

c. Data Review and Stability Evaluation

Available design drawings imply that the dam consists of a homogeneous earth embankment.

The present dam is approximately ten feet higher, and greater in cross section, than the original dam constructed at this site. Additional work should be performed to determine exactly which plans are accurate to the site; a number of different elevations are referenced on different drawings for the elevation of the top of the dam.

Downstream and upstream slopes of approximately 2 to 1 (horizontal to vertical) are indicated. No information is available on the embankment foundation, make-up of the earthen interior, or method of soil placement and compaction.

At present, the embankment is considered to be in good structural condition with no indication of instability or deterioration. The reported past periodic seepage, which was not occurring at the time of inspection, has not had a significant effect on the condition of the embankment. To reduce hazards associated with future operations, trees on slopes of the dam should be removed to eliminate the potential for embankment seepage and structural damage which could occur from a storm-caused uprooting. Slope grasses should be mowed to enable rapid detection of possible seepage occurrences. It is anticipated that, properly maintained, this earthen embankment will continue to serve satisfactorily for future loading conditions which are similar to those of the past.

The spillway structure should be kept clear of debris which could interfere with proper operation of sluice gates and spillway flow. Repair of damaged/deteriorated concrete in the spillway structure should be undertaken to prevent progressive effects. The area downstream of the spillway should be kept clear of debris and plant growth which could interfere with rapid passage of waste water.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

On the basis of the Phase I visual examination, the earth embankment of the Pocantico Dam does not show any major signs of distress and in its present status, the dam is not deemed to be considered unsafe during periods of normal hydrologic conditions. Concern is given however, for the dams safety under the condition of a severe hydrologic event. In 1977 the owner of the dam discontinued use of the site as a water supply reservoir. At the time of inspection, the dam was drawn down six feet below the spillway. Since some minor seepage has been reported in the past, it is recommended that the reservoir level be kept well below the spillway. If for some reason the reservoir level is to be raised, the dam should be inspected again under a full head with the report amended with those visual observations. A number of small trees with shallow root systems on the embankment should be removed.

Mechanical appurtenances are reportedly operable, however, are in some need of repair. Due to the status of the facility, the utility of this equipment should be evaluated in regards to a commitment to continued maintenance and repair. The dam is in the intermediate size high hazard category, and the guidelines (Ref. 1) indicates the spillway should be able to pass the Probabl Maximum Flood. The spillway has been found to be seriously inadequate and is not capable of passing the 1/2 Probable Maximum Flood (PMF). The spillway is capable of passing 28 percent of the PMF.

7.2 REMEDIAL MEASURES

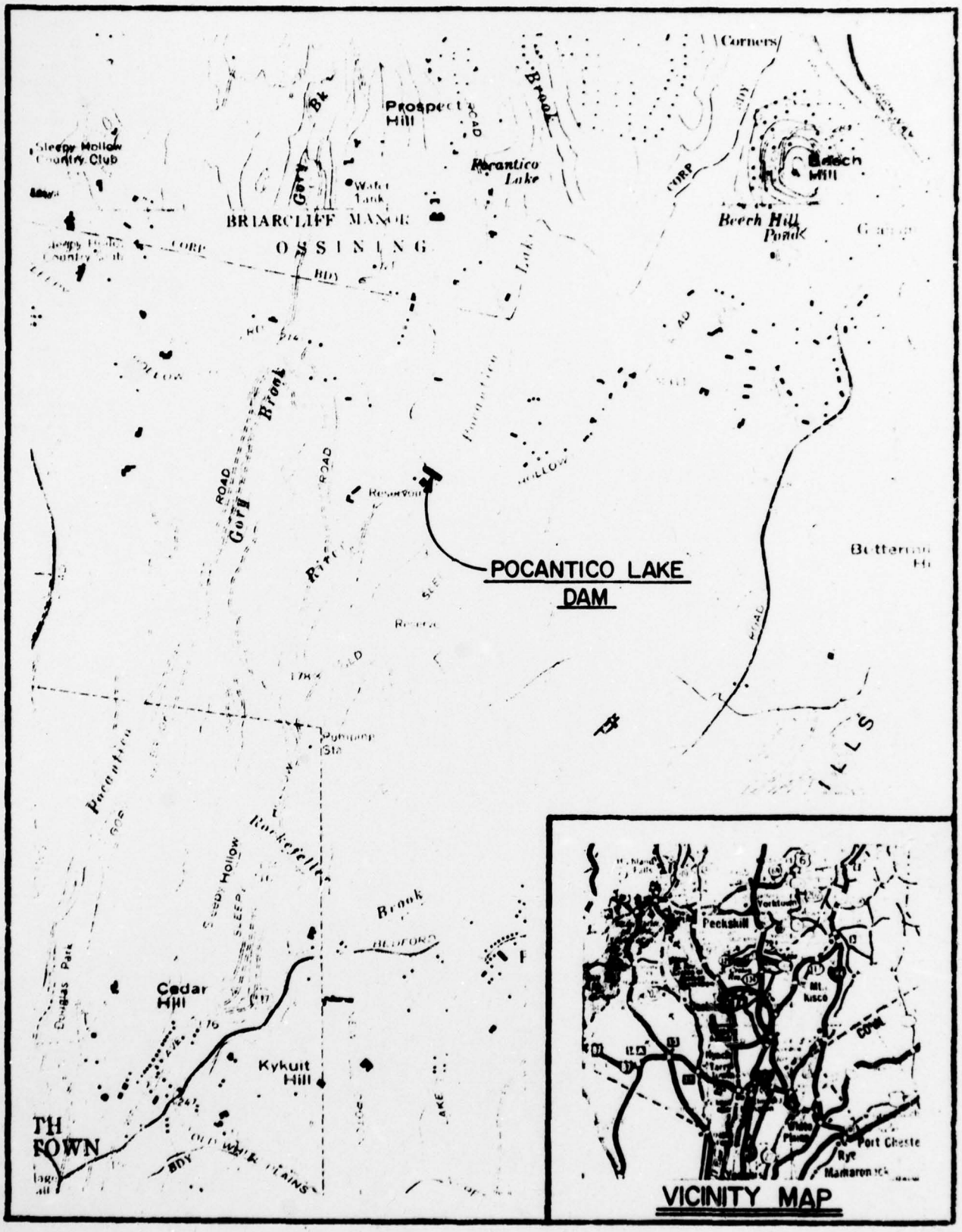
The following remedial measures are recommended.

1) Immediate Actions

The owner should continue to keep the reservoir head down at its present location and each of the sluice gates be made fully open. Since the spillway has been found to be seriously inadequate it is recommended that immediately, during periods of unusually high runoff, the owner should provide around-the-clock surveilance and have a contingency plan in the event of overtopping.

2) Further Actions to be Taken Immediately

The facility should, at a minimum, be improved to be capable of passing the 1/2 PMF. Additional engineering studies should be prepared to obtain this level of safety. The hydrologic analysis performed herein should be refined. The correct elevations of the dam should be determined, since a number of different elevations have been noted in the plans provided herein. One remedial action which should be considered, would be to have the sluice gates and their concrete frames removed to enable the spillway to pass the 1/2 PMF. As mentioned above, this alternative would have to be evaluated.



LOCATION PLAN

FIGURE 1

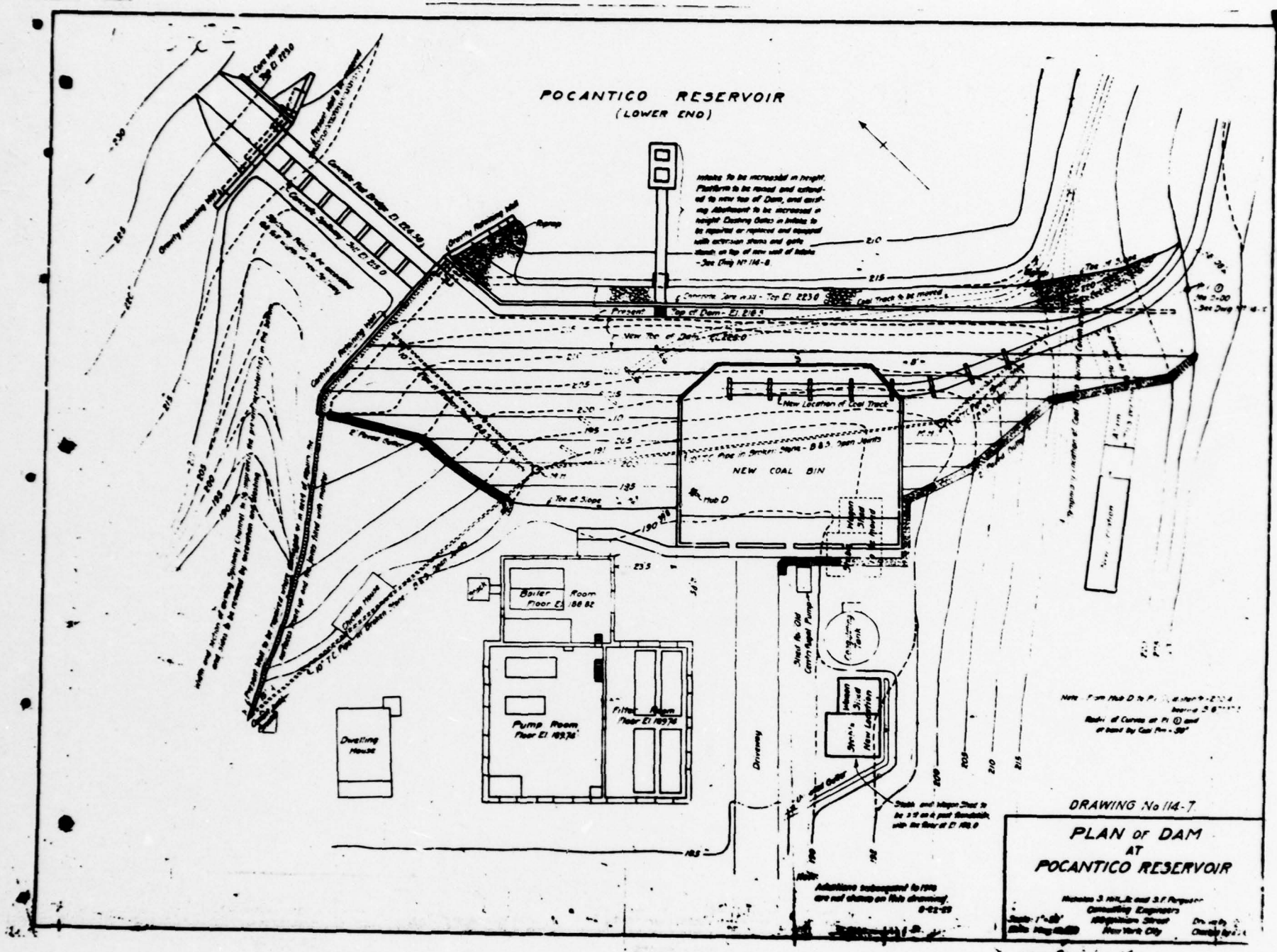
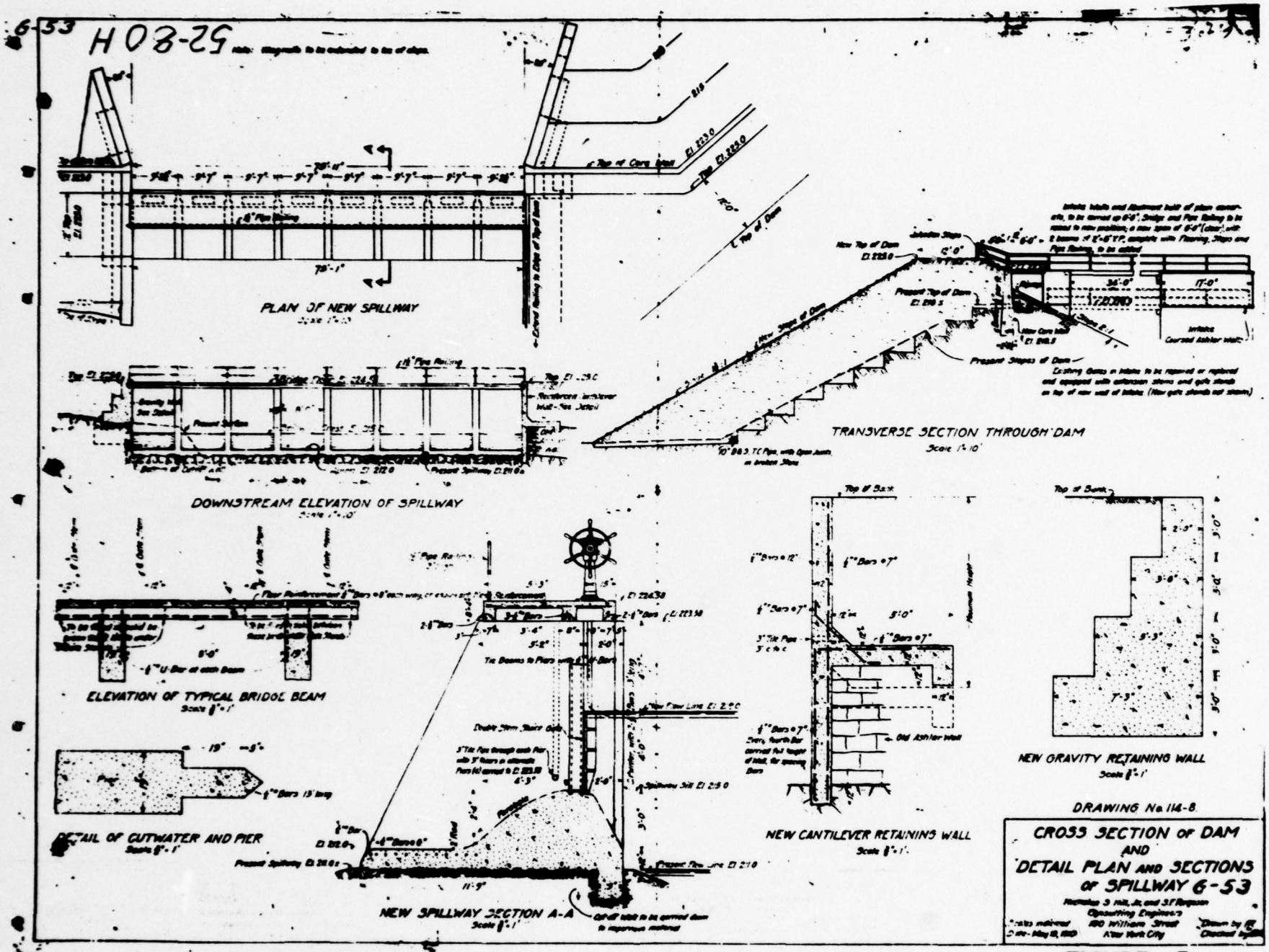
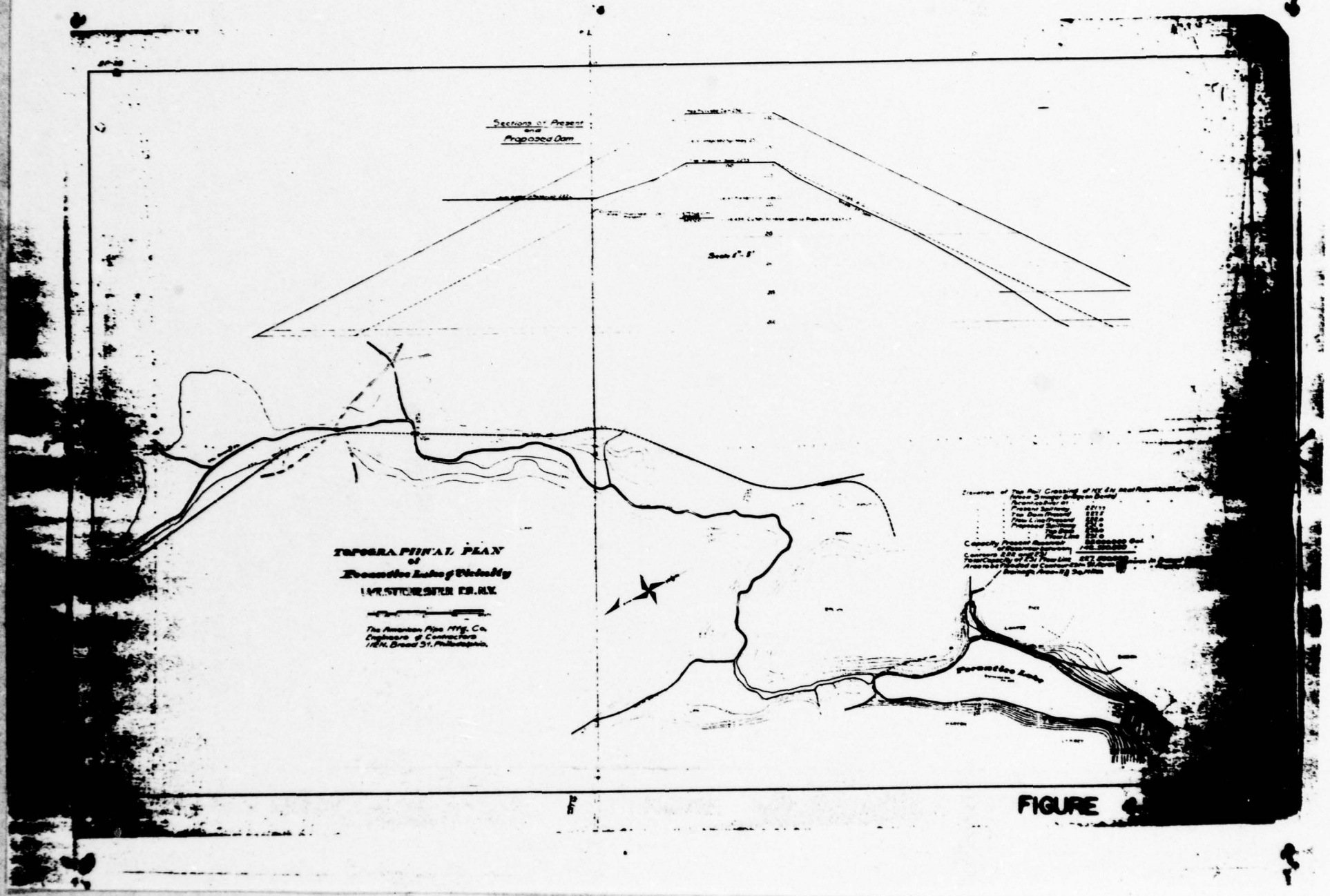

POCANTICO RESERVOIR
(LOWER END)
NEW COAL BIN
Boiler Room
Pump Room
Dwelling House
Driveway
DRAWING No 114-7
PLAN of DAM
AT
POCANTICO RESERVOIR

FIGURE 2


6-53
H 08-25
PLAN OF NEW SPILLWAY
TRANSVERSE SECTION THROUGH DAM
Scale 1"=10'
DOWNSTREAM ELEVATION OF SPILLWAY
ELEVATION OF TYPICAL BRIDGE BEAM
DETAIL OF CUTWATER AND PIER
NEW SPILLWAY SECTION A-A
NEW CANTILEVER RETAINING WALL
NEW GRAVITY RETAINING WALL
DRAWING No. 114-8
CROSS SECTION OF DAM AND DETAIL PLAN AND SECTIONS OF SPILLWAY 6-53
Consulting Engineers
180 William Street
New York City
FIGURE 3


Sections of Present and Proposed Dam
TOPOGRAPHICAL PLAN
of
Preventive Lake & Vicinity
WESTCHESTER CO. N.Y.
The American Pipe Mfg. Co.
Engineers & Contractors
1628 N. Broad St. Philadelphia
Preventive Lake

FIGURE

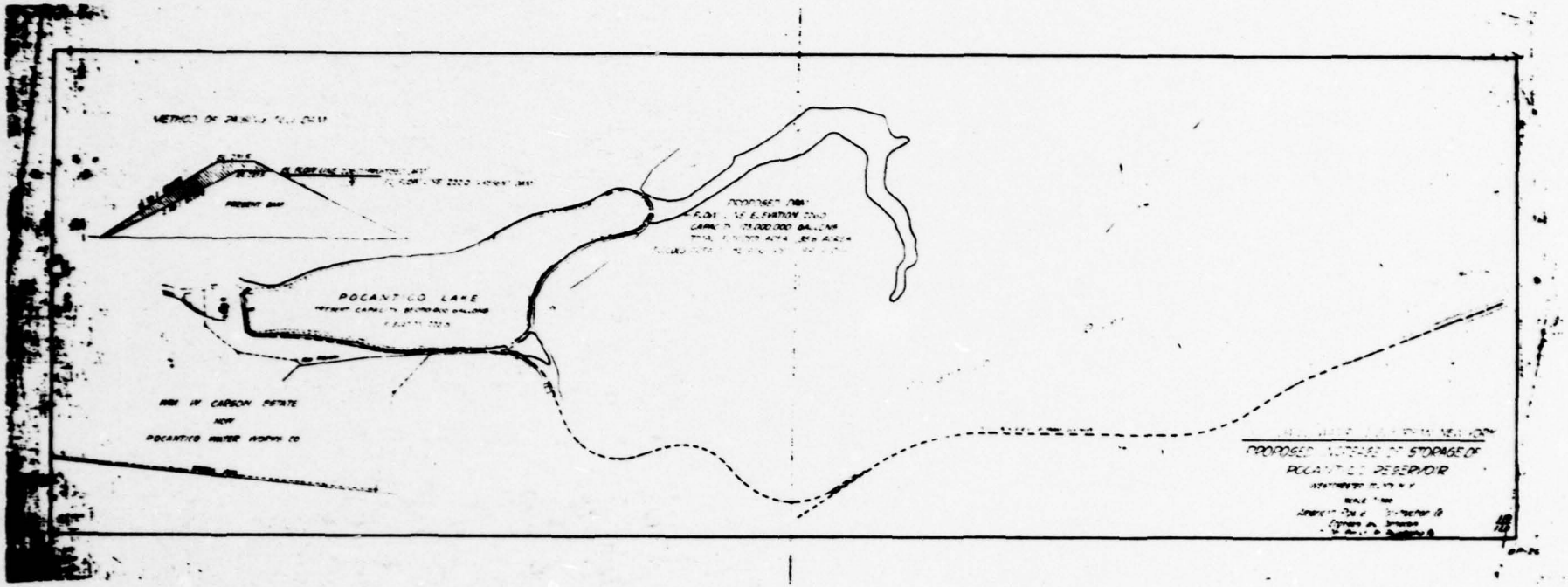
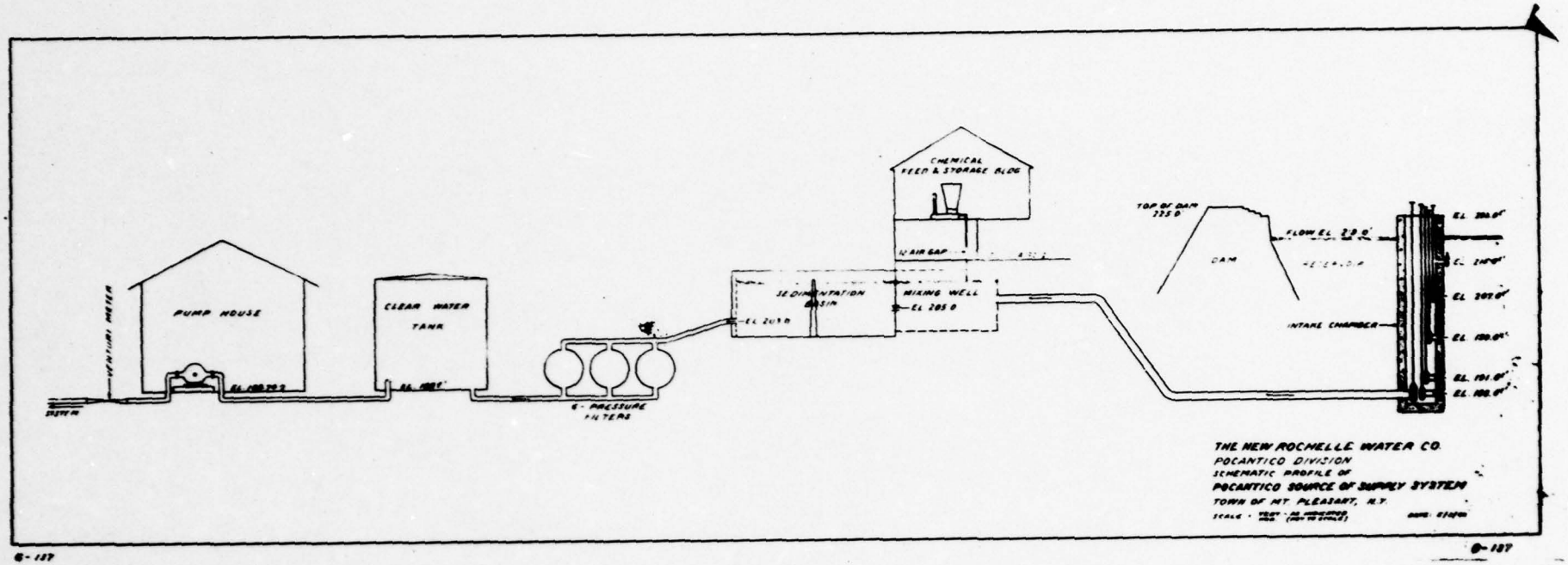


FIGURE 5



G-137

G-137

FIGURE 6

APPENDIX A

FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam POCANTICO DAM County WESTCHESTER State NEW YORK ID # NY 49

Type of Dam EARTHEN Hazard Category HIGH

Date(s) Inspection JULY 26, 1978 Weather SUNNY Temperature 70°

Pool Elevation at Time of Inspection 212 M.S.L. Tailwater at Time of Inspection --

Inspection Personnel:

N. F. DUNLEAVY	DALE ENGINEERING COMPANY	
D. F. McCARTHY	DALE ENGINEERING COMPANY	
F. W. BYSZEWSKI	DALE ENGINEERING COMPANY	
R. GAINER	NEW ROCHELLE WATER Co.	
P. CARROL	NEW ROCHELLE WATER Co.	
L. KOSILLA	NEW ROCHELLE WATER Co.	
G. LORENZ	NEW ROCHELLE WATER Co.	

N. F. DUNLEVY Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	N/A	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N/A	
DRAINS	N/A	
WATER PASSAGES	N/A	
FOUNDATION	N/A	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N/A	
STRUCTURAL CRACKING	N/A	
VERTICAL & HORIZONTAL ALIGNMENT	N/A	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	N/A	
STAFF GAGE OF RECORDER	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed.	At time of inspection, water level was 6 feet below spillway.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Minor erosion at various locations downstream face.	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	No problems observed.	
RIPRAP FAILURES	None.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	No problem areas observed.	
ANY NOTICEABLE SEEPAGE	Wetness at toe of dam near water storage tank. A number of cattails growing. East abutment below toe next to stairs is a large cavity with some seepage. Clear water flowing.	
STAFF GAGE AND RECORDER	None.	
DRAINS	None.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	None.	
APPROACH CHANNEL	None.	
DISCHARGE CHANNEL	None.	
BRIDGE AND PIERS	None.	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Fair condition - no problems.	
APPROACH CHANNEL	Front of dam, reservoir surface.	
DISCHARGE CHANNEL	Good condition.	
BRIDGE AND PIERS	Fair condition - no problems.	
GATES AND OPERATION EQUIPMENT	Not well maintained. Suspect sluice gates would be very difficult to operate in case of emergency. One sluice partially open, clogged with heavy debris.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None.	
INTAKE STRUCTURE	Blow-out control rod and fastener broken; is left open. Upper sluice front of structure corroded.	
OUTLET STRUCTURE	In stream bank; discharging approximately 4" deep through a 24" pipe. Drain valve or line is partially obstructed so that the drain will not allow full pipe capacity to flow.	
OUTLET CHANNEL	Good; clear.	
EMERGENCY GATE	None.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Good condition.	
SLOPES	Relatively flat.	
APPROXIMATE NO. OF HOMES AND POPULATION	Philips Restoration below dam. Average weekly visitors to restoration - 1400 people.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	
OBSERVATION WELLS	None.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHER	None.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	No slope above reservoir.	
SEDIMENTATION	No observed condition.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM POCANTICO

ID # N.Y. 49

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	See this report.
CONSTRUCTION HISTORY	No data.
TYPICAL SECTIONS OF DAM	See this report.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report.
RAINFALL/RESERVOIR RECORDS	At Water Plant. Plant has been abandoned. Records show maximum spillway flood 27" on 10/16/55. Rainfall for 12th thru 16th was 0.0, 0.38, 2.32, 6.08, and 0.56 inches. Maximum drawdown was 238" in 11/64.

ITEM	REMARKS
DESIGN REPORTS	None.
GEOLOGY REPORTS	None.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None.
POST-CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	None disclosed.

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	See plans in this report for available data.
HIGH POOL RECORDS	27 in. over spillway in 1955.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None.
MAINTENANCE OPERATION: RECORDS	In water plant - abandoned plant.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See this report.
OPERATING EQUIPMENT PLANS & DETAILS	See this report for available data.

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 11-3/4 square miles

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 221.77

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 221.77

ELEVATION MAXIMUM DESIGN POOL: 225.0

ELEVATION TOP DAM: 225.0

CREST:

a. **Elevation** 221.77
b. **Type** Concrete apron with chute spillway.
c. **Width** ------
d. **Length** 75 feet tapers
e. **Location Spillover** West abutment
f. **Number and Type of Gates** (8) 8'-0" x 4'-0" sluice gates

OUTLET WORKS: (Blow out/draw down pipe)

a. **Type** 24" iron pipe
b. **Location** Intake chamber thru gate house into stream
c. **Entrance Inverts** 188.0 ±
d. **Exit Inverts** ----
e. **Emergency Draindown Facilities** None

HYDROMETEOROLOGICAL GATES:

a. **Type** None
b. **Location** None
c. **Records** None

MAXIMUM NON-DAMAGING DISCHARGE: ----

APPENDIX B

PREVIOUS INSPECTION REPORTS

AND CORRESPONDENCE

SLEEPY HOLLOW RESTORATIONS

August 23, 1973

Mr. Neal F. Dunlevy, P.E.
Stetson, Dale
Bankers Trust Building
Utica, New York 13501

Dear Mr. Dunlevy:

It has come to my attention that you have recently been in our area doing an evaluation of the integrity of the dam of the New Rochelle Water Works Company.

We have always been concerned about the possibility of dam failure upstream from our Philipsburg Manor Restoration.

If you have any information with reference to our possible vulnerability, I would greatly appreciate it if you would share it with me.

Yours truly,

R. W. Doherty

R. W. Doherty, Director
Buildings and Grounds

RWD:ab

2 5 6 CP
214

MEMORANDUM

On Plans for Proposed Reconstruction of Pocantico Reservoir Dam at Tarrytown, N.Y.

The plans submitted for this dam provide for the raising of the flow line by 8 ft. The present earth dam will be increased by 8.5 ft., while the spillway will be raised 4 ft. by a masonry weir, and 4 ft. additional by eight 8' x 4' sluice gates seating on the crest of the masonry weir. The drainage area at this point as planimetered from U. S. G. S. maps is 12 square miles, and our records show that in this locality a run-off of at least 240 sec. ft. per square mile, or 2880 sec. ft., should be provided for.

With gates closed, the spillway as shown on the plans will have a discharging capacity of about 2140 sec. ft., with a depth of 4.58 ft. on the crest of the spillway. With the water level at the top of the earth dam, the discharging capacity of the spillway orifices would be about 2700 sec. ft. These discharges are both less than the estimated maximum run-off, but considering the pondage effect of the storage in the reservoir above the crest of the dam the out-flow from the reservoir will be greatly reduced.

Assuming a run-off of 240 sec. ft. per square mile from the tributary watersheds to continue at that rate for three hours, and then to gradually fall to a negligible amount within five or six hours, the maximum required discharging capacity of the spillway will be only about 2000 sec. ft. with an in-flow of 2880 sec. ft. Therefore, the spillway shown on the plans may be considered safe

against the greatest flood of which we have any record in this locality. As there are no settlements in the valley of this creek between the reservoir and the Hudson river, life would not be endangered and little property damage would result from the failure of the dam.

With a depth of 4.58 ft. of water on the top of the closed gates, the dam will be stable against overturning, and if the spillway is set well down into the rock foundation it will be stable against sliding. With this depth of water the free-board of the earth section of the dam will be only 1' 4". This seems to the writer to be rather small, and the wall should be raised by at least 2 ft. Otherwise, I see no reason why the application should not be approved.

Yours very truly,

T. Cuttings

ASSISTANT ENGINEER.

To Mr. A. R. McKim,

Inspector Docks & Dams.

June 12, 1916.

STATE OF NEW YORK
DEPARTMENT OF STATE ENGINEER AND SURVEYOR
TESTING LABORATORY
ALBANY

Tests of Sand from ____ bank at ____ N. Y.,
for use on Contract No. Road, Res. No. at Champlain Lake ____ Canal, Conservation Comm. Division.
Cons. Comm.
Contract Sample No. 50 taken ____ ; received at Laboratory July 8; made up July 11
Sand is Composed mainly of quartz with some feldspar, hornblend, and garnet grains. Broke of Trap.
Percentage of Voids 30.6 ; Loam 3.1 ; Organic matter ____
Parts of sand to cement by ~~weight~~ bulk : 3 sand to 1 cement Per cent water used +11
Temperature of water used in mixing 79 Fahr Briquettes kept in moist air 24 hours and then immersed.
Cement used in tests, Standard "Brand ____. This cement tested as follows:—
Sets (determined by Vicat needle): Initial, { in 195 min. / Minim. requirement 30 min. } ; hard, { in 385 min. / Requirement, 60 to 600 min. }
Constancy of Volume Tests:—Normal air Good ; Normal water Good ; Accelerated Good
Fineness (per cent passing sieve of 2,500 meshes per square inch) 99.6 (Requirement, 99%)
" (" " " " 10,000 " " " ") 97.4 (Requirement, 92%)

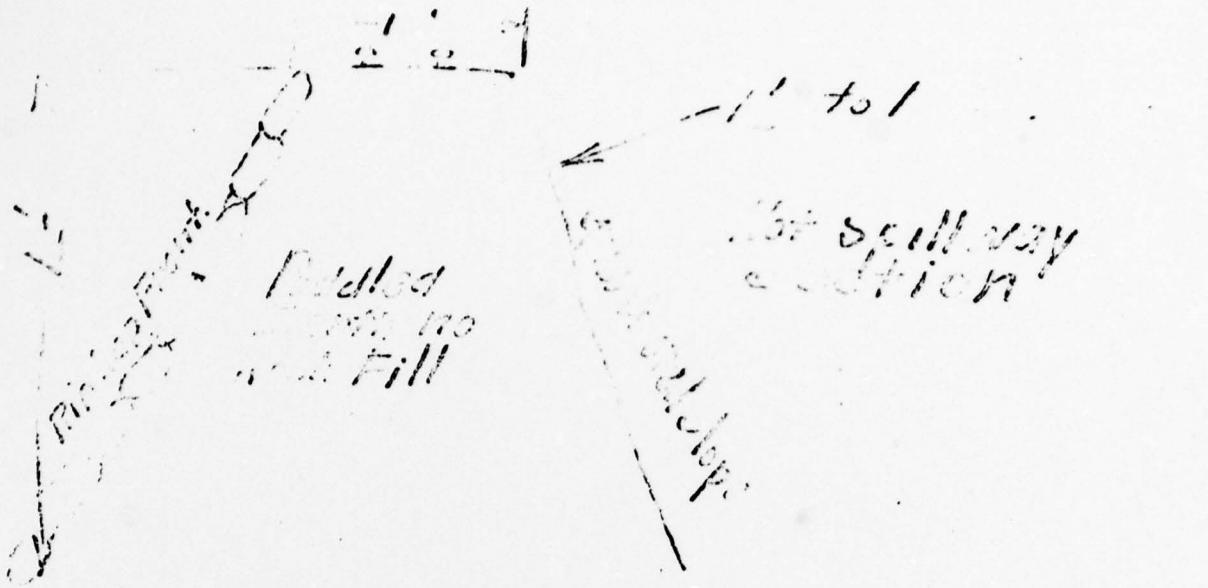
TENSILE STRENGTH IN POUNDS PER SQUARE INCH						SIZE OF SAND	
STANDARD QUARTZ SAND		NATURAL SAND		WASHED SAND		PASSING SIEVE	
7 Days	28 Days	7 Days	28 Days	7 Days	28 Days	No.	Per Cent
225	322	150				2	100.0
230	336	157				4	99.4
212	310	155				6	95.2
210	289	161				10	83.0
215	290	160				20	61.2
1092	1547	783				30	39.0
218**	309**	157**				40	21.4
						60	8.8
						74	4.8
						100	2.2
						140	1.2
						200	1.0

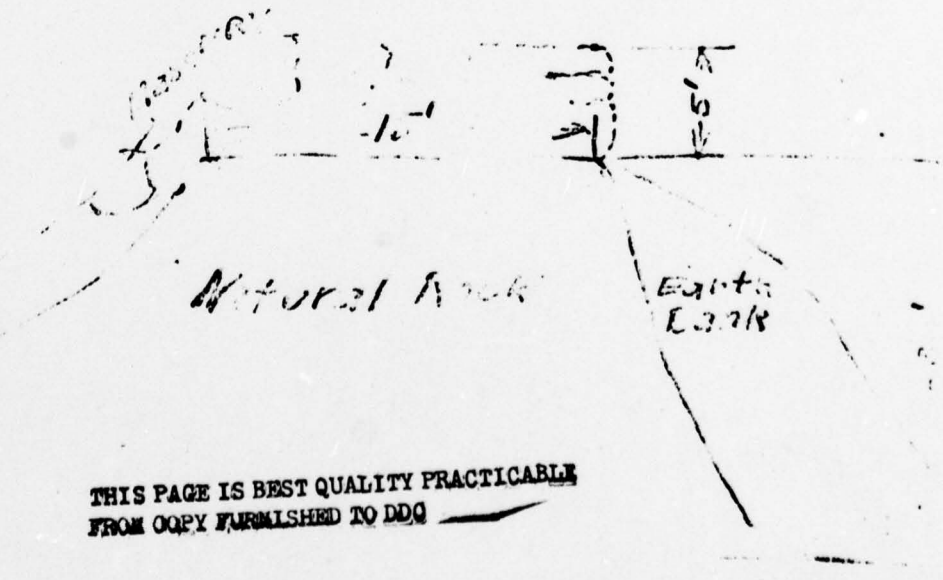
Remarks:

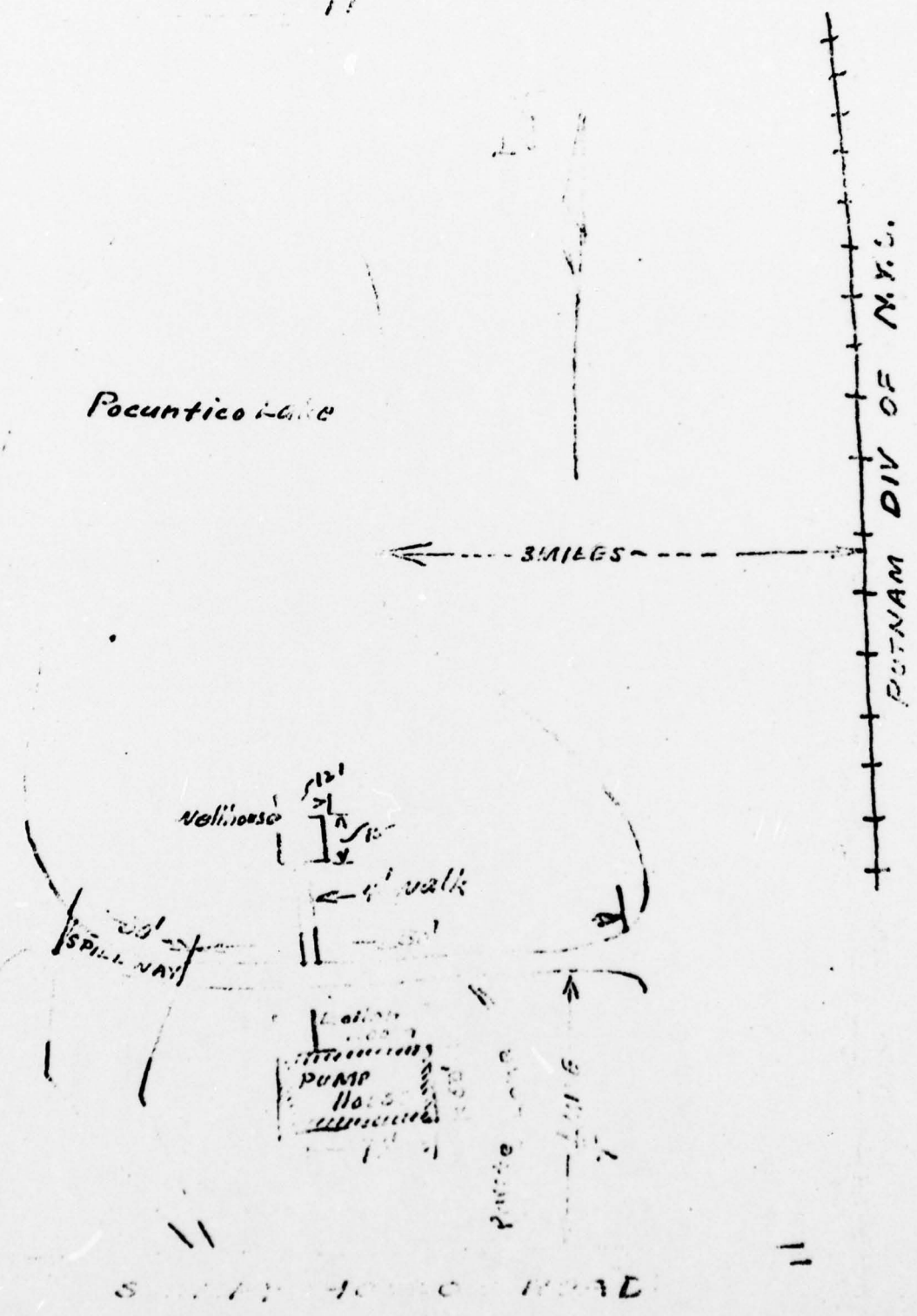
I CERTIFY *that this is a true abstract taken from the records of tests* July 18 19..

Resident Engineer in Charge of Tests

B-10







SUBJECT Pocantico Reservoir
Investigation of Dam
APP. 24

FILE NO.
ACC. NO. 6-2217
SHEET 2

COMPUTER ... June 8 19.. CHECKED BY ... Martin June 9 1916

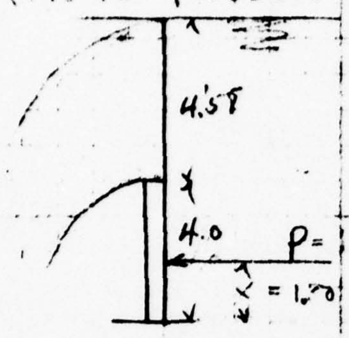
MADE IN CONNECTION WITH

REFERENCE

CONT'D FROM ACC. 6-2216

Stability about joint at top of spillway sill - El. 215

(No ice pressure - no uplift ...)



$M_o = Px$

$P = \gamma \frac{(4.58 + 8.58)}{2} \times 4 = 1645$ #/lin.ft.

$x = \frac{8.58^2 + 8.58 \times 4.58 - 2 \times 4.58^2}{3(8.58 + 4.58)} = 1.79$

$M_o = 1645 \times 1.79 = 2960$ #'/lin.ft.

Overturning moment per section 9'-7"

$M_o = 2960 \times 9.58 = 28300$ '#

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FROM COPY FURNISHED TO DDC

Resisting Moment

Pier	$1.0 \times 2.58 \times 1.58 \times 145 \times .4 \times \frac{4}{3}$		10400
	$5.17 \times 8.58 \times 1.58 \times 144 \times (4 + \frac{6.58}{2})$		66500
	$1.15 \times 8.58 \times .75 \times 144 \times (9.17 + \frac{1.15}{2})$	=	16300
Floor	$6.6 \times .33 \times 9.58 \times 144 \times 7.2$	=	21400
(Stoplog, Plank & Pier)	$.67 \times .58 \times 9.58 \times 144 \times 4.5$	=	2100
	$.67 \times .67 \times 9.58 \times 144 \times 8.5$	=	3100
	$.67 \times .58 \times 9.58 \times 144 \times 10.5$	=	3700
Mr		=	123000 '#

(Wt. of gates and stands not considered)

Ok. against overturning

Sliding - $H_o = P = 1645 \times 9.58 = 15,750$ #

$V_c = 20260$

$f = \frac{15750}{20260} = 0.78$ Too high - must be reinforced. (Could be reduced to 0.55 by considering gates & ...)

$Shear = \frac{15760}{(1.58 \times 9.17 + .75 \times 1.75)144} = 7$ #/sq in OK.

14.5   1.3
15.8

SUBJECT Pocantico Reservoir
Investigation of proposed dam — FILE NO. D-503
Apr. # 240 — ACC. NO. C-22
SHEET 1
COMPUTER E. H. Cullings, June 7, 1916 — CHECKED BY E. J. Martin, June 9, 1916
MADE IN CONNECTION WITH
REFERENCE Plans submitted by H. to Ferguson — CONT'D FROM ACC.

(12.2 sq.mi. plan from U.S.G.S.)

Drainage area — stated to be 12.11 sq.mi.

Discharging capacity required by curve Acc. C1618, = 240 c.f./sq.mi.

12.11 × 240 = 2900 sec.f. ✓

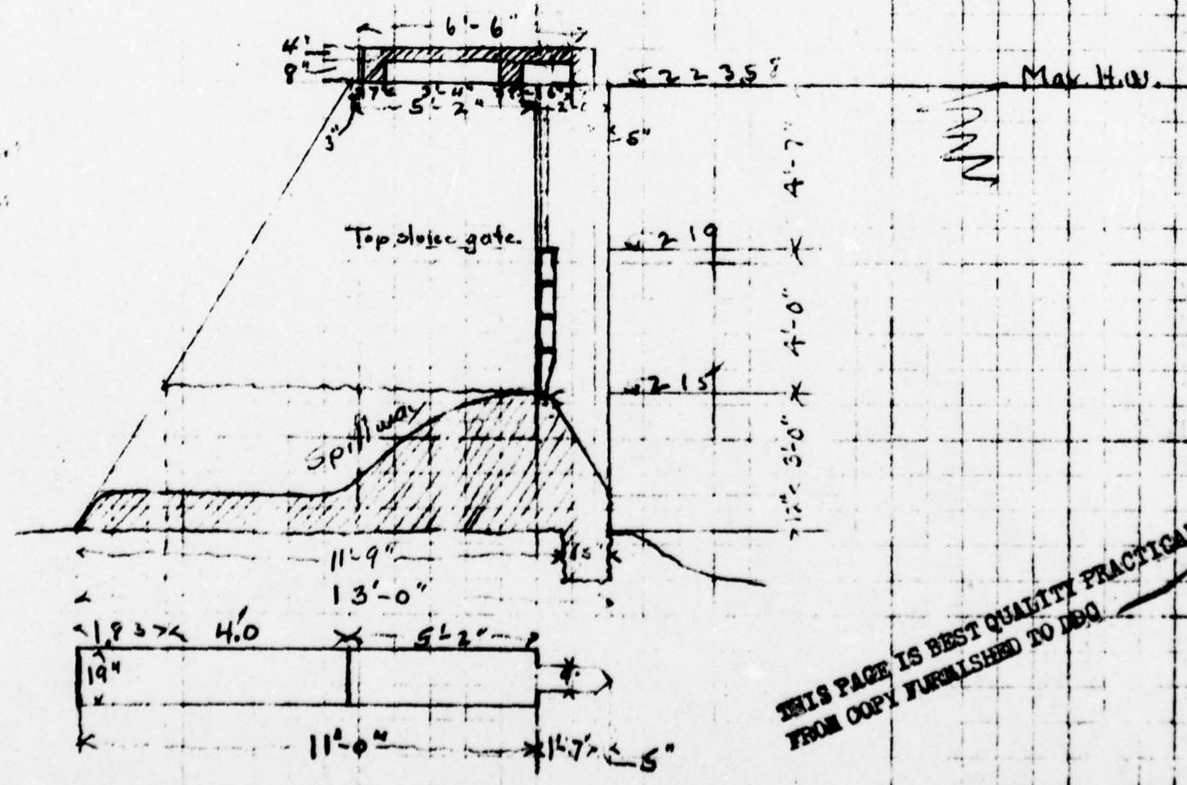
Spillway – 68 ft long – 8 – 8 ft. spaces. ✓

Proposed flow line, 219.0 = Top of gates (closed) ✓
" sill 215.0 ✓
Present flow line 211.0 ✓

With sluice gates closed, flood discharge area is limited to 8 spaces 8 ft wide and 4.58 high. ✓

Discharging capacity = $64 \times 3.33 \times 4.58^{\frac{3}{2}}$ = 2100 s.f. ✓
= 173 s.f./sq.mi. ✓

Rather low for this locality.



SUBJECT Pocantico Reservoir Investigation of Dam FILE NO. [illegible]-HL
ACC. NO. C-2218
App # 240 SHEET 3
COMPUTER [illegible] June 9 1976 CHECKED BY [illegible] June 10 1976
MADE IN CONNECTION WITH
REFERENCE CONT'D FROM ACC. C-2217

Joint along base

$M_o = \frac{62.5}{6}(12.58 - 4.5)^2 (12.58 + 2 \times 4.58) = 14400 \#/ft$

$M_o = 14400 \times 9.58 = 138,000'\#$

$M_r = $ (Acc. C-2217) $= 128,000'\#$ ✓

$+ \quad 9.17 \times 4.0 \times 1.58 \times 144 \times (1.83 + \frac{9.17}{2}) = 53,500'\#$

$+ \quad 1.75 \times 4.0 \times .75 \times 144 \times (11.0 + \frac{1.75}{2}) = 9,600'\#$

[illegible] (approx)

$+ \quad 7 \times 3 \times 8 \times 144 \times 9.[illegible] = 230,000'\#$

Total Mr. 421,100'# O.K. ✓

Sliding

$H_o = P = \gamma(12.58 - \frac{4.58}{2}) \times [illegible].0 \times 9.58 = 41300\#$ ✓

Mas. only ✓

$V_t = 2[illegible],260 + 7350 + 810 - 2 + [illegible]200 + 10500 = 64120\#$

water on face

$62.5 \times \frac{(8.58 + 11.58)}{2} \times 8 = 10200\#$ ✓

Gates, Wt, say 8000# each. 8000

V_t 82,320

$f = \frac{41300}{82320} = 0.5$ O.K. ✓

SUBJECT Pocantico Reservoir
Investigation of Dam

App #240

FILE NO. [illegible]
ACC. NO. C-2869
SHEET 4

COMPUTER S. Fellings June 9 1916 CHECKED BY [illegible] June [illegible] 1916

MADE IN CONNECTION WITH

Filed by [illegible]

REFERENCE

Cont'd from Acc C-2218

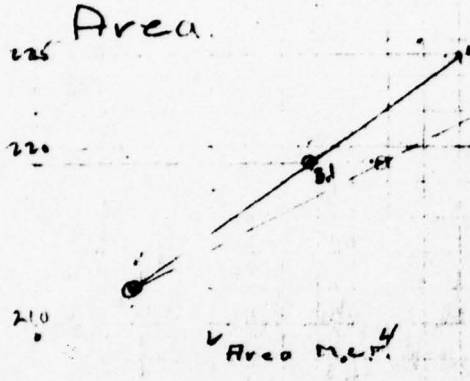
Spillway

Area present reservoir (211.0) = 25 acres (Report of Wm Fergusson 5/11/16)
" proposed " (219.0) = 90 "

211.0		1,090,000		
219.0		3,092,000	23,000,000	cu ft. capacity between top of gates and top of dam.
225.0	(Top dam) (estimated)	4,600,000		

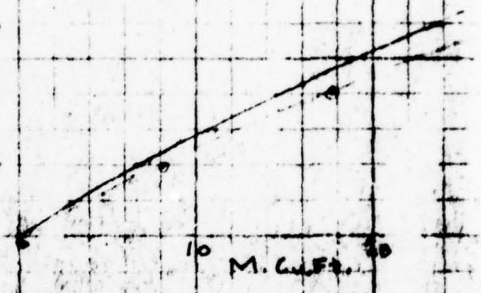
Assumed Capacity Curve of Res.

Area



Elev	Area	Vol.	Int. Vol. M.C.F.
219	3.10	0	
		6.77	6
221	3.67		6.77
		7.81	"
223	4.24		14.58
		9.04	"
225	4.[illegible]		23.62

Capacity



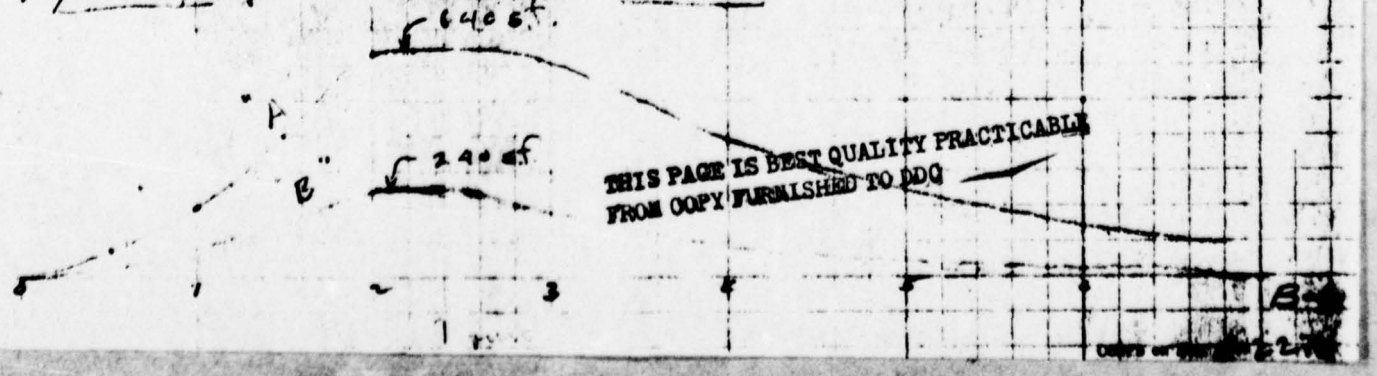
Assumptions as to rainfall and run off.

Drainage Area - 12 sq. mi.
Max. distance from dam 6 mi.
Velocity of flow in creek 5' /sec.
Time of max. concentration, 105 min, say 2 hr.

Rainfall - max. rainfall, 6. in. in 3 hr. (Rec. E: 2810)
Run-off, 50% = 3 in. in 3 hr. = 1 in. per hr.

Max. rate of run-off - at end of 2 hr. =
~~12 × 27,878,400 × 1~~ / ~~3600 × 12~~ = 7700 sec. ft.
= 640 sec. ft. / sq. mi.

Hydrograph of assumed run-off.



Cont'd on Acc C-2218

SUBJECT Pocantico Reservoir Investigation of Dam — FILE NO. [illegible] — ACC. NO. 6-2-270

COMPUTER Stc June 9 1916 — CHECKED BY App # 240 June 11 1916 — SHEET #5

MADE IN CONNECTION WITH

REFERENCE — Cont'd from Acc. 6-2-269

Pondage effect on rate of spillway discharge

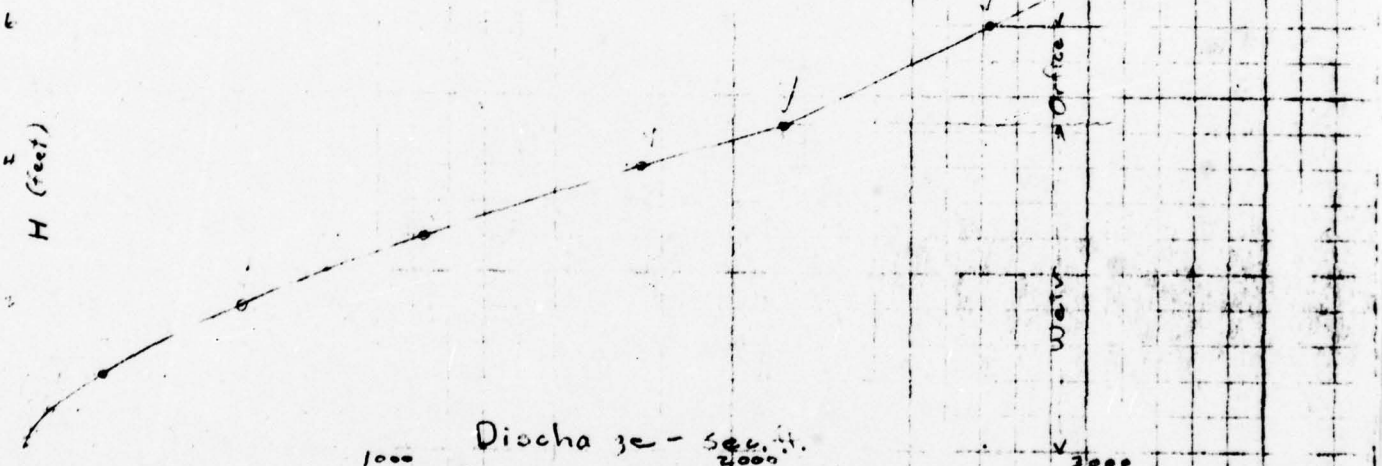
Spillway discharge computed from $Q = 3.4 L H^{1.5}$, $L = 64$

H =	0.1	Q = 6 sec. ft.
=	0.2	19
=	0.5	76
	1.0	218
	2.0	610
	3.0	1130
	4.0	1740
	4.5	2140

$Q = A\sqrt{2gh}$, $(h = 6.0 - 2.2 = 3.71)$ $(A = 4.58 \times 8 \times 5 \times 0.6 \times \sqrt{64 \times 371})$

H = 6.0 2720

Curve showing rate of spillway discharge



SUBJECT Pocantico Reservoir
Investigation of Dam

FILE NO. [illegible]
ACC. NO. C-2271
SHEET 6

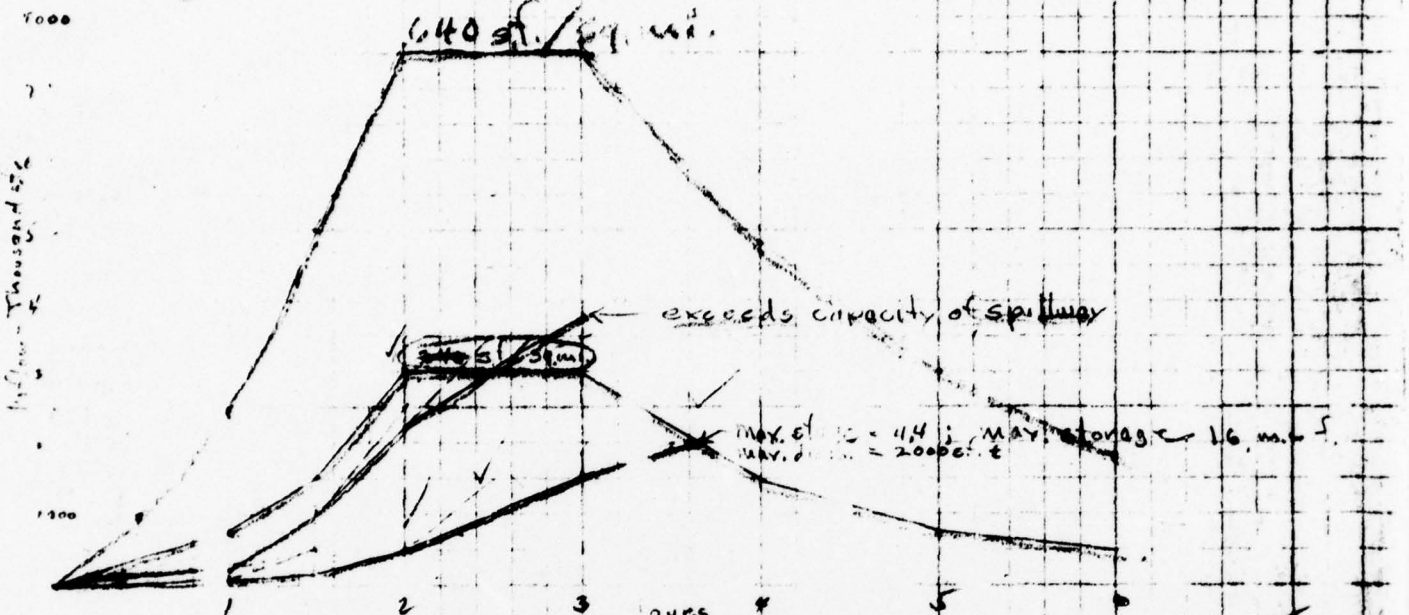
COMPUTER JHC June 9 1916 CHECKED BY Jmantica June 16 1916

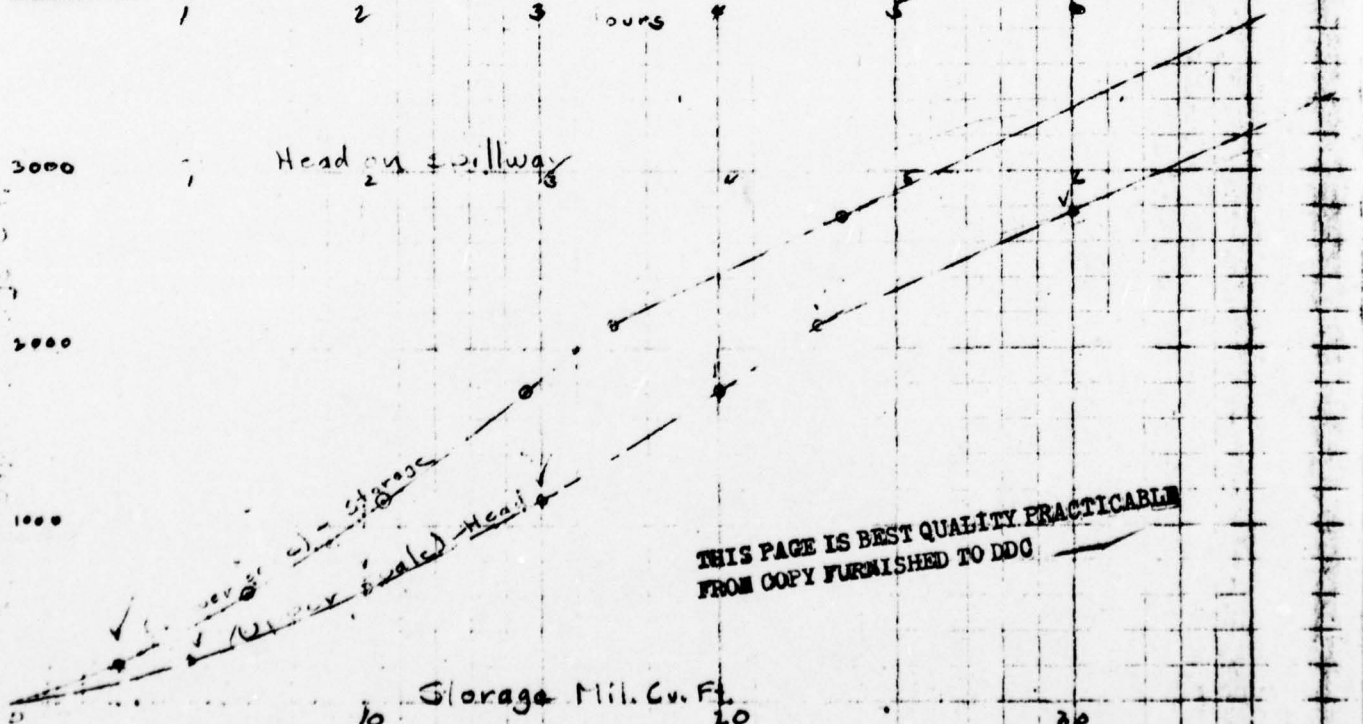
MADE IN CONNECTION WITH App # 240

REFERENCE Cont'd from Acc. C-2270

Assuming Max. Flood of 140 c.f./sq.mi. (7680 c.f.) at end of 2 hrs.

Hydrograph of assumed in-flow (Curve "A", Acc. C-2269)





July 7th, 1910.

Lower Hudson

with some foliage,

The percentage

well graded.

on the average

stream with a

which given a fair

Very truly yours,

Commissioner,

A.H.P.

Engineer.

H.H.

APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

DALE

DESIGN BRIEF

DESIGNED BY JPG DATE 8-7-78

CHECKED BY PAGE C-1 OF

PROJECT NO. 2210 SHORT TITLE NY DAM INSPECTIONS

DESIGN SUBJECT POCANTICO LAKE DAM REF. DWGS.

ESTIMATE OF CLARK'S PARAMETER

ESTIMATE OF T_c (BPR)

$$T_c = (11.9\, L^3/H)^{.385} = (11.9\,(5.114)^3/411)^{.385} = 1.608 \text{ HR}$$

SCS

$$L = \frac{l^{.8}(S+1)^{.7}}{1900\, Y^{.5}} = \frac{(27000)^{.8}(3.89)^{.7}}{1900(1.5)^{.5}}$$

$$S = \frac{1000}{CN} - 10 = 3.89$$

$$= \frac{10656.319}{2327.015} = 4.579$$

$$T_c = L/.6 = 4.579/.6 = 7.63 \text{ HR}$$

NORTH ATLANTIC DIV WATER RESOURCES STUDY (FEB 72)

$$(T_c + R) = 10\,(a)\,(DA/S)^{.3}$$

$$= 10\,(1.82)(10.492/2)^{.25} = 15.30$$

$$R/(T_c+R) = .39$$
$$R/(15.30) = .39$$
$$R = 5.97$$

$$5.97/(T_c + 5.97) = .39$$
$$5.97 = .39\,(T_c + 5.97)$$
$$5.97 = .39\,T_c + 2.33$$
$$9.33 = T_c$$

DESIGN BRIEF

DESIGNED BY _____ DATE _____

CHECKED BY _____ PAGE C-2 OF _____

PROJECT NO. 2210 SHORT TITLE NY DAM INSPECTION

DESIGN SUBJECT POCANTICO LAKE DAM REF. DWGS. _____

ESTIMATE OF SNYDER'S PARAMETERS

640 C_p =

$C_p = 0.625$

$C_T = 1.2$ assumed

$$t_p = C_T (L \times L_{CA})^{0.3}$$

$$t_p = 1.2 (5.1 \times 2.6)^{0.3}$$

$t_p = 2.6$

$t_r = t_p / 5.2 = .47$

$t_{pr} = t_p + 0.25 (t_R - t_r)$

$t_{pr} = 2.6 + 0.25 (0.5)$

$t_{pr} = 2.73$

SUMMARY OF PARAMETERS

CLARK'S

BPR $T_c = 1.60$ hours

SCS (CN METHOD) $T_c = 7.03$ hours $R = 4.98$

NORTH ATLANTIC DIV $T_c = 9.53$ hours $R = 5.97$

$R/(T_c + R) = 0.39$

SNYDER'S

$t_{pr} = 2.73$

$C_p = 0.625$

DALE

DESIGN BRIEF

DESIGNED BY _____ DATE _____

CHECKED BY _____ PAGE C-3 OF _____

PROJECT NO. 2210 SHORT TITLE NY DAM INSPECTIONS

DESIGN SUBJECT POCANTICO LAKE DAM REF. DWGS. _____

D-A-D - RELATIONSHIPS

DURATION	DEPTH	% OF INDEX
6 HR	25."	107
12 HR	29.	122
24 HR	32.	137
48 HR	36.	151
72 HR	38.	159

Index 1.00

240 sq mi

BASE FLOW

2 cfsm/sq mi = 21 cfs

LOSS RATES

INITIAL LOSS = 1.0

CONSTANT LOSS = 0.5

DALE

DESIGN BRIEF

DESIGNED BY _____ DATE _____

CHECKED BY _____ PAGE C-4 OF _____

PROJECT NO. _____ SHORT TITLE _____

DESIGN SUBJECT _____ REF. DWGS. _____

Summary of Unc[illegible] Peak

				Peak
SPF	Clarks	Parameters	Tc=7.63, R 4.46	6831
	Snyder's	"	Tc=3.63 R 2.19	11400
PMF	Clarks	Parameters		14000
	Snyder's	Parameters		23500

```
UNIT GRAPH AND HYDROGRAPH COMP JULY 1966 (REVISED AUGUST 1974)
HYDROLOGIC ENGINEERING CENTER (HEC)
DAVIS,CA
```



```
--- OPERATIONS AVAILABLE ---

TIME INT  = SET TIME INTERVAL OF ALL COMPUTATIONS
UNIT H    = COMPUTE UH BY INPUT, CLARK, OR SNYDER
RAIN      = INPUT RAIN AND LOSS RATE DATA
RUNOFF    = INPUT BASEFLOW, COMPUTE & PRINT HYDROGRAPH
PNT       = PRINT UNIT HYDROGRAPH ONLY
STOP      = STOP EXECUTION OF PROGRAM

USER MUST SELECT OPERATION DESIRED
MAY RETURN TO ANY OPERATION


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      1
ENTER TIME INTERVAL(MIN)=    60.


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      2
ENTER DRAINAGE AREA (SQMI) =     10.50
SELECT 1-3 (1=INPUT UH, 2=CLARK, 3=SNYDER )       2
ENTER NUMBER OF TIME-AREA ORDINATES (0=NONE)=     0
ENTER CLARKS TC AND R (HRS) =        7.63       4.88

      TP        CP       TC        R

    6.35     0.683     7.63     4.88


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      3
ENTER RATIO  IMPERVIOUS =        0.00
SELECT 1-3 ( 1=RAIN, 2=SPS, 3=PRS )       2
ENTER SPS INDEX RAINFALL (IN) = 12.00
ENTER TRSPC AND TRSDA (SQMI) =            1.00      10.50
SELECT 1-3 (1=INIT+CONST, 2=ACUM LOSS, 3=SCS)       1
ENTER INITIAL LOSS(IN), CONSTANT LOSS(IN/HR) =      1.00       0.10


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      4
ENTER A TITLE PLEASE -   POCANTICO SPF
ENTER STRTQ,QRCSN,AND RTIOR =       21.00    21.00     1.00

 HR MIN   RAIN   LOSS EXCESS  UNIT HG    RECSN     FLOW
  1   0   0.00   0.00   0.00      42.      21.      21.
  2   0   0.00   0.00   0.00     154.      21.      21.
  3   0   0.00   0.00   0.00     303.      21.      21.
  4   0   0.00   0.00   0.00     465.      21.      21.
  5   0   0.00   0.00   0.00     608.      21.      21.
  6   0   0.00   0.00   0.00     699.      21.      21.
  7   0   0.01   0.01   0.00     749.      21.      21.
  8   0   0.01   0.01   0.00     681.      21.      21.
  9   0   0.01   0.01   0.00     575.      21.      21.
 10   0   0.01   0.01   0.00     469.      21.      21.
 11   0   0.01   0.01   0.00     382.      21.      21.
 12   0   0.01   0.01   0.00     311.      21.      21.
 13   0   0.03   0.03   0.00     253.      21.      21.
```

15	0	0.05	0.05	0.00	168.	21.	21.
16	0	0.12	0.12	0.00	137.	21.	21.
17	0	0.04	0.04	0.00	112.	21.	21.
18	0	0.03	0.03	0.00	91.	21.	21.
19	0	0.01	0.01	0.00	74.	21.	21.
20	0	0.01	0.01	0.00	60.	21.	21.
21	0	0.01	0.01	0.00	49.	21.	21.
22	0	0.01	0.01	0.00	40.	21.	21.
23	0	0.01	0.01	0.00	33.	21.	21.
24	0	0.01	0.01	0.00	27.	21.	21.
25	0	0.02	0.02	0.00	22.	21.	21.
26	0	0.02	0.02	0.00	18.	21.	21.
27	0	0.02	0.02	0.00	15.	21.	21.
28	0	0.02	0.02	0.00	12.	21.	21.
29	0	0.02	0.02	0.00	10.	21.	21.
30	0	0.02	0.02	0.00	8.	21.	21.
31	0	0.04	0.04	0.00	7.	21.	21.
32	0	0.04	0.04	0.00		21.	21.
33	0	0.04	0.04	0.00		21.	21.
34	0	0.04	0.04	0.00		21.	21.
35	0	0.04	0.04	0.00		21.	21.
36	0	0.04	0.04	0.00		21.	21.
37	0	0.14	0.14	0.00		21.	21.
38	0	0.16	0.13	0.03		21.	22.
39	0	0.20	0.10	0.10		21.	30.
40	0	0.51	0.10	0.41		21.	63.
41	0	0.19	0.10	0.09		21.	132.
42	0	0.15	0.10	0.05		21.	226.
43	0	0.03	0.03	0.00		21.	328.
44	0	0.03	0.03	0.00		21.	419.
45	0	0.03	0.03	0.00		21.	479.
46	0	0.03	0.03	0.00		21.	498.
47	0	0.03	0.03	0.00		21.	472.
48	0	0.03	0.03	0.00		21.	413.
49	0	0.12	0.10	0.02		21.	347.
50	0	0.12	0.10	0.02		21.	291.
51	0	0.12	0.10	0.02		21.	248.
52	0	0.12	0.10	0.02		21.	217.
53	0	0.12	0.10	0.02		21.	196.
54	0	0.12	0.10	0.02		21.	184.
55	0	0.32	0.10	0.22		21.	185.
56	0	0.32	0.10	0.22		21.	212.
57	0	0.32	0.10	0.22		21.	269.
58	0	0.32	0.10	0.22		21.	360.
59	0	0.32	0.10	0.22		21.	480.
60	0	0.32	0.10	0.22		21.	618.
61	0	1.02	0.10	0.92		21.	792.
62	0	1.23	0.10	1.13		21.	1044.
63	0	1.54	0.10	1.44		21.	1416.
64	0	3.89	0.10	3.79		21.	2045.
65	0	1.43	0.10	1.33		21.	2997.
66	0	1.13	0.10	1.03		21.	4140.
67	0	0.20	0.10	0.10		21.	5296.
68	0	0.20	0.10	0.10		21.	6236.
69	0	0.20	0.10	0.10		21.	6767.
70	0	0.20	0.10	0.10		21.	6831.
71	0	0.20	0.10	0.10		21.	6428.
72	0	0.20	0.10	0.10		21.	5697.
73	0	0.01	0.01	0.00		21.	4873.
74	0	0.01	0.01	0.00		21.	4101.
75	0	0.01	0.01	0.00		21.	3436.
76	0	0.01	0.01	0.00		21.	2872.
77	0	0.01	0.01	0.00		21.	2391.
78	0	0.01	0.01	0.00		21.	1978.
79	0	0.02	0.02	0.00		21.	1626.

80	0	0.02	0.02	0.00	21.	1331.
81	0	0.02	0.02	0.00	21.	1089.
82	0	0.02	0.02	0.00	21.	891.
83	0	0.02	0.02	0.00	21.	730.
84	0	0.02	0.02	0.00	21.	599.
85	0	0.05	0.05	0.00	21.	493.
86	0	0.06	0.06	0.00	21.	405.
87	0	0.08	0.08	0.00	21.	333.
88	0	0.20	0.10	0.10	21.	279.
89	0	0.07	0.07	0.00	21.	243.
90	0	0.06	0.06	0.00	21.	219.
91	0	0.01	0.01	0.00	21.	204.
92	0	0.01	0.01	0.00	21.	189.
93	0	0.01	0.01	0.00	21.	173.
94	0	0.01	0.01	0.00	21.	153.
95	0	0.01	0.01	0.00	21.	117.
96	0	0.01	0.01	0.00	21.	94.
97	0				21.	75.
98	0				21.	64.
99	0				21.	56.
100	0				21.	49.
101	0				21.	43.
102	0				21.	38.
103	0				21.	35.
104	0				21.	32.
105	0				21.	30.
106	0				21.	28.
107	0				21.	27.
108	0				21.	26.
109	0				21.	25.
110	0				21.	24.
111	0				21.	24.
112	0				21.	23.
113	0				21.	23.
114	0				21.	22.
115	0				21.	22.
116	0				21.	22.
117	0				21.	22.
118	0				21.	22.
119	0				21.	21.
120	0				21.	21.
121	0				21.	21.
122	0				21.	21.
123	0				21.	21.
124	0				21.	21.
125	0				21.	21.
126	0				21.	21.
TOTAL		17.16	4.70	12.46	2646.	86877.

```
SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      1
ENTER TIME INTERVAL(MIN)=    60.


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      2
ENTER DRAINAGE AREA (SQMI) =      10.50
SELECT 1-3 (1=INPUT UH, 2=CLARK, 3=SNYDER )        3
ENTER SNYDERS CP AND TP (HRS) =           0.62        2.73
ENTER INITIAL EST. CLARKS TC & (HRS) (0=DEFAULT)=   0.00        0.00

      TP        CP        TC        R

    2.39     0.586     3.12      2.05
    2.64     0.647     3.23      2.12
    2.71     0.639     3.23      2.17
    2.72     0.633     3.23      2.19
    2.72     0.630     3.23      2.19


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      3
ENTER RATIO  IMPERVIOUS =          0.00
SELECT 1-3 ( 1=RAIN, 2=SPS, 3=PMS )        2
ENTER SPS INDEX RAINFALL (IN) =  2.00
ENTER TRSPC AND TRSDA (SQMI) =            1.00       10.50
SELECT 1-3 (1=INIT+CONST, 2=ACUM LOSS, 3=SCS)         1
ENTER INITIAL LOSS(IN), CONSTANT LOSS(IN/HR) =       1.00        0.10


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      4
ENTER A TITLE PLEASE -   POCANTICO SPF
ENTER STRTQ,QRCSN,AND RTIOR =        21.00    21.00     1.00

 HR MIN   RAIN   LOSS EXCESS   UNIT HG    RECSN     FLOW
  1   0   0.00   0.00   0.00       30.       21.       21.
  2   0   0.00   0.00   0.00      103.       21.       21.
  3   0   0.00   0.00   0.00      156.       21.       21.
  4   0   0.00   0.00   0.00      140.       21.       21.
  5   0   0.00   0.00   0.00       91.       21.       21.
  6   0   0.00   0.00   0.00       57.       21.       21.
  7   0   0.01   0.01   0.00       36.       21.       21.
  8   0   0.01   0.01   0.00       22.       21.       21.
  9   0   0.01   0.01   0.00       14.       21.       21.
 10   0   0.01   0.01   0.00        9.       21.       21.
 11   0   0.01   0.01   0.00        5.       21.       21.
 12   0   0.01   0.01   0.00        3.       21.       21.
 13   0   0.03   0.03   0.00        2.       21.       21.
 14   0   0.04   0.04   0.00        1.       21.       21.
 15   0   0.05   0.05   0.00                 21.       21.
 16   0   0.12   0.12   0.00                 21.       21.
 17   0   0.04   0.04   0.00                 21.       21.
 18   0   0.03   0.03   0.00                 21.       21.
 19   0   0.01   0.01   0.00                 21.       21.
```

20	0	0.01	0.01	0.00	21.	21.
21	0	0.01	0.01	0.00	21.	21.
22	0	0.01	0.01	0.00	21.	21.
23	0	0.01	0.01	0.00	21.	21.
24	0	0.01	0.01	0.00	21.	21.
25	0	0.02	0.02	0.00	21.	21.
26	0	0.02	0.02	0.00	21.	21.
27	0	0.02	0.02	0.00	21.	21.
28	0	0.02	0.02	0.00	21.	21.
29	0	0.02	0.02	0.00	21.	21.
30	0	0.02	0.02	0.00	21.	21.
31	0	0.04	0.04	0.00	21.	21.
32	0	0.04	0.04	0.00	21.	21.
33	0	0.04	0.04	0.00	21.	21.
34	0	0.04	0.04	0.00	21.	21.
35	0	0.04	0.04	0.00	21.	21.
36	0	0.04	0.04	0.00	21.	21.
37	0	0.14	0.14	0.00	21.	21.
38	0	0.16	0.13	0.03	21.	30.
39	0	0.20	0.10	0.10	21.	83.
40	0	0.51	0.10	0.41	21.	297.
41	0	0.19	0.10	0.09	21.	671.
42	0	0.15	0.10	0.05	21.	939.
43	0	0.03	0.03	0.00	21.	898.
44	0	0.03	0.03	0.00	21.	870.
45	0	0.03	0.03	0.00	21.	453.
46	0	0.03	0.03	0.00	21.	294.
47	0	0.03	0.03	0.00	21.	193.
48	0	0.03	0.03	0.00	21.	129.
49	0	0.12	0.10	0.02	21.	95.
50	0	0.12	0.10	0.02	21.	91.
51	0	0.12	0.10	0.02	21.	106.
52	0	0.12	0.10	0.02	21.	124.
53	0	0.12	0.10	0.02	21.	135.
54	0	0.12	0.10	0.02	21.	139.
55	0	0.32	0.10	0.22	21.	206.
56	0	0.32	0.10	0.22	21.	417.
57	0	0.32	0.10	0.22	21.	733.
58	0	0.32	0.10	0.22	21.	1015.
59	0	0.32	0.10	0.22	21.	1200.
60	0	0.32	0.10	0.22	21.	1316.
61	0	1.02	0.10	0.92	21.	1603.
62	0	1.23	0.10	1.13	21.	2436.
63	0	1.54	0.10	1.44	21.	3873.
64	0	3.89	0.10	3.79	21.	6243.
65	0	1.43	0.10	1.33	21.	9349.
66	0	1.13	0.10	1.03	21.	11436.
67	0	0.20	0.10	0.10	21.	10947.
68	0	0.20	0.10	0.10	21.	8635.
69	0	0.20	0.10	0.10	21.	6118.
70	0	0.20	0.10	0.10	21.	4137.
71	0	0.20	0.10	0.10	21.	2860.
72	0	0.20	0.10	0.10	21.	2057.

73	0	0.01	0.01	0.00		21.	1522.
74	0	0.01	0.01	0.00		21.	1101.
75	0	0.01	0.01	0.00		21.	738.
76	0	0.01	0.01	0.00		21.	467.
77	0	0.01	0.01	0.00		21.	289.
78	0	0.01	0.01	0.00		21.	156.
79	0	0.02	0.02	0.00		21.	94.
80	0	0.02	0.02	0.00		21.	57.
81	0	0.02	0.02	0.00		21.	43.
82	0	0.02	0.02	0.00		21.	34.
83	0	0.02	0.02	0.00		21.	28.
84	0	0.02	0.02	0.00		21.	25.
85	0	0.05	0.05	0.00		21.	22.
86	0	0.06	0.06	0.00		21.	21.
87	0	0.08	0.08	0.00		21.	21.
88	0	0.20	0.10	0.10		21.	52.
89	0	0.07	0.07	0.00		21.	124.
90	0	0.06	0.06	0.00		21.	178.
91	0	0.01	0.01	0.00		21.	161.
92	0	0.01	0.01	0.00		21.	113.
93	0	0.01	0.01	0.00		21.	79.
94	0	0.01	0.01	0.00		21.	57.
95	0	0.01	0.01	0.00		21.	44.
96	0	0.01	0.01	0.00		21.	35.
97	0					21.	30.
98	0					21.	27.
99	0					21.	25.
100	0					21.	23.
101	0					21.	22.
102	0					21.	21.
103	0					21.	21.
104	0					21.	21.
105	0					21.	21.
106	0					21.	21.
107	0					21.	21.
108	0					21.	21.
109	0					21.	21.
TOTAL		17.16	4.70	12.46	675.	2289.	86459.

```
SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      1
ENTER TIME INTERVAL(MIN)=    60.


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      2
ENTER DRAINAGE AREA (SQMI) =      10.50
SELECT 1-3 (1=INPUT UH, 2=CLARK, 3=SNYDER )        3
ENTER SNYDERS CP AND TP (HRS) =          0.62        2.73
ENTER INITIAL EST. CLARKS TC & R (HRS) (0=DEFAULT)=  0.00        0.00

      TP        CP        TC        R

    2.39     0.586     3.12      2.05
    2.64     0.647     3.23      2.12
    2.71     0.639     3.23      2.17
    2.72     0.633     3.23      2.19
    2.72     0.630     3.23      2.19


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      3
ENTER RATIO  IMPERVIOUS =          0.00
SELECT 1-3 ( 1=RAIN, 2=SCS, 3=PMS )        3
ENTER PMS INDEX RAINFALL (IN) =  24.00
ENTER R6,R12,R24,R48,R72,R96 =     107.00   122.00   137.00   151.00   159.00
ENTER TRSPC AND TRSDA (SQMI) =            0.00       10.50
SELECT 1-3 (1=INIT+CONST, 2=ACUM LOSS, 3=SCS)        1
ENTER INITIAL LOSS(IN), CONSTANT LOSS(IN/HR) =       1.00        0.10


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      4
ENTER A TITLE PLEASE -   POCANTICO PMF
ENTER STRTQ,QRCSN,AND RTIOR =        21.00    21.00     1.00

 HR MIN   RAIN   LOSS  EXCESS  UNIT HG    RECSN     FLOW
  1   0   0.02   0.02   0.00      30.       21.       21.
  2   0   0.02   0.02   0.00     103.       21.       21.
  3   0   0.02   0.02   0.00     156.       21.       21.
  4   0   0.02   0.02   0.00     140.       21.       21.
  5   0   0.02   0.02   0.00      91.       21.       21.
  6   0   0.02   0.02   0.00      57.       21.       21.
  7   0   0.05   0.05   0.00      36.       21.       21.
  8   0   0.05   0.05   0.00      22.       21.       21.
  9   0   0.05   0.05   0.00      14.       21.       21.
 10   0   0.05   0.05   0.00       9.       21.       21.
 11   0   0.05   0.05   0.00       5.       21.       21.
 12   0   0.05   0.05   0.00       3.       21.       21.
 13   0   0.21   0.21   0.00       2.       21.       21.
 14   0   0.25   0.25   0.00       1.       21.       21.
 15   0   0.32   0.18   0.14                21.       64.
 16   0   0.80   0.10   0.70                21.      380.
 17   0   0.29   0.10   0.19                21.     1021.
 18   0   0.23   0.10   0.13                21.     1550.
 19   0   0.03   0.03   0.00                21.     1563.
 20   0   0.03   0.03   0.00                21.     1213.
```

21	0	0.05	0.03	0.00	21.	851.
22	0	0.03	0.03	0.00	21.	535.
23	0	0.03	0.03	0.00	21.	344.
24	0	0.03	0.03	0.00	21.	224.
25	0	0.19	0.10	0.09	21.	177.
26	0	0.19	0.10	0.09	21.	222.
27	0	0.19	0.10	0.09	21.	333.
28	0	0.19	0.10	0.09	21.	441.
29	0	0.19	0.10	0.09	21.	510.
30	0	0.19	0.10	0.09	21.	549.
31	0	0.48	0.10	0.38	21.	666.
32	0	0.48	0.10	0.38	21.	985.
33	0	0.48	0.10	0.38	21.	1452.
34	0	0.48	0.10	0.38	21.	1867.
35	0	0.48	0.10	0.38	21.	2138.
36	0	0.48	0.10	0.38	21.	2308.
37	0	2.06	0.10	1.96	21.	2899.
38	0	2.47	0.10	2.37	21.	4724.
39	0	3.09	0.10	2.99	21.	7854.
40	0	7.82	0.10	7.72	21.	12829.
41	0	2.88	0.10	2.78	21.	19211.
42	0	2.26	0.10	2.16	21.	23446.
43	0	0.29	0.10	0.19	21.	22532.
44	0	0.29	0.10	0.19	21.	17798.
45	0	0.29	0.10	0.19	21.	12585.
46	0	0.29	0.10	0.19	21.	8464.
47	0	0.29	0.10	0.19	21.	5807.
48	0	0.29	0.10	0.19	21.	4137.
49	0	0.01	0.01	0.00	21.	3028.
50	0	0.01	0.01	0.00	21.	2172.
51	0	0.01	0.01	0.00	21.	1445.
52	0	0.01	0.01	0.00	21.	904.
53	0	0.01	0.01	0.00	21.	551.
54	0	0.01	0.01	0.00	21.	285.
55	0	0.03	0.03	0.00	21.	162.
56	0	0.03	0.03	0.00	21.	90.
57	0	0.03	0.03	0.00	21.	63.
58	0	0.03	0.03	0.00	21.	46.
59	0	0.03	0.03	0.00	21.	35.
60	0	0.03	0.03	0.00	21.	28.
61	0	0.12	0.10	0.02	21.	30.
62	0	0.14	0.10	0.04	21.	54.
63	0	0.16	0.10	0.06	21.	118.
64	0	0.46	0.10	0.36	21.	305.
65	0	0.17	0.10	0.07	21.	614.

66	0	0.13	0.10	0.03		21.	827.
67	0	0.02	0.02	0.00		21.	770.
68	0	0.02	0.02	0.00		21.	561.
69	0	0.02	0.02	0.00		21.	376.
70	0	0.02	0.02	0.00		21.	245.
71	0	0.02	0.02	0.00		21.	162.
72	0	0.02	0.02	0.00		21.	110.
73	0					21.	77.
74	0					21.	56.
75	0					21.	43.
76	0					21.	35.
77	0					21.	29.
78	0					21.	23.
79	0					21.	21.
80	0					21.	21.
81	0					21.	21.
82	0					21.	21.
83	0					21.	21.
84	0					21.	21.
85	0					21.	21.
TOTAL		30.60	4.90	25.70	6755.	1785.	175393.

```
SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      1
ENTER TIME INTERVAL(MIN)=    60.

SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      2
ENTER DRAINAGE AREA (SQMI) =      10.50
SELECT 1-3 (1=INPUT UH, 2=CLARK, 3=SNYDER )        2
ENTER NUMBER OF TIME-AREA ORDINATES (0=NONE)=      0
ENTER CLARKS TC AND R (HRS) =         7.63       4.88

      TP        CP       TC        R

    6.35     0.683     7.63     4.88

SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      3
ENTER RATIO  IMPERVIOUS =         0.00
SELECT 1-3 ( 1=RAIN, 2=SPS, 3=PMS )        3
ENTER PMS INDEX RAINFALL (IN) =  24.00
ENTER R6,R12,R24,R48,R72,R96 =      107.00  122.00  137.00  151.00  159.00
ENTER TRSPC AND TRSDA (SQMI) =              0.00       10.50
SELECT 1-3 (1=INIT+CONST, 2=ACUM LOSS, 3=SCS)        1
ENTER INITIAL LOSS(IN), CONSTANT LOSS(IN/HR) =       1.00        0.10

SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,'6=STOP)      4
ENTER A TITLE PLEASE -    POCANTICO PMF
ENTER STRTQ,QRCSN,AND RTIOR =        21.00    21.00     1.00

 HR MIN   RAIN  LOSS EXCESS  UNIT HG    RECSN      FLOW
  1   0   0.02  0.02   0.00      42.       21.       21.
  2   0   0.02  0.02   0.00      15.       21.       21.
  3   0   0.02  0.02   0.00      30.       21.       21.
  4   0   0.02  0.02   0.00      46.       21.       21.
  5   0   0.02  0.02   0.00      60.       21.       21.
  6   0   0.02  0.02   0.00      69.       21.       21.
  7   0   0.05  0.05   0.00      72.       21.       21.
  8   0   0.05  0.05   0.00      68.       21.       21.
  9   0   0.05  0.05   0.00      57.       21.       21.
 10   0   0.05  0.05   0.00      46.       21.       21.
 11   0   0.05  0.05   0.00      38.       21.       21.
 12   0   0.05  0.05   0.00      31.       21.       21.
 13   0   0.21  0.21   0.00      25.       21.       21.
 14   0   0.25  0.25   0.00      20.       21.       21.
 15   0   0.32  0.18   0.14      16.       21.       27.
 16   0   0.80  0.10   0.70     137.       21.       72.
 17   0   0.29  0.10   0.19     112.       21.      179.
 18   0   0.23  0.10   0.13      91.       21.      333.
 19   0   0.03  0.03   0.00      74.       21.      509.
 20   0   0.03  0.03   0.00      60.       21.      672.
 21   0   0.03  0.03   0.00      49.       21.      789.
 22   0   0.03  0.03   0.00      40.       21.      838.
 23   0   0.03  0.03   0.00      32.       21.      808.
 24   0   0.03  0.03   0.00      27.       21.      714.
 25   0   0.19  0.10   0.09      22.       21.      604.
 26   0   0.19  0.10   0.09      18.       21.      513.
 27   0   0.19  0.10   0.09      15.       21.      453.
 28   0   0.19  0.10   0.09      12.       21.      423.
 29   0   0.19  0.10   0.09      10.       21.      419.
 30   0   0.19  0.10   0.09       .        21.      434.
 31   0   0.48  0.10   0.38       .        21.      473.
 32   0   0.48  0.10   0.38                21.      548.
 33   0   0.48  0.10   0.38                21.      662.
```

34	0	0.48	0.10	0.38	21.	818.
35	0	0.48	0.10	0.38	21.	1012.
36	0	0.48	0.10	0.38	21.	1229.
37	0	2.06	0.10	1.96	21.	1518.
38	0	2.47	0.10	2.37	21.	1986.
39	0	3.09	0.10	2.99	21.	2729.
40	0	7.82	0.10	7.72	21.	4025.
41	0	2.88	0.10	2.78	21.	6001.
42	0	2.20	0.10	2.10	21.	8383.
43	0	0.29	0.10	0.19	21.	10796.
44	0	0.29	0.10	0.19	21.	12757.
45	0	0.29	0.10	0.19	21.	13868.
46	0	0.29	0.10	0.19	21.	14006.
47	0	0.29	0.10	0.19	21.	13179.
48	0	0.29	0.10	0.19	21.	11674.
49	0	0.01	0.01	0.00	21.	9968.
50	0	0.01	0.01	0.00	21.	8372.
51	0	0.01	0.01	0.00	21.	6996.
52	0	0.01	0.01	0.00	21.	5836.
53	0	0.01	0.01	0.00	21.	4847.
54	0	0.01	0.01	0.00	21.	4003.
55	0	0.03	0.03	0.00	21.	3286.
56	0	0.03	0.03	0.00	21.	2685.
57	0	0.03	0.03	0.00	21.	2191.
58	0	0.03	0.03	0.00	21.	1790.
59	0	0.03	0.03	0.00	21.	1463.
60	0	0.03	0.03	0.00	21.	1196.
61	0	0.12	0.10	0.02	21.	980.
62	0	0.14	0.10	0.04	21.	806.
63	0	0.18	0.10	0.08	21.	672.
64	0	0.46	0.10	0.36	21.	587.
65	0	0.17	0.10	0.07	21.	556.
66	0	0.13	0.10	0.03	21.	560.
67	0	0.02	0.02	0.00	21.	584.
68	0	0.02	0.02	0.00	21.	598.
69	0	0.02	0.02	0.00	21.	592.
70	0	0.02	0.02	0.00	21.	557.
71	0	0.02	0.02	0.00	21.	467.
72	0	0.02	0.02	0.00	21.	387.
73	0				21.	312.
74	0				21.	257.
75	0				21.	213.
76	0				21.	176.
77	0				21.	146.
78	0				21.	122.
79	0				21.	102.
80	0				21.	87.
81	0				21.	75.
82	0				21.	65.
83	0				21.	57.
84	0				21.	50.
85	0				21.	45.
86	0				21.	40.
87	0				21.	37.
88	0				21.	34.
89	0				21.	32.

90	0					21.	30.
91	0					21.	28.
92	0					21.	27.
93	0					21.	26.
94	0					21.	24.
95	0					21.	22.
96	0					21.	21.
97	0					21.	21.
98	0					21.	21.
99	0					21.	21.
100	0					21.	21.
101	0					21.	21.
102	0					21.	21.
TOTAL		30.60	4.90	25.70	67.0.	2142.	175876.

DALE

DESIGN BRIEF

DESIGNED BY NFD DATE 8.7.78

CHECKED BY PAGE C-17 OF

PROJECT NO. SHORT TITLE

DESIGN SUBJECT SPILLWAY RATING CURVE REF. DWGS.

SPILLWAY RATING CURVE

0			
1			206
2			571
3			1131
4			1794
5			2570

DALE

DESIGN BRIEF

DESIGNED BY NFD DATE 8.7.78
CHECKED BY PAGE C-18 OF
PROJECT NO. SHORT TITLE
DESIGN SUBJECT Ires. Res. REF. DWGS.

SPILLWAY RATING CURVE

b. Discharge Over Gate-Controlled Openings

$Q = 2/3\sqrt{2g}\ C\ L\ (H_1^{3/2} - H_2^{3/2})$

$L = 3@8 = 6$ feet $h_a = 0$

H	d/H_1	C	$2/3\sqrt{2g}$ (5.35)	L	$H_1^{3/2}$	$H_2^{3/2}$	$(H_1^{3/2} - H_2^{3/2})$	Q
0								
1					1			
2								
3								
4								
5								
6	.7	.64	[illegible]		14.7	2.8	11.9	261[illegible]
7	.6	.65	223		18.5	5.2	13.[illegible]	29[illegible]
8	.5	[illegible]	[illegible]		[illegible]2.6	8.0	14.[illegible]	33
9	.45	[illegible]	[illegible]		27.0	[illegible].2	15.[illegible]	36
10	4	[illegible]	[illegible]		31.[illegible]	14.7	16.[illegible]	39
11	.36	[illegible]	[illegible]		36[illegible]	[illegible].5	18.0	42
12	.33	[illegible]	[illegible]		[illegible]	[illegible].6	19.0	4503
13	.31	.69	237		46.[illegible]	27.0	19.9	47[illegible]
14	.28	.69	237		[illegible]	31.6	20.8	49[illegible]0
15	.27	.69	237		[illegible]	[illegible].5	22.4	5309
16	.25	.70	240		64.0	41.6	22.4	5376
17	.23	.70	240		70.0	46.9	23.2	5563

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DALE

DESIGN BRIEF

DESIGNED BY HFD　　　　DATE 8.7.78

CHECKED BY　　　　PAGE C-19 OF

PROJECT NO.　　　　SHORT TITLE

DESIGN SUBJECT [illegible]　　　　REF. DWGS.

Spillway Rating Curve

C. [illegible] flow over spillway [illegible]

H	C	L	$H^{3/2}$	Q
1	2.64	41[illegible]	1	10[illegible]
2	↓	↓	2.8	3063
3	↓	↓	5.2	5628
4	↓	↓	8.0	8654
5	↓	↓	11.2	12122
6	↓	↓	14.7	16152
1	↓	↓	18.	20024

DALE

DESIGN BRIEF

DESIGNED BY NFD DATE 87.78

CHECKED BY PAGE C-20 OF

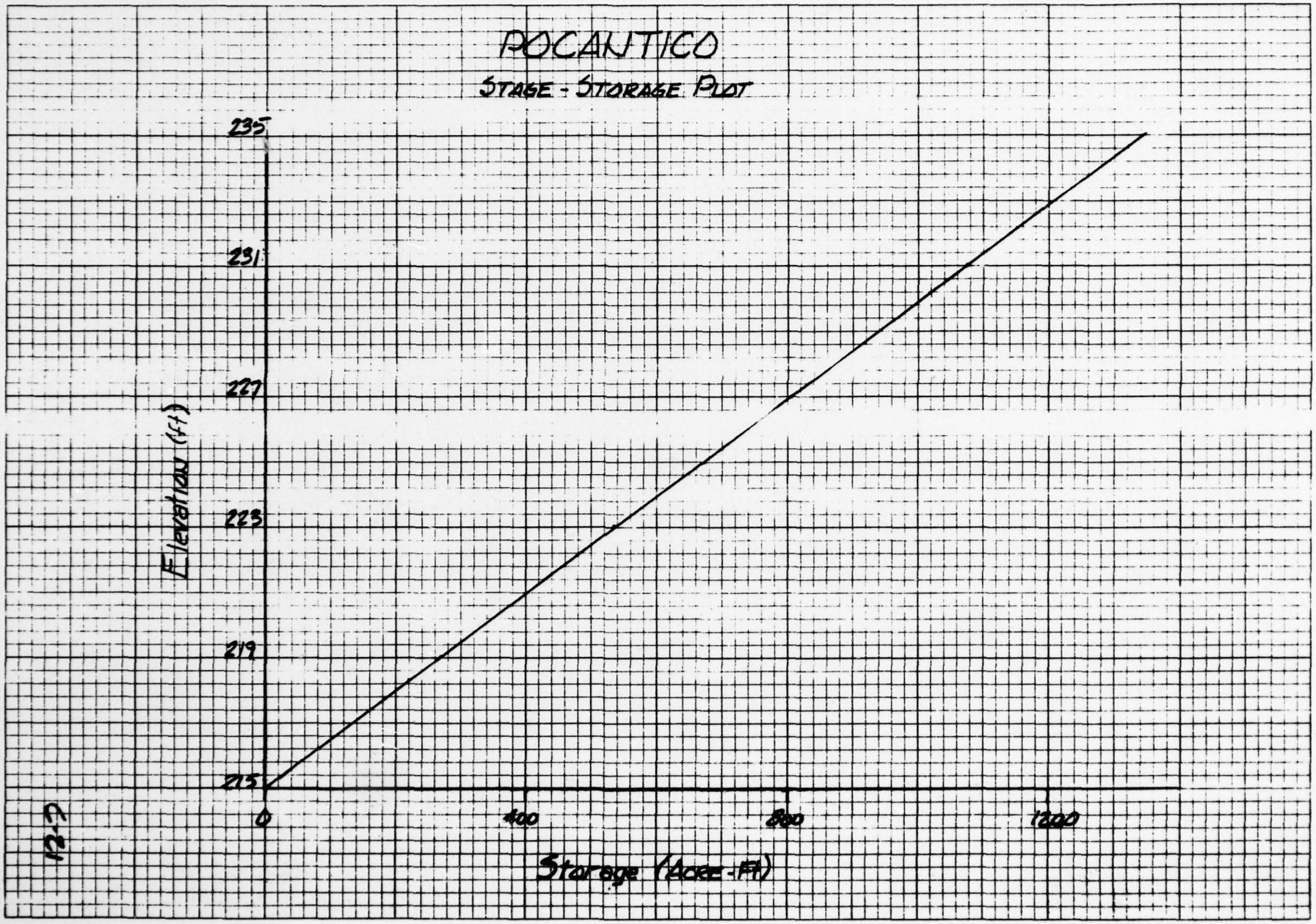
PROJECT NO. SHORT TITLE

DESIGN SUBJECT REF. DWGS.

STAGE - DISCHARGE TABULATION

DESC.	ELEV	H	Q* SPWAY	Q DAM	Q TOT
	215	0		—	0
	216	1	20	—	205
	217	2	5[illegible]	—	597
	218	3	11[illegible]	—	1131
	[illegible]	4	17[illegible]	—	1792
	220	5	25[illegible]	—	2576
	221	6	26[illegible]	—	2618
	222	7	29[illegible]	—	2964
	223	8	33[illegible]	—	3354
	[illegible]	9	36[illegible]	—	3634
TOP DAM	[illegible]	10	[illegible]	—	[illegible]5
	226	11	421	1[illegible]82	5[illegible]4
	227	12	45[illegible]	3[illegible]63	[illegible]26
	228	13	911	56[illegible]8	10[illegible]44
	[illegible]	14	498	8[illegible]9	1[illegible]99
	230	15	532	12 22	17431
	231	16	537	16 152	21528
	232	17	55[illegible]	20024	25592

* SLUICE GATES COMPLETELY OPEN.


POCANTICO
STAGE - STORAGE PLOT
235
231
227
223
219
215
Elevation (ft)
0
400
800
1200
Storage (Acre-ft)
Fig. 3

```
00100 A POCANTICO
0110 A RESERVOIR ROUTING OVER STRUCTURE OF SPF
0120 A SERVICE SPILLWAY ONLY - GATES FULLY OPEN
0130 B     60       1
0140 1      3
0150 K      0
0160 M     -1            10.5
0170 N     21      22      30      63     132     226     328     419     479     498
0180 N    472     413     347     291     248     217     193     184     185     212
0190 N    269     360     480     618     798    1044    1416    2045    2997    4140
0200 N   5296    6236    6767    6831    6428    5697    4873    4101    3436    2872
0210 N   2391    1978    1626    1331    1089     891     730     599     493     405
0220 N    333     279     243     219     204     189     173     153     117      94
0230 K      1
0240 Y                              1
0250 1      1                                                   -1
0260 2      0      50     100     320     750     840     960    1020    1080    1120
0270 3      0     205     597    2576    5274   10344   13589   17431   21528   25592
0280 K     99
0290 A
0300 A
0310 A
```

```
00100 A POCANTICO
0110 RESERVOIR ROUTING OVER STRUCTURE OF PMF
0120 A SERVICE SPILLWAY ONLY - GATES FULLY OPEN
0130 B     60       1
0140 1      3
0150 K      0
0160 M     -1            10.5
0170 N     21      27      72     179     333     509     672     789     838     808
0180 N    714     604     513     453     423     419     434     473     548     662
0190 N    818    1012    1229    1518    1986    2729    4025    6001    8383   10796
0200 N  12757   13868   14006   13179   11674    9968    8372    6996    5836    4847
0210 N   4003    3286    2685    2191    1790    1463    1196     980     806     672
0220 N    587     556     560     584     598     592     557     467     387     312
0230 K      1
0240 Y                              1
0250 1      1                                                   -1
0260 2      0      50     100     320     750     840     960    1020    1080    1120
0270 3      0     205     597    2576    5294   10344   13589   17431   21528   25592
0280 K     99
0290 A
0300 A
0310 A
#SAVE
```

****

POCANTICO
RESERVOIR ROUTING OVER STRUCTURE OF SPF
SERVICE SPILLWAY ONLY - GATES FULLY OPEN

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
60	1	0	0	0	0	0	0	0	0

JOPER	NWT
3	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
0	0	0	0	0	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	10.50	0.0	0.0	0.0	0.0	0	0	0

INPUT HYDROGRAPH

21.	22.	30.	63.	132.	226.	328.	419.	479.	498.
472.	413.	347.	291.	248.	217.	193.	184.	185.	212.
269.	360.	480.	618.	798.	1044.	1416.	2045.	2997.	4140.
5296.	6236.	6767.	6831.	6428.	5697.	4873.	4101.	3436.	2872.
2391.	1978.	1626.	1331.	1089.	891.	730.	599.	493.	405.
333.	279.	243.	219.	204.	189.	173.	153.	117.	94.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6831.	6209.	5151.	3420.	85221.
INCHES		5.50	11.17	12.58	12.58
AC-FT		3081.	6254.	7047.	7047.

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HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
0	1	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	-1.

STORAGE#	0.	50.	100.	320.	750.	840.	960.	1020.	1080.	1120.
OUTFLOW#	0.	205.	597.	2576.	5294.	10344.	13589.	17431.	21528.	25592.

TIME	EOP STOR	AVG IN	EOP OUT
1	5.	21.	21.
2	5.	22.	21.
3	6.	26.	23.
4	7.	47.	29.
5	12.	98.	49.
6	21.	179.	87.
7	35.	277.	142.
8	51.	374.	212.
9	66.	449.	328.
10	76.	489.	406.

11	81.	485.	445.
12	80.	443.	444.
13	76.	380.	413.
14	71.	319.	367.
15	65.	270.	319.
16	59.	233.	277.
17	55.	205.	242.
18	51.	189.	216.
19	49.	185.	202.
20	49.	199.	201.
21	52.	241.	218.
22	58.	315.	265.
23	67.	420.	341.
24	80.	549.	443.
25	97.	708.	573.
26	118.	921.	759.
27	146.	230.	1014.
28	190.	731.	1402.
29	257.	521.	2009.
30	354.	3569.	2788.
31	480.	4718.	3588.
32	623.	5766.	4490.
33	752.	6502.	5392.
34	787.	6799.	7358.
35	769.	6630.	6340.
36	762.	6063.	5952.
37	737.	5285.	5213.
38	690.	4487.	4912.
39	615.	3769.	4438.
40	530.	3154.	3906.
41	447.	2632.	3378.
42	369.	2185.	2884.
43	300.	1802.	2392.
44	245.	1479.	1897.
45	203.	1210.	1525.
46	171.	990.	1235.
47	145.	811.	1005.
48	125.	665.	820.
49	108.	546.	672.
50	95.	449.	555.
51	83.	369.	464.
52	73.	306.	387.
53	65.	261.	325.
54	59.	231.	279.
55	55.	212.	246.
56	52.	197.	222.
57	50.	181.	203.
58	47.	163.	191.
59	43.	135.	175.
60	38.	106.	155.
SUM			84855.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	7358.	5861.	3140.	1414.	84855.
INCHES		5.19	11.13	12.53	12.53
AC-FT		2900.	6232.	7016.	7016.

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RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	0	6831.	6209.	3151.	1420.	10.50
ROUTED TO	0	7358.	5861.	3140.	1414.	10.50

POCAHTICO
ESERVOIR ROUTING OVER STRUCTURE OF PMF
SERVICE SPILLWAY ONLY - GATES FULLY OP'N

JOB SPEC FICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
60	1	0	0	1	0	0	0	0	0

JOPER	NWT
3	0

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SUB-AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
0	0	0	0	0	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	10.50	0.0	0.0	0.0	0.0	0	0	0

INPUT HYDROGRAPH

21.	27.	72.	179.	333.	509.	672.	789.	838.	808.
714.	604.	513.	453.	423	419.	434.	473.	548.	662.
818.	1012.	1229.	1518.	1986.	2729.	4025.	6001.	8383.	10796.
12757.	13868.	14006.	13179.	11674.	9968.	8372.	6996.	5836.	4847.
4003.	3286.	2685.	2191.	1790.	1463.	1196.	980.	806.	672.
587.	556.	560.	584.	598	592.	557.	467.	387.	312.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	14006.	12713.	8800.	7396.	1.3763.
INCHES		11.26	7.68	5.66	25.66
AC-FT		6307.	4300.	14368.	14368.

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HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
0	1	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	3	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	-1.

STORAGE#	0.	50.	100.	320.	750.	840.	960.	1020.	1080.	1120.
OUTFLOW#	0.	205.	597.	2576.	7294.	11344.	13589.	17431.	21528.	25592.

TIME	EOP STOR	AVG IN	EOP OUT
1	5.	21.	21.
2	5.	24.	22.
3	7.	50.	30.
4	14.	126.	58.
5	28.	256.	115.
6	50.	421.	204.
7	74.	591.	392.
8	95.	731.	558.
9	111.	814.	692.
10	118.	823.	763.

11	118.	761.	762.
12	112.	659.	706.
13	103.	559.	626.
14	94.	483.	553.
15	87.	438.	497.
16	82.	421.	460.
17	80.	427.	443.
18	81.	454.	448.
19	85.	511.	479.
20	93.	605.	541.
21	105.	740.	643.
22	121.	915.	790.
23	141.	1121.	969.
24	166.	1374.	1188.
25	200.	1752.	1494.
26	252.	2358.	1962.
27	330.	3377.	2693.
28	491.	5013.	3654.
29	722.	7192.	5119.
30	857.	9590.	10803.
31	895.	11777.	11831.
32	953.	13313.	13395.
33	968.	13937.	14109.
34	954.	13593.	13422.
35	915.	12427.	12371.
36	854.	10821.	10735.
37	810.	9170.	8675.
38	786.	7684.	7290.
39	764.	6416.	6869.
40	739.	5342.	5222.
41	686.	4425	4892.
42	605.	3645.	4375.
43	514	2986.	3800.
44	424.	2438	3236.
45	343.	1991	2720.
46	275.	1627	2172.
47	224.	1330.	1715.
48	187.	1088.	1375.
49	157.	893.	1114.
50	135.	739.	911.
51	118.	630.	758.
52	107.	572.	657.
53	101.	558.	603.
54	99.	572.	587.
55	99.	591.	589.
56	99.	595.	592.
57	98.	575.	583.
58	94.	512.	548.
59	86.	427.	489.
60	78.	350.	421.
SUM			172940.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	14109.	12655.	6380.	2882.	172940.
INCHES		11.21	22.61	25.54	25.54
AC-FT		6278.	12662.	14300.	14300.

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RUNOFF SUMMARY - AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	0	14006.	12713.	6400.	2896.	10.50
ROUTED TO	0	14109.	12655.	6380.	2882.	10.50

APPENDIX D

REFERENCES

APPENDIX D

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Pocantico Lake Dam Lower Hudson River Basin, Westchester County, NY Inventory No. N.Y. 49		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) John B. Stetson		8. CONTRACT OR GRANT NUMBER(s) DACW 51-78-C-0035
9. PERFORMING ORGANIZATION NAME AND ADDRESS Dale Engineering Company, Inc. Bankers Trust Building Utica, New York 13501		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233		12. REPORT DATE 19 September 1978 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) Department of the Army 26 Federal Plaza/ New York District, CofE New York, New York 10007		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; Distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

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Dam Safety
National Dam Safety Program
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Hydrology, Structural Stability
Westchester County
Pocantico Dam
Pocantico River

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.

Pocantico Lake Dam was judged to be unsafe non-emergency due to a seriously inadequate spillway.

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