Phase I Inspection Report  
Larkin Creek Dam  
Lake Ontario Basin, Monroe County, N.Y.  
Inventory No. 711

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20. ABSTRACT

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 Larkin Creek 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 a foot of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.
LAKE ONTARIO BASIN

LARKIN CREEK DAM

NEW YORK

INVENTORY No. NY 711

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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NEW YORK DISTRICT CORPS OF ENGINEERS

MAY 1981
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THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.
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: Larkin Creek Dam I.D. No. NY 711
State Located: New York
County: Monroe
Watershed: Lake Ontario Basin
Stream: Larkin Creek
Date of Inspection: November 20, 1980

ASSESSMENT OF GENERAL CONDITIONS

The Phase I Inspection of the Larkin Creek 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 a foot of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

The Phase I inspection has identified the need for the following investigation to be undertaken within one year.

1. The analysis of the emergency spillway channel under flood discharges indicates that the depths of flow and velocities associated with flows in excess of the 1/2 PMF may result in erosion of the emergency spillway channel with subsequent erosion of the embankment. An investigation of the effect of flow in the emergency spillway channel should be performed to determine whether the erosive effect of high flows would cause damage to the embankment of the dam. Remedial work should be undertaken depending on the results of this investigation.

The following remedial work should be undertaken within one year:

1. Motor bike traffic should be restricted on the facility. The erosion due to this traffic should be repaired.

2. 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.

3. 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.
1. Overview of the dam. Retention basin on the right. Downstream protected area on the left. Control outlet in the background.
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 Larkin Creek 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 Larkin Creek Dam is located in the Town of Greece, west of Elmgrove Road and south of St. Andrews Drive just northwest of the Hamlet of South Greece. The dam is an earth fill structure approximately 2,100 feet long with a maximum height of approximately 12-1/2 feet. The structure is "L" shaped with the short leg facing in a north-south direction to conform to the residential subdivision development in the area. The discharge control structure for this stormwater detention facility consists of a 36 inch diameter concrete pipe outlet with a 36 inch square sluice gate which is used to regulate the outflow from the impoundment during runoff events. The regulating structure is located near the center of the facility. The emergency spillway is located at the extreme easterly end of the structure and consists of a broad crested weir 275 feet long discharging into a grassed channel with riprap protected banks. A concrete sill 5 feet deep and 2 feet wide at the crest of the emergency spillway prevents erosion at this point. The embankment at the junction with the spillway section is protected by a section of riprap. The discharge channel from the emergency spillway runs parallel to the earth fill embankment to the receiving stream.
b. **Location**  
The Larkin Creek Dam is located in the Town of Greece, Monroe County, New York.

c. **Size Classification**  
The maximum height of the dam is approximately 12 feet. The volume of the impoundment is approximately 212 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**  
The east branch of Larkin Creek, the receiving stream from the impoundment, flows through a heavily developed residential area of the Town of Greece. Several residences are located in close proximity to the structure. 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 storm water retention facility to control flows in the east branch of Larkin Creek downstream from the facility.

g. **Design and Construction History**  
The plans included in this report indicate that the dam was designed in 1976 with construction completed in 1977. 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. The facility is monitored twice weekly during these periods. During runoff events, the sluice gate controlling the outlet flow is manipulated to control flow in the receiving stream downstream from the facility. During these runoff events, the facility is monitored every 2 hours or more often if required. Adjustments to the outlet flow are made on an around-the-clock basis until the runoff event is terminated and the impoundment is drained.
1.3 PERTINENT DATA

a. Drainage Area

The drainage area of the Larkin Creek Dam is 0.96 square miles (617 acres).

b. Discharge at Dam Site

Maximum recorded reservoir elevation is 453.35, which was accompanied by a discharge of approximately 17 cfs.

Computed Discharges:

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Emergency Spillway, top of dam</td>
<td>4,230 cfs</td>
</tr>
<tr>
<td>* Gated Drawdown</td>
<td>120 cfs</td>
</tr>
</tbody>
</table>

C. Elevation (feet above MSL)

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top of Dam</td>
<td>459.0</td>
</tr>
<tr>
<td>Spillway crest</td>
<td>455.75</td>
</tr>
<tr>
<td>Stream bed at centerline of dam</td>
<td>446.5</td>
</tr>
<tr>
<td>Invert of 36 inch Pipe</td>
<td>446.6</td>
</tr>
</tbody>
</table>

d. Reservoir

Length of maximum pool | 2,400+ ft. (1/2 PMF) |
Length of normal pool | Normally dry |

e. Storage

<table>
<thead>
<tr>
<th>Storage</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top of Dam</td>
<td>212 acre feet</td>
</tr>
<tr>
<td>Spillway Crest</td>
<td>82 acre feet</td>
</tr>
</tbody>
</table>

f. Reservoir Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top of Dam</td>
<td>53 acres</td>
</tr>
<tr>
<td>Spillway Crest</td>
<td>26 acres</td>
</tr>
</tbody>
</table>

g. Dam

Type - Earth fill
Length - 2,100
Height - 12.5 feet
Freeboard Between Spillway Crest and Top of Dam - 3.25 feet
Top Width - 10 feet
Side Slopes - 3 horizontal:1 vertical, upstream and downstream
Zoning - Homogeneous
Impervious Core - None
Grout Curtain - None

* Discharge through 36 inch diameter pipe with gate fully open and the reservoir at top of dam.
h. Spillway (emergency)

Type - Broad crested weir
Length - 275+ feet
Crest Elevation - 455.75
Gates - none
U/S Channel - Impoundment
D/S Channel - Grassed slope, riprapped banks, concrete sill 5 feet deep,
2 feet wide at crest.

i. Regulating Outlets

36 inch concrete pipe outlet with 36 inch square sluice gate control.
SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Geologically, Larkin Creek 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 horizontal beds of either the Grimsby Sandstone of Lower Silurian age, the Queenston Shale of Upper Ordovician age, or is on the contact between the two formations, Grimsby to the south and Queenston to the north of the dam. The Grimsby is made up mostly of thick-bedded red siltstone and includes thin-bedded argillaceous shales, particularly near its base. The underlying Queenston is made up predominantly of thin-bedded, red argillaceous shale and includes beds of siltstone and sandstone, particularly near its top. Thus, without petrographic and grain-size analysis, it is difficult to differentiate between the two formations near their contact. Bedrock is generally within 15 feet of the surface.

The glacial debris was located at the then southern boundary of glacial Lake Iroquois. The debris appears to be mainly of a glacial lake beach which consists of silt, sand, and gravel layers and lenses. Silty sand and sandy silt are most common. A zone or layer of glacial till may be present between the bedrock below and the beach deposits above. On occasion it appears on the surface due to the probable irregularity of its thickness and may represent a covered ground moraine. The beach type covering could be wave reworked moraine.

Glacial till is an unsorted and unstratified deposit. The soil profile along the dam centerline, as shown in Figure 2 in the report by J. P. Collins (See Appendix E), is not suggestive of a till but rather beach and lacustrine deposits along with some till.

Several soil varieties are present in the vicinity of the dam. Permeability varies from moderately rapid to rapid, from 0.63 to more than 6.3 inches per hour, depending upon 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.

2.2 DESIGN RECORDS

The preliminary engineering report and design computations for the construction for the design of this facility are included in Appendix E.

2.3 CONSTRUCTION RECORDS

Although the records kept during construction were not available for review, the design engineer's certification of construction indicates that the facility was constructed under his inspection and that of his soils consultant. A letter summarizing the construction of the facility is included in Appendix E.
2.4 OPERATION RECORDS

The facility is monitored twice 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 position of the control gate. During runoff events, the facility is monitored every 2 hours or more often if required. Elevations of the water in the impoundment are recorded on a storage curve during each visit. Control gate positions are also documented. Outlet gates are adjusted to maintain optimum flow in the downstream channel.

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 State 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 Larkin Creek 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 the temperature was in the mid 30's. At the time of the inspection, there was no water in the impoundment. The control gate at the outlet structure was open approximately 8 inches. The flow through the outlet structure was not restricted by the control gate.

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. Minor erosion on the slope of the embankment and the sod surface of the spillway channel was detected. This erosion was attributed to motor bike traffic on the facility.

c. Control Outlet

The outlet control structure was in good condition and the control gate was in operating condition and well maintained.

d. Emergency Spillway

The sod surface of the emergency spillway was in good condition although minor erosion from dirtbike traffic was noted downstream in the spillway channel. The remainder of the channel was uniform in cross section with a well established sod cover. The riprapped banks of the emergency spillway channel are in good condition.

e. Reservoir Area

The reservoir area, at the spillway elevation, extends approximately 2,000 feet upstream from the dam structure. 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 area are gently sloping and no erosion was noted in the reservoir area.

f. Downstream Channel

The channel downstream from the control outlet is formed in sand and gravel. The channel is severely restricted by a 38 inch by 24 inch elliptical roadway culvert through Andrews Drive located just downstream from the impoundment.
3.2 **EVALUATION**

The visual inspection revealed that the dam is generally in good condition with only minor erosion due to motor bike traffic in the emergency spillway channel and on the slopes of the embankment. Both the control outlet and the emergency spillway are in good condition and no signs of structural instability were detected.
SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal operating procedure for this facility is to control the flow in the downstream channel of Larkin Creek to prevent flooding of residential properties during rainfall runoff events. During dry weather the sluice gate at the control outlet is maintained in a position which will allow unrestricted flow through the facility. The position of the gate at the time of the inspection provided an opening of approximately 8 inches. During rainfall events, the gate in this position would begin to impede flow and thereby raise the water level in the impoundment. As runoff continues, the facility is monitored every 2 hours or more often if necessary depending on the extent of runoff. The gate is adjusted to maintain optimum flow in the downstream channel. Around-the-clock surveillance is maintained during runoff events.

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 the conditions of the facilities. An inspection checklist is completed based on the findings of the monitoring visit.

4.3 MAINTENANCE OF OPERATING FACILITY

The gate controlling the outlet from the impoundment is in good condition and properly maintained.

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.
5.1 DRAINAGE AREA CHARACTERISTICS

The Larkin Creek Dam is a flood control structure located in the southwestern portion of the Town of Greece, just south of St. Andrews Drive and some 4,400 feet north of the Erie Canal. The dam has a drainage area of 0.96 square miles which is characterized by moderately sloping pastured and wooded terrain. The drainage area is bounded on the south by the canal and the southwestern portion extends into the Town of Ogden. The reservoir has a surface area of approximately 26 acres at the spillway crest. However, due to the operation of the facility as a flood control structure, 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 be 2.0 for the drainage area and $C_p$ was estimated to be 0.625. 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 21.6 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 inches/hour continuous loss rate. The loss rate function yielded 87 percent run-off from the PMF. The peak for the PMF inflow...
The hydrograph was 2,358 cfs and the 1/2 PMF inflow peak was 1,179 cfs. The storage capacity of the reservoir above the spillway crest only reduced these peak flows to 2,316 cfs for the PMF and 1,134 cfs for the 1/2 PMF flow.

5.3 SPILLWAY CAPACITY

Under normal operation, flood flows are released from the reservoir by controlling the gate opening for the 36 inch diameter low level outlet. If flood flows surpass the control capability provided by the low level outlet and reservoir storage, then excess flows are passed by the emergency spillway. Due to the operator regulation required and the potential for malfunction in the system, the reservoir pool was assumed to be at the spillway crest at the start of the storm, and outflow through the low level outlet was assumed to be zero for this analysis.

The emergency spillway is trapezoidal in section with a 275 foot bottom width and 3:1 side slopes. The control section is formed by a concrete section that is covered with topsoil and grassed. Both upstream and downstream faces are grassed and inclined at shallow slopes from the horizontal. The discharge capacity of the emergency spillway at the top of dam elevation is 4,228 cfs.

The low level outlet has the capability of adding another 120 cfs to the total discharge capacity of the structure with its gate fully opened and the reservoir level at the top of dam.

The emergency spillway channel runs along the toe of the embankment and tapers from a width of 275 feet at the spillway crest to about 30 feet at its nearly 90 degree confluence with the receiving stream just beyond the toe of slope. Due to this configuration and proximity to the embankment, the emergency spillway channel was investigated to determine its adequacy under flood discharges. This analysis indicates that in the lower (narrow) reach of the channel, the depth of flow will rise above the two feet height of riprap for the 1/2 PMF and larger discharges. Accompanying velocities for these flows could be in the range of 10 feet per second. This condition could lead to erosion of the embankment.
5.4 RESERVOIR CAPACITY

The reservoir storage capacity was obtained from "Preliminary Engineering Report - Larkin Creek Watershed, Retention Basin Number One" (Ref. 20) and USGS mapping. The resulting estimates of the reservoir storage capacity are shown below:

- Top of Dam: 212 Acre Feet
- Emergency Spillway Crest: 82 Acre Feet

5.5 FLOODS OF RECORD

The maximum recorded reservoir elevation was 453.35 and occurred on February 21, 1981. The discharge associated with this reservoir elevation was approximately 17 cfs.

5.6 OVERTOPPING POTENTIAL

The HEC-1 DB analysis indicates that the spillway can pass the PMF with 1.0 feet of freeboard and the 1/2 PMF with 1.75 feet of freeboard.

5.7 EVALUATION

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

The investigation of the emergency spillway channel under flood discharges indicates that the depth of flow in the lower (narrow) reach of channel will rise above the riprap for the 1/2 PMF and larger discharges. The accompanying velocities for these flows will be in the range of 10 feet per second, which could lead to erosion of the embankment. Due to this erosion potential, further investigations should be undertaken to analyze the effect of flow through the emergency spillway channel on the stability of the spillway channel and dam embankment.
SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The Larkin Creek Dam is a flood retention facility consisting of an earthen embankment and spillway section. The spillway section comprises the easterly most section of the dam and ties into the right earthen abutment. The earthen embankment portion of the dam extends from the left side of the spillway section some 1,460 feet in a westerly direction and then 650 feet in a northerly direction to the left abutment where it ties into natural ground.

The slopes of the earthen embankment are grassed and an access road runs along the entire crest of the embankment. The 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. The crest and some areas of the slope of the embankment have been subjected to motor bike travel. This has led to some localized surface erosion of the slopes.

The emergency spillway, according to the plans, consists of a 2 feet wide concrete control section that is covered with topsoil and grassed. The bottom of the emergency spillway channel is grassed, whereas the side slopes are riprapped to a height of approximately 2 feet above the channel bottom. The spillway channel extends from the right abutment, along the toe of the embankment, to its junction with the receiving stream which normally flows through the low level outlet. This channel, which is some 275 feet wide at the spillway crest, tapers down to 20 to 30 feet at its confluence with the receiving stream. The spillway channel flows into the receiving stream at a nearly 90 degree angle to the axis of the outlet channel. Due to the undesirable hydraulic characteristics of this junction and the tapered spillway channel, floodwaters discharging through the emergency spillway channel may very well flow past the outlet channel and/or rise above the channel riprap. Velocities in the spillway channel would approach 10 feet per second and could result in erosion of the channel invert, displacement of the bank protection and eventually cause damage to the downstream face of the embankment. In either of these situations, contact of the flood flows with the unprotected embankment could lead to erosion of the downstream slope with a resulting decrease in stability.

b. Design and Construction Data

No information regarding the slope stability of the structure was located. Drawings included in Appendix F substantially conform to the present facility. The drawings indicate the embankment was specified to be a homogeneous earth fill dam, compacted to 90% of modified proctor maximum density. The embankment crest was specified as 10 feet wide and the side slopes as 3:1 (horizontal to vertical), both upstream and downstream. The emergency spillway was to be constructed in natural ground. A 2 feet wide concrete sill serves as the control section running the entire crest.
length. This concrete sill is covered with sod. The spillway channel is trapezoidal with 3:1 side slopes and a bottom width that varies from 275 feet at the spillway crest to about 30 feet at its junction with the outlet channel.

Construction drawings for the project are dated April 1976 and available correspondence indicates the project was completed in 1977.

c. Operating Records

The only formal operating records pertain to pool elevations, gate openings 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.

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 25 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 reservoir and are tabulated below:

<table>
<thead>
<tr>
<th>Date</th>
<th>Intensity</th>
<th>Modified Mercalli</th>
<th>Location Relative to Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1931</td>
<td>I</td>
<td></td>
<td>8 miles E</td>
</tr>
<tr>
<td>1931</td>
<td>II</td>
<td></td>
<td>8 miles E</td>
</tr>
<tr>
<td>1944</td>
<td>II</td>
<td></td>
<td>8 miles SE</td>
</tr>
<tr>
<td>1977</td>
<td>IV</td>
<td></td>
<td>19 miles SE</td>
</tr>
</tbody>
</table>

6.2 STRUCTURAL STABILITY ANALYSIS

The earthen embankment appeared to be generally uniform in section with no signs of structural instability in evidence. The emergency spillway channel extends along the toe of the embankment from the spillway crest to its nearly 90 degree junction with the outlet channel. At the confluence with the outlet channel the spillway channel tapers to a bottom width of about 20 to 30 feet. The emergency spillway channel and outlet channel may be inadequate to safely convey flood discharges on the order of magnitude of the 1/2 PMF safely beyond the dam. This condition should be investigated further to determine if flood flows discharging from the emergency spillway channel constitute a potential hazard to the structural integrity of the embankment. The appropriate measures necessary to remedy this problem should be undertaken if the structural integrity is threatened.

14
The entire embankment, 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 Larkin Creek 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 183% of the Probable Maximum Flood (PMF). Therefore, the spillway capacity is assessed as adequate.

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 spillway channel flows into the receiving stream at a nearly 90° angle to the axis of the outlet channel. The tapered configuration of the emergency spillway channel would cause high flow velocities during spillway discharge which could result in erosion of the spillway channel, displacement of the bank protection and eventually erosion of the downstream slope of the embankment with a resulting decrease in stability.

2. Minor surface erosion due to motor bike traffic was detected on the slopes of the embankment and in the channel of the emergency spillway.

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

Further investigation should be undertaken to analyze the effect of flow through the emergency spillway on the stability of the spillway channel and embankment downstream from the emergency spillway crest.
7.2 RECOMMENDED MEASURES

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

1. An investigation of the effect of flow in the emergency spillway channel should be performed to determine whether the erosive effect of the high flows would cause damage to the embankment of the dam. Remedial work should be undertaken depending on the results of this investigation.

2. Motor bike traffic should be restricted on the facility. The erosion due to this traffic should be repaired.

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. Trash rack at inlet to control outlet. Note gate operator at top of photo.

3. Inlet to control outlet. Note staff gauge at left of stream.

4. Outlet of control outlet.
5. Outlet stream showing downstream hazard.

6. Emergency spillway as viewed from downstream. Note slope protection in light brush to left.
7. View down emergency spillway channel. Note slope protection left and right. Channel terminates at outlet stream at right foreground of Photo #5.

8. Outlet channel on downstream side of first downstream road crossing. Note gabions on right bank.
APPENDIX B

VISUAL INSPECTION CHECKLIST
VISUAL INSPECTION CHECKLIST

1) Basic Data
   a. General

      Name of Dam          Larkin Creek Dam
      Fed. I.D. #          NY 711       DEC Dam No. 409-4227
      River Basin         Lake Ontario
      Location: Town       Greece       County Monroe
      Stream Name          Larkin Creek
      Tributary of         Buck Pond
      Latitude (N)         43-12.1     Longitude (W) 77-44.4
      Type of Dam          Earth
      Hazard Category      High
      Date(s) of Inspection Nov. 20, 1980
      Weather Conditions   Fair (Light Snow Cover)
      Reservoir Level at Time of Inspection No Water Impounded At Time of Inspection

   b. Inspection Personnel

      F.W. Buszewski, B. Colwell, J.A. Gomez
      H. Muskett, D. Dale Engineering Company
      James Peet - Town of Greece

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

      James Peet P.E., Town Engineer
      Greece Town Hall       Telephone 716-225-2000
      2505 W. Ridge Rd.
      Rochester, N.Y. 14626

   d. History:

      Date Constructed       1977       Date(s) Reconstructed

      Designer               William C. Larsen P.E.
      Constructed By
      Owner                  Town of Greece
2) **Embankment**

a. Characteristics

(1) Embankment Material

```
GLACIAL TILL - SANDY SILT - SILTY
SAND
```

(2) Cutoff Type: **NONE**

(3) Impervious Core: **NONE**

(4) Internal Drainage System: **NONE**

(5) Miscellaneous: **N/A**

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: **MINOR EROSION DUE TO MOTOR BIKES**

```
TRAFFIC
```

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 \[ \text{WELL ESTABLISHED SOIL} \]

(5) Surface Cracks or Movement at Toe \[ \text{NONE OBSERVED} \]

d. Downstream Slope

(1) Slope (Estimate - V:H) \[ 1 : 3 \]

(2) Undesirable Growth or Debris, Animal Burrows \[ \text{NONE OBSERVED} \]

(3) Sloughing, Subsidence or Depressions \[ \text{NONE OBSERVED} \]
\[ \text{MINOR EROSION FROM MOTOR BIKE TRAFFIC.} \]

(4) Surface Cracks or Movement at Toe \[ \text{NONE OBSERVED} \]

(5) Seepage \[ \text{NONE OBSERVED} - \text{NO WATER WAS IMPOUNDED AT THE TIME OF THE INSPECTION.} \]

(6) External Drainage System (Ditches, Trenches; Blanket) \[ \text{DITCH ALONG TOE OF SLOPE TO CARRY LOCAL DRAINAGE - GOOD CONDITION NO SLoughING} \]

(7) Condition Around Outlet Structure \[ \text{RIP RAP COMPOSED OF STONE FILL AT OUTLET - SOME DISPLACEMENT OF STONES BY VANDALS.} \]

(8) Seepage Beyond Toe \[ \text{NONE OBSERVED} - \text{NO WATER WAS IMPOUNDED AT THE TIME OF THE INSPECTION.} \]

e. Abutments - Embankment Contact

\[ \text{NO PROBLEMS OBSERVED} \]
93-15-3(9/80)

1) Erosion at Contact None Observed

2) Seepage Along Contact None Observed. No Water Implied at Time of

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: The slopes are very flat - impoundment area is normally dry.
   b. Sedimentation: Negligible.
   c. Unusual Conditions Which Affect Dam: None.

6) **Area Downstream of Dam**
   a. Downstream Hazard (No. of Homes, Highways, etc.): Heavily developed residential subdivision, see photos.
   b. Seepage, Unusual Growth: None observed.
   c. Evidence of Movement Beyond Toe of Dam: None observed.
   d. Condition of Downstream Channel: Restricted by small roadway culverts.

7) **Spillway(s) (Including Discharge Conveyance Channel)**
   Dry weather flow passes through 30" pipe with 36" square sluice gate to control flow.
   a. General: Gate was open approx. six feet at time of the inspection.
   b. Condition of Service Spillway: Good condition, (Recent construction 1977) control gate in good condition.
c. Condition of Auxiliary Spillway

**GOOD CONDITION - NO EROSION OBSERVED, SOME MINOR DAMAGE TO SOIL COVER DUE TO MOTAR BKE TRAFFIC. (LIGHT SNOW COVER AT TIME OF INSPECTION) BROAD CRESTED WEIR, SIDE SLOPES RIPRAPE, 27' X 1' WIDE ELEVATION 6'4" DEEP X 2'4" WIDE CONCRETE SECTION AT CREST.**

d. Condition of Discharge Conveyance Channel

**FLOW CHANNEL IS RESTRICTED BY SMALL CULVERTS DOWNSTREAM. CHANNEL FROM CREST OF SPILLWAY TO OUTLET STREAM GOOD CONDITION, WELL MAINTAINED - FLOW THROUGH AUXILIARY CHANNEL HAS NEVER OCCUR.**

8) Reservoir Drain/Outlet

Type: Pipe __________ Conduit _________ Other __________

Material: Concrete _________ Metal _________ Other _________

Size: __________ Length __________

Invert Elevations: Entrance _______ Exit _______

Physical Condition (Describe): Unobservable _________

Material: **CONCRETE IN GOOD CONDITION**

Joints: **NOT OBSERVED** Alignment Good __________

Structural Integrity: **NO EVIDENCE OF STRUCTURAL PROBLEMS OBSERVED IN THE FIELD.**

Hydraulic Capability: **36" INLET CONTROL SEE HYDRAULIC ANALYSES**

Means of Control: Gate _______ Valve _______ Uncontrolled _______

Operation: Operable _______ Inoperable _______ Other _______

Present Condition (Describe): **EXCELLENT - IN GOOD OPERATING CONDITION - WELL MAINTAINED.**
9) Structural

a. Concrete Surfaces **NO PROBLEMS NOTED - NO SPALLING OR CRACKING** (OUTLET STRUCTURE)

b. Structural Cracking **NONE OBSERVED** (OUTLET STRUCTURE)

c. Movement - Horizontal & Vertical Alignment (Settlement) **NONE OBSERVED** (OUTLET STRUCTURE)

d. Junctions with Abutments or Embankments **N/A**

e. Drains - Foundation, Joint, Face **N/A**

f. Water Passages, Conduits, Sluices **N/A**

g. Seepage or Leakage **N/A**
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>h. Joints - Construction, etc.</td>
<td>N/A</td>
</tr>
<tr>
<td>i. Foundation</td>
<td>N/A</td>
</tr>
<tr>
<td>j. Abutments</td>
<td>N/A</td>
</tr>
<tr>
<td>k. Control Gates</td>
<td>N/A</td>
</tr>
</tbody>
</table>
|l. Approach & Channels | SEE PHOTOS - FREE FLOWING  
|   | No PROBLEMS. |
|m. Energy Dissipators (Plunge Pool, etc.) | N/A |
|n. Intake Structures | TRASH RACK CLEAR  
|   | NO  
|   | OBSTRUCTIONS  
|   | SEE PHOTO |
|o. Stability |   |
|p. Miscellaneous |   |
10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)
   a. Description and Condition **NONE**

11) Operation Procedures (Lake Level Regulation):
    THE FACILITY IS **MONITORED TWICE WEEKLY DURING DRY** WEATHER. DURING RAINFALL EVENTS THE FACILITY IS **MONITORED EVERY TWO HOURS OR, IF REQUIRED, EVERY HOUR.** QUIET GATES ARE ADJUSTED TO MANTAIN OPTIMUM FLOW DOWNSTREAM AT GAGES IN THE RECEIVING STREAM
PROJECT NAME: N.Y.S. Dam Inspections 1981
DATE: 1-28-81

SUBJECT: Larkin Creek Dam
PROJECT NO.: 2800

Hydrologic Parameters

Drainage Area = 0.96 mi²

\[ L = 8500' = 1.61 \text{ mi} \]
\[ L_{ca} = 4000' = 0.76 \text{ mi} \]

\[ C_f = 2.0 \text{ (assumed)} \]

\[ t_i = C_f \left(\frac{L \times L_{ca}}{C_f}\right)^{0.3} \]

\[ t_i = 2.12 \text{ hr.} \]

\[ C_p = 0.625 \text{ (assumed)} \]

Reservoir area ~ 26 acres @ spillway crest
### Design Brief

**Project Name:** N.Y.S. Dam Inspections 1981  
**Date:** 12-19-80

**Object:** Larkin Creek Dam, ID No. 711  
**Project No:** 2520

#### Depth - Area - Duration

<table>
<thead>
<tr>
<th>Duration</th>
<th>Jr Index</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 hrs.</td>
<td>117</td>
<td>25.3&quot;</td>
</tr>
<tr>
<td>12 hrs.</td>
<td>127</td>
<td>27.4&quot;</td>
</tr>
<tr>
<td>24 hrs</td>
<td>141</td>
<td>30.5&quot;</td>
</tr>
<tr>
<td>48 hrs</td>
<td>151</td>
<td>32.6&quot;</td>
</tr>
</tbody>
</table>

PMP from HMR #33  
For Lat. ~43°12', Long. ~77°44',  
Index Rainfall = 2.6" for 200 mi², 24 hr.  
Zone 2

*Adjusted for site area, Drainage Area = 0.96 mi²  
(which is less than the lower limit of the areal adjustment graph, 10 mi²), therefore these values were adjusted for this lower limit.*)
0.36 \quad 5 
0.60 \quad 4.5 
0.60 \quad 4.5 
1.0 \quad 3.5 
1.5 \quad 2.5 
1.8 \quad 1.5 
2.5 \quad 0.5 
2.7 \quad 0.5 
1.0 \quad 0 
0 
\hfill 0 
\hfill (\text{ft})

Elevation

\frac{c}{10} \quad 3 \quad z = 3

\text{where} \quad \hat{y} = \frac{3(2 \hat{y}^2 + b) - (16 \hat{y}^2 + 16 \hat{y} z + 9b^2)}{16 \hat{y}^2 + 16 \hat{y} z + 9b^2}

\hat{y} = 8.03 \quad \hat{y} = 7.03 \quad (\hat{y} = \hat{y})

\text{Ref: "Design of Dam"}

\text{Top of Dam \& Elevation, 459}

\text{Spillway Crest \& 456.31}

\text{Side Slopes}

\text{Bottom Width}

\text{Trapezoidal Spillway}

\text{DRAWN BY: J.A.B.}

\text{SPILLWAY RATING CURVE}

\text{PROJECT NO: 125-0}

\text{KAIRIN, OAKLEY DAM}

\text{N.Y.S. DAM INSPECTIONS}

\text{DATE: 1-25-81}

\text{STATION \& DATE: 1353998000}

\text{DESIGN BRIEF}
PROJECT NAME: N.Y.S. Dam Inspections 1981
SUBJECT: Larkin Creek Dam
DATE: 1-27-81
PROJECT NO.: 2520

Stage-Storage Curve

DRAWN BY: JA

Emergency Spillway Crest

Storage Volume (acre-feet)
Height of riprap above channel bottom \( \approx 2' \)

Channel slope varies from \( 1\% \) at upper end to \( 3\% \) near confluence with receiving stream.

Bottom width varies from \( 20' \) at upper end to \( 30' \) in \( 5=2\% \) region (channel etc.)

\( 1/2 \) F.M. discharge \( \approx 1135 \) cfs

<table>
<thead>
<tr>
<th></th>
<th>( K' = \frac{Q_n}{89.94 \sqrt{B}} )</th>
<th>( D/B )</th>
<th>D</th>
<th>A</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>30'</td>
<td>0.0323</td>
<td>0.0944</td>
<td>2.83</td>
<td>109.2</td>
<td>10.4 fps</td>
</tr>
<tr>
<td>50'</td>
<td>0.00828</td>
<td>0.0431</td>
<td>2.15</td>
<td>124.7</td>
<td>9.3</td>
</tr>
</tbody>
</table>

In both cases flow will exceed the height of riprap and the depths exceed the permissible velocity of the environment without slope protection. This analysis neglects tailwater and transitional effects. Freeboard requirements would increase height of riprap beyond the depths of flow calculated here.

* From "Handbook of Hydraulics" - W. C. Skogerboe
Gate Opening Curves (See Sketch Below)

NOTE: CHART INDICATES THEORETICAL FLOW BASED ON FREE DISCHARGE GRAPH BASED ON DATA FROM "LIMITATIONS OF METAL GATES" ASCE JOURNAL OF IRRIGATION & DRAINAGE, DEC 1962, P6 26, PAPER 3759; AND SOIL CONSERVATION SERVICE NOMOGRAPH FOR FREE DISCHARGE THRU PARTIALLY OPEN GATES ACTUAL VALUES MAY VARY FROM THOSE INDICATED.

\[ Q = 6.32 \times C_v \times D^2 \times H^2 \]

- \( Q \) = Design discharge rate
- \( C_v \) = Gate discharge coefficient
- \( D \) = Diameter, in feet
- \( H \) = Head, in feet, measured to the centerline of conduit

Stage - Discharge Curves

Larkin Creek
Detention Facility No. 1
St. Andrews Drive

William C. Larsen, P.E., P.C.
Civil, Sanitary, Municipal Engineering
44 Saginaw Drive, Rochester, NY 14623
Area Code: 1-800-334-5580
## CHECK LIST FOR DAMS
### HYDROLOGIC AND HYDRAULIC ENGINEERING DATA

### AREA-CAPACITY DATA:

<table>
<thead>
<tr>
<th></th>
<th>Elevation (ft.)</th>
<th>Surface Area (acres)</th>
<th>Storage Capacity (acre-ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Top of Dam</td>
<td>459</td>
<td>53</td>
<td>212</td>
</tr>
<tr>
<td>2) Design High Water (Max. Design Pool)</td>
<td>458</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3) <strong>Principal</strong> Spillway Crest</td>
<td>456.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4) Pool Level with Flashboards</td>
<td>N/A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5) Service Spillway Crest</td>
<td>455.75</td>
<td>2.6</td>
<td>82</td>
</tr>
</tbody>
</table>

### DISCHARGES

<table>
<thead>
<tr>
<th></th>
<th>Volume (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Average Daily</td>
<td>Unknown</td>
</tr>
<tr>
<td>2) Spillway @ Maximum High Water</td>
<td>4290</td>
</tr>
<tr>
<td>3) Spillway @ Design High Water</td>
<td>2300</td>
</tr>
<tr>
<td>4) Spillway @ Auxiliary Spillway Crest Elevation</td>
<td>N/A</td>
</tr>
<tr>
<td>5) Low Level Outlet (@ top of dam elev.) with gates fully open</td>
<td>120</td>
</tr>
</tbody>
</table>
| 6) Total (of all facilities) @ Maximum High Water | 4410          
| 7) Maximum Known Flood | -            |
| 8) At Time of Inspection | Unknown      |

**Res. @ ELEU. 4533:** Q ~ 17 cfs outflow
<table>
<thead>
<tr>
<th>CREST:</th>
<th>ELEVATION: 459</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: Earthfill</td>
<td></td>
</tr>
<tr>
<td>Spillover: N/A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPILLWAY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRINCIPAL</td>
</tr>
<tr>
<td>446.5</td>
</tr>
<tr>
<td>36&quot;Ø RCP</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Bottom</td>
</tr>
<tr>
<td>Width</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>36&quot; Square</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
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</tr>
</tbody>
</table>
HYDROMETEROLOGICAL GAGES:

Type: Staff gage

Location: Just upstream of 36" pipe inlet

Records: On file with Town of Greece Engineer's office

Date -

Max. Reading - Unknown

FLOOD WATER CONTROL SYSTEM:

Warning System: None.

Method of Controlled Releases (mechanisms):

Through sluice gated 36" RCP

Low level outlet
DRAINAGE AREA: 0.96 mi²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Pasture & wooded

Terrain - Relief: Moderately sloped

Surface - Soil: 

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

Existing plans call for majority of drainage to stay undeveloped.

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

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

Location: No low reaches known

Elevation: 

Reservoir:

Length @ Maximum Pool 0.45 ± (Miles)

Length of Shoreline (@ Spillway Crest) 1.2 ± (Miles)
<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>LARKIN CREEK DAM</th>
<th>FILE IS ABPX</th>
<th>PAGE OCC</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(0041)</td>
<td>A1</td>
<td>LARKIN CREEK DAM</td>
<td>FILE IS ABPX</td>
<td>PAGE OCC</td>
<td></td>
</tr>
<tr>
<td>(0042)</td>
<td>A2</td>
<td>HEC-10B (Snyder Parameters)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0043)</td>
<td>A3</td>
<td>PMF - DAM OVER TOPPING ANALYSIS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0044)</td>
<td>B</td>
<td>96</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(0045)</td>
<td>B1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(0046)</td>
<td>B2</td>
<td>0</td>
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| (0012) | P  | 21.6           | 17.1         | 8.8      | 151    | 0      |
| (0013) | W  | 2.12           | 1.62         | 0        | 0      | 0      |
| (0014) | X  | -2.0           | -0.13        | 1.6      | 0      | 0      |

| (0016) | K1 | ROUTE THRU RESERVOIR AND OVER SPILLWAY |        |        |        |
| (0017) | Y  | 0              | 1            | 0        | 0      | 0      |
| (0018) | T1 | 0              | 0            | 0        | 0      | 0      |
| (0019) | Y4 | 456            | 456.25       | 456.5    | 457    | 457.25 |
| (0020) | Y5 | 459            | 459.5        | 460.5    | 461    |        |
| (0021) | Y6 | 428            | 428.3        | 428.5    | 429    |        |
| (0022) | Y7 | 17.1           | 267          | 527      | 814    | 150C   |
| (0023) | S  | 0              | 0            | 1        | 162    | 212    |
| (0024) | SE | 446.0          | 436          | 436      | 439    | 460    |
| (0025) | S  | 456            | 0            | 0        | 0      | 0      |
| (0026) | $0 | 459            | 2.65         | 1.5      | 2110   | 0      |
| (0027) | K  | 1              | 454          | 0        | 0      | 0      |
| (0028) | K1 | SPILLWAY CHANNEL ROUTE |        |        |        |
| (0029) | Y  | 0              | 1            | 0        | 0      | 0      |
| (0030) | Y1 | 0              | 0            | 0        | 0      | 0      |
| (0031) | Y6 | 0.035          | 0.035        | 0.035    | 455    | 459    |
| (0032) | Y7 | 100            | 460          | 107      | 456    | 156    |
| (0033) | Y7 | 318            | 456          | 324      | 458    | 326    |
| (0034) | K  | 1              | 452          | 0        | 0      | 0      |
| (0035) | K1 | SPILLWAY CHANNEL ROUTE |        |        |        |
| (0036) | Y  | C              | 0            | 1        | 0      | 0      |
| (0037) | Y1 | 0              | 0            | 0        | 0      | 0      |
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DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 06 FEB 79
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RUN DATE? WED. FEB 11 1981
TIME? 15:20:12
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LARKIN CREEK DAM  FILE IS ARFX
NEC-T08 (SNYDER PARAMETERS)
PMF = DAM OVER TOPPING ANALYSIS

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MULTI-PLAN ANALYSES TO BE PERFORMED

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R105 = 0.20 C 0.50 C 0.60 C 0.80 1.00

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SUB AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 1

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HYDROGRAPH DATA

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PRECIP DATA

SPIC EPMS RR R14 R24 R48 R72 R96

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TRSFC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT STRKR DLTKR RJ1OL ERAIN STRKS JTOKJ STATL CNSTL MLAMX MLUP P1MP

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**Hydrograph Routing**

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**Peak Outflow is 457. at time 42.00 hours**

**Peak Outflow is 695. at time 42.00 hours**
PEAK OUTFLOW IS 913. AT TIME 42.00 HOURS
PEAK OUTFLOW IS 1134. AT TIME 42.00 HOURS
PEAK OUTFLOW IS 1373. AT TIME 42.00 HOURS
PEAK OUTFLOW IS 1845. AT TIME 42.10 HOURS
PEAK OUTFLOW IS 2316. AT TIME 42.00 HOURS

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**HYDROGRAPH ROUTING**

**NORMAL DEPTH CHANNEL ROUTING**

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NORMAL DEPTH CHANNEL ROUTING

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**MAXIMUM STAGE IS**
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- 454.0
- 454.2
- 454.4
- 454.6
- 454.9
- 455.1

**HYDROGRAPH ROUTING**

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<th>IECON</th>
<th>ITAPE</th>
<th>JPLT</th>
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<th>INAME</th>
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- CLOS: 0.000
- AVG: 0.000
- IRES: 0.000
- ISAME: 0.000
- IOPT: 0.000
- IPMP: 0.000
- LSTR: 0.000

**NORMAL DEPTH CHANNEL ROUTING**

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**CROSS SECTION COORDINATES**
- STA:ELEV, STA:ELEV, ETC
- 0.00: 454.00, 166.00: 454.00, 166.00: 452.00, 169.00: 451.00, 202.00: 451.00, 205.00: 452.00, 216.00: 456.00, 227.00: 459.00

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- 0.00
- 0.00
- 0.00
- 0.00
- 0.00
- 0.00
- 0.00
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**Maximum Stage is**: 452.4

**Maximum Stage is**: 452.0

**Maximum Stage is**: 452.8

**Maximum Stage is**: 453.0

**Maximum Stage is**: 453.4

**Maximum Stage is**: 453.6

---

**Spillway Channel Routing**

**Hydrograph Routing**

- **ISTAG**: 449
- **ICORP**: 1
- **ICCONS**: 0
- **ISTAGE**: 0
- **JFLY**: 0
- **JPRH**: 0
- **INAME**: 1
- **ISTAGE**: 0
- **JAUTO**: 0

**Routing Data**

- **QLOSS**: 0.000
- **QLOSS**: 0.000
- **AVG**: 1
- **RES**: 1
- **ISAME**: 0
- **I0FT**: 0
- **IPMP**: 0
- **LSTR**: 0

**Normal Depth Channel Routing**

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**Cross Section Coordinates**

- STA_ELEV:
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  - 193.00 450.00 177.00 454.00 184.00 459.00
PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLows IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

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## SUMMARY OF DAM SAFETY ANALYSIS

### PLAN 1

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### PLAN 1 STATION 452

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APPENDIX D

REFERENCES
APPENDIX D
REFERENCES

1. Department of the Army, Office of the Chief of Engineers. National Program of Investigation of Dams; Appendix D: Recommended Guidelines for Safety Inspection of Dams, 1976


17. C.A. Hartnagel, 1907, Geologic Map of the Rochester and Ontario Beach Quadrangles, New York State Museum Bulletin 114


19. Guidebook for Field Trips in Western New York, 1956, New York State Geological Association 28th Annual Meeting at the University of Rochester, N.Y.


APPENDIX E

PREVIOUS INSPECTION REPORTS/AVAILABLE DOCUMENTS
Mr. Louis M. Concra, Jr., P.E.
Central Permit Agent
NYS DEC
50 Wolf Road
Albany, NY 12233

RE: CERTIFICATION OF CONSTRUCTION
PERMIT #828-75-1152

Dear Mr. Concra:

Please be advised that the construction authorized under the above referenced permit in the Town of Greece has been completed. In accordance with the conditions of the permit issuance, this letter shall therefore serve as certification that the construction was performed under constant inspection by our office. We also subcontracted the services of a soils engineering firm to provide additional inspection services with regard to embankment construction.

The construction was completed in accordance with the plans and specifications as approved, with the following exceptions:

1. The cut-off trench from the centerline station 1+65 to centerline station 7+0 was deleted. During excavation and subgrade preparation in this area, it was determined that no defined sand layer actually existed in this area. Our soils consultant was called upon to field inspect this area and he recommended deletion of the cut-off wall as the existing soil was determined to be sufficiently impervious. Several isolated sandy soil pockets were excavated and backfilled with embankment material.

2. A crusher run access roadway was constructed along the top of the embankment from the end of the existing roadway to the discharge control structure. A vehicle by-pass around the structure was also constructed and a turn-around installed east of the discharge control structure. This was added to the project in order to facilitate access to the sluice gate controls by the Town maintenance personnel.
Mr. Louis M. Concra, Jr., P.E.
Central Permit Agent
NYS DEC
Albany NY

12/21/77

Upon completion of the as-built plans for this project, we will submit a copy to your office for review and filing. In the meantime, if you have any questions or comments regarding the project, please do not hesitate to call us.

Very truly yours

WILLIAM C. LARSEN, P.E., P.C.

William R. VanAlst, P.E.

WRV:pd

cc: Don Riley, Supervisor
    Town of Greece Engineering Dept.
    Curt Rossow, Town Planner

STATE OF NEW YORK) SS
COUNTY OF MONROE )

On this 22 day of December 1977, personally appeared William R. VanAlst, P.E., Project Engineer for the firm of William C. Larsen, PE, PC, and acknowledged that he executed the foregoing instrument.

Notary Public

Commission Expires: 3/30/79
Description of Downstream Area

Situated immediately downstream (north) of the proposed construction on Larkin Creek (Tributary 0-122-2) is the Country Club View Subdivision, a 150 lot development of single-family homes constructed in 1963. Larkin Creek is conducted through this subdivision in a grassed channel and series of elliptical concrete pipe culverts.

From this area, the stream flows across Elmgrove Road and through the Ridgemont Country Club. It then continues northward under Ridge Road (U.S. Route 104) and through wooded and open areas and along the rear of developed lots on North Avenue to a point just south of Mill Road, where it joins with another main tributary. Larkin Creek continues northward through relatively undeveloped lands, finally emptying into Lake Ontario through Buck Pond.

With the exception of Country Club View Subdivision, the western portion of which has had numerous flooding and erosion problem associated with the stream (approximately 20 lots), there is no appreciable development downstream along Larkin Creek.
## DAM INSPECTION REPORT
(By Visual Inspection)

<table>
<thead>
<tr>
<th>Dam Number</th>
<th>River Basin</th>
<th>Town</th>
<th>County</th>
<th>Hazard Class</th>
<th>Date &amp; Inspector</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 A-4227</td>
<td>W. Ontario</td>
<td>Greece</td>
<td>Monroe</td>
<td>C</td>
<td>7/5/27 WKA</td>
</tr>
</tbody>
</table>

| Stream = | Owner = Town of Greece |

<table>
<thead>
<tr>
<th>Type of Construction</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ Earth w/Concrete Spillway</td>
<td>□ Water Supply</td>
</tr>
<tr>
<td>□ Earth w/Drop Inlet Pipe</td>
<td>□ Power</td>
</tr>
<tr>
<td>□ Earth w/Stone or Riprap Spillway</td>
<td>□ Recreation - □ High Density</td>
</tr>
<tr>
<td>□ Concrete</td>
<td>□ Fish and Wildlife</td>
</tr>
<tr>
<td>□ Stone</td>
<td>□ Farm Pond</td>
</tr>
<tr>
<td>□ Timber</td>
<td>□ No Apparent Use-Abandoned</td>
</tr>
<tr>
<td>□ Other</td>
<td>☑ Flood Control</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Impoundment Size</th>
<th>Acres</th>
<th>Estimated Height of Dam above Streambed</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td></td>
<td>11.5 Ft.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition of Spillway</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ Service satisfactory</td>
</tr>
<tr>
<td>□ In need of repair or maintenance</td>
</tr>
</tbody>
</table>

**Explain:**

<table>
<thead>
<tr>
<th>Condition of Non-Overflow Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ Satisfactory</td>
</tr>
</tbody>
</table>

**Explain:**

<table>
<thead>
<tr>
<th>Condition of Mechanical Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ Satisfactory</td>
</tr>
</tbody>
</table>

**Explain:**

<table>
<thead>
<tr>
<th>Siltation</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ High</td>
</tr>
</tbody>
</table>

**Explain:**

**Remarks:**

**Evaluation (From Visual Inspection)**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Repairs req'd. beyond normal maint.</td>
<td>☑ No defects observed beyond normal maint.</td>
</tr>
</tbody>
</table>
TOW: GREECE

Use

☐ Water Supply
☐ Power
☐ Recreation - ☐ High Density
☐ Fish and Wildlife
☐ Farm Pond
☐ No Apparent Use - Abandoned
☐ Flood Control
☐ Other

Estimated Impoundment Size ☐ Acres
Estimated Height of Dam above Streambed 11.5

Condition of Spillway

☐ Service satisfactory
☐ In need of repair or maintenance
☐ Auxiliary satisfactory
☐ In need of repair or maintenance

Condition of Non-Overflow Section

☐ Satisfactory
☐ In need of repair or maintenance

Condition of Mechanical Equipment

☐ Satisfactory
☐ In need of repair or maintenance

Siltation

☐ High
☐ Low

Explain:

Explain:

Explain:

Explain:
# New York State Department of Environmental Conservation
## Water Resources Commission
### Albany, New York 12201

**Application for Permit**

For the Construction, Reconstruction or Repair of a Dam or Other Impoundment Structure under Conservation Law, Section 429 (c).

---

**1. Name and Address of Applicant**
- **First Name:**
- **M.I.:**
- **Last Name:**
- **Phone No.:**

**2. Name and Address of Owner (If different from applicant)**
- **First Name:**
- **M.I.:**
- **Last Name:**

**3. Location on U.S. Geological Survey Map**
- **Name of Map:**
- **Latitude:**
- **Longitude:**

**4. Proposed Use for Impounded Water**
- **Temporary Stormwater Storage:**

**5. State the Height Above Spillcrest of the Lowest Part of the Immediate Upstream Adjoining Property or Properties**
- **Height:**

**6. Proposed Starting Date**
- **Completion Date:**

---

**Type of Project**
- [ ] Construction
- [ ] Reconstruction
- [ ] Repair

**7. Intakes on Stream**
- [ ] Yes
- [ ] No

**8. Intakes on Stream**
- [ ] Yes
- [ ] No

**9. Size of Area Draining into Pond or Lake (Acres or Square Miles)**
- **Area:**

**10. The Drainage Area is Composed of:**
- **(Total = 100%)**
  - [ ] 12% Forest
  - [ ] 23% Cropland
  - [ ] 28% Pasture
  - [ ] 13% Other

**11. Type of Spillway**
- **Service Spillway — Auxiliary Spillway Combination**
  - [ ] Single Spillway
  - [ ] Gated conduit — Emergency spillway
  - [ ] Pipe Riser ONLY

**12. Single Spillway**
- **Frequency of Flood Peak:**
  - C.F.S. Runoff Volume:
  - In.

**13. Service Spillway Inflow Design Flood**
- **Frequency:**
  - C.F.S. Runoff Volume:
  - In.

**14. Single or Auxiliary Spillway**
- **Construction Date:**

**15. Type of Energy Dissipater Provided on Single Spillway**
- **Height of Dam Above Stream Bed:**

**16. Area-Capacity Data**
- **Answer 1, 2, 3, OR 1, 2, 4, 5**
  - **Top of Dam:**
  - **Design High Water:**
  - **Single Spillway Crest:**
  - **Auxiliary Spillway Crest:**
  - **Service Spillway Crest:**

**17. Volume Stored**
- **Acre-Feet:**

**18. Type of Energy Dissipater at Outlet of Conduit**
- [ ] Impact Basin
- [ ] Plunge Pool
- [ ] Hydraulic Jump Basin

---

**Notes:**
- Provide descriptive information on character of downstream area.
- *Class "a"* ☑
- *Class "b"* ☑
- *Class "c"* ☑

---

**Additional Information:**
- [ ] Impact Basin
- [ ] Plunge Pool
- [ ] Hydraulic Jump Basin
- [ ] Other, see plans

---

**Application No.:** 828-75-1152
**Watershed:** W. Ontario
APPLICATION

3. Application is hereby made to the Conservation Department acting in behalf of the Water Resources Commission pursuant to Sections 429(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.

[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 at 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 works, 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 limits 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 employed by a governmental agency cooperating with a soil 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 upon 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.
Mr. Stanford J. Zeccolo,
Senior Hydraulic Engineer
Environmental Analysis
N.Y.S.D.E.C.
50 Wolf Road
Albany, N.Y.

RE: CONTRACT FOR CONSTRUCTION OF EARTH DAM AND APPURTENANCES LARKIN CREEK STORMWATER DETENTION FACILITY NUMBER ONE - ST. ANDREWS DRIVE TOWN OF GREECE DRAINAGE DISTRICT NO. 24 MONROE COUNTY, NEW YORK

Dear Mr. Zeccolo:

In regard to your letter of October 21, 1975 and our subsequent discussion with George Koch, we are enclosing the following material to constitute a revised submittal for the proposed Larkin Creek stormwater Detention Facility to be located in the Town of Greece:

(1) 3 copies of revised construction drawings
(2) 3 copies of St. Andrews Drive Profile
(3) 3 copies of Spillway Capacity Calculations

In addition, it is our understanding that you have in your possession the following supporting data submitted on Sept. 29, 1975:

(1) Application for permit
(2) Specifications
(3) Addendum to soils report including covering letter, test pit logs, revised site plan and revised soil profile
(4) Letter from Geotechnical Engineers in connection with subgrade preparation.
Mr. Stanford J. Zeccolo,  
Senior Hydraulic Engineer  
Nov. 26, 1975

(5) Larsen letter of September 29, 1975 explaining previous revisions.

Basically, this submittal consists of a revised auxiliary spillway of a size and alignment to satisfy your various requirement. In addition we have raised the top of the embankment from elevation 458.0 to 459.0 to provide the required 1' of freeboard at a flow through the spillway of 2150 cfs. As a matter of explanation, we have attached a copy of sheet 4 of the construction drawings to the spillway calculations. The drawing has been marked to show locations of the calculated sections and other pertinent data. From field survey and office calculations it has been determined that at design flow (2150 cfs) water will pond in the spillway at elevation 452.87 Accordingly analysis of the spillway below that elevation should not be necessary.

We have analyzed the flow characteristics at the control section and at two separate transitions between the control section and the ponding surface. In all cases, the channel has sufficient capacity to carry the design flow. Velocities in the vicinity of transition section #2 are slightly greater than 8 ft/sec and as a result surge pile stone channel lining has been shown in that area.

With this revised submittal, it is our feeling that we have complied with all D.E.C. requirements.

If, upon your review there are any questions or any suggested modifications, please call us at once to set up a meeting to discuss these matters in detail.

May we hear from you at your earliest convenience.

Very truly yours,

Dale F. Green, P.E.

Enc.

cc: Louis M. Concra
    George Koch
I. Compute ponding elevation of spillway discharge based on outflow of 2150 CFS and attached profile of Saint Andrews Drive.

\[ Q = \frac{3}{2} \text{CLH Avg.} \]

where \( H = 2H_{\text{avg}} \) = height of water above low point in road.

try \( H_{\text{avg}} = 1.0' \)

\[ Q = \frac{3}{2} \text{CLH Avg.} \]

2150 = 2.8 \times L \times 1.0

\[ L = 768' \]

for \( H_{\text{avg}} = 1.0' \) ponded water surface = 452.87'

from road profile, for W.S. = 452.87, \( L = 770' \) check

II. Calculate water surface at control section

\[ Q = \frac{3}{2} \text{CLH} \]

2150 = 2.8 \times 275 \times H^{3/2}

\[ H^{3/2} = 2.79 \]

\[ H = 1.99' \]

Water Surface Elevation = 457.99

Area of channel = \( 275 + 286.94 \times 1.99 = 559.1 \) S.F.

\[ \text{Velocity} = \frac{Q}{A} = \frac{2150}{559.1} = 3.85 \text{ ft/sec} \]

\[ < 8 \text{ ft/sec} \]
III. Calculate Water Surface at Transition Section #1

\[ Q = A \times \frac{1.49 \times R^{2/3} \times S^{1/2}}{h} \]

try \( h = 1.60' \)

\[ R = \frac{A}{P} = \frac{\frac{1}{2} \left(175 + 184.6 \right) \times 1.6}{175 + 2 \times (5.1)} \]

\[ R = 287.7 = 1.55 \]

\[ Q = \frac{287.7 \times 1.49 \times (1.55)^{2/3} \times (0.01)}{.025} \]

\[ Q = 2299 \text{ CFS} \geq 2150 \text{ CFS} \]

find velocity at transition section

\[ V = \frac{2299}{287.7} = 7.99 \text{ ft/sec} \]
IV. Calculate Water Surface at Transition Section #2

try \( H = 1.65' \)

\[
R = \frac{A}{P} = \frac{\frac{1}{2} (160+169.9) \times 1.65'}{160 + 2 \times (5.2)} = \frac{272.2}{170.4} = 1.60
\]

\[
Q = \frac{A}{n} \times 1.49 \times \frac{2}{3} \times \frac{1}{S} = \frac{272.2}{.025} \times 1.49 \times 1.37 \times 0.1 = 2222 \text{ CFS}
\]

Find velocity

\[
V = \frac{2222}{272.2} = 8.16 \text{ ft/sec} > 8.0 \text{ ft/sec}
\]

Install surge Pile stone channel lining
We have reviewed the revised plans and the Engineer's letter submitted September 29, 1975. Following are our comments:

1. The top of dam must be raised so that there is 1 foot of freeboard above design high water.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary Spillway Crest</td>
<td>Bl. 454.0</td>
</tr>
<tr>
<td>Depth of Flow of Peak Discharge</td>
<td>1.5 Ft.</td>
</tr>
<tr>
<td>Design High Water</td>
<td>Bl. 458.5</td>
</tr>
<tr>
<td>Freeboard</td>
<td>1.0 Ft.</td>
</tr>
<tr>
<td>Required Bl. for Top of Dam</td>
<td>Bl. 459.5</td>
</tr>
</tbody>
</table>

Item 21 on the permit should reflect the correct elevations.

2. At the meeting of September 26, 1975 we indicated that an earth spillway with a transition to a narrow channel was not acceptable because of the high velocities and the resulting erosion to the spillway channel in the vicinity of the adjacent houses. We indicated that if an earth spillway was still desired it would have to be revised so that the channel transition took place further downstream where the alignment was straight. We also indicated that in order to design such a channel a water surface profile is required to determine the depths of flow and the resulting velocities in the channel.

Our review indicates that the spillway channel shown is not acceptable because of the erosive velocities in the vicinity of lots #185 and #197, and that in some locations the depth of flow exceeds the channel height.

Please submit backwater computations with a profile of the water depths and velocities.

Note:
Phone conversation with Nov 75 between

A. Conner and Dale Green.

1. Eng. will revise earth spillway so that transition will occur further downstream.

2. Eng. will submit a backwater curve to determine ups and velocities.
Mr. Louis M. Concra, Jr., P. E.
Assistant Director for Conservation Engineering
NYS DEC
50 Wolf Rd
Albany, N.Y. 12233

RE: CONTRACT FOR CONSTRUCTION OF
EARTH DAM AND APPURTENCES
LARKIN CREEK STORMWATER DETENTION FACILITY
NUMBER ONE - ST ANDREWS DRIVE
TOWN OF GREECE DRAINAGE DISTRICT NO. 24
MONROE COUNTY, NEW YORK

Dear Mr. Concra:

Reference is made to our recent meetings and correspondence in connection with the above referenced Stormwater Detention Facility to be located in the Town of Greece. Subsequent to our last meeting, we have revised the plans and have performed additional subsurface investigations. Accordingly, we are enclosing 5 copies of:

Application For Permit
Construction Drawings (under separate cover)
Addendum to Soils Report including covering letter, test pit logs, revised site plan and revised soil profile.
Letter from Geotechnical Engineers in connection with subgrade preparation

The following is a list and explanation of revisions to the original submittal:

1. The eastern portion of the embankment has been relocated approximately 200' to the south of its original position. The emergency spillway has been relocated to provide a more gradual turn into the exit channel and a concrete control section has been provided to prevent excessive erosion.
2. Payment Item No. 4 specifies that the maximum diameter of particles to be used in the embankment fill is 6".

3. The Application for Permit has been revised to reflect a spillway inflow design flood of 2400 cfs. Further, the proposed starting date is now shown as June 1976.

4. The emergency spillway is shown to be constructed in a "cut-section".

5. Since velocities over the emergency spillway for the design flow are less than 8 f.p.s. the surge pile stone channel lining has been eliminated. It has been retained in Sections of the spillway channel where erosion protection is required.

6. Centerline stationing has been provided along the axis of the dam.

7. Angle iron stops have been shown to prevent the sluice from being lowered more than 9" from the bottom.

8. In response to your request for a cut-off trench along the entire length of the dam, we offer the following comments: In those areas where granular material (less than 30% passing the #200 sieve) is encountered the specifications require that material be removed and replaced with suitable material from the borrow area. Such is the case with the granular deposit located between centerline stations 1+50-6+85. In addition, a minimum of 2' of native soil will be removed along the entire axis of the dam under Payment Item #2 - Subgrade Preparation. If any unsuitable soil is encountered in this "mucking out" operation, it too will be removed and replaced.

In effect, a minimum 2' deep cut off trench will be provided unless otherwise necessary. Our geotechnical consultants indicate that this can be done maintaining an acceptable factor of safety. Further, a qualified soils engineer will be present for the subgrade preparation and will have authority to order the contractor to remove and replace any questionable subgrade material.
Mr. Louis M. Concra, Jr., P.E.  9/29/75

It is our hope that the above revisions will satisfy the questions that you have raised in the past and that DEC approval of this project will be forthcoming shortly.

If you have any questions, please do not hesitate to call us.

Very truly yours,

DFG/pr Dale F. Green, P.E.

Enc.

cc: Stanford J. Zeccolo

George Koch
I have reviewed the hydrology and hydraulics for the proposed structure. Following are my comments.

Auxiliary Spillway

1. The alignment for the auxiliary spillway is not acceptable. The spillway channel should be perpendicular to the spillway crest. Discharge leaving the channel should be directed away from the embankment so there is no erosive effect on the embankment toe. The fact that homes are located within 50 feet of the spillway channel makes the alignment feature especially critical.

2. The auxiliary spillway does not have sufficient capacity to discharge the Spillway Inflow Design Flood (40% WFF). Our investigation indicated that the peak inflow for the design flood is 2800 cfs. Reservoir storage will reduce the peak outflow to 2150 cfs.

Service Spillway

The engineering report indicates that the discharge structure is designed to restrict flow out of the pond to a maximum discharge of 20 cfs. When the water surface is at the crest of the auxiliary spillway (N1.456) the discharge through the 36 inch pipe will be about 100 cfs.

Meeting 5 Aug 75

Dele Green
Zecelzo
Rob - Weavale
G Koch

1. Wall change alignment of Emer Spillway

From Sec Spillway will swing away from homes. Will also increase Emer. Spillway capacity.

2. All new Envgs. to keep gate on Sec. Spillway.
Mr. William MacGregor  
NYS Department of Environmental Conservation  
P.O. Box 57  
Avon, N.Y. 14414  

RE: CONTRACT FOR THE CONSTRUCTION OF EARTH DAM AND APPURTEANCES - LARKIN CREEK STORMWATER DETENTION FACILITIES - TOWN OF GREECE DRAINAGE DISTRICT #24  
TOWN OF GREECE, MONROE COUNTY, NEW YORK  

Dear Mr. MacGregor:  

Pursuant to our recent telephone conversations, our meeting at your office on June 19th and our meeting in Albany on June 25, we are enclosing herewith five copies of the "Application Package" for the above referenced project under the requirements of Section 429(C) of the Conservation Law.  

Each of the five packages contains:  

1. Form - "Application for Permit"  
2. Engineering Report  
3. Soils Report prepared by the firm of Jas P Collins, PE  
4. Construction Drawings  
5. Specifications  
6. Description of Downstream Area  
7. Plan showing dam, appurtenances, contours and property lines as required under Item 3 of the instructions.  

Since our initial discussions, several revisions to the plans have been made as a result of recommendations given at our meeting in Albany.
PRELIMINARY ENGINEERING REPORT

LARKIN CREEK WATERSHED
RETENTION BASIN NUMBER ONE
ST. ANDREWS DRIVE

Town of Greece Natural Stream
Improvement and Protection
Implementation Program
(I.P.I.P.)

AUGUST 1974

Revised April 7, 1975
Mr. Donald J. Riley, Supervisor
and Greece Town Board
2505 Ridge Rd. W.
Rochester, N.Y. 14626

RE: PRELIMINARY ENGINEERING REPORT
LARKIN CREEK WATERSHED
RETENTION BASIN NO. 1
TRIBUTARY 0-122-2
ST. ANDREWS DRIVE

TOWN OF GREECE NATURAL STREAM
IMPROVEMENT AND PROTECTION IMPLEMENTATION PROGRAM (IPIP)

Gentlemen:

We submit herewith our Preliminary Engineering Report on subject Retention Basin in accordance with your Resolution of July 2, 1974, based upon our Proposal of July 2, 1974.

The purpose of the Study and subsequent Report was to determine, in appropriate detail, a recommended solution for the drainage problems being encountered in the St. Andrews-Pine Valley-Old Meadow area, consistent with the goals outlined in the Greece Town-wide Drainage Study of July 1974. Because of the substantial flooding which has occurred late Spring and early Summer in this area we have moved ahead expeditiously to furnish solutions.

While the July 1974 Drainage Study furnished conceptual answers to this problem, it was the wish of the Town Board and the residents to explore alternative possibilities and to determine firm cost figures adequate to permit the Town Board to move ahead with a definite program if it seemed appropriate. To accomplish this it was necessary for us to insist upon the expenditure of sufficient money to permit rather detailed soil investigation and field survey work because of our very real concern of the presence of rock and the possibility of dewatering problems. This concern
Generally, the proposed stormwater detention facility is intended to eliminate flooding in the vicinity of St Andrews Dr and alleviate erosion and siltation problems which presently occur during periods of heavy rainfall.

It is proposed to retain water on an intermittent basis only and to permit the "dry weather flow" to pass unrestricted.

Ponding limits have been shown to elevation 456.0 representing a maximum depth of water of 9.5 feet. This extent of ponding would result from a 50-year storm of critical duration with full upstream development of the entire watershed area.

Please be advised that the Town of Greece is most anxious to begin work on this project in order that it can be completed and placed in operation this construction season. Any assistance you could render in expediting the review and approval of this would be greatly appreciated.

If you have any questions or if you require any additional information, please do not hesitate to call us.

Very truly yours,

Dale F. Green, P.E.

Enc.

cc: Eugene Penzimer
Mr. Donald J. Riley, Supervisor and Greece Town Board

August 29, 1974

was justified when substantial amounts of high-elevation bedrock were encountered which prevented any further consideration of a retention pond north of the subdivision plus a relief channel around the subdivision.

Accordingly, this Report recommends a return to our original recommendation to construct a Retention Reservoir south of St. Andrews Drive on Monroe County land. We recommend that the embankment be constructed to an elevation which will permit a maximum storage of 81 acre feet with a freeboard of 2.0'.

While every effort has been made to expedite the submittal of this Report you are cautioned that the plans for the retention works recommended herein must be approved by the Department of Environmental Conservation. We are advised that such review normally takes sixty days. We must regretfully advise that this would preclude construction this Fall under the best of intentions by the Town. It does make the point, however, that decision-making must nevertheless move ahead rapidly if the project is to be designed and reviewed, and financing established, in time to permit a start after the first of the year. Clearing and grubbing could take place in late Spring with construction following in the Summer.

Very truly yours,

William C. Larsen, P.E.

WCL/pr

cc: Gene Penzimer
PRELIMINARY
ENGINEERING REPORT

LARKIN CREEK
WATERSHED
RETENTION BASIN NO. 1
ST. ANDREWS DRIVE

A RECOMMENDED FACILITY
UNDER THE
TOWN OF GREECE NATURAL STREAM
IMPROVEMENT AND PROTECTION
IMPLEMENTATION PROGRAM
(I.P.I.P.)

TOWN OF GREECE
MONROE COUNTY, NEW YORK
AUGUST 1977

WILLIAM C. LARSEN, P. E.
Civil-Sanitary-Municipal
ENGINEERING
44 Saginaw Drive - Rochester, N.Y. 14623
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Overall Plan

N.B.: 1"=50' scale topo plans were also prepared under this Proposal but have not been included in the Report. They are on file in the Engineer's Office. These mapping sheets will form the basis for the project when undertaken.
This Study is related to the recurring flooding problems which have been experienced in the vicinity of Saint Andrews Drive in the Town of Greece. This office became aware of the flooding problem and resulting property damage during our routine field investigations while preparing the Townwide Drainage Study. In addition, we were present at the preliminary discussions between the homeowners in the area and representatives of the Town concerning the problem.

As a result of our initial recommendation that a storm water retention pond be constructed to alleviate these problems the Town Board has authorized this more detailed Engineering Study in accordance with our proposal dated July 2, 1974.
II THE PROBLEM

The area in which flooding occurs is within the Larkin Creek Watershed, Tributary 0-122-2.

There are 852 acres tributary to the Saint Andrews Drive culvert, 206 of which are located in the Town of Ogden. The remaining area is within the Town of Greece. During periods of heavy runoff, tributary 0-122-2 overtops its banks and causes flooding in the backyards and basements of the houses located on the south side of Saint Andrews Drive. In addition the excess storm water flows over Saint Andrews Drive and continues down the channel causing severe erosion and, in some cases, additional property damage. The problem itself can be attributed to several factors the combination of which result in the severe flooding:

First, portions of the development were constructed within the natural flooding limits of the creek. To compound the problem these houses have walkout basements which also become flooded.
Second, the culverts under Saint Andrews, Pine Valley and Old Meadow Drive are undersized and as a result the water "backs up" in the vicinity of Saint Andrews Drive and Pine Valley.

Third, based upon interviews with homeowners it appears that this tributary reaches its "peak" rather quickly in a rainstorm...in a matter of two to four hours. This is faster than would be anticipated during a normal investigation of this watershed. Whether or not the various wetlands upstream of this point are indicative of high bedrock elevation (or impervious sub-soils), causing little percolation and subsequently high run-off, is simply a matter of conjecture. Nevertheless run-off is fast and intense.

Specifically, the following cases of nuisance and damage have been documented:

- Cellar wall collapse
- Cellars flooded and personal belongings ruined
- Backyards flooded
- Erosion of channel and adjacent yards
- Destruction of private retaining walls
- Undermining and erosive damage to town-owned drainage facilities.
III DISCUSSION OF ALTERNATIVE SOLUTIONS

The immediate problem which generated the need for this Preliminary Engineering Report was the aforementioned flooding occurring in Country Club View Subdivision. The larger problem, of which this is a part of course, is the recommended Improvement and Protection of the Natural Streams of the Town. While an immediate solution might be found for the Country Club Estates problem we feel that this solution (whatever it might be) should also be able to show benefit to the Town (or at least the watershed) at large, since a considerable expenditure of funds would be required in any event.

Four possible solutions to the immediate problem presented themselves:

1. A Retention Pond south of the subdivision which would discharge at a much reduced rate, permitting the Town to continue using all, or some, of the culverts existing under the subdivision streets.

2. A Diversion Channel around the subdivision which would by-pass the existing street culverts and channel. (However, this should also include a retention basin north of the subdivision to retard discharge since the "ponding effect" south of St. Andrews Drive would now be lost.)
3. Replace the culverts under the three east-west streets with large box culverts capable of passing the future anticipated peak flows at a rate which would prevent backup on the south side of St. Andrews Drive; and provide erosion protection works along the channel banks.

4. Continue to permit flooding to take place, and either provide flood protection works at the various effected homes, or purchase the homes and tear them down.

Engineering-wise it would be rather a simple matter to enlarge the subdivision culverts or to divert the creek around the subdivision and thus to let the high rates of runoff pass through or around the area without causing any appreciable damage in the immediate vicinity. The net effect would be to release the water which is now retained in the backyards and wooded area south of Saint Andrews Drive and to allow this water to continue downstream at higher rates of flow than are experienced today.

This type of solution, while it would alleviate the flooding in the Saint Andrews Drive area, would simply transfer flooding and erosion problems downstream. It is for this reason that we have discarded this type of solution as not being in the best interest of the Town of Greece.
The fourth alternative, that of "flood-proofing" existing properties or else removing the homes, is not looked upon with favor by our office nor, we judge, would it be morally or politically acceptable. The work would consist of sealing off cellar windows and walk-out doors and filling backyards to prevent floodwaters from encroaching into the yards and basements. The flood waters would continue to overtop St. Andrews Drive. Downstream, water would continue to flood the backyards since they must be directly drained by gravity to the stream bank. The use of dikes and flood gates in this area would, in our opinion, be unrealistic and unsightly.

Therefore, it is our feeling that the most acceptable solution to this type of problem is to "hold back" the runoff in some type of retention facility during periods of heavy rainfall and then to discharge the water over a long period of time at low rates. The result would be to eliminate flooding problems in the immediate area, reduce erosion problems along the channel, and to substantially reduce the peak rates of flow downstream as well as downstream ecological damage and siltation.
The land adjacent to the study area will ultimately become part of the Monroe County Parks System. Portions of that future park are already owned by the County and other parcels remain in the hands of individual owners. A retention facility sized and located so as to be most effective must, by necessity, be located on lands which will someday be part of the County Park.

Accordingly, the following alternative locations have been investigated in an effort to not only solve the problem but to do so in a manner which would be compatible with the long range plans for the surrounding property:

1. Construct a retention pond south of Saint Andrews Drive. This could be accomplished by building a dam just to the south of the properties which now flood. The proposed elevation of the dam would be such as to allow ponding to elevation 456.0. This would provide adequate storage for a 50 year recurrence interval storm under fully developed upstream conditions. The discharge structure
would be designed so as to restrict flows out of the pond to a maximum of 20 cfs. The ponding which would occur upstream would be then sufficient to alleviate the downstream flooding conditions under ultimate conditions of upstream development. This pond would be designed to hold water only during periods of heavy rainfall and would be "dry" during normal conditions. Since the ponding would only be intermittent, it would not be necessary to remove the majority of the trees or to strip the topsoil south of the subdivision.

2. Construct a diversion ditch around the subdivision in conjunction with a retention pond to be located to the north of the subdivision on lands owned by the County. The diversion ditch would allow the increased flows to bypass the "trouble area" and the retention pond would then control the discharge to protect the downstream areas. The disadvantages connected with this alternative are that:

a. A substantial amount of excavation would be required. Since the test holes have indicated that rock is near the surface in this area, the resulting excavation and rock removal would be quite costly.
b. Some residents have indicated a desire to maintain moderate flow in the existing channel. This would require that special discharge works be constructed at additional expense. Also, the diversion ditch would require deep excavations which might result in rather unsightly conditions.

Our original recommendation had been to locate the facility to the south of Saint Andrews Drive. However, concern over the availability of land coupled with a concern for the trees in that area led to the investigation of the northern location as an alternative.

As a result of these more detailed studies, the economics of the alternatives indicate that the southern location should be reconsidered.
IV RECOMMENDED ALTERNATIVE SOLUTION

It is the recommendation of this office that the Town pursue the possibility of constructing the storm water retention facility south of Saint Andrews Drive using the existing creek bed as the point of discharge from the pond. The estimated cost for this work is $200,000. The facility and flooding area would be on land now owned, or proposed to be purchased, by the County of Monroe.

Representatives of the Monroe County Parks Department have expressed their general approval of this scheme. They did indicate that the responsibility for all construction and future maintenance would rest with the Town of Greece, however.

The most desirable volume of storage based upon a recurrence interval of 50 years is 81 acre feet. The volume of storage at the southern location on the above mentioned Park lands is approximately 81 acre feet and it is felt that this storage would be sufficient to significantly reduce the problems that now exist in the area. Further, the cost estimates of the alternative schemes indicate that the southern location is the only alternative which would
be economically feasible. Further, as additional Park 
lands are purchased to the south the service spillway and 
embankment could be raised, thereby providing additional stor-
age capacity. Our recommended design is to provide an embank-
ment to elevation 458 which will permit overflow at elevation 
456. These elevations could be increased to 467 and 465, 
respectively, at some time in the future, should creation 
of a permanent lake or additional storage be desired.
Cost Estimates for the various Alternatives are shown in the Appendices. It will be noted that the cost of the recommended alternative is in line with the original estimates of the 1974 Drainage Study.

It should also be pointed out that the cost of the alternative which would include a Diversion Channel and northside Retention Pond is extremely high because of the amount of earth and rock excavation. We have taken the position that this material would be removed from the site which, of course, substantially increases the cost. Even if the County would permit the depositing of this excavated earth on the Park lands the cost is still excessive far beyond the benefits to be obtained.

This raises the question (as do the remaining alternatives) of the relationship of cost-to-benefit and therefore the following Section VI has been included.

See Appendices for Cost Estimates.
VI  COST VS. BENEFIT

An analysis of the cost of the proposed retention facility versus the benefit derived in the immediate vicinity would seem, on the surface, to indicate a poor economic justification for this project. The value of the properties subject to flood damage in the area may not be much higher than the cost of the remedial work necessary to alleviate the problem.

It is our feeling, however, that there are other considerations which should enter into the decision-making which are not strictly economic. For example, construction of the retention facility would result in more "steady" flow in the creek, reduction of erosion all along the length of the stream, reduction of silt deposition in the stream bed and the decrease in the amount of debris travelling downstream; ecological damage would also be minimized.

Although it is difficult to assign cost values to these items, it should be recognized that the proposed project would result in these additional benefits which should be consistent with the goals for long range planning for the Improvement and Protection of Natural Streams in the Town.
VII COMPATIBILITY AND CORRELATION WITH TOWN-WIDE DRAINAGE STUDY

This Natural Stream Improvement and Protection Implementation Project is the first of those recommended under the July 1974 Town-wide Drainage Plan. Consequently it is particularly important to establish how it fits in with the Plan and whether it is following the goals established herein.

Reference is made to the Drainage Study Report, particularly the following:

Section One - Page 35, relative to Retention Basins
Section Two - Page 164, and following, relative to the St. Andrews Drive problem
Section Three - Relative to the Implementation of the Improvement and Protection Program

In summary, the Drainage Study recommends the use of retention basins as a solution to present drainage and flooding problems, and particularly recommends one south of St. Andrews Drive. Further, the Plan recommends that this be undertaken as a "high priority" item. This more detailed study, which included the necessary sub-surface investigation and surveys sees no reason to modify or change those original recommendations.
We conclude that this Proposal is compatible with the master Drainage Plan of 1974. It would also appear that if this project is undertaken with a view towards construction during the 1975 season that the costs will correlate fairly closely with the 1974 Drainage Study.

**IT IS IMPORTANT** to point out that this proposed basin is to serve the primary function of preventing future flood damage and nuisance to the developed properties in the St. Andrews-Pine Valley-Old Meadow area. It is also to serve the secondary function of reducing peak discharge rates downstream which cause flooding and erosion. HOWEVER, it must be borne in mind that this Retention Basin accommodates only approximately 18% of the entire Larkin Creek watershed (measured at Latta Road Control Point). Consequently its significance as an "anti-flood" device diminishes the further one moves down the watershed to the north. Therefore, to obtain maximum protection benefit from this expenditure it is important that other retention basins be built as development takes place in the Larkin Creek basin and that no building or filling take place within the downstream flood plain.
VII SCHEDULING

We recognize that certain pressures will be brought to bear on the Town Officials to undertake this project immediately. However, there are certain other factors to consider in establishing a schedule for a project of this nature. Earth dam construction can best be performed when the ground is dry and not frozen - usually between the months of May and December. We would not recommend that an earthwork project of this size be undertaken during the Winter months.

In addition to the time required for the detailed design, bidding and the establishment of financing, time must be allotted for review of the detailed plans and specifications by the Department of Environmental Conservation. We have been advised that this generally takes approximately 60 days.

We bring these items to your attention in order that you will be aware of the time required to implement a project such as this.

Respectfully submitted,

WCL/pr

William C. Larsen, P.E.
<table>
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<tr>
<th>Event</th>
<th>1974</th>
<th>1975</th>
</tr>
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<tbody>
<tr>
<td>Preparation of Preliminary Engineering Report by Consulting Engineer</td>
<td>Aug</td>
<td>Aug</td>
</tr>
<tr>
<td>Review by Town Engineer, Town Board, and Conservation Commission</td>
<td>Sept</td>
<td>Sept</td>
</tr>
<tr>
<td>Report by Finance Committee and Town Attorney relative to financing under Town-wide Drainage District or otherwise</td>
<td>Oct</td>
<td>Oct</td>
</tr>
<tr>
<td>Creation of Town-wide Drainage District, including advertisement, public hearings, approval of financing, and establishment of District</td>
<td>Nov</td>
<td>Nov</td>
</tr>
<tr>
<td>Authorization to undertake detailed engineering, preparation of plans and specifications</td>
<td>Dec</td>
<td>Jan</td>
</tr>
<tr>
<td>Town-County negotiations</td>
<td></td>
<td>Mar</td>
</tr>
<tr>
<td>Detailed engineering, plans and specs</td>
<td></td>
<td>Apr</td>
</tr>
<tr>
<td>Submittal to Town Board</td>
<td></td>
<td>May</td>
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<tr>
<td>Submittal to DEC for approval under Section 429(c) of the Conservation Law</td>
<td></td>
<td>June</td>
</tr>
<tr>
<td>Advertise for Bids</td>
<td></td>
<td>July</td>
</tr>
<tr>
<td>Award Contract</td>
<td></td>
<td>Aug</td>
</tr>
<tr>
<td>Construct</td>
<td></td>
<td>Sept</td>
</tr>
<tr>
<td>Clearing and Grubbing</td>
<td></td>
<td>Oct</td>
</tr>
<tr>
<td>Earthwork and structures</td>
<td></td>
<td>Nov</td>
</tr>
<tr>
<td>Seeding &amp; Site Restoration</td>
<td></td>
<td>Dec</td>
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APPENDICES
TOWN OF GREECE NATURAL STREAM IMPROVEMENT AND PROTECTION IMPLEMENTATION PROGRAM

LARKIN CREEK WATERSHED RETENTION BASIN No 1

LOCATION PLAN
ENGINEERING DATA SHEET

Allowable discharge through St. Andrews Dr Culvert = 20 cfs
Critical storm duration = 3.5 hours
Required volume of storage = 81 acre-feet

Storage available with dam elevation of 456 = 81 acre-feet

Rainfall Data: Rochester-Monroe County Rainfall Intensity Curves
Runoff Coefficient: .40%
Factors
1) Two hour Tc
2) Monroe County 50-yr return interval
3) 0.4 Runoff factor
4) 852 ± Acres
5) Output 20 cfs permitted
ESTIMATED STORAGE REQUIREMENT FOR
POND NORTH OF ST. ANDREWS DRIVE

Factors:
1) Two hour Tc
2) Monroe County 50-yr return inter
3) 0.4 Runoff factor
4) 852 ± Acres
5) Permitted Output 50 cfs

ESTIMATED STORAGE REQUIREMENTS (Million C.I. Ft.)

STORM DURATION (HOURS)
LARKIN CREEK
RETENTION BASIN NO. 1
ST. ANDREWS DRIVE

NATURAL POND
APPROXIMATE STORAGE CAPABILITY

ELEVATION (USGS)

STORAGE (MILLION CUBIC FEET)
Hydrograph

Design Recurrence Interval = 50 years

Storm Duration = 3.5 hours

Volume of Storage required

\[ V = 2 \times 0.5 \times 290 \times 2 \times 3600 + 290 \times 1.5 \times 3600 - 0.5 \times 20 \times 3.5 \times 3600 \]

\[ = 2,088,000 + 1,566,000 - 126,000 \]

\[ = 3,528,000 \text{ CF} = 81 \text{ Acre feet} \]

LARKIN CREEK
RETENTION BASIN NO. 1
ST. ANDREWS DRIVE

Aug. 1974
REVISED ENGINEER'S ESTIMATE
RETENTION POND & DISCHARGE STRUCTURE
TO BE LOCATED SOUTH OF SAINT ANDREWS DR.

20,000 CY Berm Construction 4.00 80,000.
LUMP SUM Clearing & Grubbing 27,000.
LUMP SUM Emergency Spillway 20,000.
150 LF Discharge Piping 20.00 3,000.
LUMP SUM Riser Section & Headwall 1,000.
LUMP SUM Grading and Seeding 15,000.

Estimated Construction Cost 146,000.
Plus 10% Contingent 14,600.
Plus 18% Legal, Admin. Eng., Insp. 26,400.

TOTAL ESTIMATED COST .................. $187,000.

Budget figure for Bonding use .............. $200,000.
ENGINEER'S ESTIMATE  
DIVERSION DITCH AND RETENTION POND  
WITH DISCHARGE STRUCTURE LOCATED NORTH OF OLD MEADOW DR.

Retention Pond

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Rate</th>
<th>Cost</th>
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<tbody>
<tr>
<td>4500 CY</td>
<td>Berm construction</td>
<td>4.00</td>
<td>18,000.</td>
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<tr>
<td>171500 CY</td>
<td>Additional earth excavation and disposal of material</td>
<td>6.00</td>
<td>1,029,000.</td>
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<tr>
<td>77000 CY</td>
<td>Rock Excavation</td>
<td>30.00</td>
<td>2,310,000.</td>
</tr>
<tr>
<td>LUMP SUM</td>
<td>Emergency Spillway</td>
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<tr>
<td>150 LF</td>
<td>Discharge Piping</td>
<td>20.00</td>
<td>3,000.</td>
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<tr>
<td>LUMP SUM</td>
<td>Riser Section &amp; headwall</td>
<td></td>
<td>1,000.</td>
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<tr>
<td>LUMP SUM</td>
<td>Grading &amp; Seeding</td>
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<td>15,000.</td>
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Diversion Ditch

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<th>Rate</th>
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<tr>
<td>103000 CY</td>
<td>Excavation &amp; disposal of material</td>
<td>6.00</td>
<td>618,000.</td>
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<tr>
<td>8800 CY</td>
<td>Rock Excavation</td>
<td>30.00</td>
<td>264,000.</td>
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<td>LUMP SUM</td>
<td>Grading and seeding</td>
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<td>15,000.</td>
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Estimated Construction Cost: 4,293,000.

10% Contingent: 429,300.

Legal, Admin, Eng., and Inspection: 177,700.

TOTAL ESTIMATED COST: $4,900,000.
NOTE: This Alternate is not recommended because the expenditure of funds does not provide for any protection of the Natural Streams of the Town nor does the solution have any benefit other than the immediate solution to the local problem. Further, and in fact, the flooding problem would simply be transferred downstream and increased erosion would take place as well as other ecological damage.

This alternative consists of the removal of the existing culverts under the three east-west streets and their replacement with concrete box culverts ten feet wide and five feet high. This is necessary to obtain adequate hydraulic capacity without substantially increased upstream ponding elevation. In addition to the culvert construction the channel banks should be stabilized.

3 - 5 x 10 box culverts at $30,000 each including present culvert removal and utility modification as required .............. $90,000.

Stream re-grading, retaining wall construction, and miscellaneous work and restoration ............. 80,000.

Estimated construction cost ......................... 170,000.

Contingent ........................................... 17,000.

Legal, administrative, soils investigations, engineering, inspection and surveys, and contract supervision .......................... 30,000.

TOTAL ESTIMATED COST.................. $217,000.
PRELIMINARY

SUBSURFACE TEST HOLE LOGS

The following four pages are the logs of the subsurface investigation carried out to determine the location and elevation of bedrock, and to make preliminary determinations as to soil types and groundwater depths.

This was particularly significant in this Study since inordinate amounts of excavation were going to be required if an alternative pond location was to be used north of Old Meadow Drive, and a Diversion Channel built through the high ground to the west of the subdivision.

It will be readily apparent, from the Engineer's Preliminary Estimates included herein, that rock excavation and removal are a substantial part of the total cost.

Test Hole Numbers are for identification purposes and for reference location on the Overall Plan and the 1"=50' scale plans.
## TEST HOLE LOG

<table>
<thead>
<tr>
<th>Hole #1</th>
<th>Station 13+00</th>
<th>Baseline &quot;A&quot;</th>
<th>18' north</th>
<th>Elev 443.5</th>
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<tr>
<td>0-1'</td>
<td>topsoil</td>
<td></td>
<td></td>
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<tr>
<td>1'-5½'</td>
<td>reddish brown clay - wet - some sand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>water seepage at moderate rate at 2'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5½'</td>
<td>sandstone can be broken with shovel</td>
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<tr>
<th>Hole #2</th>
<th>Station 17+00</th>
<th>Baseline &quot;A&quot;</th>
<th>26' north</th>
<th>Elev 444.5</th>
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<tr>
<td>0-1'</td>
<td>topsoil</td>
<td></td>
<td></td>
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<tr>
<td>1'-6'</td>
<td>reddish brown clay &amp; sand - wet - banks stable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6'</td>
<td>water entering hole fast rate</td>
<td></td>
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<tr>
<td></td>
<td>hardpan - sandstone hard - not easily broken</td>
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<tr>
<th>Hole #3</th>
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<th>Baseline &quot;A&quot;</th>
<th>12' north</th>
<th>Elev 458.0</th>
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<tr>
<td>0-8&quot;</td>
<td>topsoil</td>
<td></td>
<td></td>
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<tr>
<td>8&quot;-2'</td>
<td>light brown reddish sand with very little clay</td>
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<td></td>
<td></td>
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<tr>
<td>2&quot;-10½'</td>
<td>sand dry no water seepage easy digging solid banks</td>
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<tr>
<th>Hole #4</th>
<th>Station 24+00</th>
<th>Baseline &quot;A&quot;</th>
<th>18' north</th>
<th>Elev 467.5</th>
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<tr>
<td>0-1'</td>
<td>topsoil</td>
<td></td>
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<tr>
<td>1'-9½'</td>
<td>reddish-sand-dry-stable banks</td>
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<td></td>
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<tr>
<td></td>
<td>no seepage into hole - some moisture</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>9½'-10'</td>
<td>beginning of gravel or broken rock</td>
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<th>Hole #5</th>
<th>P.I. 27+13.55</th>
<th>Baseline &quot;A&quot;</th>
<th>17½' west</th>
<th>Elev 468.5</th>
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</thead>
<tbody>
<tr>
<td>0-1½'</td>
<td>topsoil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½'-7'</td>
<td>dry sandy brown soil - no water seepage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7'-9'</td>
<td>(hard digging) sandstone very hard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hole #6</td>
<td>Station 30+0</td>
<td>Baseline &quot;A&quot; 12' west</td>
<td>Elev 461.5</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>--------------</td>
<td>----------------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>0-10&quot;</td>
<td>topsoil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot;-3'</td>
<td>sandy soil</td>
<td>brown damp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3'-11'</td>
<td>medium red</td>
<td>brown clay soil</td>
<td>damp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>no water</td>
<td>seepage, also some</td>
<td>small rock</td>
<td>fragment</td>
</tr>
<tr>
<td></td>
<td>easy digging</td>
<td>- banks are stable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hole #7</th>
<th>Station 34+0</th>
<th>Baseline &quot;A&quot; 15½' west</th>
<th>Elev 462.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10&quot;</td>
<td>topsoil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot;-2½'</td>
<td>sandy reddish</td>
<td>loam</td>
<td></td>
</tr>
<tr>
<td>2½'-11½'</td>
<td>moist sand</td>
<td>having some clay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stable banks</td>
<td>- no visual seepage</td>
<td>of water,</td>
</tr>
<tr>
<td></td>
<td>easy digging</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hole #8</th>
<th>Station 40+00</th>
<th>Baseline &quot;A&quot; 17½' west</th>
<th>Elev 451.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1'</td>
<td>topsoil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1'-8'</td>
<td>clay reddish</td>
<td>moist consistency</td>
<td></td>
</tr>
<tr>
<td>8'-11'</td>
<td>beginning layer of sandstone</td>
<td>- can be broken</td>
<td></td>
</tr>
<tr>
<td></td>
<td>water seepage</td>
<td>at 8' level</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hole #9</th>
<th>Station 40+00</th>
<th>Baseline &quot;A&quot; 450'+ west</th>
<th>Elev 453.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1'</td>
<td>topsoil</td>
<td>black</td>
<td></td>
</tr>
<tr>
<td>1'-2½'</td>
<td>moist brown</td>
<td>reddish sand</td>
<td></td>
</tr>
<tr>
<td>2½'-4½'</td>
<td>gravel layer</td>
<td>moderate to excessive</td>
<td>seepage of</td>
</tr>
<tr>
<td></td>
<td>at this level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4½'-11'</td>
<td>clay - gravel</td>
<td>sand loam - moisture</td>
<td>wet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hole #10</th>
<th>Station 42+00</th>
<th>445' west 58' south section running west</th>
<th>Elev 455.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1'</td>
<td>topsoil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1'-11'</td>
<td>moist clay</td>
<td>- solid banks - no water seepage, easy</td>
<td>digging.</td>
</tr>
</tbody>
</table>

Sheet 2 of 4
<table>
<thead>
<tr>
<th>Hole #</th>
<th>Station</th>
<th>Baseline</th>
<th>Elev</th>
</tr>
</thead>
<tbody>
<tr>
<td>#11</td>
<td>46+00</td>
<td>west &amp; 10' south</td>
<td>453.0</td>
</tr>
<tr>
<td>0-10&quot;</td>
<td>topsoil</td>
<td>red clay, very hard banks, no water seepage, very dry</td>
<td></td>
</tr>
<tr>
<td>10&quot;-9½'</td>
<td>hard sandstone</td>
<td>no water seepage</td>
<td></td>
</tr>
<tr>
<td>#12</td>
<td>1+51</td>
<td>Baseline &quot;B&quot; going north</td>
<td>438.5</td>
</tr>
<tr>
<td>0-10&quot;</td>
<td>topsoil</td>
<td>red clay brown loam solid banks dry - no water seepage</td>
<td></td>
</tr>
<tr>
<td>10&quot;-6½'</td>
<td>moist clay</td>
<td>no water seepage</td>
<td></td>
</tr>
<tr>
<td>#13</td>
<td>5+42</td>
<td>Baseline &quot;B&quot; going north</td>
<td>436.5</td>
</tr>
<tr>
<td>0-10&quot;</td>
<td>topsoil</td>
<td>red sandstone (very hard) and some sand, little clay can break with shovel. Top of hardpan starts at 5½' slight water seepage noticeable.</td>
<td></td>
</tr>
<tr>
<td>10&quot;-5½'</td>
<td>red sandstone</td>
<td>moderate water seepage</td>
<td></td>
</tr>
<tr>
<td>#14</td>
<td>5+59</td>
<td>Baseline &quot;D&quot; going north</td>
<td>440.0</td>
</tr>
<tr>
<td>0-8&quot;</td>
<td>topsoil</td>
<td>red sandstone with sand in horizontal layers - hard going for tractor backhoe</td>
<td></td>
</tr>
<tr>
<td>8&quot;-1½'</td>
<td>sandy loam</td>
<td>moderate water seepage</td>
<td></td>
</tr>
<tr>
<td>1½&quot;-8½'</td>
<td>clay</td>
<td>moist to wet earth</td>
<td></td>
</tr>
<tr>
<td>#15</td>
<td>3+52</td>
<td>Baseline &quot;D&quot; going north</td>
<td>439.0</td>
</tr>
<tr>
<td>0-8&quot;</td>
<td>topsoil</td>
<td>red sandstone with sand in horizontal layers - hard going for tractor backhoe</td>
<td></td>
</tr>
<tr>
<td>8½'</td>
<td>moderate water seepage</td>
<td>moist to wet earth</td>
<td></td>
</tr>
</tbody>
</table>
Subsurface Investigations,
Larkin Creek Retention Facility,
Project No. 76924

Monroe County Department of Public Works
350 East Henrietta Road
Rochester, New York 14620
Attn: Mr. Raymond Keefe

ROCHESTER DRILLING COMPANY, INC.
45 Steel Street
Rochester, New York 14606

Carl J. Asprinio, President

April 28, 1976

Job No. 1622
Monroe County Department of Public Works
350 East Henrietta Road
Rochester, New York 14620

Attention: Mr. Raymond Keefe

Re: Subsurface Investigations,
Larkin Creek Retention Facility,
Project No. 76924

Gentlemen:

The field and laboratory examinations for the project referenced above have been completed. The test borings were begun on April 22, 1976 and were terminated on April 23, 1976. At this time a total of six (6) test holes were explored to specified depths, as indicated by Monroe County Department of Public Works.

Method

The method and procedure followed in making these test borings were in accordance with plans and specifications outlined by Monroe County Department of Public Works. The boring machine used was a C.M.E. 550 an all-terrain type drilling rig. Standard sampling was accomplished utilizing a 2½ inch hollow stem auger casing and a two (2) inch extra heavy duty split spoon sampler. Standard penetration sampling was made using a 140 pound hammer dropping 30 inches each blow, (A.S.T.M. D-1586). It should be noted that no water was induced into the test hole for drilling purposes except for core drilling rock.

Material Encountered

The material encountered was generally a sandy silt or silty fine sand with varying amounts of gravel overlying a reddish brown silt with varying amounts of fine sand and gravel, trace of shale fragments.

Location

The location of all test holes was made in the field by Monroe County Department of Public Works.

Water Levels

The water levels were observed at completion of each test hole with the casing in and out of the boring hole. It should be noted that seasonal and climatic changes will alter the observed water levels.
Classification

The classification of samples was first made in the field by the foreman, Mr. James Hammond. He then forwarded the samples and the field logs to our laboratory to be visually checked by our soil technicians.

Samples

The soil and rock samples have been forwarded to the office of County of Monroe, Department of Public Works, 350 E. Henrietta Rd.

If you have any questions please contact me at your earliest convenience.

Yours very truly,

ROCHESTER DRILLING COMPANY, INC.

(Carl J. Asprinio)

Carl J. Asprinio
President

CJA/dJ
BORING TERMS AND SYMBOLS

N  The number of blows from a 140 pound hammer falling 30 inches needed to drive a split-spoon sampler the last 12 inch penetration of the sample.

C  The number of blows from a 300 pound hammer falling 24 inches needed to drive casing 12 inches.

100/1 inch  Number of blows needed to drive sampler or casing the distance shown. Used for indicating refusal.

WR  Sampler advanced by the weight of rocks only, indicating very soft material.

WH  Sampler or casing advanced by weight of hammer only, indicating very soft material.

S1  Shelby Tube Sample (piston sample or pressed tube sample).

CS  Continuous sampling

AX  1 1/8" rock core

BX  1 5/8" rock core

NX  2 1/8" rock core

75%  Percentage of rock core recovered

P.L.  Plastic limit

L.L.  Liquid limit

M.C.  Moisture content--Dry, Damp, Moist, Wet, Saturated

H.C.  Boring caved after casing or augers were removed

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

Depth in boring where more than 150 blows per-foot are needed to advance the sample spoon.

Cohesive Soil

Very fine grain soils with appreciable dry strength. Plastic—can be rolled into a thin thread when damp with no apparent water movement. Clays and silty to sandy clays show cohesion.

<table>
<thead>
<tr>
<th>Description</th>
<th>Penetration Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blows/Foot</td>
</tr>
<tr>
<td>Very Soft</td>
<td>0-2</td>
</tr>
<tr>
<td>Soft</td>
<td>3-5</td>
</tr>
<tr>
<td>Medium</td>
<td>6-15</td>
</tr>
<tr>
<td>Stiff</td>
<td>16-25</td>
</tr>
<tr>
<td>Hard</td>
<td>26 or more</td>
</tr>
</tbody>
</table>

Non-Cohesive Soil

Soils composed of silt, sand, and gravel, show no cohesion and only slight plasticity.

<table>
<thead>
<tr>
<th>Description</th>
<th>Penetration Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blows/Foot</td>
</tr>
<tr>
<td>Loose</td>
<td>0-10</td>
</tr>
<tr>
<td>Firm</td>
<td>11-25</td>
</tr>
<tr>
<td>Compact</td>
<td>26-40</td>
</tr>
<tr>
<td>Dense</td>
<td>41-50</td>
</tr>
<tr>
<td>Very Dense</td>
<td>51 or more</td>
</tr>
</tbody>
</table>

Composition

<table>
<thead>
<tr>
<th>Estimated Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>And</td>
</tr>
<tr>
<td>Some</td>
</tr>
<tr>
<td>Little</td>
</tr>
<tr>
<td>Trace</td>
</tr>
</tbody>
</table>
SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

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

PROJECT NO. 1622 PAGE 1 OF 1 BORING NO. B-1

PROJECT
Larkin Creek Retention Facility - Project No. 76924

CLIENT
County of Monroe, Dept. of Public Works

ELEVATION 419.65
WEATHER

DATE STARTED 4-23-76
COMPLETED 4-23-76
TECHNICIAN J. Hammond

GROUND WATER - CASING IN - AT COMPLETION / TIME
BELOW SURFACE - CASING OUT - 3'8" 4-23-76

GROUND WATER

<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE</th>
<th>BLOWS ON SAMPLER</th>
<th>DEPTH OF SAMPLE</th>
<th>SOIL AND ROCK CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>32</td>
<td>40</td>
<td>48</td>
</tr>
<tr>
<td>12</td>
<td>54</td>
<td>100</td>
<td>164</td>
</tr>
<tr>
<td>15</td>
<td>3&quot;</td>
<td>9&quot;</td>
<td></td>
</tr>
</tbody>
</table>

BORING TERMINATED AT 13'6" (Refusal)

Note: Advanced test boring with hollow stem auger casing to 13'6".

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
**PROJECT NO.** 1622  **PAGE 1 OF 1**  **BORING NO.** B-2

**PROJECT** Larkin Creek Retention Facility, Project No. 78924

**CLIENT** County of Monroe, Dept. of Public Works

**ELEVATION** 418.47

**DATE STARTED** 4-23-76  **WEATHER**

**DATE COMPLETED** 4-23-76  **TECHNICIAN** J. Hammond

**GROUND WATER** - Casing IN - 10'0"  **AT COMPLETION** 6'1"

**SURFACE** - Casing OUT - 4-23-76

<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE</th>
<th>BLOWS ON SAMPLER</th>
<th>DEPTH OF SAMPLE</th>
<th>SOIL AND ROCK CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0'0&quot;-2'0&quot;</td>
<td>12</td>
<td>1</td>
<td>Very loose brown wet silt, little fine gravel and sand, trace of organic material.</td>
</tr>
<tr>
<td>4'0&quot;-5'6&quot;</td>
<td>5</td>
<td>1</td>
<td>Very loose brown wet silt, little fine gravel and sand, trace of organic material.</td>
</tr>
<tr>
<td>8'0&quot;-9'6&quot;</td>
<td>50</td>
<td>1</td>
<td>Loose brown wet fine sand and silt, little fine gravel.</td>
</tr>
<tr>
<td>12'0&quot;-12'5&quot;</td>
<td>50</td>
<td>1</td>
<td>Very dense reddish brown damp silt, little fine gravel, trace of sand.</td>
</tr>
<tr>
<td>14'6&quot;</td>
<td>50</td>
<td>1</td>
<td>Very dense reddish brown damp silt, little fine gravel, trace of sand, many shale fragments noted.</td>
</tr>
<tr>
<td>19'6&quot;</td>
<td>50</td>
<td>1</td>
<td>Medium hard red with gray mottled fine grained sandstone with few shale partings to soft red shale at 19'0&quot;. Core in many pieces from chips to 3&quot; long.</td>
</tr>
</tbody>
</table>

**BORING TERMINATED AT 19'6"**

**Note:** Advanced test boring with hollow stem auger casing to 14'6". Core drilled with AX Series "M" double tube core barrel and diamond bit from 14'6"-19'6".

**NOTES:**
- N = No of Blows to Drive
- C = No of Blows to Drive
- 2" Spoon 12" with 140 lb wt
- 30" EA BLO
**CONCRETE AND SOIL-TESTING AND INSPECTION**

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**PROJECT NO.** 1622  **PAGE 1 OF 1**  **BORING NO. B-3**

**PROJECT** Larkin Creek Retention Facility, Project No. 762924

**CLIENT** County of Monroe, Dept. of Public Works

**ELEVATION** 475.60

**DATE STARTED** 4-23-76  **COMPLETED** 4-23-76  **TECHNICIAN** J. Hammond

**GROUND WATER** — Casing IN —  **WEATHER**

**ELEVATION** 475.60  **WEATHER**

**DATE STARTED** 4-23-76  **COMPLETED** 4-23-76  **TECHNICIAN** J. Hammond

**GROUND WATER** — Casing IN —  **WEATHER**

**ELEVATION** 475.60  **WEATHER**

**DATE STARTED** 4-23-76  **COMPLETED** 4-23-76  **TECHNICIAN** J. Hammond

<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE</th>
<th>BLOWS ON SAMPLER</th>
<th>SAMPLE NO.</th>
<th>DEPTH OF SAMPLE</th>
<th>SOIL AND ROCK CLASSIFICATION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'0&quot;</td>
<td>1</td>
<td>18</td>
<td>0'0&quot;-2'0&quot;</td>
<td>Loose brown wet coarse to fine sand and silt, little coarse to fine gravel, trace of organic material.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>36</td>
<td>44</td>
<td>80 2</td>
<td>4'0&quot;-5'6&quot; Very dense reddish brown damp silt, little fine gravel, trace of sand.</td>
</tr>
<tr>
<td>8'0&quot;-9'6&quot;</td>
<td>69</td>
<td>76</td>
<td>98</td>
<td>174 3</td>
<td>8'0&quot;-9'6&quot; Very dense reddish brown damp silt, little fine gravel, trace of sand.</td>
</tr>
<tr>
<td>12'0&quot;-12'2&quot;</td>
<td>100</td>
<td>100</td>
<td>100 4</td>
<td>12'0&quot;-12'2&quot; Very dense reddish brown damp silt, little fine gravel, trace of sand.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>2'0&quot;</td>
<td></td>
<td>2&quot;</td>
<td>BORING TERMINATED AT 12'6&quot; (Refusal)</td>
<td></td>
</tr>
</tbody>
</table>

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

Note: Advanced test boring with hollow stem auger casing to 12'6".
# Subsurface Geological Investigations

## Concrete and Soil-Testing and Inspection

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

---

**Project No.** 1622  
**Page 1 of 1**  
**Boring No.** B-4  

**Project:** Larkin Creek Retention Facility, Project No. 76924  
**Client:** County of Monroe, Dept. of Public Works  
**Elevation:** 415.22  
**Inspector:**  
**Weather:**  
**Date Started:** 4-23-76  
**Completed:** 4-23-76  
**Technician:** J. Hammond  

**Ground Water - Casing In:**  
**Below Surface - Casing Out:** Top of boring is 1'0" below water - Wellpoint at surface.

<table>
<thead>
<tr>
<th>Depth Below Surface</th>
<th>Blows on Sampler</th>
<th>Depth of Sample</th>
<th>Soil and Rock Classification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>0'0&quot; - 2'0&quot;</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4'0&quot; - 5'6&quot;</td>
<td>25</td>
<td>39</td>
<td>52</td>
<td>91</td>
</tr>
<tr>
<td>8'0&quot; - 8'4&quot;</td>
<td>100</td>
<td>100</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>12'0&quot; - 12'1&quot;</td>
<td>100</td>
<td>100</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes:**  
N = No of Blows to Drive  
C = No of Blows to Drive  
2" Spoon 12" with 1" LB WT 30" EA BLO
<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE</th>
<th>BLOWS ON SAMPLER</th>
<th>DEPTH OF SAMPLE</th>
<th>SOIL AND ROCK CLASSIFICATION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0'6&quot; 6' 12' 18' 24' N</td>
<td>1'0&quot;-2'6&quot;</td>
<td>Firm brown saturated coarse to fine sand and fine gravel, little silt.</td>
<td>C:20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 6 9 15 1</td>
<td>Cobbles from 4'0&quot;-4'6&quot; noted.</td>
<td>C:46 B:20</td>
</tr>
<tr>
<td>5</td>
<td>70</td>
<td>4'6&quot;-6'0&quot;</td>
<td>Very dense reddish brown silt, some fine gravel and coarse sand, trace medium to fine sand.</td>
<td>C:46 B:20</td>
</tr>
<tr>
<td></td>
<td>60 48 108 2</td>
<td>8'0&quot;-8'9&quot;</td>
<td>Very dense reddish brown silt and shale fragments.</td>
<td>C:46 B:20</td>
</tr>
<tr>
<td>10</td>
<td>37 100 137 3</td>
<td>Run #1 12'6&quot;-17'6&quot; Rec. 2'6&quot;</td>
<td>Shale fragments and weathered and decomposed shale (refusal) 12'</td>
<td>C:46 B:20</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Med. hard red with gray mottled 12' grained sandstone with few to many soft shale partings. Core in man pieces from chips to 3&quot; pieces.</td>
<td>C:46 B:20</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>BORING TERMINATED AT 17'6&quot;</td>
<td>Note: Advanced test boring with hollow stem auger casing to 12'6&quot;.</td>
<td>C:46 B:20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Core drilled with AX Series &quot;: double tube core barrel and diamond bit from 12'6&quot; to 17'.</td>
<td>C:46 B:20</td>
<td></td>
</tr>
</tbody>
</table>

NOTES: N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB WT 30" EA B C = NO OF BLOWS TO DRIVE 12" CASING WITH 140 LB WT 30" EA B
**SUBSURFACE GEOLOGICAL INVESTIGATIONS**  
**CONCRETE AND SOIL TESTING AND INSPECTION**

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

---

**PROJECT NO.** 1622  
**PAGE** 1 OF 1  
**BORING NO.** B-6

**PROJECT** Larkin Creek Retention Facility, Project No. 76924  
**CLIENT** County of Monroe, Dept. of Public Works  
**ELEVATION** 417.72

**DATE STARTED** 4-22-76  
**COMPLETED** 4-22-76  
**TECHNICIAN** J. Hammond  
**WEATHER**

**GROUND WATER**  
- **CASING IN**  
- **AT COMPLETION**  
- **TIME**  
- **WELLPOINT AT**

---

<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE</th>
<th>BLOWS ON SAMPLER C</th>
<th>SOIL AND ROCK CLASSIFICATION</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>0'-6''</td>
<td>1 1 2</td>
<td>Very loose brown damp silt and fine sand, little fine gravel, trace of organic material.</td>
<td>3'6''</td>
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<tr>
<td>6'-12''</td>
<td>18 21 21 42 2</td>
<td>Dense brown damp fine sand and silt, little medium to fine gravel, trace coarse sand.</td>
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<tr>
<td>12'-18''</td>
<td>37 46 48 94 3</td>
<td>Very dense reddish brown silt, some medium to fine gravel and shale fragments.</td>
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<td>18'-24''</td>
<td>100 100 4 120''-12''</td>
<td>Shale fragments and weathered and decomposed shale. Refusal 12'6''.</td>
<td></td>
</tr>
<tr>
<td>24'-30''</td>
<td>1'' 1''</td>
<td>Medium hard red/gray mottled fine grained sandstone with few shale partings to soft red shale at 15'0''. Core in many pieces from chips to 3'' pieces.</td>
<td>17'6''</td>
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</tbody>
</table>

**BORING TERMINATED AT 17'6''**

**NOTES:**  
Advanced test boring with hollow stem auger casing to 17'6''.

Core drilled with AX Series "M" double tube core barrel and diamond bit from 12'6'' to 17'6''.

Boring location moved 2' South and 2' West from original stake location to avoid underground R.G.&E. 8'' gas main.

---

**NOTES:**

- **N** = NO OF BLOWS TO DRIVE  
- **C** = NO OF BLOWS TO DRIVE  
- 2'' SPOON 12'' WITH 140 LB WT 30'' EA BLO  
- Casing 12'' WITH 300 LB WT 60'' EA BLO
September 22, 1975

William C. Larsen, P.E.
44 Saginaw Drive
Rochester, New York 14623

Attention: Mr. Dale Green, P.E.

Reference: AN RET P, 2330.00

Regarding: Embankment Realignment

Gentlemen:

This letter is an addendum to our Larkin Creek Storm Water Detention Pond Report dated June 30, 1975. The east end of the embankment has been moved about 200 feet south. The original test pits were close to this alignment; however, we were interested in fall water table information and we arranged for 4 more test pits.

The new test pits, numbered TP-101 through TP-104, were excavated with a case 580 backhoe on September 10, 1975. We collected soil samples and logged the test pits. The test pit logs, a revised centerline profile, and a revised location plan are attached for inclusion in our earlier report.

The soils are the same and confirm our original profile. The site is much drier now than last spring when the first test pits were excavated. We do not think the
extensive debris stripping will be necessary if the dam is built during the late summer or early fall. All other recommendations from our June 30, 1975, report remain in effect.

If you have any questions, please call.

Very truly yours,

JAMES P. COLLINS, P.E.

John R. Earnest, P.E.

JRH:gis

enc: 8 copies, Test Pit Logs
     8 copies, Revised Soil Profile
     8 copies, Revised Location Plan
September 22, 1975

William C. Larsen, P.E.
44 Saginaw Drive
Rochester, New York 14623

Attention: Mr. Dale Green, P.E.
Reference: AN RET P, 2330.00
Regarding: Cutoff Trench

Gentlemen:

This is to confirm our discussion of a week ago in your office on the need to add a cutoff trench to the Larkin Creek Storm Water Detention Pond. We do not believe this is necessary for the integrity of the dam, nor will its omission jeopardize the safety of the embankment. We do recommend that a cutoff be placed in the west embankment as stated in our report. We also reiterate our request that a geologist or soils engineer examine the foundation after stripping to check for irregularities or sand lenses. If clean sand or gravel is found, we recommend a cutoff of the affected zone.

If you have further questions, please call.

Very truly yours,

JAMES P. COLLINS, P.E.

John R. Harnly, P.E.

JRH:gis
### LOG OF TEST PIT

**ST ANDREW'S DRIVE STORM WATER RETENTION POND**

<table>
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<th>ELEVATION</th>
<th>DATE 9/10/75</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>1.0 ft. TOPSOIL.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SM: Dense, red, fine to coarse SAND and SILT, little gravel and cobbles, moist, non-plastic, GLACIAL TILL.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
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</tbody>
</table>

Bottom of hole 9 ft.

Note: No bedrock encountered.
No water in hole.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

---

### LOG OF TEST PIT

**No. TH-102**

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<th>DEPTH (ft)</th>
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<th>DATE 9/10/75</th>
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<tbody>
<tr>
<td>0</td>
<td>1.0 ft. TOPSOIL.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SM: Dense, red, fine to coarse SAND and SILT, some gravel and cobbles, moist, non-plastic, GLACIAL TILL.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bottom of hole 9 ft.

Note: No bedrock encountered.
No water in hole.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.
LOG OF TEST PIT

ST. ANDREW'S DRIVE STORM
WATER RETENTION POND

No. TH-103

DEPTH(ft)  ELEVATION  DATE 9/10/75

0           1.2 ft. TOPSOIL.

SM          Dense, red, fine to coarse SAND
            and SILT, little gravel and cobbles,
            damp, non-plastic, GLACIAL TILL.

           Grading to moist.
           Grading to wet.
           Grading to some boulders.

           Bottom of hole 9 ft.

           Note: No water encountered.
           No bedrock encountered.

           The stratification lines represent the approximate
           boundary between soil types. The actual transition
           may be gradual.

LOG OF TEST PIT

No. TH-104

DEPTH(ft)  ELEVATION  DATE 9/10/75

0           1.5 ft. TOPSOIL AND ROOTS.

SM          Dense, red, fine to coarse SAND
            and SILT, some gravel, cobbles
            and boulders, moist, non-plastic,
            GLACIAL TILL.

           Top of rock 5.5 ft.

           Bottom of hole 5.5 ft.

           Note: Some seepage of water from
           layer just above rock.
           2" of water in bottom of hole
           after 10 minutes.

           The stratification lines represent the approximate
           boundary between soil types. The actual transition
           may be gradual.
LARKIN CREEK STORMWATER
DETENTION FACILITY
SOILS REPORT

FOR

WILLIAM C. LARSEN, P.E.
AND
TOWN OF GREECE, NEW YORK

BY

JOHN R. HARNLY, P.E.

JUNE 30, 1975

the office of james p. collins, p.e.

474 THURSTON RD. ROCHESTER, N.Y. 14619 / 716-335-3722
CONSULTING GEOTECHNICAL ENGINEERS
LARKIN CREEK STORMWATER DETENTION FACILITY

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<td>8</td>
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FIGURE 1. SITE PLAN                          3
FIGURE 2. DAM CENTERLINE SOIL PROFILE        4

APPENDICES

Appendix 1. Laboratory Test Data
Gradation Curves

Appendix 2. Test Pit Logs TP-1 through TP-16, AH-1 through AH-6 by The Office of James P. Collins, P.E.
Boring Log Legend
Test Hole Logs No. 1 through No. 19 by William C. Larsen, P.E.
INTRODUCTION

This soils report is for the proposed Larkin Creek Storm Water Detention Pond. The dam will be west of Elmgrove Road and south of St. Andrews Street in the town of Greece, Monroe County, New York. It will be owned and operated by the town of Greece. The creek has flooded homes along St. Andrews Drive and the new housing development north of St. Andrews Drive several times in the last few years. The dam will regulate the flow to rates that downstream culverts and channels can pass without damage.

The proposed 9-foot-high, 1,700-foot-long dam will hold approximately 100 acre feet of water. The watershed is approximately 1 square mile. The principal spillway will pass a 50-year frequency storm. Larger flows will pass through an emergency spillway in the east abutment.

SUMMARY OF SITE CONDITIONS

The dam site is low and heavily wooded. Drainage is to Larkin Creek and then north to Buck Pond on Lake Ontario. The land to the south and west of the site was farmed about five years ago. Housing developments north of the site were built within the
SUMMARY OF SITE CONDITIONS (CON'T.)

last three to five years. The soils are well graded, medium dense, sandy silts and silty sands overlying bedrock at 8 to 12 feet. The water table is within 2 feet of the surface for about 1,300 feet along the center section of the dam.

SUMMARY OF RECOMMENDATIONS

We recommend a homogeneous, compacted earth fill embankment. Clearing and grubbing is necessary under the embankment. Acceptable borrow for the embankment is available on site. The natural moisture content of the on-site borrow is high and may require drying. We recommend opening a large borrow area for inplace drying. We recommend the embankment be placed in the summer or early fall when the water table is low and drying conditions best. Dewatering will be necessary along the embankment during construction.

SITE CONDITIONS

The site is on gently rolling land with a maximum relief of 26 feet. The borrow area is on a hill about 500 feet west of the dam.

The dam site is poorly drained and floods several times a year. The local drainage is into Larkin Creek and then north to Lake Ontario. The borrow area is on a low hill draining to Larkin Creek on one side and to the west to another local stream.
SITE CONDITIONS (CON'T.)

The site was farmed but is not in use now. We do not know of any on-site structures or utilities. The nearest buildings are the homes on St. Andrews Drive, 150 feet north of the dam.

EXPLORATION AND TESTING

Eight test pits and six auger holes were dug along the centerline of the dam. The test pits were dug on April 22 and 23 with a Case 580 backhoe furnished by William Ehrmentraut. The test pits were at least 12 feet deep or to bedrock. Six hand auger holes were drilled in the densely wooded area. Eight additional test pits and ten hand auger holes were dug in proposed borrow areas. Samples were collected, and we logged the test pits. Test pit locations are shown on the site plan on the following page.

The testing program was set up to determine the type of soils in the dam subgrade and the soil types and conditions for embankment fill. The program includes soil classification, natural moisture content, and compaction curves for the soils in the proposed borrow areas. Test data is attached in the appendix.

GEOLOGIC HISTORY

The site is on the contact or transition between the Medina Sandstone and the underlying Queenston Shale. The Medina is a hard, fine-grained, red sandstone; the Queenston is a soft red shale. They are
REFERENCE: AN RET P, 2330.00

GEOLOGIC HISTORY (CON'T.)

horizontally bedded with a slight southerly dip. Both formations are moderately jointed, vertically and horizontally, providing an open channel for lateral movement of water. Decomposed shale layers in the soil are probably blocks displaced from the Queenston by glacial action.

Glacial till, 8 to 12 feet thick, overlies bedrock. The till is an unsorted deposit of sandy silts and silty sands with large amounts of gravel, cobbles, and boulders. The proposed borrow area is on a small drumlin of glacial till with some clean sand and gravel layers. The silty and clayey sands in the low area are stream deposits, filling former channels and covering the surrounding flood plain.

SOIL, ROCK, AND GROUNDWATER CONDITIONS

The soils are generally silty sand and sandy silts with pockets of clay and clean sand. The soils are loose to medium dense. Bedrock is at about elevation 540 feet, 8 to 12 feet below the surface. The bedrock is horizontally bedded and fractured near the surface. The backhoe excavated 1 to 2 feet into the bedrock at test pits 3, 4, 14, 15, and 16. The dam centerline soil profile is on the following page.

The water table is at about elevation 549 feet through the center of the dam site and slightly higher on both
The groundwater in May varied from 1 foot below the surface near Larkin Creek to 9 feet below the surface on the west abutment. The groundwater was probably at a seasonal high after the spring rain and snow melted and will probably be 1 to 2 feet lower during the summer and early fall.

RECOMMENDATIONS

We recommend a homogeneous compacted earth fill dam. The slope should be 3 horizontal to 1 vertical (3 on 1) on both the upstream and downstream faces. The factor of safety against this embankment sliding is over 3.0. The available on-site borrow would safely stand on a 2 on 1 slope. However, this would require additional erosion control. Also, these flatter slopes increase the dam cross section in a wooded area where rodents may be a problem. We saw signs of muskrat, a burrowing animal, along the creek. We recommend frequent inspections of the dam and control of these and other rodents.

Seepage through the dam was checked for both volume and piping. The factor of safety against piping is approximately 4.0. Seepage through the clean sand found at test pits 3 and 4 will be a problem. We recommend removal and replacement of any sand with less than 20 percent passing a No. 200 sieve with compacted embankment fill. This core should be a minimum of 10 feet wide and through the entire depth of sand.

REFERENCE: AN RET P, 2330.00
RECOMMENDATIONS (CON'T.)

drainage swale along the downstream toe should divert any seepage back to the creek.

The area under the dam will have to be cleared of all trees, stumps, roots, brush, and rubbish. Disposal areas should be designated on the plans or the specifications should require off-site disposal. The dam foundation should be inspected by a soils engineer, after clearing and grubbing, then leveled and proof-rolled with at least three passes of approved compaction equipment. Irregularities and old stream channels should be cleaned as directed by the soils engineer.

The embankment fill may be any of the silty sands or sandy silts found near the site. The fill must be well graded and free of debris, organic soil, and rocks over 6 inches in diameter. At least 30 percent shall pass a No. 200 sieve. The fill should be compacted to at least 90 percent of dry density by ASTM D-1557. Compaction equipment should be approved by the engineer. Earth moving equipment, such as pans, scrappers, and tracked vehicles, should not be approved as compaction equipment. One density test (ASTM D-1556, sand cone method) should be made for each 200 cubic yards of fill or as directed by the engineer. A soils technician should be on the site whenever the contractor is placing fill. The technician should be prepared to run the density tests as required and moisture density curves ASTM D-1557 whenever the fill material changes.
RECOMMENDATIONS (CON'T.)

The moisture content of the inplace soils was high when we tested the site in April. Tests taken in June, 1975, were within a compactible range. We recommend that a relatively large area be designated for borrow material and that the cut be less than 5 feet deep. A large area will allow inplace mixing and drying. The borrow area should be graded to drain at all times.

The site will have to be dewatered during construction of the embankment. We suggest that gravel-filled sump pits be excavated into bedrock. This operation should be started as early as possible since the silt will be slow draining. If the site is not dewatered, we expect serious problems in placing the first few lifts of compacted fill over the natural soil.

We recommend that the old stream channel be filled and that the channel be ripraped where the new channel leaves the old channel. Any on-site clean fill will be satisfactory. Compact the fill with two passes of a tracked vehicle.

The principal spillway through the dam will require special attention. The work area should be dewatered. The pipe and structures should be placed on the natural soil and backfill carefully compacted. We recommend using the most clayey soil available on the site for backfill. Special care should be taken to insure that no voids are left along the pipe or around the structure and cutoffs.

LARKIN CREEK STORMWATER DETENTION FACILITY 7
CONSTRUCTION PROBLEMS

These soils will be difficult to dewater. The first lifts over the natural soil will be difficult to place and compact. We suggest that the contractor use soils several percent dry of optimum in the first few lifts. We also suggest that he build the base at least 2 feet above the surrounding ground as he progresses along the dam. This will reduce the possibility of pumping moisture up from the subsoil and will reduce the probability of saturating the fill during a flash flood.

We recommend that the dam be built during the summer or early fall. The water table will be high during the winter and spring, making the site more difficult to dewater. Also, drying conditions are poor in the Rochester area except in the summer and early fall.
Appendix 1. Laboratory Test Data
Gradation Curves
## LARKIN CREEK STORMWATER DETENTION FACILITY
### LABORATORY DATA SUMMARY

<table>
<thead>
<tr>
<th>Boring or Test Pit No.</th>
<th>Depth (Feet)</th>
<th>Soil Classification (Unified System)</th>
<th>Natural Moisture (%)</th>
<th>Atterberg Limits L.L.</th>
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<th>P.I.</th>
<th>Specific Gravity</th>
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### LARKIN CREEK STORMWATER DETENTION FACILITY
#### LABORATORY DATA SUMMARY

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<th>Soil Classification (Unified System)</th>
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*Visual Classification  
**See Appendix 1 for Grain Size Distribution
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U.S. STANDARD BRASS SIEVE SIZES

JAMES R. COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS
MIT CLASSIFICATION
<table>
<thead>
<tr>
<th>GRAVEL</th>
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<td>COARSE</td>
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PERCENT FINER BY WEIGHT

U.S. STANDARD BRASS SIEVE SIZES

PROJECT No. TP-7
SAMPLE No. 9.5-3.0 FT.
SAMPLE DEPTH 3.5-3.0 FT.
TEST BY EJP
DATE 5/14/75
REMARKS ML-SM
SILT AND FINE LO SIEVE NO. 9 TO 16
COARSE SAND, TRACE
GRAVEL

JAMES R. COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS
<table>
<thead>
<tr>
<th>MIT CLASSIFICATION</th>
<th>GRAVEL</th>
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<th>CLAY</th>
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<td>100%</td>
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<td></td>
</tr>
<tr>
<td>90%</td>
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<td>80%</td>
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</tr>
<tr>
<td>70%</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>60%</td>
<td></td>
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U.S. STANDARD BRASS SIEVE SIZES
SAND, little gravel

U.S. STANDARD BRASS SIEVE SIZES
Appendix 2. Test Pit Logs TP-1 through TP-16, AH-1 through AH-6 by The Office of James P. Collins, P.E.

Boring Log Legend
Test Hole Logs No. 1 through No. 19 by William C. Larsen, P.E.
**LOG OF TEST PIT**

**No. TP-1**

LARKIN CREEK STORMWATER DETENTION FACILITY
TOWN OF GREECE, NEW YORK

<table>
<thead>
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<tr>
<td>0</td>
<td>TOPSOIL 0.7 ft.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>AL</td>
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</tr>
<tr>
<td>10</td>
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</tbody>
</table>

Medium dense, red-brown Silt, little medium to fine sand, some coarse gravel, cobbles and boulders.

No bedrock encountered.

Bottom of hole 12.0 ft.

---

**LOG OF TEST PIT**

**No. TP-2**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION 454.2</th>
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<tr>
<td>0</td>
<td>TOPSOIL 0.7 ft.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SM</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Loose to medium dense, brown, silty fine sand, trace gravel, cobbles and boulders.

Medium dense, red Silt, some fine sand, trace gravel, cobbles and boulders.

TOP OF ROCK 13.0 ft.

QUEENSTON SHALE—slightly weathered, moderately fractured.

Bottom of hole 13.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00
LOG OF TEST PIT

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

LOG OF TEST PIT

DEPTH(ft) ELEVATION 453.1 DATE 4/22/75

0 TOPSOIL 0.7 ft.
SP Loose, red-yellow, fine to coarse SAND.

5 SP Red-brown, fine to coarse SAND, some gravel, trace silt, cobbles and boulders.

ML Red-gray SILT, trace fine sand, trace gravel.

TOP OF ROCK 10.0 ft.
Bottom of hole 10.0 ft.

LOG OF TEST PIT

DEPTH(ft) ELEVATION 451.0 DATE 4/22/75

0 TOPSOIL 1.0 ft.
SM Medium dense to dense, red-gray, silty, very fine SAND, cobbles.

5 SP-GP Red, fine to coarse SAND and GRAVEL, trace silt.
ML Dense, gray SILT, some sand and gravel lenses.

TOP OF ROCK 9.0 ft.
Bottom of hole 9.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00
**LOG OF TEST PIT**

**No. TP-5**

**LARKIN CREEK STORMWATER DETENTION FACILITY**
**TOWN OF GREECE, NEW YORK**

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<td>TOPSOIL 0.6 ft.</td>
<td>4/22/75</td>
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<tr>
<td></td>
<td>ML</td>
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</tr>
<tr>
<td></td>
<td>Dense, red-brown SILT, trace fine sand, trace clay, moist, slightly plastic, cobbles.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SM-ML Loose to medium dense, red, fine to coarse SAND and SILT, some coarse sand layers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOP OF ROCK 9.0 ft.</td>
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</tr>
<tr>
<td></td>
<td>Bottom of hole 9.0 ft.</td>
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</tbody>
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The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

**AN RET P, 2330.00**
LOG OF TEST PIT

LARKIN CREEK STORMWATER DETENTION FACILITY
TOWN OF GREECE, NEW YORK

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<tr>
<th>DEPTH (ft)</th>
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<th>4/22/75</th>
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<td>0</td>
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<tr>
<td>5</td>
<td>ML-SM Loose to medium dense, red SILT and fine to coarse SAND, trace gravel, wet, non-plastic, cobbles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>SM Loose, red, silty fine SAND, wet, non-plastic.</td>
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No bedrock encountered.
Bottom of hole 10.0 ft.

LOG OF TEST PIT

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
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<th>4/22/75</th>
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</thead>
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<td>0</td>
<td>TOPSOIL 1.0 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SM Yellow-brown, silty fine SAND, some gravel, cobbles, wet.</td>
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<tr>
<td></td>
<td>SM-GM Red, silty fine to coarse SAND and GRAVEL.</td>
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Bottom of hole 4.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.
**LOG OF TEST PIT**

**LARKIN CREEK STORMWATER DETENTION FACILITY TOWN OF GREECE, NEW YORK**

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<tbody>
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<td>TOPSOIL 0.7 ft.</td>
<td>4/22/75</td>
</tr>
<tr>
<td>0</td>
<td>Yellow-brown SILT, trace very fine sand, trace clay, wet, slightly plastic.</td>
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</tr>
<tr>
<td>5</td>
<td>Red SILT and DECOMPOSED SHALE layers.</td>
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<tr>
<td></td>
<td>TOP OF ROCK 6.0 ft.</td>
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**LOG OF TEST PIT**

**No. TP-10**

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<tr>
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<td>Medium dense to dense, red SILT, trace fine gravel, damp, nonplastic.</td>
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<td>10</td>
<td>Bottom of hole 10.0 ft.</td>
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The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00
LOG OF TEST PIT

LARKIN CREEK
STORMWATER
DETENTION FACILITY
TOWN OF GREENE, NEW YORK

No. TP-11

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<td>5</td>
<td>Medium dense, red, silty fine to coarse SAND, little gravel, wet, cobbles and shale fragments.</td>
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</tr>
<tr>
<td>ML</td>
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Bottom of hole 9.0 ft.

LOG OF TEST PIT

No. TP-12

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<td>4/22/75</td>
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<tr>
<td>ML</td>
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</tr>
<tr>
<td>5</td>
<td>TOP OF ROCK 8.5 ft.</td>
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</table>

Bottom of hole 8.5 ft.

The stratification lines represent the approximate boundaries between soil types. The actual transition may be gradual.

AN RET P, 2330.00
### LOG OF TEST PIT

**No. TP-13**

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

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<tr>
<td></td>
<td>Loose to medium dense, red, silty fine SAND, little gravel and shale fragments, wet, nonplastic.</td>
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</tr>
<tr>
<td>5</td>
<td>ML</td>
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</tr>
<tr>
<td></td>
<td>Dense, red, fine sandy SILT and DECOMPOSED SHALE layers and boulders.</td>
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<tr>
<td></td>
<td>Top of rock 8.0 ft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Queenston Shale—Medina Sandstone, slightly weathered, moderately fractured.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom of hole 8.0 ft.</td>
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### LOG OF TEST PIT

**No. TP-14**

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<td>4/23/75</td>
</tr>
<tr>
<td>SM</td>
<td>Topsoil 1.5 ft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loose to medium dense, red, silty SAND, some coarse gravel, cobbles and boulders.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Silty SAND and DECOMPOSED SHALE.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Top of rock—10.0 ft.</td>
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<tr>
<td></td>
<td>Bottom of hole 11.0 ft.</td>
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</table>

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00
LOG OF TEST PIT

LARKIN CREEK STORMWATER DETENTION FACILITY
TOWN OF GREECE, NEW YORK

No. TP-15

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</thead>
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<td>4/23/75</td>
</tr>
<tr>
<td>1.0 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM</td>
<td>Medium dense, red, silty medium to fine SAND, some gravel, cobbles and boulders</td>
<td></td>
</tr>
<tr>
<td>4-inch sand layer.</td>
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<td></td>
</tr>
<tr>
<td>TOP OF ROCK 10.0 ft.</td>
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LOG OF TEST PIT

No. TP-16

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</tr>
<tr>
<td>1.0 ft.</td>
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<td></td>
</tr>
<tr>
<td>SM-GM</td>
<td>Medium dense, red, silty fine SAND and GRAVEL, cobbles.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOP OF ROCK 9.0 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>DECOMPOSED SHALE.</td>
<td></td>
</tr>
<tr>
<td>Bottom of hole 11.0 ft.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>451.0</td>
<td>4/30/75</td>
</tr>
</tbody>
</table>

TOPSOIL 1.5 ft.

SM-ML Red-brown, fine to coarse SAND and SILT, trace fine gravel. Grading to very fine, sandy silt.

Bottom of hole 4.0 ft.

---

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>ELEVATION</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>450.0</td>
<td>4/30/75</td>
</tr>
</tbody>
</table>

TOPSOIL 1.2 ft.

ML Gray-brown SILT, trace fine sand, trace clay, moist, slightly plastic.

Bottom of hole 4.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.
LARKIN CREEK STORMWATER DETENTION FACILITY
TOWN OF GREECE, NEW YORK

LOG OF TEST PIT

LARKIN CREEK STORMWATER DETENTION FACILITY
TOWN OF GREECE, NEW YORK

LOG OF TEST PIT

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.
LOG OF TEST PIT

LARKIN CREEK STORMWATER DETENTION FACILITY
TOWN OF GREECE, NEW YORK

LOG OF TEST PIT

No. AH-5

1.5 ft.

SM

Red, silty fine SAND, trace clay, wet, slightly plastic.
Grading to silty, very fine SAND, some medium fine gravel, wet, nonplastic.

Bottom of hole 3.5 ft.

LOG OF TEST PIT

No. AH-6

TOPSOIL 1.5 ft.

SM

Red, silty fine SAND, trace clay, wet, slightly plastic.
Grading to silty, very fine SAND, some medium fine gravel, wet, nonplastic.

Bottom of hole 3.5 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.
# TEST HOLE LOG

<table>
<thead>
<tr>
<th>Hole</th>
<th>Station</th>
<th>Baseline</th>
<th>Elev</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1    | 13+00   | "A"      | 443.0| Topsoil:  
1' - 5½' reddish brown clay - wet - some sand
5½' sandstone can be broken with shovel |
| 2    | 17+00   | "A"      | 444.5| Topsoil:  
1' - 5' reddish brown clay & sand - wet - banks stable
6' water entering hole fast rate
hardpan - sandstone hard - not easily broken |
| 3    | 20+88   | "A"      | 458.0| Topsoil:  
8" - 2' light brown reddish sand with very little clay
2' - 10½' sand dry no water seepage easy digging solid banks |
| 4    | 24+00   | "A"      | 467.5| Topsoil:  
1' - 9½' reddish-sand-dry-stable banks
9½' - 10' beginning of gravel or broken rock |
| 5    | PI 27+13.55 | "A" | 468.5| Topsoil:  
1½' - 7' dry sandy brown soil - no water seepage
7' - 9' (hard digging) sandstone very hard |

Sheet 1 of 4
Hole #6  Station 30+0  Baseline "A" 12' west  Elev 461.5
0-10" topsoil
10"-3' sandy soil brown damp
3'-11' medium reddish brown clay soil-damp
no water seepage, also some small rock fragment
easy digging - banks are stable

Hole #7  Station 34+0  Baseline "A" 15½' west  Elev 462.0
0-10" topsoil
10"-2½' sandy reddish loam
2½'-11½' moist sand having some clay
stable banks, no visual seepage of water, easy digging

Hole #8  Station 40+00  Baseline "A" 17½' west  Elev 451.5
0-1' topsoil
1'-8' clay reddish moist consistency
8'-11' beginning layer of sandstone - can be broken
water seepage at 8' level

Hole #9  Station 40+00  Baseline "A" 450'+ west  Elev 453.0
(corner of first hedge now running north-south)
0-1' topsoil - black
1'-2½' moist brown reddish sand
2½'-4½' gravel layer moderate to excessive seepage of water
at this level
4½'-11' clay - gravely sand loam - moisture wet

Hole #10  Station 42+00  445' west  58' south section running west
Elev 455.0
0-1' topsoil
1'-11' moist clay - solid banks - no water seepage, easy digging.

Sheet 2 of 4
Hole #11  Station 46+00  198' west & 10' south   Elev 453.0
0-10"   topsoil
10"-9½' hard clay, very hard banks, no water seepage, very dry

Hole #12  Station 1+51'  Baseline "B" going north   Elev 438.5
0-10"   topsoil
10"-6½' moist clay brown loam solid banks dry - no water seepage

Hole #13  Station 5+42  Baseline "B" going north   Elev 436.5
0-10"   topsoil
10"-5½' red sandstone (very hard) and some sand, little clay
        can break with shovel. Top of hardpan starts at 5½'
        slight water seepage noticable.

Hole #14  Station 5+59  Baseline "D" going north   Elev 440.0
0-8"    topsoil
8"-1½'  sandy loam
1½'-8½' small amount of clay - reddish sandstone in horizontal layers very hard - not easily excavated
        top of hardpan at 8½' - moderate water seepage at 8½'

Hole #15  Station 3+52  Baseline "D" going north   Elev 439.0
0-8"    topsoil
8"-8½'  hard reddish sandstone with sand in horizontal layers - hard going for tractor backhoe
        8½'  moderate water seepage - moist to wet earth
Hole #16 · Station 1+49 · Baseline "D" going north · Elev 439.0

0-8" topsoil
8"-9½' mixture of sand, clay, and sandstone rock fragments
moist, easy digging

Hole #17 · Station 0+50 · Baseline "F" going north · Elev 445.0

0-8" topsoil
8"-8' mostly sand small fragments of reddish sandstone
8' water seepage top of hardpan found at depth of 8'

Hole #18 · Station 6+0 · Baseline "E" going west 70' · Elev 439.0

0-8" topsoil
8"-2½' solid rock – sandstone

Hole #19 · Station 5+47 · Baseline "E" going north · Elev 441.0

0-10" topsoil
10"-6' very hard digging – dry sandy loam and reddish sandstone
6' depth of hardpan
March 23, 1981

F.W. Byszewski, P.E.,L.S.
Stetson-Dale
185 Genesee Street
Utica, New York 13501

ATTN: Jerry Gomez

RE: Corps of Engineers
Dam Safety Inspections

Gentlemen:

Enclosed, per your request, please find the following information pertaining to the operation, maintenance and performance of two manually-controlled stormwater detention basins located in the Town of Greece:

1) Peak stage elevations and date of occurrence
2) Sample copies of operation records
3) Buck Pond Detailed Drainage Study, Page 83

We are presently revising our Stage-Storage Curve for the Deschel Drive basin to correct the drafting errors which you brought to our attention.

We were unsuccessful in obtaining photographs of either detention basin in a partially-filled condition this spring.

Please contact me if you have additional questions or comments on this matter.

Very truly yours,

James S. Peet, P.E.
Town Engineer

Encl.
Peak Stage Elevations at Larkin Creek Detention Basin  
(St. Andrews Drive)

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Stage (USGS Elev.)</th>
<th>Control Gate Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-10-77</td>
<td>2:45 P.M.</td>
<td>452.0±</td>
<td>0.5' opened to 0.58'</td>
</tr>
<tr>
<td>12-26-79</td>
<td>1:00 P.M.</td>
<td>453.2</td>
<td>0.8' closed to 0.6'</td>
</tr>
<tr>
<td>12-27-79</td>
<td>10:30 A.M.</td>
<td>450.0</td>
<td>0.6' opened to 0.8'</td>
</tr>
<tr>
<td>2-11-81</td>
<td>3:50 P.M.</td>
<td>450.5</td>
<td>0.75' unchanged</td>
</tr>
<tr>
<td>2-17-81</td>
<td>11:00 A.M.</td>
<td>451.2</td>
<td>0.75' unchanged</td>
</tr>
<tr>
<td>2-20-81</td>
<td>12:10 P.M.</td>
<td>452.2</td>
<td>0.75' unchanged</td>
</tr>
<tr>
<td>2-21-81</td>
<td>11:30 A.M.</td>
<td>453.35</td>
<td>0.75' unchanged</td>
</tr>
</tbody>
</table>

Note: Gage Post Installed and Marked in January, 1979.  
Service spillway is 36" dia. RCP with manually operated sluice gate.
ST. ANDREWS DRIVE DETENTION BASIN
INSPECTION
CHECK LIST

DATE: 3/7/81

TIME: 3:30

INSPECTED BY: O. Johnson

ITEMS TO BE CHECKED

1) GATE AT ST. ANDREWS DRIVE:

   

2) GATE AND LOCK AT CONTROL STRUCTURE:

   

3) OPENING HEIGHT OF CONTROL GATE:
   ~EXISTING HEIGHT: CHANGED TO:
      

4) COMMENTS:

   

   

   

   

8/18/77
ST. ANDREWS DRIVE DETENTION BASIN
INSPECTION
CHECK LIST

DATE: 3/16/81
TIME: 2:25
INSPECTED BY: [Signature]

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: 0.75'
   CHANGED TO: ___

4) COMMENTS:
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

8/18/77
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:
   Light vibration when control arm
   was lowered. No serious problem.
APPENDIX F

DRAWINGS
LOCATION PLAN

SCALE 1:2000

FIGURE 1

VICINITY MAP
DATE
ILME