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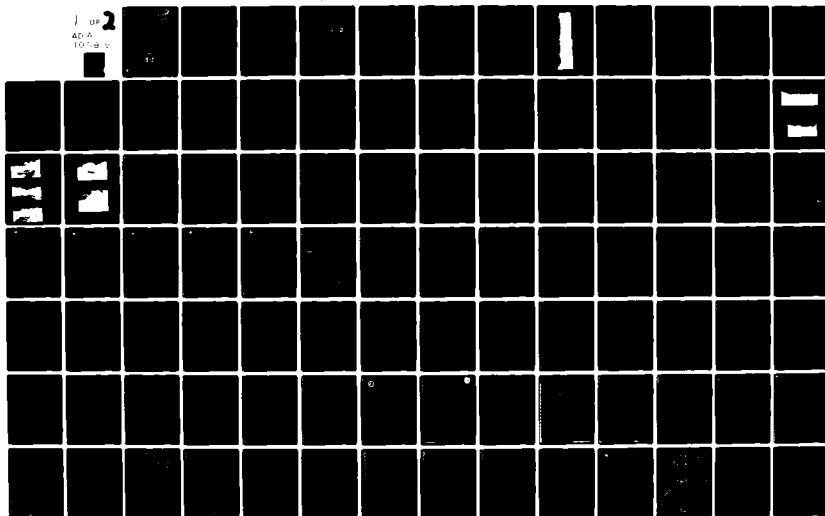
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LAKE ONTARIO BASIN

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ENGLISH ROAD DETENTION FACILITY DAM

NEW YORK

INVENTORY No. NY 996

AD A105819

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

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The Phase I Inspection of the English Road Detention Facility Dam did not indicate conditions which would constitute an immediate hazard to human life or property.		

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with 1.7 feet of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed 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 frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

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

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: English Road Detention Facility Dam
I.D. No. NY 996
State Located: New York
County: Monroe
Watershed: Lake Ontario Basin
Stream: Paddy Hill Creek
Date of Inspection: November 20, 1980

ASSESSMENT OF GENERAL CONDITIONS

The Phase I Inspection of the English Road Detention Facility Dam did not indicate conditions which would constitute an immediate hazard to human life or property.

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with 1.7 feet of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

The following remedial work should be undertaken within one year during normal maintenance operations:

1. Construction activities near the east abutment should be closely monitored to insure that damage to the dam does not occur in this area. Presently disturbed areas should be restored to the original condition.
2. Riprap lining the channel at the outlet of the control structure should be repaired, material covering the impact blocks removed and steps should be taken to control vandalism at the site.
3. A flood warning and emergency evacuation system should be implemented to alert the public should conditions occur which could result in failure of the dam.
4. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility, including the slopes and the area immediately downstream from the toe of the embankment. Deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be made.

Dale Engineering Company


John B. Stetson, President

Approved By:
Date:


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

30 JUN 1981



1. Overview of dam from upstream. Trashrack at inlet to control outlet at left. Right abutment behind trees to right of photo.

PHASE I INSPECTION REPORT
ENGLISH ROAD DETENTION FACILITY DAM I.D. NO. NY 996
LAKE ONTARIO BASIN
MONROE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and the U.S. Army Corps of Engineers.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the English Road Detention Facility Dam and appurtenant structures, owned by the Town of Greece, New York, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the U.S. Army Corps of Engineers.

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

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The English Road Detention Facility Dam is located in the Town of Greece, New York just south of English Road. The dam is an earth fill structure approximately 645 feet long with a maximum height of approximately 18 feet. The discharge control structure for this stormwater detention facility on Paddy Hill Creek consists of an 84 inch diameter concrete culvert which is used to regulate outflow from the impoundment during runoff events. There are no gate controls on the outlet culvert. The emergency spillway consists of a broad crested weir approximately 426 feet long which discharges to a downstream slope protected by a heavy stone fill. This embankment is at a slope of 1 vertical to 6-1/2 horizontal. The crest of the emergency spillway is protected from erosion by a 1 foot wide concrete wall which extends 4 feet below grade at the crest. Concrete abutments protect the embankment from the erosion effects of flow through the emergency spillway. The downstream toe of the emergency spillway channel is protected by a thickened section of heavy stone fill.

b. Location

The English Road Detention Facility Dam is located in the Town of Greece, Monroe County, New York.

c. Size Classification

The maximum height of the dam is approximately 18 feet. The volume of the impoundment is approximately 235 acre feet to the top of dam. Therefore, the dam is in the small size classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

Paddy Hill Creek, the receiving stream from the impoundment, flows through a heavily developed residential section of the Town of Greece. Several residences are located in close proximity to the stream channel. Therefore, the dam is in the high hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the Town of Greece, New York.

Contact: James S. Peet, P.E.
Town Engineer
Greece Town Hall
2505 West Ridge Road
Rochester, New York 14626
Telephone: (716) 225-2000

f. Purpose of the Dam

The dam is used as a stormwater retention facility to control flows in Paddy Hill Creek downstream from the facility.

g. Design and Construction History

The plans included in this report indicate that the dam was designed in 1977 with construction completed in 1978. The dam, as it presently exists, substantially conforms to the plans. No modifications have been made to the facility since its construction.

h. Normal Operational Procedures

The facility is operated by the Town of Greece. Flow is maintained through the outlet control structure during dry weather flow. During runoff events, the 84 inch pipe operates under inlet flow control to restrict discharge in the downstream channel. No regulating gates are provided at this facility. The facility is monitored weekly during dry weather flow. During runoff events, the facility is monitored every 2 hours or more often if required.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of English Road Detention Facility Dam is 4.25 square miles, 2,688 acres.

b. Discharge at Dam Site

Discharge records of the flood of record for this facility were not available for this report.

Computed Discharges:

Emergency Spillway, top of dam	16,210 cfs
*Drawdown Capacity	680 cfs

c. Elevation (feet above MSL)

Top of Dam	357.0
Spillway Crest	351.5
Stream Bed at Centerline of Dam	336.3
Invert of 84 inch Diameter Pipe	336.5

d. Reservoir

Length of Spillway Pool	2,700 ft.+
Length of Normal Pool	normally dry

e. Storage

Top of Dam	235 acre feet
Spillway Crest	120 acre feet

f. Reservoir Area

Top of Dam	22 acres
Spillway Crest	18.6 acres

g. Dam

Type - homogeneous earth fill
Length - 645
Height - 18+ feet
Freeboard Between Emergency Spillway and Top of Dam - 5.5 feet
Top Width - 10 feet
Side Slopes - upstream, 1 vertical to 3 horizontal; downstream 1 vertical to 6.5 horizontal
Zoning - none
Impervious Core - none
Grout Curtain - none

* Discharge through 84 inch diameter conduit with reservoir at spillway crest.

h. Emergency Spillway

Type - broad crested weir

Length - 426 feet

Crest Elevation - 351.5

Gates - none

U/S Channel - impoundment

D/S Channel - slope, 1 vertical to 6.5 horizontal protected by heavy stone fill

i. Regulating Outlets

84 inch concrete pipe - no flow regulating gate.

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Geologically, English Road Detention Facility Dam is located in the Eastern Lake section of the Central Lowland Province which is part of the Interior Plains, the major physiographic division. The dam is sited on glacial debris which overlies the Queenston Shale of Upper Ordovician age. The Queenston is made up predominantly of thin-bedded argillaceous red shale which includes beds of siltstone and sandstone. Bedding is horizontal. The glacial debris is, for the most part, lacustrine having been deposited on the floor of the former glacial Lake Iroquois. Some of the lake floor was reworked to form beaches and sandbars. Isolated patches of ground moraine, covered by lake deposits, poke through on occasion due to the probable irregularity of its thickness above bedrock or due to erosion of its lake bed cover.

Several soil varieties are present in the vicinity of the dam. Permeability varies from moderately rapid to rapid, from 0.2 to more than 6.3 inches per hour, depending on the soil type.

b. Subsurface Investigations

Detailed subsurface investigations were conducted prior to the design of the facility. The records of these subsurface investigations are included in Appendix E. The plans (See Appendix F) indicate that the dam was to be keyed into bedrock, which is Queenston Shale. The boring records indicate mainly silt to fine sand with a gravel zone present above the bedrock.

2.2 DESIGN RECORDS

The engineering design computations and report are on file with the design engineers. A portion of this design report is included in Appendix E.

2.3 CONSTRUCTION RECORDS

Although the records kept during construction were not available for review, inquiry with the design engineers revealed that the construction was carried out under their direct supervision.

2.4 OPERATION RECORDS

The facility is monitored weekly during dry weather periods. An inspection check list (See Appendix E) is filled out during each inspection trip. The check list covers security measures at the site and documents the condition of the control outlet structure. During runoff events, the facility is monitored every 2 hours or more often if required. Elevations of the water level in the impoundment are recorded on a storage curve during each visit.

2.5 EVALUATION OF DATA

The data presented in this report was obtained from the Town Engineer of the Town of Greece and from the files of the New York Department of Environmental Conservation, Dam Safety Section. The information appears to be reliable and adequate for a Phase I Inspection Report.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The English Road Detention Facility Dam was inspected on November 20, 1980. The Dale Engineering Company Inspection Team was accompanied on the inspection by James S. Peet, P.E., Town Engineer of the Town of Greece. At the time of the inspection, a light snow cover partially obscured the ground surface in the area. The weather was fair and sunny and temperature was in the mid 30's. At the time of the inspection, there was no water in the impoundment. Flow through the 84 inch control culvert was approximately 8 inches deep.

b. Dam

The embankment of the facility shows no signs of subsidence, misalignment, or sloughing of the slopes. Since the facility is a stormwater detention basin and no water was impounded at the time of the inspection, there was no evidence in the field of seepage at the toe or on the downstream slope of the embankment. The grassed slopes are in good condition with no signs of erosion. Highway construction was underway near the east abutment of the embankment. The ground surface in this area has been recently disturbed by this construction. There is some evidence of construction vehicle traffic on the downstream slope of the embankment near the abutment.

c. Control Outlet

The outlet control structure was in good condition at the time of the inspection. The trashrack on the upstream end of the structure was free of debris and flow was unimpeded through the culvert.

d. Emergency Spillway

Concrete surfaces of the emergency spillway were in good condition, typical of new construction. The spillway channel immediately downstream from the spillway crest was overgrown with light brush. A roadway on the impoundment side of the facility shows signs of recent travel probably as a result of the highway construction near the east abutment.

e. Reservoir Area

The reservoir area at the spillway elevation extends approximately 2,700 feet upstream from the dam. The area in the impoundment remains in a natural state with light woods and brush prevailing throughout the area. Slopes at the edge of the impoundment at the maximum pool elevation are quite steep with no evidence of recent erosion. The Town Engineer indicated that the depth of water in the impoundment has never exceeded the top of the pipe of the control outlet.

f. Downstream Channel

The channel downstream from the control outlet is formed in sand and gravel. The riprap protection of the banks at the discharge point shows signs of vandalism through the displacement of the rock material. Despite the poor condition of the bank protection, no signs of recent erosion were evident in the field. Much of this riprap is presently covering the concrete energy dissipator blocks at the outlet of the control outlet.

3.2 EVALUATION

The visual inspection revealed that the dam is generally in good condition. Both the control outlet and the emergency spillway are in good condition and no signs of structural instability were detected.

The following specific items should be addressed by the Owner:

1. The riprap lining the channel at the outlet of the control structure should be replaced to prevent erosion of the channel during high flows and the material covering the energy dissipator blocks should be removed to allow this feature to operate as designed.
2. Close surveillance should be maintained on the construction operations presently underway near the east abutment to insure that the structural integrity of the embankment is not compromised due to these construction activities. The abutment should be restored to its original condition upon completion of the construction activities.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal operating procedure for this facility is to control flow in the downstream channel of Paddy Hill Creek to prevent flooding of residential properties during rainfall runoff events. This is accomplished by the restricted flow which occurs through the 84 inch diameter outlet structure. There are no facilities at this structure to regulate flows through the discharge pipe.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the Town of Greece. Periodic visits are made to the site to check on conditions of the facilities. An inspection checklist is completed based on the findings of the monitoring visit.

4.3 MAINTENANCE OF OPERATING FACILITY

Maintenance of the control outlet consists mainly of removing debris from the trashrack at the inlet to the culvert.

4.4 DESCRIPTION OF WARNING SYSTEM

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenances are regularly inspected by representatives of the Town of Greece. The facility is presently in good condition. There is no evidence of deterioration caused by lack of maintenance. Since the dam is in the high hazard classification, a warning system should be implemented to alert the public should conditions occur which could result in failure of the dam.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The English Road Detention Facility Dam is a flood control structure located in the southeastern portion of the Town of Greece, some 1,000 feet south of English Road. The dam has a drainage area of 4.25 square miles which is characterized by suburban developments and some industrial developments. The structure is situated on Paddy Hill Creek, which flows in a northerly direction to its confluence with Round Pond Creek and eventually into Lake Ontario. Much of the drainage course upstream of the dam is channelized. The reservoir has a surface area of approximately 19 acres at the spillway crest. However, due to the operation of the structure as a flood control facility, the reservoir area is normally dry.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. This has been assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the reservoir and the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration of run-off of a specific location that is considered reasonably possible for a particular drainage area.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data, were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF. In the event that the dam could not pass 1/2 the Probable Maximum Flood without overtopping, additional analyses are to be performed on potential dam failures if the dam is designated as a High Hazard Classification. This process was done with the concept that, if the dam was unable to satisfy this criteria, further refined hydrologic investigations would be required.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB using the Modified Puls Method of flood routing was used to evaluate the dam, spillway capacity, and downstream hazard.

Unit hydrographs were defined by Snyder coefficients, C_t and C_p . Snyder's C_t was estimated to vary from 1.5 to 1.75 for the drainage area and C_p was estimated to be 0.625. The drainage area was divided into sub-areas to model the variability in hydrologic characteristics within the drainage basin.

Run-off, routing and flood hydrograph combining was then performed to obtain the flow into the reservoir. In this analysis, the reservoir pool was assumed to be at the spillway crest elevation at the start of the storm and outflow through the low level outlet was assumed to be zero.

The Probable Maximum Precipitation (PMP) was 21.5 inches according to Hydrometeorological Report (HMR #33) for a 24-hour duration storm, 200 square mile basin, while loss rates were set at 1.0 inches initial abstraction and 0.1 inch/hour continuous loss rate. The loss rate function yielded 86 percent run-off from the PMF. The peak for the PMF inflow hydrograph was 9,468 cfs and the 1/2 PMF inflow peak was 4,157 cfs. The storage capacity of the reservoir above the spillway only reduced these peak flows to 9,464 cfs for the PMF and 4,153 cfs for the 1/2 PMF flow.

5.3 SPILLWAY CAPACITY

The spillway is a broad crested weir type structure 426 feet in length with sloping upstream and downstream faces. A weir coefficient of 2.95 was assigned for the spillway rating curve development. The discharge capacity of the spillway at the top of dam elevation is 16,210 cfs.

SPILLWAY CAPACITY

<u>Flood</u>	<u>Peak Discharge</u>	<u>Capacity as % of Flood Discharge</u>
PMF	9,464 cfs	177%
1/2 PMF	4,153 cfs	390%

5.4 RESERVOIR CAPACITY

The reservoir storage capacity was obtained from the permit application for the facility (see Appendix E) and USGS mapping. The resulting estimates of the reservoir storage capacity are shown below:

Top of Dam	235 Acre Feet
Emergency Spillway Crest	120 Acre Feet

5.5 FLOODS OF RECORD

Discharge records of the floods of record for this facility were not available for this report.

5.6 OVERTOPPING POTENTIAL

The HEC-1 DB analysis indicates that the spillway can pass the PMF with 1.7 feet of freeboard and the 1/2 PMF with 3.3 feet of freeboard.

5.7 EVALUATION

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with 1.7 feet of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The English Road Detention Facility consists of an earthen embankment and an uncontrolled low level outlet and emergency spillway. The dam spans some 645 feet across the ravine, with the spillway occupying 426 feet of the central portion of the dam. The control section for the emergency spillway is formed by a concrete sill which extends across the entire crest width. A grassed earthen section leads up to this crest at a shallow slope and downstream of the crest the spillway channel bottom is lined with heavy stone fill to about 15 feet beyond the toe of slope. Concrete training walls extend from about 20 feet upstream of the spillway crest to just beyond the toe of slope, forming the sides of the emergency spillway channel. Earthen sections extend to either side of these training walls to where they tie into natural ground. An access road runs the entire length of the dam, passing just upstream of the training walls and spillway crest. The low level outlet consists of a reinforced concrete pipe that extends through the left portion of the embankment to the stone lined outlet channel. Outlet end treatment for this low level outlet consists of a concrete headwall and a concrete apron with concrete impact blocks.

The earthen embankment is well maintained, adequately mowed, and void of any brush or tree growth. The slopes are generally uniform with no evidence of structural movement or cracking. Near the vicinity of the right abutment, the earthen embankment has been disturbed somewhat as a result of the highway construction in the area. This disturbed area extends along the junction with natural ground on the downstream slope and leaves this area susceptible to erosion. The concrete spillway crest, training walls and low level outlet structures were all in excellent condition, although some minor diagonal surface cracking was noted in the right abutment wall. The low level outlet apron and impact blocks were covered with stones by vandals. The heavy stone fill on the emergency spillway channel showed some segregation by size of stone and there were some weeds growing up through the stone.

b. Design and Construction Data

No information regarding the stability of the structure was located. Drawings included in Appendix F substantially conform to the present facility. The drawings indicate that the embankment was specified to be constructed of impervious soil, although the gradation limits are such that the material could be as coarse as a silty sand and still satisfy the specifications. This embankment material was to be compacted to not less than 95% of standard proctor maximum density. The upstream slope was specified as 3:1 (horizontal to vertical) with a 10 foot wide maintenance ramp and the downstream slope as 6.5:1. A keyway trench was designed to run the length of the embankment, extending beneath the embankment to sound rock. The crest width of the earthen embankment was to be 10 feet and all of the embankment, with the exception of the spillway

and access roads were to be covered with topsoil and seeded. The emergency spillway channel was designed to be lined with 2 feet of heavy stone filling that is underlaid with 6 inches of bedding material and a fabric filter. This fabric filter was to be attached at its edges to the concrete spillway crest and the footings of the training walls.

Construction drawings for the project are dated July 1977 (with August 1977 revisions), and available correspondence indicates the project was completed in 1978.

c. Operating Records

The only formal operating records pertain to pool elevations, discharge condition of the low level outlet, and security measures.

d. Post Construction Changes

There is no field evidence or available information indicating post construction changes to the facility other than the previously mentioned disturbed area near the right abutment.

e. Seismic Stability

No known faults or lineaments suggesting faults are present in the immediate area. The area is located within Zone 2 of the Seismic Probability Map but is only 28 miles northeast of an active Zone 3 which has had earthquakes with intensities as great as VIII on the Modified Mercalli Scale. Only a few earthquakes have been recorded in the vicinity of the dam and are tabulated below:

<u>Date</u>	<u>Intensity Modified Mercalli</u>	<u>Location Relative to Dam</u>
1931	I	5 miles SE
1931	II	5 miles SE
1944	II	7 miles SE
1977	IV	17 miles SE

6.2 STRUCTURAL STABILITY ANALYSIS

The earthen embankment generally appeared to be uniform in section with no signs of structural instability in evidence. The area near the right abutment has been recently disturbed as a result of highway construction. This area should be restored to protect the facility.

The entire embankment and spillway facility, as well as areas beyond the toe of the slope, should be regularly inspected as a part of a formalized inspection program to detect deficiencies. Any deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be based.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

The Phase I Inspection of the English Road Detention Facility Dam did not indicate conditions which would constitute an immediate hazard to human life or property.

The hydrologic/hydraulic analysis indicates that the spillway will pass 177% of the Probable Maximum Flood (PMF). Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

The visual inspection did not reveal conditions which would indicate evidence of structural displacement or instability.

The following specific safety assessments are based on the Phase I visual examination and analysis of hydrology and hydraulics, and structural stability:

1. The ground surface near the earthen embankment has been disturbed as a result of highway construction near the east abutment, leaving the area susceptible to erosion.
2. Riprap at the outlet of the control structure has been displaced by vandals; much of it thrown on the concrete apron, covering the concrete energy dissipator blocks.
3. No warning system is presently in effect to alert the public should conditions occur which could result in failure of the dam.
4. Although the facility is inspected regularly, the inspection program does not include a formalized inspection of the entire embankment and areas beyond the toe of slope.

b. Adequacy of Information

The information available is adequate for this Phase I investigation.

c. Urgency

Items 1 through 4 of the safety assessment should be addressed by the Owner and appropriate actions taken within one year of this notification.

d. Need for Additional Investigation

This Phase I inspection has not revealed the need for additional investigations regarding this structure.

7.2 RECOMMENDED MEASURES

The following is a list of recommended measures to be undertaken to insure safety of the facility:

1. Construction activities near the east abutment should be closely monitored to insure that further damage does not occur in this area. Presently disturbed areas should be restored to the original condition.
2. Riprap at the outlet of the control structure should be repaired, the material covering the concrete impact blocks removed, and steps should be taken to control vandalism at the site.
3. A flood warning and emergency evacuation system should be implemented to alert the public should conditions occur which could result in failure of the dam.
4. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility including the slopes and the area immediately downstream from the toe of the embankment. Deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be made.

APPENDIX A

PHOTOGRAPHS



2. View along crest of emergency spillway. Impoundment area to right. Note disturbed areas of right abutment in background.



3. Looking along emergency spillway crest from right abutment



4. Upstream channel and
impoundment area.



5. Channel downstream
of control outlet.



6. Outlet headwall and
channel at control
outlet.



7. Emergency spillway outlet channel. Looking downstream from spillway crest.



8. Portion of downstream hazard. Stream to right of photo.

APPENDIX B
VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST1) Basic Data

a. General

Name of Dam ENGLISH ROAD DETENTION FACILITY DAMFed. I.D. # N.Y. 996 DEC Dam No. _____River Basin LAKE ONTARIOLocation: Town GREECE County MONROEStream Name PADDY HILL CREEKTributary of ROUND PONDLatitude (N) 43-14.0 Longitude (W) 77-40.5Type of Dam EARTHHazard Category HIGHDate(s) of Inspection NOV. 20, 1980Weather Conditions FAIR (LIGHT SNOW COVER)Reservoir Level at Time of Inspection NO WATER IMPOUNDED AT TIME OF INSPECTIONb. Inspection Personnel F.W. BYSZEWSKI, B. COLWELL, J. GOMEZH. MUSKATT - DALE ENGINEERING COMPANY; J. PEET - TOWN ENGINEER
TOWN OF GREECE

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

JAMES PEET P.E. TOWN ENGINEERGREECE TOWN HALL TELEPHONE: 716-225-20002505 W. RIDGE RD.ROCHESTER N.Y. 14626

d. History:

Date Constructed 1978 Date(s) Reconstructed _____Designer ERDMAN AND ANTHONY ASSOCIATES

Constructed By _____

Owner TOWN OF GREECE.

2) Embankment

a. Characteristics

- (1) Embankment Material "IMPERVIOUS EMBANKMENT" WITH
GRADATION LIMITS AS DEFINED IN SPECS (SEE APPENDIX E)
- (2) Cutoff Type "IMPERVIOUS EMBANKMENT"
- (3) Impervious Core NONE
- (4) Internal Drainage System NONE
- (5) Miscellaneous —

b. Crest

- (1) Vertical Alignment NO MISALIGNMENT OBSERVED.
- (2) Horizontal Alignment NO MISALIGNMENT OBSERVED
- (3) Surface Cracks NONE OBSERVED (LIGHT SNOW COVER
AT TIME OF INSPECTION)
- (4) Miscellaneous —

c. Upstream Slope

- (1) Slope (Estimate) (V:H) 1:3
- (2) Undesirable Growth or Debris, Animal Burrows NONE OBSERVED.
- (3) Sloughing, Subsidence or Depressions NONE OBSERVED.

(4) Slope Protection NONE

(5) Surface Cracks or Movement at Toe NONE OBSERVED (LIGHT
SNOW COVER AT TIME OF INSPECTION)

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 : 6.5

(2) Undesirable Growth or Debris, Animal Burrows NONE OBSERVED

(3) Sloughing, Subsidence or Depressions NONE OBSERVED

(4) Surface Cracks or Movement at Toe NONE OBSERVED (LIGHT
SNOW COVER AT TIME OF INSPECTION)

(5) Seepage NONE OBSERVED (NO WATER IMPOUNDED
AT TIME OF INSPECTION)

(6) External Drainage System (Ditches, Trenches; Blanket) NONE

(7) Condition Around Outlet Structure RIP RAP AT OUTLET
OF STRUCTURE HAS BEEN DISPLACED. VANDALISM.

(8) Seepage Beyond Toe NONE NOTED NO WATER
IMPOUNDED AT TIME OF INSPECTION.

e. Abutments - Embankment Contact

NO PROBLEMS NOTED - GOOD CONDITION.

(1) Erosion at Contact NONE

(2) Seepage Along Contact NONE OBSERVED (NO WATER
IMPOUNDED AT TIME OF INSPECTION)

3) Drainage System

a. Description of System NONE

b. Condition of System —

c. Discharge from Drainage System —

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

5) Reservoir

- a. Slopes NO EVIDENCE OF INSTABILITY
- b. Sedimentation MINOR SILTING OF STREAM AT TRASH RACK
- c. Unusual Conditions Which Affect Dam DETENTION OF STORM WATER - NO IMPOUNDMENT MOST OF THE TIME

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) RESIDENTIAL SUBDIVISIONS DOWN STREAM.
- b. Seepage, Unusual Growth NONE OBSERVED
- c. Evidence of Movement Beyond Toe of Dam NONE OBSERVED
- d. Condition of Downstream Channel NO RECENT EROSION OBSERVED. BANKS ARE STABLE

7) Spillway(s) (Including Discharge Conveyance Channel)

- SERVICE SPILLWAY IS AN 84" E.C.P. - NO OTHER CONTROL IS PROVIDED.
- a. General GOOD CONDITION - NO MISALIGNMENT OBSERVED.
- b. Condition of Service Spillway GOOD CONDITION.

c. Condition of Auxiliary Spillway EXCELLENT - NO FLOW
HAS OCCURRED SINCE IT'S CONSTRUCTION. SOME LIGHT
BRUSH GROWING IN ZIP RAP SLOPE

d. Condition of Discharge Conveyance Channel GOOD CONDITION
NEVER USED.

8) Reservoir Drain/Outlet

Type: Pipe ☒ Conduit _____ Other _____

Material: Concrete ☒ Metal _____ Other _____

Size: 84" Length 154 L.F.

Invert Elevations: Entrance 336.5 Exit 335.7

Physical Condition (Describe): _____ Unobservable _____

Material: GOOD RECENTLY CONSTRUCTED (1978)

Joints: OK Alignment GOOD

Structural Integrity: NO SIGN OF STRUCTURAL PROBLEMS

Hydraulic Capability: _____

Means of Control: Gate _____ Valve _____ Uncontrolled ☒

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): _____

9) Structural

a. Concrete Surfaces EXCELLENT

b. Structural Cracking NONE OBSERVED

c. Movement - Horizontal & Vertical Alignment (Settlement) NO MOVEMENT OBSERVED.

d. Junctions with Abutments or Embankments NO PROBLEMS NOTED.

e. Drains - Foundation, Joint, Face NONE

f. Water Passages, Conduits, Sluices NONE

g. Seepage or Leakage NONE

h. Joints - Construction, etc. OK

i. Foundation N/A

j. Abutments GOOD - NO PROBLEMS.

k. Control Gates NONE

l. Approach & Outlet Channels N/A

m. Energy Dissipators (Plunge Pool, etc.) N/A

n. Intake Structures N/A

o. Stability N/A

p. Miscellaneous N/A

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition NONE

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

11) Operation Procedures (Lake Level Regulation):

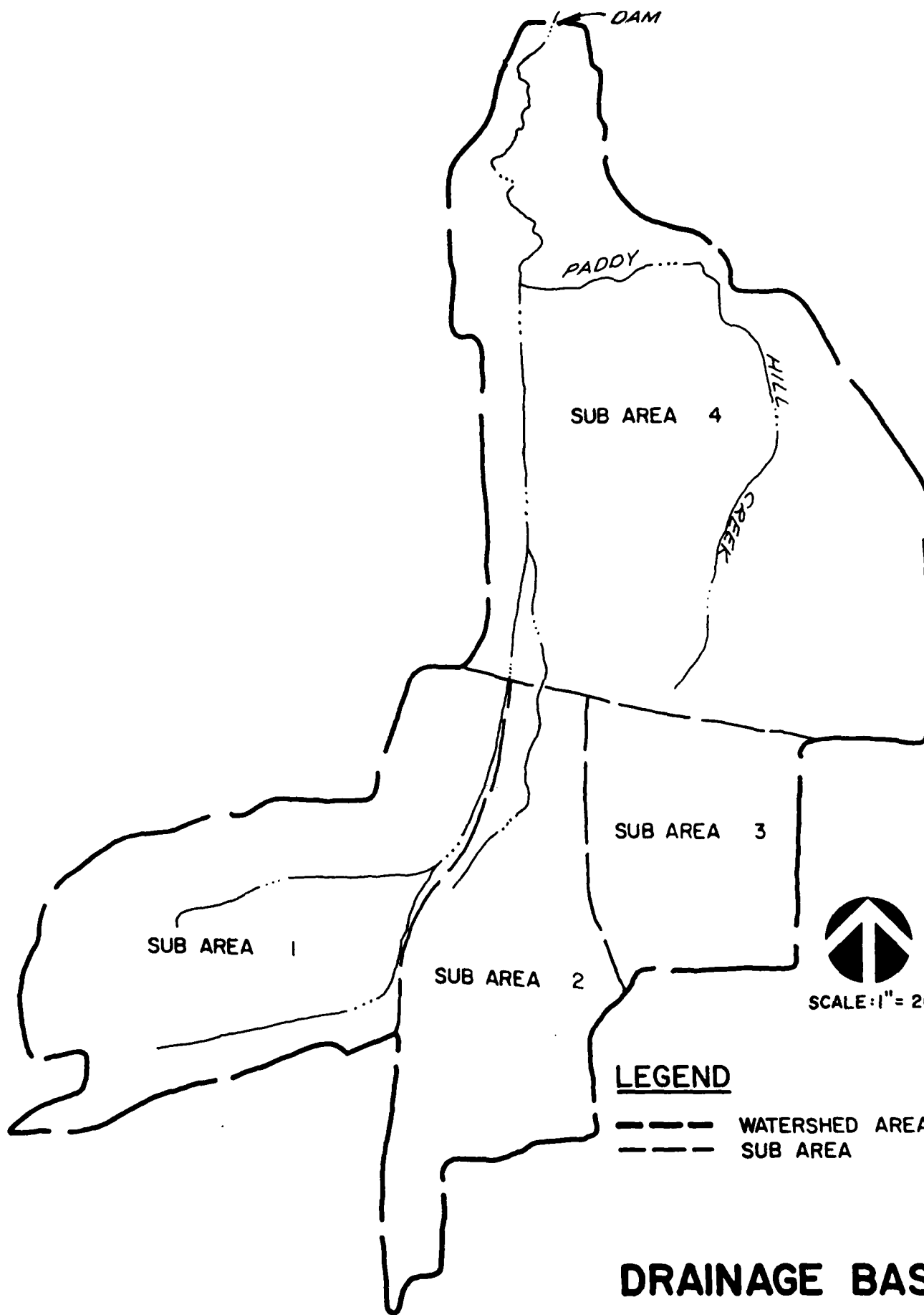
FACILITY IS INSPECTED TWICE WEEKLY.

MORE OFTEN DURING RUN-OF-EVENT.

OUTLET IS UNCONTROLLED

APPENDIX C

HYDROLOGIC/HYDRAULIC, ENGINEERING DATA AND COMPUTATIONS



DRAINAGE BASIN

**STETSON • DALE**BANKERS TRUST BUILDING
UTICA • NEW YORK • 13501

TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections DATE _____
SUBJECT English Food Inspection Facility PROJECT NO. 2520
Subarea Hydrologic Parameters DRAWN BY JAG

<u>Subarea</u>	<u>Area</u>	<u>C_f</u>	<u>L</u>	<u>L_{CA}</u>	<u>$t_r = C(L \times L_{CA})^{0.3}$</u>
1	1.067 mi ²	1.5	1.93 mi	0.81 mi	1.72 hr
2	0.726	1.5	2.0	1.02	1.86
3	0.479	1.5	1.02	0.53	1.25
4	1.968	1.75	3.18	2.1	3.09
	<u>$\Sigma = 4.24$ mi²</u>				

**STETSON • DALE**BANKERS TRUST BUILDING
UTICA • NEW YORK • 13501
TEL 315-797-5800**DESIGN BRIEF**

OBJECT NAME N.Y.S. Dam Inspections 1981 DATE 12-19-80
SUBJECT English Road Detention Facility, ID# 996 PROJECT NO. 2520
Depth-Area-Duration DRAWN BY JAG

PMP

FROM HMR # 33

for Lat. ~ $43^{\circ}14'$ Long. ~ $77^{\circ}40.5'$
Index Rainfall = 26.5" for 200 mi², 24 hr
Zone 2

<u>Duration</u>	<u>% Index*</u>	<u>Depth</u>
6 hrs.	117	25.2"
12 hrs.	127	27.3
24 hrs	141	30.3
48 hrs	151	32.5

* Adjusted for site area, Drainage Area = 4.2 mi²
(which is less than the lower limit of the
area adjustment graph, 10 mi², therefore
these values were adjusted for this lower
limit)



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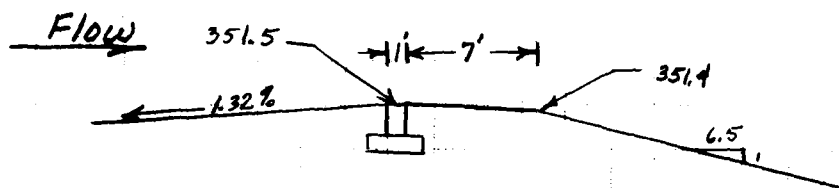
BANKERS TRUST BUILDING
UTICA • NEW YORK • 13501

TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME NYS Dam Inspections -1981 DATE 2-3-81
 SUBJECT English Road Detention Facility PROJECT NO 2520
Spillway Rating DRAWN BY J.A.

Spillway Crest ELEV. = 351.5
 Spillway Length = 426'
 Top of Dam ELEV. = 357



Spillway is approximately trapezoidal in profile and rectangular perpendicular to flow

$$Q = CL H^{3/2}$$

$C \sim 2.95$ for vertical sidewalls

ELEV.	H (ft.)	Q (cfs)
351.5	0	0
352	0.5	444
353	1.5	2309
354	2.5	4968
355	3.5	8229
356	4.5	11,996
357	5.5	16,210

Top of Dam

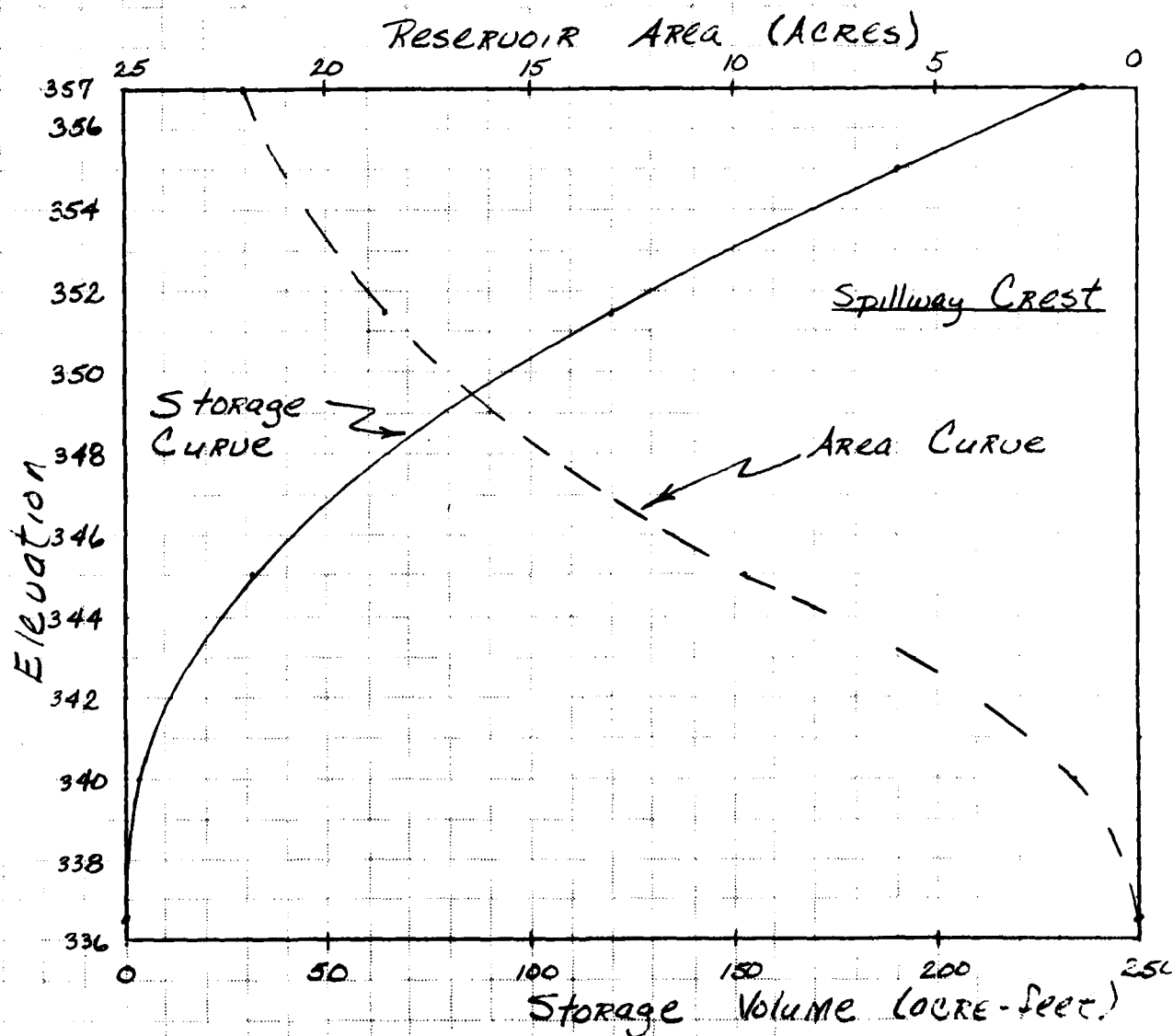


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DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 8-5-8
SUBJECT English Road Deletion Facility PROJECT NO. 2510
Area Capacity Curve DRAWN BY _____





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DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections - 1981 DATE _____
SUBJECT English Road Detention Facility PROJECT NO. 2552
Low Level Outlet Capacity DRAWN BY _____

84" RCP

L = 154'

Inlet Invert @ 336.5

Outlet Invert @ 335.7

Neglecting Trashrock Losses

A. Assuming Inlet Control

$$H = 351.5 - 336.5 = 15'$$

$$Q = 680 \text{ cfs}$$

B. Assuming Outlet Control if outlet
unsubmerged

$$H W + S_o L = 351.5 - 335.7 = 15.8'$$

$$Q = 760 \text{ cfs}$$

therefore inlet control would govern unless
the outlet is submerged sufficiently.

NY # 996

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

1

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>357</u>	<u>22</u>	<u>235</u>
2) Design High Water (Max. Design Pool)	<u>355</u>	<u>21</u>	<u>190</u>
3) <u>Principal</u> Spillway Crest	<u>336.5</u>	<u>0</u>	<u>0</u>
4) Pool Level with Flashboards	<u>N/A</u>		
5) Service Spillway Crest	<u>351.5</u>	<u>18.6</u>	<u>120</u>

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>Unknown</u>
2) Spillway @ Maximum High Water	<u>16210</u>
3) Spillway @ Design High Water	<u>8230</u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>N/A</u>
5) Low Level Outlet (84" RCP, RES. @ Top of Dam, Elev. 357)	<u>850</u>
6) Total (of all facilities) @ Maximum High Water	<u>17060</u>
7) Maximum Known Flood	<u>Unavailable</u>
8) At Time of Inspection	<u>Unknown</u>

CREST:

ELEVATION: 357Type: Earth FillWidth: 18'Length: 645'

Spillover

None(Emergency Spillway @ Right abutment)

Location

SPILLWAY:

PRINCIPAL

336.5

Elevation

351.584" Ø RCP

Type

Broad crested weir

Width

426'Type of Control

Uncontrolled

Controlled:

Type

(Flashboards; gate)

Number

Size/Length

Invert Material

Anticipated Length
of operating service

Chute Length

Height Between Spillway Crest
& Approach Channel Invert
(Weir Flow)

CREST:

ELEVATION: 357Type: Earth fillWidth: 18'Length: 645'Spillover None (^{emergency} Spillway @ Right abutment)

Location _____

SPILLWAY:

PRINCIPAL

336.5

Elevation

351.584" Ø RCP

Type

Broad crested weir

Width

426'Type of Control

Uncontrolled

Controlled:

Type

(Flashboards; gate)

Number

Size/Length

Invert Material

Anticipated Length
of operating service

Chute Length

Height Between Spillway Crest
& Approach Channel Invert
(Weir Flow)

HYDROMETEROLOGICAL GAGES:

Type : None

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: No formalized system

Method of Controlled Releases (mechanisms):

None other than the control provided by the
discharge capacity of the uncontrolled
low level outlet (84"Ø pipe)

DRAINAGE AREA: 4.25 mi²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: 20% commercial, industrial, 80% suburban

Terrain - Relief: Moderately Sloped

Surface - Soil: —

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

Upper portion of drainage area
may be subject to urbanization

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

None Known

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None at present

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: No low reaches

Elevation: —

Reservoir:

Length @ Maximum Pool 0.5± (Miles)

Length of Shoreline (@ Spillway Crest) 1.1± (Miles)

FILE	IS	ABQD	ENGLISH RD. DETENTION FACILITY	FILE	IS	ABQD
(0001)	A1		HEC1-DB (SNYDER PARAMETERS)			
(0002)	A2		PMF - DAM OVER TOPPING ANALYSIS			
(0003)	A3					
(0004)	B	300	C	10	C	C
(0005)	B1	5	C	0	C	C
(0006)	J	1	7	1	C	C
(0007)	J1	0.2	0.3	C.4	0.5	0.6
(0008)	K	0	100	0	0	0
(0009)	K1		RUNOFF SUBAREA 1			
(0010)	M	1	1	1.067	0	4.24
(0011)	F	J	21.5	117	127	141
(0012)	T	C	0	0	0	0
(0013)	W	1.72	0.625	0	0	0
(0014)	X	-2.0	-0.10	0	0	0
(0015)	K	1	101	0	0	0
(0016)	K1		ROUTE UNDER RIDGE ROAD			
(0017)	Y	0	0	0	1	1
(0018)	Y1	1	0	0	0	0
(0019)	Y2	0	4	10	0	0
(0020)	Y3	0	760	3500	0	0
(0021)	Y4	409	411	415	417	423
(0022)	Y4	433				426
(0023)	Y5	3	70	200	370	550
(0024)	Y5	3500				760
(0025)	K	1	410	0	0	0
(0026)	K1		ROUTE TO CONFLUENCE W/ SUBAREA 2			
(0027)	Y	0	0	1	1	0
(0028)	Y1	1	0	0	0	0
(0029)	Y6	-06	.035	.06	397	410
(0030)	Y7	100	410	150	405	188
(0031)	Y7	227	401	260	405	300
(0032)	K	0	200	0	0	0
(0033)	K1		RUNOFF SUBAREA 2			
(0034)	M	1	1	0.726	0	4.24
(0035)	F	0	21.5	117	127	141
(0036)	T	0	0	0	0	0
(0037)	W	1.85	0.625	0	0	0
(0038)	X	-2.0	-0.10	0	0	0

(0039)	K	1	201	C	C	C	C	1	C	C	C	C
(0040)	K1	ROUTE UNDER RIDGE RD.										
(0041)	Y	1	0	C	1	1	C	C	C	C	C	C
(0042)	Y1	1	0	C	C	C	C	-1	C	C	C	C
(0043)	Y2	0	50	175	300	C	C	C	C	C	C	C
(0044)	Y3	0	230	270	3400	C	C	C	C	C	C	C
(0045)	Y4	414	416	418	420	424	424	432	433	433	433	433
(0046)	Y5	0	40	130	210	230	230	270	3400	3400	3400	3400
(0047)	K	1	410	C	0	0	0	1	C	C	C	C
(0048)	K1	ROUTE TO CONFLUENCE W/SUBAREA 1										
(0049)	Y	1	0	C	1	1	1	C	C	C	C	C
(0050)	Y1	1	0	0	0	0	0	-1	C	C	C	C
(0051)	Y6	-06	-035	-06	397	410	2000	C-0085	C	C	C	C
(0052)	Y7	100	410	150	405	188	401	200	397	397	397	397
(0053)	Y7	227	401	260	405	300	410	C	C	C	C	C
(0054)	K	2	410	C	0	C	0	1	C	C	C	C
(0055)	K1	COMBINE 2 HYDROGRAPHS 1 & 2										
(0056)	K	1	410	C	0	0	0	1	C	C	C	C
(0057)	K1	ROUTE TO RESERVOIR										
(0058)	Y	1	0	C	1	1	C	C	C	C	C	C
(0059)	Y1	1	0	C	0	C	C	-1	C	C	C	C
(0060)	Y6	-07	-035	-07	352	365	8000	C-0056	C	C	C	C
(0061)	Y7	100	365	150	360	188	356	200	352	352	352	352
(0062)	Y7	227	356	260	360	300	365	C	215	215	215	215
(0063)	K	0	300	C	0	C	C	C	C	C	C	C
(0064)	K1	RUNOFF SUBAREA 3										
(0065)	M	1	1	C-479	C	4-24	0	C	C	C	C	C
(0066)	P	0	21-5	117	127	141	151	C	1	1	1	1
(0067)	T	0	0	C	C	C	C	1-0	0-1	0-1	0-1	0-1
(0068)	W	1-25	0-625	1-6	0	C	C	1	C	C	C	C
(0069)	X	-2-0	-0-10	C	0	C	C	C	C	C	C	C
(0070)	K	1	301	C	0	C	C	C	C	C	C	C
(0071)	K1	ROUTE UNDER RIDGE RD.										
(0072)	Y	0	0	C	1	1	C	C	C	C	C	C
(0073)	Y1	1	0	C	C	C	C	-1	C	C	C	C
(0074)	Y2	0	1	2	5	10	18	30	47	47	47	47
(0075)	Y3	0	23	47	72	90	110	1780	5090	5090	5090	5090
(0076)	Y4	413	415	416	417	418	419	420	421	421	421	421

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	100
ROUTE HYDROGRAPH TO	101
ROUTE HYDROGRAPH TO	410
RUNOFF HYDROGRAPH AT	200
ROUTE HYDROGRAPH TO	201
ROUTE HYDROGRAPH TO	410
COMBINE 2 HYDROGRAPHS AT	410
ROUTE HYDROGRAPH TO	411
RUNOFF HYDROGRAPH AT	300
ROUTE HYDROGRAPH TO	301
ROUTE HYDROGRAPH TO	401
RUNOFF HYDROGRAPH AT	400
COMBINE 3 HYDROGRAPHS AT	400
ROUTE HYDROGRAPH TO	401
END OF NETWORK	

 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 26 FEB 79

RUN DATE? WED, MAR 04 1981
 TIME? 08:01:31

ENGLISH RD. DETENTION FACILITY FILE IS ABQD
 HEC1-DB (SNYDER PARAMETERS)
 PMF - DAM OVER TOPPING ANALYSIS

JOB SPECIFICATION									
NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
500	0	10	0	0	0	0	0	4	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED

RTIUS= 0.20 C.30 C.40 0.50 C.60 0.80 1.00
 MPLAN= 1 MRTIO= 7 LRTIO= 1

SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 1
 ISTAQ 100
 ICOMP 0 IECON 0 ITAPE 0 JPLT 0 JFRT 0 INAME 1 ISTAGE 0 IAUTO 0

HYDROGRAPH DATA									
INVDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNO4	ISAME	LOCAL
1	1	1.27	C.LC	4.24	0.00	C.000	0	1	0

PRECIP DATA			
SFFE	PMS	R0	R24
C.00	21.50	117.00	127.00
			141.00
			151.00
			C.00
			R72
			C.00

TRSPC COMPUTED BY THE PROGRAM IS 0.600

LOSS DATA										
LROPT	STKR	DLTKR	RTIOL	LRIN	STKRS	MTIOL	STRTL	CNSTL	ALSPX	RTIPL
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

U.S. IT HYDROGRAPH DATA
 TP= 1.72 CH= 1.03 RTA= 0

STRTQ= -2.00 RECESION DATA RTIOR= 1.60
 QRCNS= -0.10
 UNIT HYDROGRAPH 56 END-OF-PERIOD ORDINATES, LAG= 1.70 HOURS, CP= 0.63 VOL= 1.00
 8. 29. 58. 129. 167. 202. 230. 259.
 260. 246. 223. 200. 180. 162. 143. 117. 100.
 95. 85. 77. 69. 62. 56. 50. 45. 36.
 33. 29. 26. 24. 21. 19. 17. 15. 12.
 11. 10. 9. 8. 7. 6. 5. 4.
 4. 3. 3. 3. 2.

MO.DA HR.MN PERIOD RAIN EXCS LOSS
 END-OF-PERIOD FLOW
 MO.DA HR.MN PERIOD RAIN EXCS LOSS COMF Q
 SUM 25.97 22.34 3.63 9205.
 (660.)(567.)(92.)(2605.29)

HYDROGRAPH ROUTING

ROUTE UNDER PIDGE ROAD
 ISTAT ICOMP 1
 121
 OLUSS CLOSS AVG
 0.0 0.000 0.00
 NSTPS NSTDL 1 0
 LAG AMSKK X
 0 0.000 0.00
 JFRT INAKE ISTAGE IALIC
 0 1 0
 IFMP LSTR
 0 0
 TSK STGRA ISPRAT
 0.00 -1. 0
 STORAGE 0.00 4.00 10.00 11.00
 OUTFLOW 0.00 760.00 1260.00 3500.00
 STAGE 409.00 411.00 413.00 415.00 417.00 420.00 423.00 426.00 429.00
 433.00
 FLOW 0.00 70.00 200.00 370.00 550.00 760.00 900.00 100.00 1150.00
 3500.00

MAXIMUM STAGE IS 417.6
 MAXIMUM STAGE IS 422.6
 MAXIMUM STAGE IS 429.7
 MAXIMUM STAGE IS 432.1

MAXIMUM STAGE IS 432.2
 MAXIMUM STAGE IS 432.5
 MAXIMUM STAGE IS 432.6

HYDROGRAPH ROUTING

ROUTE TO CONFLUENCE W/ SUBAREA 2
 IRTAQ ICOMP IECON ITAPE JPLT JFRT INAPE IRTAGE IRTQC
 410 0 0 0 0 0 0 0 0 0
 ROUTING DATA
 IRES ISAME IOFT IPMP LSTR
 1 1 0 0 C
 OLQSS CLOSS AVG C.O
 0.000 0.00 0.00
 NSTPS NSTDL LAG AMSKK X TSK STORA ISPRAT
 1 0 0 0.000 0.000 -1. C

NORMAL DEPTH CHANNEL ROUTING

ON(1) ON(2) ON(3) ELNVT ELMAX RLNM RLNM SEL
 0.000 0.0350 0.0600 597.0 410.0 200. 0.0000

CROSS SECTION COORDINATES--STA=ELEV*STA+ELEV--ETC
 100.00 410.00 150.00 415.00 188.00 401.00 200.00 397.00
 227.00 411.00 260.00 425.00 300.00 410.00

STORAGE	0.00	0.54	1.20	1.99	2.92	3.97	5.15	6.63	8.48
	13.54	16.54	19.72	23.49	27.65	32.19	37.12	42.43	48.13
OUTFLOW	0.00	27.48	92.16	191.97	328.74	505.03	731.23	1049.43	1429.30
	2403.08	3009.29	3702.35	4487.47	5370.39	6356.13	7449.57	8655.48	9978.51
STAGE	397.00	397.00	397.00	397.00	397.00	397.00	397.00	397.00	397.00
	403.84	404.55	405.21	405.89	406.58	407.26	407.95	408.63	409.32
FLOW	0.00	27.48	92.16	191.97	328.74	505.03	731.23	1049.43	1429.30
	2403.08	3009.29	3702.35	4487.47	5370.39	6356.13	7449.57	8655.48	9978.51

MAXIMUM STAGE IS 430.7

MAXIMUM STAGE IS 401.4

MAXIMUM STAGE IS 402.0
 MAXIMUM STAGE IS 402.6
 MAXIMUM STAGE IS 403.0
 MAXIMUM STAGE IS 403.8
 MAXIMUM STAGE IS 404.5

SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 2
 ISTAQ ICCPP IECON ITAFE JPLT JPRT INAME ISTAGE IAUTO
 200 0 0 0 0 0 0 0

INYDG IUNG TAREA SNAP TRSDA TRSFC RATIO ISNOW ISAME LOCAL
 1 1 0.73 0.00 4.24 0.00 0.00 3 1 0

HYDROGRAPH DATA
 PRECIP DATA
 SPFE PMS RC R12 R24 R48 R72 R90
 0.00 21.50 117.00 127.00 141.00 151.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA
 LROPT STKR DLTKR RTIOL ERAIN STRKS RTIOL STRTL CNSTL ALSMX RTIYP
 0 0.00 0.00 1.00 0.00 0.00 1.00 1.00 0.10 0.00 0.05

UNIT HYDROGRAPH DATA
 TP= 1.35 CP=0.63 NTA= C

RECESION DATA
 STRID= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 62 END-OF-PERIOD ORIGINATES, LAG= 1.80 HOURS, CP= 0.05 VOL= 1.00
 4. 16. 33. 52. 73. 95. 116. 135. 149. 158.
 103. 162. 153. 135. 120. 114. 104. 94. 80. 78.
 70. 64. 58. 53. 48. 43. 39. 36. 32. 29.
 27. 24. 20. 18. 16. 15. 14. 12. 11.
 10. 9. 8. 7. 6. 5. 4. 3. 2.
 4. 3. 3. 3. 2. 2. 2. 2. 2.

NO.DA HR.MN PERIOD RAIN EXCS LOSS CUMP Q END-OF-PERIOD FLOW NO.DA HR.MN PERIOD RAIN EXCS LOSS CUMP Q

SUM 25.97 22.41 3.56 62531.
(660.)(569.)(99.)(1775.68)

HYDROGRAPH ROUTING

ROUTE UNDER RIDGE RD.				HYDROGRAPH ROUTING				
ISTAG	ICOMP	IECON	ITAFE	JPLT	JFRT	INAME	ISTAGE	IAUTO
201	1	0	0	0	0	1	0	0
ROUTING DATA								
QLCSS	CLCSS	AVG	IRF	IOFT	IFMP		LSTR	
C.0	0.000	C.00	1	0	0		0	
NSTPS NSTDL								
	1	0			ISK	STORA	ISPRAT	
					0.000	-1.		
STORAGE	0.00	50.00	175.00	300.00				
OUTFLOW	0.00	230.00	270.00	3400.00				
STAGE	414.00	416.00	416.00	424.00	428.00	432.00	433.00	
FLOW	0.00	40.00	130.00	230.00	250.00	270.00	3400.00	
MAXIMUM STAGE IS	424.5							
MAXIMUM STAGE IS	427.6							
MAXIMUM STAGE IS	431.2							
MAXIMUM STAGE IS	432.1							
MAXIMUM STAGE IS	432.2							
MAXIMUM STAGE IS	432.3							
MAXIMUM STAGE IS	432.5							

HYDROGRAPH ROUTING

ROUTE TO CONFLUENCE #/SUBAREA 1				HYDROGRAPH ROUTING				
ISTAG	ICOMP	IECON	ITAFE	JPLT	JFRT	INAME	ISTAGE	IAUTO
410	1	0	0	0	0	1	0	0

ROUTING DATA									
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR		
C.C	0.000	C.C	1	1	0	0	C		
	NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISFRAT	
	1	0	0	0.000	C.CC	C.CC	-1.	C	

NORMAL DEPTH CHANNEL ROUTING

GN(1) GN(2) GN(3) ELMVT ELMAX RLNTH SEL
C.0600 C.0350 0.0600 397.0 410.0 2000. 0.00850

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 410.00 150.00 405.00 180.00 401.00 200.00 397.00 215.00 397.00
220.00 401.00 260.00 405.00 300.00 410.00

STORAGE	0.00	0.54	1.20	1.99	2.92	3.97	5.15	6.63	8.48
	13.34	16.34	19.72	23.49	27.65	32.19	37.12	42.43	48.13
OUTFLOW	0.00	32.71	109.69	228.49	391.28	611.11	875.33	1249.07	1701.21
	2860.24	3581.78	4406.68	5341.17	6392.04	7565.30	8866.77	10302.09	11876.80
STAGE	397.00	397.60	398.37	399.05	399.74	400.42	401.11	401.79	402.47
	4.3.84	4.4.53	4.5.21	4.6.89	4.8.58	5.1.26	5.3.95	5.6.63	5.9.32
FLOW	0.00	32.71	109.69	228.49	391.28	611.11	875.33	1249.07	1701.21
	2860.24	3581.78	4406.68	5341.17	6392.04	7565.30	8866.77	10302.09	11876.80

MAXIMUM STAGE IS 399.1

MAXIMUM STAGE IS 399.1

MAXIMUM STAGE IS 399.2

MAXIMUM STAGE IS 400.4

MAXIMUM STAGE IS 401.1

MAXIMUM STAGE IS 401.9

MAXIMUM STAGE IS 402.5

COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS 1 & 2
 ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
 410 2 0 C 0 0 1 C C

HYDROGRAPH ROUTING

ROUTE TO RESERVOIR
 ISTAQ 410 ICOMP 1 IECON 0 ITAPE 0 JPLT 0 JPRT 0 INAME 1 ISTAGE C IAUTO 0
 CLOSS CLOSS AVG ROUTING DATA LSTR
 C.C 0.000 0.00 IRES ISAME 1 IOFT 0 IPFP 0
 NSTPS NSTDL LAG AMSKK X TSK STORA ISPRAT
 1 0 0 0.000 0.000 0.000 -1. 0

NORMAL DEPTH CHANNEL ROUTING

QNC(1) QNC(2) QNC(3) ELWUT ELMAX RLNTH SEL
 0.0700 0.0350 0.0700 352.0 365.0 8000.0 0.00560

CROSS SECTION COORDINATES--STA/ELEV/STA/ELEV--ETC
 100.00 365.00 150.00 360.00 188.00 356.00
 227.00 356.00 260.00 360.00 300.00 365.00

STORAGE	OUTFLOW	STAGE	FLOW	200.00	352.00	215.00	352.00	20.61	26.50	33.93
53.36	2297.64	352.00	2297.64	11.67	15.87	128.75	148.46	169.72	192.53	
53.36	2297.64	352.00	2297.64	110.58	128.75	128.75	148.46	169.72	192.53	
53.36	2297.64	352.00	2297.64	317.60	487.91	487.91	706.43	1013.06	1376.68	
53.36	2297.64	352.00	2297.64	5043.69	5943.66	5943.66	6937.16	8028.02	9220.00	
53.36	2297.64	352.00	2297.64	354.74	355.42	355.42	356.11	356.79	357.47	
53.36	2297.64	352.00	2297.64	361.58	362.26	362.26	362.95	363.63	364.32	
53.36	2297.64	352.00	2297.64	317.60	487.91	487.91	706.43	1013.06	1376.68	
53.36	2297.64	352.00	2297.64	5043.69	5943.66	5943.66	6937.16	8028.02	9220.00	

MAXIMUM STAGE IS 356.3
 MINIMUM STAGE IS 357.0
 MINIMUM STAGE IS 357.5

MAXIMUM STAGE IS 358.0
MAXIMUM STAGE IS 358.7
MAXIMUM STAGE IS 360.1
MAXIMUM STAGE IS 361.1

***** SUB-AREA RUNOFF COMPUTATION *****

RUNOFF SUBAREA 3
ISTAO 300 IECON 0 ITAPE 0 JPLT 3 JPRY 0 INAME 0 ISTAGE 0 IAUTO 0

INVDG 1 IUNG 1 TAREA 0.48 SNAP 0.00 TRSDA 4.24 TRSPC 0.00 RATIO 0.00C ISNOW 0 ISAME 1 LOCAL 0

PRECIP DATA
R12 R24 R48 R72 R96
SPFE PMS R6 R12 R24 R48 R72 R96
0.00 21.50 117.00 127.00 147.00 151.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.60

LOSS DATA
LROPT 0 STRKR 0.00 DLTGR 0.00 HTIOL 1.00 ERAIN 0.00 STRKS 0.00 RTIOK 1.00 STRYL 1.00 CNSTL 0.10 ALSMX 0.00 RTIMP 0.00

UNIT HYDROGRAPH DATA
TP= 1.25 CP=0.63 NTA= 0

RECESSION DATA
STRIG= -2.00 GRCSN= -0.10 RTIOR= 1.00

UNIT HYDROGRAPH 41 END-OF-PERIOD ORDINATES, LAG= 1.24 HOURS, CP= 0.63 VOL= 1.00
7. 27. 53. 83. 114. 138. 154. 159. 151. 133.
115. 99. 85. 74. 64. 55. 47. 41. 35. 30.
26. 22. 19. 17. 14. 12. 11. 9. 8. 7.
6. 4. 4. 3. 3. 2. 2. 2. 2. 2.
1. 1. 1. 1. 1. 1. 1. 1. 1. 1.

END-OF-PERIOD FLCA
MO.DA HR.MN PERIOD RAIN EXCS LOSS
SUM 25.57 22.51 3.46 421.00
(00.00) (572.00) (58.00) (1194.57)

NSTPS NSTOL LAG AMSKK X TSK STORA ISPRAT
 1 0 0 0.000 0.000 -1. C

JOURNAL DEPTH CHANNEL ROUTING

QN(1) QN(2) QN(3) ELNVT ELMAX RLNTH SEL
 C.0700 0.0350 0.0700 352.0 365.0 16800. 0.00400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 365.00 150.00 360.00 188.00 356.00 200.00 352.00 215.00 352.00
 227.00 356.00 260.00 360.00 300.00 365.00

	C.00	4.50	10.00	16.75	24.50	33.33	43.27	55.66	71.25
STORAGE	112.05	137.25	165.67	197.32	232.22	270.37	311.77	350.42	404.32
OUTFLOW	0.00	22.44	75.25	156.74	268.42	412.36	597.04	856.19	1163.51
	1941.86	2421.09	2965.24	3577.81	4262.70	5023.31	5862.97	6784.92	7792.32
STAGE	352.00	352.68	353.37	354.05	354.74	355.42	356.11	356.79	357.47
	358.84	359.53	360.21	360.89	361.58	362.26	362.95	363.63	364.32
FLOW	0.00	22.44	75.25	156.74	268.42	412.36	597.04	856.19	1163.51
	1941.86	2421.09	2965.24	3577.81	4262.70	5023.31	5862.97	6784.92	7792.32

MAXIMUM STAGE IS 354.5
 MAXIMUM STAGE IS 355.3
 MAXIMUM STAGE IS 355.9
 MAXIMUM STAGE IS 356.3
 MAXIMUM STAGE IS 356.7
 MAXIMUM STAGE IS 357.3
 MAXIMUM STAGE IS 357.9

***** SUB-AREA RUNOFF COMPUTATION *****

SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 4
 ISTAQ 400 ICOMP 0 IECON 0 ITAPE 0 JPLT 0 JFRT 1 INAME 1 ISTAGE 1 IAUTU 0

INHYG 1 IUNG 1 TAREA 1.97 SNAP 0.00 TRSDA 4.24 TRSPC 0.00 RATIO 0.000 ISNOW 0 ISAME 1 LOCAL 0

PRECIP DATA
 SPFE PMS R6 R12 R24 R48 R72 R96
 C.CC 21.50 117.00 127.00 141.00 151.00 0.00 C.00

LOSS DATA
 LROPT STKR DLTKR RTIOL ERAIN STRKS RTIOK STIRL CNSTL ALSMX RTIMP
 C C.CC 0.00 1.00 0.00 0.00 1.00 1.00 0.10 C.CC C.CC

UNIT HYDROGRAPH DATA
 TP= 3.10 CP=0.63 NTA= 0

RECESSION DATA
 STRTG= -2.00 QRCSN= -0.10 RTIUR= 1.60

UNIT HYDROGRAPH 10C END-OF-PERIOD ORIGINATES, LAG= 3.09 HOURS, CP= 0.63 VOL= 0.59
 3. 13. 26. 42. 59. 78. 98. 119. 141. 163.
 185. 205. 222. 236. 248. 257. 263. 265. 265. 261.
 250. 236. 211. 199. 186. 177. 167. 156. 149.
 141. 133. 125. 118. 112. 105. 99. 94. 89. 84.
 75. 70. 66. 63. 59. 56. 53. 50. 47. 42.
 44. 40. 37. 35. 33. 31. 30. 28. 26. 21.
 25. 22. 21. 20. 19. 18. 17. 16. 15. 14.
 13. 12. 11. 10. 9. 8. 7. 6. 5. 4.
 4. 4. 4. 4. 3. 3. 3. 3. 3. 3.

MO-DA HR-MN PERIOD RAIN EXCS LOSS END-OF-PERIOD FLOW MC-DA HR-MN PERIOD RAIN EXCS LOSS COMPT G
 SUM 25.97 22.38 3.60 160733.
 (660.) (568.) (91.) (4551.45)

COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS TOTAL RESERVOIR INFLOW
 ISTAQ ICOMP 400 3 IECON ITAME JPLT JFRT INAME ISTAGE IALTO
 400 3 0 0 1 0 0

HYDROGRAPH ROUTING

```

ROUTE THRU RESERVOIR AND OVER SPILLWAY
  ISTAQ  ICOPP  RECON  ITAFE  JPLT  JFPT  INAME  ISTAGE  IAUTO
  400    1      0      0      0      0      1      0      0
  ROUTING DATA
  QLOSS  CLCSS  AVG      IRES  ISAME  IOPT  IPMP  LSTR
  C.C    0.000  0.00  1      1      0      0      0
  NSTPS  NSTDL  LAG  AMSK  X      TSK  STORA  ISFRAT
  1      1      0  0.000  0.000  0.000  -352.  C
  CAPACITY=  0.  120.  130.  148.  170.  192.  213.  235.
  ELEVATION= 337.  352.  352.  353.  354.  355.  356.  357.
  CREL  SPWID  CCGW  EXFW  ELEV  CQGL  CAREA  EXPL
  351.5  426.0  2.9  1.5  0.0  0.0  3.0  3.0
  TOPEL  CQGD  EXPD  DAMWID
  357.0  2.6  1.5  3.0
  DAM DATA
  
```

```

PEAK OUTFLOW IS 1752. AT TIME 42.33 HOURS
PEAK OUTFLOW IS 2578. AT TIME 42.17 HOURS
PEAK OUTFLOW IS 3376. AT TIME 42.17 HOURS
PEAK OUTFLOW IS 4153. AT TIME 42.00 HOURS
PEAK OUTFLOW IS 5213. AT TIME 42.67 HOURS
PEAK OUTFLOW IS 7418. AT TIME 42.33 HOURS
PEAK OUTFLOW IS 9464. AT TIME 42.17 HOURS
  
```

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS						
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7
				C.20	0.30	C.40	0.50	C.60	0.80	1.00
HYDROGRAPH AT	100	1.07 (2.76)	1	591. (16.73)	826. (25.17)	1182. (33.46)	1477. (41.83)	1773. (50.19)	2323. (66.52)	2954. (83.65)
ROUTED TO	101	1.07 (2.76)	1	591. (16.74)	881. (24.94)	1174. (33.24)	1500. (42.48)	1804. (51.07)	2327. (67.02)	2955. (83.67)
ROUTED TO	41	1.27 (2.76)	1	590. (16.70)	887. (24.92)	1173. (33.22)	1480. (41.92)	1777. (50.31)	2365. (66.96)	2956. (83.72)
HYDROGRAPH AT	200	0.73 (1.86)	1	384. (10.88)	577. (16.23)	769. (21.77)	961. (27.21)	1153. (32.65)	1537. (43.54)	1922. (54.42)
ROUTED TO	201	0.73 (1.86)	1	232. (6.58)	246. (7.03)	266. (7.54)	616. (17.16)	876. (24.83)	1337. (37.87)	1760. (49.85)
ROUTED TO	41	0.73 (1.86)	1	232. (6.58)	246. (7.03)	266. (7.54)	605. (17.14)	876. (24.81)	1338. (37.90)	1758. (49.78)
< COMBINED	41	1.79 (4.64)	1	783. (22.19)	1115. (31.56)	1417. (40.12)	1730. (48.99)	2238. (63.39)	3434. (97.23)	4519. (127.96)
ROUTED TO	41	1.79 (4.64)	1	773. (21.90)	1099. (31.12)	1394. (39.49)	1693. (47.93)	2200. (62.31)	3326. (95.38)	4426. (125.38)
HYDROGRAPH AT	300	0.48 (1.24)	1	312. (8.85)	469. (13.27)	625. (17.69)	781. (22.12)	937. (26.54)	1253. (35.39)	1562. (44.23)
ROUTED TO	301	0.48 (1.24)	1	310. (8.78)	465. (13.18)	620. (17.57)	776. (21.96)	931. (26.35)	1241. (35.14)	1551. (43.92)
ROUTED TO	401	0.48 (1.24)	1	230. (6.52)	364. (10.27)	533. (15.06)	679. (19.23)	823. (23.29)	1048. (31.16)	1370. (38.60)
HYDROGRAPH AT	401	1.97 (5.10)	1	786. (22.26)	1179. (33.39)	1572. (44.53)	1966. (55.66)	2359. (66.79)	3145. (89.55)	3931. (111.32)
< COMBINED	401	4.24 (11.55)	1	1720. (49.71)	2572. (73.11)	3363. (95.79)	4157. (117.71)	5222. (147.87)	7466. (211.31)	9468. (267.11)

ROUTED TO 400 4-24 1 1752. 25/8. 3376. 4153. 5213. 7418. 9464.
(10.98) (49.62) (72.49) (95.60) (117.61) (147.60) (210.66) (267.98) (

PLAN 1 STATION 101

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.20	591.	417.6	41.33
0.30	881.	422.6	41.33
0.40	1174.	429.7	41.33
0.50	1500.	432.1	41.17
0.60	1814.	432.2	41.17
0.80	2367.	432.5	41.33
1.00	2955.	432.8	41.17

PLAN 1 STATION 410

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.20	590.	400.7	41.33
0.30	880.	401.4	41.50
0.40	1173.	402.0	41.50
0.50	1480.	402.6	41.33
0.60	1777.	403.1	41.33
0.80	2365.	403.8	41.33
1.00	2956.	404.5	41.33

PLAN 1 STATION 201

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.20	232.	424.5	43.33
0.30	248.	427.6	44.17
0.40	260.	431.2	44.50
0.50	276.	432.1	43.33
0.60	276.	432.2	42.83
0.80	1337.	432.5	42.17
1.00	1760.	432.5	42.10

PLAN 1 STATION 415

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.20	232.	349.1	43.33
0.30	248.	349.1	44.17

C.40	268.	399.2	44.50
C.50	655.	406.4	43.33
C.60	876.	401.1	42.83
C.70	1336.	401.9	42.33
1.00	1758.	402.5	42.00

PLAN 1 STATION 413

RATIO	MAXIMUM FLOW/CFS	MAXIMUM STAGE/FT	TIME HOURS
C.20	773.	356.3	41.83
C.30	1099.	357.0	41.67
C.40	1394.	357.5	41.67
C.50	1693.	358.0	41.67
C.60	2200.	358.7	42.67
C.80	3368.	360.1	42.17
1.00	4428.	361.1	42.00

PLAN 1 STATION 301

RATIO	MAXIMUM FLOW/CFS	MAXIMUM STAGE/FT	TIME HOURS
C.20	510.	419.1	40.83
C.30	645.	419.2	40.83
C.40	620.	419.3	40.83
C.50	776.	419.4	40.83
C.60	931.	419.5	40.83
C.80	1241.	419.7	40.83
1.00	1551.	419.9	40.83

PLAN 1 STATION 401

RATIO	MAXIMUM FLOW/CFS	MAXIMUM STAGE/FT	TIME HOURS
C.20	230.	354.5	42.00
C.30	384.	355.3	41.67
C.40	533.	355.9	41.50
C.50	679.	356.3	41.50
C.60	823.	356.7	41.50
C.80	1058.	357.3	41.33
1.00	1370.	357.9	41.50

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1	ELEVATION STORAGE OUTFLOW	INITIAL VALUE 351.50 120. 0.	SPILLWAY CREST 351.50 120. 0.	TOP OF DAM 357.00 235. 16210.	
RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS
0.20	352.75	0.00	143.	1752.	0.00
0.30	353.11	0.00	151.	2578.	0.03
0.40	353.43	0.00	158.	3376.	0.07
0.50	353.72	0.00	164.	4153.	0.00
0.60	354.08	0.00	172.	5213.	0.01
0.80	354.77	0.00	187.	7418.	0.01
1.00	355.34	0.00	199.	9466.	0.03
					TIME OF FAILURE HOURS
					42.33
					42.17
					42.17
					42.00
					42.67
					42.33
					42.17

APPENDIX D
REFERENCES

APPENDIX D

REFERENCES

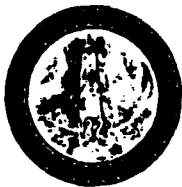
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APPENDIX E

PREVIOUS INSPECTION REPORTS/AVAILABLE DOCUMENTS

MAR 10 1980



TOWN OF GREECE

2505 WEST RIDGE ROAD
ROCHESTER, NEW YORK, 14626 • 716-225-2000

March 6, 1980

Kenneth D. Harmer
Dam Safety Coordinator
New York State Department
of Environmental Conservation
50 Wolf Road
Albany, New York 12233

ATTN: Boyd Kaler

RE: English Road Flood Control Facility
DEC Dam No. 40A-4294

Gentlemen:

The following information is provided per your request of February 26, 1980. Please be advised that the above structure was completed in June of 1978 and has been in service since that time.

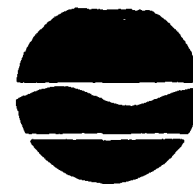
Thank you for your interest.

Very truly yours,

James S. Peet, P.E.
Town Engineer

JSP:rm

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233



Robert F. Flacke
Commissioner

February 26, 1980

Town of Greece
2505 Ridge Road West
Rochester, New York 14626

Re: Dam No. 40A-4294
Watershed Western Lake Ontario
Township Greece
County Monroe

Dear Sir:

The Dam Safety Section is involved in maintaining up-to-date files on dams in New York State. Therefore, would you please fill in the following information and return to this office:

Has Dam No. 40A-4294 located at South of English Road,
been built?

If not, do you intend to construct the dam?

On what date will construction be complete?

Thank you for your time and cooperation.

Very truly yours,

Kenneth D Harmer

Kenneth D. Harmer
Dam Safety Coordinator

By: Boyd Kaler
Principal Engineering Technician

B. Kaler

APPLICATION FOR PERMIT

for the Construction, Reconstruction or Repair of a Dam or
Other Impoundment Structure under Conservation Law, Section 429 (c).Dam No. 40A-4274
W. L. K. ONTARIO
Watershed Greene

Instructions on the reverse side before completing this application. Please type or print clearly in ink.

1. NAME AND ADDRESS OF APPLICANT		2. NAME AND ADDRESS OF OWNER (if different from applicant)	
Name	M.I.	First Name	M.I.
Last Name Phone No.		Last Name	
Address		Street Address	
City	State	Post Office	State
Zip Code		Zip Code	
TOWN OF GREECE			
2505 RIDGE ROAD WEST			
ROCHESTER NEW YORK 14626			
3. IS STATE-OWNED LAND TO BE USED?		5. PROPOSED STARTING DATE	
☒ Yes ☐ No		August 1977	
6. EXPECTED COMPLETION DATE		June 1978	

7. DESCRIPTION			
Name of Dam			
Body of Water		County	Town
Paddy Hill Creek		Monroe	Greece
Give distance and direction from commonly accepted landmark.		1000' South of English Road	
8. PROPOSED USE FOR IMPOUNDED WATER		9. STATE THE HEIGHT ABOVE SPILLWAY CREST OF THE LOWEST PART OF THE IMMEDIATE UPSTREAM ADJOINING PROPERTY OR PROPERTIES	
Temporary flood storage		1.5 Feet	
10. PROPOSED POND OR LAKE PART OF A PUBLIC WATER SUPPLY?		11. SIZE OF AREA DRAINING INTO POND OR LAKE (Acres or Square Miles)	
Where is nearest downstream public water supply intake? ☐ Yes ☒ No		3233 acres	
12. DRAINAGE AREA IS COMPOSED OF: (Total = 100%)			
20% commercial - industrial			
13. SPILLWAY			
Service Spillway - Auxiliary Spillway Combination			
Single Spillway			
Pipe Riser ONLY			
Other			
14. DESIGNER'S ESTIMATE OF CLASS OF HAZARD (as described in "Guidelines for Small Earth Dam Designs")			
☐ Class "a" ☐ Class "b" ☒ Class "c"			
NOTE: Provide descriptive information on character of downstream area.			

15a. SERVICE SPILLWAY INFLOW DESIGN FLOOD		15b. SERVICE SPILLWAY INFLOW DESIGN FLOOD	
Frequency	Flood Peak	Frequency	Flood Peak
10 y. R.F.F.	7200 c.f.s.	50	1357 c.f.s.
Runoff Volume	10 in.	Runoff Volume	2.6 in.
16. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		17. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
18. SINGLE OR AUXILIARY SPILLWAY DISCHARGE AT DESIGN HIGH WATER		19. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
8500 c.f.s.		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
20. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		21. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	

22. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		23. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
24. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		25. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
26. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		27. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
28. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		29. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
30. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		31. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	

32. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		33. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
34. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		35. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
36. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		37. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
38. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		39. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
40. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		41. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	

42. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		43. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
44. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		45. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
46. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		47. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
48. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		49. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	
50. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY		51. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY	
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other		☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other	

Soils over rock are primary medium to give some with deposits of glacial till and glacial wash. Rock is layered shales and Siltstone, top 1' usually weathered and ripable

Gradation of embankment material is specified in contract documents.

What is the source of embankment fill material(s)?

Contractor to provide borrow source to be tested by Engineer

Are there porous seams or fissures beneath the foundation of the proposed dam? ☐ Yes ☒ No Method used to obtain the above soil data ☒ Soil Forms ☒ Test Pits

DESIGN ENGINEER

Name of Agency or Individual

Erdman, Anthony, Assoc.

P.E. License No. of Individual

40155
45083

Address

242 Andrews St., Rochester, N.Y. 14604

Title

26. CONSTRUCTION ENGINEER OR CONTRACTOR

Name of Agency or Individual

(Public bid)

P.E. License No. of Individual

Address

Title

NAME AND ADDRESS OF OFFICIAL NEWSPAPER OF LOCALITY WHERE PROPOSED WORKS ARE LOCATED

Greece Post, P.O. Box 2829, Rochester, N.Y. 14626

RTIFICATION

Application is hereby made to the Conservation Department acting in behalf of the Water Resources Commission pursuant to Sections 424(c) of the Conservation Law.

The applicant certifies that the above statements are true and agrees that the issuance of the permit is based on the accuracy thereof. As a condition to the issuance of a permit, the applicant accepts full legal responsibility for all damage, direct or indirect, of whatever nature, and by whomsoever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

July 12, 1977

Date

Signature

INSTRUCTIONS

1. Type or print in INK.
2. Five (5) copies of all papers including detail construction plans and specifications must be filed.
3. The plans and specifications submitted with the application must include the following information:
 - (a) A plan showing proposed dam, dam appurtenances, bench marks, topographic contours of dam and around the anticipated reservoir area, including 2-foot contours to 6 feet above high water level.
 - (b) A profile along the dam axis and a transverse section of the dam at its maximum height.
 - (c) A profile along the center line and transverse section, or sections, of the spillways including stilling basins, outlet work, and other details, if necessary, in design of the structures.
 - (d) A topographical plan to a suitable scale showing drainage area, normal water level in the lake or pond and owners property line metes and bounds.
 - (e) Specifications for materials and methods of construction.
 - (f) A log of all soil information available to the design engineer or conservationist and location of drill holes, test pits or other foundation exploration, location of borrow area, horizontal and vertical controls, if necessary.
 - (g) Additional drawings should be included to clearly show all details of the proposed works.
4. NO WORK of construction, reconstruction or repairs of the structure or structures SHALL BE STARTED UNTIL A PERMIT therefor has been issued by the New York State Water Resources Commission.
5. The design, preparation of plans, estimates and specifications and the supervision of the erection, reconstruction and repair of all the structures herein applied for shall be done by a licensed professional engineer, or in the case of farm ponds by an engineer or conservationist, or by a governmental agency cooperating with a conservation district, or by an engineer employed by the Department of Environmental Conservation.
6. A "Notice of Application" must be published by the applicant. The form of notice and instructions for publication will be furnished to the applicant by the Local Permit Agent to whom the application is delivered.
7. An information circular "Guidelines for Small Earth Dam Designs" is available and request from the Water Resources Commission or the Local Permit Agent.
8. Samples of foundation, embankment and construction materials need not be furnished unless requested.

L. Conera/S. Zaccolo
Wm. Richter/G. Koch
Proposed English Road Detention Facility - Town of Greece
Application No. 828-77-1212
August 8, 1977

Reference is made to the letter of August 3, 1977 from the Engineer which was addressed to G. Koch. Included with the letter are the revised drawings S-1, S-3, and S-7 for the energy dissipator at the outlet of the pipe spillway. We have reviewed the drawings and they are satisfactory. The revisions shown on the drawings will be implemented by providing a field change to the present contract.



ERDMAN, ANTHONY, ASSOCIATES

CONSULTING ENGINEERS & PLANNERS

P. O. BOX 9589 • 242 ANDREWS STREET
ROCHESTER, NEW YORK 14604
(716) 325-1866

PAUL B. ERDMAN, P.E.
EDWIN L. ANTHONY, P.E., L.S.

ALFRED F. LYNG, P.E.

A. J. BEDARD, JR., P.E.
D. J. BERGMANN, P.E.
R. M. GOSS, P.E.
K. KETCHEK, P.E.
F. J. MCSHEA, P.E., L.S.
G. R. SMELTZ, P.E.
E. C. TONIAS, P.E.
P. TREER, P.E.
D. C. TUTTLE, P.E., L.S.
R. B. ULP, P.E.

August 5, 1977

New York State Department
of Environmental Conservation
50 Wolfe Road
Albany, N.Y. 12233

Attn: Mr. George Koch

Re: English Road Detention Facility
Town of Greece, N.Y.

Dear Mr. Koch,

Attached please find 3 copies of Drawings S-1, S-3 and S-7 of the above referenced project. In these drawings we have incorporated the energy dissipator apron and splash blocks as agreed upon by our telephone conversation of 28 July 1977. It is our understanding that this change fulfills the requirements of your office for the review of this project.

Should you have any questions please contact us. We wish to express our sincere appreciation for all consideration given us and we apologize for the short time given you for review.

Again we many thanks.

Very truly yours,

ERDMAN, ANTHONY, ASSOCIATES

Elias C. Tonia, P.E.
Associate

2-6218 Encl.

cc: S. Zeccolo, NYSDEC, Albany w/o enclosure
G. Penzimer, Town of Greece w/enclosure
E. Wagner, NYSDEC, Avon w/enclosure



ERDMAN, ANTHONY, ASSOCIATES

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G. R. SMELTZ, P.E.
E. C. TONIAS, P.E.
P. TREER, P.E.
D. C. TUTTLE, P.E., L.S.
R. B. ULP, P.E.

July 29, 1977

New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233

Attn: Mr. George Koch

Re: English Road Detention Facility
Town of Greece, N.Y.

Dear Mr. Koch:

This letter is written in regards to the design review meeting of July 26, 1977 attended by Gene Penzimer and James Peet (Town of Greece), Elias Tonia and Ken Allen (Erdman, Anthony, Associates), and yourself. We would like to respond to matters discussed at that meeting and noted in your interoffice memorandum dated July 22, 1977, as follows:

1. Service Spillway Channel Protection

We have reviewed the manual provided by your office entitled "Model Studies of Culvert Outlet Structures" prepared by the California Department of Water Resources. We would prefer not to utilize a structure of this nature in the English Road project for the following reasons:

- a. Increased height or provision of overhangs on the concrete walls could be required to control the secondary flow patterns, as noted on page 16 of the manual.
- b. A concrete apron would appear to be necessary downstream of the structure to handle the impact of flows in the intermediate range which strike the reverse portion of the outlet and flip upward, as noted on page 14 of the manual.

- c. The jump in water surface downstream of the structure would overtop the banks of the channel in an erratic pattern.
- d. The structure does not appear to be effective in reducing velocities for lower flow rates which occur more frequently, as noted on Figure 22 of the manual.
- e. The model tests do not provide specific design recommendations for control of secondary flow patterns, protection of downstream bed from impact forces, etc.

The concept which we have proposed for protection of the auxiliary spillway is considered to be a sound one. However we are conscious of your concerns about the outflow velocity. Therefore we suggest that a greater degree of conservation could be provided reasonably at this point by adding an 8' wide x 20' long concrete apron with impact blocks on the channel bottom downstream of the culvert outlet, with the upstream end tied to the headwall and the downstream end extending to sound rock. If this change meets with the approval of the Department, it will be designed in detail and provided under contract as a field change. Detailed drawings will be provided to the Department under separate cover.

2. Auxiliary Spillway

The auxiliary spillway has been designed for standard project flood peak discharge, with no reduction in peak due to storage at this facility, or at any point upstream. As such, a highly conservative design in the stone protection is not considered to be necessary. The stone selected is considered to be adequate for standard project flood flows based on data from Bureau of Public Roads HEC number 11. A check was made of overflow velocities for storms less than standard project flood and the results were as follows:

<u>Frequency</u>	<u>Aux. Spillway Velocity</u>
100 year	3.2 FPS
1000 year	7.5 FPS

Every reasonable precaution has been taken to ensure the integrity of the auxiliary spillway stone by the provision of the concrete retaining walls and the liner material anchored continuously to the wall footings.

ERDMAN, ANTHONY, ASSOCIATES

- 3 -

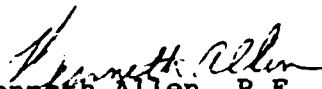
With regards to the length of the walls in the hydraulic jump area, the computed length of the jump was found to be 15.7' if the jump were occurring on a smooth concrete apron. Due to the roughness of the heavy stone, the jump length would be somewhat less than the computed length. In that the froude number was in a low, stable range and the design was for standard project flood, the provision of 12' of retaining walls was considered to be adequate.

We request that you consider the information thus provided and we thank you for your thorough review of the project. If any additional information is required by the Department prior to granting of the permit, please call us.

The loan copy of the Model Studies Report has been enclosed herewith.

Very truly yours,

ERDMAN, ANTHONY, ASSOCIATES


Kenneth Allen, P.E.

1-5182.03
Enclosure
cc: G. Penzimer (w/enc.)

KA/sml

L. Concre/B. Zepole - Environ. Analysis
Wm. Richter/G. Koch - FACM
Proposed English Road Detention Facility
Town of Greece, Appl. No. 828-77-1212

July 22, 1977

We have reviewed the Hydrology and Hydraulics for the above structure and have the following comments:

Service Spillway

A concrete structure is required at the outlet of the 84-inch diameter RCP.

Auxiliary Spillway

For the stone protection in the spillway channel the engineer indicates that an average stone diameter of 1.9 feet is required to withstand the velocities. Criteria developed by the Corps of Engineers and the Bureau of Reclamation indicate that the stone diameter for the channel velocity should be 2.5 feet.

The depth of stone is not large enough. The depth should be at least 1.5 times the average stone diameter.

The walls at the basin should be extended to cover the full length of the hydraulic jump.

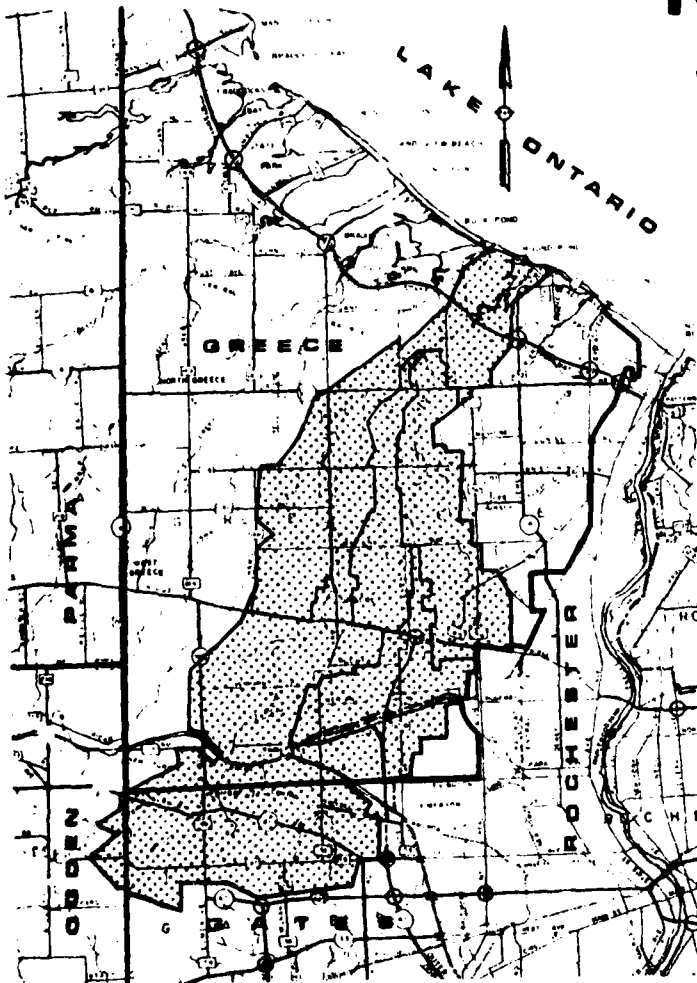
Meeting

A meeting has been scheduled for Tuesday July 26, 1976 at 11:00 A.M. on Wolf Road, Albany to discuss our comments with the engineer. Jim Post and Ken Allen will be there.

**TOWN OF GREECE
COUNTY OF MONROE
NEW YORK**

**ROUND POND
WATERSHED**

**DETAILED
DRAINAGE
STUDY**



VOLUME I REPORT

JUNE 1976

Rev. 11-19-76

ERDMAN, ANTHONY, ASSOCIATES
Consulting Engineers and Planners
Rochester, N. Y. Camp Hill Pa.

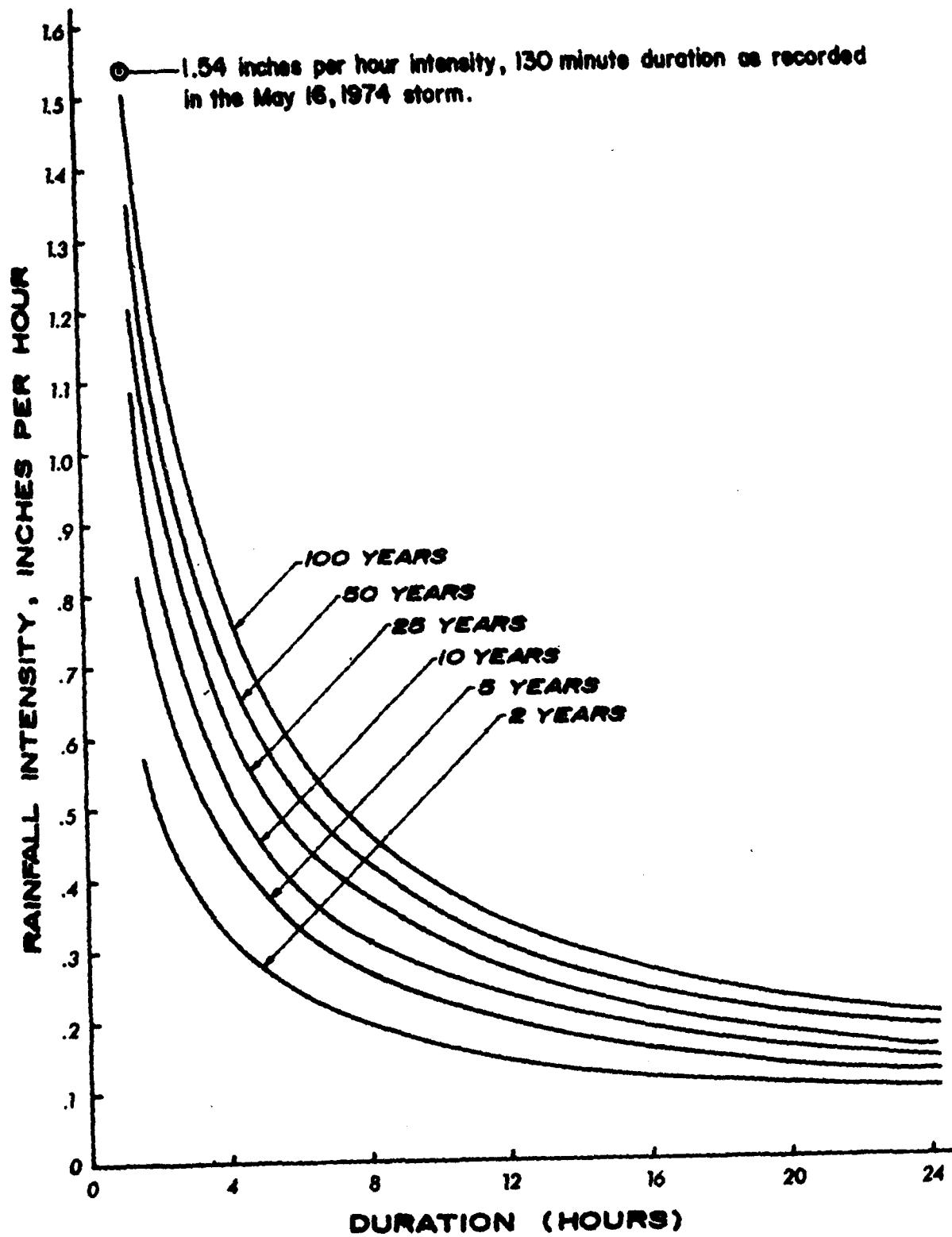
By: [Signature]
3

- - - - Watershed Boundary
 - . - - Tributary Boundary
 - - - - North-South Interceptor

- 1 Round Pond Creek
- 2 Kirk Creek Tributary
- 3 West Tributary
- 4 Paddy Hill Tributary
- 5 Paddy Hill Diversion Tributary

Lake Ontario

PLATE 1



RAINFALL INTENSITY CURVES
for
MONROE COUNTY, NEW YORK

TABLE I

EXISTING CHANNEL SLOPES

<u>Stream</u>	<u>Reach</u>	<u>Slope, %</u>
Round Pond Creek	Town Line to Ridgeway Ave.	1.20
	Ridgeway Ave. to Doe Run	0.60
	Doe Run to Ridge Road	0.18
	Ridge Rd. to Long Pond Rd.	0.75
	Long Pond Rd. to Mill Rd.	0.52
	Mill Rd. to English Rd.	1.00
	English Rd. to Latta Rd.	0.48
	Latta Rd. to Penn Central Railway	0.64
	Penn Central Railway to Parkway	0.24
	Parkway to Lake Ontario	0.04
Kirk Creek	Maiden Lane to 1700' south of English Road	0.73
	1700' south of English Road to 1300' north of English Rd.	1.15
	1300' north of English Rd. to Latta Road	0.55
	Latta Road to Jonathan Drive	1.58
	Jonathan Drive to confluence with Round Pond Creek	0.67
Paddy Hill Creek	Stone Ridge Dr. to Marblehead Dr.	0.21
	Marblehead Dr. to English Rd.	0.44
	English Rd. to confluence with Round Pond Creek	0.72
Paddy Hill Creek Diversion	Ridge Rd. to 400' south of Maiden Lane	0.43
West Tributary	Maiden Lane to Mill Road	0.42
	Mill Road to English Road	1.20
	English Rd. to Round Pond Creek Confluence	0.57

PADDY HILL CREEK (0-121-1)

C.P. No.	LOCATION	DRAINAGE AREA IN ACRES	STRUCTURE DESCRIPTION	EXIST INVERTS	FLOW IN C.F.S.				
					Nom. Cap.	Q10	Q25	Q50	Q100
42	Hoover Road	25	3'x 2.5' Conc. Box		60	9	11	13	15
43	Ridge Road	92	48" RCP		100	33	40	48	54
43A	Imperial Manor Apts.	155	60" CMP	395.8 395.3	80	55	66	80	90
44	Stone Ridge Drive	199	48" RCP	393.7 393.1	60	71	84	102	116
45	Marron Drive	379	103x71 CSPA	384.1 384.0	200	132	156	192	219
47	Maiden Lane	739	14.0'x 6.25' Conc. Bridge	376.5 376.3	700	240	288	356	408
47A	Heritage Drive	815	13.05'x 7.05' Conc. Bridge	374.0 374.6	600	261	317	394	450
48	Marblehead Drive	850	14'x 6' Box Culv.	367.3 367.0	600	273	332	412	472
49	Confluence	1030	None			327	410	494	563
49	Combined (0-121-1') Paddy Hill Diversion	2604	None			700	870	1040	1185
50A	Future Dorsey Road W/ Kirk Cr. Div.	2733/3071	None			705	880	1060	1210
51	Greece Town Park	2895/3233	Proposed detention			800	1005	1225	1405
						840	1055	1290	1475
						505	595	675	900
53	English Road	3045/3383	14'x5' Conc. Bridge	325.7 325.2	700	520	610	700	925

PADDY HILL CREEK (0-121-1)

C.P. No.	LOCATION	DRAINAGE AREA IN ACRES	STRUCTURE DESCRIPTION	EXIST INVERTS	FLOW IN C.F.S.				
					Nom. Cap.	Q10	Q25	Q50	Q100
53A	Everwild Lane	* 3085/3425	12'-10"x8'-4" CSSPPA, Headwall with wings both ends	315.0 314.5	800	531	608	709	925
55	Bridgewood Drive (So.)	3268/3608	12'-4"x 7'-9" CSSPPA	291.4 291.2	500	550	645	735	955
55A	Bridgewood Dr. (North)	3332/3672	12'-4"x 7'-9" CSSPPA	282.0 281.6	600	365	650	740	950
56	Latta Road	3430/3770	10.8'x 10.8' RC Box	279.5 278.0	1000	580	670	760	975
57	NYCRR	3556/3896	48" CIP		150	580	685	780	990
29	Confluence	3556/3896	None						
PADDY HILL CREEK DIVERSION (0-121-1')									
59	Weiland Road	165	60" CMP	437.0 436.5	150	54	69	84	94
60	Confluence	170	None			55	70	85	95
60	Combined	641	None			125	160	190	215
61	Latona Road	706	8' x 4' Conc. Box Culv.	427.6 427.3	350	140	175	210	235
64	Ridge Road	799	10'x6' Conc. Box Culv.	409.1 407.3	350	175	215	260	295
65	Confluence Tributary (0-121-1'-1)	817	None	397.0		180	220	265	300

PADDY HILL CREEK DIVERSION (0-121-1')

C.P. No.	LOCATION	DRAINAGE AREA IN ACRES	STRUCTURE DESCRIPTION	EXIST INVERTS	FLOW IN C.F.S.			
					Nom. Cap.	Q10	Q25	Q50
65	Combined	1509	None	397.0		360	140	525
67	Maiden Lane	1574	12'x 6' Box Culv.	374.3 373.6	1200	355	535	520
49	Confluence	1574	None			355	435	520
TRIBUTARY (0-121-1'-1)								
37	Lee Road	205	24" CMP	508.1 506.4		75	95	115
38	Ridgeway Avenue	264	24" CMP to 18" CMP	505.3 504.1	20	100	120	145
40	Weiland Road	286	3'x 5' Conc. Culv.	436.5 436.2	80	104	130	155
41	Latona Road	378	8'x 4' Conc. Box Culv.	429.8	350	138	170	205
41A	Ridge Road	634	81"x 59" CMPA	414.0 402.0	350	165	200	235
65	Confluence	692	None	397.0		185	225	265
								295

PADDY HILL CREEK DIVERSION (0-121-1')

C.P. No.	LOCATION	DRAINAGE AREA IN ACRES	STRUCTURE DESCRIPTION	EXIST INVERTS	FLOW				C.F.S.		
					Nom. Cap.	Q10	Q25	Q50	Q100		
			<u>TRIBUTARY (0-121-1'-2)</u>								
72	Hospital Pond Long Pond Road	179	24" x 38" Conc.	442.73	45	65 20	80 25	95 30	110 30		
73	West of Sannita Drive	317	Proposal Detention 42" CMP	433.60 433.43	60	80 35	100 40	120 55	135 65		
73A	Sannita Drive West	367	48" CMP	433.41 433.38	80	45	55	60	65		
73B	Sannita Drive East	449	6'x 3'-8" CMPA	430.93 430.06	100	75	90	105	115		
60	Walkway Culv.	471	6'x 3' -8' CMPA	429.50 429.17	100	80	105	125	140		
60	Confluence	471	None			80	105	125	140		



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March 6, 1981

Mr. Jerry A. Gomez, P.E.
Stetson-Dale
105 Genesee Street
Utica, New York 13501

RECEIVED

3 10 1981

Dear Mr. Gomez:

Re: 1981 DAM INSPECTION
ENGLISH ROAD DETENTION FACILITY
TOWN OF GREECE, NEW YORK

STETSON-DALE

Please find enclosed a copy of the design report for the above facility as per your letter of request dated February 11, 1981.

Section C - Geology, Section F - Contract Documents, and Section G - Operations and Maintenance have been omitted as your letter indicated that you already had this information. A copy of the drainage area map is enclosed with the report.

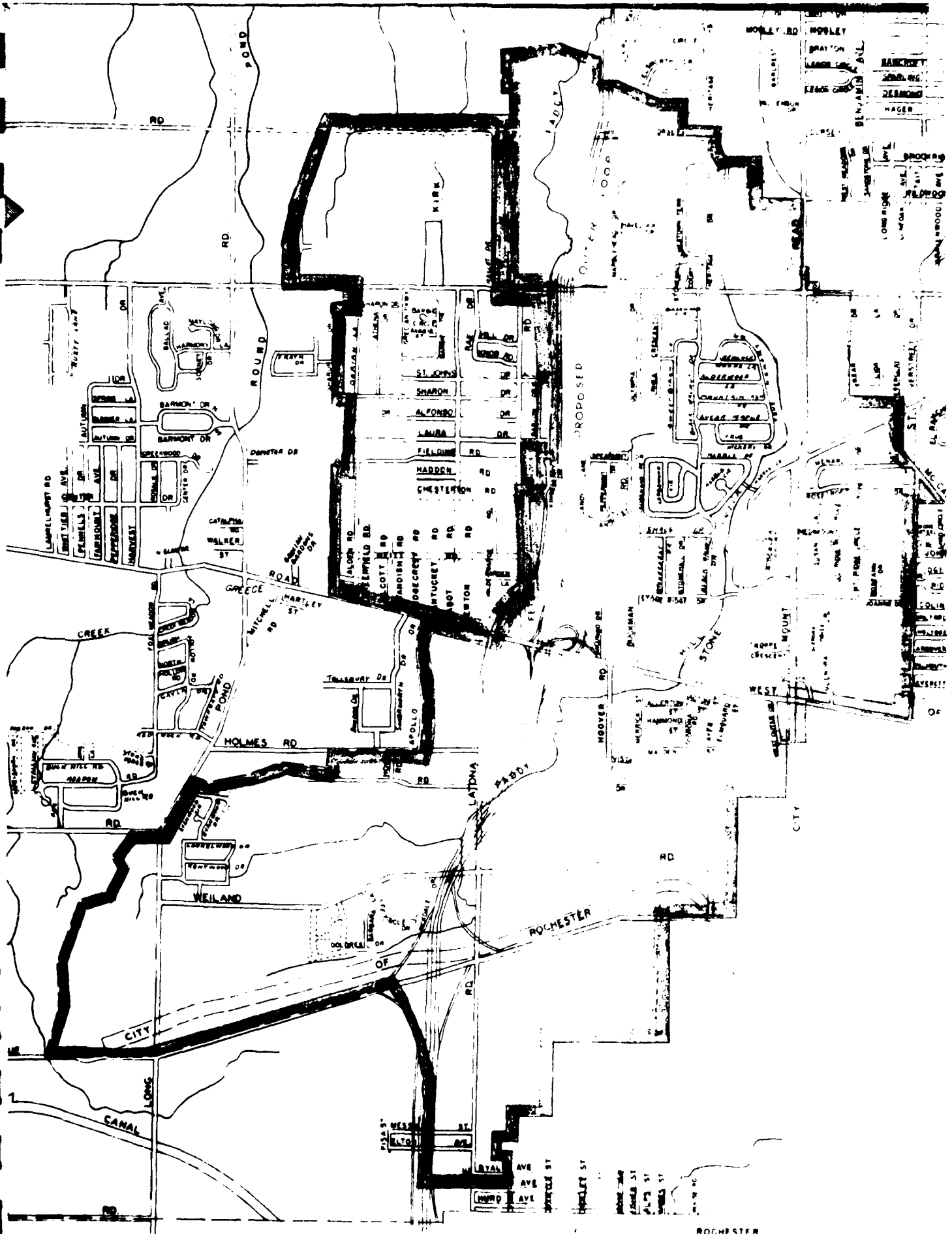
I have discussed this project with Mr. Carl Flexer of our office who was the resident engineer during construction. The construction records, including the gradation tests for the embankment have all been turned in to the Town of Greece. They would have to be obtained from Mr. James Peet, Town Engineer. Mr. Flexer assured me that the project was built in complete conformance to the design plans and that the erosion control membrane used under the rip-rap was as specified in the Contract Documents. The contractor requested no substitution on this project.

If you have any further questions, please feel free to contact me.

Very truly yours,
ERDMAN, ANTHONY, ASSOCIATES

Philip C. King
PHILIP C. KING, P.E.
ASSOCIATE

PCK/vrm
1-2160
Encls.
F5



GATES

ROCHESTER

ENGLISH ROAD PARK
DETENTION FACILITY

Report On Design

July 1977



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AD-A105 819

STETSON-DALE UTICA NY

F/G 13/13

NATIONAL DAM SAFETY PROGRAM. ENGLISH ROAD DETENTION FACILITY DA--ETC(U)

JUN 81 J B STETSON

DACW51-81-C-0009

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2 OF 2

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BY	DATE	ERDMAN, ANTHONY, ASSOCIATES	SHEET	OF
CKD	DATE	SUBJECT	SUB-SHEET NO.	
OWNER	PROJECT NAME			

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SECTION G - OPERATIONS AND MAINTENANCE REL.

INTRODUCTORY REMARKS

1. Need for Project.

The combination of upstream development and construction of the diversion channel along Route 47 has greatly increased the volume and peak rate of runoff to areas north of Maiden Lane. The increased flow rates have caused major erosion of the fine grained soils along the channels downstream as well as undesirable inundations of residential areas.

2. Evaluation of Alternatives

This project was identified in the Pound Creek Drainage Study prepared by Erdman, Anthony in 1976. No reasonable alternatives to the proposed action were determined at that time.

3. Lands for Project.

The project lies almost entirely within lands owned by the Town of Greece. Minor grading will extend into lands owned by the NYSDOT for future Rte 47. The Regional Office of NYSDOT has reviewed the project and agreed in concept (see letter Dated May 5, 1977, sheet E-2)

BY	1/10/77	DATE	6/29/77	ERDMAN, ANTHONY, ASSOCIATES	SHEET	OF
CKD		DATE		SUBJECT	SUB-SHEET NO.	
OWNER				PROJECT NAME		

2. OVERALL TOWN PROGRAM OF FLOOD CONTROL

This project represents one part of a comprehensive program of flood control which has been undertaken by the Town of Greece. The thrust of this program will be towards constructing a minimal number of large detention facilities and avoiding the problems associated with each developer providing a small detention pond. As part of this program, major facilities have already been constructed at Deschel Drive and St. Andrews Drive.

DRAINAGE AREA.

From Paddy Hill Creek, 2895 acres

Effective acreage from Kirk Creek diversion 338 acres

Total area (effective) = 3233 acres

Areas are outlined on Plate V.
Paddy Hill Creek in red. Kirk Creek in yellow.

HAZARD CLASS

Areas downstream of the proposed impoundment are primarily existing or planned single family developments, with the exception of the wetland areas located north of the old Penn.-Central Railroad. In this case, NYSPEC Hazard Class "C" would be appropriate.

HYDROLOGIC DESIGN CRITERIA.

Refer to NYSDAC "Guidelines For Design of Small Dams".

Service spillway Design Flood 50 year

Spillway Design Flood 60% OF MPF

Minimum Freeboard 2 ft.

HYDROLOGIC COMPUTATION METHODS.

Hydrologic computations for this project were made using the U.S. Soil Conservation Service computer program TR-20 on an IBM 1130 computer. This program combines and routes hydrographs from each subarea of the drainage basin.

The computations assume full development of the upstream drainage area in accordance with the Town of Greece Master Plan.

upstream detention is assumed along tributary (0-121-1'-2) as follows:

Existing Park Ridge Hospital
Detention Pond 19.9 acre-ft.

Future Sannita Drive
Detention Project. 18 acre-ft.

The ultimate land use of the upstream watershed is primarily single family residential development, with the exception of the industrial area located south of Ridge Road and east of Route 47. The overall CN factor for the upstream watershed is 79.5.

In addition, detention of 2 acre-ft is assumed south-east of the Ridgeway Ave-Lee Rd intersection. This project is in final design phase as part of Monroe County Highway Improvement Project.

The Q50 flood routing is shown on sheet A3
The QMPF routing is shown on sheet A4

SUBROUTINE ADDHYD CROSS SECTION 44
INPUT HYDROGRAPHS= 5.6 OUTPUT HYDROGRAPH= 7

ENGLISH ROAD PARK

DETENTION FACILITY

850 Flood Routing

6/22/77

TIME	DISCHG	0.00	0.37	5.97	4.00	DELTA T= 0.40	DRAINAGE AREA= 5.06
4.00	DISCHG	193.52	327.82	554.25	447.72	1112.52	1307.72
8.00	DISCHG	670.18	576.73	519.55	491.44	474.77	434.73
12.00	DISCHG	366.89	339.12	311.09	322.73	345.75	344.03
16.00	DISCHG	274.88	274.28	273.51	271.38	258.64	237.86
20.00	DISCHG	252.82	227.76	175.24	117.29	74.23	52.32
24.00	DISCHG	31.32	29.85	26.24	26.42	24.63	22.88
28.00	DISCHG	15.74	14.57	13.51	12.99	11.57	10.69
32.00	DISCHG	7.22	6.65	6.17	5.69	5.29	4.89
36.00	DISCHG	3.43	3.20	3.00	2.80	2.64	2.47
40.00	DISCHG						
TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.5616							CFS-HRS= 8375.05
							ACRE-FT= 692.11

SUBROUTINE RESVOR STRUCTURE 4
SURFACE ELEVATION= 336.50

INFLOW HYDROGRAPH

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
11.59	890.068	351.71
24.22	239.979	342.42
26.78	47.340	339.09
27.59	38.984	338.75
28.38	33.896	338.54
29.14	28.933	338.35
29.90	24.571	338.18
30.65	20.897	338.03

OUTFLOW HYDROGRAPH

TIME	DISCHG	0.00	0.29	5.37	4.00	DELTA T= 0.40	DRAINAGE AREA= 5.06
4.00	DISCHG	147.51	223.49	302.06	396.49	442.20	554.31
8.00	DISCHG	341.10	342.19	343.31	344.84	346.49	348.10
12.00	DISCHG	757.54	677.13	669.19	659.10	648.26	636.33
16.00	DISCHG	556.93	530.61	517.06	496.87	480.46	466.70
20.00	DISCHG	362.09	343.39	318.29	301.73	284.47	273.94
24.00	DISCHG	237.78	238.68	225.25	179.70	110.50	71.57
28.00	DISCHG	26.64	33.68	25.42	20.83	22.93	24.40
32.00	DISCHG	15.78	14.02	11.62	12.67	11.68	10.83
							ACRE-FT= 692.11

EXEC. I/F CONTROL CARD
EXECUTIVE CONTROL CARD
STARTING TIME= 0.00 RAIN DEPTH= 19.60 RAIN DURATION= 6.00 RAIN TABLE NO.= 2 SOIL CONDITIONS= 2
ALTERNATE NO.= 1 STORM NO.= 6

ENGLISH ROAD PARK

DETENTION FACILITY

MAX. PROBABLE FLOOD RUN

4/12/77

SUBROUTINE RUNOFF STRUCTURE 1

AREA= 4.53 INPUT RUNOFF CURVES 79.5 TIME OF CONCENTRATION= 2.07
COMPUTED CURVE NO. = 79.5

PEAK TIMES 3.62
PEAK DISCHARGES 13054.421
PEAK ELEVATIONS (RUNOFF)

TIME 0.00 DISCHG 0.00 1.52 30.59 180.95 632.84 1713.32 4162.86 8395.28 12985.49 14975.08
4.00 DISCHG 14288.41 12452.29 10570.97 8992.52 7699.62 6630.67 5702.36 4703.55 3576.73 2512.87
8.00 DISCHG 1682.89 1098.38 698.62 433.81 272.67 173.64 107.63 65.01 37.69 20.13
12.00 DISCHG 8.79 2.29 0.00

DELTA I= 0.40 DRAINAGE AREA= 4.53
HYDROGRAPH, IZER= 0.00 CFS=HRSE 49913.19 ACRE=FI= 4124.82

SUBROUTINE RESVOR STRUCTURE 4

SURFACE ELEVATION= 334.00

INFLOW HYDROGRAPH

PEAK TIMES 3.73
PEAK DISCHARGES 15205.085
PEAK ELEVATIONS 356.75
356.40
335.81
335.11
334.60
334.42
334.25
334.15
334.09
334.06

OUTFLOW HYDROGRAPH

TIME 0.00 DISCHG 0.00 1.36 27.58 174.56 399.19 504.28 665.32 7527.24 12005.68 14996.34
0.00 ELEV 334.00 334.05 335.10 338.20 342.12 345.47 350.81 354.47 355.88 356.70
4.00 DISCHG 14439.28 12806.09 10930.10 9295.64 7971.55 6847.86 5899.14 4931.62 3831.66 2861.34
4.00 ELEV 356.55 356.11 355.56 355.07 354.62 354.24 353.90 353.51 353.06 352.58
8.00 DISCHG 1942.21 1379.99 926.07 665.87 551.03 425.46 593.96 559.26 523.27 475.53
8.00 ELEV 352.10 351.66 351.24 350.83 350.24 349.39 348.42 347.30 346.10 344.51
12.00 DISCHG 403.47 27.23 71.72 57.52 45.10 35.36 27.73 21.74 17.05 13.37
12.00 ELEV 342.26 330.51 336.39 331.69 335.80 332.58 335.10 333.13 334.68 333.46
16.00 DISCHG 10.48 8.22 6.44 5.05 3.96 3.10 2.43 1.91 1.49 1.17
16.00 ELEV 334.41 333.67 334.25 333.79 334.15 333.87 334.09 333.92 334.05 333.95
20.00 DISCHG 0.92 0.72 0.56 0.44 0.34 0.27 0.21 0.16 0.13 0.10
20.00 ELEV 334.03 333.97 334.02 333.98 334.01 333.98 334.00 333.99 334.00 333.99
24.00 DISCHG 0.08 0.06 0.04 0.03 0.03 0.02 0.01 0.01 0.01 0.00
24.00 ELEV 334.00 333.99 334.00 333.99 334.00 333.99 334.00 333.99 334.00 333.99
28.00 DISCHG 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
28.00 ELEV 334.00 333.99 334.00 333.99 334.00 333.99 334.00 334.00 334.00 334.00

Aux. SPILLWAY DESIGN FLOW

Max. Prob. Flood for Paddy Hill Creek = 15054 CFS
from 4/12/77 computer run.

Allowance for Kirk Creek diversion, controlled
by pipe capacity, extreme flows will not
be able to cross from Kirk to
Paddy Hill, prelim size of diversion = 72" ϕ
say 246 CFS

MPF = 15,300 CFS

60% MPF = 9180 CFS, say 9200 CFS

Allowance for service spillway,
do not claim entire 860 $\pm$ CFS
capacity. Allow some loss
due to debris. See pg B6-B7

say -700 CFS

net req'd capacity of Aux. spillway = 8500 CFS.

Manual Computation - Maximum Probable Flood.

Refer to USDA - SCS National Engineering Handbook,
 Section 2, Chapter 21.

1. Rainfall Amount. as with computer program, use
19.6" of rainfall

3. Duration Adjustment. not req'd

2. Areal Adjustment. adjustment made using
 Corps Criteria for 20% reduction in total
 rainfall

4. Rainfall Curve No. $CN = 79.5$

1. Determine Rainfall Amount

$$CN = 79.5, P = 19.6$$

from Figure 10.1, $Q = 16.8$

5. Determine the Hydrograph Family

from Figure 21.3 (ES 1011) with $CN = 79.5$,
 $P = 19.6$, Hydrograph Family No 1.

6. Determine Duration of Excess Rainfall, T_0

Figure 21.4 (ES 1012) with $P = 19.6$, $CN = 79.5$

$$T_0 = 5.6 \text{ hours.}$$

7. Compute Initial value of TP.

By Equation 21.4, pg 21.52

$$TP = 0.7 T_c, \quad T_c = 2.07 \text{ hours from routing computations}$$

$$TP = 0.7 \times 2.07 = 1.45 \text{ hours}$$

8. Compute T_o/TP .

$$T_o = \text{duration of excess rainfall} = 5.6 \text{ hrs}$$

$$T_o/TP = 5.6 / 1.45 = 3.86$$

9. Select Revised T_o/TP from Table 21.16

$$\text{Initial } T_o/TP = 3.86$$

$$T_o/TP \text{ revised} = 4.0$$

10. Compute Revised TP.

$$\text{Revised } TP = \frac{T_o}{(T_o/TP)_{\text{rev}}} = \frac{5.6}{4.0} = 1.40$$

11. Compute g_p

$$\text{Eqn 21.6, } g_p = \frac{484 A}{\text{Rev. TP}}$$

$A = 2895 \text{ acres plus Kira Creek diversion}$

Compute MPF based on PK Creek only, then add
 m/glw from Kira Creek

$$A = 4.53 \text{ acres}$$

$$g_p = \frac{484 \times 4.53}{1.40} = 1570 \text{ CFS}$$

12. Compute Q_{gp}

$$Q_{(gp)} = 2 \times g_p = 16.8 \times 1570 = 26,400 \text{ CFS}$$

13. Compute times for Hydrograph rate determinations

$$t = (t/T_p) (\text{Revised } T_p.) \quad \text{Eqn 21.7}$$

	t/T_p *	t (hours)	g_c/g_p	g CF
1	0	0	0	0
2	0.35	0.49	0.003	79
3	0.70	0.98	0.015	396
4	1.05	1.47	0.049	1290
5	1.40	1.96	0.122	3220
6	1.75	2.45	0.298	7870
7	2.10	2.94	0.528	13900
8	2.45	3.43	0.585	15450
9	2.80	3.92	0.518	13700
10	3.15	4.41	0.413	10,900
11	3.50	4.90	0.334	8820
12	3.85	5.39	0.273	
13	4.20	5.88	0.231	
14	4.55	6.37	0.185	
15	4.90	6.86	0.128	
16	5.25	7.35	0.080	
17	5.60	7.84	0.047	
18	5.95	8.33	0.028	
19	6.30	8.82	0.017	
20	6.65	9.31	0.010	
21	7.00	9.80	0.006	
22	7.35	10.29	0.004	
23	7.70	10.78	0.003	
24	8.05	11.27	0.002	
25	8.40	11.76	0.001	
26	8.75	12.25	0	

about
same as
computer
program
result of
F054

$$t = (t/T_p) (Rev. T_p) = 1.40 (t/T_p)$$

* from Table 21.17 for $T_0/T_p = 4$

$$g = (g_c/g_p) (2) (g_p) \quad , \quad g_p = 1570$$

$$2 = 16.8$$

$$g = (g_c/g_p) (26,400)$$

Manual Comps. constitute a check of computer run.

Low Flow Measurements - Paddy Hill Creek

low flow measurements were made at the Latta Road box culvert. Part way through box, invert has a drop of 9" to Flow is relatively uniform approaching drop. Depth of flow upstream of drop by 3' was 2" average. Approach velocity measured at 1 fps. Width of weir = 5'-4"

$$Q = 3.0 L H^{3/2}$$

$$H = 0.17 + \frac{V^2}{2g} = 0.17 + \frac{1.0}{64.4} = 0.19'$$

$$H^{3/2} = 0.083$$

$$Q = 3.0 \times 5.33 \times 0.083 = 1.3 \text{ CFS}$$

Area at Project site = 2895 ac.

Area at point of measurement = 3430 ac.

AUXILIARY SPILLWAY LENGTH

Aux. spillway flow = 8500 CFS

The spillway will function as a broad crested weir. Refer to Handbook of Hydraulics, King and Bratner, pg 5-23.

$$Q = CLH^{3/2}$$

on page 5-24,

"If the upstream corner of a weir is so rounded as entirely to prevent contraction, and if the slope of the crest is as great as the loss of head due to friction, flow occurs at critical depth, and discharge is given by the rational formula"

$$Q = 3.087 LH^{3/2}$$

Important considerations in the selection of our weir coefficient are:

1. We will have a long (30'±) gradual approach @ 1.5% ± to the weir sill. upstream slope beyond the 1.5% will be 1 on 3, with rounding at the pvt.
2. A concrete sill will be provided to ensure uniform Q/B for the entire weir length.
3. The slope downstream of the weir sill will be 2% for 7', then 1 on 6.5

4. Head H for the spillway design flood will be 3.5'.

Based on the above, our spillway will be very close to ideal conditions for a broad crested weir.

$$\text{Assume } C = 3.05$$

$$\text{Assume } H = 3.5, H^{3/2} = 6.548$$

$$Q/b = C H^{3/2} = 3.05 \times 6.548 = 19.97 \text{ CFS/LF}$$

$$\text{Weir length} = \frac{Q}{Q/b} = \frac{8500 \text{ CFS}}{19.97} = 426'$$

BY LPA. DATE Mar 17, 1977 ERDMAN, ANTHONY, ASSOCIATES SHEET B3 OF
 CKD DATE SUBJECT SUB-SHEET NO.
 OWNER PROJECT NAME English Road

TAILWATER CURVE.

Exist downstream culvert is 14x5 box at English Road. Conditions at this structure are:

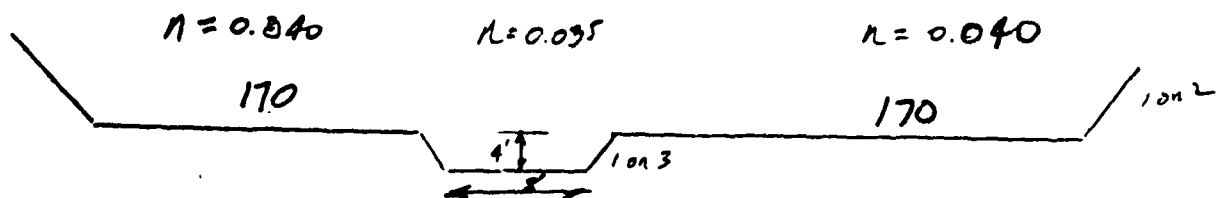
$$\begin{aligned} Q_{10} &= 520, & WS &= 331.2 \\ Q_{50} &= 700, & WS &= 333.0 \\ Q_{100} &= 925, & WS &= 335.0 \pm (\text{overflow road}) \end{aligned}$$

The outlet of our dam will be ≈ 335.7

$$\text{Slope of existing channel to English Road} = \left(\frac{335.7 - 325.7}{1120} \right) = 0.0089\%$$

Develop a rating curve for flow depth at outlet of dam, assuming no effect due to English Road. This is conservative assumption.

Assume a channel section as follows:



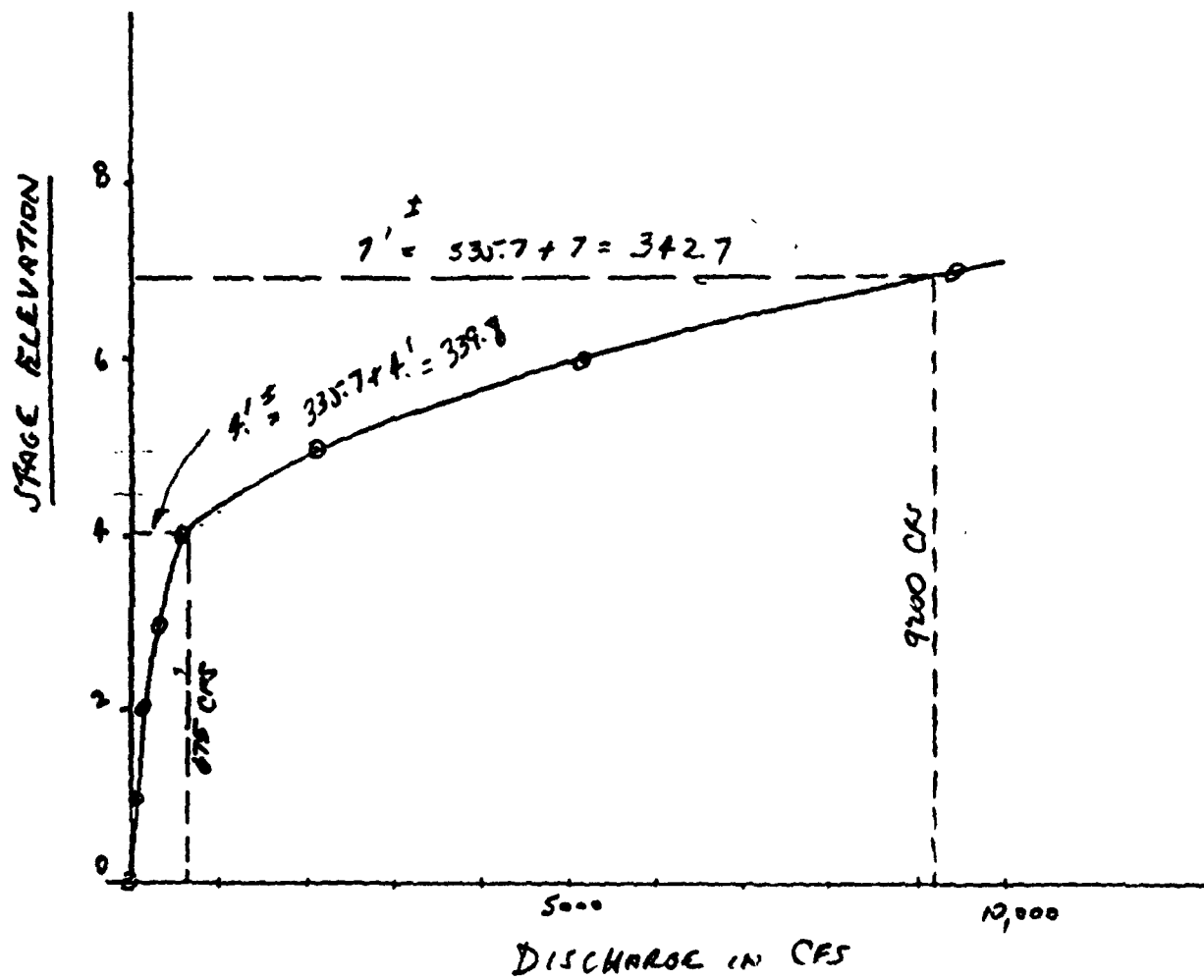
n factor selected to be conservative, actual $n = 0.080$ now, but trees could be removed at some time in future.

$$S_0 = 0.0089 \quad S_0^{\frac{1}{2}} = 0.094$$

BY HA DATE 5/3/77 ERDMAN, ANTHONY, ASSOCIATES SHEET B4 OF
 CKD DATE SUBJECT SUB-SHEET NO.
 OWNER PROJECT NAME

C = channel OB = overbank. Q = CFS
 D = depth of flow K = conveyance T = total

D_c	K_c	Q_c	D_{os}	K_{os}	Q_{os}	Q_T	V_c	V_{os}
0	0	0	0	0	0	0		
1	392	37	0	0	0	37		
2	1456	137	0	0	0	137		
3	3311	311	0	0	0	311		
4	6093	573	0	0	0	573		
5	9935	934	1	12645	1189	2123		
6	14962	1406	2	40179	3778	5184		
7	21294	2002	3	79026	7434	9436		



AUXILIARY SPILLWAY RATING CURVE

Auxiliary spillway ($C = 3.05$, $L = 426'$)

<u>Elev</u>	<u>H</u>	<u>$H^{\frac{3}{2}}$</u>	<u>Q</u>
351.5	0	0	0
352.0	0.5	0.35	460
353.0	1.5	1.84	2390
354.0	2.5	3.96	5140
355.0	3.5	6.58	8550
356.0	4.5	9.60	12470

PROJECT WA By WA DATE 6/2/77

AREA No: 1 REMARKS: Service Spillway

HYDROLOGIC & CHANNEL INFORMATION

Drainage Area Acres 54 Station 335.7

10 YR 25 YR 50 YR 100 YR 154 YR 154 YR

Q₁₀ Q₂₅ Q₅₀ Q₁₀₀ Q₁₅₄

TW₁₀ TW₂₅ TW₅₀ TW₁₀₀ TW₁₅₄

HEAD WATER COMPUTATION

Q	SIZE	HEAD (ft)		OUTLET (ft)		HEAD (ft)		OUTLET (ft)		HEAD (ft)	OUTLET (ft)	HEAD (ft)	OUTLET (ft)
		10 YR	25 YR	50 YR	100 YR	154 YR	10 YR	25 YR	50 YR				
100	84"	0.5	3.5	2.5	2.6	4.8	0.2	0.8	4.2	4.2	4.2	4.2	4.2
200		2.75	5.3	3.7	5.1	5.1	0.7	5.3	5.3	5.3	5.3	5.3	5.3
300		2.97	6.8	4.6	5.8	5.8	1.7	6.7	6.8	6.8	6.8	6.8	6.8
400		1.20	8.4	5.3	6.1	6.1	3.0	8.3	8.4	8.4	8.4	8.4	8.4

Q₁₀ 0.013 RCP

COMMENTS

ADDITIONAL RECOMMENDATIONS:

Downstream T.W. will not affect culvert outflow.

DATE _____
DATE _____

ERDMAN and ANTHONY

B7 **CP**

NO. 4343

SUBJECT _____
PROJECT NAME _____

LOCATION

PROJECT

By MA

DATE 6/21/77

AREA No:

REMARKS:

Hydrologic & Channel Information

Drainage Area

Acres;

50

10

25

50

yr

Q₁

Q₂

Q₃

Q₄

Q₅

Q₆

Q₇

Q₈

Q₉

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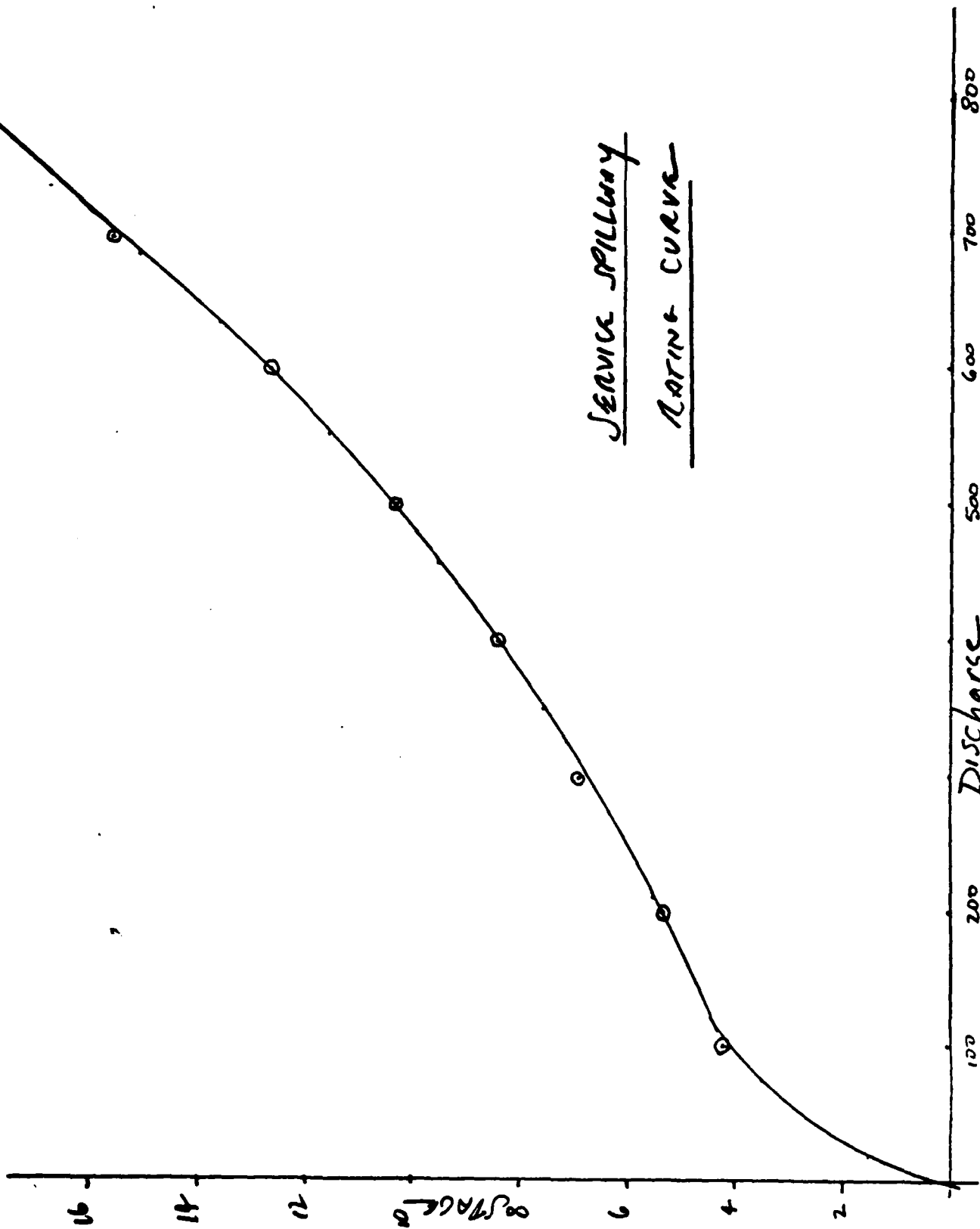
Q₇₈

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Q_{80</}

SUMMARY & RECOMMENDATIONS:

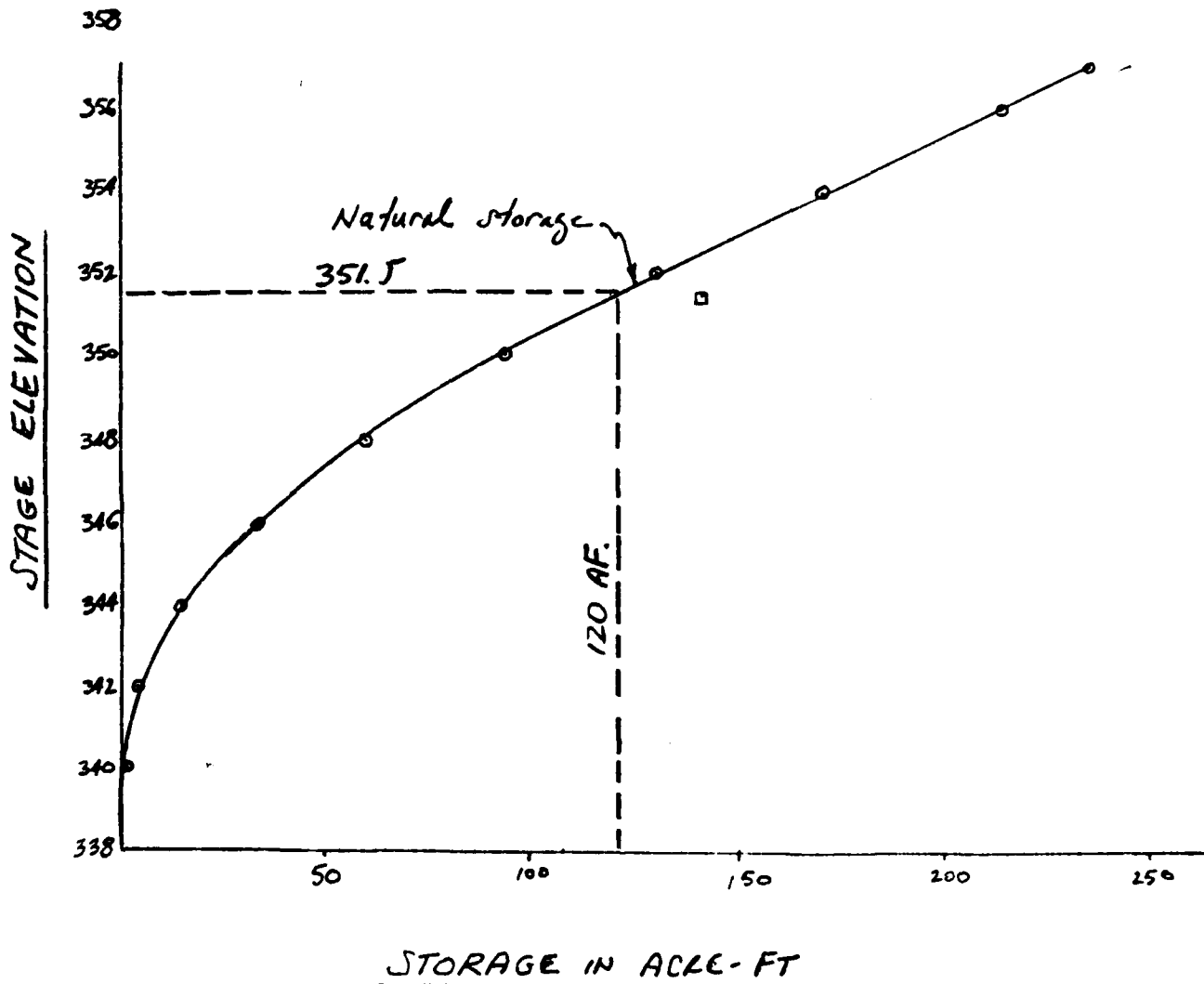
SERVICE SPILLWAY
NATURAL CURVE



by XPA DATE 5/3/11 ERDMAN, ANTHONY, ASSOCIATES SHEET B9 OF
CKD DATE SUBJECT SUB-SHEET NO.
OWNER PROJECT NAME English Road

ENGLISH ROAD PARK DETENTION

STAGE - STORAGE CURVE



BY ME DATE 6/21/77 ERDMAN, ANTHONY, ASSOCIATES SHEET 810 OF
 CKD DATE SUBJECT SUB-SHEET NO.
 OWNER PROJECT NAME English Road

SUMMARY - STAGE - STORAGE - OUTFLOW DATA.

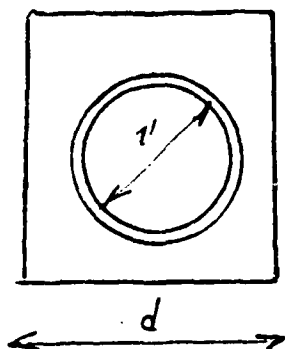
<u>Stage.</u>	<u>Storage</u>	<u>Serv. spill</u>	<u>Aux. spill</u>	<u>Total Q.</u>
336.5	0	0	0	0
338.0	0.1	20	0	20
340.0	0.2	70	0	70
342.0	3.5	210	0	210
344.0	14	350	0	350
346.0	33	460	0	460
348.0	61	550	0	550
350.0	94	630	0	630
351.5	120	680	0	680
352.0	130	700	460	1160
353.0	150	740	2390	3130
354.0	170	770	5140	5910
355.0	190	810	8550	9360
356.0	212	850	12470	13320

Service Spillway Levee Collar

$L = 151'$

NIDEC requires $15\frac{1}{6}$ of $151' = 22.65'$

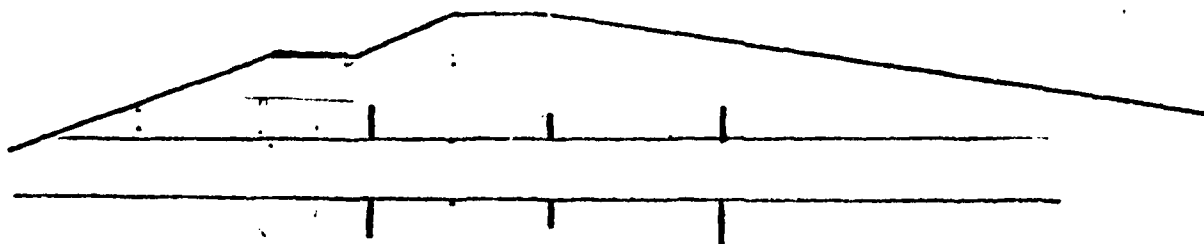
we 3 separate collars, $\frac{22.65}{3} = 7.6'$ per collar



$$d = 7'-0'' + (2 \times 8'') + 2 \times \left(\frac{7.6}{2} \right) =$$

$$= 7'-0'' + 1'-4'' + 7'-7''$$

$$= 15'-11'' \text{ say } 16'$$



AUXILIARY SPILLWAY DESIGN - STONE PROTECTION

$$Q/3 = 19.97 \text{ CFS/LF}$$

assume $n = 0.050$

$$\text{Slope } S_o = 1 \text{ on } 6.5 = 0.154$$

$$S_o^{1/2} = 0.39$$

$$K = \frac{Q}{S_o^{1/2}} = \frac{19.97}{0.39} = 51.2$$

$$y = \left(\frac{K}{1.486/n} \right)^{0.6} = \left(\frac{51.2}{297} \right)^{0.6} = (1.72)^{0.6} = 1.38'$$

$$V = \frac{19.97 \text{ CFS}}{1.38 \text{ ft}} = 14.5 \text{ fps.}$$

Refer to HEC No 11, "Use of Riprap for Bank Protection"

Assume NYSDOT Medium Dumped Stone,

$$K = 50 \text{ Stone size} = 1.1' \phi = 100 \#$$

$$\frac{K}{d} = \frac{1.1}{1.38} = 0.80$$

Refer to Figure No 1, Pg 11-5

$$\frac{V_s}{V_o} = 0.92$$

$$V_s = 0.92 V = 0.92 \times 14.5 = 13.3 \text{ fps.}$$

$V_{\text{allowable}}$ from Figure 2, Pg 11-6 = 13.2 FPS, OK.

BY NAA DATE 6/3/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D3 OF
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 OWNER PROJECT NAME English Land Park

In order to be conservative, specify NYSDOT heavy stone filling,

$$d_{50} = 600 \# = 1.9' \phi$$

$$K/d = \frac{1.9}{1.38} = 1.38$$

Refer to Figure no 1, pg 11-5

$$\frac{V_r}{V_0} = 1.0, \quad V_s = 14.5$$

Allowable velocity from Figure 2, pg 11-6 = 17'

BY <u>APA.</u>	DATE <u>5/2/77</u>	ERDMAN, ANTHONY, ASSOCIATES		SHEET <u>D4</u> OF
CKD	DATE	SUBJECT	SUB-SHEET NO.	
OWNER	PROJECT NAME		<u>Eng. No. 1.</u>	

AUXILIARY SPILLWAY - FREEBOARD.

Refer to Design of Small Dams, pg 393

$$\text{Freeboard} = 2.0 + 0.025 \sqrt[3]{V}$$

$$V = 14.5$$

$$d = 1.38 \quad d^{2.33} = 1.11$$

$$\text{Freeboard} = 2.0 + 0.025 \times 14.5 \times 1.11 = 2.4'$$

In this case, make freeboard for levee and channel the same, 2' in the we are designing for std' Project F.b.d.

HYDRAULIC JUMP CONDITIONS @ END OF AUX. SPILLWAY.

For spillway design flood,

$$Q/3 = 19.97$$

$$\text{depth of flow} = 1.38'$$

$$\text{velocity} = 14.5 \text{ fps.}$$

$$F = \frac{V}{\sqrt{gd}} = \frac{14.5}{\sqrt{32.2 \times 1.38}} = \frac{14.5}{6.66} = 2.2$$

Form "A" jump, Bar Rec, Design of Small Dams,
pg 394.

$$\frac{d_2}{d_1} = \frac{1}{2} \left(\sqrt{8F^2 + 1} - 1 \right)$$

$$d_1 = 1.38, F = 2.2$$

$$\frac{d_2}{d_1} = \frac{1}{2} \left(\sqrt{\frac{31.72}{8 \times 1.38 + 1} - 1} \right)$$

$$= \frac{1}{2} (6.3 - 1) = \frac{1}{2} (5.3) = 2.65$$

$$\therefore d_2 = 2.65 d_1 = 2.65 \times 1.38 = 3.66 \text{ ft.}$$

$$\frac{L}{d_2} \text{ from Figure B-15, pg 571} = 4.3$$

$$\therefore L = 4.3 d_2 = 4.3 \times 3.66 = 15.7 \text{ ft.}$$

$\therefore$ carry stone 16' beyond toe of
 of the 1 on 6.5 slope spillway. This
 is conservative in that Bar Rec tables
 are for concrete aprons with dumped
 stone and greater roughness, jump length
 would be less.

BY LPA DATE 5/4/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D6 OF
 CKD DATE SUBJECT SUB-SHEET NO.
 OWNER PROJECT NAME English Road.

Elevation of downstream walls must be
 $(339.4 + d_2 + \text{freeboard})$ as a minimum

$$\text{freeboard} = 0.1 (V_1 + d_2) = 0.1 (12.5 + 3.66) = 1.8'$$

$$339.4 + 3.7 + 1.8 = 344.9 \text{ say } 345.0$$

The 3.7' value of d_2 would represent desirable tailwater depth for the std. project flood flow. The tailwater curve in section "B" is very conservative in the assumption of "n" factors.

DESIGN OF AUXILIARY SPILLWAY EMBANKMENT



Assume max. head will occur for 2nd water surface = 357.5'

Assume tailwater = 340.0'

$$h = 357.5 - 340.0 = 11.5'$$

Soils consist of fine sands or fine sands overlying glacial till; which in turn overlay the layered shales and siltstones, depth to rock will be in the 3-5' range.

Refer to Bureau of Rec., Design of Small Dams, pg 224.

"Whenever economically possible, seepage through a pervious foundation should be cut off by a trench extending to bedrock or other impervious stratum."

In this project, rock is at shallow depths in flood plain. Use cutoff trench excavated to rock and remove any loose shales at surface of rock as means of controlling seepage.

The width of the cutoff trench should be at least:

$$w = h - d \quad \text{where } h = 11.5$$

$$d = 4' \pm \text{to bottom of bore holes}$$

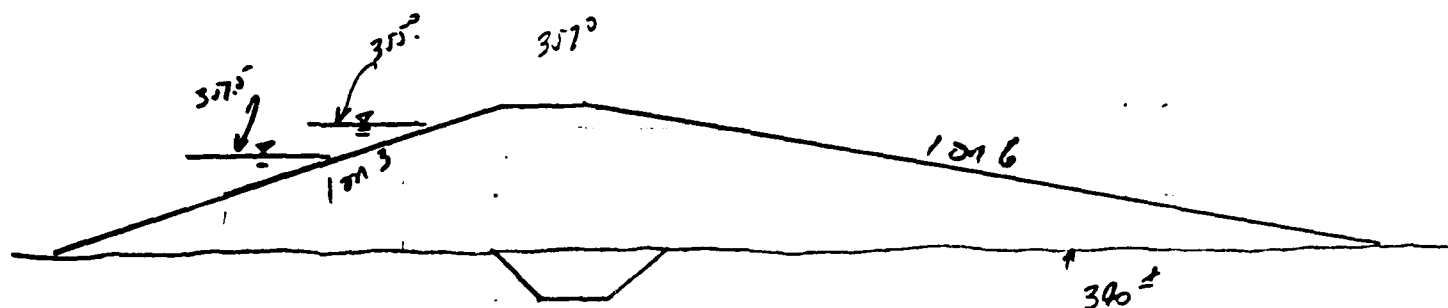
$$w = 11.5 - 4 = 7.5$$

Say $w = 8'$, 1 on 1 sideslopes

Due to flat slopes utilized, no further analysis of embankment req'd.

Embankment to be homogeneous rolled fill from borrow.

DESIGN OF LEVEE EMBANKMENT.



Assume max. head = $357.5 - 340.5 = 11.5$
 SPF flow will make tailwater go to 343.5

Design for seepage to be same as that for
 aux. spillway section

$$W = 11.5 - 4 = 7.5 \text{ say } 8', \text{ } 1 \text{ on } 1 \text{ sideslopes}$$

Due to flat slopes utilized, no further
 analysis of embankment reqd.

SELECTION OF STILLING BASIN FOR JERVICK SPILLWAY

In that the Froude No of discharge is close to 1.0, any forms of hydraulic jump basin would be ineffective for velocity reduction.

Impact basins, such as Bur. Rec utilizes would be extremely large and costly.

Most reasonable design in this case would be Colorado State University non-scouring Riprapped Basin. The recommended length of protection was determined by manual computation and computer run.

$$L_{\text{manual}} = 67.5'$$

$$L_{\text{computer run}} = 80'$$

To be conservative, use 80' of heavy stone filling.

Service Spillway Energy Dissipation Colorado U. Method

84" ϕ RCP, $D = 7.0$

$Q = 675$ (FS)

Outlet velocity = $19.5 \pm$ fps

tailwater = $d_t = 4.0'$

V_{ch} = allowable downstream velocity = 8 fps.

$y_0 =$ depth of flow at outfall section, assume $\frac{Q_c + Q}{2} = 5.8'$

$$\frac{Q}{D^{2.5}} = \frac{675}{7^{2.5}} = \frac{675}{130} = 5.19 \text{ ft}^3/\text{sec} / \text{ft}^{5/2}$$

$$\frac{d_t}{D} = \frac{4.0}{7.0} = 0.57$$

$$\frac{d_t}{y_0} = \frac{4.0}{5.8} = 0.69$$

$$\frac{y_0}{D} = \frac{5.8}{7.0} = 0.83$$

from Table 90, $\tan \theta = 0.1$ for $d_t/y_0 = 0.69$

$$L = \left[\frac{1}{2} \tan \theta \right] \left[\left(\frac{Q}{d_t V_{ch}} \right) - D \right]$$

$$L = \left[\frac{1}{0.2} \right] \left[\left(\frac{675}{4.0 \times 8} \right) - 7 \right] = 5 \times (20.5 - 7)$$

$$L = 67.5'$$

check Θ by computation:

$$\tan \Theta = 0.0495 \left(\frac{d_t}{y_o} \right)^{-1.52} \text{ for } \frac{d_t}{y_o} \text{ from 0.4-1.2}$$

$$= 0.0495 \times 1.964 = 0.097 \approx 0.1$$

check size of stone required for
service spillway

Assume depth of flow = 4'
stone $\phi = 1.9' = 19$

$$K/d = \frac{1.9}{4} = 0.48$$

from figure 1, HEC N° 11,

$$\frac{V_s}{V} = 0.76$$

$$V_s = 0.76 \times 19.5 = 14.8 \text{ FPS}$$

From Figure 2, HEC N° 11,

allowable $V_s = 17 \text{ FPS}$ for 600 # stone.

C. 1 Colorado State University Non-Scouring Riprapped Basin

The basic function of this basin is to allow the high velocity jet at the culvert outlet to expand laterally until the flow velocity is reduced to a stable level in the natural channel. The expansion angle of the velocity jet is duplicated by the basin geometry to eliminate scour. No advantage is gained in protecting for velocities less than those that occur naturally.

Two design procedures are employed in the Non-Scouring Riprapped Basin. The first case is the low tailwater design where the tailwater is less than the culvert rise. The second case is the high tailwater design where the tailwater is equal to or greater than the culvert rise. The methods are identical excepting the basin length and flare angle calculations. In both cases, the scour hole depth, length, and width will be zero if a non-scouring rock size is used.

In the low tailwater case, the length of basin depends on the channel allowable average velocity. Figure (20) and Figure (21) for circular and rectangular shapes respectively, yield estimates of the required flare angle. The curves are entered with a tailwater depth/brink depth ratio to obtain the flare angle in terms of the tangent of the angle. The curves are based on outlet Froude numbers of 1.5 and 1.4. Compensation for larger or smaller Froude numbers is accomplished by multiplying the flare angle by 1.5/Froude number for circular culverts and 1.4/Froude number for rectangular culverts. Using the tangent of the angle, the discharge, the tailwater depth, the allowable average channel velocity, and the basin inlet width, the basin outlet width is then obtained by the continuity equation based on conservation of mass. The basin inlet width is combined with the basin outlet width and flare angle to compute the basin length.

The high tailwater case employs Figure (22) to compute the basin length by using the arithmetic mean of the velocities measured along a vertical centerline at the culvert outlet and the arithmetic mean of the velocities measured along a vertical centerline at X distance downstream. The former is computed by multiplying the culvert outlet average velocity by 1.10 (smooth pipe) or 1.15 (rough pipe). The latter is estimated by using the channel maximum velocity. The distance X or basin length is then obtained from the curve. The outlet width of the basin is found by using the continuity equation. The possible diversion of the jet from side to side depends on the ratio of basin outlet width to basin inlet width. If the basin outlet width is greater than four times the basin inlet width, the danger of jet attachment to a wall is minimum. The high tailwater problem can also be solved by riprapping the downstream channel banks.

Equations:

$$C = (1./2. \tan \theta) ((Q / ((TW) (V_a))) - W_o) \quad \text{Non-Scouring Basin Length (ft) Figure (8)}$$

$$B = Q / ((TW) (V_a)) \quad \text{Non-Scouring Basin Outlet Width (ft) Figure (8)}$$

An Estimate of the Angle of Lateral Expansion for Horizontal and Mild Sloping Circular Culverts - Figure (20)

These equations were derived from multiple regression analysis of Figure (20)

$$\tan \theta = 1.8 - 5.5(d_t/Y_0) \quad (d_t/Y_0 \text{ range } 0.0-0.23)$$

$$\tan \theta = 0.0714(d_t/Y_0)^{-1.42} \quad (d_t/Y_0 \text{ range } 0.23-0.40)$$

$$\tan \theta = 0.0495(d_t/Y_0)^{-1.82} \quad (d_t/Y_0 \text{ range } 0.40-1.20)$$

$$\text{Minimum } \tan \theta = 0.05$$

An Estimate of the Angle of Lateral Expansion for Horizontal and Mild Sloping Rectangular Culverts - Figure (21)

These equations were derived from multiple regression analysis of Figure (21)

$$\tan \theta = 0.90 + 4.67(0.20 - d_t/Y_0) \quad (d_t/Y_0 \text{ range } 0.0-0.20)$$

$$\tan \theta = 0.05 + 1.3158(1. - d_t/Y_0)^{1.91624} \quad (d_t/Y_0 \text{ range } 0.20-1.20)$$

$$\text{Minimum } \tan \theta = 0.05$$

Distribution of Centerline Velocity for Flow from Submerged Outlets-Figure (22)

$$X = 6.W_0 V_{oave}/V_{xave} \quad (V_{xave}/V_{oave} \text{ } 0.1-0.6)$$

$$X = W_0(22.62474 + 98.61093(V_{xave}/V_{oave})^3 - 33.01651(V_{xave}/V_{oave})^5 - 87.13084(V_{xave}/V_{oave})^2) \quad (V_{xave}/V_{oave} \text{ } 0.6-1.0)$$

D15

CULVERT EROSION PROTECTION

GRFEE DRAINAGE STUDY

INPUT PARAMETERS

CHANNEL

VELOCITY = 19.5 FPS

DEPTH = 5.0 FT

MAXIMUM VELOCITY = 11.2 FPS

AVERAGE VELOCITY = 7.5 FPS

DISCHARGE/BAHKL = 700.0 CFS

PEAK DISCHARGE DURATION = 200. MIN

OUTLET

VELOCITY = 19.5 FPS

DEPTH = 5.0 FT

FROUDE NO. = 1.35

DISCHARGE/BAHKL = 700.0 CFS

PEAK DISCHARGE DURATION = 200. MIN

CULVERT

TYPE = CIRCULAR

SLOPE = 0.0040 FT/FT

RISE = 7.0 FT

SPAN = 7.0 FT

NO. OF BARRELS = 1.

BARREL SPACING = 0.0 FT

RIPRAP

EFFECTIVE ROCK DIAMETER = 0.000 FT

RIPRAP ROCK SPECIFIC GRAVITY = 2.70

MAXIMUM ROCK DIAMETER = 0.000 FT

UNDER SLOPE = 0.00 FT/FT

EMBANKMENT SLOPE = 0.00 FT/FT

END SLOPE = 0.00 FT/FT

SIDE SLOPE = 0.00 FT/FT

CULVERT EMISSION PROTECTION

D16

GREECE DRAINAGE STUDY

DESIGNED FOR SINGLE BARREL DISCHARGE

COLORADO STATE UNIVERSITY

ROCK WRAPPED BASINS

BASIN TYPE	EFFECTIVE ROCK DIAMETER	SCOUR DEPTH	SCOUR LENGTH	SCOUR WIDTH	SCOUR INLET	BASIN INLET	BASIN OUTLET	BASIN LENGTH	BASIN HEIGHT	BASIN THICKNESS	BASIN VOLUME

SCOURING	0.28 FT	9.4 FT	126.4 FT	34.1 FT	40.1 FT	40.1 FT	244.0 FT	10.5 FT	9.5 FT	10.9 FT	2603. CU
SCOURING	0.56 FT	5.6 FT	137.2 FT	28.3 FT	42.3 FT	42.3 FT	269.0 FT	10.5 FT	1.1 FT	6.0 FT	2070. CU
NON-SCOURING	0.98 FT	0.0 FT	0.0 FT	0.0 FT	7.0 FT	13.5 FT	60.0 FT	10.5 FT	1.2 FT	1.2 FT	274. CU
HYBRID	0.85 FT	1.7 FT	65.5 FT	15.4 FT	22.4 FT	29.4 FT	124.6 FT	10.5 FT	1.7 FT	3.4 FT	635. CU

SELECTION OF AUXILIARY SPILLWAY TYPE

Primary factors in selection of the recommended auxiliary spillway section were as follows:

1. Capacity Due to high runoff ($CN=79.5$) and short time of concentration, the 60% MPF is quite high for a small watershed. The storage facility does not have sufficient capacity volumetrically to decrease the 60% MPF peak and $Q_{in} = Q_{out}$. In order to have as much storage as possible below aux. spillway, the height between aux. spillway crest and top of protective walls must be minimized.
2. Tailwater The dissipation of energy resulting from auxiliary spillway flows must carefully consider what tailwater depths will be present. Due to the relatively steep ($0.8\% \pm$) valley slope and wide width of the floodplain, tailwater depths were found to be relatively low.

Types of spillways considered and comments on applicability are as follows:

1. Straight Drop. Not recommended in park setting. Tailwater requirements would necessitate rock excavations for conc. stilling basin.

2. Gravity overflow Down same tailwater problems as with straight drop. Costly and complex to construct and maintain at town level.
3. Ramp spillway with stone The most reasonable selection in this case, for the reasons noted below:
 - a. Maximum length of seepage path for seepage consideration
 - b. Relatively simple to construct and maintain.
 - c. Limits velocities due to flow over heavy stone filling
 - d. Can be made very conservative by using training walls, concrete weir wall, liner and bedding under heavy stone, etc.

USE OF ON-SITE MATERIALS IN DAM EMBANKMENTS

Due to the poor gradation of the fine sands on site, their use in embankments should be limited to widening of the upstream face, in areas away from the spillway walls.

Transition Considerations: Refer to Design of Small Dams, Pg 265. "Transition zones predominantly not req'd between impervious and sand-gravel zones."

Rapid Drawdown Considerations

Rapid drawdown is defined by Bar Rec as "6" or more per day following prolonged storage at high reservoir levels." (Pg 269)

This facility will not be subjected to prolonged storage at high reservoir levels due to the relatively large size of service spillway.

Reference to pg 262, Bar Rec Design of Small Dams:

"Flood damage due to failure of the upstream face is very unlikely. Failure can take place only during construction or following a rapid drawdown; in both cases, the reservoir should be virtually empty."

RETAINING WALL/ABUTMENT DESIGN Panels A and B

PG 1

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15162.03 (HT=6.00)

CONTROL 3 -2, 1 4 1 0 0 0

CONCR FC FSTEN FSCOM MAXT MAXC N COVF COVR COVB WT WLC UALL VALL
 1.200 20.000 20.000 1.5 0.5 10.0 2.00 2.00 3.00 0.150 1.00 0.240 0.052
 EARTH WT PHI PALL FRIC FSS FSO RLOC HO SURC SLOC AXPLA SHRA PULA
 0.120 36.75 5.000 0.45 1.50 2.00 0.33 0.0 0.00 0.0 0.000 0.000 0.000
 STEM HT TOP BATF BATR HTSS DROP DELT SLPD
 A.00 1.50 0.00 0.00 0.00 -2.00 0.00 0.0
 FOOTING OPTH TOE HEEL TMAX HMAX THMIN EDT EOH PSPM
 1.75 1.50 7.50 2.00 10.00 1.50 0.00 0.00 2.50
 LOADS OLV LLV LLH W/LL W/SS FR HLCC VLCC EQAF WTAB CFH
 0.000 0.000 0.000 0.000 0.000 0.000 0.00 0.00 6.00 0.000

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE
 HEIGHT WIDTH KIPSVERT KIPSLAT BM FTKIP A TENSTL P COMPSL
 8.00 0.00 0.000 0.060 0.040 -0.01 -0.17 0.02
 6.00 1.50 0.449 0.241 0.321 0.01 0.06
 4.00 1.50 0.899 0.662 1.165 0.02 0.18
 2.00 1.50 1.349 1.443 3.211 0.09 0.40
 0.00 1.50 1.799 2.585 7.180 0.24 0.73
 FC MAX FOR STEM= 0.383 KSI BATR= 0.00

FOOTING DESIGN
 WIDTH DEPTH FSO FSS RVERT RECC KSFMX KSPMN OM RM
 10.50 1.75 6.19 1.57 13.556 0.34 1.546 1.035 12,796 79,270
 TOE RESULTS
 WIDTH RM V-SHEAR A1/4 A1/2 A3/4 ATENS PER FS FC ACOMS
 1.50 1.385 1.807 0.00 0.01 0.03 0.05 0.44 19.977 0.128 0.00
 HEEL RESULTS INCLUDE PRESSURE UNDER HEEL
 WIDTH BM V-SHEAR A1/4 A1/2 A3/4 ATENS PER FS FC ACOMS
 7.50 10.174 2.468 0.03 0.10 0.22 0.37 0.62 19,962 0.373 0.00

RETAINING WALL/ABUTMENT DESIGN Panels C-F

PG 1

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=6.00)

CONTROL 3 -2 1 4 1 0 0 0

CONCR	FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVR	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052	
EARTH	WT	PHI	PALL	FRIC	FSS	FSD	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.45	1.50	2.00	0.33	0.0	0.00	0.0	0.000	0.000	0.000	0.000
STEM	HT	TOP	BATF	BATR	HTSS	DROP	DELT	SLPU					
6.00	1.50	0.00	0.00	0.00	-1.00	0.00	0.00	0.0					
FOOTING	DPH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EDH	PSPM				
1.50	1.50	4.50	2.00	10.00	1.50	0.00	0.00	2.50					
LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	MLOC	VLOC	EQAF	WTAB	CFH		
0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	4.00	0.000			

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM	FTKIP	A	TENSTL	P	COMPSYL
6.00	0.00	0.000	0.015	0.005	-0.00	-0.02			
4.00	1.50	0.449	0.135	0.135	0.00	0.03			
2.00	1.50	0.899	0.496	0.708	0.02	0.13			
0.00	1.50	1.349	1.217	2.362	0.05	0.33			
FC MAX FOR STEM= 0.225 KSI BATR= 0.00									

FOOTING DESIGN

WIDTH	DEPTH	FSD	FSS	RVERT	RECC	KSFMX	KSFMN	OM	RM
7.50	1.50	6.15	1.53	6.817	0.16	1.026	0.791	4.746	29.210
TOE RESULTS									
WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC
1.50	0.848	1.094	0.00	0.01	0.02	0.04	3.32	19.978	0.118
HEEL RESULTS INCLUDE PRESSURE UNDER HEEL									
WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC
4.50	2.941	1.345	0.01	0.03	0.07	0.13	0.40	19.968	0.228

D21

RETAINING WALL/ABUTMENT DESIGN Panel G

PG 1

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=6.00)

CONTROL	3	-2'	1	4	1	0	0	0	0			
CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVR	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052
EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.60	1.50	2.00	0.33	0.0	0.00	0.0	0.000	0.000	0.000
STEM	HT	TOP	BATF	BATR	HTSS	OROP	DELT	SLPD				
6.00	1.50	0.00	0.00	0.00	0.00	-1.00	0.00	0.00				
FOOTING	DPH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EUH	PSPM			
3.00	1.50	3.75	1.50	10.00	1.50	0.00	0.00	0.00	2.50			
LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLOC	EQAF	WTAB	CFH	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	4.00	0.000	

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM	FTKIP	A	TENSTL	P	COMPSTL
6.00	0.00	0.000	0.015	0.005	-0.00	-0.02			
4.00	1.50	0.449	0.135	0.135	0.00	0.03			
2.00	1.50	0.899	0.496	0.708	0.02	0.13			
0.00	1.50	1.349	1.217	2.362	0.05	0.33			
FC MAX FOR STEM=		0.225 KSI	RATR=		0.00				

FOOTING DESIGN

WIDTH	DEPTH	FSO	FSS	KVERT	RECC	KSFMX	KSFMN	OM	RM	
6.75	3.00	3.39	1.52	7.537	0.69	1.806	0.426	8.447	28.645	
TOE RESULTS										
WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
1.50	1.400	1.782	0.00	0.01	0.02	0.03	0.23	19.985	0.070	0.00
HEEL RESULTS INCLUDE PRESSURE UNDER HEEL										
WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
3.75	4.416	1.914	0.01	0.02	0.05	0.08	0.25	19.978	0.128	0.00

D21

RETAINING WALL/ABUTMENT DESIGN Panels H, I, J - East Wall PG 1
 ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=8.25)

CONTROL	3	-2'	1	4	1	0	0	0				
CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVB	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052
EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.60	1.50	2.00	0.33	0.0	0.00	0.0	0.000	0.000	0.000
STEM	HT	TOP	BATF	BATR	HTSS	DROP	DELT	SLPD				
A.25	1.50	0.00	0.00	0.00	-1.00	0.00	0.00	0.0				
FOOTING DPTH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EDH	PSPH				
1.75	1.50	5.00	2.00	10.00	1.50	0.00	0.00	0.00	2.50			
LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLOC	EQAF	WTAB	CFH	
0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.000	6.25	0.000	

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE												
HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM	FTKIP	A	TENSTL	P	COMPSTL			
8.00	1.50	0.056	0.023	0.009	0.00	0.00						
6.00	1.50	0.506	0.161	0.172	0.00	0.04						
4.00	1.50	0.956	0.567	0.840	0.00	0.15						
2.00	1.50	1.406	1.333	2.681	0.00	0.37						
0.00	1.50	1.856	2.458	6.413	0.21	0.69						
FC MAX FOR STEM	0.363	KSI	BAIR	0.00								

FOOTING DESIGN												
WIDTH	DEPTH	FSO	IFSS	RVERT	RECC	KSFMX	KSFMN	OM	RM			
8.00	1.75	3.65	1.52	9.506	0.70	1.618	0.558	11.796	43.101			
TOE RESULTS												
WIDTH	RM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS		
1.50	1.646	2.126	0.00	0.02	0.03	0.06	0.52	19.976	0.140	0.00		
HEEL RESULTS												
INCLUDE PRESSURE	UNDER	HEEL										
WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS		
5.00	7.228	2.301	0.02	0.08	0.16	0.26	0.57	19.964	0.308	0.00		

RETAINING WALL/ABUTMENT DESIGN Panel H - West Wall

PG 1

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=8.25)

CONTROL 3 -2 1 4 1 0 0 0

CONCR FC FSTEN FSCOM MAXT MAXC N COVF COVR COVB WT WLC UALL VALL
1.200 20.000 20.000 1.5 0.5 10.0 2.00 2.00 3.00 0.150 1.00 0.240 0.052
EARTH WT PHI PALL FRIC FSS FSD RLOC HO SURC SLOC AXPLA SHRA PULA
0.120 36.75 5.000 0.45 1.50 2.00 0.33 0.0 0.00 0.0 0.000 0.000 0.000

STEM HT TOP BATF RATR HTSS DROP DELT SLPU

A.25 1.50 0.00 0.00 0.00 -1.00 0.00 0.0
FOOTING DPTH TOE HEEL TMAX HMAX THMIN EDT EDH PSPM

1.75 1.50 7.50 2.00 10.00 1.50 0.00 0.00 2.50

LOADS DLV LLV LLH W/LL W/SS FR MLOC VLUC EGAF WTAB CFH
0.000 0.000 0.000 0.000 0.000 0.000 0.00 0.00 6.25 0.000

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT WIDTH KIPSVERT KIPSLAT BM FTKIP A TENSTL P COMSTL

8.00 1.50 0.056 0.023 0.009 0.00 0.00

6.00 1.50 0.506 0.161 0.172 0.00 0.04

4.00 1.50 0.956 0.567 0.840 0.00 0.15

2.00 1.50 1.406 1.333 2.681 0.06 0.37

0.00 1.50 1.856 2.458 6.413 0.21 0.69

FC MAX FOR STEM= 0.363 KSI BATR= 0.00

FOOTING DESIGN

WIDTH DEPTH FSO FSS RVERT RECC KSFHX KSFMN OM RM

10.50 1.75 6.34 1.55 12.937 0.37 1.497 0.966 11.796 74.840

TOE RESULTS

WIDTH HM V-SHEAR A1/4 A1/2 A3/4 ATENS PER FS FC ACOMS

1.50 1.331 1.737 0.00 0.01 0.03 0.05 0.42 19.978 0.125 0.00

HEEL RESULTS INCLUDE PRESSURE UNDER HEEL

WIDTH HM V-SHEAR A1/4 A1/2 A3/4 ATENS PER FS FC ACOMS

7.50 9.317 2.205 0.02 0.09 0.20 0.34 0.55 19.963 0.355 0.00

RETAINING WALL/ABUTMENT DESIGN Panels Tank - West Wall

PG 1

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=13.0)

CONTROL 3 -2 1 4 1 0 0 0

CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVB	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052
EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.60	1.50	2.00	0.50	0.0	0.00	0.0	0.000	0.000	0.000
STEM	HT	TOP	BATF	RATR	HTSS	DROP	DELT	SLPD				
13.00	1.50	0.00	0.00	0.00	-1.00	0.00	0.0	0.0				
FOOTING	DEPTH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	LUH	PSPH			
2.00	1.50	9.50	2.50	20.00	1.50	0.00	0.00	0.00	2.50			
LOADS	OLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLUC	EQAF	WTAB	CFH	
0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	11.00	0.000	

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM	FIKIP	A	TENSTL	P	COMPSTL
12.00	1.50	0.224	0.060	0.040	0.00	0.01			
10.00	1.50	0.674	0.271	0.331	0.01	0.07			
8.00	1.50	1.124	0.812	1.354	0.02	0.22			
6.00	1.50	1.574	1.713	3.820	0.11	0.48			
4.00	1.50	2.024	2.974	8.447	0.29	0.84			
2.00	1.50	2.474	4.594	15.956	0.60	1.33			
0.00	1.50	2.924	6.575	27.067	1.08	1.95			

FC MAX FOR STEM= 0.796 KSI BATR= 0.00

FOOTING DESIGN

WIDTH	DEPTH	FSO	FSS	RVERT	RFCC	KSFMX	KSFMN	OM	RM
12.50	2.00	3.61	1.52	22.634	1.33	2.972	0.648	42,499	153,708
TOE RESULTS									
WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC
1.50	2.893	3.782	0.01	0.02	0.05	0.09	0.79	19,974	0.161
HEEL RESULTS INCLUDE PRESSURE UNDER HEEL									
WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC
9.50	34.214	4.481	0.10	0.37	0.72	1.10	0.99	19,967	0.631

D25

E1



DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBCO-S Re: 77-985-20
Town of Greece, NY

23 June 1977

Kenneth Allen, P.E.
Erdman, Anthony, Associates
P.O. Box 9589
242 Andrews Street
Rochester, NY 14604

Proj. No.	5182
Original	FIA
Enclosure	
P. E. E.	
E. L. A.	
A. S. P.	RA ✓

Dear Mr. Allen:

Please refer to your letter of 8 June 1977 concerning English Road Park Detention Facility.

I have reviewed the data supplied and our field inspection report and decided that a Department of the Army permit will not be required. The fill area is not a freshwater wetland and the average flow of the waterway does not appear to be above five cubic feet per second as required by the administrative procedures for Section 404 of the Federal Water Pollution Control Act Amendments of 1972.

Thank you for your cooperation in this matter.

Sincerely yours,

James P. Bair
L.H. HAIR, Chief

Construction-Operations Division

RECEIVED
JUNE 28 1977

Erdman, Anthony, Associates
ROCHESTER, N. Y.

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION

Raymond T. Schuler, Commissioner

E-2

Region 4 Office: 1530 Jefferson Road, Rochester, New York 14623

May 5, 1977

Erdman, Anthony, Associates
Consulting Engineers and Planners
P. O. Box 9589
242 Andrews Street
Rochester, New York 14604

ATTENTION: Mr. Kenneth Allen

Re: ROCHESTER OUTER LOOP
RIDGE ROAD TO LAKE ONTARIO PARKWAY
P.I.N. 4070.00
ENGLISH ROAD PARK
DETENTION FACILITY

Gentlemen:

This is to acknowledge your letter of April 27, 1977.

A preliminary investigation of the expressway in connection with your proposed detention facility has been made by this office. It was discovered that high water will flood the expressway if provisions are not made for an earth berm in the areas with an elevation of less than 355, your estimate of extreme high water.

This office will approve your permit application if provisions are made in the application to allow the State of New York to do the necessary grading on the Town of Greece Park land, to assure protection for the expressway. This protection will be in the form of a berm with an elevation of 357'±.

Very truly yours,

A. J. Kopczynski
Regional Director

By:

J. D. TenHagen
J. D. TenHagen
Regional Design Engineer

JDTH:AMB:ses

cc: R. B. Tylock, Regional Planning Engineer
Gene Penzimer, Greece Town Engineer

RECEIVED
MAY - 9 1977

Erdman, Anthony, Associates
ROCHESTER, N. Y.

Original	SLBZ
Enclosure	ALA
P. E. E.	
P. L. A.	
A. S. P.	
9	KH

1930

1931

1932



EARTHWORK

Item 203.02, unclassified excavation and disposal, will be paid for all excavations made on this project in accordance with the Contract Documents.

Item 203.03, Embankment in Place, will be paid for all embankments placed on this project in accordance with the Contract Documents.

Excavations and embankments of a temporary nature which are not called for on the plans will not be paid for.

The material utilized in the portions of the dam embankments noted as "Impervious Embankment" shall be graded within the following limits:

<u>Sieve Size U.S. Std. Square Mesh.</u>	<u>Percent Passing by Weight</u>
6"	100
3/4"	90 - 100
No. 4	75 - 95
No. 40	45 - 85
No. 200	25 - 65

It is anticipated that none of the on-site excavations will yield materials which will conform to the required "Impervious Embankment". The Contractor will submit the location of any borrow sources to the Engineer for approval in accordance with Section 203-3.16 of the NYSDOT Standards.

The remaining embankments on the project, outside of the "impervious embankment" areas may be constructed of suitable materials from the excavations. Suitable materials shall be as defined in the NYSDOT Standards, Section 203-1.08.

Any excess of suitable materials from the excavations which are not utilized for construction of embankments shall be stockpiled on the site at a location designated by the owner.

Unsuitable materials from the on-site excavations, as defined by Section 203-1.09 of the NYSDOT Standards, shall be disposed of on-site at the location indicated on the plans.

SUBSURFACE DATA

Subsurface data accumulated by the Engineer has been provided herein. Information obtained from these records is not to be substituted for personal investigation and research by the Contractor. Attention is directed to the paragraph headed "Subsurface Information" in Section 100, Part 102-05 of the NYSDOT Standard Specifications.

PROJECT COMPLETION TIME

A total duration of 300 calendar days from the Notice to Proceed has been specified for completion of all work items of this Contract. A second condition of the Contract shall be that all work items associated with the dam and spillways required to make the project operational for flood control purposes shall be completed within 120 calendar days from the Notice to Proceed.



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1777 PAGE 1 OF 2 BORING NO. B-1
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 556.0 INSPECTOR D. Dugear WEATHER _____
DATE STARTED 4/26/77 COMPLETED 4/27/77 TECHNICIAN D. Sweeting
GROUND WATER - CASING IN - _____ AT COMPLETION / TIME _____
BELOW SURFACE - CASING OUT - _____ -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	3' 12"	12' 36"	18' 54"	24' 72"	N			
	6	2	2				4			Loose to firm brown damp fine sand, trace of silt.
	8			3	4	7	1		0'0"-2'0"	
	10	6	10				16			3'0"
	17			14	17	31	2		2'0"-4'0"	Firm to compact brown damp silt, little fine sand, trace of organic matter
5	30	17	20				37			4'6"
				21	30	51	3		4'0"-6'0"	Dense to very dense brown damp fine sand, trace to little silt.
	21	30					51			7'0"
				41	56	97	4		6'0"-8'0"	Very dense brown damp silt, little to some fine sand.
	17	30					47			
10				31	33	64	5		8'0"-10'0"	10'0"
	17	19			36					Compact to dense brown damp silt, trace to little fine sand.
				21	24	45	6		10'0"-12'0"	
	30	75					105	7	12'0"-13'0"	12'6"
	100								13'0"-13'6"	Very dense reddish brown damp fine sandy silt, little to some medium to fine gravel.
15	5"									13'6"
										Very dense reddish brown weathered shale and siltstone.
20										
	31	50/					81/	8	20'0"-20'9"	Very dense reddish brown and black fine gravel and coarse to fine sand. (Appears to be glacial wash).
		3"					6"			
25	50/						50/	9	25'0"-25'1"	No Recovery Refusal 25'0"
	1"						1"			Sort to medium hard reddish brown with greenish grey slightly mottled shale and siltstone. Few weathered cones throughout Rock Core.
									Run #1 25'0"-26'4"	Core in many pieces from chips to 6" long.
									Rec. 1'4"	
									Run #2 26'4"-30'0"	
30									Rec. 3'5"	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE 2" CASING 1" WITH 300 LB. WT. 24" EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1777 PAGE 2 OF 2 BORING NO. B-1
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 356.0 INSPECTOR D. Degear WEATHER _____
DATE STARTED 4/26/77 COMPLETED 4/27/77 TECHNICIAN D. Sweeting
GROUND WATER - CASING IN - _____ AT COMPLETION / TIME _____
BELOW SURFACE - CASING OUT - _____ -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0"	6"	12"	18"	24"	N			
										Boring terminated at 30'0" Notes: Advanced test boring with hollow stem auger casing to 25'0" Placed NX Flush coupled casing to 25'0" Core drilled with NX Series "M" double tube core barrel and diamond bit from 25'0" - 30'0" Performed permeability tests in overburd at 3'0" and 8'0" through 2½" drive pipe casing.

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE 2" CASING 12" WITH 200 LB. WT. 30" EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLD. DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 1 OF 2 BORING NO. B-3
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 340.2 INSPECTOR D. DeGear WEATHER
DATE STARTED 4/6/77 COMPLETED 4/6/77 TECHNICIAN J. Hammond
GROUND WATER - CASING IN - AT COMPLETION / TIME
BELOW SURFACE - CASING OUT - -WELLPOINT AT
Water Observed During Drilling at 1'6"

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		6"	4"	12"	15"	18"	N		
		1	1				2		TOPSOIL 1'0"
				1	2	3	1	0'0"-2'0"	Loose to firm brown damp fine sand little silt, trace of gravel.
		5	6				11		
				10	12	22	2	2'0"-4'0"	
5		33	17	30		47	3	4'0"-5'6"	Dense to firm brown damp fine sand little silt, trace of gravel.
					70	70	4	5'6"-6'0"	5'6"
								Run #1	Very dense reddish brown damp partially
							3.0	6'4"-8'4"	weathered shale 6'4"
							3.0	Rec. 2'0"	
10							3.0	Run #2	Soft to medium hard reddish brown with greenish
							3.0	8'4"-18'4"	grey slightly mottled shale and siltstone. Some
							2.5	Rec. 9'9"	thin to very thick weathered zones from 6'4" to
							2.0		16'0". Core in many pieces from chips to 15" long
							2.0	Run #3	
15							2.0	18'4"-26'4"	
							2.0	Rec. 8'3"	
							2.5		
							2.5		
							3.0		
							3.0		
20							3.0		
							3.0		
							2.5		
							3.0		
							2.5		
25							3.0		
							2.5		
							2.5		
2									
30									Boring terminated at 26'4"

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPCON 12" WITH 150 LB WT. 20" EA BLOW
C = NO. OF BLOWS TO DRIVE CASING WITH LB. WT. EA BLOW
NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
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PROJECT NO. 1777 PAGE 2 OF 2 BORING NO. B-3
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERMANN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 340.2 INSPECTOR D. DeGear WEATHER
DATE STARTED 4/6/77 COMPLETED 4/6/77 TECHNICIAN J. Hammond
GROUND WATER - CASING IN - AT COMPLETION / TIME
BELOW SURFACE - CASING OUT - -WELLPOINT AT
Water Observed During Drilling at 1'6"

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS																																																												
		0" 6"	6" 12"	12" 18"	18" 24"	N																																																																
										NOTES: Water Pressure Tests <table><thead><tr><th></th><th>Head</th><th>P.S.I.</th><th>Take (min/gal)</th></tr></thead><tbody><tr><td>1. 25'4" to 26'4"</td><td>5'5"</td><td>25.5</td><td>0</td></tr><tr><td>2. 21'4" to 26'4"</td><td>4'3"</td><td>23.0</td><td>0</td></tr><tr><td>3. 16'4" to 21'4"</td><td>5'8"</td><td>20.0</td><td>0</td></tr><tr><td>4. 11'4" to 16'4"</td><td>5'8"</td><td>18.0</td><td>5/42.0</td></tr><tr><td></td><td></td><td></td><td>5/31.5</td></tr><tr><td></td><td></td><td></td><td>5/33.6</td></tr><tr><td></td><td></td><td></td><td>5/32.7</td></tr><tr><td></td><td></td><td></td><td>5/32.5</td></tr><tr><td>5. 10'4" to 15'4"</td><td>6'8"</td><td>18.0</td><td>5/28.7</td></tr><tr><td></td><td></td><td></td><td>5/42.3</td></tr><tr><td></td><td></td><td></td><td>5/36.0</td></tr><tr><td></td><td></td><td></td><td>5/34.0</td></tr><tr><td></td><td></td><td></td><td>5/35.0</td></tr><tr><td></td><td></td><td></td><td>5/31.5</td></tr></tbody></table>		Head	P.S.I.	Take (min/gal)	1. 25'4" to 26'4"	5'5"	25.5	0	2. 21'4" to 26'4"	4'3"	23.0	0	3. 16'4" to 21'4"	5'8"	20.0	0	4. 11'4" to 16'4"	5'8"	18.0	5/42.0				5/31.5				5/33.6				5/32.7				5/32.5	5. 10'4" to 15'4"	6'8"	18.0	5/28.7				5/42.3				5/36.0				5/34.0				5/35.0				5/31.5
	Head	P.S.I.	Take (min/gal)																																																																			
1. 25'4" to 26'4"	5'5"	25.5	0																																																																			
2. 21'4" to 26'4"	4'3"	23.0	0																																																																			
3. 16'4" to 21'4"	5'8"	20.0	0																																																																			
4. 11'4" to 16'4"	5'8"	18.0	5/42.0																																																																			
			5/31.5																																																																			
			5/33.6																																																																			
			5/32.7																																																																			
			5/32.5																																																																			
5. 10'4" to 15'4"	6'8"	18.0	5/28.7																																																																			
			5/42.3																																																																			
			5/36.0																																																																			
			5/34.0																																																																			
			5/35.0																																																																			
			5/31.5																																																																			
										Notes: Advanced test hole with hollow stem auger casing.																																																												
										Placed NX Flush coupled casing to 6'4" Core drilled with NX Series "M" double tube core barrel and diamond bit from 6'4" to 26'4"																																																												
										Water pressure tests of rock were made at intervals shown between 6'4" and 26'4". (5/20.0) represents holding test at 5 minutes and rock taking 20.0 gallons per 5 minute interval.																																																												
										Time it takes to drill one foot of rock is shown in sample number column.																																																												

NOTE: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE CASING WITH LB. WT. EA. BLOW
NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 2 OF 2 BORING NO. B-4
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 355.0 ± INSPECTOR D. Degen WEATHER _____
DATE STARTED 4/27/77 COMPLETED 4/27/77 TECHNICIAN D. Sweeting
GROUND WATER - CASING IN - 19'0" AT COMPLETION / TIME _____
BELOW SURFACE - CASING OUT - _____ WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	24" 30"	30" 36"				
											Notes: Advanced test boring with hollow stem auger casing to 23'6" Advanced test boring with NX Flushed coupled casing to 24'0" Core drilled with NX Series "M" double tube core barrel and diamond bit from 24'0" to 29'0" Performed one permeability test in overburden at 3'0" through 2½" drive pipe casing.
7											

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 1 OF 2 BORING NO. B-5
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 362.5 INSPECTOR D. DeGear WEATHER _____
DATE STARTED 3/31/77 COMPLETED 3/31/77 TECHNICIAN J. Hammond
GROUND WATER - CASING IN - 19'0" AT COMPLETION 3/31 TIME _____
BELOW SURFACE - CASING OUT - 9'6" 3/31/77 - WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N	STAMP ON SAMPLE		
5		1	1			2		0'0"-2'0"	Loose brown damp fine sand, little silt.
		6	12			18			Firm brown damp fine sand, little silt.
				12	13	25	2	2'0"-4'0"	
		10	13			23			
				14	12	26	3	4'0"-6'0"	
10		12	12			24			
				12	12	24	4	6'0"-8'0"	
		12	20			32			
				26	27	53	5	8'0"-10'0"	
		28	36			64			
15				60	58	118	6	10'0"-12'0"	11'6"
		32	38			70			Very dense brown damp fine gravel, some silt, trace to little coarse to fine sand. 13'0"
				44	46	90	7	12'0"-14'0"	
		22	25			47			Very dense brown wet medium to fine sand, trace of silt.
				24	24	48	8	14'0"-16'0"	
20		18	18			36			17'6"
				20	27	47	9	16'0"-18'0"	Dense reddish brown wet silty fine sand, some shale gravel.
		20	12			32			
				23	24	67	10	18'0"-20'0"	
		70	72			142			21'0"
25				92	52	144	12	20'0"-22'0"	WEATHERED SHALE 21'6"
		100				107	13	22'0"-22'1"	Very dense reddish brown damp shale gravel and sand, little silt.
		1"				1"			
		100				100	14	24'0"-24'5"	
		5"				5"			
30								Run #1	No Recovery Refusal 26'0"
						6.0		26'0"-28'0"	Soft to medium hard reddish brown with greenish grey slightly mottled shale and siltstone. Some thin to thick weathered zone throughout rock core
						2.5		Rec. 1'9"	
						3.0		Run #2	
						3.0		28'0"-34'0"	

NOTES: H = NO. OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW
NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE FURNISHED DATA.

ROCHESTER **D** **C** **COMPANY, INC.**

SUBSURFACE GEOLOGICAL INVESTIGATIONS **CONCRETE AND SOIL-TESTING AND INSPECTION**

45 Steel Street • Rochester, New York 14606
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PROJECT NO. 1777 PAGE 1 OF 3 BORING NO. B-6
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. I-5182-03
CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 343.9 INSPECTOR D. DeGear WEATHER _____
DATE STARTED 4/5/77 COMPLETED 4/5/77 TECHNICIAN J. PARMON
GROUND WATER - CASING IN - _____ AT COMPLETION / TIME _____
BELOW SURFACE - CASING OUT - 1'0" - WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N	SAMPLE NO		
		1	1			2			
				3	7	10	1	0'0"-2'0"	Firm reddish brown wet silty fine sand, little gravel. 2'6"
		6	9			15			
5				10	10	20	2	2'0"-4'0"	Firm to compact reddish brown silty fine sand and shale gravel.
		8	24			32			
				12	14	26	3	4'0"-6'0"	
		16	48			64			6'6"
				75		75	4	6'0"-7'6"	Weathered Shale 8'3"
							1.0	Run #1	
10							3.0	8'3"-11'0"	Soft to medium hard reddish brown with greenish grey slightly mottled shale and siltstone. Some thin to thick weathered zones throughout rock core. Core in many pieces from chips to 13" long.
							3.0	Rec. 2'7"	
							1.5		
							3.0	Run #2	
							2.5	11'0"-21'0"	
15							2.5	Rec. 10'0"	
							2.5		
							2.5	Run #3	
							3.0	21'0"-28'3"	
							2.5	Rec. 7'0"	
20							2.5		
							2.5		
							2.5		
							2.5		
25							2.5		
							2.5		
							2.5		
							2.0		
30							3.0		

Boring terminated at 28'3"

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE CASING WITH LB. WT. EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
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PROJECT NO. 1777 PAGE 2 OF 3 BORING NO. B-6
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 343.9 INSPECTOR D. DeGear WEATHER _____
DATE STARTED 4/5/77 COMPLETED 4/5/77 TECHNICIAN J. Hammond
GROUND WATER - CASING IN - _____ AT COMPLETION / TIME _____
BELOW SURFACE - CASING OUT - 1'0" - WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION	
		0' 6"	6' 2"	12' 2"	18' 2"	N			REMARKS	
										Notes:
										Water Pressure Tests
										Head P.S.I. Take (min./gal.)
										1. 27'3" to 28'3" 3'6" 27.0 5/0.9
										5/0.4
										5/0.4
										2. 23'3" to 28'3" 2'5" 25.0 0
										3. 18'3" to 23'3" 2'6" 20.0 5/2.6
										5/4.6
										5/14.7
										5/14.5
										5/14.2
										4. 13'3" to 18'3" 2'5" 20.0 0
										5. 16'3" to 21'3" 1'6" 20.0 5/7.0
										5/9.8
										5/11.4
										5/12.6
										5/13.0
										6. 10'3" to 15'3" 5'7" 18.0 5/23.6
										5/28.6
										5/28.8
										Notes: Advanced test hole with hollow stem
										auger casing to 7'6"
										Placed NX Flush coupled casing to 8'3"
										Core drilled with NX Series "H" double
										tube core barrel and diamond bit from
										8'3" to 23'3"/
										Water pressure tests of rock were made
										at intervals shown between 8'3" and 28'3"
										(5/20.0) represents holding test at 5
										minutes and rock taking 20.0 gallons

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 1 1/2" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

1
TYPICAL INSPECTION CHECKLIST

FOR English Rd, St. Andrews Drive & Point Road

ST. ANDREWS DRIVE DETENTION BASIN
INSPECTION
CHECK LIST

DATE: 11/18/80

TIME: 11:45

INSPECTED BY: B. J.

ITEMS TO BE CHECKED

1) GATE AT ST. ANDREWS DRIVE:

O.K.

2) GATE AND LOCK AT CONTROL STRUCTURE:

O.K.

3) OPENING HEIGHT OF CONTROL GATE:

EXISTING HEIGHT:

CHANGED TO:

0.75'

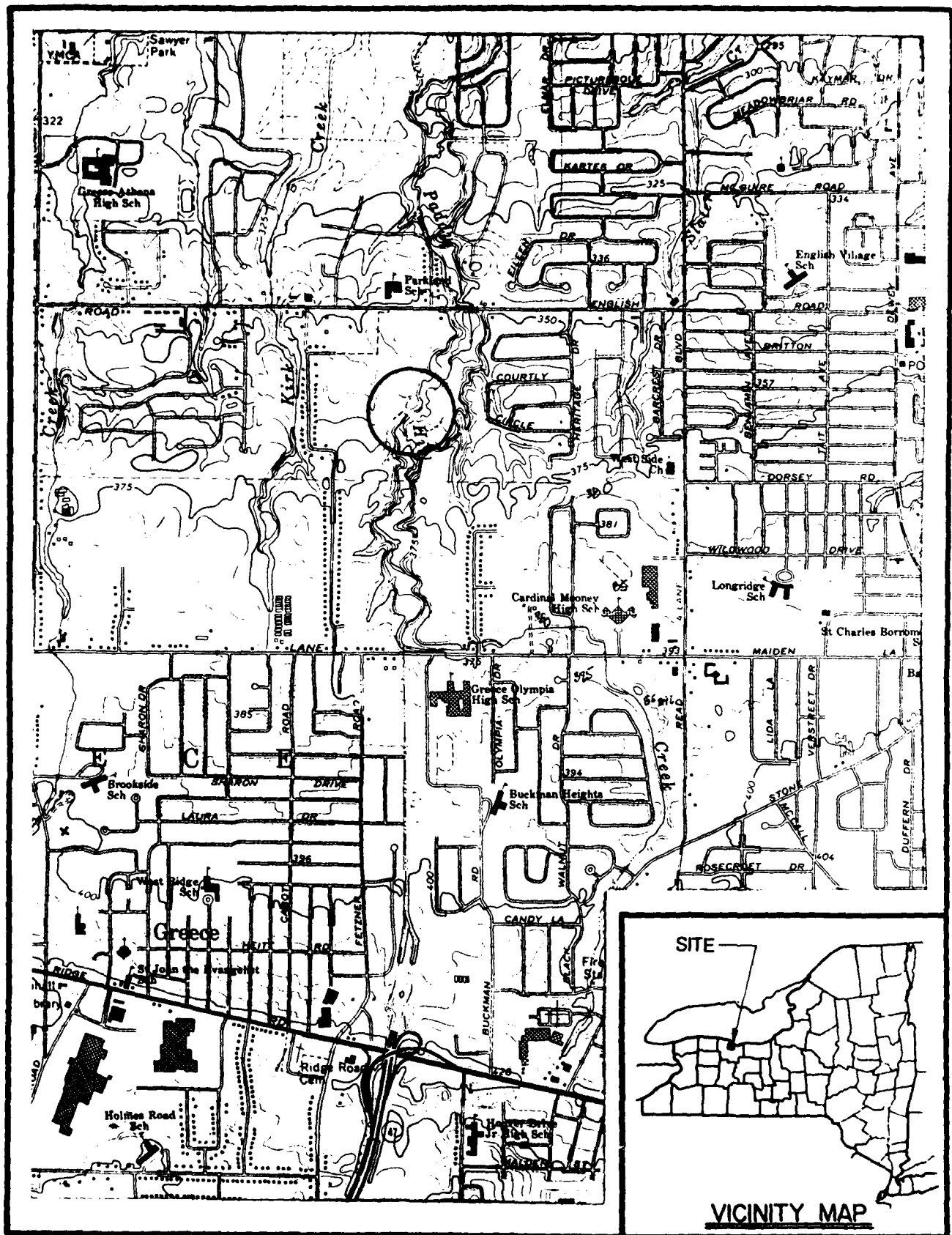
4) COMMENTS:

Slight vibration when control arm
is lowered. No serious problems.

8/18/77

APPENDIX F

DRAWINGS



LOCATION PLAN

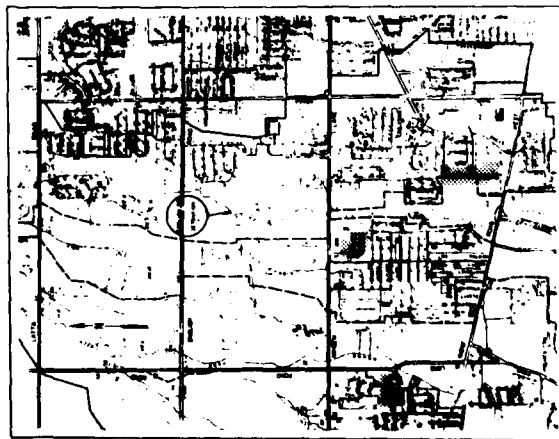
SCALE 1:2000



FIGURE 1

CONTRACT DRAWINGS FOR THE ENGLISH ROAD DETENTION FACILITY

Town of Greece, Monroe County, New York



LOCATION PLAN
SCALE 1" = 200'

TOWN SUPERVISOR: Donald J. Riley
TOWN BOARD: Joseph M. Darwesh
Howard Gesano
Roger W. Bolly
George R. Tobin

APPROVED BY: Town Engineer
Commissioner of Public Works
Erdmen, Anthony, Associates

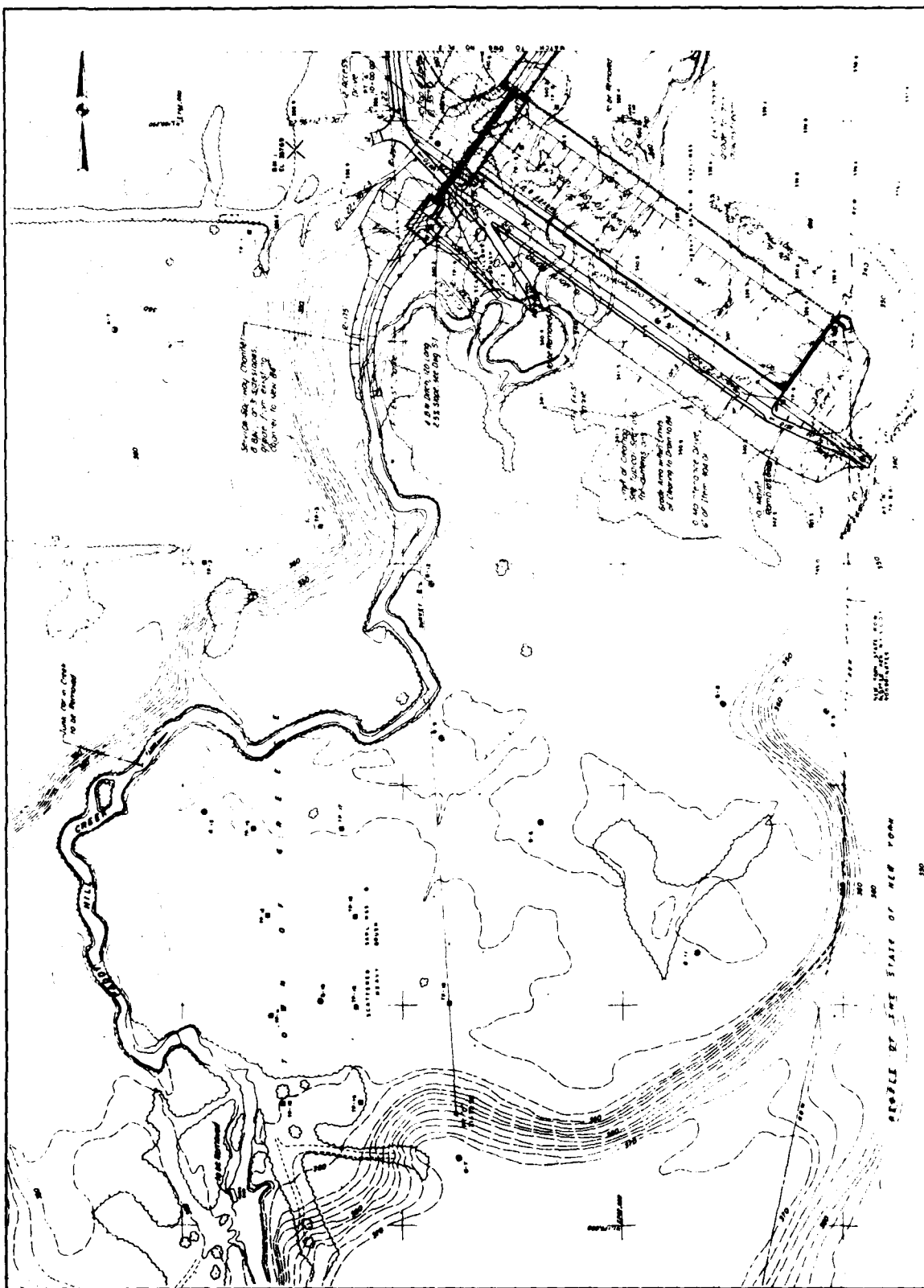
[Signature]
Erdmen, Anthony, Associates
Date

[Signature]
Date

40A 4294 ~~6-2-84~~
N.Y. 10810
FIGURE 2

[illegible]

FIGURE 3





COMMERCIAL IMPORTERS & PLANTERS
INCORPORATED, N.Y. 6000 25th ST., N.Y.

9.000

NOTE
UNSUBSTANTIATED ALLEGATIONS OR ACCUSATIONS TO
CONTAIN A VIOLATION OF THE NEW YORK
STATE EDUCATION LAW ARTICLE 14B, SECTION
1003

[illegible][illegible]

ENGLISH ROAD
DETENTION FACILITY

CLIENT

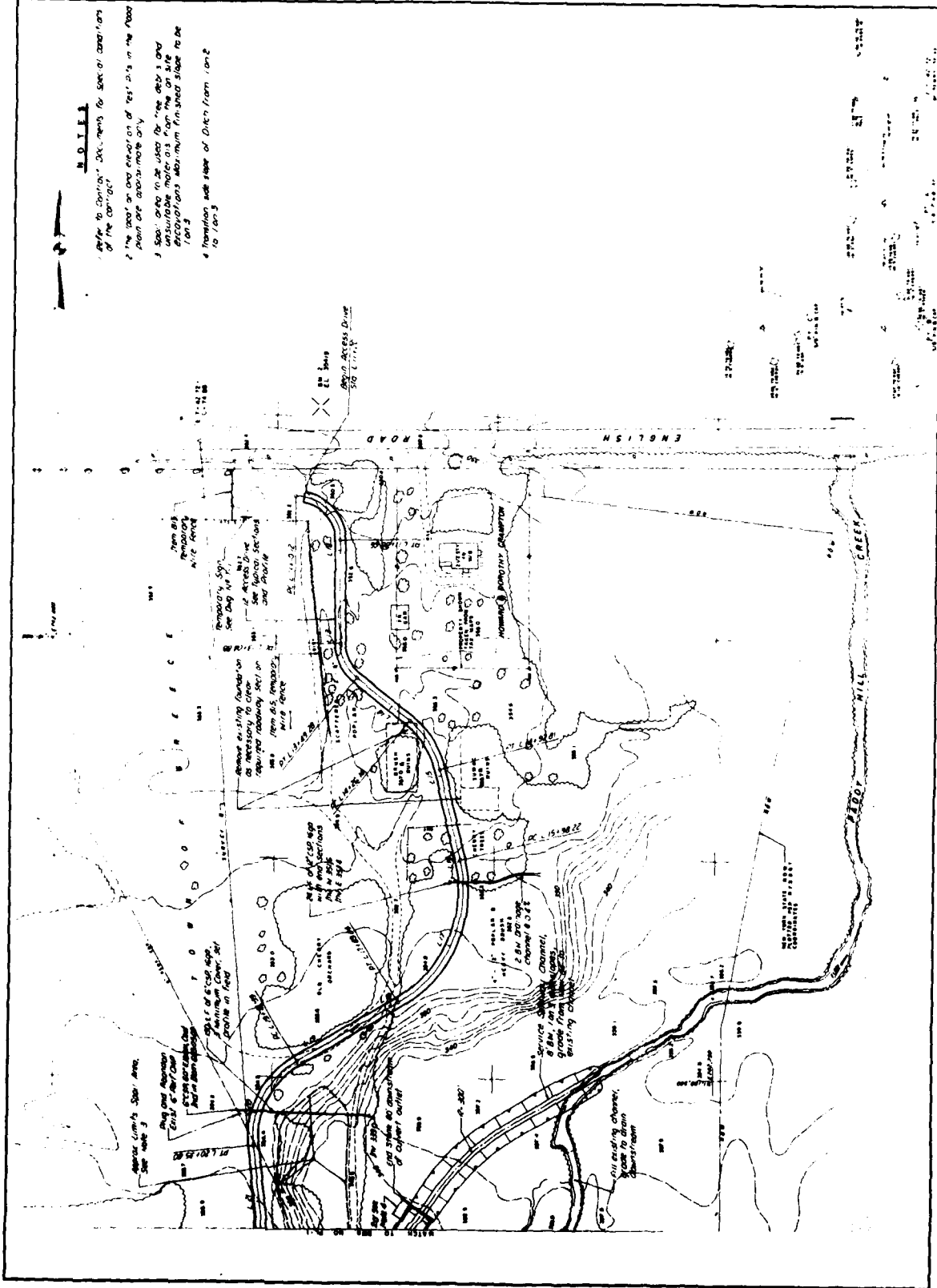
TOWN OF GREECE N.Y.

DRAWING TITLE

SITE PLAN

[illegible]

FIGURE 1





DESIGNED BY
CHECKED BY
DATE

NOTES:
1. THE ENGINEER HAS SPECIFICALLY REVIEWED THE DESIGN AND CONSTRUCTION OF THIS PROJECT AND HAS FOUND IT TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE T.C.D.P. SPECIFICATIONS AND THE T.C.D.P. DESIGN MANUAL.

NO.	REVISIONS	BY
1	AS SHOWN	

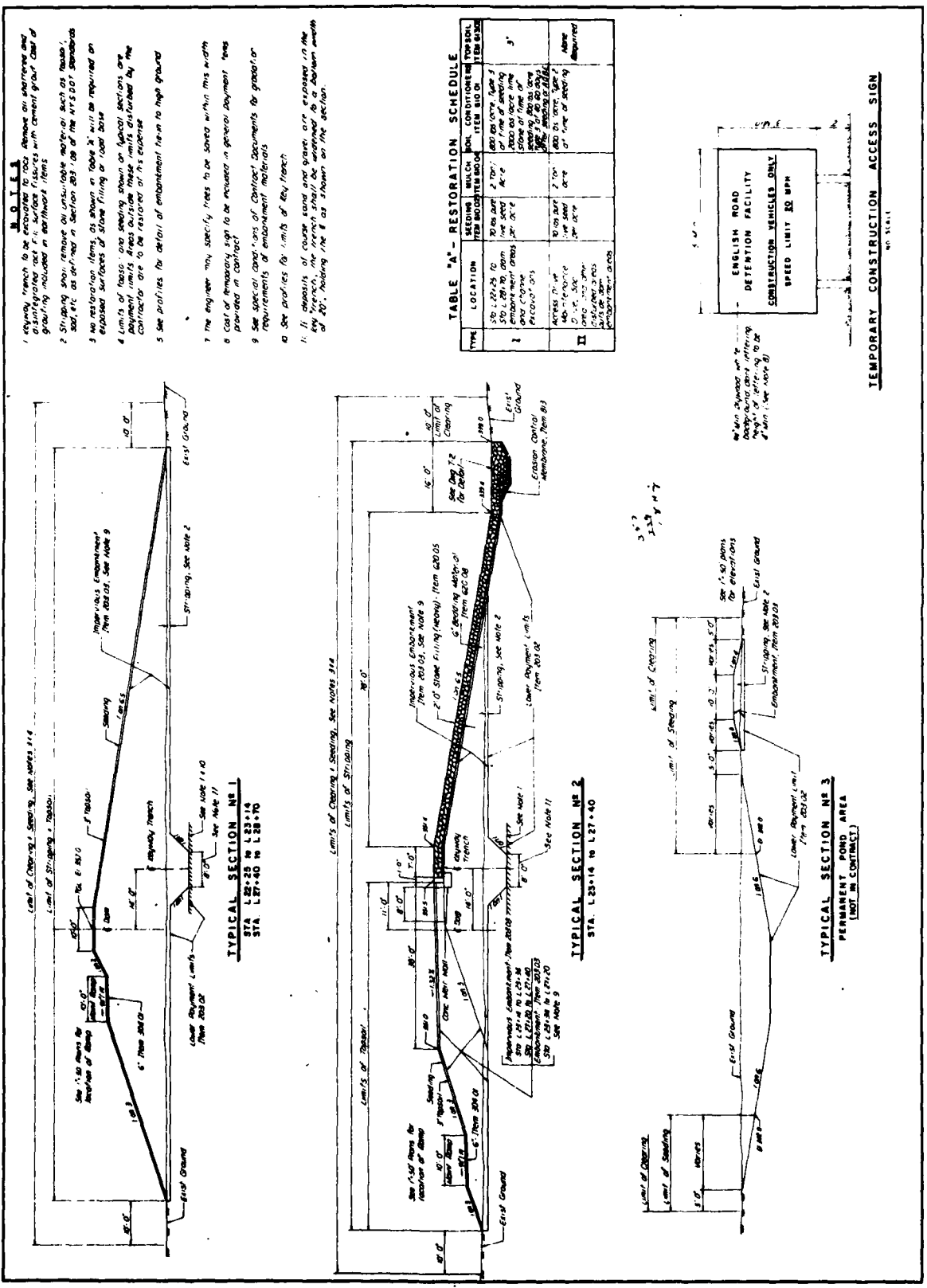
PROJECT NAME
ENGLISH ROAD
DETENTION FACILITY

CLIENT
TOWN OF GREECE, N.C.

DRAWING TITLE
TYPICAL SECTION

NO.	REVISIONS	BY
1	AS SHOWN	

FIGURE



6034
5-AYE
DRAWD
JAN 71
3-2-E

REVISED

500 1.00

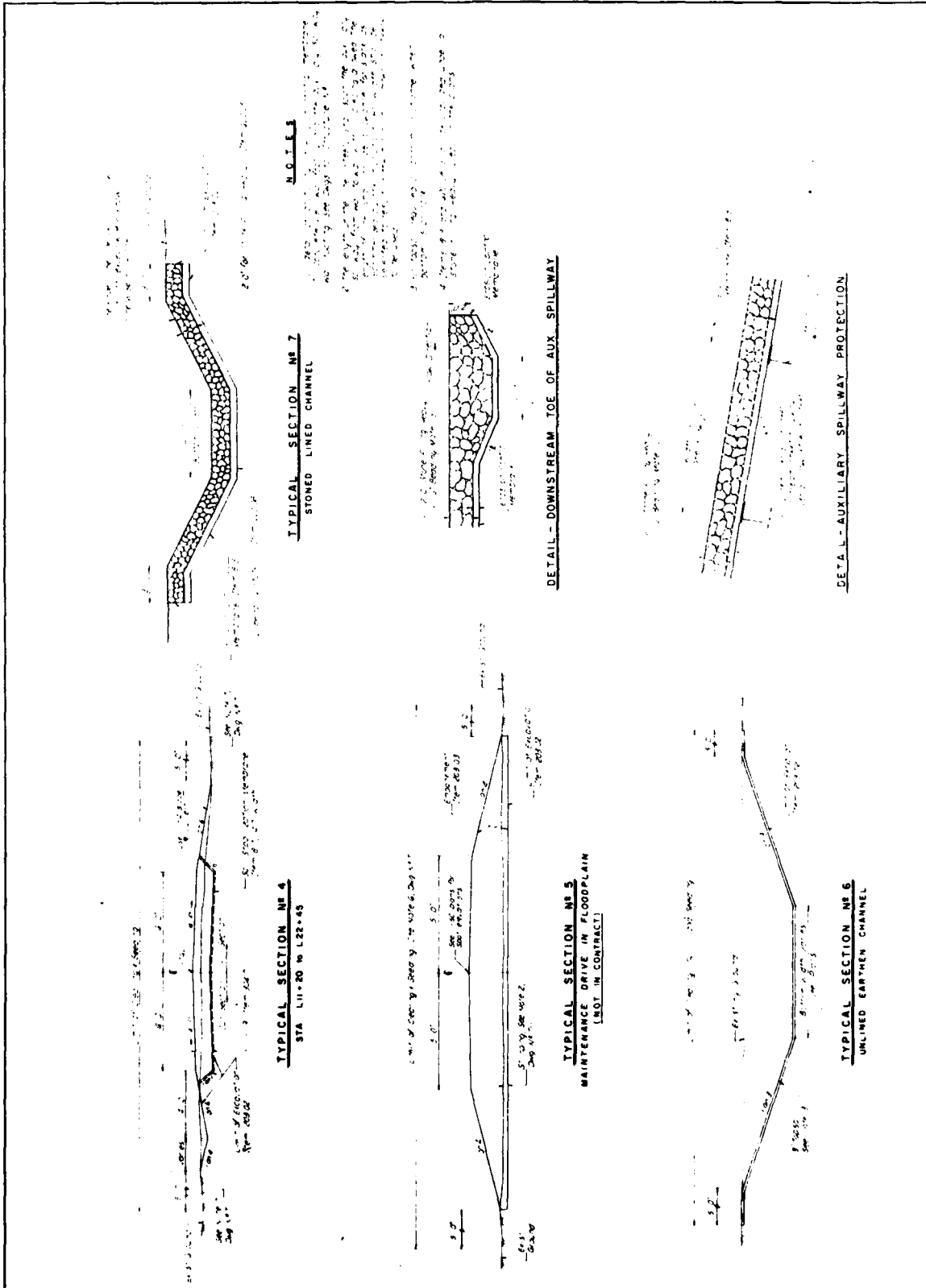
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ENGLISH ROAD
DETENTION F2

TOWN OF GREECE, N. Y.

TYPICAL SECTION 11E

FIGURE 7





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3-11
RECOMMENDED ALLOCATION OF APPROXIMATE TO
STANDARD 1 ALLOCATION OF THE NEW YORK
STATE EDUCATION LAW ARTICLE 108, SECTION
2209

REVISIONS

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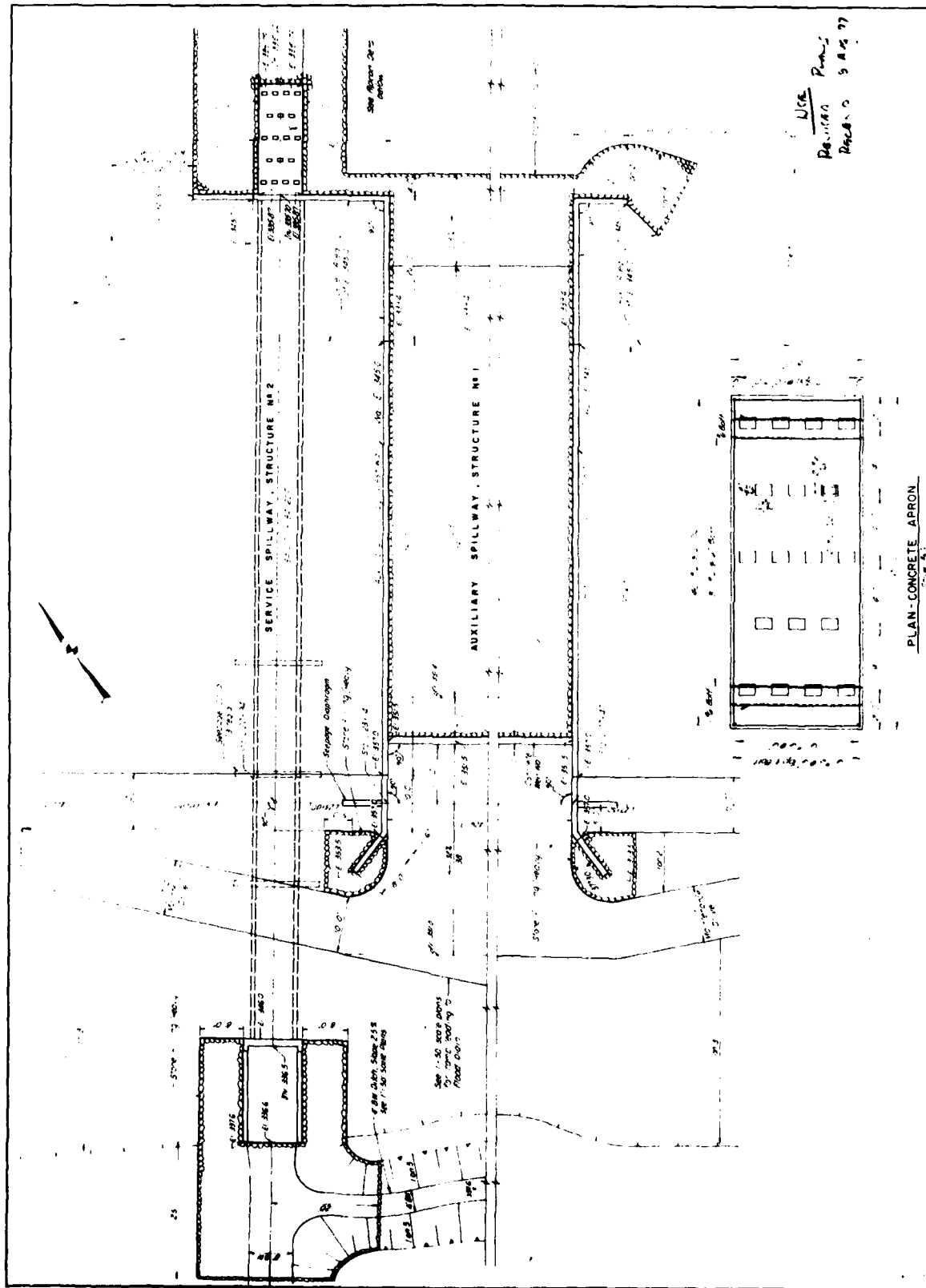
ENGLISH ROAD
DETENTION FACILITY

TOWN OF GREECE, N.Y

GENERAL PLAN
STRUCTURES Nº 1 & 2

20. 1985 - 27
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FIGURE 1





E.A. ASSOCIATES, INC.
STRUCTURAL ENGINEERS & PLANNERS
CHICAGO, ILL. 60601



STATE OF ILLINOIS
Professional Engineer
No. 123456
Exp. 12/31/80

NOTE
AMENDMENTS: AMENDMENT NO. 1 TO THE SPECIFICATIONS FOR THE DETENTION FACILITY, TOWN OF GREECE, N.Y. TYPE 100

NO.	DATE	REVISIONS	BY	CHK
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PROJ. EC. NAME
ENGLISH ROAD
DETENTION FACILITY

TOWN OF GREECE, N.Y.

STRUCTURAL DETAILS

FIGURE 1

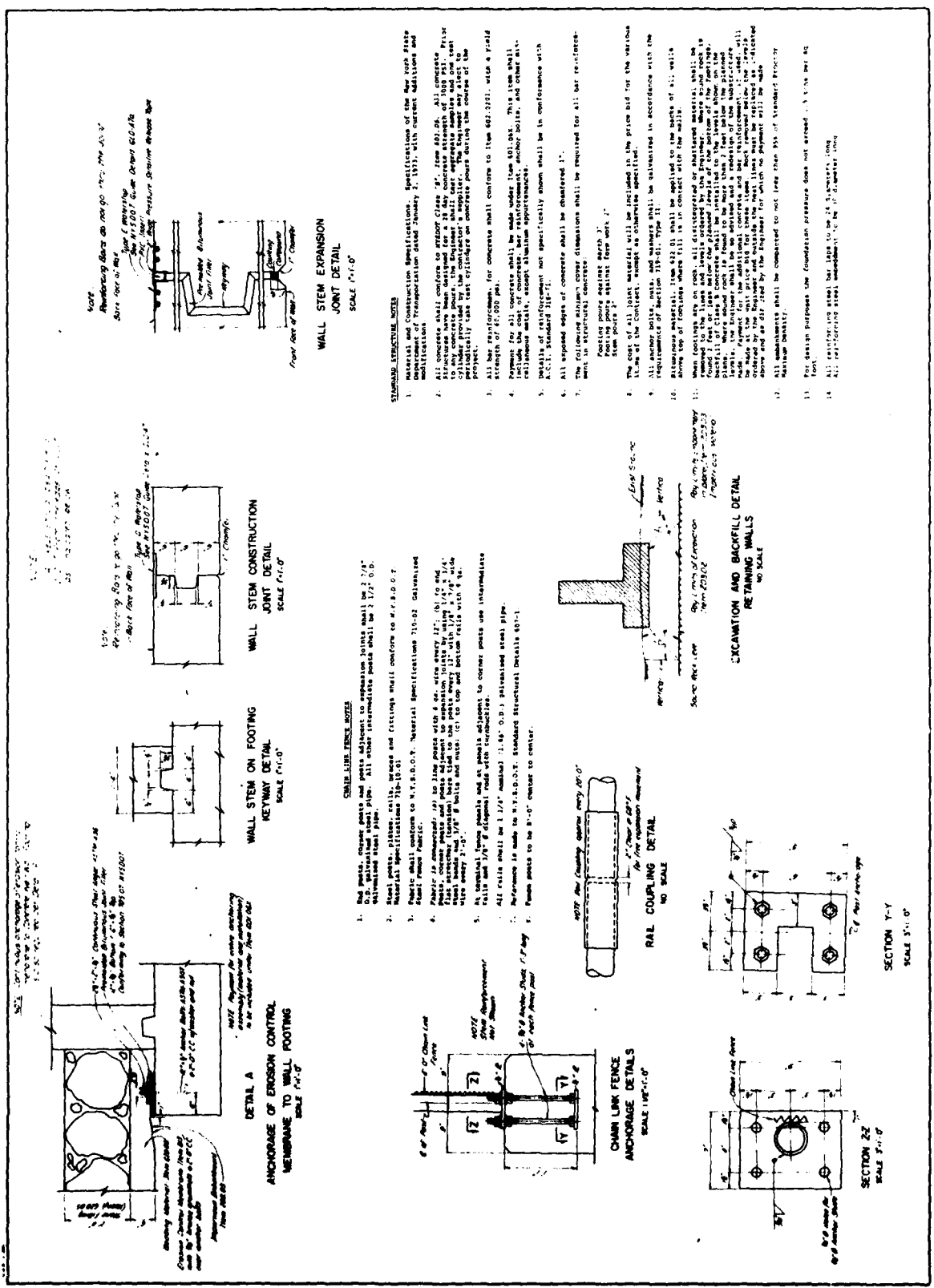
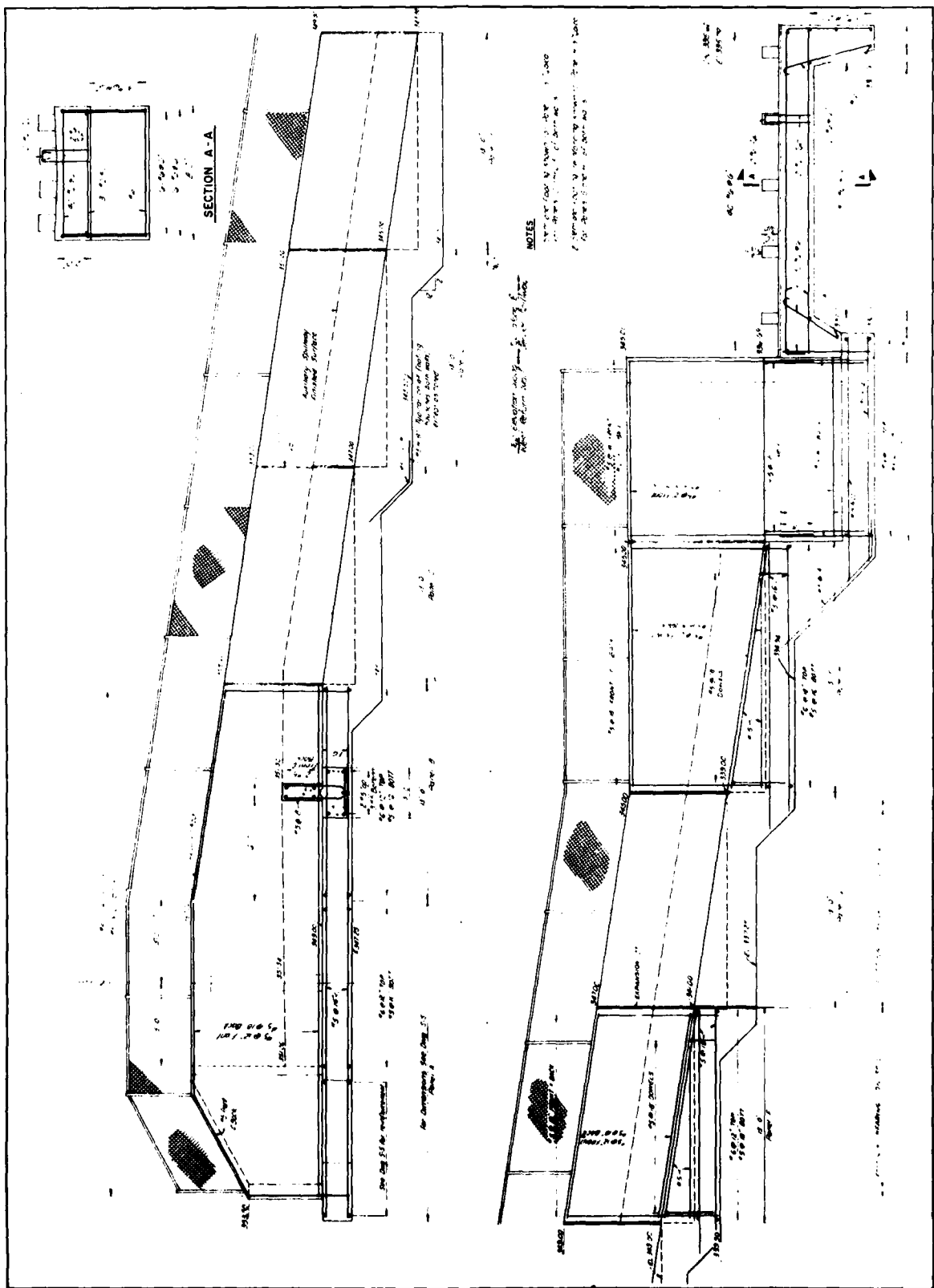




FIGURE 10





NOTE: INFORMATION ON SUBJECTS IS LIMITED TO A SUMMARY OF THE RESULTS OF THE TESTS AND A SUMMARY OF THE RESULTS OF THE TESTS.

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PROJECT NAME	ENGLISH ROAD	DETENTION FACILI	CLIENT
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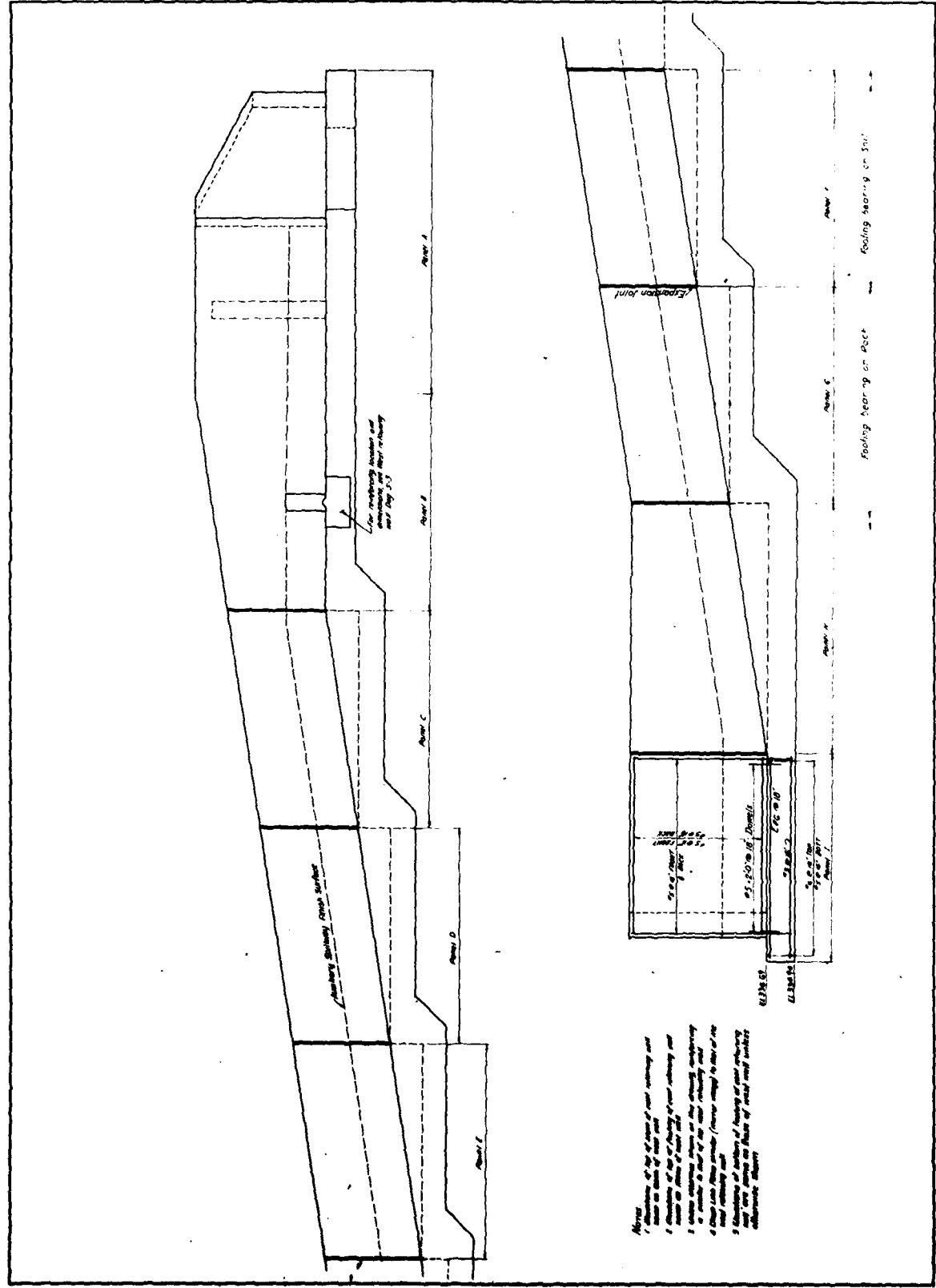
TOWN OF GREECE, N

DRAWING TITLE

STRUCTURE NO. 1
EAST WALL ELEVATION

DATE	10.10.1970	NO. 1000
TO	10.10.1970	1000
BY	10.10.1970	1000
REMARKS	10.10.1970	1000

FIGURE



REVISIONS		
NO	DATE	DESCRIPTION
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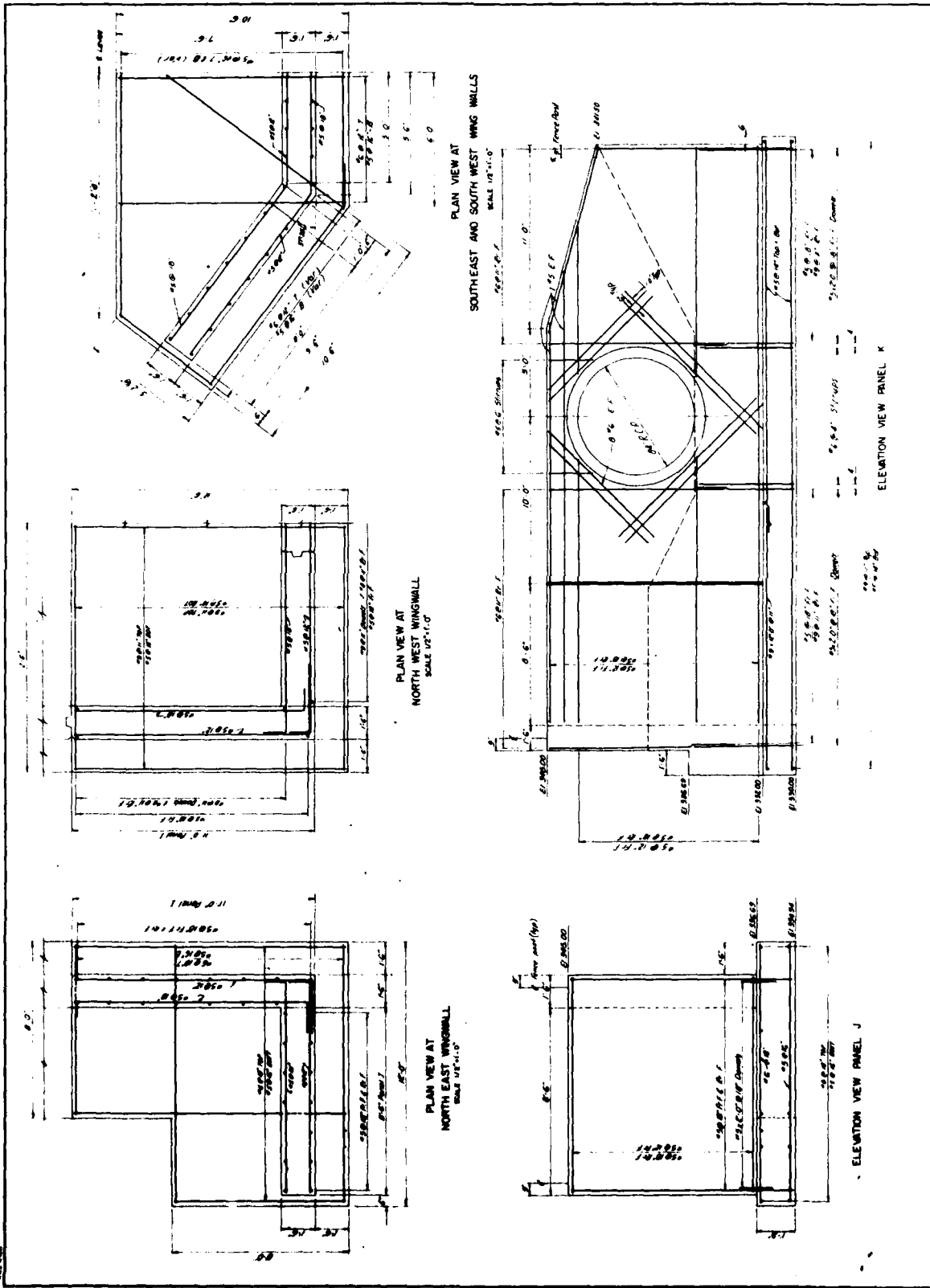
PROJEC ^o NAME	CLIENT
ENGLISH ROAD DETENTION FACILITY	

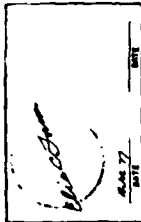
TOWN OF GREECE, NY

DRAWING NO. 1
STRUCTURE NO. 1
WINGWALL DETAILS

[illegible]

FIGURE 12





NOTE: CONTRACTOR TO VERIFY ALL DIMENSIONS AND LOCATIONS OF THE WALLS AND FOUNDATIONS WITH THE TOWN OF GREECE, N.Y. BEFORE CONSTRUCTION.

NO.	DATE	REVISIONS
1	10/27/77	REVISED

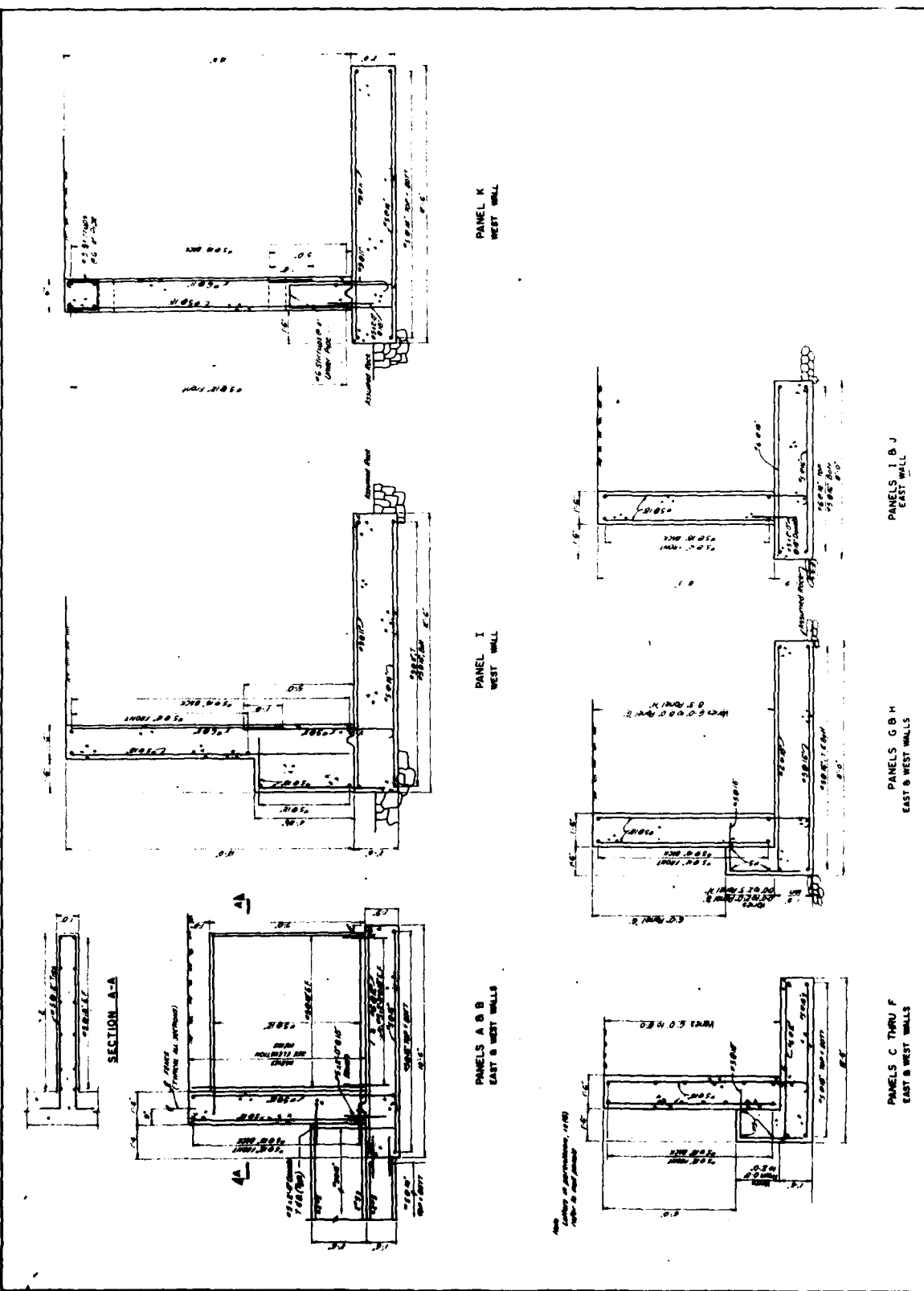
PROJECT NAME
ENGLISH ROAD
DETENTION FACILITY

CLIENT
TOWN OF GREECE, N.Y.

DRAWING TITLE
STRUCTURE NO. 1
TYPICAL SECTIONS

NO.	DATE	REVISIONS
1	10/27/77	REVISED

FIGURE 13



[illegible]