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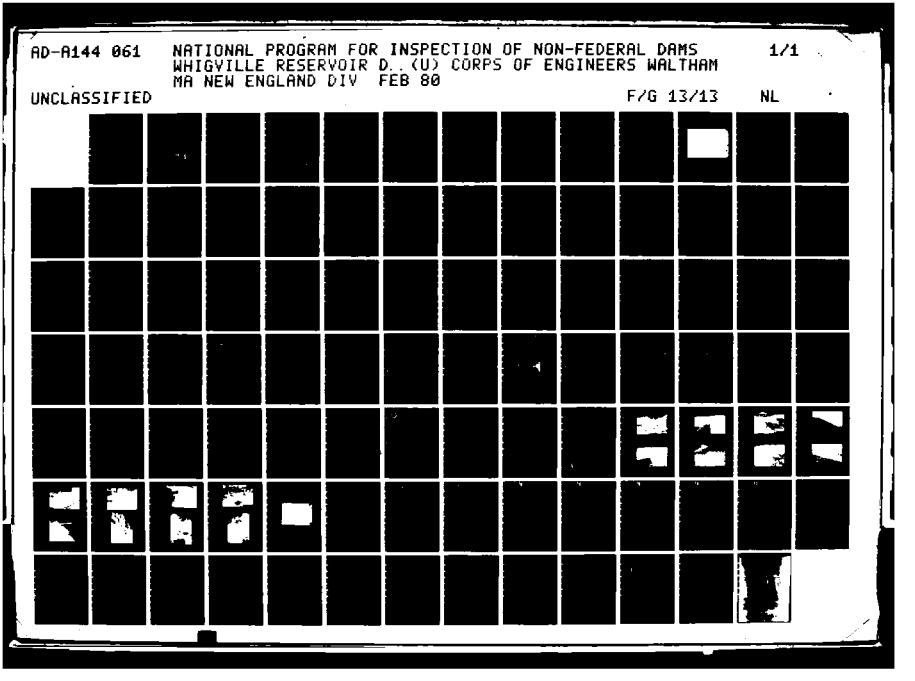
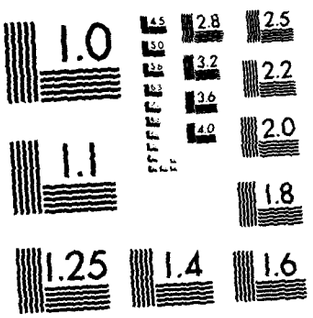
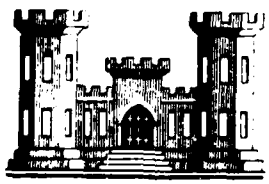




FARMINGTON RIVER BASIN
BURLINGTON CONNECTICUT

WHIGVILLE RESERVOIR DAM
CT-00379

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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

FEBRUARY 1980

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

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

Whigville Reservoir Dam is an earthen embankment structure with a concrete/boulder core wall. The dam is 460 feet long and has a maximum height of 54 feet. The dam is judged to be in generally poor condition. For the combination of dam size (inermediate) and downstream hazard (high), the magnitude of the spillway test flood is required to be the PMF.

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WHIGVILLE RESERVOIR DAM

CT 00379

FARMINGTON RIVER BASIN

BURLINGTON, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.:	CT 00379
Name of Dam:	Whigville Reservoir Dam
Town:	Burlington
County and State:	Hartford, Connecticut
Stream:	Whigville Brook
Date of Inspection:	24 October, 1979

BRIEF ASSESSMENT

Whigville Reservoir Dam is an earthen embankment structure with a concrete/boulder core wall. The dam is 460 feet long and has a maximum height of 54 feet. The 40 foot long concrete/boulder spillway is located at the right side of the dam. Slope paving forms the approach to the spillway. The downstream face is mortared stone masonry. Stone masonry training walls form the wasteway section. The outlet works consist of an upper and lower gatehouse each of which connect to submerged concrete intake structures. A 24 inch diameter blow off pipe passes under the wasteway channel to a stone masonry waste pot.

Whigville Reservoir is used as a public water supply source for the City of New Britain. The dam has a storage of 250 acre-feet. The size classification based on height is intermediate. A breach of the dam could affect several homes and commercial establishments along Main Street in the village of Whigville. With the possibility of some loss of life and the probability of excessive economic losses, the dam has been classified as having a high hazard potential.

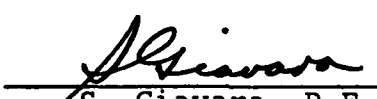
The dam is judged to be in generally poor condition. The riprap on the upstream face is in generally good condition. The vertical and horizontal alignment is good. The downstream slope is covered with an extensive growth of trees and brush. Apparent seepage and wet areas were noted near the toe and at both sides of the spillway channel. The concrete parapet walls are in fair condition, with areas of erosion, spalling and deterioration noted. The concrete spillway weir is in poor condition with severely deteriorated concrete.

For the combination of dam size (intermediate) and downstream hazard (high), the magnitude of the spillway test flood is required to be the PMF. The spillway test flood inflow is 7,880 CFS. The maximum spillway capacity is 1,565 CFS at a stage of five feet. no period

above the spillway crest (top of earth embankment). The spillway is not adequate to pass the PMF spillway test flood outflow (7730 CFS) without overtopping the dam. The test flood would overtop the dam by about 4.2 feet. The spillway would pass about 20 percent of the test flood outflow without overtopping the dam.

Within one year of receipt of the Phase I Inspection Report, the owner should retain a qualified registered engineer to accomplish the following: 1) investigate the seepage along the downstream toe and recommend measures for monitoring the seepage and for preventing piping of the embankment soils; 2) investigate the seepage through the joints in the stone masonry wingwalls and recommend measures for repair to prevent erosion and piping of the embankment soils; 3) remove trees growing on the downstream embankment and within 25 feet of the downstream toe ensuring that the root depressions are backfilled with appropriate soils; 4) investigate the source of water flowing into the spillway channel from several pipe outlets; 5) conduct more refined hydrologic and hydraulic analysis to determine the need for and methods of increasing the project discharge capacity; 6) repair failed portion of right retaining wall; 7) repair spalled and deteriorated concrete at spillway crest, downstream weir and parapet wall; and 8) locate and operate low level outlet and, if inoperable, provide a means of lowering water level in reservoir.

The owner should also carry out the following operational and maintenance procedures: 1) brush and small saplings growing on the downstream slope of the dam should be cut every year; 2) grass should be cut on a regular basis; 3) after the brush and saplings have been removed, the dam should be re-inspected by a qualified registered engineer; 4) a formal annual technical inspection program by a qualified registered engineer should be established; 5) grass should be planted on the crest of the dam and on the slopes to prevent erosion at these locations; 6) repair scour hole at end of spillway discharge channel; 7) repair and clean out deteriorated stilling well for "blow off"; 8) repair deteriorated concrete of stilling basin slab; 9) replace all missing riprap; 10) paint steel members of footbridge to prevent continued rusting; and 11) establish a formal surveillance program for use during and immediately after heavy rainfall and also a flood warning plan to follow in case of flood flow conditions or imminent dam failure.



S. Giavara, P.E.
President

Registered CT. 7634

PREFACE

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

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

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

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

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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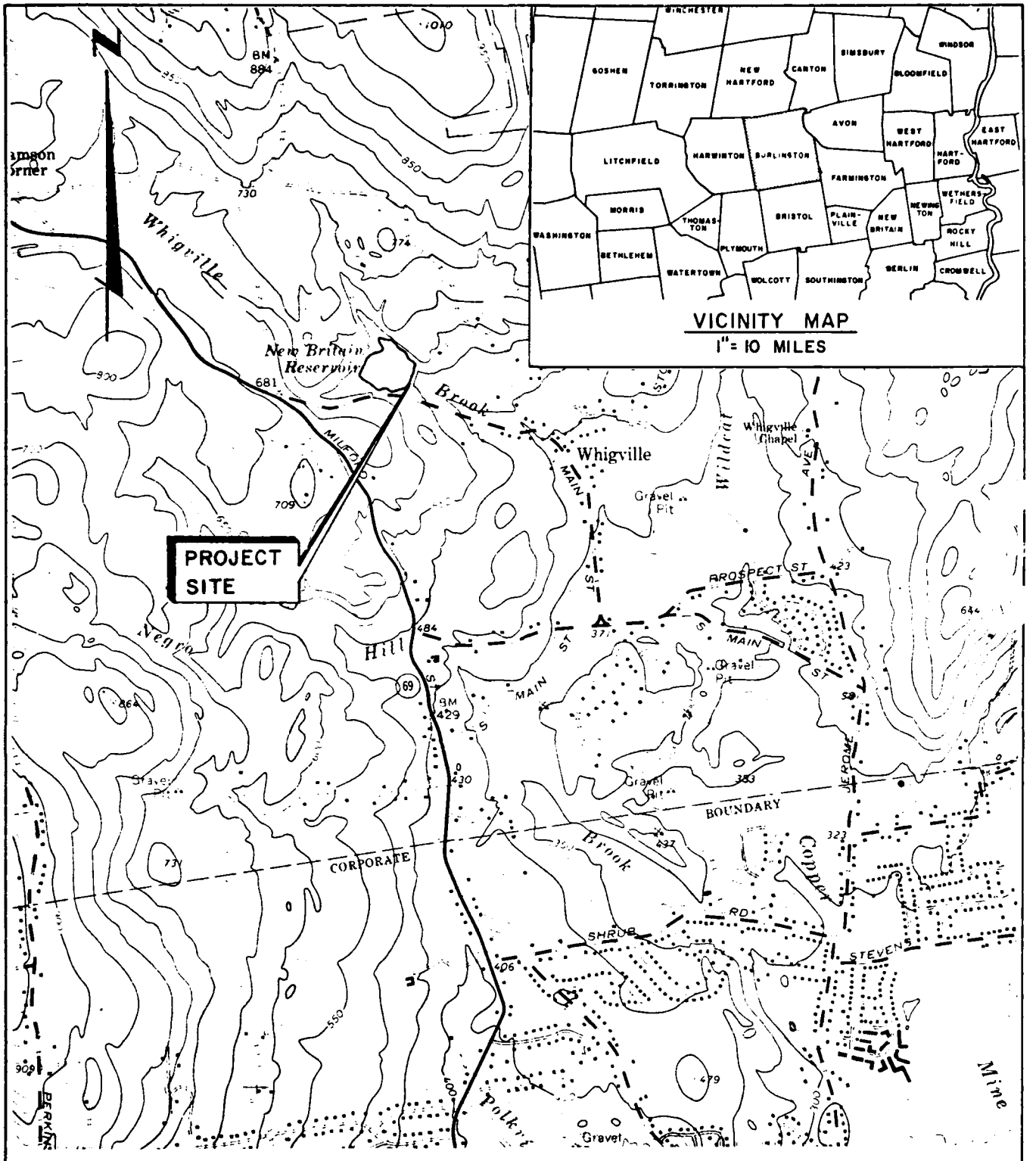
APPENDIXES

Overview Photo
Whigville Reservoir Dam



WHIGVILLE RESERVOIR DAM

LOCATION MAP

BURLINGTON, CONNECTICUT

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
WHIGVILLE RESERVOIR DAM - CT 00379

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL:

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection through the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Flaherty Giavara Associates, P.C. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Flaherty Giavara Associates, P.C. under a letter of 19 October 1979 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0001 has been assigned by the Corps of Engineers for this work.

b. Purpose.

1) Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.

2) Encourage and assist the States to initiate quickly effective dam safety programs for non-federal dams.

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

1.2 DESCRIPTION OF THE PROJECT:

a. Location. The Whigville Reservoir Dam is located in Burlington, Connecticut on Whigville Brook. The reservoir is located approximately 2,000 feet northwest of the Village of Whigville. The reservoir is shown on the U.S.G.S. Map "Bristol, Connecticut" at a latitude of 41° 44' 00" and a longitude of 75° 57' 06". The Location Map on Page vi shows the location of the structure.

b. Description of Dam and Appurtenances. Whigville Reservoir Dam is 460 feet in length and 54 feet in height. The dam is concrete/boulder core wall. A concrete parapet wall 3 feet in width extends 2 feet above the downstream embankment and 7 feet above the upstream face. The elevation of the parapet crest is 574.3 NGVD. The core wall is composed of boulders encased in concrete. The downstream face of the core wall slopes at 4 inches horizontal to 12 inches vertical and is lined with stone paving. The upstream face of the core wall contains a 2 feet thick layer of concrete with a varying slope of 1-1/8 - 2-1/2 inches horizontal to 12 inches vertical. The

upstream earth embankment is lined with stone paving and slopes at 2 feet horizontal to 2 feet vertical. The upstream embankment begins at elevation 562.3. The width of the downstream embankment is 14 feet to the north of the spillway and 34 feet to the south of the spillway. Both downstream embankments slope at 2 feet horizontal to 1 feet vertical. The elevation of the crest of the downstream embankment is 572.3. At the left abutment the embankment elevation is at 572 feet for a distance of 40 feet. There is no concrete parapet wall at this location.

Thespillway is 40 feet in width at a crest elevation of 567 feet. The spillway consists of a section of boulders encased in concrete, which is an extension of the core wall of the main dam. The upstream embankment slope paving forms the approachway to the spillway. The downstream face of the spillway is mortared stone masonry. At the toe of the spillway is a stilling basin with a concrete weir dissipator. Stone masonry training walls are located to either side of the spillway. Beyond the weir is the spillway wasteway. The base of the wasteway is paved with masonry stone and the sides of the channel are formed with stone masonry walls.

The outlet works consist of an upper and lower gatehouse each of which connects to submerged intake structures within the reservoir. 24-inch dia. conduits connect the upper intake structure to the upper gatehouse. A 24-inch conduit also connects the lower intake structure with the lower gatehouse. Water from both intakes can either pass through or bypass the lower gatehouse. A 24-inch diameter main transmits water from the gatehouses to the New Britain water supply system. A 24-inch diameter waste pipe passes under the wasteway channel to a stone masonry waste pot. This facility serves as the blow off. A gate valve just upstream of the waste pot controls the blow off.

c. Size Classification. The Whigville Reservoir has a storage volume of 250 acre feet and a dam height of 54 feet. A dam height of greater than 40 feet classifies this structure in the "intermediate" category according to guidelines established by the Corps of Engineers.

d. Hazard Classification. The dam is classified as having a "high" hazard potential. The areas of probable impact include Main Street in the Village of Whigville. The number of residential dwellings in the probable impact area are approximately 15. With the potential for the loss of more than a few lives and significant economic losses, the dam has been classified as having a high hazard potential.

e. Ownership. The Whigville Reservoir Dam is owned by the City of New Britain, Water Department, 1000 Shuttle Meadow Road, New Britain, Connecticut. The Superintendent of the Water Department is Mr. Jack McManus, telephone (203) 223-7515.

f. Operator. The New Britain Water Department, Superintendent, Mr. Jack McManus, operates this dam.

g. Purpose of Dam. The purpose of this dam is to impound water for public water supply to serve the City of New Britain.

h. Design and Construction History. Plans obtained for the dam are dated 1909. It is assumed that the dam was constructed within several years of this date. An extensive underdrain system is shown on plans dated 1912-1913, Daniel Crowley, Civil Engineers.- Outlets of this underdrain system where observed at the dam. In October and December of 1956 repairs were made to the spillway wasteway just below the toe, due to damages incurred during the October 1955 flood. A new wasteway bed was formed including a concrete weir dissipator. The work was constructed by Manafort Bros., New Britain, Connecticut.

i. Normal Operation Procedure. The reservoir is operated for use as a public water supply. Water is drawn for either the lower or upper intake structure for transmission to the 24 inch diameter water main conduit to New Britain.

1.3 PERTINENT DATA:

a. Drainage Area. The drainage area consists of 4.15 square miles of hilly to mountainous wooded terrain. Johnnycake and Scranton Mountains are contained within the watershed.

b. Discharge and Dam Site.

1) A 24 inch diameter waste pipe passes under the spillway and wasteway to the waste pot. The maximum outlet capacity has been computed to be approximately 90 cfs.

2) The October 1955 flood caused damage at this structure. The stage of this flood is unknown.

3) The ungated spillway capacity at the top of the left embankment (control) - 1565 cfs @ El. 572.0.

4) The ungated spillway capacity at the test flood elevation - 3907 cfs @ El. 576.2.

5) The gated spillway capacity at normal pool elevation is not applicable at this dam.

6) The gated spillway capacity at test flood elevation is not applicable at this dam.

7) The total spillway capacity at test flood elevation - 3907 cfs @ El. 576.2.

8) The total project discharge at the top of dam - 1565 cfs @ El. 572.

9) The total project discharge at test flood elevation - 7730 cfs @ El. 576.2.

c. Elevation (Ft. above National Geodetic Vertical Datum - NGVD)

1) Streambed at toe of dam.....520.3

2) Bottom of cutoff.....520

3) Maximum tailwater.....N/A

4) Recreation pool.....N/A

5) Full flood control pool.....N/A

6) Spillway crest.....567

7) Design surcharge.....Unknown

8) Top of dam.....Parapet: 574.3
Left Abutment: 572.0

9) Test flood design surcharge.....576.2

d. Reservoir (Length in Feet).

1) Normal pool.....700±

2) Flood control pool.....N/A

3) Spillway crest pool.....700±

4) Top of dam.....750±

5) Test flood pool.....800±

e. Storage (Acre-Feet).

1) Normal pool.....175

2) Flood control pool.....N/A

3) Spillway crest pool.....175

4) Top of dam.....250

5) Test flood pool.....270

f. Reservoir Surface (Acres.)

1) Normal pool.....11

2) Flood control pool.....N/A

3) Spillway crest.....11

4) Test flood pool.....14

5) Top of dam.....13.2

g. Dam.

1) Type.....Earth embankment with concrete/boulder core wall

2) Length Spillway: Concrete/boulder section

2) Length.....460 Feet

3) Height.....54 Feet

4) Top Width.....Concrete Parapet: 3'

D/S Embankment: 14', 34'

5) Side slopes... Upstream: 2.0 horizontal to 1 vertical
Downstream: 2.0 horizontal to 1 vertical

6) Zoning.....N/A

7) Impervious Core.....Concrete/ boulder core

8) Cutoff..... Concrete/boulder core wall keyed into natural ground

9) Grout curtain.....None

h. Diversion and Regulating Tunnel.

1) Type.....N/A

2) Length.....N/A

3) Closure.....N/A

4) Access.....N/A

5) Regulating Facilities.....N/A

i. Spillway.

1) Type.....Concrete/boulder sharp crested weir

2) Length of weir.....40 Feet

3) Crest elevation.....567 Feet

4) Gates.....None

5) U/S Channel.....Reservoir embankment slope

6) D/S Channel.....Rectangular stone masonry channel

j. Regulating Outlets.

1)	Invert	Upper - 560 NGVD Lower - 536 NGVD Blow off - 527 NGVD
2)	Size	All 24"
3)	Description	Material: Upper - Unknown Lower - Unknown Blow off - Cast Iron
4)	Control mechanism	Manually operated gates for all outlets

SECTION 2 - ENGINEERING DATA

2.1 DESIGN:

The following documents which contain the principal information regarding this dam and its appurtenances were reviewed in the preparation of this report.

Drawings: Whigville Reservoir No. 1, New Britain Waterworks, Plan-Profile-Cross Section, dated 1909 (Sheet B).

Whigville Reservoir No. 1, New Britain Waterworks, Wasteway - Plan - Sections and Waste Pipe Outlet, dated 1909 (Sheet C).

Whigville Reservoir No. 1, New Britain Waterworks, subsurface drains and weep holes to accompany seepage chart, dated 1912-1913.

Additionally, several items of correspondence pertaining to the project and specifications for the repair work to the spillway (1956) were reviewed.

2.2 CONSTRUCTION:

No information is available concerning the foundation preparation or embankment construction. Apparently subsurface drains of various sizes were added to the original design drawings when springs were encountered during construction. Details shown on the drawings are in good agreement with field observations, although the size of subdrains appear to have been modified from those shown on the seepage chart.

2.3 OPERATION:

Formal operational records are not available for this dam. Operation of the dam is by the New Britain Water Department.

2.4 EVALUATION:

a. Availability. Only minimal engineering information is available for this dam.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Validity. Only minor conflicts have been noted between the available data and the observations made during the inspection. In general, there is no reason to question the validity of the available data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS:

a. General. Based on the visual inspection the dam and its appurtenances appear to be in poor condition. The dam is an earth embankment with a concrete core wall and exposed concrete parapet wall. The riprap on the upstream face is in generally good condition. However, it is missing from the bench in front of the upstream concrete wall. The vertical and horizontal alignment is good. The downstream slope is covered with an extensive growth of trees and brush. Apparent seepage and wet areas were noted near the toe of the dam and at both sides of the spillway channel. The concrete parapet wall is in fair condition, with areas of erosion, spalling and deterioration noted. The concrete spillway weir is in poor condition with severely deteriorated concrete.

b. Dam.

1) Upstream face - The upstream face is comprised of a 7 foot high concrete parapet and stone paving riprap which extends below the reservoir surface (see photo No. 1 and photo No. 2). The stone paving is in good condition with only a few openings visible which exposed the underlying embankment material. Spalling of the concrete parapet wall is evident and erosion/deterioration is expecially noticeable at the recent waterline. The aggregate is exposed below the waterline (see photo No. 9).

2) Crest - The crest is covered with grass and weeds behind the upstream concrete parapet to the left of the spillway. A small path has been worn bare of vegetation at several locations to the left of the spillway structure as indicated in photo No. 3. To the right of the spillway channel, the crest has been worn bare over an extensive area due to vehicular traffic.

3) Downstream Slope - The downstream slope on the left-hand side of the dam is covered by grass and patches of brush as indicated in photos No. 6 and No. 7. Many small saplings are growing near and at the toe of the slope (see photo No. 8).

Several large trees are growing on the slope at the intersection with the left abutment, as indicated in photo No. 7 (background).

The downstream toe area is wet, and slightly soggy in numerous places. A small stream was observed flowing parallel to the toe of the dam and 10 feet downstream in the vicinity of Station 3+0. Approximately 150 feet downstream of the dam, two 4 inch pipe weep holes were noted. One was discharging a significant amount of water into the spillway channel (as shown in photo No. 15).

The downstream slope to the right side of the spillway channel is separated into two areas by a bench on which is located the lower gatehouse. The upper slope is covered with grass and brush. Stumps up to 4 inches diameter were observed near the crest of the slope. Several paths have been worn bare from the crest to the bench as a result of vehicular and motorbike traffic (photo No. 5). There is evidence of small area of sloughing of the slope adjacent to the right spillway wingwall near the toe of the upper slope.

Generally the lower slope contains an extensive growth of saplings, brush and other types of vegetation as indicated in photo No. 14. The area at or just upstream of the toe of the lower slope is generally wet and soggy (photo No. 4). Standing water was observed at several locations adjacent to the spillway channel.

A 2 inch diameter galvanized steel pipe was observed discharging water adjacent to the right bank of the spillway channel in the vicinity of the lower stilling basin. The purpose of this pipe is not known.

c. Appurtenant Structures.

1) Spillway - The 40' wide spillway has a stone and mortar masonry face, with a concrete cap along its crest. The concrete crest is in poor condition. Extensive deterioration and spalling of the surface concrete was observed as indicated in photo No. 11.

The nearly vertical downstream face of the spillway is generally in good condition, although there are numerous minor leaks and seepage noted at the joints (see photo No. 10).

2) Spillway Stilling Basin/Discharge Channel - The stilling basin at the toe of the spillway is in good condition. As shown in photo No. 10 the side walls are the extension of the spillway training walls, and have some leaks and efflorescence in the stone and mortar joints. The concrete slab that forms the floor is in good condition. The concrete weir at the downstream end of the stilling basin is in good condition. The spillway discharge channel is located downstream of the stilling basin, and has a concrete bottom with stone and mortar walls (photo No. 13). The concrete slab is in poor condition and shows evidence of surface wear, erosion and deterioration. The coarse aggregate is exposed, and there are numerous areas of spalling. A portion of the 4 foot high (right) south retaining wall has failed. Both walls shown signs of severe deterioration and seepage is occurring as indicated in photo No. 12.

3) Outlet Works - The upper gatehouse is used to operate the upper intake. The lower gatehouse is used to operate the lower intake. Both gatehouses are in good condition.

A 24" cast iron blow-off pipe (low level outlet) is intended to discharge into a stilling basin downstream of the dam, and thence over a weir into the main spillway discharge channel. The stilling well is severely deteriorated, and partially full of earth and debris. The pipe's outlet could not be found. A manhole, presumably with the controls for the blow off pipe, was also located, but could not be opened.

d. Reservoir Area. The perimeter area of the reservoir has moderate to steep slopes that are well wooded and stable. There is no evidence of slides or sloughing (see photo No. 17).

e. Downstream Channel. There is a 2 foot deep scour hole at the end of the spillway discharge channel, and the riprap has been displaced. The water level in this channel is controlled by a 4 foot high weir located 100 feet downstream of the spillway discharge channel. The weir is in very poor condition, with several horizontal cracks and has been complete deteriorated in some areas up to 12 inches.

The natural channel downstream of the weir is 10 feet wide and 2 feet deep, is in fair condition, and appears stable (see photo No. 16). Trees are close to the channel on both sides.

f. Service Bridge. The foot bridge over the spillway is in good condition (photo No. 10). Some rusting of the steel members is taking place.

3.2 EVALUATION:

On the basis of the results of the visual inspection the dam is considered to be in poor condition.

Trees and saplings growing on the downstream slope and the area immediately downstream of the toe of the dam may cause serious seepage or erosion problems if they blow over and pull out their roots or if they die or are cut and the roots rot.

The seepage through the joints in the stone masonry spillway wingwall could lead to long-term erosion problems if remedial action is not taken.

The presence of soft, wet ground and standing water at or near the downstream toe of the dam may be the result of seepage conditions which, if not controlled, could lead to failure of the dam. The source of seepage which exits into the spillway channel in the vicinity of the lower spillway stilling basin should be investigated.

The presence of extensive vegetation and saplings on the lower slope on the left side of the embankment and at the toe makes it impossible to inspect the wet areas adequately. It is important that those areas be thoroughly investigated.

The concrete on the spillway crest, downstream weir and parapet wall is severely deteriorated and in generally poor condition, with areas of erosion, spalling and deterioration noted.

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES:

a. General. The Whigville Reservoir is a surface water storage facility for the New Britain Water Department. Water can be taken off at the upper intake to the upper gatehouse in a 24" diameter pipe and at the lower intake to the lower gatehouse in a 24" diameter pipe. Although the lower intake can discharge directly into the water supply line and bypass the lower gatehouse, this is not a normal operational procedure. A 24" diameter blow off can be operated to lower the water level in the reservoir.

b. Description of any Warning System in Effect. There is no formal warning system in effect in the event of a failure or partial failure of the structure.

4.2 MAINTENANCE PROCEDURES:

a. General. It does not appear that any formal maintenance procedures are practiced at the dam. Numerous trees and brush have overgrown the downstream slope and the concrete surface show considerable deterioration.

b. Operating Facilities. There are no formal maintenance procedures followed for the operating facilities.

4.3 EVALUATION:

Regular operation maintenance procedures for this dam and its appurtenances have not been developed or implemented.

An emergency action plan should be prepared to prevent or minimize the impact of failure. This plan should list the expedient action to be taken and authorities to be contacted in emergency situations.

SECTION 5 - EVALUATION OF HYDRAULIC/HYRDOLOGIC FEATURES

5.1 GENERAL:

The Whigville Reservoir Dam is an earth embankment structure, with a concrete core wall and a stone and mortar spillway section in the vicinity of the right abutment. The crest length of the dam is 460 feet; its height is 54 feet.

The spillway is 40 feet wide and discharges directly into a stilling basin, and thence into a rectangular spillway raceway (wasteway) that passes through the dam, and extends downstream about 150 feet beyond the toe of slope.

The watershed area is 4.15 square miles of upland terrain that is well wooded. The land within the watershed is largely undeveloped.

5.2 DESIGN DATA:

No specific design data is available for this watershed or the structures of Whigville Reservoir Dam. In lieu of existing design information, U.S.G.S. Topographic Maps (Scale 1"=2,000') were utilized to develop hydrologic parameters. Some of the pertinent hydraulic design data was obtained and/or confirmed by actual field measurements at the time of the visual field inspection.

5.3 EXPERIENCE DATA:

Historical data for recorded discharges is not available for this dam.

The only known information concerning passage of flood flows is that the present operator has observed about 10 inches of water passing over the spillway. In addition, correspondence in the Department of Environmental Protection files indicates that flood flows in the fall of 1955 caused major damage to the toe of the spillway, requiring extensive repairs that were completed in 1956 (Appendix B).

5.4 TEST FLOOD ANALYSIS:

The test flood for determining the spillway adequacy is based upon Corps of Engineers guidelines. The size classification of the dam is "intermediate" based upon a height of 54 feet and storage volume of 250 acre-feet. The hazard potential is "high" due to the land use downstream of the dam (possibility of some loss of life and probability of excessive economic losses). The spillway test flood required by Corps of Engineers guidelines for this size dam and hazard potential is the probable maximum flood (PMF).

The magnitude of the Spillway Test Flood is based upon "Preliminary Guidance for Estimating PMF Discharges" by the New England Division, Corps of Engineers, dated December 1977. The watershed is rolling to steep, and has some floodwater storage areas in natural wetlands. The flood magnitude was based on the "rolling" watershed curve. The test flood inflow is 7880 cfs.

The maximum spillway capacity is 1560 cfs at a stage of 5 feet above the spillway crest (equal to the top of the earth embankment).

The spillway test flood was formed into a triangular hydrograph with a peak inflow of 7880 cfs and a duration of 12 hours. The duration was selected so that the triangular hydrograph would contain the same volume of water as the estimated storm runoff.

The hydrograph was routed through the reservoir using a computer program based on stage-storage and stage-discharge data. The reservoir was assumed to be full and level with the spillway prior to the storm event. The results of the flood routing computations indicate that the spillway test flood peak inflow rate of 7880 cfs is reduced to a peak outflow rate of 7730 cfs by the storage of water in the reservoir. The spillway can pass 20 percent of the spillway test flood outflow without overtopping the dam.

The peak flood stage from the test flood is at elevation 576.2, which is 4.2 feet above the crest of the embankment, and 1.9 feet above the parapet wall. The duration of the overflow is approximately 8 hours.

The dam was also evaluated for a flood flow equal to 1/2 PMF. The peak inflow is 3940 cfs. When this flood is routed through the reservoir the resulting flood stage is elevation 574.8, about 2.8 feet above the crest of the dam and 0.5 feet over the top of the parapet wall.

5.5 DAM FAILURE ANALYSIS:

The downstream impact of a dam failure was analyzed using the COE "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs" dated April 1978.

Based upon an assumed breach width of 124 feet, equal to 40% of the dam's width at mid-height, the peak flood flow due to failure would be 82,000 cfs. The base flow would be negligible.

Using topography data from U.S.G.S. maps the evaluation indicates that the dam failure floodwave would move rapidly down the steep valley of Whigville Brook, flooding Main Street in the village of Whigville and the one-family houses on both sides of Main Street.

It is estimated that sixteen houses would be affected (three buildings in areas with 3 feet of water or less above ground level, nine buildings with 3 to 6 feet of water above ground level, and four buildings with over 6 feet of water). In addition, developed areas further downstream would also be subject to flooding damages. With the potential for the loss of more than a few lives and significant economic losses, the dam has been classified as having a high hazard potential.

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATIONS

The visual inspection did not disclose any immediate stability problems. However, the following potential structural stability problems were indicated:

a. The presence of soft, wet ground and standing water at the downstream toe of the dam may be the result of a seepage condition, which, if not controlled, could lead to failure of the dam.

b. Seepage through the joints of the stone mortar spillway wing wall adjacent to the dam embankment.

c. Severe deterioration including erosion and spalling of concrete at the parapet wall, the spillway crest and downstream weir.

6.2 DESIGN AND CONSTRUCTION DATA

There is insufficient design and construction data to permit a formal evaluation of stability.

6.3 POST-CONSTRUCTION CHANGES

The available correspondence indicates a section of the spillway washed out during the floods in August and October of 1955. Plans and specifications for the required repairs were prepared by S. Wood in August 1956. The repairs were completed in December 1956.

6.4 SEISMIC STABILITY

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

SECTION 7 - ASSESSMENT, RECOMMENDATIONS, AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition. Based on the visual inspection, the dam appears to be in poor condition. There are several features which could adversely affect the condition of the dam in the future including: 1) Seepage along the toe of the dam and adjacent to the spillway wing walls. 2) Trees on downstream embankment slopes. 3) Existence of several pipe outlets discharging into the spillway channel from unknown sources. 4) Seepage through the joints of the stone masonry spillway wing walls.

The capacity of the spillway is inadequate to pass the PMF spillway test flood outflow of 7730 CFS without overtopping the dam. The test flood would overtop the dam by about 4.2 ft. The spillway is adequate to pass about 20 percent of the test flood outflow without overtopping the dam.

b. Adequacy of Information. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data but is based primarily on visual inspection, past operational performance, and sound engineering judgement.

c. Urgency. The recommendations and remedial measures described below should be implemented by the owner within one year after receipt of the Phase I inspection report.

7.2 RECOMMENDATIONS

The following items should be performed under the direction of a qualified registered engineer:

a. Investigate the significance of the seepage along the downstream toe and recommend measures for monitoring the seepage and for preventing piping of the embankment soils.

b. Investigate the seepage through the joints in the stone masonry wing walls and recommend measures for repair to prevent erosion and piping of the embankment soils.

c. Remove trees growing on downstream embankment soils and within 25 ft. of the downstream toe. Backfill root depressions with appropriate soils.

d. Investigate source of water flowing into the spillway channel from several pipe outlets.

e. Conduct more refined hydrologic and hydraulic analysis to determine the need for and methods of increasing the project discharge capacity.

f. Repair failed portion of right retaining wall.

g. Repair spalled and deteriorated concrete at spillway crest, downstream weir and parapet wall.

h. Locate and operate low level outlet and, if inoperable, provide a means of lowering water level in reservoir.

7.3 REMEDIAL MEASURES

a. Operating and Maintenance Procedure.

1) Brush and small saplings growing on and downstream slope of the dam should be cut and the brush and saplings should be removed and the new growth cut every year.

2) Grass growing on the dam should be maintained on a regular basis.

3) After the brush and saplings have been removed, the dam should be re-inspected by a qualified registered engineer.

4) Grass should be planted on the bare areas on the crest of the dam and on the slopes to prevent erosion at these locations.

5) Repair scour hole at end of spillway discharge channel.

6) Repair and clean out deteriorated stilling well for "blow off."

7) Repair deteriorated concrete of stilling basin slab.

8) Replace all missing riprap.

9) Paint steel members of footbridge to prevent continued rusting.

10) Engage a qualified registered engineer to make a comprehensive technical inspection of the dam once a year.

11) Establish a formal surveillance program for use during and immediately after heavy rainfall and also a flood warning plan to follow in case of flood flow conditions or imminent dam failure.

7.4 ALTERNATIVES

There are no practical alternatives to the recommendations contained in Sections 7.2 and 7.3.

APPENDIX A

INSPECTION CHECK LIST

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Whigville Reservoir Dam **DATE** Oct. 24, 1979

TIME 1030

WEATHER Clear, 50°F

W.S. ELEV. ____ **U.S.** ____ **DN.S.**

PARTY:

1. R. Smith, FGA, Projec' Manager
2. J. MacBroom, FGA, Hydraulics/Hydrology
3. R. Murdock, GEI, Geotechnical
4.
5.

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Whigville Reservoir Dam DATE: Oct. 24, 1979

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	None observed.
Pavement Condition	Grass.
Movement or Settlement of Crest	None observed.
Lateral Movement	None observed.
Vertical Alignment	Good.
Horizontal Alignment	Good.
Condition at Abutment and at Concrete Structures	Erosion adjacent to spillway wing wall. Concrete wall at upstream face spalling/ erosion at water line.
Indications of Movement of Structural Items on Slopes	None observed.
Trespassing on Slopes	Vehicular path on the downstream slope near Sta. 0+20.
Sloughing or Erosion of Slopes or Abutments	Small scarp on slope adjacent to right wing wall at Sta. 1+0.
Rock Slope Protection - Riprap Failures	Riprap missing from bench in front of upstream concrete wall, other areas rip-rap in good condition.
Unusual Movement or Cracking at or near Toes	None observed.
Unusual Embankment or Downstream Seepage	Apparent seepage and wet area at the toe and on both sides of the spillway.
Piping or Boils	None observed.
Foundation Drainage Features	
Toe Drains	
Instrumentation System	
Vegetation	Extensive growth of trees on the down-stream slope below the lower gatehouse.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Whigville Reservoir Dam DATE: Oct. 24, 1979

AREA EVALUATED	CONDITIONS
DIKE EMBANKMENT	Not applicable.
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	
Rock Slope Protection - Riprap Failures	
Unusual Movement or Cracking at or near Toes	
Unusual Embankment or Downstream Seepage	
Piping or Boils	
Foundation Drainage Features	
Toe Drains	
Instrumentation System	
Vegetation	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Whigville Reservoir Dam DATE: Oct. 24, 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Not applicable.
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	Concrete in good condition.
Stop Logs and Slots	Underwater.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Whigville Reservoir Dam DATE: Oct. 24, 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Generally appears to be in good condition, not used in operation of dam. Lower gate-house in good condition.
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Whigville Reservoir Dam DATE: Oct. 24, 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - TRANSITION AND CONDUIT	Not applicable.
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Whigville Reservoir Dam DATE: Oct. 24, 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	Not applicable.
General Condition of Concrete	
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain Holes	
Channel	
Loose Rock or Trees Overhanging Channel	
Condition of Discharge Channel	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Whigville Reservoir Dam DATE: Oct. 24, 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Underwater.
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	Concrete in poor condition, with extensive spalling and deterioration observed.
Rust or Staining	None observed.
Spalling	Major spalling of weir.
Any Visible Reinforcing	None observed.
Any Seepage or Efflorescence	Training walls show evidence of seepage (wet) and efflorescence.
Drain Holes	Discharging water, several contain extensive vegetation.
c. Discharge Channel	
General Condition	The discharge channel is in fair condition.
Loose Rock Overhanging Channel	None observed.
Trees Overhanging Channel	Trees close to channel on both sides.
Floor of Channel	Natural bottom, has been concreted during recent repair.
Other Obstructions	Small weir existing in the channel approximately 500 ft. below end of training walls.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Whigville Reservoir Dam DATE: Oct. 24, 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SERVICE BRIDGE	
a. Superstructure	Steel truss in good condition, with some rusting and staining taking place.
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	Good condition.
Expansion Joints	
Paint	Rusting.
b. Abutment & Piers	
General Condition of Concrete	Fair condition, with efflorescence observed at bridge seat.
Alignment of Abutment	
Approach to Bridge	
Condition of Seat and Backwall	

APPENDIX B

ENGINEERING DATA

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Whigville Res. Dam

I.D. NO. CT 00379

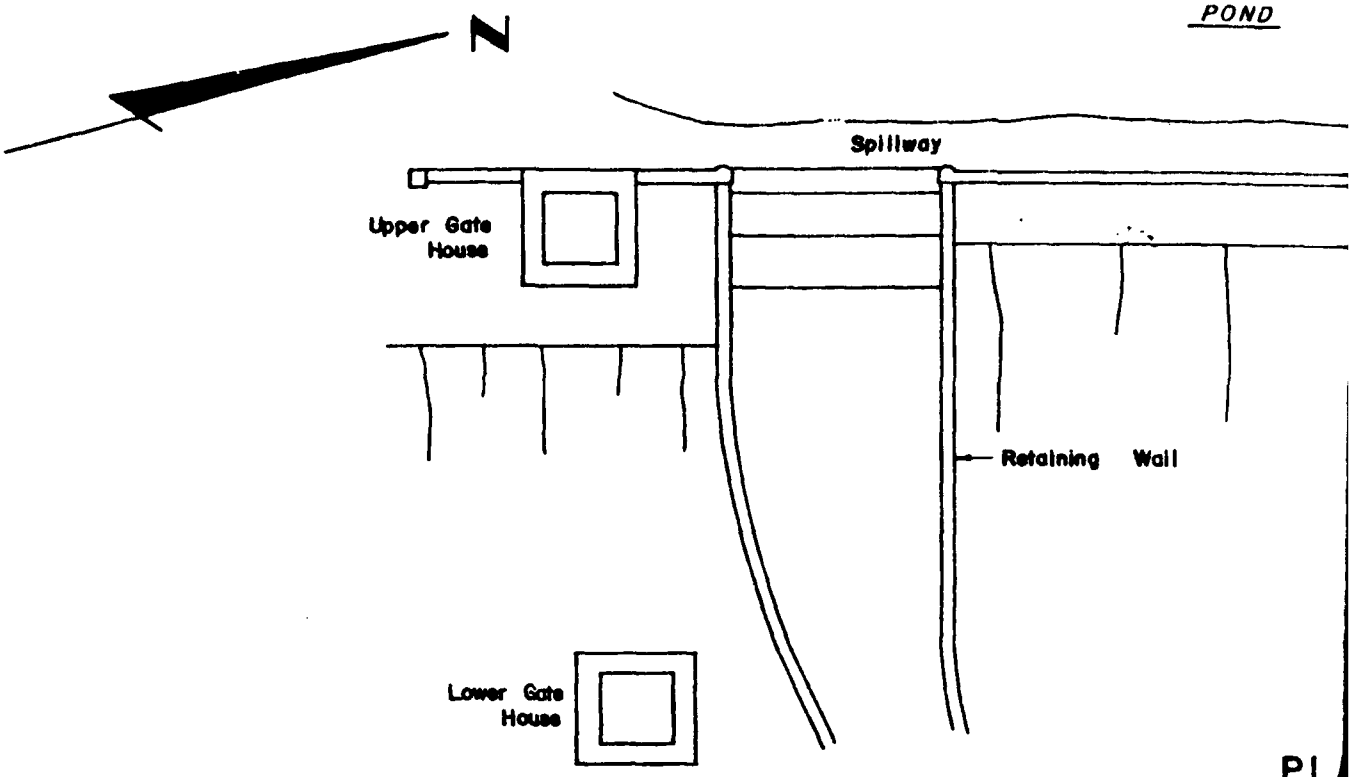
ITEM	REMARKS
AS-BUILT DRAWINGS	Construction Plans - New Britain Water Co. Files
REGIONAL VICINITY MAP	Available from U.S.G.S.
CONSTRUCTION HISTORY	Limited Data - New Britain Water Co. Files
TYPICAL SECTIONS OF DAM	From plans
OUTLETS - Plan	From plans
- Details	From plans
- Constraints	Unknown
- Discharge Ratings	None
RAINFALL/RESERVOIR RECORDS	New Britain Water Co.
DESIGN REPORTS	Unavailable
GEOLOGY REPORTS	None
DESIGN COMPUTATIONS	
HYDROLOGY & HYDRAULICS	None available
DAM STABILITY	None available
SEEPAGE STUDIES	None available
MATERIALS INVESTIGATIONS	
BORINGS RECORDS	None
LABORATORY	None
FIELD	None

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

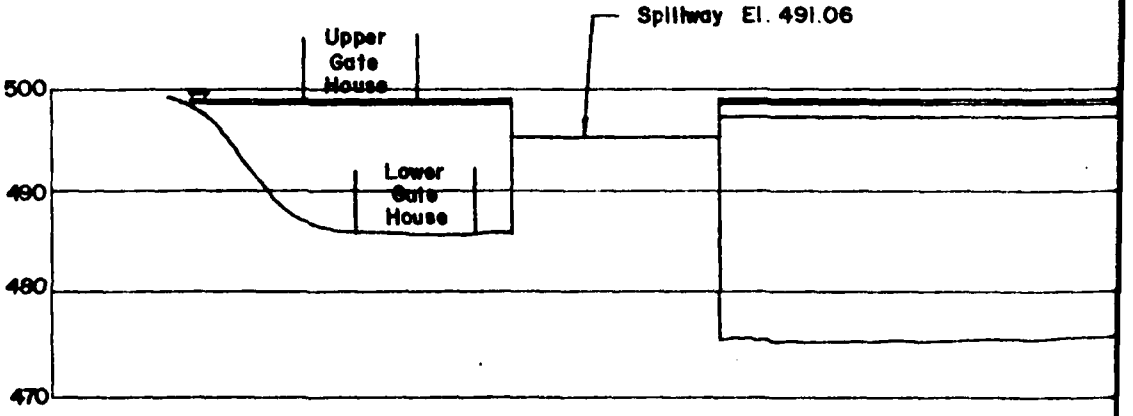
NAME OF DAM Whigville Res. Dam

I.D. NO. CT 00379

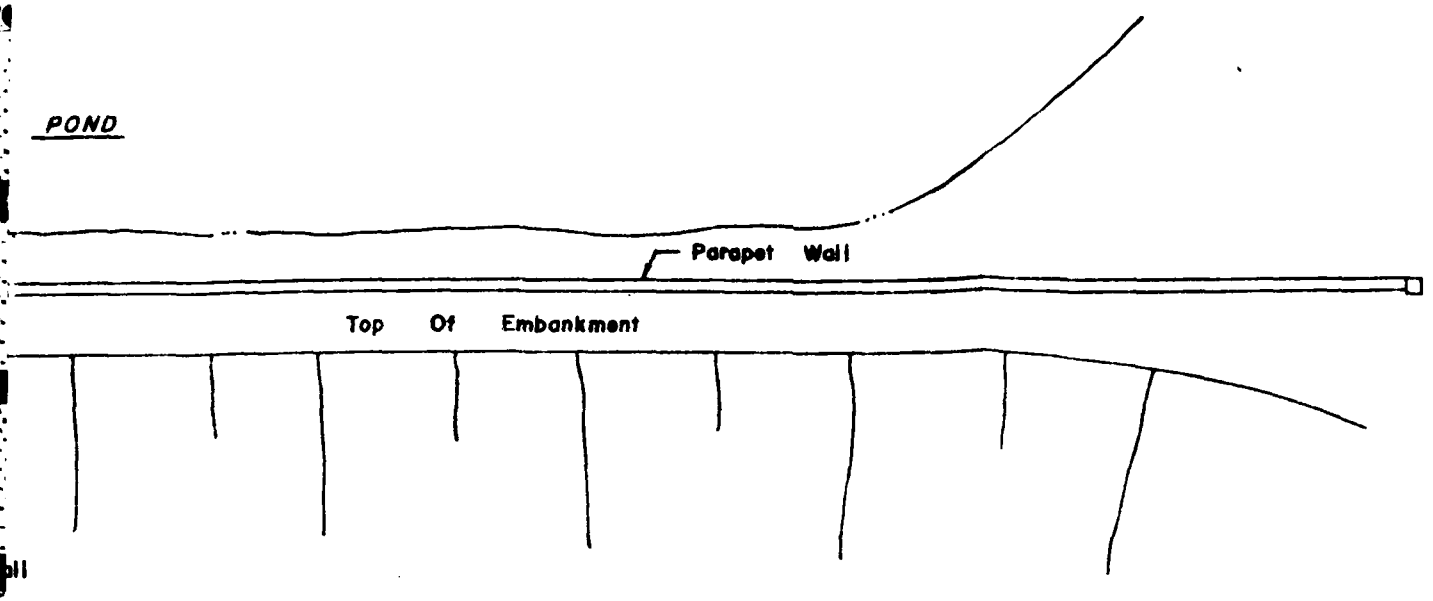
ITEM	REMARKS
POST-CONSTRUCTION SURVEYS OF DAM	None available
BORROW SOURCES	Unknown
MONITORING SYSTEMS	None
MODIFICATIONS	Yes - DEP files
HIGH POOL RECORDS	None
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	No
MAINTENANCE OPERATION RECORDS	None
SPILLWAY PLAN	
SECTIONS	From plans
DETAILS	From plans
OPERATING EQUIPMENT PLANS & DETAILS	From plans



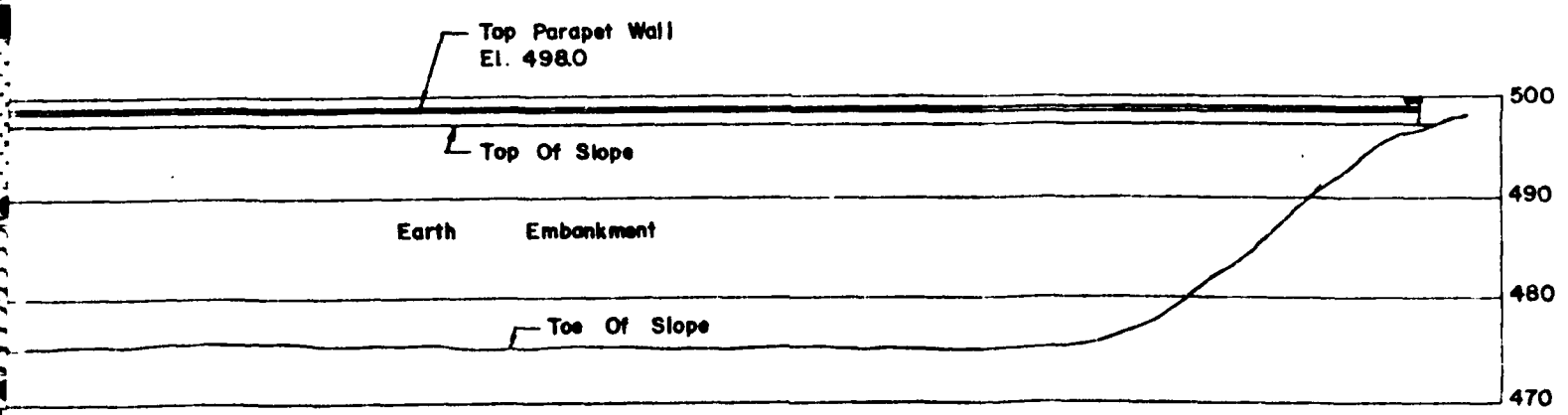
PL
NT



DOWNSTREAM

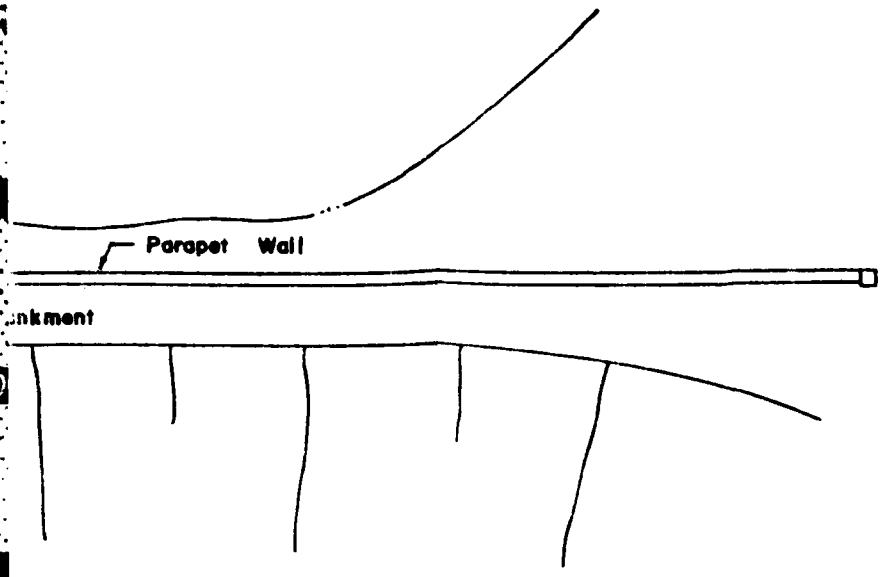


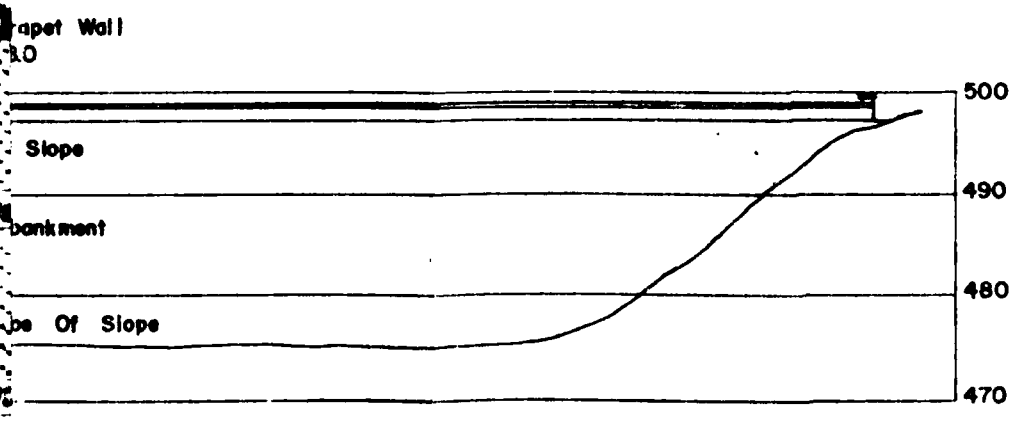
PLAN
NTS



WNSTREAM ELEVATION OF DAM
NTS

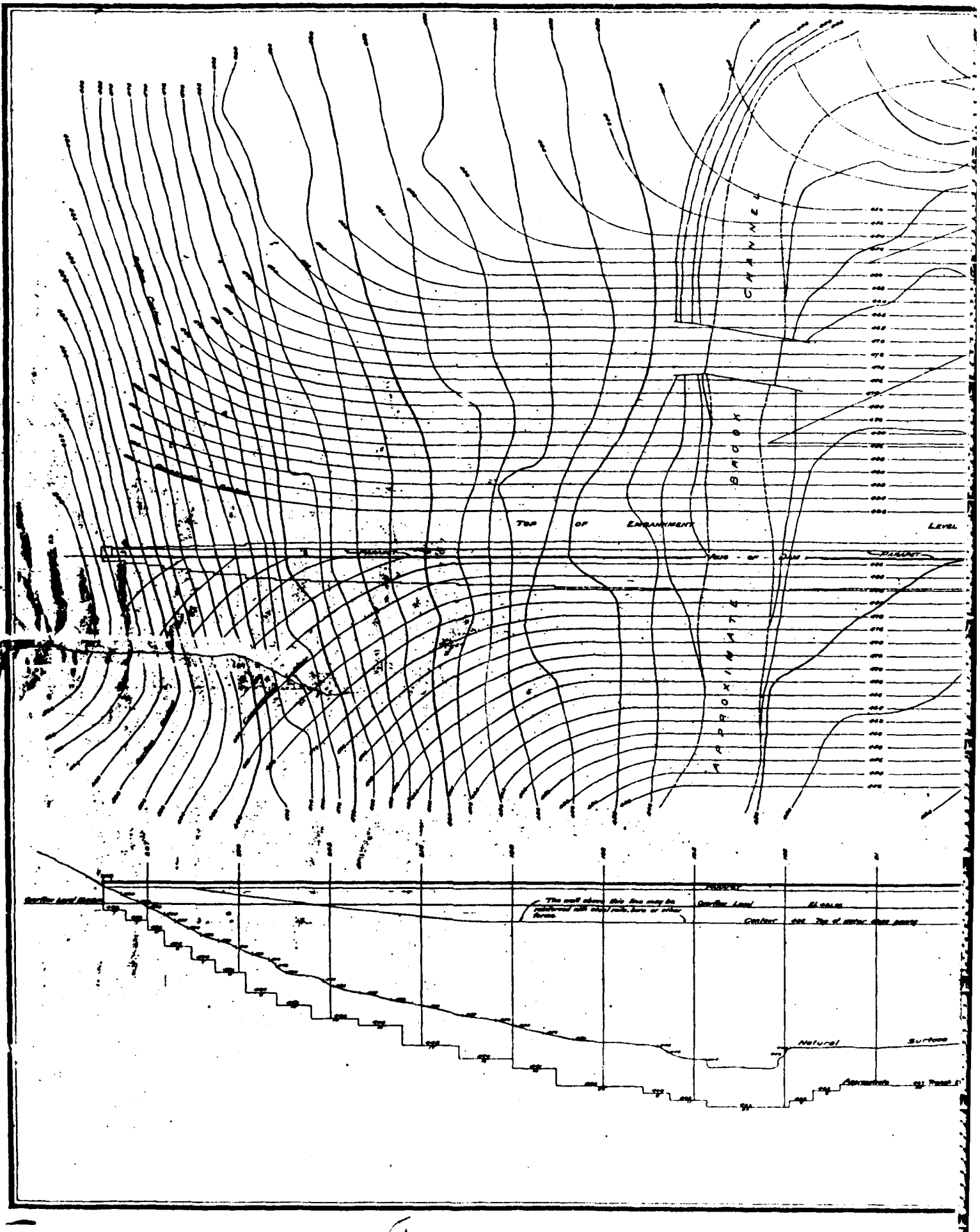
WHIGVILLE RESERVOIR

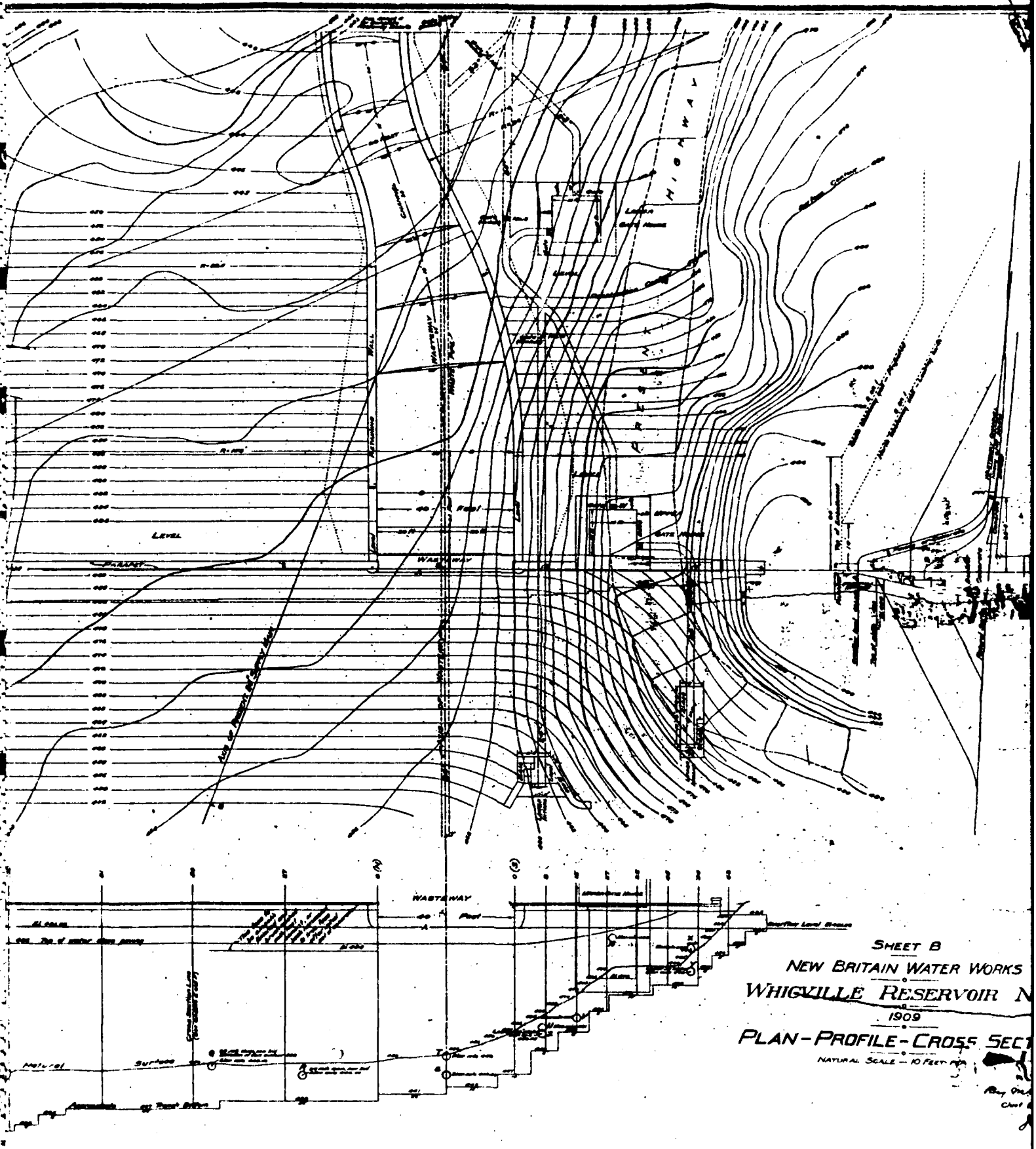




DAM

WHIGVILLE RESERVOIR DAM


CHANNEL
BROOK
APPROXIMATE
TOP OF EMBANKMENT
LEVEL
Natural Surface



SHEET B

NEW BRITAIN WATER WORKS

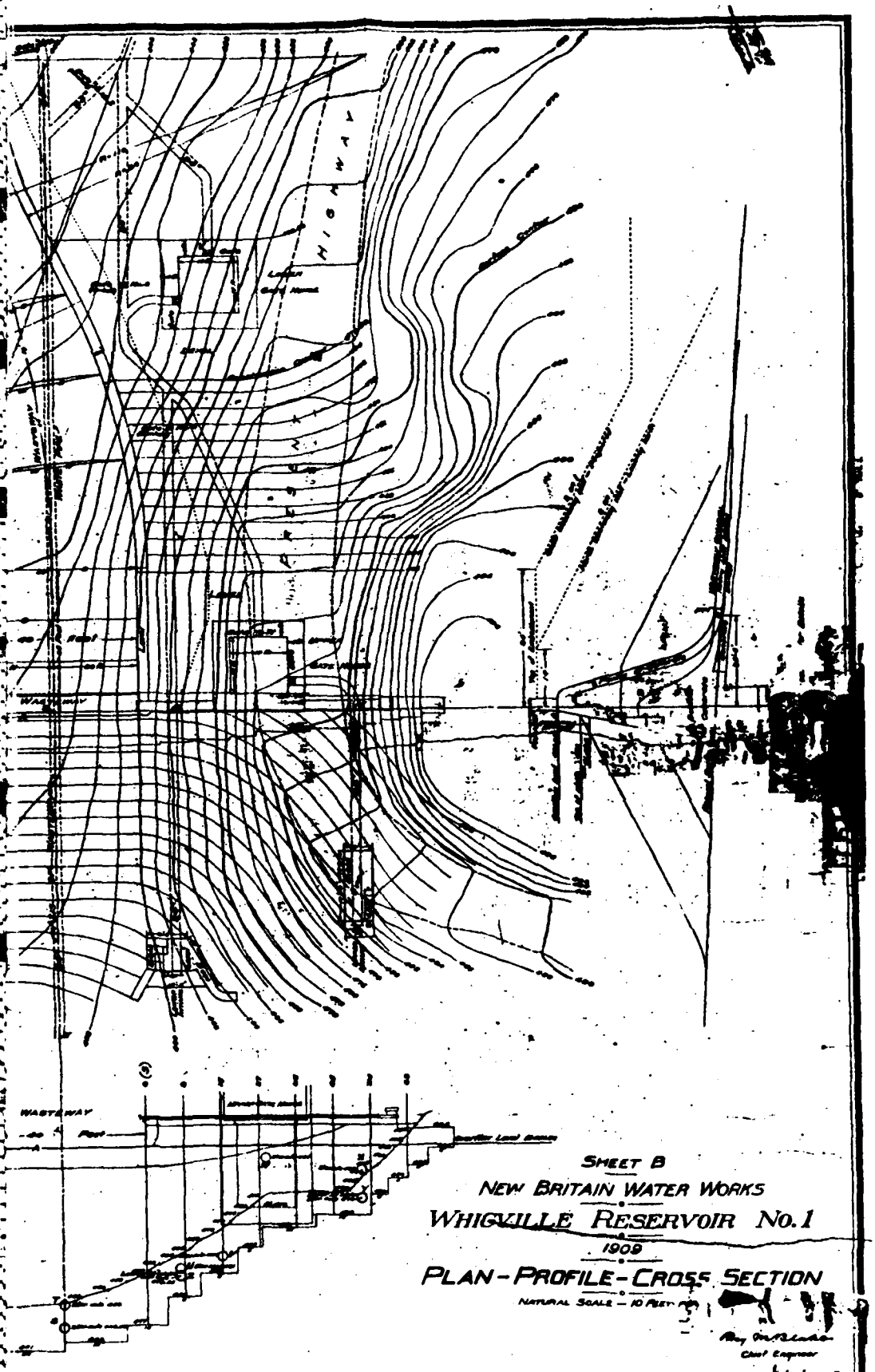
WHIGVILLE RESERVOIR N

1909

PLAN - PROFILE - CROSS SECT

NATURAL SCALE — 10 FEET PER

REDUCED NOT TO SCALE



REDUCED NOT TO SCALE

SHEET C

NEW BRITAIN WATER WORKS

WHIGVILLE RESERVOIR No. 1

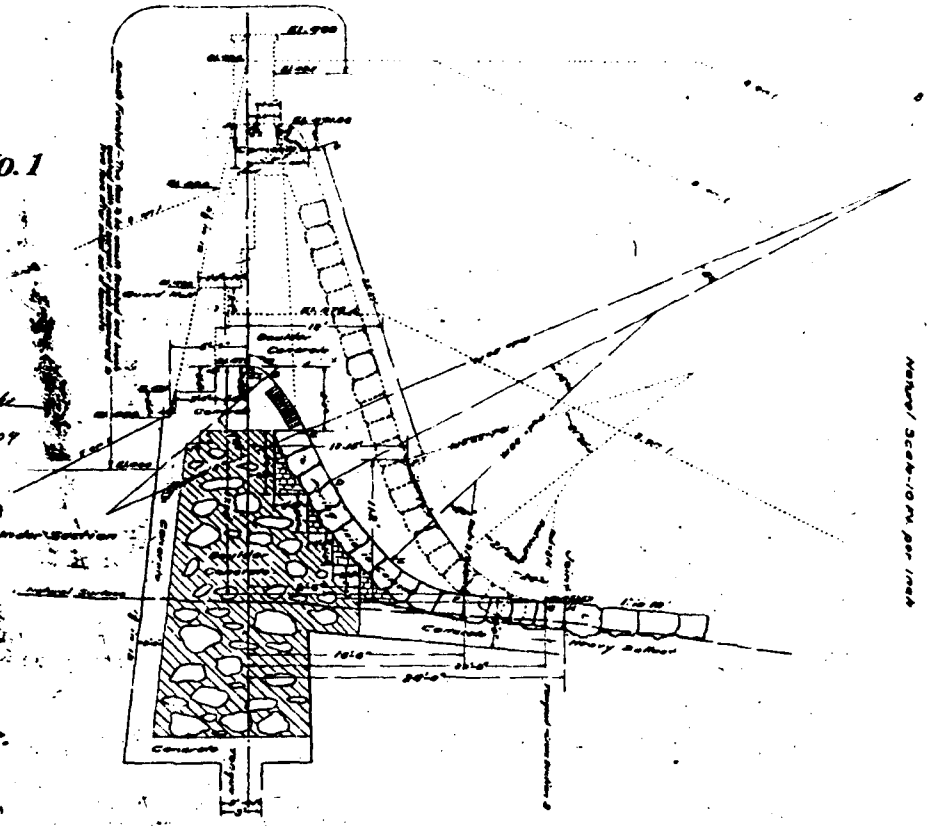
1909

WASTEWAY

PLAN-SECTIONS AND WASTE PIPE OUTLET

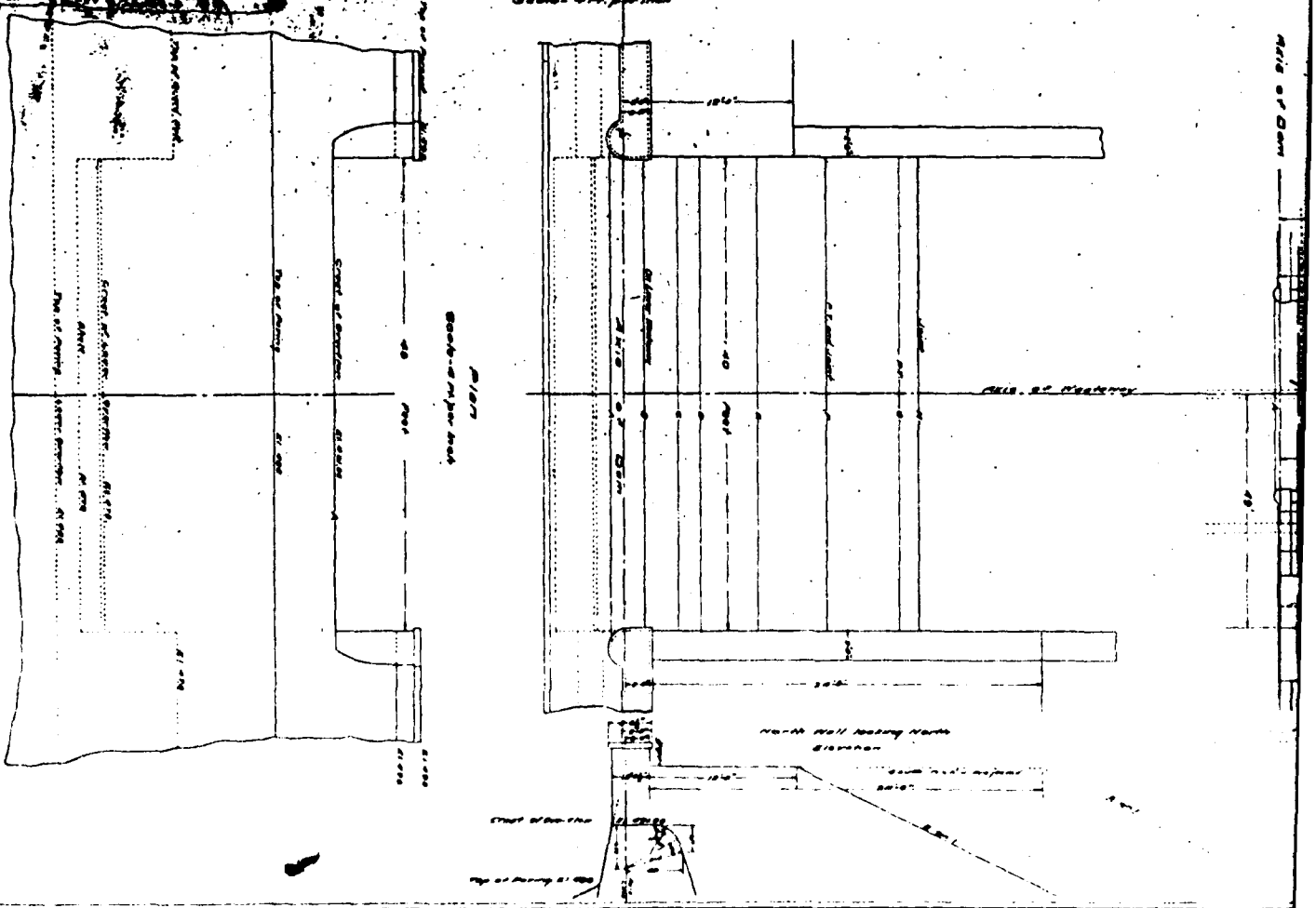
VARIOUS SCALES

Roy McClain
Chief Engineer
July 8, 1909



CROSS SECTIONS OF WASTEWAY CHANNEL

WASTEWAY OVERFALL
Scale- 4 Ft. per inch



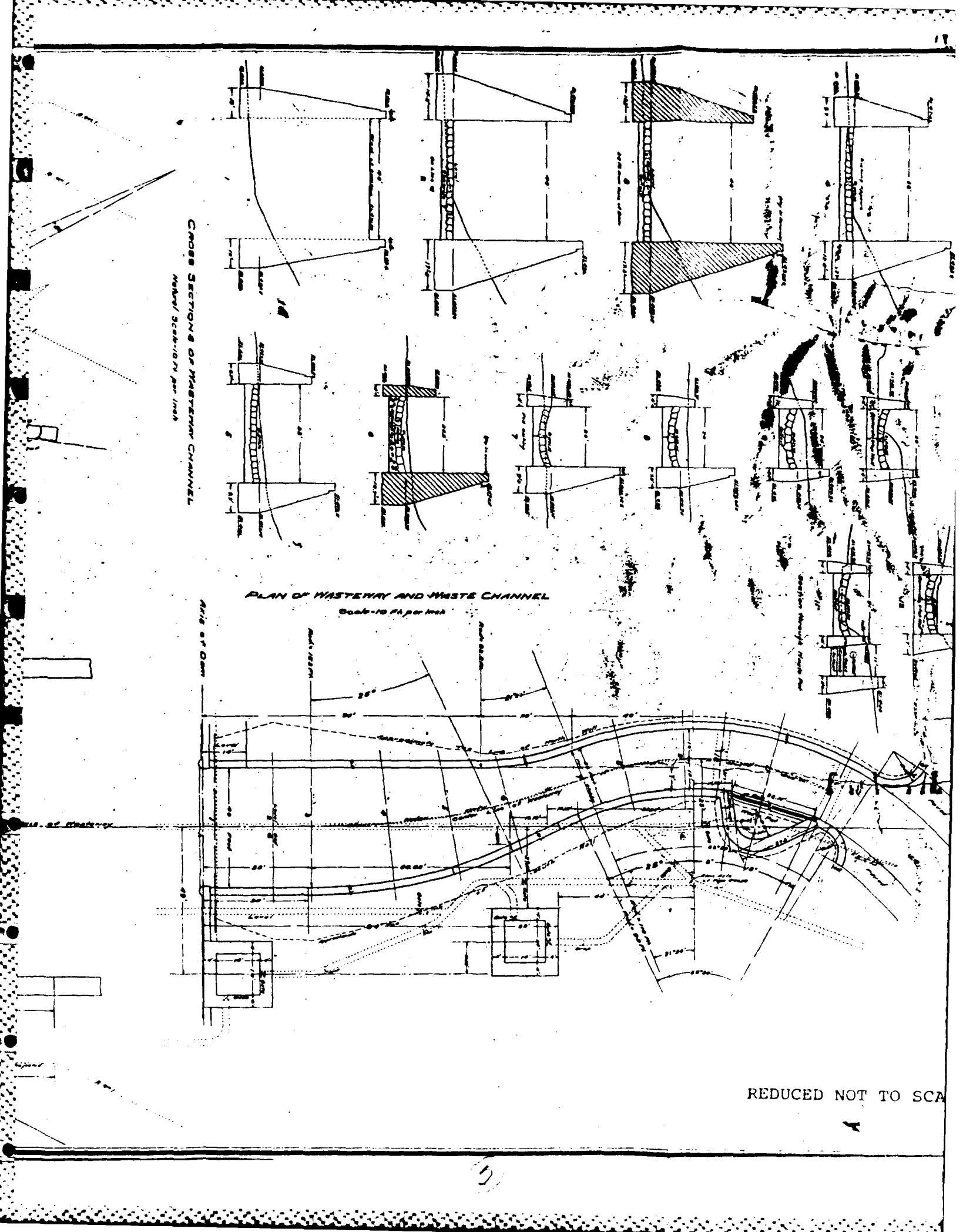
Elevation - Down Side
Scale- 4 Ft. per inch

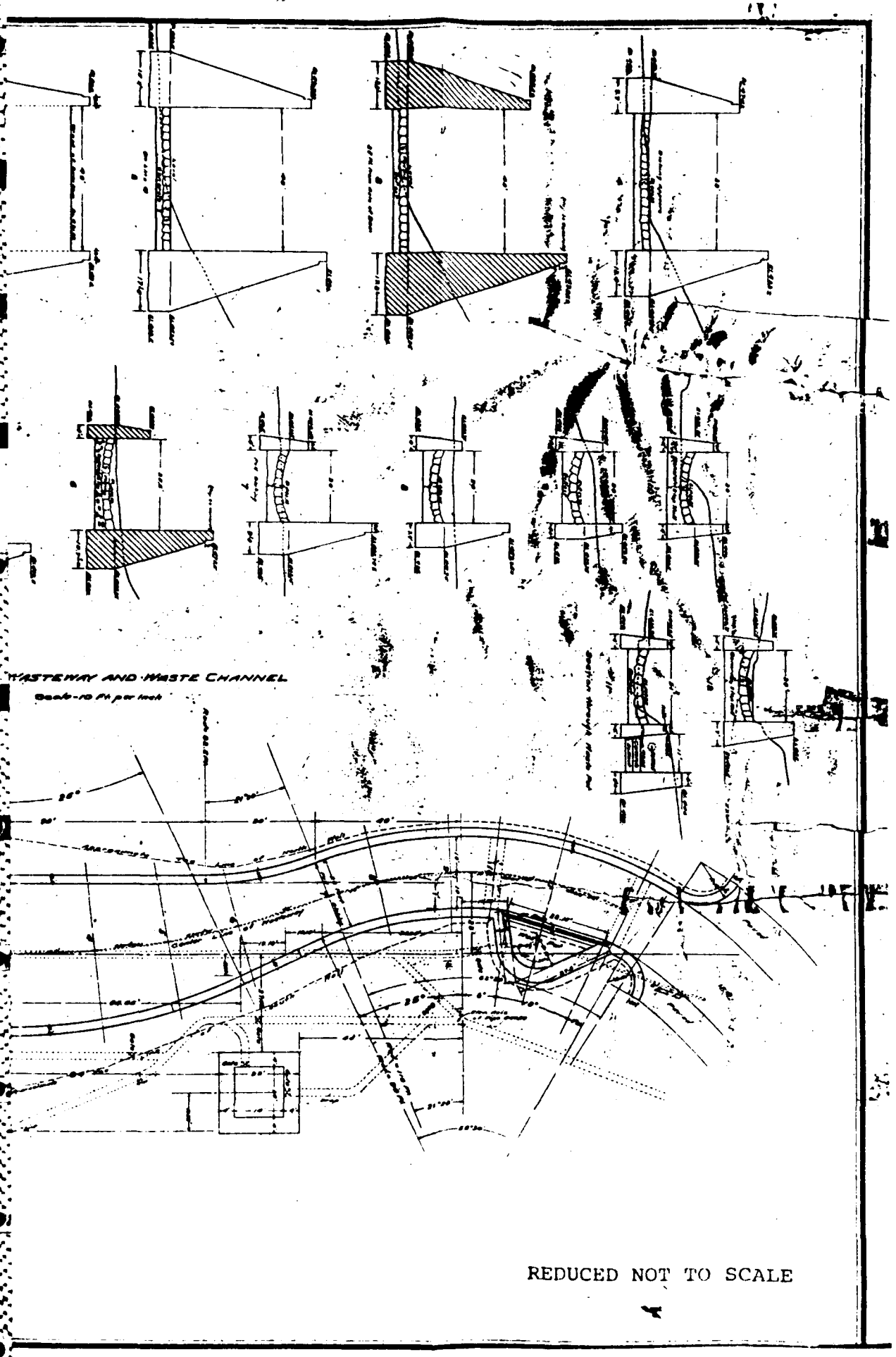
Plan
Scale- 4 Feet per inch

North Wall looking North
Elevation

Plan

6


Cross Sections of Waterway Channel
Natural Scale-10 ft. per inch
Plan of Waterway and Waste Channel
Scale-10 ft. per inch
Axis of Dam
REDUCED NOT TO SCA



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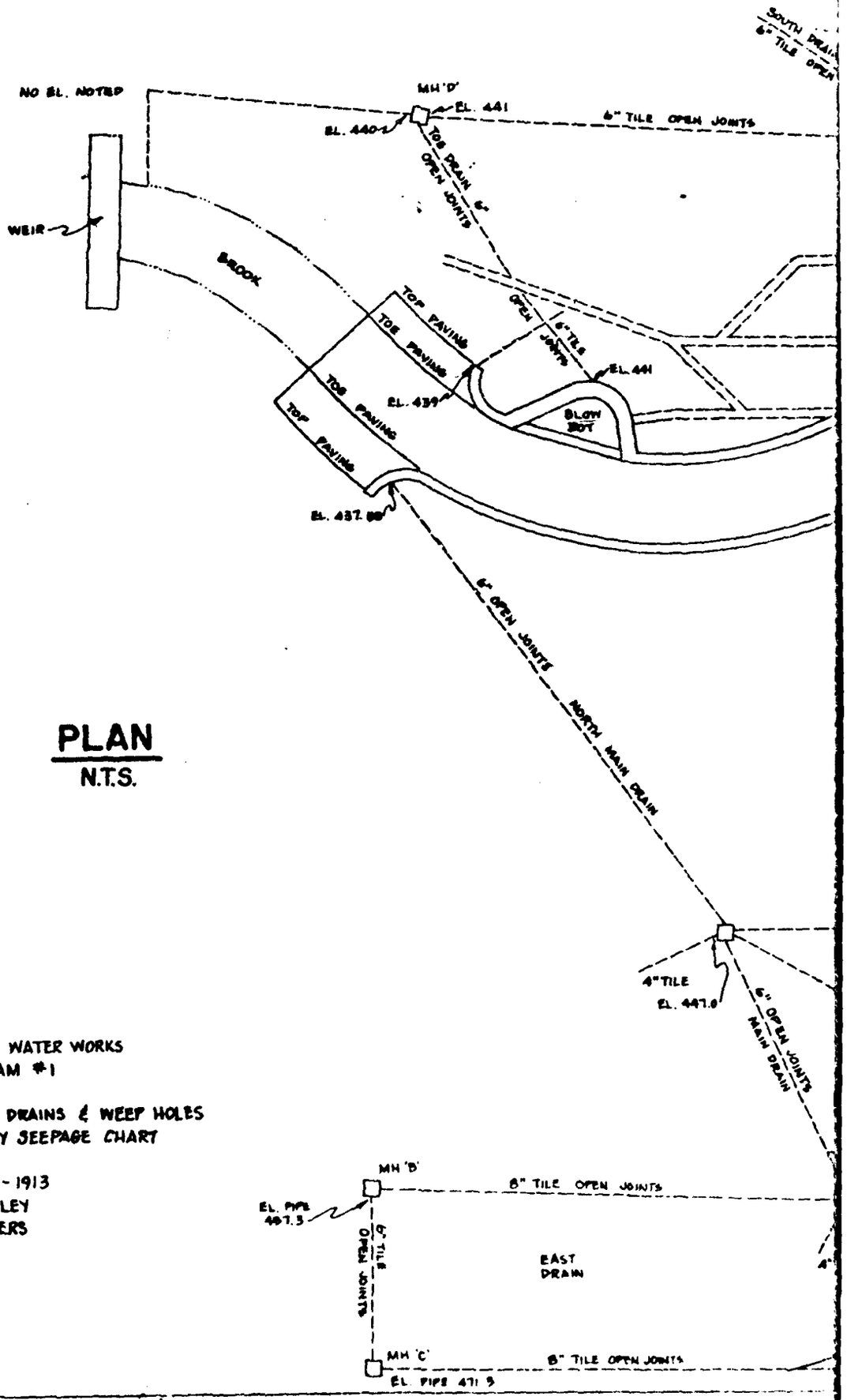


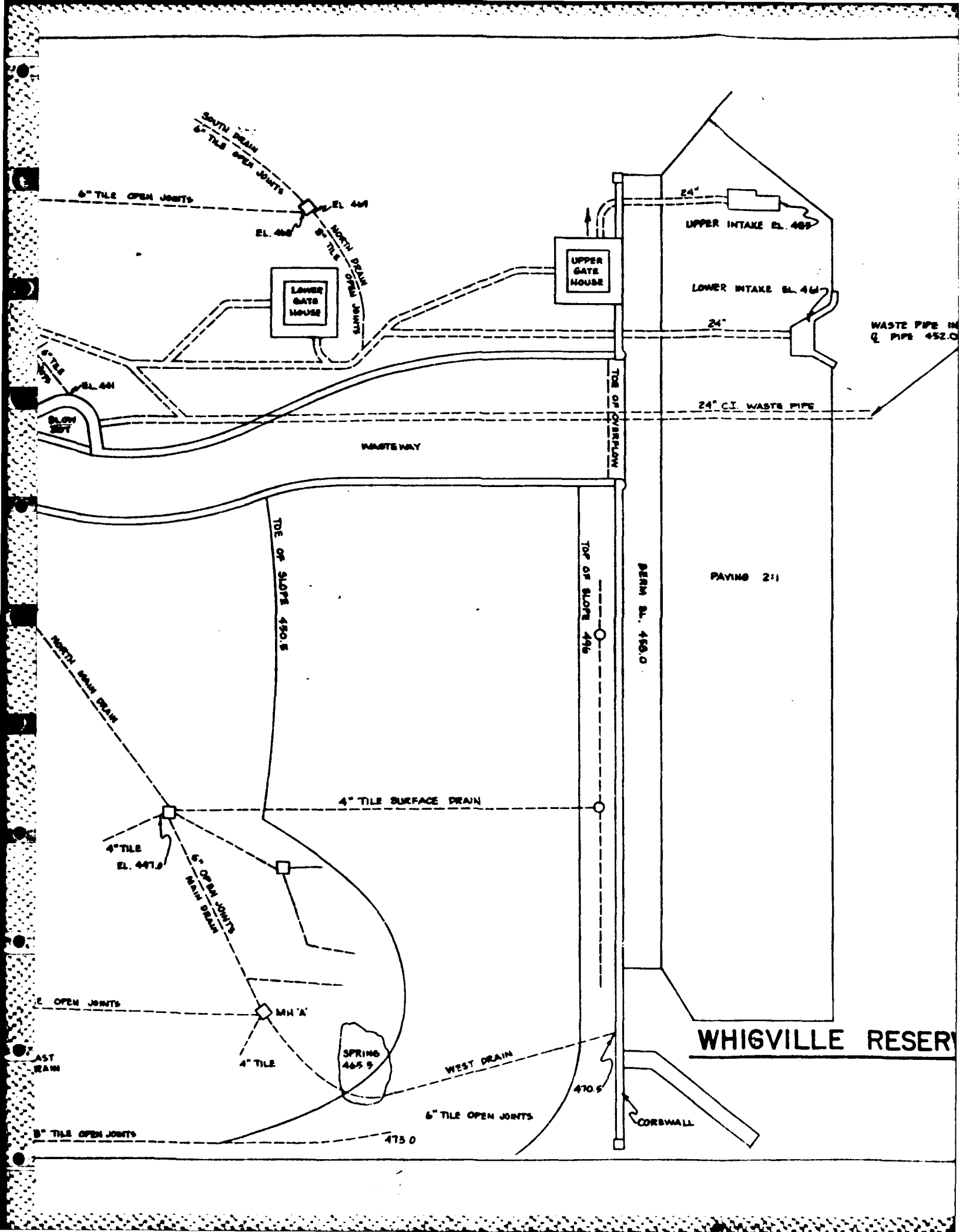
PLAN
N.T.S.

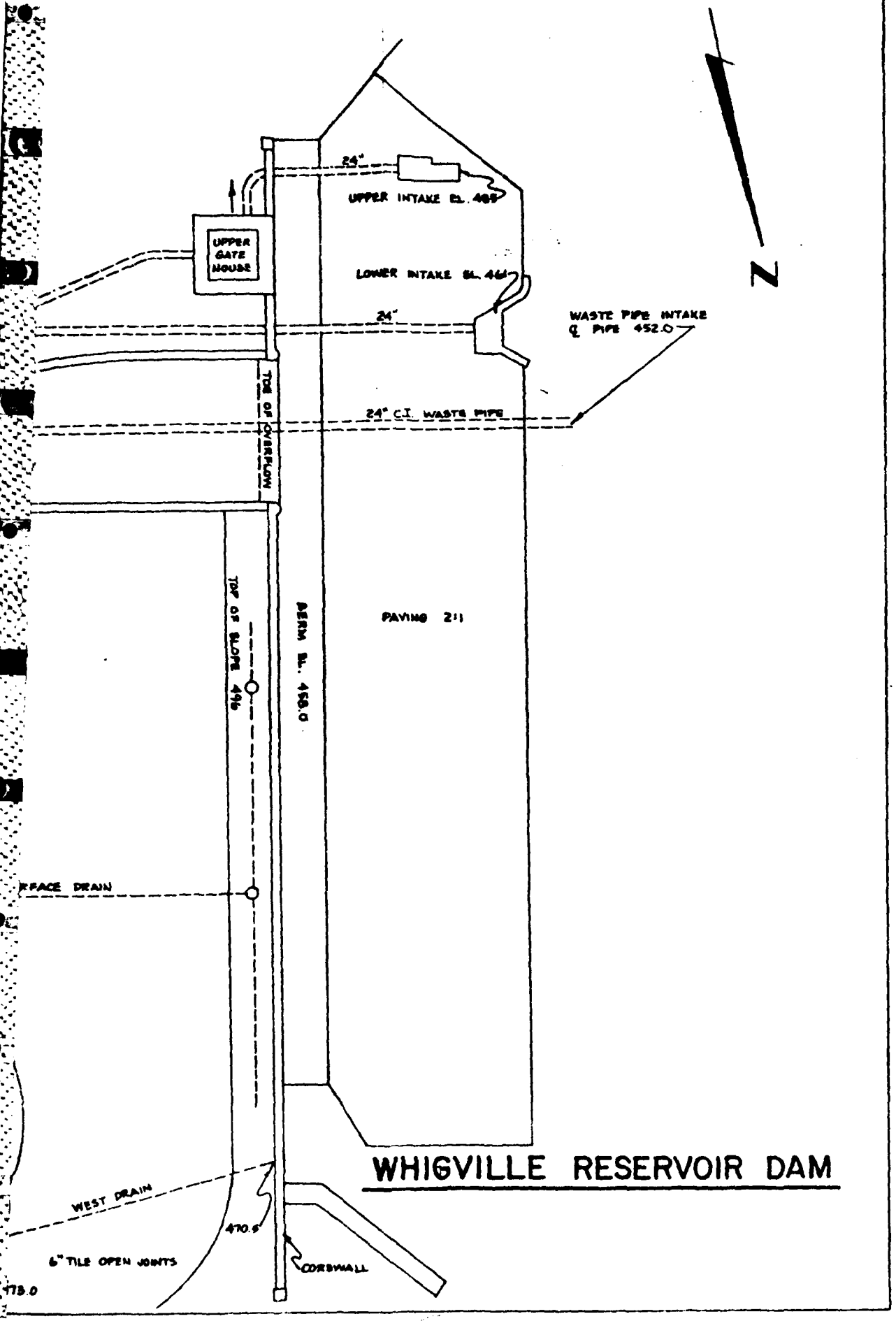
SOURCE:

NEW BRITAIN WATER WORKS
WHIGVILLE DAM #1

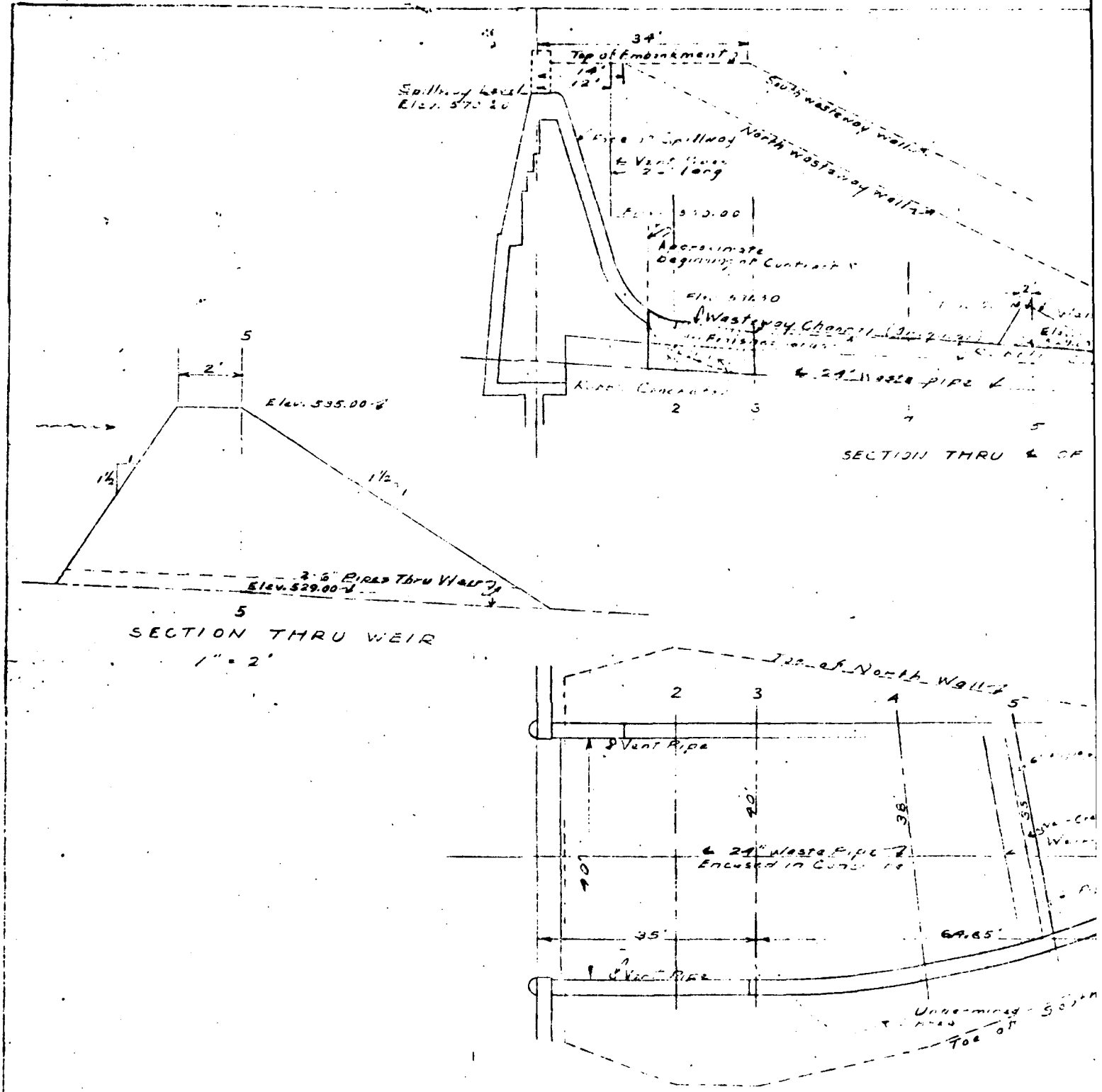
SUBSURFACE DRAINS & WEEP HOLES
TO ACCOMPANY SEEPAGE CHART

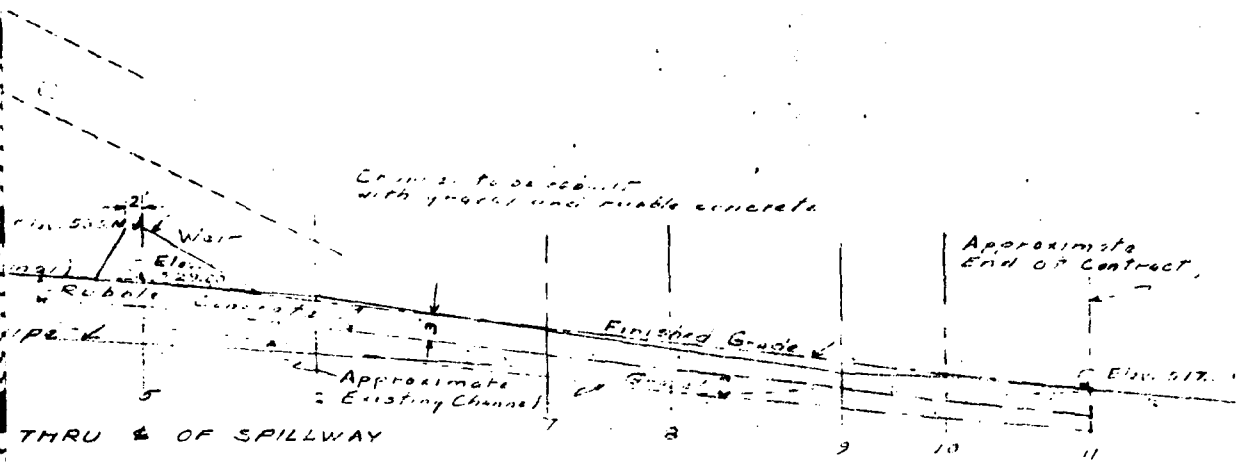
1" = 20' 1912 - 1913
DANIEL CROWLEY
CIVIL ENGINEERS

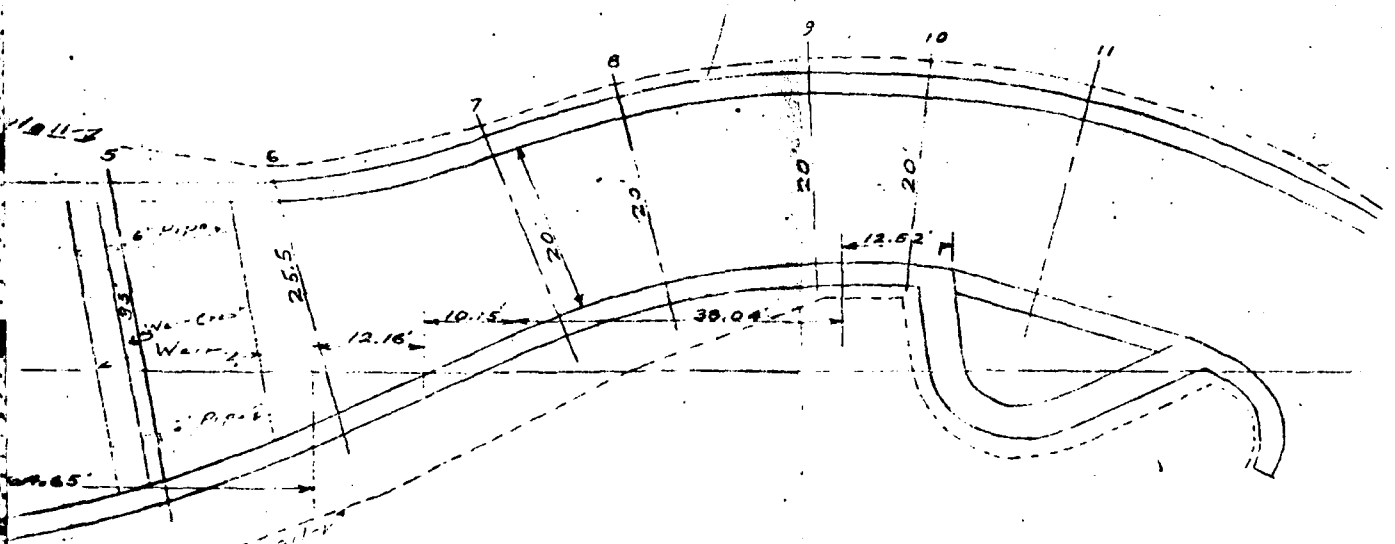

SOUTH DRAIN
6" TILE OPEN JOINTS
6" TILE OPEN JOINTS
EL. 461
EL. 460
NORTH DRAIN
6" TILE OPEN JOINTS
LOWER GATE HOUSE
UPPER GATE HOUSE
24"
UPPER INTAKE EL. 465
LOWER INTAKE EL. 461
24"
WASTE PIPE IN
℄ PIPE 452.0
6" TILE
EL. 461
BLOW OFF
WASTE WAY
TOE OF OVERFLOW
24" C.I. WASTE PIPE
TOE OF SLOPE 450.5
TOP OF SLOPE 496
BERM EL. 459.0
PAVING 2:1
NORTH MAIN DRAIN
4" TILE SURFACE DRAIN
4" TILE
EL. 447.0
6" OPEN JOINTS
MAIN DRAIN
OPEN JOINTS
MH 'A'
4" TILE
SPRING
465.5
WEST DRAIN
410.5
6" TILE OPEN JOINTS
CORBWALL
8" TILE OPEN JOINTS
473.0
WHIGVILLE RESERV



WHIGVILLE RESERVOIR DAM


34'
Top of Embankment
Spillway Level
Elev. 570.20
South Wasteway Wall
North Wasteway Wall
Approximate
Beginning of Curve
Wasteway Channel
24" Waste Pipe
River Concrete
SECTION THRU
5
2'
Elev. 595.00
1½
1½
3'-6" Pipes Thru Wall
Elev. 529.00
SECTION THRU WEIR
1" = 2'
Top of North Wall
Vent Pipe
42'
38'
24" Waste Pipe
Enclosed in Conc
35'
64.65'
Vent Pipe
Toe of
PLAN
Scale 1" = 10'





APPROVED
FOR CONSTRUCTION
STATE BOARD OF SUPERVISION OF DAMS
BY
DATE 9/8/56

RECEIVED
SEP 8 1956
JOHN J. MOZZOCHI
CONSULTING ENGINEER

AN

"=10'

REDUCED NOT TO SCALE

BOARD OF WATER COMMISSIONERS
NEW BRITAIN, CONN
REPAIRS TO WHIGVILLE SPILLWAY
Scale: 1" = 10
Aug 1956
S.W. Wood - Chief Eng.

B-7

SPECIFICATIONS

1. The work to be performed under this contract shall consist of furnishing all labor, materials and equipment necessary for making repairs to the spillway of the Whigville Reservoir located in Burlington, Conn.

2. The work consists of repairing a washed out area under the south wall of the spillway channel and repairing the bed of the spillway channel.

3. The work shall be strictly in accordance with the specifications and the accompanying drawing.

4. Care must be exercised to protect the 24-inch waste pipe from damage.

5. The contractor shall obtain all permits necessary for the prosecution of the work. The contractor shall comply with all local and state laws, ordinances, rules and regulations relating to the performance of the work.

6. The contractor is required to inspect the site of the work before he submits his bid.

7. Rubble concrete shall be used with large clean stones thoroughly embedded in the concrete and as near together as possible while still entirely surrounded by concrete. No stones shall extend above the finished grade of the spillway channel. There shall be at least one foot of concrete above all stones.

8. Concrete shall be in the proportion 1:3:5 and shall be in accordance with the latest recommendations of the Joint Committee A.C.I.A.S.T.M.

9. The concrete shall be brought to the finished grade as set by the Owner and given a screeded finish.

10. The gravel to be used for the gravel base shall consist of sound, tough, durable particles of crushed or uncrushed gravel free from soft, thin, elongated or laminated pieces and vegetable or other deleterious substances. Samples of the gravel to be used must be approved by the Owner.

11. The two 6-inch vent pipes shall be either wrought iron or extra heavy steel pipe and shall be securely fastened to the faces of the side walls of the spillway channel.

12. The contractor shall guarantee the quality of all materials used and the work performed for a period of one year from the time of completion.

13. The contractor shall take out and maintain during the life of this contract such Public Liability and Property Damage Insurance as shall protect him and any subcontractor performing work covered by this contract from claims for damages for personal injury, including accidental death, as well as from claims for property damages which may arise from operations under this contract, whether such operations be by himself or by any subcontractor or by anyone directly or indirectly employed by either of them and the amounts of such insurance shall be as follows:

APPROVED
FOR CONSTRUCTION
STATE BOARD OF SUPERVISION OF DAMS
BY J.J. Mazzochi
DATE 9/28/56

Public Liability Insurance in an amount not less than $50,000 for injuries, including accidental death, to any one person, and subject to the same limit for each person, in an amount not less than $100,000 on account of one accident, and Property Damage Insurance in an amount not less than $5,000.

14. The wages to be paid to any mechanic, laborer or workman employed upon the work herein contracted for shall be at the rate customary or prevailing for the same work in the same trade and occupation in the City of New Britain based upon the wage schedule and the rates therein set by the U. S. Department of Labor for the New Britain area.

JOHN J. MOZZOCHI AND ASSOCIATES
CIVIL ENGINEERS

GLASTONBURY, CONN.
217 HEBRON AVENUE
PHONE 633-9401

PROVIDENCE 3, R. I.
198 DYER STREET
PHONE GAspee 1-0420

JOHN J. MOZZOCHI
ASSOCIATES
OWEN J. WHITE
JOHN LUCHS, JR.
ECTOR L. GIOVANNINI

June 14, 1965

REPLY TO: Glastonbury

William P. Sander-Engineer-Geologist
Water Resources Commission
State Office Building
Hartford 15, Connecticut

Re: Our File 57-73-69
Whigville Dam
Burlington

Dear Mr. Sander:

I inspected the referenced dam on June 10th in accordance with your instructions of May 10th and found that the work originally called for by the Preliminary Permit dated September 8, 1956, has been completed and the repairs are in good condition today with the possible exception of the 6" dia. vent pipes.

My recollection is that these vent pipes were to extend almost to the apron, whereas the bottom of the pipes are now about 12' above the apron and one of them is disjointed about at it's mid-point. Otherwise the work may be considered acceptable to issue a Final Permit.

Very truly yours,

John J. Mozzochi and Associates
Civil Engineers

JJM:hk

CITY OF NEW BRITAIN
NEW BRITAIN, CONNECTICUT

October 28, 1965

State of Connecticut
Water Resources Commission
State Office Building
Hartford, Connecticut

Attention: Mr. William P. Sander
Engineer - Geologist

Re: Inspection Report of Whigville Dam in Burlington

Dear Sir:

The items noted for action in your letter of June 24, 1965 on the subject matter have been reviewed by this department. An inspection of the area manifested that the vent pipes were installed in accordance with the contract plans. The joint in the vent pipes which had become disconnected have been sealed by enclosing them in a concrete encasement.

Funds are being requested in the 1966 budget to replace all old concrete that has deteriorated over the years because of weather action.

If there are any further questions, please contact the writer at 224-2491, Ext. 260.

Yours truly,

BOARD OF WATER COMMISSIONERS

Peter M. Arburr
Engineer III

jek

STATE OF CONNECTICUT

WATER RESOURCES COMMISSION

STATE OFFICE BUILDING · HARTFORD 15, CONNECTICUT

CERTIFICATE OF APPROVAL

April 5, 1966

City of New Britain
Board of Water Commissioners
27 West Main Street
New Britain, Connecticut

TOWN: Burlington
RIVER: Copper Mine Brook
TRIBUTARY: Whigville Brook
CODE NO.: P 6.6 CM 4.5 W 2.2

Gentlemen:

NAME AND LOCATION OF STRUCTURE: The Whigville Dam located on Whigville Brook in the Town of Burlington.

DESCRIPTION OF STRUCTURE AND WORK PERFORMED: Repairing a washed out area under the south wall of the spillway channel and repairing the bed of the spillway channel.

CONSTRUCTION PERMIT ISSUED UNDER DATE OF: September 8, 1956

This certifies that the work and construction included in the plans submitted, for the structure described above, has been completed to the satisfaction of this Commission and that this structure is hereby approved in accordance with Section 25-114 of the 1958 Revision of the General Statutes.

The owner is required by law to record this Certificate in the land records of the town or towns in which the structure is located.

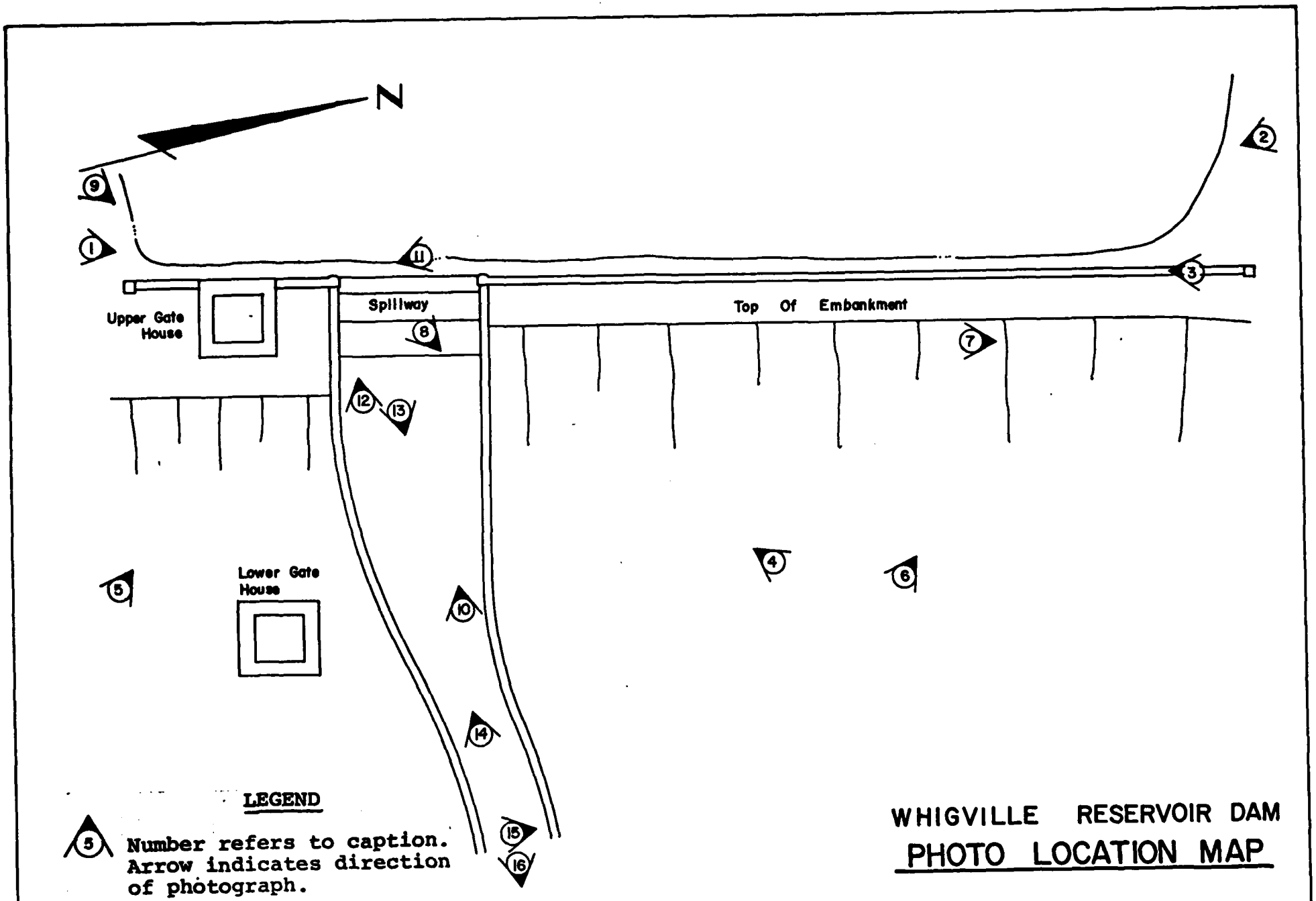
WATER RESOURCES COMMISSION

BY: _____
William S. Wise, Director

WSW:ja

APPENDIX C

PHOTOGRAPHS


N
Upper Gate House
Spillway
Top Of Embankment
Lower Gate House
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
LEGEND
5 Number refers to caption. Arrow indicates direction of photograph.
WHIGVILLE RESERVOIR DAM
PHOTO LOCATION MAP

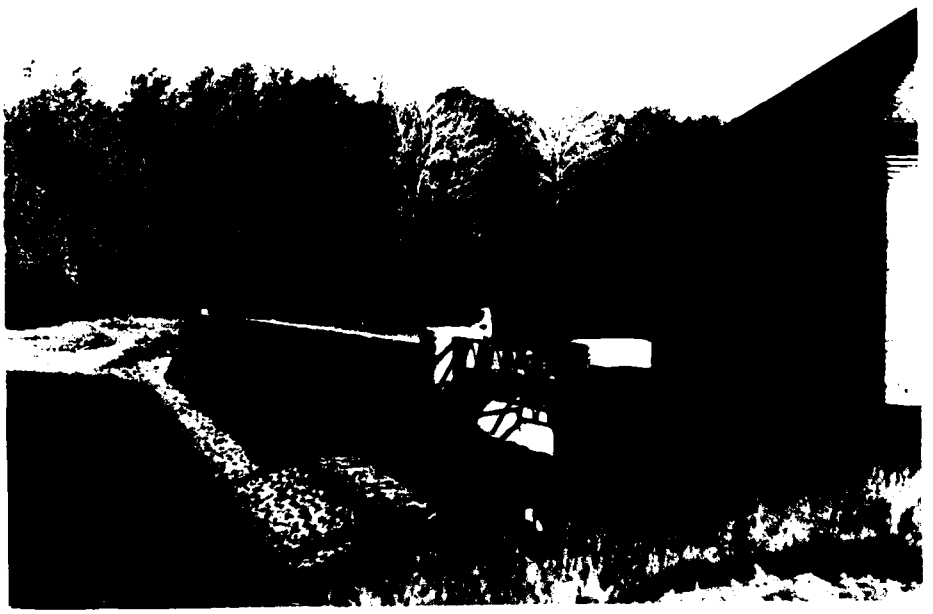


PHOTO #1: Upstream face of dam from right (south) abutment.

PHOTO #2: Upstream face of dam from left (north) abutment.

PHOTO #3: Crest of dam from left (north) abutment.

PHOTO #4: Downstream slope from vicinity of toe.

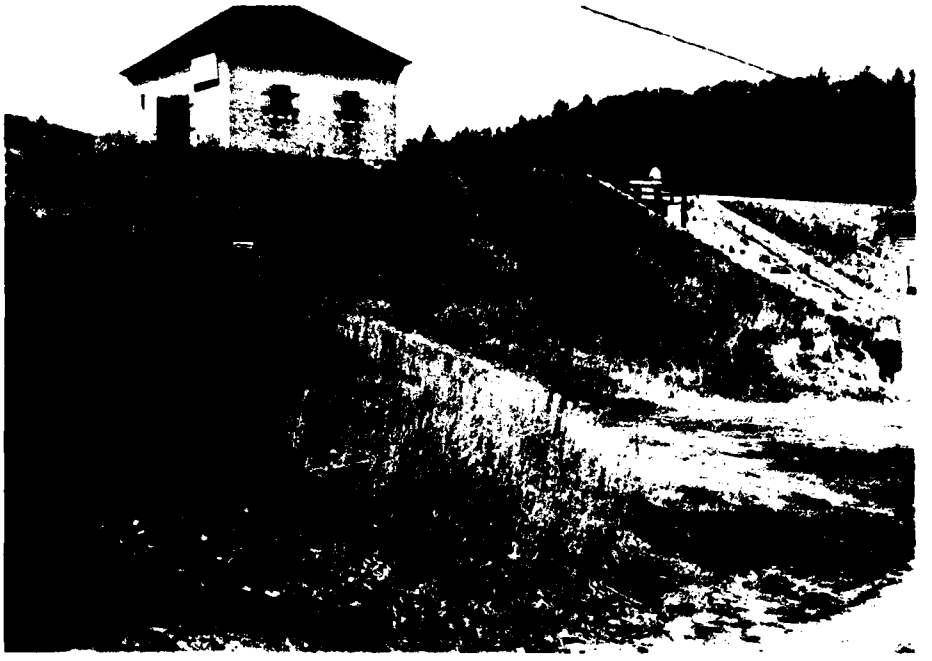


PHOTO #5: Downstream slope from right (south) abutment, looking towards spillway.

PHOTO #6: Downstream slope looking towards left (north) abutment.

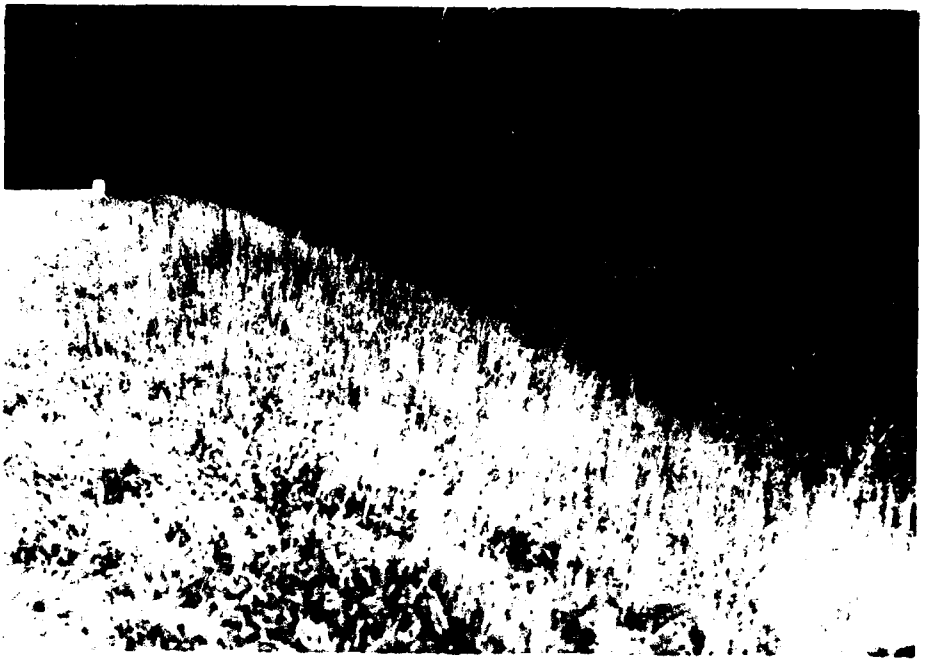


PHOTO #7: Downstream slope.

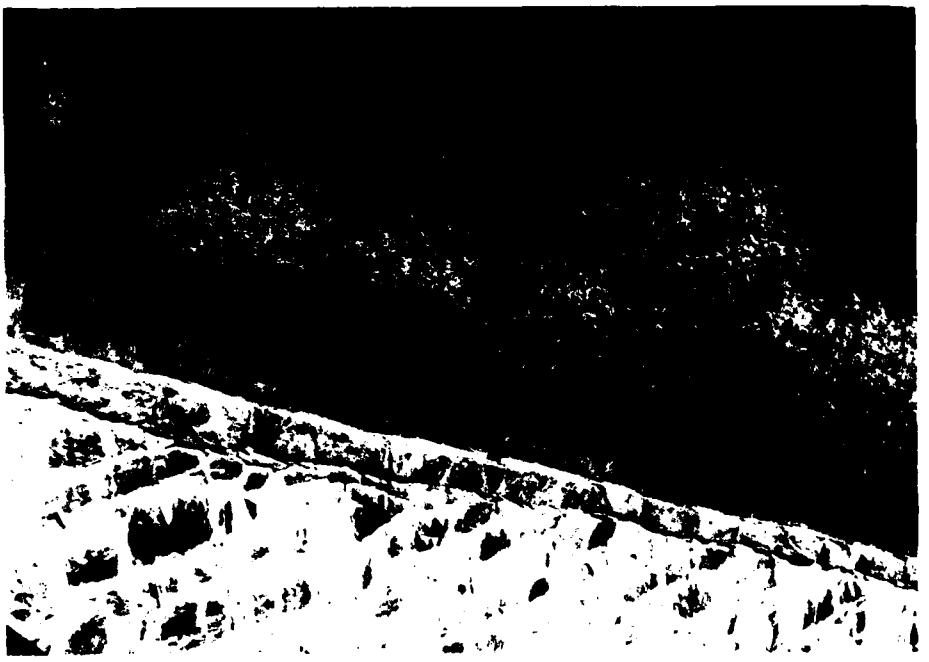


PHOTO #8: Downstream slope. Note extensive vegetation.

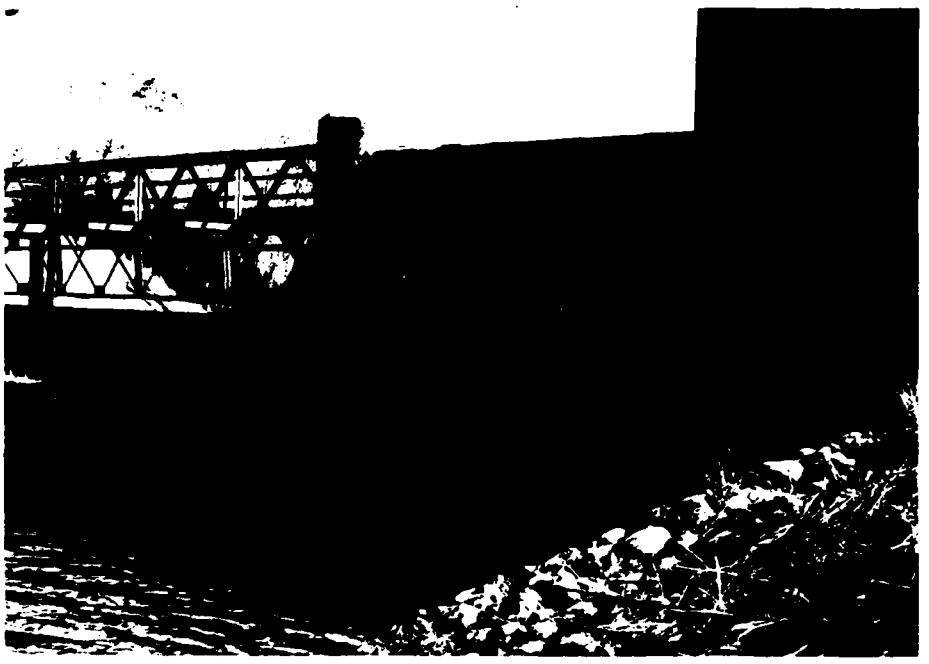


PHOTO #9: Upstream face, looking towards spillway approach.

PHOTO #10: Spillway and service bridge.

PHOTO #11: Spillway weir.

PHOTO #12: Right (south) side spillway training wall.

PHOTO #13: Spillway channel from service bridge.

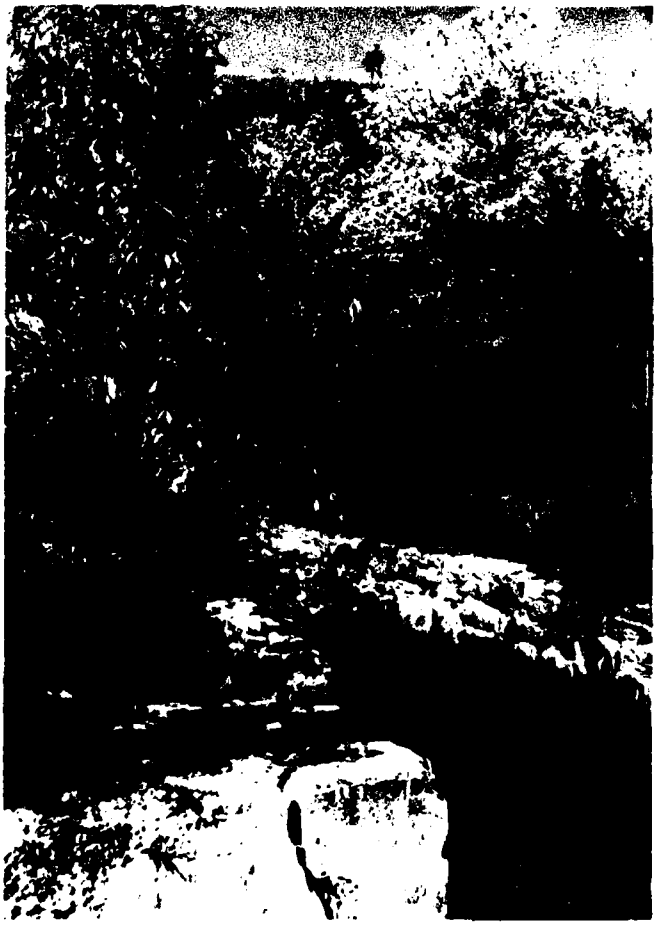


PHOTO #14: Looking upslope from end of spillway channel.

PHOTO #15: 4-inch diameter toe drains.

PHOTO #16: Spillway channel.

PHOTO #17: Reservoir Area.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

DETERMINATION OF SPILLWAY TEST FLOOD*

A. SIZE CLASSIFICATION

Storage Volume (Ac.-Ft.) 250

Height of Dam (Ft.) 54

Size Classification INTERMEDIATE

B. HAZARD POTENTIAL CLASSIFICATION

Category	Loss of Life	Economic Loss
Low	None expected	Minimal
Significant	Few	Appreciable
(High)	(More than few)	Excessive

Hazard Classification HIGH

C. HYDROLOGIC EVALUATION GUIDELINES

Hazard	Size	Spillway Test Flood*
Low	Small	50 to 100-Year Frequency
	Intermediate	100-Year Frequency to 1/2 PMF
	Large	1/2 PMF to PMF
Significant	Small	100-Year Frequency to 1/2 PMF
	Intermediate	1/2 PMF to PMF
	Large	PMF
(High)	Small	1/2 PMF to PMF
	(Intermediate)	(PMF)
	Large	PMF

Spillway Test Flood* PMF

*Based upon "Recommended Guidelines for Safety Inspection of Dams" Department of the Army, Office of the Chief of Engineers, November 1976.

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

DETERMINATION OF THE

MAXIMUM PROBABLE FLOOD (MPF)

A. Drainage Area in Square Miles 4.15

B. Watershed Characteristic: Flat & Coastal

(Rolling)

Moutainous

C. M.P.F. in CFS/Square Mile,* 1900

M.P.F. = (CFS/Square Mile) x (Area in Square Miles)

1900 x 4.15 = 7885

*Based upon the figure "Maximum Probable Flood Peak Flow Rates" U.S. Army Corps of Engineers, December 1977.

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

THE PMP RAINFALL IS 23.5 INCHES FOR A 6HR DURATION, 24 HR STORM. USING A 20% FACTOR FOR IMPERFECT FIT, THE EFFECTIVE RAINFALL IS 18.8 INCHES, (SEE FIG. 15, DESIGN OF SMALL DAMS).

RUNOFF

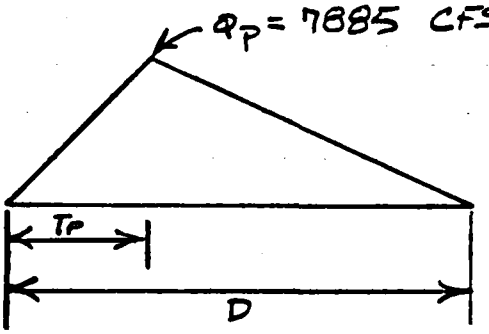
BASED ON AN ASSUMED CN VALUE OF 80 (FOR GLACIAL TILL SOILS), RUNOFF FOR THE PMF IS 16.0 INCHES (FIG. A-4 "DESIGN OF SMALL DAMS),

$$\text{VOLUMN OF RUNOFF} = (16''/12''/FT)\,(4.15\ mi^2)\,(640\ AC/mi^2) =$$

$$= 3540\ AC\text{-}FT$$

HYDROGRAPH

A TRIANGULAR HYDROGRAPH IS TO BE USED FOR THE ROUTING OF THE TEST FLOOD THROUGH THE RESERVOIR. PEAK FLOW EQUALS 7885 CFS, SET DURATION OF RUNOFF SO AS TO CONTAIN VOLUMN OF RUNOFF, AND RECEEDING LIMB EQUAL TWICE THE RISING LIMB.



$$VOL = 4205\ AC\text{-}FT = \tfrac{1}{2}\,Q_p\,D$$

$$D = \frac{3540\ AC\text{-}FT}{0.5\,(7885\ CFS)} = \frac{(3540)\,(43560\ ft^2/AC)}{0.5\,(7885\ CFS)\,(60\ SEC/MIN)\,(60\ MIN/HR)} = 10.8\ HRS$$

SAY T_p = 4.0 HRS D = 12.0 HRS

PROJECT WHIGVILLE RES. DAM BURLINGTON

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SHEET NO. 4 OF
BY DKS DATE 11-30-7
CHK'D. BY RAC DATE 1-14-8

FORM INFLOW TRIANGULAR HYDROGRAPH

Q_p = 7885 CFS
T_p = 4.0 HRS
D = 12.0 HRS

TIME (HRS)	PMF INFLOW (CFS)	1/2 PMF INFLOW, CFS
0	0	0
1	1971	986
2	3942	1971
3	5914	2957
4.	7885	3942
5	7000	3500
6	5914	2957
7	4925	2462
8	3943	1972
9	2957	1478
10	1971	985
11	986	493
12	0	0

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

Form Inflow Triangular Hydrograph

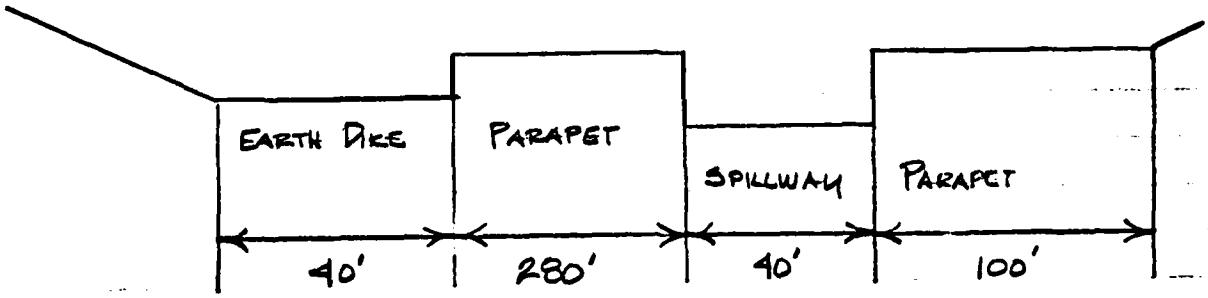
Q_p = 7885 CFS
T_p = 4.0 Hrs
D = 12.0 Hrs

Time (Hrs)	PMF Inflow (CFS)	1/2 PMF Inflow, CFS
0	0	0
1	1971	986
2	3942	1971
3	5914	2957
4.	7885	3942
5	7000	3500
6	5914	2957
7	4925	2462
8	3943	1972
9	2957	1478
10	1971	985
11	986	493
12	0	0

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SPILLWAY AND OVERFLOW SECTION DATA

N.T.S.



SEGMENT	ITEM	C.	LENGTH	ELEV.
1	EARTH DIKE	2.5	40'	572.0
2	PARAPET	3.0	280	574.3
3	SPILLWAY	3.5	40	567.0
4	PARAPET	3.0	100	574.3

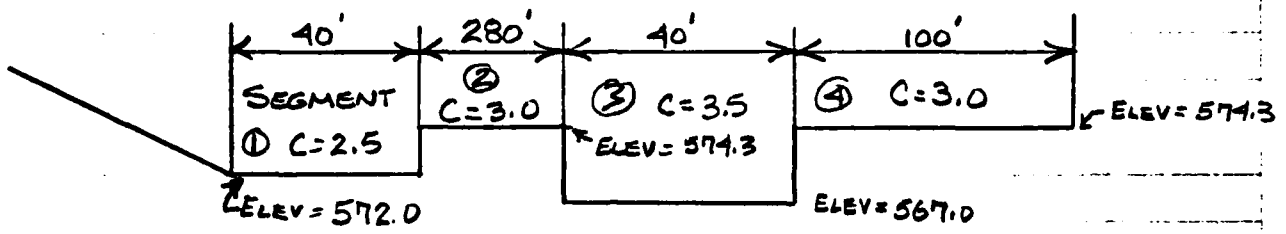
IE = 567.0 IV = 0.0 E = 567 A = 11 E = 580 A = 15

BREACH WIDTH = 124

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

STAGE DISCHARGE DATA

N.T.S.



$Q_1 = C_1 L_1 H_1^{3/2}$
$(2.5)(40)$

$Q_2 = C_2 L_2 H_2^{3/2}$
$3.0(280)$

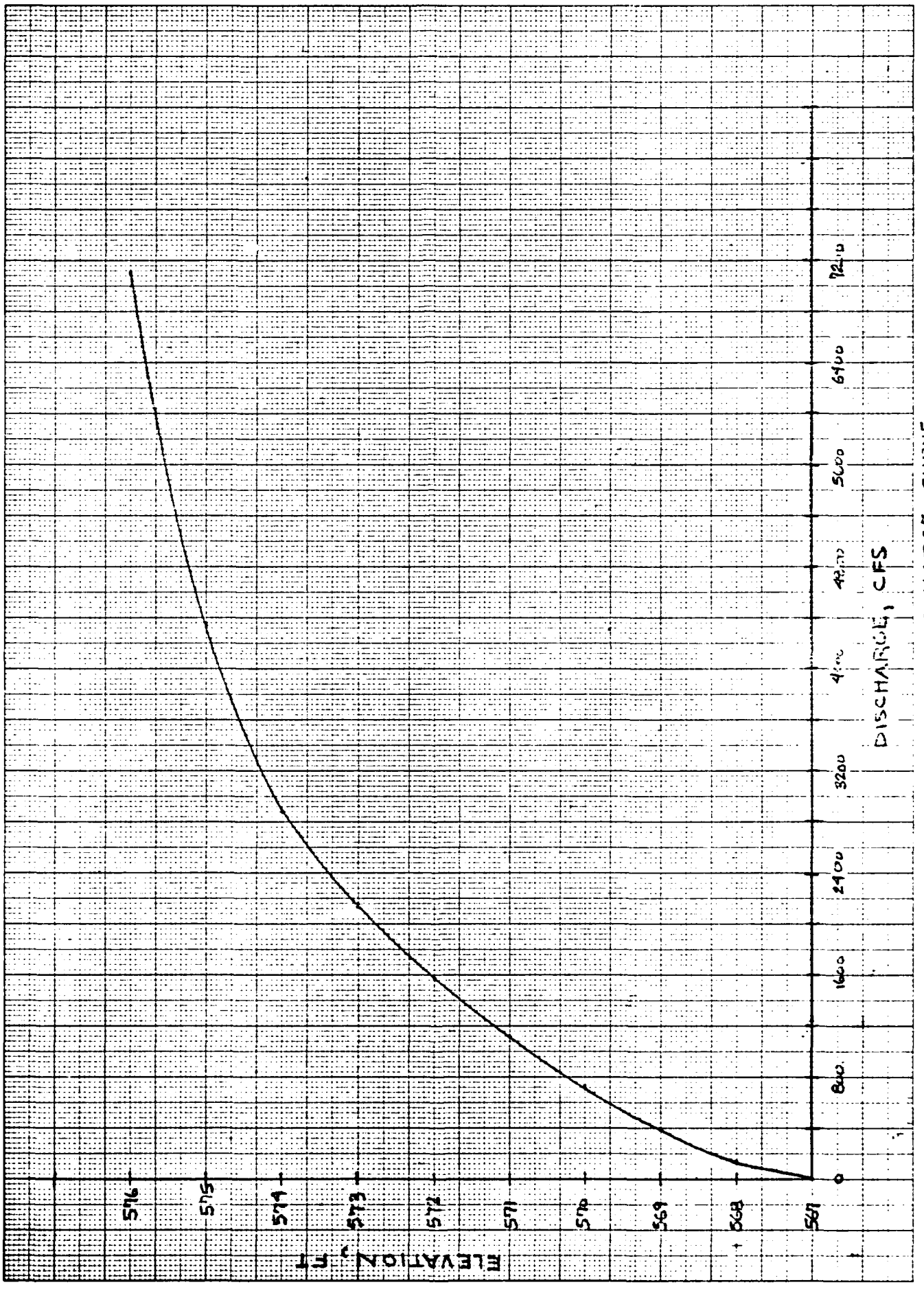
$Q_3 = C_3 L_3 H_3^{3/2}$
$3.5(40)$

$Q_4 = C_4 L_4 H_4^{3/2}$
$3.0(100)$

ELEV	568	569	570	571	572	573	574	575	576
					0	100	283	520	800
							0	492	1862
	0	190	396	727	1120	1565	2058	2593	3168	3780
							0	176	665
TOTAL	190	396	727	1120	1565	2158	2876	4356	7107

WHIGVILLE RES

KAC 1-22-80
PJB 2-14-80

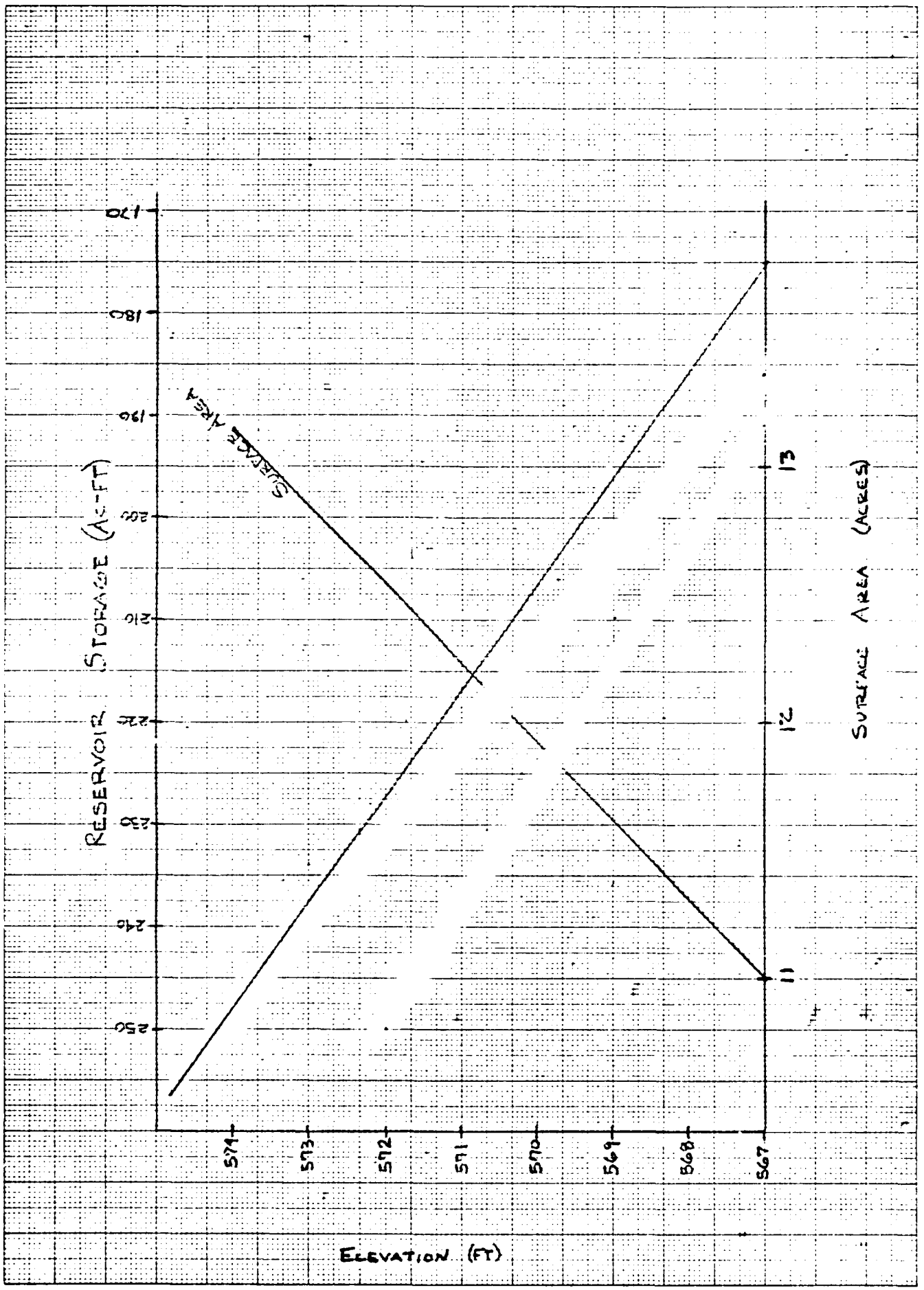


STAGE - DISCHARGE CURVE

D-7

WHIGVILLE RES.

RAC 1-23-80
2-14-80



WHIGVILLE RES. DAM PMF 799010 FLOOD ROUTING RAC FEB. 12, 1984

INPUT DATA: UNSUBMERGED WEIR

SEGMENT 1	DISCHARGE COEFFICIENT = 2.5	LENGTH OF WEIR = 40	ELEVATION OF WEIR = 572
SEGMENT 2	DISCHARGE COEFFICIENT = 3	LENGTH OF WEIR = 280	ELEVATION OF WEIR = 574.3
SEGMENT 3	DISCHARGE COEFFICIENT = 3.5	LENGTH OF WEIR = 40	ELEVATION OF WEIR = 567
SEGMENT 4	DISCHARGE COEFFICIENT = 3	LENGTH OF WEIR = 100	ELEVATION OF WEIR = 574.3

IE=567.0 IV= 0.0 E=567.0 A= 11.00 E=580.0 A= 15.00

HOUR	INFLOW	MASS INFLOW	WATER EL.	TAIL WATER	OUTFLOW	MASS OUTFLOW	STORAGE(R)	STORAGE(A)
0.00	0CFS	0.00AC-F	567.00FT	.00FT	0CFS	0.00AC-F	0.00AC-F	0.00AC-F
1.00	1,971CFS	81.44AC-F	570.61FT	0.00FT	960CFS	39.70AC-F	41.73AC-F	41.73AC-F
2.00	3,942CFS	325.78AC-F	574.68FT	0.00FT	3,696CFS	232.15AC-F	93.63AC-F	93.63AC-F
3.00	5,914CFS	733.05AC-F	575.58FT	0.00FT	5,865CFS	627.26AC-F	105.79AC-F	105.79AC-F
4.00	7,885CFS	1,303.26AC-F	576.19FT	0.00FT	7,731CFS	1,189.13AC-F	114.13AC-F	114.13AC-F
5.00	7,000CFS	1,918.34AC-F	576.03FT	0.00FT	7,207CFS	1,806.44AC-F	111.89AC-F	111.89AC-F
6.00	5,914CFS	2,451.98AC-F	575.58FT	0.00FT	5,855CFS	2,346.23AC-F	105.74AC-F	105.74AC-F
7.00	4,925CFS	2,899.87AC-F	575.29FT	0.00FT	5,077CFS	2,798.02AC-F	101.85AC-F	101.84AC-F
8.00	3,943CFS	3,266.32AC-F	574.81FT	0.00FT	3,947CFS	3,170.98AC-F	95.33AC-F	95.33AC-F
9.00	2,957CFS	3,551.44AC-F	574.30FT	0.00FT	3,115CFS	3,462.86AC-F	88.57AC-F	88.57AC-F
10.00	1,971CFS	3,755.08AC-F	573.06FT	0.00FT	2,203CFS	3,682.66AC-F	72.42AC-F	72.42AC-F
11.00	986CFS	3,877.27AC-F	571.36FT	0.00FT	1,274CFS	3,826.38AC-F	50.88AC-F	50.88AC-F
12.00	0CFS	3,918.01AC-F	568.99FT	0.00FT	395CFS	3,895.41AC-F	22.60AC-F	22.60AC-F

WHIGVILLE RES. DAM 1/2 PMF 799010 FLOOD ROUTING RAC FEB. 12, 198

INPUT DATA: UNSUBMERGED WEIR

SEGMENT 1	DISCHARGE COEFFICIENT =	2.5	LENGTH OF WEIR =	40	ELEVATION OF WEIR =	572
SEGMENT 2	DISCHARGE COEFFICIENT =	3	LENGTH OF WEIR =	280	ELEVATION OF WEIR =	574.3
SEGMENT 3	DISCHARGE COEFFICIENT =	3.5	LENGTH OF WEIR =	40	ELEVATION OF WEIR =	567
SEGMENT 4	DISCHARGE COEFFICIENT =	3	LENGTH OF WEIR =	100	ELEVATION OF WEIR =	574.3

IE=567.0 IV= 0.0 E=567.0 A= 11.00 E=580.0 A= 15.00

HOUR	INFLOW	MASS INFLOW	WATER EL.	TAIL WATER	OUTFLOW	MASS OUTFLOW	STORAGE(R)	STORAGE(A)
0.00	0CFS	0.00AC-F	567.00FT	.00FT	0CFS	0.00AC-F	0.00AC-F	0.00AC-F
1.00	986CFS	40.74AC-F	569.07FT	0.00FT	418CFS	17.27AC-F	23.47AC-F	23.47AC-F
2.00	1,971CFS	162.93AC-F	572.14FT	0.00FT	1,639CFS	102.27AC-F	60.65AC-F	60.65AC-F
3.00	2,957CFS	366.57AC-F	573.84FT	0.00FT	2,759CFS	284.03AC-F	82.53AC-F	82.53AC-F
4.00	3,942CFS	651.65AC-F	574.76FT	0.00FT	3,845CFS	556.99AC-F	94.66AC-F	94.66AC-F
5.00	3,500CFS	959.17AC-F	574.65FT	0.00FT	3,632CFS	866.00AC-F	93.17AC-F	93.17AC-F
6.00	2,957CFS	1,225.99AC-F	574.14FT	0.00FT	2,987CFS	1,139.54AC-F	86.44AC-F	86.44AC-F
7.00	2,462CFS	1,449.91AC-F	573.62FT	0.00FT	2,595CFS	1,370.26AC-F	79.65AC-F	79.64AC-F
8.00	1,972CFS	1,633.14AC-F	572.87FT	0.00FT	2,074CFS	1,563.23AC-F	69.90AC-F	69.90AC-F
9.00	1,478CFS	1,775.70AC-F	572.09FT	0.00FT	1,614CFS	1,715.63AC-F	60.06AC-F	60.06AC-F
10.00	985CFS	1,877.47AC-F	571.08FT	0.00FT	1,154CFS	1,830.02AC-F	47.45AC-F	47.45AC-F
11.00	493CFS	1,938.55AC-F	569.86FT	0.00FT	678CFS	1,905.77AC-F	32.77AC-F	32.77AC-F
12.00	0CFS	1,958.92AC-F	568.39FT	0.00FT	229CFS	1,943.32AC-F	15.60AC-F	15.60AC-F

WHIGVILLE RES. DAM 799010 RAC APRIL 11, 1980

FGA FLOOD WAVE ROUTING

APPROXIMATE FLOOD WAVE ROUTING BASED UPON U.S. ARMY CORPS OF ENGINEERS' "RULE OF THUMB GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS" DATED APRIL, 1978.

INITIAL STATION = 0 +0
INITIAL BASE FLOW = 2,761 CFS
INITIAL WAVE HEIGHT = 54.0 FT
ASSUMED BREACH WIDTH = 124.0 FT
INITIAL RESERVOIR STORAGE = 250 ACRE-FT
COMPUTED FLOOD WAVE PEAK FLOW = 82,679 CFS
TOTAL FLOOD WAVE PEAK FLOW = 85,440CFS

STATION 1+30

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.070			
-720.0 FT	600.0 FT	-480.0 FT	580.0 FT	-300.0 FT	570.0 FT
-40.0 FT	560.0 FT	-10.0 FT	525.0 FT		
		N = 0.050			
-10.0 FT	525.0 FT	-5.0 FT	523.0 FT	5.0 FT	523.0 FT
10.0 FT	525.0 FT				
		N = 0.070			
10.0 FT	525.0 FT	100.0 FT	530.0 FT	160.0 FT	540.0 FT
200.0 FT	550.0 FT	360.0 FT	600.0 FT		

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
181.9 SF	27.1 FT	0.070	15.8 FPS	2,881CFS
442.1 SF	20.7 FT	0.050	47.8 FPS	21,169CFS
2,328.7 SF	174.0 FT	0.070	25.0 FPS	58,436CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
523.0 FT	22.6 FT	545.6 FT	2,952 SF	27.9 FPS	82,486 CFS	0.0440

BASE FLOW = 2,761 CFS BASE STAGE = 528.7 FT.

STATION 10 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.070			
-530.0 FT	550.0 FT	-230.0 FT	500.0 FT	-20.0 FT	490.0 FT
-10.0 FT	488.0 FT				
		N = 0.050			
-10.0 FT	488.0 FT	-5.0 FT	486.0 FT	5.0 FT	486.0 FT
10.0 FT	488.0 FT				
		N = 0.070			
10.0 FT	488.0 FT	60.0 FT	490.0 FT	70.0 FT	500.0 FT
310.0 FT	530.0 FT	380.0 FT	540.0 FT	670.0 FT	540.0 FT
920.0 FT	550.0 FT				

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
1,850.1 SF	238.7 FT	0.070	17.2 FPS	31,891CFS
330.2 SF	20.7 FT	0.050	38.9 FPS	12,870CFS
817.0 SF	88.4 FT	0.070	19.3 FPS	15,833CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
486.0 FT	17.0 FT	503.0 FT	2,997 SF	20.2 FPS	60,594 CFS	0.0430

BASE FLOW = 2,761 CFS BASE STAGE = 491.3 FT.

STATION 21+70

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.070			
-950.0 FT	500.0 FT	-860.0 FT	490.0 FT	-730.0 FT	490.0 FT
-380.0 FT	490.0 FT	-80.0 FT	450.0 FT	-20.0 FT	440.0 FT
-10.0 FT	436.0 FT				
		N = 0.050			
-10.0 FT	436.0 FT	-5.0 FT	434.0 FT	5.0 FT	434.0 FT
10.0 FT	436.0 FT				
		N = 0.070			
10.0 FT	436.0 FT	30.0 FT	440.0 FT	300.0 FT	450.0 FT
400.0 FT	460.0 FT	690.0 FT	470.0 FT	780.0 FT	490.0 FT
1210.0 FT	500.0 FT				

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
443.6 SF	74.1 FT	0.070	14.6 FPS	6,512CFS
316.6 SF	20.7 FT	0.050	38.3 FPS	12,135CFS
1,686.6 SF	293.9 FT	0.070	14.2 FPS	24,074CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
434.0 FT	16.3 FT	450.3 FT	2,446 SF	17.4 FPS	42,722 CFS	0.0440

BASE FLOW = 2,761 CFS BASE STAGE = 440.3 FT.

STATION 31+30

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.070			
-1200.0 FT	460.0 FT	-880.0 FT	430.0 FT	-470.0 FT	430.0 FT
-400.0 FT	420.0 FT	-40.0 FT	410.0 FT	-10.0 FT	408.0 FT
		N = 0.050			
-10.0 FT	408.0 FT	-5.0 FT	406.0 FT	5.0 FT	406.0 FT
10.0 FT	408.0 FT				
		N = 0.070			
10.0 FT	408.0 FT	70.0 FT	410.0 FT	310.0 FT	430.0 FT
1000.0 FT	440.0 FT	1270.0 FT	450.0 FT	1330.0 FT	460.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
1,455.9 SF	321.9 FT	0.070	9.8 FPS	14,392CFS
232.1 SF	20.7 FT	0.050	25.2 FPS	5,872CFS
940.6 SF	157.6 FT	0.070	11.8 FPS	11,186CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
406.0 FT	12.1 FT	418.1 FT	2,628 SF	11.9 FPS	31,450 CFS	0.0290

BASE FLOW = 2,761 CFS BASE STAGE = 411.4 FT.

STATION 36 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.070			
-2000.0 FT	440.0 FT	-1800.0 FT	430.0 FT	-1700.0 FT	420.0 FT
-1400.0 FT	420.0 FT	-1000.0 FT	410.0 FT	-950.0 FT	400.0 FT
-600.0 FT	400.0 FT	-400.0 FT	390.0 FT	-200.0 FT	390.0 FT
-5.0 FT	387.0 FT				
		N = 0.050			
-5.0 FT	387.0 FT	5.0 FT	387.0 FT		
		N = 0.070			
5.0 FT	387.0 FT	100.0 FT	390.0 FT	125.0 FT	400.0 FT
250.0 FT	420.0 FT	950.0 FT	420.0 FT	2150.0 FT	420.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
1,896.6 SF	469.3 FT	0.070	10.7 FPS	20,428CFS
67.1 SF	10.0 FT	0.050	21.1 FPS	1,419CFS
512.3 SF	105.0 FT	0.070	12.2 FPS	6,256CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
387.0 FT	6.7 FT	393.7 FT	2,476 SF	11.3 FPS	28,105 CFS	0.0400

BASE FLOW = 2,761 CFS BASE STAGE = 390.1 FT.

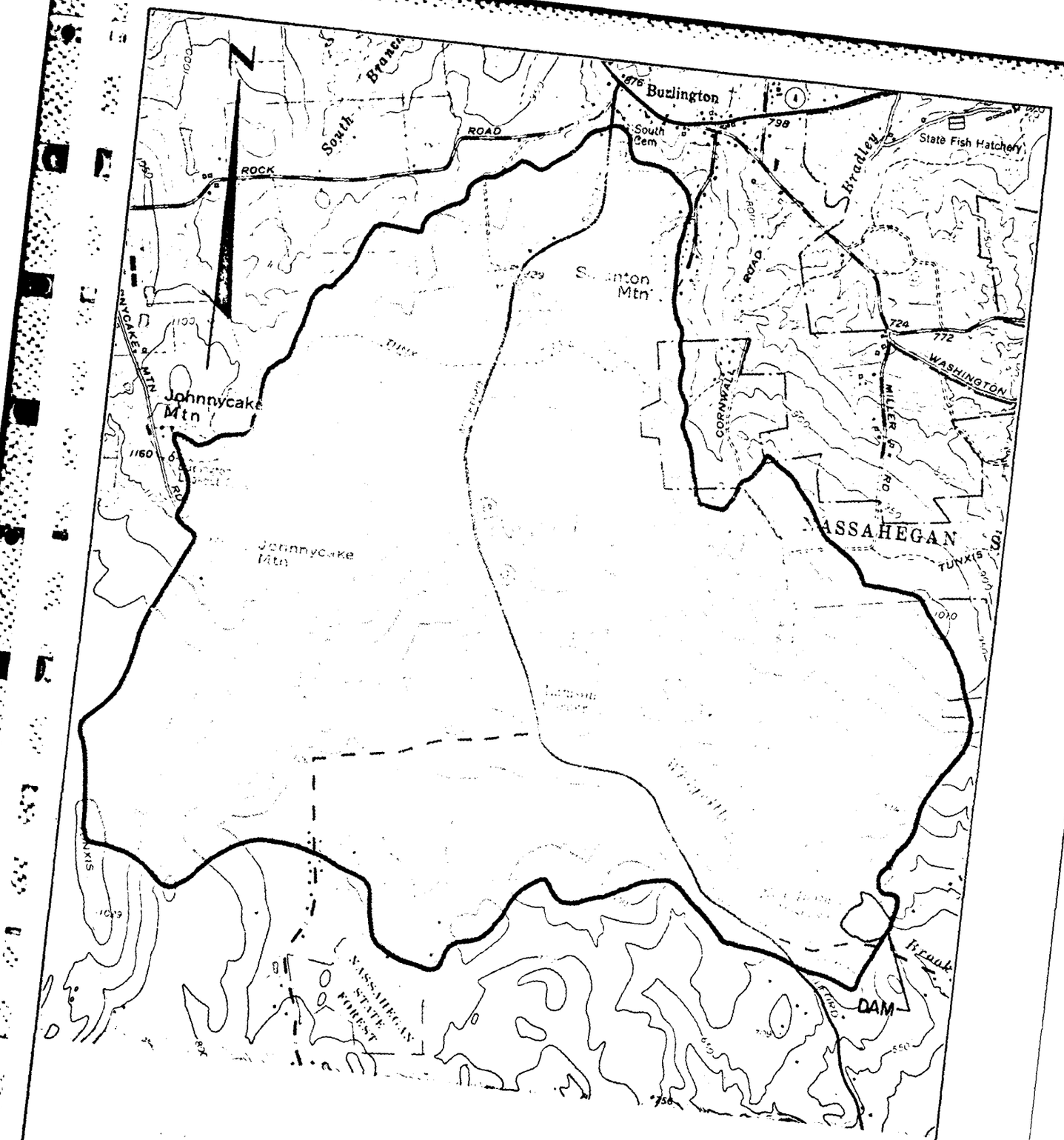
STATION 43 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.070			
-2020.0 FT	410.0 FT	-1900.0 FT	400.0 FT	-1600.0 FT	380.0 FT
-10.0 FT	370.0 FT				
		N = 0.050			
-10 0 FT	370.0 FT	-5.0 FT	368.0 FT	5.0 FT	368.0 FT
10.0 FT	370.0 FT				
		N = 0.070			
10.0 FT	370.0 FT	270.0 FT	370.0 FT	750.0 FT	370.0 FT
1500.0 FT	370.0 FT	2250.0 FT	400.0 FT	2600.0 FT	450.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
335.6 SF	326.7 FT	0.070	3.8 FPS	1,297CFS
71.0 SF	20.7 FT	0.050	12.0 FPS	858CFS
3,114.4 SF	1541.4 FT	0.070	6.0 FPS	18,902CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
368.0 FT	4.0 FT	372.0 FT	3,521 SF	5.9 FPS	21,058 CFS	0.0320

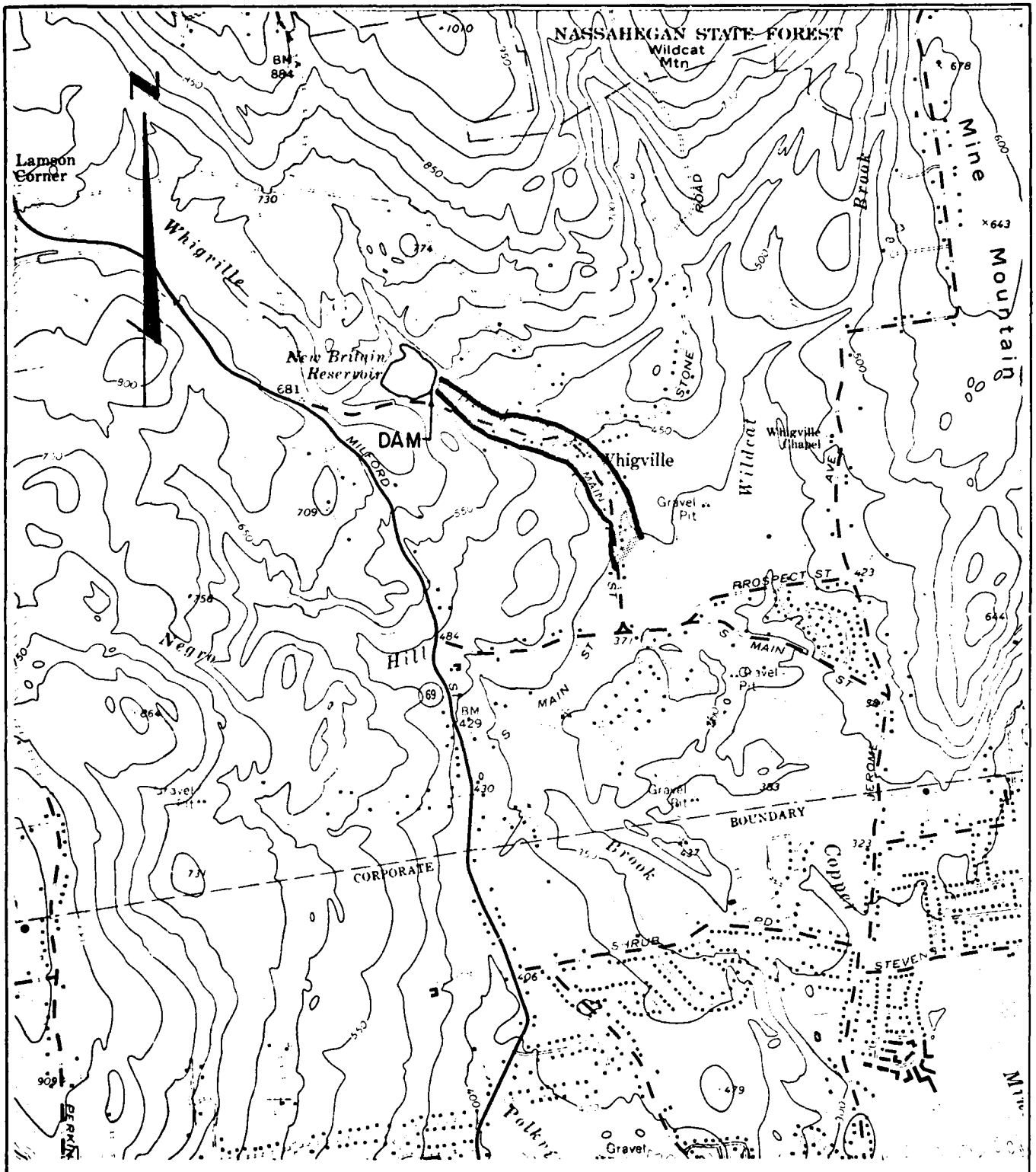
BASE FLOW = 2,761 CFS BASE STAGE = 370.5 FT.



WHIGVILLE RESERVOIR DAM
DRAINAGE MAP
BURLINGTON, CONNECTICUT

FLAHERTY • GIAVARA ASSOCIATES, P.C.

D-17



WHIGVILLE RESERVOIR DAM

DAM FAILURE ANALYSIS

IMPACT AREA

BURLINGTON , CONNECTICUT

FLAHERTY • GIAVARA ASSOCIATES, P.C.

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS