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NATIONAL DAM SAFETY PROGRAM. CONEWAGO CREEK WATERSHED DAM NUMB--ETC(U)

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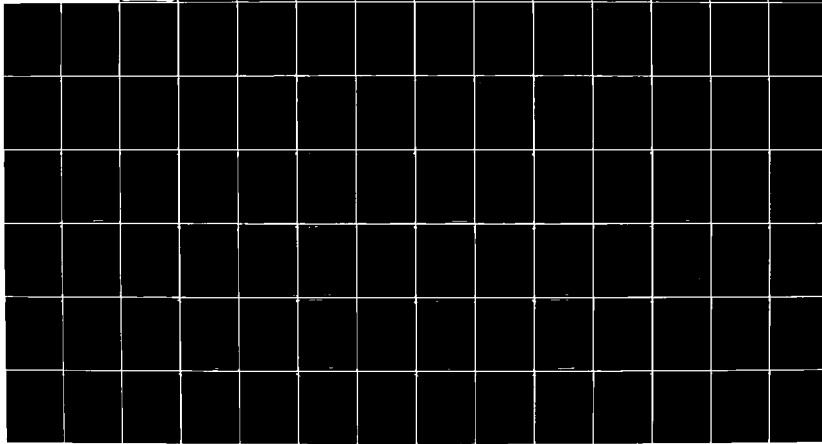
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| 1. REPORT NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2. GOVT ACCESSION NO. | 3. RECIPIENT'S CATALOG NUMBER                                                                  |
| AD-A105730                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                                                                                                |
| 4. TITLE (and Subtitle)<br>Phase I Inspection Report<br>Conewango Creek Watershed Site 9A Dam<br>Allegheny River Basin, Chautauqua County, NY<br>Inventory No. 596                                                                                                                                                                                                                                                                                                                                                                                                        |                       | 5. TYPE OF REPORT & PERIOD COVERED<br>Phase I Inspection Report<br>National Dam Safety Program |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       | 6. PERFORMING ORG. REPORT NUMBER                                                               |
| 7. AUTHOR(s)<br>ROBERT J. FARRELL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | 8. CONTRACT OR GRANT NUMBER(s)<br>DACW51-81-C-0017                                             |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>Erdman, Anthony, Associates<br>242 Andrews Street P.O. Box 9589<br>Rochester, New York 14604                                                                                                                                                                                                                                                                                                                                                                                                                               |                       | 10. PROGRAM ELEMENT, PROJECT, TASK<br>AREA & WORK UNIT NUMBERS                                 |
| 11. CONTROLLING OFFICE NAME AND ADDRESS<br>Department of the Army<br>26 Federal Plaza New York District, CoFE<br>New York, New York 10287                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       | 12. REPORT DATE<br>27 August 1981                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       | 13. NUMBER OF PAGES                                                                            |
| 14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)<br>Department of the Army<br>26 Federal Plaza New York District, CoFE<br>New York, NY 10287                                                                                                                                                                                                                                                                                                                                                                                                   |                       | 15. SECURITY CLASS. (of this report)<br>UNCLASSIFIED                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       | 15a. DECLASSIFICATION/DOWNGRADING<br>SCHEDULE                                                  |
| 16. DISTRIBUTION STATEMENT (of this Report)<br><br>Approved for public release; Distribution unlimited.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                                                                                                |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                                                                                                |
| 18. SUPPLEMENTARY NOTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                                                                                                |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)<br>Dam Safety<br>National Dam Safety Program<br>Visual Inspection<br>Hydrology, Structural Stability<br>Conewango Creek Watershed Site 9A Dam<br>Chautauqua County<br>Allegheny River Basin                                                                                                                                                                                                                                                                                            |                       |                                                                                                |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>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.<br><br>Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life and property. However, the dam has some deficiencies which require further investigation and remedial action. |                       |                                                                                                |

The hydrologic/hydraulic analysis performed indicates that the spillway does not have sufficient capacity to discharge the peak outflow from the Probable Maximum Flood (PMF). However, spillway discharges occurring during large storm events will cause water surface elevations in the downstream hazard area to rise to flood levels. A dam failure resulting from overtopping would not significantly increase the hazard to loss of life from that which would exist just prior to an overtopping failure. The spillway has sufficient capacity to discharge 79% of the PMF. Therefore, the spillway is assessed as inadequate.

The dam is located in Seismic Zone 3 and there is no record of a seismic stability analysis being performed. Therefore, additional investigations by a qualified registered professional engineer to evaluate the seismic stability of the dam are recommended.

The investigations should be completed within 12 months of notification to owner, and to remedial actions resulting from these investigations completed in the subsequent 12 months.

The following remedial measures should be performed within one year from notification:

- Regrade and fill in the tire ruts on the downstream slope. Reseed the disturbed areas.
- Regrade and fill in the area of wave erosion on the upstream slope. Monitor for signs of future erosion.
- Implement a program of diligent and periodic maintenance including but not limited to: operation and lubrication of the reservoir drain; mowing of slopes and spillway channels; backfilling ruts, drainage gullies and animal burrows with suitable compacted material; clearing debris from trash racks and from upstream slopes.
- Install ladder rungs on the riser to provide access to the drain gate housing.
- Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.
- Develop and maintain a program of biannual technical inspections.

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**ALLEGHENY RIVER BASIN**

**CONEWANGO CREEK WATERSHED  
DAM No. 9A**

**CHAUTAUQUA COUNTY, NEW YORK  
INVENTORY No. N.Y. 596**

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

Conewango Creek Watershed Dam Number 9A  
(Inventory Number NY.596), Allegheny River  
Basin, Chautauqua County, New York. Phase  
I Inspection Report.



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Robert J. Farrell

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**NEW YORK DISTRICT, CORPS OF ENGINEERS**

**AUGUST 1981**

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## PREFACE

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

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

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

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

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PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM

|                     |                                      |
|---------------------|--------------------------------------|
| Name of Dam:        | Conewango Creek Watershed Dam No. 9A |
| State Located:      | New York                             |
| County Located:     | Chautauqua                           |
| Stream:             | Conewango Creek                      |
| Basin:              | Allegheny River                      |
| Date of Inspection: | May 22, 1981                         |

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life and property. However, the dam has some deficiencies which require further investigation and remedial action.

The hydrologic/hydraulic analysis performed indicates that the spillway does not have sufficient capacity to discharge the peak outflow from the Probable Maximum Flood (PMF). However, spillway discharges occurring during large storm events will cause water surface elevations in the downstream hazard area to rise to flood levels. A dam failure resulting from overtopping would not significantly increase the hazard to loss of life from that which would exist just prior to an overtopping failure. The spillway has sufficient capacity to discharge 79% of the PMF. Therefore, the spillway is assessed as inadequate.

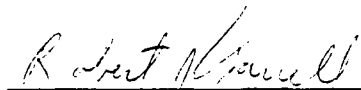
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The following remedial measures should be performed within one year from notification:

- Regrade and fill in the tire ruts on the downstream slope. Reseed the disturbed areas.
- Regrade and fill in the area of wave erosion on the upstream slope. Monitor for signs of future erosion.

- Implement a program of diligent and periodic maintenance including but not limited to: operation and lubrication of the reservoir drain; mowing of slopes and spillway channels; backfilling ruts, drainage gullies and animal burrows with suitable compacted material; clearing debris from trash racks and from upstream slopes.
- Install ladder rungs on the riser to provide access to the drain gate housing.
- Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.
- Develop and maintain a program of biannual technical inspections.

  
Robert J. Farrell, P.E.  
New York No. 55983

Approved by:

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

Date:

27 Aug 81

# **Conewango Creek Watershed (Site 9A)**



**OVERVIEW**



PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
CONEWANGO CREEK WATERSHED DAM NO. 9A

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the New York District Corps of Engineers in a letter dated 24 February 1981, in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, dated 8 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF THE PROJECT

a. Description of Dam and Appurtenances

The Conewango Creek Watershed Dam No. 9A is an earth embankment approximately 1590 ft. long, with a maximum height of about 43 ft. and a crest width of 16 ft. The grassed downstream slope is 1V:2½H. The upstream slope is 1V:3H and grassed from the bottom to the top.

According to available contract drawings, the embankment consists of semi-pervious silty sand and gravel core with coarse gravel shells. There is a berm on the upstream slope approximately 10 ft. wide. The berm extends the full length of the dam at elevation 1365.5 MSL. Beneath the embankment is an earthfill cutoff trench which is 12 ft. wide at the bottom. According to available plans, it is constructed of the same silty sand and dense gravel material as the embankment.

The principal spillway consists of a reinforced concrete drop inlet structure with a sluice gate controlled inlet pipe, two uncontrolled orifice inlets and a 48 in. outlet pipe supported on a concrete cradle.

The inside dimensions of the riser structure are 30 ft. high and 12 ft. wide normal to the axis of the dam. It is 4 ft. long parallel to the embankment and flares to 21.67 ft. long at the top. The walls of the structure are 18 in. thick for the bottom 4.5 ft., 15 in. thick for the next 10 ft., 12 in. thick for the next 5 ft., and 10 in. thick for the top section. The top slab is 8 in. thick. The structure is founded on a 9 ft. by 15 ft. spread footing.

The "low stage inlet" is an uncontrolled opening approximately 15.6 ft. above the sluice gate invert. It is 3 ft wide and 2.2 ft. high and is located in the upstream face of the riser structure. The water flows through this orifice and drops into the riser structure. It is protected by a trash rack assembly approximately 11 ft. high and 5.5 ft. wide. This assembly is fabricated from galvanized steel angle sections.

The "high stage inlet" consists of two openings approximately 30 ft. above the sluice gate invert. They are 12 ft. wide and 2 ft. high and are located in the left and right sides of the flared portion of the riser structure. They are protected by a galvanized steel grating 33.4 in. high placed in front of each high stage opening and 5 galvanized steel angles placed in the sloping section below each opening. A 3 ft. diameter manhole permits access into the riser structure.

The riser structure is drained by a 48 in. diameter reinforced concrete pressure pipe. It is approximately 178 ft. long and drops approximately 2 ft. over that length. The pipe penetrates the downstream side of the riser structure and is supported by a 6 in. thick concrete cradle within the embankment. Plans indicate 7 concrete anti-seep collars cast around the pipe within the embankment.

The downstream end of the pipe penetrates the reinforced concrete impact basin. The inside dimensions of the impact basin are 23.3 ft. wide normal to the axis of the dam and 17.5 ft. long parallel to the embankment. It is 12.3 ft. high at the upstream face and tapers to 7.3 ft. at the downstream end. At the downstream side there is a cutoff wall extending 3.0 ft. beneath the floor of the impact basin and there are two wingwalls extending 10.5 ft. beyond the sidewalls of the basin parallel to the embankment. There is a 1 ft. thick by 7.5 ft. high baffle spanning between the walls of the impact basin. A 24 in. thick rip-rap apron extends 16 ft. downstream from the end of the impact basin.

An excavated emergency spillway channel is located at the north abutment. The channel is approximately 200 ft. wide at the base, 5.2 ft. high, and has 1V:3H side slopes. The control section is 200 ft. wide and 50 ft. long and the downstream channel is roughly 400 ft. long. A 50 ft. wide excavated bench is located north of the emergency spillway at elevation 1396 MSL. The bench intersects existing ground at 1V:3H side slope.

A 48 ft. long reinforced concrete pressure pipe located on the upstream side of the principal spillway sewer acts as the reservoir drain. The pipe rests on a 6 in. thick unreinforced concrete cradle. The upstream invert is at elevation 1354.5 MSL, and the pipe enters the principal spillway at elevation 1353.8 MSL, 2.8 ft. above the riser floor. The drain is regulated inside the structure by an 18 in. diameter slide gate, and a stem, and stem guides which rise to the top of the top slab where the handle housing is located.

A vertical seepage drain is located beneath the downstream slope to provide a safe outlet for seepage. It is 4 ft. wide and of variable depth. From approximately 160 ft. right of the principal spillway outlet to approximately 800 ft. left of the outlet, the drain contains a system of two, 8 in. diameter, perforated asbestos cement pipes which outlet on either side of the impact basin outlet structure.

b. Location

The dam is located approximately 4 miles northwest of South Dayton, New York in the Town of Villanova.

c. Size Classification

The dam is 43 ft. high and the reservoir has a storage capacity of 964 acre-ft. at elevation 1391.8 (top of dam). The dam is classified as "INTERMEDIATE" in size (40 to 100 ft. in height).

d. Hazard Classification

The dam is classified as HIGH hazard due to the significant economic and high potential for loss of life downstream in the event of dam failure. Table 5-1 shows the locations of downstream dwellings.

e. Ownership

The dam is owned and operated by:

Conewango Creek Watershed Commission  
Donald Crowell, Chairman  
RD #2  
S. Dayton, New York 14138  
Tele: (716) 988-3300

f. Purpose of Dam

The purpose of this dam is to reduce downstream flooding by providing temporary storage for the runoff from 3,840 acres. The temporary storage is released gradually through the two-stage principal spillway system.

g. Design and Construction History

The dam was designed by the U.S. Department of Agriculture Soil Conservation Service. For this inspection, a set of "as-built" contract drawings was provided by the Soil Conservation Service in Syracuse, New York. "As-built" dam cross sections, geotechnical design and analysis data, and supervision of construction reports can be found at the U.S. Department of Agriculture - Soil Conservation Service, Design Section, Syracuse, New York. The dam was constructed in 1972. The contractor's name is unknown.

h. Normal Operating Procedure

Water release from the lake is through the 48 in. reinforced concrete outlet pipe.

### 1.3 PERTINENT DATA

a. Drainage Area - 6.0 square miles

b. Discharge at Damsite

Maximum known flood at damsite - Unknown

Discharge from observed recent high water mark 114 cfs

Emergency Spillway

Maximum Pool (top of dam) 7708 cfs

Principal Spillway

Maximum Pool (top of dam) 492 cfs

Total Spillway Capacity at Maximum Pool Elevation 8200 cfs

c. Elevation (U.S.G.S. Datum)

Top of dam - 1391.8 ft.

Normal Pool 1366.6 ft.

Principal Spillway

Upstream invert 1351 ft.

Downstream invert 1349 ft.

Riser Crest 1381 ft.

Emergency Spillway Crest 1386.6 ft.

d. Reservoir

Length of Normal Pool 1200 ft.

Length of Maximum Pool 3400 ft.

e. Storage

Normal Pool 41 acre-ft.

Maximum Pool 964 acre-ft.

f. Reservoir Surface

Normal Pool 8.8 acres

Maximum Pool 74.6 acres

|    |                           |                                           |
|----|---------------------------|-------------------------------------------|
| g. | <u>Dam</u>                |                                           |
|    | Type                      | Earth                                     |
|    | Length                    | 1590 ± ft.                                |
|    | Maximum Height            | 43 ± ft.                                  |
|    | Top Width                 | 16 ft.                                    |
|    | Side Slopes (V:H)         |                                           |
|    | Upstream                  | 1:3                                       |
|    | Downstream                | 1:2.5                                     |
| h. | <u>Reservoir Drain</u>    |                                           |
|    | Type                      | Reinforced concrete pipe                  |
|    | Diameter                  | 18 in.                                    |
|    | Closure                   | Vertical slide gate                       |
| i. | <u>Principal Spillway</u> |                                           |
|    | Type                      | Reinforced concrete pipe                  |
|    | Diameter                  | 48 in.                                    |
|    | Location                  | Near center of reservoir                  |
|    | Support                   | Concrete cradle                           |
|    | Upstream                  | Rectangular concrete drop inlet structure |
|    | Downstream                | Reinforced concrete impact basin          |
| j. | <u>Emergency Spillway</u> |                                           |
|    | Type                      | Excavated channel                         |
|    | Base Width                | 200 ft.                                   |
|    | Height                    | 5.2 ft.                                   |
|    | Side Slopes               | 1V:3H                                     |
|    | Location                  | North abutment                            |

## SECTION 2 - ENGINEERING DATA

### 2.1 GEOLOGY

Local bedrock consists of interbedded shales, siltstones, and sandstones of late Devonian Age (345-375 million years ago). These relatively underformed flat-lying sedimentary rocks are medium hard. Regionally, the bedrock forms a homocline dipping southward to southwestward at approximately 40 feet per mile. Small terraces and low folds locally modify this dip to essentially horizontal over short distances. Only minor folding and faulting are found in the region with no major or active faults known to exist in the area.

The Conewango Creek Dam 9A is situated in a region classified as Zone 3 seismicity as shown on Figure No. 1 of the Recommended Guidelines for Safety Inspection of Dams.

Pleistocene glaciation (beginning approximately 2 million years ago) has modified the topography by means of erosion and deposition. The thick continental ice sheet advanced and receded repeatedly in the area smoothing terrain by glacial scour and mantling uplands with till deposits.

The Pleistocene geology of the immediate dam site consists of glacial ground moraine deposits. Generally, the overburden consists of sandy gravel alluvial deposits overlying lacustrine clays and silts. Alluvial gravels and sands underlie the lacustrine materials and dense glacial tills underlay the alluvial materials. In recent times alluvium, eroded from nearby uplands, has been deposited upon the glacial deposits.

### 2.2 SUBSURFACE INVESTIGATION

Test hole logs are contained in the "as-built" drawings. A total of 28 test pits and 34 drill holes were dug to determine subsurface conditions. The logs show that the dam is founded on glacial till at the north abutment and on silty sand and gravels in the center and south abutments.

### 2.3 DESIGN RECORDS

The records available for the project consists of 34 contract drawings which show the plans, sections and details of the dam, appurtenant structures, impact basin details and grating, fencing details, and logs of test holes; and a design report issued by the U.S. Soil Conservation Service dated May 10, 1972.

### 2.4 CONSTRUCTION RECORDS

Construction records and specifications are available at the U.S. Soil Conservation Service, Design Section, Syracuse, N.Y.

The sedimentation basin structure shown on Page 2 of the "As-built" drawings was not found during the visual inspection.

## **2.5 OPERATION RECORDS**

No written maintenance or operation records exist for the dam

## **2.6 EVALUATION OF DATA**

Information obtained from the "As built" drawings is consistent with observations made during this inspection with the exception of the sedimentation basin discussed in Section 2.4. The information obtained from available data was considered adequate for the Phase I inspection and evaluation.

## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS

#### a. General

A visual inspection of Conewango Creek Watershed Dam No. 9A was made on 2 May 1981. The weather was clear and the temperature in the mid-seventies. At the time of the inspection, the reservoir level was about 2 in. above the intake structure crest elevation.

#### b. Dam

The earth embankment appears to be in good condition.

There is a light brush growth at the waterline on the upstream slope. The grass cover on this dam is generally in good condition. There has been some vehicular traffic on the downstream slope resulting in ruts approximately 2 to 4 in. deep, running vertically up the slope approximately 75 ft. to the right of the outlet structure. The crest of the dam is in good condition with no evidence of vertical or horizontal movement.

Animal burrows up to 6 in. in diameter were noted in the downstream slope approximately 150 ft. to the left of the right abutment, approximately 300 ft. to the left of the outlet structure, and at the contact with the emergency spillway diversion berm. An animal burrow approximately 8 in. in diameter was noted at the right upstream end of the diversion berm.

There is no slope protection on the upstream slope other than the vegetative cover and a 10 ft. berm just below waterline. Approximately 4 to 6 in. of erosion due to wave action was noted at and just above the waterline. Small (1-2 in diameter) eddy current type, erosion gullies were noted over most of the surface of the embankment. A few minor (3 in. deep) erosion channels were noted approximately 400 ft. north of the outlet structure on the downstream slope. A mat of dead grass caused by infrequent mowing is believed to be responsible for this concentration of runoff.

Some debris in the form of trash, vegetation, and driftwood, etc., has collected along the upstream slope at approximately the level of the high stage inlet.

Two toe drain outlets are located in the wingwalls of the impact basin. No discharge was noted from these outlets.

c. Principal Spillway

The principal spillway appears to be in good condition. No debris was noted on the low or high stage trash racks or on riser structure. There is a minimum amount of erosion around the inlet and outlet works. There is no access to the riser structure. No seepage was found around the spillway pipe. The channel for 16 ft. downstream of the impact basin is protected by rip-rap which appears durable and is generally in good condition.

d. Emergency Spillway

The emergency spillway appears to be in good condition. Grass, 6 in. high, covers the crest and downstream channel spillway. No debris was noted on the crest. An area of ponded runoff or natural groundwater was noted downstream of the control section of the channel. It encompasses the surface of the berm on the north slope. A small spring was noted on the north slope above the berm.

The water is drained from the berm through a 4 in. cast iron pipe located approximately at station 8+00, 100 ft. left on the emergency spillway.

There is a small tributary which joins the outlet channel approximately 250 ft. downstream of the principal spillway outlet. The tributary flows normal to the direction of outflow channel from dam.

e. Appurtenant Structures

The sedimentation basin structure shown on Page 2 of "As built" drawing was not found but there exists an embankment with no definite slope.

The stem of the slide gate does not have a handle attached to it. The operability of the gate could not, therefore, be determined. The reservoir drain inlet was located below the water surface at the time of inspection.

f. Downstream Channel

The downstream channel is a narrow channel passing over relatively flat flood plain. Minor erosion of the right bank has taken place at a point 200 ft. downstream of the outlet. The channel bottom is gravel.

g. Reservoir

The shore of the reservoir is generally shallow sloping pasture and farmland. It appears to be stable and in good condition. There is no visible sign of sedimentation problems in the reservoir area.

h. Abutments

No seepage was observed at either the south or north abutments. The south abutment is covered by farm lands and the north abutment is cut into a hill covered by woods. There exists an unpaved road at the south abutment that runs along the top of the dam.

### 3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the inspection did not indicate any serious problems which would adversely affect the adequacy of the dam and appurtenant facilities.

The potential problems noted during the visual inspection are listed below:

1. Animal burrows in embankment slopes.
2. Brush growth and wave erosion at the waterline on the upstream slope.
3. Rutting of downstream slope due to vehicular traffic.
4. Grass needs regular mowing.
5. The operation of the reservoir drain could not be checked because there is no access to the top of the riser and no gate handle on the stem.

## SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

### 4.1 PROCEDURES

No written operation and maintenance procedures exist for the project. The normal operation of the project consists of allowing water to flow through the service spillway outlet pipe.

### 4.2 MAINTENANCE OF DAM

An annual inspection of the dam is made by the Soil Conservation Service. Recommendations resulting from this inspection are implemented by the Soil Conservation Service.

### 4.3 WARNING SYSTEM IN EFFECT

No warning system is in effect or in preparation.

### 4.4 EVALUATION

The overall condition of the dam and appurtenant structures appears to be good. Recommendations in connection with regular maintenance are discussed in Section 7.

## SECTION 5 - HYDRAULIC/HYDROLOGIC

### 5.1 DRAINAGE AREA CHARACTERISTICS

Conewango Creek Watershed Dam No. 9A is located on a tributary of Conewango Creek in the Allegheny River basin, and has a drainage area of 6.0 square miles. The dam is situated approximately 4 miles northwest of South Dayton, New York in the Town of Villenova. The topography of the watershed is hilly woodland, pastures, and farmlands.

### 5.2 DESIGN DATA

The dam was designed as a Class B structure in accordance with criteria established in Washington Engineering Memorandum SCS-27. Under this classification, the emergency spillway is designed for a rainfall equal to  $P(100) + 0.12 [PMP - P(100)]$ , while the freeboard pool is designed for  $P(100) + 0.40 [PMP - P(100)]$ .

The Soil Conservation Service (SCS) design calculations have been reviewed. The dam was designed to contain the runoff for the 50 year flood without discharging through the emergency spillway. The peak outflow is 312 cfs and the peak elevation is 1386.6 ft. (MSL). The SCS design allowed for a 50 year sediment accumulation with a storage of 40.6 acre-ft. The principal spillway consists of 48 in. diameter reinforced concrete pressure pipe and a 4 ft. x 12 ft. reinforced concrete riser with two 12 ft. x 2 ft. openings with a crest elevation of 1381.0 ft. (MSL). The riser has a 3.0 ft. x 2.17 ft. orifice with a crest elevation of 1366.6 ft. (MSL). The emergency spillway control cross section is 200 ft. wide, with side slopes of 3 horizontal to 1 vertical and a crest elevation of 1386.6 (MSL). The dam crest elevation is 1391.8 (MSL).

### 5.3 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and the storage of the reservoir was performed using the Corps of Engineers HEC-1 Dam Safety Version computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 22.6 in. (24 hours 200 sq. miles) from Hydrometeorological Report #33 in accordance with the Recommended Guidelines of the Corps of Engineers. The dam is 43 ft. high and impounds approximately 964 acre-ft. at the top of the dam. The dam is classified as a HIGH hazard and INTERMEDIATE in size, according to the Recommended Guidelines of the Corps of Engineers. The spillway design flood is the Probable Maximum Flood (PMF). The floods selected for analysis were 20, 40, 50, 60 80 and 100% of the PMF flows. The PMF inflow of 10,448 cfs was routed through the reservoir and the peak outflow was determined to be 10,423 cfs. The peak PMF

### 5.5 EXPERIENCE DATA

There are no flood records for the dam site. However, during the field investigation evidence of recent high water was observed at elevation 1380.5 ft. (MSL). This reservoir elevation corresponds to a peak outflow of 114 cfs.

### 5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillways is 8259 cfs which is less than the PMF peak outflow of 10,423 cfs. The dam is overtopped by the PMF, the peak elevation being 0.4 ft. above the top of the dam. The dam is not overtopped by half the PMF, the peak elevation being 1.5 ft. below the top of the dam. The spillways can pass 79% of the PMF outflow before overtopping occurs.

### 5.7 ANALYSIS OF DOWNSTREAM IMPACTS

During the field investigation, dwellings and highways located downstream of the dam were identified and referenced to the channel invert. The cross section locations used in the downstream channel routing are shown on Page D-2, Appendix D. The impacts of the PMF on dwellings located downstream of the dam are shown in Table 5.1. For the purposes of this analysis, a danger of loss of life was assumed to exist if the computed PMF water surface was above the first floor elevation of a structure. This situation does not occur at any of the structures and no roads are overtopped during the PMF. In spite of these results, the potential danger of loss of life and economic damage is substantial enough to warrant classification as a HIGH hazard dam.

### 5.8 EVALUATION

The spillway of Conewango Creek Watershed Dam No. 9A will safely pass the 1/2 PMF without overtopping but it will not pass the PMF without overtopping. The spillway, therefore, is assessed as inadequate, but not seriously inadequate. Potential problems include:

- a) The danger of loss of life and economic damage downstream of the dam for the PMF condition.

TABLE 5-1

## SUMMARY OF DOWNSTREAM IMPACTS FOR PMF

| Location #<br>(See Pg. D-2)<br>Appendix D | Location                      | # of<br>Dwellings | Structure<br>Height Above<br>Streambed*<br>(ft) | Peak<br>Flow<br>(cfs) | Peak<br>Stage<br>(ft) | Comments                     |
|-------------------------------------------|-------------------------------|-------------------|-------------------------------------------------|-----------------------|-----------------------|------------------------------|
| -                                         | At Dam                        | -                 | -                                               | 10423                 | -                     | -                            |
| 1                                         | 670 ft.<br>d/s of Dam         | 1<br>1            | 13.5<br>12                                      | 10430                 | 8.8                   | No danger of<br>loss of life |
| 2                                         | 7600 ft.<br>d/s of Location 1 | 2                 | 20.                                             | 20599                 | 14.1                  | No danger of<br>loss of life |
| 3                                         | 1800 ft.<br>d/s of Location 2 | 1                 | 26                                              | 20605                 | 16.6                  | No danger of<br>loss of life |
| 4                                         | 1500 ft.<br>d/s of Location 3 | 2                 | 20.                                             | 20577                 | 14.6                  | No danger of<br>loss of life |

\* The structure height above the streambed is the elevation of the first floor above the channel invert.

NOTE: A tributary stream joins the channel leading from the dam at a point between Locations 1 and 2

## SECTION 6 - STRUCTURAL STABILITY

### 6.1 VISUAL OBSERVATIONS

There does not appear to be significant displacement or distress associated with the embankments at this site. The dam appears to be in good condition at the present time.

### 6.2 DESIGN AND CONSTRUCTION DATA

Analyses carried out during the design and construction phase by the Soil Conservation Service included a slope stability analysis by a modified Swedish circle method. The parameters assumed were:

Upstream slope: 3H:1V, full drawdown, 10 ft. berm at El. 1365.6 ft,  $\phi = 31.5^\circ$ ,  $c = 100$  psf.

Downstream slope: 2.5H:1V, trench drain at  $c/b = 0.6$ , no berm,  $\phi = 31.5^\circ$ ,  $c = 100$  psf.

The factors of safety calculated were 1.35 for the upstream slope and 1.74 for the downstream slope. The Phase I Recommended Guidelines suggests safety factors of 1.2 and 1.5, respectively, for the conditions analyzed. Based on the existing conditions as revealed by the visual inspection and the review of the original design information, the dam is considered to possess adequate structural stability.

### 6.3 POST CONSTRUCTION CHANGES

There have been no known changes to any of the embankments or structures at this dam.

### 6.4 SEISMIC STABILITY

The dam is located in Seismic Zone #3 and, in accordance with recommend Phase I guidelines, a seismic stability analysis is warranted. This should be accomplished by a qualified registered professional engineer and should be made part of the record for this dam.

## SECTION 7 - ASSESSMENT/RECOMMENDATIONS

### 7.1 ASSESSMENT

#### a. Safety

Examination of the available documents and visual inspections of the Conewango Creek Watershed Dam No. 9A and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The dam and its appurtenances are considered to be in good condition at the present time.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for the spillway design flood of the full PMF. The principal and auxiliary spillway capacity are, therefore, judged as inadequate. The dam would not be overtopped for one-half the PMF.

#### b. Adequacy of information

This report and its conclusions are based on visual inspection, interview data, contract drawings, and office hydrologic/hydraulic studies. This information and data are adequate for a Phase I inspection.

#### c. Need for additional investigations

It is recommended that the services of a qualified registered professional engineer be retained to evaluate:

- 1) the seismic stability of the dam.

The engineer should make recommendations for remedial measure if warranted and the owner should implement the findings of these studies.

#### d. Urgency

All remedial actions described below should be completed within one year of notification to the owner.

### 7.2 RECOMMENDED MEASURES

It is recommended that the owner institute the following remedial measures:

- 1) Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.
- 2) Develop and maintain a program of biannual technical inspections.

- 3) Regrade and fill in the tire ruts on the downstream slope. Reseed the disturbed areas.
- 4) Regrade and fill the area of wave erosion on the upstream slope. Monitor for signs of future erosion.
- 5) Install ladder rungs on the riser to provide access to the drain gate housing.
- 6) Implement a program of diligent and a periodic maintenance including but not limited to: mowing of slopes and spillway channels; back-filling ruts, drainage gullies, and animal burrows with suitable compacted material; clearing debris from trash racks and upstream slopes; and check the operability of and lubricating of the reservoir drain gate.

APPENDIX A  
VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Conewango Creek Watershed Dam No. 9A  
Fed. I.D. # N.Y. 00596 DEC Dam No. 7B-3979  
River Basin Allegheny  
Location: Town Villanova County Chautauqua  
Stream Name Tributary of Conewango Creek  
Tributary of \_\_\_\_\_  
Latitude (N) 42° 23.0' Longitude (W) 79° 06.9'  
Type of Dam Earth Embankment  
Hazard Category HIGH  
Date(s) of Inspection May 20, 1981  
Weather Conditions Sunny, 75°  
Reservoir Level at Time of Inspection Approximately elevation 1367

b. Inspection Personnel Jeff Hardin, Ray Kampff, Ken Avery, Bob Farrell

c. Persons Contacted (including Address & Phone No.) \_\_\_\_\_

U.S. Soil Conservation Service, RM771-Federal Bldg., So. Clinton St., Syracuse, N.Y.

State Construction Engineer: Philip "Skip" Nelson / 1-315-423-5502

Area 1 Project Engr (Batavia): Pete Wright / 1-716-343-3664

Contracting Office for Ischua Creek Watershed: Ed Smith - Contacted through Pete Wright

d. History:

Date Constructed 1972 Date(s) Reconstructed \_\_\_\_\_

Designer U.S.D.A. Soil Conservation Service

Constructed by \_\_\_\_\_

Owner Conewango Creek Watershed Commission

**(2) Embankment**

**a. Characteristics**

- (1) Embankment Material Semi-pervious, silty sand and gravel core, coarse gravel shells
- (2) Cutoff Type Earth fill, semi-pervious, 12 feet wide, variable depth
- (3) Impervious Core Semi-pervious silty sand and gravel (compacted glacial till)
- (4) Internal Drainage System 4 foot wide trench drain with 8 inch diameter perforated pipe
- (5) Miscellaneous \_\_\_\_\_

**b. Crest**

- (1) Vertical Alignment Good
- (2) Horizontal Alignment Good
- (3) Surface None noted
- (4) Miscellaneous \_\_\_\_\_

**c. Upstream Slope**

- (1) Slope (Estimate) (V:H) 1 vertical to 3 horizontal
- (2) Undesirable Growth or Debris, Animal Burrows light brush and grass growth, needs mowing
- (3) Sloughing, Subsidence or Depressions None noted

(4) Slope Protection Grass, no riprap, 10 foot berm just below waterline, approximately 6 inches of wave erosion at, and just above, waterline

(5) Surface Cracks or Movement at Toe None noted

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 vertical and 2.5 horizontal

(2) Undesirable Growth or Debris, Animal Burrows Animal burrows noted 150 feet left of right abutment, 300 feet left of outlet and at left

(3) <sup>abutment</sup> Sloughing, Subsidence, or Depressions None noted

(4) Surface Cracks or Movement at Toe None noted

(5) Seepage None noted

(6) External Drainage System (Ditches, Trenches, Blanket) None

(7) Condition Around Outlet Structure Generally good, minor erosion along slopes

(8) Seepage Beyond Toe None noted

e. Abutments - Embankment Contact

Generally good condition, spring noted in left abutment above top of dam elevation

(1) Erosion at Contact None noted

(2) Seepage Along Contact None noted

3) Drainage System

(a) Description of System 4 ft. wide, trench drain with 8 in. perforated pipe

(b) Condition of System Could not be assessed, zero discharge probably not significant since no signs of seepage were noted.

(c) Discharge from Drainage System None

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, etc.) None installed

5) Reservoir

a. Slopes Appear stable and in good condition

b. Sedimentation Very minor accumulation

c. Unusual Conditions Which Affect Dam None noted

6) Area Downstream of Dam

a. Downstream Hazard (No. of homes, highways, etc) Refer to Table 5.1 for a summary of downstream dwellings and highways

b. Seepage, unusual growth None noted

c. Evidence of movement beyond toe of Dam None noted

d. Conditions of Downstream Channel Erosion of right stream bank, should be regraded and slope protection provided

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

Principal Spillway: Drop inlet structure with outlet conduit to impact basin

Emergency Spillway: Vegetated earth, 200 ft. wide

a. General Good

b. Condition of Service Spillway Excellent

c. Condition of Auxiliary Spillway Good

d. Condition of Discharge Conveyance Channel Good with minimum erosion

8) Reservoir Drain/Outlet

Type: Pipe x Conduit \_\_\_\_\_ Other \_\_\_\_\_

Material: Concrete x Metal \_\_\_\_\_ Other \_\_\_\_\_

Size: 18" Ø Length 40±

Invert Elevations: Entrance 1354.5 Exit 1353.78

Physical Condition (Describe): \_\_\_\_\_ Unobservable x

Material: \_\_\_\_\_

Joints: \_\_\_\_\_ Alignment \_\_\_\_\_

Structural Integrity: \_\_\_\_\_

Hydraulic Capability: \_\_\_\_\_

Means of Control: Gate \_\_\_\_\_ Valve x Uncontrolled \_\_\_\_\_

Operation: Operable \_\_\_\_\_ Inoperable x Other \_\_\_\_\_

Present Condition (Describe): No handle

9) Structural

- a. Concrete Surfaces N/a
- b. Structural Cracking N/A
- c. Movement - Horizontal & Vertical Alignment (Settlement) N/A
- 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
- h. Joints - Construction, etc. N/A
- i. Foundation N/A
- j. Abutments N/A
- k. Control Gates N/A
- l. Approach & Outlet Channels N/A

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

n. Intake Structures \_\_\_\_\_ N/A

o. Stability \_\_\_\_\_ N/A

p. Miscellaneous \_\_\_\_\_ N/A

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

a. Description and Condition \_\_\_\_\_ None .

APPENDIX B  
ENGINEERING DATA

## APPENDIX B

| <u>TITLE</u>                                   | <u>PAGE</u> |
|------------------------------------------------|-------------|
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| Plan of Storage Area                           | B-3         |
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| Fill Placement & Principal Spillway Excavation | B-9         |
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| Riser Structural Details                       | B-14        |
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# CONEWANGO CREEK WATERSHED PROJECT

## FLOODWATER RETARDING DAM

### SITE 9A

|                               |                       |
|-------------------------------|-----------------------|
| DRAINAGE AREA                 | 3840 Acres            |
| FLOOD STORAGE                 | 612 Ac Ft             |
| (TO EMERGENCY SPILLWAY CREST) |                       |
| WATER SURFACE AREA            | 9 Acres               |
| (SEDIMENT POOL)               |                       |
| HEIGHT OF DAM                 | <sup>42</sup> 42 Feet |
| VOLUME OF FILL                | 174,319 Cu Yds        |

BUILT UNDER THE WATERSHED PROTECTION AND  
FLOOD PREVENTION ACT

BY

CONEWANGO CREEK WATERSHED COMMISSION

WITH THE ASSISTANCE OF THE  
SOIL CONSERVATION SERVICE

OF THE

U S DEPARTMENT OF AGRICULTURE

[SITE 9A]

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| SHEET 3   | PLAN OF STRUCTURAL WORKS                         |
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| SHEET 5   | CUTOFF TRENCH EXCAVATION                         |
| SHEET 6   | EMERGENCY SPILLWAY                               |
| SHEET 7   | FILL PLACEMENT & PRINCIPAL SPILLWAY EXCAVATION   |
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| SHEET 9   | DRAINAGE SYSTEM                                  |
| SHEET 10  | PLAN PROFILE OF PRINCIPAL SPILLWAY               |
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| SHEETS 26 | FENCING DETAILS — 27-28-29-30 LOGS OF TEST HOLES |

# HED PROJECT M

3840 Acres  
612 Ac Ft  
9 Acres  
43  
42 Feet  
174,319 Cu Yds

CTION AND

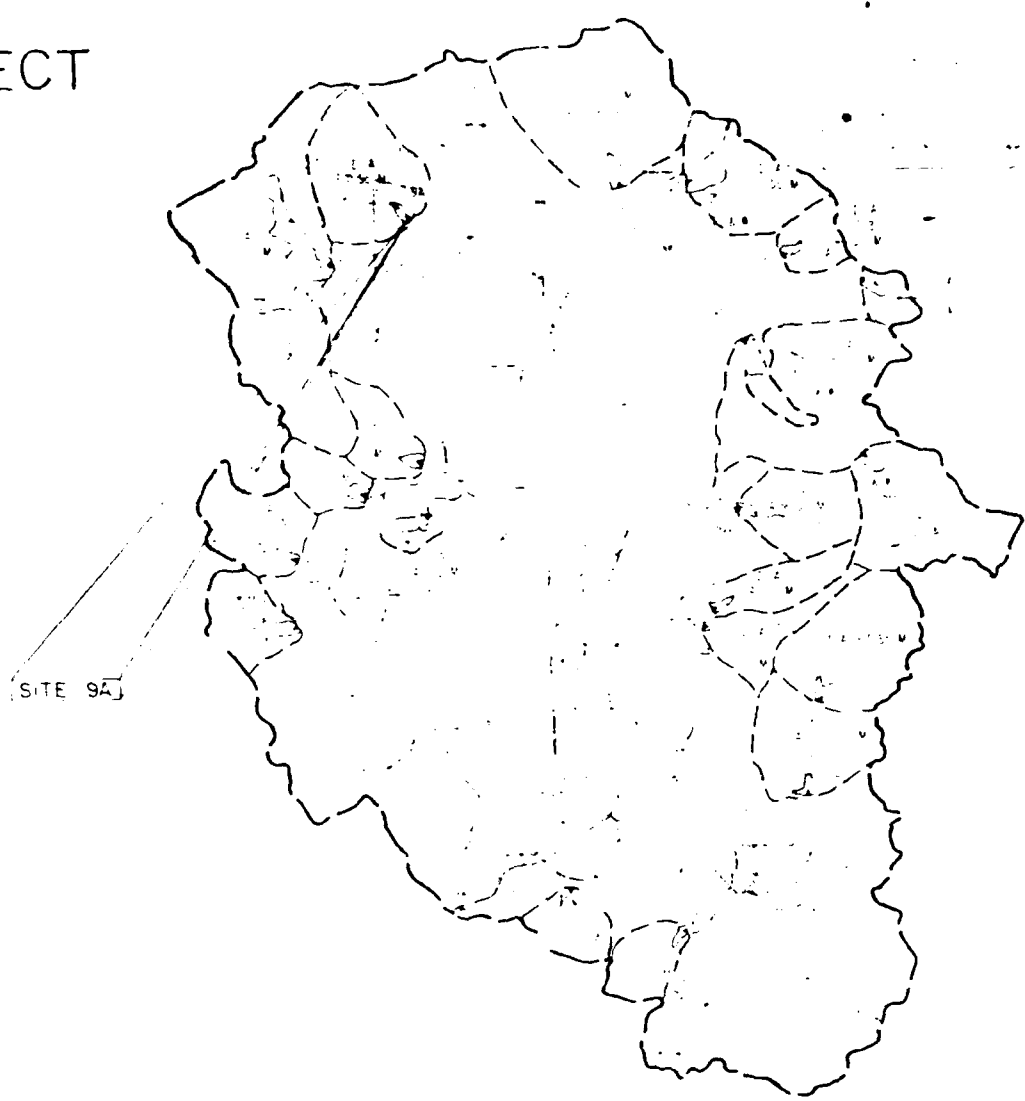
OMMISSION

RE

WAY EXCAVATION

AY  
S

LOGS OF TEST HOLES



**AS BUILT**  
8/22/74

|                                   |                      |          |
|-----------------------------------|----------------------|----------|
| APRIL 72                          | SHEETS 2, 3, 5, 6, 6 | 11/15/72 |
| DATE                              | NEW                  | APP'D    |
| REVISION                          |                      |          |
| CONEWANGO CREEK WATERSHED PROJECT |                      |          |
| SITE 9A                           |                      |          |
| FLOODWATER RETARDING DAM          |                      |          |
| CHAUTAUQUA COUNTY, NEW YORK       |                      |          |
| COVER SHEET                       |                      |          |
| U. S. DEPARTMENT OF AGRICULTURE   |                      |          |
| SOIL CONSERVATION SERVICE         |                      |          |
| 11/71                             | JOHN HESSEN          | 11/71    |
| 11/71                             | WILLIAM TURNER       | 11/71    |
|                                   |                      | NY-216-P |

2

B-2

#### CONSTRUCTION DETAILS

- 1 Areas under the dam and levee emergency spillway including 15 feet outside the cut slopes shall be cleared and grubbed. Limits of area to be cleared and grubbed to be staked in the field by the engineer.
- 2 The waste area and the area upstream from the dam and below elevation 1267.0 or actual stream bed elevation flood plain shall be cleared. Limits of area to be cleared shall be staked in the field by the engineer.
- 3 Depths and limits of borrow excavation shall be determined in the field by the engineer at the time of construction. At the completion of earth fill operations, the borrow area will be left gently sloping generally smooth and free draining. Side slopes shall be no steeper than 3:1.
- 4 Bottom section of emergency spillway to be covered with 6" of topsoil from sta. 3+50 to approx. sta. 4+40.
- 5 Waste areas to be graded so as to prevent ponding.
- 6 The contractor will sprinkle or apply dust suppressors on Haul Roads and at the site as necessary to reduce pollution of the air.
- 7 All chemicals, fuels and lubricants will be located, stored, and disposed of in such a manner as to prevent their entry into streams, wells, or springs.
- 8 Sanitary facilities will be located in such a manner as to prevent pollution of springs, wells, and streams.
- 9 The abandoned road in the right abutment shall not be broken up except within the base area of the dam.
- 10 Diversions and rock-lined channel above the emergency spillway and borrow area shall be completed before borrow is taken from the emergency spillway or borrow area unless otherwise approved by the engineer.

#### SEDIMENT BASIN CONSTRUCTION DETAILS

- 1 Use earth fill requirements for zone 2 as described on sheet 7 except that class C compaction shall consist of a minimum of one pass of the equipment used to place the fill.
- 2 Use of other earth fill materials will be as approved by the engineer.
- 3 Sediment basin location and length as shown is approximate and will be staked in the field by the engineer.

NOTE  
FOR PLAN VIEW OF  
SEDIMENT BASIN  
SEE SHEET 3

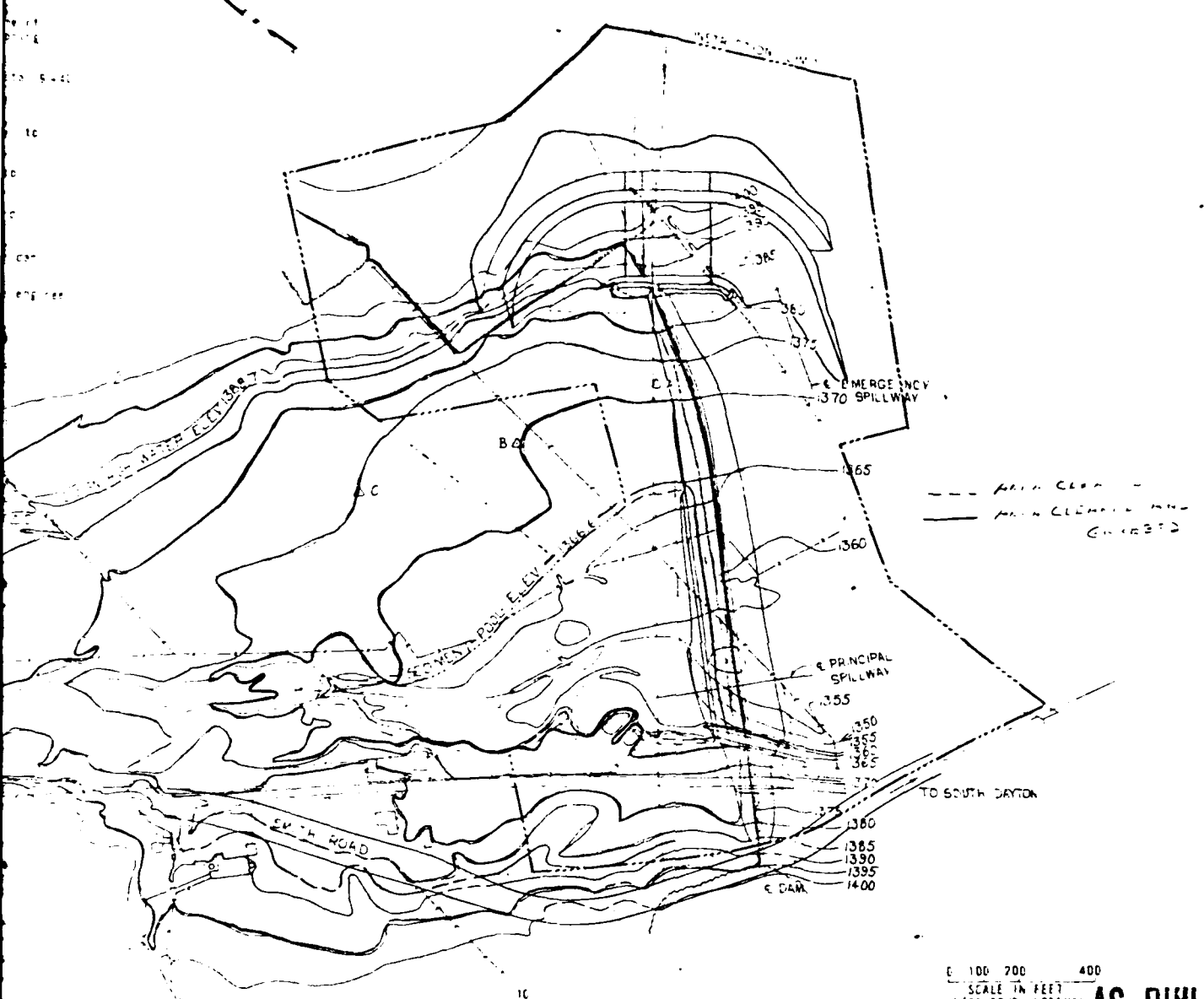
CONCRETE STEEL PLATE WELDED  
TO END OF 6" DIA PERFORATED PIPE

ELEV. 1270  
6" DIA. PERFORATED PIPE

05.000

15'-1"

FIELD  
SEE SHEET 2



0 100 200 400  
SCALE IN FEET  
5' CONTOUR INTERVAL

**AS BUILT**

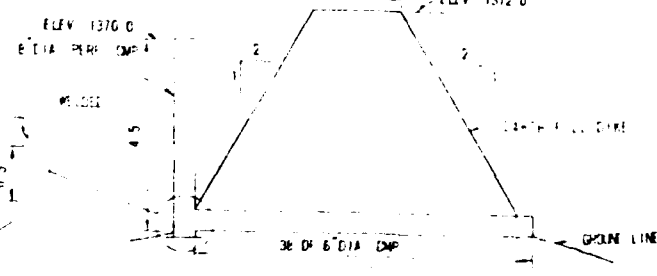
APRIL 72 'SECIMENT' BASIN EMERG. CRRY. BENCH  
DATE ITEM REVISION

CONEWANGO CREEK WATERSHED PROJECT  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK  
PLAN OF STORAGE AREA

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

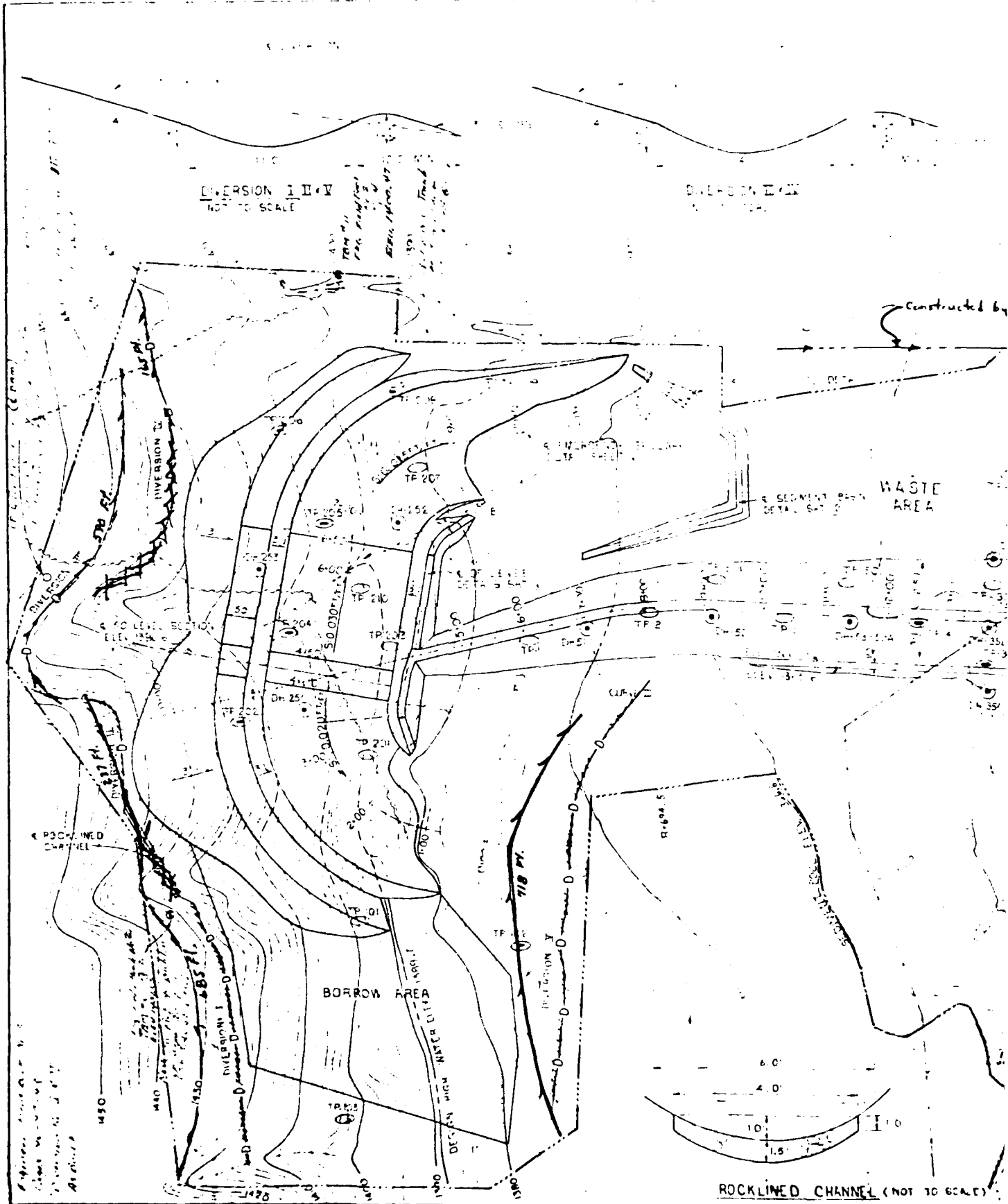
|                |      |
|----------------|------|
| J. TOENNISSSEN | 6/71 |
| D. BURDICK     | 6/71 |
| D. BURDICK     | 6/71 |

2 NY-2161-P

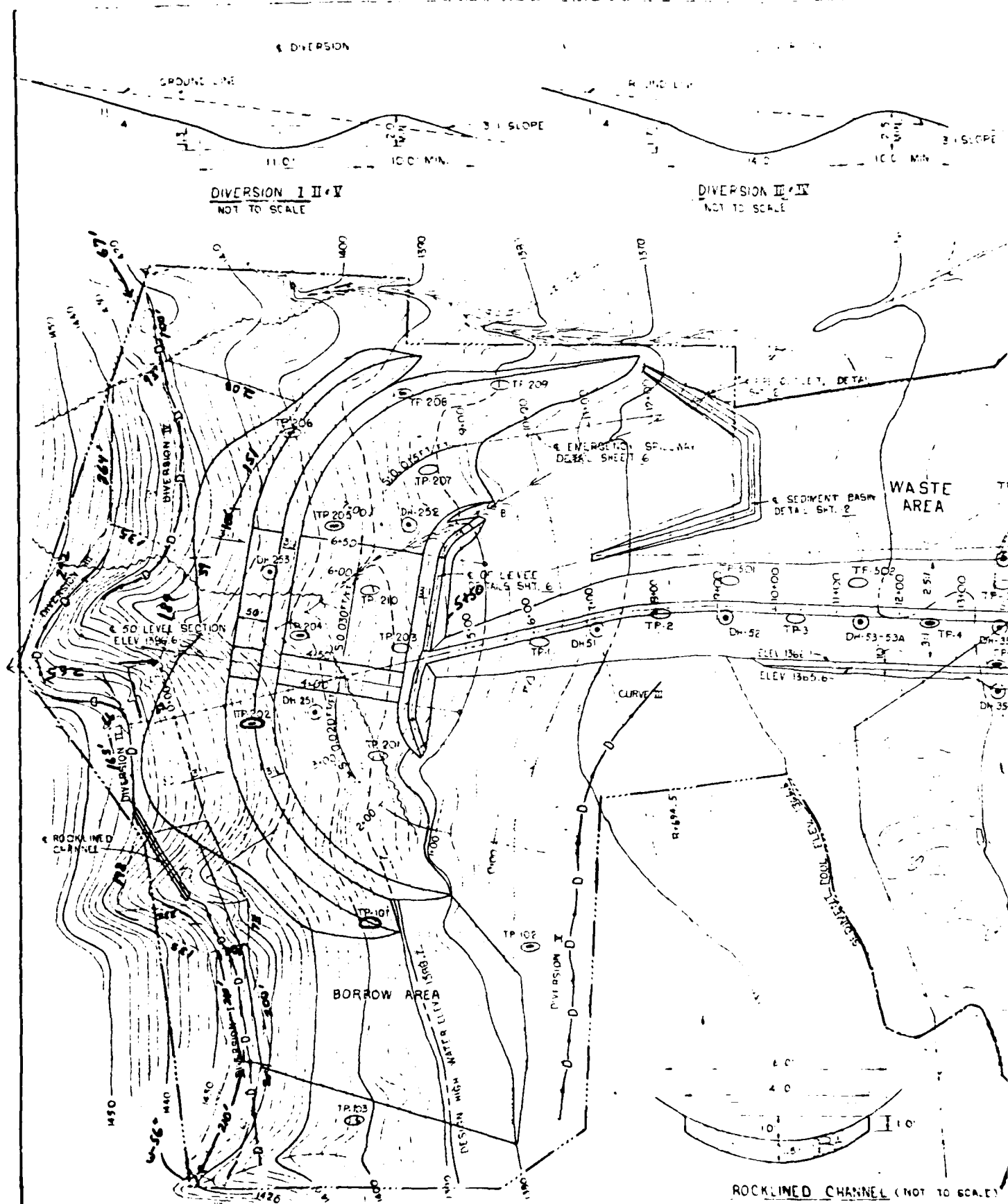


SEDIMENT BASIN DETAILS  
(NOT TO SCALE)

2







VERSION II-X  
TO SCALE

# LEGEND

- CONTOUR LINE
- - - - - 6" ELEVATION
- - - - - FLOODPLAIN (100 YEAR)
- - - - - BUILDING
- - - - - BENCH MARK
- - - - - DESIGN HIGH WATER
- - - - - SEDIMENT POOL
- - - - - TEST PIT (100000)
- - - - - TEST PIT (100000)
- - - - - DRAIN HOLE (100000)
- - - - - CONSTRUCTION LIMITS
- - - - - FENCE LINE (PLANNED)
- - - - - PAVED ROAD
- - - - - DIVERSION (PLANNED)
- - - - - POWER LINE

## FOUNDATION EXCAVATION DETAILS

SHAPE RIGHT ABUTMENT TO SLOPES AS SHOWN ON SHEETS A AND B FOR DISTANCES 130FT UPSTREAM AND 130FT DOWNSTREAM FROM & OF DAM TO PROVIDE A SMOOTH, CLEAN SURFACE FOR PLACEMENT OF COMPACTED FILL

## DIVERSION AND ROCKLINED CHANNEL CONSTRUCTION DETAILS

1. Final locations and slopes of diversions and rocklined channel to be staked in the field by the engineer at the time of construction
2. The 4:1 side slopes of the diversion may be steepened to reduce excavation in certain areas as directed by the engineer
3. The rock in the rocklined channel will be well graded between a minimum of 3 and a maximum of 18"

OF DAM, TOP WIDTH 60' ELEV. 1391.8  
GATE

Survey Done 1973

## BENCH MARK DESCRIPTION

BM#25 ELEV. 1357.18  
TOP OF IRON RAILING NORTH SIDE OF BRIDGE EAST CORNER

2' CONTOUR INTERVAL  
0 50 100 200  
SCALE IN FEET

**AS BUILT**

8/22/74

|          |                      |      |       |         |
|----------|----------------------|------|-------|---------|
| APRIL 72 | SEDIMENT BASIN-EMERG | SPWY | BENCH | 1/11/72 |
| DATE     | ITEM                 |      |       | APP'D   |
|          | REVISION             |      |       |         |

**CONEWANGO CREEK WATERSHED PROJECT**  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK  
PLAN OF STRUCTURAL WORKS  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
J. TOENNIESSEN 7/71  
D. ANGELO 11/71

3A  
NY-2161-P

### LAYOUT DATA CURVE I

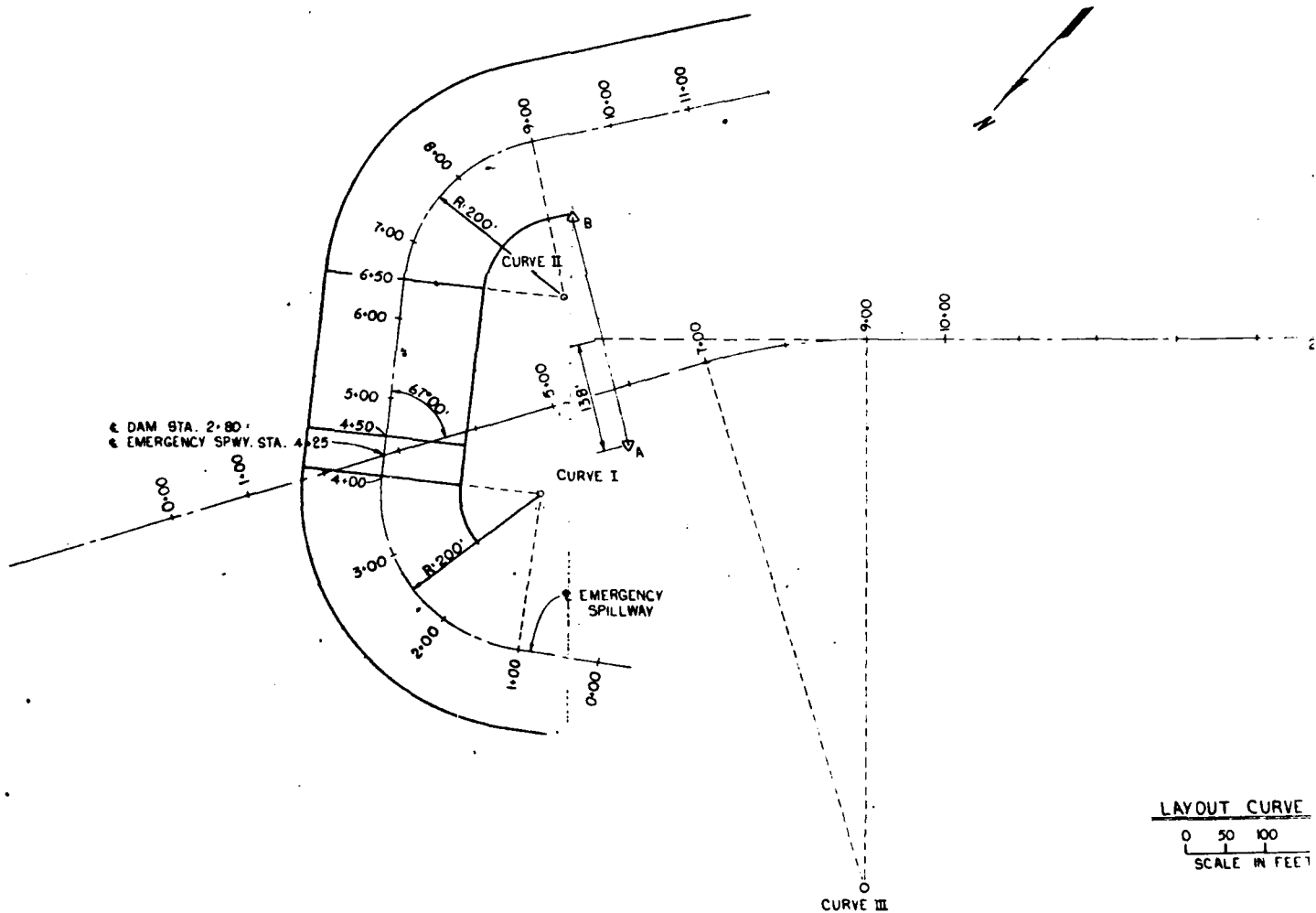
$\Delta = 85^\circ 37'$      $T = 186.34'$   
 $R = 200'$      $E = 73.55'$   
 $D = 88^\circ 39'$      $M = 53.67'$   
 $L = 300'$

| STATION | DEFLECTION | CHORD DIST. |
|---------|------------|-------------|
| 1+00    | 0° 00'     | —           |
| 1+50    | 7° 10'     | 49.87       |
| 2+00    | 14° 20'    |             |
| 2+50    | 21° 29'    |             |
| 3+00    | 28° 39'    |             |
| 3+50    | 35° 49'    |             |
| 4+00    | 42° 58.5'  |             |

### LAYOUT DATA CURVE II

$\Delta = 71^\circ 37'$      $T = 144.31'$   
 $R = 200'$      $E = 46.63'$   
 $D = 28^\circ 39'$      $M = 37.81'$   
 $L = 250'$

| STATION | DEFLECTION | CHORD DIST. |
|---------|------------|-------------|
| 1+50    | 0° 00'     | —           |
| 1+00    | 7° 10'     | 49.87       |
| 1+50    | 14° 20'    |             |
| 2+00    | 21° 29'    |             |
| 2+50    | 28° 39'    |             |
| 3+00    | 35° 48.75' |             |



# LAYOUT DATA CURVE II

$\Delta = 1^\circ 37'$   
 $R = 200'$   
 $D = 28^\circ 39'$   
 $T = 144.31'$   
 $E = 46.63'$   
 $M = 37.81'$   
 $L = 250'$

# LAYOUT DATA CURVE III

$\Delta = 16^\circ 30'$   
 $R = 694.5'$   
 $D = 8^\circ 15'$   
 $T = 100.6'$   
 $E = 7.22'$   
 $M = 7.15'$   
 $L = 200.0'$

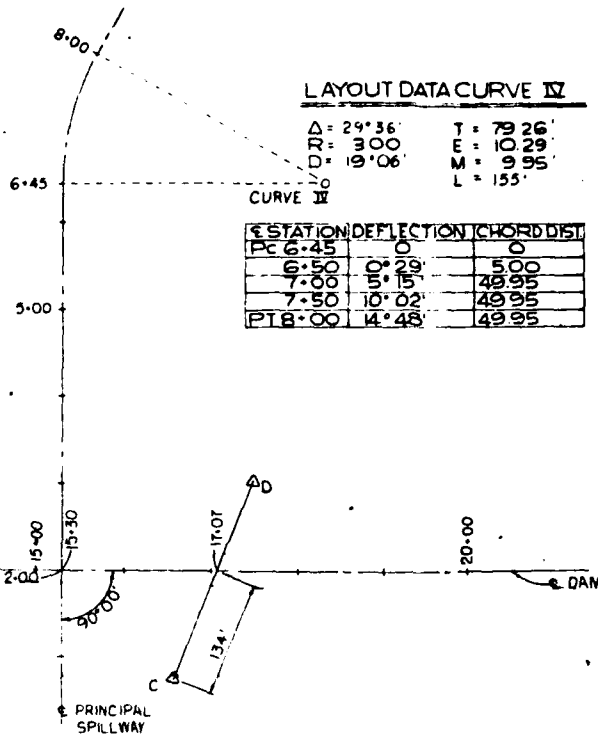
| STATION | DEFLECTION | CHORD DIST. |
|---------|------------|-------------|
| 0+00    | 0° 00'     |             |
| 1+00    | 7° 10'     | 49.87       |
| 2+00    | 14° 20'    |             |
| 3+00    | 21° 29'    |             |
| 4+00    | 28° 39'    |             |
| 5+00    | 35° 48.75' |             |

| STATION | DEFLECTION | CHORD DIST. |
|---------|------------|-------------|
| 9+00    | 0° 00'     |             |
| 8+50    | 2° 04'     | 50.00       |
| 8+00    | 4° 08'     |             |
| 7+50    | 6° 11'     |             |
| 7+00    | 8° 15'     |             |

# LAYOUT DATA CURVE IV

$\Delta = 29^\circ 36'$   
 $R = 300'$   
 $D = 19^\circ 06'$   
 $T = 79.26'$   
 $E = 10.29'$   
 $M = 9.95'$   
 $L = 155'$

| STATION | DEFLECTION | CHORD DIST. |
|---------|------------|-------------|
| PC 6+45 | 0° 00'     | 0           |
| 6+50    | 0° 29'     | 5.00        |
| 7+00    | 5° 15'     | 49.95       |
| 7+50    | 10° 02'    | 49.95       |
| PT 8+00 | 14° 48'    | 49.95       |



# LAYOUT CURVE DATA

0 50 100 200  
 SCALE IN FEET

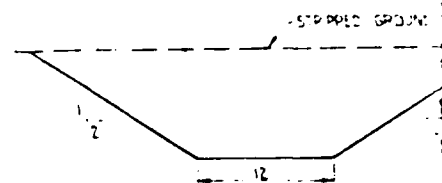
8/22/74  
**AS BUILT**

CONEWANGO CREEK WATERSHED PROJECT  
 SITE 9A  
 FLOODWATER RETARDING DAM  
 CHAUTAUQUA COUNTY, NEW YORK  
 LAYOUT DATA

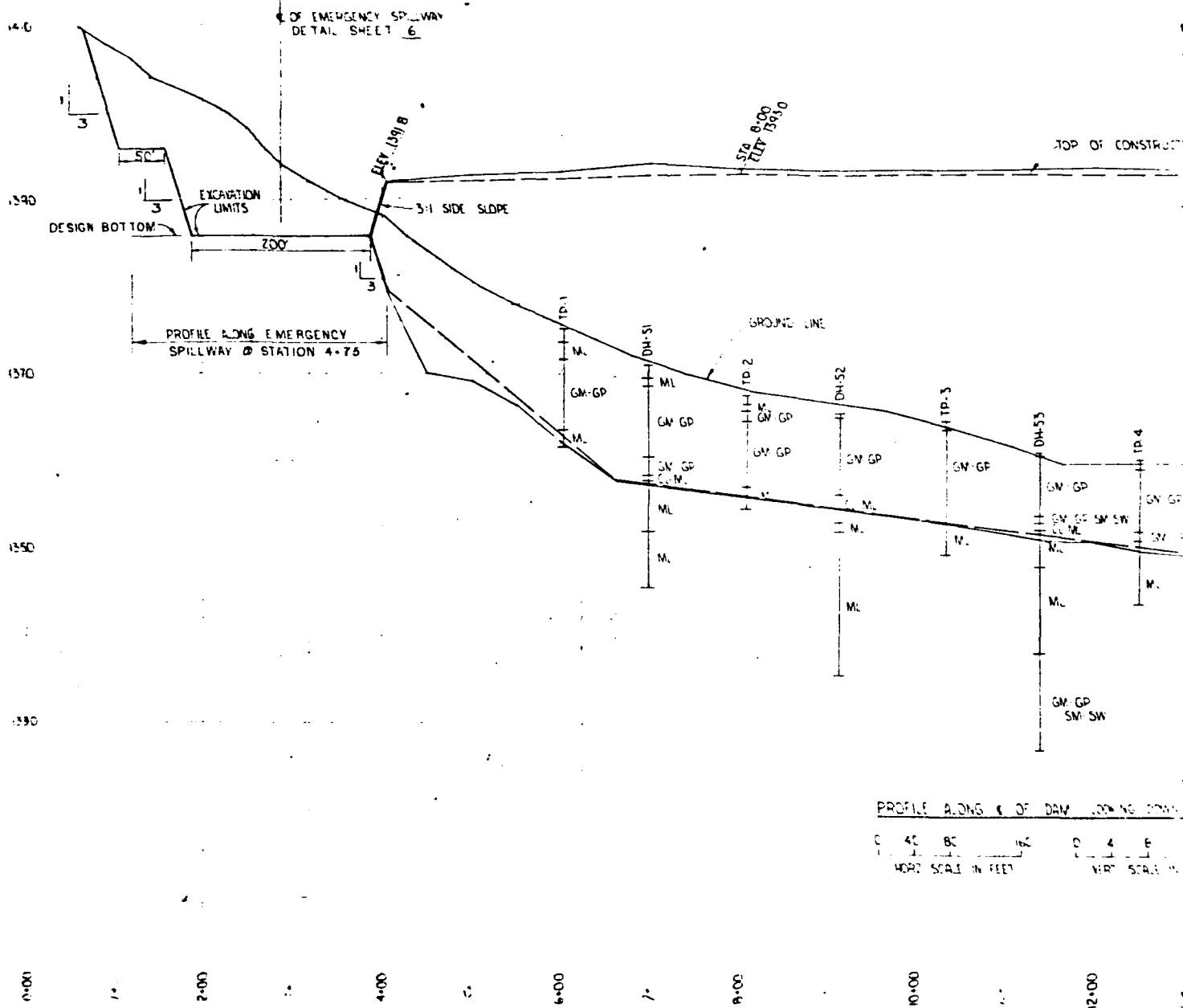
U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

|                         |           |             |
|-------------------------|-----------|-------------|
| Designed J. TOENNIESSEN | Date 9/71 | Approved by |
| Drawn D. ANGELO         | Date 9/71 | Title       |
| Traced                  | Sheet 4   | Drawing No. |
| File no.                | NY-2161-P |             |

B-6

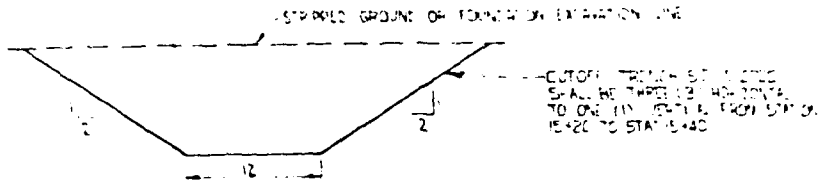


CROSS SECTION OF CUTOFF TRENCH

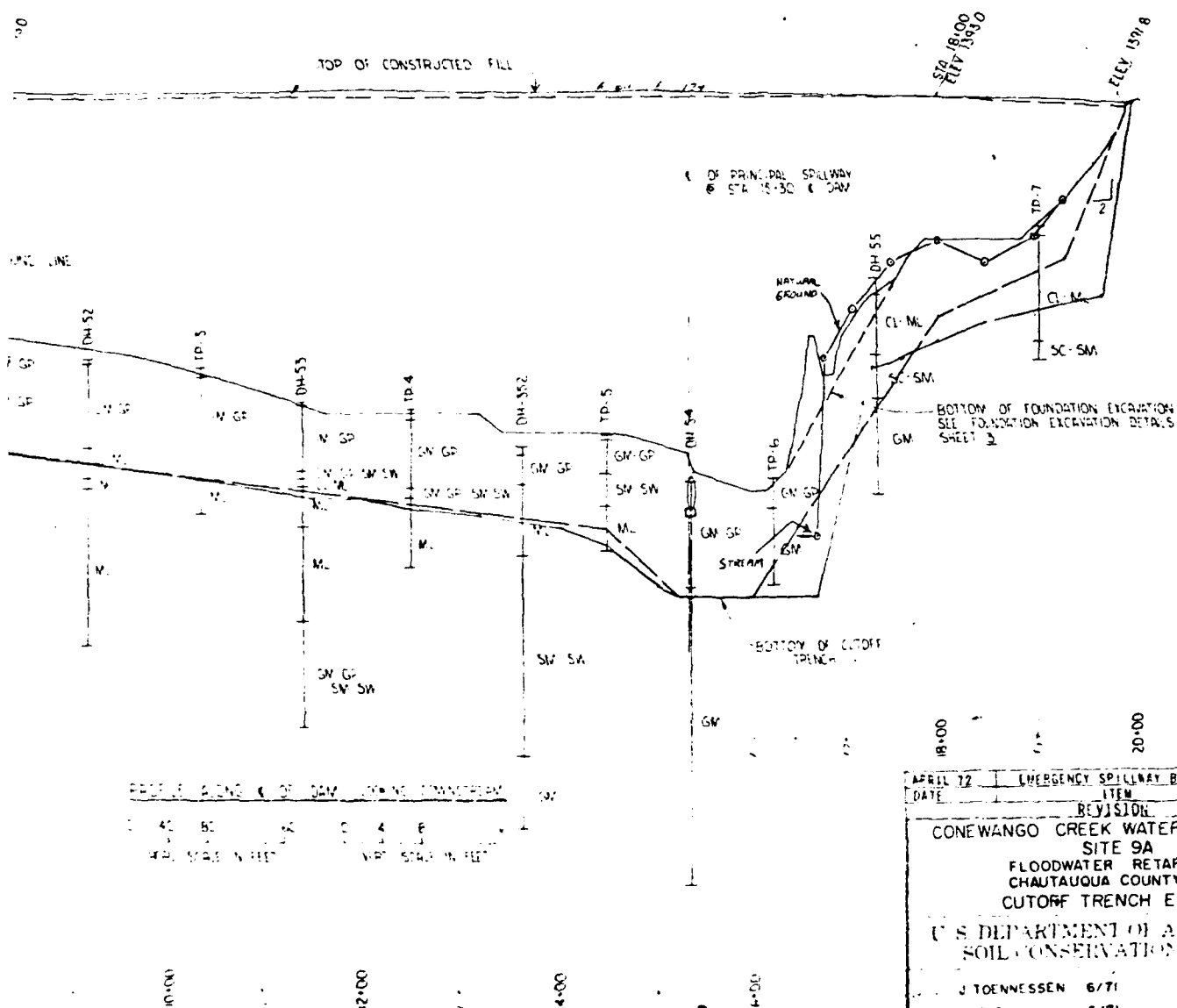


# CONSTRUCTION DETAIL

FINAL DEPTH OF TRENCH TO BE DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION

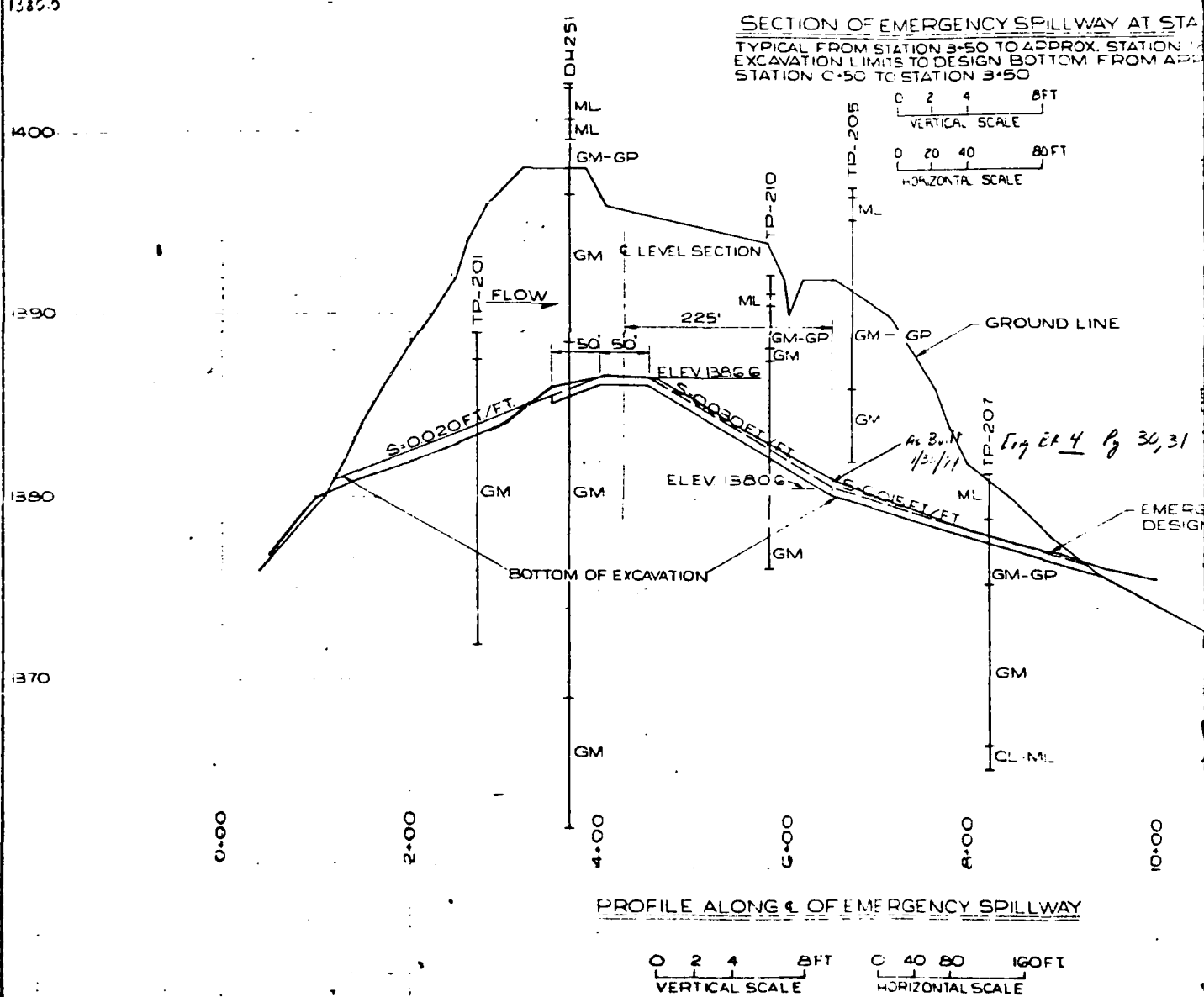
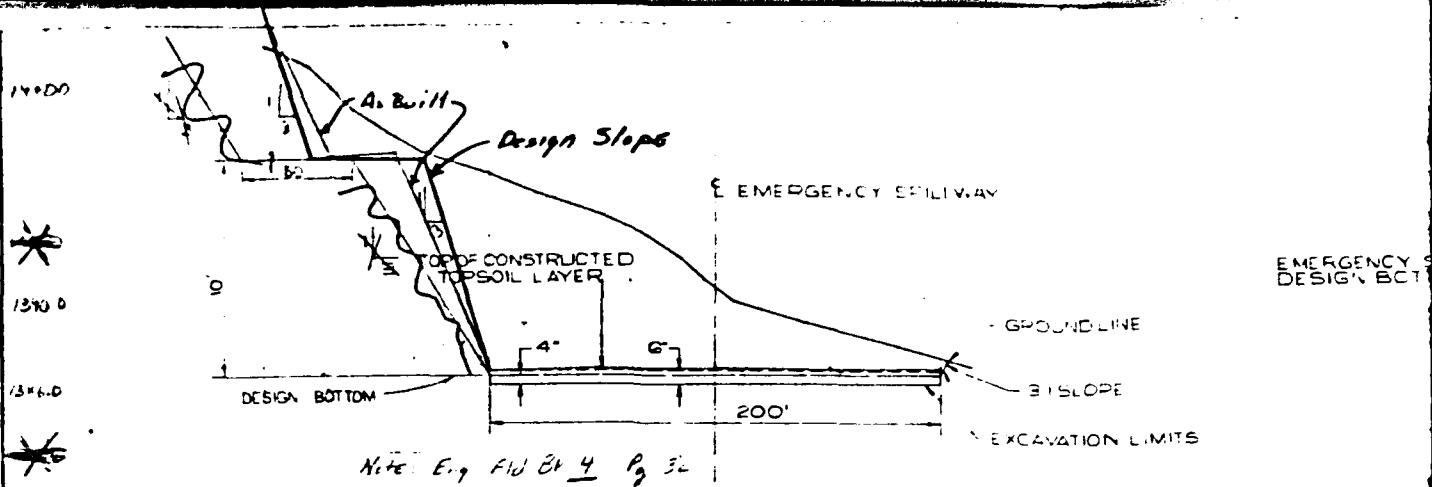


CROSS SECTION OF CUTOFF TRENCH



**AS BUILT**  
6/22/74

|                                   |                          |
|-----------------------------------|--------------------------|
| APRIL 72                          | EMERGENCY SPILLWAY BENCH |
| DATE                              | ITEM                     |
| REVISION                          |                          |
| CONEWANGO CREEK WATERSHED PROJECT |                          |
| SITE 9A                           |                          |
| FLOODWATER RETARDING DAM          |                          |
| CHAUTAUQUA COUNTY NEW YORK        |                          |
| CUTOFF TRENCH EXCAVATION          |                          |
| U.S. DEPARTMENT OF AGRICULTURE    |                          |
| SOIL CONSERVATION SERVICE         |                          |
| J. TOENNESSEN                     | 6/71                     |
| W. E. G.                          | 6/71                     |
| NY-2161-P                         |                          |



EMERGENCY SPILLWAY.  
DESIGN BOTTOM

GROUNDLINE

3:1 SLOPE

EXCAVATION LIMITS

### SECTION OF INSIDE LEVEE AT STA 4+50

TYPICAL FROM 50' UPSTREAM OF E OF LEVEE SECTION  
TO 250' DOWNSTREAM OF E OF LEVEE SECTION

0 2 4 8 FT

VERTICAL SCALE

0 4 8 16 FT

HORIZONTAL SCALE

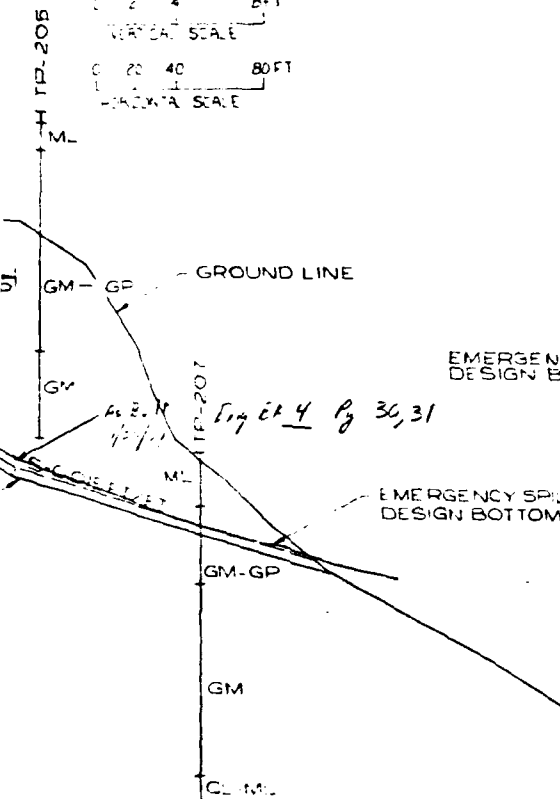
SECTION OF EMERGENCY SPILLWAY AT STA 4+25  
FROM STATION 3+50 TO APPROX. STATION 12+00  
N LIMITS TO DESIGN BOTTOM FROM APPROX  
2+50 TO STATION 3+50

0 2 4 8 FT

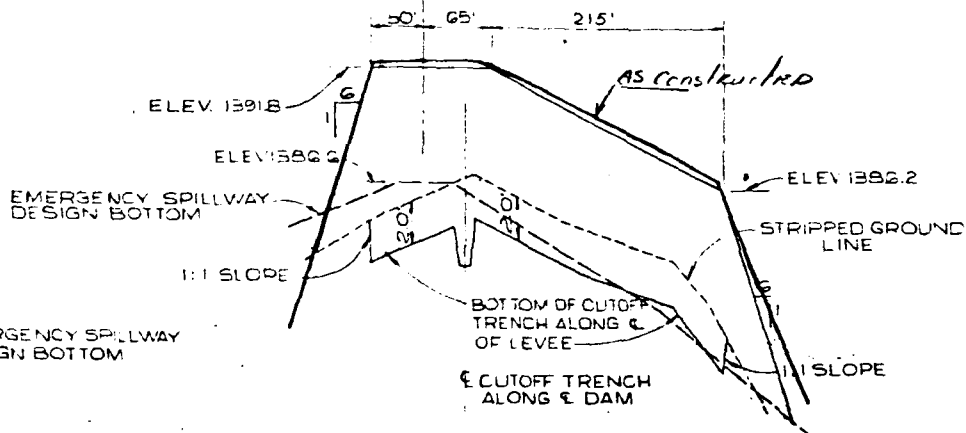
VERTICAL SCALE

0 20 40 80 FT

HORIZONTAL SCALE



### EMERGENCY SPILLWAY LEVEL SECTION



0 2 4 8 FT

VERTICAL SCALE

0 40 80 160 FT

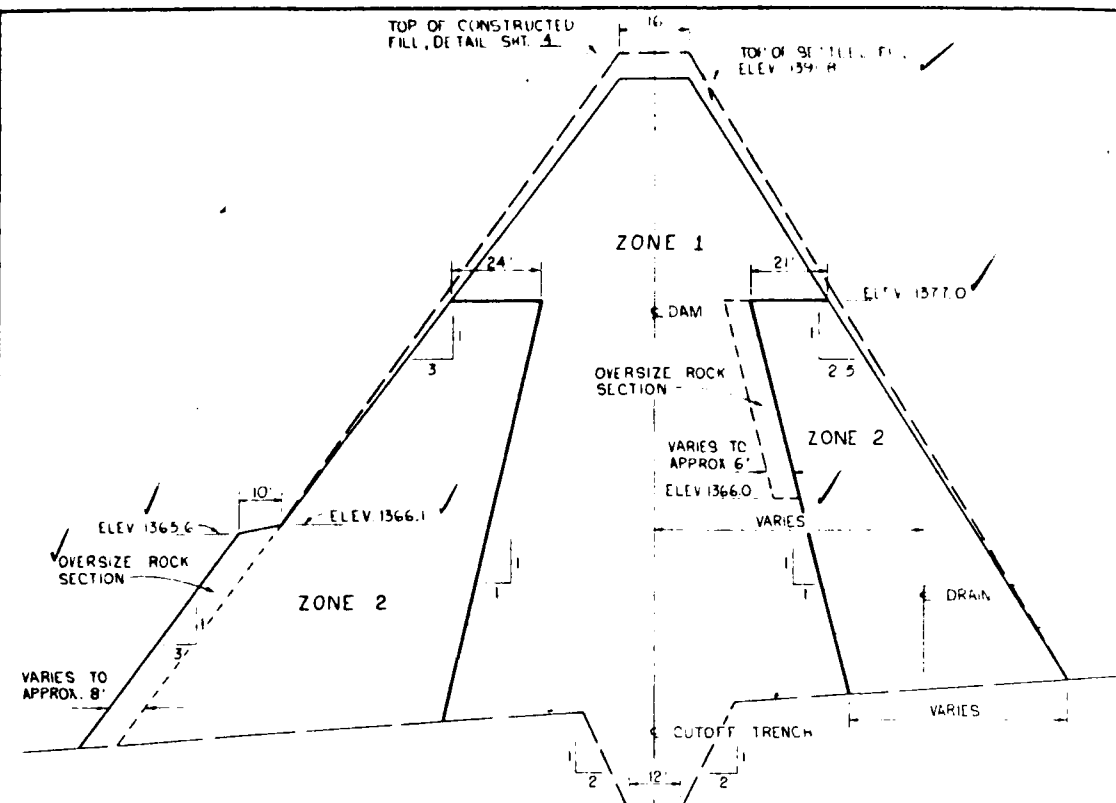
HORIZONTAL SCALE

### PROFILE ALONG E OF LEVEE

1370  
**AS BUILT**  
8/22/77

| DATE                              | REVISION | ITEM                     |
|-----------------------------------|----------|--------------------------|
| APRIL 72                          |          | EMERGENCY SPILLWAY BENCH |
|                                   |          | REVISION                 |
| CONEWANGO CREEK WATERSHED PROJECT |          |                          |
| SITE 9A                           |          |                          |
| FLOODWATER RETARDING DAM          |          |                          |
| CHAUTAUQUA COUNTY NEW YORK        |          |                          |
| EMERGENCY SPILLWAY                |          |                          |
| U. S. DEPARTMENT OF AGRICULTURE   |          |                          |
| SOIL CONSERVATION SERVICE         |          |                          |
| J. TOENNIESSEN                    | 11/71    |                          |
| WILLIAM TURNER                    | 11/71    |                          |
|                                   |          | NY-2161-P                |

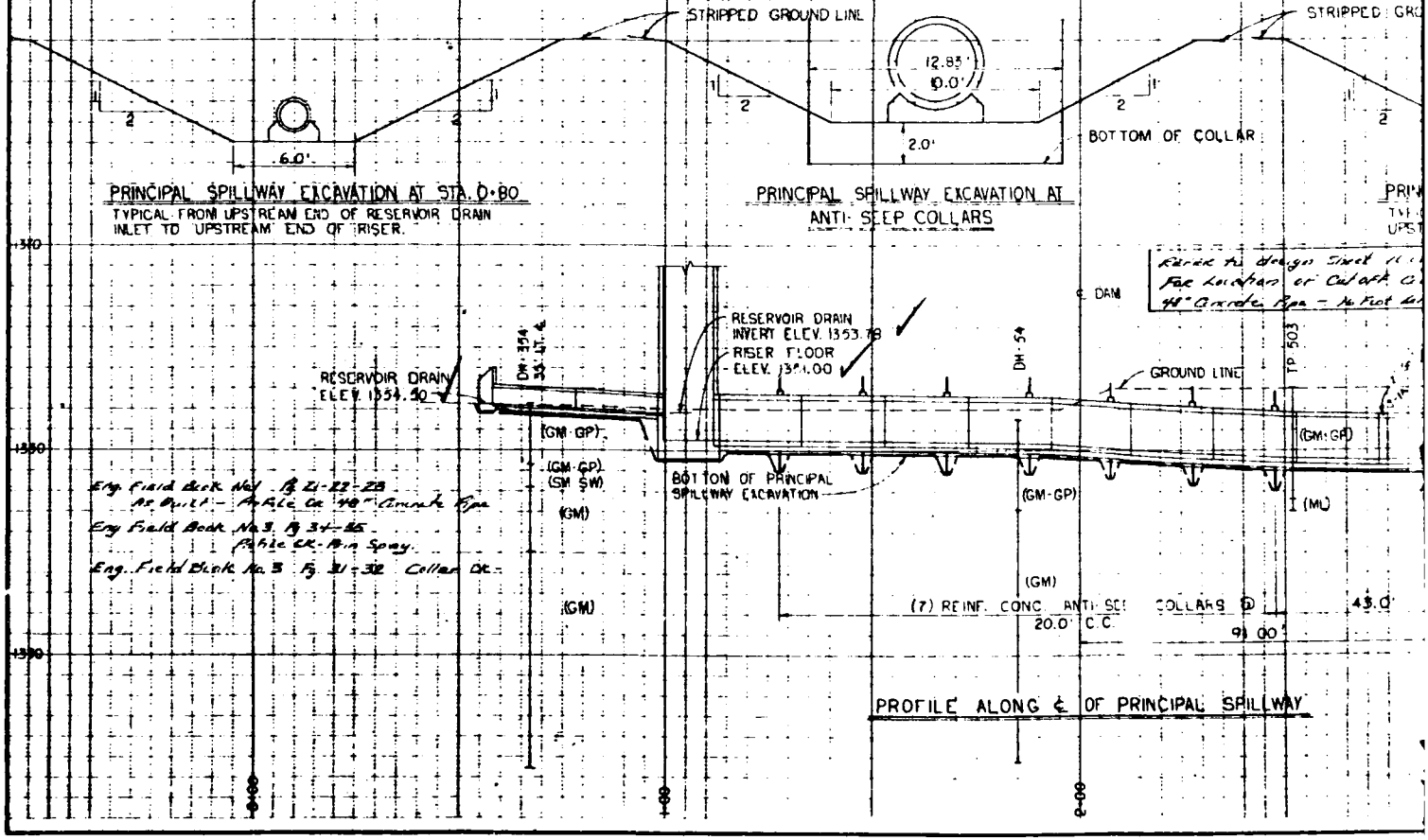
B-8



| ZONE | MATERIAL                                                                                            |
|------|-----------------------------------------------------------------------------------------------------|
| 1    | GLACIAL TILL RE<br>TP 204 From 10<br>TP 206 From 9                                                  |
| 2    | ALLUVIAL & COLL<br>REPRESENTED BY<br>TP 7 From 1<br>TP 202 From 5<br>TP 205 From 1<br>TP 205 From 0 |

- 1/ The placement of
- 2/ a) Maximum rock  
Plate Vibrators s  
b) Maximum rock  
as shown on the  
Maximum lift to  
than 18' prior to  
water content at  
Thoroughly wet  
a) Not more than  
at the time of  
b) Not so wet as  
of equipment  
5/ a) For typical co  
Use CLASS C co  
minimum of six in  
approved by the
- 1 Zone boundaries are
- 2 Material placed sh  
be essentially fine  
at the upstream side  
3 Topsoil that is su  
slopes of the earth

SECTION OF DAM @ STATION 15+00  
TYPICAL FROM APPROX. STA. 4+00 TO STA. 20+00



Eng. Field Book No. 1, p. 21-22-23  
As built - 1/4" scale 1/8" contour  
Eng. Field Book No. 3, p. 34-35  
Public Co. 1/4" scale  
Eng. Field Book No. 3, p. 31-32 Collar Dr.

Check the design sheet for  
the location of Collar Dr.  
1/4" Contour Map - 1/4" scale

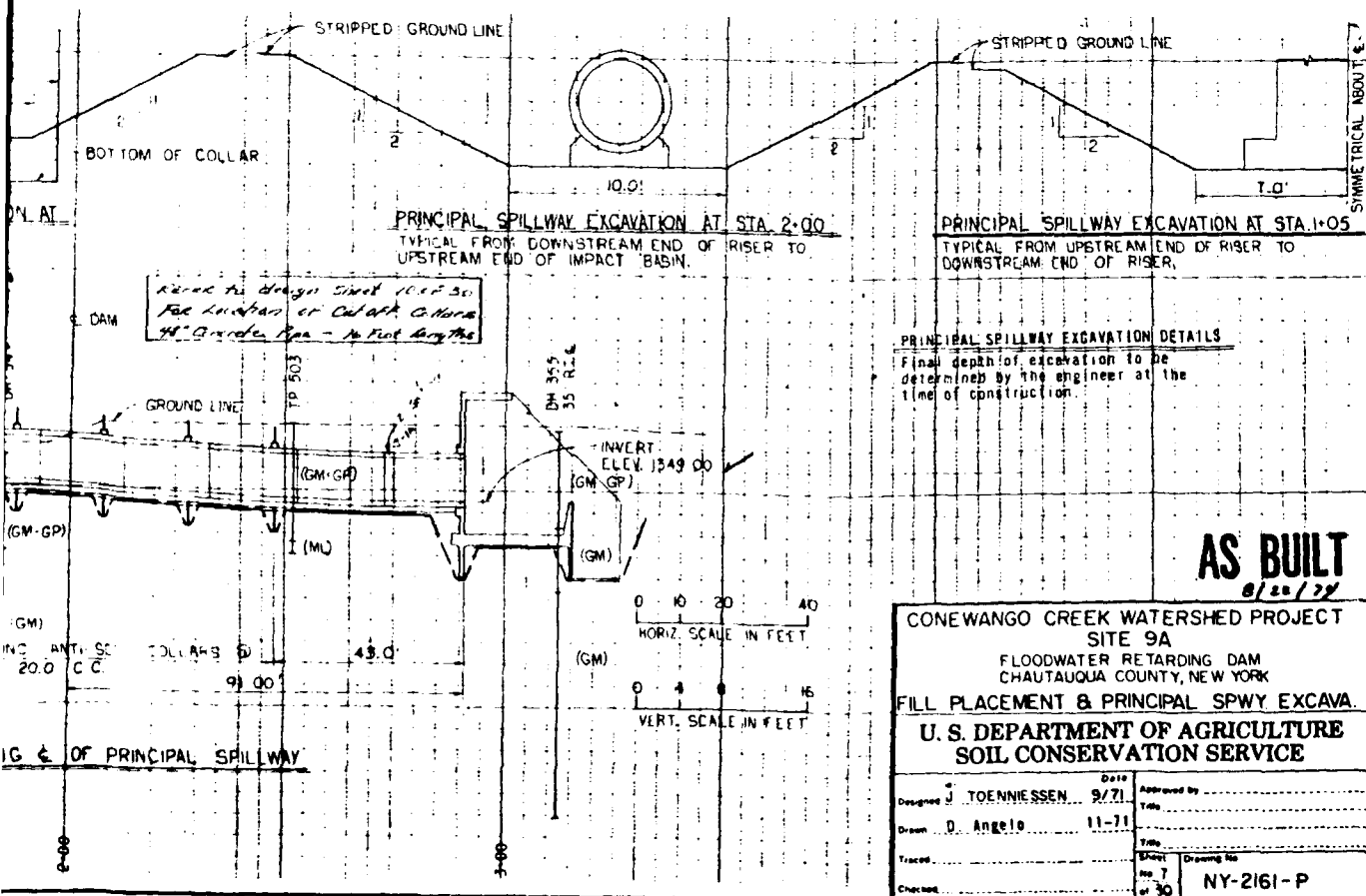
PROFILE ALONG C OF PRINCIPAL SPILLWAY

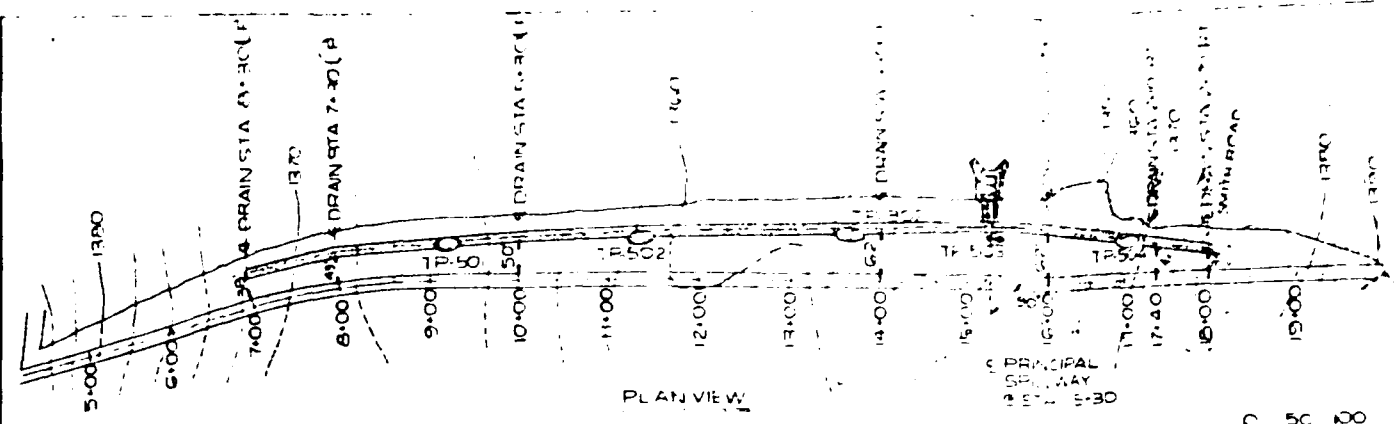
| EARTH FILL REQUIREMENTS |                                                                                                                                                                                |                  |                       |                                   |               |                                                                                                                                                                                                                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------|-----------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ZONE                    | MATERIAL 1/                                                                                                                                                                    | MAX ROCK SIZE 2/ | MAX LIFT THICKNESS 3/ | MIN REQUIRED WATER CONTENT 4/     | COMPACTION 5/ |                                                                                                                                                                                                                                                                          |
|                         |                                                                                                                                                                                |                  |                       |                                   | CLASS         | DEFINITION                                                                                                                                                                                                                                                               |
| 1                       | GLACIAL TILL REPRESENTED BY<br>TP 204 From 10 0'-14 4' (SM)<br>TP 206 From 9 0'-16 0' (ML)                                                                                     | 6"               | 9"                    | 2 percentage points below optimum | A             | 90 standard density by ASTM D 698 method A                                                                                                                                                                                                                               |
| 2                       | ALLUVIAL & COLLUVIAL MATERIALS REPRESENTED BY<br>TP 7 From 1 0'-12 0' (CL ML)<br>TP 202 From 5 5'-8 0' (GM GP)<br>TP 205 From 1 0'-11 0' (GM GP)<br>TP 205 From 0 5'-1 0' (VL) | 6"               | 9"                    | wet 5/                            | C             | Four passes per layer of fill by a smooth wheel vibrating roller at least 72" wide weighing at least one ton (Static Service Weight) per foot of width and capable of exerting a dynamic impact of at least 20 000 pounds at the rate of at least 1 200 times per minute |

- 1/ The placement table indicates estimated use of materials
- 2/ a) Maximum rock size in backfill compacted by means of manually directed power tampers or Plate Vibrators shall be 3"  
b) Maximum rock size of 18" placed in earth fill shall be taken to the portion of the dam labeled OVERSIZE ROCK SECTION as shown on the drawings
- 3/ Maximum lift thickness prior to compaction. The maximum lift thickness of the oversize rock section shall be no greater than 18" prior to compaction
- 4/ Water content at time of compaction
- 5/ Thoroughly wet but
  - a) Not more than 12 percent moisture content based on the material passing the #4 sieve unless modified by the engineer at the time of construction or
  - b) Not so wet as to cause adherence of the soil to the wheels or tracks of the equipment, nor to cause bogging down of equipment
- 6/ a) For typical compaction curves see sheet 27  
b) Use CLASS C compaction in areas of the dam containing oversize material. This CLASS C compaction shall consist of a minimum of six passes per lift of fill by a tamping roller exerting a min. contact pressure of 450PSI or equivalent as approved by the engineer. The final number of passes will be determined by the engineer in the field.

#### CONSTRUCTION DETAILS

- 1 Zone boundaries are approx. Adjustments will be made by the engineer to utilize all coarse material from the emergency spillway and borrow area.
- 2 Material placed in the OVERSIZE ROCK SECTIONS shall consist of oversize material taken from the earth fill. These sections shall be essentially free of material less than 3". Oversize rock section above Elev. 1366 may be relocated so as to be exposed at the upstream slope of the dam as determined by the engineer.
- 3 Topsoil that is suitable for use and not used on the specified areas of the emerg spillway shall be incorporated within the slopes of the earth fill as directed by the engineer.

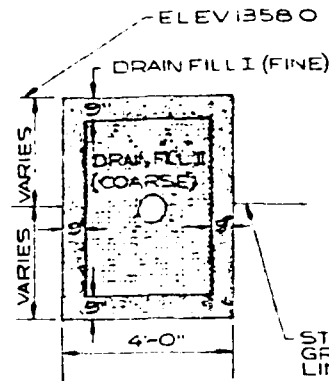




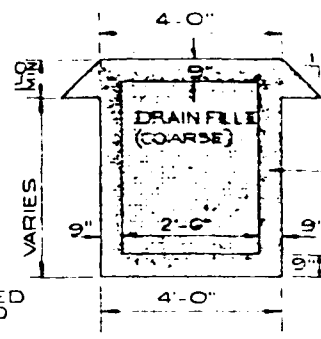
PLAN VIEW

PRINCIPAL SPILLWAY  
P 504 5+30

C 50 100  
SCALE IN FEET



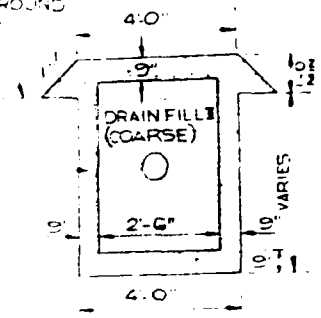
SECTION B-B



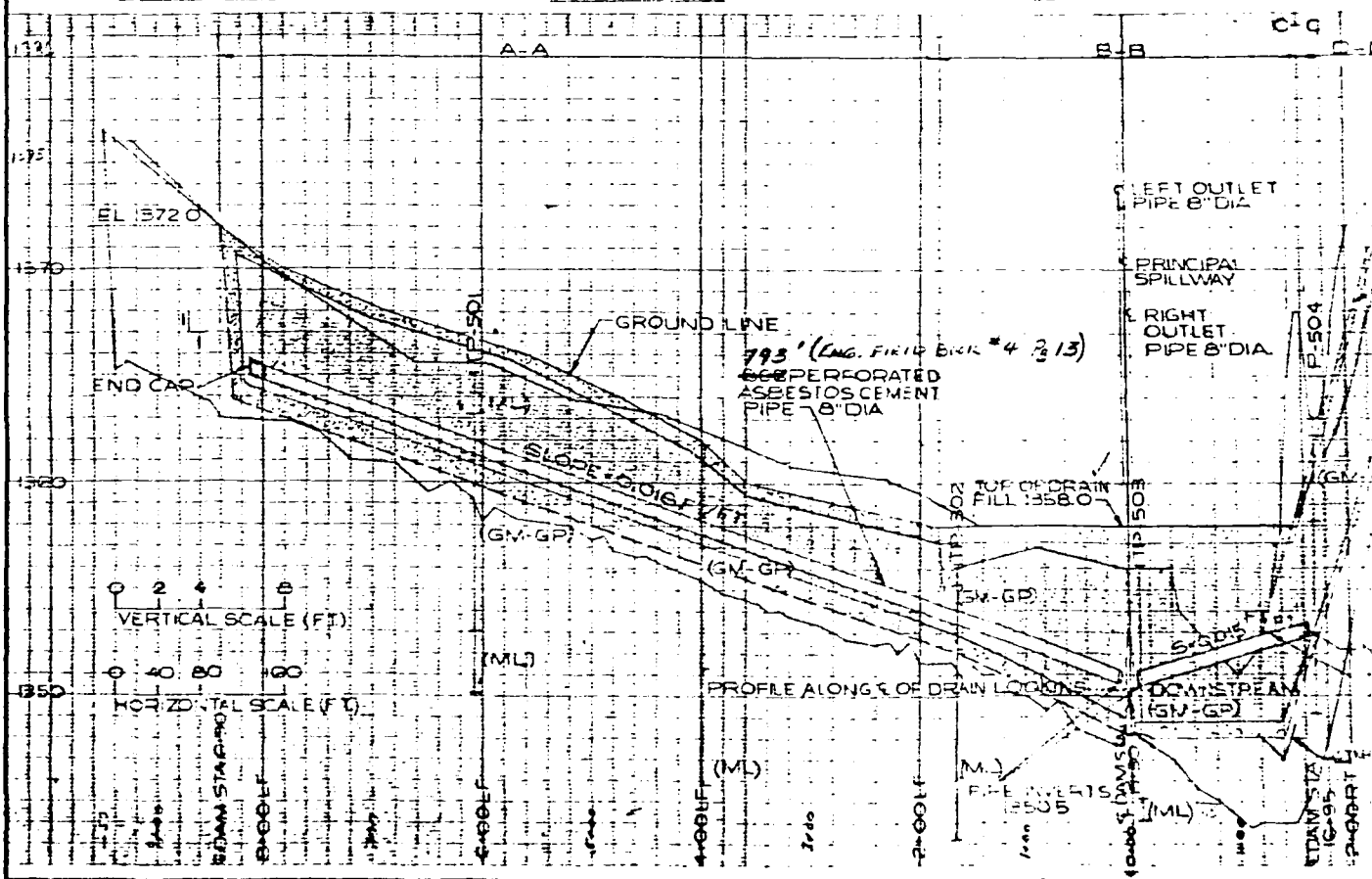
SECTION D-D

STRIPPED GROUND LINE OR FOUNDATION EXCAVATION LINE

DRAIN FILL I (FINE)



SECTION C-C



# DRAINAGE SYSTEM DETAILS

PERFORATED DRAIN PIPE SHALL CONFORM TO A.S.T.M. A 131 AND SHALL BE 8" DIA PRESSURE PIPE LINED WITH 1/2" THICK PROFILE AT THE BOTTOM OF ALL EXCAVATION. ALL DIMENSIONS ARE ONLY APPROXIMATE. THE REQUIRED FINISH SHALL BE ESTABLISHED IN THE FIELD AT THE TIME OF CONSTRUCTION BY THE ENGINEER.

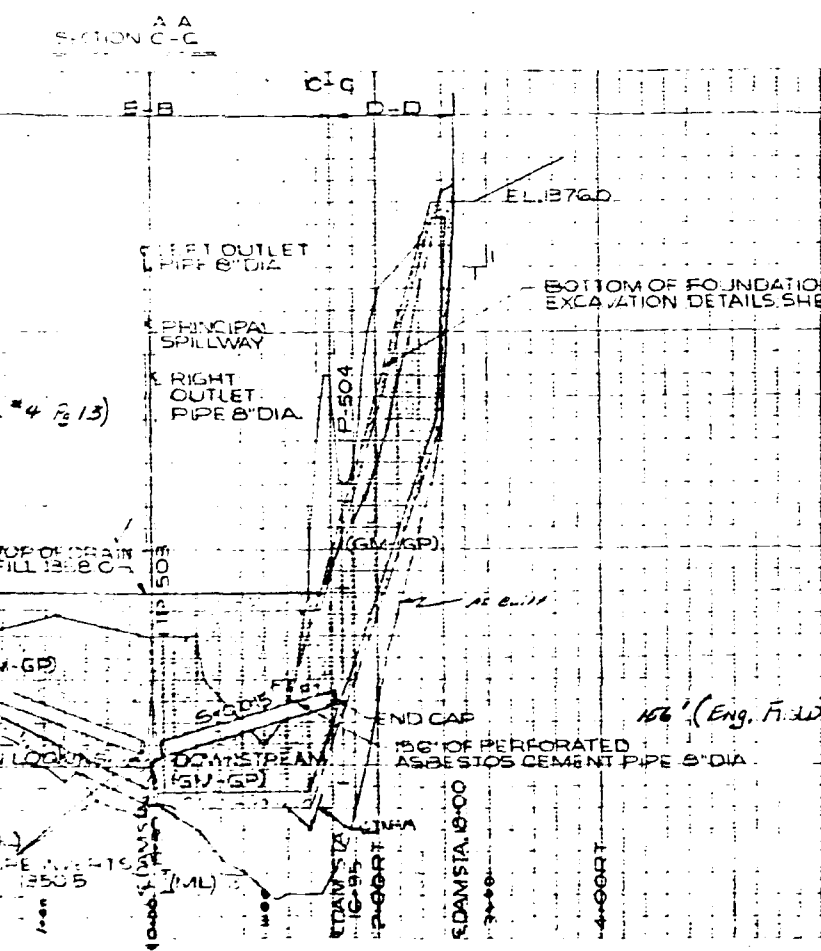
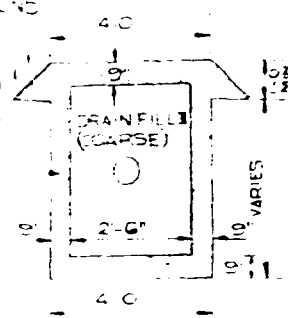
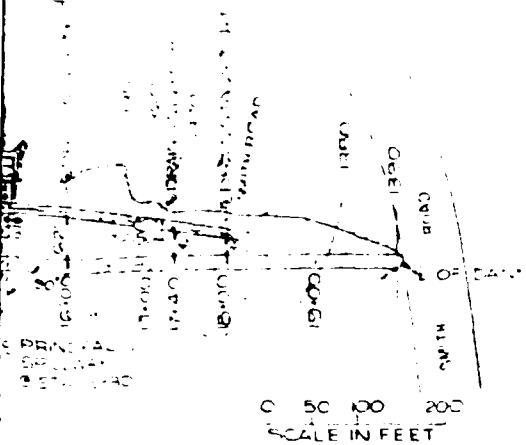
## QUANTITY SUMMARY

- 925 = 20 YDS DRAIN FILL I (FINE)
- 847 = 20 YDS DRAIN FILL II (COARSE)
- 1063 = 100 FT STRAIGHT SECTION OF PERFORATED ASBESTOS CEMENT PIPE (8" DIA)
- 2 END CAPS
- 1 90° ELBOWS (8" DIA CAST IRON)
- 2 45° ELBOWS (8" DIA CAST IRON)

## GRAIN SIZE DESCRIPTION FOR DRAIN FILL

DRAIN FILL I (FINE) SHALL MEET THE GRADATION OF A.S.T.M. C 33-67 FOR FINE AGGREGATE. IN ADDITION, THE PERCENTAGE OF MATERIAL IN DRAIN FILL I FINER THAN A # 200 SIEVE SHALL NOT BE MORE THAN THREE (3) PERCENT.

DRAIN FILL II (COARSE) SHALL MEET THE GRADATION OF N.Y.S. DOT COARSE AGGREGATE #1. IN ADDITION, THE PERCENTAGE OF MATERIAL IN DRAIN FILL II FINER THAN A # 200 SIEVE SHALL NOT BE MORE THAN THREE (3) PERCENT.

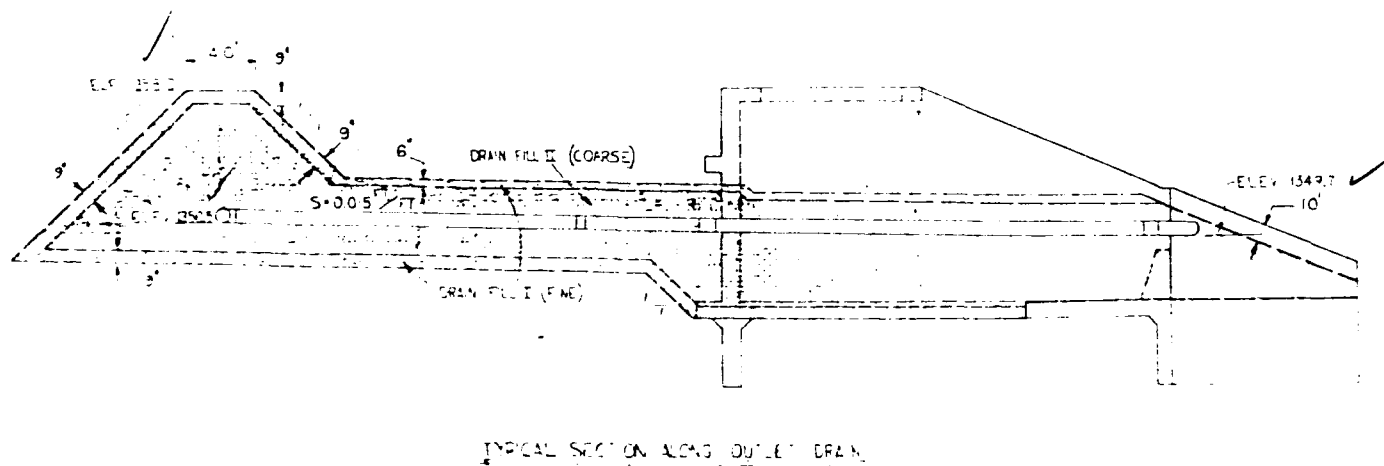
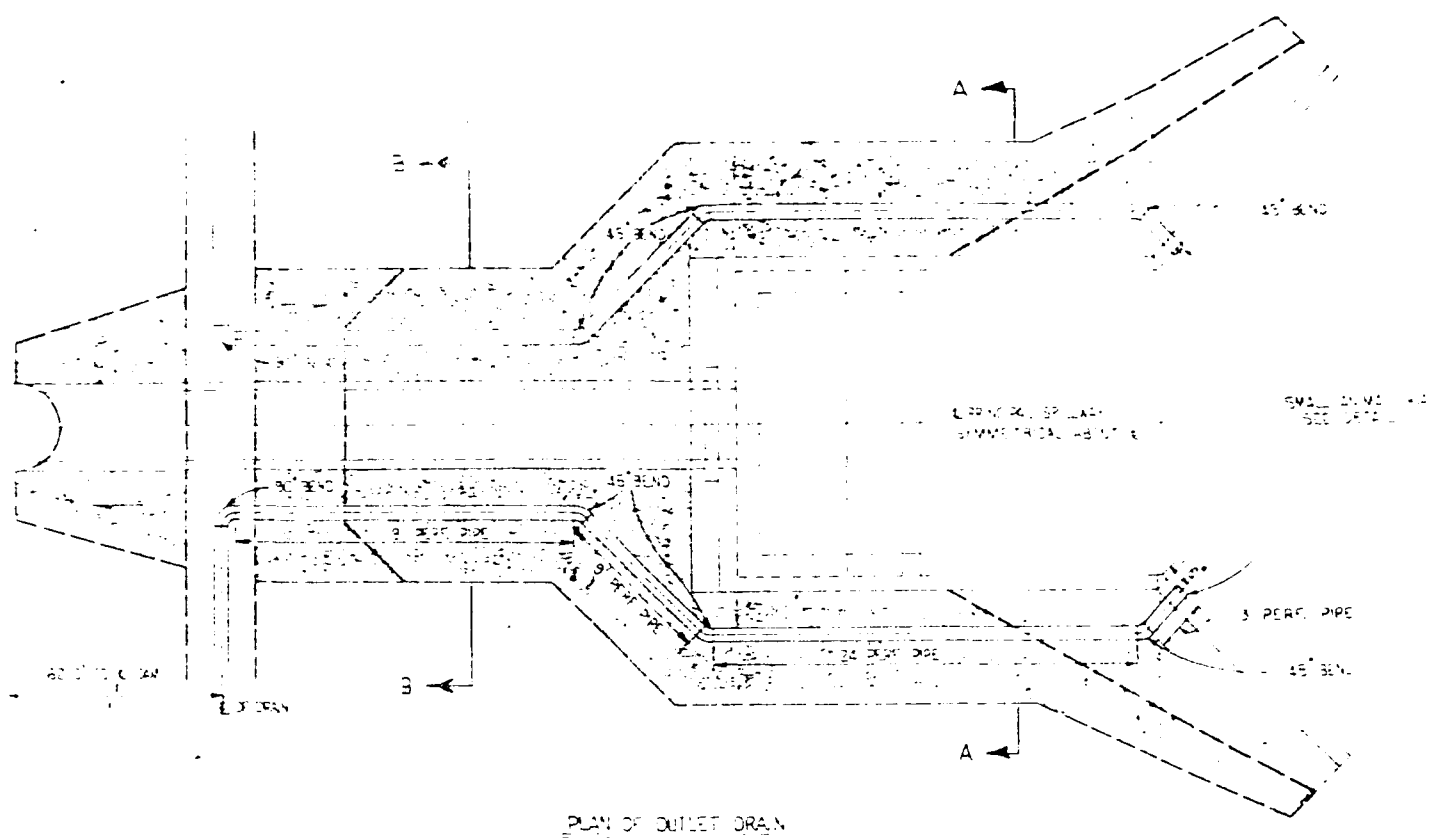


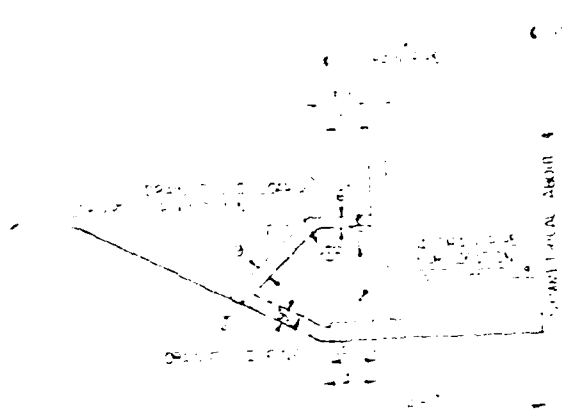
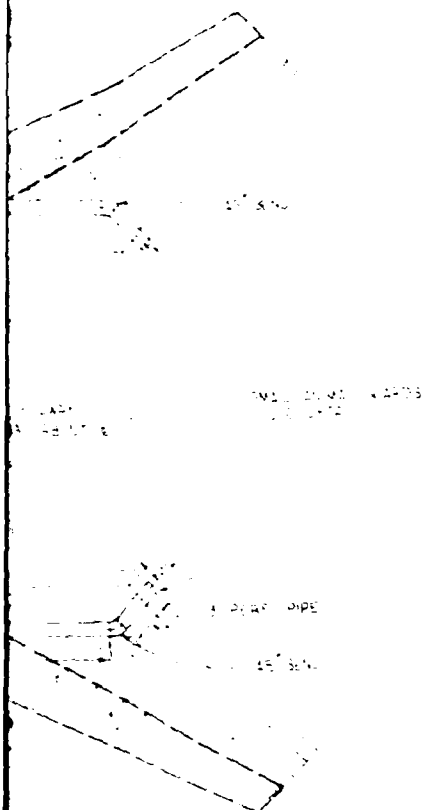
9/22/74  
**AS BUILT**

CONE WANGO CREEK WATERSHED PROJECT  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK  
DRAINAGE SYSTEM

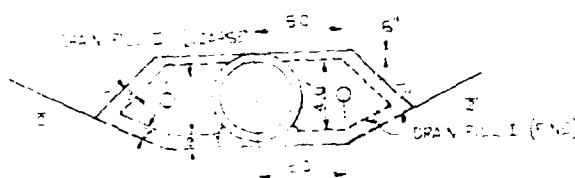
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

|                                      |                     |                                      |                     |
|--------------------------------------|---------------------|--------------------------------------|---------------------|
| Designed by<br><b>J. TOENNIESSEN</b> | Date<br><b>9/71</b> | Approved by<br><b>WILLIAM TURNER</b> | Date<br><b>9/71</b> |
| Title<br><b>NY-216-P</b>             |                     | Scale<br><b>1" = 10'</b>             |                     |





SECTION AA



SECTION BB

8" PRECASTED  
ASBESTOS CEMENT  
PIPE



8" ASBESTOS CEMENT PIPE

1/2" GALVANIZED PIPE

1/2" GALV. BOLT W/FLAT

WASHER 1/2"



15" WOVEN WIRE MESH  
GALVANIZED NO. 2 GAGE

DETAIL OF WALL, ANNUAL GAGE SCREEN & OUTLET OF DRAIN PIPE  
NOT TO SCALE

**AS BUILT**  
8/22/77

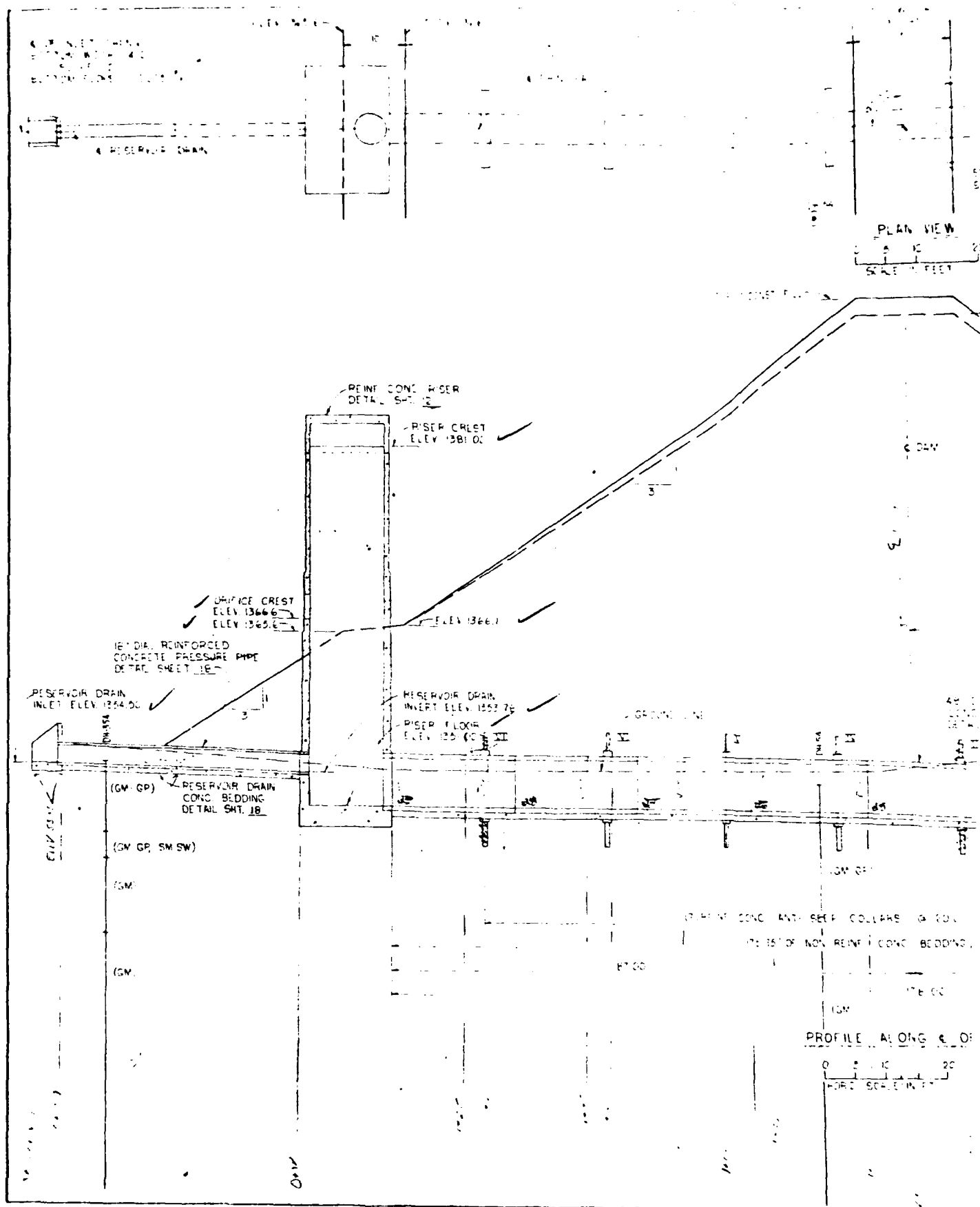
GENE WANGO CREEK WATERSHED PROJECT  
SITE 3A  
FLOODWATER RETARDING DAM  
CHAUTAUQUE COUNTY, NEW YORK  
DRAINAGE SYSTEM  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

DESIGNED BY 9/77  
DRAWN BY 9/77

IN-10-10

B-II

2



PLAN VIEW

SCALE 1" = 20'

WHEN PIPE IS SUPPLIED IN LENGTHS OTHER THAN SHOWN, THE ENGINEER WILL PROVIDE THE CONTRACTOR WITH A REVISION OF THIS SHEET SHOWING ORDER OF INSTALLATION AND PIPE INVERT ELEVATIONS.

| COLLAR | DIST. FROM OUTLET | INVERT OF PIPE |
|--------|-------------------|----------------|
| I      | 43                | 1349.32        |
| II     | 61                | 1349.72        |
| III    | 78                | 1350.17        |
| IV     | 103               | 1350.72        |
| V      | 123               | 1350.91        |
| VI     | 143               | 1350.96        |
| VII    | 166               | 1350.98        |

ABOVE DIMENSIONS FOR LENGTHS OF PIPE ARE BASED ON NOMINAL LENGTHS AND DO NOT INCLUDE CREEP

| COLLAR | DIST. FROM OUTLET | INVERT OF PIPE |
|--------|-------------------|----------------|
| I      | 43                | 1349.32        |
| II     | 61                | 1349.72        |
| III    | 78                | 1350.17        |
| IV     | 103               | 1350.72        |
| V      | 123               | 1350.91        |
| VI     | 143               | 1350.96        |
| VII    | 166               | 1350.98        |

PROFILE ALONG & OF PRINCIPAL SPILLWAY

SCALE 1" = 20' HORIZ. SCALE 1" = 10' VERT. SCALE

AS BUILT

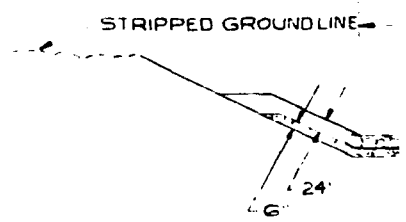
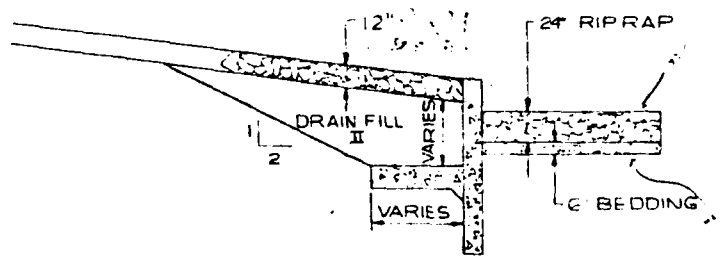
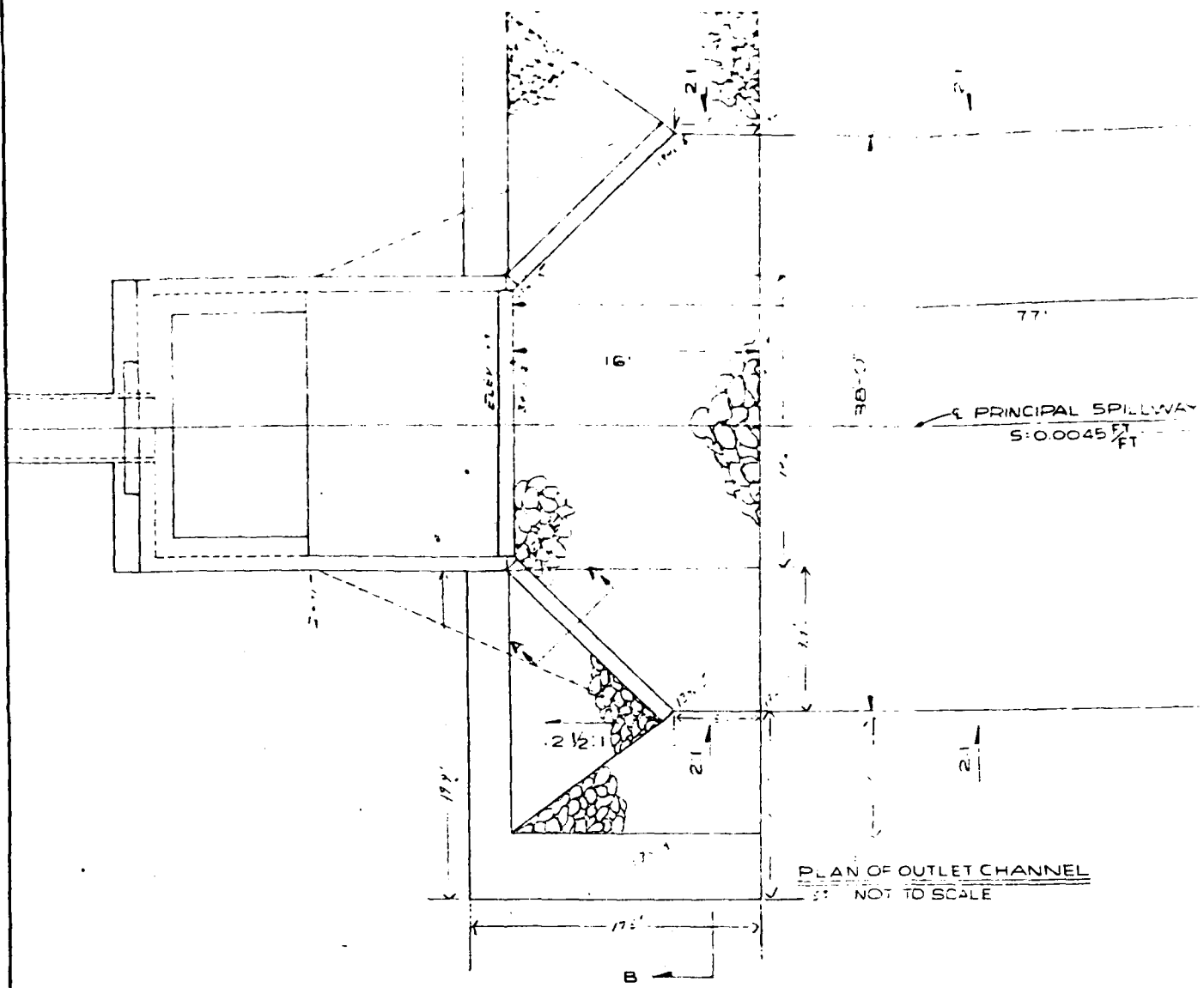
8/22/79

CONEWANGO CREEK WATERSHED PROJECT  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY NEW YORK  
PLAN PROFILE OF PRINCIPAL SPILLWAY  
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

J. TOENNISSSEN 9/7/79  
D. J. ANGELO 9/7/79

NY-2161-P

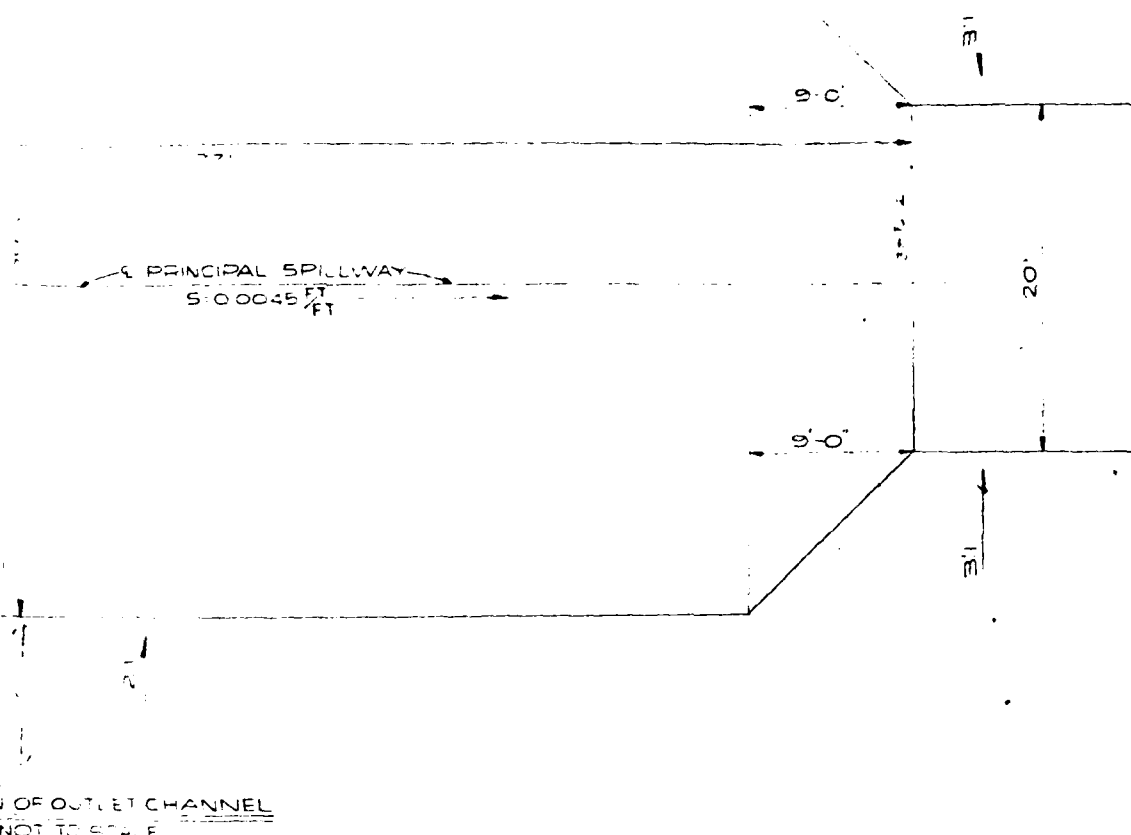
B-12



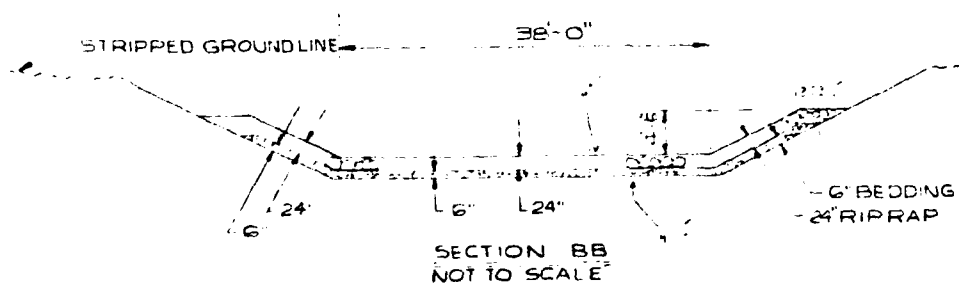
LOOSE ROCK RIP RAP SHALL BE GRADED FROM A MAXIMUM SIZE OF 10 CM MINIMUM SIZE OF 2 CM. MAXIMUM OF 20% SHALL BE LESS THAN 6 CM. A MAXIMUM OF 60% SHALL BE LESS THAN 12 CM. 60 CM.

**BEDDING DETAILS**

BEDDING SHALL MEET THE SPECIFICATION OF NYS DEPT OF TRANSPORTATION COARSE AGGREGATE # 1



OF OUTLET CHANNEL  
NOT TO SCALE

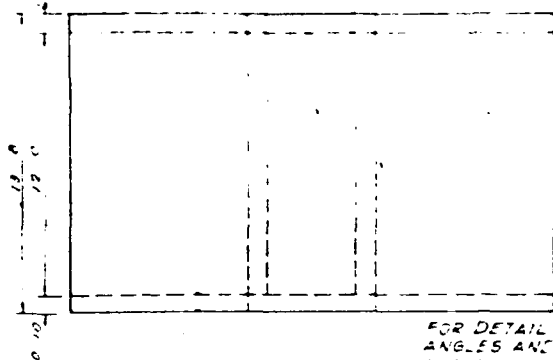


SECTION BB  
NOT TO SCALE

2

8/22/74  
**AS BUILT**

|                                                                                                                                                                                                      |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| CONEWANGO CREEK WATERSHED<br>SITE 9A<br>FLOODWATER RETARDING DAM<br>CHAUTAUQUA COUNTY, NEW YORK<br>OUTLET CHANNEL AND RIPRAP DETAILS<br>U. S. DEPARTMENT OF AGRICULTURE<br>SOIL CONSERVATION SERVICE |           |
| Designed by J. D. TOENNISSSEN                                                                                                                                                                        | Date 8-71 |
| Drawn by W. TURNER                                                                                                                                                                                   | Date 8-71 |
| Checked by                                                                                                                                                                                           | Date      |
| Approved by                                                                                                                                                                                          | Date      |
| NY-2161-P                                                                                                                                                                                            |           |

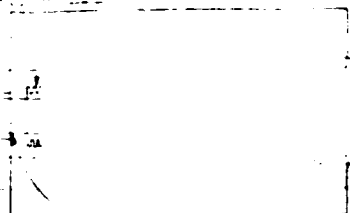


TOP PLAN

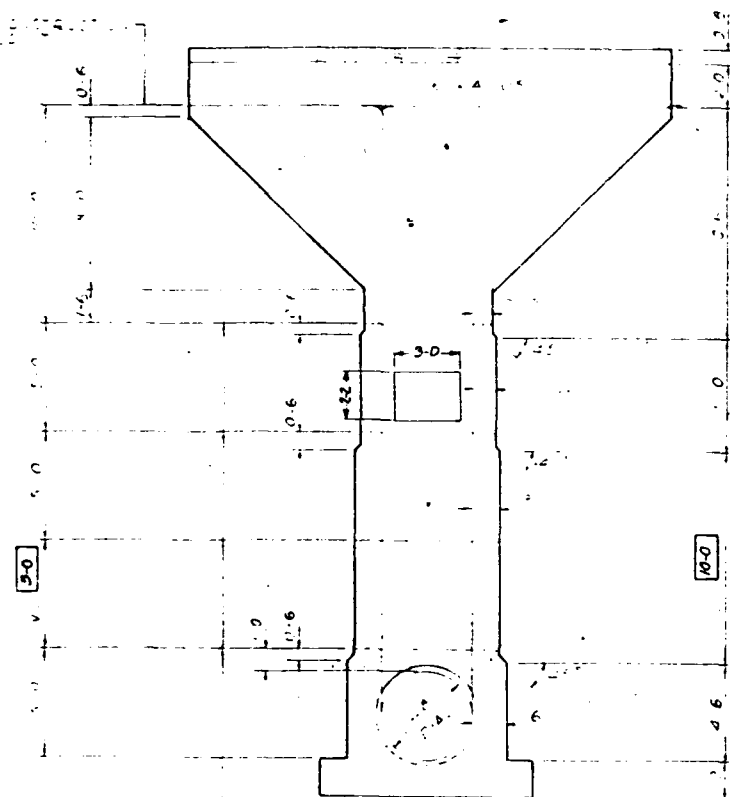
FOR DETAIL OF TRASH-RACK  
ANGLES AND GRATINGS  
SEE SHEET 16

MANHOLE ASSEMBLY DETAILS  
CONCRETE MANHOLE RINGS  
MINIMUM SIZE 30" DIA.  
NATIONAL FOUNDRY COMPANY  
MODEL R-64E1-MH-11  
STAINLESS STEEL SCREENS OR  
APPROVED EQUIVALENT

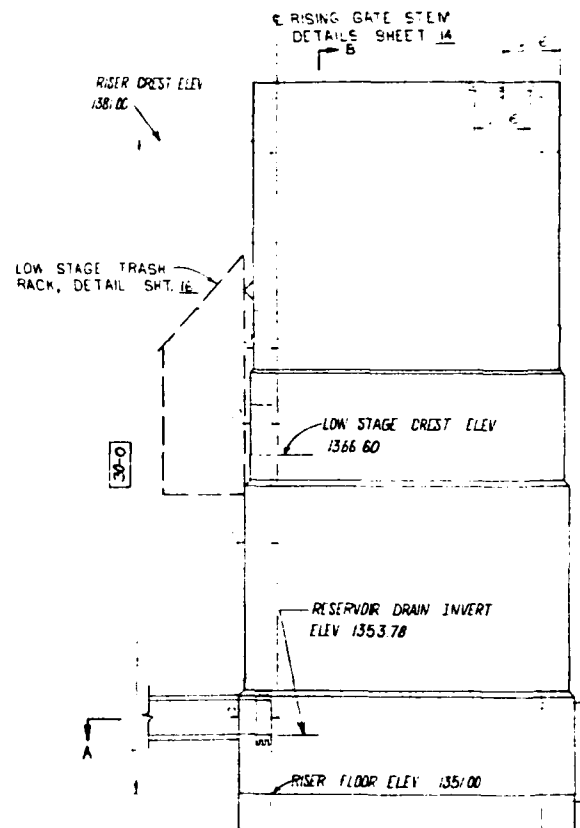
WALL FITTING SEE DETAIL SHEET 16



BELL WALL FITTING  
DETAIL SHEET 16



SECTION B-B



ERISING GATE STEM  
DETAILS SHEET 14

RISER DREST ELEV  
1381.00

LOW STAGE TRASH  
RACK, DETAIL SHT. 16

LOW STAGE DREST ELEV  
1366.60

RESERVOIR DRAIN INVERT  
ELEV 1353.78

RISER FLOOR ELEV 1351.00

DATE 2-28-68  
SHEET 1 OF 4

| STANDARD COVERED RISER |               |               |  |
|------------------------|---------------|---------------|--|
| MANHOLE RINGS          | 12" - 4000 PS | 12" - 1600 PS |  |
|                        | 18" - 8       | 18" - 2000 PS |  |
| STANDARD: TWO NO       | ES 3048 30 30 |               |  |
| DATE: 8-58             |               | SPEED: 1 OF 4 |  |

BELL WALL FITTING  
DETAIL SHEET E

SECTION A-A

CRABING GATE STEM  
DETAIL SHEET 1A

LOW STAGE DREST ELEV  
1366.60

RESERVOIR DRAIN INVERT  
ELEV 1353.78

PSR FLOOR ELEV 1351.00

SIDEWALL ELEVATION

# STEEL SCHEDULE

| MARK | SIZE | QUANTITY | LENGTH | TYPE | TOTAL LENGTH |
|------|------|----------|--------|------|--------------|
| 71   | 5    | 24       | 5.6    | 1    | 134.4        |
| 72   | 5    | 8        | 12.3   | 1    | 98.4         |
| 73   | 5    | 4        | 8.6    | 1    | 34.4         |
| 74   | 5    | 4        | 3      | 1    | 12.0         |
| 75   | 5    | 4        | 6.0    | 1    | 24.0         |
| 76   | 5    | 4        | 4.9    | 1    | 19.6         |
| 77   | 5    | 4        | 3.6    | 1    | 14.4         |
| 78   | 5    | 4        | 14.0   | 19   | 56.0         |
| 79   | 6    | 16       | 12.9   | 1    | 206.4        |
| 710  | 5    | 4        | 12.9   | 1    | 51.6         |
| 711  | 5    | 2        | 4.9    | 1    | 9.8          |
| 712  | 5    | 2        | 5.9    | 1    | 11.8         |
| 713  | 5    | 2        | 8.3    | 1    | 16.6         |
| 714  | 5    | 2        | 10.9   | 1    | 21.8         |
| 715  | 5    | 2        | 13.3   | 1    | 26.6         |
| 716  | 5    | 2        | 15.9   | 1    | 31.8         |
| 717  | 5    | 2        | 18.3   | 1    | 36.6         |
| 718  | 5    | 2        | 20.9   | 1    | 41.8         |
| 719  | 5    | 20       | 9.9    | 1    | 198.0        |
| 720  | 5    | 10       | 12.3   | 1    | 123.0        |
| 721  | 5    | 4        | 9.3    | 1    | 37.2         |
| 722  | 5    | 4        | 6.0    | 1    | 24.0         |
| 723  | 5    | 4        | 5.9    | 1    | 23.6         |
| 724  | 5    | 4        | 5.6    | 1    | 22.4         |
| 725  | 5    | 4        | 4.3    | 1    | 17.2         |
| 726  | 5    | 4        | 3.6    | 1    | 14.4         |
| 727  | 5    | 4        | 4.0    | 19   | 56.0         |
| 728  | 6    | 32       | 11.3   | 21   | 362.4        |
| 729  | 5    | 16       | 11.0   | 24   | 176.0        |
| 730  | 5    | 2        | 8.3    | 1    | 16.6         |
| 731  | 5    | 2        | 6.9    | 1    | 13.8         |
| 732  | 5    | 2        | 11.3   | 1    | 22.6         |
| 733  | 5    | 2        | 13.9   | 1    | 27.8         |
| 734  | 5    | 2        | 16.9   | 1    | 33.8         |
| 735  | 5    | 2        | 18.9   | 1    | 37.8         |
| 736  | 5    | 2        | 21.3   | 1    | 42.6         |
| 737  | 5    | 4        | 21.3   | 1    | 85.2         |
| 738  | 5    | 4        | 21.3   | 1    | 85.2         |
| 739  | 5    | 36       | 12.9   | 1    | 463.2        |
| 740  | 6    | 5        | 9.3    | 1    | 46.5         |
| 741  | 5    | 11       | 21.3   | 1    | 234.3        |
| 742  | 4    | 4        | 9.3    | 1    | 37.2         |
| 743  | 4    | 11       | 21.3   | 1    | 234.3        |
| 744  | 4    | 4        | 9.3    | 1    | 37.2         |
| 745  | 5    | 36       | 9.3    | 21   | 334.8        |
| 746  | 5    | 2        | 11.6   | 21   | 243.6        |
| 747  | 5    | 2        | 2.9    | 21   | 59.4         |

|     |   |    |      |    |       |
|-----|---|----|------|----|-------|
| 71  | 5 | 24 | 5.6  | 1  | 134.4 |
| 72  | 5 | 8  | 12.3 | 1  | 98.4  |
| 73  | 5 | 4  | 8.6  | 1  | 34.4  |
| 74  | 5 | 4  | 3    | 1  | 12.0  |
| 75  | 5 | 4  | 6.0  | 1  | 24.0  |
| 76  | 5 | 4  | 4.9  | 1  | 19.6  |
| 77  | 5 | 4  | 3.6  | 1  | 14.4  |
| 78  | 5 | 4  | 14.0 | 19 | 56.0  |
| 79  | 6 | 16 | 12.9 | 1  | 206.4 |
| 710 | 5 | 4  | 12.9 | 1  | 51.6  |
| 711 | 5 | 2  | 4.9  | 1  | 9.8   |
| 712 | 5 | 2  | 5.9  | 1  | 11.8  |
| 713 | 5 | 2  | 8.3  | 1  | 16.6  |
| 714 | 5 | 2  | 10.9 | 1  | 21.8  |
| 715 | 5 | 2  | 13.3 | 1  | 26.6  |
| 716 | 5 | 2  | 15.9 | 1  | 31.8  |
| 717 | 5 | 2  | 18.3 | 1  | 36.6  |
| 718 | 5 | 2  | 20.9 | 1  | 41.8  |
| 719 | 5 | 20 | 9.9  | 1  | 198.0 |
| 720 | 5 | 10 | 12.3 | 1  | 123.0 |
| 721 | 5 | 4  | 9.3  | 1  | 37.2  |
| 722 | 5 | 4  | 6.0  | 1  | 24.0  |
| 723 | 5 | 4  | 5.9  | 1  | 23.6  |
| 724 | 5 | 4  | 5.6  | 1  | 22.4  |
| 725 | 5 | 4  | 4.3  | 1  | 17.2  |
| 726 | 5 | 4  | 3.6  | 1  | 14.4  |
| 727 | 5 | 4  | 4.0  | 19 | 56.0  |
| 728 | 6 | 32 | 11.3 | 21 | 362.4 |
| 729 | 5 | 16 | 11.0 | 24 | 176.0 |
| 730 | 5 | 2  | 8.3  | 1  | 16.6  |
| 731 | 5 | 2  | 6.9  | 1  | 13.8  |
| 732 | 5 | 2  | 11.3 | 1  | 22.6  |
| 733 | 5 | 2  | 13.9 | 1  | 27.8  |
| 734 | 5 | 2  | 16.9 | 1  | 33.8  |
| 735 | 5 | 2  | 18.9 | 1  | 37.8  |
| 736 | 5 | 2  | 21.3 | 1  | 42.6  |
| 737 | 5 | 4  | 21.3 | 1  | 85.2  |
| 738 | 5 | 4  | 21.3 | 1  | 85.2  |
| 739 | 5 | 36 | 12.9 | 1  | 463.2 |
| 740 | 6 | 5  | 9.3  | 1  | 46.5  |
| 741 | 5 | 11 | 21.3 | 1  | 234.3 |
| 742 | 4 | 4  | 9.3  | 1  | 37.2  |
| 743 | 4 | 11 | 21.3 | 1  | 234.3 |
| 744 | 4 | 4  | 9.3  | 1  | 37.2  |
| 745 | 5 | 36 | 9.3  | 21 | 334.8 |
| 746 | 5 | 2  | 11.6 | 21 | 243.6 |
| 747 | 5 | 2  | 2.9  | 21 | 59.4  |

8/22/74 AS BUILT

## QUANTITIES

STEEL 3186.0 LBS  
3323 LBS  
15482.0 LBS

CONCRETE 69.0 CUBIC YDS.

LENGTH OF 2" BARS (354) = LENGTH OF BARS 4" THROUGH 2"

## CONEWANGO CREEK WATERSHED PROJECT

SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK  
RISER STRUCTURAL DETAILS

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

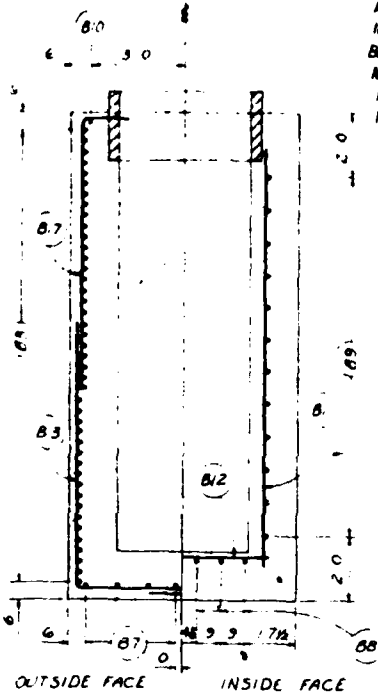
DESIGNED BY J. DENNISSEN

DATE 7/71

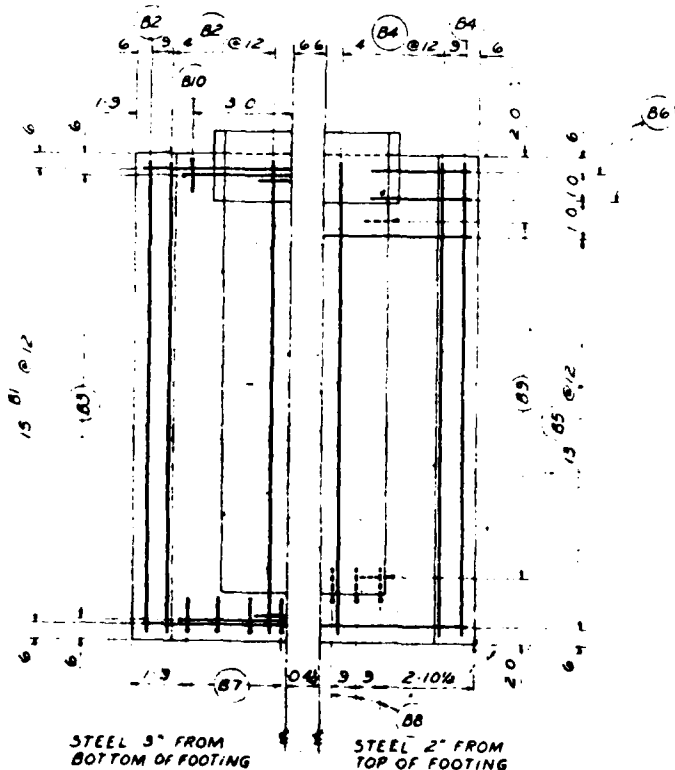
BY R. G. YOLTON

NY-26-P

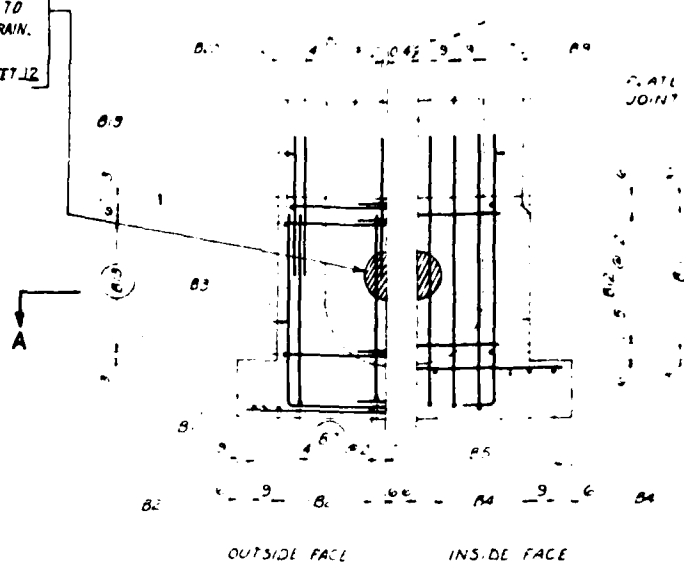
AS DIRECTED BY ENGINEER, STEEL  
IN SHADED AREA WILL BE CUT,  
BENT OR MOVED AS REQUIRED TO  
ACCOMMODATE RESERVOIR DRAIN.  
FOR EXACT LOCATION OF  
RESERVOIR DRAIN SEE SHEET 12.



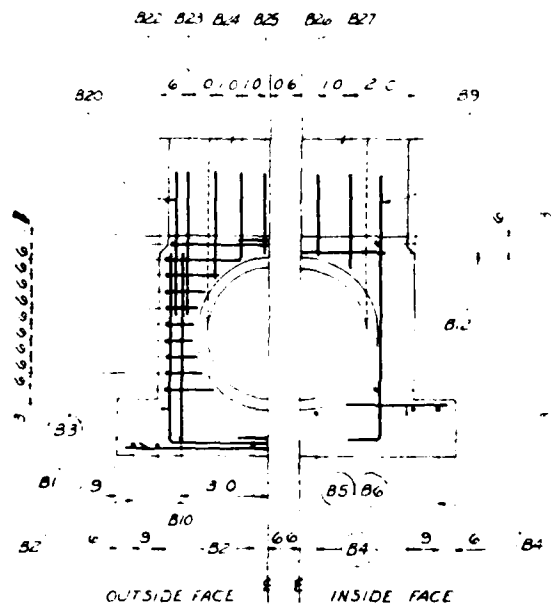
SECTION A-A



FOOTING PLAN



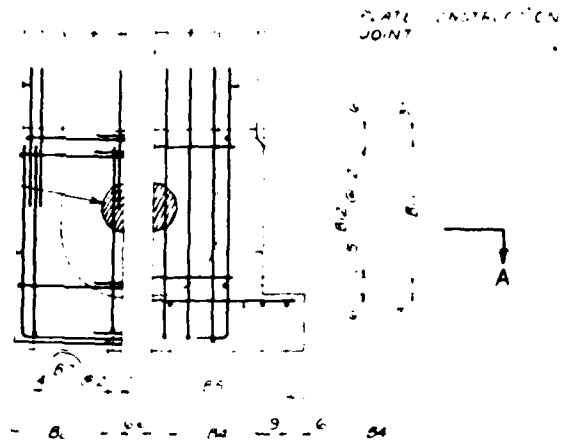
UPSTREAM ELEVATION



DOWNSTREAM ELEVATION

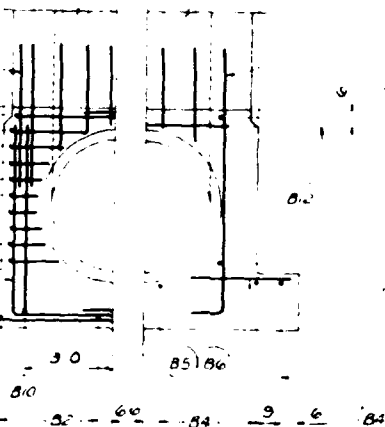
| STANDARD COVERED RISER |                    |
|------------------------|--------------------|
| DESIGN CONSTANTS       |                    |
| $f'_c$ - 4000 psi      | $f'_s$ - 1600 psi  |
| $n$ - 8                | $f_s$ - 20,000 psi |
| STANDARD SPEC. NO.     |                    |
| ES-3048-3015E          |                    |
| DATE 8-08              | SHEET 2 OF 4       |

0 2 4 6  
SCALE IN FEET

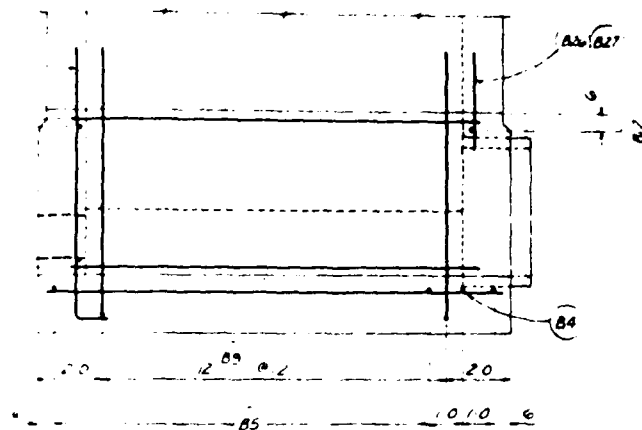


UPSTREAM ELEVATION

B21 B24 B25 B26 B27  
B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B20

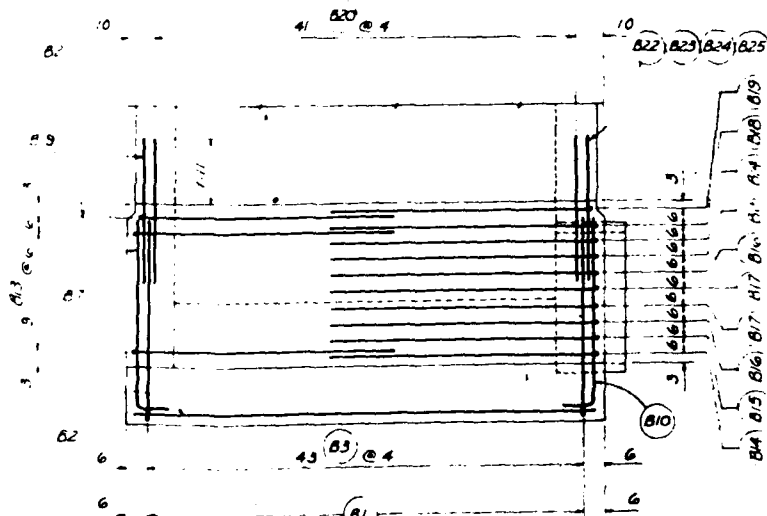


DOWNSTREAM ELEVATION



STEEL 2" FROM INSIDE FACE OF RISER  
AND 2" FROM TOP OF FOOTING

SIDEWALL ELEVATION



STEEL 2" FROM OUTSIDE FACE OF RISER  
AND 3" FROM BOTTOM OF FOOTING

SIDEWALL ELEVATION

**AS BUILT**  
8/22/77

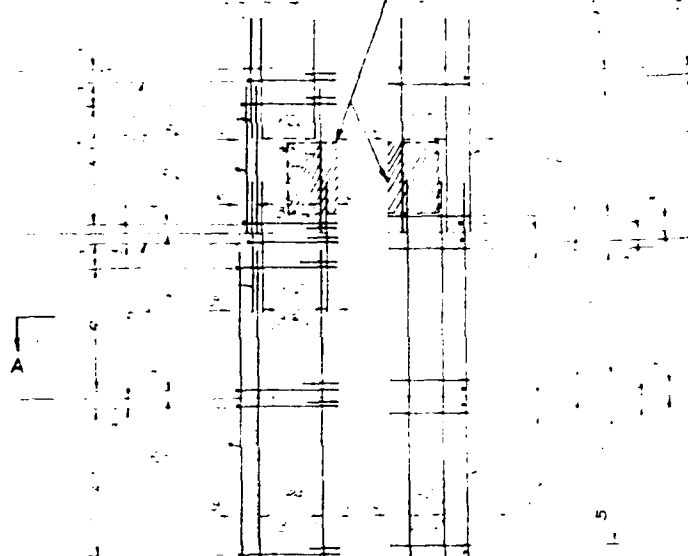
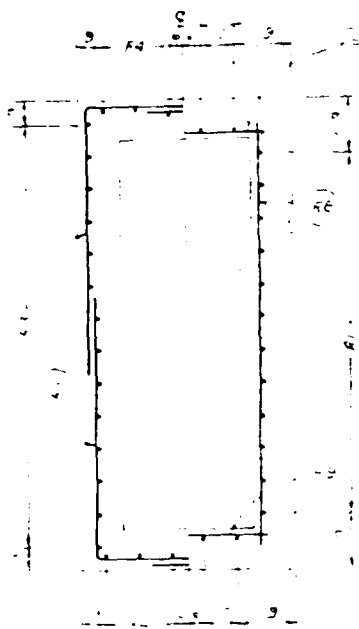
CONEWANGO CREEK WATERSHED PROJECT  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK  
RISER STRUCTURAL DETAILS

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

|                       |             |              |  |
|-----------------------|-------------|--------------|--|
| Adapted: J. Thomasson | Date: 11/21 | Approved by: |  |
| Drawn:                |             | Reviewed by: |  |
| Traced:               |             | Checked by:  |  |
| Checked:              |             | NY-2161-P    |  |

B-15

AS DIRECTED BY ENGINEER, SEE  
 1/4" SH-ALUM AREA WILL BE G.T.  
 BEAT OF MOVED AS PER FED TO  
 ACCOMMODATE OFFICE FOR ERECT  
 LOCATION OF OFFICE SEE SHEET 11



# SECTION A-A

OTHER SECTIONS SIMILAR

# ENDWALL ELEVATION

## CONSTRUCTION DETAILS

1. SPECIFIED BAR DIMENSIONS ARE MEASURED TO OUTSIDE EDGE OF ALL BENDS.
2. RADIUS OF BENDS EQUALS 3 BAR DIAMETERS FOR SIZES EQUALS TO OR LESS THAN #7.
3. THE 2" AND 3" DISTANCE FROM SPECIFIED CONCRETE SURFACE ARE CLEAR DISTANCES. WHERE NOT OTHERWISE SPECIFIED ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE GROUND SHALL HAVE A MINIMUM OF 3" COVER. ALL REINFORCING STEEL PLACED IN CONCRETE POURED IN FORMS SHALL HAVE A MINIMUM OF 2" CLEAR COVER.
4. ALL EXPOSED EDGES OF CONCRETE TO HAVE A 3/4" CHAMFER UNLESS OTHERWISE NOTED.

## SLIDE GATE DETAILS

1. 18" DIA. FLAT FRAME SLIDE GATE
2. CLASS O-30
3. SLIDE GATE SHALL CONFORM TO SPECIFICATIONS AND SHALL BE TYPE MHS-1.
4. 2" TYPE WALL THIMBLE 10" DEEP.
5. RISING STEM, STEM GUIDES, AND LIFTING DEVICE SHALL BE SIZED, AND SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

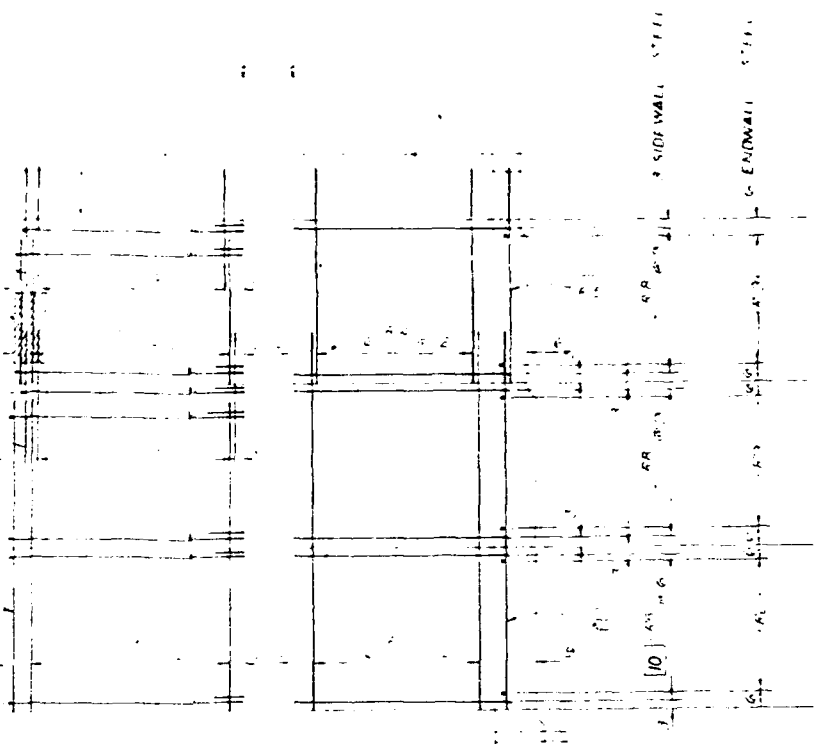
CONSTR. JOINT

## STANDARD COVERED P/SER

|          |          |          |
|----------|----------|----------|
| DESIGNER | 10-27-25 | 10-27-25 |
| DATE     | 10-27-25 | 10-27-25 |
| REVISION | 10-27-25 | 10-27-25 |
| DATE     | 10-27-25 | 10-27-25 |

SCALE IN FEET

PLA  
 CONSTR



SIDEWALL ELEVATION



CONSTR JOINT

Continuous thru construction joint  
 Splices shall be either:  
 1. Butt welded  
 2. Lapped 3' and lap spliced  
 3. Lapped 3' and lap spliced



PLATE  
CONSTR JOINT

2

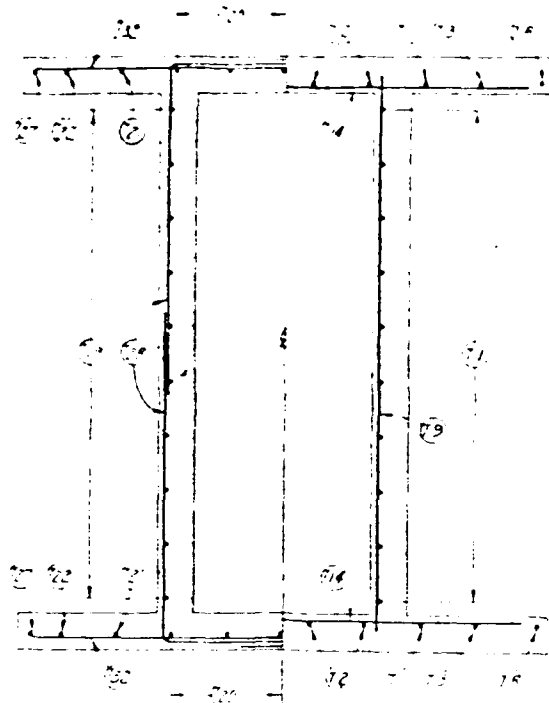
**AS BUILT**  
 8/22/77

CONEWANGO CREEK WATERSHED PROJECT  
 SITE 9A  
 FLOODWATER RETARDING DAM  
 CHAUTAUQUA COUNTY, NEW YORK  
 RISER STRUCTURAL DETAILS

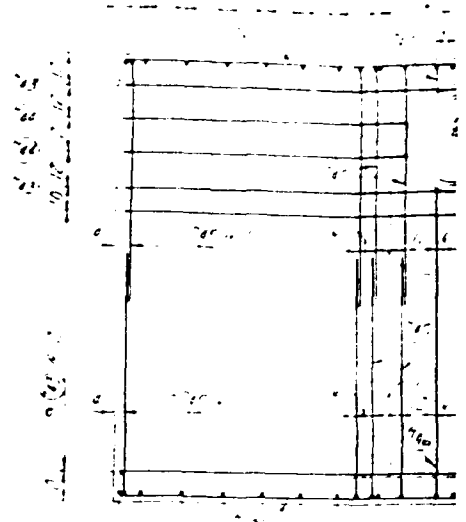
U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

DESIGNED BY J. TOENNIESSEN 7/77  
 DRAWN BY R. G. YOJON 7/77

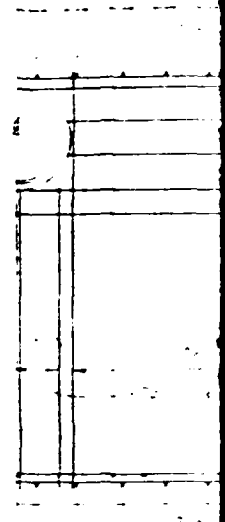
NY-2161-P



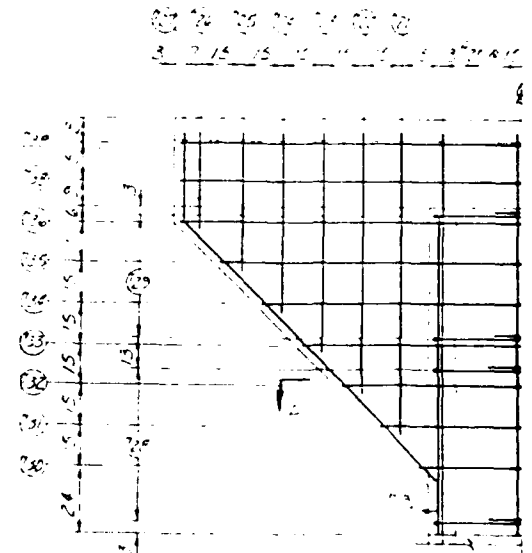
Outside Steel Inside Steel  
 24" 72" 24" 72" 18"  
 1000 Feet



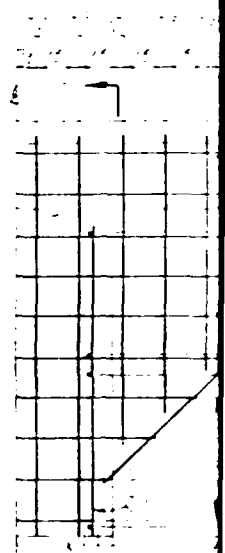
Steel 1/2" dia. at 12" o.c.  
 Steel 1/2" dia. at 12" o.c.



Steel 1/2" dia. at 12" o.c.  
 Steel 1/2" dia. at 12" o.c.



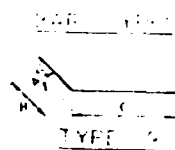
Steel 1/2" dia. at 12" o.c.  
 Steel 1/2" dia. at 12" o.c.



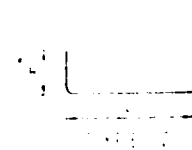
Steel 1/2" dia. at 12" o.c.  
 Steel 1/2" dia. at 12" o.c.

| STANDARD COVERED RISER |                |                |        |
|------------------------|----------------|----------------|--------|
| DISCREPANCIES          | 1/2" - 400 ps. | 1/2" - 100 ps. |        |
|                        | n=8            | 1/2" - 200 ps. |        |
| STANDARD Dwg. No.      | ES 4046 3015E  |                |        |
| DATE                   | 1/1            | SHEET          | 4 OF 4 |

TYPE

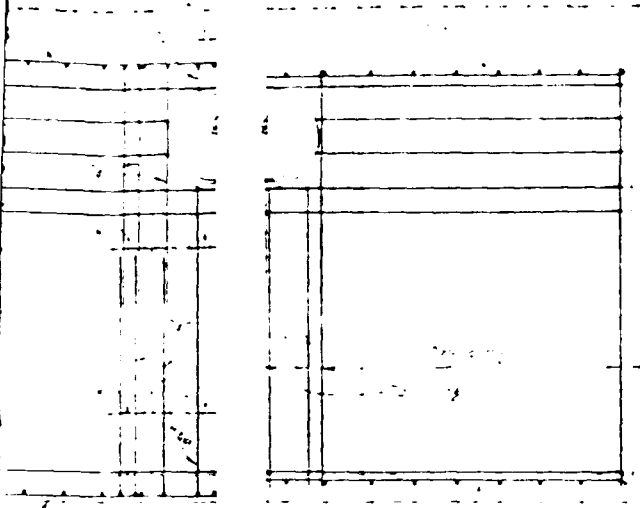


TYPE

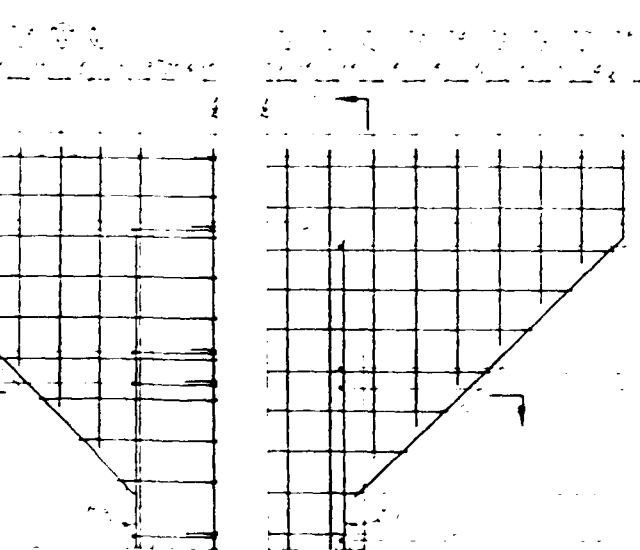


TYPE

NOTE:  
 1. Out of 100%  
 2. The 100% of 100%  
 3. Clear D. 100%  
 4. Radius of 100%  
 5. 100% of 100%



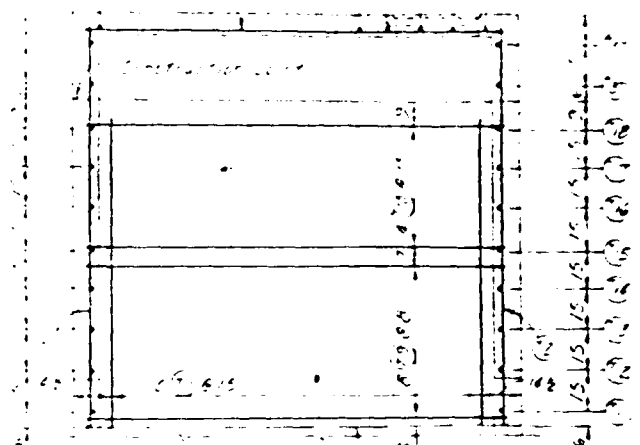
Steel 2" From Inside Face  
Steel 2" From Bottom  
Steel 2" From Top



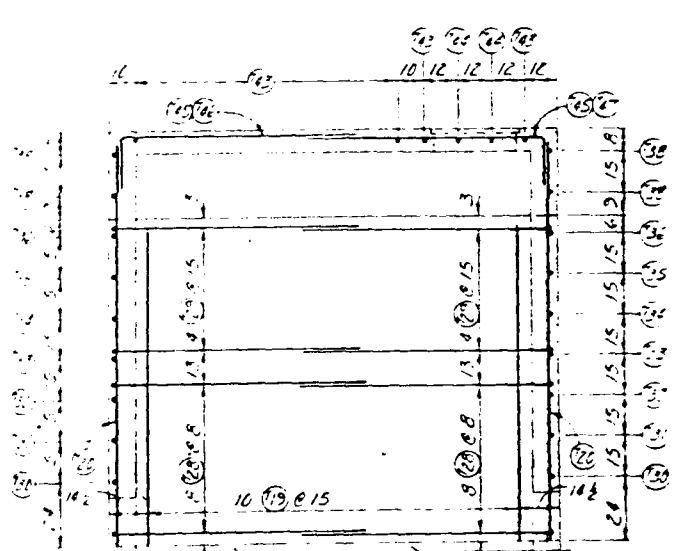
Steel 2" From Inside Face  
Steel 2" From Bottom  
Steel 2" From Top

1. All dimensions are in feet and inches.  
2. The 2" and 4" dimensions are from the face of the concrete.  
3. Radius of bend equals 12" for all reinforcement bars.  
4. All reinforcement bars are to be placed in the concrete.

2



Steel 2" From Inside Face  
Steel 2" From Bottom  
Steel 2" From Top



Steel 2" From Outside Face  
Steel 2" From Bottom  
Steel 2" From Top

**AS BUILT**

Scale in Feet  
Unless Otherwise Shown 8/24/79

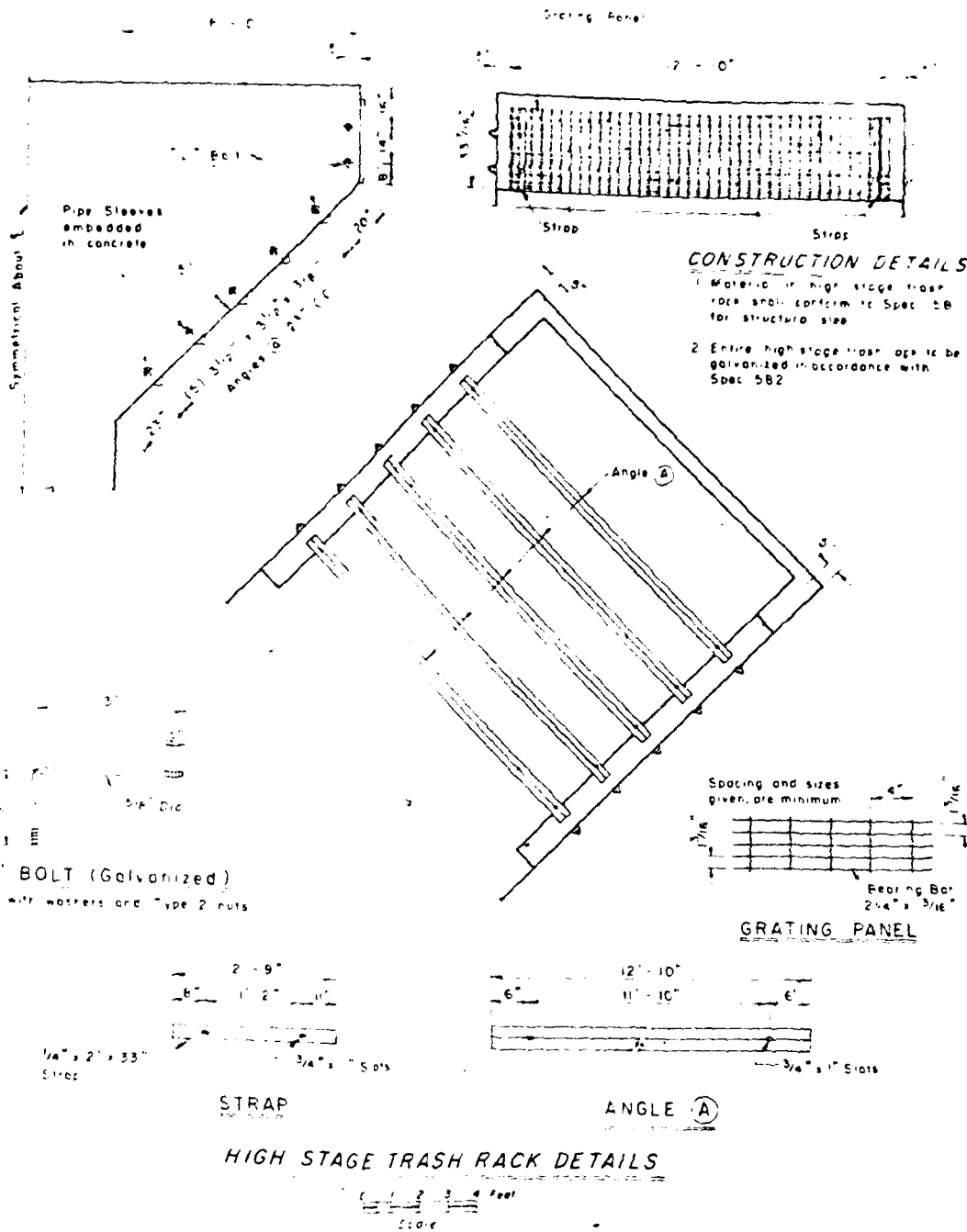
**CONEWAGO CREEK WATERSHED PROJECT**  
**SITE 9A**  
**FLOODWATER RETARDING DAM**  
**CHAUTAUQUE COUNTY, NEW YORK**  
**RISER STRUCTURAL DETAILS**

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

DATE: 11/71  
 DRAWING: 11/71  
 NY-218-P

LOW STAGE TRASH RACK DETAILS

SECTION 4.4



"L" BOLT (Galvanized)  
Supply with washers and Type 2 nuts

| HIGH STAGE TRASH RACK BILL OF MATERIALS |                        | MATERIALS |          |
|-----------------------------------------|------------------------|-----------|----------|
| ITEM                                    | SIZE                   | LENGTH    | QUANTITY |
| Angle A                                 | 3 1/2" x 2 1/2" x 3/4" | 2 - 10'   | 10       |
| Strap                                   | 1/4" x 2" x 33"        | 2 - 10'   | 4        |
| "L" Bolt                                | 1/2" Dia               | 4 - 3'    | 28       |
| Grating Panel                           | 22" x 12" x 10"        | 2         | 2        |
| Support Brackets                        | 1/4" x 1/2"            | 2         | 2        |

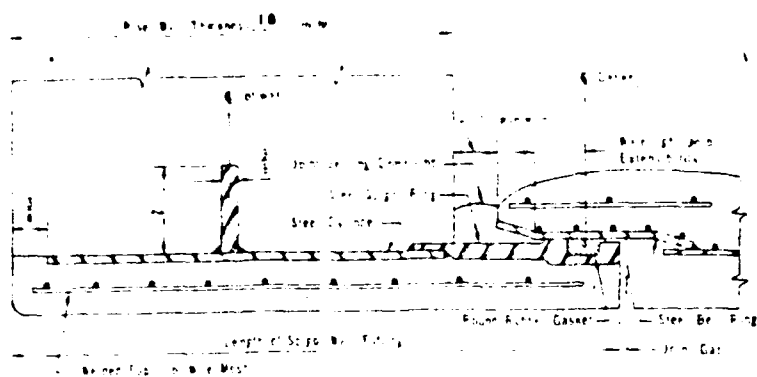
2

CONEWANGO CREEK WATERSHED PROJECT  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK  
RISER TRASH RACKS  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

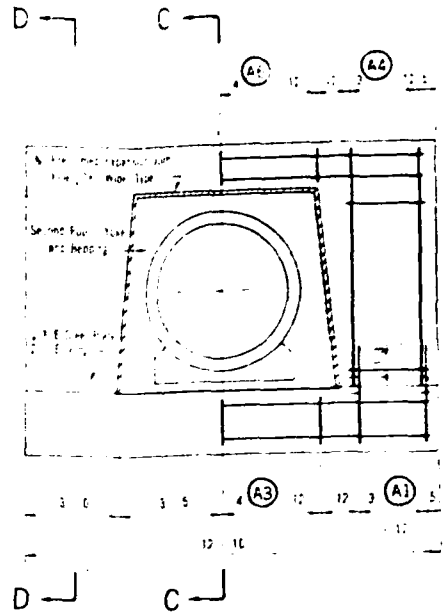
Adopted by TOENNISSSEN 11/73  
Drawn by L. H. Holmes 4/70

NY-2.6.-P

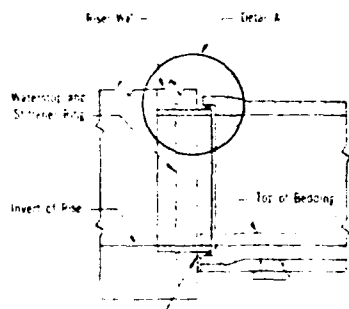
B-18



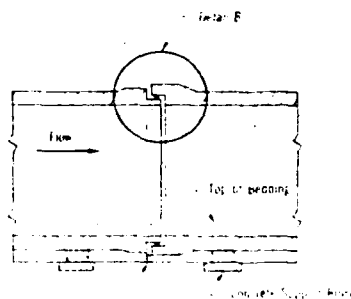
DETAIL A



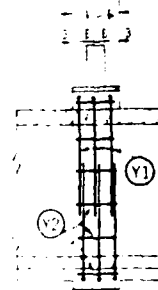
DETAIL OF ANTI-SEEP COLLAR 7



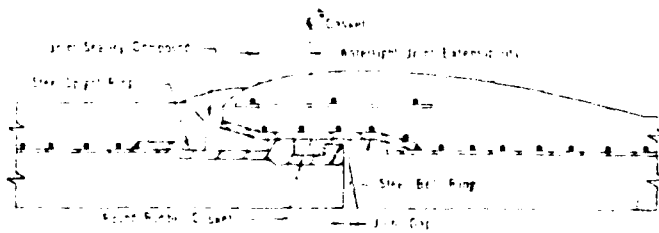
DETAIL OF SPIGOT WALL FITTING



DETAIL OF PIPE JOINT



SECTION C-C



DETAIL B

| JOINT REQUIREMENTS   |        |                     |                   |
|----------------------|--------|---------------------|-------------------|
| NO. OF PIPE SECTIONS | Length | Min. Wall Thickness | Min. Joint Length |
| EACH                 |        |                     |                   |
| B                    | 200    | 2' 4"               | 0' 50" 2' 53"     |
| I                    | 18 0   | 2' 4"               | 0' 50" 2' 53"     |

SUPPLY ONE SPIGOT RING WALL FITTING FOR 18" WALL CAST OUTSIDE OF SPIGOT RING WITH CONCRETE ON 18" SECTION

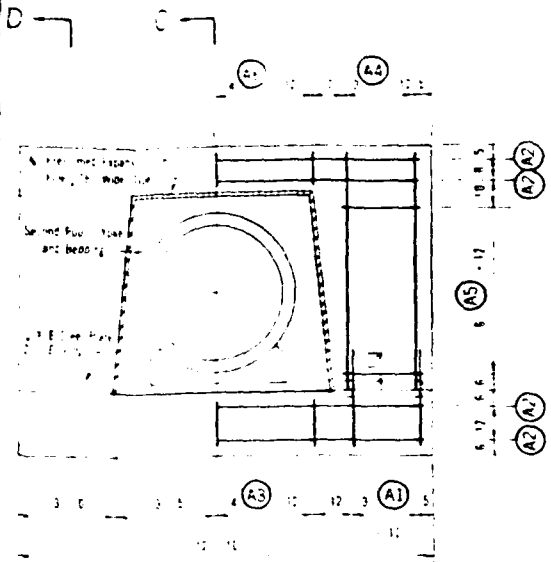
|                                                          |            |
|----------------------------------------------------------|------------|
| STANDARD CONDUIT DETAILS                                 |            |
| FOR REINFORCED CONCRETE PRESSURE PIPE PRINCIPAL SPILLWAY |            |
| STANDARD EPG NO.                                         | ES-5048-BE |
| DATE                                                     | 2-70       |
| SHEET                                                    | 1 OF 1     |

NOTE: THE PIPE SHALL BE JOINED TOGETHER SO THAT THE MAXIMUM JOINT GAP DOES NOT EXCEED 1/8" FOR PIPE Laid ON A STRAIGHT LINE. FOR CURVED PIPE OR PIPE Laid ON A CURVED LINE, THE JOINT GAP AT THE LOWEST POINT SHALL NOT EXCEED 1/4" INCH.

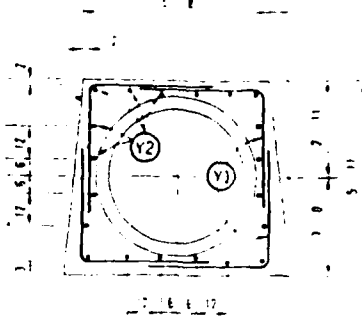
For pipe joints, the manufacturer's joint requirements will be determined by the Engineer.

For pipe joints, the manufacturer's joint requirements will be determined by the Engineer.

For pipe joints, the manufacturer's joint requirements will be determined by the Engineer.



DETAIL OF ANTI-SEEP COLLAR 7 REQUIRED



DETAIL OF ANTI-SEEP COLLAR YOKE

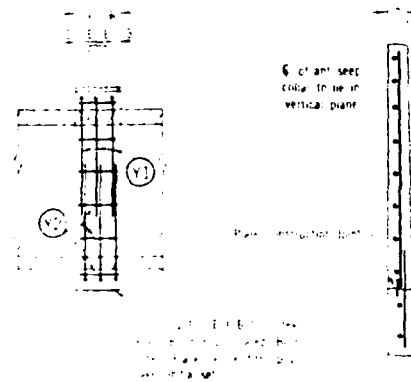
### STEEL SCHEDULE

| Item | Size | Quantity | Weight | Notes |
|------|------|----------|--------|-------|
| 1    | 4"   | 1        | 120-0  |       |
| 2    | 4"   | 1        | 120-0  |       |
| 3    | 4"   | 1        | 120-0  |       |
| 4    | 4"   | 1        | 120-0  |       |
| 5    | 4"   | 1        | 120-0  |       |
| 6    | 4"   | 1        | 120-0  |       |
| 7    | 4"   | 1        | 120-0  |       |
| 8    | 4"   | 1        | 120-0  |       |
| 9    | 4"   | 1        | 120-0  |       |
| 10   | 4"   | 1        | 120-0  |       |
| 11   | 4"   | 1        | 120-0  |       |
| 12   | 4"   | 1        | 120-0  |       |
| 13   | 4"   | 1        | 120-0  |       |
| 14   | 4"   | 1        | 120-0  |       |
| 15   | 4"   | 1        | 120-0  |       |
| 16   | 4"   | 1        | 120-0  |       |
| 17   | 4"   | 1        | 120-0  |       |
| 18   | 4"   | 1        | 120-0  |       |
| 19   | 4"   | 1        | 120-0  |       |
| 20   | 4"   | 1        | 120-0  |       |
| 21   | 4"   | 1        | 120-0  |       |
| 22   | 4"   | 1        | 120-0  |       |
| 23   | 4"   | 1        | 120-0  |       |
| 24   | 4"   | 1        | 120-0  |       |
| 25   | 4"   | 1        | 120-0  |       |
| 26   | 4"   | 1        | 120-0  |       |
| 27   | 4"   | 1        | 120-0  |       |
| 28   | 4"   | 1        | 120-0  |       |
| 29   | 4"   | 1        | 120-0  |       |
| 30   | 4"   | 1        | 120-0  |       |
| 31   | 4"   | 1        | 120-0  |       |
| 32   | 4"   | 1        | 120-0  |       |
| 33   | 4"   | 1        | 120-0  |       |
| 34   | 4"   | 1        | 120-0  |       |
| 35   | 4"   | 1        | 120-0  |       |
| 36   | 4"   | 1        | 120-0  |       |
| 37   | 4"   | 1        | 120-0  |       |
| 38   | 4"   | 1        | 120-0  |       |
| 39   | 4"   | 1        | 120-0  |       |
| 40   | 4"   | 1        | 120-0  |       |
| 41   | 4"   | 1        | 120-0  |       |
| 42   | 4"   | 1        | 120-0  |       |
| 43   | 4"   | 1        | 120-0  |       |
| 44   | 4"   | 1        | 120-0  |       |
| 45   | 4"   | 1        | 120-0  |       |
| 46   | 4"   | 1        | 120-0  |       |
| 47   | 4"   | 1        | 120-0  |       |
| 48   | 4"   | 1        | 120-0  |       |
| 49   | 4"   | 1        | 120-0  |       |
| 50   | 4"   | 1        | 120-0  |       |
| 51   | 4"   | 1        | 120-0  |       |
| 52   | 4"   | 1        | 120-0  |       |
| 53   | 4"   | 1        | 120-0  |       |
| 54   | 4"   | 1        | 120-0  |       |
| 55   | 4"   | 1        | 120-0  |       |
| 56   | 4"   | 1        | 120-0  |       |
| 57   | 4"   | 1        | 120-0  |       |
| 58   | 4"   | 1        | 120-0  |       |
| 59   | 4"   | 1        | 120-0  |       |
| 60   | 4"   | 1        | 120-0  |       |
| 61   | 4"   | 1        | 120-0  |       |
| 62   | 4"   | 1        | 120-0  |       |
| 63   | 4"   | 1        | 120-0  |       |
| 64   | 4"   | 1        | 120-0  |       |
| 65   | 4"   | 1        | 120-0  |       |
| 66   | 4"   | 1        | 120-0  |       |
| 67   | 4"   | 1        | 120-0  |       |
| 68   | 4"   | 1        | 120-0  |       |
| 69   | 4"   | 1        | 120-0  |       |
| 70   | 4"   | 1        | 120-0  |       |
| 71   | 4"   | 1        | 120-0  |       |
| 72   | 4"   | 1        | 120-0  |       |
| 73   | 4"   | 1        | 120-0  |       |
| 74   | 4"   | 1        | 120-0  |       |
| 75   | 4"   | 1        | 120-0  |       |
| 76   | 4"   | 1        | 120-0  |       |
| 77   | 4"   | 1        | 120-0  |       |
| 78   | 4"   | 1        | 120-0  |       |
| 79   | 4"   | 1        | 120-0  |       |
| 80   | 4"   | 1        | 120-0  |       |
| 81   | 4"   | 1        | 120-0  |       |
| 82   | 4"   | 1        | 120-0  |       |
| 83   | 4"   | 1        | 120-0  |       |
| 84   | 4"   | 1        | 120-0  |       |
| 85   | 4"   | 1        | 120-0  |       |
| 86   | 4"   | 1        | 120-0  |       |
| 87   | 4"   | 1        | 120-0  |       |
| 88   | 4"   | 1        | 120-0  |       |
| 89   | 4"   | 1        | 120-0  |       |
| 90   | 4"   | 1        | 120-0  |       |
| 91   | 4"   | 1        | 120-0  |       |
| 92   | 4"   | 1        | 120-0  |       |
| 93   | 4"   | 1        | 120-0  |       |
| 94   | 4"   | 1        | 120-0  |       |
| 95   | 4"   | 1        | 120-0  |       |
| 96   | 4"   | 1        | 120-0  |       |
| 97   | 4"   | 1        | 120-0  |       |
| 98   | 4"   | 1        | 120-0  |       |
| 99   | 4"   | 1        | 120-0  |       |
| 100  | 4"   | 1        | 120-0  |       |

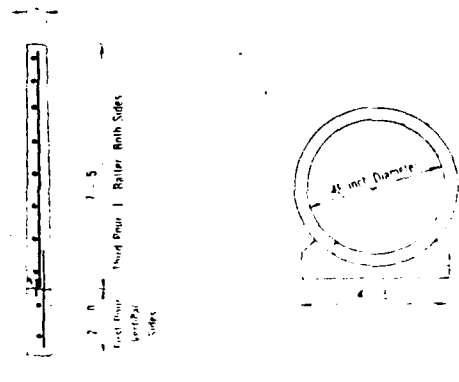
### QUANTITIES

| Item                            | Quantity    | Weight |
|---------------------------------|-------------|--------|
| Concrete                        |             |        |
| Anti-seep Collar including Yoke | 22.0 cu YDS |        |
| Total                           | 21.2 cu YDS |        |
| Steel                           |             |        |
| Anti-seep Collar including Yoke | 1842-2      | 1231   |
| Total                           |             | 57.48  |

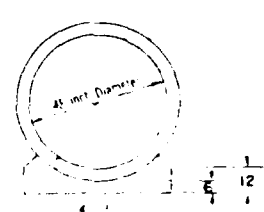
Complete quantities are given in an outside diameter of 48 inches.



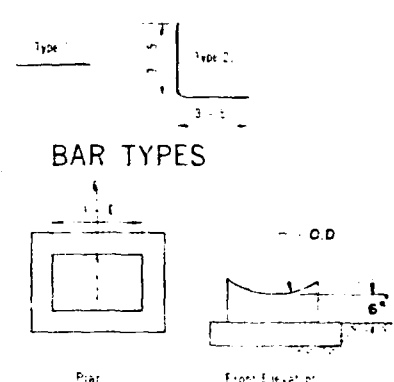
SECTION C-C



SECTION D-D



DETAIL OF BEDDING



BAR TYPES

### JOINT REQUIREMENTS

| Joint | Material | Dimensions      |
|-------|----------|-----------------|
| 200   | 2" x 4"  | 0.50 x 2" x 53" |
| 18 0  | 2" x 4"  | 0.50 x 2" x 53" |

NE SPIGOT RING WALL ATTACHING FOR 18" WALL  
SIDE OF SPIGOT RING WITH CONCRETE ON 18" SECTION

### STRENGTH REQUIREMENTS

| Item | Material | Dimensions      |
|------|----------|-----------------|
| 200  | 2" x 4"  | 0.50 x 2" x 53" |
| 18 0 | 2" x 4"  | 0.50 x 2" x 53" |

### SUGGESTED SUPPORT BLOCKS

Sufficient blocks shall be provided to support the pipe to the required line and grade. The contractor shall determine the number and size of blocks required. Weight must be given note.

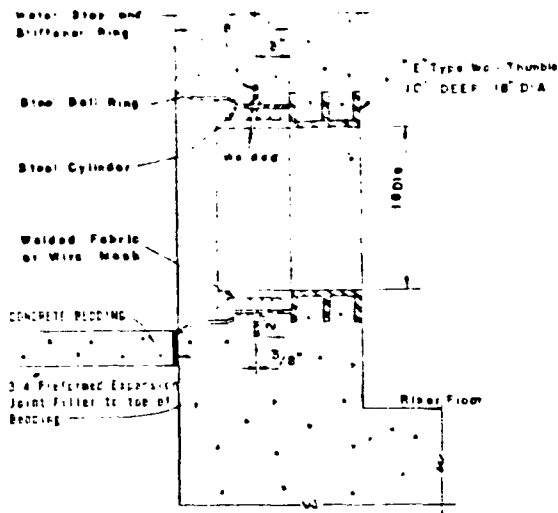
**AS BUILT**

**CONEWAGO CREEK WATERSHED PROJECT**  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAMPAIGN COUNTY, NEW YORK  
48" DIA. CONDUIT DETAILS

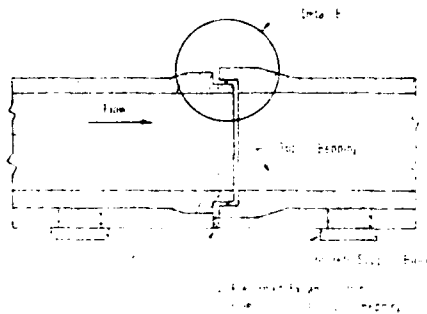
**U.S. DEPARTMENT OF AGRICULTURE**  
SOIL CONSERVATION SERVICE

Designer: J.D. TOFFANSEN  
Drawn: W.M. TURNER  
Checked: [Signature]  
Date: 8-71  
Scale: 1" = 1'-0"

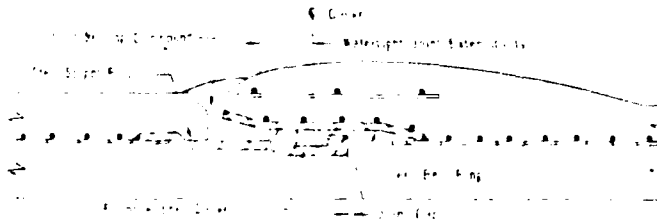
NY-216-P



**BELL WALL FITTING**  
**W/ "E" TYPE WALL THIMBLE**



**DETAIL OF PIPE JOINT**



**DETAIL B**

**JOINT REQUIREMENTS**

| No of<br>PIPE<br>SECTIONS<br>EACH | 20.0 | 23.4" | 00960 5*30" |
|-----------------------------------|------|-------|-------------|
| 2                                 |      |       |             |

| STANDARD CONDUIT DETAILS          |            |              |
|-----------------------------------|------------|--------------|
| FOR                               |            |              |
| REINFORCED CONCRETE PRESSURE PIPE |            |              |
| PRINCIPAL SPILLWAY                |            |              |
| STANDARD ERL NO                   | ES 5018-BE |              |
| DATE                              | 2-70       | SHEET 1 OF 1 |

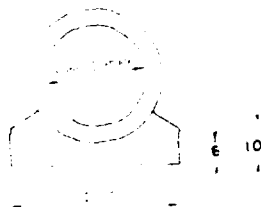
The drawing is to be used for the design of the spillway structure. It is to be used for the design of the spillway structure. It is to be used for the design of the spillway structure.

1. The drawing is to be used for the design of the spillway structure. It is to be used for the design of the spillway structure. It is to be used for the design of the spillway structure.

STR

18.C

QUANTITIES, (THIS SHEET ONLY)  
 CONCRETE 2.4 CU Yds  
 (NON-REINF)



DETAIL OF BEDDING



SUGGESTED SUPPORT BLOCKS

Support blocks shall be placed to support the structure and shall be placed on the ground surface. The blocks shall be placed on the ground surface and shall be placed on the ground surface.

*Blue/ry*  
**AS BUILT**

STRENGTH REQUIREMENTS

IT REQUIREMENTS

180 34.2 4712

240

CONEWANGO CREEK WATERSHED PROJECT  
 SITE 9A  
 FLOODWATER RETARDING DAM  
 CHAUTAUQUA COUNTY, NEW YORK  
 RESERVOIR DRAIN CONDUIT DETAILS  
 U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

DESIGNED BY  
 JULIUS D. TOENNIESSEN 9-71

CHECKED BY  
 WILLIAM TURNER 9-71

NY-2161-P

B-20

2



NOTE: Last section of conduit to be as horizontal as possible

Pipe ID

Concrete bedding  
Compressible material (Styrofoam)  
1/2" Expansion joint material

see section below

# SECTION ON CENTERLINE

Sidewall

Headwall  
(Wingwall similar)

1/4" x 6" Carbon steel plate at 6" of wall Use 3" lap splices

Apron

Drain fill Detail see sheet 2

4" Drain Pipe  
Detail see detail, sheet 2 of 5

## SECTION THROUGH DRAIN & FILTER

NOT TO SCALE

## CONSTRUCTION JOINT DETAILS

NOT TO SCALE

NOTE

Perforated drain pipe shall conform to specification 545 and shall be 4" dia pressure pipe, class 200

## QUANTITIES

|                                    |        |        |
|------------------------------------|--------|--------|
| Formwork (Contact area)            | 3080   | Sq Ft  |
| Reinforced Concrete (Class 4000)   | 77     | Cu Yds |
| Reinforcing Steel                  | 14,100 | Lbs    |
| Drainage                           |        |        |
| 4" Perforated drain pipe           | 137    | Lm Ft  |
| Animal screen detail, sheet 2 of 5 | 13     | ea     |
| Drain pipe tees                    | 13     | ea     |
| Drain pipe 90° ell                 | 2      | ea     |
| Drain pipe 45° ell                 | 2      | ea     |

8/21/74 AS BUILT

Joint 1/4" x 6" Carbon steel plate Structural grade 985 lbs

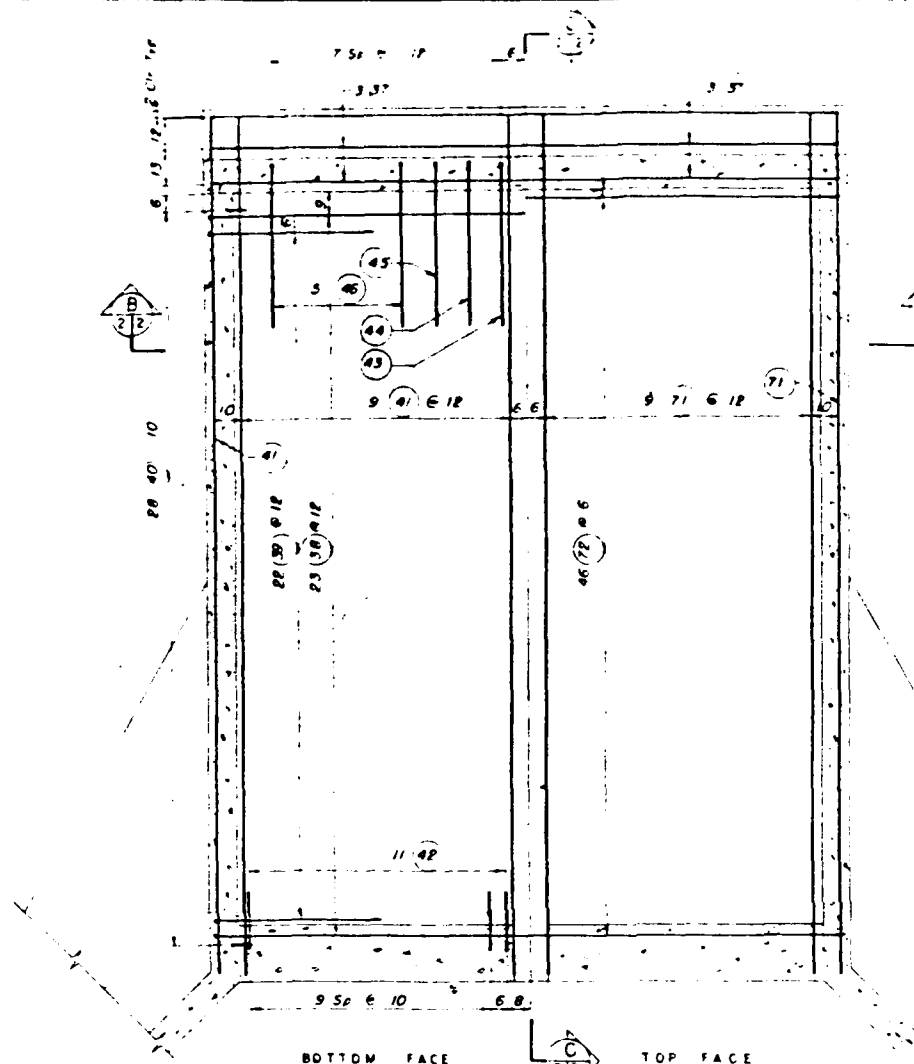
CONEWANGO CREEK WATERSHED PROJECT  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUE COUNTY, NEW YORK  
IMPACT BASIN DETAILS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

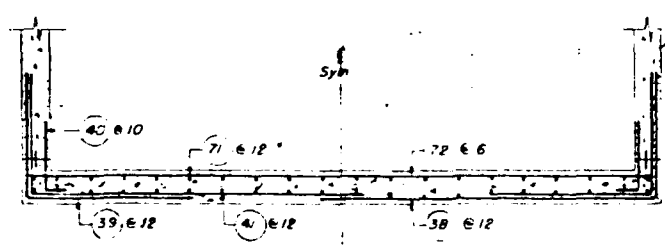
|                              |               |             |
|------------------------------|---------------|-------------|
| DESIGNED BY<br>J. TOENNENSEN | DATE<br>11/74 | APPROVED BY |
| DRAWN BY                     | CHECKED BY    | DATE        |
| PROJECT NO.                  | NY-261-P      |             |

## ISOMETRIC VIEW

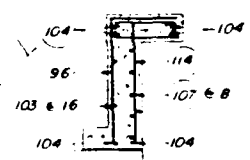
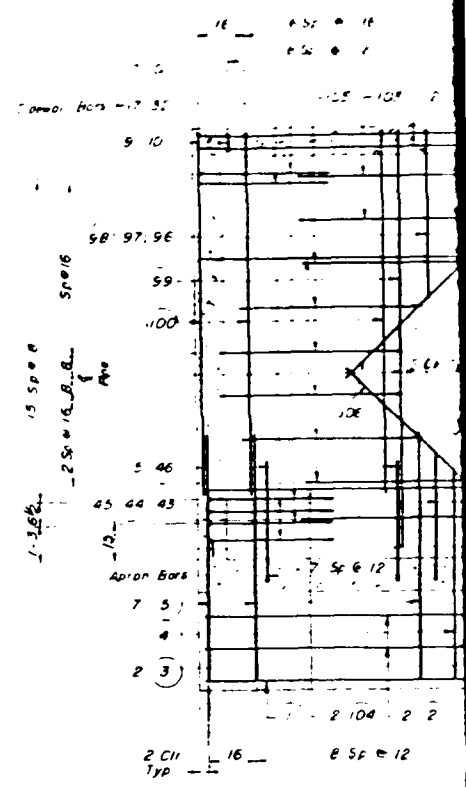
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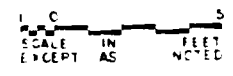
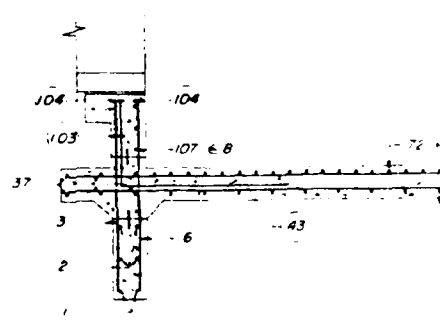
PLAN OF APRON



SECTION



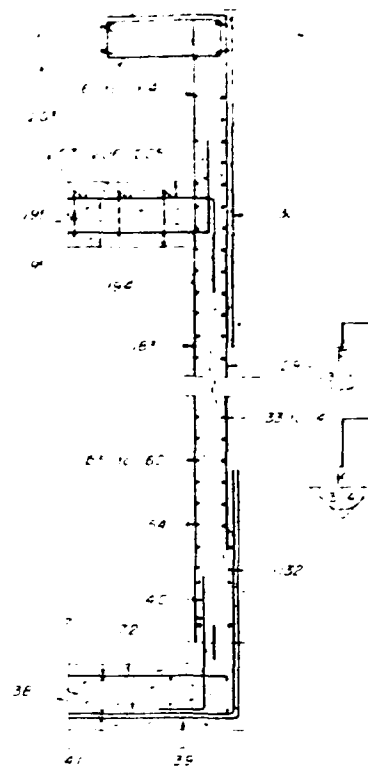
HEADW



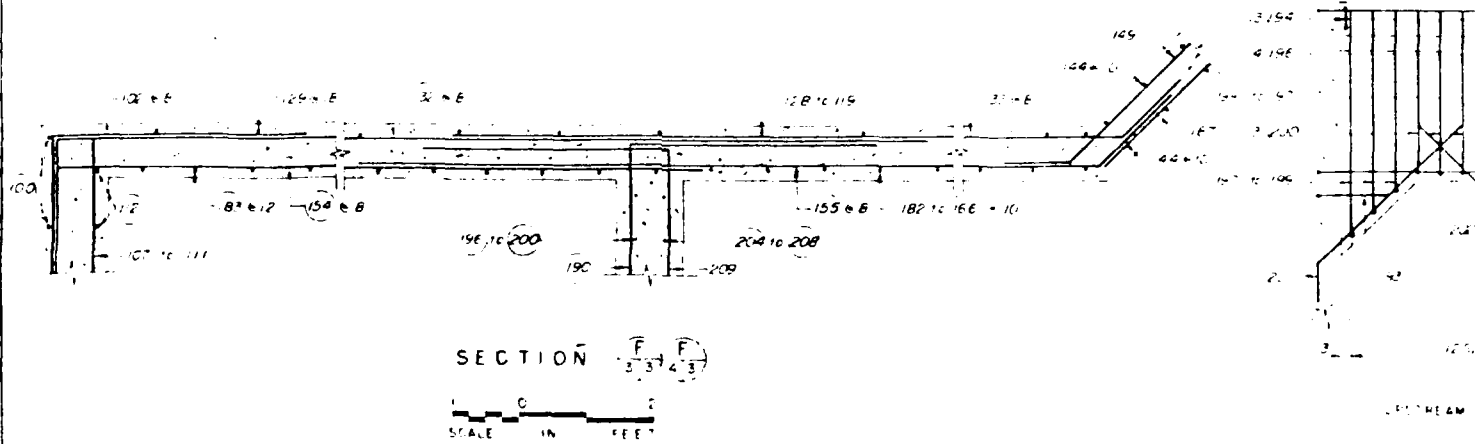
|                       |                    |
|-----------------------|--------------------|
| STANDARD IMPACT BASIN |                    |
| DESIGN CONSTANTS      | 14000 PSI 1600 PSI |
|                       | 20,000 PSI         |
| STANDARD DRAWING NO.  | ES-4175            |
| DATE                  | 1-70               |
| SHEET                 | 2 OF 3             |

CARL RICHDE  
Consulting Engineer  
654 Ridgeway Rd Lake Oswego, Ore

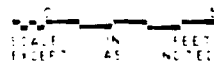
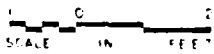




SCALE IN FEET

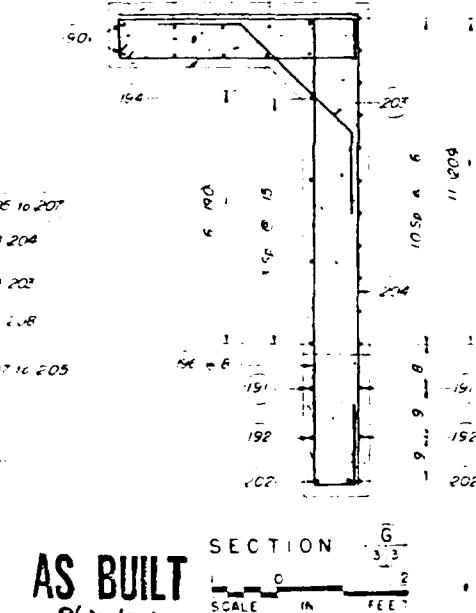
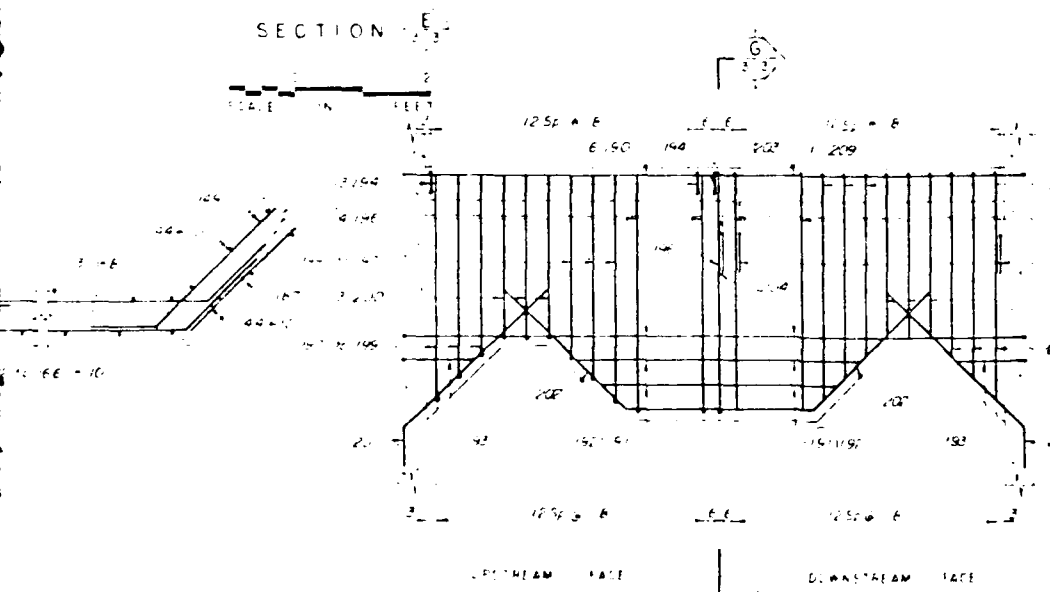
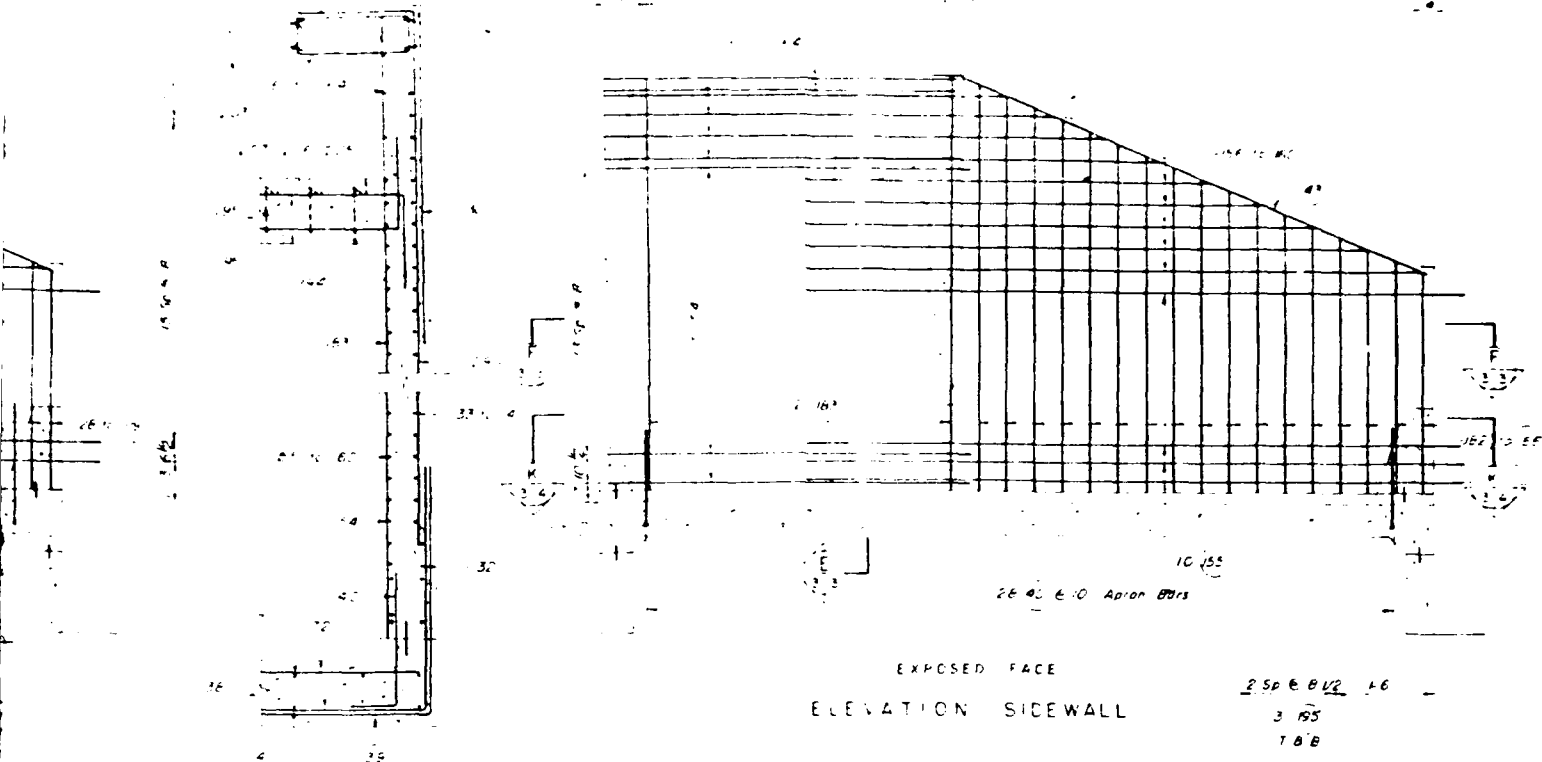


SECTION 3-3-4



|                             |                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------|
| STANDARD IMPACT BASIN       |                                                                                             |
| ES IN CONSTANTS             | $f_c = 4000 \text{ psi}$<br>$f_t = 1600 \text{ psi}$<br>$n = 8$<br>$f = 20,000 \text{ psi}$ |
| STANDARD DRAWING NO ES-4175 |                                                                                             |
| DATE 1-7                    | SHEET 3 OF 3                                                                                |

CARL RONDE  
Consulting Engineer  
654 Ridgeway RD Lost Oswego, Ore



BAFFLE ELEVATION

**AS BUILT**  
 8/22/74

SECTION 6  
 SCALE IN FEET

CONEWANGO CREEK WATERSHED PROJECT  
 SITE 9A  
 FLOODWATER RETARDING DAM  
 CHAUTAUQUA COUNTY, NEW YORK  
 IMPACT BASIN DETAILS

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

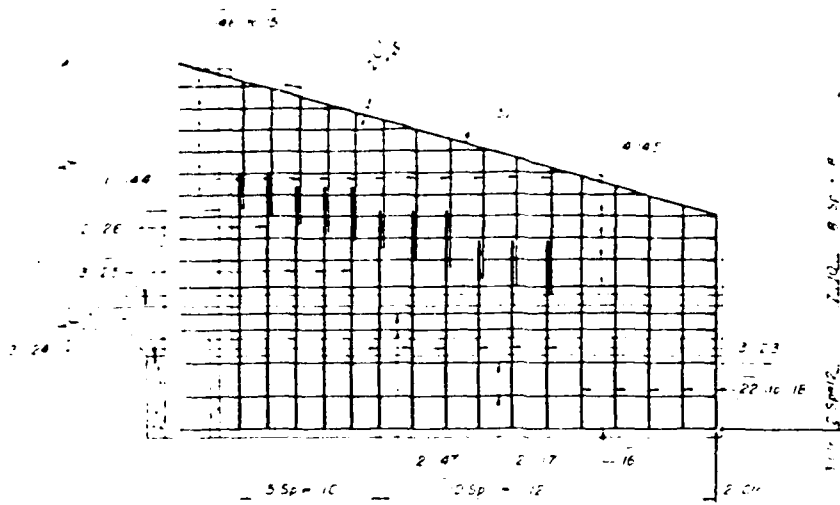
J. T. Tressler  
 ASPECTED

11 71

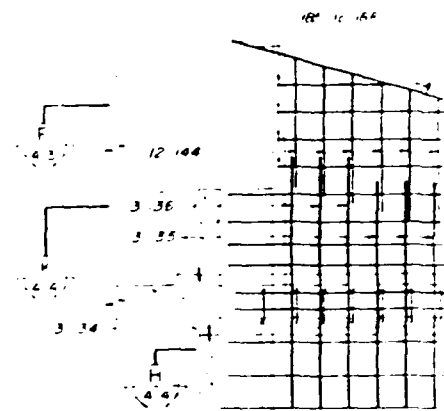
21

NY-2161-P

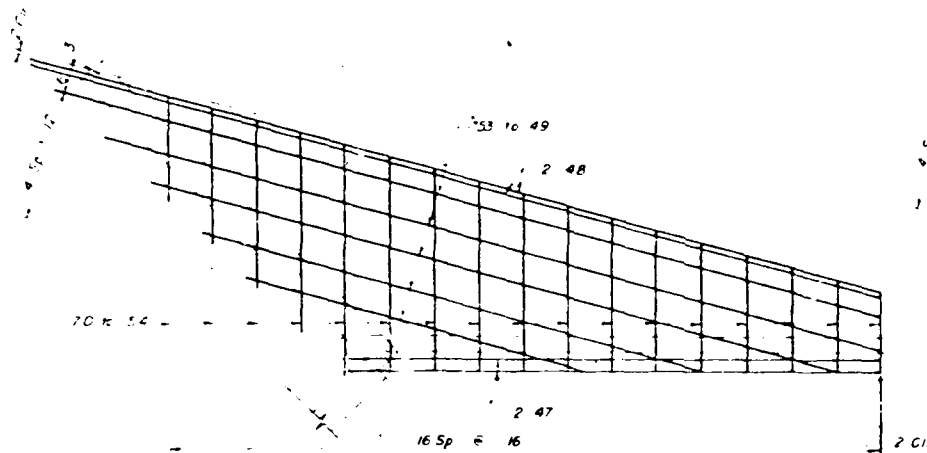
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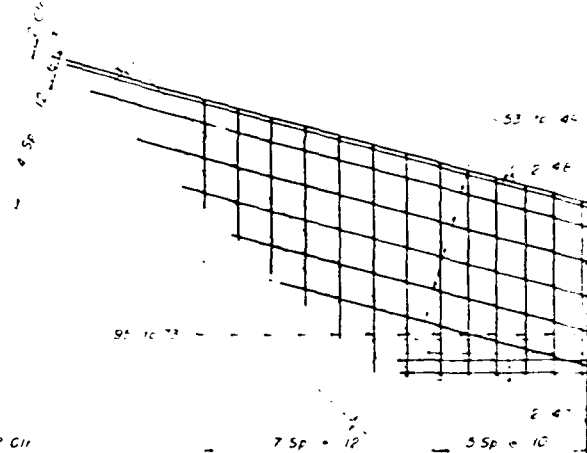
UNEXPOSED FACE  
WINGWALL ELEVATION



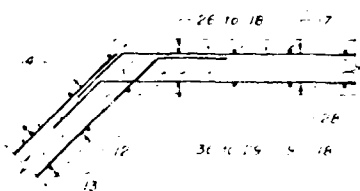
EXPOSED FACE  
WINGWALL ELEVATION



PLAN WINGWALL FOOTING - BOTTOM FACE

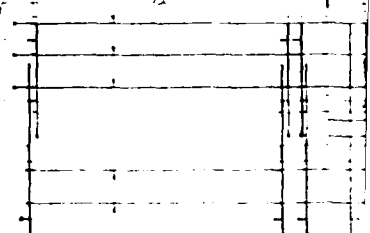


PLAN WINGWALL FOOTING - TOP FACE



SECTION

1 0 2  
SCALE IN FEET



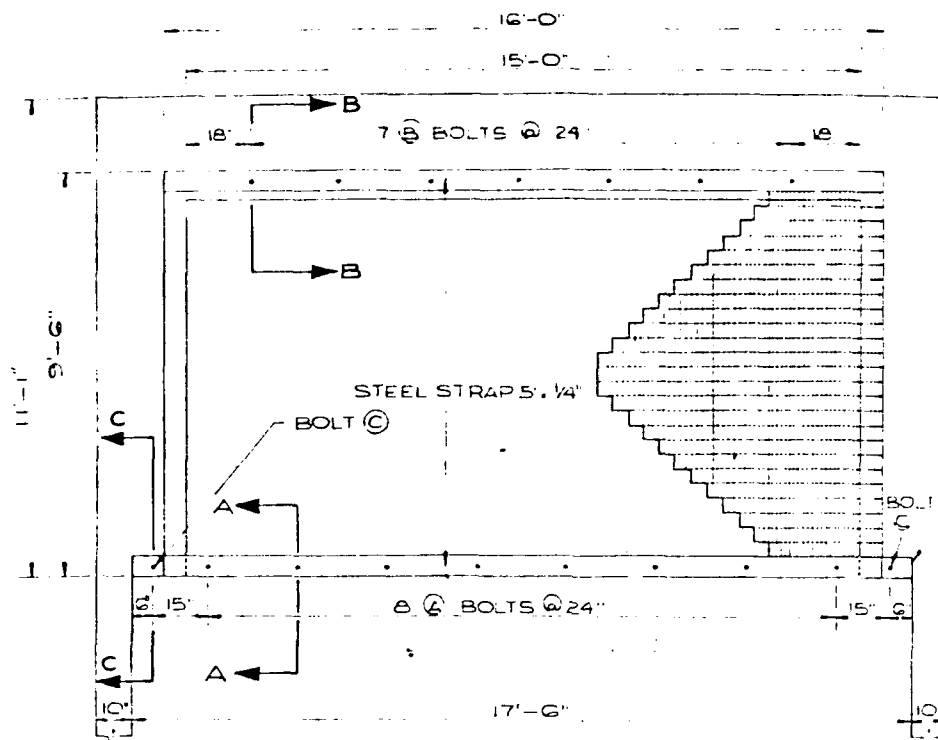
ELEVATION OF END

1 0  
SCALE IN FEET  
EXCEPT AS NOTED

STANDARD IMPACT BASIN  
NO. 100000  
ES-4.75  
SHEET 4 OF 5

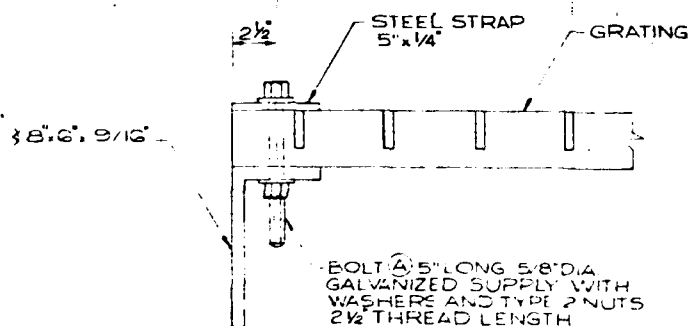
CARL RICHIE  
Consulting Engineer  
654 Prosperity Rd. Suite 100, Opa-Lake, Okla.



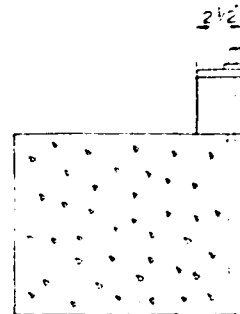


PLAN VIEW

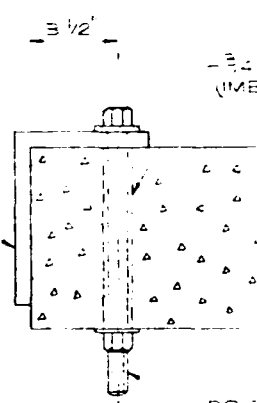
0 1 2 4  
SCALE IN FEET



SECTION A-A

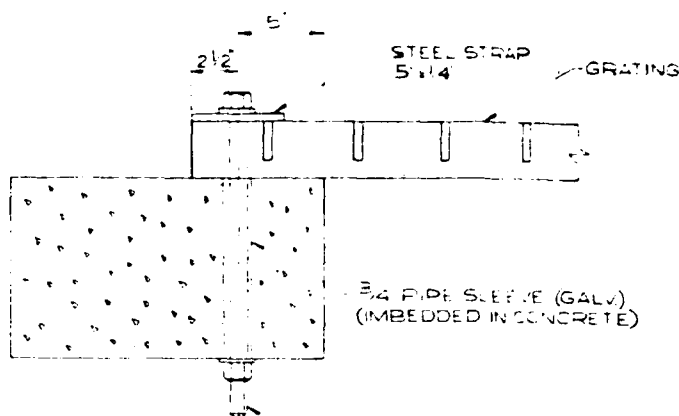


SECTION B-B



SECTION C-C

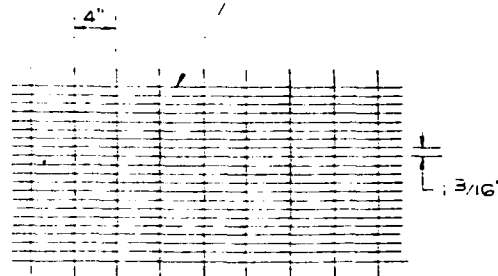
| IMPACT BASIN GRATING BILL OF MATERIAL |                |        |          |
|---------------------------------------|----------------|--------|----------|
| ITEM                                  | SIZE           | LENGTH | QUANTITY |
| GRATING PANEL 9'-6" x 12'-0"          |                |        |          |
| STRAP                                 | 5" x 1/4"      | 12'-0" | 2        |
| ANGLE IRON                            | 6" x 6" x 1/2" | 17'-6" | 1        |
| BOLT A                                | 5/8" DIA       | 5"     | 8        |
| BOLT B                                | 5/8" DIA       | 14"    | 7        |
| BOLT C                                | 5/8" DIA       | 12"    | 2        |
| PIPE SLEEVES                          | 3/4" DIA       | 10"    | 8        |



SECTION B-B

- BOLT B 14" LONG  
5/8" DIA GALVANIZED  
SUPPLY WITH WASHER  
AND TYPE 2 NUTS 2 1/2"  
THREAD LENGTH

- BEARING BAR 2 1/4" x 3/16"



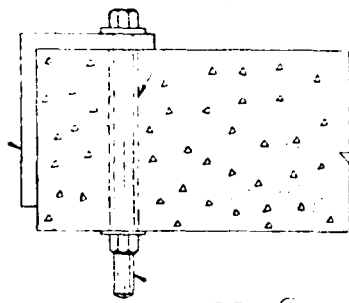
GRATING PANEL GALVANIZED (NOT TO SCALE)

#### CONSTRUCTION DETAILS

1. MATERIAL IN IMPACT BASIN GRATING SHALL CONFORM TO SPEC 581 FOR STRUCTURAL STEEL
2. ENTIRE IMPACT BASIN GRATING TO BE GALVANIZED IN ACCORDANCE WITH SPEC 582.

- ANGLE IRON  
6" x 6" x 1/2"

- 3/4" PIPE SLEEVE (GALV)  
(IMBEDDED IN CONCRETE)



BOLT (C)  
12" LONG  
5/8" DIA GALVANIZED  
SUPPLY WITH WASHERS  
AND TYPE 2 NUTS 2 1/2"  
THREAD LENGTH

SECTION C-C

8/22/77  
**AS BUILT**

CONEWANGO CREEK WATERSHED  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK  
IMPACT BASIN GRATING

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

JOE TOENNIESSEN 11/71  
WILLIAM TURNER 11/71

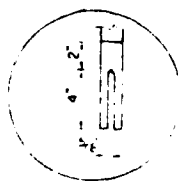
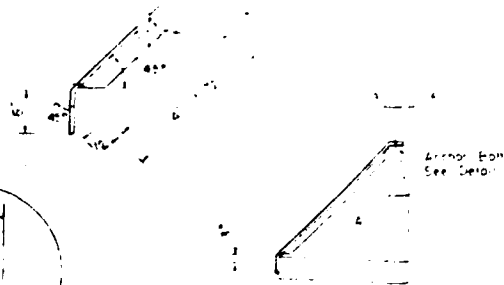
NY-2161-P

| ITEM | DESCRIPTION | QUANTITY | UNIT |
|------|-------------|----------|------|
| 1    | TRASH RACK  | 1        | EA   |
| 2    | ANCHOR BOLT | 4        | EA   |

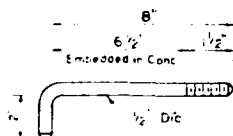
# CONSTRUCTION DETAILS

Material in reservoir drain trash rack and  
conform to Spec 58 for structural steel

- Trash rack to be galvanized in accordance  
with Spec 582



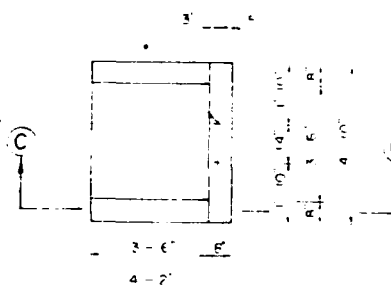
TRASH RACK



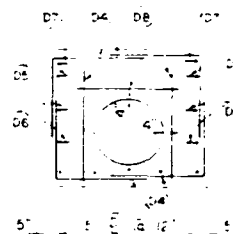
ANCHOR BOLT

Material to conform to Spec 58

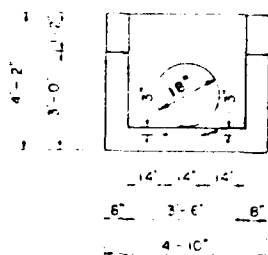
Anchor Bolt  
See Detail



PLAN

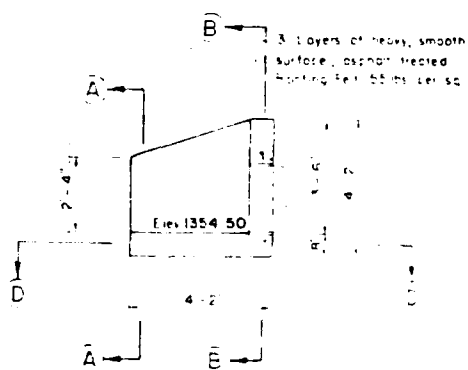


SECTION BB

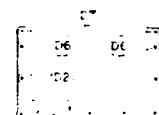


UPSTREAM ELEVATION

Anchor Bolt  
See Detail



SECTION ALONG CENTERLINE



SECTION AA

REINF. CONCRETE RESERVOIR DRAIN INLET



ISOMETRIC

RESERVOIR DRAIN STEEL SCHEDULE

| MARK | QUANT | SIZE | LENGTH | TYPE | WGT | WGT  |
|------|-------|------|--------|------|-----|------|
| D-1  | 4     | 4    | 3-0"   | 1    | 1.5 | 6.0  |
| D-2  | 4     | 4    | 1-0"   | 2    | 1.5 | 6.0  |
| D-3  | 4     | 4    | 6-0"   | 2    | 2.0 | 24.0 |
| D-4  | 4     | 4    | 5-0"   | 2    | 2.0 | 20.0 |
| D-5  | 2     | 4    | 2-0"   | 2    | 2.0 | 4.0  |
| D-6  | 4     | 4    | 4-6"   | 2    | 3.0 | 12.0 |
| D-7  | 2     | 4    | 4-6"   | 2    | 3.0 | 12.0 |
| D-8  | 3     | 4    | 3-6"   | 2    | 3.0 | 10.8 |

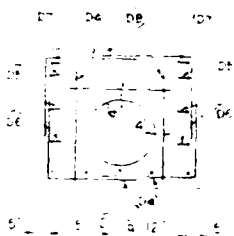
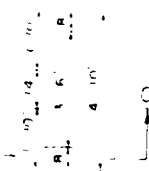
QUANTITIES (This Sheet Only)

STEEL

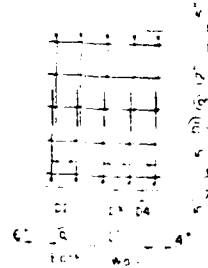
No. 4 bar 126.3      #4      1.5

CONCRETE

1.4 cu. yds. Reinforced

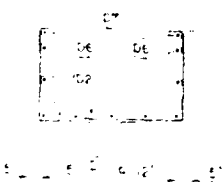
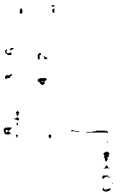


SECTION BB

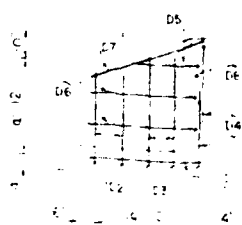


SECTION DD

1. Layers of heavy, smooth surface, asphalt treated



SECTION AA



SECTION CC

8/22/74  
**AS BUILT**

CONEWANGO CREEK WATERSHED PROJECT  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK  
RESERVOIR DRAIN INLET DETAILS  
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

DESIGNED BY J. E. POLULECH 3-70  
CHECKED BY D. J. ANGELO 3-70  
W. E. GRASSO JR.

21 NOTE - R  
34

**B-26**

2

# NATURAL DEPOSITIONS CON. MAP 9A

**D**  
Gravel, sandy, w/little silt (55-60% gravel, 30-34% sand, 11-12% fines); max size 2", 5-8" - 4"; 15-20 3-6"; gray-brown; moist, saturated in parts of flood plain; rapid permeability; non-plastic; medium-dense; alluvial and glacio-fluvial (outwash); DS 503.1 and DS 202.2 (GM-GP)

**E**  
Gravel, sandy, w/little silt (63% gravel, 27% sand, 10% fines); max size 2", 7-8", 18 3-6"; brown; moist; rapid permeability; non-plastic; medium-dense; alluvial; DS 205.2 (GM-GP)

**F**  
Sand, gravelly, w/little silt (20% gravel, 69% sand, 11% fines); max size 2", brown; moist-sat.; rapid permeability; non-plastic; medium; alluvial; DS 3.1: (SM-SW)

**G**  
Sand, gravelly, w/silt and clay (30% gravel, 45% sand, 17% fines); max size 8", 3L-3"; gray-brown; moist; moderate permeability; LL-19, PI-5; hard; alluvial; DS 7.2: (SC-SM)

**H**  
Gravel, silty w/sand (33-28% gravel, 27--26% sand, 46-60% fines); max size 15", 3L-6", 8L 3-6"; color grades from brown to gray with depth; moist-wet; permeability varies from impermeable to rapid; non-plastic; dense-very dense; silty till; DS 204.1 (gray), 206.1 (brown); (GM)

**I**  
Silt and clay, sandy w/gravel (20-20% gravel, 20-20% sand; 50-50% fines); max size 6", 2L-3" brown-yellow brown; moist; moderate permeability; non-plastic to LL-23, PI-6; hard; colluvial; DS 202.1 (ML), 7.1 (CL-ML)

**J**  
Silt and clay, gravelly, w/sand (25% gravel, 19% sand, 56% fines); max size 3"; red-brown; moist; slight permeability; LL-32, PI-11; very stiff; lacustrine; DS 102.1 (CL-ML)

**K**  
Silt, sandy (1% gravel, 38% sand, 61% fines); max size 3/4"; brown; wet-saturated; rapid permeability; non-plastic; medium-dense; lacustrine; DS 301.2 (ML)

**L**  
Silt, sandy w/gravel (12-11% gravel, 15-12% sand, 76-74% fines); max size 1"; brown-yellow brown; moist; moderate permeability; non-plastic; loose-medium; colluvial; DS 205.1 and "MR" (ML)

**M**  
Silt and clay, sandy (2% gravel, 6% sand, 92% fines); max size 3/4"; brown; moist-saturated; slight-moderate permeability; LL-36, PI-13; very stiff; lacustrine; DS 206.1 (CL-ML)

**N**  
Silt (100% fines); max size 2 mm.; gray and brown; moist-saturated; slight-moderate permeability; non-plastic; dense; lacustrine; DS's 4.1 and 301.1 (ML)

**O**  
Topsoil, gravelly in flood plain; some roots and organic material; brown; moist; medium to rapid permeability; loose; ave. thickness ~ 1.0".

**P**  
Gravel, sandy w/silt (est. 55% gravel, 30% sand, 15% fines); max. size 20"; 5L-4", 15L 3-6"; gray-brown; moist; rapid permeability; non-plastic; very, very dense (n>100); cemented alluvial gravel; stratified. (GM)

## NATURAL DEPOSITIONS

### TP #1, C/L Dan 8/26/68 DBC 1367.6

|      |      |                      |
|------|------|----------------------|
| 0.0  | 1.0  | Material L (Topsoil) |
| 1.0  | 3.0  | " 1 (ML)             |
| 3.0  | 11.0 | " 8 (GM-GP)          |
| 11.0 | 13.0 | " 8 (ML)             |

Note: Dry pit.

### TP #2, C/L Dan 8/26/68 DBC 1367.6

|      |      |                      |
|------|------|----------------------|
| 0.0  | 1.0  | Material L (Topsoil) |
| 1.0  | 1.8" | " 1 (ML)             |
| 1.8  | 3.0  | " 8 (GM-GP)          |
| 3.0  | 10.5 | " A (GM-GP)          |
| 10.5 | 13.0 | " K (ML)             |

Note: Water level @ 10.0'

### TP #3, C/L Dan 8/30/68 DBC 1364.8

|      |      |                      |
|------|------|----------------------|
| 0.0  | 1.0  | Material L (Topsoil) |
| 1.0  | 11.7 | " A (GM-GP)          |
| 11.7 | 15.2 | " K (ML)             |

Note: Dry pit

### TP #4, C/L Dan 8/27/68 DBC 1360.4

|     |      |                      |
|-----|------|----------------------|
| 0.0 | 1.0  | Material L (Topsoil) |
| 1.0 | 6.2  | " A (GM-GP)          |
| 6.2 | 9.2  | " AAC (GM-GP, SM-SW) |
| 9.2 | 16.5 | " K (ML) D.S. 4.1    |

Note: Water level @ 8.0'

### TP #5, C/L Dan 8/27/68 DBC 1357.8

|     |      |                        |
|-----|------|------------------------|
| 0.0 | 0.5  | Material L (Topsoil)   |
| 0.5 | 4.0  | " A (GM-GP)            |
| 4.0 | 7.5  | " C (SM-SW) D.S. 5.1   |
| 7.5 | 12.0 | " K & M interbeds (ML) |

Note: Water level @ 11.0'. Materials "A" & "C" are often rhythmically bedded.

### TP #6, C/L Dan 8/27/68 DBC 1353.3

|      |      |                    |
|------|------|--------------------|
| 0.0  | 3.0" | Material A (GM-GP) |
| 3.0" | 11.0 | " B (GM)           |

Note: Water level @ surface (pit in stream). Break based on degree of difficulty of digging.

### TP #7, C/L Dan 8/27/68 DBC 1379.3

|      |      |                      |
|------|------|----------------------|
| 0.0  | 1.0  | Material L (Topsoil) |
| 1.0  | 12.0 | " F (CL-ML) D.S. 7.1 |
| 12.0 | 14.0 | " D (SC-SM) D.S. 7.2 |

Note: Shall keep @ 11.0'. Starts to slough @ 9.7'

### TP #101, Borrow Area 8/29/68 DBC 1367.7

|     |      |                      |
|-----|------|----------------------|
| 0.0 | 1.0  | Material L (Topsoil) |
| 1.0 | 12.0 | " E (GM, brown)      |

Note: Dry pit.

### TP #102, Borrow Area 8/24/68 DBC 1372.1

|     |      |                        |
|-----|------|------------------------|
| 0.0 | 1.0  | Material L (Topsoil)   |
| 1.0 | 2.0  | " 7 (ML)               |
| 2.0 | 5.0  | " A (GM-GP)            |
| 5.0 | 7.0  | " C (CL-ML) D.S. 102.1 |
| 7.0 | 12.0 | " E (GM)(brown)        |

Note: Water level @ 7.0'

## TP #103, Borrow Area 8/24/68 DBC 1372.1

|     |      |                      |
|-----|------|----------------------|
| 0.0 | 1.0  | Material L (Topsoil) |
| 1.0 | 2.0  | " 1 (ML)             |
| 2.0 | 6.0  | " 8 (GM-GP)          |
| 6.0 | 14.0 | " E (GM) brow        |

Note: Dry pit

## TP #201 Emergency Spillway 8/29/68

|     |      |                      |
|-----|------|----------------------|
| 0.0 | 1.5  | Material L (Topsoil) |
| 1.5 | 17.0 | " E (GM) brow        |

Note: Dry pit

## TP #202 Emergency Spillway 8/29/68

|      |      |                      |
|------|------|----------------------|
| 0.0  | 1.0  | Material L (Topsoil) |
| 1.0  | 2.5  | " F (ML) D.          |
| 2.5  | 5.0  | " 1 (ML)             |
| 5.0  | 8.0  | " A (GM-GP)          |
| 8.0  | 16.0 | " E (GM) brow        |
| 16.0 | 18.0 | " E (GM) brow        |

Note: Dry pit

## TP #203 Emergency Spillway 8/24/68

|     |      |                      |
|-----|------|----------------------|
| 0.0 | 1.0  | Material L (Topsoil) |
| 1.0 | 3.0  | " 1 (ML)             |
| 3.0 | 7.0  | " B (GM-GP)          |
| 7.0 | 16.0 | " E (GM) brow        |

Note: Slight seep @ 13.0' between materials but not very distinct

## TP #204 Emergency spillway 5/24/68

|      |      |                      |
|------|------|----------------------|
| 0.0  | 1.0  | Material L (Topsoil) |
| 1.0  | 10.0 | " E (GM) brow        |
| 10.0 | 14.4 | " E (GM) grav        |
| 14.4 | 17.0 | " E (GM) brow        |

Note: Water level at 17.0 sandier between 14.4

## TP #205 Emergency Spillway 8/19/68

|      |      |                      |
|------|------|----------------------|
| 0.0  | 0.5  | Material L (Topsoil) |
| 0.5  | 1.8  | " 1 (ML) D.          |
| 1.8  | 11.0 | " B (GM-GP)          |
| 11.0 | 15.0 | " E (GM) brow        |

Note: Dry pit. Soil scientist c (Mat'l 1) the B; horizon. Fall phase and DS 201.1 is horizon of the C & D

## TP #206 Emergency Spillway 8/25/68

|     |      |                      |
|-----|------|----------------------|
| 0.0 | 0.7  | Material L (Topsoil) |
| 0.7 | 1.8  | " 1 (ML)             |
| 1.8 | 9.0  | " B (GM-GP)          |
| 9.0 | 16.0 | " E (GM) brow        |

Note: Dry pit

## TP #207 Emergency Spillway 8/24/68

|      |      |                      |
|------|------|----------------------|
| 0.0  | 1.0  | Material L (Topsoil) |
| 1.0  | 2.0  | " 1 (ML)             |
| 2.0  | 6.0  | " E (GM-GP)          |
| 6.0  | 14.7 | " E (GM) brow        |
| 14.7 | 16.0 | " J (CL-ML)          |

Note: Slight seep @ 14.5'

TP #200 Emergency Spillway 8/20/68 DBC 1389.0

0.0 1.0 Material L (Topsoil)  
1.0 2.0 " 1 (ML)  
2.0 6.0 " B (GM-GP)  
6.0 14.0 " E (GM) brown

Note: Dry pit

TP #201 Emergency Spillway 8/20/68 DBC 1389.0

0.0 1.0 Material L (Topsoil)  
1.0 17.0 " E (GM) brown

Note: Dry pit

TP #202 Emergency Spillway 8/20/68 DBC 1414.2

0.0 1.0 Material L (Topsoil)  
1.0 2.5 " F (ML) D.S. 202.1  
2.5 4.0 " 1 (ML)  
4.0 8.0 " A (GM-GP) D.S. 202.2  
8.0 16.0 " E (GM) brown  
16.0 18.0 " E (GM) gray

Note: Dry pit

TP #203 Emergency Spillway 8/20/68 DBC 1389.1

0.0 1.0 Material L (Topsoil)  
1.0 3.0 " 1 (ML)  
3.0 7.0 " B (GM-GP)  
7.0 11.0 " E (GM) brown

Note: Slight seep @ 13.0'. Break between materials B and E is not very distinct

TP #204 Emergency Spillway 5/24/68 DBC 1401.0

0.0 1.0 Material L (Topsoil)  
1.0 10.0 " E (GM) brown  
10.0 14.4 " E (GM) gray D.S. 204.1  
14.4 17.0 " E (GM) brown

Note: Water level at 17.0'. Material E is sandier between 14.4 and 17.0'

TP #205 Emergency Spillway 5/24/68 DBC 1357.1

0.0 0.5 Material L (Topsoil)  
0.5 1.0 " 1 (ML) D.S. 205.1  
1.0 11.0 " B (GM-GP) D.S. 205.2  
11.0 15.0 " E (GM) brown

Note: Dry pit. Soil scientist calls DS 205.1 (Mat'l 1) the Big horizon of the Chenango Fan phase and DS 205.2 (Mat'l B) the IIC horizon of the Chenango Fan phase.

TP #206 Emergency Spillway 8/20/68 DBC 1400.2

0.0 0.5 Material L (Topsoil)  
0.5 1.0 " 1 (ML)  
1.0 4.0 " B (GM-GP)  
4.0 16.0 " E (GM) brown D.S. 206.1

Note: Dry pit

TP #207 Emergency Spillway 5/24/68 DBC 1381.2

0.0 1.0 Material L (Topsoil)  
1.0 2.0 " 1 (ML)  
2.0 6.0 " E (GM-GP)  
6.0 14.7 " E (GM) brown  
14.7 16.0 " J (CL-ML)

Note: Slight seep @ 14.5'

TP #208 Emergency Spillway 8/20/68 DBC 1385.8

0.0 0.5 Material L (Topsoil)  
0.5 1.0 " 1 (ML)  
1.0 6.0 " B (GM-GP)  
6.0 12.0 " E (GM) brown  
12.0 15.0 " J (CL-ML) DS 208.1

Note: Water level @ 12.0'. Material E is siltier than usual.

TP #209 Emergency Spillway 8/20/68 DBC 1385.8

0.0 0.8 Material L (Topsoil)  
0.8 3.5 " B (GM-GP)  
3.5 7.0 " E (GM) brown  
7.0 9.8 " E (GM) brown  
9.8 15.5 " J (CL-ML)

Note: Water level @ 9.3'. Material E is siltier than usual (same as TP208) from 7.0-9.8'. Some cobbles and sandy streaks in material J. Lots of flat, angular 3-4" cobbles near bottom

TP #210 Emergency Spillway 8/20/68 DBC 1392.1

0.0 1.0 Material L (Topsoil)  
1.0 1.7 " 1 (ML)  
1.7 4.0 " B (GM-GP)  
4.0 4.7 " E (GM) brown  
4.7 16.0 " E (GM) brown

Note: Dry pit. Material E is siltier from 4.0-4.7'.

TP #201 Prior Spwy (Initial) 5/24/68 DBC 1356.4

0.0 0.5 Material L (Topsoil)  
0.5 4.5 " A (GM-GP)  
4.5 6.5 " C (SM-SW)  
6.5 12.0 " K&N interbeds (ML) DS 301.1, 301.2

Note: Water level @ 6.5'. Materials B & N are rhythmically bedded, with DS 301.1 representing the finer fraction and DS 301.2 representing the coarser fraction.

TP #302 Prior Spwy (Initial) 5/24/68 DBC 1356.2

0.0 1.0 Material L (Topsoil)  
1.0 4.0 " A (GM-GP)  
4.0 13.0 " K&N interbeds (ML)

Note: Water level @ 4.0'

TP #401 Out. Chan. (Initial) 5/30/68 DBC 1357.4

0.0 1.0 Material L (Topsoil)  
1.0 7.0 " A (GM-GP)  
7.0 12.0 " K&N interbeds (ML)  
12.0 15.0 " A (GM-GP)

Note: Water level @ 5.4'

TP #402 Out. Chan. (Initial) 5/30/68 DBC 1351.5

0.0 1.0 Material L (Topsoil)  
1.0 7.0 " A (GM-GP)  
7.0 11.0 " K&N interbeds (ML)

Note: Water level @ 2.5'

TP #403 Out. Chan. (Initial) 5/30/68 DBC 1351.5

0.0 1.0 Material L (Topsoil)  
1.0 1.0 " 1 (ML)  
2.0 12.0 " A (GM-GP)  
12.0 14.0 " E (ML)

Note: Water level @ 11.0'

TP #404 Drain Line 5/24/68 DBC 1381.4

0.0 1.0 Material L (Topsoil)  
1.0 10.5 " A (GM-GP)  
10.5 16.0 " E (ML)

Note: Water level @ 10.0'

TP #405 Drain Line 5/24/68 DBC 1381.4

0.0 11.0 Material A (GM-GP) D.S. 204.1  
11.0 12.0 " K&N interbeds (ML)

Note: Water level @ 11.0'

TP #406 Drain Line 5/24/68 DBC 1381.4

0.0 1.0 Material L (Topsoil)  
1.0 4.0 " A (GM-GP)  
5.0 14.0 " M (GM)

Note: Dry pit. Hard digging in Material M. DS "M" from the above pit 504. See plan & profiles.

8/22/77  
**AS BUILT**

CONEWANGO CREEK WATERSHED PROJECT  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUE COUNTY, NEW YORK  
LOGS OF TEST HOLES  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

By *James Champion* 9/8/68  
GEOLOGIST  
By *L. Sandberg* 10/6/68  
STATE CONS ENGINEER  
NY 216-P

B-27

[illegible]

Elev. 1313.2  
 GP)  
 13.  
 er-hen (ML)  
 22.  
 er-eh (GM-GP, SM-SW)  
 14.  
 ev. 1361.2  
 GP)  
 11.  
 from 9.5-11.0'.  
 1.1' recovery.

| DH #94 C/L Dec 9/11-12/68 DRC Elev. 1313.0 |                                                 |
|--------------------------------------------|-------------------------------------------------|
| 8                                          |                                                 |
| 13                                         | 2.0' 9/12/68 6 day                              |
| 36                                         | Material A (GM-GP)                              |
| 47                                         | 35.4 fpd                                        |
| 44                                         |                                                 |
| 60                                         |                                                 |
| 91                                         |                                                 |
| 103/6                                      | 0.22' fpd                                       |
| 175                                        |                                                 |
| 100/2                                      |                                                 |
| 158/5                                      |                                                 |
| 177/5                                      | 0.122 fpd                                       |
| 179/2                                      |                                                 |
| 192/2                                      |                                                 |
| 216/5                                      |                                                 |
| 133                                        |                                                 |
| 144/5                                      | 6.93 fpd                                        |
| 195/2                                      |                                                 |
| 211/5                                      |                                                 |
| 109/3                                      |                                                 |
| 192/2                                      |                                                 |
| Aug.                                       |                                                 |
| 177/2                                      | 2.88 fpd                                        |
| 133/5                                      |                                                 |
| 42.0                                       |                                                 |
| Note: 2 day water table at 1.7'            |                                                 |
| DH #95 C/L Dec 9/12/68 DRC Elev. 1374.0    |                                                 |
| 6                                          | Material L (Topsoil)                            |
| 36                                         |                                                 |
| 27                                         |                                                 |
| 28                                         | 0.133 fpd                                       |
| 38                                         | 5' 5" 5/12/68 6 day                             |
| 50                                         | Note: 1 day water level at 3.3'.<br>Caved @ 18" |
| 43                                         |                                                 |
| 40                                         |                                                 |
| 174                                        |                                                 |
| 119                                        |                                                 |
| 81                                         |                                                 |
| 139                                        |                                                 |
| 89                                         |                                                 |
| 70                                         |                                                 |
| 102                                        |                                                 |
| 22.5                                       |                                                 |

| DH #251 Emer. Spwy. 9/16-17/68 DRC 1402.3 |                      |
|-------------------------------------------|----------------------|
| 10                                        | Material L (Topsoil) |
| 40                                        | " F (ML)             |
| 32                                        | " I (ML)             |
| 27                                        | " R (GM-GP)          |
| 20                                        | 2.10' 9/18/68 1 day  |
| 24                                        |                      |
| 42                                        |                      |
| 55                                        |                      |
| 79                                        |                      |
| 43                                        |                      |
| 33                                        |                      |
| 27                                        | 5.20 fpd             |
| 40                                        |                      |
| 39                                        |                      |
| 34                                        |                      |
| 28                                        |                      |
| 32                                        | 0.988 fpd            |
| 35                                        |                      |
| 25                                        |                      |
| 26                                        |                      |
| 33                                        |                      |
| 37                                        | 2.37 fpd             |
| 99/4                                      |                      |
| 172/8                                     |                      |
| 156/5                                     |                      |
| 200/5                                     |                      |
| 150/2                                     |                      |
| 72/1                                      |                      |
| 47.0                                      |                      |

Note: Quick condition 31.5-33.5. Water level probably not accurate.

8/22/74  
**AS BUILT**

|                                                                                                          |                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CONEWANGO CREEK WATERSHED PROJECT                                                                        |                                                                                                                                                                          |
| SITE 9A                                                                                                  |                                                                                                                                                                          |
| FLOODWATER RETARDING DAM                                                                                 |                                                                                                                                                                          |
| CHAUTAUQUA COUNTY, NEW YORK                                                                              |                                                                                                                                                                          |
| LOGS OF TEST HOLES                                                                                       |                                                                                                                                                                          |
| U. S. DEPARTMENT OF AGRICULTURE                                                                          |                                                                                                                                                                          |
| SOIL CONSERVATION SERVICE                                                                                |                                                                                                                                                                          |
| Name <i>Bruce Chapman</i><br>Title <b>GEOLOGIST</b><br>Date <i>1-15-69</i><br>Checked <i>L.H. Curtis</i> | Date <i>2-18-68</i><br>Approved by <i>L.H. Curtis</i><br>Title <b>STATE CONS ENGINEER</b><br>File No. <i>29</i><br>Drawing No. <i>29</i><br>Project No. <b>NY-2161-P</b> |

| DH #27 Elev. Spwy. 9/13/68 DBC Elev. 133.8 |                      |     | DH #28 Elev. Spwy. 9/13-16/68 DBC Elev. 140.7 |                      |     |
|--------------------------------------------|----------------------|-----|-----------------------------------------------|----------------------|-----|
| 1                                          | Material L (Topsoil) | 0.0 | 11                                            | Material L (Topsoil) | 0.0 |
| 10                                         |                      |     | 12                                            |                      | 1.5 |
| 11                                         |                      |     | 13                                            |                      |     |
| 12                                         | 3'-0" 3/15/68 5 day  | 3.3 | 14                                            | 3'-0" 3/15/68 7 day  | 4.0 |
| 13                                         |                      |     | 15                                            |                      |     |
| 14                                         |                      |     | 16                                            |                      |     |
| 15                                         |                      |     | 17                                            |                      |     |
| 16                                         |                      |     | 18                                            |                      |     |
| 17                                         |                      |     | 19                                            |                      |     |
| 18                                         |                      |     | 20                                            |                      |     |
| 19                                         |                      |     | 21                                            |                      |     |
| 20                                         |                      |     | 22                                            |                      |     |
| 21                                         |                      |     | 23                                            |                      |     |
| 22                                         |                      |     | 24                                            |                      |     |
| 23                                         |                      |     | 25                                            |                      |     |
| 24                                         |                      |     | 26                                            |                      |     |
| 25                                         |                      |     | 27                                            |                      |     |
| 26                                         |                      |     | 28                                            |                      |     |
| 27                                         |                      |     | 29                                            |                      |     |
| 28                                         |                      |     | 30                                            |                      |     |
| 29                                         |                      |     | 31                                            |                      |     |
| 30                                         |                      |     | 32                                            |                      |     |
| 31                                         |                      |     | 33                                            |                      |     |
| 32                                         |                      |     | 34                                            |                      |     |
| 33                                         |                      |     | 35                                            |                      |     |
| 34                                         |                      |     | 36                                            |                      |     |
| 35                                         |                      |     | 37                                            |                      |     |
| 36                                         |                      |     | 38                                            |                      |     |
| 37                                         |                      |     | 39                                            |                      |     |
| 38                                         |                      |     | 40                                            |                      |     |
| 39                                         |                      |     | 41                                            |                      |     |
| 40                                         |                      |     | 42                                            |                      |     |
| 41                                         |                      |     | 43                                            |                      |     |
| 42                                         |                      |     | 44                                            |                      |     |
| 43                                         |                      |     | 45                                            |                      |     |
| 44                                         |                      |     | 46                                            |                      |     |
| 45                                         |                      |     | 47                                            |                      |     |
| 46                                         |                      |     | 48                                            |                      |     |
| 47                                         |                      |     | 49                                            |                      |     |
| 48                                         |                      |     | 50                                            |                      |     |
| 49                                         |                      |     | 51                                            |                      |     |
| 50                                         |                      |     | 52                                            |                      |     |
| 51                                         |                      |     | 53                                            |                      |     |
| 52                                         |                      |     | 54                                            |                      |     |
| 53                                         |                      |     | 55                                            |                      |     |
| 54                                         |                      |     | 56                                            |                      |     |
| 55                                         |                      |     | 57                                            |                      |     |
| 56                                         |                      |     | 58                                            |                      |     |
| 57                                         |                      |     | 59                                            |                      |     |
| 58                                         |                      |     | 60                                            |                      |     |
| 59                                         |                      |     | 61                                            |                      |     |
| 60                                         |                      |     | 62                                            |                      |     |
| 61                                         |                      |     | 63                                            |                      |     |
| 62                                         |                      |     | 64                                            |                      |     |
| 63                                         |                      |     | 65                                            |                      |     |
| 64                                         |                      |     | 66                                            |                      |     |
| 65                                         |                      |     | 67                                            |                      |     |
| 66                                         |                      |     | 68                                            |                      |     |
| 67                                         |                      |     | 69                                            |                      |     |
| 68                                         |                      |     | 70                                            |                      |     |
| 69                                         |                      |     | 71                                            |                      |     |
| 70                                         |                      |     | 72                                            |                      |     |
| 71                                         |                      |     | 73                                            |                      |     |
| 72                                         |                      |     | 74                                            |                      |     |
| 73                                         |                      |     | 75                                            |                      |     |
| 74                                         |                      |     | 76                                            |                      |     |
| 75                                         |                      |     | 77                                            |                      |     |
| 76                                         |                      |     | 78                                            |                      |     |
| 77                                         |                      |     | 79                                            |                      |     |
| 78                                         |                      |     | 80                                            |                      |     |
| 79                                         |                      |     | 81                                            |                      |     |
| 80                                         |                      |     | 82                                            |                      |     |
| 81                                         |                      |     | 83                                            |                      |     |
| 82                                         |                      |     | 84                                            |                      |     |
| 83                                         |                      |     | 85                                            |                      |     |
| 84                                         |                      |     | 86                                            |                      |     |
| 85                                         |                      |     | 87                                            |                      |     |
| 86                                         |                      |     | 88                                            |                      |     |
| 87                                         |                      |     | 89                                            |                      |     |
| 88                                         |                      |     | 90                                            |                      |     |
| 89                                         |                      |     | 91                                            |                      |     |
| 90                                         |                      |     | 92                                            |                      |     |
| 91                                         |                      |     | 93                                            |                      |     |
| 92                                         |                      |     | 94                                            |                      |     |
| 93                                         |                      |     | 95                                            |                      |     |
| 94                                         |                      |     | 96                                            |                      |     |
| 95                                         |                      |     | 97                                            |                      |     |
| 96                                         |                      |     | 98                                            |                      |     |
| 97                                         |                      |     | 99                                            |                      |     |
| 98                                         |                      |     | 100                                           |                      |     |
| 99                                         |                      |     | 101                                           |                      |     |
| 100                                        |                      |     | 102                                           |                      |     |
| 101                                        |                      |     | 103                                           |                      |     |
| 102                                        |                      |     | 104                                           |                      |     |
| 103                                        |                      |     | 105                                           |                      |     |
| 104                                        |                      |     | 106                                           |                      |     |
| 105                                        |                      |     | 107                                           |                      |     |
| 106                                        |                      |     | 108                                           |                      |     |
| 107                                        |                      |     | 109                                           |                      |     |
| 108                                        |                      |     | 110                                           |                      |     |
| 109                                        |                      |     | 111                                           |                      |     |
| 110                                        |                      |     | 112                                           |                      |     |
| 111                                        |                      |     | 113                                           |                      |     |
| 112                                        |                      |     | 114                                           |                      |     |
| 113                                        |                      |     | 115                                           |                      |     |
| 114                                        |                      |     | 116                                           |                      |     |
| 115                                        |                      |     | 117                                           |                      |     |
| 116                                        |                      |     | 118                                           |                      |     |
| 117                                        |                      |     | 119                                           |                      |     |
| 118                                        |                      |     | 120                                           |                      |     |
| 119                                        |                      |     | 121                                           |                      |     |
| 120                                        |                      |     | 122                                           |                      |     |
| 121                                        |                      |     | 123                                           |                      |     |
| 122                                        |                      |     | 124                                           |                      |     |
| 123                                        |                      |     | 125                                           |                      |     |
| 124                                        |                      |     | 126                                           |                      |     |
| 125                                        |                      |     | 127                                           |                      |     |
| 126                                        |                      |     | 128                                           |                      |     |
| 127                                        |                      |     | 129                                           |                      |     |
| 128                                        |                      |     | 130                                           |                      |     |
| 129                                        |                      |     | 131                                           |                      |     |
| 130                                        |                      |     | 132                                           |                      |     |
| 131                                        |                      |     | 133                                           |                      |     |
| 132                                        |                      |     | 134                                           |                      |     |
| 133                                        |                      |     | 135                                           |                      |     |
| 134                                        |                      |     | 136                                           |                      |     |
| 135                                        |                      |     | 137                                           |                      |     |
| 136                                        |                      |     | 138                                           |                      |     |
| 137                                        |                      |     | 139                                           |                      |     |
| 138                                        |                      |     | 140                                           |                      |     |
| 139                                        |                      |     | 141                                           |                      |     |
| 140                                        |                      |     | 142                                           |                      |     |
| 141                                        |                      |     | 143                                           |                      |     |
| 142                                        |                      |     | 144                                           |                      |     |
| 143                                        |                      |     | 145                                           |                      |     |
| 144                                        |                      |     | 146                                           |                      |     |
| 145                                        |                      |     | 147                                           |                      |     |
| 146                                        |                      |     | 148                                           |                      |     |
| 147                                        |                      |     | 149                                           |                      |     |
| 148                                        |                      |     | 150                                           |                      |     |
| 149                                        |                      |     | 151                                           |                      |     |
| 150                                        |                      |     | 152                                           |                      |     |
| 151                                        |                      |     | 153                                           |                      |     |
| 152                                        |                      |     | 154                                           |                      |     |
| 153                                        |                      |     | 155                                           |                      |     |
| 154                                        |                      |     | 156                                           |                      |     |
| 155                                        |                      |     | 157                                           |                      |     |
| 156                                        |                      |     | 158                                           |                      |     |
| 157                                        |                      |     | 159                                           |                      |     |
| 158                                        |                      |     | 160                                           |                      |     |
| 159                                        |                      |     | 161                                           |                      |     |
| 160                                        |                      |     | 162                                           |                      |     |
| 161                                        |                      |     | 163                                           |                      |     |
| 162                                        |                      |     | 164                                           |                      |     |
| 163                                        |                      |     | 165                                           |                      |     |
| 164                                        |                      |     | 166                                           |                      |     |
| 165                                        |                      |     | 167                                           |                      |     |
| 166                                        |                      |     | 168                                           |                      |     |
| 167                                        |                      |     | 169                                           |                      |     |
| 168                                        |                      |     | 170                                           |                      |     |
| 169                                        |                      |     | 171                                           |                      |     |
| 170                                        |                      |     | 172                                           |                      |     |
| 171                                        |                      |     | 173                                           |                      |     |
| 172                                        |                      |     | 174                                           |                      |     |
| 173                                        |                      |     | 175                                           |                      |     |
| 174                                        |                      |     | 176                                           |                      |     |
| 175                                        |                      |     | 177                                           |                      |     |
| 176                                        |                      |     | 178                                           |                      |     |
| 177                                        |                      |     | 179                                           |                      |     |
| 178                                        |                      |     | 180                                           |                      |     |
| 179                                        |                      |     | 181                                           |                      |     |
| 180                                        |                      |     | 182                                           |                      |     |
| 181                                        |                      |     | 183                                           |                      |     |
| 182                                        |                      |     | 184                                           |                      |     |
| 183                                        |                      |     | 185                                           |                      |     |
| 184                                        |                      |     | 186                                           |                      |     |
| 185                                        |                      |     | 187                                           |                      |     |
| 186                                        |                      |     | 188                                           |                      |     |
| 187                                        |                      |     | 189                                           |                      |     |
| 188                                        |                      |     | 190                                           |                      |     |
| 189                                        |                      |     | 191                                           |                      |     |
| 190                                        |                      |     | 192                                           |                      |     |
| 191                                        |                      |     | 193                                           |                      |     |
| 192                                        |                      |     | 194                                           |                      |     |
| 193                                        |                      |     | 195                                           |                      |     |
| 194                                        |                      |     | 196                                           |                      |     |
| 195                                        |                      |     | 197                                           |                      |     |
| 196                                        |                      |     | 198                                           |                      |     |
| 197                                        |                      |     | 199                                           |                      |     |
| 198                                        |                      |     | 200                                           |                      |     |
| 199                                        |                      |     | 201                                           |                      |     |
| 200                                        |                      |     | 202                                           |                      |     |
| 201                                        |                      |     | 203                                           |                      |     |
| 202                                        |                      |     | 204                                           |                      |     |
| 203                                        |                      |     | 205                                           |                      |     |
| 204                                        |                      |     | 206                                           |                      |     |
| 205                                        |                      |     | 207                                           |                      |     |
| 206                                        |                      |     | 208                                           |                      |     |
| 207                                        |                      |     | 209                                           |                      |     |
| 208                                        |                      |     | 210                                           |                      |     |
| 209                                        |                      |     | 211                                           |                      |     |
| 210                                        |                      |     | 212                                           |                      |     |
| 211                                        |                      |     | 213                                           |                      |     |
| 212                                        |                      |     | 214                                           |                      |     |
| 213                                        |                      |     | 215                                           |                      |     |
| 214                                        |                      |     | 216                                           |                      |     |
| 215                                        |                      |     | 217                                           |                      |     |
| 216                                        |                      |     | 218                                           |                      |     |
| 217                                        |                      |     | 219                                           |                      |     |
| 218                                        |                      |     | 220                                           |                      |     |
| 219                                        |                      |     | 221                                           |                      |     |
| 220                                        |                      |     | 222                                           |                      |     |
| 221                                        |                      |     | 223                                           |                      |     |
| 222                                        |                      |     | 224                                           |                      |     |
| 223                                        |                      |     | 225                                           |                      |     |
| 224                                        |                      |     | 226                                           |                      |     |
| 225                                        |                      |     | 227                                           |                      |     |
| 226                                        |                      |     | 228                                           |                      |     |
| 227                                        |                      |     | 229                                           |                      |     |
| 228                                        |                      |     | 230                                           |                      |     |
| 229                                        |                      |     | 231                                           |                      |     |
| 230                                        |                      |     | 232                                           |                      |     |
| 231                                        |                      |     | 233                                           |                      |     |
| 232                                        |                      |     | 234                                           |                      |     |
| 233                                        |                      |     | 235                                           |                      |     |
| 234                                        |                      |     | 236                                           |                      |     |
| 235                                        |                      |     | 237                                           |                      |     |
| 236                                        |                      |     | 238                                           |                      |     |
| 237                                        |                      |     | 239                                           |                      |     |
| 238                                        |                      |     | 240                                           |                      |     |
| 239                                        |                      |     | 241                                           |                      |     |
| 240                                        |                      |     | 242                                           |                      |     |
| 241                                        |                      |     | 243                                           |                      |     |
| 242                                        |                      |     | 244                                           |                      |     |
| 243                                        |                      |     | 245                                           |                      |     |
| 244                                        |                      |     | 246                                           |                      |     |
| 245                                        |                      |     | 247                                           |                      |     |
| 246                                        |                      |     | 248                                           |                      |     |
| 247                                        |                      |     | 249                                           |                      |     |
| 248                                        |                      |     | 250                                           |                      |     |
| 249                                        |                      |     | 251                                           |                      |     |
| 250                                        |                      |     | 252                                           |                      |     |
| 251                                        |                      |     | 253                                           |                      |     |
| 252                                        |                      |     | 254                                           |                      |     |
| 253                                        |                      |     | 255                                           |                      |     |
| 254                                        |                      |     | 256                                           |                      |     |
| 255                                        |                      |     | 257                                           |                      |     |
| 256                                        |                      |     | 258                                           |                      |     |
| 257                                        |                      |     | 259                                           |                      |     |
| 258                                        |                      |     | 260                                           |                      |     |
| 259                                        |                      |     | 261                                           |                      |     |
| 260                                        |                      |     | 262                                           |                      |     |
| 261                                        |                      |     | 263                                           |                      |     |
| 262                                        |                      |     | 264                                           |                      |     |
| 263                                        |                      |     | 265                                           |                      |     |
| 264                                        |                      |     | 266                                           |                      |     |
| 265                                        |                      |     | 267                                           |                      |     |
| 266                                        |                      |     | 268                                           |                      |     |
| 267                                        |                      |     | 269                                           |                      |     |
| 268                                        |                      |     | 270                                           |                      |     |
| 269                                        |                      |     | 271                                           |                      |     |
| 270                                        |                      |     | 272                                           |                      |     |
| 271                                        |                      |     | 273                                           |                      |     |
| 272                                        |                      |     | 274                                           |                      |     |
| 273                                        |                      |     | 275                                           |                      |     |
| 274                                        |                      |     | 276                                           |                      |     |
| 275                                        |                      |     | 277                                           |                      |     |
| 276                                        |                      |     | 278                                           |                      |     |
| 277                                        |                      |     | 279                                           |                      |     |
| 278                                        |                      |     | 280                                           |                      |     |
| 279                                        |                      |     | 281                                           |                      |     |
| 280                                        |                      |     | 282                                           |                      |     |
| 281                                        |                      |     | 283                                           |                      |     |
| 282                                        |                      |     | 284                                           |                      |     |
| 283                                        |                      |     | 285                                           |                      |     |
| 284                                        |                      |     | 286                                           |                      |     |
| 285                                        |                      |     | 287                                           |                      |     |
| 286                                        |                      |     | 288                                           |                      |     |
| 287                                        |                      |     | 289                                           |                      |     |
| 288                                        |                      |     | 290                                           |                      |     |
| 289                                        |                      |     | 291                                           |                      |     |
| 290                                        |                      |     | 292                                           |                      |     |
| 291                                        |                      |     | 293                                           |                      |     |
| 292                                        |                      |     | 294                                           |                      |     |
| 293                                        |                      |     | 295                                           |                      |     |
| 294                                        |                      |     | 296                                           |                      |     |
| 295                                        |                      |     | 297                                           |                      |     |
| 296                                        |                      |     | 298                                           |                      |     |
| 297                                        |                      |     | 299                                           |                      |     |
| 298                                        |                      |     | 300                                           |                      |     |
| 299                                        |                      |     | 301                                           |                      |     |
| 300                                        |                      |     | 302                                           |                      |     |
| 301                                        |                      |     | 303                                           |                      |     |
| 302                                        |                      |     | 304                                           |                      |     |
| 303                                        |                      |     | 305                                           |                      |     |
| 304                                        |                      |     | 306                                           |                      |     |
| 305                                        |                      |     | 307                                           |                      |     |
| 306                                        |                      |     | 308                                           |                      |     |
| 307                                        |                      |     | 309                                           |                      |     |
| 308                                        |                      |     | 310                                           |                      |     |
| 309                                        |                      |     | 311                                           |                      |     |
| 310                                        |                      |     | 312                                           |                      |     |
| 311                                        |                      |     | 313                                           |                      |     |
| 312                                        |                      |     | 314                                           |                      |     |
| 313                                        |                      |     | 315                                           |                      |     |
| 314                                        |                      |     | 316                                           |                      |     |
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| 316                                        |                      |     | 318                                           |                      |     |
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| 319                                        |                      |     | 321                                           |                      |     |
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| 321                                        |                      |     | 323                                           |                      |     |
| 322                                        |                      |     | 324                                           |                      |     |
| 323                                        |                      |     | 325                                           |                      |     |
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| 326                                        |                      |     | 328                                           |                      |     |
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| 328                                        |                      |     | 330                                           |                      |     |
| 329                                        |                      |     | 331                                           |                      |     |
| 330                                        |                      |     | 332                                           |                      |     |
| 331                                        |                      |     | 333                                           |                      |     |
| 332                                        |                      |     | 334                                           |                      |     |
| 333                                        |                      |     | 335                                           |                      | </  |

Note: Water level = 3.9', 2 day.

| D. #31 Test. Spdw. (Indicated) 9/11/65 - DHC 11-12 |          |                    |
|----------------------------------------------------|----------|--------------------|
|                                                    |          | Material A (QV-GP) |
| 24                                                 | 3.52 fpd |                    |
| 25                                                 |          |                    |
| 26                                                 |          |                    |
| 27                                                 |          |                    |
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| 100                                                |          |                    |

Note: Water level @ 2.9', 9/13/65, 1 day.  
 Core @ 3.0', 9/13/65, 1 day.

| D. #31 Test. Spdw. (Indicated) 9/13/65 - DHC 11-12 |  |  |
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Note: Water level accurate.

| D. #31 Test. Spdw. (Indicated) 9/13/65 - DHC 11-12 |  |  |
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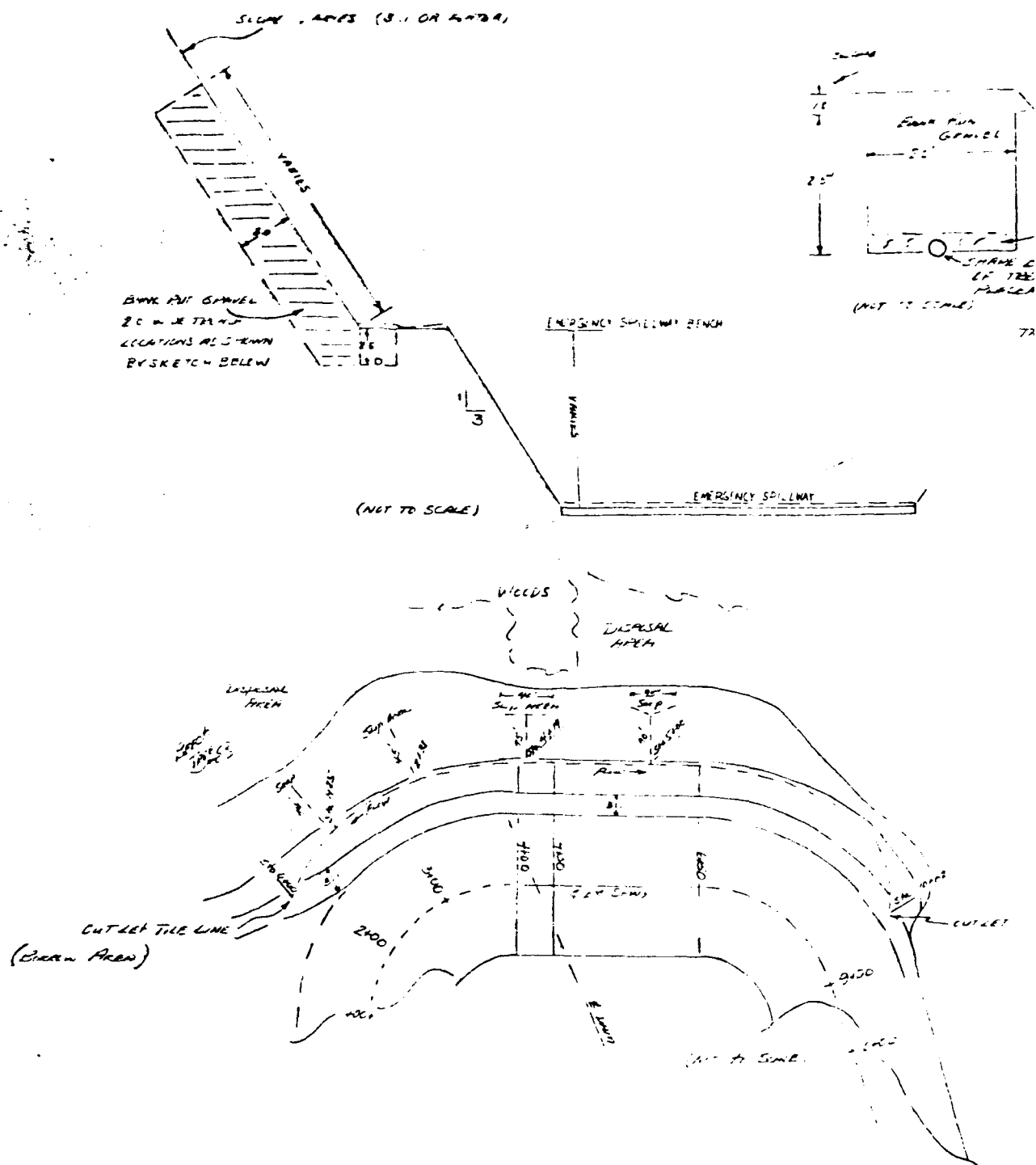
Note: Water level accurate.

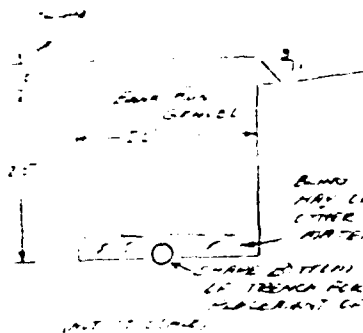
8/22/74  
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CONEWANGO CREEK WATERSHED PROJECT  
 SITE 9A  
 FLOODWATER RETARDING DAM  
 CHAUTAUQUE COUNTY, NEW YORK  
 LOGS OF TEST HOLES  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

By *Bruce Hampton* Date *9/18/68*  
 Title *GEOLOGIST*  
 State *NEW YORK*  
 License No. *12161-P*

B-29





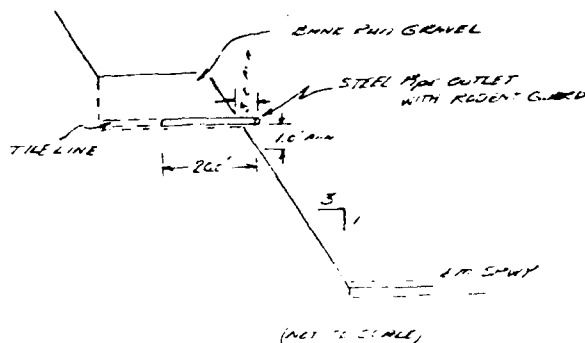
REFER TO CONSTRUCTION PLAN

ROUND TILE WITH  
HAY OR STRAW OR  
OTHER SUITABLE  
MATERIAL - MIN OF 6" OVER TILE

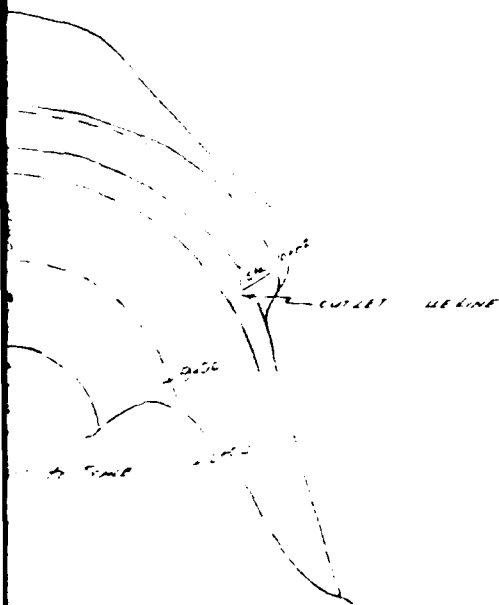
USE 1/4" HOLE 2" DIA  
FOR DRAINING TO TILE TRENCH

THE LIVE STAKE MUST BE IN PLACE  
FOLLOWING THE 1/4" DIA. RIGID SLOPE  
11.4" OVER 100' TO BE 24"

### OUTLET DETAIL



EMERGENCY SPILLWAY



### LIST OF MATERIALS

4" TILE LINE MATERIAL 100' L.F.  
CHUNKY PAV. GRAVEL 100' L.F.  
2 CHUTE & 20' EA  
4" STEEL OUTLET PIPE 40' L.F.  
POLLUT GUARDS 2 NO.  
BLANKING PLATE 1 NO.

THIS CONSTRUCTION PLAN IS FOR THE  
USE OF THE PROJECT ONLY

CONWAY AND GREEN WATERSHED PROJECT  
SITE 9A  
FLOODWATER BY ARUNDAM  
CHARMINGUA COUNTY NEW YORK  
TILE DRAINAGE - EMERGENCY SPILLWAY  
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

8/22/77  
AS BUILT

AD-A105 730

ERDMAN ANTHONY ASSOCIATES ROCHESTER NY

F/G 13/13

NATIONAL DAM SAFETY PROGRAM, CONEWANGO CREEK WATERSHED DAM NUMB--ETC(U)

AUG 81 R J FARRELL

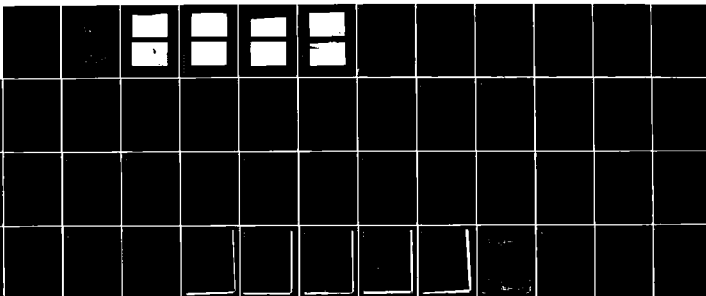
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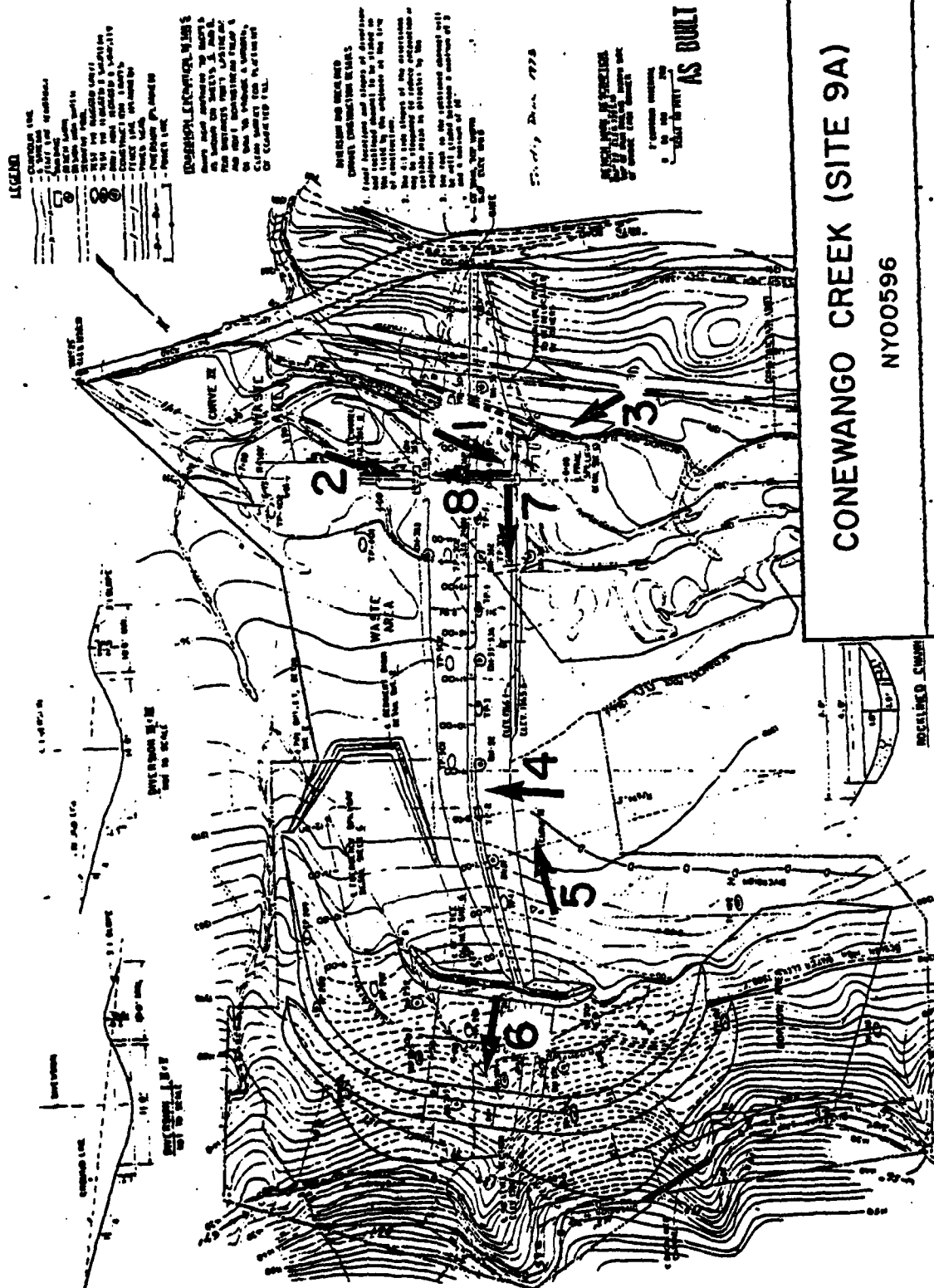
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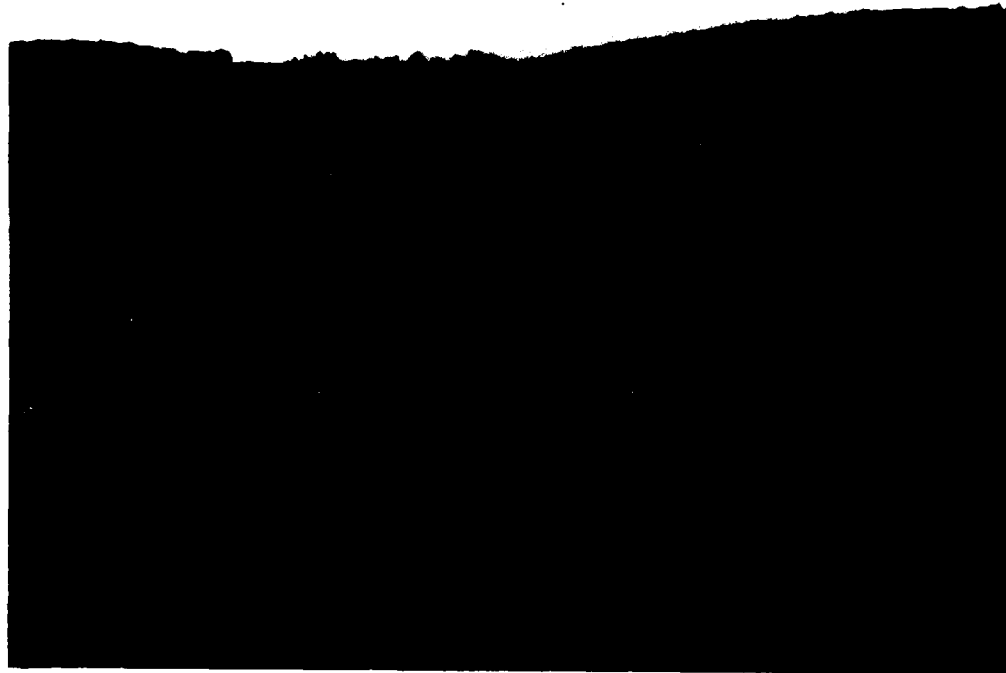
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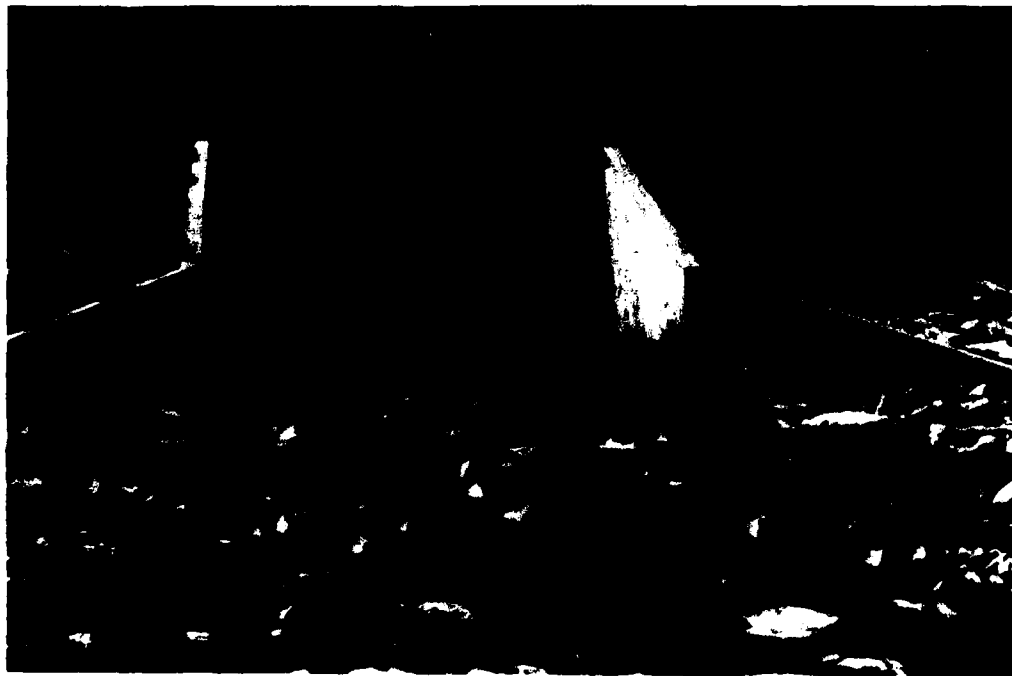
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APPENDIX C  
PHOTOGRAPHS





1. Principal spillway inlet structure. Note slide gate stem and lack of access to the top of structure.



2. Principal spillway impact basin



3. Principal spillway inlet structure, showing low stage inlet and trash rack.



4. Upstream slope of dam. Note rutting due to vehicular traffic.



5. Upstream slope of dam. Note debris at recent high water level.



6. Spring in north slope of emergency spillway



7. Upstream slope of dam. Note wave erosion.



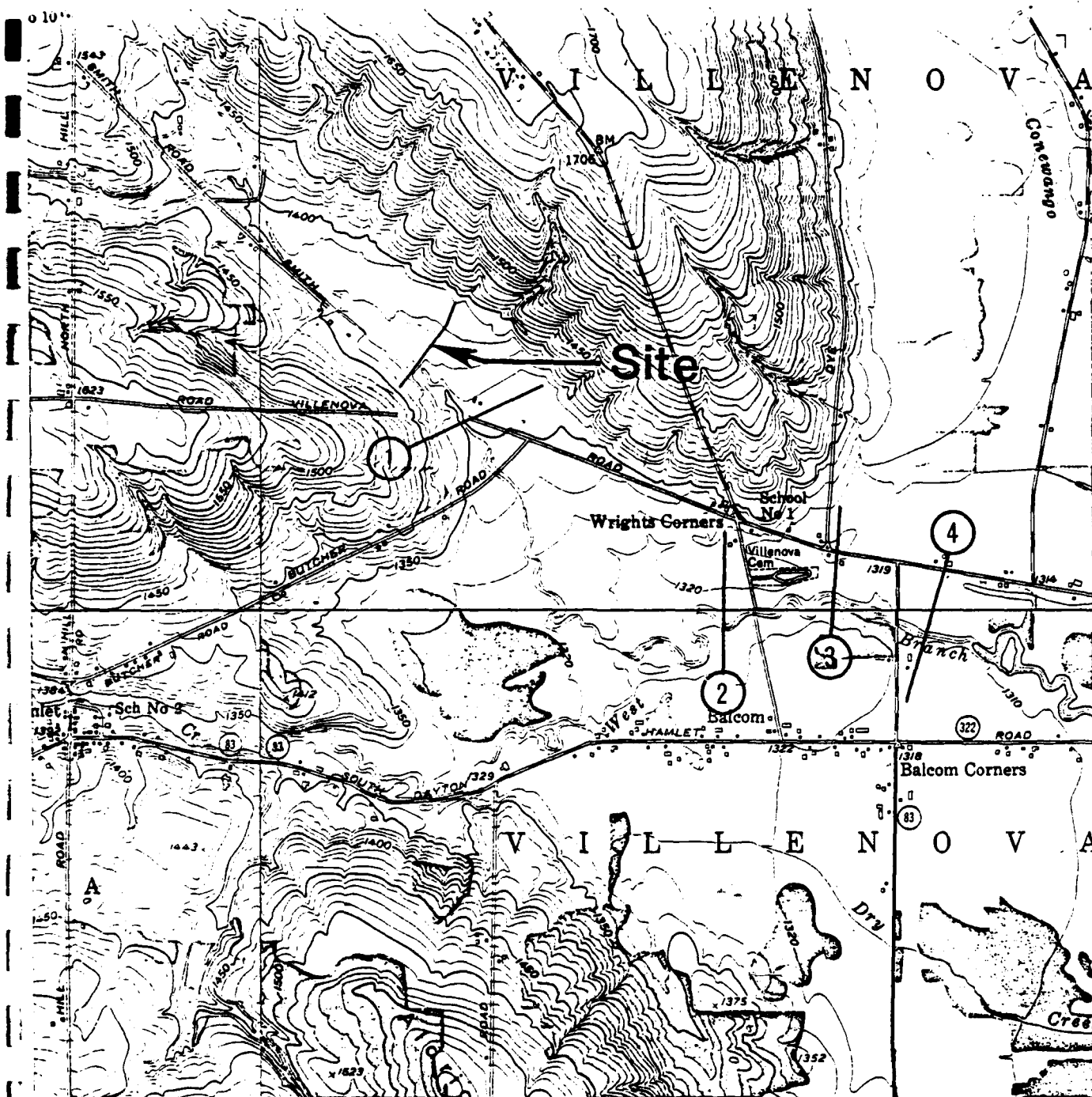
8. Downstream channel. Note minor erosion on right bank of channel.

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS

## APPENDIX D

|                                                         | <u>PAGE</u> |
|---------------------------------------------------------|-------------|
| Cross Section Location Plan                             | D-2         |
| HEC-1 Dam Safety Version Computer Program-Input         | D-3         |
| HEC-1 Dam Safety Version Computer Program-Output        | D-5         |
| Supporting Calculations                                 |             |
| o Hydrology                                             | D-14        |
| o Spillway Hydraulics                                   | D-18        |
| o Downstream Channel Routing                            | D-28        |
| Checklist for Hydrologic and Hydraulic Engineering Data | D-30        |



# Conewango Creek Watershed (Site 9A)

## CROSS SECTION LOCATION PLAN

Scale: 1"=2000' D-2

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF  
 HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF CONEWAGO CREEK-SITE 9A  
 RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM

DAM NY 596

0 0 -1

100 0 15

01 5

J 1 6 1

J1 0.2 0.4 0.5 0.6 0.8 1.0 1

K 0 INFLOW

K1 CALCULATION OF INFLOW HYDROGRAPH

M 1 6.0 12.17 0

P 0 22.6 114 124 138 148 1.0 0.1

T 4.08 0.63

U 2.0 -1.0 2.0

X 1 OUTFLOW

K1 COMPUTE OUTFLOW HYDROGRAPH FROM DAM NY596

Y 1

Y1 1381 1382 1383 1384 1385 1387 1388 1389 1390 1391

Y4 1391.8 1392 356 467 473 640 1522 2844 4489 6453

Y5 110 205

Y5 8200 8550

Y5 40.6 611.9 746.2 964.2

Y5 40.6 1381 1386.6 1388.7 1391.8

Y5 1386.6

Y5 1391.8 2.7 1.5 1590

K 1

K1 CHANNEL ROUTING -MOD PULS REACH 0-1

Y 1

Y1 1

Y6 0.045 0.04 1346 1360 670 0.0116

Y7 0 1360 700 1355 1370 1352 1395

Y7 1430 1352 1708 1360 1701 1360

K 0 INFLOW

K1 COMPUTE RUNOFF FROM ADJACENT WATERSHED

M 1 6.17 12.17 0

P 0 22.6 114 124 138 148 1.0 0.1

T 3.96 0.63

U -0.1 2.

X 2 COMBINE

K 2 COMBINE HYDROGRAPHS

K1 1

K1 CHANNEL ROUTING -MOD PULS REACH 1-2

Y 1

Y1 1

Y6 0.045 0.04 0.045 1308 1330 7600 0.0005

Y7 0 1330 700 1320 1300 1314 1340

Y7 1400 1314 2200 1320 2201 1320

K 1

K1 CHANNEL ROUTING -MOD PULS REACH 2-3

Y 1

Y1 1

Y6 0.045 0.04 0.045 1304 1322 1800 0.0022

Y7 0 1320 700 1322 880 1320

Y7 1370 1304 1360 1314 2200 1322

K 1

K1 CHANNEL ROUTING -MOD PULS REACH 3-4

V 1

V1 1

V6 0.045

V7 0

V7 1900

K 99

A

0.04

1315

1315

0.045

1200

2900

1310

1302

1312

1500

1302

1318

0.0013

1295

1302

1320

1312

OK. SFG #HEC108

OK. SEG #HEC108  
ENTER PROJECT NUMBER  
80166-08.09  
INPUT FILE ? NYS96  
1.....  
FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION JULY 1978  
LAST MODIFICATION 26 FEB 79  
.....

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS  
1  
RUNOFF HYDROGRAPH AT INFLOW  
ROUTE HYDROGRAPH TO UTIFLOW  
ROUTE HYDROGRAPH TO 1  
RUNOFF HYDROGRAPH AT INFLOW  
COMBINE 2 HYDROGRAPHS AT DMBINE  
ROUTE HYDROGRAPH TO 2  
ROUTE HYDROGRAPH TO 3  
ROUTE HYDROGRAPH TO 4  
END OF NETWORK.

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

RUN DATE: 6/10/  
TIME: 8:55 AM

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF DAM NY 596  
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF CONEWAGO CREEK-SITE 9A  
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM

| JOB SPECIFICATION |       |      |      |     |       |       |      |      |       |
|-------------------|-------|------|------|-----|-------|-------|------|------|-------|
| NO                | NHR   | NMIN | 1DAY | IHR | IMIN  | METRC | IPLT | IFRT | NSTAN |
| 100               | 0     | 15   | 0    | 0   | 0     | 0     | -1   | 4    | 0     |
|                   | JOPER |      | 5    | NWT | LROPT | TRACE |      |      |       |
|                   |       |      |      | 0   | 0     | 0     |      |      |       |

MULTI-PLAN ANALYSES TO BE PERFORMED  
RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00  
NPLAN= 1 NRTIO= 6 LRTIO= 1

\*\*\*\*\*  
SUR-AREA RUNOFF COMPUTATION  
\*\*\*\*\*  
CALCULATION OF INFLOW HYDROGRAPH  
ISTAG INFLW ICOMP IECON ITAPE JPLT JPRT INAPE ISTAGE IAUTO  
0 0 0 0 0 0 0 0 0 0  
HYDROGRAPH DATA  
IHYG IUNG TAREA SNAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL

OK, SEE #MECIOR

PAGE 0002

1 1 6.00 0.00 12.17 0.00 0.00 0 1 0

PRECIP DATA  
R6 R12 R24 R48 R72 R96  
0.00 22.60 114.00 124.00 130.00 148.00 0.00 0.00 0.00

TRAPC COMPUTED BY THE PROGRAM IS 0.007

LOSS DATA  
LROPT STRKR OLTRK RTIOL ERAIN STRKS RTIOK STRTL CNSTL ALSMX RTIMP  
0 0.00 0.00 1.00 0.00 0.00 1.00 1.00 0.10 0.00 0.00

UNIT HYDROGRAPH DATA  
TP= 4.00 CP=0.63 NTA= 0

RECESSION DATA  
STRTO= 2.00 QRC5N= -0.10 RTIOR= 2.00

UNIT HYDROGRAPH 89 END-OF-PERIOD ORDINATES, LAG= 4.09 HOURS, CP= 0.64 VCL= 1.00

|      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|
| 9.   | 35.  | 73.  | 117. | 165. | 218. | 273. | 330. | 388. | 445. |
| 496. | 537. | 571. | 596. | 613. | 621. | 619. | 603. | 571. | 534. |
| 499. | 467. | 436. | 408. | 381. | 356. | 333. | 312. | 291. | 272. |
| 255. | 238. | 222. | 208. | 194. | 182. | 170. | 159. | 149. | 139. |
| 130. | 121. | 113. | 106. | 99.  | 93.  | 87.  | 81.  | 76.  | 71.  |
| 66.  | 62.  | 58.  | 54.  | 51.  | 47.  | 44.  | 41.  | 39.  | 36.  |
| 34.  | 32.  | 30.  | 28.  | 26.  | 24.  | 23.  | 21.  | 20.  | 18.  |
| 17.  | 16.  | 15.  | 14.  | 13.  | 12.  | 11.  | 10.  | 9.   | 9.   |
| 9.   | 8.   | 8.   | 7.   | 7.   | 6.   | 6.   | 5.   | 5.   | 4.   |

MO.DA HR.MN PERIOD RAIN EXCS LOSS END-OF-PERIOD FLOW NO.DA HR.MN PERIOD RAIN EXCS LOSS CCMF 0  
SUM 26.99 23.23 3.76 290432.  
( 685.)( 596.)( 95.)( 8224.11)

HYDROGRAPH ROUTING

COMPUTE OUTFLOW HYDROGRAPH FROM DAM NY596

|              |       |       |       |        |        |        |       |
|--------------|-------|-------|-------|--------|--------|--------|-------|
| ISTAQ        | ICOMP | ITYPE | JPLI  | JPR1   | INAVE  | ISTAGE | IAUTO |
| 0            | 0     | 0     | 0     | 0      | 1      | 0      | 0     |
| ROUTING DATA |       |       |       |        |        |        |       |
| IRCS         | ISAME | IOPT  | IPMP  |        |        |        |       |
| 1            | 1     | 0     | 0     |        |        |        |       |
| LAG          | AMSKK | X     | TSK   | STORA  | ISPRAT |        |       |
| 0            | 0.000 | 0.000 | 0.000 | -1367. | -1     |        |       |

|           |         |         |         |         |         |         |         |         |         |         |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| STAGE     | 1381.00 | 1382.00 | 1383.00 | 1384.00 | 1385.00 | 1387.00 | 1388.00 | 1389.00 | 1390.00 | 1391.00 |
| FLOW      | 8200.00 | 205.00  | 356.00  | 467.00  | 473.00  | 640.00  | 1522.00 | 2844.00 | 4489.00 | 6451.00 |
| CAPACITY= | 41.     | 416.    | 612.    | 746.    | 964.    |         |         |         |         |         |

|        |       |      |      |      |      |       |      |
|--------|-------|------|------|------|------|-------|------|
| CREL   | SPVID | COOW | EXPV | ELEV | COOL | CAREA | EXFL |
| 1386.6 | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  |

|                 |        |         |             |
|-----------------|--------|---------|-------------|
| PEAK OUTFLOW IS | 1442.  | AT TIME | 46.00 HOURS |
| PEAK OUTFLOW IS | 4010.  | AT TIME | 44.25 HOURS |
| PEAK OUTFLOW IS | 5116.  | AT TIME | 44.00 HOURS |
| PEAK OUTFLOW IS | 6167.  | AT TIME | 44.00 HOURS |
| PEAK OUTFLOW IS | 8259.  | AT TIME | 43.75 HOURS |
| PEAK OUTFLOW IS | 10423. | AT TIME | 43.75 HOURS |

中国有色金属工业协会

\*\*\*\*\*

[illegible]

| QN(1)  | QN(2)  | QN(3)  | ELNVT  | ELMAX  | RLNTH | SEL     |
|--------|--------|--------|--------|--------|-------|---------|
| 0.0450 | 0.0400 | 0.0450 | 1346.0 | 1360.0 | 670.  | 0.01160 |

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

CROSS SECTION COORDINATES--STATION=STATION=ELV--ELV

|  | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 | 2105 | 2106 | 2107 | 2108 | 2109 | 2110 | 2111 | 2112 | 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 | 2128 | 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 | 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 | 2144 | 2145 | 2146 | 2147 | 2148 | 2149 | 2150 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 | 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 | 2185 | 2186 | 2187 | 2188 | 2189 | 2190 | 2191 | 2192 | 2193 | 2194 | 2195 | 2196 | 2197 | 2198 | 2199 | 2200 | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 | 2208 | 2209 | 2210 | 2211 | 2212 | 2213 | 2214 | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 | 2224 | 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 | 2233 | 2234 | 2235 | 2236 | 2237 | 2238 | 2239 | 2240 | 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2249 | 2250 | 2251 | 2252 | 2253 | 2254 | 2255 | 2256 | 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 | 2264 | 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 | 2272 | 2273 | 2274 | 2275 | 2276 | 2277 | 2278 | 2279 | 2280 | 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 | 2288 | 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 | 2297 | 2298 | 2299 | 2300 | 2301 | 2302 | 2303 | 2304 | 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 | 2316 | 2317 | 2318 | 2319 | 2320 | 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 | 2329 | 2330 | 2331 | 2332 | 2333 | 2334 | 2335 | 2336 | 2337 | 2338 | 2339 | 2340 | 2341 | 2342 | 2343 | 2344 | 2345 | 2346 | 2347 | 2348 | 2349 | 2350 | 2351 | 2352 | 2353 | 2354 | 2355 | 2356 | 2357 | 2358 | 2359 | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 | 2368 | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 | 2377 | 2378 | 2379 | 2380 | 2381 | 2382 | 2383 | 2384 | 2385 | 2386 | 2387 | 2388 | 2389 | 2390 | 2391 | 2392 | 2393 | 2394 | 2395 | 2396 | 2397 | 2398 | 2399 | 2400 | 2401 | 2402 | 2403 | 2404 | 2405 | 2406 | 2407 | 2408 | 2409 | 2410 | 2411 | 2412 | 2413 | 2414 | 2415 | 2416 | 2417 | 2418 | 2419 | 2420 | 2421 | 2422 | 2423 | 2424 | 2425 | 2426 | 2427 | 2428 | 2429 | 2430 | 2431 | 2 |
|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|
|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|

OK, SEE #MEC108

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|       |         |         |          |          |          |          |          |          |          |          |
|-------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| STAGE | 1346.00 | 1346.74 | 1347.47  | 1348.21  | 1348.95  | 1349.68  | 1350.42  | 1351.16  | 1351.89  | 1352.63  |
|       | 1353.37 | 1354.10 | 1354.84  | 1355.58  | 1356.32  | 1357.05  | 1357.79  | 1358.53  | 1359.26  | 1360.00  |
| FLOW  | 0.00    | 61.02   | 202.91   | 411.60   | 688.91   | 1036.16  | 1456.09  | 1951.85  | 2526.78  | 3375.65  |
|       | 4031.06 | 7216.05 | 10819.22 | 16083.62 | 22936.79 | 31422.70 | 41652.64 | 53738.30 | 67798.06 | 83916.67 |

MAXIMUM STAGE IS 1350.4  
 MAXIMUM STAGE IS 1353.0  
 MAXIMUM STAGE IS 1353.5  
 MAXIMUM STAGE IS 1353.8  
 MAXIMUM STAGE IS 1354.3  
 MAXIMUM STAGE IS 1354.8

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SUB-AREA RUNOFF COMPUTATION

COMPUTE RUNOFF FROM ADJACENT WATERSHED  
 ISTAQ ICOMP IECOM ITAPE JPLY JPRT INAPE ISTAGE IAUOTO  
 INFLOW 0 0 0 0 0 0 0 0 0 0

HYDROGRAPH DATA

|       |      |       |      |       |       |       |       |       |       |
|-------|------|-------|------|-------|-------|-------|-------|-------|-------|
| INHYD | IUNG | TAREA | SNAP | TRSDA | TRSPC | RATIO | ISNOW | ISAME | LOCAL |
| 1     | 1    | 6.17  | 0.00 | 12.17 | 0.00  | 0.000 | 0     | 0     | 0     |

PRECIP DATA

|      |       |        |        |        |        |      |      |
|------|-------|--------|--------|--------|--------|------|------|
| SPEE | PMS   | R6     | R12    | R24    | R48    | R72  | R96  |
| 0.00 | 22.60 | 114.00 | 124.00 | 138.00 | 148.00 | 0.00 | 0.00 |

TRSPC COMPUTED BY THE PROGRAM IS 0.807

LOSS DATA

|       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| LAOPT | STAKR | DLTKR | RTIOL | ERAIN | STKRS | RTIOK | STRTL | CNSTL | ALSMX | RTIMP |
| 0     | 0.00  | 0.00  | 1.00  | 0.00  | 0.00  | 1.00  | 1.00  | 0.10  | 0.00  | 0.00  |

UNIT HYDROGRAPH DATA

TPE= 3.96 CP=0.63 NTA= 0

RECESSION DATA

STRIO= 2.00 GRCSNE= -0.10 RTIOR= 2.00

UNIT HYDROGRAPH 86 END-OF-PERIOD ORDINATES, LAG= 3.95 HOURS, CP= 0.63 VOL= 1.00

|      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|
| 10.  | 39.  | 79.  | 127. | 181. | 238. | 297. | 359. | 423. | 483. |
| 535. | 578. | 611. | 636. | 651. | 655. | 648. | 623. | 585. | 546. |
| 509. | 475. | 443. | 414. | 386. | 360. | 336. | 314. | 293. | 275. |
| 255. | 238. | 222. | 207. | 193. | 180. | 168. | 157. | 146. | 137. |
| 128. | 119. | 111. | 104. | 97.  | 90.  | 84.  | 79.  | 73.  | 68.  |
| 64.  | 60.  | 56.  | 52.  | 48.  | 45.  | 42.  | 39.  | 37.  | 34.  |
| 32.  | 30.  | 28.  | 26.  | 24.  | 23.  | 21.  | 20.  | 18.  | 17.  |
| 16.  | 15.  | 14.  | 13.  | 12.  | 11.  | 11.  | 10.  | 9.   | 9.   |
| 8.   | 7.   | 7.   | 7.   | 6.   | 6.   | 6.   | 6.   | 6.   | 6.   |

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社會工作師公會

## COMBINE HYDROGRAPHS

|         |             |       |       |      |      |       |        |       |
|---------|-------------|-------|-------|------|------|-------|--------|-------|
| COMBINE | HYDROGRAPHS | IECON | ITYPE | JPLT | JPR1 | INAPE | ISTAGE | IAUTO |
|         | ISTAO       | ICOMP | 0     | 0    | 0    | 0     | 0      | 0     |
|         | OMBINE      | 2     |       |      |      |       |        |       |

**◆ ◆ ◆ ◆ ◆**

## HYDROGRAPH ROUTING

| CHANNEL ROUTING -MOD PULS REACH 1-2 |       |       |       |       |      |       |        |  |  | IAUTO |  |
|-------------------------------------|-------|-------|-------|-------|------|-------|--------|--|--|-------|--|
| ISTAQ                               | ICOMP | RECON | ITYPE | JPLT  | JPRT | IMAPE | ISTAGE |  |  |       |  |
| 2                                   | 1     | 0     | 0     | 0     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 | 0.000 | 0.00  | 1     | 1     | 0    | 0     | 0      |  |  |       |  |
| ROUTING DATA                        |       |       |       |       |      |       |        |  |  |       |  |
|                                     |       | AVG   | IRCS  | ISAME | IOPT | IPMP  | LSTR   |  |  |       |  |
| 0.0                                 |       |       |       |       |      |       |        |  |  |       |  |

# NORMAL DEPTH CHANNEL ROUTING

| QN(1)  | QN(2)  | QN(3)  | ELNVT  | ELMAX  | RLNTH | SEL     |
|--------|--------|--------|--------|--------|-------|---------|
| 0.0450 | 0.0400 | 0.0450 | 1308.0 | 1330.0 | 7600. | 0.00050 |

=====STA.FLEV.SIA.FLEV--EIC

ROSS SECTION COORDINATES--SYA,ELEV,SYA,ELEV--LIC

|         | 1400.00 | 1314.00  | 1228.00  | 1142.00  | 1056.00  | 970.00   | 884.00   | 798.00   | 712.00   | 626.00   | 540.00    | 454.00    | 368.00    | 282.00    | 196.00    | 110.00    | 24.00     |
|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| STORAGE | 0.00    | 7.42     | 17.58    | 30.46    | 46.06    | 64.90    | 86.40    | 102.78   | 121.51   | 141.51   | 163.71    | 188.11    | 214.61    | 243.21    | 273.91    | 306.61    | 341.31    |
|         | 798.49  | 1101.25  | 1423.02  | 1761.14  | 2115.64  | 2486.51  | 2873.75  | 3277.35  | 3697.33  | 4133.67  | 4581.37   | 5040.41   | 5510.81   | 5992.51   | 6485.61   | 6990.11   | 7506.11   |
| OUTFLOW | 0.00    | 34.81    | 122.06   | 264.55   | 468.78   | 741.57   | 1095.01  | 1427.59  | 1739.30  | 2030.15  | 2300.15   | 2549.35   | 2777.85   | 2985.65   | 3172.85   | 3339.55   | 3485.85   |
|         | 8433.60 | 13411.18 | 19284.59 | 26214.89 | 34194.46 | 43224.27 | 53316.59 | 64463.27 | 76694.53 | 89999.39 | 104478.81 | 120032.81 | 136671.31 | 154404.41 | 173242.11 | 193195.61 | 214275.91 |
| STAGE   | 1308.00 | 1309.16  | 1310.32  | 1311.47  | 1312.63  | 1313.79  | 1314.95  | 1316.10  | 1317.26  | 1318.42  | 1319.58   | 1320.73   | 1321.89   | 1323.05   | 1324.21   | 1325.37   | 1326.52   |
|         | 1319.58 | 1320.73  | 1321.89  | 1323.05  | 1324.21  | 1325.37  | 1326.52  | 1327.68  | 1328.84  | 1329.99  | 1331.15   | 1332.30   | 1333.46   | 1334.61   | 1335.77   | 1336.92   | 1338.08   |
| FLOW    | 0.00    | 34.81    | 122.06   | 264.55   | 468.78   | 741.57   | 1095.01  | 1427.59  | 1739.30  | 2030.15  | 2300.15   | 2549.35   | 2777.85   | 2985.65   | 3172.85   | 3339.55   | 3485.85   |
|         | 8433.60 | 13411.18 | 19284.59 | 26214.89 | 34194.46 | 43224.27 | 53316.59 | 64463.27 | 76694.53 | 89999.39 | 104478.81 | 120032.81 | 136671.31 | 154404.41 | 173242.11 | 193195.61 | 214275.91 |

MAXIMUM STAGE IS 1316.7  
 MAXIMUM STAGE IS 1319.1  
 MAXIMUM STAGE IS 1319.8  
 MAXIMUM STAGE IS 1320.3  
 MAXIMUM STAGE IS 1321.3  
 MAXIMUM STAGE IS 1322.1

## HYDROGRAPH ROUTING

## CHANNEL ROUTING -MOD PULS REACH 2-3

| ISTAQ                                    | ICOMP | IECON | ITAPE | JPLT  | JPRT  | INAVE | ISTAGE | IAUTO |
|------------------------------------------|-------|-------|-------|-------|-------|-------|--------|-------|
| 3                                        | 1     | 0     | 0     | 0     | 0     | 1     | 0      | 0     |
| ROUTING DATA                             |       |       |       |       |       |       |        |       |
| GROSS                                    | CLOSS | AVG   | IRES  | ISAME | IOPT  | IPMP  | LSTR   |       |
| 0.0                                      | 0.000 | 0.00  | 1     | 1     | 0     | 0     |        |       |
| NSTPS NSTOL LAG ANSKK X TSK STORA ISPRAT |       |       |       |       |       |       |        |       |
| 1                                        | 0     | 0     | 0.000 | 0.000 | 0.000 | 0.0   |        |       |

## NORMAL DEPTH CHANNEL ROUTING

| ON(1)  | ON(2)  | ON(3)  | ELNVT  | ELMAX  | RLNTH | SEL     |
|--------|--------|--------|--------|--------|-------|---------|
| 0.0450 | 0.0400 | 0.0450 | 1304.0 | 1322.0 | 1000. | 0.00220 |

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

|         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0.00    | 1320.00 | 700.00  | 1322.00 | 800.00  | 1320.00 | 1320.00 | 1314.00 | 1330.00 | 1304.00 |
| 1370.00 | 1304.00 | 1300.00 | 1314.00 | 2200.00 | 1322.00 |         |         |         |         |

|         |         |         |         |         |         |         |          |          |          |          |
|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|
| STORAGE | 0.00    | 1.60    | 3.28    | 5.03    | 6.86    | 8.76    | 10.73    | 12.70    | 14.90    | 17.09    |
|         | 19.37   | 22.34   | 30.84   | 45.86   | 67.40   | 95.46   | 130.03   | 171.21   | 227.11   | 301.13   |
| OUTFLOW | 0.00    | 64.04   | 204.00  | 402.51  | 652.86  | 951.26  | 1295.30  | 1683.33  | 2114.23  | 2581.25  |
|         | 3101.86 | 2742.33 | 2750.56 | 3683.55 | 5422.09 | 8049.00 | 11681.41 | 16536.40 | 23626.22 | 32014.54 |
| STAGE   | 1304.00 | 1304.95 | 1305.89 | 1306.84 | 1307.79 | 1308.74 | 1309.68  | 1310.63  | 1311.58  | 1312.53  |
|         | 1313.47 | 1314.42 | 1315.37 | 1316.31 | 1317.26 | 1318.21 | 1319.16  | 1320.10  | 1321.05  | 1322.00  |
| FLOW    | 0.00    | 64.04   | 204.00  | 402.51  | 652.86  | 951.26  | 1295.30  | 1683.33  | 2114.23  | 2581.25  |
|         | 3101.86 | 2742.33 | 2750.56 | 3683.55 | 5422.09 | 8049.00 | 11681.41 | 16536.40 | 23626.22 | 32014.54 |

MAXIMUM STAGE IS 1312.9

MAXIMUM STAGE IS 1318.0

[illegible][illegible]

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**MAXIMUM STAGE IS 1316.6**

| OPERATION | STATION | AREA | PLAN | RATIOS APPLIED TO FLOWS |         |         |         |         |         |
|-----------|---------|------|------|-------------------------|---------|---------|---------|---------|---------|
|           |         |      |      | RATIO 1                 | RATIO 2 | RATIO 3 | RATIO 4 | RATIO 5 | RATIO 6 |
|           |         |      |      | 0.20                    | 0.40    | 0.50    | 0.60    | 0.80    | 1.00    |

|                      |                   |               |                    |                    |                     |                     |                     |        |
|----------------------|-------------------|---------------|--------------------|--------------------|---------------------|---------------------|---------------------|--------|
| HYDROGRAPH AT INFLOW | 6.00<br>( 15.54)  | 1<br>( 59.17) | 2090.<br>( 118.35) | 4179.<br>( 147.93) | 5224.<br>( 177.52)  | 6269.<br>( 236.69)  | 8359.<br>( 295.87)  | 10442. |
| ROUTED TO            | 6.00<br>( 15.54)  | 1<br>( 40.82) | 1442.<br>( 113.55) | 4010.<br>( 144.86) | 5116.<br>( 174.62)  | 6167.<br>( 233.86)  | 8259.<br>( 295.13)  | 10422. |
| ROUTED TO            | 6.00<br>( 15.54)  | 1<br>( 40.97) | 1447.<br>( 113.63) | 4013.<br>( 144.86) | 5116.<br>( 174.63)  | 6167.<br>( 233.93)  | 8261.<br>( 295.34)  | 10430. |
| HYDROGRAPH AT INFLOW | 6.17<br>( 15.98)  | 1<br>( 61.92) | 2187.<br>( 123.84) | 4373.<br>( 154.80) | 5467.<br>( 185.76)  | 6560.<br>( 247.68)  | 8747.<br>( 309.55)  | 10932. |
| 2 COMBINED           | 12.17<br>( 31.52) | 1<br>( 85.66) | 3025.<br>( 233.08) | 8231.<br>( 297.03) | 10490.<br>( 358.07) | 12645.<br>( 479.18) | 16922.<br>( 604.12) | 21337. |
| ROUTED TO            | 12.17<br>( 31.52) | 1<br>( 78.96) | 2788.<br>( 210.99) | 7451.<br>( 274.06) | 9678.<br>( 336.02)  | 11866.<br>( 459.36) | 16222.<br>( 583.30) | 20599. |
| ROUTED TO            | 12.17<br>( 31.52) | 1<br>( 78.92) | 2787.<br>( 210.94) | 7449.<br>( 274.01) | 9676.<br>( 335.68)  | 11854.<br>( 459.26) | 16219.<br>( 583.46) | 20605. |
| ROUTED TO            | 12.17<br>( 31.52) | 1<br>( 78.87) | 2785.<br>( 210.54) | 7435.<br>( 273.38) | 9654.<br>( 335.72)  | 11856.<br>( 459.15) | 16215.<br>( 582.67) | 20577. |

## SUMMARY OF DAM SAFETY ANALYSIS

| PLAN 1 .....       |                                  |                                         |                                           |                                        |                               |
|--------------------|----------------------------------|-----------------------------------------|-------------------------------------------|----------------------------------------|-------------------------------|
|                    | ELEVATION<br>STORAGE<br>OUTFLOW  | INITIAL VALUE<br>1366.60<br>41.<br>118. | SPILLWAY CREST<br>1386.60<br>612.<br>607. | TOP OF DAM<br>1391.80<br>964.<br>8200. |                               |
| RATIO<br>OF<br>PMF | MAXIMUM<br>RESERVOIR<br>W.S.ELEV | MAXIMUM<br>DEPTH<br>OVER DAM            | MAXIMUM<br>STORAGE<br>AC-FT               | MAXIMUM<br>OUTFLOW<br>CFS              | DURATION<br>OVER TOP<br>HOURS |
| 0.20               | 1387.91                          | 0.00                                    | 696.                                      | 1442.                                  | 0.00                          |
|                    |                                  |                                         |                                           |                                        | TIME OF<br>FAILURE<br>HOURS   |
|                    |                                  |                                         |                                           |                                        | 46.00                         |
|                    |                                  |                                         |                                           |                                        | 0.00                          |

|      |         |      |      |        |      |       |      |
|------|---------|------|------|--------|------|-------|------|
| 0.40 | 1389.71 | 0.00 | 817. | 4010.  | 0.00 | 44.25 | 0.00 |
| 0.50 | 1390.32 | 0.00 | 860. | 5116.  | 0.00 | 44.00 | 0.00 |
| 0.60 | 1398.85 | 0.00 | 898. | 6167.  | 0.00 | 44.00 | 0.00 |
| 0.80 | 1391.82 | 0.02 | 966. | 8259.  | 0.50 | 43.75 | 0.00 |
| 1.00 | 1392.24 | 0.44 | 995. | 10423. | 3.50 | 43.75 | 0.00 |

| PLAN 1 |                   | STATION 1         |            |
|--------|-------------------|-------------------|------------|
| RATIO  | MAXIMUM FLOW, CFS | MAXIMUM STAGE, FT | TIME HOURS |
| 0.20   | 1447.             | 1350.4            | 46.00      |
| 0.40   | 4013.             | 1353.0            | 44.25      |
| 0.50   | 5116.             | 1353.5            | 44.00      |
| 0.60   | 6167.             | 1353.8            | 44.00      |
| 0.80   | 8261.             | 1354.3            | 44.00      |
| 1.00   | 10430.            | 1354.8            | 43.75      |

| PLAN 1 |                   | STATION 2         |            |
|--------|-------------------|-------------------|------------|
| RATIO  | MAXIMUM FLOW, CFS | MAXIMUM STAGE, FT | TIME HOURS |
| 0.20   | 2788.             | 1316.7            | 46.25      |
| 0.40   | 7451.             | 1319.1            | 45.00      |
| 0.50   | 9678.             | 1319.8            | 44.75      |
| 0.60   | 11866.            | 1320.3            | 44.50      |
| 0.80   | 16222.            | 1321.3            | 44.25      |
| 1.00   | 20599.            | 1322.1            | 44.25      |

| PLAN 1 |                   | STATION 3         |            |
|--------|-------------------|-------------------|------------|
| RATIO  | MAXIMUM FLOW, CFS | MAXIMUM STAGE, FT | TIME HOURS |
| 0.20   | 2787.             | 1312.9            | 46.25      |
| 0.40   | 7449.             | 1318.0            | 45.00      |
| 0.50   | 9676.             | 1318.6            | 44.75      |
| 0.60   | 11854.            | 1319.2            | 44.50      |
| 0.80   | 16219.            | 1320.0            | 44.50      |
| 1.00   | 20605.            | 1320.6            | 44.25      |

| PLAN 1 |                   | STATION 4         |            |
|--------|-------------------|-------------------|------------|
| RATIO  | MAXIMUM FLOW, CFS | MAXIMUM STAGE, FT | TIME HOURS |
| 0.20   | 2785.             | 1310.6            | 46.50      |
| 0.40   | 7435.             | 1314.8            | 45.25      |
| 0.50   | 9654.             | 1315.2            | 45.00      |
| 0.60   | 11856.            | 1315.6            | 44.75      |
| 0.80   | 16215.            | 1316.1            | 44.50      |
| 1.00   | 20577.            | 1316.6            | 44.25      |

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

WATERSHED UPSTREAM OF DAM

$$T_p = c_t (L L_{ca})^{0.3} \checkmark$$

$$T_r = \frac{T_p}{5.5} \checkmark$$

$$c_t = 2.00$$

$$c_p = 0.63$$

$$T_{PR} = T_p + 0.25 (T_R - T_r)$$

$$L = 25000' = \frac{25000}{5280} = 4.73 \text{ MI} \checkmark$$

$$L_{ca} = 11300' = \frac{11300}{5280} = 2.14 \text{ MI} \checkmark$$

$$T_p = 2 (4.73 \times 2.14)^{0.3} = 4.01 \text{ hr.} \checkmark$$

$$T_r = \frac{4.01}{5.5} = 0.73 \text{ hr} \checkmark \Rightarrow T_R = 1 \text{ hr} \checkmark$$

$$T_{PR} = 4.01 + 0.25 (1 - 0.73) = 4.08 \text{ hr.} \checkmark$$

D.P. DATE 3-27-81 ERDMAN, ANTHONY, ASSOCIATES SHEET 2 OF 16  
 DKO B.R. DATE 4/27/81 SUBJECT DAM SITE HYDROLOGY SUB-SHEET NO. 2  
 OWNER PROJECT NAME HE-1 DAM INSPECTION 80166-00.09

WATERSHED UPSTREAM OF DAM

DAM 096 JONEWANDS CREEK SITE 9A

REF. QUAD. PERRYSBURG, N.Y.  
FORESTVILLE, N.Y.

DISTANCE L & LCA MEAS. WITH MAP MEAS. WHEEL (1" = 2000')

COMPUTATION FOR L DISTANCE

| RUN | MEAS. DIST             | AVG. DIST | COEF. | L DISTANCE                                 |
|-----|------------------------|-----------|-------|--------------------------------------------|
| A   | 1 = 12.50              |           |       |                                            |
|     | 2 = 12.50              |           |       |                                            |
|     | $25.00 \div 2 = 12.50$ |           |       | $\times 2000' = \underline{25,000. FT.}^*$ |

| RUN | MEAS. DIST          | AVG. DIST | COEF. | L DISTANCE                 |
|-----|---------------------|-----------|-------|----------------------------|
| B   | 1 = 3.6             |           |       |                            |
|     | 2 = 3.7             |           |       |                            |
|     | $7.3 \div 2 = 3.65$ |           |       | $\times 2000' = 17,300 FT$ |

COMPUTATION FOR LCA DISTANCE

| RUN | MEAS. DIST           | AVG. DIST | COEF. | LCA DISTANCE                               |
|-----|----------------------|-----------|-------|--------------------------------------------|
| A   | 1 = 5.6              |           |       |                                            |
|     | 2 = 5.7              |           |       |                                            |
|     | $11.3 \div 2 = 5.65$ |           |       | $\times 2000' = \underline{11,300. FT.}^*$ |

SUMMARY

\* USE RUN A FOR L DISTANCE = 25,000. FT.

\* USE RUN A FOR LCA DISTANCE = 11,300. FT.

ADJACENT WATERSHED

$$L = 27000 \text{ ft} \checkmark = \frac{27000}{5280} = 5.11 \text{ MI} \checkmark$$

$$L_a = 9500 \text{ ft} \checkmark = \frac{9500}{5280} = 1.80 \text{ MI} \checkmark$$

$$T_p = C_r (L \times L_a)^{0.3}$$

$$C_r = 2.00$$

$$T_p = 2 (5.11 \times 1.80)^{0.3}$$

$$C_p = 0.63$$

$$T_p = 3.89 \text{ hr.} \checkmark$$

$$T_r = \frac{T_p}{5.5}$$

$$T_r = \frac{3.89}{5.5} = 0.71 \implies T_R = 1 \text{ hr} \checkmark$$

$$T_{PR} = T_p + 0.25 (T_R - T_r)$$

$$T_{PR} = 3.89 + 0.25 (1 - 0.71) = 3.96 \text{ hr.} \checkmark$$

DATE 4/28/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 4 OF 16  
 D B.R. DATE 4/28/81 SUBJECT DAM 596 HYDROLOGY SUB-SHEET NO. 4  
 OWNER PROJECT NAME HEC-1 DB DAM INSPECTION 80136-00.09

ADJACENT WATERSHED  
 DAM 596 CONEWANGS CREEK SITE 9A

REF. QUAD HAMLET, NY  
 CHERRY CR., NY  
 FORESTVILLE, NY  
 PEREYSBURG, NY.

LAIRAGE DISTANCE

DISTANCE L & LCA MEAS. WITH MAP MEAS. WHEEL (1"=2000')

COMPUTATIONS FOR L DISTANCE

| CON | MEAS. DIST | AVG. DIST       | COEF.          | L DIST.                |
|-----|------------|-----------------|----------------|------------------------|
| A 1 | 13.5       |                 |                |                        |
| 2   | 13.5       |                 |                |                        |
|     | 27.0       | $\div 2 = 13.5$ | $\times 2000'$ | $= 27,000 \text{ ft.}$ |

| CON | MEAS. DIST | AVG. DIST        | COEF.         | L DIST.               |
|-----|------------|------------------|---------------|-----------------------|
| B 1 | 12.6       |                  |               |                       |
| 2   | 12.7       |                  |               |                       |
|     | 25.2       | $\div 2 = 12.65$ | $\times 2000$ | $= 25,300 \text{ ft}$ |

\* L = 27,000 ft. USED RUN A

COMPUTATION FOR LCA DISTANCE

| CON | MEAS. DIST | AVG. DIST       | COEF.          | LCA DIST.             |
|-----|------------|-----------------|----------------|-----------------------|
| A 1 | 4.8        |                 |                |                       |
| 2   | 4.7        |                 |                |                       |
|     | 9.5        | $\div 2 = 4.75$ | $\times 2000'$ | $= 9,500 \text{ ft.}$ |

\* Lca = 9,500 ft.

BY B.R. DATE 4/24/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 5 OF 16  
 D DATE 1/1/71 SUBJECT Dam 596 HYDRAULICS SUB-SHEET NO. 1  
 OWNER PROJECT NAME Dam Inspection 80166-00.09

## Dam 596 HYDRAULICS

### SERVICE SPILLWAY

18"  $\phi$  RCP  $\checkmark$  w/ 4' x 12' Riser  $\checkmark$

From design report:

$$Q_s = 481 \text{ cfs} \quad \text{Elev. } 1386.6 \checkmark$$

$$Q_s = 467 \text{ cfs} \quad \text{Elev. } 1384 \checkmark$$

① 
$$Q_s = C_o A_o \sqrt{2gh_o} + 467 \text{ cfs}, \quad h_o \text{ is Elev. above Elev. } 1384$$

$$A_o = \left[ \left( \frac{48}{12} \right)^2 / 4 \right] \pi = 12.57 \text{ ft}^2 \checkmark$$

Determine  $C_o$  from  $\begin{cases} Q = 481 - 467 \text{ cfs} \\ Q = 14 \text{ cfs} \end{cases} \quad \begin{cases} h_o = 1386.6 - 1384 \\ h_o = 2.6 \end{cases}$

From eq. ①

$$C_o = \frac{14}{12.57 \sqrt{2 \times 32.2 \times 2.6}} = 0.09$$

NOTE: Equation ① is only for elevations above elevation 1384.

For elevations below 1384 flow <sup>D-18</sup> are given in design report

$$Q_s = 0.09 \times 12.57 \sqrt{2 \times 32.2 \times h} + 467 = 9.08 h_o^{0.5} + 467 \text{ cfs}$$

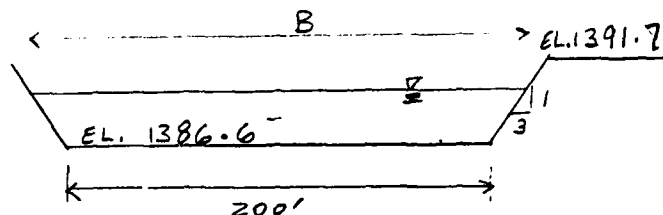
The above formula is used only for elevations above 1394.

| SERVICE SPILLWAY |       |       |
|------------------|-------|-------|
| ELEV.            | $h_o$ | $Q_s$ |
| 1381             |       | 118 ✓ |
| 1382             |       | 205 ✓ |
| 1383             |       | 356 ✓ |
| 1383.5           |       | 446 ✓ |
| 1384             | 0     | 467 ✓ |
| 1386.6           | 2.6   | 481 ✓ |
| 1387             | 3     | 483 ✓ |
| 1388             | 4     | 485 ✓ |
| 1389             | 5     | 487 ✓ |
| 1390             | 6     | 489 ✓ |
| 1391             | 7     | 491 ✓ |
| * 1391.8         | 7.8   | 492 ✓ |
| 1392             | 8     | 493 ✓ |
| 1393             | 9     | 494 ✓ |
| 1394             | 10    |       |

FROM  
DESIGN  
REPORT

\* Top of dam

# EMERGENCY SPILLWAY



EMERGENCY SPILLWAY SECTION

$$S_0 = 0.03$$

$$Q_c = \sqrt{\frac{g A^3}{B}}$$

$$\text{for } y = 1'$$

$$B = (2 \times 3) + 200 = 206'$$

$$A = \frac{1}{2}(206 + 200) \times 1 = 203 \text{ ft}^2$$

$$Q_c = \sqrt{\frac{32.2 \times 203^3}{206}} = 1143.5 \text{ cfs}$$

$$K = \frac{1.49}{n} A R^{2/3} = \frac{1.49}{0.035} 203 \left[ \frac{203}{200 + 2(1+9)^{0.5}} \right]^{2/3}$$

$$K = 8549$$

$$S_c = \left( \frac{1143.5}{8549} \right)^2 = 0.018$$

spillway slope > critical slope ( $0.03 > 0.018$ )

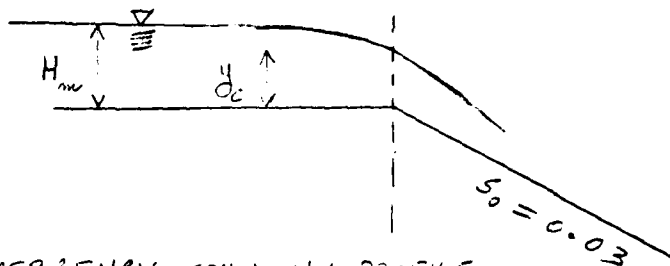
∴ Flow goes through critical depth for  $y = 1'$  and also for  $y > 1'$

use Table 4-7 from "King and Brister"

$$Z = 3/1 = 3$$

$$b = 200'$$

$$Q_E = C_2 b H_m^{1.5}$$



EMERGENCY SPILLWAY PROFILE

| EMERGENCY SPILLWAY<br>DISCHARGE - ELEVATION RELATIONSHIP |                   |       |         |        |
|----------------------------------------------------------|-------------------|-------|---------|--------|
| $H_m$                                                    | $\frac{H_m Z}{b}$ | $C_2$ | $Q_E$   | ELEV.  |
| 0                                                        | 0                 | 3.09  | 0       | 1386.6 |
| 0.4                                                      | 0.01              | 3.11  | 157 ✓   | 1387   |
| 1.4                                                      | 0.02              | 3.13  | 1037 ✓  | 1388   |
| 2.4                                                      | 0.04              | 3.17  | 2357 ✓  | 1389   |
| 3.4                                                      | 0.05              | 3.19  | 4000 ✓  | 1390   |
| 4.4                                                      | 0.07              | 3.23  | 5962 ✓  | 1391   |
| * 5.2                                                    | 0.08              | 3.25  | 7708 ✓  | 1391.3 |
| 5.4                                                      | 0.08              | 3.25  | 8157 ✓  | 1392   |
| 6.4                                                      | 0.10              | 3.29  | 10654 ✓ | 1393   |
| 7.4                                                      | 0.11              | 3.32  | 13366 ✓ | 1394   |

\* actual top of dam.

LONGWANG CREEK DAM 596 CITE 9A

C.L. AREA RESEVIOIR SURFACE AREA

LEFF. U.S. DEPT. OF A.S.C.S. AS BUILT PLANS DWG. NY-2161-P  
 SCALE 1" = 200' PLAN & 1/2" REDUCTION = 1" = 400

$$\text{Eq. } \frac{\text{in}^2 \times 400^2 \text{ ft}^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = \text{AC}$$

ELEV. 1370

$$4.6 \frac{\text{in}^2 \times 400^2 \text{ ft}^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 16.90 \text{ AC. } \checkmark$$

ELEV. 1375

$$8.28 \frac{\text{in}^2 \times 400^2 \text{ ft}^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 30.41 \text{ AC. } \checkmark$$

ELEV. 1380

$$12.10 \frac{\text{in}^2 \times 400^2 \text{ ft}^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 44.44 \text{ AC. } \checkmark$$

ELEV. 1385

$$16.67 \frac{\text{in}^2 \times 400^2 \text{ ft}^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 51.23 \text{ AC. } \checkmark$$

ELEV. 1390

$$19.66 \frac{\text{in}^2 \times 400^2 \text{ ft}^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 72.21 \text{ AC. } \checkmark$$

ELEV. 1395

$$24.0 \frac{\text{in}^2 \times 400^2 \text{ ft}^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 88.15 \text{ AC. } \checkmark$$

TOTAL AC = 303.34

\* Used storage values from <sup>main</sup> D-22 report

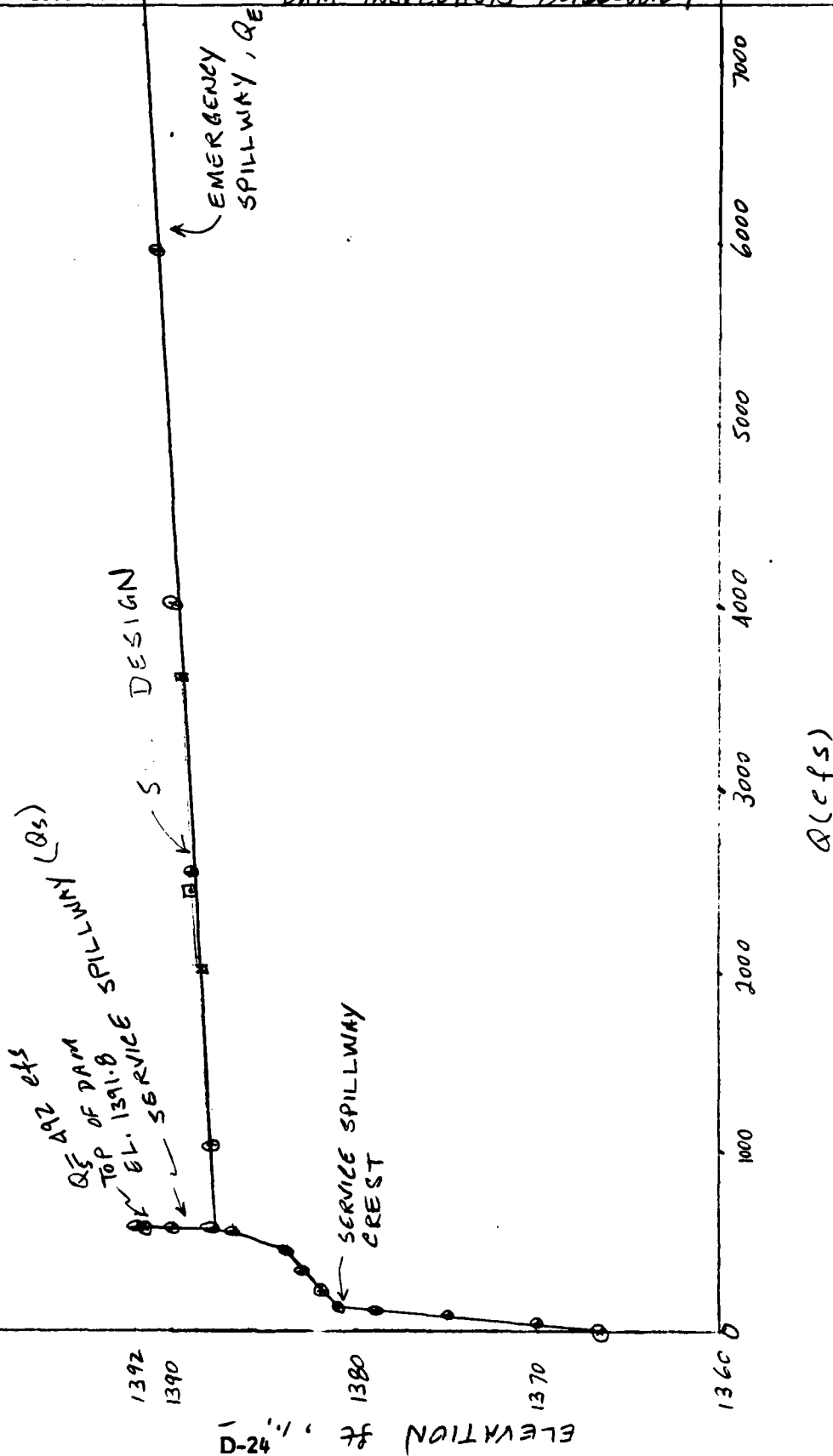
BY R.R. DATE 4/29/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 10 OF 16  
 CD 1 DATE 1 SUBJECT DAM 596 HYDRAULICS SUB-SHEET NO. 6  
 OWNER PROJECT NAME DAM INSPECTION 60166-0009

| $Q_S + Q_E$<br>TOTAL SPILLWAYS DISCHARGE |                      |                           |
|------------------------------------------|----------------------|---------------------------|
| ELEV.<br>ft                              | $Q_S + Q_E$<br>(cfs) | RESERVOIR<br>SURFACE AREA |
| 1366.6                                   | 0                    | 8.8                       |
| 1367                                     | 2.5                  |                           |
| 1367.5                                   | 8.5                  |                           |
| 1368                                     | 16.4                 |                           |
| 1368.77                                  | 32                   |                           |
| 1370                                     | 49                   | 16.90 AC.                 |
| 1375                                     | 87                   | 30.41 AC.                 |
| 1379                                     | 113                  |                           |
| 1380                                     | 118                  | 44 AC                     |
| 1381                                     | 116                  |                           |
| 1382                                     | 205                  |                           |
| 1383                                     | 356                  |                           |
| 1383.5                                   | 446                  |                           |
| 1384                                     | 467                  | 51.23 AC                  |
| 1385                                     | 473                  | 59.5 AC.                  |
| 1386.6                                   | 481                  |                           |
| 1387                                     | 640                  |                           |
| 1388                                     | 1522                 | 65.5                      |
| 1389                                     | 2844                 |                           |
| 1390                                     | 4489                 | 72.21 AC                  |
| 1391                                     | 6453                 |                           |
| 1391.8                                   | 8200                 | 74.5 AC                   |
| 1392                                     | 8650                 |                           |
| 1393                                     | 11148                |                           |
| 1394                                     |                      |                           |
| 1395                                     |                      | 88.15 AC                  |

\* TOP OF DAM

BY B.R. DATE 4/27/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 11 OF 16  
 DATE 7/11 SUBJECT DAM 596 HYDRAULICS SUB-SHEET NO. 7  
 OWNER PROJECT NAME DAM INSPECTION B0166-00.09

SPILLWAY RATING CURVE - DAM 596



B.R. DATE 4/27/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 12 OF 16  
 KD RRA DATE 5/29/81 SUBJECT DAM 596 - HYDRAULICS SUB-SHEET NO. 8  
 OWNER PROJECT NAME DAM INSPECTION 80166-00.09

VALUES ON \$D CARD OF HEC-1

| <u>FIELD</u> | <u>VARIABLE</u> | <u>VALUE</u> |
|--------------|-----------------|--------------|
| 0            | ID              | \$D          |
| 1            | TOPEL           | 1391.8 ✓     |
| 2            | CQCD            | 2.7 ✓        |
| 3            | EXPD            | 1.5 ✓        |
| 4            | DAMWID          | 1590 ✓       |

AREA OF THE ADJACENT WATERSHED

$$A = 43.0 \text{ in}^2 \text{ (scale : } 1'' = 2000') \text{ )}$$

$$A = 43 \text{ in}^2 \times \frac{2000^2 \cancel{\text{ft}^2}}{\text{in}^2} \times \frac{\text{ac}}{43560 \cancel{\text{ft}^2}} \times \frac{\text{MILE}^2}{640 \text{ ac.}} = 6.17 \text{ Mile}^2 \checkmark$$

## Emergency Spillway Capacities

| <u>Flood</u> | <u>Q<sub>T</sub></u> | <u>Elev.</u> | <u>Q<sub>es</sub></u> | <u>A</u> | <u>V</u> | <u>Comments</u> |
|--------------|----------------------|--------------|-----------------------|----------|----------|-----------------|
| H.F.         | 16,423               | 1392.21'     | 8756                  | 1075     | 8.15     | > 8.0 : erosion |
| M.F.         | 5116                 | 1390.32      | 4328                  | 575      | 8.08     | > 8.0 : erosion |

PMF

$$y = 8157 + \frac{(20)(13354 - 8157)}{13354 - 8157} = 8756 \text{ as } \checkmark$$

$$\text{Assume } \frac{y}{b} < 0.02 \Rightarrow \frac{y}{b} = 0.749 \left( \frac{Q n}{b S_b^{1/2}} \right)^{0.6}$$

$$y/b = 0.749 \left( \frac{8756 (0.06)}{200 (0.03)^{1/2}} \right)^{0.6} = 4.03', \frac{y}{b} = \frac{4.03}{200} = 0.02 \neq 0.02 \text{ N.G.}$$

Since  $\frac{y}{b}$  is not less than 0.02, then  $\frac{y}{b}$  is found from Table 10.1 of Fundamentals of Open Channel Hydraulics byacey.

$$\frac{Q n}{(b)^{3/2} (S_b)^{1/2}} = \frac{8756 (0.06)}{(200)^{3/2} (0.03)^{1/2}} = 0.00222 \checkmark$$

$$\begin{array}{ccc} 0.00150 & 0.02 & \frac{y}{b} = 0.02 + .01 \left( \frac{0.00222}{0.00147} \right) = 0.025 \checkmark \\ 0.00222 & \frac{y}{b} & \\ 0.00298 & 0.03 & \end{array}$$

$$y/b = 0.025(200) = 50' \checkmark$$

$$A = (50)(200) + \frac{1}{2} \left( \frac{1}{2} (50)(3)(200) \right) = 1075 \text{ ft}^2 \checkmark$$

$$V = \frac{Q}{A} = \frac{8756 \text{ ft}^3/\text{s}}{1075 \text{ ft}^2} = 8.15 \text{ ft/s} \checkmark$$

DATE 6/1/71 ERDMAN, ANTHONY, ASSOCIATES SHEET 14 OF 16  
 NO BR DATE 6/1/71 SUBJECT DAM 596 - Hydraulics SUB-SHEET NO. 10  
 OWNER \_\_\_\_\_ PROJECT NAME DAM 596 (80166-33, 39)

1/2 DMF

1982 4000  
 1981 32 Y  
 1981 1982

$$y = 4000 + 0.32(5962 - 4000) = 4628 \checkmark$$

$$\text{Assume } y/b < 0.02 \Rightarrow y_n = 0.754 \left( \frac{Q n}{b \sqrt{S}} \right)^{0.6}$$

$$y_n = 0.754 \left( \frac{4628 (0.02)}{200 (0.02)^{1/2}} \right)^{0.6} = 2.75', \quad y/b = \frac{2.75'}{200} = 0.014 < 0.02 \quad \text{OK}$$

$$A = 2.75(200') + \frac{1}{2} \left( \frac{1}{3} (2.75')(3(2.75')) \right) = 573 \text{ ft}^2 \checkmark$$

$$V = \frac{Q}{A} = \frac{4628}{573} = 8.08 \text{ ft/sec} \checkmark$$

BY C.R. DATE 6/1/81 **ERDMAN, ANTHONY, ASSOCIATES** SHEET 15 OF 16  
 CD PKP DATE 6/1/81 SUBJECT DHM 596 - Channel Rosting SUB-SHEET NO. 1  
 OWNER PROJECT NAME DHM INSPECTION 80166-00.09

CONEWANGO CREEK SITE 9A

REF. U.S. DEP. OF ARCS DESIGN REPORT SHEETS & RATING CURVE  
SHEET A AREA SHEET

DAM TOP ELEV. 1391.8  
DAM INV. ELEV. 1353.78

REACH 1 LENGTH = 670'

CROSS SECTION:  $\frac{1360}{0}, \frac{1355}{700}, \frac{1352}{1370}, \frac{1346}{1395}, \frac{1346}{1420}, \frac{1352}{1430}, \frac{1360}{1700}, \frac{1360}{1701}$

$$SLOPE = (DMM \text{ INV.} - RE. 1 \text{ INV.}) \div \text{REACH LENGTH}$$

$$1353.8 - 1346 = 7.8 \div 670 = 0.0116$$

REACH 2 LENGTH = 7600'

CROSS SECTION:  $\frac{1330}{0}, \frac{1320}{700}, \frac{1314}{1300}, \frac{1308}{1340}, \frac{1308}{1370}, \frac{1314}{1400}, \frac{1320}{2200}, \frac{1320}{2201}$

$$\text{SLOPE} = (1346 - 1308) \div \frac{8200}{1600} = 0.0046$$

REACH 3 LENGTH = 1800' ✓

CROSS SECTION:  $\frac{1320}{0}$ ,  $\frac{1322}{700}$ ,  $\frac{1320}{880}$ ,  $\frac{1314}{1320}$ ,  $\frac{1304}{1330}$ ,  $\frac{1304}{1370}$ ,  $\frac{1314}{1380}$ ,  $\frac{1322}{2200}$

$$\text{slope} = (1308 - 1304) \div 1800 = 0.0022$$

REACH A LENGTH = 1500'

CROSS SECTION:  $\frac{1315}{0}$ ,  $\frac{1312}{1200}$ ,  $\frac{1302}{1255}$ ,  $\frac{1302}{1295}$ ,  $\frac{1312}{1320}$ ,  $\frac{1315}{1400}$ ,  $\frac{1318}{2400}$ ,  $\frac{1312}{3000}$

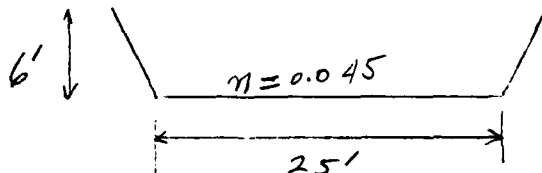
$$\text{Error} = (1304 - 1302) \div 1500 = 0.0013$$

S.R. DATE 5-22-81 ERDMAN, ANTHONY, ASSOCIATES SHEET 16 OF 16  
 RD 112H DATE 5/29/81 SUBJECT Dam 596 - Channel Section SUB-SHEET NO. 2  
 OWNER PROJECT NAME Dam Inspection - B0166-00.09

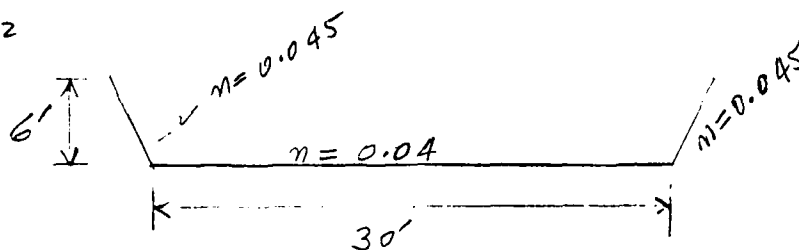
DOWNSTREAM CHANNEL SECTIONS

SECTION 1

2

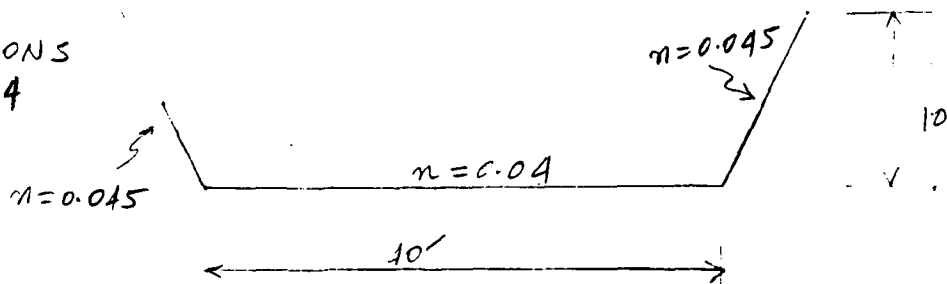


SECTION 2



SECTIONS

3 & 4



1

CHECK LIST FOR DAMS  
HYDROLOGIC AND HYDRAULIC  
ENGINEERING DATA

(DAM NY 596)

AREA-CAPACITY DATA:

|                                            | <u>Elevation</u><br>(ft.) | <u>Surface Area</u><br>(acres) | <u>Storage Capacity</u><br>(acre-ft.) |
|--------------------------------------------|---------------------------|--------------------------------|---------------------------------------|
| 1) Top of Dam                              | <u>1391.8</u>             | <u>74.6</u>                    | <u>964</u>                            |
| 2) Design High Water<br>(Max. Design Pool) | <u>1386.6</u>             | <u>59.5</u>                    | <u>612</u>                            |
| 3) Auxiliary Spillway<br>Crest             | <u>1386.6</u>             | <u>59.5</u>                    | <u>612</u>                            |
| 4) Pool Level with<br>Flashboards          | <u>N/A</u>                | <u>-</u>                       | <u>-</u>                              |
| 5) Service Spillway<br>Crest               | <u>1381.0</u>             | <u>8.8</u>                     | <u>41</u>                             |

DISCHARGES

|                                                   | <u>Volume</u><br>(cfs) |
|---------------------------------------------------|------------------------|
| 1) Average Daily                                  | <u>unknown</u>         |
| 2) Spillway @ Maximum High Water                  | <u>492</u>             |
| 3) Spillway @ Design High Water                   | <u>481</u>             |
| 4) Spillway @ Auxiliary Spillway Crest Elevation  | <u>481</u>             |
| 5) Low Level Outlet (gated reservoir drain)       | <u>0</u>               |
| 6) Total (of all facilities) @ Maximum High Water | <u>8200</u>            |
| 7) Maximum Known Flood                            | <u>unknown</u>         |
| 8) At Time of Inspection                          | <u>31</u>              |

CREST:

ELEVATION: 1391.8Type: broad-crested ; grassed earth embankmentWidth: 16 ft. Length 1590 ft.

Spillover \_\_\_\_\_

Location South end of dam

SPILLWAY:

SERVICE

AUXILIARY

1381.0Elevation 1386.6conc. pipe w/ riserType excavated channel48" dia.Width 200' Bottom width w/ 1V:3H sideslopesType of Control

✓

Uncontrolled

✓

Controlled:

Type

(Flashboards; gate)

Number

Size/Length

Invert Material

Anticipated Length  
of operating service

Chute Length

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

HYDROMETEROLOGICAL GAGES:

Type : None

Location: -

Records:

Date - -

Max. Reading - -

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

None

DRAINAGE AREA:

6.0 sq. mi.

## DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Woodland, pastures, farmlands, very minor developmentTerrain - Relief: RollingSurface - Soil: Glacial till over shallow bedrockRunoff Potential (existing or planned extensive alterations to existing  
(surface or subsurface conditions))None

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

None at present. The dam was designed for  
a 50 yr. sediment accumulation.Potential Backwater problem areas for levels at maximum storage capacity  
including surcharge storage:flooding of agricultural lands.Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the  
Reservoir perimeter:Location: NoneElevation: -

## Reservoir:

Length @ Maximum Pool ±0.6 (Miles)Length of Shoreline (@ Spillway Crest) ±0.4 (Miles)

APPENDIX E

REFERENCES

## APPENDIX E

### REFERENCES

- 1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May, 1961.
- 2) F.M. Henderson, Open Channel Flow, Macmillian Publishing Co., Inc., 1966.
- 3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th Edition, McGraw-Hill, 1963.
- 4) T. W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1969.
- 5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.
- 6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.
- 7) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.
- 8) U.S. Department of Commerce, Hydrometeorological Report No. 33, Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas From 10 to 1000 Square Miles and Durations of 6, 12, 24, and 48 hours, April 1956.
- 9) U.S. Department of the Army, Engineering Manual 1110-2-1411, Standard Project Flood Determinations, March 1952.
- 10) U.S. Army Corps of Engineers, The Hydrologic Engineering Center, Flood Hydrograph Package (HEC-1) Users Manual for Dam Safety Investigations, September, 1978.

APPENDIX F

PREVIOUS INSPECTION REPORTS/  
AVAILABLE DOCUMENTS

**DAM INSPECTION REPORT**  
(By Visual Inspection)

| Dam Number | River Basin | Town      | County   | Hazard Class | Date & Inspector |
|------------|-------------|-----------|----------|--------------|------------------|
| 7B-3979    | Allegheny   | Villanova | Chataqua | B+           | 10/18/77 K.W.H.  |

Stream =

Owner =

County

Type of Construction

- ☐ Earth w/Concrete Spillway
- ☒ Earth w/Drop Inlet Pipe *conc.*
- ☐ Earth w/Stone or Riprap Spillway
- ☐ Concrete
- ☐ Stone
- ☐ Timber
- ☐ Other \_\_\_\_\_

Use

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

~~Estimated~~ Impoundment Size 65 Acres ~~Estimated~~ Height of Dam above Streambed 42 Ft.

Condition of Spillway

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

Explain: \_\_\_\_\_

Condition of Non-Overflow Section

- ☒ Satisfactory
- ☐ In need of repair or maintenance

Explain: \_\_\_\_\_

Condition of Mechanical Equipment

- ☒ Satisfactory
- ☐ In need of repair or maintenance

Explain: \_\_\_\_\_

Siltation

- ☐ High
- ☒ Low

Explain: \_\_\_\_\_

Remarks: \_\_\_\_\_

Evaluation (From Visual Inspection)

- ☐ Repairs req'd. beyond normal maint.
- ☒ No defects observed beyond normal maint.

DATE February 14, 1972

MEMORANDUM  
DEPARTMENT OF TRANSPORTATION

SUBJECT CONEWANGO CREEK WATERSHED PROJECT  
FLOODWATER RETARDING DAM, SITE 9A  
CHAUTAUQUA COUNTY

FROM Wm. P. Hofmann, Soil Mechanics Bureau, Rm. 102, Bldg. 7 *BEB*  
By: Bernard E. Butler

TO A. W. Moon, Bridge Planning and Railroads Bur., 6th Flr., Bldg. 5 ✓

This Bureau has completed a review of the soils and foundation aspects of the subject dam. Our review was based on plans and specifications prepared by the U.S.D.A. Soil Conservation Service and received in this office on January 19, 1972.

Our review indicates the design, in general, properly accounts for the anticipated soils and foundation conditions. However, we offer the following comment:

1. On sheet No. 7, Drawing No. NY-2161-P under Earth Fill Requirements Note No. 2, "hand tamping or" should be deleted.

BEB:PJW:MVM

# DESIGN REPORT

CONEWAGO CREEK WATERSHED  
SITE 9A  
FLOODWATER RETARDING DAM  
CHAUTAUQUA COUNTY, NEW YORK

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

DESIGN SECTION, SYRACUSE, N.Y.

Sheet 1 of 6

MAY 1951

U. S. DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE

This single purpose flood control structure is located on an unnamed tributary to the West branch of Conewango Creek approximately 4 miles NNE of South Dayton in the Town of Villenova. Sheet 5 of this report, together with the Perrysburg 7.5' quadrangle published by the U.S. Geological Survey, may be used to locate this site.

A summary of pertinent design information is given on Sheet 3 of this report.

Criteria and procedures used in this design are given in Soil Conservation Service publications.

This structure is one of 20 proposed floodwater retarding dams in the Conewango Creek Watershed designed to reduce floodwater damage.

Site 9A is designed to retard a 50-yr. frequency storm without discharge occurring in the emergency spillway.

The results of hydrologic and hydraulic computations are given on Sheet 4 of this report.

The structure consists of a zoned, compacted earth fill primarily of gravelly glacial till (GM), and alluvial gravel (GM-GP).

In the floodplain of the foundation, sandy gravel (GM-GP) alluvium overlies lacustrine CL silt and sandy silt deposits. Alluvial gravels and sands underlie the lacustrine materials and glacial till underlies the alluvial materials.

A dense cemented alluvial GM gravel underlies the glacial till of the left abutment and the alluvium and colluvium in the right abutment.

A drainage system is located under the downstream portion of the earth fill to control the phreatic surface and to provide a safe outlet for foundation seepage. A cutoff trench is located on the dam centerline to reduce seepage.

The principal spillway is a drop inlet structure composed of a 2-stage reinforced concrete riser, 48" diameter concrete water pipe, impact basin, and excavated outlet channel.

A vegetated earth emergency spillway with a bottom width of 200' is provided in the left abutment.

DESIGN SECTION, SYRACUSE, N. Y.

Sheet 2 of 6

U.S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

| Element of Structure        | Determining Factor                        | Elev.  | Surface Area Acres | Storage             |          | Inflow       |             | Peak Outflow C.F.S. |
|-----------------------------|-------------------------------------------|--------|--------------------|---------------------|----------|--------------|-------------|---------------------|
|                             |                                           |        |                    | AC.FT.              | Inches # | Volume In. # | Rate C.F.S. |                     |
| Invert of Orifice           | 50 Yr. Submerged Sediment                 | 1366.6 | 8.8                | 40.6                | 0.13     | -            | -           | -                   |
| Crest of Riser              | 1.00" Storage plus 100 Yr. Total Sediment | 1381.0 | 44.0               | 415.6 <sup>1/</sup> | 1.30     | -            | -           | 114                 |
| Crest of Emergency Spillway | 50 Yr. Frequency Storm, AMC II            | 1386.6 | 59.5               | 611.2 <sup>2/</sup> | 1.91     | -            | -           | 312                 |
| Design High Water           | ES-1020 Sh. 2 of 5. AMC II **             | 1398.7 | 65.5               | 746.2 <sup>2/</sup> | 2.33     | 3.56         | 3178        | 1709                |
| Top of Dam                  | ES-1020 Sh. 3 of 5. AMC II **             | 1391.8 | 74.5               | 964.2 <sup>2/</sup> | 3.01     | 8.80         | 7938        | 6941                |

1/ Includes 14.7 Ac. Ft. of Aer. Sediment Storage.

2/ Excludes 95.8 Ac. Ft. total sediment storage.

\* Volume expressed in inches of runoff from controlled watershed of 3840 acres.

\*\* Refer to hydrologic criteria in National Engineering Memo SCS-27 (Rev.).

DESIGN SECTION, SYRACUSE, N.Y.

42° 25' 00"

79° 07' 30"

79° 05' 00"

CONEWANGO CR. SITE 9A  
N 42° 23' 05"  
E 79° 06' 58"



108

42° 22' 30"

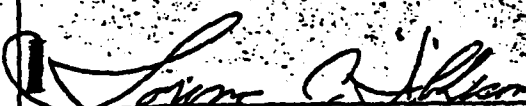
REF. USGS QUAD. 7 1/2' PERRYSBURG NY

DESIGN SECTION, SYRACUSE, N.Y.

Sheet 5 of 6

U. S. DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE

Information pertaining to the criteria and procedures referred to in this report may be obtained from Mr. Albert C. Addison, State Conservationist, U. S. Department of Agriculture, Soil Conservation Service, Syracuse, New York.

  
Design Engineer

  
for State Conservation Engineer

DESIGN SECTION, SYRACUSE, N. Y.

Sheet 1 of 1

March 1, 1972

Mr. Eldred Rich, Chief  
Bureau of Water Management  
Department of Environmental Conservation  
Division of Resource Management Services  
50 Wolf Road  
Albany, New York 12205

Dear Sir:

Dam at Site 9A  
Conewango Creek Watershed Project

The plans, specifications and other data submitted by the Bureau of Water Management, to the Structures Subdivision of the Department of Transportation for the construction by the owner, Conewango Creek Watershed Commission, Court House, Mayville, New York, of a flood water retarding dam located in the Town of Villenova, County of Chautauque and situated on an unknown tributary of Conewango Creek, have been reviewed.

The design and details pertaining to the soils, foundation and structural features of the dam are satisfactory to us insofar as the safety and stability of the structure are concerned.

The structure has been listed upon our records under the designation of Dam No. 7B-3979 of the Allegheny River Watershed.

Two sets of formally approved plans and specifications are enclosed. Also enclosed are two copies of the Bureau of Soil Mechanics' memorandum to this office stating the Bureau's comments concerning the anticipated soils and foundation conditions at the dam site with a recommendation to be followed during the construction of the structure. The recommendation is shown marked in red on the plans.

Very truly yours,

Original signed by  
A. W. MOON  
A. W. MOON  
Assistant Deputy Chief Engineer  
AMM:RCS:ME  
Attachments  
cc: Mr. F. Hofmann

New York State Department of Environmental Conservation

MEMORANDUM

7B 3979  
NY 576

TO: Eldred Rich  
FROM: Charles W. Kolak  
SUBJECT: Conewango Creek Site 9-A Watershed Project, March 17, 1972  
DATE: May 10, 1972

~~In response to the request by the Stream Protection Section of the Bureau of Water Regulation, We~~ have made a hydrologic and hydraulic investigation of the proposed watershed project at Conewango Creek - Site 9A, Hamlet, New York.

The following information was used to evaluate the proposed dam:

1. Application for permit submitted by SCS, Syracuse, New York
2. Contract drawings and specifications submitted by SCS

The design of the auxiliary spillway and the service spillway were reviewed and the following results were obtained:

AUXILIARY SPILLWAY

Hydrology:

Downstream hazard classification is Class "B".

Drainage Area -- 6.00 square miles

Design Flood -- Emergency Spillway Hydrograph for Class "B" Structures  
(ES 1020 sheet 2 of 5)

Reference -- "Guidelines for Small Earth Dam Designs" - New York State  
Rainfall = 6.2"

CN=77

Runoff 3.7"

Reference -- SCS National Engineering Handbook, Section 4 - Hydrology  
Chapter 21

Flood Routing:

The design hydrograph indicates a maximum inflow of 2890 cfs. At 3.00 hours, water will begin spilling over the crest of the auxiliary spillway. The peak discharge occurs at t=5.04 hours with 2335 cfs discharging over the auxiliary spillway and 340 cfs discharging through the service spillway. The reservoir water surface reached an elevation of 1388.95 which will provide more than the required 2 feet of freeboard.

Memo to: Eldred Rich

- 2 -

May 10, 1972

### SERVICE SPILLWAY

#### Hydrology:

Downstream hazard classification is Class "B".

Drainage Area -- 6.00 square miles.

Design Flood -- New York State requirement 25-year, 6-hour storm

Reference -- "Guidelines for Small Earth Dam Designs" - New York State  
and Technical Paper #40, Pg. 42

Rainfall = 3.5"

CN=77

Runoff -- 1.45"

Maximum Q = 1290 cfs

Reference -- SCS National Engineering Handbook, Section 4 - Hydrology  
Chapter 21

#### Flood Routing:

The reservoir will have sufficient capacity to store all the runoff from the design flood without discharging in the auxiliary spillway. It was therefore not necessary to go through the flood routing calculations.

### CONCLUSION

#### Auxiliary Spillway:

The auxiliary spillway has sufficient capacity to discharge the design storm and also have ~~1 foot~~ <sup>2 feet</sup> of freeboard below the top of the dam.

#### Service Spillway:

The service spillway has sufficient capacity to retard the design storm without discharge occurring in the auxiliary spillway.

#### Drawdown:

The reservoir drain inlet is sufficient to drain the reservoir within the drawdown times.

#### General Comments:

1. A copy of the hydrologic and hydraulic comments that were sent to ~~the Bureau of Water Regulation~~ are attached.  
Frank Dwyer of Water Management
- 2.. Soil stability analysis and structural comments will be furnished by the Department of Transportation.

CWK:CK/ea

New York State Department of Environmental Conservation

MEMORANDUM

TO: Eldred Rich  
FROM: Charles W. Kolak *CK*  
SUBJECT: Review of Conewango Creek Watershed Project - Site 9A  
DATE: March 8, 1972

The hydraulics and hydrology were reviewed for the proposed dam and were found to be satisfactory.

CWK/ea

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