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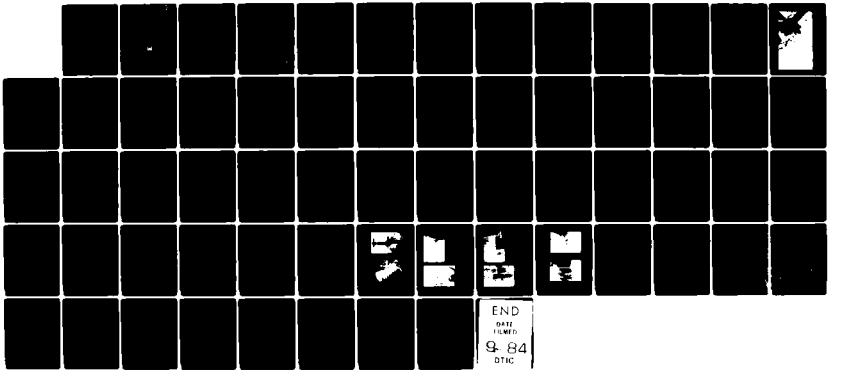

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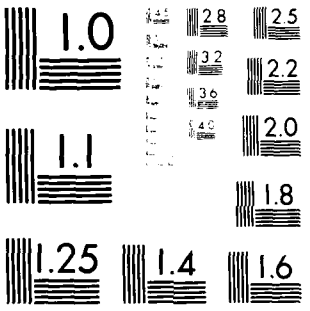

HOUSATONIC RIVER BASIN
NEWTOWN, CONNECTICUT

ROCKY GLEN DAM
CT 00310

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

JANUARY 1980

UNCLASSIFIED

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

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Newtown, Connecticut

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

The Rocky Glen Dam consists of a 100 foot long concrete ogee spillway section and a 30 foot long earth embankment section with an upstream concrete wall. The dam has a maximum height of 38 feet. The physical condition of the dam appears to be good. The dam is classified as "Small" in size with a "High" hazard potential. A test flood equal to ½ the PMF was selected.

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ROCKY GLEN DAM
CT 00310

HOUSATONIC RIVER BASIN
NEWTOWN, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

49-05

January 1980

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

IDENTIFICATION NO: CT 00310

NAME OF DAM: Rocky Glen Dam

TOWN: Newtown

COUNTY AND STATE: Fairfield County, Connecticut

STREAM: Pootatuck River

DATE OF INSPECTION: November 27, 1979

BRIEF ASSESSMENT

The Rocky Glen Dam consists of a 100 foot long concrete ogee spillway section and a 30 foot long earth embankment section with an upstream concrete wall. The dam has a maximum height of 38 feet and appears to be founded on bedrock. A 48-inch diameter low level outlet or blowoff is located at the left end of the earth embankment and discharges through the right spillway training wall. An intake structure and canal are located at the right end of the dam and divert water from the impoundment to a downstream manufacturing plant where it was used to generate electricity and for manufacturing purposes. At the present time the manufacturing plant is not in operation.

The physical condition of the dam is judged to be good. Erosion at the base of the right training wall and trees growing on the downstream embankment at the top of this wall require further attention.

Based on the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the dam is classified as "Small" in size with a "High" hazard potential. A test flood equal to one-half of the probable maximum flood was selected in accordance with the Corps

of Engineers' Guidelines. Due to the small size of the impoundment, the test flood outflow was assumed to equal the test flood inflow of 17,500 cfs and would overtop the dam by 7-1/2 feet. The spillway capacity with the water level at the top of the dam is equal to 2,500 cfs or 14% of the test flood. Therefore, the overall condition of the dam is judged to be fair based on the inadequate spillway capacity.

It is recommended that the owner retain the services of a qualified registered engineer to evaluate the adequacy of the spillway discharge capacity; determine if the non-overflow section of the dam is capable of withstanding overtopping; evaluate the stability of the overflow section under increased loads; provide for increased spillway capacity if necessary; investigate the erosion at the base of the right training wall; and to inspect the spillway and downstream toe during a no flow condition.

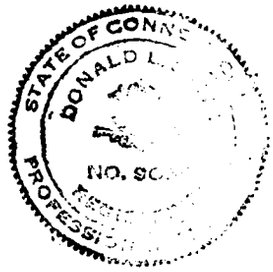
The trees growing on the downstream slope next to the spillway wall should be removed. The bar screen for the power canal intake should be cleaned and the wood deck repaired. An operations and maintenance manual should be prepared for the dam and operating facilities. A program of technical inspections by a qualified registered engineer every two years should be instituted and a formal warning system put into effect.

The owner should implement the recommendations as described above and in greater detail in Section 7 of the Report within two years after the receipt of this Phase I Inspection Report. The

exception to this recommendation is that the investigations involving the inadequacy of the spillway should be carried out within one year after receipt of this Report.

Donald L. Smith
Project Engineer

Roald Haestad
President



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.

TABLE OF CONTENTS

INDEX TO REPORT

INDEX TO APPENDIXES

OVERVIEW PHOTO

U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS	ROCKY GLEN DAM - CT 00310 PEQUABUCK RIVER NEWTOWN, CONNECTICUT DATE : 12 DEC 78
ROALD HAESTAD, INC CONSULTING ENGINEERS ASTERN RI CONNECTICUT		

FIGURE 1

LOCATION PLAN

ROCKY GLEN DAM
NEWTOWN, CONNECTICUT

SCALE: 1" = 2000'

ROALD HAESTAD, INC. NEWTOWN QUADRANGLE 1972

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

PROJECT INFORMATION
SECTION 1

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. Roald Haestad, Inc., 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 were issued to Roald Haestad, Inc. under a letter of November 1, 1979, from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0015 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

The Purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to indentify conditions requiring correction in a timely manner by non-federal interest.
2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.
3. To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

The dam is located on the Pootatuck River in the Town of Newtown, Connecticut, approximately one-half mile from the confluence with the Housatonic River. The dam is shown on the Newtown U.S.G.S. Quadrangle Map having coordinates of latitude N 41° 26.0' and longitude W 73° 16.6'.

b. Description

From left to right, the dam consists of a concrete ogee spillway section approximately 100 feet in length and an earth embankment section approximately 30 feet in length with an upstream concrete wall. The dam has a maximum height of 38 feet and appears to be founded on rock with the left abutment consisting of an almost vertical rock slope. The outlet works consist of a 48-inch diameter blowoff controlled by a manually operated gate located near the left end of the earth embankment and discharging through the right spillway training wall. A manually operated sluice gate approximately 6'-6" x 5'-0" located at the right abutment allows water to flow through a conduit and canal to a downstream building which houses a generator and manufacturing plant.

c. Size Classification - "Small"

According to the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, a dam is classified as "Small" in size if the height is between 25 feet and 40 feet, or the dam impounds between 50 Acre-Feet and 1,000 Acre-Feet. The dam has a maximum height of 38 feet and a maximum storage capacity of 70 Acre-Feet. Therefore, the dam is classified as "Small" in size.

d. Hazard Classification - "High"

Based on the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the hazard classification for the dam is "High". A residential development is under construction approximately 2,000 feet downstream of the dam.

e. Ownership

Former Owners: The Rubber Goods Manufacturing Company
Uniroyal, Inc. (formerly U. S. Rubber Company)

Present Owner: Newtown Mill Associates
c/o Webber and Doepke
1 East Putman Avenue
Greenwich, Connecticut
Frank Dean (203) 661-3366

f. Operator: Louis Gillotti - (203) 426-8864
Fabric Fire Hose Company
Glen Road
Sandy Hook, Connecticut 06482

g. Purpose of Dam

The dam was formerly used to store water for generating electricity and for manufacturing purposes for a downstream manufacturing plant. The new owner is currently investigating the feasibility of using the generating equipment.

h. Design and Construction History

No information on the design and construction of the dam was available. A plaque on the dam reads *Fred T. Ley and Company, Contractors, Springfield, Massachusetts.* A map dated 1905, found at the Newtown, Connecticut Town Hall, indicates a dam at the Rocky Glen site. There appears to be remnants of a wood structure, possibly a log crib dam, immediately upstream of the present dam.

i. Normal Operational Procedure

The dam is presently not in use. The blowoff is normally left partially opened.

1.3 Pertinent Data

a. Drainage Area

The drainage area consists of 25.5 square miles of rolling wooded terrain with scattered residential development.

b. Discharge at Damsite

Normally water discharges over the 100 foot long concrete overflow spillway and through the 48-inch diameter blowoff located to the right of the spillway. The blowoff is usually left slightly opened. The maximum known flood at the damsite occurred during the August 1955 Flood when the flow was 3.1 feet over the spillway with the blowoff fully opened for an estimated flow of 2,300 cfs.

1.	Outlet Works (conduit) Size:	48-inch
	Invert Elevation:	151.75
	Discharge Capacity:	275 cfs
2.	Maximum Known Flood at Damsite:	2,300 cfs, August 1955
3.	Ungated Spillway Capacity at Top of Dam:	2,500 cfs
	Elevation:	173.5
4.	Ungated Spillway Capacity at Test Flood Elevation:	13,860 cfs
	Elevation:	181.0
5.	Gated Spillway Capacity at Normal Pool Elevation:	N/A
	Elevation:	N/A
6.	Gated Spillway Capacity at Test Flood Elevation:	N/A
	Elevation:	N/A
7.	Total Spillway Capacity at Test Flood Elevation:	13,860 cfs
	Elevation:	181.0
8.	Total Project Discharge at Top of Dam:	2,775 cfs
	Elevation:	173.5

9.	Total Project Discharge at Test Flood Elevation:	17,500 cfs
	Elevation:	181.0

c. Elevation - Feet Above Mean Sea Level (NGVD)

1.	Streambed at Toe of Dam:	135.0
2.	Bottom of Cutoff:	Unknown
3.	Maximum Tailwater:	N/A
4.	Recreation Pool:	N/A
5.	Full Flood Control Pool:	N/A
6.	Spillway Crest:	170.0
7.	Design Surcharge - Original Design:	Unknown
8.	Top of Dam:	173.5
9.	Test Flood Surcharge:	181.0

d. Reservoir - Length in Feet

1.	Normal Pool:	1,500
2.	Flood Control Pool:	N/A
3.	Spillway Crest Pool:	1,500
4.	Top of Dam:	1,500
5.	Test Flood Pool:	1,500

e. Storage - Acre-feet

1.	Normal Pool:	60 Ac.-Ft.
2.	Flood Control Pool:	N/A
3.	Spillway Crest Pool:	60 Ac.-Ft.
4.	Top of Dam:	70 Ac.-Ft.
5.	Test Flood Pool:	100 Ac.-Ft.

f. Reservoir Surface - Acres

1.	Normal Pool:	3.8 Acres
2.	Flood-Control Pool:	N/A
3.	Spillway Crest:	3.8 Acres
4.	Test Flood Pool:	5 Acres
5.	Top of Dam:	3.8 Acres

g. Dam

1.	Type:	Gravity Concrete Overflow Section (100' long); Earth Embankment with upstream Concrete wall (30' long)
2.	Length:	130'
3.	Height:	38'
4.	Top Width:	N/A
5.	Side Slopes:	Unknown
6.	Zoning:	N/A
7.	Impervious Core:	N/A
8.	Cutoff:	Unknown
9.	Grout Curtain:	Unknown
10.	Other:	

h. Diversion and Regulating Tunnel

1.	Type:	N/A
2.	Length:	N/A
3.	Closure:	N/A
4.	Access:	N/A
5.	Regulating Facilities:	N/A

i. Spillway

1.	Type:	Concrete Ogee
2.	Length of Weir:	100'
3.	Crest Elevation with Flashboards: without Flashboards:	 N/A 170
4.	Gates:	N/A
5.	Upstream Channel:	N/A
6.	Downstream Channel:	Natural Stream
7.	General:	

j. Regulating Outlets

1.	Invert:	151.75
2.	Size:	48-inch
3.	Description:	Conduit through end of earth embankment discharging through right training wall. Cap. 275 cfs
4.	Control Mechanism:	Manually Operated Upstream Gate
5.	Other:	Intake to power canal consists of intake structure with approximate 6'-6"x5'-0" sluice gate discharging through an unknown sized conduit. Invert Elev. 165.4

ENGINEERING DATA
SECTION 2

2.1 Design Data

There was no design data available for review.

2.2 Construction Data

The Rocky Glen Dam was constructed by Fred T. Ley and Company, Contractors, of Springfield, Massachusetts. Robert T. Ley, a retired employee of Fred T. Ley and Company, was contacted but did not have any recollection of the dam. The date of construction is unknown. There was no construction data available for review.

2.3 Operation Data

The maximum known flow over the dam occurred during the August 1955 Flood when the water level rose to 3.1 feet above spillway before the blowoff was fully opened.

2.4 Evaluation of Data

a. Availability

There was no design or construction data available from either the State of Connecticut, Department of Environmental Protection, the owner, or the contractor.

b. Adequacy

As no design or construction data was available, the assessment of the dam was based on the visual inspection. past performance history, and hydraulic and hydrologic calculations.

VISUAL INSPECTION

SECTION 3

3.1 Findings

a. General

The visual inspection of the dam was conducted on November 27, 1979. At the time of the inspection the water level was approximately 6 inches above spillway crest. The general condition of the dam at the time of inspection was good.

The dam consists of, from left to right, a concrete spillway, an earth dam with an upstream concrete wall, and an intake structure for a canal.

b. Dam

1. Embankment Section

The exposed portion of the upstream concrete wall is in good condition with minor cracking and efflorescence as shown in Photo 1. The crest and downstream slope are grass covered and show no signs of erosion. There are some bushes and small trees growing on the downstream slope against the right spillway training wall. The downstream slope appears dry with no evidence of seepage. Some bushes are growing on the crest.

2. Spillway Section

The left abutment consists of a practically vertical rock cliff. Immediately downstream of the spillway, bedrock is exposed at the bottom of the channel and at the base of the right training wall. It was not possible to inspect the downstream toe because of water flowing over the spillway. The flow of water over the crest appears smooth, Photo 2,

indicating the concrete at the crest to be in good condition. The right training wall consists of a concrete section and a dry stone masonry section, Photo 3. The concrete shows some deterioration in the lower part of the wall, Photo 4. Some minor cracking and efflorescence is present near the outlet to the blowoff. Erosion has occurred at the base of both the concrete and dry stone masonry walls, as shown in Photo 5. Some seepage was observed from the cavity at the base of stone wall but no soil transport was apparent. Minor cracking and efflorescence is also present at the concrete wall which connects the spillway section to the left abutment.

c. Appurtenant Structures

The gate and the conduit of the blowoff could not be observed due to the flow of water through it. The manual operator located at the crest of the dam appeared to be in good condition.

The intake structure for the canal is located to the right of the dam. Water flows from the intake structure through a conduit under the access road and into the canal. The concrete and stone masonry intake structure appears to be in good condition but the wood deck is deteriorated and the bar screen clogged with debris, Photo 6. The manual operator that controls the 6'-6" x 5'-0" sluice gate is reported to be in working condition. The canal is formed by an earth dike at the left side and the abutment along the right side. The dike shows no apparent seepage. The downstream slope is covered with grass, bushes, and a few trees, Photo 7.

d. Reservoir Area

The reservoir is confined between the river banks. The very steep left bank shows no evidence of recent rock falls as indicated by trees growing on the cliff.

e. Downstream Channel

The downstream channel is the natural streambed, Photo 8, and shows no obstructions to flow in the vicinity of the dam.

3.2 Evaluation

On the basis of the visual inspection, the dam is judged to be in good condition. However, because of the flow of water at the time of inspection, the spillway and the downstream toe of the spillway could not be inspected.

The right training wall of the spillway has been undermined and could in the future collapse under further erosion. Trees growing on the downstream slope of the dam at the top of the training wall increase the pressure against the wall and could cause damage to it.

The deteriorated wood deck and clogged bar screen of the power canal intake structure could hamper its use.

OPERATIONAL AND MAINTENANCE PROCEDURES
SECTION 4

4.1 Operational Procedures

a) General

The Rocky Glen Dam was formerly used to store water for generating and manufacturing purposes for a downstream manufacturing plant. The generators have not been used for the past 25 - 30 years and the manufacturing plant has been closed for the past two years. No formal operational procedures for the dam and operating facilities exist. The caretaker at the dam indicated that the blowoff is normally left partially opened and is fully opened when the water level reaches the top of a bolt set in concrete (3.1 feet above spillway).

b) Description of Any Warning System in Effect

There is no formal warning system in effect. There is no development below the dam at this time.

4.2 Maintenance Procedures

a) General

Maintenance of the dam consists of mowing the grass on the slope of the embankment and making necessary repairs.

b) Operating Facilities

Water has not been drawn from the impoundment for the past two years. No maintenance has been performed on the canal intake structure during this period (Photo No. 6). The blowoff gate and operating stem were repaired approximately eight years ago after a log had jammed in the gate.

4.3 Evaluation

The present operational and maintenance procedures are inadequate as is evident from the erosion at the base of the right spillway training wall and the condition of the canal intake structure.

An operational and maintenance manual for the dam and operating facilities should be prepared. The dam should also be inspected once every two years by qualified registered engineers, and any problems such as the erosion at the base of the right spillway training wall corrected.

A formal warning system should be put into effect, and should included monitoring of the dam during extremely heavy rains, and procedures for notifying downstream authorities in the event of an emergency.

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

SECTION 5

5.1 General

The spillway for Rocky Glen Dam consists of a 100 foot long concrete gravity ogee section. The dam has a maximum height of 38 feet. The top of the dam is 3-1/2 feet above the spillway crest. Outlets include a 48-inch blowoff at the right end of the spillway and a 6'-6" x 5'-0" sluice gate to a diversion canal at the right abutment.

The dam is located in a narrow rock gorge. The impoundment is 1,500 feet long, but quite narrow with a normal surface area of 3.8 acres and a capacity at top of dam estimated at 70 Acre-Feet. The watershed area is 25.5 square miles of "rolling" terrain, mostly wooded with scattered residential development. Surface elevations range from approximately 700 for the higher hills to 170 at the dam site. The Sandy Hook Dam is located 3,000 feet upstream.

5.2 Design Data

No plans or design data were available.

5.3 Experience Data

During the August 1955 Flood, the water level reached 3.1 feet above spillway level. The 48-inch blowoff was then opened and the water level rose no further. Maximum discharge, including blowoff, would have been 2,300 cfs.

5.4 Test Flood Analysis

The dam is classified as "Small" in size with a "High" hazard potential. According to the Recommended Guidelines for Safety Inspection of Dams, the test flood for a "Small", "High" hazard dam is between 1/2 the Probable Maximum Flood (1/2 PMF) and the Probable Maximum Flood (PMF), depending on the risk to downstream development.

At present, there is no development downstream which would be affected by a dam failure. However, construction is underway for residential housing in an area that would be affected by a dam breach. For this reason a test flood equal to 1/2 PMF was selected.

The guide curve for "rolling" terrain, supplied by the Corps of Engineers, was used along with the watershed area of 25.5 square miles to arrive at the 1/2 PMF of 17,500 cfs. The impoundment is too small to affect the flood peak, and inflow is equal to outflow. The spillway capacity was calculated to be 2,500 cfs at the top of the dam. The 48-inch blowoff has an additional capacity of 275 cfs.

The spillway with the blowoff assumed closed has a capacity equal to 14% of the test flood. The non-overflow portion of the dam would overtop by 7-1/2 feet due to the test flood.

For comparison purposes, a flood equal to the 100 year flood was calculcated, as detailed in Appendix D, using the Weiss Formula, developed by U.S.G.S. and approved for use with dams by the State of Connecticut. The spillway is capable of passing 46% of the 5,400 cfs outflow calculated for the 100 year flood.

The spillway capacity of this dam is judged to be inadequate. Overtopping of the dam could occur in the future. Further investigations are required to determine if the dam is capable of withstanding overtopping or if the spillway capacity must be increased.

5.5 Dam Failure Analysis

A dam failure analysis was made using the "Rule of Thumb" guidance provided by the Corps of Engineers. Failure was assumed when the water level reached the top of the dam.

The dam breach would release up to 20,500 cfs into the gorge below the dam. At present there are no homes or important roads which would be affected by a dam failure. However, residential construction is underway in an area 2,000 feet downstream that would be affected by a dam breach.

An elevation of 110 feet has been established by a flood insurance study as the height of the 100 year flood on the Housatonic River. Construction of houses will not be allowed below this elevation.

Flood routing showed the peak flood flow for the area under construction would be 9,350 cfs. This would produce a depth of flow of about 7.2 feet which would flood six of the houses proposed for the area. Depth of flow prior to the dam breach would have been 4.2 feet assuming a maximum spillway capacity flow of 2,500 cfs.

It should be noted that the information on the proposed residential construction came from subdivision plans on file with the Newtown Planning and Zoning Commission. These plans have not been approved as of the writing of this Report.

EVALUATION OF STRUCTURAL STABILITY

SECTION 6

6.1 Visual Observations

The visual inspection did not disclose any evidence of dam instability.

The evaluation of the hydraulic/hydrologic features indicate that the non-overflow portion of the dam would be overtopped by 7-1/2 feet as a result of the test flood. The overflow portion of the dam would be overtopped by 11 feet as opposed to the 3-1/2 feet it was probably designed for. Sufficient data is not available to evaluate the ability of the non-overflow section of the dam to withstand overtopping, and to evaluate the stability of the overflow section of the dam under the increased load.

6.2 Design and Construction Data

There was no design and construction data available.

6.3 Post-Construction Changes

No known post construction changes have been made which might jeopardize the safety of the dam.

6.4 Seismic Stability

The dam is located in Seismic Zone 1 and in accordance with the recommended Phase I guidelines does not warrant seismic analysis.

ASSESSMENT, RECOMMENDATIONS, & REMEDIAL MEASURES
SECTION 7

7.1 Dam Assessment

a. Condition

On the basis of the visual inspection and past performance history, the dam is judged to be in good physical condition. However, as water was flowing over the spillway at the time of the inspection, the spillway and downstream toe could not be inspected. Therefore, this assessment is subject to verification pending a technical inspection of the spillway and downstream toe when there is no water flowing.

The future safety of the dam could be affected by further undermining of the right spillway training wall and by trees growing next to the top of this wall.

An evaluation of the hydraulic and hydrologic features of the dam determined that the spillway is capable of passing 14% of the test flood (1/2 PMF). Therefore, the overall condition of the dam is fair, based on inadequate spillway capacity.

b. Adequacy of Information

There was no design and construction information available and thus the assessment of the condition of the dam is based solely on the visual inspection and past performance history of the dam.

c. Urgency

The recommendations presented in Sections 7.2 and 7.3 should be carried out by the owner within two years of receipt of this Report. The exception to this recommendation is that the investigations concerning the inadequacy of the spillway capacity should be carried out within one year of receipt of this Report.

7.2 Recommendations

It is recommended that the owner retain the services of a qualified registered engineer to:

a) Perform further studies to determine the adequacy of the spillway discharge capacity.

b) Investigate the ability of the non-overflow section of the dam to withstand overtopping and evaluate the stability of the overflow section of the dam under increased loads; or to provide for additional spillway capacity if the studies performed under a) indicate that the spillway capacity is insufficient.

c) Investigate the cause of the concrete erosion at the base of the right training wall and oversee repairs.

d) Inspect the spillway and downstream toe during a no flow condition.

7.3 Remedial Measures

a) Operations and Maintenance Procedures

1) Trees growing on the downstream slope next to the right spillway training wall should be removed. The bar screen for the intake structure to the power canal should be cleaned and the wood deck repaired.

2) A program of technical inspections by qualified registered engineers once every two years should be instituted. Records of findings and recommendations should be maintained.

3) A formal operations and maintenance manual for the dam and operating facilities should be prepared.

4) A formal warning system should be put into effect, and should include monitoring of the dam during extremely heavy rains, and procedures for notifying downstream authorities in the event of an emergency.

7.4 Alternatives

There are no practical alternatives to the above recommendations.

APPENDIX A

VISUAL CHECK LIST WITH COMMENTS

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT: Rocky Glen Dam

DATE: 11/27/79 TIME: 1:30 p.m. to 3:30 p.m. WEATHER: Sunny - Approximately 50°

W.S. ELEVATION: 170.5 U.S. N/A DN.S

	PARTY	DISCIPLINE
1.	Donald L. Smith, P.E. - Roald Haestad, Inc.	Civil/Hydrologist
2.	Ronald G. Litke, P.E. - Roald Haestad, Inc.	Civil Engineer
3.	Gonzalo Castro, Ph.D., P.E. - Geotechnical Engineers, Inc.	Geotechnical Engineer
4.		
5.		
6.		

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam Embankment-Upstream Concrete Face	GC	Some trees Good-on embankment
2.	Outlet Works-Intake Channel and Structure	GC,RGL,DLS	Good
3.	Outlet Works-Transition and Conduit	GC,RGL,DLS	Could not be observed
4.	Outlet Works-Outlet Structure and Channel	GC,RGL,DLS	Good-natural streambed
5.	Outlet Works-Spillway Weir, Appr. & Disch.	GC,RGL,DLS	Good with some deterioration of concrete at the base of right training wall. Water was going over spillway weir.
6.			
7.			
8.	Dike Embankment	GC	Good
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT: Rocky Glen Dam DATE: 11/27/79

PROJECT FEATURE: Dam Embankment - Upstream Concrete Face NAME:

DISCIPLINE: Geotechnical Engineer NAME: GC

AREA ELEVATION	CONDITIONS
DAM EMBANKMENT - UPSTREAM CONCRETE FACE CREST ELEVATION	173.5
CURRENT POOL ELEVATION	170.5 (6" above spillway)
MAXIMUM IMPOUNDMENT TO DATE	173.1 (August 19, 1955)
SURFACE CRACKS	Minor on concrete face
PAVEMENT CONDITION	N/A
MOVEMENT OR SETTLEMENT OF CREST	None observed
LATERAL MOVEMENT	None observed
VERTICAL ALIGNMENT	Good
HORIZONTAL ALIGNMENT	Good
CONDITION AT ABUTMENT AND AT CONCRETE STRUCTURES	Good
INDICATIONS OF MOVEMENT OF STRUCTURAL ITEMS ON SLOPES	N/A
TRESPASSING ON SLOPES	None of significance
VEGETATION ON SLOPES	Grass, some bushes and trees
SLOUGHING OR EROSION OF SLOPES OR ABUTMENTS	None observed
ROCK SLOPE PROTECTION - RIPRAP FAILURES	N/A
UNUSUAL MOVEMENT OR CRACKING AT OR NEAR TOES	None observed
UNUSUAL EMBANKMENT OR DOWNSTREAM SEEPAGE	None observed, except through base of right training wall
PIPING OR BOILS	None observed
FOUNDATION DRAINAGE FEATURES	None known
TOE DRAINS	None known
INSTRUMENTATION SYSTEM	None known

PERIODIC INSPECTION CHECK LIST

PROJECT: Rocky Glen Dam DATE: 11/27/79

PROJECT FEATURE: Outlet Works - Intake Channel and Structure NAME: DLS,RGL

DISCIPLINE: Civil - Geotechnical NAME: GC

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
A. APPROACH CHANNEL:	No approach channel
SLOPE CONDITIONS	
BOTTOM CONDITIONS	
ROCK SLIDES OR FALLS	
LOG BOOM	
DEBRIS	
CONDITION OF CONCRETE LINING	
DRAINS OR WEEP HOLES	
B. INTAKE STRUCTURE:	
CONDITION OF CONCRETE	Good, as is stone masonry
STOP LOGS AND SLOTS	N/A - Bar Screen clogged

COMMENTS: Wood deck of intake structure deteriorated.

PERIODIC INSPECTION CHECK LIST

PROJECT: Rocky Glen Dam DATE: 11/27/79

PROJECT FEATURE: Outlet Works - Transition and Conduit NAME: DLS

DISCIPLINE: Civil Engineer NAME: RGL

AREA EVALUATED	CONDITIONS
OUTLET WORKS - TRANSITION AND CONDUIT	Conduit could not be observed.
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: Rocky Glen Dam DATE: 11/27/79

PROJECT FEATURE: Outlet Works - Outlet Structure and Channel NAME: RGL, DLS

DISCIPLINE: Civil - Geotechnical NAME: GC

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	Outlet channel for blowoff is same as spillway channel
GENERAL CONDITION OF CONCRETE	Good
RUST OR STAINING	None observed
SPALLING	Minor spalling except at base of right training wall, which is severe
EROSION OR CAVITATION	None observed
VISIBLE REINFORCING	None observed
ANY SEEPAGE OR EFFLORESCENCE	Efflorescence at right training wall near outlet
CONDITION AT JOINTS	None observed
DRAIN HOLES	None observed
CHANNEL	Natural streambed
LOOSE ROCK OR TREES OVERHANGING CHANNEL	None of significance
CONDITION OF DISCHARGE CHANNEL	Good

PERIODIC INSPECTION CHECK LIST

PROJECT: Rocky Glen Dam DATE: 11/27/79

PROJECT FEATURE: Outlet Works - Spillway Weir, Appr. & Disch. NAME: GC

DISCIPLINE: Geotechnical - Civil NAME: RGL,DLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
A. APPROACH CHANNEL:	No approach channel
GENERAL CONDITION	
LOOSE ROCK OVERHANGING CHANNEL	
TREES OVERHANGING CHANNEL	
FLOOR OF APPROACH CHANNEL	
B. WEIR AND TRAINING WALLS:	
GENERAL CONDITION OF CONCRETE	Water flowing - appears to be smooth
RUST OR STAINING	None observed
SPALLING	Present at bottom of right training wall
ANY VISIBLE REINFORCING	None observed
ANY SEEPAGE OR EFFLORESCENCE	Minor efflorescence at outlet pipe and at left abutment
DRAIN HOLES	None observed
C. DISCHARGE CHANNEL:	Natural streambed
GENERAL CONDITION	Good
LOOSE ROCK OVERHANGING CHANNEL	None of significance
TREES OVERHANGING CHANNEL	None of significance
FLOOR OF CHANNEL	Bedrock, boulders
OTHER OBSTRUCTIONS	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Rocky Glen Dam DATE: 11/27/79

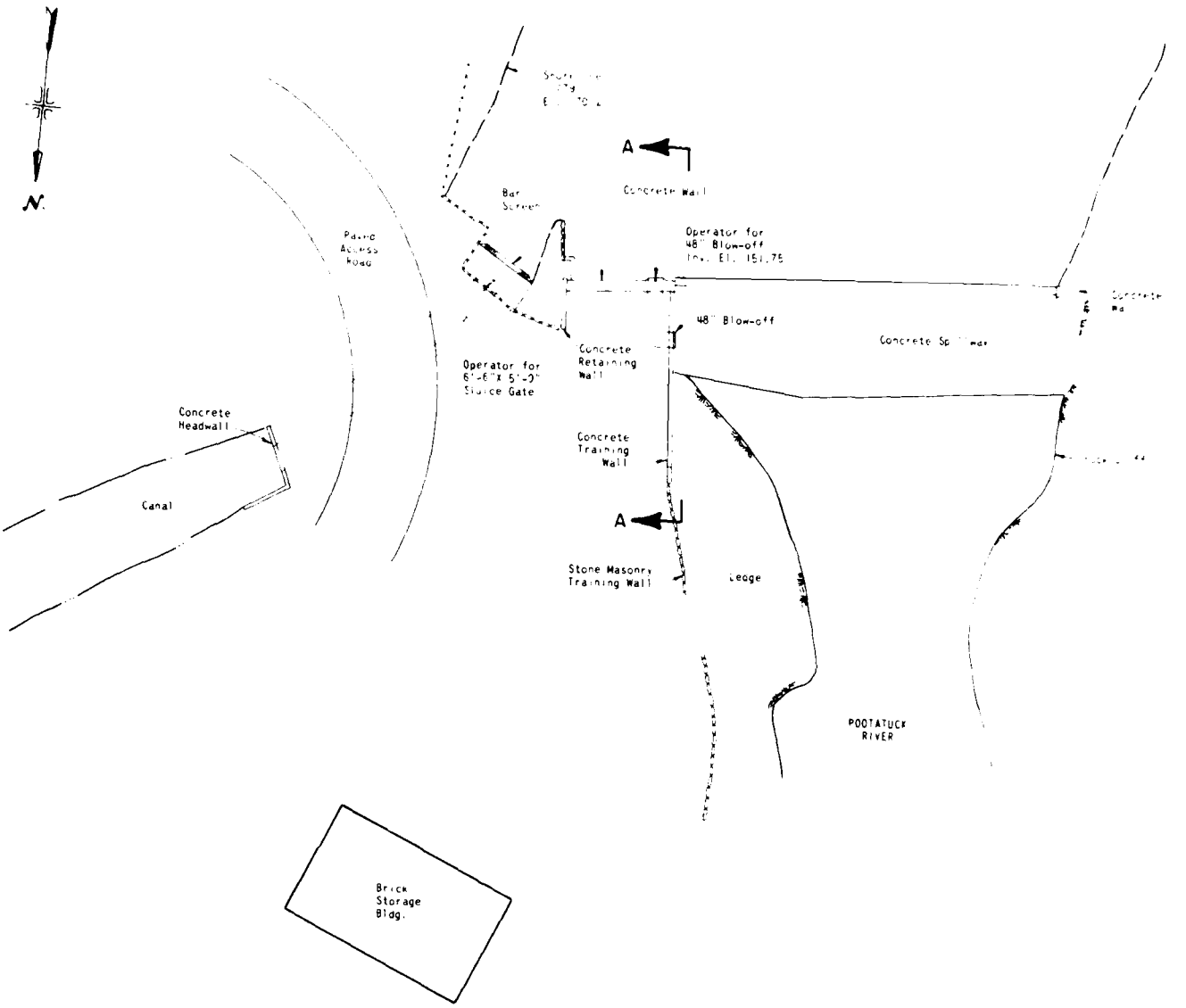
PROJECT FEATURE: Outlet Works - Dike Embankment NAME:

DISCIPLINE: Geotechnical NAME: GC

AREA EVALUATED	CONDITIONS
DIKE EMBANKMENT	
CREST ELEVATION	N/A
CURRENT POOL ELEVATION	N/A
MAXIMUM IMPOUNDMENT TO DATE	N/A
SURFACE CRACKS	None observed
PAVEMENT CONDITION	N/A
MOVEMENT OR SETTLEMENT OF CREST	None observed
LATERAL MOVEMENT	None observed
VERTICAL ALIGNMENT	Too irregular to judge
HORIZONTAL ALIGNMENT	Too irregular to judge
CONDITIONS AT ABUTMENT AND AT CONCRETE STRUCTURES	Good
INDICATIONS OF MOVEMENT OF STRUCTURAL ITEMS ON SLOPES	N/A
TRESPASSING ON SLOPES	None of significance
VEGETATION ON SLOPES	Grass, bushes, a few trees on the downstream slope
SLOUGHING OR EROSION OF SLOPES OR ABUTMENTS	None observed
ROCK SLOPE PROTECTION - RIPRAP FAILURE	N/A
UNUSUAL MOVEMENT OR CRACKING AT OR NEAR TOES	None observed
UNUSUAL EMBANKMENT OR DOWNSTREAM SEEPAGE	None observed
PIPING OR BOILS	None known
FOUNDATION DRAINAGE FEATURES	None known
TOE DRAINS	None known
INSTRUMENTATION SYSTEM	None known

APPENDIX B

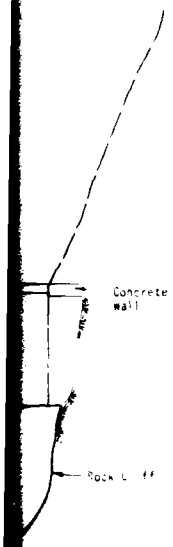
ENGINEERING DATA

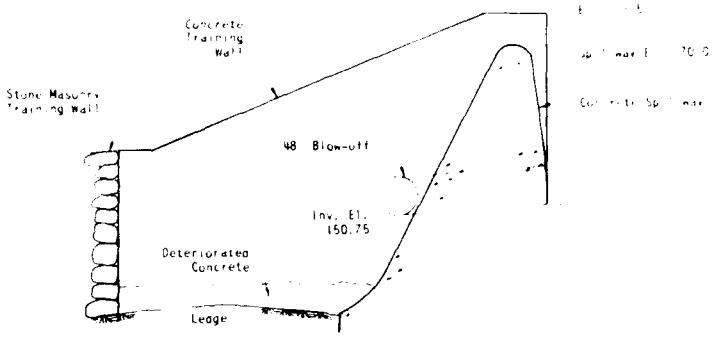


PLAN

Scale: 1" = 40'

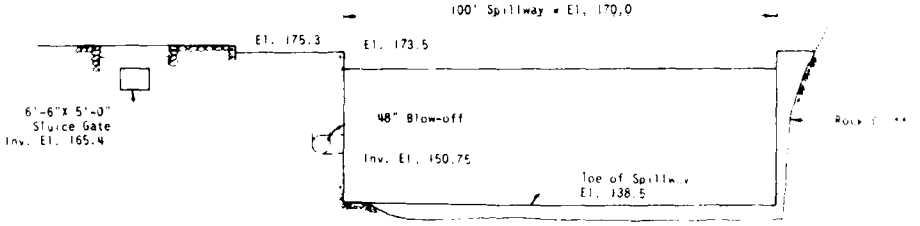
FIGURE 2





SECTION A-A

Scale 1" = 20'



ELEVATION

Scale 1" = 40'

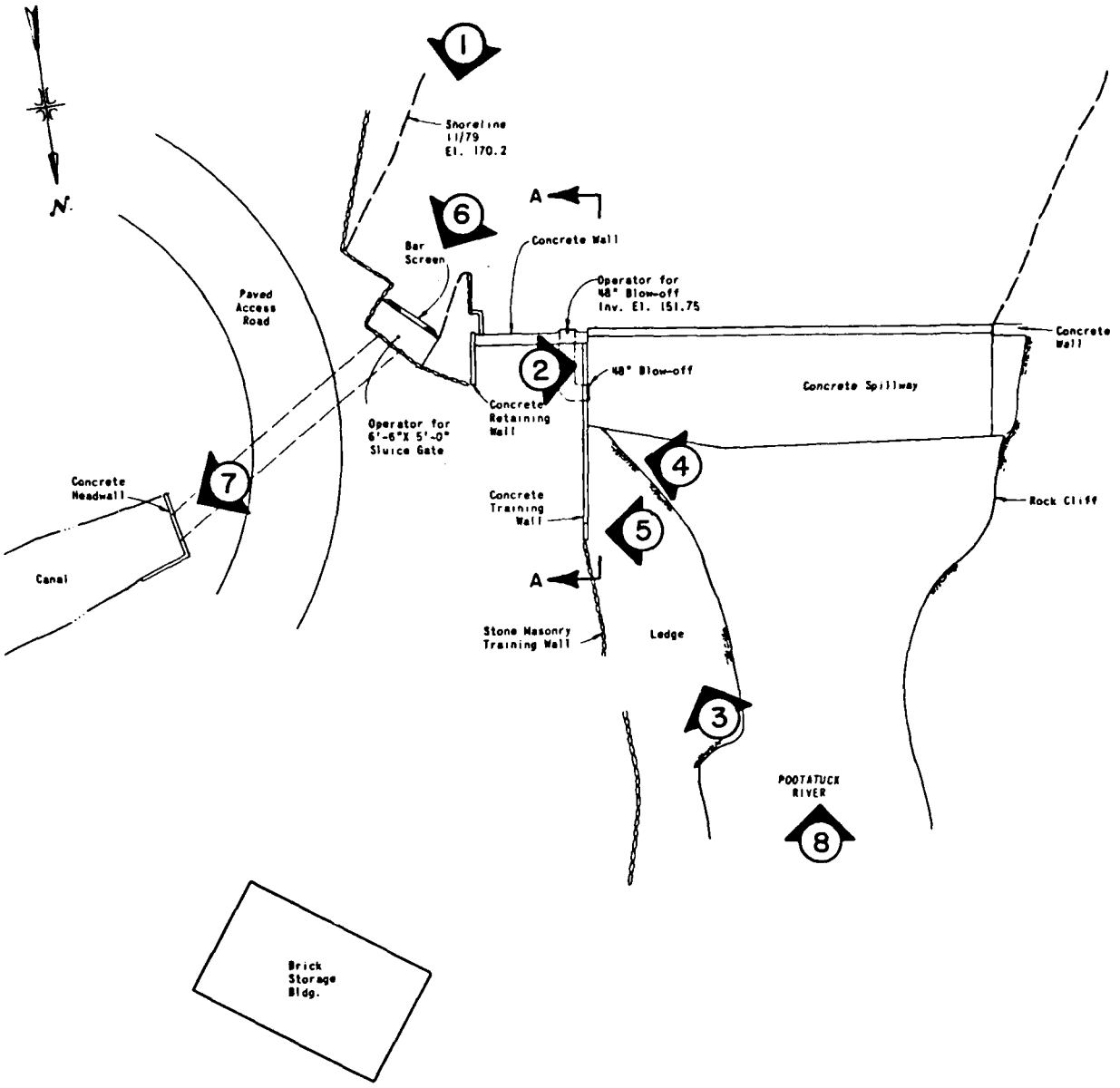
NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS

ROCKY GLEN DAM

APPENDIX C

PHOTOGRAPHS

FIGURE 3



DENOTES PHOTO NUMBER
AND DIRECTION IN WHICH
PHOTO WAS TAKEN

PHOTO LOCATION PLAN

ROCKY GLEN DAM
NEWTOWN, CONNECTICUT

SCALE: 1" = 40'

ROALD HAESTAD, INC.

JANUARY 1980

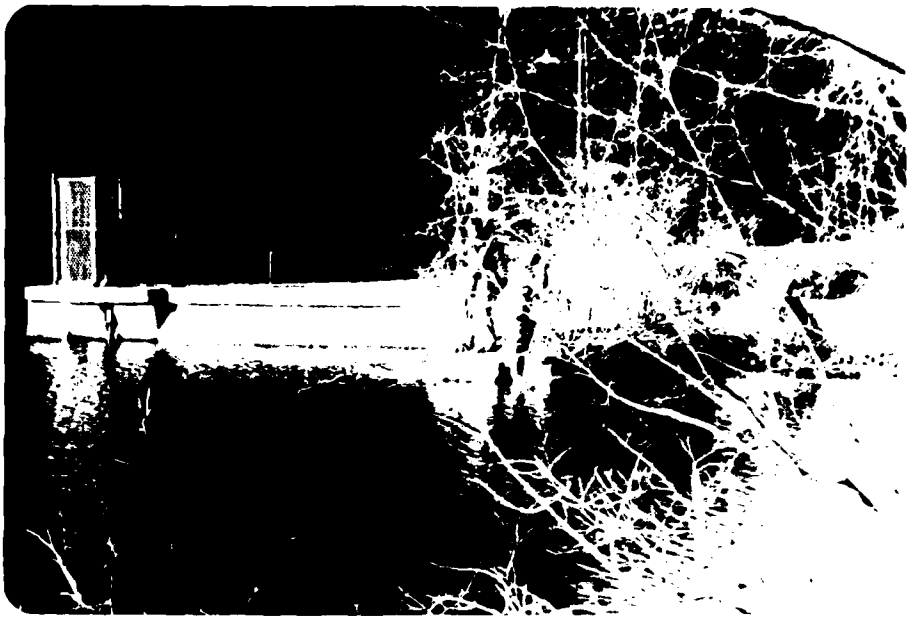


PHOTO NO. 1

BLOWOFF INLET ON THE LEFT, CANAL INLET ON THE RIGHT
UPSTREAM CONCRETE FACE OF DAM

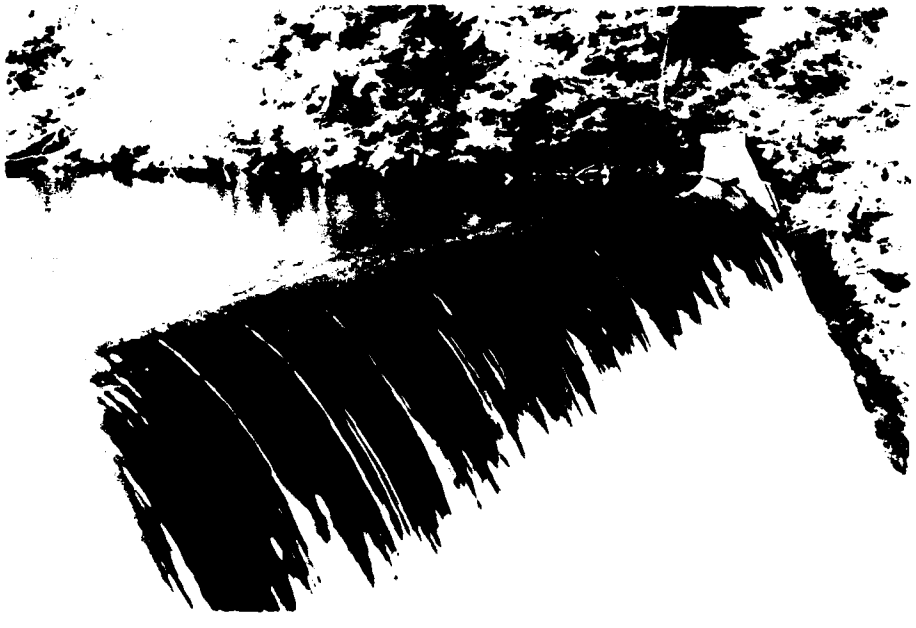


PHOTO NO. 2

SPILLWAY FROM RIGHT
TRAINING WALL

U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	ROCKY GLEN DAM POOTATUCK RIVER NEWTOWN, CONNECTICUT CT 00310 27 NOV '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 3

RIGHT TRAINING WALL

PHOTO NO. 4

CONCRETE EROSION AT BASE OF RIGHT TRAINING WALL

US ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	ROCKY GLEN DAM POOTATUCK RIVER NEWTOWN, CONNECTICUT CT 00310 19 NOV '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 5

UNDERMINING AT BASE OF RIGHT TRAINING WALL

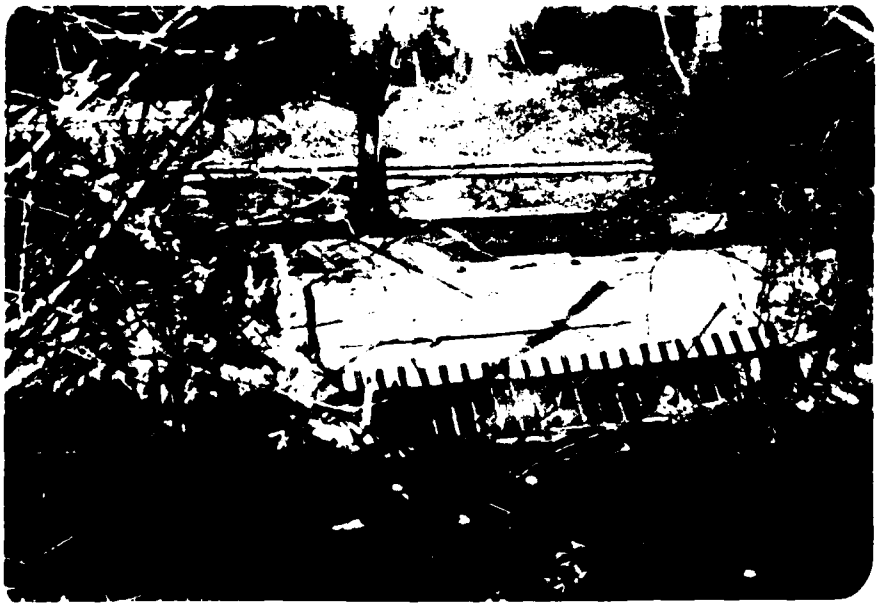


PHOTO NO. 6

INTAKE STRUCTURE TO POWER CANAL

U.S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	ROCKY GLEN DAM POOTATUCK RIVER NEWTOWN, CONNECTICUT CT 00310 19 NOV '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 7

CANAL FROM ACCESS ROAD

PHOTO NO. 8

SPILLWAY AND CHANNEL
FROM DOWNSTREAM

U.S ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	ROCKY GLEN DAM POOTATUCK RIVER NEWTOWN, CONNECTICUT CT 00310 27 NOV '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

BY DLS DATE 12/18/79 **ROALD HAESTAD, INC.** SHEET NO 1 OF 7

CONSULTING ENGINEERS

CKD BY SH DATE 12/31/79 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-05

SUBJECT ROCKY GLEN DAM - TEST FLOOD

WATERSHED AREA = 25.5 Sq. mi.

TERRAIN - "ROLLING"

FROM GRAPH · MAXIMUM PROBABLE FLOOD = 1370 cfs/Sq. mi.

PMF = 25.5 Sq. mi. X 1370 cfs/Sq. mi.

PMF = 34,935 cfs SAY 35,000 cfs

TEST FLOOD FOR "SMALL-SIGNIFICANT" DAM

100 YEAR TO ½ PMF

½ PMF = 35,000/2 = 17,500 cfs

100 YEAR FLOOD (CONNECTICUT FORUMLA)

$$Q_{100} = \frac{5.0\, A^{1.18}\, R_{24,100}^{1.145}}{(L/\sqrt{S})^{.5}}$$

$$Q_{100} = \frac{5.0\,(25.5)^{1.18}\,(10)^{1.145}}{(8.5/\sqrt{35.3})^{0.5}}$$

Q_{100} = 5382 cfs

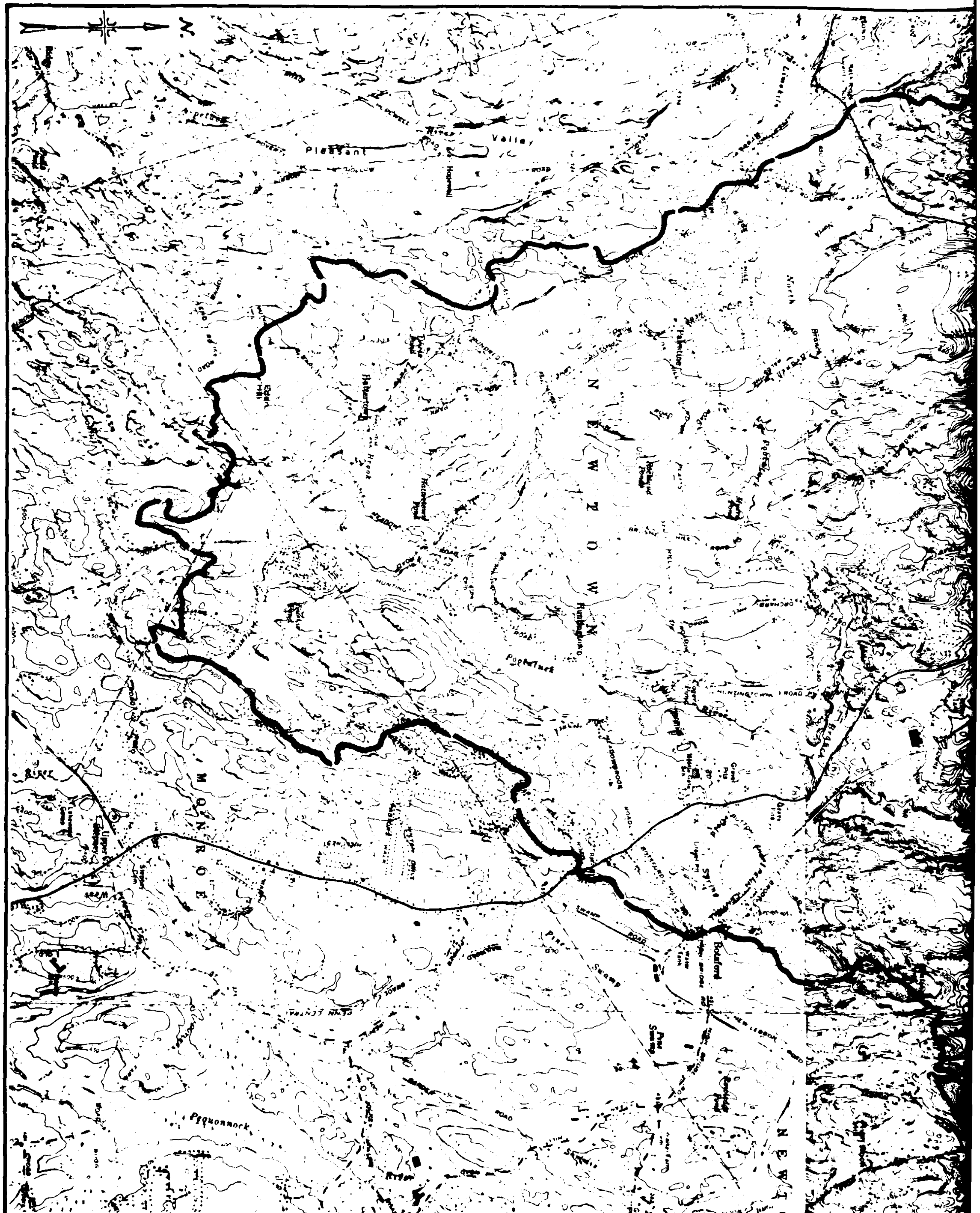
SAY Q_{100} = 5400 cfs

A = drainage area, Sq. mi.

$R_{24,100}$ = Rainfall, inches 24 hour - 100 year

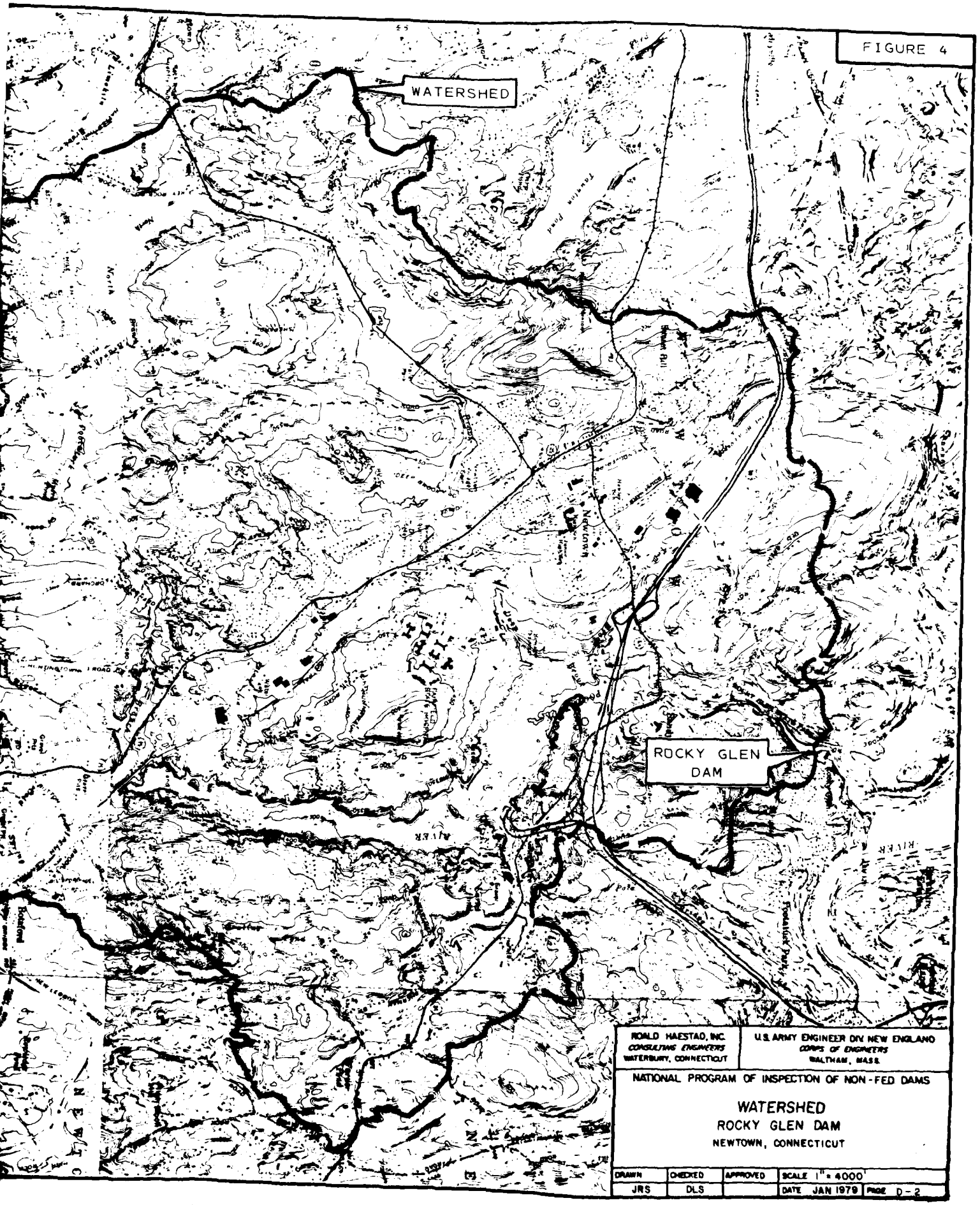
L = main channel length miles

S = main Channel Slope (ft/mi)



Pleasant
Valley
N E W T O W N
M O N R O E
Pootatuck
Botsford
Pine Swamp
Pequonnock
North

FIGURE 4



ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

WATERSHED

ROCKY GLEN DAM

NEWTOWN, CONNECTICUT

DRAWN	CHECKED	APPROVED	SCALE 1" = 4000'
JRS	DLS		DATE JAN 1979 PAGE D-2

SUBJECT ROCKY GLEN DAM - FLOOD ROUTING

SPILLWAY CAPACITY

LENGTH = 100'

HEIGHT = 3.5'

COEF. = 3.8

$Q = CLH^{3/2} = 3.8(100)(3.5)^{3/2} = 2488$ CFS

STORAGE CAPACITY

SURFACE AREA AT SPILLWAY ELEV. = 3.8 ACRES

LENGTH OF POND = 1500'

DEPTH AT SPILLWAY ≅ 30'

ASSUME AVERAGE DEPTH = 15'

VOLUME AT SPILLWAY ELEV. ≅ 60 Ac·Ft.

VOLUME AT DAM CREST ≅ 70 Ac·Ft.

DAM FAILURE PEAK DISCHARGE

$Q_{pl} = 8/27\, W_b \sqrt{g}\, y_o^{3/2}$

W_b = breach width = 40% of dam width at mid height

$= 0.40(130') = 52'$

Y_o = Hydraulic Height, River bed to Crest

$= 38'$

$Q_{pl} = 8/27(52)(\sqrt{32.2})(38)^{3/2} = 20{,}500$ CFS

BY DAS DATE 12/31/79 **ROALD HAESTAD, INC.** SHEET NO 3 OF 7

CONSULTING ENGINEERS

CKD BY SL DATE 12/31/79 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 079-05

SUBJECT ROCKY GLEN DAM - SPILLWAY CAPACITY

SPILLWAY	MAIN	ABUTMENTS	OVERBANK 1	OVERBANK 2
LENGTH	100'	35'	40'	50'
ELEVATION	170	173.5	175.3	180
COEF.	3.8	2.7	2.7	2.7

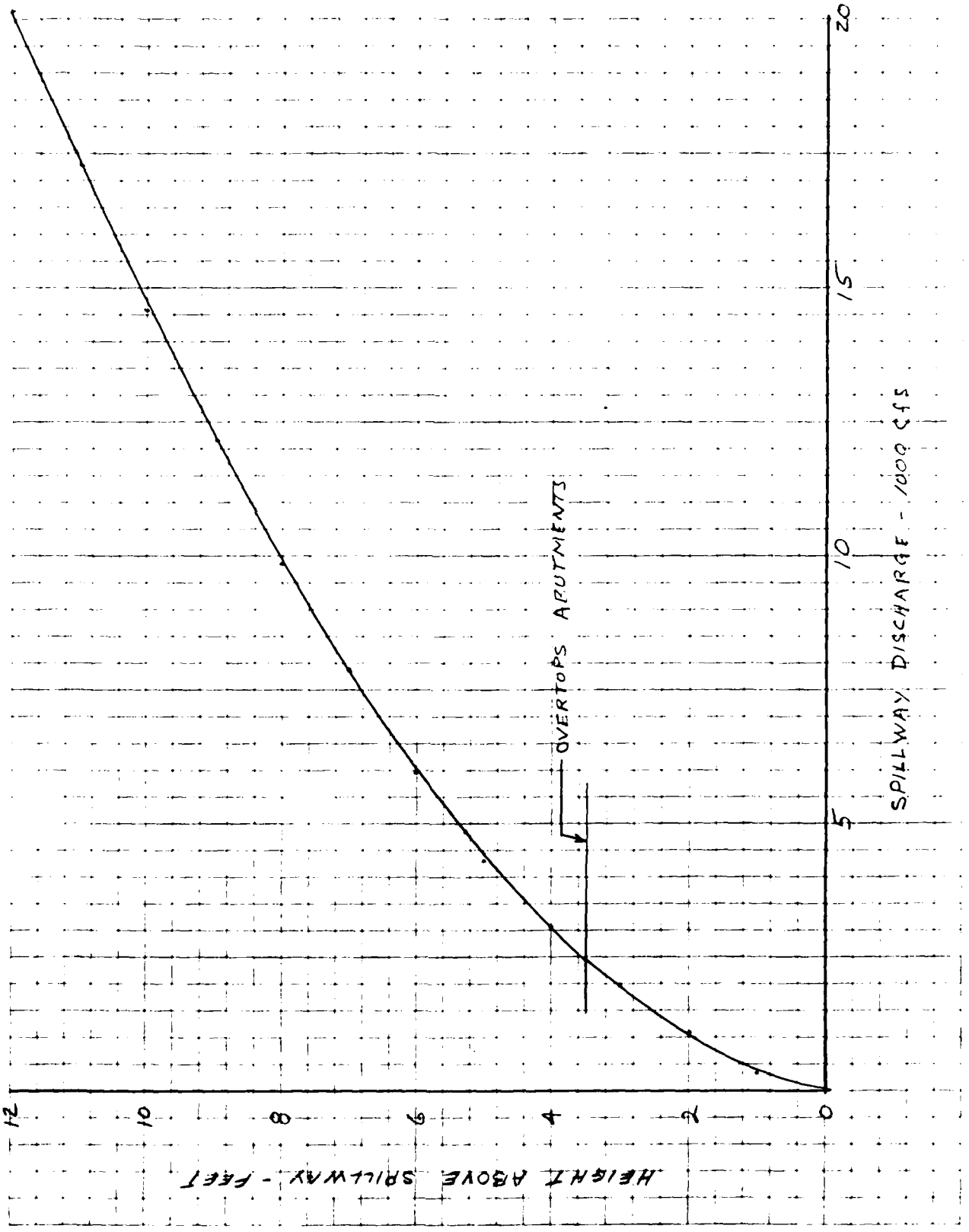
DEPTH OF FLOW	DISCHARGE CAPACITY - CFS				TOTAL
	MAIN	ABUTMENT	O.B.1	O.B.2	
1	380	0	0	0	380
2	1075	0	0	0	1075
3	1975	0	0	0	1975
3.5	2488	0	0	0	2488
4	3040	33	0	0	3073
5	4249	174	0	0	4423
5.3	4637	228	0	0	4865
6	5585	374	63	0	6022
7	7038	619	239	0	7896
8	8598	902	479	0	9979
9	10,260	1219	769	0	12,248
10	12,017	1566	1100	0	14,683
11	13,863	1941	1470	135	17,409
12	15,796	2342	1873	382	20,393

BY DLS DATE 12-6-79 **ROALD HAESTAD, INC.** SHEET NO 9 OF 7

CONSULTING ENGINEERS

CKD BY SH DATE 12/31/79 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-05

SUBJECT ROCKY GLEN DAM - SPILLWAY CAPACITY CURVE



BY D.L.S. DATE 12/6/79 **ROALD HAESTAD, INC.** SHEET NO 6 OF 7
CONSULTING ENGINEERS
CKD BY S.L. DATE 12/31/79 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 079-05

SUBJECT ROCKY GLEN DAM - FLOOD ROUTING

SECTION 1 (SEE FIGURE 5) Reach Length = 1900'

$Q_{p1} = 20,500$ cfs STORAGE = 70 Ac-Ft.

$H_1 = 22'$ $A_1 = 1100$ ac

$V_1 = 1100$ ac $\times 1900'/43560 = 35$ Ac-Ft.

$Q_{p2\ TRIAL} = Q_{p1}\left(1 - \frac{V}{S}\right) = 20,500\left(1 - \frac{35}{70}\right) = 10,250$ cfs

$H_{2\ TRIAL} = 13'$ $A_{2\ TRIAL} = 650$ ac

$V_{2\ TRIAL} = 650 \times 1400'/43560 = 21$ Ac-Ft.

$V_{AVE.} = \frac{35+21}{2} = 28$ Ac-Ft.

$Q_{p2} = 20,500\left(1 - \frac{28}{70}\right) = 12,300$ cfs $H = 15'$, $A = 750$ ac

SECTION 2 REACH LENGTH = 700'

$Q_{p2} = 12,300$ cfs

$H_2 = 7.5'$ $A_2 = 1100$ ac

$V_c = 1100 \times 700'/43560 = 17.7$ Ac-Ft.

$Q_{p3\ TRIAL} = 12,300\left(1 - \frac{17.7}{70}\right) = 9190$ cfs

$H_{2\ TRIAL} = 7.1'$ $A_{2\ TRIAL} = 1000$ ac

$V_{2\ TRIAL} = 1000 \times 700/43560 = 16$ Ac-Ft.

$V_{AVE.} = \frac{17.7+16}{2} = 16.8$ Ac-Ft.

$Q_{p3} = 12,300\left(1 - \frac{16.8}{70}\right) = 9,348$ cfs

$H_3 = 7.2$ ft.

BY R.L.S. DATE 12/6/79 **ROALD HAESTAD, INC.** SHEET NO 6 OF 7

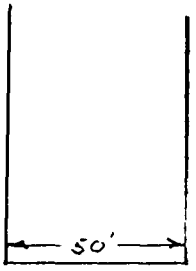
CONSULTING ENGINEERS

CKD BY S.L. DATE 12/31/79 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 549-05

SUBJECT ROCKY GLEN DAM - FLOOD ROUTING

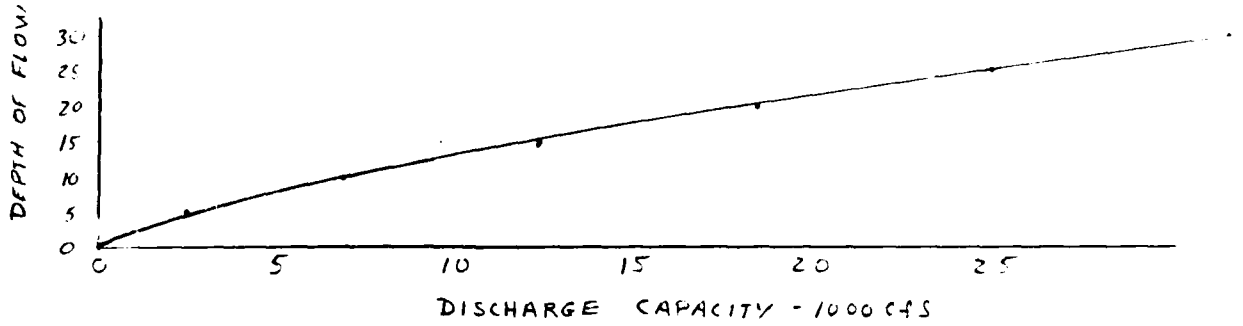
SECTIONS - 1 (SEE FIGURE 6)

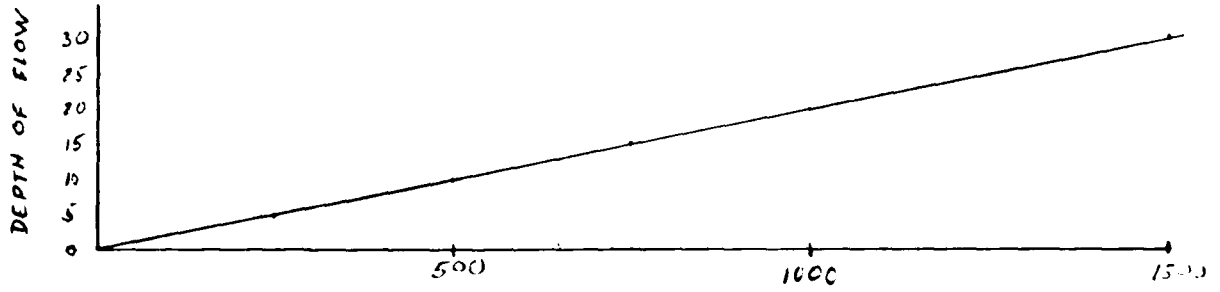
CHANNEL - VERTICAL SIDED GORGE 50' WIDE ON THE BOTTOM



S = 0.010
n = 0.04
L = 1400'

D	W_p	A	R	S	V	Q
5	60	250	4.17	0.010	9.6	2400
10	70	500	7.14	0.010	13.8	6900
15	80	750	9.38	0.010	16.5	12,375
20	90	1000	11.11	0.010	18.5	18,500
25	100	1250	12.50	0.010	20.0	25,000
30	110	1500	13.64	0.010	21.2	31,800





AREA - Sq. Ft.

BY DAS DATE 1/16/80 **ROALD HAESTAD, INC.** SHEET NO 7 OF 7

CONSULTING ENGINEERS

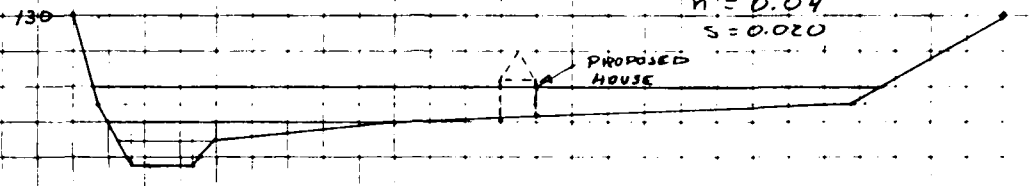
CKD BY SL DATE 1/18/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 046-05

SUBJECT ROCKY GLEN DAM - DAM FAILURE FLOOD ROUTING

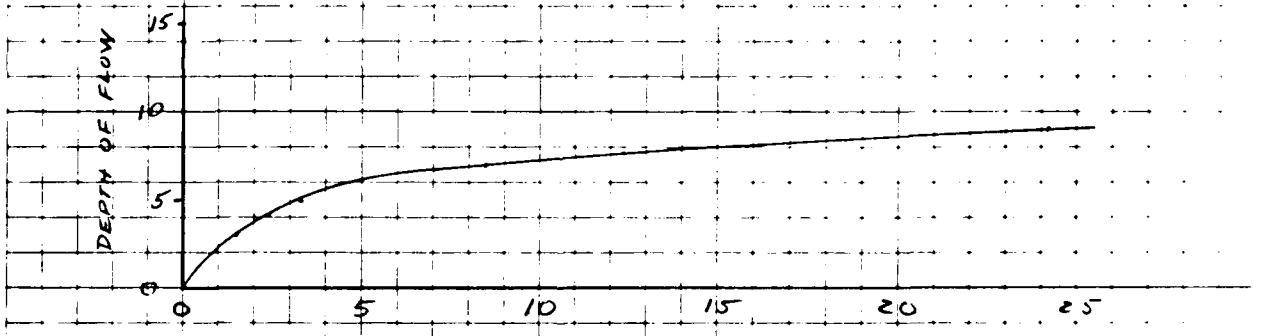
SECTION 2 CONTOURS FROM SUBDIVISION MAP "BRIDGE END FARM WEST" DATED NOV. 1979, SCALE 1"=100' HORZ. 1" = 20' VERT.

n = 0.04

s = 0.020



ELEV.	D	Wp	A	R	S	V	Q
116	3	60	160	2.67	0.020	10.1	1616
118	5	170	375	2.21	0.020	8.9	3338
120	7	430	955	2.22	0.020	8.9	8500
122	9	450	1815	4.03	0.020	13.3	24,140



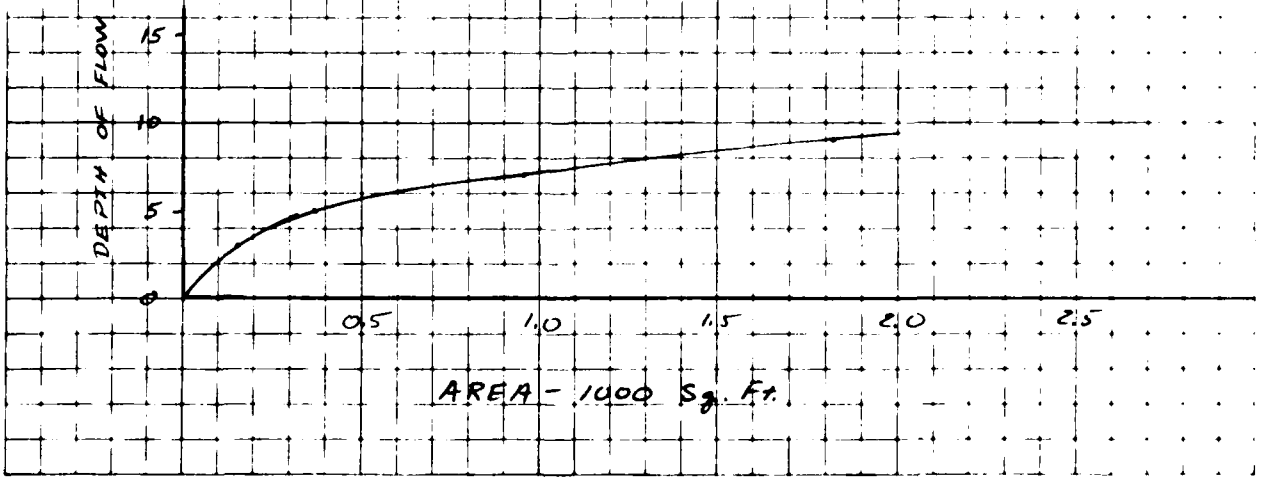
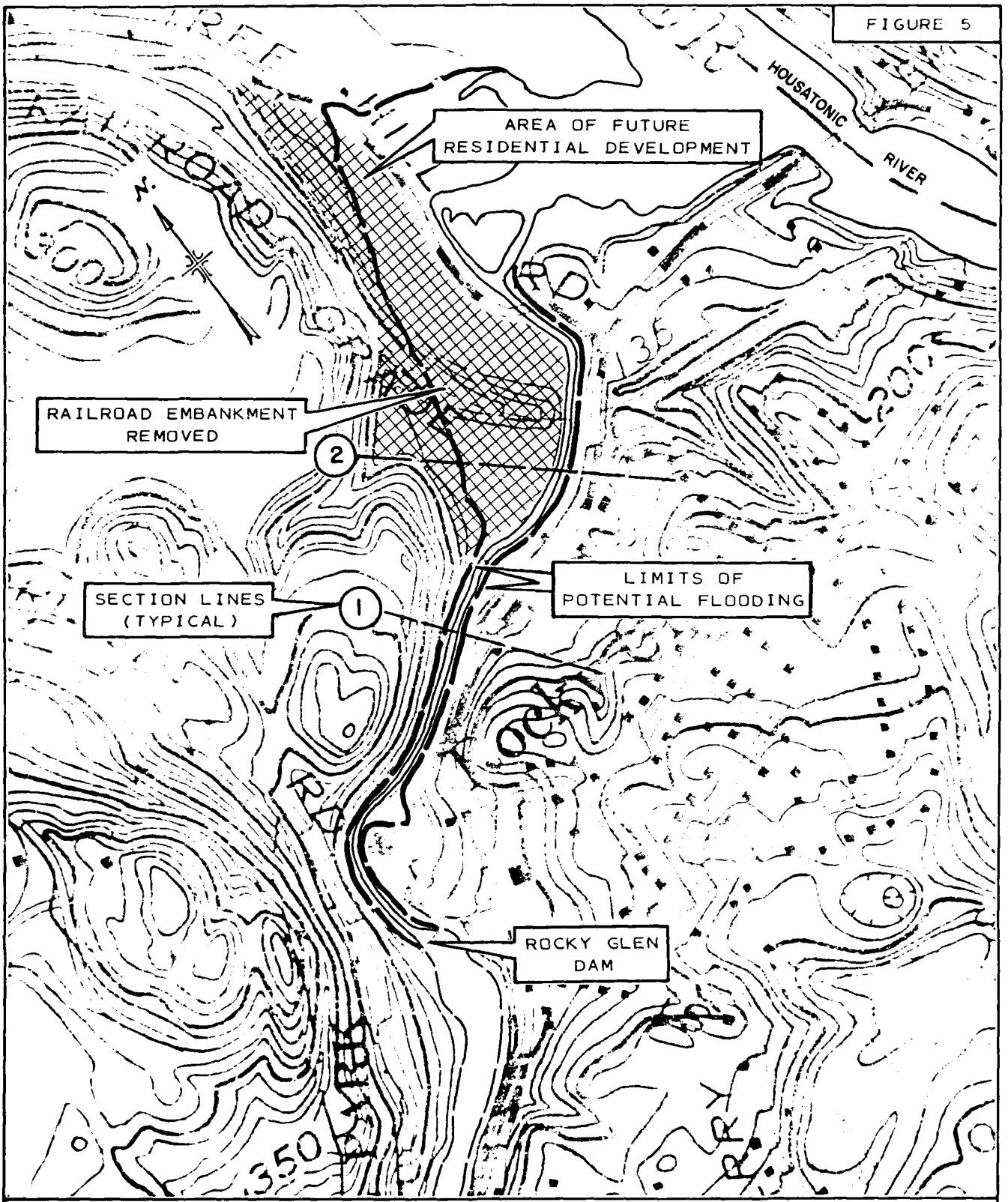


FIGURE 5



LIMITS OF POTENTIAL FLOODING

ROCKY GLEN DAM
NEWTOWN, CONNECTICUT

SCALE: 1" = 500'

ROALD HAESTAD, INC.

NEWTOWN QUADRANGLE 1972

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS


DATE
ILME