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NATIONAL DAM INSPECTION PROGRAM. GREEN VALLEY FARMS DAM (NOI NJ--ETC(U)
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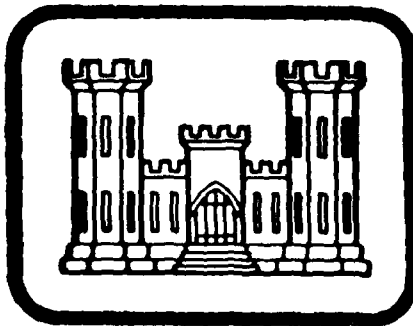
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DELAWARE RIVER BASIN
GREEN VALLEY FARMS DAM
MRS. ELEANOR M. REYNOLDS

NDI NO. PA-01101
DER NO. 15-307

CHESTER COUNTY, PENNSYLVANIA

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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

BY
Berger Associates
Harrisburg, Pennsylvania 17105
Contract DACW31-81-C-0013

JUNE 1981

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PREFACE

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

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

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

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway 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.

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
BRIEF ASSESSMENT OF GENERAL CONDITIONS
AND RECOMMENDATIONS

Name of Dam: GREEN VALLEY FARMS DAM
State & State No.: PENNSYLVANIA, 15-307
County: CHESTER COUNTY
Stream: TROUT RUN
Date of Inspection: APRIL 10, 1981

Based on the visual inspection, past performance and the available engineering data, the dam and its appurtenant structures appear to be in fair condition.

In accordance with the Corps of Engineers' evaluation guidelines, the size classification of this dam is small and the hazard classification is high. These classifications indicate that the Spillway Design Flood (SDF) should be in the range of one-half the Probable Maximum Flood (PMF) to the full PMF. The recommended SDF is one-half the PMF. The spillway capacity is adequate for passing only 14 percent of the PMF peak inflow without overtopping the dam. The spillway is considered to be inadequate.

The following recommendations are presented for immediate action by the owner:

- (1) That provisions be made to provide an adequate spillway capacity;
2. That the 12-inch CMP be cleared of obstructions on a regular basis;
3. That the upstream slope be protected from wave action erosion, and that brush and weed growth on the slope be controlled on a regular basis;
4. That the 4-inch drawdown valve be maintained and operated on a regular basis;

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GREEN VALLEY FARMS DAM

NDI NO. PA-01101

DER NO. 15-307

ELEANOR M. REYNOLDS

CHESTER COUNTY

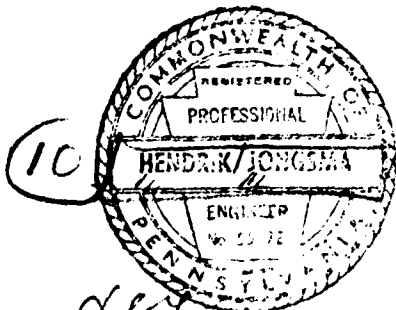
- 5) That provisions be made for upstream closure of the drawdown pipe in case of an emergency;
- 6) That the fence across the spillway discharge channel be relocated to preclude obstruction of the flow;
- 7) That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall; and
- 8) That an operation and maintenance manual be prepared for guidance in the operation of the dam during normal and emergency conditions, and that a schedule be developed for the annual inspection of the dam and its appurtenant structures.

SUBMITTED BY:

APPROVED BY:

BERGER ASSOCIATES, INC.
HARRISBURG, PENNSYLVANIA

DATE: June 5, 1981



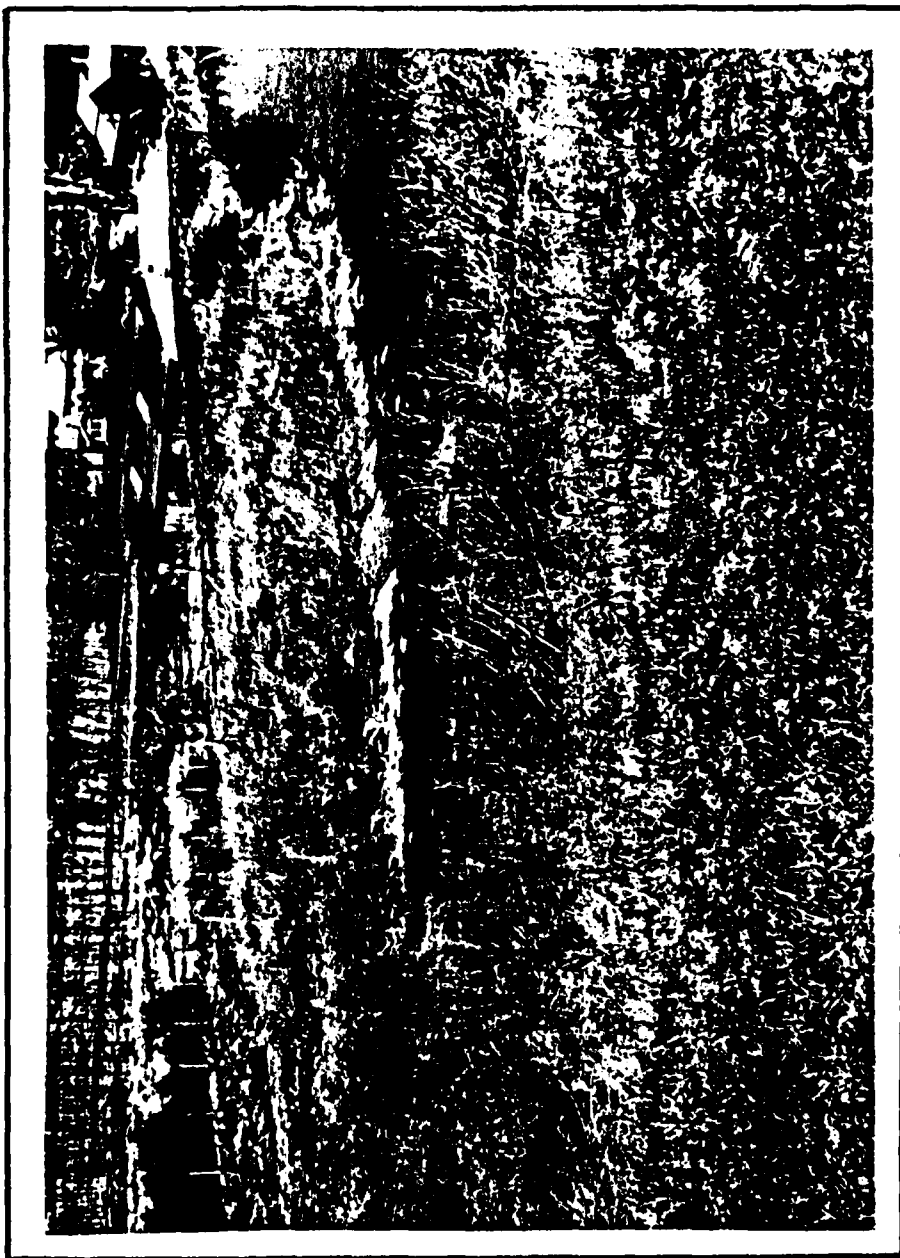
James W. Peck
JAMES W. PECK
Colonel, Corps of Engineers
Commander and District Engineer

DATE: 17 June 1981

⑮ DACW 31-81-C-0013

⑥

National Dam Inspection Program.
Green Valley Farms Dam (NDI Number
PA-01101, DER Number 15-307), ~~Delaware~~
Delaware River Basin, Chester County,
Pennsylvania. Phase I Inspection Report,



OVERVIEW
GREEN VALLEY FARMS DAM
Photograph No. 1

TABLE OF CONTENTS

	<u>Page</u>
SECTION 1 - <u>PROJECT INFORMATION</u>	
1.1 GENERAL	1
1.2 DESCRIPTION OF PROJECT	1
1.3 PERTINENT DATA	2
SECTION 2 - <u>ENGINEERING DATA</u>	
2.1 DESIGN	5
2.2 CONSTRUCTION	5
2.3 OPERATION	5
2.4 EVALUATION	5
SECTION 3 - <u>VISUAL INSPECTION</u>	
3.1 FINDINGS	7
3.2 EVALUATION	8
SECTION 4 - <u>OPERATIONAL PROCEDURES</u>	
4.1 PROCEDURES	9
4.2 MAINTENANCE OF DAM	9
4.3 MAINTENANCE OF OPERATING FACILITIES	9
4.4 WARNING SYSTEM	9
4.5 EVALUATION	9
SECTION 5 - <u>HYDROLOGY/HYDRAULICS</u>	
5.1 EVALUATION OF FEATURES	10
SECTION 6 - <u>STRUCTURAL STABILITY</u>	
6.1 EVALUATION OF STRUCTURAL STABILITY	12
SECTION 7 - <u>ASSESSMENT AND RECOMMENDATIONS</u>	
7.1 DAM ASSESSMENT	13
7.2 RECOMMENDATIONS	13
APPENDIX A - CHECK LIST OF VISUAL INSPECTION REPORT	
APPENDIX B - CHECK LIST OF ENGINEERING DATA	
APPENDIX C - PHOTOGRAPHS	
APPENDIX D - HYDROLOGY AND HYDRAULIC CALCULATIONS	
APPENDIX E - PLATES	
APPENDIX F - GEOLOGIC REPORT	

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

GREEN VALLEY FARMS DAM

NDI NO. PA-01101

DER NO. 15-307

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 inspections of 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

Note: A design drawing for the spillway (Plate III, Appendix E) indicates a spillway elevation (normal pool) of 121.0. It was estimated from the U.S.G.S. Quadrangle sheet that normal pool elevation is 330. Elevation 330 was used as the invert elevation of the overflow pipe in the spillway.

Green Valley Farms Dam is an earthfill structure constructed along a curved centerline with two tangent sections near the abutments. The length of the embankment is about 680 feet and its maximum height is about 23 feet. Several barns and a silo are located immediately downstream of the toe of the embankment. An earth lined spillway is located in the left abutment. The original spillway was modified after construction by placement of a 12-inch diameter CMP on the crest and placement of about 2.5 feet of fill on the crest. This was done to gain vehicle access across the spillway. Inflow now discharges through the 12-inch diameter CMP until the water level reaches the crest of the raised spillway elevation. The spillway was constructed as a grass lined channel. The reservoir can be drained through a four inch line which has a downstream valve control. A toe drain was installed after completion of the dam to intercept any subsurface seepage from the reservoir. Several lagoons are located downstream of the dam.

- B. Location: Newgarden Township, Chester County
U.S.G.S. Quadrangle - West Grove, Pa.
Latitude 39°-49.4', Longitude 75°-46.0'
Appendix E, Plates I & II
- C. Size Classification: Small: Height - 23 feet
Storage - 80 acre-feet
- D. Hazard Classification: High (refer to Section 3.1.E.)
- E. Ownership: Mrs. Eleanor M. Reynolds
P.O. Box 506
Avondale, PA 19311
- F. Purpose: Farm use and fire protection
- G. Design and Construction History

Design drawings for the embankment do not exist. Construction of the dam was started in 1963. Material excavated from the reservoir was used in the construction of the embankment. After construction started, Geo-Technical Services, Harrisburg, Pennsylvania, was requested to survey the area and to design a spillway. Plate III, Appendix E shows the results of this survey and the spillway layout.

A toe drain was installed in 1970 or 1971 to intercept sub-surface water and thus prevent it from entering the downstream lagoons.

H. Normal Operating Procedures

There are no operating procedures at the present time. All inflow is discharged through the 12-inch CMP and the earth spillway. The valve on the four inch drawdown line has not been operated in at least the past eight years.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

From files:	.23
Computed for this report:	.21
Use:	.21

B. Discharge at Dam Site (cubic feet per second)
See Appendix D for hydraulic calculations.

Maximum known flood (estimated from gage records of nearby Middle Branch White Clay Creek)	145
--	-----

Outlet works at low pool level Elev. 330 (spillway crest - 4-inch pipe)	1.1
Outlet works at low pool Elev. 315	.5
Spillway capacity at pool Elev. 333.1 (low point of dam)	42
C. <u>Elevation</u> (feet above mean sea level)	
Top of dam (low point)	333.1
Top of dam (design crest)	333.0
Spillway crest	332.4
12-inch CMP invert	330.0
Upstream outlet invert (approximate)	309.4
Streambed at downstream toe	310
D. <u>Reservoir</u> (miles)	
Length of normal pool (Elev. 330.0)	.2
Length of maximum pool (Elev. 333.1)	.2
E. <u>Storage</u> (acre-feet)	
Spillway crest (Elev. 330)	55
Top of dam (Elev. 333.1)	80
F. <u>Reservoir Surface</u> (acres)	
Spillway crest (Elev. 330.0 - 12-inch CMP invert)	7.3
Top of dam (Elev. 333.1)	9.0
G. <u>Dam</u>	
Refer to Plates A-I, II and III in Appendix A for plan and section.	
Type:	Homogeneous earthfill.
Length:	680 feet.
Height:	23 feet.

Top Width: Design - 12 feet; Survey - 14 feet.

Side Slopes:		<u>Design</u>	<u>Surveyed</u>
	Upstream	3H to 1V	Varies
	Downstream	3H to 1V	3.8H to 1V

Zoning: None.

Cutoff: Unknown.

Grouting: None.

H. Outlet Facilities

Type: 4-inch pipe through embankment.

Closure: Valve at downstream toe.

Location: Near center of dam.

I. Spillway

Type: Uncontrolled, sod lined, broad crested weir and a 12-inch diameter CMP.

Length
of Weir: 48 feet.

Crest
Elevation: 330 (CMP); 332.4 (Emergency)

J. Regulating Outlets

See Section 1.3.H. above.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Engineering data for Green Valley Farms Dam is limited. Mr. Yachin of Geo-Technical Services, Harrisburg, Pennsylvania, stated that his company did not get involved with the project until the embankment had been partially constructed. A drawing prepared by this company indicates an area capacity curve. The spillway crest was designed to be 3 feet below the crest of the dam with a bottom width of 40 feet. The size of the dam did not require a permit from the Pennsylvania Department of Environmental Resources (PennDER).

2.2 CONSTRUCTION

There are no records of construction. The construction period was 1963 and 1964. The name of the contractor is unknown.

2.3 OPERATION

Records of operation are not maintained by the owner.

2.4 EVALUATION

A. Availability

The only available drawing (Plate III, Appendix E) was obtained from Geo-Technical Services. A representative of the owner stated that some records perhaps could be made available; however, a considerable effort would be required to locate these records.

B. Adequacy

Because of the lack of engineering and construction data, the assessment of the dam is based on the results of the visual inspection.

C. Operating Records

Operating records have not been maintained.

D. Post Construction Changes

The dam is located on an experimental farm. Several lagoons were constructed downstream from the dam for special treatment of cow manure. In 1970 or 1971, six inch diameter drains were installed to reduce the flow of subsurface water from the dam area into these lagoons. The pipes discharge the collected drainage into a well from which the water is piped to an area downstream from the lagoons. The system diverted about 70,000 to 100,000 gallons per day after its installation.

Farmland is located to the southwest of the left abutment. The owner's representative stated that to provide access to this land, a twelve inch pipe was placed in the spillway and fill was placed over the pipe. While this action provided a dry access road to the farmland, it also reduced the capacity of the spillway.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

A. General

The general appearance of Green Valley Farms Dam is fair. The upstream slope has been eroded by wave action and has a considerable amount of high weeds and some brush. The crest of the dam and the downstream slope are in good condition. The spillway appears to be small. There were no signs of structural instability or seepage.

The visual inspection check list and sketches of the general plan and profile of the dam, as surveyed during the inspection, are presented in Appendix A of this report. Photographs of the facilities taken during the inspection are reproduced in Appendix C.

Representatives of the owner accompanied the inspectors on the day of inspection. Due to the lack of formal information, this report is based partially on information received in the field. Files concerning this dam are in the owner's office but are unorganized and difficult to locate.

B. Embankment

The centerline of the dam was constructed along a curved alignment in its center section with tangents at both abutments (Plate A-I, Appendix A). The crest averages about 14 feet in width and has a good grass mat cover. The typical cross section (Plate A-III, Appendix A) indicates that the crest is sloped down toward the downstream side. The upstream slope has been eroded by wave action over at least half its length causing a nearly vertical three foot high embankment above normal pool level (Photograph No. 5). Weed growth and some brush are located on this slope.

The downstream slope varies over the length of the embankment. The right end of the embankment has a slope of about at 2.5H to 1V. Near the center of the dam at station 5+30 (Plate A-III) the average slope is 3.8H to 1V. The slope has a good grass mat cover. There were no signs of sloughage or seepage. A 30-inch diameter observation well is located near the downstream toe. Two drainpipes, estimated at 6-inch diameter, enter this well. One drain was active. Another pipe discharges the collected water from the well to the downstream area.

C. Appurtenant Structures

The spillway is located in the left abutment and consists of a grassed earth channel. The crest of this weir is only .7 foot below the low point in the dam crest profile (Plate A-II). A 12-inch CMP located in the spillway channel functions as the principal spillway. This pipe

is partially obstructed by weeds at the upstream end (Photograph No. 11) and with rocks at the downstream end. The owner's representatives stated that in order to provide access across the original spillway to the adjacent farmland, this 12-inch pipe was placed in the original spillway channel. Fill was placed over the pipe, thus providing a dry access road. The spillway channel has eroded at the outlet end of the pipe and beyond that point (Photograph No. 12). Further erosion will occur if preventative measures are not taken. A wire fence crosses the spillway outlet and if clogged, could reduce the discharge capacity of the spillway.

A four inch drawdown pipe is located near the center of the dam. This pipe has a downstream valve control through a 6-inch vertical standpipe. The valve has not been operated in at least eight years. The outlet of this drawdown line could not be located and is apparently buried.

D. Reservoir Area

The slopes around the reservoir are flat to moderate and consist mostly of farmlands. The banks are stable.

E. Downstream Channel

The immediate downstream channel of the spillway is a new channel created when the spillway was constructed. The stream runs through farm fields. Several barns and one house are located immediately downstream of the dam near the right abutment. Several lagoons, used for experimental farming, are located 600 to 700 feet downstream of the dam. An industry and a railroad are located 2,000 feet downstream in the floodplain. A potential hazard to loss of life exists downstream if the dam fails. The possible loss of life is estimated to be more than a few. The hazard category is therefore considered to be "High."

3.2 EVALUATION

The overall visual evaluation of the facilities indicates that Green Valley Farms is in fair condition. Although the crest and the downstream slope have a good appearance, the upstream slope should be protected against wave action and the weeds and brush should be removed. The spillway capacity has been reduced to permit a dry access road to farmland. The 12-inch outlet pipe in the spillway should be cleared of obstructions and the discharge channel should be protected from erosion. The fence across the spillway should be relocated.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

Green Valley Farms Dam was constructed for farm use and as a water supply for fire protection. Maintenance procedures are limited and there are no operational procedures for the opening and maintenance of the four inch drawdown valve.

4.2 MAINTENANCE OF EMBANKMENT

The inspection indicates that the crest and downstream slope of the embankment has a good grass mat and appears to be mowed and maintained regularly. The upstream slope is eroding by wave action and has a growth of weeds and some brush.

4.3 MAINTENANCE OF OPERATING FACILITIES

The only operating facility is a four inch drawdown valve on the downstream slope. This valve has not been maintained, greased or operated for at least eight years. The entrance to the 12-inch pipe on the spillway is not maintained on a regular basis.

4.4 WARNING SYSTEM

There is no formally organized surveillance and downstream warning system in existence at the present time.

4.5 EVALUATION

The operational procedures for Green Valley Farms Dam are minimal. It is recommended that a program be developed for maintenance of the upstream slope and the regular operation of the drawdown valve. The spillway outlet discharge pipe should also be maintained. A formal surveillance plan and downstream warning system should be developed for implementation during periods of heavy or prolonged precipitation.

SECTION 5 - HYDROLOGY/HYDRAULICS

5.1 EVALUATION OF FEATURES

A. Design Data

No hydrologic and hydraulic analyses were available from PennDER for Green Valley Farms Dam. Drawings of proposed modification obtained from the owner's engineer include an area-capacity curve and indicate a 40 foot wide trapezoidal spillway with an elevation 3 feet below the crest of the dam. This spillway had a design capacity of 345 cfs.

B. Experience Data

There are no records of flood levels at Green Valley Farms Dam. Based on records of the U.S.G.S. stream gage on Middle Branch White Clay Creek at nearby Landenberg, Pennsylvania, the maximum inflow to Green Valley Farms Dam is estimated to have been 145 cfs. This flood, occurring in June 1972, was passed without reported damage.

C. Visual Observations

It was noted that the 12-inch CMP spillway pipe was partially obstructed by rocks and weeds. No other conditions were observed that would indicate that the appurtenant structures of the dam could not operate satisfactorily during a flood event until the dam is overtopped.

D. Overtopping Potential

Green Valley Farms Dam has a total storage capacity of 80 acre-feet and an overall height of 23 feet, both referenced to the top of the dam. These dimensions indicate a size classification of "Small," and a hazard classification of "High" (see Section 3.1.E.).

The recommended Spillway Design Flood (SDF) for a dam having the above classifications is in the range of one-half the Probable Maximum Flood (PMF) to the full PMF. Because of the size, the recommended SDF is one-half the PMF. For this dam, the SDF peak inflow is 411 cfs (see Appendix D for HEC-1 inflow computations).

Comparison of the estimated SDF peak inflow of 411 cfs with the estimated spillway discharge capacity of 42 cfs indicates that a potential for overtopping of Green Valley Farms Dam exists.

An estimate of the storage effect of the reservoir and routing of the computed inflow hydrograph through the reservoir shows that this dam does not have the necessary storage available to pass the SDF without overtopping. The spillway-reservoir system can pass a flood event equal to 14% of a PMF.

E. Spillway Adequacy

Calculations show that the spillway discharge capacity and reservoir storage capacity combine to handle 14% of the PMF (refer to Appendix D).

Since the spillway discharge and reservoir storage capacity cannot pass one-half of the PMF, and since overtopping of about one-half foot, caused by one-half of the PMF, is not expected to cause a breach of this dam, the spillway is considered to be inadequate, but not seriously inadequate.

If the spillway would be reconstructed to its design dimensions (40 foot bottom width at elevation 330 with 2.0:1 side slopes), the project would be able to pass 83% of the PMF without overtopping and would be considered adequate.

The hydrologic analysis for this investigation was based upon existing conditions of the watershed. The effects of future development were not considered.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

A. Visual Observations

1. Embankment

The visual inspection of Green Valley Farms Dam did not detect any signs of seepage through the embankment. A drainage system at the toe was installed in 1970 or 1971 to intercept subsurface flow toward lagoons located further downstream. This system was installed for the protection of the lagoons. The stability of the dam was not threatened. The downstream slope of 3.8H to 1V is considered adequate for this type of embankment and there were no signs of sloughs or surface cracks. The upstream slope, although apparently stable, is unprotected and has been eroded by wave action.

2. Appurtenant Structures

The outlet of the 12-inch CMP and the earth spillway have been eroded by normal discharge. Although the condition is not critical at this time, further erosion could endanger the safety of the structure.

B. Design and Construction Data

Design and construction data for the embankment do not exist.

C. Operating Records

Operating records for this dam have not been maintained by the owner.

D. Post Construction Changes

The toe drain system was installed after completion of the embankment. This system was not required for an uncontrolled seepage condition and should not affect the stability of the structure. It is apparent from the visual inspection that the original spillway has been modified, reducing its discharge capacity. This condition will effect the chance of overtopping the dam and, therefore, the stability of the structure.

E. Seismic Stability

This dam is located in Seismic Zone 1, and it is considered that the static stability is sufficient to withstand minor earthquake-induced dynamic forces. No studies or calculations have been made to confirm this assumption.

SECTION 7 - ASSESSMENT AND RECOMMENDATIONS

7.1 DAM ASSESSMENT

A. Safety

The visual inspection indicates that Green Valley Farms Dam is in fair condition. Engineering design and construction data are not available for review. One drawing indicates the design dimensions of the spillway. The upstream slope and the spillway discharge channel should be protected against further erosion.

In accordance with the Corps of Engineers' evaluation guidelines, the size classification of this dam is small and the hazard classification is high. These classifications indicate that the Spillway Design Flood (SDF) should be in the range of one-half the Probable Maximum Flood (PMF) to the full PMF. The recommended SDF for this structure is one-half the PMF.

The hydrologic and hydraulic computations indicate that the combination of storage capacity and the discharge capacity of the spillway is adequate for passing only 14 percent of the PMF. The spillway is therefore considered to be inadequate.

B. Adequacy of Information

The visual inspection is considered to be sufficiently adequate for making a reasonable assessment of this dam.

C. Urgency

The recommendations presented below should be implemented immediately.

D. Additional Studies

Additional studies are not required at this time if the recommendations are implemented immediately.

7.2 RECOMMENDATIONS

In order to assure the continued satisfactory operation of this dam, the following recommendations are presented for immediate implementation by the owner:

1. That provisions be made to provide an adequate spillway capacity.
2. That the 12-inch CMP in the spillway be cleared of obstructions on a regular basis.

3. That the upstream slope be protected from wave action erosion, and that brush and weed growth on the slope be controlled on a regular basis.
4. That the 4-inch drawdown valve be maintained and operated on a regular basis.
5. That provisions be made for upstream closure of the drawdown pipe in case of an emergency.
6. That the fence across the spillway discharge channel be relocated to preclude obstruction of the flow.
7. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.
8. That an operation and maintenance manual be prepared for guidance in the operation of the dam during normal and emergency conditions, and that a schedule be developed for the annual inspection of the dam and its appurtenant structures.

APPENDIX A
CHECK LIST OF VISUAL INSPECTION REPORT

APPENDIX A

CHECK LIST

PHASE I - VISUAL INSPECTION REPORT

PA DER #15-307

NDI NO. PA- 01101

NAME OF DAM Green Valley Farms Dam HAZARD CATEGORY High

TYPE OF DAM Earthfill

LOCATION Newgarden TOWNSHIP Chester COUNTY, PENNSYLVANIA

INSPECTION DATE 4/10/81 WEATHER Sunny, warm TEMPERATURE 60's

INSPECTORS: R. Houseal (Recorder) OWNER'S REPRESENTATIVE(s):

H. Jongsma

Jackie

R. Shireman

Dominic

A. Bartlett

NORMAL POOL ELEVATION: 330 (U.S.G.S.) AT TIME OF INSPECTION: 330.2

BREAST ELEVATION: 333.1 (Survey) POOL ELEVATION: _____

330.0 - 12-inch pipe

SPILLWAY ELEVATION: 332.4 - emergency TAILWATER ELEVATION: _____

MAXIMUM RECORDED POOL ELEVATION: Unknown

GENERAL COMMENTS:

Upstream slope eroded to near vertical.

VISUAL INSPECTION
EMBANKMENT

	OBSERVATIONS AND REMARKS
A. SURFACE CRACKS	None observed.
B. UNUSUAL MOVEMENT BEYOND TOE	None observed.
C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES	None observed on downstream slope. Upstream slope eroded to near vertical for a depth of 3±' then flattens in the upstream direction.
D. ALIGNMENT OF CREST: HORIZONTAL: VERTICAL:	Horizontal Alignment - Curved. Vertical - Refer to Profile - Plate No. A-II.
E. RIPRAP FAILURES	No riprap.
F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY	Good.
G. SEEPAGE	None observed on downstream slope or at toe of embankment.
H. DRAINS	30" vertical pipe near toe of slope. 6" pipes discharging into this pipe. 6" pipe at 11.5' below top of 30" pipe.
J. GAGES & RECORDER	Observation wells for water quality sampling.
K. COVER (GROWTH)	Field grass over top and downstream slope. A few clumps of brush at crest on upstream side.

VISUAL INSPECTION
OUTLET WORKS

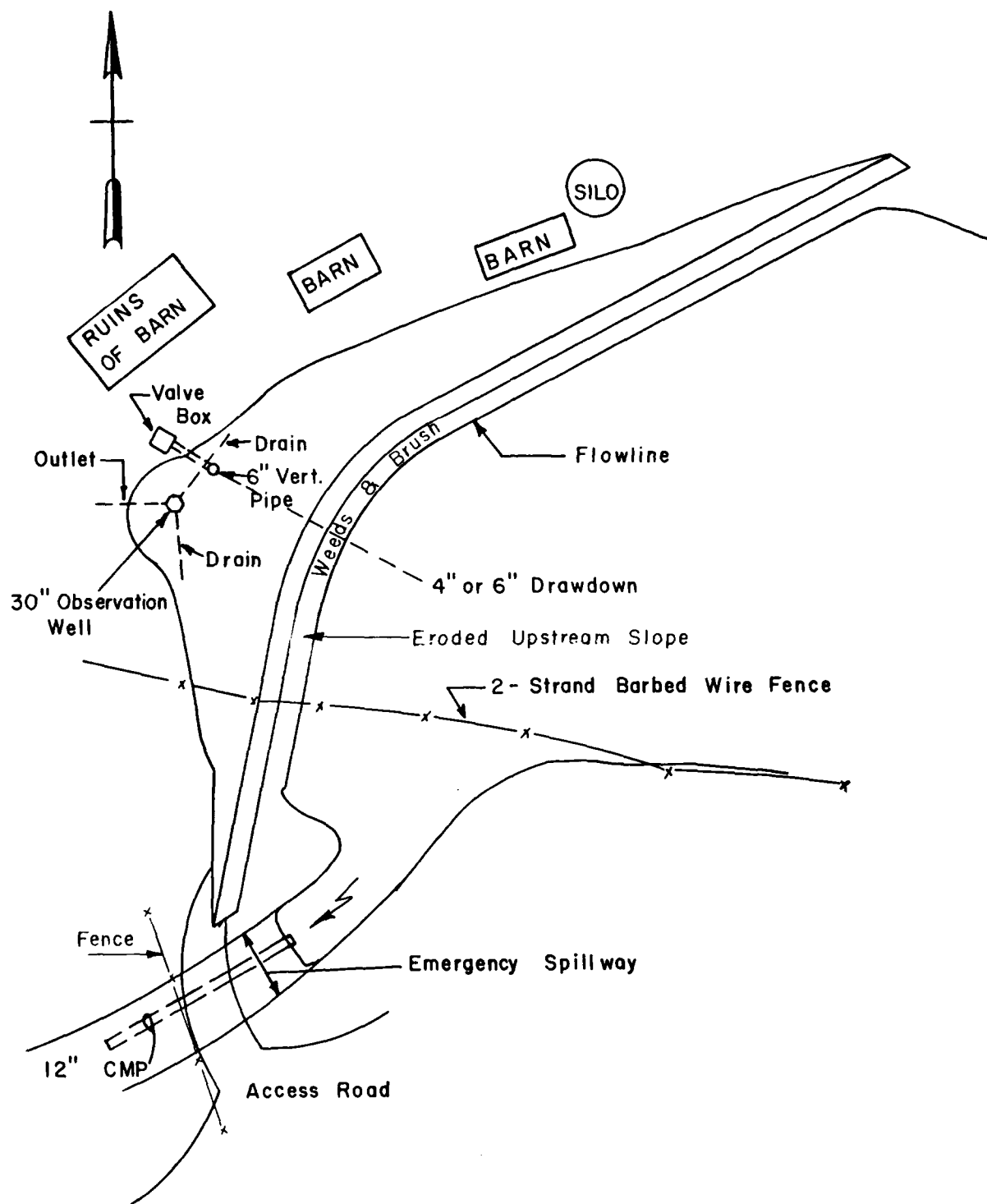
	OBSERVATIONS AND REMARKS
A. INTAKE STRUCTURE	None.
B. OUTLET STRUCTURE	4" pipe with valve located in a 6" vertical pipe on downstream slope. Water standing in this pipe to about 7 feet below top of pipe.
C. OUTLET CHANNEL	Not located. Note: drawdown line indicated to be 4" by Geotechnical Services. Owner's representative reported line to be 6".
D. GATES	4" valve.
E. EMERGENCY GATE	4" drawdown line with valve on downstream slope.
F. OPERATION & CONTROL	No records.
G. BRIDGE (ACCESS)	N/A.

VISUAL INSPECTION
SPILLWAY

	OBSERVATIONS AND REMARKS
A. APPROACH CHANNEL	Water discharges from reservoir through 12" horizontal metal pipe located at left side of reservoir in the spillway.
B. WEIR: Crest Condition Cracks Deterioration Foundation Abutments	Spillway created at left end of embankment.
C. DISCHARGE CHANNEL: Lining Cracks Stilling Basin	Natural drainage swale, some rocks. No stilling basin.
D. BRIDGE & PIERS	None.
E. GATES & OPERATION EQUIPMENT	None.
F. CONTROL & HISTORY	None.

VISUAL INSPECTION

	OBSERVATIONS AND REMARKS
<u>INSTRUMENTATION</u>	
Monumentation	None.
Observation Wells	Yes.
Weirs	None.
Piezometers	None.
Staff Gauge	None.
Other	None.
<u>RESERVOIR</u>	
Slopes	Moderate.
Sedimentation	Unknown.
Watershed Description	Farmland.
<u>DOWNSTREAM CHANNEL</u>	
Condition	Fields.
Slopes	Moderate.
Approximate Population	More than a few.
No. Homes	One house and industry (Mushroom).



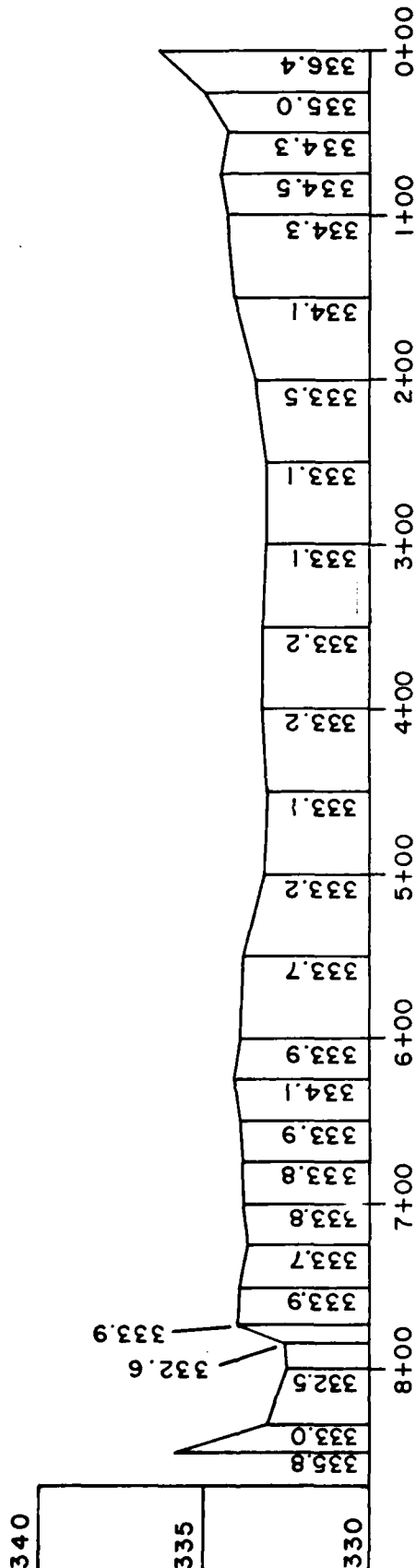
GREEN VALLEY FARMS DAM

PA-01101

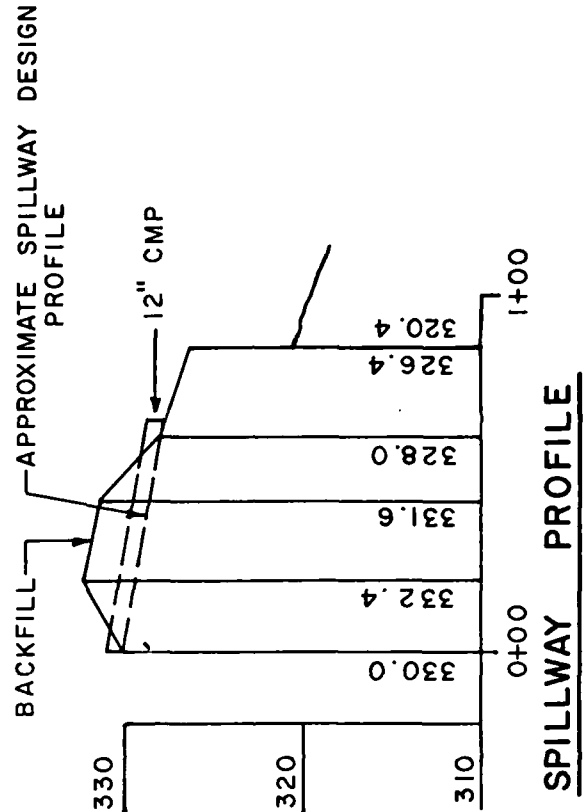
INSPECTION SURVEY

PLATE A-I

SURVEYED 4-10-81



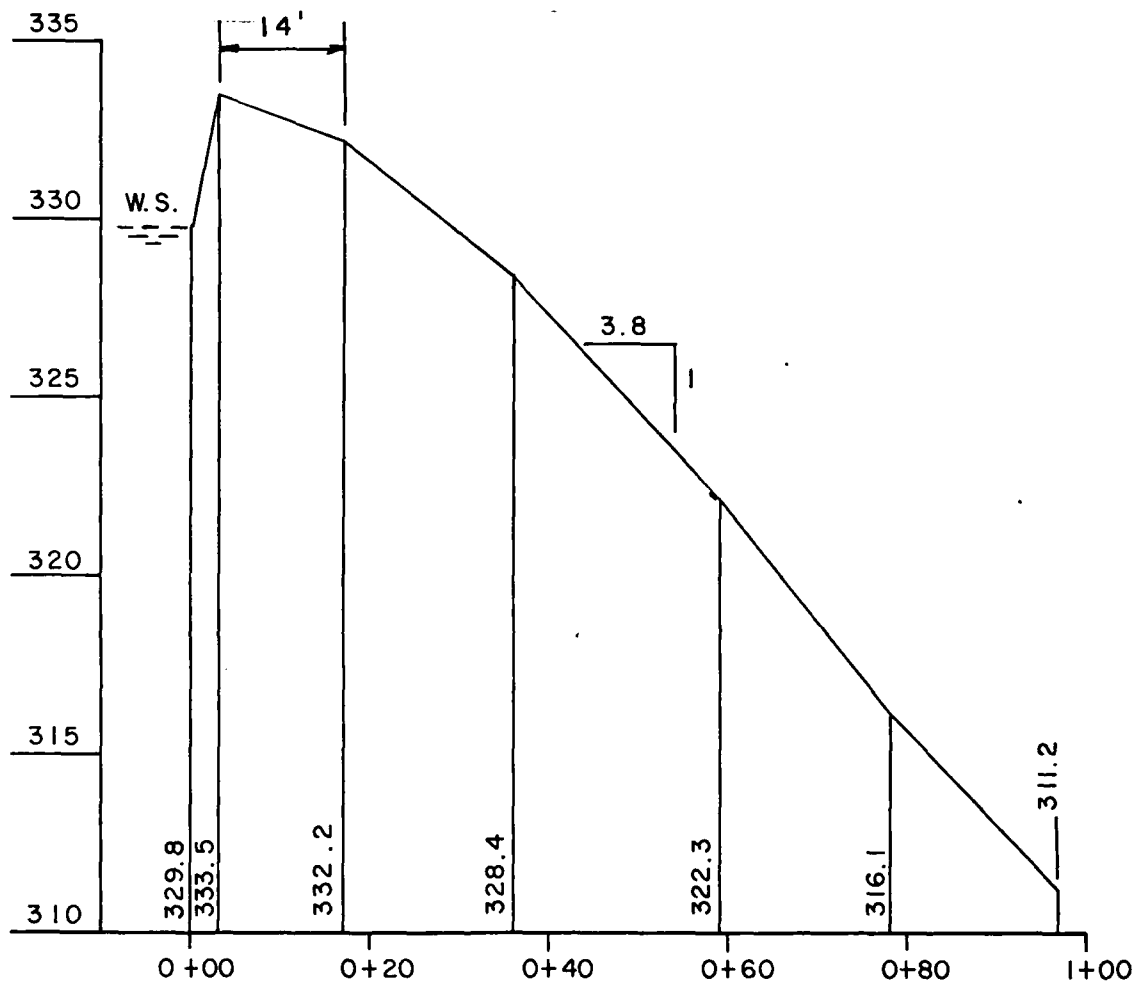
EMBANKMENT PROFILE



SPILLWAY PROFILE

GREEN VALLEY FARMS DAM
 PA-01101
 INSPECTION SURVEY
 PLATE A-II

SURVEYED 4-10-81



EMBANKMENT SECTION - STA. 5+30

GREEN VALLEY FARMS DAM
PA-01101

INSPECTION SURVEY
PLATE A-III

SURVEYED 4-10-81

APPENDIX B
CHECK LIST OF ENGINEERING DATA

CHECK LIST
ENGINEERING DATA

PA DER # 15-307

NDI NO. PA- 01101

NAME OF DAM Green Valley Farms Dam

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	U.S.G.S. Quadrangle - West Grove, Pa. See Plate II, Appendix E
CONSTRUCTION HISTORY	Constructed in 1963 and 1964. Spillway designed by Geo-Technical Services, Harrisburg, Pennsylvania, after embankment construction had started.
GENERAL PLAN OF DAM	Plate III, Appendix E.
TYPICAL SECTIONS OF DAM	Plate A-III, Appendix A.
OUTLETS: PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	No plans. A 4 or 6 inch drawdown line with downstream control. Outlet not located.

ENGINEERING DATA

ITEM	REMARKS
RAINFALL & RESERVOIR RECORDS	No records.
DESIGN REPORTS	No reports.
GEOLOGY REPORTS	None.
DESIGN COMPUTATIONS: HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS: BORING RECORDS LABORATORY FIELD	No records.
POST CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	From reservoir area.

ENGINEERING DATA

ITEM	REMARKS
MONITORING SYSTEMS	Observation well near downstream toe. No records or drawings.
MODIFICATIONS	No records. See Section 3 for unrecorded modifications.
HIGH POOL RECORDS	No records.
POST CONSTRUCTION ENGINEERING STUDIES & REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM Description: Reports:	None.
MAINTENANCE & OPERATION RECORDS	No records.
SPILLWAY PLAN, SECTIONS AND DETAILS	Plate III, Appendix E. No records of modification.

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT, PLANS & DETAILS	No plans.
CONSTRUCTION RECORDS	No records.
PREVIOUS INSPECTION REPORTS & DEFICIENCIES	None.
MISCELLANEOUS	

NDI NO. PA- 01101

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Farmland

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 330.0 Acre-Feet 55

TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev. 333.1 Acre-Feet 80

MAXIMUM DESIGN POOL: Elev. 333.0

TOP DAM: Elev. 333.1

SPILLWAY:

a. Elevation 330

b. Type Sod lined, broad crested weir with 12" CMP

c. Width 48'

d. Length pipe 60' long

e. Location Spillover left abutment

f. Number and Type of Gates none

OUTLET WORKS:

a. Type 4" pipe with valve

b. Location valve pit at downstream toe

c. Entrance inverts 309.4

d. Exit inverts 309.4

e. Emergency drawdown facilities 4" pipe

HYDROMETEOROLOGICAL GAGES:

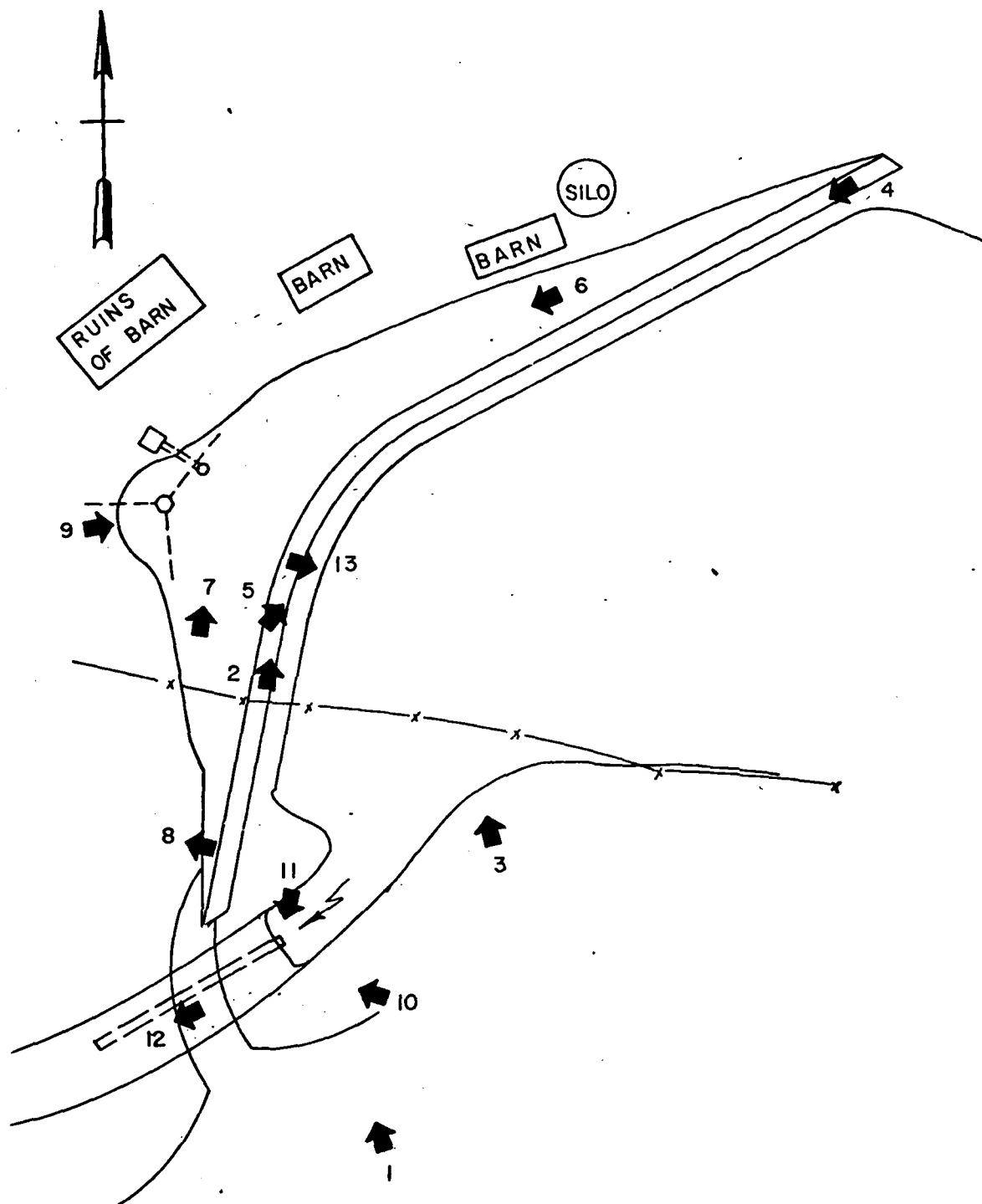
a. Type none

b. Location

c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 42 cfs

APPENDIX C
PHOTOGRAPHS



GREEN VALLEY FARMS DAM

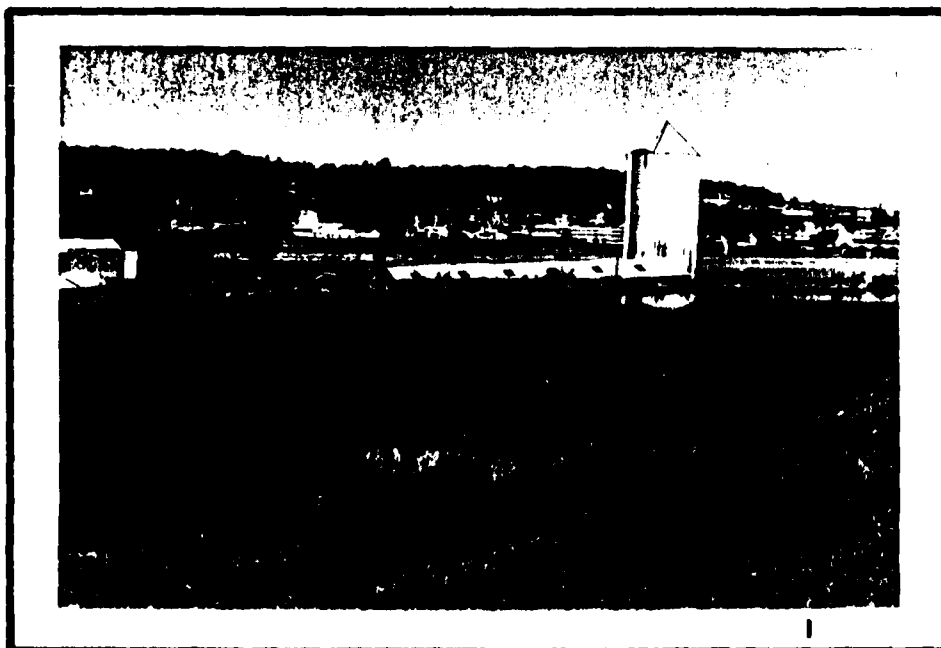
PA-01101

KEY MAP OF PHOTOGRAPHS

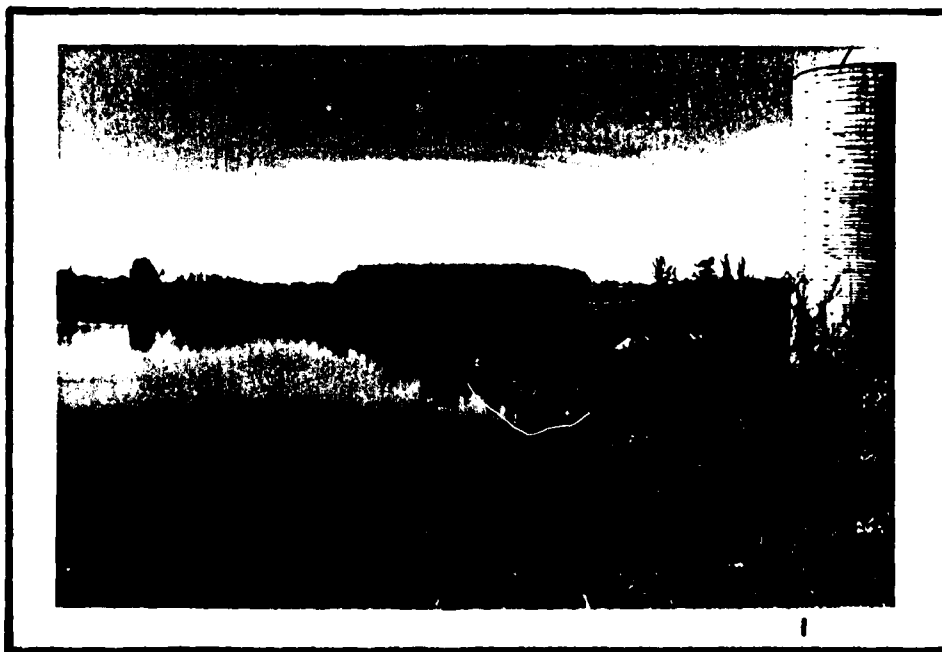
PLATE C-I



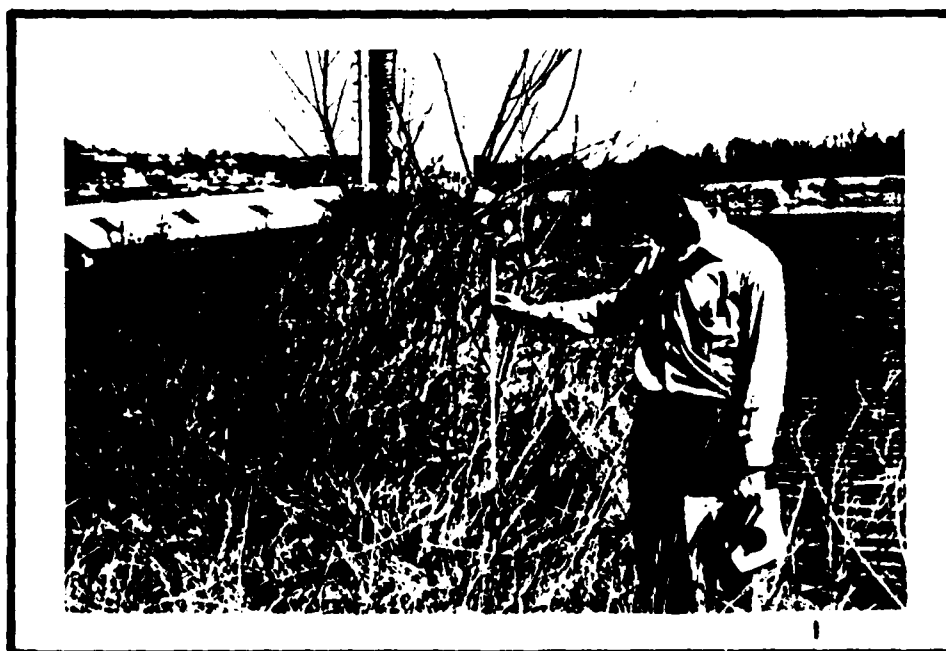
OVERVIEW RIGHT END OF EMBANKMENT - NO. 2



OVERVIEW SPILLWAY FOREBAY - NO. 3
NOTE: BARBED WIRE FENCE



UPSTREAM SLOPE AT RIGHT END - NO. 4

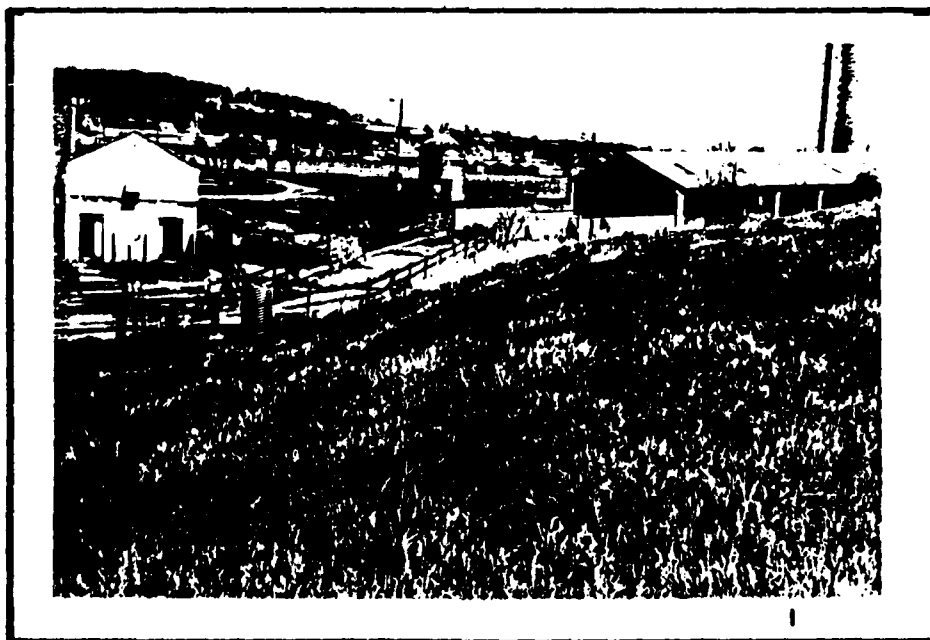


UPSTREAM SLOPE - NO. 5

NOTE: WEEDS, BRUSH AND EROSION FROM WAVE ACTION



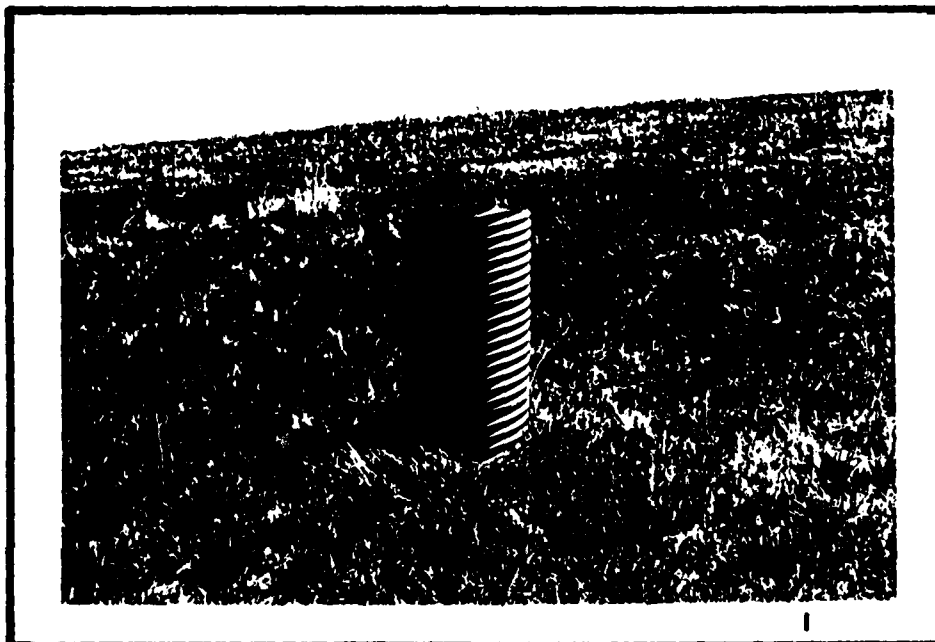
DOWNSTREAM SLOPE - NO. 6



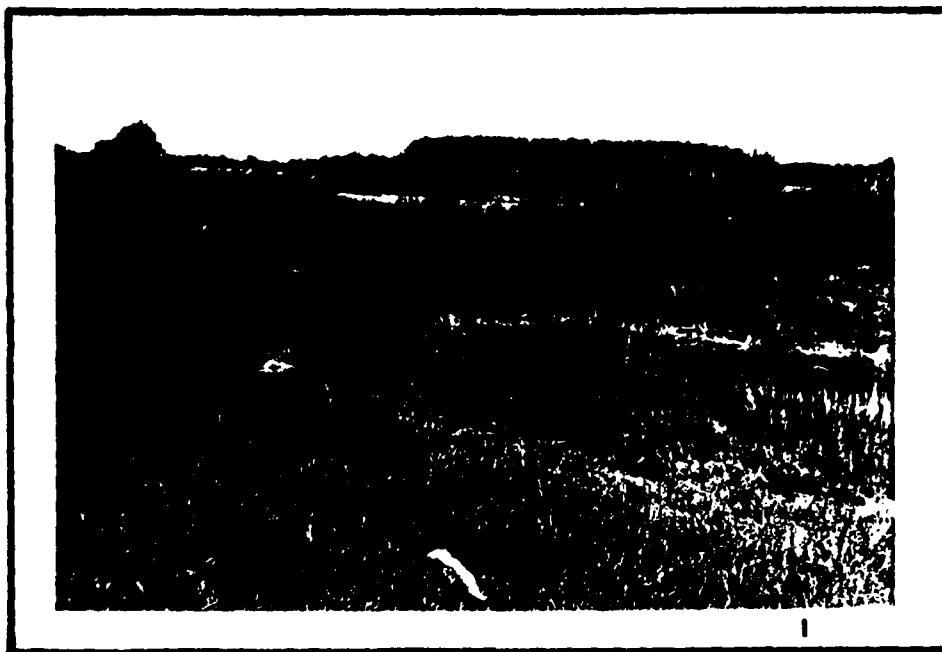
DOWNSTREAM SLOPE - NO. 7
NOTE: OBSERVATION WELL AND BARNS



DOWNSTREAM SLOPE AND VIEW OF LAGOONS - NO. 8



OBSERVATION WELL OF SUBSURFACE DRAINAGE - NO. 9



SPILLWAY FOREBAY AREA - NO. 10



INLET OF 12-INCH CMP PRINCIPAL SPILLWAY - NO. 11



SPILLWAY DISCHARGE CHANNEL - NO. 12



OVERVIEW OF RESERVOIR - NO. 13

APPENDIX D
HYDROLOGY AND HYDRAULIC CALCULATIONS

SUMMARY DESCRIPTION
OF
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION

The hydrologic and hydraulic evaluation for this inspection report has employed computer techniques using the Corps of Engineers computer program identified as the Flood Hydrograph Package (HEC-1) Dam Safety Version.

The program has been designed to enable the user to perform two basic types of hydrologic analyses: (1) the evaluation of the overtopping potential of the dam, and (2) the capability to estimate the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. A brief summary of the computation procedures typically used in the dam overtopping analysis is shown below.

- Development of an inflow hydrograph to the reservoir.
- Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.
- Routing of the outflow hydrograph(s) of the reservoir to desired downstream locations. The results provide the peak discharge and maximum stage of each routed hydrograph at the outlet of the reach.

The output data provided by this program permits the comparison of downstream conditions just prior to a breach failure with that after a breach failure and the determination as to whether or not there is a significant increase in the hazard to loss of life as a result of such a failure.

The results of the studies conducted for this report are presented in Section 5.

For detailed information regarding this program refer to the Users Manual for the Flood Hydrograph Package (HEC-1) Dam Safety Version prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California.

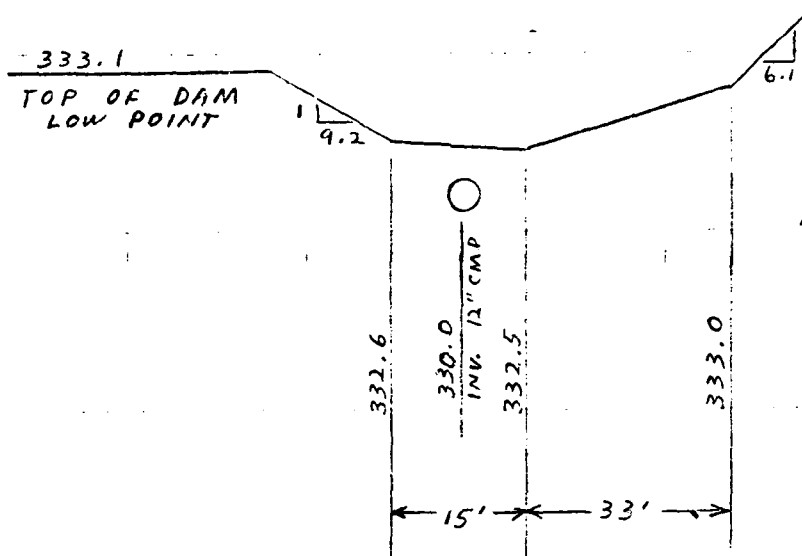
BY RLS DATE 4/14/81
CHKD. BY _____ DATE _____
SUBJECT _____

BERGER ASSOCIATES

SHEET NO. 1 OF 8
PROJECT D0590

GREEN VALLEY FARM DAM

SPILLWAY RATING



SOD-LINED
BROAD CRESTED
WEIR

$C = 2.7$ (KINGS HDBK)

ORIFICE

$C = 0.6$ (KINGS HDBK)

ORIFICE: $Q = CA\sqrt{2gH}$

$H = 333.1 - 330.5 = 2.6'$

$Q = 0.6 \times \pi \times \frac{1}{4} \times (2 \times 32.2 \times 2.6)^{0.5}$

$= 6 \text{ CFS}$

SWALE: $Q = C (L_1 H_1^{3/2} + L_2 H_2^{3/2} + L_3 H_3^{3/2} + L_4 H_4^{3/2})$

$L_1 = 9.2 \times (333.1 - 332.6) = 4.6'$

$L_2 = 15'$

$L_3 = 33'$

$L_4 = 6.1 \times (333.1 - 333.0) = .6'$

$H_1 = (333.1 - 332.6) / 2 = .25'$

$H_2 = 333.1 - ((332.6 + 332.5) / 2) = .55'$

$H_3 = 333.1 - ((332.5 + 333.0) / 2) = .35'$

$H_4 = (333.1 - 333.0) / 2 = .05'$

$Q = 2.7 ((4.6 \times (.25)^{1.5}) + (15 \times (.55)^{1.5}) + (33 \times (.35)^{1.5}) + (.6 \times (.05)^{1.5}))$

$= 36.5 \text{ SAY } 37 \text{ CFS}$

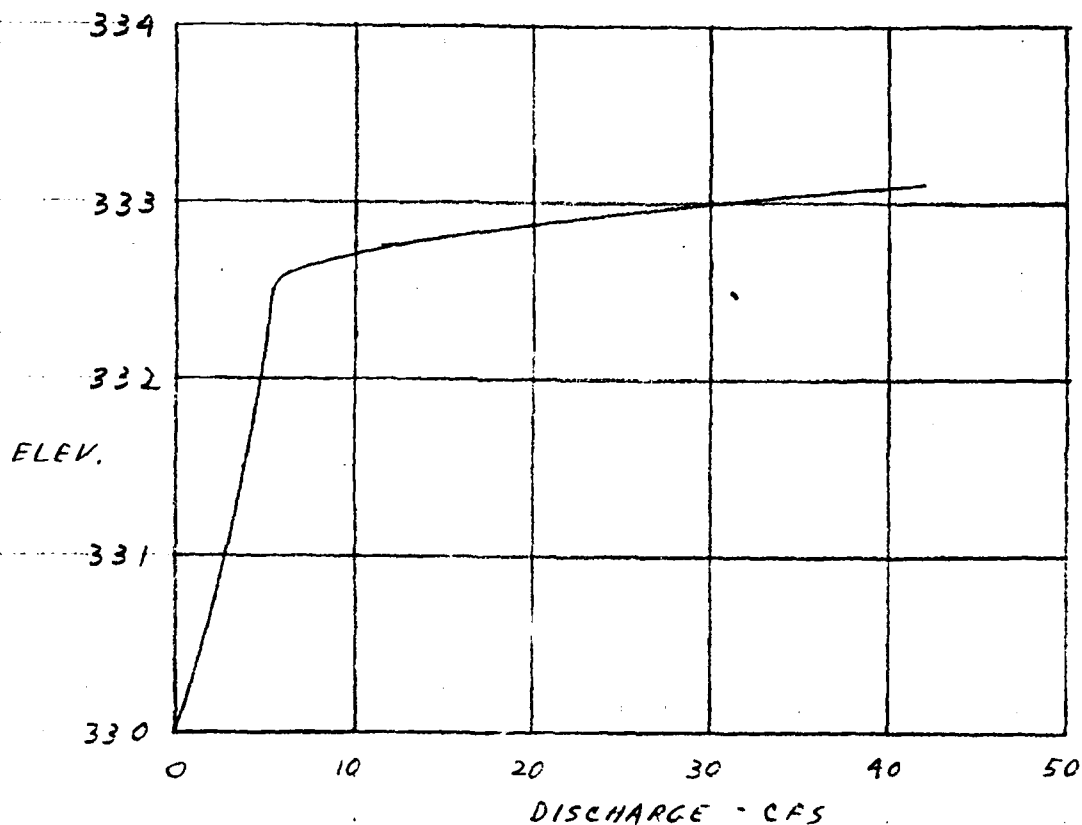
BY RLS DATE 4/14/81
CHKD. BY _____ DATE _____
SUBJECT _____

BERGER ASSOCIATES

SHEET NO. 2 OF 8
PROJECT 00590

GREEN VALLEY FARM DAM

SPILLWAY RATING CURVE



BY RLS DATE 4/14/81
CHKD. BY _____ DATE _____
SUBJECT _____

BERGER ASSOCIATES

SHEET NO. 3 OF 8
PROJECT D0590

GREEN VALLEY FARM DAM

DISCHARGE THROUGH OUTLET WORKS

4" DIA PIPE

C = 0.6 (KINGS HDBK.)

INVERT = 309.4 ±

$$Q = CA \sqrt{2gH}$$

AT POOL ELEV 330

$$H = 330 - 309.65 = 20.35$$

$$Q = 0.6 \times \pi \times \frac{(2.5)^2}{4} \times (2 \times 32.2 \times 20.35)^{0.5}$$

$$= 1.1 \text{ CFS}$$

AT LOW POOL ELEV 315

$$H = 315 - 309.65 = 5.35$$

$$Q = 0.6 \times \pi \times \frac{(2.5)^2}{4} \times (2 \times 32.2 \times 5.35)^{0.5}$$

$$= .5 \text{ CFS}$$

BY RLS DATE 4/14/81
CHKD. BY _____ DATE _____
SUBJECT _____

BERGER ASSOCIATES

SHEET NO. 4 OF 8
PROJECT D0596

GREEN VALLEY FARM DAM

EMBANKMENT RATING

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

$$C = 2.7 \text{ (KINGS HDBK)}$$

AT ELEV 333.5

$$2.7 \times 50 \times (.2)^{1.5} = 12$$

$$2.7 \times 50 \times (.4)^{1.5} = 39$$

$$2.7 \times 50 \times (.35)^{1.5} = 28$$

$$2.7 \times 50 \times (.3)^{1.5} = 22$$

$$2.7 \times 100 \times (.35)^{1.5} = 56$$

$$2.7 \times 30 \times (.15)^{1.5} = 5$$

$$\Sigma = 157 \text{ CFS}$$

AT ELEV 334

$$2.7 \times 42 \times (.25)^{1.5} = 14$$

$$2.7 \times 50 \times (.7)^{1.5} = 79$$

$$2.7 \times 50 \times (.85)^{1.5} = 106$$

$$2.7 \times 50 \times (.8)^{1.5} = 97$$

$$2.7 \times 100 \times (.85)^{1.5} = 212$$

$$2.7 \times 50 \times (.55)^{1.5} = 55$$

$$2.7 \times 50 \times (.2)^{1.5} = 12$$

$$2.7 \times 25 \times (.05)^{1.5} = 1$$

$$2.7 \times 25 \times (.15)^{1.5} = 4$$

$$2.7 \times 25 \times (.2)^{1.5} = 6$$

$$2.7 \times 25 \times (.25)^{1.5} = 8$$

$$2.7 \times 25 \times (.2)^{1.5} = 6$$

$$2.7 \times 23 \times (.1)^{1.5} = 2$$

$$2.7 \times 50 \times (.9)^{1.5} = 115$$

$$\Sigma = 717 \text{ CFS}$$

AT ELEV 334.5

$$\Sigma = 1802 \text{ CFS}$$

BY RLS DATE 4/14/81
CHKD. BY _____ DATE _____
SUBJECT _____

BERGER ASSOCIATES

SHEET NO. 5 OF 8
PROJECT D0590

GREEN VALLEY FARM

MAXIMUM KNOWN FLOOD AT DAMSITE

THERE ARE NO RECORDS OF FLOOD LEVELS AT THIS DAM. BASED ON THE RECORDS OF THE STREAM GAGING STATION ON MIDDLE BRANCH WHITE CLAY CREEK AT NEARBY LANDENBERG, PA, (D.A. = 12.7 SQ. MI.) THE MAXIMUM DISCHARGE AT THE GAGE OCCURRED IN JUNE 1972 WHEN A DISCHARGE OF 3860 CFS WAS RECORDED. THE MAXIMUM INFLOW TO GREEN VALLEY FARM DAM IS ESTIMATED TO BE

$$\left(\frac{1.21}{12.7}\right)^{0.5} \times 3860 = 145 \text{ CFS}$$

DESIGN FLOOD

SIZE CLASSIFICATION

MAXIMUM STORAGE = 80 ACRE-FEET

MAXIMUM HEIGHT = 23 FEET

SIZE CLASSIFICATION IS "SMALL"

HAZARD CLASSIFICATION :

ONE HOUSE AND ONE INDUSTRY LOCATED

NEAR THE DOWNSTREAM CHANNEL

USE "HIGH"

BY RLS DATE 4/21/81

BERGER ASSOCIATES

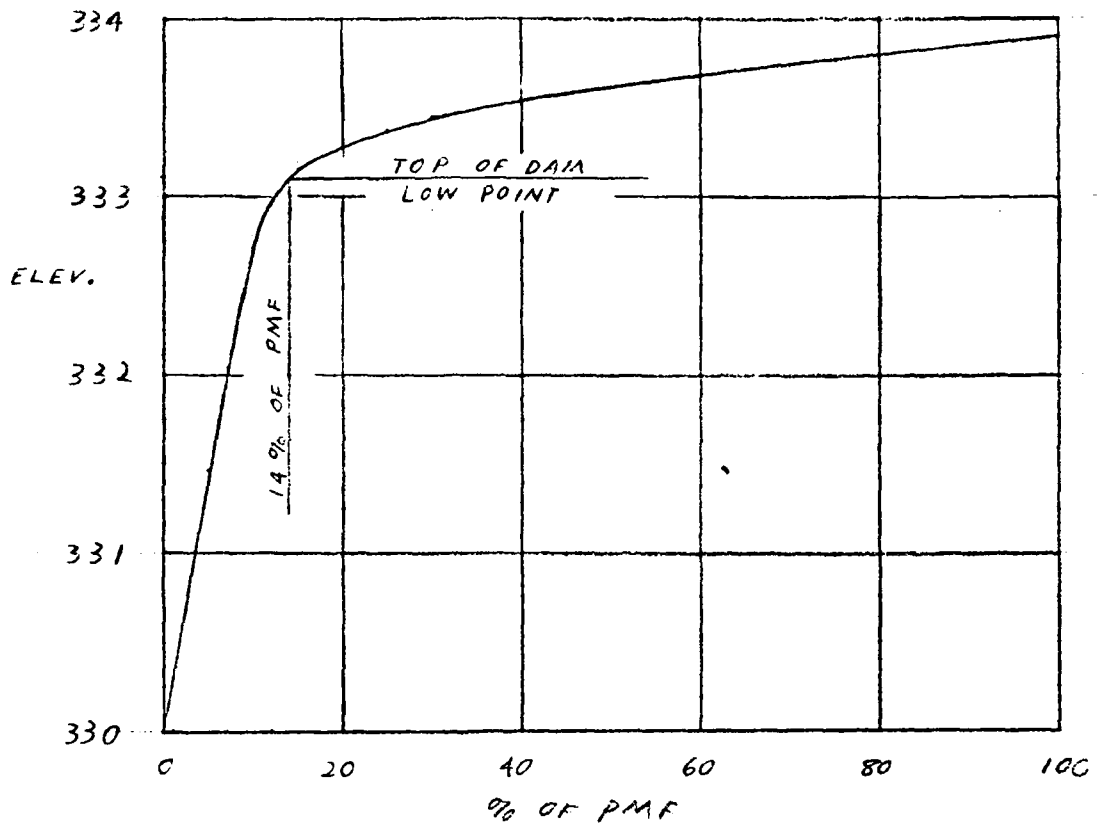
SHEET NO. 6 OF 8

CHKD. BY _____ DATE _____

PROJECT D0590

SUBJECT GREEN VALLEY FARM DAM

SPILLWAY CAPACITY CURVE



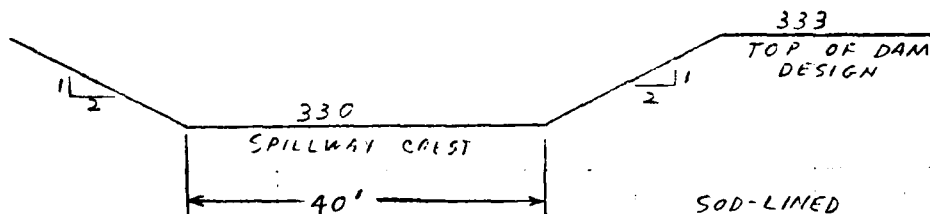
BY RLS DATE 5/28/31
CHKD. BY _____ DATE _____
SUBJECT _____

BERGER ASSOCIATES

SHEET NO. 7 OF 8
PROJECT DO590

GREEN VALLEY FARM

SPILLWAY RATING (DESIGN)



SOD-LINED
BROADCRESTED
WEIR

$C = 2.7$ (KING'S HOBBS)

$$Q = C L_1 H_1^{3/2} + C L_2 H_2^{3/2} + C L_3 H_3^{3/2}$$

$$L_1 = 2 \times 3 = 6'$$

$$L_2 = 40'$$

$$L_3 = 2 \times 3 = 6'$$

$$H_1 = (333 - 330) / 2 = 1.5'$$

$$H_2 = 333 - 330 = 3'$$

$$H_3 = (333 - 330) / 2 = 1.5'$$

$$Q = 2.7 \times 6 \times (1.5)^{1.5} + 2.7 \times 40 \times (3)^{1.5} + 2.7 \times 6 \times (1.5)^{1.5}$$

$$= 621 \text{ CFS}$$

BY RLS DATE 5/4/81
CHKD. BY _____ DATE _____
SUBJECT _____

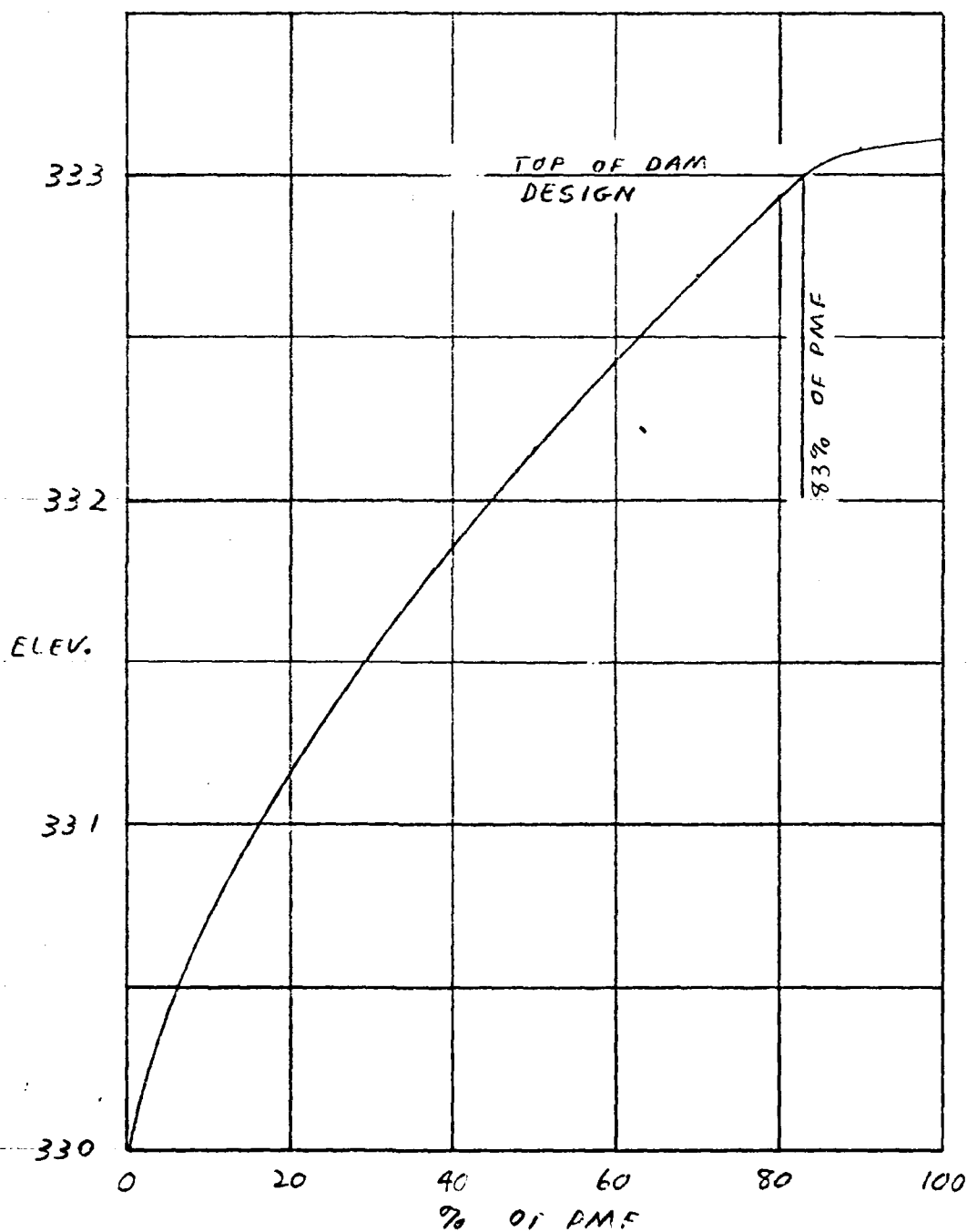
BERGER ASSOCIATES

SHEET NO. 8 OF 8
PROJECT 00590

GREEN VALLEY

SPILLWAY CAPACITY CURVE

(DESIGN)



HYDROLOGY AND HYDRAULIC ANALYSIS DATA BASE

NAME OF DAM: Green Valley Farms Dam RIVER BASIN: Delaware
 PROBABLE MAXIMUM PRECIPITATION (PMP) = 23.5 INCHES/24 HOURS ⁽¹⁾

(FOR FOOTNOTES SEE NEXT PAGE)

STATION		1	2	3	4
STATION DESCRIPTION		GREEN VALLEY DAM			
DRAINAGE AREA (SQUARE MILES)		.21			
CUMULATIVE DRAINAGE AREA (SQUARE MILE)		.21			
ADJUSTMENT OF PMP FOR DRAINAGE AREA (%) ⁽²⁾	6 HOURS	113			
	12 HOURS	123			
	24 HOURS	132			
	48 HOURS	143			
	72 HOURS				
	Zone 6				
SNYDER HYDROGRAPH PARAMETERS	ZONE ⁽³⁾	10			
	C_p / C_t ⁽⁴⁾	.60/1.25			
	L (MILES) ⁽⁵⁾	.80			
	L_{co} (MILES) ⁽⁵⁾	.44			
	$T_p = C_t (L \cdot L_{co})^{0.3}$ (Hours)	.91			
SPILLWAY DATA	CREST LENGTH (FT.)	PIPE 1' diameter	SWALE 48		
	FREEBOARD (FT.)	3.1	.6		
	DISCHARGE COEFFICIENT	.6	2.7		
	EXPONENT	--	1.5		
	ELEVATION	330	332.5		
AREA ⁽⁶⁾ (ACRES)	NORMAL POOL				
	ELEV. <u>330</u>	7.3			
	ELEV. <u>340</u>	12.9			
STORAGE (ACRE - FEET)	NORMAL POOL ⁽⁷⁾ ELEV. 330	55			
	ELEV. <u>307.4</u> ⁽⁸⁾	0			
	ELEV. _____ ⁽⁸⁾				
	ELEV. _____ ⁽⁸⁾				

- (1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.
- (2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.
- (3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).
- (4) Snyder's Coefficients.
- (5) L = Length of longest water course from outlet to basin divide.
 L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.
- (6) Planimetered area encompassed by contour upstream of dam.
- (7) PennDER files.
- (8) Computed by conic method.

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

OVERTOPPING
 ANALYSIS
 (EXISTING CONDITIONS)

1	A1	GREEN VALLEY FARM DAM	****	TROUT RUN							
2	A2	NEW GARDEN TWP., CHESTER COUNTY, PA.									
3	A3	NDI # PA-01101		PA DER # 15-307							
4	B	300	0	15	0	0	0	0	0	-4	0
5	B1	5									
6	J	1	9	1							
7	J1	1	.8	.6	.5	.4	.25	.1	.05	.01	
8	K		1					1			
9	K1		INFLOW HYDROGRAPH								
10	M	1	1	.21							
11	P		23.5	113	123	132	143				
12	T							1	.05		
13	W	.91	.60								
14	X	-1.5	-.05	2							
15	K	1	2					1			
16	K1		RESERVOIR ROUTING								
17	Y		1								
18	Y1	1						55	-1		
19	Y4	330	331	331.5	332.5	333.1	333.5	334	334.5		
20	Y5	0	3	4	5.5	42	267	946	2187		
21	YA	0	7.3	12.9							
22	YE	307.4	330	340							
23	YF	330									
24	YD	333.1									
25	K	99									

1 PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	2
END OF NETWORK	

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

RUN DATE# 81/05/27.
 TIME# 12.55.31.

GREEN VALLEY FARM DAM **** TROUT RUN
 NEW GARDEN TWP., CHESTER COUNTY, PA.
 NDI # PA-01101 PA DER # 15-307

JOB SPECIFICATION									
NQ	NHR	NMIN	IDAY	IHR	IMIN	METAC	IPLT	IFRT	WSTAN
300	0	15	0	0	0	0	0	-4	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
 NPLAN= 1 NRTIO= 9 LRTIO= 1

RTIOS=	1.00	.80	.60	.50	.40	.25	.10	.05	.01
--------	------	-----	-----	-----	-----	-----	-----	-----	-----

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

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 .21 0.00 .21 0.00 0.000 0 0 0

PRECIP DATA

SPFE PMS R6 R12 R24 R48 R72 R96
0.00 23.50 113.00 123.00 132.00 143.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT STRKR DTKR 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= .91 CP= .60 NTA= 0

RECESSION DATA

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

UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG= .91 HOURS, CP= .60 VOL= 1.00

11.	40.	72.	88.	79.	60.	46.	35.	27.	20.
15.	12.	9.	7.	5.	4.	3.	2.	2.	1.
1.	1.								

0

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 26.88 24.47 2.42 13448.
(633.)(621.)(61.)(330.80)

HYDROGRAPH ROUTING

RESERVOIR ROUTING

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

ROUTING DATA

GLOSS	CLOSS	AVG	IRIS	ISAME	ICPT	IPMP	LSTR
0.0	0.000	0.00	1	0	0	0	0

NSIPS	NSTD	LAG	AMSK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	55.	-1

STAGE	330.00	331.00	331.50	332.50	333.10	333.50	334.00	334.50
FLOW	0.00	3.00	4.00	5.50	42.00	267.00	946.00	2187.00
SURFACE AREA=	0.	7.	13.					
CAPACITY=	0.	55.	155.					
ELEVATION=	307.	330.	340.					

CREL	SPWID	COQW	EXPW	ELEV	COQL	CAREA	EXPL
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COGD	EXPD	DAMWID
333.1	0.0	0.0	0.

PEAK OUTFLOW IS 804. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 644. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 483. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 403. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 322. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 195. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 18. AT TIME 43.25 HOURS

PEAK OUTFLOW IS 4. AT TIME 44.25 HOURS

PEAK OUTFLOW IS 1. AT TIME 44.00 HOURS

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	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9
				1.00	.80	.60	.50	.40	.25	.10	.05	.01
HYDROGRAPH AT	1	.21	1	821.	657.	493.	411.	329.	205.	82.	41.	8.
	(	.54)	(	23.26)(	18.61)(	13.95)(	11.63)(	9.30)(	5.81)(	2.33)(	1.16)(	.23)
ROUTED TO	2	.21	1	804.	644.	483.	403.	322.	195.	18.	4.	1.
	(	.54)	(	22.78)(	18.22)(	13.67)(	11.41)(	9.13)(	5.52)(	.52)(	.11)(	.03)

1

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	330.00	330.00	333.10
STORAGE	55.	55.	80.
OUTFLOW	0.	0.	42.

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
1.00	333.90	.80	87.	804.	8.00	40.50	0.00
.80	333.78	.68	84.	644.	7.50	40.50	0.00
.60	333.66	.56	85.	483.	6.50	40.50	0.00
.50	333.60	.50	85.	403.	6.00	40.50	0.00
.40	333.54	.44	84.	322.	5.00	40.50	0.00
.25	333.37	.27	82.	195.	3.50	40.75	0.00
.10	332.71	0.00	77.	18.	0.00	43.25	0.00
.05	331.46	0.00	66.	4.	0.00	44.25	0.00
.01	330.30	0.00	57.	1.	0.00	44.00	0.00

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

OVERTOPPING
 ANALYSIS
 (DESIGN CONDITION)

5

1	A1	GREEN VALLEY FARM DAM *** TROUT RUN									
2	A2	NEW GARDEN TWP., CHESTER COUNTY, PA.									
3	A3	NDI # PA-XXXX PA DER # 15-307									
4	B	300	0	15	0	0	0	0	0	-4	0
5	B1	5									
6	J	1	9	1							
7	J1	1	.9	.8	.7	.6	.5	.4	.3	.15	
8	K	1									
9	K1	INFLOW HYDROGRAPH									
10	M	1	1	.21							
11	P		23.5	113	123	132	143				
12	T							1	.05		
13	W	.91	.60								
14	X	-1.5	-.05	2							
15	K	1	2								
16	K1	RESERVOIR ROUTING									
17	Y			1							
18	Y1	1								55	-1
19	Y4	330	330.5	331	331.5	332	332.5	333	333.5	334	
20	Y5	0	39	112	209	321	465	621	1471	2950	
21	\$A	0	7.3	12.9							
22	\$E	307.4	330	340							
23	\$\$	330									
24	\$D	333.0									
25	K	99									

1

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	2
END OF NETWORK	

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

RUN DATE# 81/04/24.
 TIME# 08.20.32.

GREEN VALLEY FARM DAM *** TROUT RUN
 NEW GARDEN TWP., CHESTER COUNTY, PA.
 NDI # PA-XXXX PA DER # 15-307

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
300	0	15	0	0	0	0	0	-4	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED

NPLAN= 1 NRTIO= 9 LRTIO= 1

RTIOS=	1.00	.90	.80	.70	.60	.50	.40	.30	.15
--------	------	-----	-----	-----	-----	-----	-----	-----	-----

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

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	.21	0.00	.21	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	23.50	113.00	123.00	132.00	143.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .600

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTICK	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= .91 CP= .60 NTA= 0

RECESSION DATA

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

UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAS= .91 HOURS, CP= .60 VOL= 1.00

11.	40.	72.	88.	79.	60.	46.	35.	27.	20.
15.	12.	9.	7.	5.	4.	3.	2.	2.	1.
1.	1.								

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 26.88 24.47 2.42 13448.
(683.)(621.)(61.)(380.60)

HYDROGRAPH ROUTING

RESERVOIR ROUTING

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

ROUTING DATA

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

NSTPS	NSTD	LAG	ANSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	55.	-1

STAGE	330.00	330.50	331.00	331.50	332.00	332.50	333.00	333.50	334.00
FLOW	0.00	39.00	112.00	209.00	321.00	465.00	621.00	1471.00	2950.00
SURFACE AREA=	0.	7.	13.						
CAPACITY=	0.	55.	155.						
ELEVATION=	307.	330.	340.						

CREL	SPWID	COBW	EXPW	ELEV	COOL	CAREA	EXPL
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	CGOD	EXPD	DAMWID
333.0	0.0	0.0	0.

PEAK OUTFLOW IS 801. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 751. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 600. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 523. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 445. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 367. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 290. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 215. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 103. AT TIME 41.00 HOURS

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	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9
				1.00	.90	.80	.70	.60	.50	.40	.30	.15
HYDROGRAPH AT	1	.21	1	821.	739.	657.	575.	493.	411.	329.	246.	123.
	(	.54)	(	23.26)(	20.93)(	18.61)(	16.28)(	13.95)(	11.63)(	9.30)(	6.98)(	3.49)
ROUTED TO	2	.21	1	801.	751.	600.	523.	445.	367.	290.	215.	103.
	(	.54)	(	22.67)(	21.27)(	16.98)(	14.31)(	12.59)(	10.40)(	8.21)(	6.09)(	2.91)

1

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	330.00	330.00	333.00
STORAGE	55.	55.	79.
OUTFLOW	0.	0.	621.

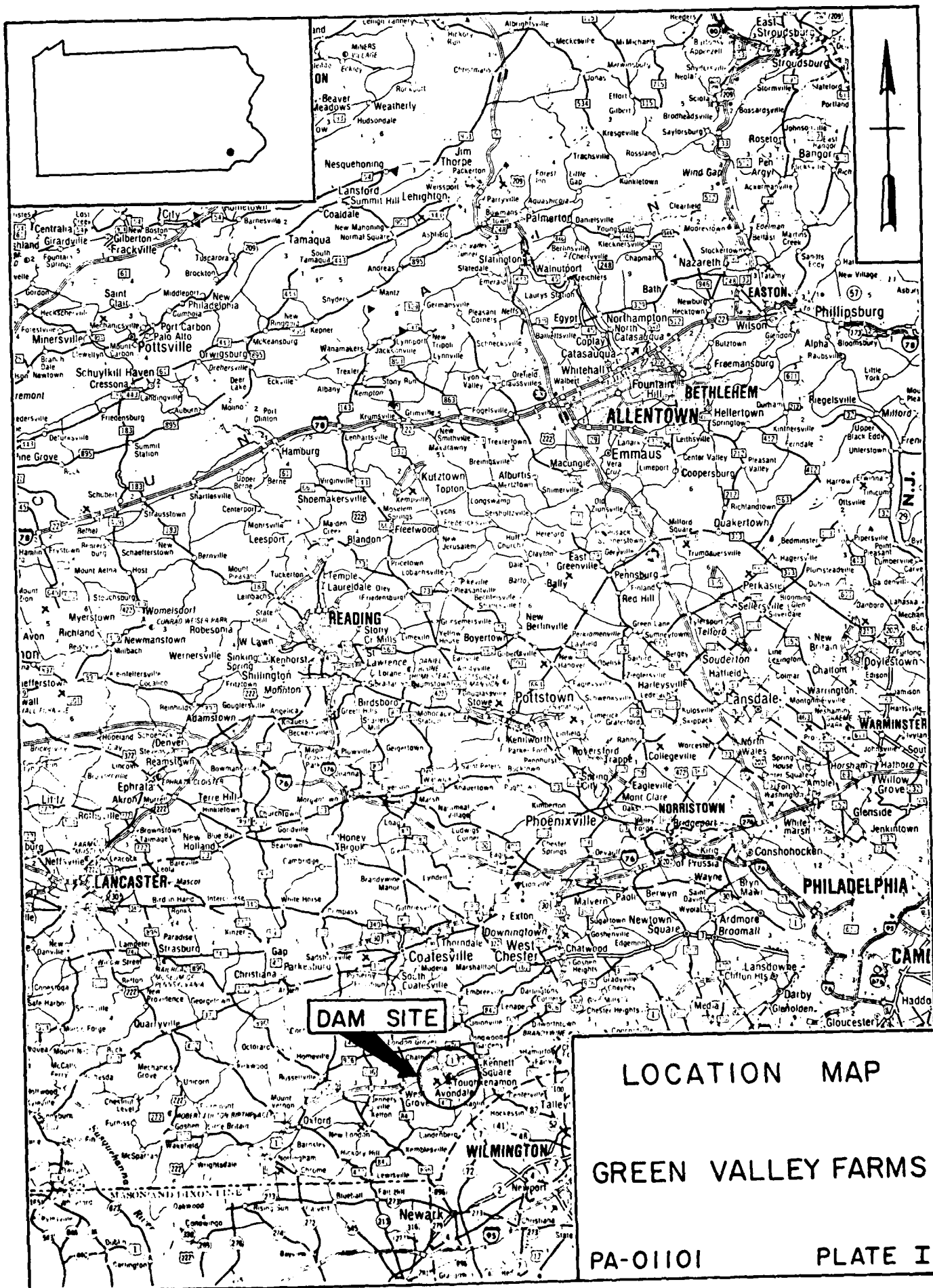
RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	333.11	.11	80.	801.	1.00	40.50	0.00
.90	333.08	.08	80.	751.	.75	40.75	0.00
.80	332.93	0.00	79.	600.	0.00	40.75	0.00
.70	332.69	0.00	76.	523.	0.00	40.75	0.00
.60	332.43	0.00	74.	445.	0.00	40.75	0.00
.50	332.16	0.00	72.	367.	0.00	41.00	0.00
.40	331.86	0.00	69.	290.	0.00	41.00	0.00
.30	331.53	0.00	67.	215.	0.00	41.00	0.00
.15	330.94	0.00	62.	103.	0.00	41.00	0.00

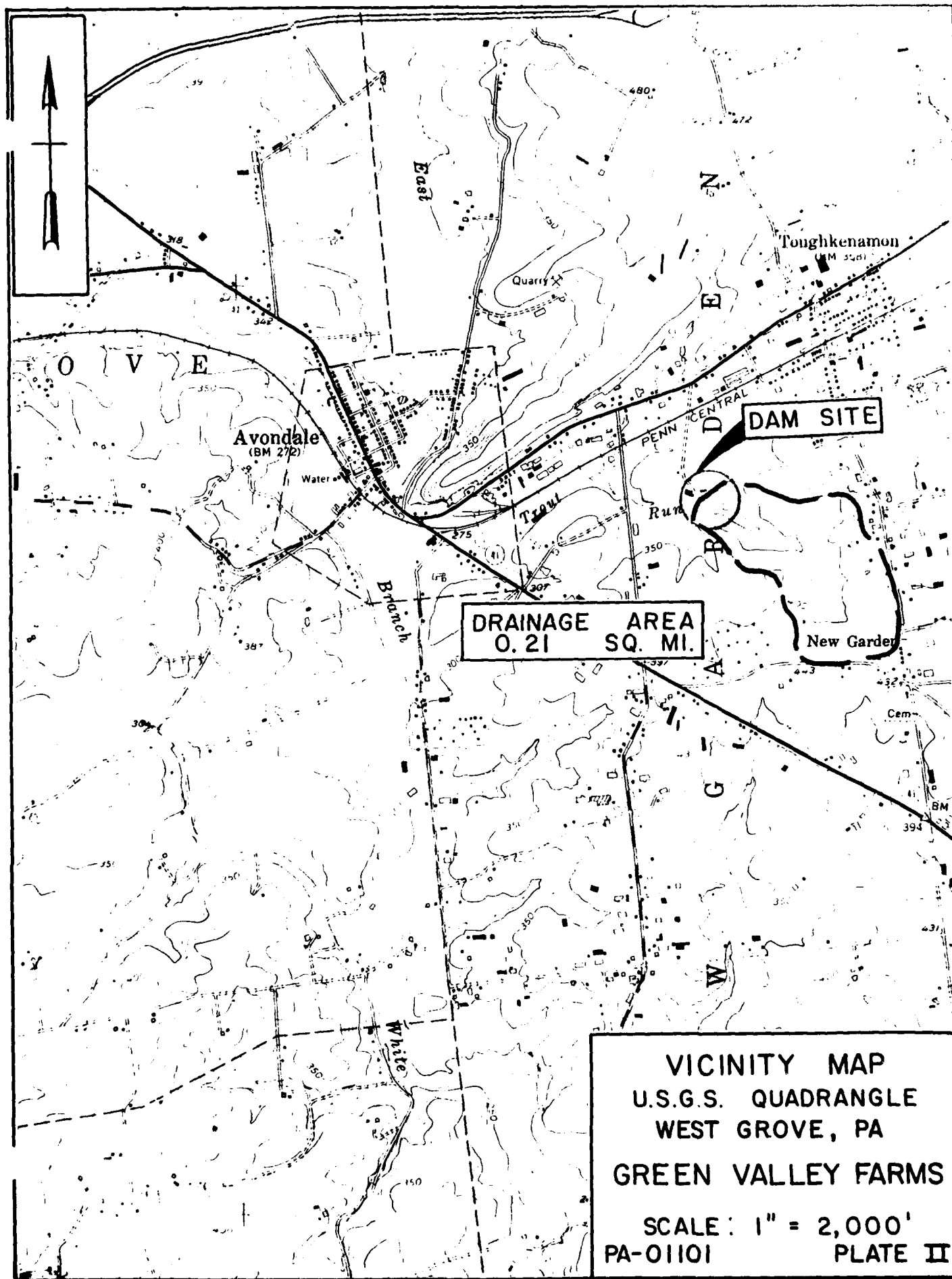
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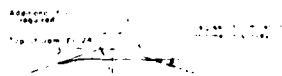
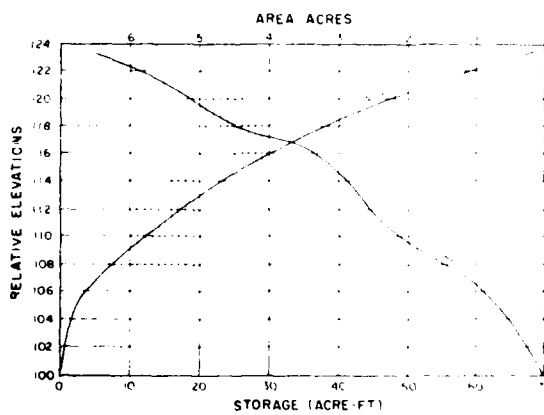
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APPENDIX E

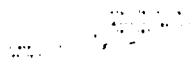
PLATES



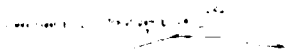




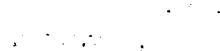
SECTION A-A
SCALE 1" = 50'



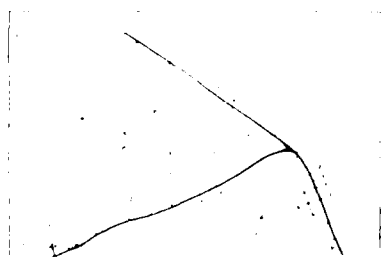
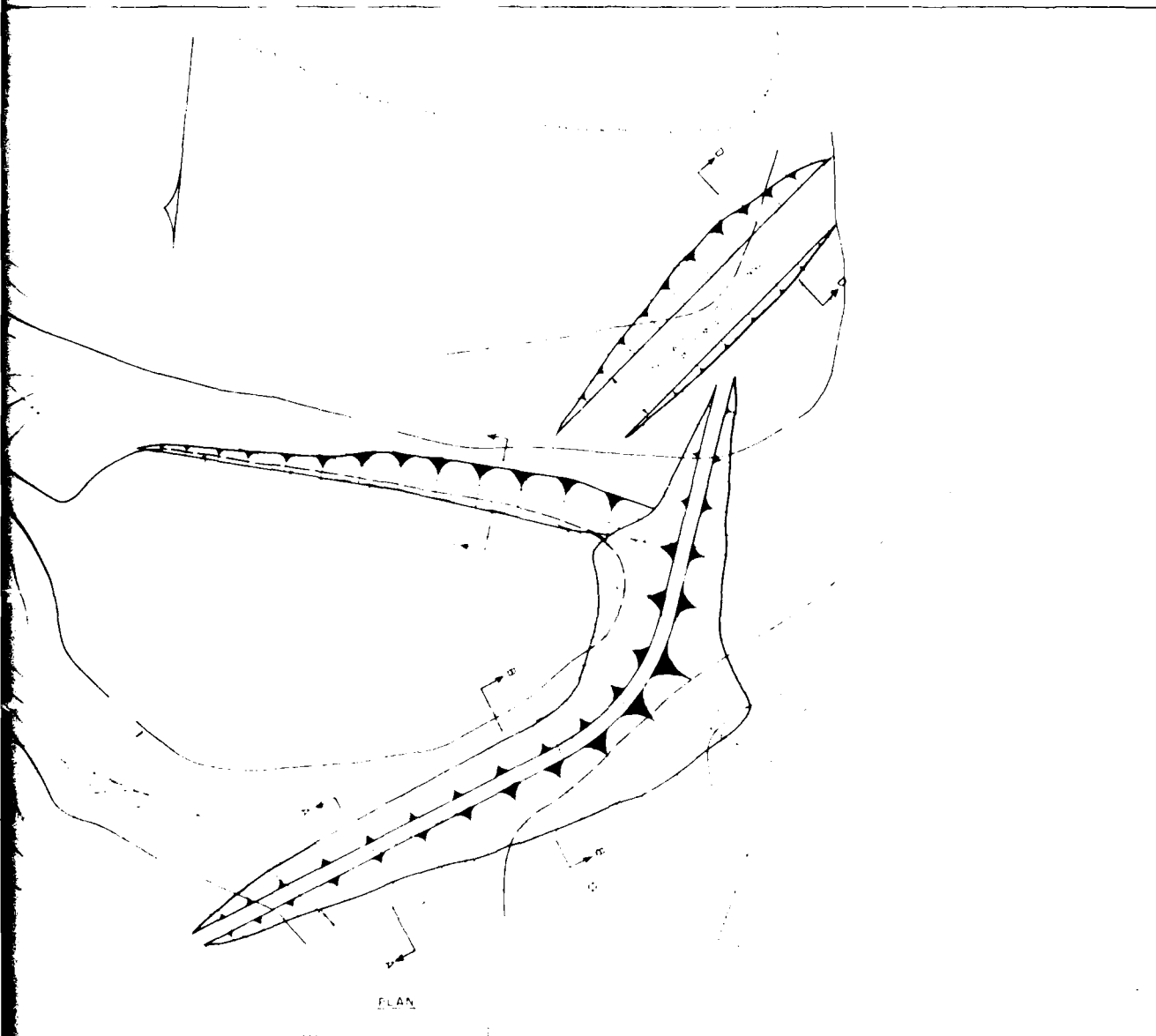
SECTION C-C
SCALE 1" = 50'



SECTION B-B
SCALE 1" = 50'



SECTION D-D
SCALE 1" = 50'



PERTINENT DATA

1. Pond area 1.2 acres
2. Pond depth 10 feet
3. Pond volume 12,000 cubic feet

NOTES

1. The pond is located on the east side of the road, near the intersection with the river.
2. The pond is a natural pond, and is not a man-made pond.
3. The pond is used for irrigation purposes.
4. The pond is a good source of water for the surrounding area.

GREEN VALLEY FARMS
NEW GARDEN TWP CHESTER CO. PA
IRRIGATION PROJECT
FARM POND PLAN AND ELEVATION

PLATE III
PA-01101

2

Note: Toe, drain has added (see)

1.5. 1963
R. H. H. H.

APPENDIX F
GEOLOGIC REPORT

GEOLOGIC REPORT

BEDROCK - DAM AND RESERVOIR

This area overlies the oligoclase-mica schist of the Wissahickon Formation. This schist consists of some hornblende gneiss members and some augen gneiss and quartz rich and feldspar rich members showing various degrees of granitization.

STRUCTURE

Cleavage is highly abundant, well developed and has a platy pattern. Joints are present, usually irregular and poorly formed. Dip varies from 45-85°.

OVERBURDEN

The overburden in this area is most probably a residual soil originating from the parent bedrock.

AQUIFER CHARACTERISTICS

Like all schistose formations, the Wissahickon has a low secondary porosity. Subsurface seepage should be of little concern.

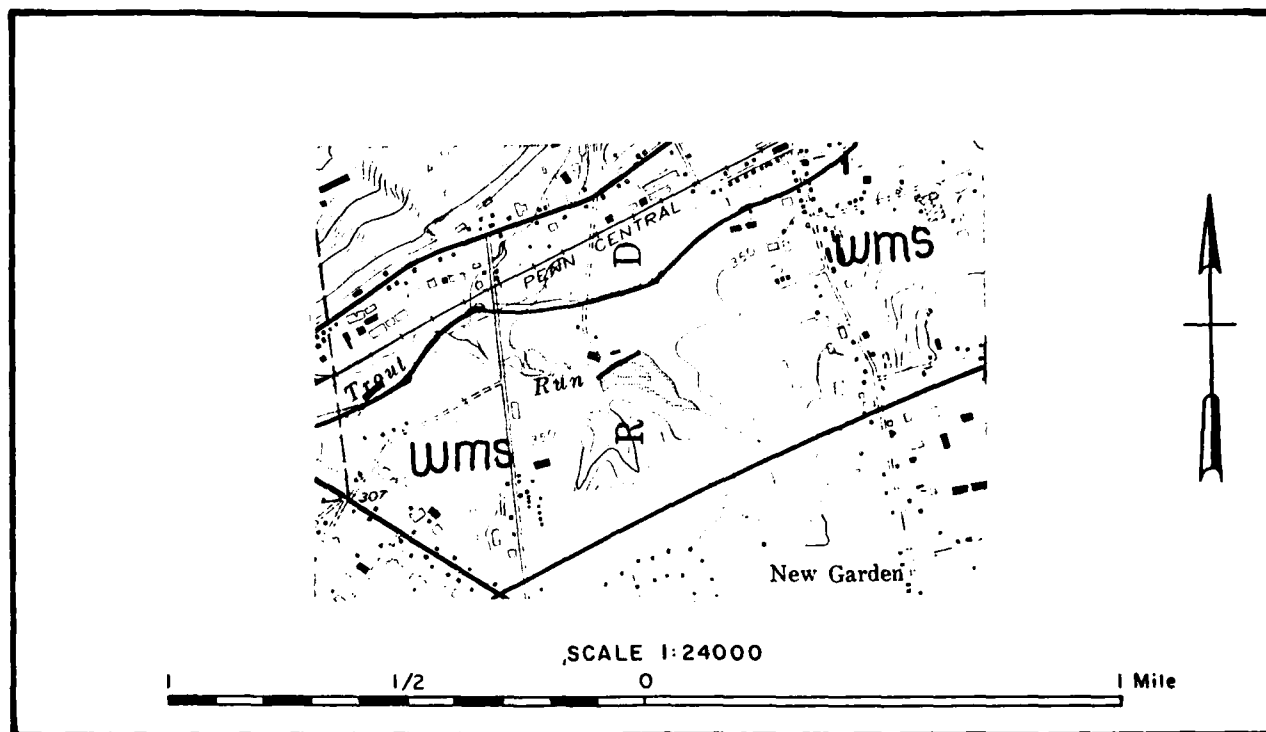
DISCUSSION

There are no construction plans available to determine whether or not the cutoff trench of the dam was excavated to bedrock. However, the Wissahickon Formation provides a good quality foundation for heavy structures.

SOURCES OF INFORMATION

1. Bascom, F., et. al., 1932. Coatesville-West Chester, Pennsylvania-Delaware Folio: U.S. Geological Survey F-223.
2. McGlade, W.G., 1972. Engineering Characteristics of the Rocks of Pennsylvania: Pennsylvania Geological Survey EG-1.

GEOLOGICAL MAP - GREEN VALLEY FARMS



LEGEND



Wissahickon Formation

DAT
ILM