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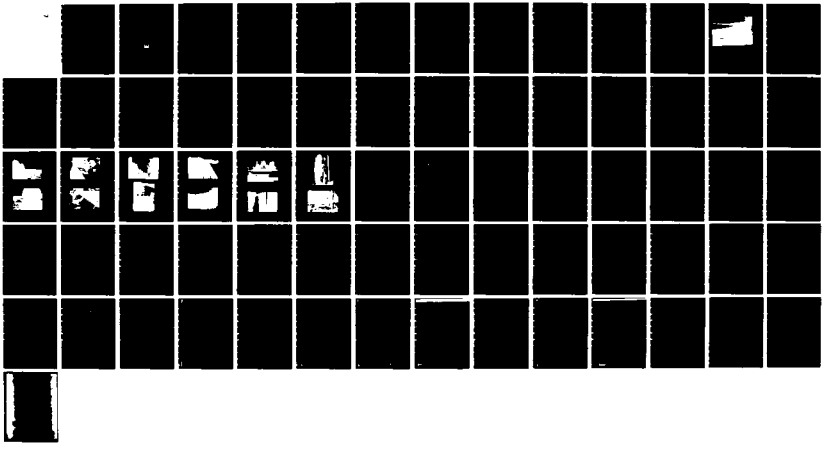

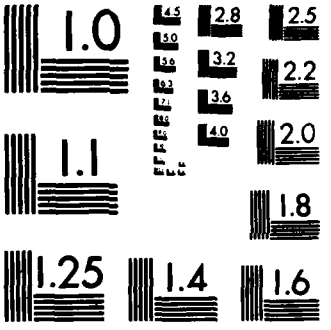

CONNECTICUT WESTERN COASTAL AREA
STAMFORD - NEW CANAAN, CONNECTICUT

LAUREL RESERVOIR DAM
CT 00049

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

AUGUST 1978

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Conn. Western Coastal Area
Stamford New Canaan, Conn.
Laurel Reservoir Dam

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Laurel Reservoir Dam is a linear concrete gravity structure, 1,950 ft. long with a 100 ft. spillway located on the west end of the dam. An earthen embankment on the downstream portion of the dam begins 10 ft. wide top width and a 2:1 slope. The maximum spillway capacity at top of dam is 15 percent of the peak inflow rate of the test flood. Therefore, the test flood cannot be passed by the spillway without overtopping the dam. The overflow will be 2.6 ft. above the top of the dam.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:
NEDED

AUG 29 1979

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

I am forwarding to you a copy of the Laurel Reservoir 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 Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Stamford Water Company, 103 Summer Street, Stamford, Connecticut 06901.

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 Protection for your cooperation in carrying out this program.

Sincerely yours,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

LAUREL RESERVOIR DAM

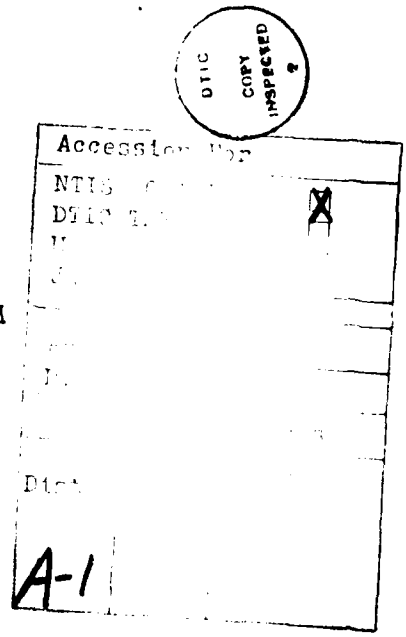
CT 00049

CONNECTICUT WESTERN COASTAL AREA

GREENWICH, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM



PHASE I REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam: LAUREL RESERVOIR DAM

State Located: Connecticut

County Located: Fairfield County

Stream: Rippowam River

Date of Inspection: 15 JUNE 1978

BRIEF ASSESSMENT

The Laurel Reservoir Dam is a linear concrete gravity structure, 1,950 feet long with a 100 foot spillway located on the west end of the dam. An earthen embankment on the downstream portion of the dam begins 10 feet below the top of the dam, having a 10 foot wide top width and a 2:1 (horizontal to vertical) slope.

Based on a visual inspection of the site, review of available information and past performance of the dam, the dam is judged to be in good condition.

The maximum spillway capacity at top of dam is 15 per cent of the peak inflow rate of the test flood. Therefore, the test flood cannot be passed by the spillway without overtopping the dam. The overflow will be 2.6 feet above the top of the dam.

It is recommended that detailed engineering investigations be undertaken by the owner to determine methods for obtaining additional spillway capacity. Concrete surfaces affected by spalling should be repaired.

Due to the potential for overtopping and the high hazard classification, it is recommended that a definite plan for around the clock surveillance be implemented during periods of heavy rains and a formal warning system be developed by the owner.

S. Giavara, P.E.
Principal

Registered, CT 7634

This Phase I Inspection Report on Laurel Reservoir 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.

Charles G. Tiersch

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

Fred J. Ravens Jr.

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

Saul Cooper

SAUL COOPER, Member
Chief, Water Control 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.

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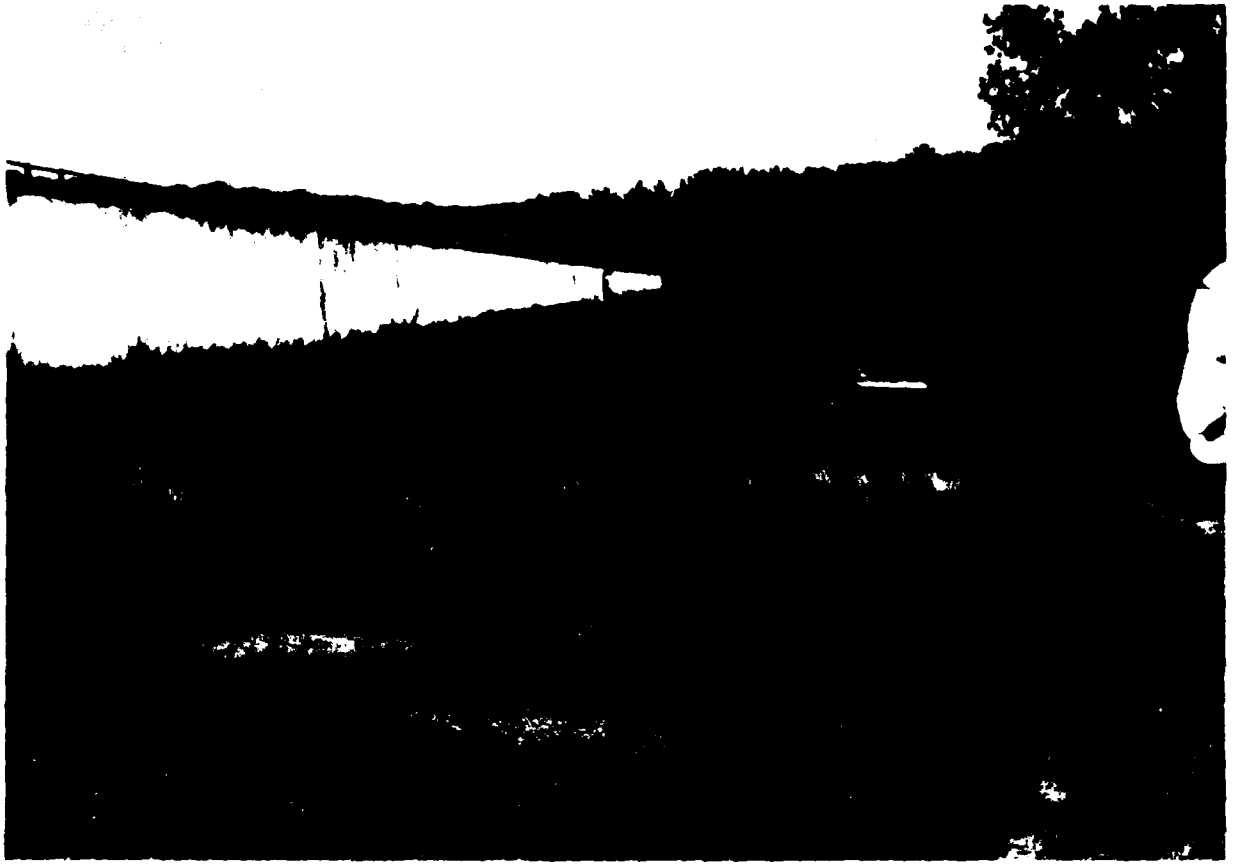
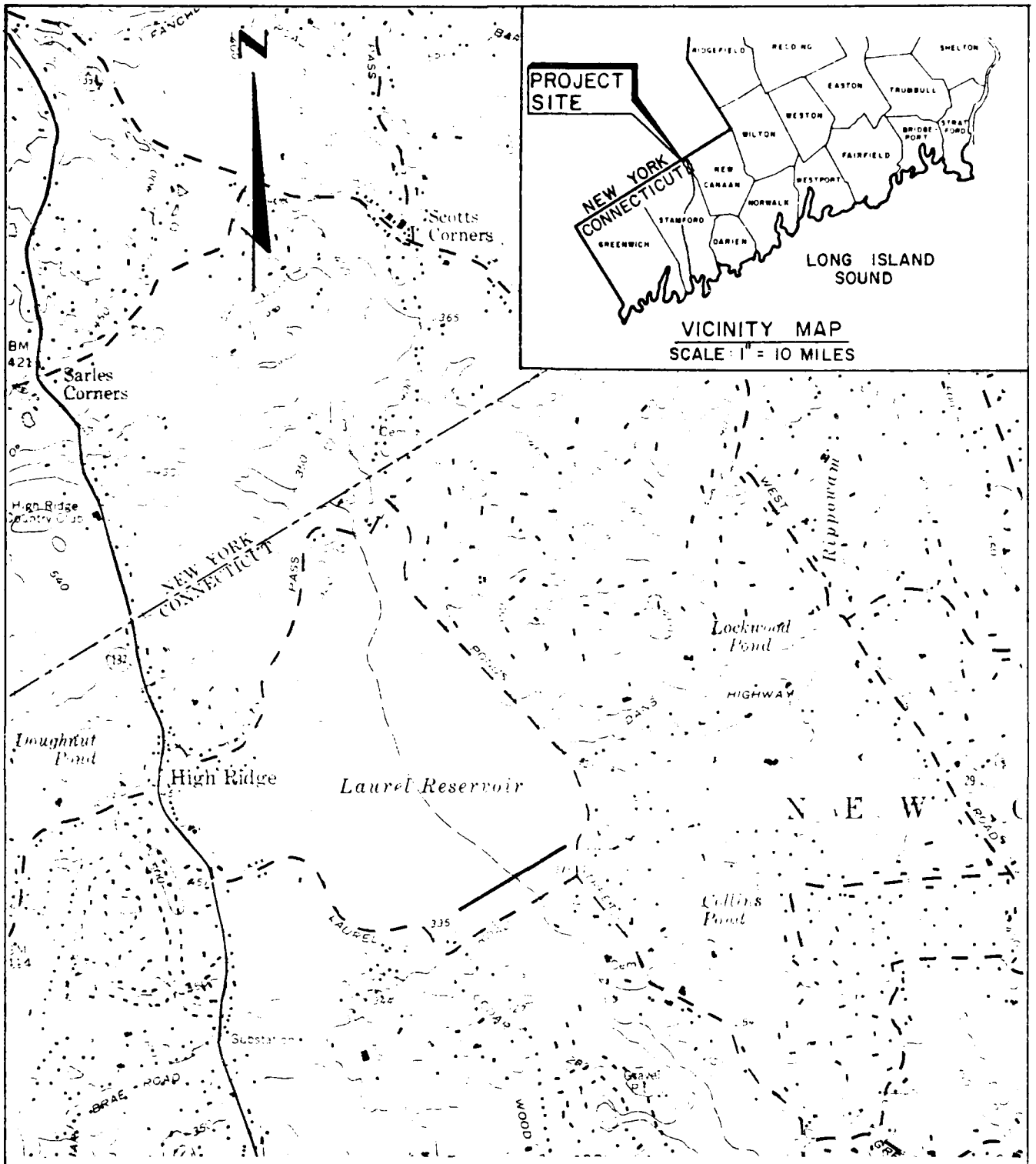


LAUREL RESERVOIR DAM



LOCATION MAP

LAUREL RESERVOIR DAM

STAMFORD - NEW CANAAN
CONNECTICUT

PHASE I INSPECTION REPORT
LAUREL RESERVOIR DAM CT 00049

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 through 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. Flaherty Giavara Associates, P.C. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Flaherty Giavara Associates, P.C. under a letter of 25 April 1978 from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0309 has been assigned by the Corps of Engineers for this work.

b. Purpose:

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) To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF PROJECT:

a. Description of Dam and Appurtenances. The Laurel Reservoir Dam is a linear concrete gravity structure, 1,950 feet long, with a 100-foot spillway located at the west end of the dam. An earthen embankment on the downstream portion of the dam begins 10 feet below the top of the dam, having a 10-foot wide top width and having a 2:1 (horizontal to vertical) slope. The top of the dam is about eleven feet wide with a railing on the upstream side. The dam is approximately 42 feet above the streambed. An intake structure is located in the center of the dam, providing 6 sluice gates for varying take off points from the reservoir. A 30-inch blow off and 8-inch drain discharge to the Rippowam River.

b. Location. Laurel Reservoir Dam is located on the Rippowam River, within the Connecticut western coastal area. The Town lines of Stamford and New Canaan bisect the reservoir. The dam is approximately 2 miles north of North Stamford.

c. Size Classification. The size classification may be determined by either storage or height, whichever gives the larger size category. Based on both the storage capacity and height of the dam, the size classification is intermediate. The applicable guidelines indicate that for an intermediate category the storage in acre-feet for the impoundment must be greater than or equal to 1,000 and less than 50,000. The height must be greater than or equal to 40 feet and less than 100 feet. The top of dam storage is 7,150 acre-feet and the height of dam is dam is 45 feet.

d. Hazard Classification. The dam is designated as having a high hazard potential. About 100 houses are located in the floodplain. The dam is located in an area where failure may cause serious damage to homes, and to industrial and commercial facilities. Additionally, excessive damage to the Merritt Parkway and the Connecticut Turnpike could also be expected.

e. Ownership. The dam is owned by the Stamford Water Company, of Stamford, Connecticut.

f. Purpose of Dam. The dam was constructed to impound water for the Laurel Reservoir. The Laurel Reservoir forms part of the Stamford Water Company's water distribution system and supplies the people of Stamford.

g. Design and Construction History. The dam was designed in 1922 by Albert B. Hill, Consulting Engineer. Construction history is unknown.

h. Normal Operational Procedures. The dam is operated to supply water to the system. Water taken off at the Laurel Reservoir is chlorinated and piped to the North Stamford pump station 2 miles south of the dam. A 36-inch blow off is operated periodically, and an 8-inch drain is open to maintain flow of the Rippowam River.

1.3 PERTINENT DATA:

a. Drainage Area -	13.4 sq. miles
b. Discharge at Dam Site -	
Maximum Known Flood	Unknown
Warm Water Outlet	Unknown
Div. Tunnel Low Pool Outlet	Not Applicable
Diversion Tunnel Outlet	Not Applicable
Gated Spillway	Not Applicable
Ungated Spillway at Max. Pool	4,000 CFS
Total Spillway Cap. at Max. Pool	4,000 CFS
c. Elevation (above M.S.L.) -	
Top of Dam	315
Max. Design Pool	Unknown
Full Flood Control Pool	Not Applicable
Recreation Pool	Not Applicable
Spillway Crest Ungated	310
Upstream Portal Invert. Div. Tunnel	Not Applicable
Downstream Portal Invert. Div. Tunnel	Not Applicable
Streambed at Centerline of Dam	265
Maximum Tailwater	270±
d. Reservoir -	
Length of Max. Pool	3,700 Ft.
Length of Recreation Pool	Not Applicable
Length of Flood Control Pool	Not Applicable
e. Storage -	
Recreation Pool	Not Applicable
Flood Control Pool	Not Applicable
Design Surcharge	Not Available
Top of Dam	7,150 Acre-Feet
f. Reservoir Surface (acres) -	
Top of Dam	Not Available
Max. Pool	Not Available
Flood Control Pool	Not Applicable
Recreation Pool	Not Applicable
Spillway Crest	265

g. Dam -

Type:	Concrete Gravity with Earth Embankment
Length:	1,850 feet
Height:	50 feet
Top Width:	9 feet
Side Slopes:	Upstream: Vertical
	Downstream: 7 Horizontal/10 Vertical
Earth Embankment:	Top Width: 10 feet
	Side Slopes: 2 Horizontal/1 Vertical

h. Diversion and Regulating Tunnel -

Type:	No Tunnel
Length:	Not Applicable
Diameter:	Not Applicable
Access:	Not Applicable
Regulation:	Not Applicable

i. Spillway -

Type:	Ogee
Length of Weir:	100 feet
Crest Elevation:	310
Gates:	Ungated
Upstream Channel:	Reservoir
Downstream Channel:	Riprap bottom, retaining walls on sides

Spillway is founded on rock (plans)

j. Regulating Outlets -

6 - 2-foot by 3-foot sluice gates
2 - 30-inch supply mains
1 - 36-inch blow off
1 - 8-inch drain

SECTION 2 - ENGINEERING DATA

2.1 DESIGN:

The design of the dam and related structure was made by Arthur Hill, Consulting Engineer of New Haven, Connecticut. Pertinent parts of the following have been utilized in this report.

a. Laurel Road Reservoir Plans (3 sheets).

b. Hydrologic Study of Laurel Reservoir Watershed.

c. Report on Raising Laurel Reservoir Dam.

d. Files - Department of Environmental Protection, Supervisor of Dam Maintenance.

While no as-built drawings exist for this project, contract drawings were utilized for analysis purposes. No engineering values, assumptions, test results or calculations are available.

2.2 CONSTRUCTION:

No construction records are available.

2.3 OPERATION:

Operation records are available at the Stamford Water Company in Stamford, Connecticut.

2.4 EVALUATION:

a. Availability. Only plans showing dimensional features are available. Specifications indicating the properties of the materials used and construction procedures are not available.

b. Adequacy. Information available is adequate for Phase I investigation purposes.

c. Validity. There is no reason to question the validity of the documents reviewed.

4) Earth Embankment - The earth embankment is in good condition showing no indications of deformation, sloughing or erosion with the exception of one location near the downstream chlorination facility where a cut had been made into the side of the embankment to allow construction equipment access to the roof of the building. The downstream slope of the embankment was covered with extensive vegetation which has not been mowed this year. Brush heights in excess of 3 feet in some places were observed at some locations. No seeps were observed through either the embankment slope, the toe or downstream of the dam. The construction drawings indicate a stone drain placed against the downstream face of the dam with no apparent connection to any horizontal drain under the downstream embankment. The top of the drain, against the downstream face of the concrete dam, is shown on the drawings as 2 feet down from the surface of the downstream embankment crest. Thus the presence of the drain could not be visually verified.

Several animal holes (6 to 8 inch diameters) were noted at various locations in the high grass on the downstream slope of the earth embankment. Other animal holes may exist which were not visually observed.

c. Appurtenant Structures.

1) Gate House - The concrete and brick is in good condition. All the gates and valves are manually operated and appear in good condition and easy to turn. The 8-inch blow-off was discharging to the river at the time of inspection to maintain downstream flow. The 36-inch blow-off valve was not operated during the inspection, but was cracked slightly for a short period of time. All visable wiring in the gate house (used only for lighting) was enclosed in conduits and free of dirt and corrosion.

2) Access Road Bridge - Access to the dam is via a road that passes over the spillway discharge channel. The bridge has two spans of approximately 20 feet each, with a concrete center pier. The bridge is in excellent overall condition.

3) Bridge Over Spillway - This steel truss foot bridge is in good condition.

d. Reservoir Area. The reservoir perimeter has well vegetated banks at moderate to steep slopes. There was no evidence of sloughing. No noticeable debris or obstructions were seen in the vicinity of the intake tower. The depth of sediment, and rate of accumulation in the reservoir, is unknown.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES:

The Stamford Water Company by use of the 8-inch drain maintains flow of the Rippowam River. A small distribution facility at Laurel Reservoir supplies local customers with approximately 120,000 gallons per day. The Rippowam River continues about 2 miles south, emptying into the North Stamford Reservoir. A major distribution plant is located there to provide 16.5 million gallons per day to customers in Stamford.

4.2 MAINTENANCE OF DAM:

The dam and associated structures are well maintained with a regular program of grass mowing and general maintenance in effect.

4.3 MAINTENANCE OF OPERATING FACILITIES:

The regulating gates and valves were tested and appear to be in mechanically good operating condition, and are completely functional.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT:

There was no warning system of any kind in effect at the time of the inspection.

4.5 EVALUATION:

The Laurel Reservoir Dam, which is approximately 55 years old, is well operated and maintained. Although not designed for rapid drawdown, it should be noted that, if the need should arise, drawdown could be effected by the following procedures:

a. Allowing for maximum discharge through the 36-inch diameter blow-off.

b. Allowing for maximum discharge through the 30-inch diameter supply main, which can blow-off at the discharge channel.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES:

a. Design Data. The Laurel Reservoir Dam's original hydraulic design is not available. Under established criteria (OCE Guidelines), the recommended spillway test flood for the size (intermediate) and hazard potential (high) classification is the probable maximum flood (PMF). The PMF is the flood that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. The PMF has recently been calculated by a consultant to the Stamford Water Company (Roald Haestad, Inc.).

The hydrograph was developed using rainfall data and computational techniques as described in "Design of Small Dams" - Bureau of Reclamation.

The Laurel Reservoir inflow hydrograph was actually a composite, which included the inflow hydrographs of two upstream reservoirs (Trinity and Mill), and the runoff contributed by the land downstream of the two reservoirs. The flood hydrograph was then routed through Laurel Reservoir, with the following results:

Storm Frequency	Inflow Peak Runoff	Outflow Peak Runoff
100 years	5,300 CFS	2,700 CFS
1,000 years	8,060 CFS	4,900 CFS
PMF	29,000 CFS	29,000 CFS

The stage verse outflow rates from the Laurel Reservoir were computed and plotted by the consultant. The spillway capacity was identified as being approxiamtely 3,900 cubic feet per second.

As part of the current investigation of the Laurel Reservoir Dam, a rough check of the PMF was made. The computed peak flow was 20,800 CFS, noticeably lower than the consultant's value of 29,000 CFS. As a conservative approach to the investigation, the higher design PMF hydrograph was used.

b. Experience Data. The Laurel Reservoir Dam has been operational since the mid-1920's. During this time it has safely discharged the floods which have hit the Westchester-Connecticut area. During the storm of October 15-17, 1955, the discharge over the Laurel spillway was estimated to be 2,780 CFS.

c. Visual Observations. The on-site inspection of the dam revealed that the spillway has a crest length of 100 feet, while the original plans show a proposed length of 120 feet. Although flashboards are in place, they are designed to collapse under a head of a little over 6 inches.

d. Overtopping Potential. The existing Laurel Reservoir spillway is capable of discharging the 100-year storm, but the dam will be overtopped by the 1,000-year storm and the test flood. The test flood will result in a stage in the reservoir of elevation 317.6 (2.6 feet above the top of the dam).

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY:

a. Visual Observations. Visual observations did not indicate any existing structural problems.

b. Design and Construction Data. The design and construction reflected in the three existing drawings indicate the concrete dam is founded in the underlying bedrock formation which is not exposed downstream of the dam. The stability of the concrete wall and the downstream earth embankment cannot be formally evaluated with the available information.

c. Operating Records. The dam was built before 1926 and to our knowledge, there has been no indications of any instability since construction. As the Laurel Reservoir Dam was constructed for water supply purposes and has been subjected to a full head of water since its construction, its stability is considered to be adequate based on performance.

d. Post-Construction Changes. The 36-inch blow off pipe, and 8-inch drain were extended approximately 30 feet south and a new endwall constructed. Additionally, at the same time (1974) a 30-inch blow off from the water supply main was constructed. It was reported that the excavation for this extension did not uncover any seepage problems.

e. Seismic Stability. This dam is located in Seismic Zone 1 and hence does not have to be evaluated for seismic stability.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT:

a. Condition. Based on the visual inspection, records available and past operational performance, the dam is judged to be in good condition.

The project will not pass the test flood without overtopping the dam, and therefore, the spillway capacity is inadequate. The spillway will pass only 15 per cent of the test flood, and is considered seriously inadequate.

b. Adequacy of Information. The evaluation of the dam is mainly based on the visual inspection assisted by the general physical dimensions provided in the three available drawings, and the past operational performance of the structure.

c. Urgency. The measures recommended below should be implemented in the near term.

d. Need for Additional Investigation. Further investigation and engineering analysis of methods of increasing spillway capacity are warranted.

7.2 RECOMMENDATIONS:

It is recommended that the following measures be undertaken by the owner:

1) Detailed investigations should be initiated to determine methods for obtaining additional spillway capacity.

2) Concrete surfaces affected by spalling should be repaired.

3) Trees and brush obstructing the spillway discharge channel should be removed.

7.3 REMEDIAL MEASURES:

Although the dam is generally maintained in a good condition, it is considered important that the following items be accomplished:

a. Alternatives. Not applicable.

b. Operation and Maintenance and Procedures.

1) Operation and maintenance manual for the project should be prepared.

2) A program of periodic inspections of the project features should be established.

3) Due to the potential for overtopping, it is recommended that a definite plan for around the clock surveillance be implemented during periods of unusually heavy rains and a formal warning system be developed for use in the event of an emergency.

APPENDIX I

PHOTOGRAPHS

PHOTO #1: Upstream Face of Dam, looking West.

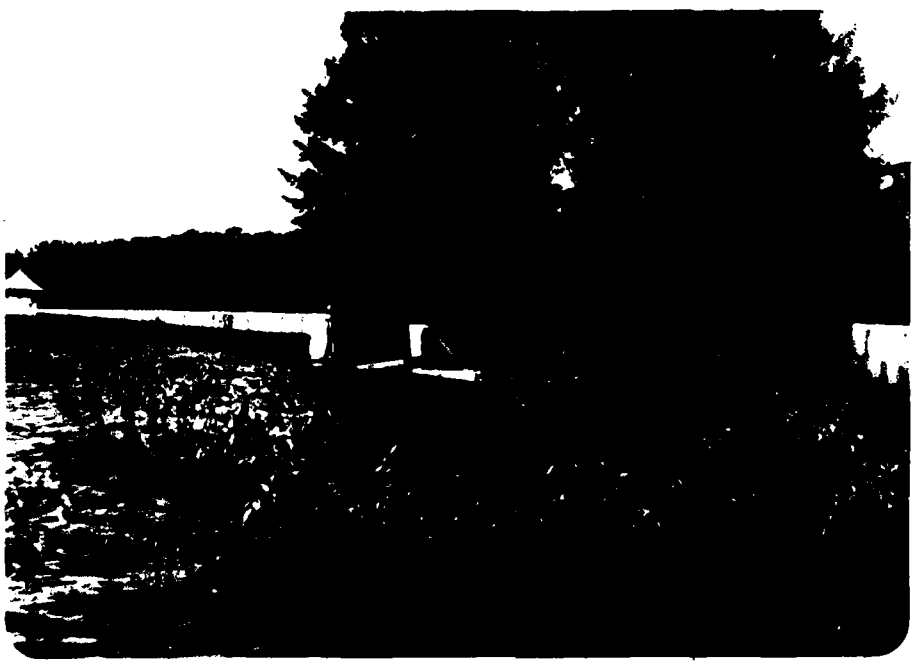


PHOTO #2: Upstream Face of Dam and Spillway Bridge, looking East.

PHOTO #3: Spillway, looking East.

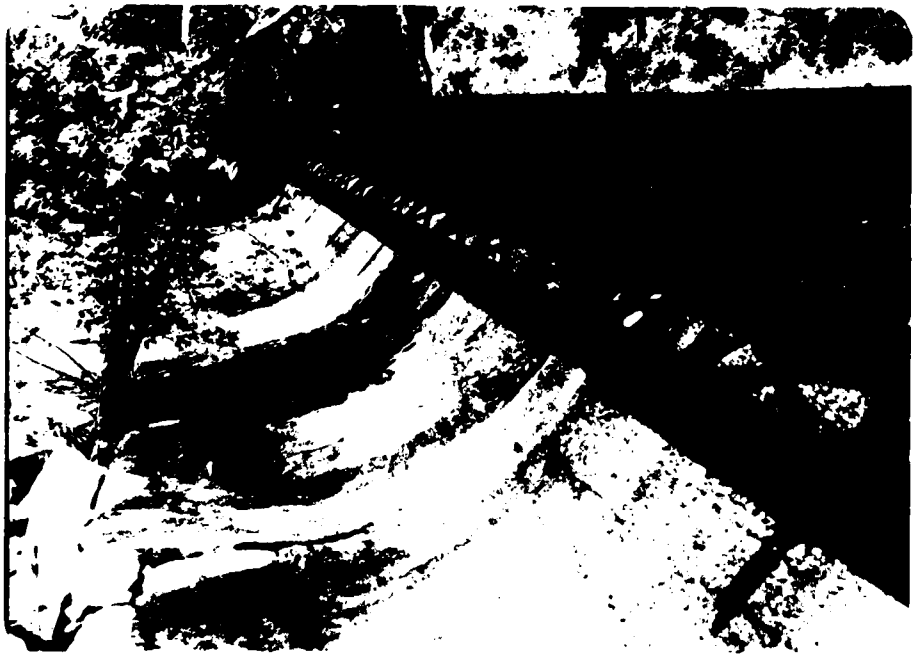


PHOTO #4: Spillway, looking West. Note Flashboards.

PHOTO #5: Outlet Works and Discharge Point and Channel.

PHOTO #6: Downstream Face of Dam and Embankment looking West.

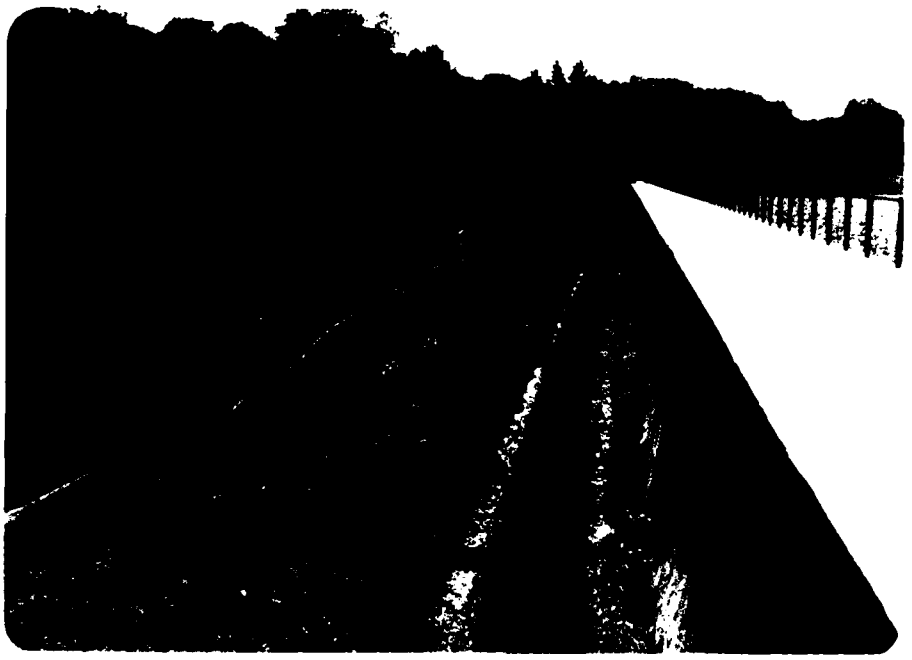


PHOTO #7: Downstream Face of Dam and Embankment looking West.

PHOTO #8: Central Portion of Embankment, looking East.

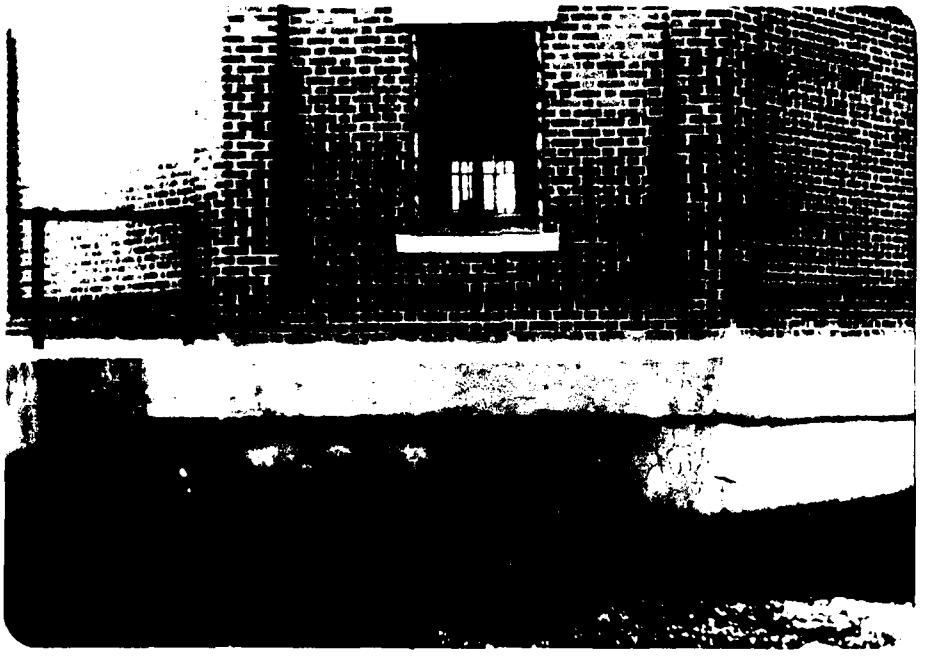


PHOTO #9: Control Tower.

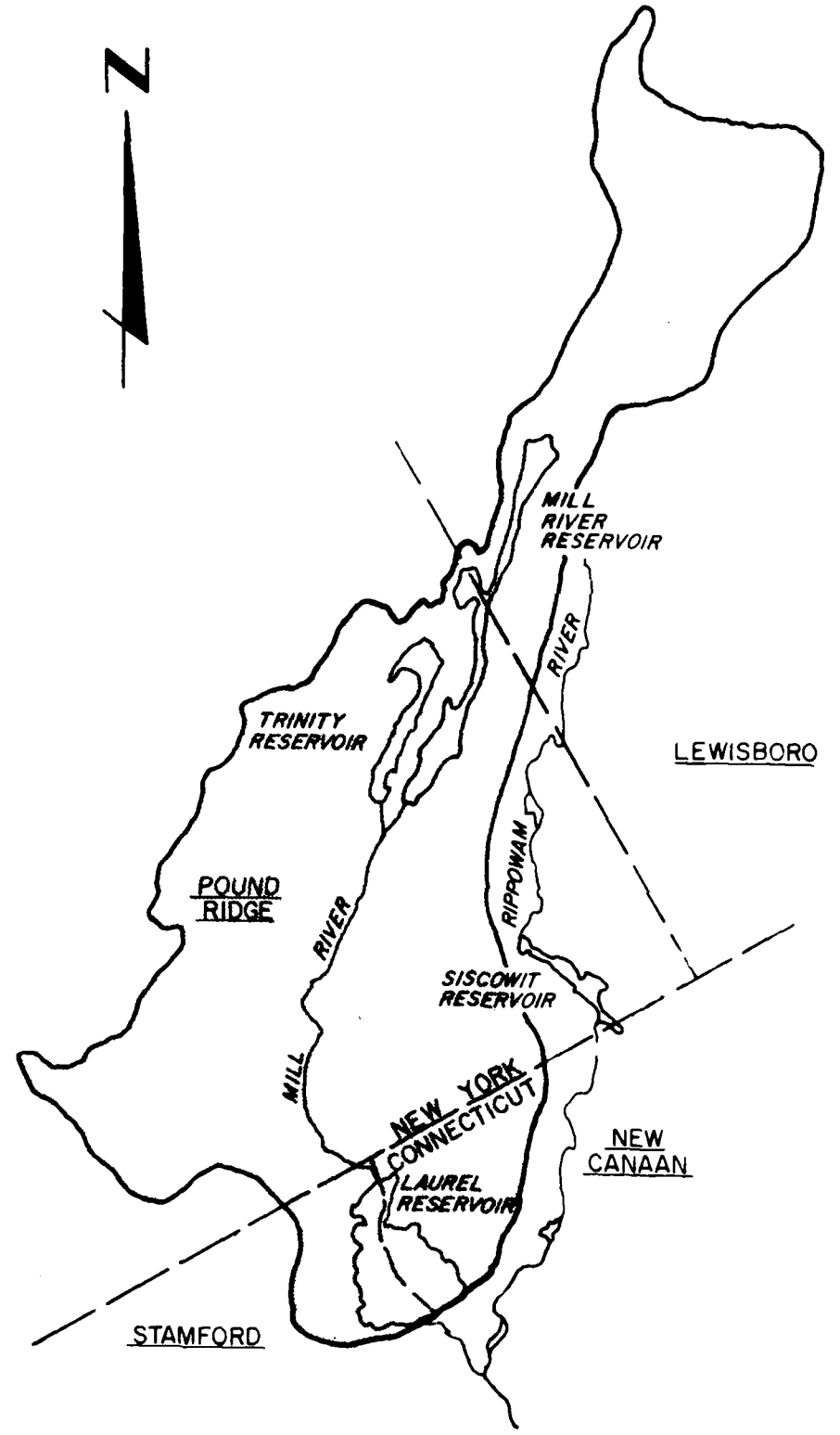
PHOTO #10: Typical Spalling at a Construction Joint on the Upstream Face of the Dam.

PHOTO #11: Typical Spalling at Joint, Downstream Face.

PHOTO #12: Typical Spalling, Downstream Face, at Top of Earth Embankment.

APPENDIX II

HYDROLOGIC COMPUTATIONS



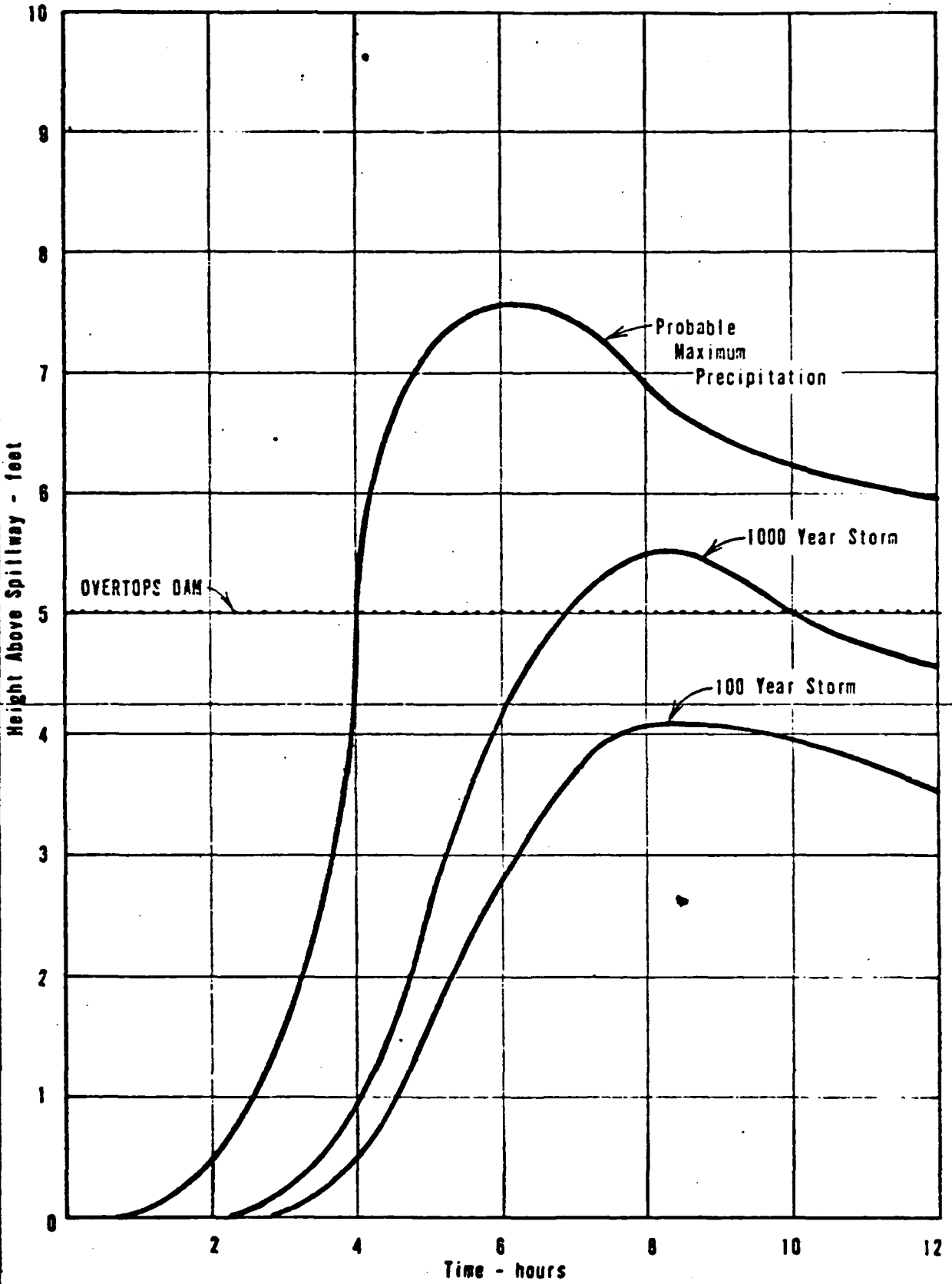
SCALE IN FEET

6000 0 3000 6000

DRAINAGE AREA MAP

LAUREL RESERVOIR DAM

STAMFORD – NEW CANAAN, CONNECTICUT



STAMFORD WATER COMPANY

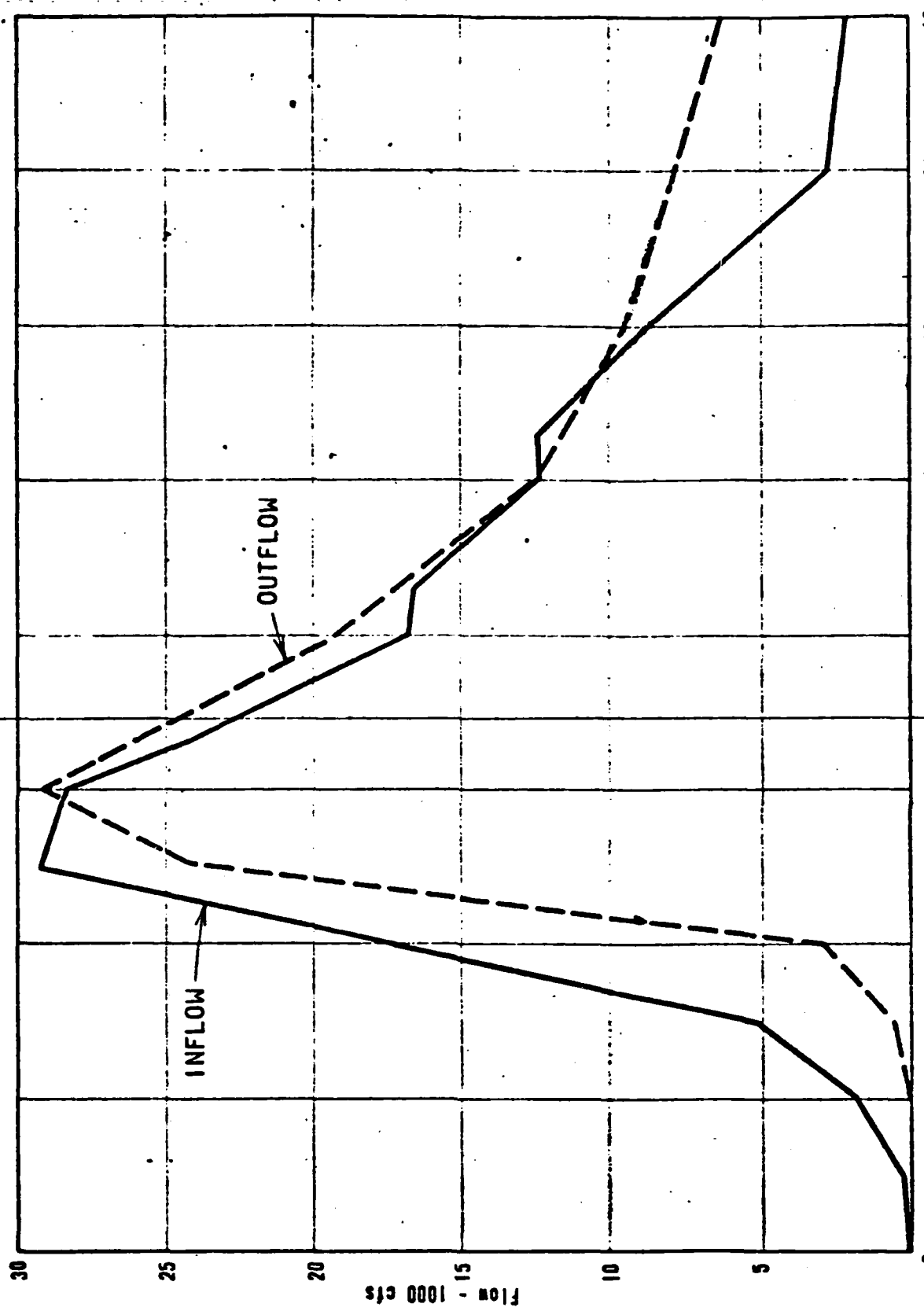
SUMMARY DISCHARGE CURVES

EXISTING SPILLWAY

LAUREL RESERVOIR

ROALD HAESTAD, INC.
Consulting Engineers

August 1972



STAMFORD WATER COMPANY

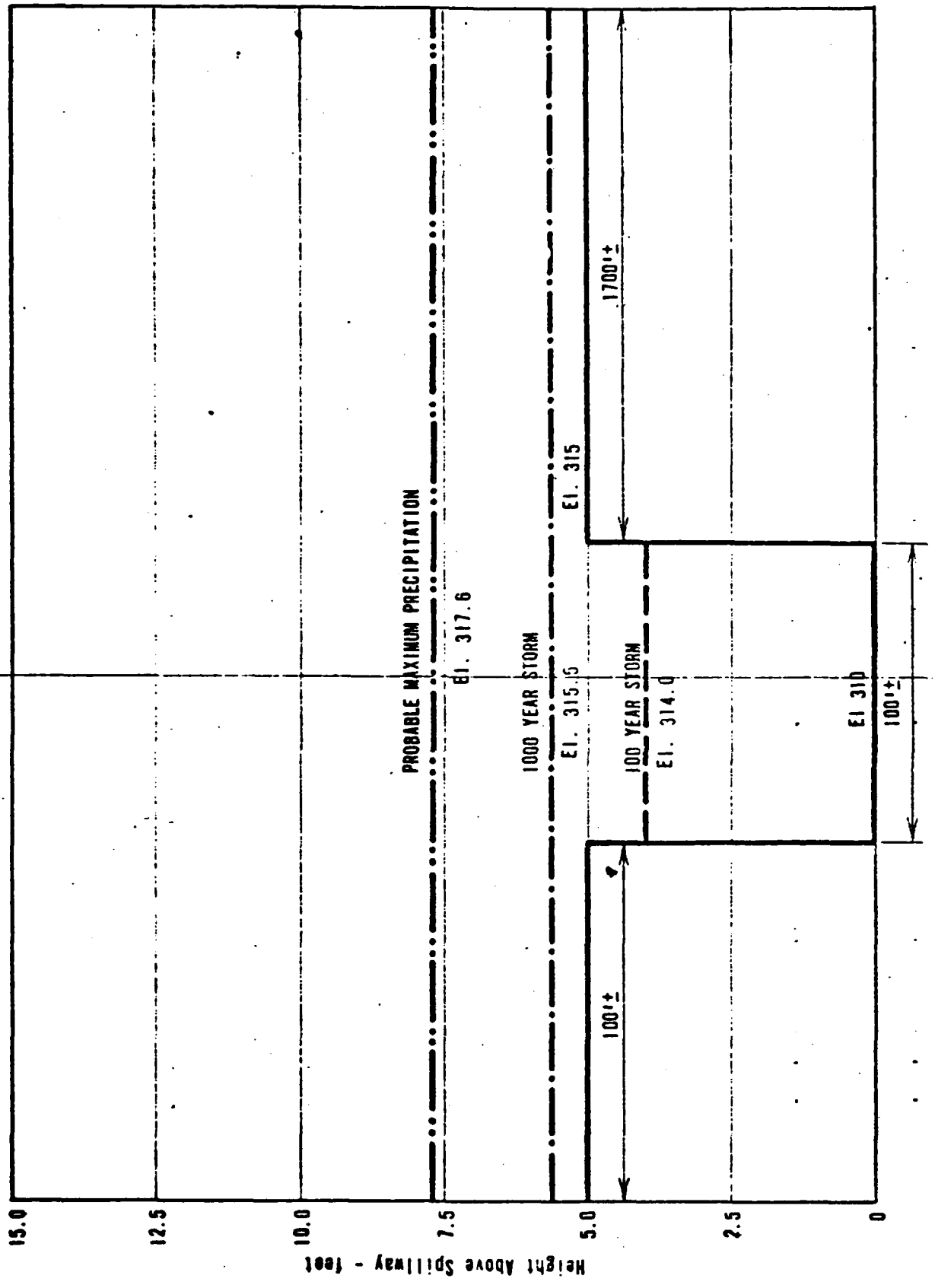
INFLOW-OUTFLOW HYDROGRAPH - PMP STORM

EXISTING SPILLWAY

LAUREL RESERVOIR

ROALD HAESTAD, INC.
Consulting Engineers

August 1979

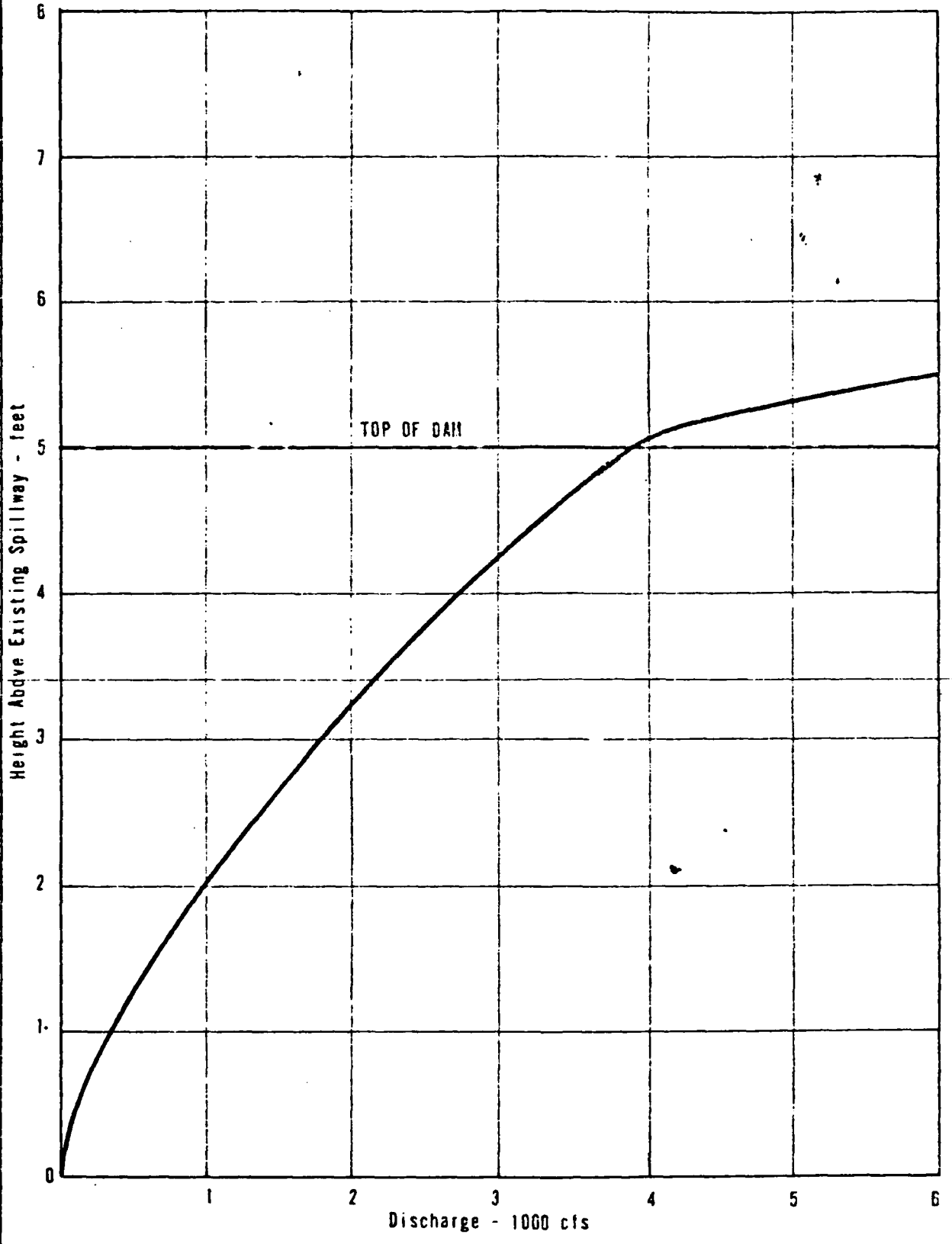


STAMFORD WATER COMPANY

EXISTING SPILLWAY PROFILE

LAUREL RESERVOIR

ROALD HAESTAD, INC.



STAMFORD WATER COMPANY

SPILLWAY RATING CURVE

LAUREL RESERVOIR

EXISTING SPILLWAY

ROALD HAESTAD, INC.
Consulting Engineers

August 1973

APPENDIX III

VISUAL INSPECTION

CHECK LIST

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam **DATE** June 15, 1978

INSPECTOR Anthony Rummo **DISCIPLINE** Structural

INSPECTOR _____ **DISCIPLINE** _____

AREA EVALUATED	CONDITION
CONCRETE DAM STRUCTURE	
General Condition Concrete Surfaces	
Movement or Settlement of Crest	None observed
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and Other Structures	
Structural Cracking	None observed
Spalling	Spalling noted on U/S and D/S faces
Visible Reinforcing	No visible reinforcing
Rusting or Staining of Concrete	None observed
Condition of Monolith/ Construction Joints	
Drains - Foundation, Joint, Faces	
Any Seepage or Efflorescence	
Foundation Damage, Undermining	
Water Passages	
Abutments	

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam DATE June 15, 1978

INSPECTOR Anthony Rummo DISCIPLINE Structural

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	315
Current Pool Elevation	310 (±)
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	Good, a few animal holes were encountered.
Sloughing or Erosion of Slopes or Abutments	Slight erosion near chlorination facility
Rock Slope Protection - Riprap Failures	None observed
Unusual Movement or Cracking at or near Toes	None observed
Ususual Embankment or Downstream Seepage	None observed

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam DATE June 15, 1978

INSPECTOR Anthony Rummo DISCIPLINE Structural

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT - (continued)	
Piping or Boils	None
Foundation Drainage Features	None observed
Toe Drains	None
Instrumentation System	

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam — DATE June 15, 1978

INSPECTOR Anthony Rummo — DISCIPLINE Structural

INSPECTOR James MacBroom — DISCIPLINE Hydraulics/ Hydrology

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Concrete (gunite) in good condition, some spalling at water line
Condition of Joints	
Spalling	
Visible Reinforcing	None observed
Rusting or Staining of Concrete	None
Any Seepage or Efflorescence	None
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	Gunite separating from original concrete at bottom of application (2'-3' below water line)
Rusting or Corrosion of Steel	None
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam

DATE June 15, 1978

INSPECTOR Anthony Rummo

DISCIPLINE Structural

INSPECTOR James MacBroom

DISCIPLINE Hydraulics/ Hydrology

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER (continued)	
Service Gates	All gates/valves are manually operated, appear to be in good condition and easy to turn
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System In Gate Chamber	Wiring in gate house, enclosed in conduits, free of dirt and corrosion

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam DATE June 15, 1978

INSPECTOR Richard Murdock DISCIPLINE Geotechnical

INSPECTOR James MacBroom DISCIPLINE Hydraulics/ Hydrology

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Upstream face of dam
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	8"-diameter log overhanging flashboards
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam — DATE June 15, 1978

INSPECTOR Anthony Rummo — DISCIPLINE Structural

INSPECTOR James MacBroom — DISCIPLINE Hydraulics/ Hydrology

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Reservoir, could not observe
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	
Rust or Staining	
Spalling	Spalling/crack in central portion of spillway
Any Visible Reinforcing	None
Any Seepage or Efflorescence	
Drain Holes	
c. Discharge Channel	
General Condition	Channel heavily overgrown, trees up to 2" in diameter
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Yes
Floor of Channel	Riprap at upper end, middle cut in bedrock, lower earth; no significant erosion, but overgrown with heavy brush
Other Obstructions	

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam DATE June 15, 1978

INSPECTOR Anthony Rummo DISCIPLINE Structural

INSPECTOR James M cBroom DISCIPLINE Hydraulics/ Hydrology

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	(Access)
a. Super Structure	
Bearings	Bridge in excellent condition
Anchor Bolts	
Bridge Seat	
Longitudinal Members	3 double "tee" prestressed concrete, in good condition
Under Side of Deck	
Secondary Bracing	
Deck	Concrete in excellent shape
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutments & Piers	
General Condition of Concrete	Center pier in excellent condition
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

PERIODIC INSPECTION CHECK LIST

ROJECT Laurel Reservoir Dam **DATE** June 15, 1978

INSPECTOR Anthony Rummo **DISCIPLINE** Structural

INSPECTOR James MacBroom **DISCIPLINE** Hydraulics/ Hydrology

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	(Over Spillway)
a. Super Structure	
Bearings	Bridge in excellent condition minor rusting noted
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutments & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

PERIODIC INSPECTION CHECK LIST

ROJECT _____ DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT Laurel Reservoir Dam — DATE June 15, 1978

INSPECTOR James MacBroom — DISCIPLINE Hydraulics/ Hydrology

INSPECTOR Richard Murdock — DISCIPLINE Geotechnical

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Concrete endwall in excellent condition
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain Holes	
Channel	
Loose Rock or Trees Overhanging Channel	None
Condition or Discharge Channel	The discharge channel is in good condition, no evidence of degradation or unstable banks

APPENDIX IV

ENGINEERING DATA

CHECK LIST

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Lauf... Reservoir Dam

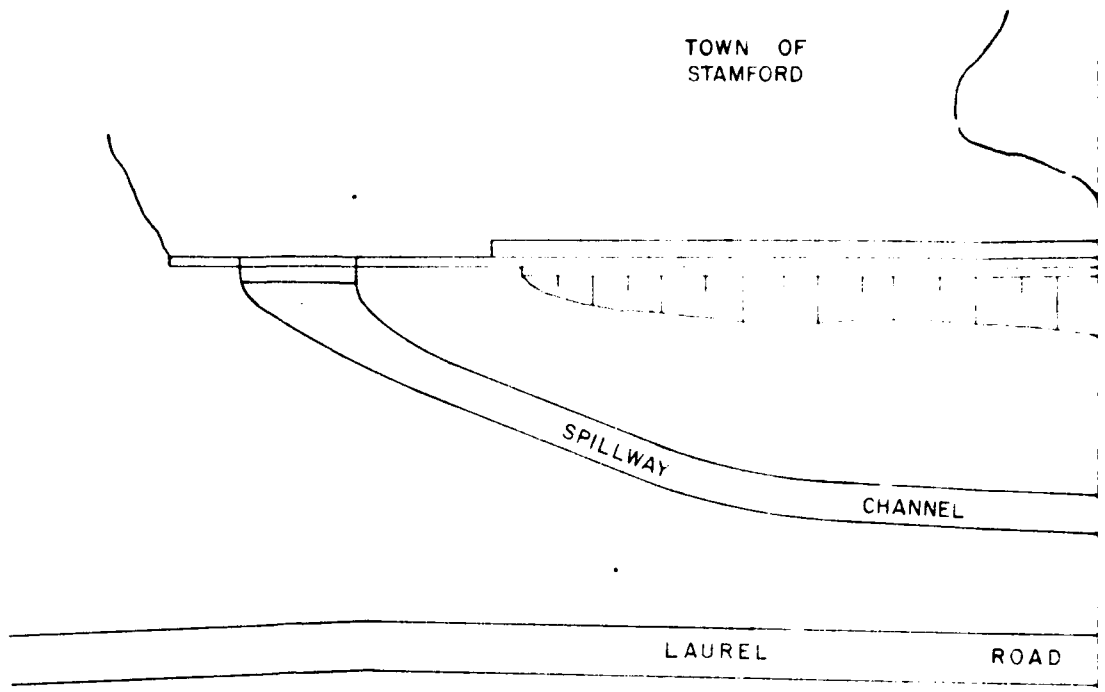
I.D. NO. 49

ITEM	REMARKS
POST-CONSTRUCTION SURVEYS OF DAM	None available
BORROW SOURCES	Unknown
MONITORING SYSTEMS	None
MODIFICATIONS	From Stamford Water Company
HIGH POOL RECORDS	None
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None
MAINTENANCE OPERATION RECORDS	None
SPILLWAY PLAN	
SECTIONS	From plans
DETAILS	From plans
OPERATING EQUIPMENT PLANS & DETAILS	From plans

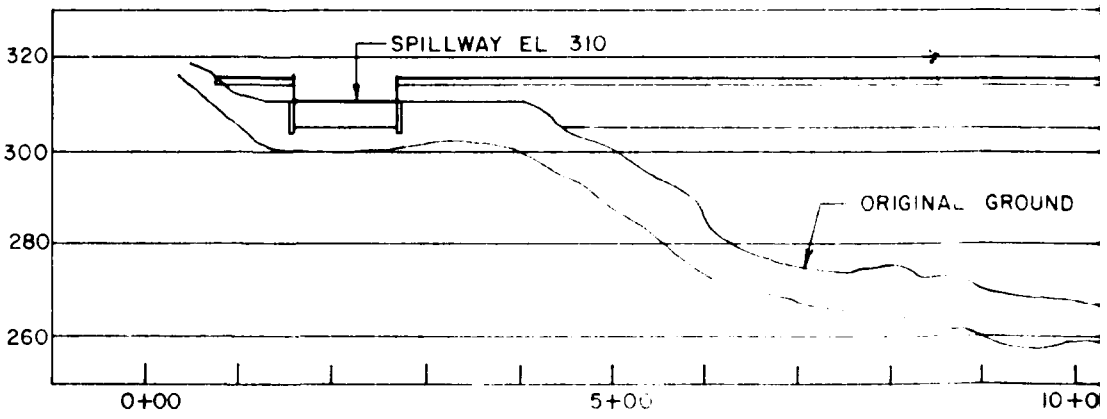
DRAWINGS

APPENDIX V

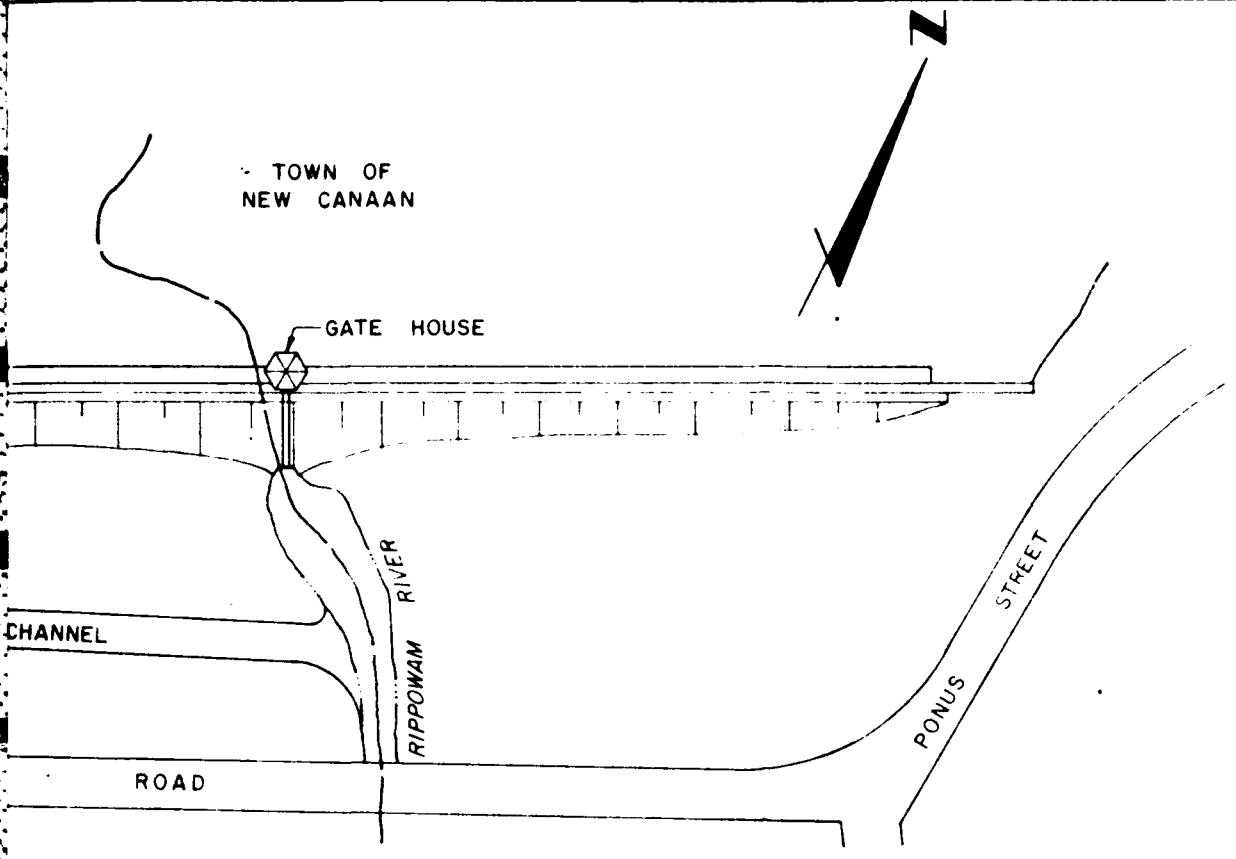
DRAWINGS



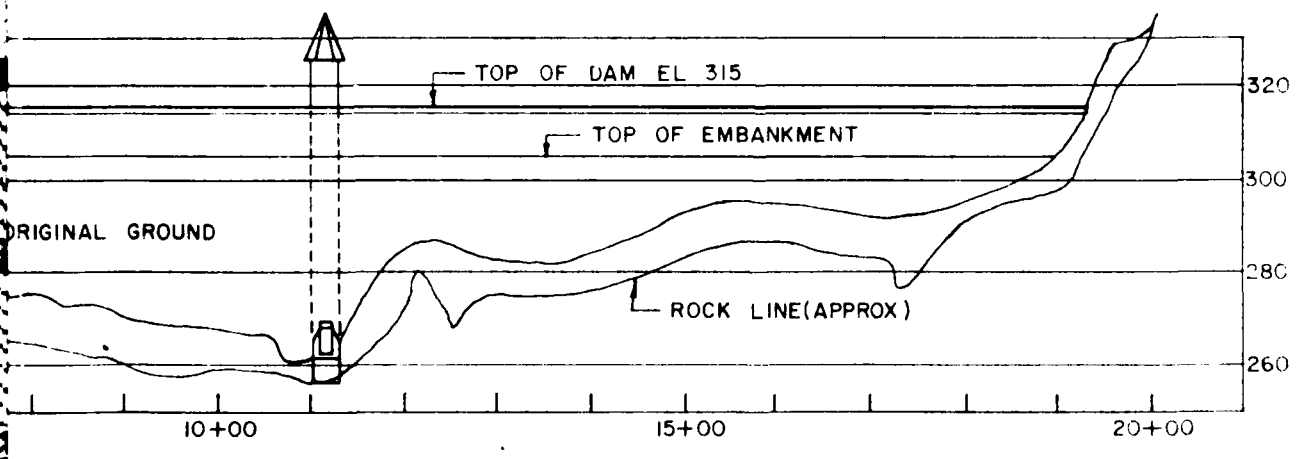
PLAN
NTS



DOWNSTREAM ELEV
NTS

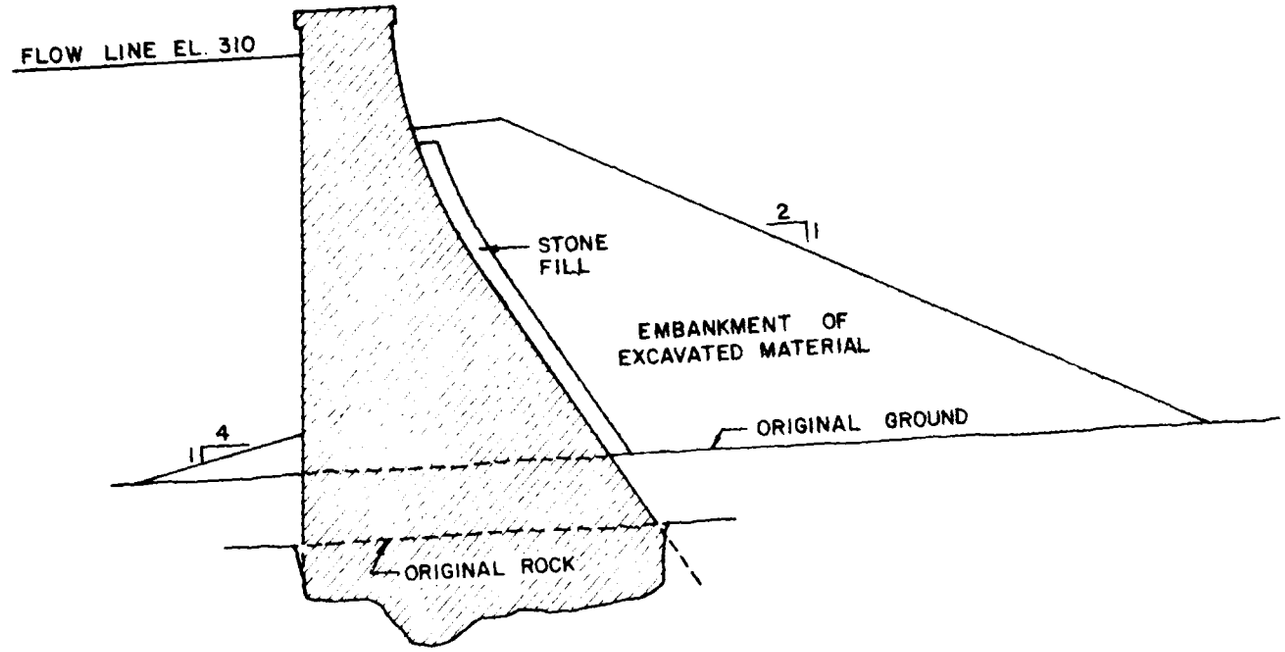


PLAN
NTS



STREAM ELEVATION OF DAM
NTS

LAUREL RESERVOIR DAM
RIPPOWAM RIVER

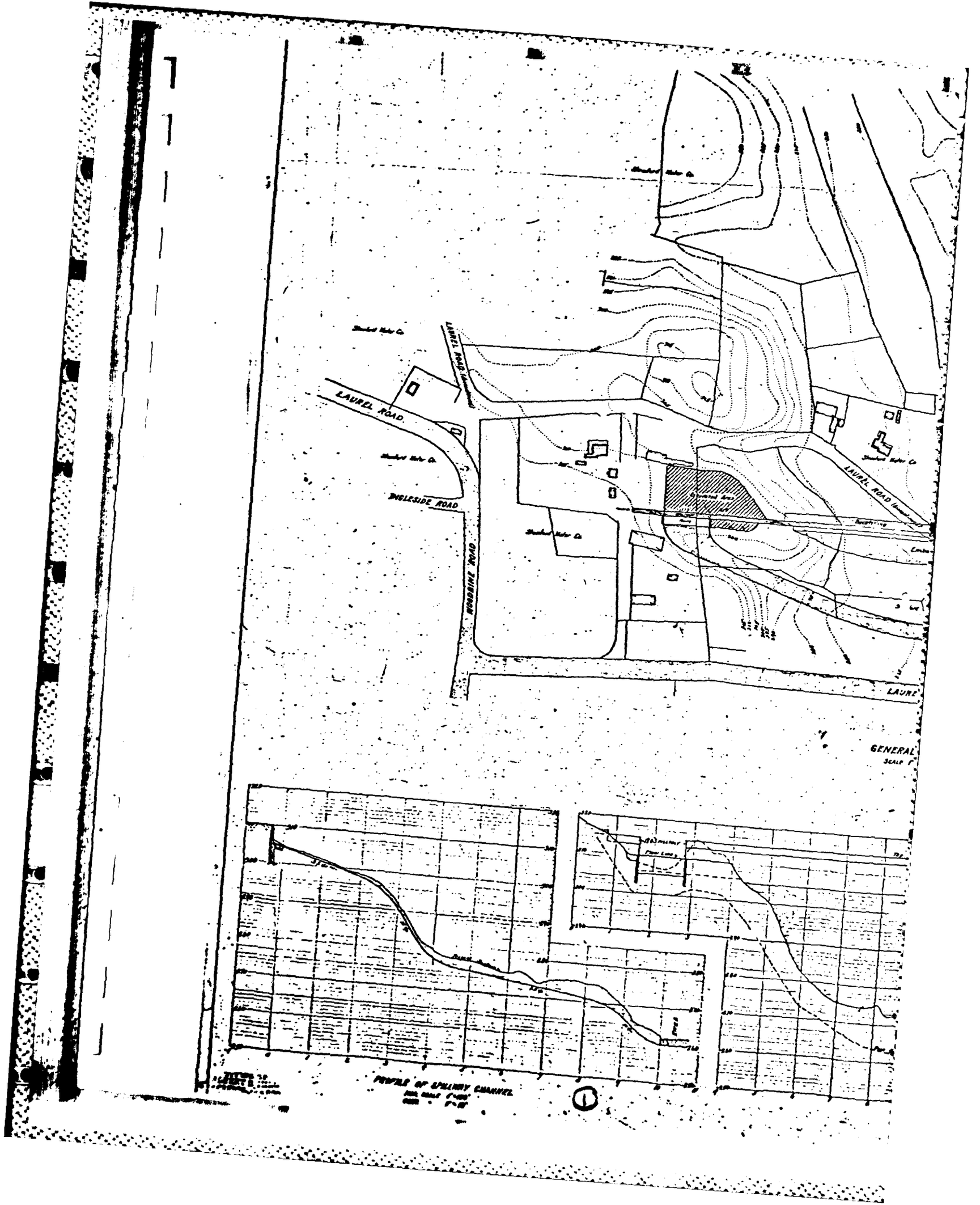


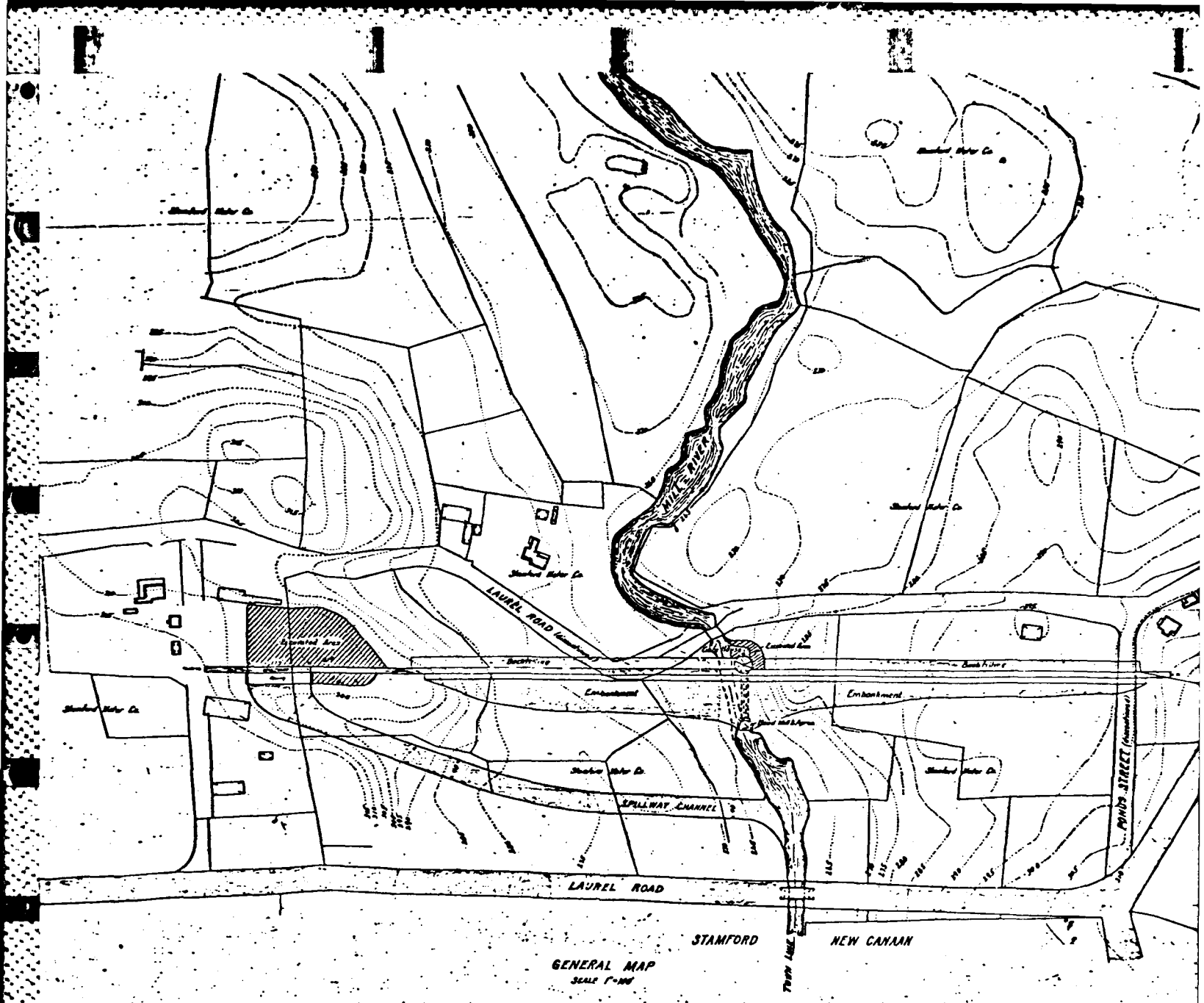
CROSS SECTION OF DAM

NTS

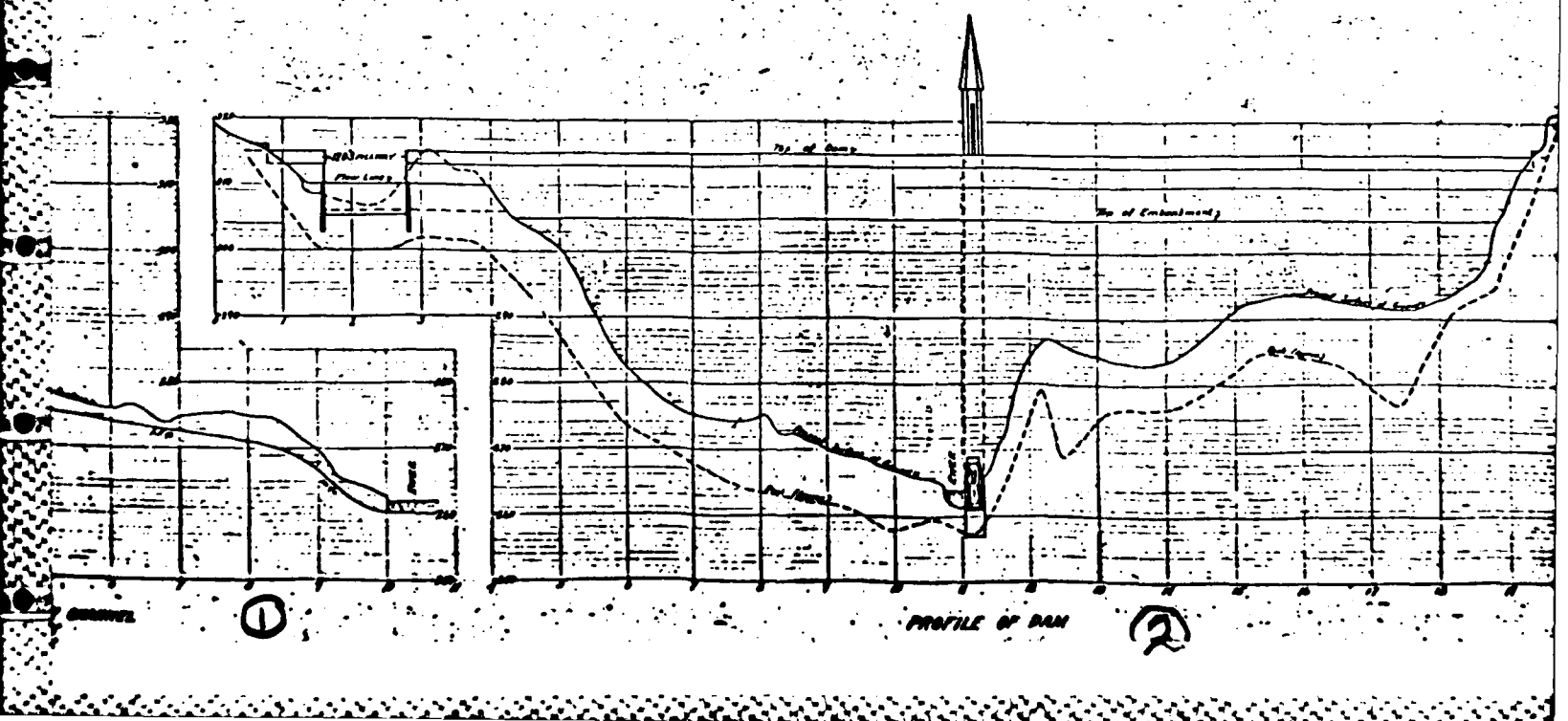
LAUREL RESERVOIR DAM

RIPPOWAM RIVER


LAUREL ROAD
INGLESIDE ROAD
HORSHAM ROAD
LAUREL ROAD
GENERAL
PROFILE OF SPILLWAY CHANNEL

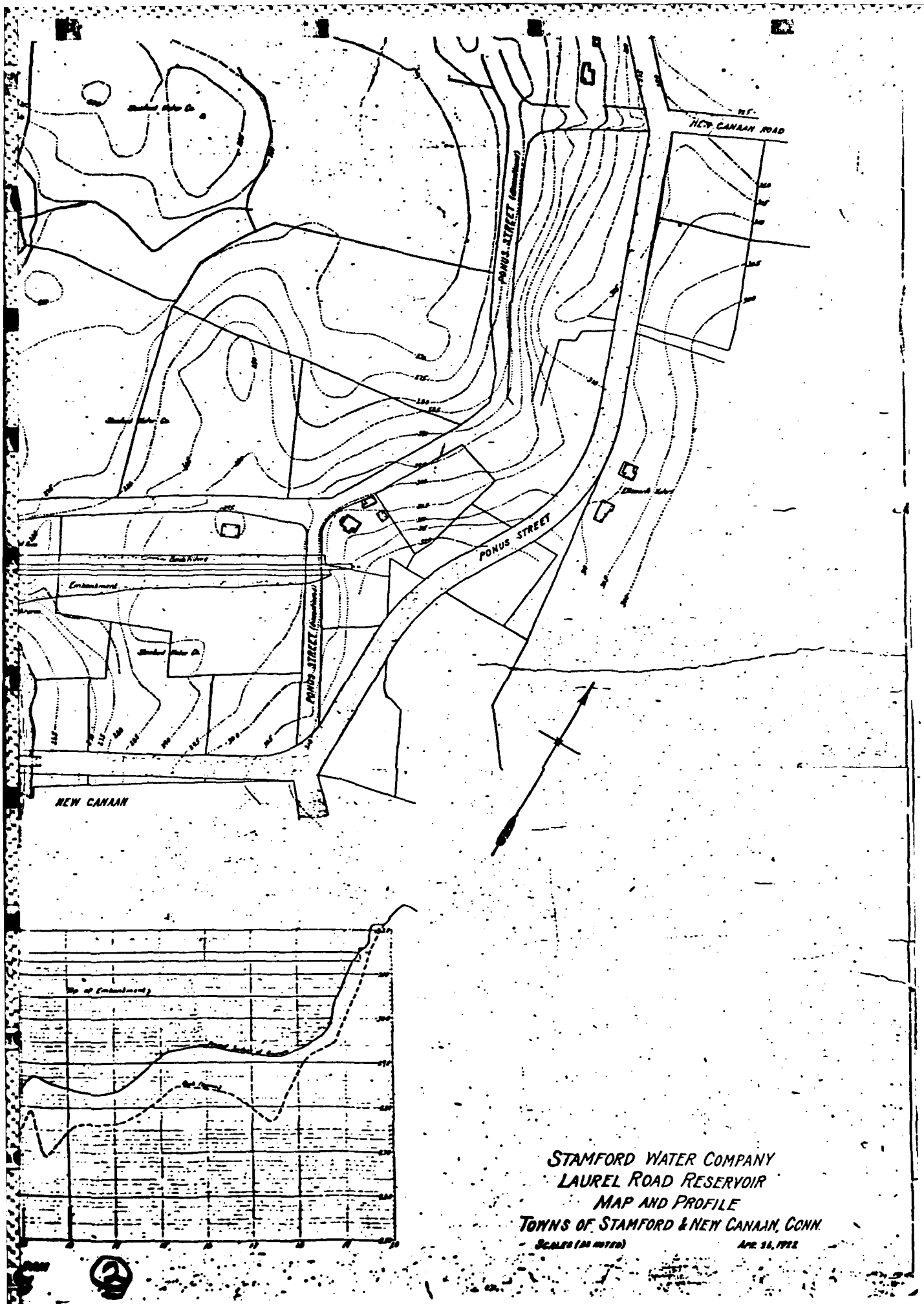


GENERAL MAP
SCALE 1"=100'

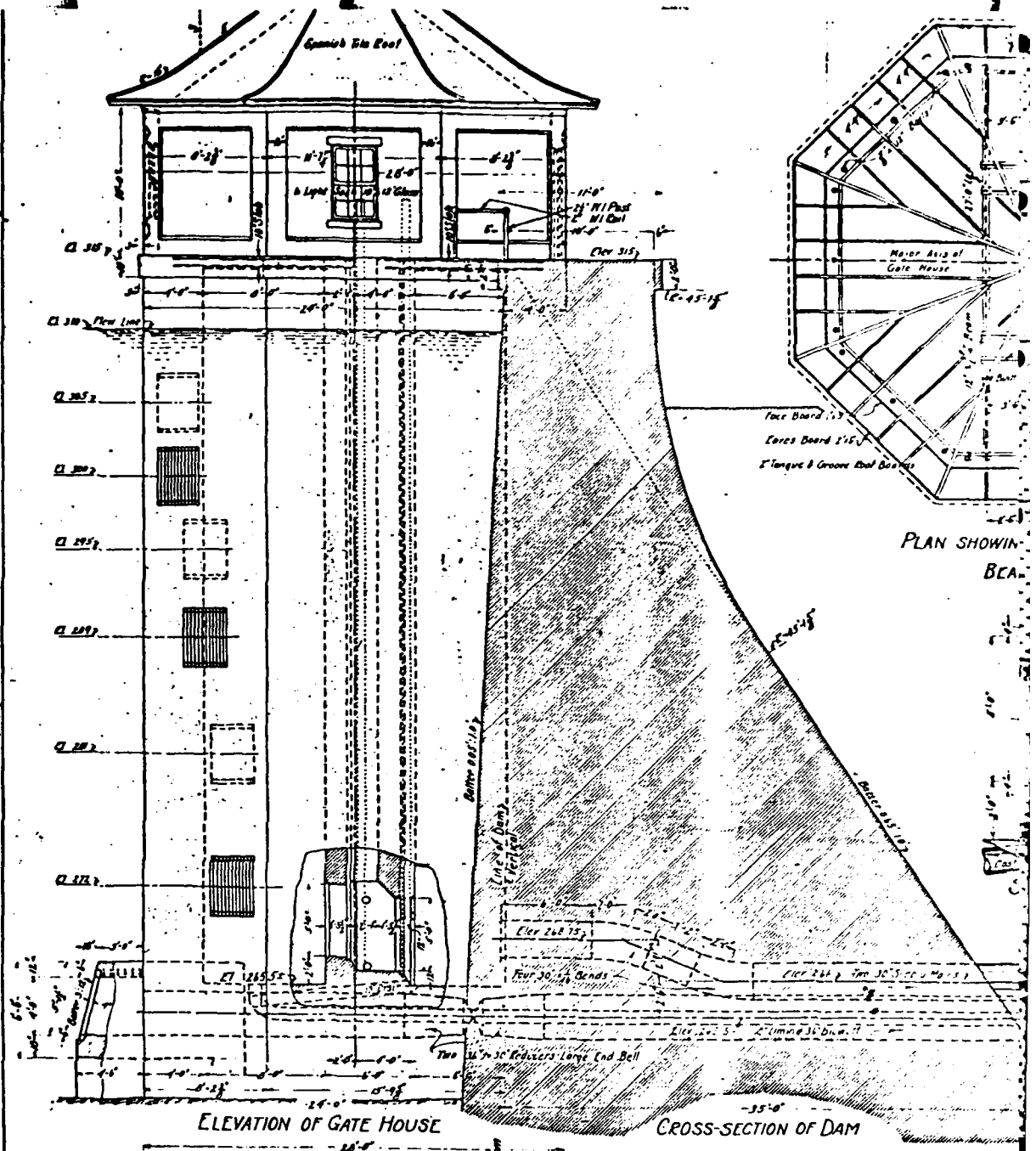


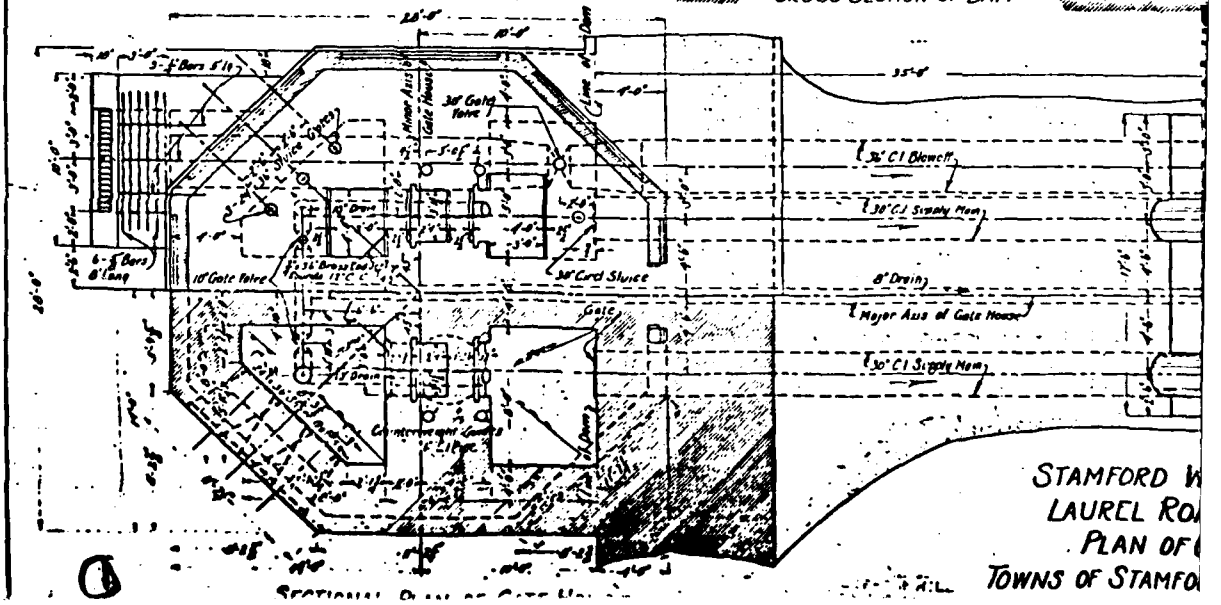
(1)

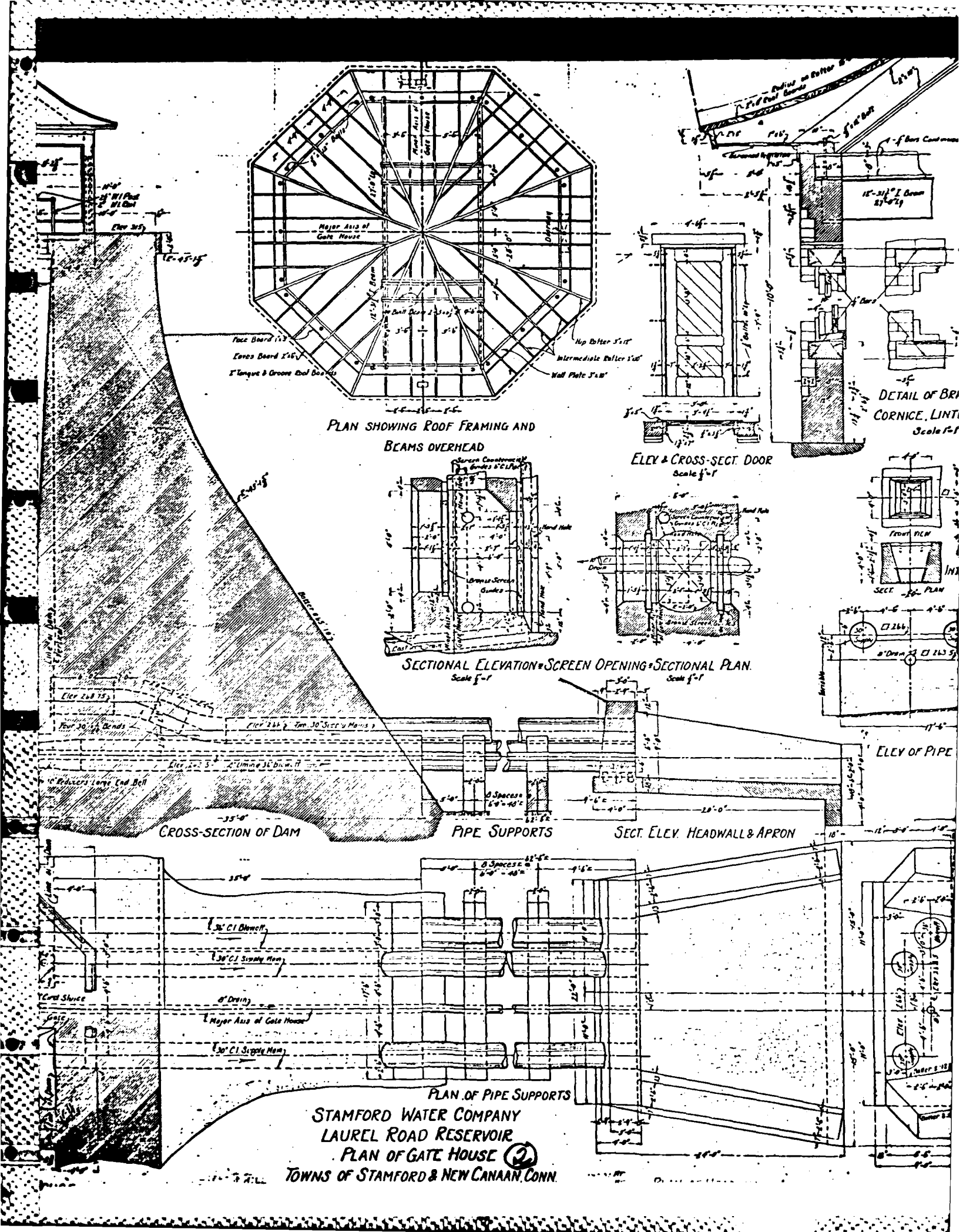
PROFILE OF DAM (2)



STAMFORD WATER COMPANY
LAUREL ROAD RESERVOIR
MAP AND PROFILE
TOWNS OF STAMFORD & NEW CANAAN, CONN.
SCALES (AS NOTED) APR. 26, 1922


Spanish Tile Roof
Major Axis of Gate House
Face Board 1'3"
Eaves Board 2'6"
5" Tongue & Groove Roof Boards
PLAN SHOWIN
BEA
ELEVATION OF GATE HOUSE
CROSS-SECTION OF DAM


30" C.I. Blowoff
30" C.I. Supply Main
8" Drain
Major Axis of Gate House
30" C.I. Supply Main
STAMFORD W
LAUREL RO
PLAN OF
TOWNS OF STAMFO



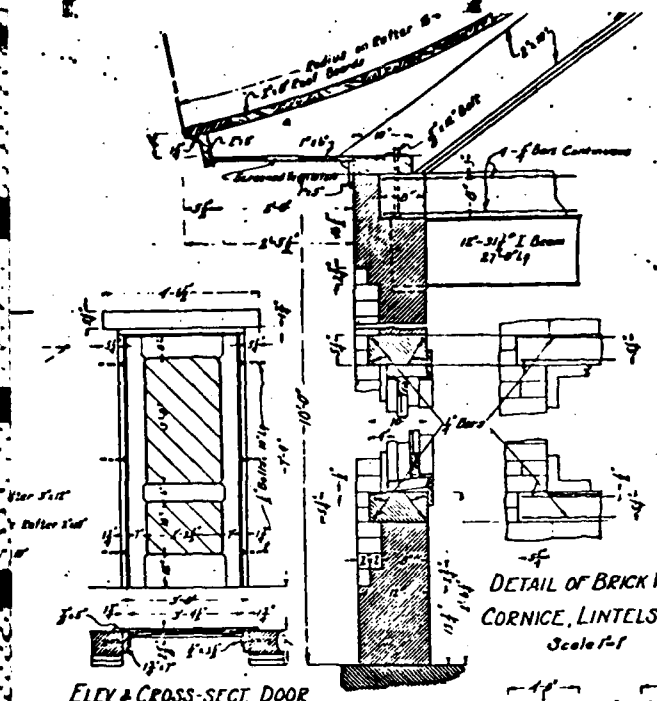
Plan showing Roof Framing and Beams overhead

Elev & Cross-Sect. Door
Scale 1"=1'

Detail of Bri
Cornice, Lint
Scale 1"=1

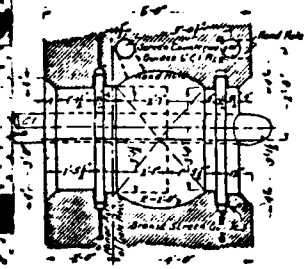
Sectional Elevation of Screen Opening & Sectional Plan.
Scale 1"=1'

Stamford Water Company
Laurel Road Reservoir
Plan of Gate House (2)
Towns of Stamford & New Canaan, Conn.

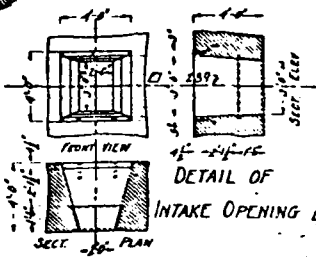


DETAIL OF BRICK WALL CORNICE, LINTELS & SILLS
Scale 1"=1'

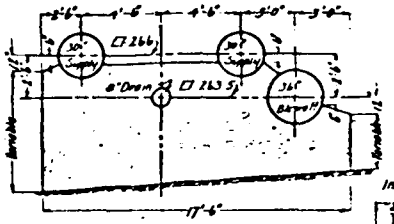
ELEV. & CROSS-SECT. DOOR
Scale 1"=1'



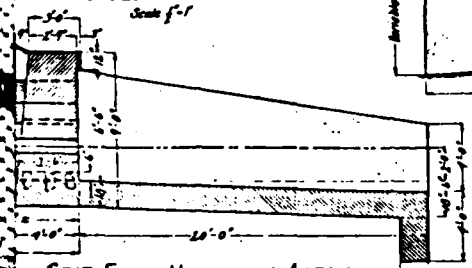
OPENING & SECTIONAL PLAN
Scale 1"=1'



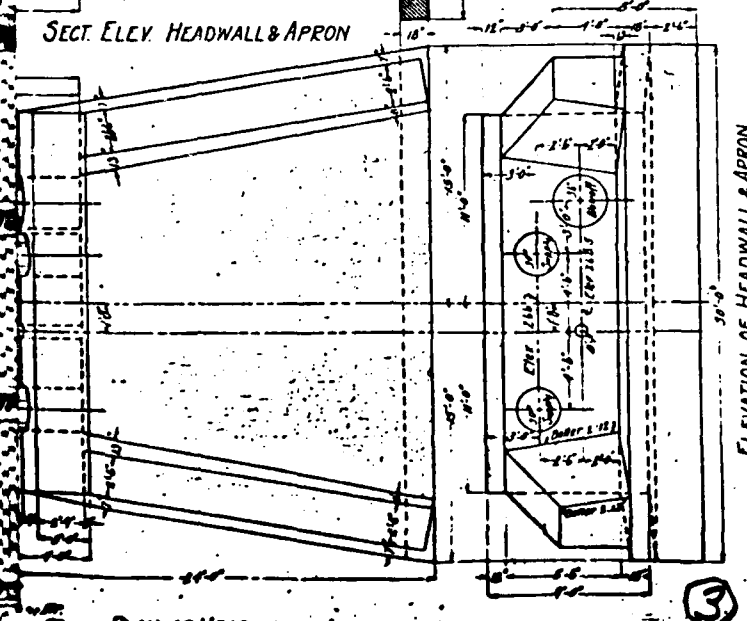
DETAIL OF INTAKE OPENING



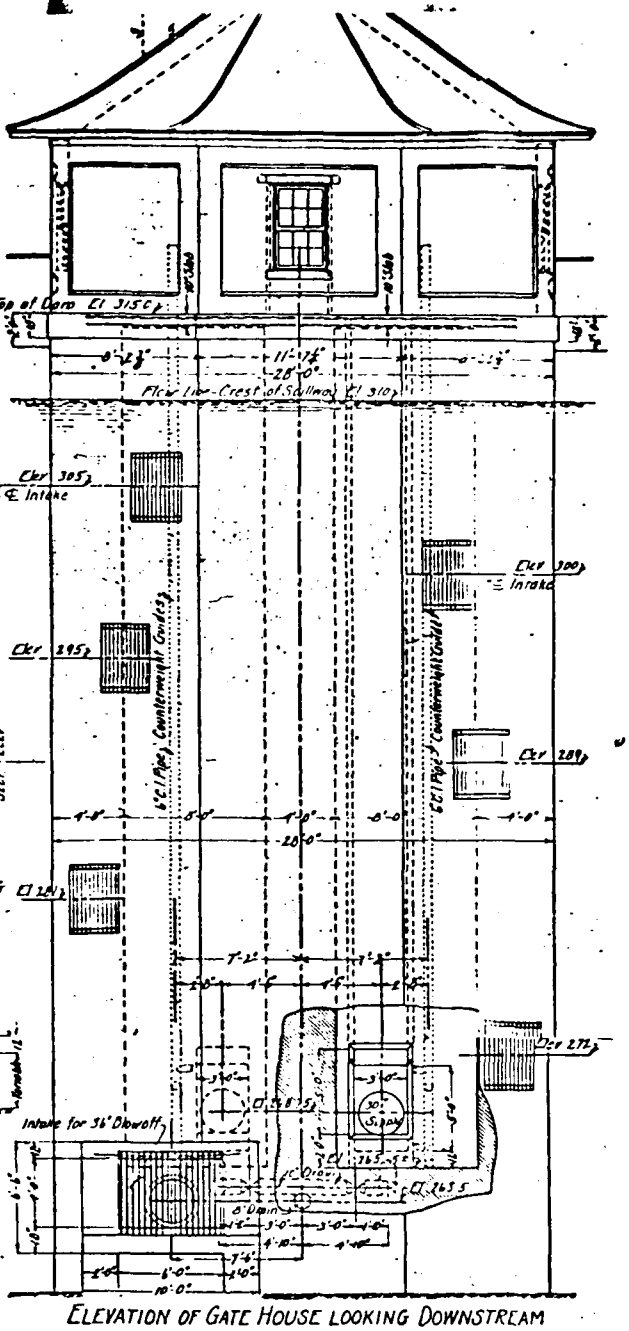
ELEV. OF PIPE SUPPORT



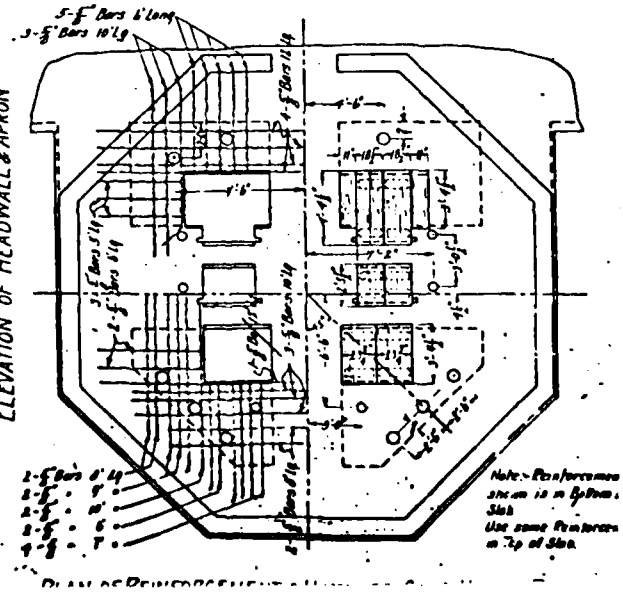
SECT. ELEV. HEADWALL & APRON



PLAN OF HEADWALL & APRON

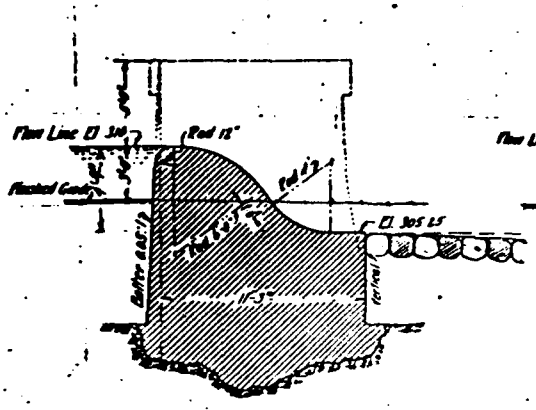


ELEVATION OF GATE HOUSE LOOKING DOWNSTREAM

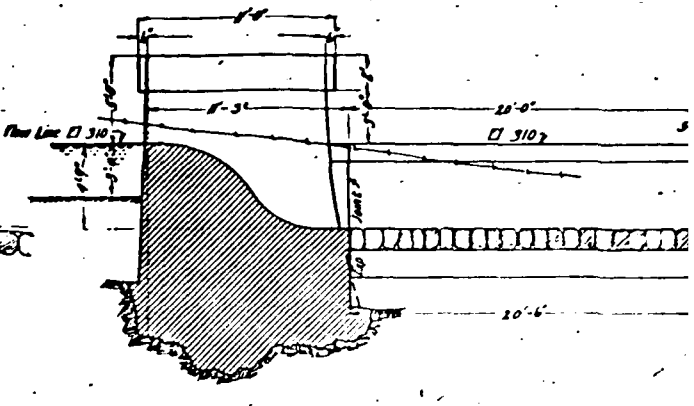


ELEVATION OF HEADWALL & APRON

(3)

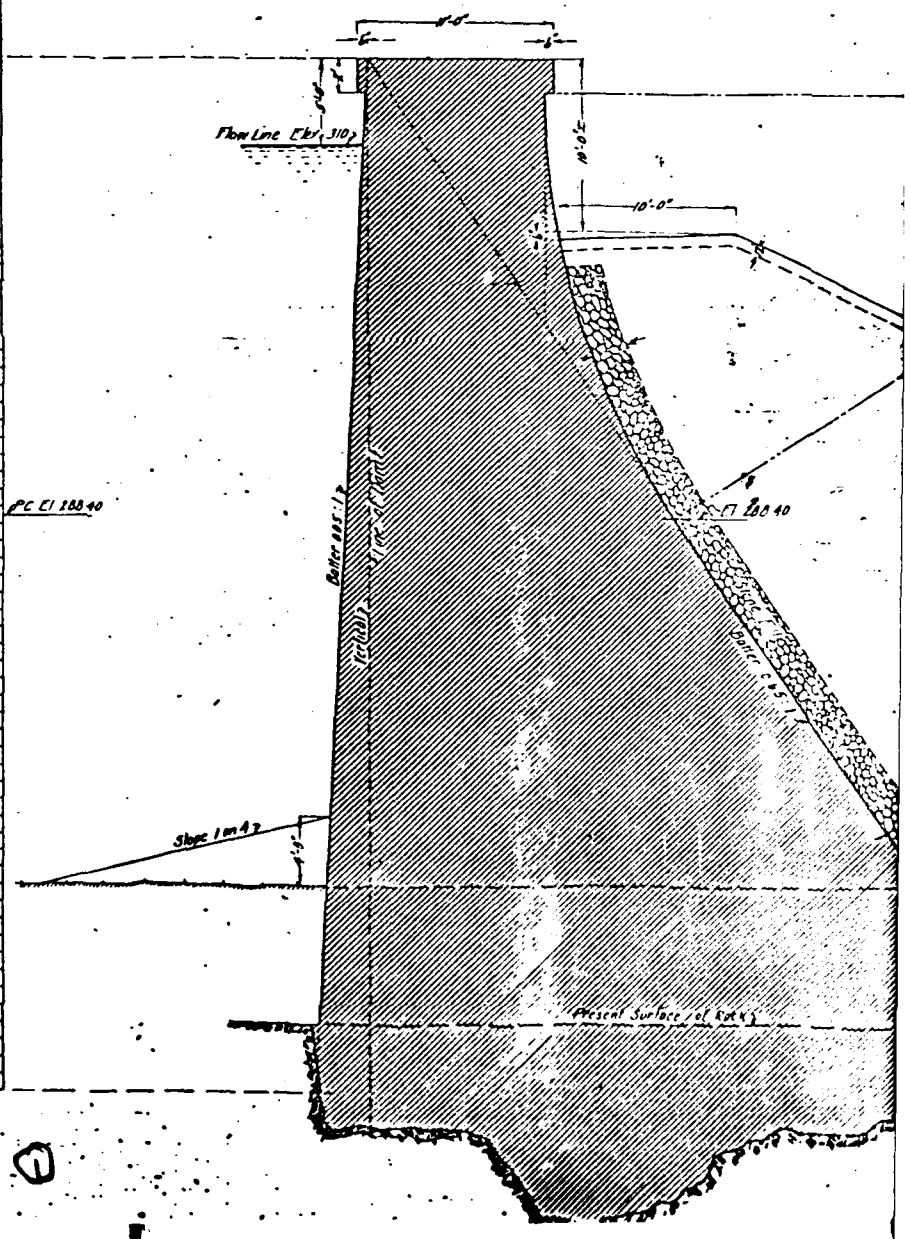


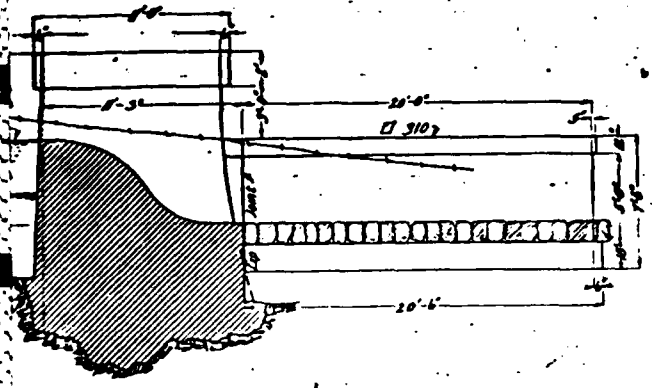
CROSS-SECTION OF SPILLWAY



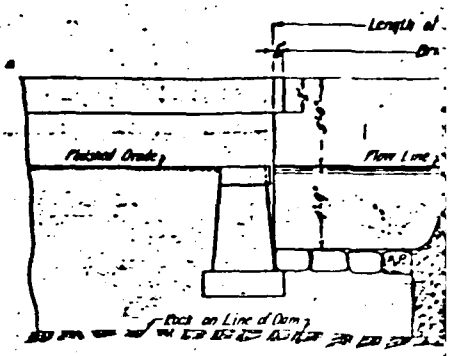
ELEVATION OF SPILLWAY ABUTMENT & RETAINING WA

Dist. between Top	Elev	Offset to Back	Offset to Face	Bottom Width of Section	Volume cu yards per lin ft
0	315	0 50	10 50	11 0	
1	314	0 50	10 50	11 0	0 407
2	313	0 55 / 0 75	10 50 / 10 80	11 0 / 11 55	0 815
3	312	0 15	10 82	10 97	1 190
4	311	0 30	10 94	10 24	1 548
5	310	0 35	10 10	10 35	1 900
6	309	0 30	10 16	10 46	2 335
7	308	0 35	10 26	10 63	2 726
8	307	0 40	10 40	10 80	3 123
9	306	0 45	10 54	10 99	3 526
10	305	0 50	10 72	11 22	3 930
11	304	0 55	10 91	11 46	4 350
12	303	0 60	11 12	11 72	4 781
13	302	0 65	11 36	12 01	5 226
14	301	0 70	11 62	12 32	5 677
15	300	0 75	11 92	12 67	6 140
16	299	0 80	12 23	13 03	6 616
17	298	0 85	12 57	13 42	7 106
18	297	0 90	12 93	13 83	7 610
19	296	0 95	13 32	14 27	8 131
20	295	1 00	13 75	14 75	8 668
21	294	1 05	14 20	15 25	9 223
22	293	1 10	14 68	15 78	9 798
23	292	1 15	15 19	16 34	10 393
24	291	1 20	15 72	16 92	11 009
25	290	1 25	16 30	17 55	11 647
26	289	1 30	16 92	18 22	12 310
27	288	1 35	17 55	18 90	12 997
28	287	1 40	18 20	19 60	13 710
29	286	1 45	18 85	20 30	14 449
30	285	1 50	19 50	21 00	15 213
31	284	1 55	20 15	21 70	16 004
32	283	1 60	20 80	22 40	16 821
33	282	1 65	21 45	23 10	17 664
34	281	1 70	22 10	23 80	18 532
35	280	1 75	22 75	24 50	19 427
36	279	1 80	23 40	25 20	20 347
37	278	1 85	24 05	25 90	21 293
38	277	1 90	24 70	26 60	22 266
39	276	1 95	25 35	27 30	23 264
40	275	2 00	26 00	28 00	24 289
41	274	2 05	26 65	28 70	25 338
42	273	2 10	27 30	29 40	26 414
43	272	2 15	27 95	30 10	27 516
44	271	2 20	28 60	30 80	28 643
45	270	2 25	29 25	31 50	29 797
46	269	2 30	29 90	32 20	30 977
47	268	2 35	30 55	32 90	32 182
48	267	2 40	31 20	33 60	33 414
49	266	2 45	31 85	34 30	34 671
50	265	2 50	32 50	35 00	35 954
51	264	2 55	33 15	35 70	37 263
52	263	2 60	33 80	36 40	38 598
53	262	2 65	34 45	37 10	39 960
54	261	2 70	35 10	37 80	41 347
55	260	2 75	35 75	38 50	42 760
56	259	2 80	36 40	39 20	44 198
57	258	2 85	37 05	39 90	45 664
58	257	2 90	37 70	40 60	47 156
59	256	2 95	38 35	41 30	48 671
60	255	3 00	39 00	42 00	50 213

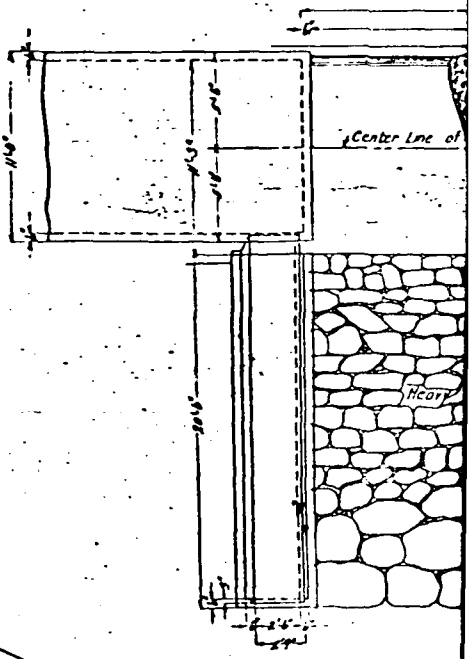




ELEVATION OF SPILLWAY ABUTMENT & RETAINING WALL



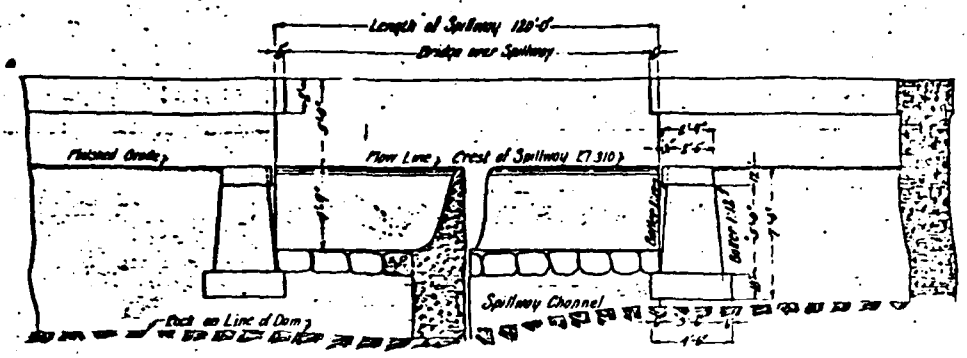
ELEVATION OF SPILLWA



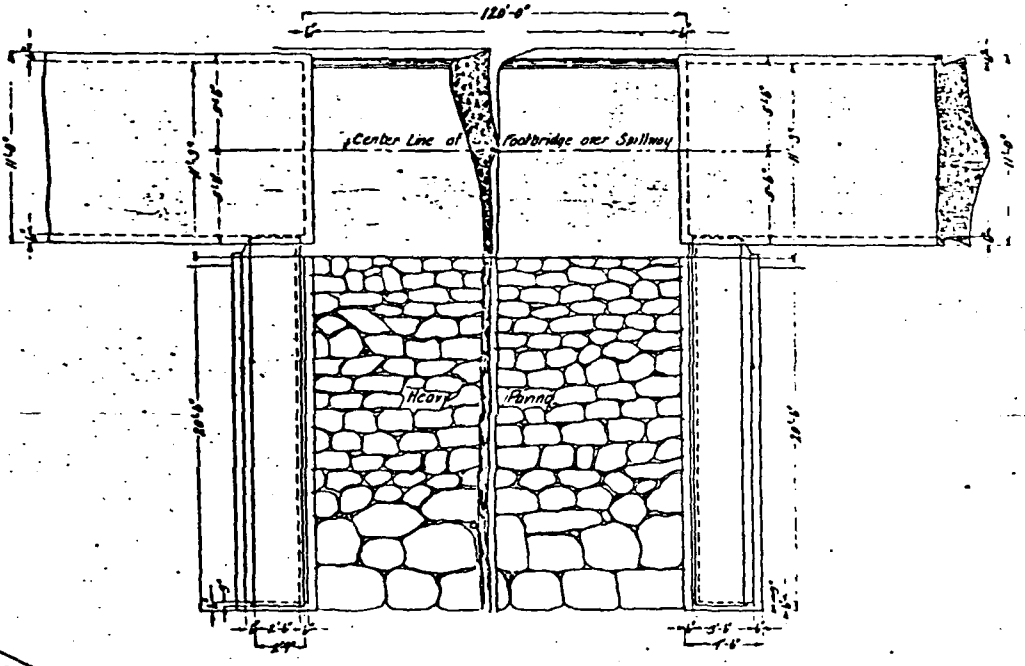
PLAN OF SPILLWAY S

(2)

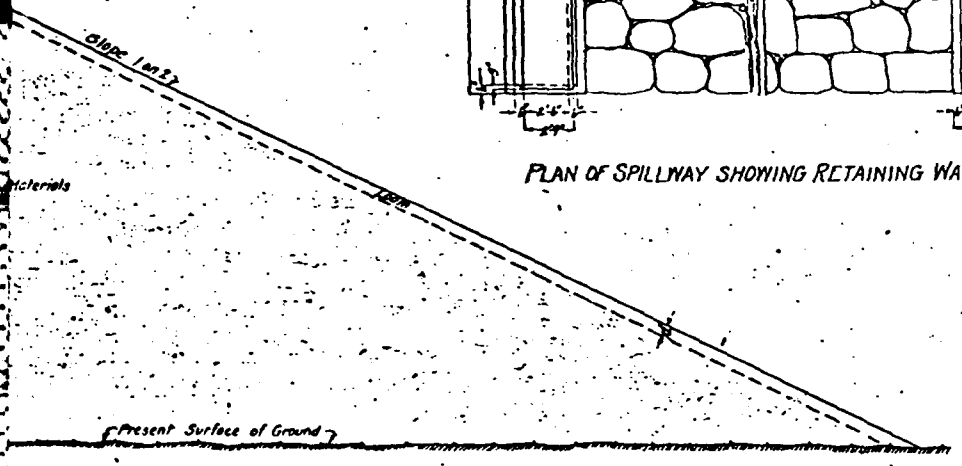
CROSS-SECTION OF DAM



ELEVATION OF SPILLWAY SHOWING RETAINING WALLS



PLAN OF SPILLWAY SHOWING RETAINING WALLS



STAMFORD WATER COMPANY
LAUREL ROAD RESERVOIR
PLAN OF DAM & SPILLWAY
TOWNS OF STAMFORD & NEW CANAAN, CONN.
SCALE 1"=1'
APRIL 24, 1912.

(3)

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(10) NAME	(11) LATITUDE (NORTH)	(12) LONGITUDE (WEST)	(13) REPORT DATE DAY | MO | YR
CT	49	NED	CT	001	04				LAUREL RESERVOIR DAM	4109.9	7352.7	18AUG78

(14) POPULAR NAME	(15) NAME OF IMPOUNDMENT
	LAUREL RESERVOIR

(16) REGION	(17) BASIN	(18) RIVER OR STREAM	(19) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(20) DIST FROM DAM (MI.)	(21) POPULATION
01	07	RIPPOWAM RIVER	NORTH STAMFORD	0	1500

(22) TYPE OF DAM	(23) YEAR COMPLETED	(24) PURPOSES	(25) STRUCTURAL HEIGHT (FT.)	(26) HYDRAULIC HEIGHT (FT.)	(27) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	(27) IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VEH/DATE
RECTPG	1925	S	50	45	1375	1000	NED	N	N	N	N	16AUG78

(28) REMARKS

(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) SPILLWAY TYPE	(32) SPILLWAY WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) POWER CAPACITY PROPOSED (MW)	(37) NAVIGATION LOCKS NO.	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	1850	U	100	5900	135000											

(38) OWNER	(39) ENGINEERING BY	(40) CONSTRUCTION BY
STAMFORD WATER CO	ALBERT B HILL	

(41) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

(42) INSPECTION BY	(43) INSPECTION DATE DAY | MO | YR	(44) AUTHORITY FOR INSPECTION
FLAHERTY-GIAVARA, ASSOC, P.C	15JUN78	P.L. 92 367

(45) REMARKS

END

FILMED

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