

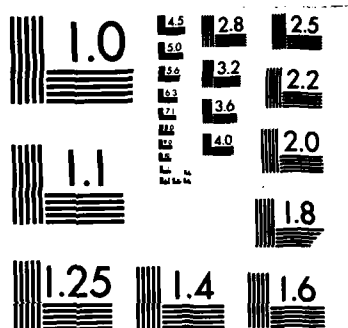
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
SARGENT POND DAM MA 0. (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV MAY 80

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THAMES RIVER BASIN
LEICESTER, MASSACHUSETTS

SARGENT POND DAM
MA 00986

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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JUL 03 1985
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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) -The dam is about 214 ft. long. It basically consists of a rubble masonry and concrete gravity spillway and two earth embankments. The dam is judged to be in fair condition. There is no seepage evident along the earth embankments. The size is small with a hazard potential of significant.		



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

OCT 28 1980

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

Inclosed is a copy of the Sargent Pond Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, Stanley and Helen Nicas, Leicester, Mass..

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Quality Engineering for your cooperation in carrying out this program.

Sincerely,


MAX B. SCHEIDER

Colonel, Corps of Engineers
Division Engineer

Incl
As stated

SARGENT POND DAM

MA 00986

THAMES RIVER BASIN
LEICESTER, MASSACHUSETTS

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.: MA 00986
Name of Dam: Sargent Pond Dam
Town: Leicester
County and State: Worcester County, Massachusetts
Stream: Town Meadow Brook
Date of Inspection: 16 April 1980

BRIEF ASSESSMENT

Sargent Pond Dam, constructed around the turn of the century, is a composite structure about 214 ft. long. It basically consists of a rubble masonry and concrete gravity spillway and two earth embankments. The embankments are about 250 ft. to 300 ft. wide. The crest of the left embankment is a paved parking lot and a private home is located on the crest of the right embankment. State Route 9 crosses the downstream end of both embankments. The upstream face of the left embankment and a portion of the right embankment have vertical rubble masonry retaining walls. There is a 10 in. dia. low level outlet whose invert elevation is unknown. There are provisions for flashboards in a notch on the spillway crest.

The reservoir is about 3,200 ft. long and the surface area of the pond at spillway crest is about 64 acres. The drainage area above the dam is about 2.91 sq. mi. (1,863 acres), the maximum storage to top of dam is about 670 acre-ft., and the height of the dam is about 18 ft. Based on height and storage, the size classification is small. A breach of the dam would damage 6 homes, State Route 9, a local road and potentially could cause the loss of life; therefore, the dam has been classified as having a significant hazard potential. Based upon the guidelines, the recommended test flood ranges from a 100 year frequency flood to a 1/2 PMF. Because of the developments downstream, the magnitude of the test flood selected as most closely relating to the involved risk was a 1/2 PMF.

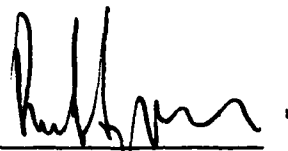
The test flood inflow is equal to 2,760 cfs. The routed test flood outflow of 2,210 cfs would overtop the dam by about 3.6 ft. The spillway can pass about 450 cfs or about 20 percent of the routed test flood outflow without overtopping the dam.

The dam is judged to be in generally fair condition due to the lack of an operating low level outlet and spillway inadequacy. There is no seepage evident along the earth embankments. There is minor seepage through the left portion of the spillway. The crest and downstream slope of the dam have been adequately maintained. The spillway and training walls and upstream retaining walls require minor grouting of joints. According to the owner, the low level outlet is operative, although it has not been used for the past six years. Because of high flow at the time of inspection, the condition of the flashboards could not be determined. For these reasons the dam is judged to be in good physical condition.

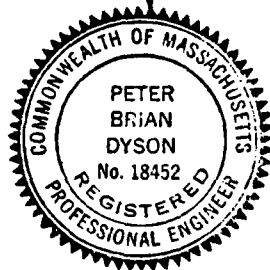
Within one year after receipt of this Phase I Inspection Report, the owners, Stanley and Helen Nicas, should retain the services of a registered professional

engineer and implement the results of his evaluation of the following: (1) a detailed hydrologic-hydraulic investigation to assess further the potential for overtopping and the adequacy of the spillway and downstream culvert; (2) review the use of flashboards on the spillway crest and determine the feasibility of either eliminating their use altogether, or modifying them to facilitate their quick removal in anticipation of a storm; and (3) inspection of the spillway structure during no flow conditions.

The owner should also implement the following operating and maintenance measures: (1) repoint with mortar all voids in the downstream spillway face, the spillway training walls and the upstream retaining walls; (2) determine whether the low level outlet is still operative and perform any necessary repair work; (3) develop a formal surveillance and downstream emergency warning plan including round-the-clock monitoring during periods of heavy precipitation; (4) institute procedures for an annual technical inspection of the dam and its appurtenant structures, including the minor seepage; and, (5) implement a regular periodic maintenance program.



Peter B. Dyson
Project Manager



This Phase I Inspection Report on Sargent Pond Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Richard J. DiBuono

RICHARD DIBUONO, MEMBER
Water Control Branch
Engineering Division

Aramast Mahtesian

ARAMAST MAHTESIAN, CHAIRMAN
Geotechnical Engineering Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar
JOE B. FRYAR

Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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INVENTORY OF DAMS

SARGENT POND DAM



OVERVIEW FROM LEFT ABUTMENT

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

There are no design calculations, as-built drawings or other data which would permit the preparation of structural stability computations. The dam is now stable and is in good condition. The only deficiency that should be corrected is the repair of the downstream toe of the spillway overflow section, the spillway training walls and the upstream retaining walls.

6.2 Design and Construction Data

No plan or calculations of value to a stability assessment are available.

6.3 Post-Construction Changes

There are no records of any post-construction changes made to the dam or spillway that are of significance to the stability of the facility.

6.4 Seismic Stability

The dam is located in Seismic Zone No. 2 and in accordance with recommended Phase I guidelines, does not warrant seismic analysis.

In summary, it is estimated that in the initial impact area described above, as many as six houses would be affected by high water, one local road and State Route 9 would be severely damaged, and there is the potential for loss of life because of a breach. Appendix D, Sheet D-22, shows the area of potential flooding described above.

assuming no flashboards in place. If flashboards were installed in the entire 1.7 ft. high 9.8 ft. long flashboard notch the spillway discharge would be reduced to about 330 cfs when the water level is at the low point in the crest of the dam. This would amount to about a 27 percent reduction in discharge capacity at this pond level. It should be noted that the spillway is affected by tail water conditions at time of high flow, because of a culvert constriction about 25 ft. downstream of the spillway.

A flood routing was performed for the test flood. The results of this routing and a routing of 0.25 PMF are shown on Sheets D-13 thru D-15, Appendix D, and are summarized as follows:

<u>Flood Magnitude</u>	<u>Maximum Inflow (cfs)</u>	<u>Maximum Pond El. (ft. N.G.V.D.)</u>	<u>Maximum Head Over Low Point of Dam (ft.)</u>	<u>Routed Test Flood Outflow (cfs)</u>
½ PMF				
Test Flood	2,760	912.0	3.6	2,210
¼ PMF	1,380	909.9	1.5	1,010

From the above table it can be seen that the project will not pass the routed test flood outflow without overtopping the low point in the dam by 3.6 ft. The spillway can handle 450 cfs or about 20 percent of the routed test flood outflow without overtopping the low point of the dam. The spillway crest serves as the control during the entire flood routing period.

5.5 Dam Failure Analysis

A breach owing to structural failure of the dam by piping or sloughing is a possibility. For this analysis, a breach was assumed with the water level in the pond even with the low point of the dam's crest. The "rule of thumb" method suggested in the NED March 1978 Guidance Report was used for the breach analysis. A breach width equal to the width of the spillway was used for the breach calculation. The breach discharge was calculated to be 4,400 cfs which includes about 500 cfs from the spillway, (see Sheets D-16 thru D-21, Appendix D).

A breach of the dam would possibly damage a house located on the right embankment of the dam and would result in the loss of a section of State Route 9. A house just below the dam would be flooded to a depth of about 3 ft. Dutton Pond, a small impoundment of water, is about 3,900 ft. downstream of the dam. It is estimated that the stage over the embankment of the dam impounding the pond would be about 3 ft., however, no houses or other structures are in this reach of Town Meadow Brook. In the reach below Dutton Pond it is estimated that the breach discharge would be about 4,000 cfs and as many as five houses would be flooded by depths of water ranging from 2 to 3 ft. One local road would also be flooded in this reach. It is estimated that there would be no flooding of homes within these reaches due to a maximum spillway discharge condition. Below the above described reaches, there are no structures in close proximity to Town Meadow Brook. About 2.65 miles below the dam, Town Meadow Brook empties into Greenville Pond just upstream from the French River. Available storage in Greenville Pond should significantly reduce the discharge from Town Meadow Brook due to the breach.

SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

Sargent Pond Dam is a rubble masonry and earthfill dam spanning the outlet to Sargent Pond. It has a concrete spillway with rubble masonry training walls, which at times of high flows is submerged due to the culvert under State Route 9 which is located about 25 ft. downstream of the spillway. The dam impounds a normal storage of about 500 acre-ft. with provisions for an additional 170 acre-ft. of capacity in its surcharge space to the top of the low point in the dam's crest. The general topographic characteristics of the 2.91 sq. mi. (1,863 acres) drainage basin is best described as rolling terrain, which rises from elevation 906 to elevation 1,180. The area contains both open fields and forests, but is predominately forested.

5.2 Design Data

No hydrologic computation or hydraulic data has been recovered for the dam.

5.3 Experience Data

No records are available in regard to past operation of the dam, nor of surcharge encroachments and flows through the spillway. However, it was reported that the dam was slightly overtopped during the floods of August 1955.

5.4 Test Flood Analysis

Hydrologic and hydraulic characteristics of Sargent Pond Dam and drainage area were evaluated in accordance with the criteria given in Recommended Guidelines for Safety Inspection of Dams. For determining surface areas and surcharge capacities, planimetered areas were taken from contours delineated on U.S.G.S. 2,000 ft. per in. quadrangle sheets. As indicated in Section 1.2, paragraphs c and d, Sargent Pond Dam is classified as small in size and has significant hazard potential. The recommended range of test floods for hydraulic evaluation of such a dam is between a 100 year frequency flood and a $\frac{1}{2}$ PMF. Because the downstream reaches have a scattered population, a test flood of a magnitude corresponding to $\frac{1}{2}$ PMF was selected as appropriate.

Precipitation data were obtained from Hydrometeorological Report No. 33, which for this area of Massachusetts approximates 23.5 in. of 6 hour maximum rainfall over a 10 square mile area. This value was then reduced by 20 percent to allow for basin size, shape and fit factors, and an additional 0.4 in. was deducted for infiltration losses. The six hour rainfall was distributed into one hour incremental periods as suggested in COE Publication EC 1110-2-1411.

A triangular incremental unitgraph was assumed for the inflow hydrograph using a computed lag time of 4.07 hours to derive a time-to-peak for the triangular hydrograph of 3.75 hours (see computations on Sheets D-10 thru D-12, Appendix D), indicating a peak inflow of about 5,520 cfs. The peak inflow was divided by two to arrive at the test flood inflow value of 2,760 cfs or a CSM value of about 948.

Discharge tables and curves for the spillway and for over the top of the dam are shown on Sheets D-4 thru D-9, Appendix D. The discharge curve has been computed

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operation Procedures

a. General. The Sargent Pond Dam is owned and operated by Stanley and Helen Nicas. Sargent Pond is used as a recreational facility by the shoreline property owners. In the spring flashboards are installed on the spillway crest for the benefit of swimmers and boaters. In the fall the flashboards are removed to allow shoreline property owners to make repairs to boat docks, retaining walls, swimming areas, etc.

b. Description of any Warning System in Effect. No warning system is in effect at Sargent Pond Dam.

4.2 Maintenance Procedures

a. General. There is no documented regular periodic maintenance program in effect at Sargent Pond Dam. There are, however, several items which require periodic maintenance, such as: the removal of debris from the spillway crest; the maintenance of the flashboards; the repair of the spillway training walls and upstream retaining walls; the surveillance of the embankment regarding seeps and the maintenance of the outlet facility.

b. Operating Facilities. The low level outlet below the spillway has not been operated for six years. It is therefore questionable whether it is still operative. The flashboards are normally removed in the fall and winter.

4.3 Evaluation

Overall maintenance of the dam is generally good. Specific maintenance items are evaluated as follows: the crest of the spillway was free of debris; because of the high flow at the time of the inspection, the condition of the flashboards could not be determined; the downstream face of the spillway overflow section, the spillway training walls and the upstream retaining walls have mortar missing from some of the joints and are in generally fair condition; no embankment seeps were evident; and, it is not known whether the low level outlet is operative. The owner should establish a formal warning system for the dam in the event of an emergency.

d. Reservoir Area. The pond behind the dam is an impoundment of Town Meadow Brook. The shoreline upstream of the dam appears to be quite stable with no evidence of slides, movements or distress.

e. Downstream Channel. At the downstream end of the stone box culvert the discharge channel has a rubble masonry retaining wall on the left bank (see Appendix C, Photo No. 12). The right bank is natural ground. There are numerous trees on both banks and several trees in the downstream channel. The valley immediately below the dam is relatively wide. About 3,900 ft. downstream of the dam is located Dutton Pond and Dam. The 1,500 ft. reach immediately below Dutton Pond is narrower than the previous reach and there are numerous homes within the valley section. Beyond this reach from about 5,400 ft. to about 9,400 ft. below Sargent Pond Dam there is significant valley storage along Town Meadow Brook. The next 4,000 ft. reach to Greenville Pond and Dam is rather narrow. Downstream of Greenville Pond is the French River.

3.2 Evaluation

In general, the visual inspection adequately revealed key characteristics of the dam as they may relate to its stability and integrity, permitting an assessment to be made of those features affecting the safety of the structure. No seepage was evident along the downstream slope of the dam. There is minor seepage through the spillway overflow section. The crest and downstream slope of the dam are adequately maintained.

It is not known for certain whether the low level outlet is operative. The spillway training walls and upstream retaining walls need some minor grouting of joints. Because of high flow, the condition of the flashboards could not be determined. For these reasons the dam was judged to be in fair condition. There is no regular periodic maintenance program.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General. The visual inspection of Sargent Pond Dam took place on 16 April 1980. On that date the water level was about 8.5 in. above the top of the 10 in. flashboard. There was no evidence of major problems, but several items require attention (see Section 7). The dam was judged to be in generally fair condition due to spillway inadequacy and the lack of an operating low level outlet.

b. Dam. Sargent Pond Dam is a composite structure consisting of a rubble masonry and concrete gravity spillway section, and two earth embankments. The pond is used as a recreational facility by the shoreline property owners. It appears that at one time a mill building occupied the site.

The dam consists of a 30.3 ft. long rubble masonry and concrete gravity spillway, a 48 ft. long left embankment and a 136 ft. long right embankment. The dam has a hydraulic height of about 18 ft.

The left embankment has a crest width of about 250 ft. The crest of the embankment is on a variable slope and serves as a paved parking lot for a restaurant located on the left abutment. State Route 9 crosses the downstream portion of the embankment. There is a vertical rubble masonry retaining wall on the upstream face of the embankment. Mortar is missing from some of the joints of the wall. The left embankment appears to be in generally good condition (see Appendix C, Photo No. 2).

The right embankment is about 136 ft. long and has a crest width of about 300 ft. A private home is located on the upstream part of the crest. State Route 9 crosses the downstream end of the sloping crest. A vertical rubble masonry retaining wall extends along the portion of the embankment immediately adjacent to the spillway. Mortar is missing from some of the joints of this wall. The remainder of the upstream slope is irregular, with random rock riprap along some areas. Along other areas there is gravel or grass. There are also many mature trees and some light brush growth on the upstream face of the embankment. In general, the right embankment appears to be in good condition (see Appendix C, Photo Nos. 1, 3 and 4).

c. Appurtenant Structures. The 30.3 ft. long spillway of the dam is a concrete and rubble masonry broad crested weir. There is a 9.8 ft. long and 1.7 ft. deep notch in the spillway crest which has provisions for flashboards and pins. At the time of the inspection there were 10 in. high flashboards installed in the spillway notch. Because of the high flow condition at the time of inspection, the condition of the flashboards could not be determined. The spillway training walls are about 2.5 ft. above the spillway crest. There is mortar missing from the joints of the training walls. There is minor seepage through the left portion of the spillway overflow section. At the downstream toe of the spillway a 5.8 ft. wide by 8.3 ft. high stone box culvert carries the outflow under State Route 9 to Town Meadow Brook. The culvert had some mortar missing from joints, but was in generally good condition (see Appendix C, Photo Nos. 5, 6, 7 and 8).

There is a 10 in. dia. low level outlet through the spillway. The operating mechanism and invert elevation are not know. It was reported to have been last used about six years ago.

SECTION 2 - ENGINEERING DATA

2.1 Design Data

The only data recovered concerning the dam and appurtenances are the inspection reports found in Appendix B.

2.2 Construction Data

No records or correspondence regarding construction of the dam have been recovered.

2.3 Operation Data

No records or correspondence regarding past operation of the dam have been recovered. Flashboards are normally installed in the spring and removed in the fall for the benefit of shoreline property owners.

2.4 Evaluation of Data

a. Availability. Since no engineering data is available, it is not possible to make an assessment of the safety of the dam. The basis of the information presented in this report is principally the visual observations of the inspection team.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Validity. Not applicable.

g. Dam

- (1) Type - Concrete and rubble masonry gravity overflow section with earthfill embankments.
- (2) Length - 214 ft.
- (3) Height - 18 ft.
- (4) Top Width - Varies - about 250 ft. minimum
- (5) Side Slopes - Upstream: More than 50 percent has a vertical wall, remainder varies.
Downstream: Varies
- (6) Zoning - Unknown
- (7) Impervious Core - Unknown
- (8) Cutoff - Unknown
- (9) Grout Curtain - Unknown

h. Diversion and Regulating Tunnel - None

i. Spillway

- (1) Type - Broad concrete weir, with 9.8 ft. long flashboard notch.
- (2) Length of weir - 30.3
- (3) Crest elevation - With flashboards - 906.0
Without flashboards - 904.3
- (4) Gates - None
- (5) U/S Channel - Natural
- (6) D/S Channel - 5.8 ft. wide X 8.3 ft. high rubble masonry highway culvert

j. Regulating Outlets

- (1) Invert - Unknown
- (2) Size - 10 in. dia.
- (3) Description - Outlet pipe is about 20 ft. downstream of and into culvert at d/s toe of spillway.
- (4) Control Mechanism - appears to be a gate stem.
- (5) Other - According to the owner, the low level outlet was opened about six years ago.

- (2) Bottom of cutoff - Unknown
- (3) Maximum tailwater - Unknown
- (4) Recreation pool - 906.0
- (5) Full flood control pool - Not applicable
- (6) Spillway crest - 904.3 without flashboards
906.0 with flashboards
- (7) Design surcharge (Original Design) - Unknown
- (8) Top of dam - 908.4 (low point in wall, see Appendix D, page D-4)
- (9) Test flood surcharge - 912.00

d. Reservoir (Length in Feet)

- (1) Normal pool - 3,200
- (2) Flood control pool - Not applicable
- (3) Spillway crest pool - 3,200
- (4) Top of dam - 3,500
- (5) Test flood pool - 3,800

e. Storage (acre-ft.)

- (1) Normal pool - 500
- (2) Flood control pool - Not applicable
- (3) Spillway crest pool - 410
- (4) Top of dam - 670
- (5) Test flood pool - 990

f. Reservoir Surface (acres)

- (1) Normal pool - 64.3
- (2) Flood-control pool - Not applicable
- (3) Spillway crest - 54.0
- (4) Top of dam - 79.0
- (5) Test flood pool - 98.5

i. Normal Operating Procedures. There are no written operating procedures for the facility. The flashboards are normally installed in the spring and removed in the fall for the benefit of shoreline property owners.

The only operating devices are the flashboards and low level outlet. The spillway and upstream rubble masonry walls are repaired as necessary.

1.3 Pertinent Data

a. Drainage Area. The drainage area contributing to Sargent Pond is situated at the headwaters of Town Meadow Brook. The drainage area encompasses a total of about 2.91 sq. mi. (1,863 acres), of which about 65 acres is occupied by the pond. The longest circuitous stream course leading to the dam is about 3.0 miles long with an elevation difference of about 222 ft., or at a slope of about 74 ft. per mile. The drainage area has a length of about 2.6 miles and an average width of about 1.1 miles. The basin consists of both open fields and forested areas, with sparse population except in the southeast corner of the drainage area which has a dense population.

b. Discharge at Damsite

(1) Outlet Works Conduit. There is a low level outlet for Sargent Pond Dam, said to be a 10 in. dia. pipe. However, the size and type of valve and the invert elevation are unknown.

(2) Maximum Known Flood at Damsite. No records are available of flood inflows into Sargent Pond, nor of spillway releases and surcharge heads during such inflows. However, it was reported that during the floods of August 1955, the dam was slightly overtopped.

(3) Ungated Spillway Capacity at Top of Dam. The total spillway capacity without flashboards at top of dam, elevation 908.4 N.G.V.D., is about 450 cfs. The total spillway capacity with flashboards installed at top of dam, elevation 908.4 N.G.V.D., is about 330 cfs.

(4) Ungated Spillway Capacity at Test Flood Elevation. The ungated spillway capacity is 1,200 cfs at test flood elevation 912.00 N.G.V.D.

(5) Gated Spillway Capacity at Normal Pool Elevation. Not Applicable.

(6) Gated Spillway Capacity at Test Flood Elevation. Not Applicable.

(7) Total Spillway Capacity at Test Flood Elevation. The total spillway capacity at test flood elevation is the same as (4) above, 1,200 cfs at test flood elevation 912.00 N.G.V.D.

(8) Total Project Discharge at Top of Dam. The total project discharge without flashboards at top of dam is the same as (3) above, 450 cfs at elevation 908.4 N.G.V.D. The total project discharge with flashboards is the same as (3) above, 330 cfs at elevation 908.4 N.G.V.D.

(9) Total Project Discharge at Test Flood Elevation. The total project discharge at test flood elevation is 2,210 cfs at elevation 912.00 N.G.V.D.

c. Elevation (ft. N.G.V.D.)

(1) Streambed at toe of dam - 890.1

The embankment to the right of the spillway is about 136 ft. long, 300 ft. wide and has a private home located on the crest. A vertical rubble masonry wall extends along a portion of the embankment immediately adjacent to the spillway. The remainder of the upstream face is irregular and in some areas has random rock rip-rap.

The 30.3 ft. long spillway consists of a broad crested concrete and masonry weir with rubble masonry training walls. There is a 9.8 ft. long and 1.7 ft. deep notch in the spillway crest which has provisions for flashboards and pins. At the downstream toe of the spillway a culvert carries the outflow under State Route 9 to Town Meadow Brook.

There is a low level outlet said to be a 10 in. dia. pipe through the left embankment of the dam. The exact size and invert elevation of the outlet conduit are not known. Discussions with the owner indicate that a valve stem is used to operate the gate. The outlet gate was last operated about six years ago, according to the owner. The approximate location of the outlet gate is shown on Drawing B-1 in Appendix B.

c. Size Classification. Sargent Pond Dam has a hydraulic height of about 18 ft. above downstream river level, and impounds a normal storage of about 500 acre-ft. to spillway crest level and a maximum of about 670 acre-ft. to top of dam. In accordance with the size and capacity criteria given in Recommended Guidelines for Safety Inspection of Dams, the project falls into the small category on the basis of height and storage capacity and is therefore classified accordingly.

d. Hazard Classification. A breach failure of Sargent Pond Dam would release a surge of water down Town Meadow Brook into Greenville and Rochdale Ponds and then into the French River. A breach of the dam would cause severe damage to State Route 9 and could possibly damage the house located on the right embankment of the dam. It is also estimated that as many as six additional homes would sustain flood damage as well as one local roadway. The estimated depth of flooding of these houses is between 1 and 3 ft. and it is estimated that none of these houses would be flooded under the spillway full conditions. Consequently, Sargent Pond Dam has been classified as having a significant hazard potential in accordance with the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership. Sargent Pond Dam is owned by Stanley and Helen Nicas of Leicester, Mass.

f. Operator. Stanley and Helen Nicas, Owners, Castle Restaurant, Route 9, Leicester, Mass. Telephone (413) 892-9090.

g. Purpose of Dam. The dam impounds a lake used for recreational purposes.

h. Design and Construction History. It is not known by whom the dam was designed or constructed. Inspection reports indicate that minor repairs have been made to the rubble masonry walls, the spillway and low level outlet. Copies of the inspection reports can be found in Appendix B.

PHASE I INSPECTION REPORT

SARGENT POND DAM MA 00986

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Louis Berger & Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Massachusetts. Authorization and notice to proceed was issued to Louis Berger & Associates, Inc. under a letter of 28 March 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0043 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

(3) Update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location. Sargent Pond Dam is located in Worcester County in the Town of Leicester in south-central Massachusetts. The Pond is situated at the headwaters of Town Meadow Brook approximately 2.65 miles upstream from the confluence of Town Meadow Brook and Bartons Brook at Greenville Pond, the headwaters of the French River. The dam is located just upstream from State Route 9. It is shown on U.S. G.S. Quadrangle, Leicester,, Massachusetts with coordinates approximately at N 42° 14' 41", W 71° 55' 02".

b. Description of Dam and Appurtenances. Sargent Pond Dam is an 18 ft. high composite structure consisting of a rubble masonry and concrete gravity spillway section and two earth embankments. It is not known when the dam was constructed. There are however inspection reports dating back to 1925, which would indicate the structure was probably built in the early 1900's. The original use of the dam appears to have been to supply water power for a mill building. The dam is currently used to impound a lake used for recreational purposes.

The embankment to the left of the spillway is about 48 ft. long, 250 ft. wide and serves as a paved parking area for a restaurant located on the left abutment. It has a vertical rubble masonry upstream face and a variable downstream slope. State Route 9 crosses the downstream part of the embankment. The crest of the spillway is 2.4 ft. below the top of the dam.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. On the basis of the Phase I visual examination, Sargent Pond Dam appears to be in fair condition. The deficiencies revealed indicate that a further investigation should be carried out and that some remedial work is needed. The major concerns of the overall integrity of the dam are as follows:

- (1) The spillway can only pass 20 percent of the routed test flood outflow.
- (2) Whether the low level outlet is still operative.

b. Adequacy of Information. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Urgency. The recommendations and remedial measures enumerated below should be implemented by the owner within one year after receipt of this Phase I Inspection Report.

7.2 Recommendations

It is recommended that the owner retain the services of a registered professional engineer experienced in the design of earth dams to make investigations and studies of the following, and if proved necessary, to design appropriate remedial works.

(1) Make a thorough study of the hydrology of the drainage basin. Review the spillway and downstream culvert adequacy in relation to the potential overtopping of the earth embankments.

(2) Review the use of flashboards on the spillway crest and determine the feasibility of either eliminating their use altogether or modifying them to facilitate their quick removal in anticipation of a storm.

(3) Inspect the condition of the spillway structure during a no flow condition.

7.3 Remedial Measures

a. Operating and Maintenance Procedures

(1) Repoint with mortar all voids in the downstream face of the spillway overflow section, the spillway training walls and the upstream retaining walls.

(2) Determine whether the low level outlet is still operative and perform any necessary repair work.

(3) Develop a formal surveillance and downstream emergency warning plan, including round-the-clock monitoring during periods of heavy precipitation.

(4) Institute procedures for an annual periodic technical inspection of the dam and its appurtenant structures.

(5) Implement a regular periodic maintenance program.

7.4 Alternatives

There appear to be no feasible alternatives to the above recommendations.

APPENDIX A
INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT SARGENT POND DAM DATE 16 April 1980
 OWNER Stanley & Helen Nicas TIME 1:30 p.m.
 WEATHER Clear, Sunny
 W.S. ELEV. 905.83 U.S. NA DN.S.

INSPECTION PARTY

A/E REPRESENTATIVES

OWNER'S REPRESENTATIVE

- | | |
|--------------------------------|---------------------------------|
| 1. <u>Peter B. Dyson</u> | 6. <u>Stanley Nicas - owner</u> |
| 2. <u>Pasquale E. Corsetti</u> | 7. _____ |
| 3. <u>Roger F. Berry</u> | 8. _____ |
| 4. <u>Carl J. Hoffman</u> | 9. _____ |
| 5. <u>William S. Zoino</u> | 10. _____ |

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Hydrologic</u>	<u>Roger F. Berry</u>	<u>LBA</u>
2. <u>Hydraulics/Structures</u>	<u>Carl J. Hoffman</u>	<u>LBA</u>
3. <u>Soils & Geology</u>	<u>William S. Zoino</u>	<u>GZA</u>
4. <u>General Features</u>	<u>Peter B. Dyson</u>	<u>LBA</u>
5. <u>General Features</u>	<u>Pasquale E. Corsetti</u>	<u>LBA</u>
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____
9. _____	_____	_____
10. _____	_____	_____

LBA - Louis Berger & Associates, Inc.
 GZA - Goldberg-Zoino & Associates, Inc.

PERIODIC INSPECTION CHECKLIST

PROJECT SARGENT POND DAM DATE 16 April 1980

PROJECT FEATURE Earth Embankment NAME William S. Zoino

DISCIPLINE Geotechnical NAME _____

AREA EVALUATED	CONDITIONS
----------------	------------

DAM EMBANKMENT

Crest Elevation	908.4
Current Pool Elevation	905.83
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed
Pavement Condition	N/A
Movement or Settlement of Crest	None evident
Lateral Movement	None evident
Vertical Aligment	Irregular, but no indication of movement
Horizontal Alignment	Irregular, but no indication of movement
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	None
Sloughing or Erosion of Slopes or Abutments	None
Rock Slope Protection - Riprap Failures	Minor erosion of right embankment on upstream shoreline
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Minor seepage through d/s face of left portion of spillway overflow section
Piping or Boils	None evident
Foundation Drainage Features	None evident
Toe Drains	None evident
Instrumentation System	None evident

PERIODIC INSPECTION CHECKLIST

PROJECT SARGENT POND DAM DATE 16 April 1980

PROJECT FEATURE Spillway NAME C. Hoffman

DISCIPLINE Structures NAME _____

AREA EVALUATED	CONDITIONS
----------------	------------

OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS

a. Approach Channel

General Condition	Fair
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Yes
Floor of Approach Channel	Unknown

b. Weir and Training Walls

General Condition of Concrete	Fair (see note below)
Rust or Staining	None
Spalling	None
Any Visible Reinforcing	N/A
Any Seepage or Efflorescence	Minor
Drain Holes	N/A

c. Discharge Channel

General Condition	Fair
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Yes
Floor of Channel	Natural
Other Obstructions	Trees growing in channel

NOTE: Spillway training walls are of rubble masonry. Mortar is missing from some joints, especially right upstream spillway training wall.

PERIODIC INSPECTION CHECKLIST

PROJECT SARGENT POND DAM DATE 16 April 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITIONS
----------------	------------

Outlet Works - Control Tower	N.A.
------------------------------	------

Outlet Works - Intake Channel & Intake Structure	N.A.
--	------

Outlet Works - Transition and Conduit	N.A.
---------------------------------------	------

Outlet Works - Outlet Structure and Outlet Channel	N.A.
---	------

Outlet Works - Service Bridge	N.A.
-------------------------------	------

APPENDIX B
ENGINEERING DATA

TOWN OR CITY	DEGREE NO.	PLAN NO.	DAM NO.
Leicester			627-100
Sargent Pond			
Leicester Center			
C. C. DOCKET NO.			
DESCRIPTION OF DAM			
Earth- Masonry Walls El. 100'			
Length	80'±		
Height	13'±		
Thickness top	abt. crest		
" bottom	Indefinite		
Downstream Slope	4:1		
Upstream	El. Crest of Dam 906.9 Vertical.		
Length of Spillway	El. crest 910		
Size of Gates	Spillway is gate - Prob 24" c.i. pipe		
Location of Gates	Near west end of dam.		
Flashboards used	None		
Width Flashboards or Gates			
Dam designed by			
" constructed by			
Year constructed			
GENERAL REMARKS			
Owned by Wore. Con. St. Ry Co. - Sold			
Inspected Jan. 8, 1925 - L.O. Marden			
Aug. 7, 1927 - "			
July 11, 1928 - "			
Dec. 31, 1931 - "			
May 7, 1935 - "			
March 19, 1936 - W.O.L., M.F.H.			
March 12, 1936 - L.O.M., L.H.S.			
March 12, 1937 - L.O. Marden			
Inspected: Nov. 16, 1947 - L.O.M.			
" Mar. 20, 1951 - "			
" 1955 - "			
Jan. 28, 1959 - owned by Stanley Nicks - Castle Restaurant			
DESCRIPTION OF RESERVOIR & WATERSHED			
Name of Main Stream Branch French River			
" " any other Streams			
Length of Watershed			
Width "			
Is Watershed Cultivated			
Percent in Forests			
Steepness of Slope			
Kind of Soil Loamy - Stone			
No. of Acres in Watershed 1984. 274 3.1 Sq. Miles.			
" " " Reservoir 84			
Length of Reservoir 1988 - owned by Stanley Nicks			
Width " Castle Rest - TW 2900			
Max Flow Cu. Ft. per Sec.			
Head or Flashboards-Low Water			
" " -High "			
GENERAL REMARKS			
Inspected: Mar. 12, 1937 - L.O.M., Mr. Moreau			
Owned by Neil S. Moreau.			
Inspected: Oct. 13, 1938 - L.H. Spafford			
Aug. 13, 1936 - L.O.M.			
Measure Spillway - 329.9 Corcoran, Galletta, Bl. 1502.75			
Inspected: Dec. 9, 1942 - L.H. SARTY			
" June 29, 1944 - L.O.M.			
1936 Flood 202.5			

2-Library Bureau (8-28246)

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by L.O. Marden ✓ Date ^{Aug 7. 1927} Jan. 8, 1925 ✓ Dam No. 25-12 ✓

Town Leicester Center ✓ Location Leicester Center ✓
Owner Wor. Cons. St. Ry. Co. ✓ Use storage ✓
Material and Type Vert. upstream masonry wall Earth filled ✓

Dam Designed by _____ Constructed by _____ Year _____

SPILLWAY LENGTH 20 ✓

El. top Abutment 100 ✓ El. Crest 97 ✓ El. Apron _____ El. Streambed 87 ✓

Width top Abutment 80 ✓ Width top Crest 80 ✓ Width bottom Spillway 21

Width Flashboards carried 3 Kind Flashboards _____

El. Flowline Cleanout Pipe _____ Size and Kind Cleanout Pipe _____

Kind of Foundation under Spillway _____

Condition _____

EMBANKMENT LENGTH 70

El. Top 100 El. Natural Ground 98 ✓ Width Top 80 ✓

Width of Bottom _____ Upstream Slope _____ Downstream Slope _____

Kind of Corewall _____ Riprap _____

Material in Embankment _____ Foundation _____

Condition _____

GATES Location spillway ✓

Size also gate to pipe spillway ✓ El. Flowline _____

Condition Wall caving in several places. Repair embankment ✓

WHEEL Kind _____ Size _____ Rated H. P. _____

Location _____ Ave. Head _____

Evidence of Leaks in Structure _____

Recent Repairs and Date _____

Topography of Country below Dam Ashworth Mill Pond ✓

Nature of Buildings and Roads below Dam State Highway ✓

Number Acres in Pond _____ Drainage Area in Square Miles _____

Discharge in Second Feet per Square Mile _____

Estimated Storage Million Cubic Feet _____

COUNTY OF WORCESTER MASSACHUSETTS
COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by L.O. Marden Date July 11, 1928 Dam No. 25-12

Town Leicester Center Location Sargent Pond

Owner Worc. Cons. St. Ry. Co. Use storage

Material and Type

Dam Designed by Constructed by Year

SPILLWAY

El. top Abutment El. Crest El. Apron El. Streambed

Width top Abutment Width top Crest Width bottom Spillway

Width Flashboards carried Kind Flashboards

El. Flowline Cleanout Pipe Size and Kind Cleanout Pipe

Kind of Foundation under Spillway

Condition Clean out all brush etc out of spillway

EMBANKMENT

El. Top El. Natural Ground Width Top

Width of Bottom Upstream Slope Downstream Slope

Kind of Corewall Riprap

Material in Embankment Foundation

Condition clean embankment of brush etc.

GATES Location

Size Kind El. Flowline

Condition

WHEEL Kind Size Rated H. P.

Location Ave. Head

Evidence of Leaks in Structure

Recent Repairs and Date

Topography of Country below Dam

Nature of Buildings and Roads below Dam

Number Acres in Pond Drainage Area in Square Miles

Discharge in Second Feet per Square Mile

Estimated Storage Million Cubic Feet

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by L.O. Marden Date Dec. 31, 1931 Dam No. 25-12

Town Leicester Location Sragent Pond.

Owner Worc. Cons. St. Ry Co. Use

Material and Type

Dam Designed by Constructed by Year

SPILLWAY—Length Feet. Depth Feet

El. top Abutment El. Crest El. Apron El. Streambed

Width top Abutment Width top Crest Width bottom Spillway

Width Flashboards carried Kind Flashboards

El. Flowline Cleanout Pipe Size and Kind Cleanout Pipe

Kind of Foundation under Spillway

Condition OK

EMBANKMENT—Length overall Feet

El. Top El. Natural Ground Width Top

Width of Bottom Upstream Slope Downstream Slope

Kind of Corewall Riprap

Material in Embankment Foundation

Condition OK

GATES Location

Size Kind El. Flowline

Condition OK

WHEEL Kind Size Rated H. P.

Location Ave. Head

Evidence of Leaks in Structure none visible.

Recent Repairs and Date

Topography of Country below Dam

Nature of Buildings and Roads below Dam

Number of Acres in Pond Drainage Area in Square Miles

Discharge in Second Feet per Square Mile

Estimated Storage Million Cubic Feet

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by.....L.O. Marden..... Date May 7, 1935..... Dam No. 25-12.....

Town.....Leicester..... Location.....Sargent Pond.....

Owner.....Worc. St. Ry Co.?..... Use.....

Material and Type.....

Dam Designed by..... Constructed by..... Year.....

SPILLWAY—Length.....Feet. Depth.....Feet

El. top Abutment.....El. Crest.....El. Apron.....El. Streambed.....

Width top Abutment.....Width top Crest.....Width bottom Spillway.....

Width Flashboards carried.....Kind Flashboards.....

El. Flowline Cleanout Pipe.....Size and Kind Cleanout Pipe.....

Kind of Foundation under Spillway.....

Condition.....OK.....

EMBANKMENT—Length overall.....Feet

El. Top.....El. Natural Ground.....Width Top.....

Width of Bottom.....Upstream Slope.....Downstream Slope.....

Kind of Corewall.....Riprap.....

Material in Embankment.....Foundation.....

Condition.....OK.....

GATES..... Location.....

Size.....Kind.....El. Flowline.....

Condition.....OK.....

WHEEL.....Kind.....Size.....Rated H. P.....

Location.....Ave. Head.....

Evidence of Leaks in Structure.....OK none visible.....

Recent Repairs and Date.....none.....

Topography of Country below Dam.....

Nature of Buildings and Roads below Dam.....

Number of Acres in Pond.....Drainage Area in Square Miles.....

Discharge in Second Feet per Square Mile.....

Estimated Storage Million Cubic Feet.....

WN Leicester

DAM NO. 25-12

CATION Sargent Pond

STREAM _____

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

DAM INSPECTION REPORT

IGNED BY Neil Moreau PLACE Leicester. USE Pleasure

PECTED BY LOM DATE May 8, 1957

PE OF DAM Earth-Stone Abts CONDITION West abt washed out

PILLWAY

FLASHBOARDS IN PLACE None RECENT REPAIRS _____

CONDITION W. Abt washed out

REPAIRS NEEDED Widen spillway and rebuild abt

MBANKMENT

RECENT REPAIRS Repair back of Abt

CONDITION check height and regrade

REPAIRS NEEDED " " " "

GATES

RECENT REPAIRS None. Is in bad location in pond

CONDITION Move to gate section

REPAIRS NEEDED " " " "

EAKS

HOW SERIOUS None visible

DATE May 8, 1957

L. O. Marden
COUNTY ENGINEER

TOWN Leicester

DAM NO. 2072

LOCATION Sargeant Pond

STREAM _____

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

DAM INSPECTION REPORT

OWNED BY Neil S. Moreau PLACE Leicester USE _____

INSPECTED BY LAM DATE 1956

TYPE OF DAM _____ CONDITION _____

SPILLWAY

FLASHBOARDS IN PLACE None RECENT REPAIRS _____

CONDITION 1951 - washed out west abt. - Concrete crest still in place

REPAIRS NEEDED Needs new 40' x 6" spillway

ordered Moreau to rebuild this dam and provide plans - he has not moved.

EMBANKMENT

RECENT REPAIRS _____

CONDITION _____

REPAIRS NEEDED _____

GATES

RECENT REPAIRS _____

CONDITION _____

REPAIRS NEEDED _____

LEAKS

HOW SERIOUS _____

DATE 1956

L.O. Marden
COUNTY ENGINEER

OWN Leicester

DAM NO. 25-12

LOCATION Sargent Pond

STREAM Town
Meadow Br.

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

DAM INSPECTION REPORT

OWNED BY _____ PLACE Main St. USE Recreation
& storage
INSPECTED BY WOL DATE 9-13-55
TYPE OF DAM Earth and stone CONDITION Poor

SPILLWAY

FLASHBOARDS IN PLACE None RECENT REPAIRS _____

CONDITION Dry stone retaining walls on pond side should be repaired

REPAIRS NEEDED Spillway on pond side should be paved and new retaining walls below spillway constructed. Water topped dam during flood, due to small spillway and culvert under State Highway.

EMBANKMENT

RECENT REPAIRS _____

CONDITION Some washouts and undermining next to spillway

REPAIRS NEEDED _____

GATES

RECENT REPAIRS _____

CONDITION None visible

REPAIRS NEEDED _____

LEAKS

HOW SERIOUS None visible

DATE _____

COUNTY ENGINEER

TOWN Leicester

DAM NO. 25-12

LOCATION Sargent Pond

STREAM French R.

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

DAM INSPECTION REPORT

OWNED BY Neil S. Moreau PLACE Leicester USE pleasure

INSPECTED BY LOM DATE 3-20-51

TYPE OF DAM earth-stone spillway & gate section CONDITION fair

SPILLWAY

FLASHBOARDS IN PLACE none RECENT REPAIRS none

CONDITION part stone crest washed out- part apron washed out.

REPAIRS NEEDED rebuild crest and apron

EMBANKMENT

RECENT REPAIRS none

CONDITION part stone wall upstream side embankment knocked down

REPAIRS NEEDED rebuild upstream stone wall, setting stones in
cement. mortar.

GATES

RECENT REPAIRS none

CONDITION out in pond

REPAIRS NEEDED can be worked

LEAKS

HOW SERIOUS none visible.

DATE _____

COUNTY ENGINEER

TOWN Leicester

DAM NO. 25-12

LOCATION Sargent Pond

STREAM _____

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

DAM INSPECTION REPORT

OWNED BY _____ PLACE Leicester USE storage

INSPECTED BY LOM DATE Nov.16,1949

TYPE OF DAM flat emb-stone forebay also spill CONDITION good
and masonry channel

SPILLWAY

FLASHBOARDS IN PLACE _____ RECENT REPAIRS _____

CONDITION _____

REPAIRS NEEDED _____

EMBANKMENT

RECENT REPAIRS _____

CONDITION _____

REPAIRS NEEDED _____

GATES

RECENT REPAIRS _____

CONDITION _____

REPAIRS NEEDED _____

LEAKS

HOW SERIOUS _____

DATE _____

COUNTY ENGINEER

WORCESTER COUNTY ENGINEERING DEPT.

WORCESTER, MASS.

DATE June 29, 1944

SUBJECT: Dam No. 25-12 Sargent Pond - Leicester

TO _____

This dam is in good condition

CAR USED

CAR MILEAGE

END TRIP

BEGIN TRIP

TRIP MILES

L.O. Marden

SIGNATURE

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by L. H. Sarty Date 12-9-42 Dam No. 25-12

Town Leicester Location

Owner Use

Material and Type

Dam Designed by Constructed by Year

SPILLWAY.

El. top Abutment El. Crest El. Apron El. Streambed

Width top Abutment Width top Crest Width bottom Spillway

Width Flashboards carried Kind Flashboards

El. Flowline Cleanout Pipe Size and Kind Cleanout Pipe

Kind of Foundation under Spillway

Condition Good

EMBANKMENT

El. Top El. Natural Ground Width Top

Width of Bottom Upstream Slope Downstream Slope

Kind of Corewall Riprap

Material in Embankment Foundation

Condition Good - No visible leakage

GATES Location

Size Kind El. Flowline

Condition

WHEEL Kind Size Rated H. P.

Location Ave. Head

Evidence of Leaks in Structure

Recent Repairs and Date None

Topography of Country below Dam

Nature of Buildings and Roads below Dam

Number Acres in Pond Drainage Area in Square Miles

Discharge in Second Feet per Square Mile

Estimated Storage Million Cubic Feet

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by Corcoran-Casella Date 3-24-1939 Dam No. 25-12

Town Leicester Location Greenville Reservoir ?

Owner _____ Use _____

Material and Type measured spillway (Field Book 150-Page 75) Lost JLB

Dam Designed by _____ Constructed by _____ Year _____

SPILLWAY

El. top Abutment _____ El. Crest _____ El. Apron _____ El. Streambed _____

Width top Abutment _____ Width top Crest _____ Width bottom Spillway _____

Width Flashboards carried _____ Kind Flashboards _____

El. Flowline Cleanout Pipe _____ Size and Kind Cleanout Pipe _____

Kind of Foundation under Spillway _____

Condition _____

EMBANKMENT

El. Top _____ El. Natural Ground _____ Width Top _____

Width of Bottom _____ Upstream Slope _____ Downstream Slope _____

Kind of Corewall _____ Riprap _____

Material in Embankment _____ Foundation _____

Condition _____

GATES _____ Location _____

Size _____ Kind _____ El. Flowline _____

Condition _____

WHEEL _____ Kind _____ Size _____ Rated H. P. _____

Location _____ Ave. Head _____

Evidence of Leaks in Structure _____

Recent Repairs and Date _____

Topography of Country below Dam _____

Nature of Buildings and Roads below Dam _____

Number Acres in Pond _____ Drainage Area in Square Miles _____

Discharge in Second Feet per Square Mile _____

Estimated Storage Million Cubic Feet _____

COUNTY OF WORCESTER MASSACHUSETTS
COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by Lt. Spafford Date Oct. 13, 1938 Dam No. 25-12

Town Leicester Location Sargent Pond

Owner N. & S. Main Use Impounding

Material and Type Heavy earth embankment with dry stone masonry wall on pond side - all in good condition

Dam Designed by _____ Constructed by _____ Year _____

18 x 22-6"
- SPILLWAY with rock apron all in good condition - spillway leads to passage under road.
El. top Abutment _____ El. Crest _____ El. Apron _____ El. Streambed 5' incl x 6 1/2' high dry stone rubble

Width top Abutment _____ Width top Crest _____ Width bottom Spillway with grade top - all in good condition

Width Flashboards carried none Kind Flashboards _____

El. Flowline Cleanout Pipe _____ Size and Kind Cleanout Pipe _____

Kind of Foundation under Spillway Heavy rock wall

Condition Signs indicate that not over 1 1/2 ft of water went over the spillway during the flood

EMBANKMENT

El. Top _____ El. Natural Ground _____ Width Top _____

Width of Bottom _____ Upstream Slope _____ Downstream Slope _____

Kind of Corewall _____ Riprap _____

Material in Embankment _____ Foundation _____

Condition Excellent

GATES _____ Location _____

Size _____ Kind _____ El. Flowline _____

Condition _____

WHEEL _____ Kind _____ Size _____ Rated H. P. _____

Location _____ Ave. Head _____

Evidence of Leaks in Structure _____

Recent Repairs and Date _____

Topography of Country below Dam _____

Nature of Buildings and Roads below Dam _____

Number Acres in Pond _____ Drainage Area in Square Miles _____

Discharge in Second Feet per Square Mile _____

Estimated Storage Million Cubic Feet _____

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by L. O. M. A. Mr. Moreau Date 3-12-37 Dam No. 25-12

Town Leicester Location Sargents Pond

Owner Neals S. Moreau, Leicester Use

Material and Type 1m. Stone parapet has been raised to spillway June '37

Dam Designed by Constructed by Year

SPILLWAY—Length Feet. Depth Feet

El. top Abutment El. Crest El. Apron El. Streambed

Width top Abutment Width top Crest Width bottom Spillway

Width Flashboards carried Kind Flashboards

El. Flowline Cleanout Pipe Size and Kind Cleanout Pipe

Kind of Foundation under Spillway

Condition Has grubbed out all of brush and roots. Part of stone pavement heaved by frost. To relay. Owner says will raise stone parapet to keep flow during floods from crossing over state highway.

EMBANKMENT—Length overall Feet

El. Top El. Natural Ground Width Top

Width of Bottom Upstream Slope Downstream Slope

Kind of Corewall Riprap

Material in Embankment Foundation

Condition Grubbing out roots from embankment and relaying riprap.

GATES Location

Size Kind El. Flowline

Condition Is to clean out waste gates.

WHEEL Kind Size Rated H. P.

Location Ave. Head

Evidence of Leaks in Structure

Recent Repairs and Date

Topography of Country below Dam

Nature of Buildings and Roads below Dam

Number of Acres in Pond Drainage Area in Square Miles

Discharge in Second Feet per Square Mile

Estimated Storage Million Cubic Feet

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by.....L. O. M..... Date.....8-15-36..... Dam No.....25-12.....

Town.....Leicester.....Location.....Sargent Pond.....

Owner.....Use.....

Material and Type.....

Dam Designed by.....Constructed by.....Year.....

SPILLWAY—Length.....Feet. Depth.....Feet

El. top Abutment.....El. Crest.....El. Apron.....El. Streambed.....

Width top Abutment.....Width top Crest.....Width bottom Spillway.....

Width Flashboards carried.....Kind Flashboards.....

El. Flowline Cleanout Pipe.....Size and Kind Cleanout Pipe.....

Kind of Foundation under Spillway.....

Condition.....Wastew weir needs increased length. Make study of same.

EMBANKMENT—Length overall.....Feet

El. Top.....El. Natural Ground.....Width Top.....

Width of Bottom.....Upstream Slope.....Downstream Slope.....

Kind of Corewall.....Riprap.....

Material in Embankment.....Foundation.....

Condition.....

GATES.....Location.....

Size.....Kind.....El. Flowline.....

Condition.....

WHEEL.....Kind.....Size.....Rated H. P.....

Location.....Ave. Head.....

Evidence of Leaks in Structure.....

Recent Repairs and Date.....

Topography of Country below Dam.....

Nature of Buildings and Roads below Dam.....

Number of Acres in Pond.....Drainage Area in Square Miles.....

Discharge in Second Feet per Square Mile.....

Estimated Storage Million Cubic Feet.....

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by W.O.L., M.F.H. Date 3/19/36 Dam No. #25-12

Town Leicester Location Sargent Pond

Owner..... Use.....

Material and Type.....

Dam Designed by..... Constructed by..... Year.....

SPILLWAY—Length.....Feet. Depth.....Feet

El. top Abutment.....El. Crest.....El. Apron.....El. Streambed.....

Width top Abutment.....Width top Crest.....Width bottom Spillway.....

Width Flashboards carried.....Kind Flashboards.....

El. Flowline Cleanout Pipe.....Size and Kind Cleanout Pipe.....

Kind of Foundation under Spillway.....

Condition Seams small. Brush should be removed. Small arch bridge taking overflow filled to capacity.

EMBANKMENT—Length overall.....Feet

El. Top.....El. Natural Ground.....Width Top.....

Width of Bottom.....Upstream Slope.....Downstream Slope.....

Kind of Corewall.....Riprap.....

Material in Embankment.....Foundation.....

Condition Was reinf. with sand bags. Partly washed out. Water went over embankment both sides of spillway

GATES.....Location.....

Size.....Kind.....El. Flowline.....

Condition.....

WHEEL.....Kind.....Size.....Rated H. P.....

Location.....Ave. Head.....

Evidence of Leaks in Structure.....

Recent Repairs and Date.....

Topography of Country below Dam.....

Nature of Buildings and Roads below Dam.....

Number of Acres in Pond.....Drainage Area in Square Miles.....

Discharge in Second Feet per Square Mile.....

Estimated Storage Million Cubic Feet.....

COUNTY OF WORCESTER MASSACHUSETTS

COUNTY ENGINEER

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by L.O.M., L.H. Spofford Date 3/12/36 Dam No. 25-12

Town Leicester Location Sargent Pond
Owner Worc. Street Railway Co. Use
Material and Type Should increase size of wasteway

Dam Designed by Constructed by Year

SPILLWAY—Length Feet. Depth Feet

El. top Abutment El. Crest El. Apron El. Streambed

Width top Abutment Width top Crest Width bottom Spillway

Width Flashboards carried Kind Flashboards

El. Flowline Cleanout Pipe Size and Kind Cleanout Pipe

Kind of Foundation under Spillway

Condition Spillway inadequate to care for flood waters. Water flowing
over embankment and roadway

EMBANKMENT—Length overall Feet

El. Top El. Natural Ground Width Top

Width of Bottom Upstream Slope Downstream Slope

Kind of Corewall Riprap

Material in Embankment Foundation

Condition Water over embankment

GATES Location

Size Kind El. Flowline

Condition

WHEEL Kind Size Rated H. P.

Location Ave. Head

Evidence of Leaks in Structure

Recent Repairs and Date

Topography of Country below Dam

Nature of Buildings and Roads below Dam

Number of Acres in Pond Drainage Area in Square Miles

Discharge in Second Feet per Square Mile

Estimated Storage Million Cubic Feet

**/COUNTY OF WORCESTER MASSACHUSETTS
COUNTY ENGINEER**

Inspection of Dams, Reservoir Dams, and Reservoirs.

Inspected by He-1010 Date 9-30-35 Dam No. 25-12

Town Leicester Location Sargent Pond. Leicester Center

Owner..... Use.....

Material and Type.....

Dam Designed by..... Constructed by..... Year.....

SPILLWAY

El. top Abutment..... El. Crest..... El. Apron..... El. Streambed.....

Width top Abutment..... Width top Crest..... Width bottom Spillway.....

Width Flashboards carried..... Kind Flashboards.....

El. Flowline Cleanout Pipe..... Size and Kind Cleanout Pipe.....

Kind of Foundation under Spillway

Condition.....

EMBANKMENT

El. Top..... El. Natural Ground..... Width Top.....

Width of Bottom..... Upstream Slope..... Downstream Slope

Kind of Corewall..... Riprap.....

Material in Embankment..... Foundation.....

Condition.....

GATES..... Location.....

Size..... Kind..... El. Flowline.....

Condition.....

Open Water is down about 4 ft below Spillway

WHEEL..... Kind..... Size..... Rated H. P.....

Location..... Ave. Head

Evidence of Leaks in Structure.....

Recent Repairs and Date.....

Topography of Country below Dam

Nature of Buildings and Roads below Dam

Number Acres in Pond..... Drainage Area in Square Miles.....

Discharge in Second Feet per Square Mile.....

Estimated Storage Million Cubic Feet.....

TOWN Leicester DAM NO. 25-12

LOCATION Nly side of Main St STREAM (Town Meadow) Brook

"Jergent Pond."

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

D A M I N S P E C T I O N R E P O R T

Owned by Neal S. Moreau Place Watson St. Leicester Use Pond

Inspected by WOL Date Nov. 19, 1963

Type of Dam Earth-stone-concrete Condition New construction

SPILLWAY

Flashboards in Place No boards. Recent Repairs

Condition Spillway to be widened to 32'. Old spillway crest stones

Repairs Needed extend to this width

EMBANKMENT

Recent Repairs New cemented wall on westerly side of spillway.

Condition Repairs to wall on easterly side " " "

Repairs Needed Embankment is good.

GATES

Recent Repairs

Condition Good. Gate is now wide open. Outlet is inside arch stone

Repairs Needed culvert @ 50' below spillway.

LEAKS

How Serious No leaks visible.

DATE: _____ County Engineer

TOWN Leicester DAM NO. 25-12
LOCATION Northerly side - Main St. STREAM Town Meadow Brook

"Sargent Pond"
WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

D A M I N S P E C T I O N R E P O R T

Owned by Noble S. Moreau Place Leicester Use Storage and Recreation
Inspected by F.E.P. - WOL. Date May 15, 1964
Type of Dam Earth and stone. Condition Report by the owner

SPILLWAY

Flashboards in Place No boards Recent Repairs _____
Condition The present spillway will be lengthened 10' at the
Repairs Needed westerly end. The crest at this new section will be 2'
lower than the present crest, with slots for removable boards.

EMBANKMENT

Recent Repairs _____
Condition Good
Repairs Needed The present water level is about 3' below the
spillway crest.

GATES

Recent Repairs _____
Condition This shear gate is in good condition
Repairs Needed _____

LEAKS

How Serious No leaks

DATE: _____ County Engineer

TOWN Leicester DAM NO. 25-12
LOCATION Nly side of State Hwy STREAM Town Meadow Brook
Rte 9. "Sargent Pond"

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

D A M I N S P E C T I O N R E P O R T

Owned by Neale S. Moraw Place Leicester Use Recreation
Inspected by WOL Date Dec. 15, 1964
Type of Dam Earth and Stone Condition Good

SPILLWAY

Flashboards in Place 2' of boards Recent Repairs New construction
in 1964.
Condition Good
Repairs Needed _____

EMBANKMENT

Recent Repairs _____
Condition Good
Repairs Needed _____

GATES

Recent Repairs _____
Condition Good
Repairs Needed _____

LEAKS

How Serious No leaks visible

DATE: _____ County Engineer

TOWN LEICESTER DAM NO. 25-12
LOCATION Road 9 STREAM SAGE Pond

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

D A M I N S P E C T I O N R E P O R T

Owned by _____ Place _____ Use _____
Inspected by JASPER Date MAY 3, 1969
Type of Dam _____ Condition _____

SPILLWAY

Flashboards in Place NO BOARD Recent Repairs _____
Condition GOOD, SPILLWAY CLEAN, WATER RUNNING OVER
Repairs Needed SPILLWAY DEPTH ABOUT 2"

EMBANKMENT

Recent Repairs _____
Condition _____
Repairs Needed _____

GATES

Recent Repairs _____
Condition _____
Repairs Needed _____

LEAKS

How Serious _____

DATE: _____ County Engineer _____

TOWN Lancaster DAM NO. 25-12

LOCATION Sargent Pond STREAM _____

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

D A M I N S P E C T I O N R E P O R T

Owned by _____ Place _____ Use _____

Inspected by Reynolds Date _____

Type of Dam _____ Condition _____

SPILLWAY

Flashboards in Place None Recent Repairs _____

Condition Level 10" above crest to gate

Repairs Needed Water flowing over spillway

EMBANKMENT

Recent Repairs _____

Condition _____

Repairs Needed _____

GATES

Recent Repairs _____

Condition _____

Repairs Needed _____

LEAKS

How Serious _____

DATE: 11/2/60

County Engineer

TOWN Leicester

DAM NO. 25-12

LOCATION Main St

STREAM Town Meadow Brook

"Sargent Pond"

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

DAM INSPECTION REPORT

Owned by Neal Moreau Place Leicester Use Storage Pond

Inspected by WCL - N. Moreau Date Apr. 13 1969

Type of Dam old earth and stone dam Condition Fair to good

SPILLWAY

Flashboards in Place 1 board in place Recent Repairs _____

Condition The present water level is 6" below the crest

Repairs Needed The spillway is in good condition

EMBANKMENT

Recent Repairs Mr. Moreau, the owner is now quite old and unable to work

Condition The embankment is in good condition

Repairs Needed (The wrought iron shear gate @ 10" @ diameter will be left open for 1/2 to 1 day only for repairs)

GATES

Recent Repairs The gate is partly open. This gate has been opened by

Conditions Mr. Bates (Hyway Supt) with Mr. Moreau's permission. This shear

Repairs Needed gate has been removed by hitting straight up with a 2' x 12' end
hammer and will be welded, repaired, cleaned etc by the Town and town expenses

LEAKS

How Serious _____

DATE: _____

County Engineer

TOWN Leicester

DAM NO. 25-12

LOCATION Main St

STREAM Town Mill Pond Brook

"Mill Pond"

WORCESTER COUNTY ENGINEERING DEPARTMENT
WORCESTER, MASSACHUSETTS

DAM INSPECTION REPORT

Owned by Neal Muraan Place Leicester Use Storage Pond

Inspected by WOL - R.X.T. Date Apr. 16 1969

Type of Dam Earth and stone dam Condition Good

SPILLWAY

Flashboards in Place No boards Recent Repairs _____

Condition _____

Repairs Needed _____

EMBANKMENT

Recent Repairs The water level is at the lower spillway crest

Condition _____

Repairs Needed _____

GATES

Recent Repairs _____

Conditions The gate has been repaired and cleaned, etc. and

Repairs Needed was replaced by the Town Highway Dept - to-day.

LEAKS

How Serious No leaks are visible

DATE: _____

County Engineer

APPENDIX C
PHOTOGRAPHS

LOUIS BERGER & ASSOC., INC
WELLESLEY, MASS.
ARCHITECT · ENGINEER

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

SARGENT POND DAM

SKETCH PLAN SHOWING LOCATION &
ORIENTATION OF PHOTOS

STATE-MA

SCALE

DATE

OVERVIEW PHOTO

APPENDIX 'C' PHOTOS

ROUTE 9

Approx. location
of outlet valve

Seepage

House

SARGENT
POND

SARGENT POND DAM



1. Rubble masonry wall along upstream face of right embankment.



2. Rubble masonry wall along upstream face of left embankment

SARGENT POND DAM



3. Upstream slope of right embankment.



4. Downstream slope of right embankment.

SARGENT POND DAM



5. Overview of spillway crest.



6. Upstream view of spillway crest with flashboards in place.

SARGENT POND DAM



7. Upstream entrance to stone box culvert under Route 9.



8. Discharge end of stone box culvert under Route 9.

SARGENT POND DAM



9. Downstream discharge channel.

RFE DATE 5-9-50 LOUIS BERGER & ASSOCIATES INC. SHEET NO. 1 OF 3
BY DATE INSPECTION OF DAMS PROJECT W-198
JECT SARGENT POND DAM, RESERVOIR ROUTING

DRAINAGE AREA = 2.91 SQ. MI. = 1863 ACRES

SIZE CLASSIFICATION: SMALL

MAXIMUM STORAGE = 670 ACRE-FT
HEIGHT = 16 FT.

HAZARD CLASSIFICATION = HIGH

OCE GUIDELINES: $\frac{1}{2}$ PMF TO FULL PMF

USE $\frac{1}{2}$ PMF

FROM INLEW HYDROGRAPH, PMF = 5520 & $\frac{1}{2}$ PMF = 2760

TEST FLOOD = 2760 CFS

STEP 1: $Q_{p1} = 2,760$ CFS

STEP 2a: ELEV. = 912.7 FT

STEP 2b: SURCHARGE VOLUME = 560 ACRE-FT

$$\text{INCHS RUNOFF} = \frac{560 \text{ ACRE-FT}}{1863} \times 12 \text{ IN/FT} = 3.61$$

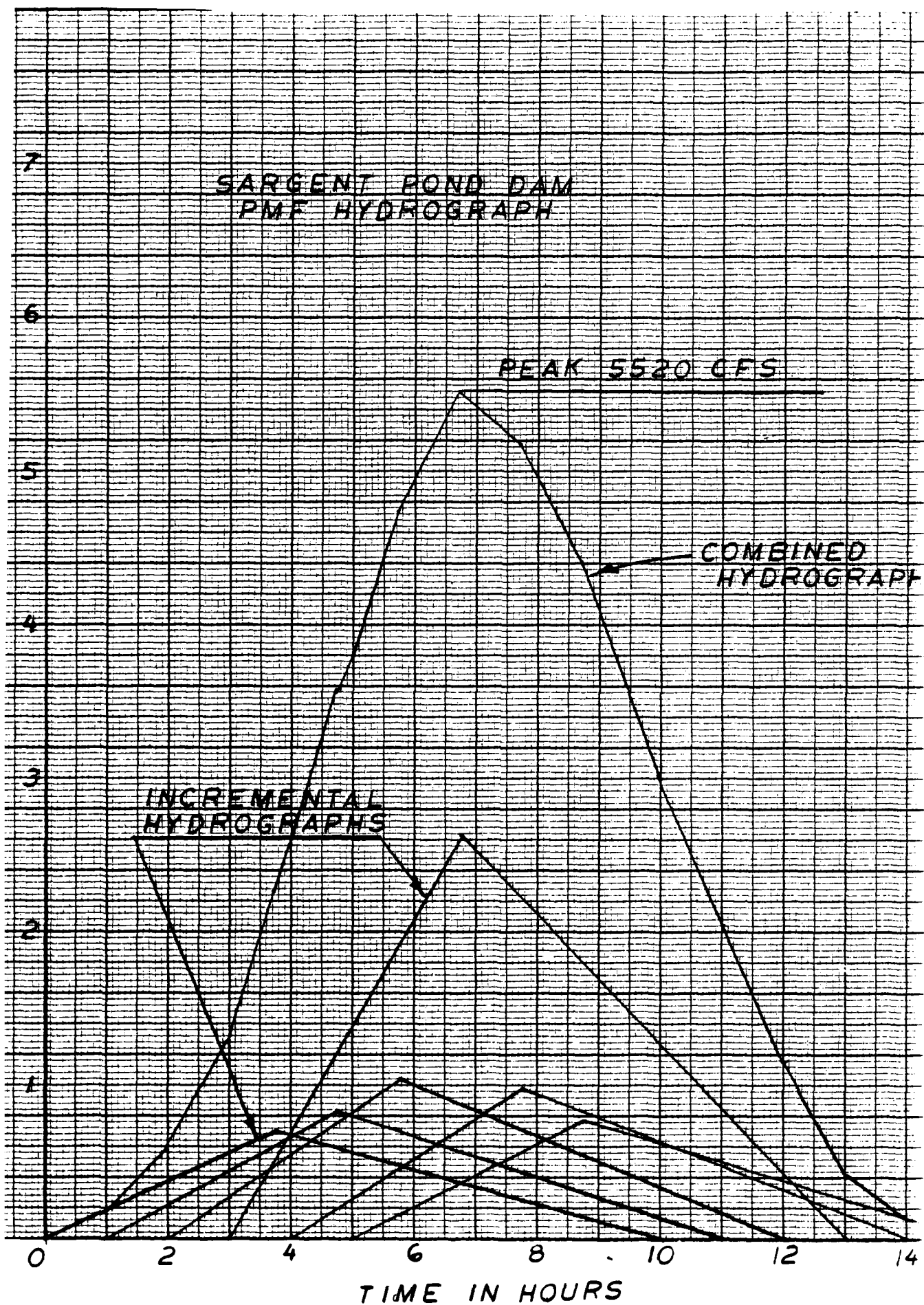
$$\text{STEP 2c: } Q_{p2} = 2,760 \times \left(1 - \frac{3.61}{9.5}\right)$$

$$Q_{p2} = 1,711$$

STEP 3a FOR $Q = 1,711$

SURCHARGE HEIGHT = 911.28

SURCHARGE VOLUME = 420 ACRE-FT



RF3 DATE 4-3-80 LOUIS BERGER & ASSOCIATES INC. SHEET NO. 2 OF 2
 KD. BY DATE INSPECTION OF DAMS PROJECT W-113
 SUBJECT SARGENT POND DAM, H&H, INFLOW HYDROLOGICAL

$$T_R = 1.67 T_p = 1.67 (3.75) = 6.26 \text{ HRS}$$

$$T_B = T_p + T_R = 3.75 + 6.26 = 10.01 \text{ HRS}$$

q_p = PEAK RATE IN CFS

$$q_p = \frac{484 A Q}{T_p} \quad \begin{array}{l} A = \text{DRAINAGE AREA} \\ Q = \text{RUNOFF IN INCHS} \end{array}$$

$$q_p = \frac{484 (2.11) (1)}{3.75} = 376 \text{ CFS}$$

PMP = PROBABLE MAXIMUM PRECIPITATION
 = 23.5 (0.8) = 18.8" FOR UXBIDGE, MA.
 = 18.4" CONSIDERING INFILTRATION FOR
 OVERLAND FLOW.

TIME (HOURS)	RAINFALL		Q_p CFS	TIME		
	*%	INCHS		BEGIN	PEAK	END
0.0	-					
1.0	10	1.84	692	0	3.75	10
2.0	12	2.21	831	1.0	4.75	11
3.0	15	2.76	1038	2.0	5.75	12
4.0	38	6.99	2628	3.0	6.75	13
5.0	14	2.58	970	4.0	7.75	14
6.0	11	2.02	760	5.0	8.75	15

* DISTRIBUTION OF MAXIMUM 6 HR PMP
 IN PERCENT OF 6 HOUR AMOUNT PER

EM 1110-2-K11

BY RFB DATE 4-3-80 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF 2
 CHKD. BY _____ DATE _____ INSPECTION OF DAMS PROJECT W-198
 SUBJECT SARGENT POND H&H INFLOW HYDROGRAPH

DRAINAGE AREA (TOTAL) = 2.91 sq. mi

RESERVOIR AREA < 25% D.A.

LENGTH OF LONGEST WATERCOURSE, $L = 16,000$ FT
 $L = 3.03$ MI

$$\text{ELEV. DIFFERENCE} = \frac{(1086 - 906) + (1170 - 906)}{2} = 222 \text{ FT}$$

$$\therefore \text{SLOPE} = \frac{222}{3.03} = 73.3 \text{ FT/MILE} \quad \frac{1}{\sqrt{S}} = 8.56$$

$$\text{Now } \left(\frac{LLC}{\sqrt{S}} \right)^{.33} = \left(\frac{3.03 \times 3.03}{2 \times 8.56} \right)^{.33} = 0.814$$

$$LAG = K \left(\frac{LLC}{\sqrt{S}} \right)^{.33} = 0.814 K$$

ASSUME $K = 5.0$ HRS REFER TO "CURVE B" MOUNTAINOUS
 REGION, MIXED TERRAIN, BOR REC

$$LAG = 0.814 (5) = 4.07 \text{ HRS}$$

$$T_p = 0.41D + 0.82LAG, \text{ WHERE } D = 1.0 \text{ HRS}$$

$$T_p = 0.41(1) + 0.82(4.07)$$

$$T_p = 0.41 + 3.34 = 3.75 \text{ HRS}$$

CHECK VELOCITY

$$T_c = \frac{T_p - 0.5D}{0.6}$$

$$T_c = \frac{3.75 - 0.5(1)}{0.6} = 5.42 \text{ HRS}$$

$$V = \frac{16,000}{5.42(3600)} = 0.82 \text{ FT/SEC} \quad \text{O.K.}$$

916

914

912

910

908

906

904

ELEV. IN FEET

6-D

SARGENT POND
DISCHARGE CAPACITY

DISCHARGE
ELEV.

TOTAL DISCHARGE

LOW POINT ON WALL

ELEV 908.4

CREST ELEV 904.3

1000

2000

3000

DISCHARGE IN C.F.S.

BY RFB DATE 5-7-80 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 4 OF 4
 CHKD. BY _____ DATE _____ **INSPECTION OF DAMS** PROJECT W-195
 SUBJECT SARGENT POND DAM, DISCHARGE CAPACITY

ELEV FT	* ΣQ SPILLWAY C + D	ΣQ CULVERT & OVERDAD	ΣQ A THRU H
906	65	580	65
907	192		192
908	383	740	383
908.4	453		453
908.8	569		571
909	620		634
910	892	1090	1064
910.2	951		1174
911	1198		1693
912	1532	1660	2550
913	1893		3578
914	2280	2330	4975

* SPILLWAY CONTROLS

ELEV FT	LOSS IN Q DUE TO SUBMERGENCE	FINAL ΣQ
	C + D "X"	
906	0	65
908	0	383
910	36	1028
911	148	1545
912	306	2244
913	570	3008
914	798	4177

BY RFB DATE 5-8-80

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 3 OF 4

CHKD. BY _____ DATE _____

INSPECTION OF DAMS

PROJECT W-198

SUBJECT _____

WATER ELEV CRIST	He	Q	ELEV TAILR	d	hd	$\frac{hd+d}{He}$	$\frac{hd}{He}$	% RED	Q CFS
908	2	383	902.6	6.1	5.4	6.75	2.7	0	383
910	4	892	908.9	14.4	1.1	3.88	0.275	8%	820
911	5	1200	910.4	15.9	0.6	3.3	0.112	25%	900
912	6	1532	911.6	17.1	0.4	2.9	0.07	40%	920
913	7	1890	912.7	18.2	0.3	2.64	0.04	60%	756
914	8	2280	913.8	19.3	0.2	2.61	0.025	70%	684



* Fig 252 D.S.D.

916

914

912

910

908

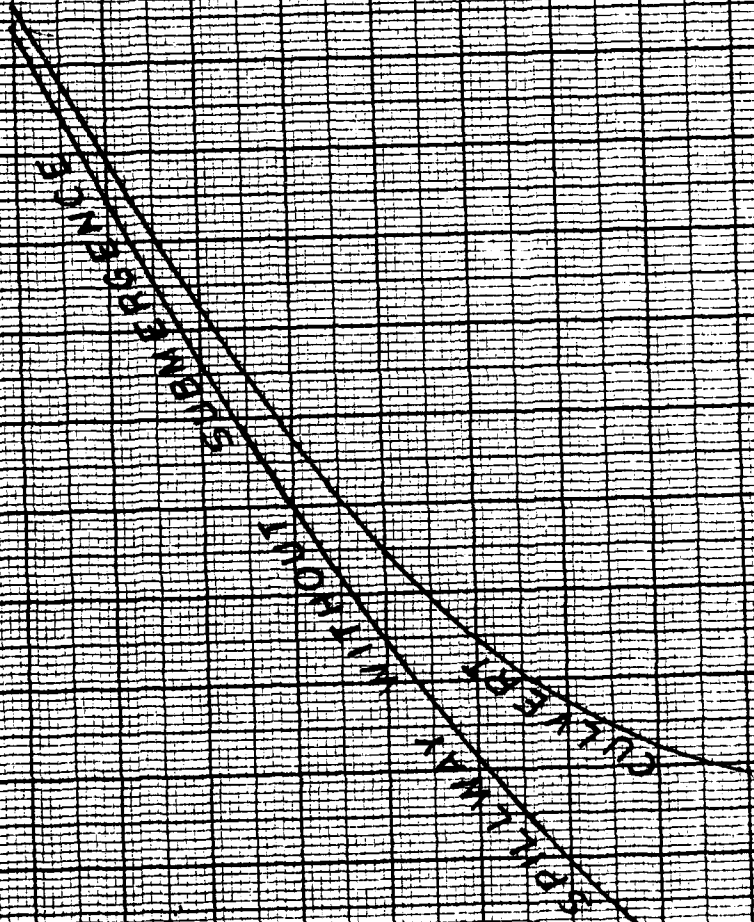
906

904

ELEV IN FEET

9-0

KEUFFEL & ESSER
MADE IN U.S.A.



STAGE - DISCHARGE
SARGENT POND

BY RFB DATE 5-7-80

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 2 OF 4

CHKD. BY _____ DATE _____

INSPECTION OF DAM

PROJECT W-198

SUBJECT SARGENT POND DAM, DISCHARGE CAPACITY

ELEV FT.	A, C=2.5			B, C=2.7			C, C=3.0			D, C=3.0		
	H	L	Q	H	L	Q	H	L	Q	H	L	Q
906	0	0	0	0	0	0	0	0	0	1.7	9.8	65
907	0	0	0	0	0	0	1	20.5	62	2.7		130
908	0	0	0	0	0	0	2		174	3.7		209
908.4	0	0	0	0	0	0	2.4		229	4.1		244
908.8	0	0	0	0	0	0	2.8		288	4.5		281
909	0	0	0	0.2	20	5	3		320	4.7		300
910	0	0	0	1.2	20	71	4		492	5.7		400
910.2	0	0	0	1.4	20	89	4.2		529	5.9		422
911	0.4	5.9	4	2.2	20	176	5		688	6.7		510
912	0.8	13.3	28	3.2	20	304	6		904	7.7		638
913	1.4	20.6	85	4.2	20	465	7		1139	8.7		754
914	1.9	28	183	5.2	20	640	8		1342	9.7		888

ELEV FT.	E, C=2.7			F, C=2.0			G, C=1.0			H, C=2.0		
	H	L	Q	H	L	Q	H	L	Q	H	L	Q
908.4	0	0	0	0	0	0	0	0	0	0	0	0
908.8	.2	7	2	0	0	0	0	0	0	0	0	0
909	.3	20	9	0	0	0	0	0	0	0	0	0
910	.13		80	.5	30	21	0	0	0	0	0	0
910.2	.15		99	.7		35	.1	13	0	0	0	0
911	.23		188	1.5		110	.5	66	21	0	0	0
912	.33		323	2.5		287	1.5		121	0	20	40
913	.43		481	3.5		593	2.5		261	2		113
914	.53		659	4.5		873	3.5		432	3		208

BY RFB DATE 5-7-80

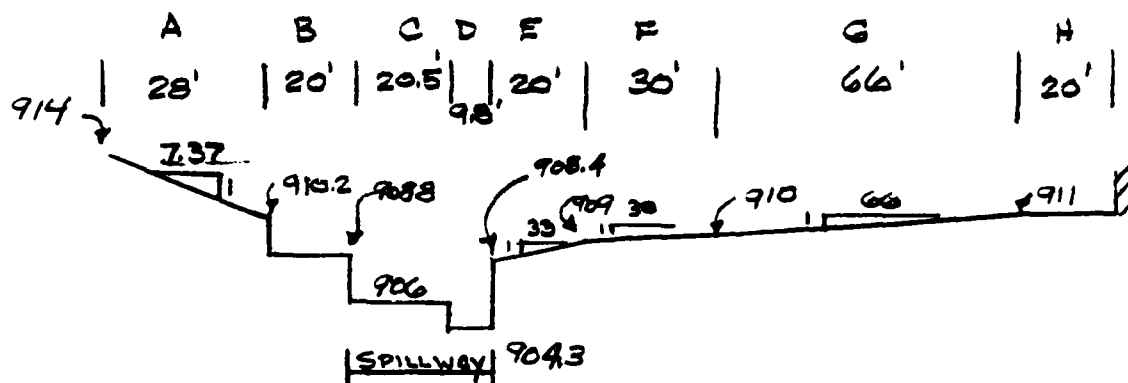
LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 1 OF 4

CHKD. BY DATE INSPECTION OF DAMS

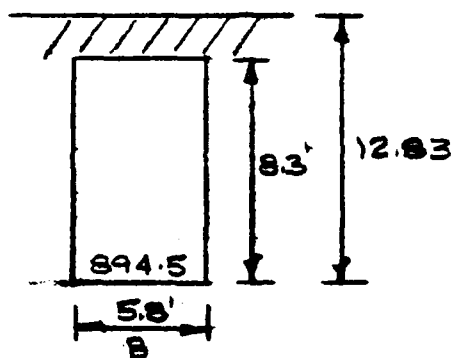
PROJECT W-198

SUBJECT SARGENT POND DAM, DISCHARGE CAPACITY



SPILLWAY CONTROL SECTION

CULVERT
CONTROL
SECTION
DOWNSTREAM
OF DAM



CULVERT DISCHARGE / INLET CONTROL

OVER ROAD
C = 2.5

ELEV	H	H W/D	Q/B	Q	H	L	Q
897	2.5	.30	11.5	67	0	0	0
900	3.5	.66	38	220	0	0	0
903	8.5	1.02	70	406	0	0	0
906	11.5	1.39	100	580	0	0	0
907.3	12.8	1.54	111	644	0	0	0
908	13.5	1.63	120	696	.7	303	44
910	15.8	1.87	130	754	2.7		336
912	17.5	2.11	153	888	4.7		772
914	19.5	2.35	175	1018	6.7		1314

ELEV IN FEET

STANDARD CROSS SECTION
10 X 10 TO THE HALF INCH

D-3

AREA IN ACRES
SURCHARGE IN ACRE-FT. X 102

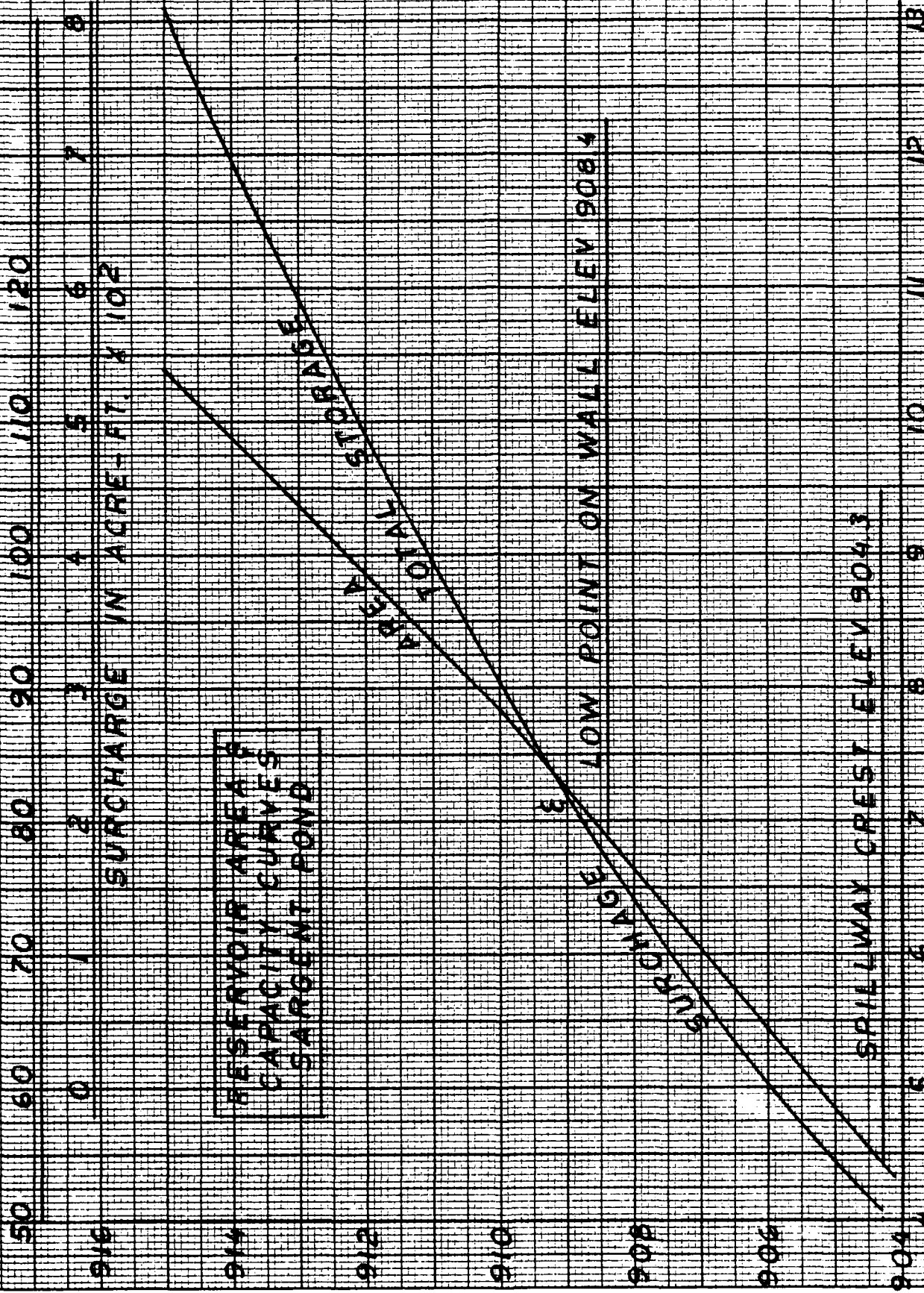
RESERVOIR AREA &
CAPACITY CURVES
SARGENT POND

RESERVOIR STORAGE

SURCHARGE
LOW POINT ON WALL ELEV 908.4

SPILLWAY CREST ELEV 904.3

TOTAL STORAGE IN ACRE-FT. X 102



BY RFB DATE 5-8-80

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 1 OF 1

CHKD. BY _____ DATE _____

INSPECTION OF DAMS

PROJECT W-198

SUBJECT

SARGENT POND DAM, STORAGE CAPACITY

RESERVOIR AREA = 64.3 ACRES

SAY DEPTH = $906 - 890.1 = 15.9$ VOLUME = $(64.3)(15.9)(\frac{1}{2}) \approx 500$ ACRE-FT

ELEV	AREA	AVE AREA	ΔH	Δ STORAGE	TOTAL STORAGE	SURCHARGE STORAGE
906	64.3				500	
907	70.3	67.3		67.3	567	67
908	76.2	73.2		73.2	640	140
909	82.2	79.2		79.2	720	220
910	88.2	85.2		85.2	805	305
911	93.3	90.8		90.8	895	396
912	98.5	95.9		95.9	992	492
913	103.6	101.0		101.0	1093	593
914	108.8	106.2		106.2	1199	699
915	113.9	111.4		111.4	1310	810

BY REF DATE 3-28-80 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF 1
 CHKD. BY _____ DATE _____ INSPECTION OF DAMS PROJECT W-198
 SUBJECT SARGENT POND DAM

FIND DRAINAGE AREA

SCALE 1:24,000

READ #2	42.16	READ #3	62.46
" #1	<u>21.88</u>	" #2	<u>42.16</u>
	20.28		20.30

$$\text{DRAINAGE AREA} = 20.29(0.1435) = \underline{2.91 \text{ SQ. MI.}} = \underline{1863 \text{ ACRES}}$$

FIND RESERVOIR SURFACE AREA, ELEV 906

READ #2	63.15	READ #3	63.84
" #1	<u>62.46</u>	" #2	<u>63.15</u>
	0.72		0.69

$$\text{RESERVOIR AREA} = 0.705(91.83) = \underline{64.7 \text{ ACRES}}$$

FIND AREA @ ELEV 910 FT

READ #2	64.92	READ #3	65.86
" #1	<u>63.94</u>	" #2	<u>64.92</u>
	0.98		0.94

$$\text{AREA @ ELEV 910} = 0.96(91.83) = \underline{88.2 \text{ ACRES}}$$

FIND AREA @ ELEV. 920 FT

READ #2	66.84	READ #3	68.36
" #1	<u>65.32</u>	" #2	<u>66.84</u>
	1.52		1.52

$$\text{AREA @ ELEV. 920} = 1.52 \times 91.83 = \underline{139.6 \text{ ACRES}}$$

APPENDIX D
HYDROLOGIC AND HYDRAULIC COMPUTATIONS

BY RFB DATE 5-9-80 LOUIS BERGER & ASSOCIATES INC. SHEET NO. 2 OF 3
 CHKD. BY _____ DATE _____ INSPECTION OF DAMS PROJECT W-198
 SUBJECT SARGENT POND DAM, RESERVOIR ROUTING

$$\text{INCHS OF RUNOFF} = \frac{429}{1863} \times 12 \text{ W/FT} = 2.71 \text{ INCHS}$$

STEP 3b

$$\text{AVE. STOR} = \frac{3.61 + 2.71}{2} = 3.16 \text{ INCHS}$$

$$\text{AVE SURCHARGE} = \frac{3.16 \times 1863}{12 \text{ W/FT}} = 491 \text{ ACRE-FT}$$

FROM STAGE-STORAGE CURVE : STAGE = 912.02

FROM STAGE-DISCHARGE CURVE : $Q = 2,210 \text{ CFS}$

$$\frac{1}{2} \text{ PMF OVERTOPS LOW POINT BY } 912.02 - 908.4 = 3.62 \text{ FT}$$

$$Q = 2,210 \text{ CFS}$$

$$\text{TRY } 100\text{YR } \frac{3}{4} \text{ PMF} = \frac{5520}{4} = 1380 \text{ CFS}$$

$$\text{STEP 1: } Q_{p1} = 1380 \text{ CFS}$$

$$\text{STEP 2a: SURCHARGE HEIGHT} = 910.7$$

$$\text{STEP 2b: SURCHARGE VOLUME} = 367$$

$$\text{INCHS OF RUNOFF} = \frac{367}{1863} \times 12 = 2.37$$

$$\text{STEP 2c } Q_{p2} = 1380 \left(1 - \frac{2.37}{4.75}\right) = 692 \text{ CFS}$$

$$Q_{p2} = 692 \text{ CFS}$$

BY RFB DATE 5-9-80 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 3 OF 3
CHKD. BY _____ DATE _____ INSPECTION OF DAMS PROJECT W-198
SUBJECT SARGENT POND DAM, RESERVOIR ROUTING

STEP 3a: For $Q = 692 \text{ cfs}$

SURCHARGE HEIGHT = 909.0

SURCHARGE VOLUME = 223 ACRE-FT

$$\text{INCHS OF RUNOFF} = \frac{223}{1863} \times 12 \text{ IN/FT} = 1.44 \text{ INCHS}$$

$$\text{STEP 3b} \quad \text{AVE STOR} = \frac{2.37 + 1.44}{2} = 1.90 \text{ INCHS}$$

$$\text{AVE SURCHARGE} = \frac{1.90 \times 1863}{12 \text{ IN/FT}} = 295 \text{ ACRE-FT}$$

FOR 295 ACRE-FT

SURCHARGE HEIGHT = 909.9

FROM STAGE DISCHARGE CURVE: 1010 cfs

$\frac{1}{4}$ PMF OVERTOPS LOW POINT BY $909.9 - 908.4 = 1.5 \text{ FT}$
 $Q = 1,010 \text{ cfs}$

BY RFB DATE 5-9-80 LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 1 OF 6

CHKD. BY DATE INSPECTION OF DAM

PROJECT W-195

SUBJECT SARGENT POND DAM, FAILURE ANALYSIS

STEP 1 RESERVOIR ELEV. @ FAILURE = 908.4

STORAGE = 670 ACRES-FT

HEIGHT = 18 FT

SAY FAILURE WIDTH = 30 FT = WIDTH OF SPILLWAY

STEP 2 : PEAK FAILURE OUTFLOW

$$Q_{P1} = 0.27 W \sqrt{g} Y_0^{3/2}$$

$$Q_{P1} = 1.68 (30) (18)^{3/2}$$

$$Q_{P1} = 3,850$$

ADD SPILLWAY FLOW : $Q_{SPILLWAY} = 500$ CFS

$$Q_{P1, TOTAL} = 3,850 + 500 = 4350$$

$$SAY Q_{P1} = 4,400 \text{ CFS}$$

REACH #1, STA 0+00 TO 25+00

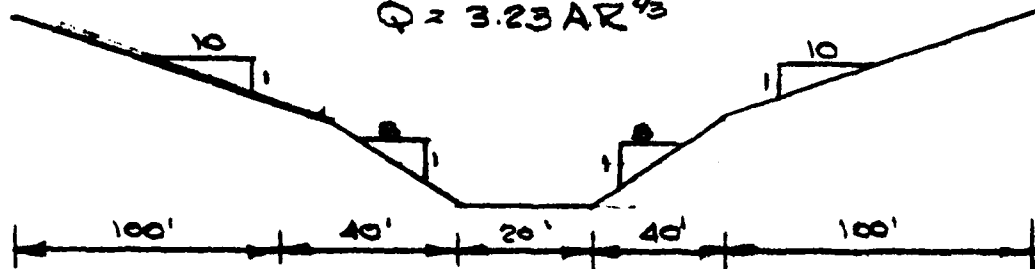
$$n = 0.065$$

$$S = \frac{50}{2500} = 0.02$$

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

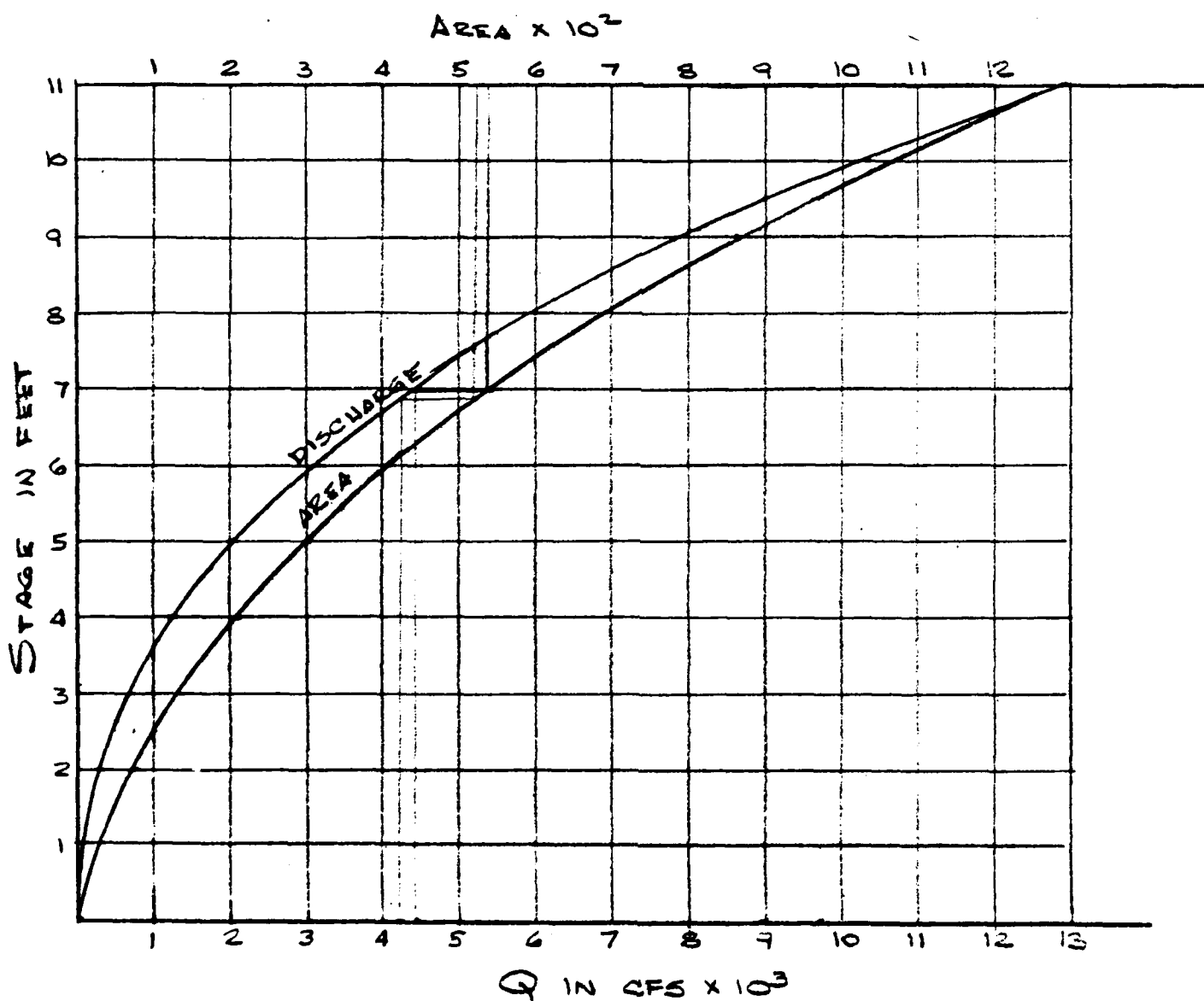
$$S^{1/2} = 0.1414$$

$$Q = 3.23 A R^{2/3}$$



BY RFB DATE 5-9-80 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 2 OF 6
 CHKD. BY _____ DATE _____ INSPECTION OF DAMS PROJECT W-198
 SUBJECT SARGENT POND DAM, FAILURE ANALYSIS

STAGE	AREA	P	R	$R^{2/3}$	Q
2	72	53	1.36	1.23	286
4	208	86	2.42	1.80	1210
5	300	102.5	2.93	2.05	1986
7	540	142.7	3.70	2.43	4238
9	860	182.9	4.70	2.81	7806
11	1260	223.9	5.63	3.17	12901



BY RFB DATE 5-9-80 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 3 OF 6
 CHKD. BY _____ DATE _____ INSPECTION OF DAMS PROJECT W-108
 SUBJECT SARGENT POND DAM, FAILURE ANALYSIS

FOR $Q = 4,400$ STAGE = 7.0 , AREA = 540

$$V_1 = \frac{540 \times 2500}{43,560} = 31 \text{ ACRE-FT}$$

$$Q_{P2} (\text{TRIAL}) = 4,400 \left(1 - \frac{31}{670}\right)$$

$$= 4196$$

FOR $Q = 4,200$, STAGE = 6.8 FT , AREA = 520

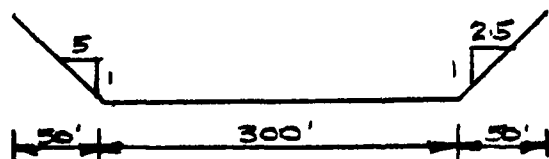
$$V_2 = \frac{520 \times 2500}{43,560} = 30$$

$$V_{AVE} = \frac{31 + 30}{2} = 30.5$$

$$Q_{P2} = 4,400 \left(1 - \frac{30.5}{670}\right) = 4200$$

STA 25+00 , STAGE = 6.8 FT , $\Delta H = 4.2$ FT

STA 25+00 TO 39+00



H	C	L	Q
2	2.4	300	2036
4	2.4	300	5760
6	2.4	300	10580

BY RFB DATE 5-9-80

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 5 OF 6

CHKD. BY _____ DATE _____

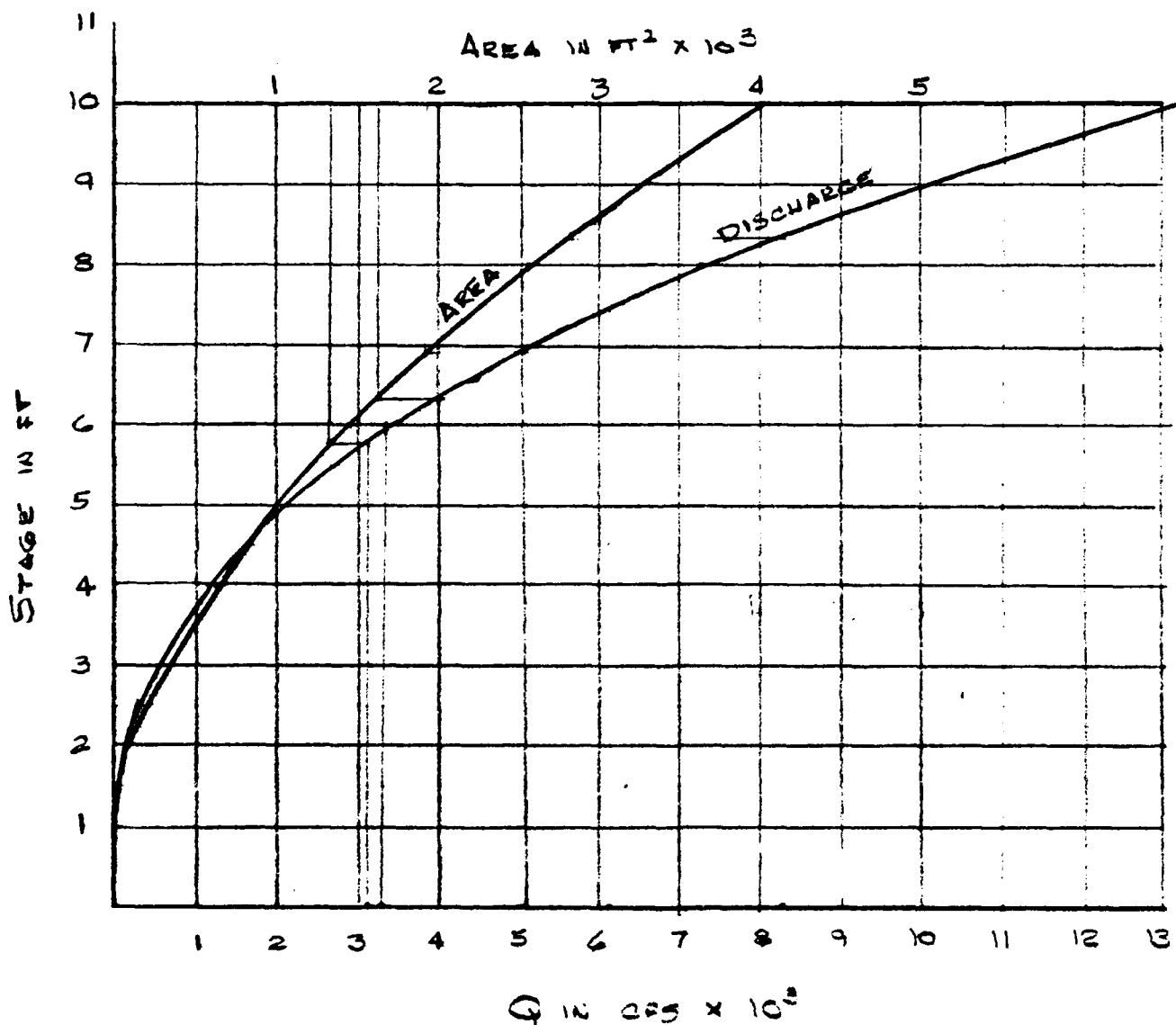
INSPECTION OF DAMS

PROJECT W-198

SUBJECT SARGENT POND DAM

FAILURE ANALYSIS

STAGE	AREA	P	R	$R^{2/3}$	Q
2	160	160	1.0	1.0	181
4	640	320	2.0	1.59	1150
6	1440	480	3.0	2.08	3384
8	2560	640	4.0	2.52	7289
10	4000	800	5.0	2.93	13244



BY RFB DATE 5-9-80

LOUIS BERGER & ASSOCIATES INC.

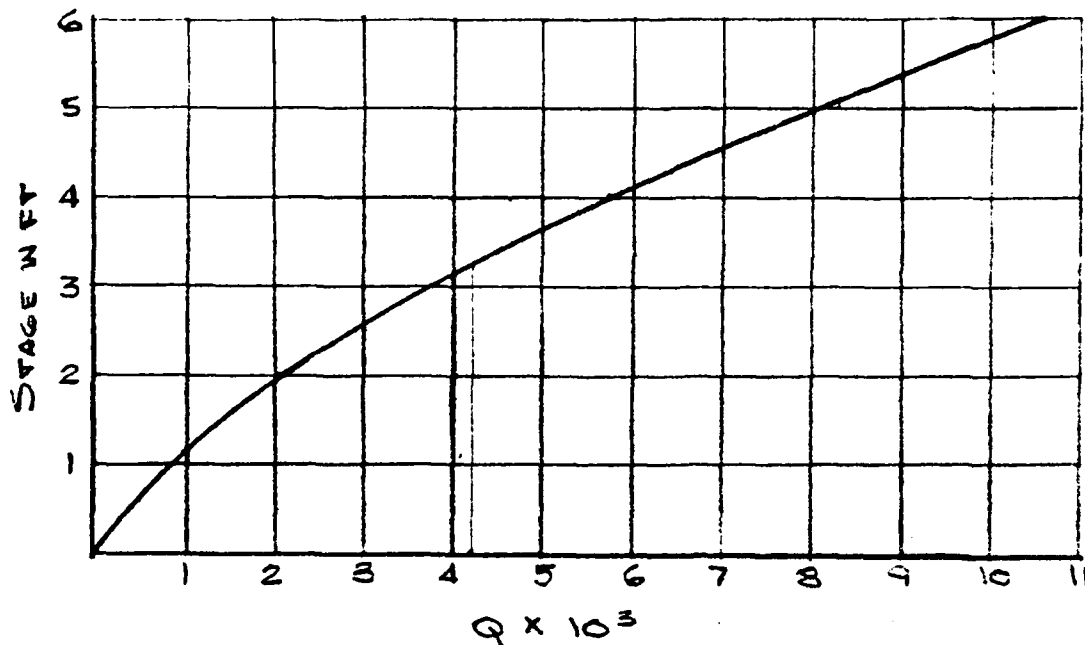
SHEET NO. 4 OF 6

CHKD. BY _____ DATE _____

INSPECTION OF DAMS

PROJECT W-193

SUBJECT SARGENT Pond Dam, FAILURE ANALYSIS



For 4,200 CFS, $H = 3.2$ FT $V_1 = \frac{3.2 \times 300 \times 1400}{43,560} = 31$

$Q_{p2} (\text{TRIGL}) = 4,200 \left(1 - \frac{31}{670}\right) = 4,000$ CFS

For 4,000, $H = 3.2$ FT, $V = 31$

Sta 39+00, $H = 3.2$, $V = 31$, $Q = 4,000$, $\Delta H = 2.5$

Sta 39+00 TO 54+00 No SIGNIFICANT VALLEY STORAGE

Sta 54+00 TO 94+00

REACH #3

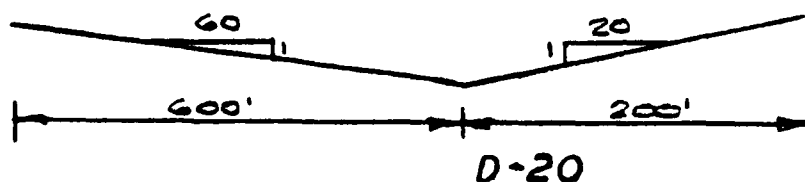
$n = 0.08$

$Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$

$Q = 1.13 AR^{2/3}$

$S = \frac{20}{5400} = .0037$

$S^{1/2} = .061$



D-20

BY RFR DATE 5-12-80 LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 6 OF 6

CHKD. BY _____ DATE _____ INSPECTION OF DAMS

PROJECT W-198

SUBJECT SARGENT POND DAM, FAILURE ANALYSIS

FOR $Q = 4,000$, STAGE = 6.7, AREA = 1620 $\square$

$$V_1 = \frac{1620 \times 4000}{43,560} = 149 \text{ ACRES}$$

$$Q_{P2} (\text{TRIAL}) = 4,000 \left(1 - \frac{149}{670} \right)$$

$$" = 3110 \text{ CFS}$$

FOR $Q = 3110$, STAGE = 5.8 FT, AREA = 1310 $\square$

$$V_2 = \frac{1310 \times 4000}{43,560} = 120 \text{ ACRES}$$

$$Q_{P2} (\text{TRIAL}) = 4,000 \left(1 - \frac{120}{670} \right)$$

$$" = 3280$$

STA 94+00, $Q = 3280$, $H = 5.9$, $\Delta H \approx 2.9 \text{ FT}$

FLOOD DAMAGE. JUST BELOW RT 9 - 1 HOUSE 3 FT

LOCAL ROAD 5 HOUSES 2-3 FT

APPENDIX E

INFORMATION AS CONTAINED
IN THE
NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

IDENTITY NUMBER	DIVISION	STATE	COUNTY	DIST.	CONGR. DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE	
									DAY	MO YR
22	MA	MA	027	03		SARGENT POND DAM	4214.7	7155.0	16	APR 80

POPULAR NAME	NAME OF IMPONDMENT
	SARGENT POND

REGION BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	POPULATION
0100	TOWN MEADOW RIVER	LEICESTER	8887

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCT. HEIGHT (FT.)	HYDRAU. HEIGHT (FT.)	IMPOUNDING CAPACITIES (ACRE-FT.)	DIST. FROM DAM (MI.)	POPULATION
EMBEED	1023	R	14	14	470	500	8887

REMARKS									
22-APPROXIMATE									

D/S HAS	SPILLWAY TYPE	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY (KW)	IMPOSED PROPOSED	NO. OF LOCKS	LENGTH (FT.)	WIDTH (FT.)	HEIGHT (FT.)	DIST. FROM DAM (MI.)	POPULATION
1	214 U	50	450								

OWNER	ENGINEERING BY	CONSTRUCTION BY
STANLEY NICAS		

REGULATORY AGENCY		
DESIGN	CONSTRUCTION	OPERATION
NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE	AUTHORITY FOR INSPECTION
LOUIS BERGER & ASSOC INC	16 APR 80	PL 92-347

REMARKS									

DIST UWN FED R PRV/FED SCS A VER/DATE

END

FILMED

8-85

DTIC