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NATIONAL DAM INSPECTION PROGRAM. VALLEY VIEW LAKE DAM (NDI ID N--ETC(U)
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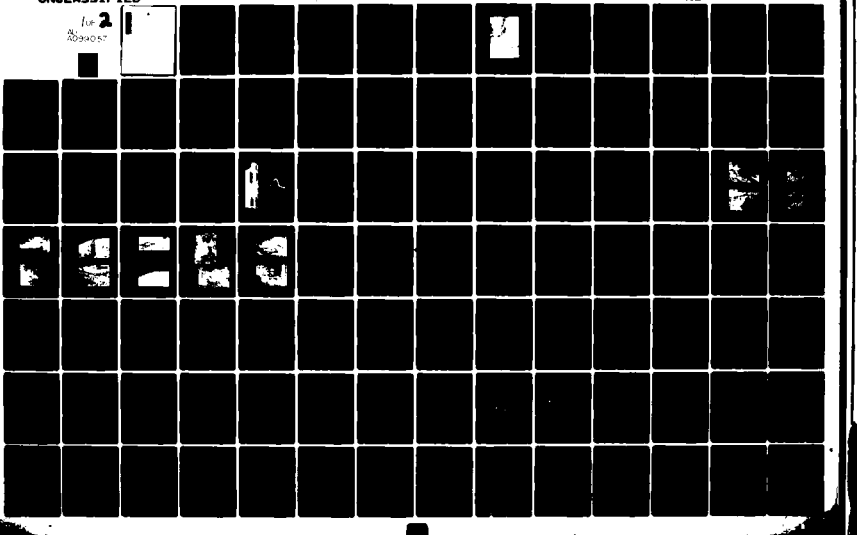


SUSQUEHANNA RIVER BASIN

TRIB. TO LITTLE FISHING CREEK, COLUMBIA COUNTY

PENNSYLVANIA

VALLEY VIEW LAKE DAM

NDI ID No. PA-01006
DER ID No. 19-75

VALLEY VIEW LAKE ASSOCIATION

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

Prepared By:

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

FEBRUARY 1981

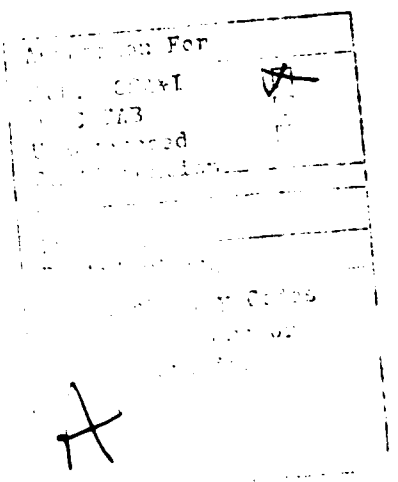
PREFACE

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.

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 design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design 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.



NDI ID No. PA-01006, DER ID No. 19-75

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

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APPENDICES

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION AND RECOMMENDED ACTION

NAME OF DAM:	Valley View Lake Dam NDI ID No. PA 01006 DER ID No. 19-75
SIZE:	Small (20 feet high; 72 acre-feet)
HAZARD CLASSIFICATION:	High
OWNER:	Valley View Lake Association Millville, PA
STATE LOCATED:	Pennsylvania
COUNTY LOCATED:	Columbia
STREAM:	Tributary of Little Fishing Creek
DATE OF INSPECTION:	2 Dec 80

The visual inspection and review of available design and construction data indicate that Valley View Lake Dam is in poor condition. The deteriorated condition of the spillway walls, severe erosion of the spillway discharge channel, and seepage observed at the downstream toe are the primary deficiencies which cause concern for the safety of this facility. The dam in its present condition is considered to be unsafe, non-emergency.

The hydrologic and hydraulic computations indicate that the combination of reservoir storage and spillway discharge capacity will pass only 32% of the PMF prior to overtopping the embankment. Overtopping the dam could cause failure, which would lead to a significant increase in downstream loss of life and property damage. Therefore, the spillway for Valley View Lake Dam is considered to be seriously inadequate.

The following measures ~~are~~ recommended for immediate action: are listed

1. The owner should immediately retain a qualified professional engineer, experienced in dam design and construction, to determine remedial measures necessary for the damaged spillway and discharge channel, and to investigate means for providing adequate spillway capacity for this facility.

2. The seepage near the left abutment should be closely monitored, and appropriate remedial measures taken if any turbidity or significant increase in flow is noted.

3. The erosion of the ditch along the left abutment contact on the downstream side of the embankment should be monitored, along with the associated minor cracking occurring adjacent to the ditch. Appropriate remedial measures should be taken if the condition worsens significantly.

4. The drop inlet should be provided with some form of protection from floating debris.

5. The bridge across the spillway should be removed or rehabilitated such that it will have no adverse impact on the spillway structure.

6. The upstream embankment face should be provided with adequate riprap protection.

7. The operational adequacy of the existing plug or valve on the upstream end of the outlet pipe should be verified.

8. A formal surveillance and downstream emergency warning system should be developed for use during periods of heavy or prolonged precipitation.

9. An operation and maintenance manual or plan should be prepared for use as a guide in the operation of the dam during normal and emergency conditions.

10. A schedule of regular inspection by a qualified engineer should be developed.

APPROVED BY:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS

James Peck

DATE: 9 APR 81

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

VALLEY VIEW LAKE DAM

OVERVIEW

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

VALLEY VIEW LAKE DAM

NDI ID No. PA01006
DER ID No. 19-75

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of non-federal dams throughout the United States.

b. Purpose. The purpose of this inspection is to determine if the dam constitutes a hazard to human life and property.

1.2 Description of Project.

a. Description of Dam and Appurtenances. Valley View Lake Dam is an earthfill structure approximately 20 feet high and 380 feet in length (including spillway). The spillway is an uncontrolled broad-crested weir located at the right abutment. A roadway bridge, no longer in service, spans the spillway, which has a length of 20 feet between two concrete walls. The outlet works consists of a 10 inch diameter concrete encased corrugated metal pipe (CMP) extending through the embankment, having a 15 or 18 inch diameter CMP drop inlet on the reservoir side. The drop inlet has a crest elevation of 656.0 which is 0.75 feet below the spillway crest elevation.

Available records indicate that the original design called for a dam height of 21.7 feet, with an overall length of 265 feet. The dam was to have a clay core, and the upstream slope was to be protected by riprap. The 10-inch outlet pipe was to be encased in 6 inches of concrete, with an anti-seep ring near the center of the embankment. The spillway bridge was not included in the original design.

Normal inflow is discharged through the outlet works.

b. Location. Greenwood Township, Columbia County
U.S.G.S. Quadrangle - Millville.
Latitude 41° 7.1' and Longitude 76° 31.0'
Ref. Appendix E, Plates I & II.

c. Size Classification: Small: Height - 20.1 feet, Storage - 72 Acre-feet.

d. Hazard Classification: High (Refer to Section 3.1.E)

e. Ownership: Valley View Lake Association, c/o Jacob Kessler, Secretary/Tresurer R.D. #2, Millville, Pennsylvania 17846

f. Purpose: Recreation

g. Design and Construction History: The design and construction of the dam were both apparently accomplished primarily by Mr. Ernest Albertson, the original owner. Mr. Albertson was assisted by a Mr. Fought, who reportedly had some previous experience in the construction of small dams for the U.S. Soil Conservation Service.

A permit for construction of the dam was issued by the Pennsylvania Department of Environmental Resources (PennDER) on 30 June 1958, and construction was reported to be complete by Mr. Albertson on 16 August 1960.

During construction (6 November 1958), a PennDER inspector recommended that a change be made in the alignment of the spillway discharge channel to prevent erosion of the toe of the embankment. In a later PennDER inspection report dated 28 October 1959, it was stated that heavy rainfall just prior to the inspection had caused the predicted erosion to occur. Mr. Albertson was advised to place large boulders in the discharge channel and place a concrete apron just below the spillway. On 16 August 1960 Mr. Albertson advised PennDER that all requested work had been done and the dam was complete.

The PennDER permit for the dam was officially assigned to the Valley View Lake Association on 14 March 1969.

h. Normal Operating Procedure. The reservoir is normally maintained at the crest of the drop inlet. Inflow which exceeds the capacity of the drop inlet will be stored until reaching the uncontrolled spillway elevation.

1.3 Pertinent Data.

a. Drainage Area (square miles)

From files:	0.52
Computed for this report:	0.52
Use:	0.52

b. Discharge at Damsite (cubic feet per second)

Maximum known flood	unknown
Outlet works with maximum pool (El. 660.2)	12
Spillway with maximum pool (El. 660.2)	420

c. Elevations (feet above mean sea level)

Top of Dam	
Design	661.25
Existing (low point as surveyed)	660.20
Normal pool (design drop inlet crest)	656.00
Spillway Crest (used as datum)	
Design	656.75
Existing	656.75
Outlet Works	
Upstream portal invert (design)	641.5
Crest of Drop Inlet	
Design	656.0
Existing	656 (Estimated)
Downstream portal invert	
Design	639.6 ±
Existing	641.9
Streambed at toe	640.1

d. Reservoir Length (feet)

Normal pool (El. 656.00)	1500
Spillway crest (El. 656.75)	1600
Maximum pool (El. 660.2)	1800

e. Storage (acre-feet)

Normal pool (El. 656.00)	30
Spillway crest (El. 656.75)	35
Maximum pool (El. 660.2)	72

f. Reservoir Surface (acres)

Normal pool (El. 656.00)	9.0
Spillway crest (El. 656.75)	9.5
Maximum pool (El. 660.2)	13.0

g. Dam

Note: Refer to plates in Appendix E for plans and sections.

Type	Earthfill w/clay core
Length	380 feet (incl. spillway)
Top Width	10 feet (as surveyed; 12 feet design)

g. Dam (Cont'd):

Height	20.1 feet (as surveyed; low pt. to d/s toe)
Side Slopes	
Upstream	1V:3H
Downstream	1V:3H
Zoning	8 foot wide clay core to El. 656.0 (design)
Cutoff	Clay core designed to extend to solid shale; 4 feet below existing ground.
Grouting	None reported.

h. Outlet Works.

Type	Ten-inch diameter concrete encased corrugated metal pipe through embankment for pond drain; attached 15 or 18 inch corrugated metal pipe as a drop inlet.
Closure	Glass bottle on upstream end, no control on drop inlet.

i. Spillway

Type	Uncontrolled, rectangular concrete broad crested weir
Location	Right end of dam
Length	20 feet
Crest Elevation	656.75 (from design dwgs.)
Freeboard	3.5 feet

i. Spillway (Cont'd):

Approach Channel	Reservoir
Downstream Channel	Earth and Rock
Bridge	Low steel at elev 660.55, no piers

SECTION 2

ENGINEERING DATA

2.1 Design.

The available data for Valley View Lake Dam consist of files provided by PennDER. Information available includes a permit application report with a general description of the proposed design, PennDER inspection reports, various related correspondence, and line sketches dated April and May 1958 showing a cross-section, general plan, and longitudinal section of the proposed dam.

No other plans or design details are known to exist.

2.2 Construction.

Information relative to the construction of the dam consists of PennDER inspection reports dated 6 November 1958, 6 July 1959, and 28 October 1959.

These reports indicate that the overall construction of the dam was satisfactory; however, the potential erosion problems with the alignment of the spillway discharge channel being so close to the toe of the embankment were noted. The original owner was to have corrected this problem by protecting the channel with large boulders and placing a concrete apron at the downstream side of the spillway.

The July 6, 1959 report also indicates that riprap was placed on the upstream slope.

2.3 Operation

No formal records of operation or maintenance exist. Members of the Lake Association live in homes surrounding the lake and are responsible for operation and maintenance of the facility. Mr. Jacob Kessler, Secretary-Treasurer of the Association, stated that to his knowledge the greatest spillway flow occurred during Tropical Storm Agnes in 1972 when the lake rose to within approximately one foot of the dam crest.

Mr. Kessler did not recall any riprap ever being visible on the upstream slope of the dam.

The most recent PennDER inspection (May 1964) indicated that the dam was in satisfactory condition.

2.4 Evaluation

a. Availability. All available written information was contained in the permit files provided by PennDER.

b. Adequacy. The available data, including that collected during the recent detailed visual inspection, are considered to be adequate to make a reasonable assessment of the dam.

SECTION 3

VISUAL OBSERVATIONS

3.1 Observations.

a. General. The overall condition of the dam and its appurtenances is poor.

Noteworthy deficiencies are described briefly below. The visual inspection checklist and field sketch are presented in Appendix A of this report. Photographs taken during the inspection are reproduced in Appendix C.

The reservoir pool was approximately 0.2 feet above normal pool (El. 656.00) on the day of the inspection, 2 December 1980. The owner's representative was not present during the inspection but was interviewed at his nearby residence.

b. Embankment. The horizontal alignment of the dam is good; however a crack, about 40 feet long, is forming on the downstream face near the left abutment. The junction of the dam and left downstream abutment form a drainage channel which is eroding and causing the adjacent embankment to slough sufficiently to form the crack. A large clump of briars is growing upslope of the crack. The downstream face and the upper 18 inches of the upstream face are grass covered. The crest, which is used as a roadway, and the remainder of the upstream face are covered with small gravel and shale bedding respectively. Trees and brush are growing along the downstream abutment contacts. Clear seepage is flowing at the rate of about 8 gpm from two locations at the toe between the midpoint of the dam and the left abutment contact. The source is unknown but may be springs since the lake is reported to be spring-fed. The vertical alignment of the crest is fair, with a maximum variation of 0.7 feet; however the low point which is located at the dam's right center is one foot below the design crest elevation of 661.25.

c. Appurtenant Structures. The location of the outlet works and the spillway are shown on the field sketch in Appendix A. The spillway approach channel is the reservoir with approximately the first 20 feet being grass covered. The spillway slab and walls are cracked and in poor condition. The left spillway wall is separated from the upstream wingwall and is tilting. Based on photographs in PennDER files, the right spillway wall was originally constructed to the same height as the left wall. Sometime after April 1964 the right wall was raised about 3 feet by placing concrete block with mortared joints on top of the existing wall. A 4 foot high by 6 foot long triangular section of this concrete block has failed. The remaining concrete block is leaning and separating at the mortared joints. The upstream end of the original concrete wingwall is also seriously cracked and leaning. Concrete in the form of a bulge is visible beneath the bridge and acts as a buttress for the right wall. The spillway walls and slab end approximately 4 feet downstream of the bridge. Material from the right abutment is covering a portion of the right side of the slab to a maximum depth of 2 feet.

The area immediately downstream of the spillway slab is filled with dumped trees, brush and leaves which prevent a thorough inspection of the area. This debris was probed and it is apparent that erosion has created a 12 to 15 foot vertical drop from the spillway slab. The depth of the observed undercutting of the slab could not be determined due to the heavy debris. The right side of the discharge channel has a near vertical slope in weathered shale to a height of 8 feet for the first 50 feet before becoming steeply sloping earth. The initial 50 feet of the channel bottom is also cut into bedrock. Further downstream the bottom is lined with fragments of bedrock that have eroded from the upper portion. Erosion of the left side of the discharge channel is removing material from the dam embankment. Several large pieces of broken concrete line the upper portion of the channel slope but afford little protection. As the channel turns and parallels the toe of the dam, the left side is eroded on a slope of 4V on 3H to a height of 5 feet.

The discharge end of the 10 inch diameter outlet conduit and the top of the drop inlet are the only portions of the outlet works that were observed. The drop inlet is uncontrolled and appears to be about a 15 or 18 inch diameter corrugated metal pipe. A trashrack consisting of several metal rods attached to the pipe has collected some debris which was partially obstructing flow. On the day of inspection the structure was operating with approximately 0.2 feet of head. The outlet pipe projects 15 inches from the concrete encasement which in turn projects 2 feet from the embankment. The pipe is in fair condition. It should be noted that the design drawings show a 10 or 12 inch steel oil line placed on a concrete cradle and encased in 6 inches of concrete. The outlet pipe discharges into a small plunge pool, which is lined with 4-10 inch rock. Minor erosion is in evidence adjacent to the embankment. The earth lined discharge channel parallels the toe for a short distance before joining the natural streambed.

d. Reservoir Area. The reservoir slopes are moderate to steep and appear stable. Several residences are at various elevations around the entire perimeter of the lake.

e. Downstream Channel. The downstream channel is cut in earth and flows through meadowland in a relatively narrow floodplain for the first 1,000 feet. The floodplain then begins to widen and the stream crosses two local roads. Approximately 4,200 feet downstream from the dam, the stream crosses Pa. Route 42. Two houses are located adjacent to the stream 500 feet further downstream. The proximity of these residences to the stream constitutes a high hazard to loss of life should the dam fail.

f. Evaluation. The poor condition of the spillway walls and the severe erosion of the spillway discharge channel cause concern for the stability of the dam during high spillway discharges. Failure of the spillway walls could block the spillway and seriously reduce its capacity. The seepage at the toe causes less concern since no fines are being transported at this time; however this condition should be monitored. In addition, the erosion of the ditch along the left downstream abutment contact should be controlled and the crack monitored.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Normal Operating Procedure. The lake is maintained at the level of the drop inlet, elevation 656.0. Inflow in excess of the capacity of the drop inlet is stored until the pool level reaches elevation 656.75, the spillway crest. Above this elevation spillway flow begins and discharges into an unnamed tributary of Little Fishing Creek. No formal operations manual exists.

4.2 Maintenance of Dam. The overall condition of the dam and appurtenances as observed by the inspection team was poor. The drop inlet was operating but had become partially obstructed by debris covering a portion of the inlet pipe. The spillway structure has deteriorated and the walls have tilted to a degree that now requires corrective action. Basic maintenance such as mowing the embankment and removing brush and trees has generally been performed. No formal maintenance manual exists.

4.3 Maintenance of Operating Facility. See Section 4.2 above.

4.4 Warning System. No formal warning system exists.

4.5 Evaluation. Overall maintenance of the facility appears to be inadequate at this time. The spillway has undergone significant deterioration, especially the wingwalls and spillway exit channel immediately downstream of the spillway crest. Investigation as to the type of closure on the drawdown facility should be determined and reviewed for adequacy and ease of operation under extreme conditions. Formal operation and maintenance manuals are recommended to ensure that all needed maintenance is identified and performed regularly. In addition, a formal warning system for the protection of downstream inhabitants should be developed. Included in the plan should be provisions for around-the-clock surveillance of the facility during periods of unusually heavy precipitation.

SECTION 5

HYDROLOGIC/HYDRAULIC EVALUATION

5.1 Design Data. No design reports, calculations or miscellaneous design data are known to exist for the facility. However, a suggested design spillway outlet capacity of 500 cfs was found in the PennDER files dated May 1958.

5.2 Experience Data. Records of reservoir levels and/or spillway discharges are not available. Overtoppings are not known to have occurred. Records of past performance are limited to the verbal report by the owner's representative concerning the June 1972 flood event.

5.3 Visual Observations. On the date of the inspection, conditions were present that may prevent the facility from operating as designed during a flood event. The spillway walls have deteriorated and are now leaning into the spillway opening. Immediately, downstream of the spillway slab, erosion has scoured out portions of the downstream channel adjacent to the embankment. This area had been filled with leaves and brush. Although this material presents no obstruction to flow, it did prevent a thorough inspection of the outlet channel. See Exhibit A-1 of Appendix A.

5.4 Method of Analysis. The facility has been analyzed in accordance with procedures and guidelines established by the U.S. Army, Corps of Engineers, Baltimore District for Phase I hydrologic and hydraulic evaluations. This analysis has been performed using a modified version of the HEC-1 program developed by the U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, California. Capabilities of the program are briefly outlined in the preface contained in Appendix D.

5.5 Summary of Analysis.

a. Spillway Design Flood (SDF). In accordance with the procedures and guidelines contained in the National Guidelines for Safety Inspection of Dams for Phase I Investigations, the SDF for Valley View Lake Dam ranges between one-half the Probable Maximum Flood (PMF) and the full PMF. This classification is based on the relative size of the dam (small), and the potential hazard of dam failure to downstream development (high). Due to the small storage (approximately 70 ac-ft) and small height (20 feet) the SDF selected was one-half PMF.

b. Results of the Analysis. Valley View Lake Dam was evaluated under near-normal operating conditions. The starting lake elevation was set at the drop inlet crest, El. 656.0, and the 20 foot wide emergency spillway is at elevation 656.75. The spillway crest to top of dam (low point) has a freeboard of approximately 3.5 feet. Flood hydrographs and spillway calculations were developed and the following results were obtained.

Spillway Capacity at Top of Dam	370 CFS
Peak SDF (1/2 PMF) Inflow	650 CFS

The overtopping analysis (using HEC-1DB) indicated that the discharge/storage capacity of Valley View Lake Dam is 32% of the PMF prior to overtopping the embankment. Under one-half PMF conditions, the dam is overtopped for 4.0 hours to a maximum depth of 0.8 feet. Since the SDF for this dam is one-half PMF, it can be concluded that Valley View Lake Dam has a high potential for overtopping, and thus, for breaching by floods of less than SDF magnitude.

To determine if the spillway is seriously inadequate, these conditions must be met:

(i) There is a high hazard to loss of life from large flows downstream of the dam.

(ii) The spillway is not capable of passing one-half PMF without overtopping the dam and causing failure.

(iii) Dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream of the dam from that which would exist just before overtopping.

Since Valley View Lake Dam meets the first two conditions, the third condition must be evaluated and therefore, a breach analysis was performed.

The modified HEC-1, computer program was used for the breaching analysis. The computer program requires that a failure elevation be given to the model so that failure may commence. It was assumed that the dam could withstand up to 0.5 feet of overtopping for short durations. Therefore, the water surface elevation selected to cause failure was elevation 660.7.

Four breach models were analyzed under conditions that would approximate 0.5 feet of overtopping. The flood selected to cause breaching was 42% of the PMF. Of the four plans, Plan 1 was a non-breach analysis used to provide a means of direct comparison between failure and non-failure conditions at downstream locations for the same flood event. Failure times in the three remaining plans were 0.33 hr (Plan 2), 1.00 hr (Plan 3), and 2.00 hrs (Plan 4). Downstream damage elevations and locations are shown in Appendix D and E of this report. Page D-14 of Appendix D, provides peak outflows and changes in stage at downstream damage centers. As indicated in the table, failure conditions significantly increase the hazard to loss of life when compared to non-failure conditions. Breach geometry and location are also discussed in Appendix D.

5.6 Spillway Adequacy. Under existing conditions Valley View Lake Dam can accommodate 32% of the PMF prior to overtopping. Should an event in excess of this occur, the dam would be overtopped and could possibly fail. Since the failure of this dam increases the hazard to loss of life or property damage at existing downstream residences, this spillway is considered to be seriously inadequate. The dam can accommodate 47% of the PMF if the embankment is raised to the design elevation of 661.25.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

(1) Embankment. Visual observations of Valley View Lake Dam indicate that the dam and appurtenances are in poor condition. The embankment is apparently constructed of random earth. Surface soil on the upstream slope was visually classified as silt, ML; soil on the downstream slope was visually classified as clay, CL. The upstream and downstream slopes measured 3H:1V as designed; however, the crest width measured 10 feet which is 2 feet less than design. There is no riprap on the upstream embankment face even though there appears to be bedding below the water. A footpath of shale, approximately 4 feet wide, along the upstream face may offer some resistance to erosion. No erosion was noted on the upstream slope. Drainage from the ditch located at the downstream left abutment contact is causing erosion of the embankment toe. The embankment adjacent to the ditch is wet and shows signs of movement. There appears to be a crack developing in the embankment parallel to the drainage ditch and approximately 8 feet away. The right downstream embankment toe is being eroded by spillway discharges since the spillway channel is at the abutment contact. Erosion has steepened some areas of the embankment toe to a slope of 3H:4V. Clear seepage was observed at the toe and left downstream abutment contact with a combined discharge of approximately 8 gpm.

(2) Appurtenant Structures. The spillway is in poor condition. Both walls are leaning inward. A portion of the upstream end of the right wall has collapsed. A bridge for limited vehicle traffic spans the spillway and rests on both walls, which contributes to the instability of these walls.

The spillway channel lacks protection and has experienced a large amount of erosion in the weathered shale exposed in the first 50 feet of the channel. The downstream end of the spillway slab has been undetermined and a near vertical 12 to 15 foot drop has been caused by erosion.

b. Design and Construction Data

(1) Embankment. Design and construction data consist of several sketches, a permit application, and several letters. No stability analyses, permeability tests, or soil strength tests are known to have been performed. Three test pits were dug in the dam foundation and show loam overlying clay which overlies shale. The dam was designed to have an 8 foot wide clay core excavated to shale and a top elevation 656.0. The permit application indicates that the embankment was to be placed and compacted in 4 inch lifts, have a crest width of 12 feet and up and downstream slopes of 3H:1V. The upstream slope was riprapped for protection.

(2) Appurtenant Structures. Design and construction data are listed in paragraph 6.1b(1). The existing outlet works consists of a concrete

encased 10 inch CMP sealed on the upstream end. It is in fair condition. A 15 or 18 inch vertical pipe is connected to the 10 inch CMP. The spillway located at the right end of the embankment is constructed of concrete, located on natural ground, and designed to have upstream and downstream cutoffs. Eight inch stones were to be placed in the downstream spillway channel for the first 20 feet.

c. Operating Records. None.

d. Post Construction Changes. No changes have been reported to PennDER; however, changes have been made. A bridge was constructed over the spillway. The trash rack originally provided for the drop inlet has been replaced. Riprap originally placed on the upstream slope has been removed.

e. Seismic Stability. The embankment is located in Seismic Zone 1 and is considered to be statically stable. Normally, it can be considered that if a dam located in this zone is stable under static conditions, it can be assumed safe under minor earthquake conditions. The spillway walls do not appear to be stable and could possibly fail with earthquake loading.

SECTION 7

ASSESSMENT AND RECOMMENDATIONS

7.1 Dam Assessment

a. Safety. The visual inspection and review of available design and construction data indicate that Valley View Lake Dam is in poor condition. The deteriorated condition of the spillway walls, severe erosion of the spillway discharge channel, seepage observed at the downstream toe, and limited spillway capacity are the primary deficiencies which cause concern for the safety of this facility. The dam in its present condition is considered to be unsafe, non-emergency.

The hydrologic and hydraulic computations indicate that the combination of reservoir storage and spillway discharge capacity will pass only 32% of the PMF prior to overtopping the embankment. Therefore, in accordance with the criteria outlined and evaluated in Section 5.5, the spillway for Valley View Lake Dam is considered to be seriously inadequate.

b. Adequacy of Information. The design and construction data contained in PennDER files in conjunction with data collected during the recent visual inspection, are considered to be adequate for making a reasonable assessment of this dam.

c. Urgency. The recommendations presented below should be implemented immediately.

d. Necessity for Additional Studies. The results of this inspection indicate a need for additional studies to provide an adequate spillway facility for this dam, including design of necessary remedial measures for the existing wingwalls and discharge channel.

7.2 Recommendations.

1. The owner should immediately retain a qualified professional engineer, experienced in dam design and construction, to determine remedial measures necessary for the damaged spillway and discharge channel, and to investigate means for providing adequate spillway capacity for this facility.

2. The seepage near the left abutment should be closely monitored, and appropriate remedial measures taken if any turbidity or significant increase in flow is noted.

3. The erosion of the ditch along the left abutment contact on the downstream side of the embankment should be monitored, along with the associated minor cracking occurring adjacent to the ditch. Appropriate remedial measures should be taken if the condition worsens significantly.

4. The drop inlet should be provided with some form of protection from floating debris.

5. The bridge across the spillway should be removed or rehabilitated such that it will have no adverse impact on the spillway structure.

6. The upstream embankment face should be provided with adequate riprap protection.

7. The operational adequacy of the existing plug or valve on the upstream end of the outlet pipe should be verified.

8. A formal surveillance and downstream emergency warning system should be developed for use during periods of heavy or prolonged precipitation.

9. An operation and maintenance manual or plan should be prepared for use as a guide in the operation of the dam during normal and emergency conditions.

10. A schedule of regular inspection by a qualified engineer should be developed.

APPENDIX A

CHECKLIST - VISUAL INSPECTION

Check List
Visual Inspection
Phase 1

Name Dam Valley View Lake Dam County Columbia State Pennsylvania

Date(s) Inspection 2 Dec 80 Weather Sunny Temperature 50°

Pool Elevation at Time of Inspection 656.2 M.S.L. Tailwater at Time of Inspection 640.2 M.S.L.

Inspection Personnel:

J. Bianco (COE)
B. Cortright (COE)
J. Evans (COE)
E. Hecker (COE)
D. Kahler (PennDER)

B. Cortright Recorder

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS
Any noticeable seepage	A total of approximately 8 gpm of clear seepage is flowing from two locations at the toe. See Exhibit A-1 for location. Source could be springs but further monitoring is needed.
Junction of Embankment With: Abutments Spillway	Drainage along downstream left junction has created ditch which is eroding and causing a crack to form in embankment (see below). Left spillway wall is leaning in toward spillway but present effect on embankment is minimal; however failure of this wall would permit erosion of dam.
Surface Cracks	40 foot long crack is developing along downstream face parallel to the embankment/abutment contact and 7-8 feet upslope of the contact. A drainage ditch has formed along this junction with erosion causing sloughing of embankment.
Crest Alignment: Vertical Horizontal	 Vertical - Good; maximum variation of 0.7 feet Horizontal - Good
Unusual Movement or Cracking at or Beyond the Toe	None observed.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS
Sloughing or Erosion: Embankment Crest/Slopes Abutment Slopes	Runoff along downstream left junction of embankment and abutment is causing erosion of contact and dam. Ditch should be lined with rock or paved. See related items on Exhibit A-1. Spillway flow is eroding some of the embankment immediately downstream of the left spillway wall and along the toe of dam where discharge channel parallels toe. Concrete paving apparently was placed to protect area downstream of left spillway wall but this has been undermined and has broken into several large pieces.
Riprap Failures	Although design drawings specify riprap on upstream face, none exists at this time. A bedding type material presently covers most of the upstream face. No erosion problems apparent.
Miscellaneous Vegetation Roads or ramps	Upper 18 inches of upstream face and entire downstream face are grass. Roadway across crest surfaced with fine shale - good condition. Ramp down to spillway approach - no erosion; grass covered. Trees and brush along most of downstream embankment/ abutment contact. Tree stump on upstream face-left side.
Instrumentation	None.
Staff Gage and Recorder	None.

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS
Outlet Conduit	10 inch diameter corrugated metal pipe. Also a 15 or 18 inch diameter corrugated metal riser pipe (drop inlet) extends from the 10 inch pipe about midway on upstream slope.
Intake Structure Pond Drain Riser pipe (drop inlet)	Pond drain - Submerged; not observed. Riser pipe - Several metal bars across top act as trash rack. Partially blocked by leaves, twigs and small logs (firewood size)
Outlet Structure	None. Pipe projects about 15 inches beyond concrete encasement.
Outlet Channel	Small plunge pool at end of pipe which projects 2 feet beyond embankment. 4"-10" stone in plunge pool. Flows parallel to toe in earth channel for a short distance before joining natural stream channel.
Emergency Gate	None; upstream end of pipe reported sealed with glass bottle. Not observed.

UNGATED SPILLWAY

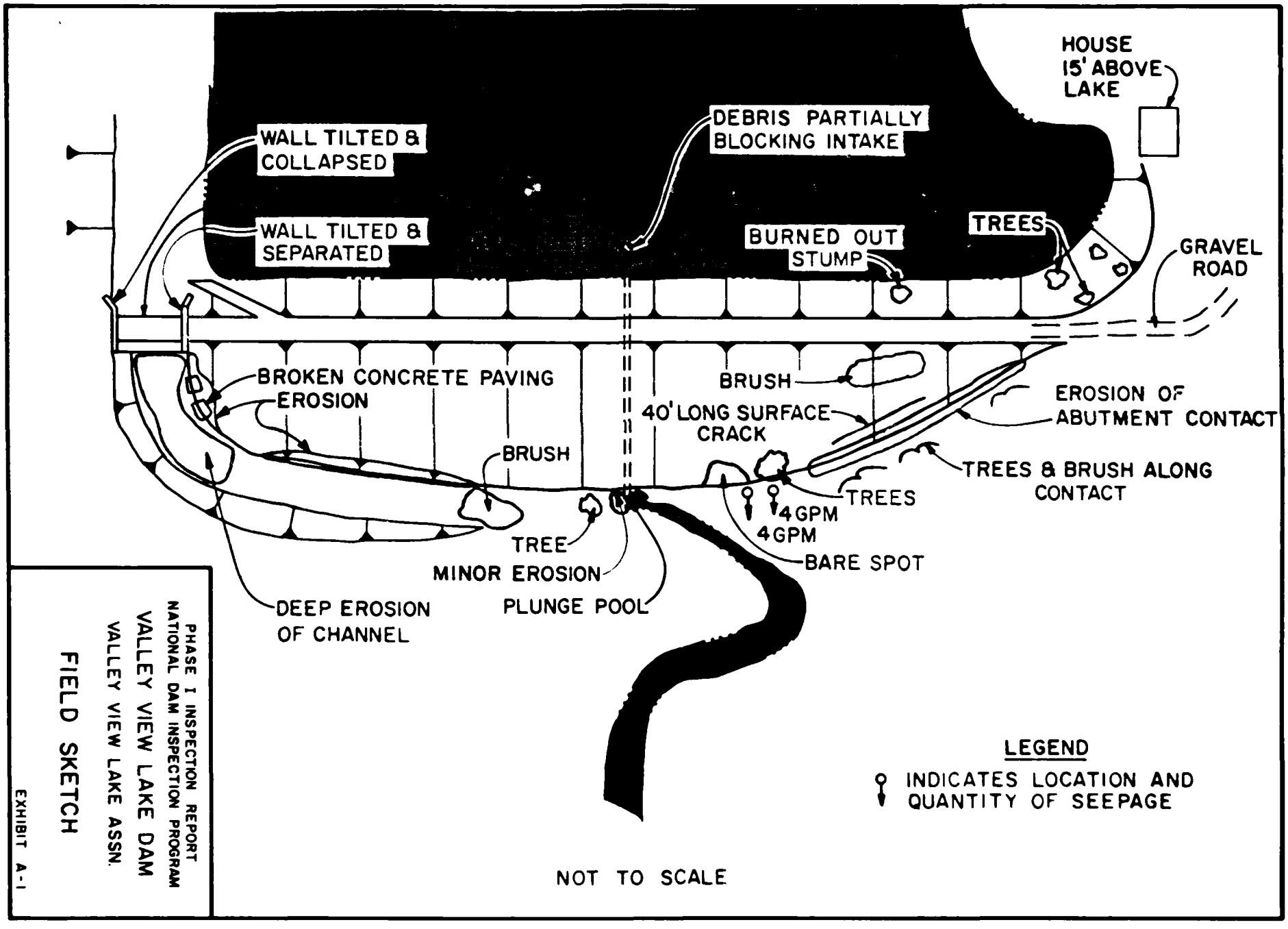
VISUAL EXAMINATION OF	OBSERVATIONS
Concrete Weir	Concrete slab; broad crested. Minor cracking. Left wall leaning in toward spillway. Joint w/upstream wingwall separated. Right wall near collapse. Poured concrete portion of wall and wingwall upstream of bridge are cracked through and leaning. The bridge is resting on five courses of concrete block which were placed on top of wall. Horizontal joints are missing some mortar and block is leaning in. Concrete has been poured against block and wall under bridge in form of bulge to buttress wall.
Approach Channel	Reservoir; no obstructions.
Discharge Channel	Deeply eroded; 12-15 foot vertical drop off end of spillway. Area filled recently with leaves which obscurred thorough investigation; however it appears the spillway slab is being undercut. Dam embankment on left side immediately downstream of slab is eroding. Concrete apparently was placed to prevent erosion but undercutting has caused this paving to break-up into several large pieces. First 50 feet beyond spillway slab has bottom and vertical right side in bedrock. Left side is eroded embankment. Channel follows toe of dam with bedrock disappearing. Toe of embankment is eroded to slope of 3V:4H. Needs protection.

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS
Slopes	Moderate to steep; appears stable.
Sedimentation	None observed or reported.

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS
Condition (Obstructions, etc.)	Earth bottom; Pa. Route 42 crosses 4,200 feet downstream
Slopes	Moderate side slopes; meadow
Approximate Number of Homes	Two homes near stream 4,700 feet downstream

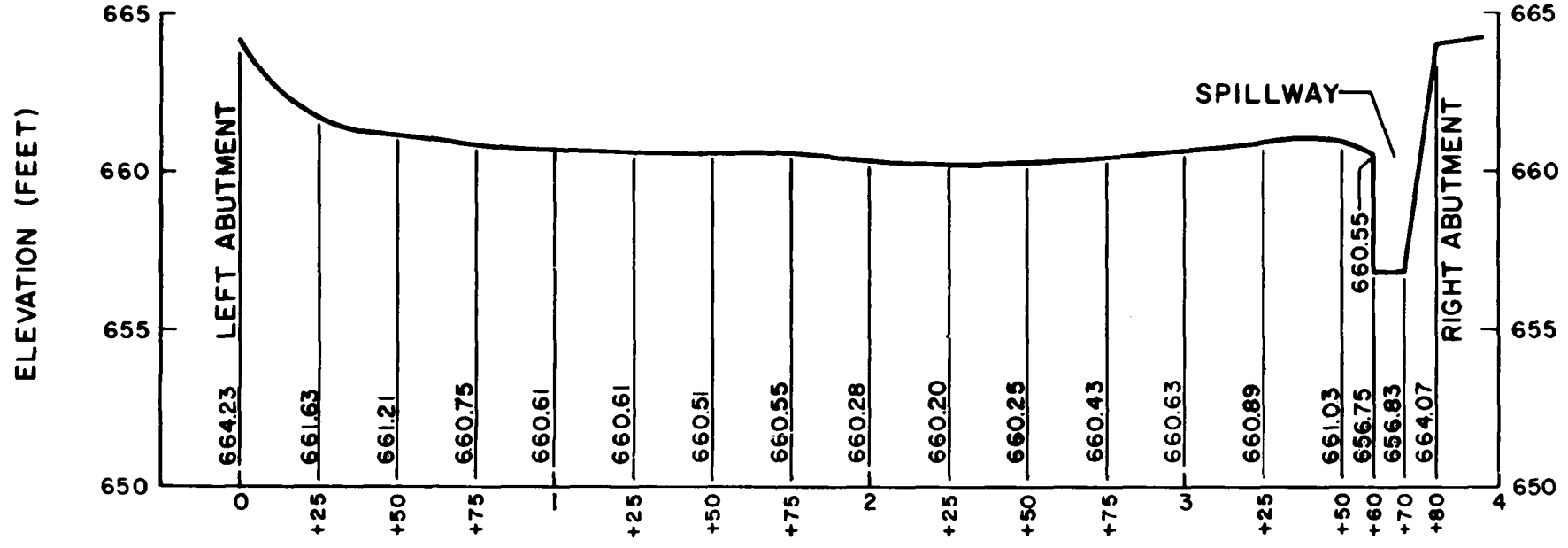


PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

VALLEY VIEW LAKE DAM
VALLEY VIEW LAKE ASSN.

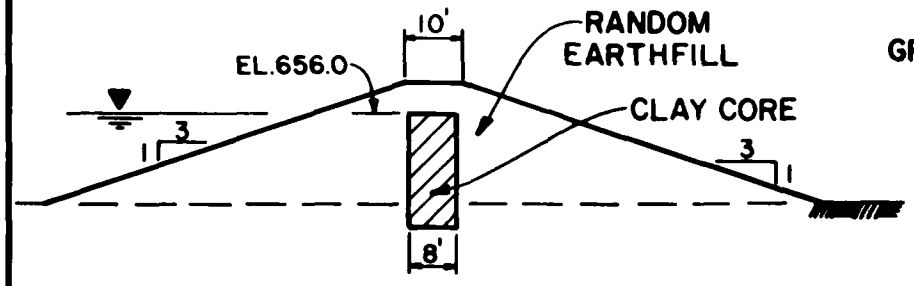
FIELD SKETCH

EXHIBIT A-1



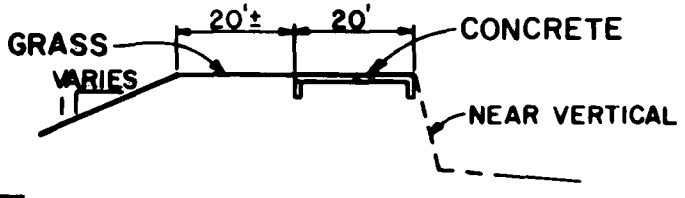
TOP OF DAM – PROFILE

SCALE – HORIZ.: 1 IN. = 50 FT.
VERT. : 1 IN. = 5 FT.



EMBANKMENT SECTION

SCALE : 1 IN. = 30 FT.



SPILLWAY SECTION

SCALE : 1 IN. = 30 FT.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

VALLEY VIEW LAKE DAM

VALLEY VIEW LAKE ASSN.

PROFILE AND SECTIONS

EXHIBIT A-2

APPENDIX B

CHECKLIST - ENGINEERING DATA

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

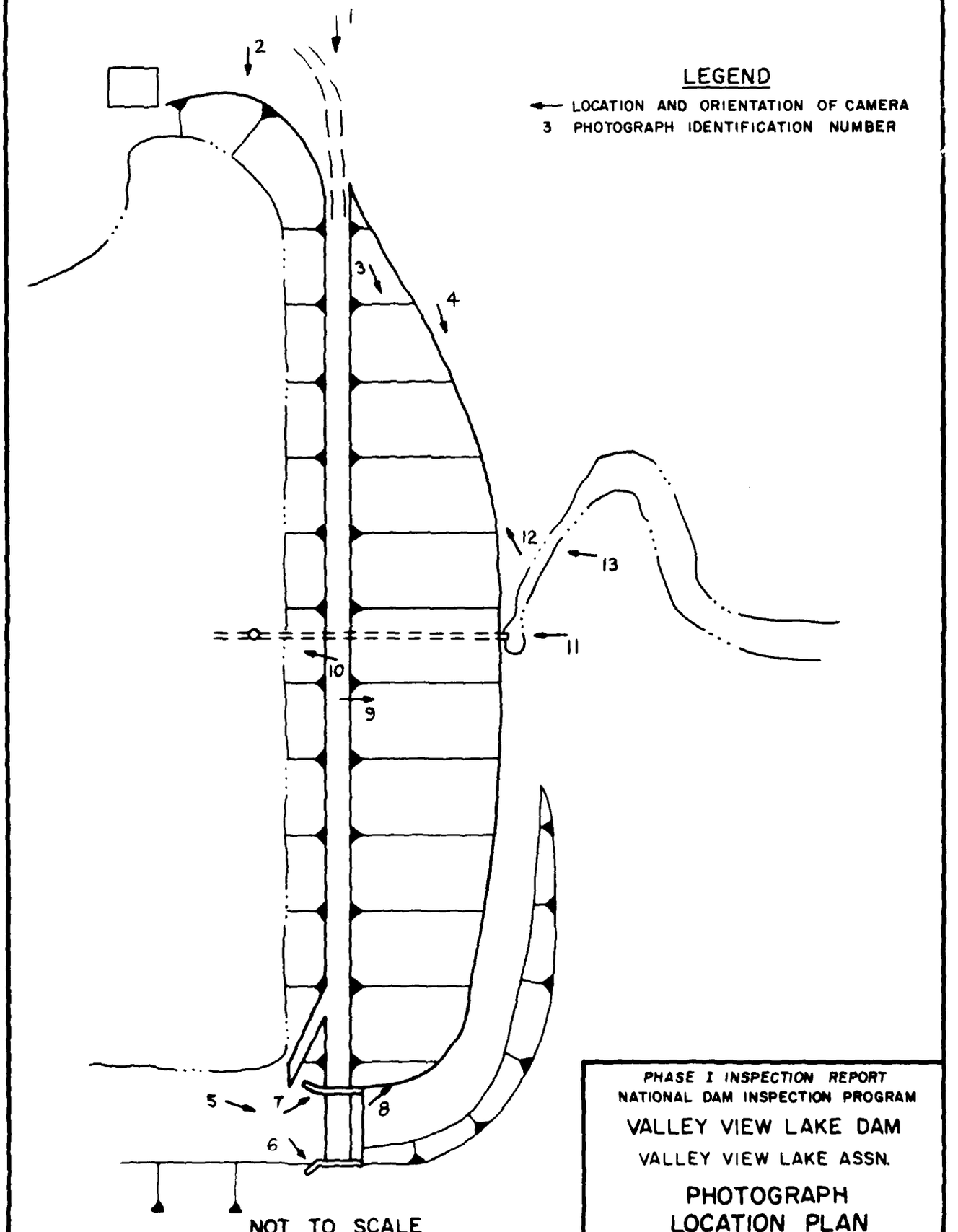
ITEM	REMARKS
As-Built Drawings	None. However, sketches of dam from Penn Der Files are in Appendix E.
Regional Vicinity Map	U.S.G.S Millville Quadrangle 7 1/2 minute Quad Sheet. See Appendix E, Plate E-2.
Construction History	Permit issued in 1958, completed in 1960. Suggestion made to realign.
Typical Sections of Dam	See sketches in Appendix E.
Outlets - Plan Details Constraints Discharge Ratings	See sketches in Appendix E.
Rainfall/Reservoir Records	None
Design Reports	None
Geology Reports	None

ITEM	REMARKS
Design Computations Hydrology & Hydraulics Dam Stability Seepage Studies	None, however, Penn Der suggested a spillway design with a capacity of 500 c.f.s.
Materials Investigations Boring Records Laboratory Field	Three test pits were dug in dam foundation.
Post-Construction Surveys of Dam	None
Monitoring Systems	None
Modifications	Riprap appears to have been removed from upstream face. A bridge was constructed over the spillway, trash rack removed.
High Pool Records	In June 1972, pool was within 1 foot of dam crest.
Post-Construction Engineering Studies and Reports	None
Prior Accidents or Failure of Dam Description Reports	None reported. Erosion has taken place on spillway outlet channel adjacent to embankment; concrete protection has been undermined.

ITEM	REMARKS
Maintenance Operation Records	None
Spillway Plan	See Appendix E for sketches of spillway.
Sections	
Details	
Operating Equipment Plans & Details	None
Specifications	None
Miscellaneous	None
Previous Inspections	Last documented inspection in PennDer files was in 1964.

APPENDIX C

PHOTOGRAPHS



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

VALLEY VIEW LAKE DAM

VALLEY VIEW LAKE ASSN.

PHOTOGRAPH LOCATION PLAN

EXHIBIT C-1

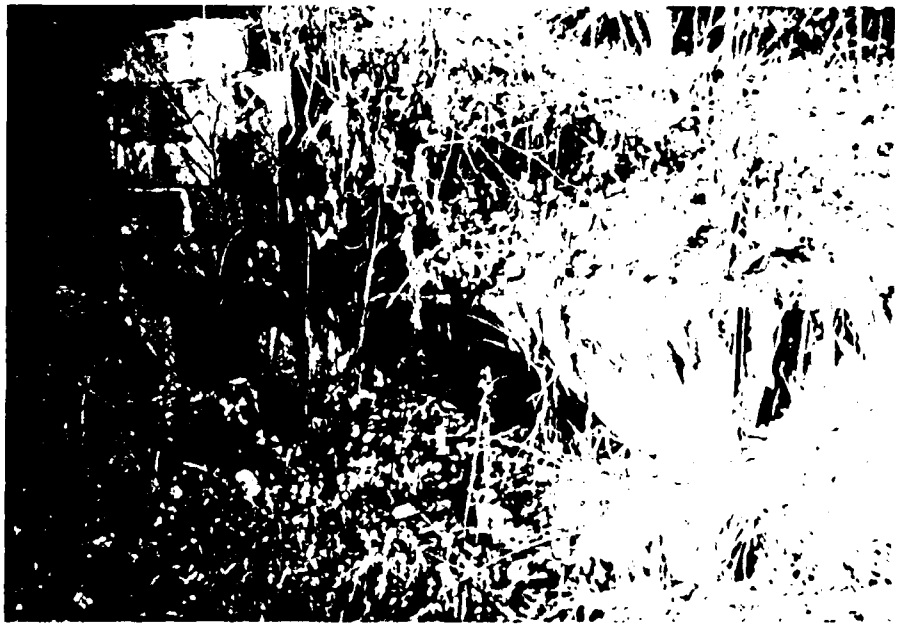
1. Embankment Crest and Right Abutment

2. Upstream Face and Right Abutment

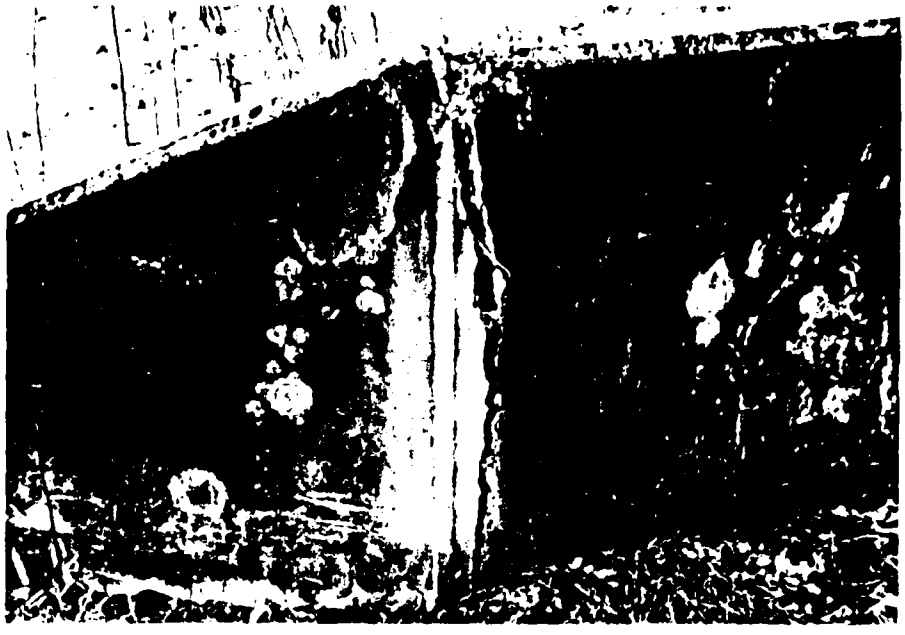
3. Downstream slope of embankment

4. Crack on downstream slope of embankment near outlet structure

5. Approach Channel to Spillway



6. Close-up View of Upstream End Right Spillway Wall



7. Crack in Approach Wall of Left Spillway Wall

8 Spillway Discharge Channel

9. Downstream Channel

10. Drop Inlet in Reservoir

11. Outlet Conduit at Downstream Toe of Embankment

12 Drainage Channel Along Downstream Slope of Embankment Near Toe of Dam

13. View of Downstream Slope. Clipboard indicates location of seepage.

14. Downstream Damage Area. First Floor Level is 5 Feet Above Streambed.

APPENDIX D

HYDROLOGY AND HYDRAULICS

PREFACE

The modified HEC-1 program is capable of performing two basic types of hydrologic analyses: 1) the evaluation of the overtopping potential of the dam; and 2) the estimation of the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. Briefly, the computational procedures typically used in the dam overtopping analysis are as follows:

a. Development of an inflow hydrograph(s) to the reservoir.

b. Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.

c. Routing of the outflow hydrograph(s) from the reservoir to desired downstream locations. The results provide the peak discharge(s), time(s) of the peak discharge(s), and the maximum stage(s) of each routed hydrograph at the downstream end of each reach.

The evaluation of the hydrologic-hydraulic consequence resulting from an assumed structural failure (breach) of the dam is typically performed as shown below.

a. Development of an inflow hydrograph(s) to the reservoir.

b. Routing of the inflow hydrograph(s) through the reservoir.

c. Development of a failure hydrograph(s) based on specified breach criteria and normal reservoir outflow.

d. Routing of the failure hydrograph(s) to desired downstream locations. The results provide estimates of the peak discharge(s), time(s) to peak and maximum water surface elevations of failure hydrographs for each location.

HYDROLOGY & HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: VALLEY VIEW LAKE DAM

PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.2 INCHES/24 HOURS (1)

SUSQUEHANNA RIVER BASIN

STATION	1	2	3
STATION DESCRIPTION	VALLEY VIEW LAKE DAM		
DRAINAGE AREA (SQUARE MILES)	0.52		
CUMULATIVE DRAINAGE AREA (SQUARE MILES)	0.52		
ADJUSTMENT OF PMF FOR (1) DRAINAGE AREA LOCATION (%)	100%		
6 Hours	117		
12 Hours	127		
24 Hours	136		
48 Hours	143		
72 Hours	145		
SNYDER HYDROGRAPH PARAMETERS			
Zone (2)	13		
C_p (3)	0.5		
C^t (3)	1.85		
L^t (MILES) (4)	1.29		
L_{ca} (MILES (4)	0.53		
$tp = C_t (L \cdot L_{ca})$ 0.3 (HOURS)	1.65		
SPILLWAY DATA			
CREST LENGTH (FEET)	20		
FREEBOARD (FEET)	3.5		

(1) HYDROMETEOROLOGICAL REPORT 40 , U. S. Army Corps of Engineers, 1955.

(2) Hydrologic zone defined by Corps of Engineers, Baltimore District, For Determination of Snyder Coefficients (C_p and C_t).

(3) Snyder Coefficients

(4) L = Length of longest watercourse from dam to basin divide.
L_{ca} = Length of longest watercourse from dam to point opposite basin centroid.

BALTIMORE DISTRICT CORPS OF ENGINEERS PAGE

SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 1 OF SHEETS

COMPUTED BY JPG CHECKED BY DATE 12-81

DAM CLASSIFICATION

SIZE OF DAM - SMALL
HAZARD - HIGH
REQUIRED SDF - ½ PMF TO FULL PMF

DAM STATISTICS

HEIGHT OF DAM - 21.1 FT
STORAGE AT NORMAL POOL - 30 AC-FT
STORAGE AT TOP OF DAM - 72 AC FT
DRAINAGE AREA ABOVE DAMSITE - 0.52 mi²

ELEVATIONS:

TOP OF DAM LOW POINT (FIELD) - 660.20
NORMAL POOL - 650.00
STREAMBED AT CENTERLINE OF DAM - [illegible]
DROP INLET:
INLET - 656.20
OUTLET - [illegible]
SPILLWAY CREST - 656.75

HYDROGRAPH PARAMETERS:

RIVER BASIN - SUSQUEHANNA RIVER BASIN
ZONE - 13
SNYDER COEFFICIENTS -

C_p - 0.50

C_t - 1.85

MEASURED PARAMETERS: *

L = LENGTH OF LONGEST WATERCOURSE L = 1.24 mile

L_{CA} = LENGTH OF LONGEST WATERCOURSE TO CENTROID OF THE BASIN L_{CA} = 0.53 mile

* FROM U.S.G.S. QUAD SHEETS ENTITLED: LAIRDSVILLE, PA.
MILLVILLE PA.

NADB FORM 1232, 28 MAR 74

NOTE: ELEVATIONS ARE REFERENCED TO DRAWING ... SPILLWAY (BROAD CRESTED WEIR) AT ELEVATION ... THIS SEEMS REASONABLE WHEN EXAMINING ... PA. THE LAKE DOES NOT HAVE AN ELEVATION ... SHEET

t_p = SNYDERS BASIN LAG TIME TO PEAK ...

$$t_p = C_t(L \cdot L_{ca})^{0.3}$$
$$= 1.85(\;29(0.53))^{0.3}$$
$$= 1.6.5 \text{ HOURS}$$

RESERVOIR CAPACITY:

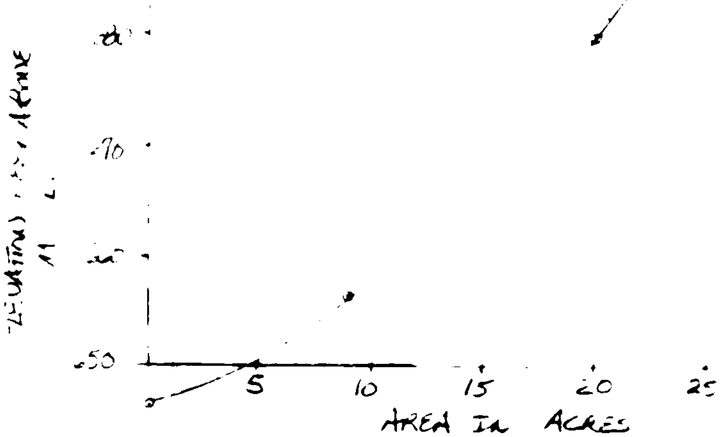
SURFACE AREA AT NORMAL POOL ... ACRES
- SURFACE AREA AT ELEVATION ... ACRES
(PLANIMETERED VALUE)

ASSUME CONICAL METHOD APPLIES ... LOW POINT IN POOL BELOW NORMAL POOL.

VOLUME AT NORMAL POOL ...

$V = \frac{1}{3}AH$, $H = \frac{3V}{A}$ = 3 ...

ZERO STORAGE AT ELEVATION ...



... ASSUME THE AVERAGE END AREA METHOD ... ELEVATIONS ABOVE NORMAL POOL ELEV ...

$\Delta V = \left(\frac{A_1 + A_2}{2}\right)\Delta H$

NADB FORM ... MAR 74

ELEVATION STORAGE TABLE

ELEVATION (MSL)	AREA (ACRES)	ΔH (ft)	ΔV = $\left(\frac{A_1 + A_2}{2}\right)\Delta H$ (AC-FT)	CUMULATIVE VOLUME (AC-FT)
[illegible]75				
[illegible]	[illegible]	—	—	30.0
[illegible]75	[illegible]	.55	5.0	35.0
[illegible]5[illegible] 00	[illegible]0	1.25	[illegible]2.1	47.1
659 00	[illegible]5	1.00	[illegible]0.8	57.9
[illegible] 00	[illegible]	[illegible]00	[illegible]0	[illegible]77
[illegible]	[illegible]	1.00	[illegible]2.8	[illegible]7
[illegible] 00	[illegible]	[illegible]00	33	[illegible]0
663 00	4	1.00	[illegible]7	[illegible]97
[illegible]4 00	4[illegible]	[illegible]00	[illegible]4 2	[illegible]3.9
[illegible]5 00	5[illegible]	[illegible]00	14.8	[illegible]38.7
670 00	[illegible]0	5.00	77.5	216.2

• [illegible] FOR [illegible] ABOVE SPILLWAY CREST.

THE DRAINAGE AREA ABOVE DAM IS = 0.52 mi²

ELEVATION (MSL)	STORAGE (AC FT)
[illegible]75	0
656 00	30
656 75	35
[illegible]58 00	50
659 00	60
660 00	70
661 00	80
[illegible]2 00	100
[illegible]3 00	110
[illegible]4 00	120
[illegible]5 00	140
670 00	[illegible]20

THIS DATA TO BE INPUT ON $S & $E CARDS.

[illegible]60.20 = 8[illegible] AC FT

BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE _____

SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 4 OF 12 SHEETS

COMPUTED BY JPB CHECKED BY _____ DATE 1-13-81

PMP CALCULATIONS:

- APPROXIMATE RAINFALL INDEX = 22.2 INCHES
  (CORRESPONDING TO A DURATION OF 24 HOURS AND A DRAINAGE AREA OF 200 mi^2) - ALL SEASON ENVELOPE
- SUSQUEHANNA RIVER BASIN - GEOGRAPHIC AREA ADJUSTMENT MADE BY HYDROMET 40 - FIGURE 1 IS 100 %.
- DEPTH - AREA - DURATION - HYDROMET 40 VALUE
- ASSUME VALUES CORRESPONDING TO A 10 mi^2 AREA MAY BE APPLIED TO THIS 0.52 mi^2 AREA

DURATION (HRS)	PERCENT OF INDEX RAINFALL
6	117
12	127
24	136
48	143
72	145

NOTE. HOP BROOK FACTOR IS INTERNALLY COMPUTED BY THE HEC-DB PROGRAM. FOR A DRAINAGE AREA LESS THAN 10 SQUARE MILES, THE ADJUSTMENT FACTOR = 0.80. THIS ADJUSTMENT IS FOR BASIN SHAPE AND FOR THE LESSER LIKLIHOOD OF A SEVERE STORM CENTERING OVER A SMALL BASIN.

SDF · BASED ON THE SMALL STORAGE (LESS THAN 80 AC FT) AND SMALL HEIGHT (APPROXIMATELY 20 FEET), THE SDF SELECTED FOR THIS POND WAS ½ THE PMF. THIS IS IN ACCORDANCE WITH THE GUIDENCE PROVIDED.

∴ USE SDF = ½ PMF

BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE _____

SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 5 OF 16 SHEETS

COMPUTED BY JAB CHECKED BY _____ DATE 1-13-81

EMERGENCY SPILLWAY CAPACITY:

NOTE: SPILLWAY IS LOCATED NEAR RIGHT ABUTMENT. SEE FIELD SKETCH IN APPENDIX A, EXHIBIT A-1.

SPILLWAY DATA.

TYPE - BROAD CRESTED, 20 FEET WIDE
LENGTH - 20 FEET
CREST ELEVATION - 656.75
LOW POINT TOP OF DAM - 660.20
SPILLWAY FREEBOARD - 3.5 feet
C VALUE - 2.80 for spillway
2.85 for embankment

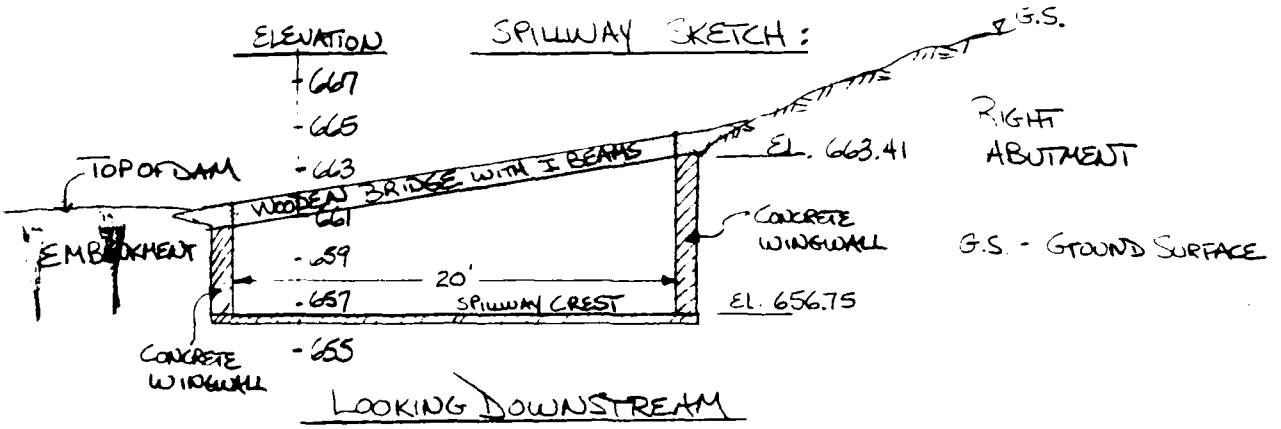
NOTE: THESE C VALUES WILL BE USED BASED ON WIDTH PARALLEL TO FLOW, SPILLWAY 20 FEET, EMBANKMENT 0 FEET. THESE VALUES WILL BE HELD CONSTANT FOR ALL HEADS, AND WILL BE CONSERVATIVE FOR FACILITY RATING.

SPILLWAY RATING CURVE:

ELEVATION

667
665
663
661
659
657
655

SPILLWAY SKETCH:



LOOKING DOWNSTREAM

NOTE: ONCE WATER SURFACE ELEVATION REACHES 660.55, STEEL I-BEAMS IN BRIDGE BEGIN TO BLOCK SPILLWAY FLOW AS SHOWN ABOVE. THIS OCCURS FIRST ON LEFT SIDE ON SPILLWAY WHERE BRIDGE SLOPES DOWN ONTO EMBANKMENT.

NADB FORM 1232, 18 MAR 74

SINCE THE LOW POINT TOP OF DAM IS ELEVATION 660.20 AND PRESSURE FLOW WOULD NOT BEGIN IN THE SPILLWAY UNTIL ELEVATION 660.55, FLOW WOULD OVERTOP THE EMBANKMENT BEFORE PRESSURE FLOW WOULD BEGIN IN THE SPILLWAY. THEREFORE, THE SPILLWAY RATING CURVE WAS COMPUTED TO ELEVATION 660.55 AS FREE DISCHARGE, AND THIS VALUE WOULD BE THE MAXIMUM DISCHARGE THAT THE SPILLWAY WOULD PASS.

SPILLWAY RATING CURVE

recall $C = 2.85$; $L = 20$ feet

POOL ELEVATION (MSL)	H (ft)	Q (CFS)	ROUNDED Q (CFS)
656.75	0	0	0
657.00	0.25	7.1	10
658.00	1.25	79.6	80
659.00	2.25	192.4	190
660.00	3.25	333.9	330
660.20	3.45	365.3	370
660.55	3.80	422.2	420
665.00	-	—	420

$Q = CLH^{3/2}$ for DISCHARGE VALUES

EMBANKMENT RATING CURVE:

THIS ANALYSIS ASSUMES THAT THE EMBANKMENT BEHAVES AS A BROAD CRESTED WEIR IF OVERTOPPING OCCURS. THIS DISCHARGE CAN BE ESTIMATED BY:

$$Q = CL_1 H_w^{3/2}$$

WHERE: Q = DISCHARGE OVER EMBANKMENT, IN CFS
L_1 = LENGTH OF EMBANKMENT, FT
H_w = WEIGHTED HEAD, IN FEET, AVERAGE FLOW AREA WEIGHTED ABOVE LOW POINT OF DAM
C = COEFFICIENT OF DISCHARGE

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SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 7 OF 16 SHEETS

COMPUTED BY JPB CHECKED BY DATE 1-14-81

LENGTH OF EMBANKMENT INNUNDATED VS. RESERVOIR ELEVATION:

RESERVOIR ELEVATION (MSL)	EMBANKMENT LENGTH (FT)
660.20	0
660.55	100
661.00	280
662.00	340
663.00	355
664.00	360 *
665.00	360 *
670.00	360 *

* - MAXIMUM LENGTH OF EMBANKMENT

EMBANKMENT RATING TABLE:

RESERVOIR ELEVATION (MSL)	L_1 (FT)	L_2 (FT)	INCREMENTAL HEAD, H_i (FT)	① INCREMENTAL FLOW AREA, A_i (FT^2)	TOTAL FLOW AREA, A_T (FT^2)	② WEIGHTED HEAD, H_W (FT)	③ Q (CFS)
660.20	0	0	0	0	0	0	0
660.55	100	0	0.35	17.5	17.5	0.175	21
661.00	280	100	0.45	85.5	103	0.37	178
662.00	340	280	1.00	310.0	413	1.21	1289
663.00	355	340	1.00	347.5	760.5	2.14	3169
664.00	360	355	1.00	357.5	1118.0	3.10	5600
665.00	360	360	1.00	360.0	1478.0	4.10	8517
670.00	360	360		1800.0	3278.0	9.10	28160

① $A_i = H_i[(L_1+L_2)/2]$

② $H_W = A_T/L_1$

③ $Q = CL_1 H_W^{3/2}$

recall $C = 2.85$ from page 5 of this appendix

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BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE

SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 8 OF 16 SHEETS

COMPUTED BY JPB CHECKED BY DATE 1-14-81

TOTAL FACILITY RATING CURVE:

RESERVOIR ELEV. (MSL)	Q SPILLWAY (CFS)	Q EMBANKMENT (CFS)	Q TOTAL (CFS)
656.75	0	0	0
657.00	10	0	10
658.00	80	0	80
660.20	370	0	370
660.55	420	20	440
661.00	420	180	600
662.00	420	1300	1720
663.00	420	3170	3590
664.00	420	5600	6020
665.00	420	8520	8940

NOTE: DROP INLET IS ASSUMED BLOCKED FOR FLOOD ROUTING PURPOSES.

THE ABOVE VALUES WILL BE INPUT ON J4 & J5 CARDS.

DROP INLET

FIRST WE WILL CALCULATE THE DIAMETER OF THE JET AS THE FLOW FALLS FROM THE INVERT OF DROP INLET - EL. 656 TO THE BOTTOM OF THE 18 inch pipe where it changes to a 10 inch pipe, elevation 641.0. MAX POOL IS AT 660.20

* THE DIAMETER OF A JET ISSUING FROM A HORIZONTAL ORIFICE CAN BE DETERMINED FOR ANY POINT BELOW THE WATER SURFACE IF IT IS ASSUMED THAT THE CONTINUITY EQUATION, $Q = VA$, IS VALID AND IF FRICTION AND OTHER LOSSES ARE NEGLECTED.

* FROM- DESIGN OF SMALL DAMS, WATER RESOURCE TECHNICAL PUBLICATION REPRINT 1977

MADB FORM 1232, 28 MAR 74

BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE

SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 9 OF 16 SHEETS

COMPUTED BY JTB CHECKED BY DATE 1-22-81

* FOR A CIRCULAR JET, $Q = \pi R^2 \sqrt{2gh}$

we have an 18" DROP INLET TO AN APPROXIMATE HORIZONTAL 10" LINE.

THE MINIMUM SIZE SHAFT WHICH WILL ACCOMMONDATE THE FLOW WITHOUT RESTRICTIONS AND WITHOUT DEVELOPING PRESSURES ALONG THE SIDE OF THE SHAFT. ASSUME JET IS 70% OF PIPE DIA, THEREFORE, FREE FALL WOULD BE APPLICABLE.

$$R = 0.204 \frac{Q^{1/2}}{H_a^{1/4}}$$ where: H_a = difference in water surface elevation, and ELEVATION under consideration.

$$\therefore Q = \left[\frac{1}{0.204} R (H_a)^{1/4}\right]^2 = \left[\frac{1}{0.204} (0.525 ft)(19.2)^{1/4}\right]^2 = 29 \text{ CFS}$$

$H_a = 660.2 - 641.0 = 19.2$ feet

R = radius of jet $= 0.7\left(\frac{18in}{2}\right)\left(\frac{ft}{12in}\right) = 0.525$ feet

NOW CHECKING FOR ORIFICE FLOW IN 10 inch HORIZONTAL LINE

$$Q = CA\sqrt{2gh} \qquad C = 0.6 \text{ (A)}$$

$$\therefore Q = 0.6\left(\pi\left(\frac{5in}{12in}ft\right)^2\right)\sqrt{2\left(32.2\frac{ft}{sec^2}\right)(19.2ft)} = 11.5 \text{ CFS}$$

∴ LIMITING VALUE AT MAXIMUM POOL IS - 11.5 CFS

Q = 11.5 CFS @ MAX. POOL THRU OUTLET

See APPENDIX E FOR PLANS OF DROP INLET.

∴ Q ≃ 12 CFS AT MAXIMUM POOL (EL. 660.2)

NADB FORM 1232, 28 MAR 74

* FROM - DESIGN OF SMALL DAMS -

(A) FROM - HANDBOOK OF HYDRAULICS - KING - 1963 - pg - 4-6

BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE _____

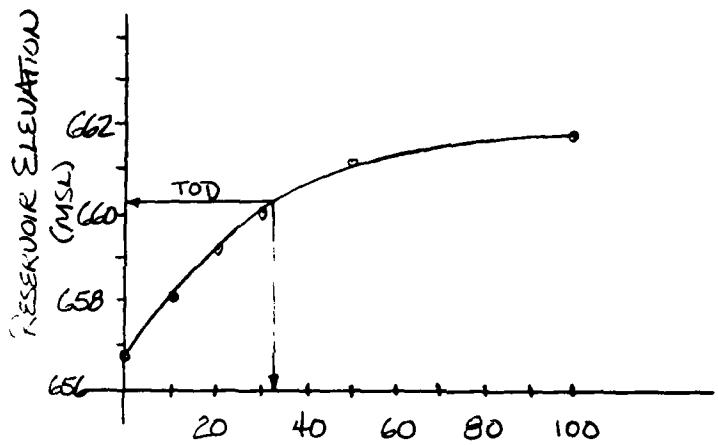
SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 10 OF 16 SHEETS

COMPUTED BY JPB CHECKED BY _____ DATE 1-14-81

RESULTS OF THE OVERTOPPING ANALYSIS:

AS CAN BE SEEN ON PAGE 4/4 OF THE OVERTOPPING ANALYSIS, THE FOLLOWING CURVE CAN BE DRAWN FROM THE SUMMARY TABLE.



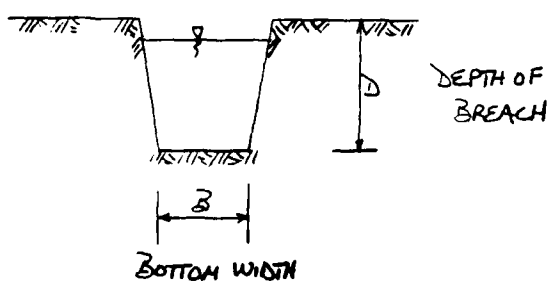
CAN PASS 32% OF THE PMF PRIOR TO OVERTOPPING THE EMBANKMENT.

TOP OF DAM ELEVATION IS 660.20

SINCE THE SDF = ½ the PMF, THIS FACILITY CAN HANDLE 32 % OF THE PMF. SINCE IT IS FELT AT 50% PMF, THE DAM WOULD FAIL DUE TO OVERTOPPING. A BREACH ANALYSIS IS REQUIRED.

BREACH ANALYSIS:

TYPICAL BREACH SECTION



NADB FORM 1232, 28 MAR 74

BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE _____

SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 11 OF 16 SHEETS

COMPUTED BY JPB CHECKED BY _____ DATE 1-14-81

HECIDB INPUT PARAMETERS FOR BREACH ANALYSIS

FOUR PLANS WILL BE USED FOR A DIRECT COMPARISON OF FAILURE VS. NON-FAILURE CONDITIONS. PARAMETERS ARE AS FOLLOWS.

PLAN NUMBER	BREACH BOTTOM WIDTH (FT)	FULL BREACH DEPTH (FT)	SIDE SLOPES (1H on 1V)	TOTAL BREACH TIME (HRS)
1	–	–	–	–
2	75	13.2	1H on 1V	0.33
3	75	13.2	1H on 1V	1.00
4	75	13.2	1H on 1V	2.00

HECIDB OUTPUT:

RESULTS OF DAM BREACH ANALYSIS

AS NOTED ABOVE, PLAN 1 IS FOR NON-FAILURE CONDITIONS.

PLAN NUMBER	MAXIMUM OUTFLOW OVER DAM AND/OR THRU BREACH (CFS)	DOWNSTREAM DAMAGE CENTER #1 STAGE (MSL)	DOWNSTREAM DAMAGE CENTER #1 FLOW (CFS)	DOWNSTREAM DAMAGE CENTER #2 STAGE (MSL)	DOWNSTREAM DAMAGE CENTER #2 FLOW (CFS)
1	516	605.3	507	604.1	5.7
2	5212	607.9	2345	606.8	2368
3	2288	607.0	1546	605.9	1539
4	1379	606.6	1190	605.4	187

DOWNSTREAM DAMAGE CENTER #1 - DAMAGE ELEV. AT 606

DOWNSTREAM DAMAGE CENTER #2 - DAMAGE ELEV. AT 606

NADB FORM 1232, 28 MAR 74

BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE

SUBJECT DAM SAFETY ANALYSIS

COMPUTATIONS VALLEY VIEW LAKE SHEET 12 OF 16 SHEETS

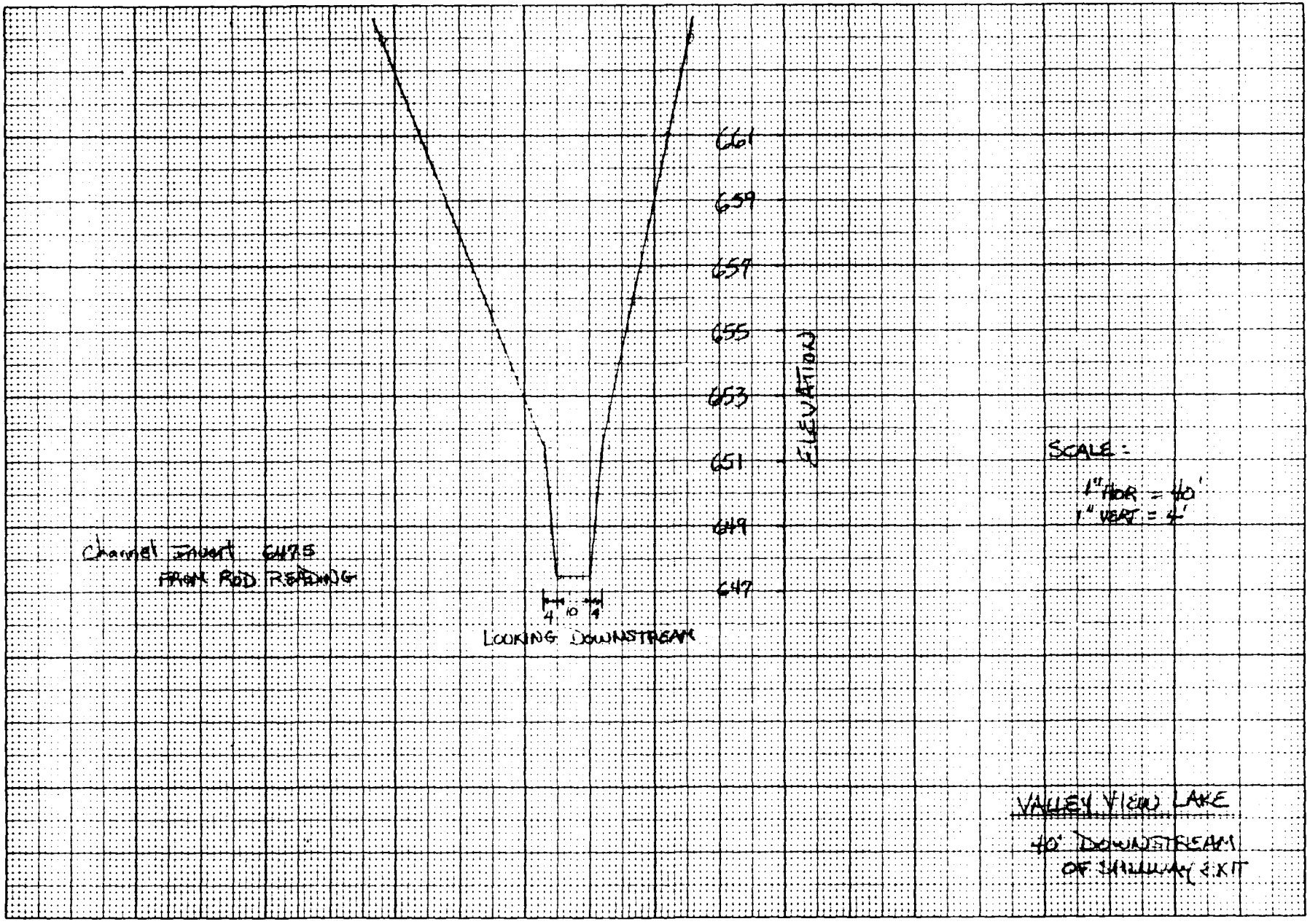
COMPUTED BY JPB CHECKED BY DATE 1-16-81

SINCE PLAN 2 INDICATES THAT FAILURE CONDITIONS SIGNIFICANTLY INCREASE THE HAZARD TO LOSS OF LIFE OR INCREASED PROPERTY DAMAGE, THE SPILLWAY IS RATED AS SERIOUSLY INADEQUATE.

NADB FORM 1232, 28 MAR 74

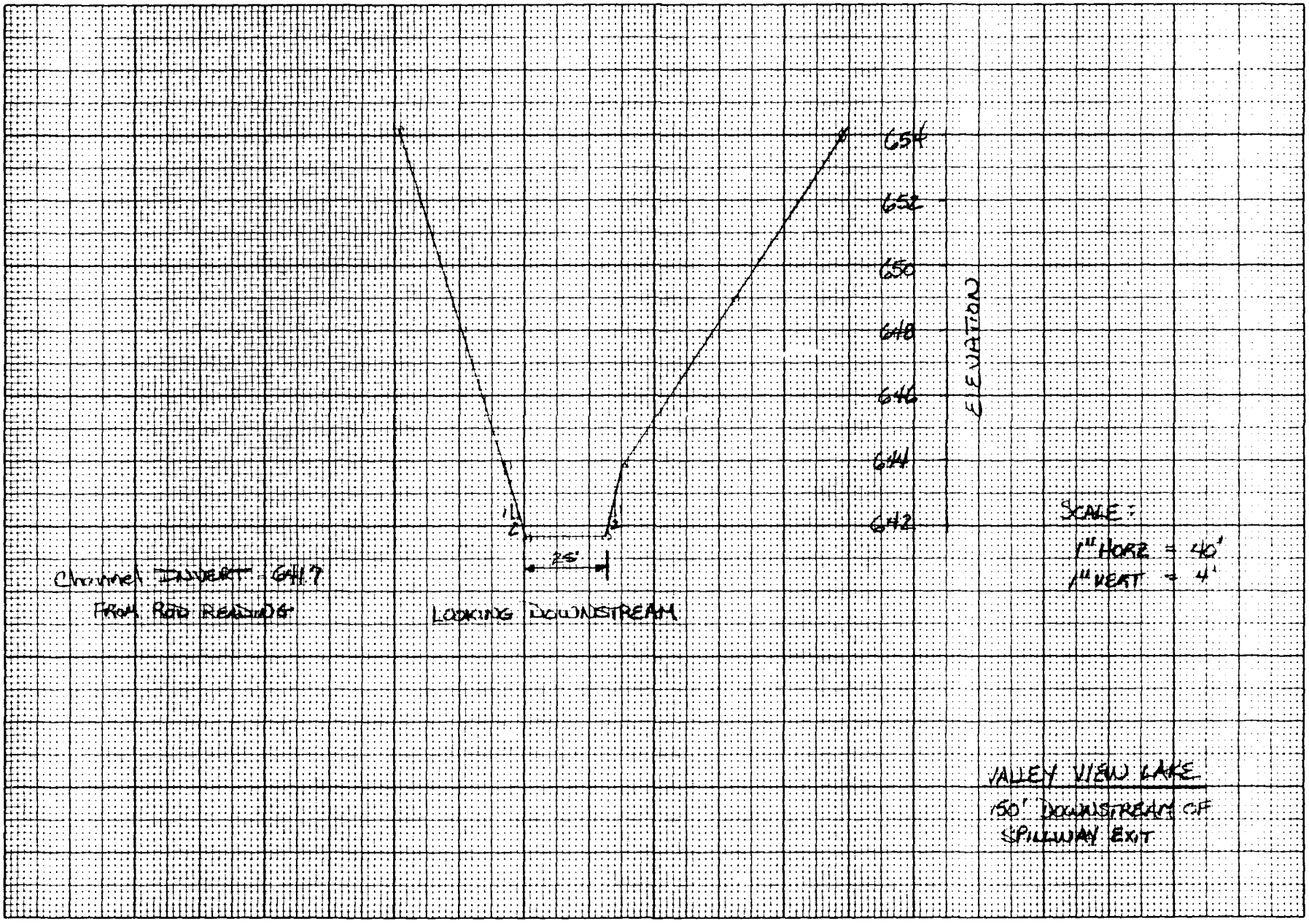
NO. 340R-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

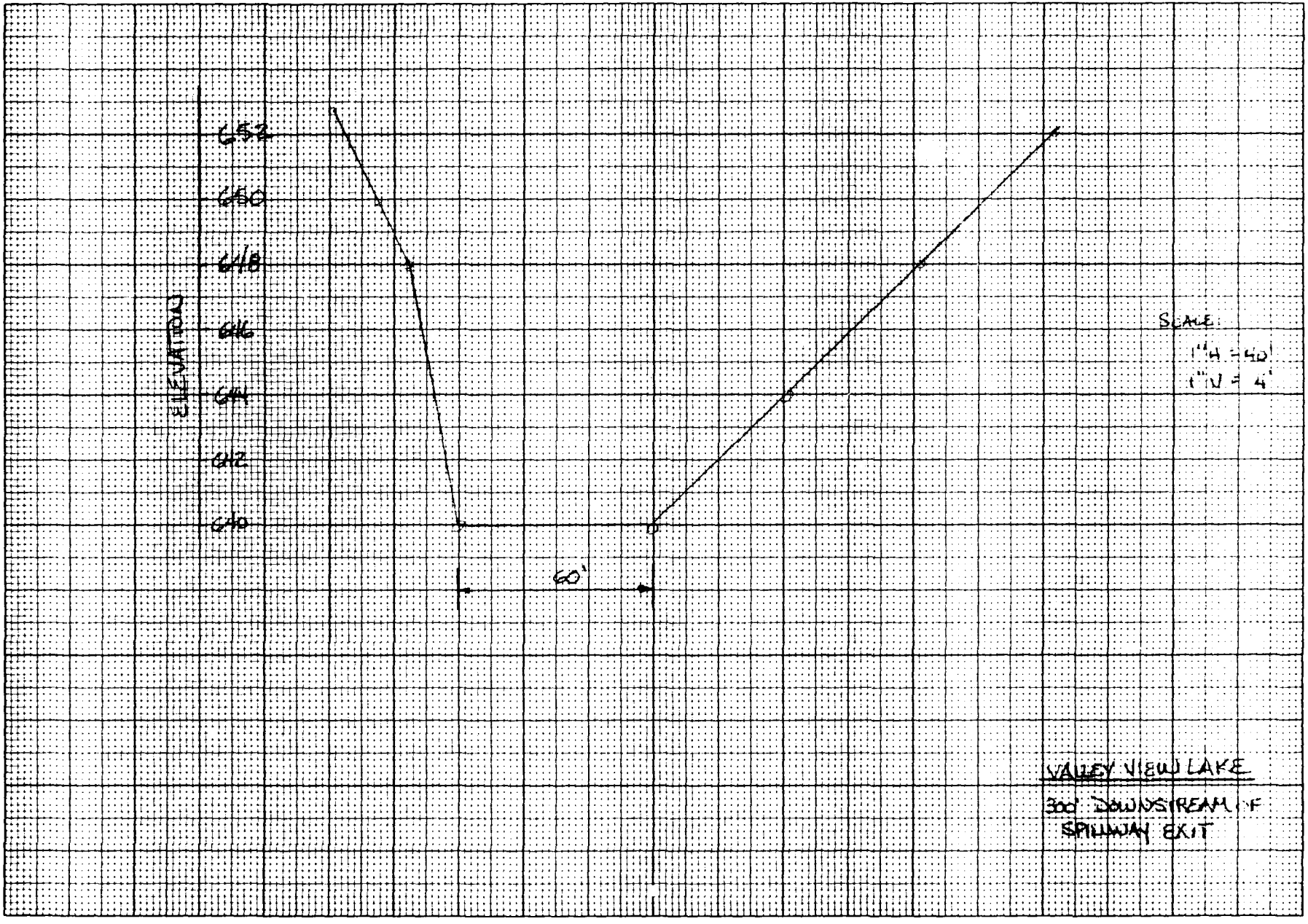
EUGENE DIETZGEN CO.
MADE IN U. S. A.



D-16

Page 13/16

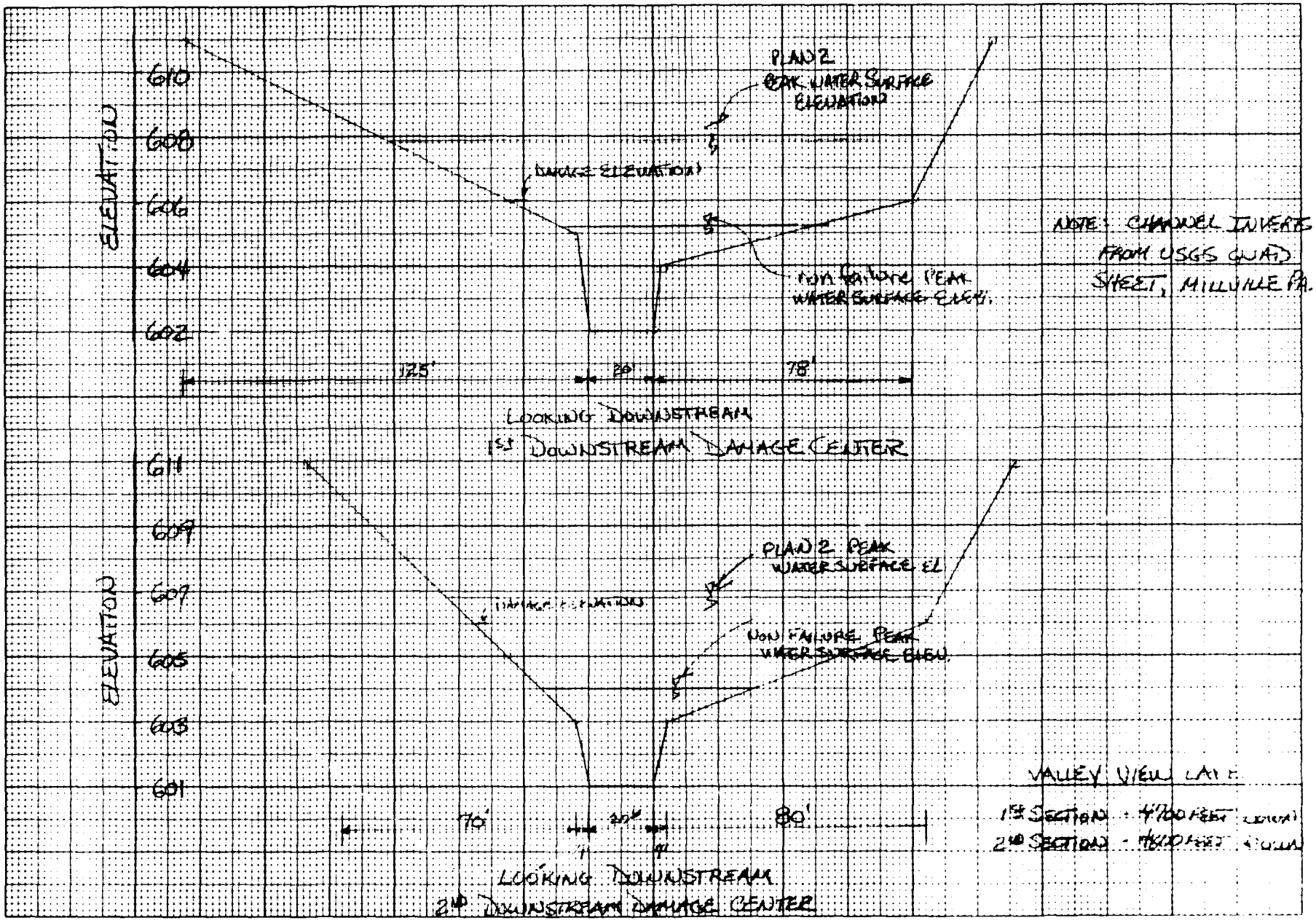




7-19

Sheet 15/16

1



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1**********
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  01 APR 80
 **********
     1              A1     VALLEY VIEW LAKE  DER NO. 70-19-75
     2              A2   DAM SAFTEY INSPECTION PROGRAM     1-14-81
     3              A3    OVERTOPPING ANALYSIS    *** PRELIMINARY   ***
     4              B    144     0      20      0       0       0       0       0       0       0
     5              B1     5     0       0      0       0       0       0       0       0       0
     6              J      1     5       1
     7              J1  0.10   0.20    0.30   0.50    1.00
     8              K      0     1       0      0       0       0       1       0       0       0
     9              K1   RUNOFF FROM DRAINAGE AREA ABOVE VALLEY VIEW LAKE
    10              M      1     1    0.52      0    0.52       0       0       0       1       0
    11              P      0  22.2     117    127     136     143     145
    12              T      0     0       0      0       0       0     1.0    0.05       0       0
    13              W   1.65  0.50
    14              X   -1.5 -0.05       2
    15              K      1     1       0      0       0       0       1       0       0       0
    16              K1   ROUTING ZPMF'S THRU VALLEY VIEW LAKE AND SPILLWAY
    17              Y      0     0       0      1       1       0       0       0       0       0
    18              Y1     1     0       0      0       0       0  -656.0      -1       0       0
    19              Y4 656.0  657.0   658.0  660.2  660.55   661.0   662.0   663.0   664.0   665.0
    20              Y5     0    10      80    370     440     600    1720    3590    6020    8940
    21              $S     0    30      35     50      60      70      80     100     110     140
    22              $E646.50 656.0  656.75  658.0   659.0   660.0   661.0   662.0   663.0   665.0
    23              $$656.75
    24              $D 660.2
    25              K     99
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                RUNOFF HYDROGRAPH AT          1
                                ROUTE HYDROGRAPH TO           1
                                END OF NETWORK


1**********
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  01 APR 80
 **********

 RUN  DATE= 81/03/05.
      TIME= 07.14.31.


                    VALLEY VIEW LAKE  DER NO. 70-19-75
                   DAM SAFTEY INSPECTION PROGRAM     1-14-81
                    OVERTOPPING ANALYSIS    *** PRELIMINARY   ***

                                        JOB SPECIFICATION
                    NO     NHR    NMIN    IDAY     IHR    IMIN   METRC    IPLT    IPRT   NSTAN
                   144       0      20       0       0       0       0       0       0       0
                                        JOPER     NWT   LROPT   TRACE
                                            5       0       0       0


                                  MULTI-PLAN ANALYSES TO BE PERFORMED
                                      NPLAN= 1 NRTIO= 5 LRTIO= 1
                    RTIOS=    .10    .20    .30    .50   1.00
```

VALLEY VIEW LAKE

OVERTOPPING ANALYSIS

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

RUNOFF FROM DRAINAGE AREA ABOVE VALLEY VIEW LAKE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	.52	0.00	.52	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.20	117.00	127.00	136.00	143.00	145.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.65 CP= .50 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 5.50 AND R= 6.52 INTERVALS

UNIT HYDROGRAPH 38 END-OF-PERIOD ORDINATES, LAG= 1.66 HOURS, CP= .50 VOL= 1.00

8.	29.	58.	84.	101.	101.	89.	76.	66.	56.
48.	41.	35.	30.	26.	22.	19.	16.	14.	12.
10.	9.	8.	7.	6.	5.	4.	4.	3.	3.
2.	2.	2.	1.	1.	1.	1.	1.		

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING %PMF'S THRU VALLEY VIEW LAKE AND SPILLWAY

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-656.	-1

STAGE	656.00	657.00	658.00	660.20	660.55	661.00	662.00	663.00	664.00	665.00
FLOW	0.00	10.00	80.00	370.00	440.00	600.00	1720.00	3590.00	6020.00	8940.00
CAPACITY=	0.	30.	35.	50.	60.	70.	80.	100.	110.	140.
ELEVATION=	647.	656.	657.	658.	659.	660.	661.	662.	663.	665.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
656.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
660.2	0.0	0.0	0.

VALLEY VIEW LAKE

OVERTOPPING ANALYSIS

1 ********** ********** ********** ********** **********

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .10	RATIO 2 .20	RATIO 3 .30	RATIO 4 .50	RATIO 5 1.00
HYDROGRAPH AT	1	.52	1	131.	261.	392.	653.	1306.
		(1.35)		(3.70)(	7.40)(	11.10)(	18.50)(	36.99)(
ROUTED TO	1	.52	1	103.	230.	348.	639.	1289.
		(1.35)		(2.91)(	6.50)(	9.86)(	18.10)(	36.50)(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	656.00	656.75	660.20
STORAGE	30.	35.	72.
OUTFLOW	0.	8.	370.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	658.17	0.00	52.	103.	0.00	42.67	0.00
.20	659.13	0.00	61.	230.	0.00	42.33	0.00
.30	660.03	0.00	70.	348.	0.00	42.33	0.00
.50	661.04	.84	81.	639.	3.67	41.67	0.00
1.00	661.62	1.42	92.	1289.	6.67	41.33	0.00

1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80
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VALLEY VIEW LAKE
OVERTOPPING ANALYSIS
page 3/a

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1**********
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  01 APR 80
**********
    1          A1    VALLEY VIEW LAKE  DER NO. 70-19-75
    2          A2   DAM SAFTEY INSPECTION PROGRAM     1-14-81
    3          A3    BREACHING ANALYSIS    *** PRELIMINARY   ***
    4          B   144       0      15       0       0       0       0       0       0       0
    5          B1    5       0       0       0       0       0       0       0       0       0
    6          J     4       1       1
    7          J1  0.42
    8          K     0       1       0       0       0       0       1       0       0       0
    9          K1   RUNOFF FROM DRAINAGE AREA ABOVE VALLEY VIEW LAKE
   10          M     1       1    0.52       0    0.52       0       0       0       1       0
   11          P     0    22.2     117     127     136     143     145
   12          T     0       0       0       0       0       0     1.0    0.05       0       0
   13          W  1.65    0.50
   14          X  -1.5   -0.05       2
   15          K     1       1       0       0       0       0       1       0       0       0
   16          K1   ROUTING %PMF'S THRU VALLEY VIEW LAKE AND SPILLWAY
   17          Y     0       0       0       1       1       0       0       0       0       0
   18          Y1    1       0       0       0       0       0  -656.0      -1       0       0
   19          Y4 656.0   657.0   658.0   660.2  660.55   661.0   662.0   663.0   664.0   665.0
   20          Y5    0      10      80     370     440     600    1720    3590    6020    8940
   21          $S    0      30      35      50      60      70      80     100     110     140
   22          $E646.50   656.0  656.75   658.0   659.0   660.0   661.0   662.0   663.0   665.0
   23          $$656.75
   24          $D 660.2
   25          $B   75       1     647    0.33  656.75     670
   26          $B   75       1     647    0.33  656.75   660.7
   27          $B   75       1     647    1.00  656.75   660.7
   28          $B   75       1     647    2.00  656.75   660.7
   29          K     1       2       0       0       0       0       1
   30          K1   ROUTE FLOWS THRU 1ST DOWNSTREAM CROSS SECTION (SPILLWAY)
   31          Y     0       0       0       1       1
   32          Y1    1       0       0       0       0       0       0
   33          Y6 0.07    0.05    0.07   647.5     664      40    0.25
   34          Y7  100     664     117     661     150   651.4     155   647.5     165   647.5
   35          Y7  170   651.4     178     656     195     664
   36          K     1       3       0       0       0       0       1
   37          K1   ROUTE FLOWS THRU 2ND DOWNSTREAM CROSS SECTION
   38          Y     0       0       0       1       1
   39          Y1    1       0       0       0       0       0       0
   40          Y6 0.07    0.05    0.07   641.8     654     110   0.052
   41          Y7  100     654     120     648     133     644     140   641.8     165   641.8
   42          Y7  170     644     205     649     238     654
   43          K     1       4       0       0       0       0       1
   44          K1   ROUTE FLOWS THRU 3RD DOWNSTREAM CROSS SECTION (SPILLWAY)
   45          Y     0       0       0       1       1
   46          Y1    1       0       0       0       0       0
   47          Y6 0.07    0.05    0.07     640     652     150   0.012
   48          Y7  100     652     115     650     125     648     140     640     200     640
   49          Y7  240     644     282     648     324     652
   50          K     1       5       0       0       0       0       1
   51          K1   1ST DOWNSTREAM CROSS SECTION  **DAMAGE CENTER**
   52          Y     0       0       0       1       1
   53          Y1    1       0       0       0       0       0       0
   54          Y6 0.07    0.05    0.07     602     611    4400  0.0086
   55          Y7  100     611     200     606     220     605     225     602     245     602
   56          Y7  248     604     323     606     350     611
   57          K     1       6       0       0       0       0       1
   58          K1   2ND DOWNSTREAM CROSS SECTION  ** DAMAGE CENTER **
   59          Y     0       0       0       1       1
   60          Y1    1       0       0       0       0       0       0
   61          Y6 0.07    0.05    0.07     601     611     100    0.01
   62          Y7  100     611     162     605     183     603     188     601     208     601
   63          Y7  213     603     290     606     318     611
   64          K    99

1                        PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                         RUNOFF HYDROGRAPH AT          1
                         ROUTE HYDROGRAPH TO           1
                         ROUTE HYDROGRAPH TO           2
                         ROUTE HYDROGRAPH TO           3
                         ROUTE HYDROGRAPH TO           4
                         ROUTE HYDROGRAPH TO           5
                         ROUTE HYDROGRAPH TO           6
                         END OF NETWORK

1**********
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  01 APR 80
```

VALLEY VIEW LAKE

BREACH ANALYSIS

DAM BREACH DATA

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
75.	1.00	647.00	.33	656.75	670.00

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

PEAK OUTFLOW IS 516. AT TIME 42.00 HOURS

DAM BREACH DATA

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
75.	1.00	647.00	.33	656.75	660.70

STATION 1, PLAN 2, RATIO 1

BEGIN DAM FAILURE AT 41.75 HOURS

PEAK OUTFLOW IS 5215. AT TIME 42.05 HOURS

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
75.	1.00	647.00	1.00	656.75	660.70

STATION 1, PLAN 3, RATIO 1

PEAK OUTFLOW IS 2295. AT TIME 42.44 HOURS

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
75.	1.00	647.00	2.00	656.75	660.70

STATION 1, PLAN 4, RATIO 1

PEAK OUTFLOW IS 1384. AT TIME 42.96 HOURS

VALLEY VIEW LAKE
BREACH ANALYSIS
Page 2/n

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE FLOWS THRU 1ST DOWNSTREAM CROSS SECTION (SPILLWAY)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0700	.0500	.0700	647.5	664.0	40.	.25000

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

100.00	664.00	117.00	661.00	150.00	651.40	155.00	647.50	165.00	647.50
170.00	651.40	178.00	656.00	195.00	664.00				

STORAGE	0.00	.01	.02	.03	.05	.06	.08	.11	.13	.16
	.20	.23	.28	.32	.37	.42	.48	.54	.61	.68
OUTFLOW	0.00	118.98	387.85	789.21	1325.13	2074.59	3072.23	4277.73	5709.50	7384.11
	9315.85	11519.25	14017.07	16825.14	19958.85	23433.15	27189.78	31263.85	35774.01	40740.05
STAGE	647.50	648.37	649.24	650.11	650.97	651.84	652.71	653.58	654.45	655.32
	656.18	657.05	657.92	658.79	659.66	660.53	661.39	662.26	663.13	664.00
FLOW	0.00	118.98	387.85	789.21	1325.13	2074.59	3072.23	4277.73	5709.50	7384.11
	9315.85	11519.25	14017.07	16825.14	19958.85	23433.15	27189.78	31263.85	35774.01	40740.05

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE FLOWS THRU 2ND DOWNSTREAM CROSS SECTION

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0700	.0500	.0700	641.8	654.0	110.	.05200

VALLEY VIEW LAKE
BREACH ANALYSIS
page 3/7

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

100.00	654.00	120.00	648.00	133.00	644.00	140.00	641.80	165.00	641.80
170.00	644.00	205.00	649.00	238.00	654.00				

STORAGE	0.00	.04	.09	.15	.21	.28	.36	.45	.56	.67
	.80	.93	1.08	1.24	1.40	1.58	1.77	1.97	2.17	2.39
OUTFLOW	0.00	82.83	269.41	543.91	931.66	1439.06	2054.95	2785.22	3635.46	4611.18
	5717.62	6960.12	8347.04	9880.67	11565.04	13404.90	15404.98	17569.97	19904.49	22413.12
STAGE	641.80	642.44	643.08	643.73	644.37	645.01	645.65	646.29	646.94	647.58
	648.22	648.86	649.51	650.15	650.79	651.43	652.07	652.72	653.36	654.00
			269.41	543.91	931.66	1439.06	2054.95	2785.22	3635.46	4611.18

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE FLOWS THRU 3RD DOWNSTREAM CROSS SECTION (SPILLWAY)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

GLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
.0700	.0500	.0700	640.0	652.0	150.	.01200

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

100.00 652.00 115.00 650.00 125.00 648.00 140.00 640.00 200.00 640.00
240.00 644.00 282.00 648.00 324.00 652.00

STORAGE	0.00	.14	.29	.46	.65	.86	1.08	1.31	1.57	1.84
	2.13	2.43	2.75	3.09	3.45	3.83	4.23	4.66	5.11	5.58
OUTFLOW	0.00	92.96	302.16	609.17	1010.34	1505.75	2097.10	2847.88	3734.04	4727.86
	5830.95	7044.90	8371.37	9835.42	11467.68	13228.10	15120.08	17147.00	19315.78	21630.77
STAGE	640.00	640.63	641.26	641.89	642.53	643.16	643.79	644.42	645.05	645.68
	646.32	646.95	647.58	648.21	648.84	649.47	650.11	650.74	651.37	652.00
FLOW	0.00	92.96	302.16	609.17	1010.34	1505.75	2097.10	2847.88	3734.04	4727.86
	5830.95	7044.90	8371.37	9835.42	11467.68	13228.10	15120.08	17147.00	19315.78	21630.77

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

1ST DOWNSTREAM CROSS SECTION ++DAMAGE CENTER++

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

GLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
.0700	.0500	.0700	602.0	611.0	4400.	.00860

VALLEY VIEW LAKE
BREACH ANALYSIS
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CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 611.00 200.00 606.00 220.00 605.00 225.00 602.00 245.00 602.00
248.00 604.00 323.00 606.00 350.00 611.00

STORAGE	0.00	.99	2.06	3.19	4.40	5.93	8.32	11.70	16.35	22.20
	28.69	35.76	43.40	51.62	60.42	69.79	79.74	90.26	101.36	113.03
OUTFLOW	0.00	15.98	51.10	101.32	165.31	247.15	354.39	500.80	696.08	959.11
	1291.05	1683.56	2137.88	2655.57	3238.41	3888.30	4607.22	5397.17	6260.19	7198.34
STAGE	602.00	602.47	602.95	603.42	603.89	604.37	604.84	605.32	605.79	606.26
	606.74	607.21	607.68	608.16	608.63	609.11	609.58	610.05	610.53	611.00

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

2ND DOWNSTREAM CROSS SECTION ** DAMAGE CENTER **

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0700	.0500	.0700	601.0	611.0	100.	.01000

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

100.00 611.00 162.00 605.00 183.00 603.00 188.00 601.00 208.00 601.00
213.00 603.00 290.00 606.00 318.00 611.00

STORAGE	0.00	.03	.05	.09	.12	.17	.25	.35	.47	.61
	.78	.96	1.14	1.34	1.55	1.77	2.00	2.23	2.48	2.74
OUTFLOW	0.00	20.82	67.55	136.04	228.13	358.93	531.92	756.82	1041.98	1394.93
	1836.81	2368.91	2975.98	3658.21	4416.25	5251.02	6163.62	7155.29	8227.37	9381.25
STAGE	601.00	601.53	602.05	602.58	603.11	603.63	604.16	604.68	605.21	605.74
	606.26	606.79	607.32	607.84	608.37	608.89	609.42	609.95	610.47	611.00
FLOW	0.00	20.82	67.55	136.04	228.13	358.93	531.92	756.82	1041.98	1394.93
	1836.81	2368.91	2975.98	3658.21	4416.25	5251.02	6163.62	7155.29	8227.37	9381.25

********** ********** ********** ********** **********

1

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

OPERATION	STATION	AREA	PLAN	RATIO	1
					.42
HYDROGRAPH AT	1	.52	1		547.
		(1.35)			(15.50)(
			2		547.
					(15.50)(
			3		547.
					(15.50)(
			4		547.
					(15.50)(
ROUTED TO	1	.52	1		516.
		(1.35)			(14.61)(
			2		4249.
					(120.31)(
			3		1790.
					(50.69)(
			4		1319.
					(37.35)(
ROUTED TO	2	.52	1		516.
		(1.35)			(14.60)(
			2		4241.
					(120.08)(
			3		1791.
					(50.71)(
			4		1319.
					(37.34)(
ROUTED TO	3	.52	1		516.
		(1.35)			(14.61)(
			2		4194.
					(118.76)(
			3		1796.
					(50.85)(
			4		1318.
					(37.31)(
ROUTED TO	4	.52	1		516.
		(1.35)			(14.60)(
			2		4073.
					(115.34)(
			3		1809.
					(51.21)(
			4		1314.
					(37.21)(
ROUTED TO	5	.52	1		507.
		(1.35)			(14.36)(
			2		2345.
					(66.40)(
			3		1546.
					(43.77)(
			4		1190.
					(33.70)(
ROUTED TO	6	.52	1		507.
		(1.35)			(14.36)(
			2		2368.
					(67.04)(
			3		1539.

VALLEY VIEW LAKE
BREACH ANALYSIS
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SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	656.75	656.75	660.20
STORAGE	35.	35.	72.
OUTFLOW	8.	8.	370.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.42	660.76	.56	78.	516.	3.00	42.00	0.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	656.75	656.75	660.20
STORAGE	35.	35.	72.
OUTFLOW	8.	8.	370.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.42	660.76	.56	78.	5215.	1.14	42.05	41.75

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	656.75	656.75	660.20
STORAGE	35.	35.	72.
OUTFLOW	8.	8.	370.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.42	660.76	.56	78.	2295.	1.31	42.44	41.75

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	656.75	656.75	660.20
STORAGE	35.	35.	72.
OUTFLOW	8.	8.	370.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.42	660.76	.56	78.	1384.	1.50	42.96	41.75

VALLEY VIEW LAKE DAM

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	516.	649.5	42.00

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	516.	643.7	42.00

PLAN 2 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	4241.	653.6	42.00

PLAN 2 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	4194.	647.3	42.00

PLAN 3 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1791.	651.5	42.50

PLAN 3 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1796.	645.4	42.50

PLAN 4 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1319.	651.0	43.00

PLAN 4 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1319.	[illegible]	[illegible]

VALLEY VIEW LAKE
BREACH ANALYSIS
page 6/7

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	516.	641.7	42.00

PLAN 2 STATION 4

RATI	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	4073.	645.3	42.00

PLAN 3 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1809.	643.5	42.50

PLAN 4 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1314.	642.9	43.00

PLAN 1 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	507.	605.3	42.25

PLAN 2 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	2345.	607.9	42.25

PLAN 3 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1546.	607.0	42.50

PLAN 4 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1190.	606.6	43.00

PLAN 1 STATION 6

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	507.	604.1	42.25

PLAN 2 STATION 6

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	2368.	606.8	42.25

PLAN 3 STATION 6

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1539.	605.9	42.50

PLAN 4 STATION 6

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.42	1187.	605.4	43.00

STATION 5 =

DOWNSTREAM DAMAGE CENTER #1. DAMAGE AT ELEV. 606.0

STATION 6 =

DOWNSTREAM DAMAGE CENTER #2 DAMAGE AT ELEV. 606.0

RECALL:

PLAN 1 = NON FAILURE

ALL OTHER PLANS ARE BREACH CONDITIONS.

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1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  01 APR 80
**********************************
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VALLEY VIEW LAKE
BREACH ANALYSIS
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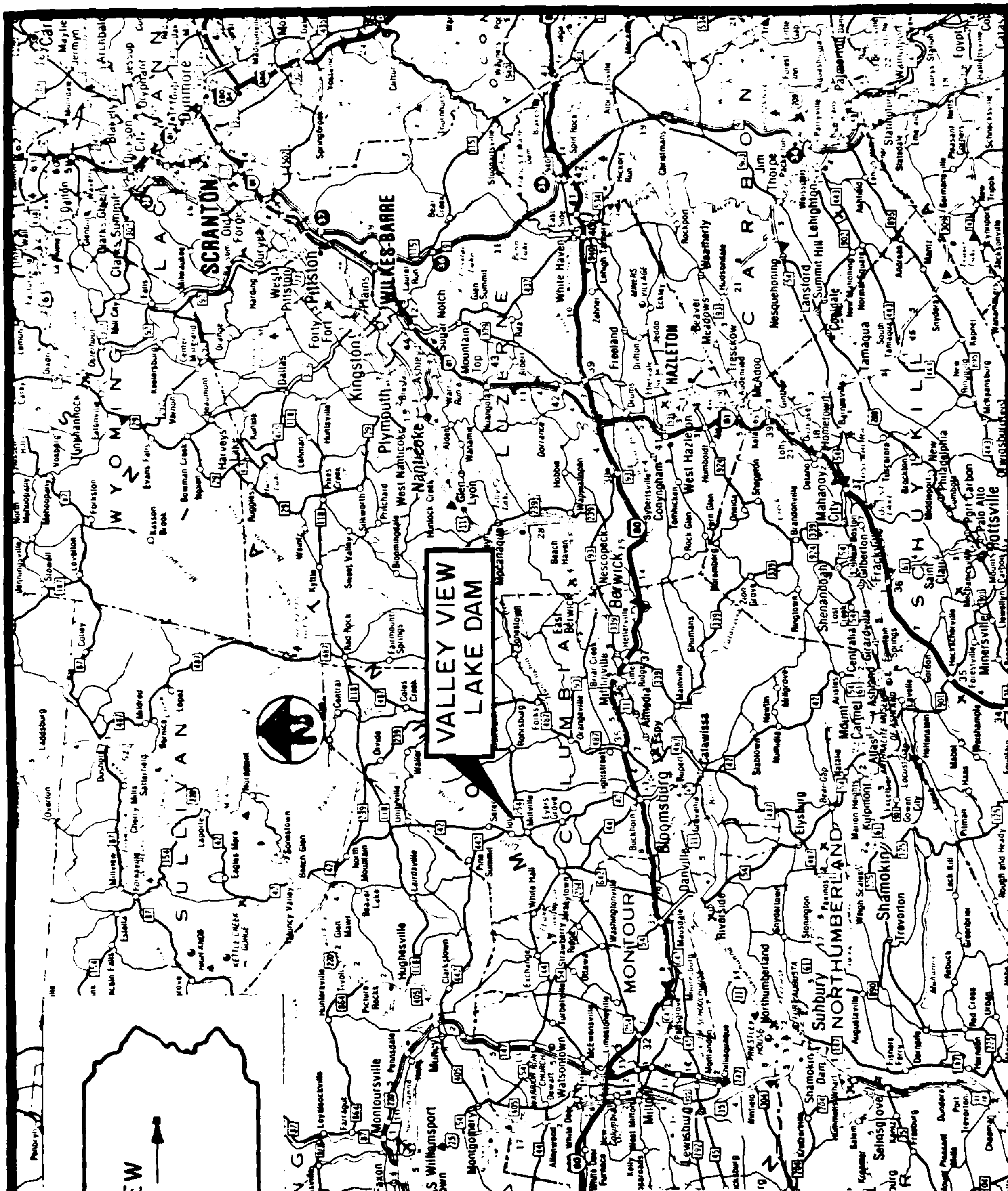
APPENDIX E

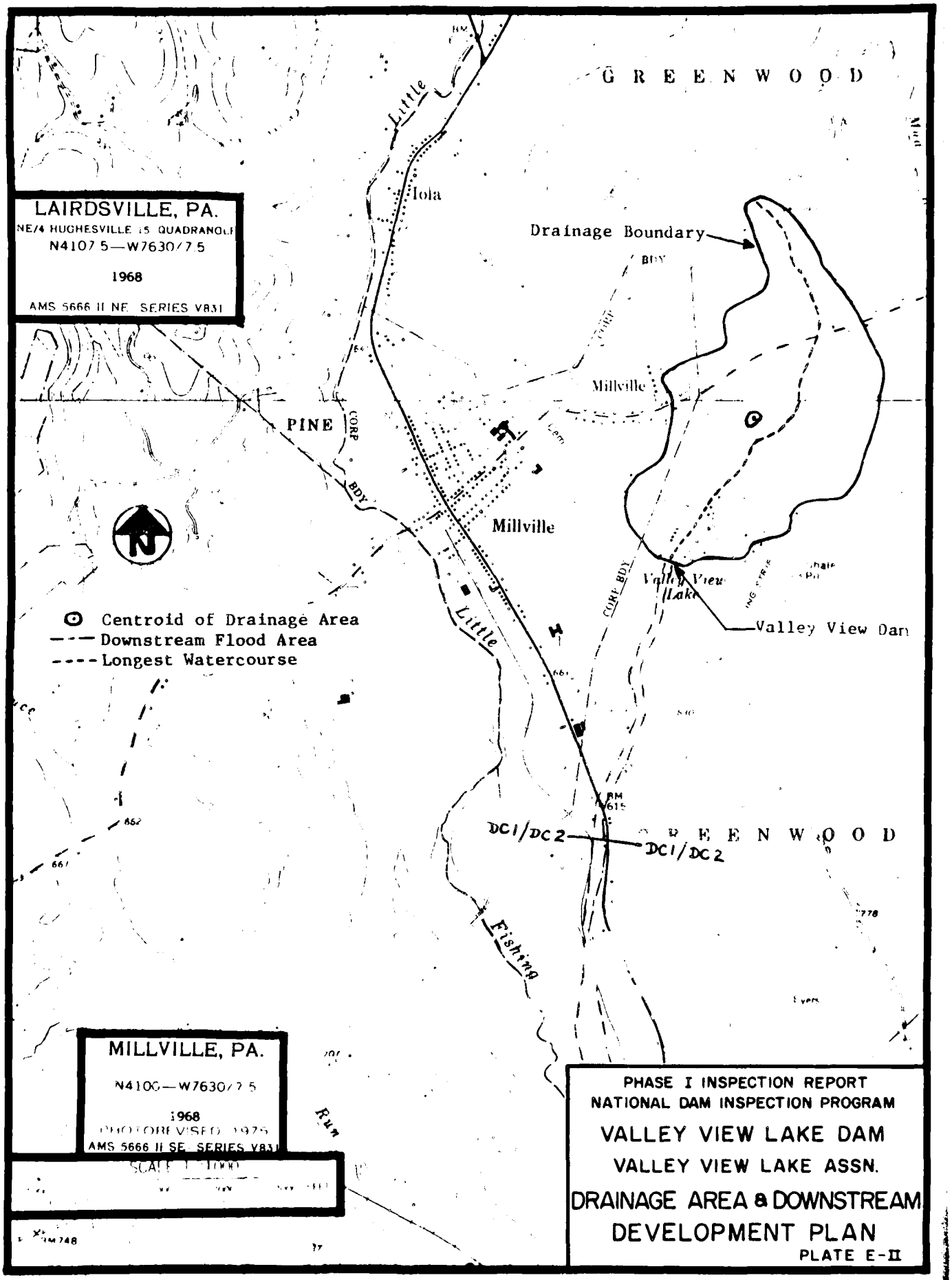
PLATES



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
VALLEY VIEW LAKE DAM
VALLEY VIEW LAKE ASSN.

LOCATION MAP

PLATE E-I

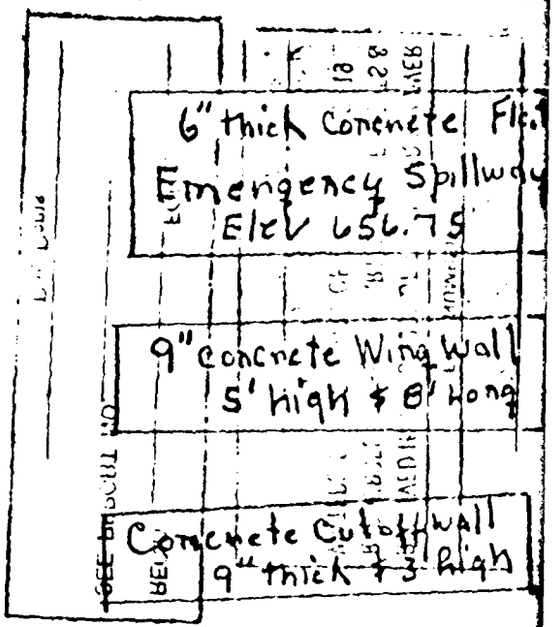

LAIRDSVILLE, PA.
NE/4 HUGHESVILLE 15 QUADRANGLE
N4107 5—W7630/7 5
1968
AMS 5666 II NE SERIES V831
GREENWOOD
Little
Iola
Drainage Boundary
Millville
PINE
CORP BDY
Millville
Valley View Lake
Valley View Dam
Centroid of Drainage Area
Downstream Flood Area
Longest Watercourse
DC1/DC2
DC1/DC2
GREENWOOD
Fishing
MILLVILLE, PA.
N4100—W7630/7 5
1968
AMS 5666 II SE SERIES V831
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
VALLEY VIEW LAKE DAM
VALLEY VIEW LAKE ASSN.
DRAINAGE AREA & DOWNSTREAM DEVELOPMENT PLAN
PLATE E-II

Hibernson Dam

General Plan

No scale – Deminsons written

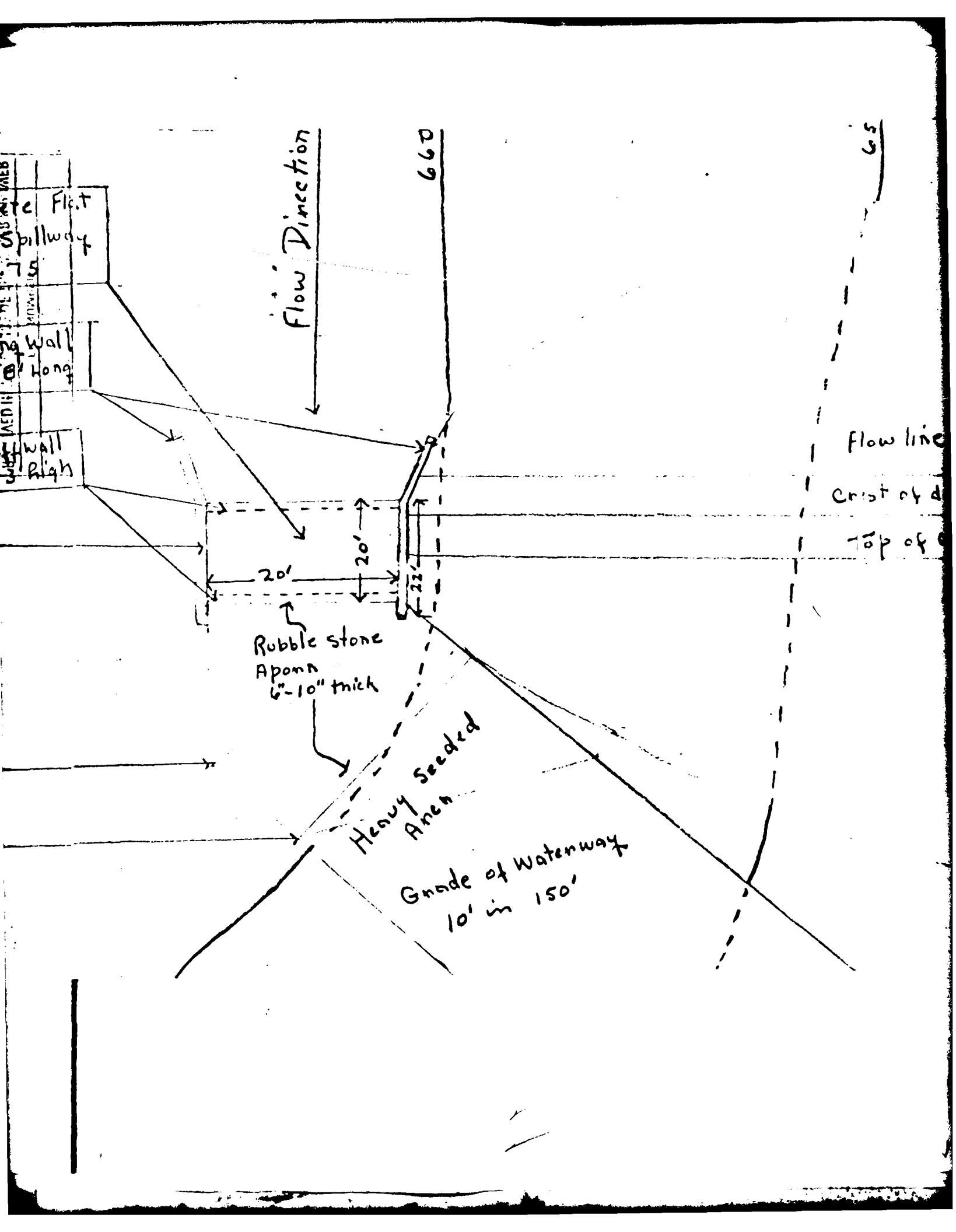
Revised May 26, 1958

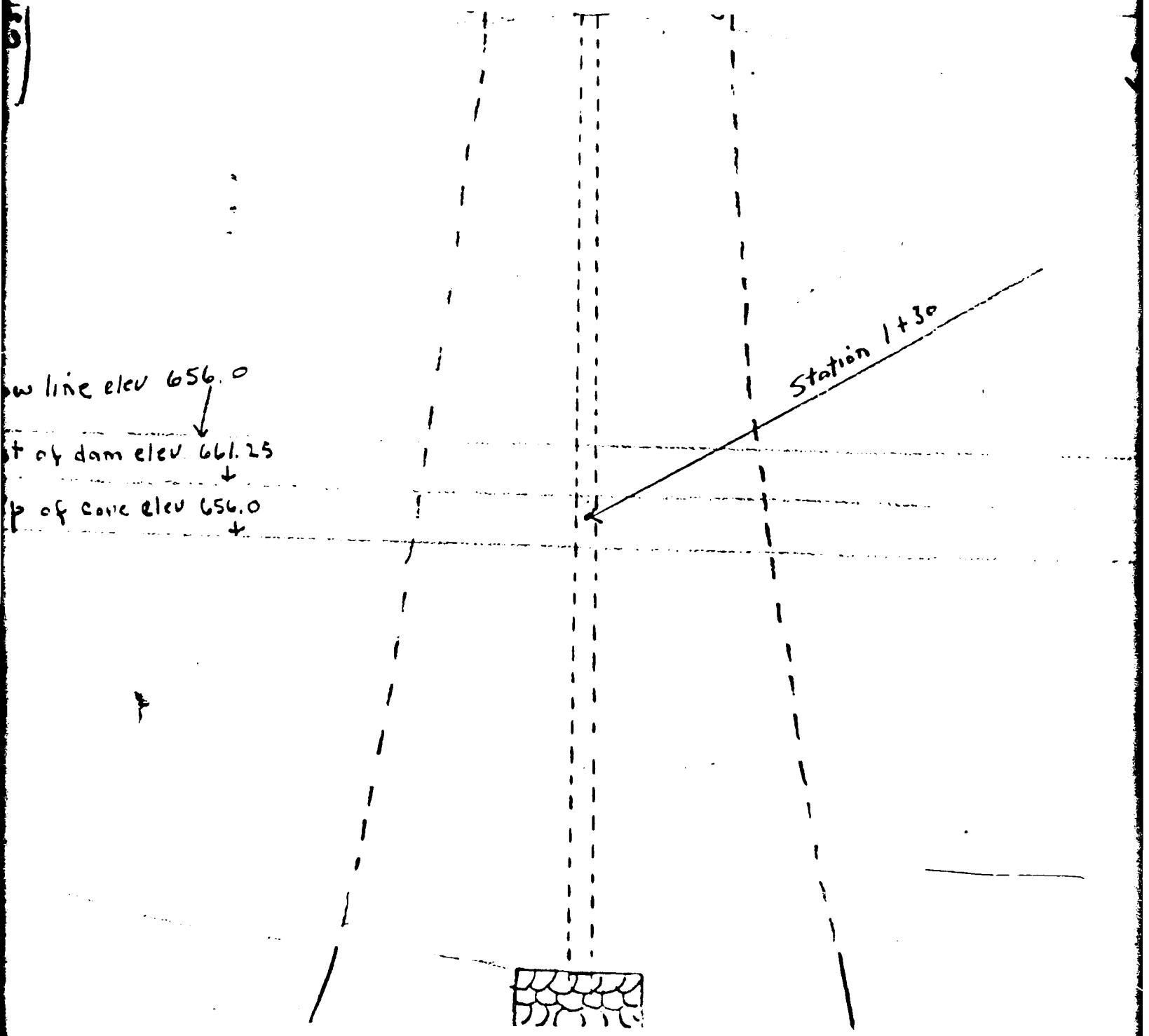


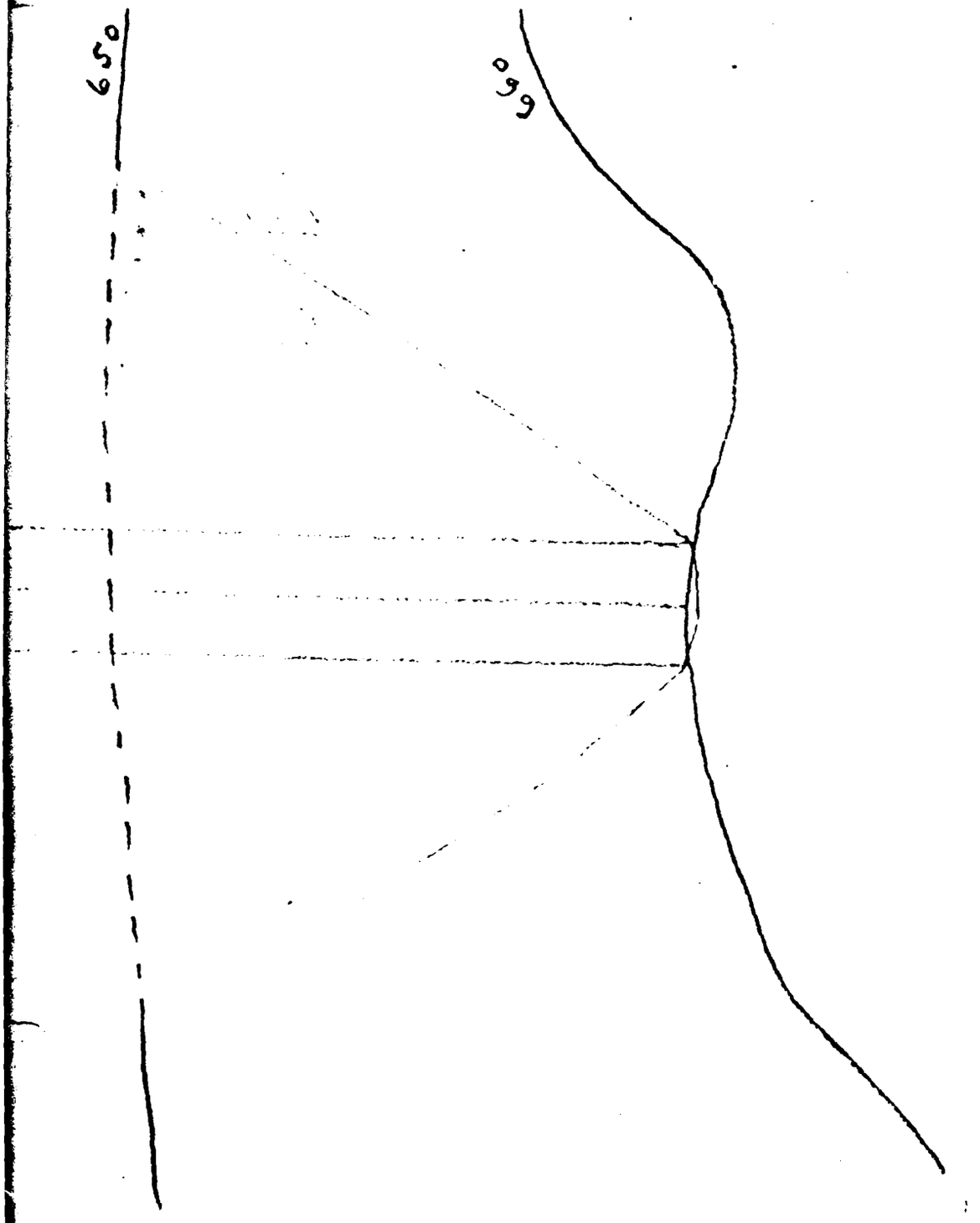
Elev Top of Walls 661.25

Elev 650.0

Elev 648.5


Flow Direction
660
65
Flow line
20'
20'
22'
Rubble stone
Apron
6"-10" thick
Heavy Seeded
Area
Grade of Waterway
10' in 150'


w line elev 656.0
t of dam elev 661.25
p of core elev 656.0
Station 1+30

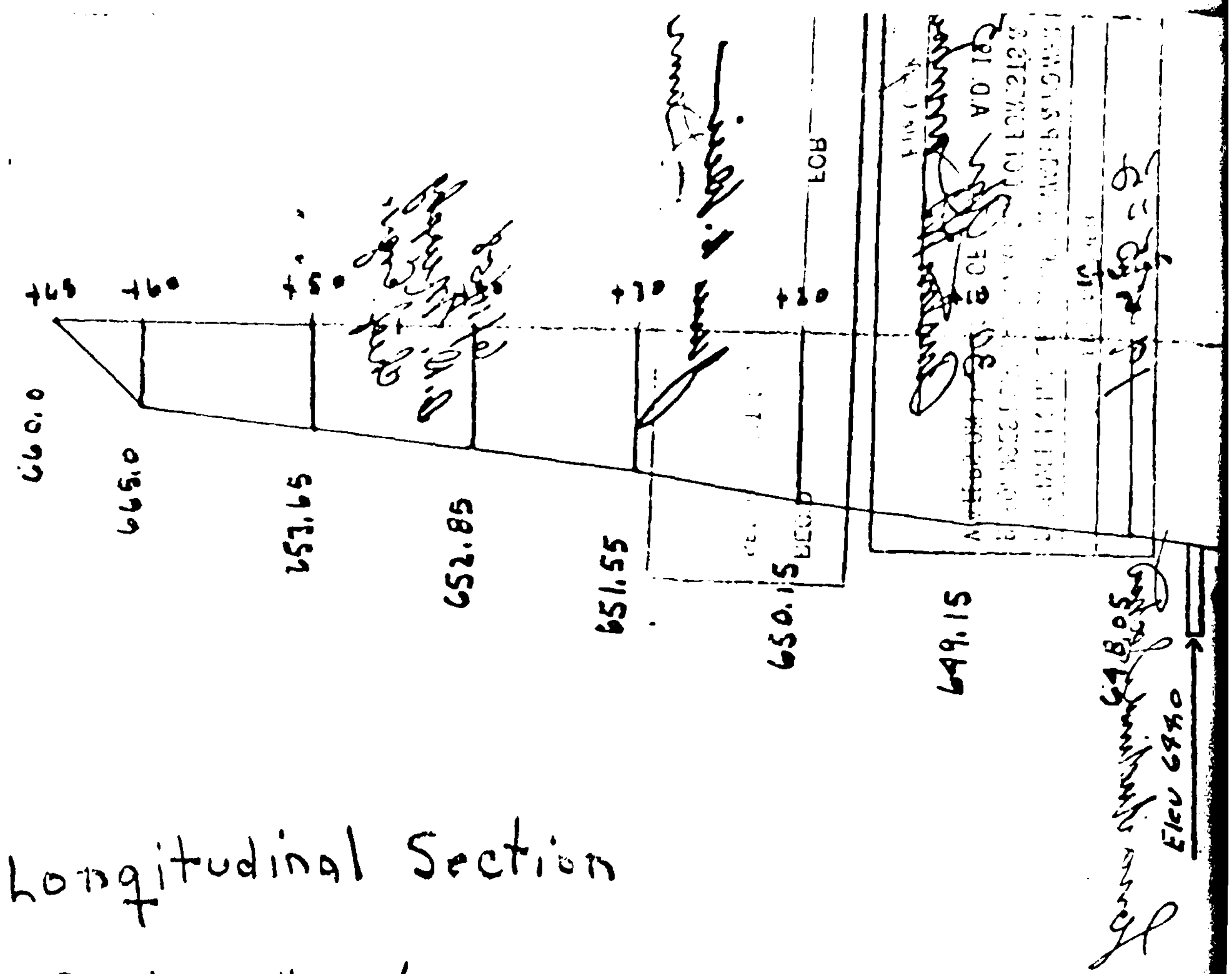


PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

VALLEY VIEW LAKE DAM

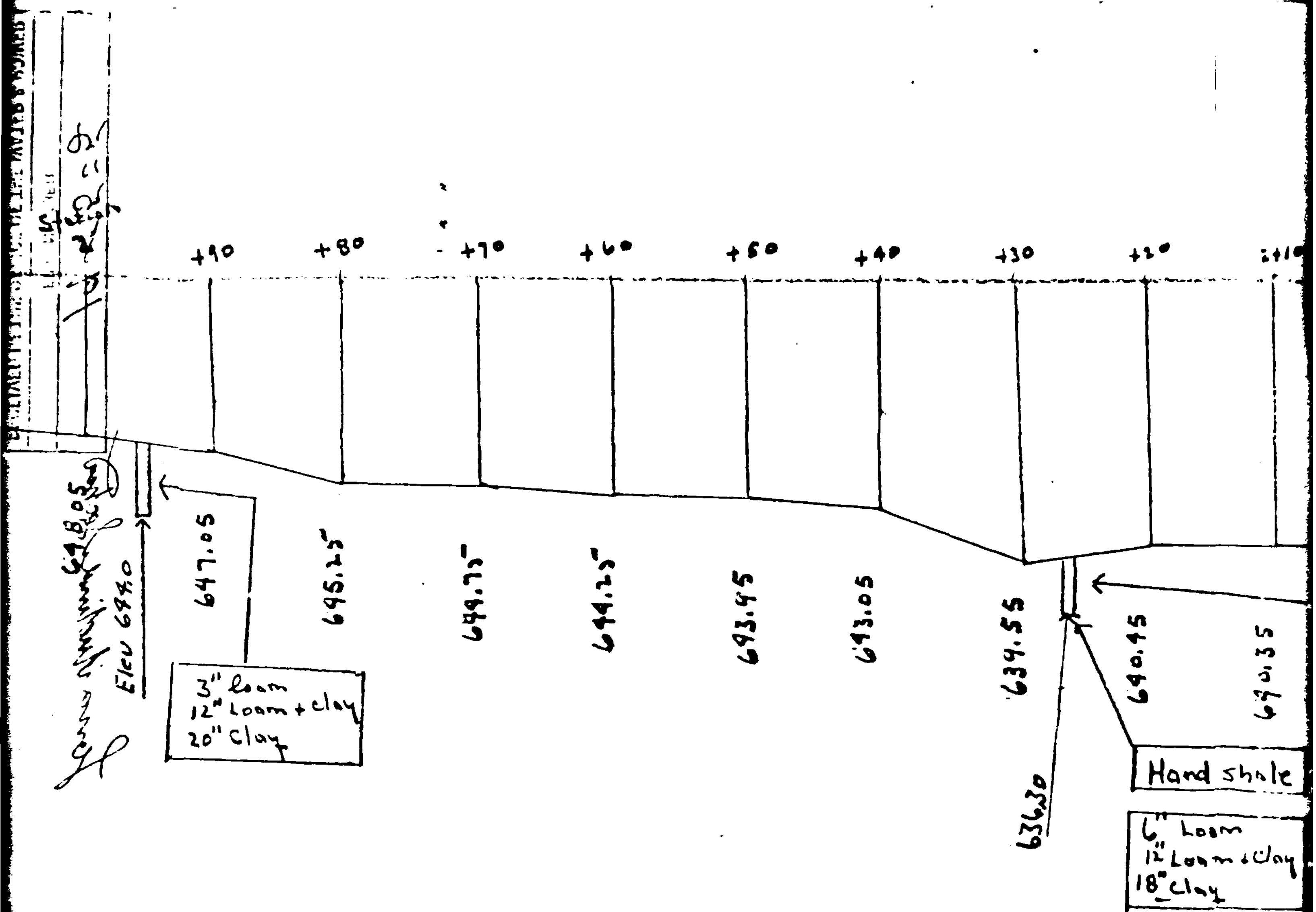
VALLEY VIEW LAKE ASSN.

PLATE E-III

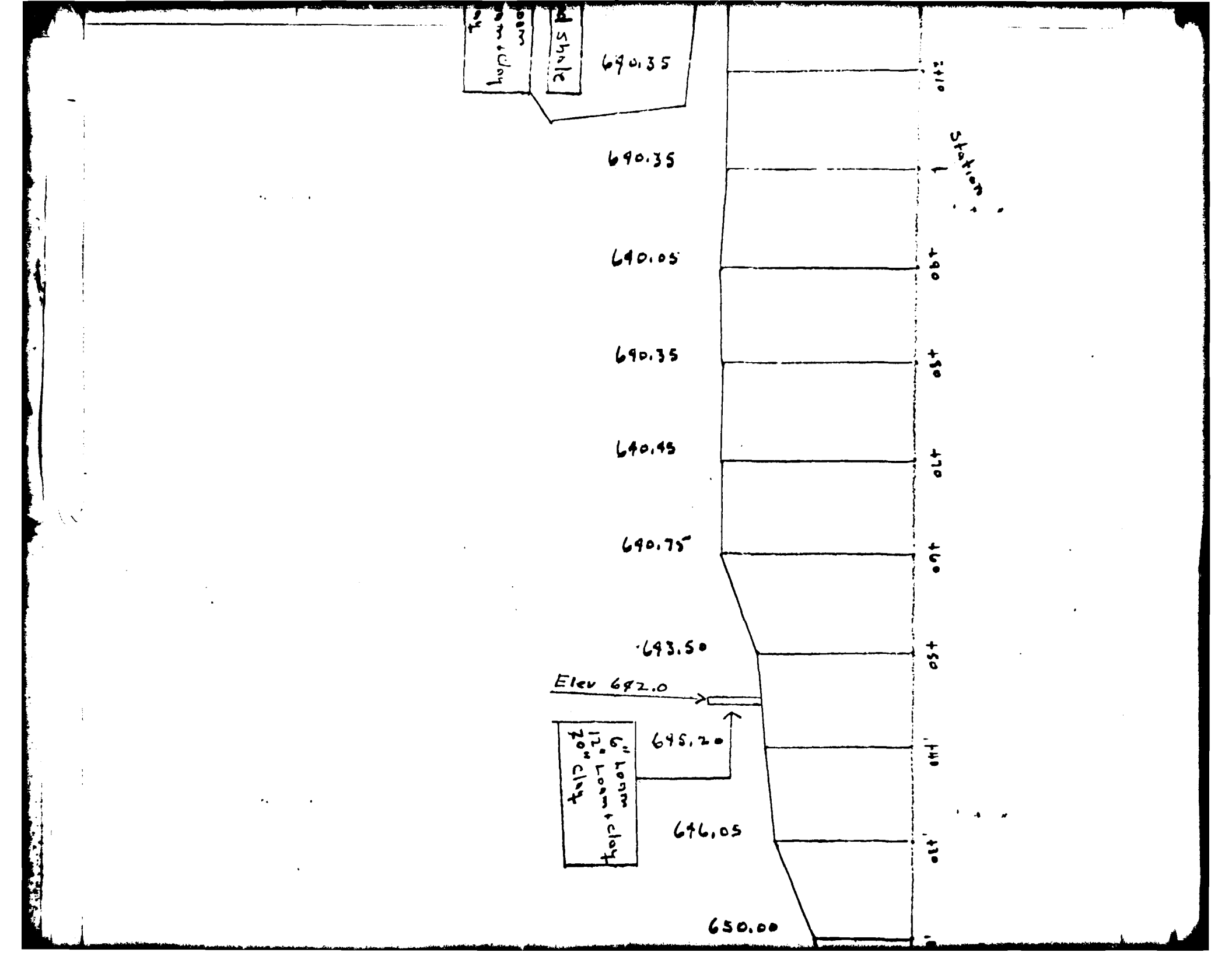


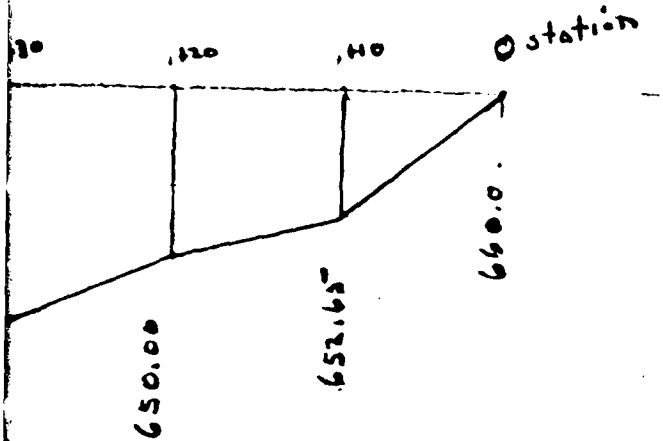
Longitudinal Section

Scale – 1" = 10'



+90
+80
+70
+60
+50
+40
+30
+20
+10
648.05
Elev 648.0
647.05
645.25
644.75
644.25
643.45
643.05
639.55
640.45
640.35
3" loam
12" Loam + clay
20" Clay
636.30
Hard shale
6" Loam
12" Loam + Clay
18" Clay


690.35
690.35
690.05
690.35
690.45
690.75
693.50
Elev 692.0
695.20
696.05
650.00
Station
2+10
1
0+50
0+90
0+50
0+70
0+90
0+50
1+10
1+30



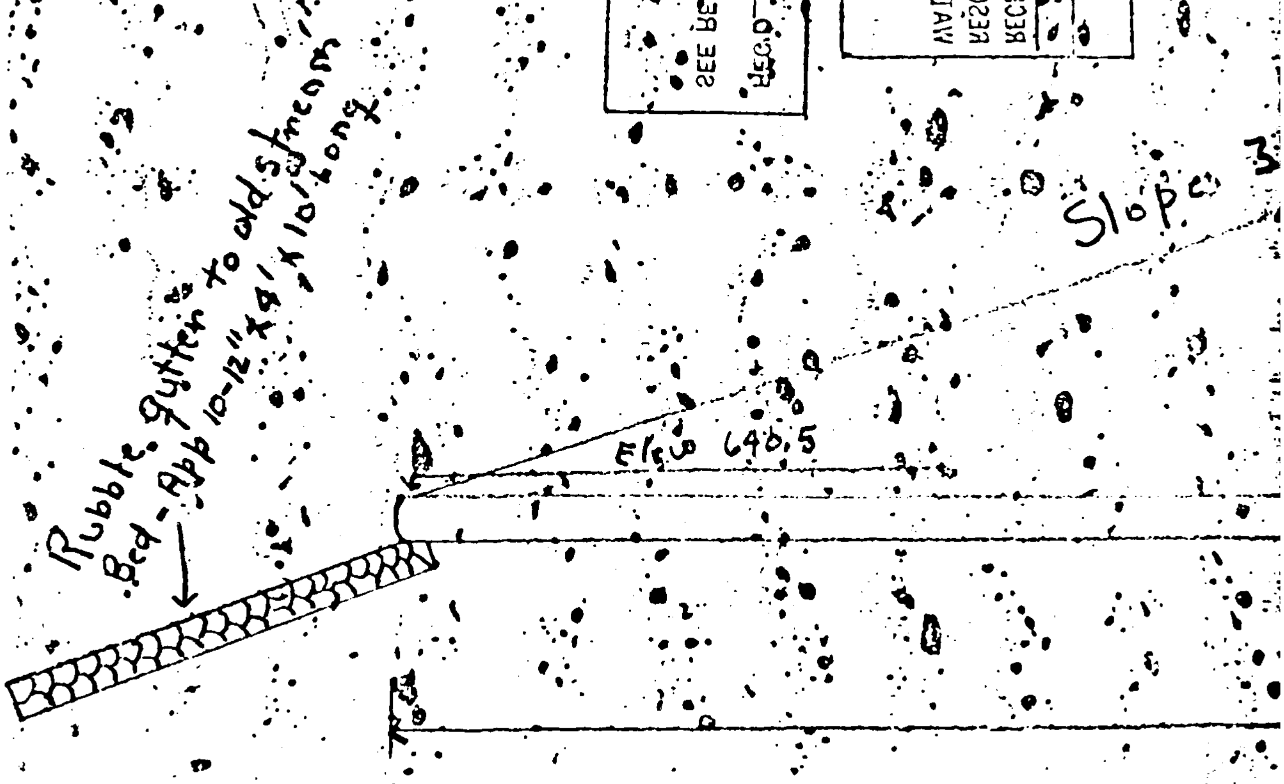
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

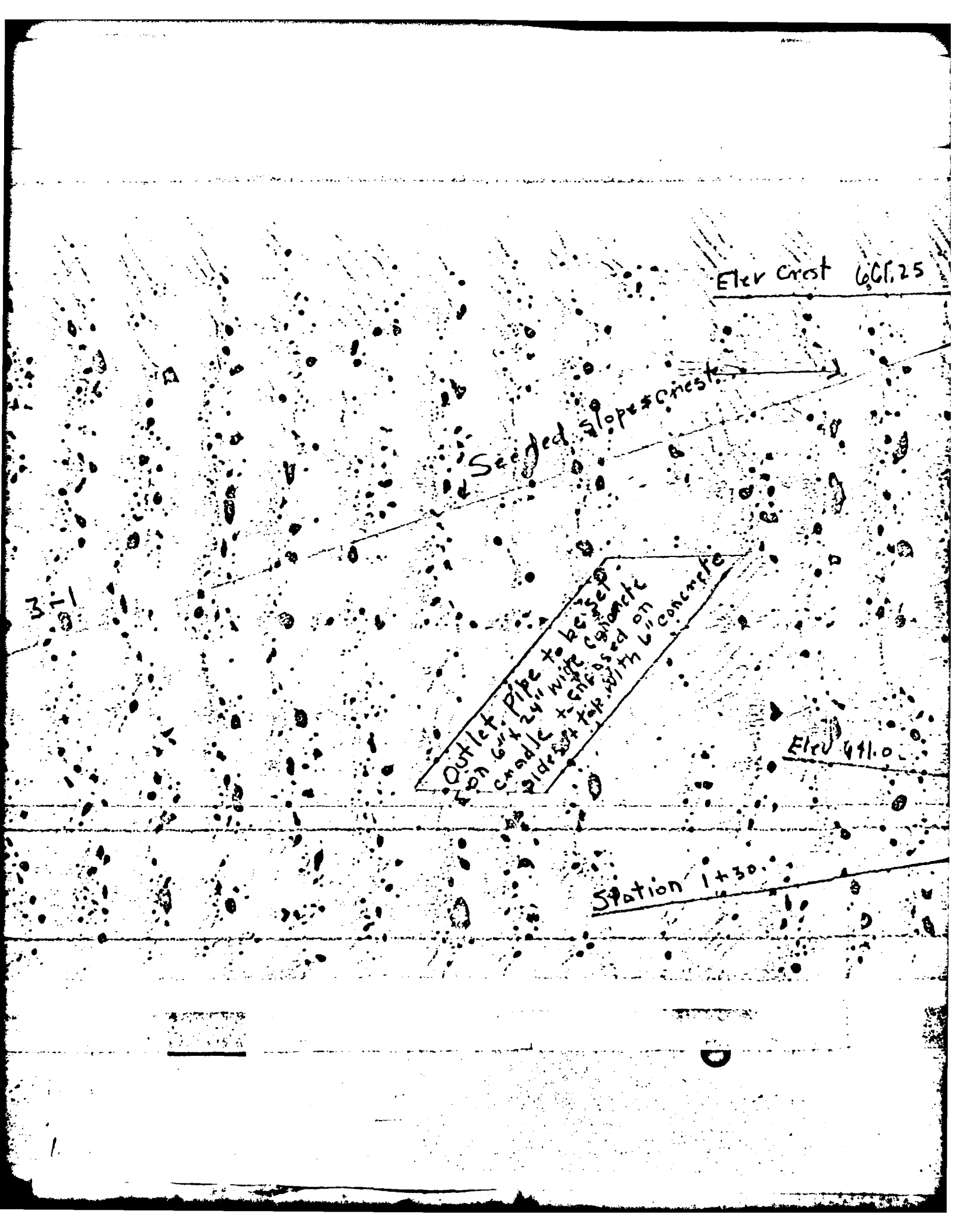
VALLEY VIEW LAKE DAM

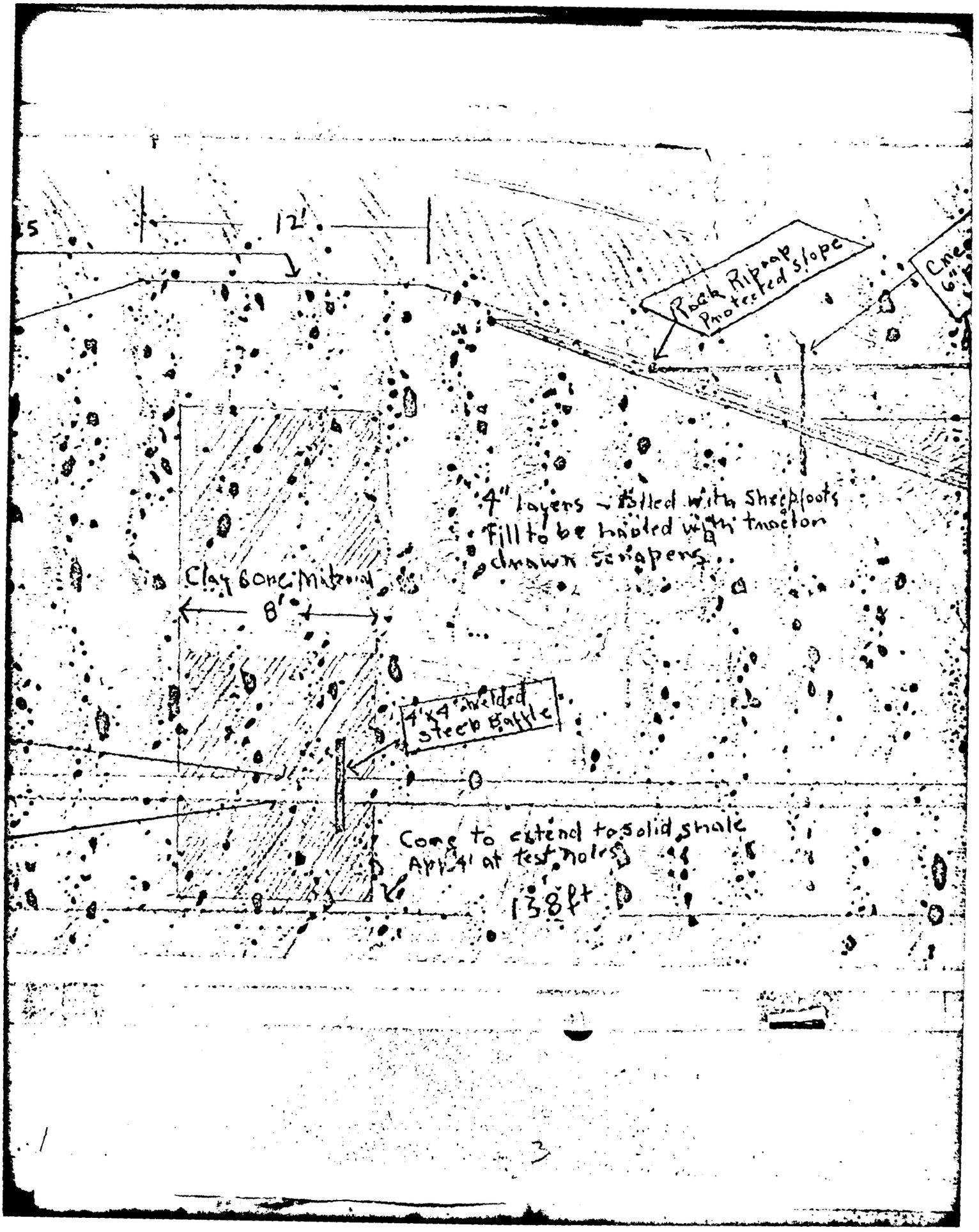
VALLEY VIEW LAKE ASSN.

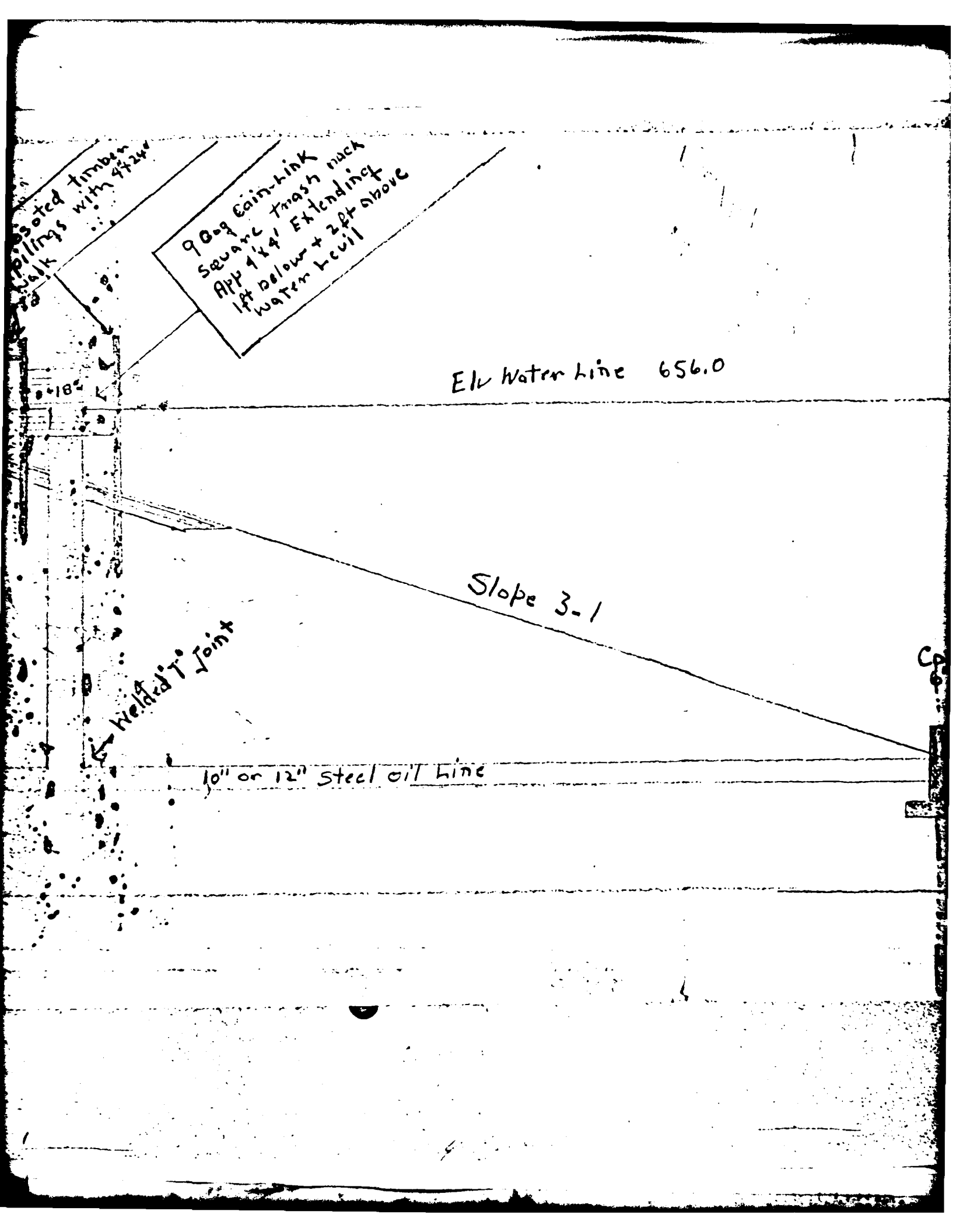
PLATE E-IV

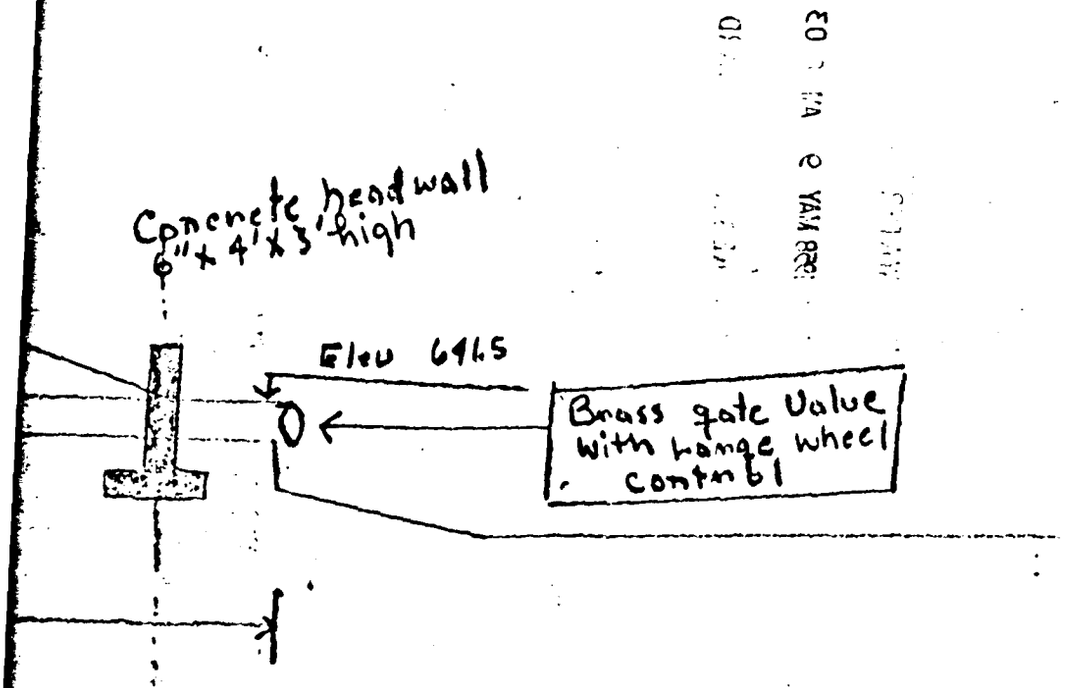
Cross Section
Station 1+30
Scale 1/4 in = 1 ft.
Revised May 8, 1958




Elev Crest 660.25
Seeded Slopes Crest
3:1
Outlet Pipe to be set on 6" x 24" wide concrete cradle + encased on sides & top with 6" concrete
Elev 641.0
Station 1+30

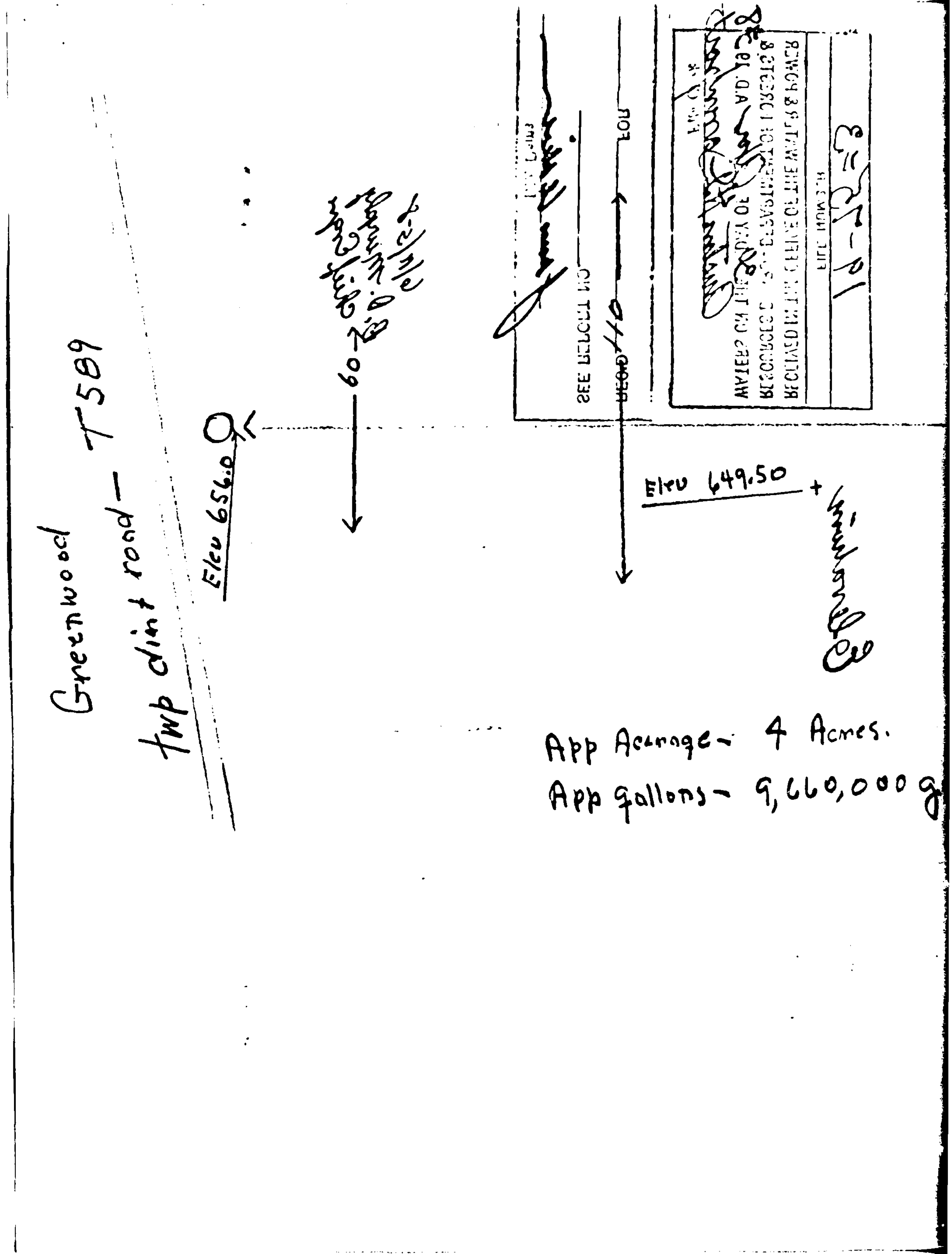

5
12'
Rock Riprap Protected Slope
4" layers - filled with Sheepfoots
Fill to be hauled with tractor drawn scrapers
Clay Core Material
8'
4'x4' welded steel Baffle
Core to extend to solid shale
Appx at test holes
138ft


Bossted timber
pilings with 4'x4'
walk
90 sq Cain-link
square trash rack
App 4'x4' Extending
1ft below + 2ft above
water Level
Elv Water Line 656.0
18"
Slope 3-1
Welded 'T' Joint
10" or 12" Steel oil Line



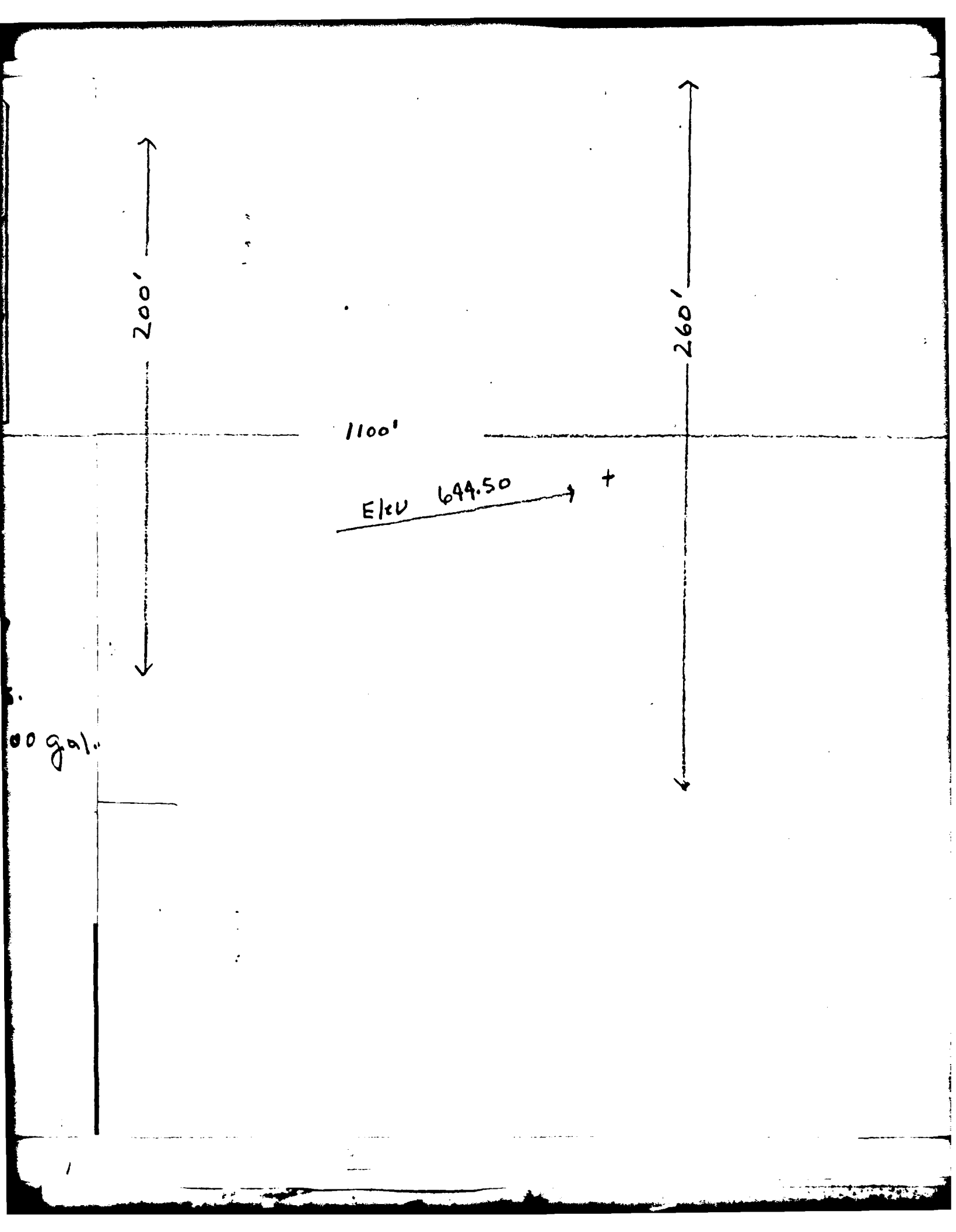
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
VALLEY VIEW LAKE DAM
VALLEY VIEW LAKE ASSN.

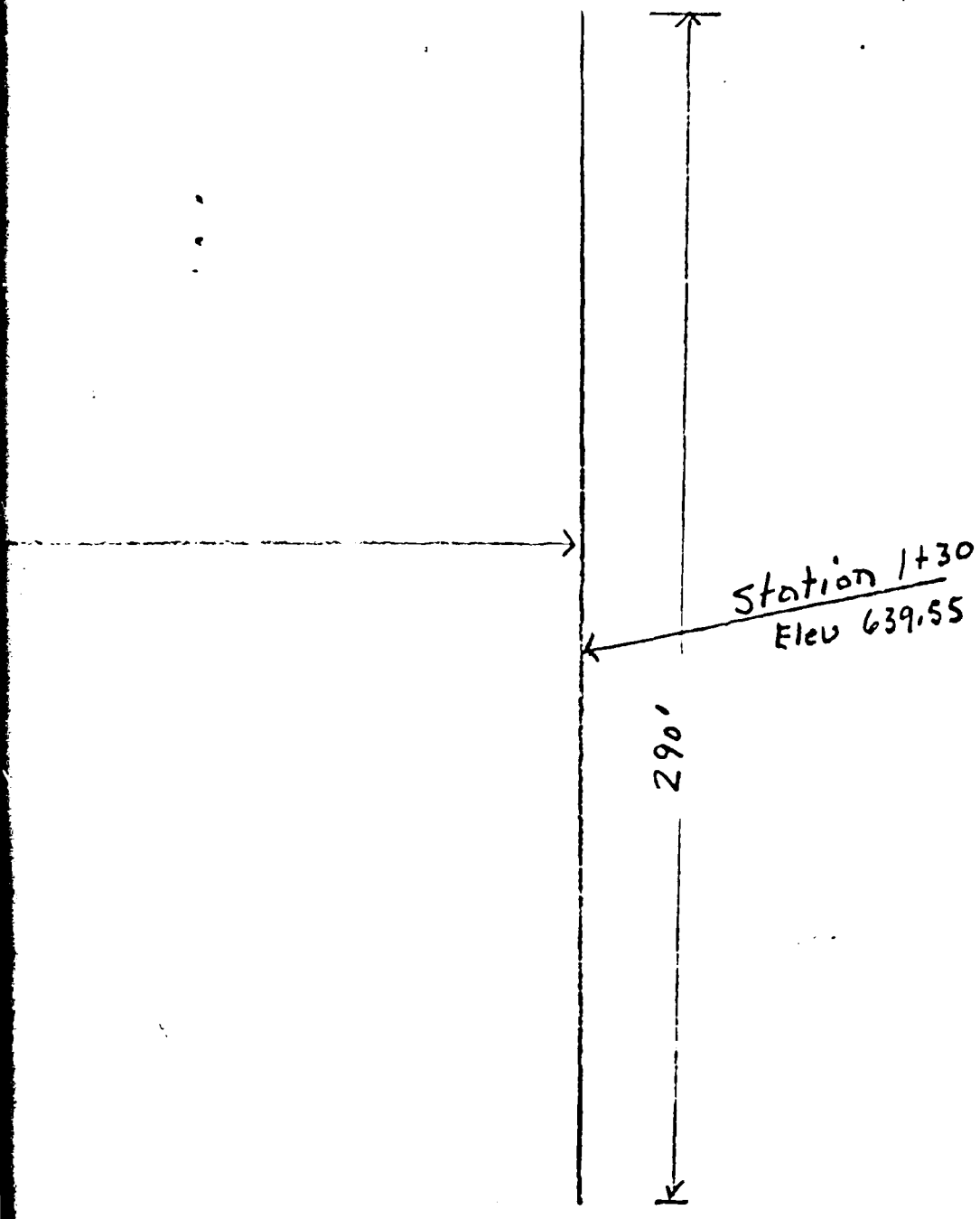
PLATE E-V



App Acreage - 4 Acres.

App gallons - 9,660,000 g


200'
260'
1100'
Elev 694.50
+
00 gal.



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

VALLEY VIEW LAKE DAM

VALLEY VIEW LAKE ASSN.

PLATE E-VI

APPENDIX F

GEOLOGY

GENERAL GEOLOGY

Bedrock at Valley View Lake (Northeast quadrant, Millville, Pa 7 1/2-minute quadrangle) is the Mahantango Formation. It is dark gray, silty claystone in poorly defined, massive beds 3 to 10 feet thick containing calcareous zones and pyrite, siderite and limestone nodules. At the dam site, beds are nearly flat lying, dipping only 3^{o} to 5^{o} from the horizontal. Joints are well developed and closely spaced. The formation is moderately to poorly resistant with the rock weathering to splintery and slabby fragments. Unconsolidated material overlying bedrock is glacial till along with weathered material from adjacent bedrock units with a combined thickness no greater than 10 feet at the dam. At the head of the lake bedrock is exposed.

LEGEND
(Bedrock)

Dmh Mahantango Formation

Gray, brown, and olive shale and silty claystone with some limestone and calcareous shale. A thin, resistant sandstone occurs near the middle by the formation in some areas.

Dtr Trimmers Rock Formation

Olive-gray siltstone and shale characterized by graded bedding; contains beds of fine-grained sandstone in some areas.

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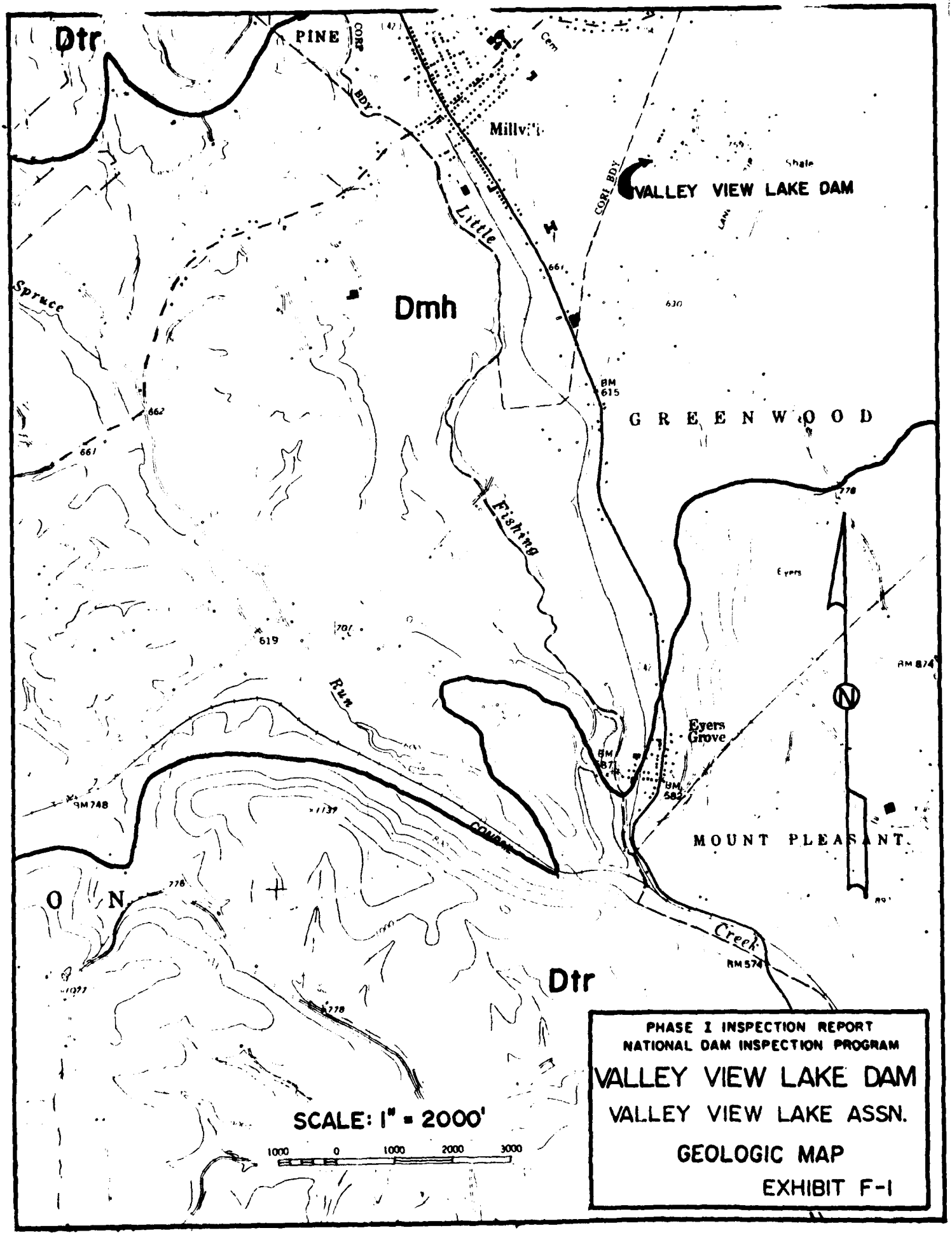
Dtr
PINE
CORP BDY
Millville
Cem
CORP BDY
Shale
VALLEY VIEW LAKE DAM
Little
Spruce
Dmh
BM 615
GREENWOOD
Fishing
Run
Eyers Grove
BM 582
MOUNT PLEASANT
RM 874
RM 748
RM 574
Creek
Dtr
SCALE: 1" = 2000'
1000 0 1000 2000 3000
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VALLEY VIEW LAKE DAM
VALLEY VIEW LAKE ASSN.
GEOLOGIC MAP
EXHIBIT F-1