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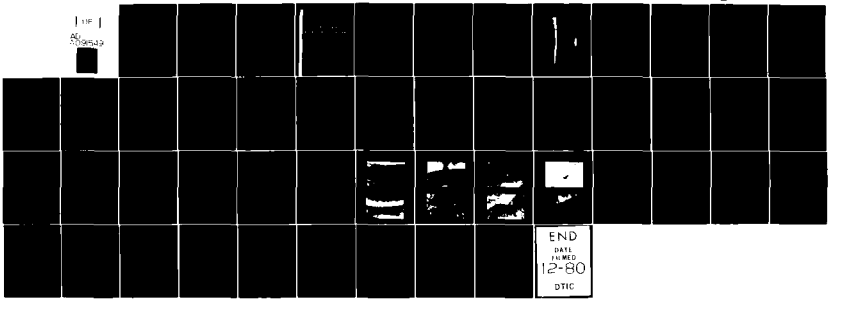

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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER: VA 14720	2. GOVT ACCESSION NO.: AD-A091549
3. RECIPIENT'S CATALOG NUMBER: 5749	
4. TITLE (and Subtitle): Phase I Inspection Report National Dam Safety Program Brisentine's Dam Prince Edward County, Commonwealth of Virginia	5. TYPE OF REPORT & PERIOD COVERED: Final
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Michael Baker, Jr., Inc. Beaver, Pennsylvania 15009	8. CONTRACT OR GRANT NUMBER(s): DACW 65-80-D-0032
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: U. S. Army Engineering District, Norfolk 803 Front Street Norfolk, Virginia 23510	12. REPORT DATE: September 1980 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report): Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

LEVEL II

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Copies are obtainable from National Technical Information Service, Springfield, Virginia 22151

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

Dams - VA
National Dam Safety Program Phase I
Dam Safety
Dam Inspection

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

(See reverse side)

AD A091549

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20. Abstract

Pursuant to Public Law 92-367, Phase I Inspection Reports are prepared under guidance contained in the recommended guidelines for safety inspection of dams, published by 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 conditions 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.

Based upon the field conditions at the time of the field inspection and all available engineering data, the Phase I report addresses the hydraulic, hydrologic, geologic, geotechnic, and structural aspects of the dam. The engineering techniques employed give a reasonably accurate assessment of the conditions of the dam. It should be realized that certain engineering aspects cannot be fully analyzed during a Phase I inspection. Assessment and remedial measures in the report include the requirements of additional indepth study when necessary.

Phase I reports include project information of the dam and appurtenances, all existing engineering data, operational procedures, hydraulic/hydrologic data of the watershed, dam stability, visual inspection report and an assessment including required remedial measures.

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 the Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

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

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

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the design flood should not be interpreted as necessarily posing a highly inadequate condition. The 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.

JAMES RIVER BASIN

Name of Dam: Brisentine's Dam
Location: Prince Edward County, Commonwealth of Virginia
Inventory Number: VA 14720

(9) Final Rept.,

PHASE I INSPECTION REPORT

(6)

NATIONAL DAM SAFETY PROGRAM

Brisentine's Dam (Inventory Number VA-14720)
James River Basin, Prince Edward County, Commonwealth of Virginia.
Phase I Inspection Report.

(11) Sep 80 (10) Michael Baker, III

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September 1980

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Brisentine's Dam
State: Commonwealth of Virginia
County: Prince Edward
USGS 7.5 Minute Quadrangle: Prospect, VA
Stream: Unnamed Tributary to Falling Creek
Date of Inspection: 9 July 1980

BRIEF ASSESSMENT OF DAM

Brisentine's Dam is an earthfill embankment 28.4 feet high and 3550 feet long, with an 80 foot wide vegetated earth emergency spillway located adjacent to the left abutment. Brisentine's Dam is a side-hill embankment and the embankment forms the entire eastern and southern sides of Brisentine's Pond. The principal spillway is a 6 inch diameter corrugated metal pipe serving as a riser. The reservoir inlet is a 15 inch diameter corrugated metal pipe located at the western end of the reservoir. The dam, located approximately 9.5 miles west of Farmville, Virginia, is used for recreation by the owner, Mrs. Paul P. Hicks. Brisentine's Dam is a "small" size - "significant" hazard structure as defined by the Recommended Guidelines for Safety Inspection of Dams.

Using the Corps of Engineer's screening criteria for initial review of spillway adequacy, the 100-year flood was selected as the spillway design flood (SDF). The SDF was routed through the reservoir and found to reach a maximum water surface elevation 2.5 feet below the minimum top of dam. The spillway is capable of passing up to 60 percent of the Probable Maximum Flood without overtopping the crest of the dam. The spillway is adjudged as adequate.

The dam and appurtenant structures were found to be in generally fair to poor condition. Due to the lack of an adequate vegetative cover, minor erosion is occurring in scattered areas on most of the eastern half of the dam. Severe erosion is occurring in several areas. There were two areas of seepage on the downstream slope of the embankment and a third area of wetness below the toe. Erosion is also occurring along much of the eastern half of the northern bank of the reservoir.

Visual inspection and office analyses indicate deficiencies requiring remedial treatment.

The seeps and wet areas should be examined at regular intervals for turbidity and/or increase in flow, which may indicate

the potential for piping of embankment material. If turbidity or increased flows are noted, a qualified geotechnical engineering firm should be retained to perform a stability check of the dam. A warning system and emergency action plan should be developed and put into operation.

Regular inspections should be made of the dam and appurtenant structures. A thorough check list should be compiled for use by the owner's representative as a guide for the inspections. Maintenance items should be completed annually.

The following repair items should be accomplished as part of the general maintenance of the dam:

1) All areas of erosion on the dam should be regraded and recompacted. Riprap may be necessary in some areas to prevent the recurrence of erosion.

2) A good grass cover should be established over the entire dam and emergency spillway.

3) The strips of erosion on the eastern half of the northern bank of the reservoir should be regraded and reseeded.

4) A staff gage should be installed to monitor reservoir levels above normal pool.

MICHAEL BAKER, JR., INC.

Michael Baker, III, P.E.
Chairman of the Board and
Chief Executive Officer

COMMONWEALTH OF VIRGINIA
MICHAEL
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NO. 3176
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Date: SEP 19 1980

OVERALL VIEW OF DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM: BRISENTINE'S DAM ID# VA 14720

SECTION 1 - PROJECT INFORMATION

1.1 General

1.1.1 Authority: Public Law 92-367, 8 August 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of safety inspections of dams throughout the United States. The Norfolk District has been assigned the responsibility of supervising the inspection of dams in the Commonwealth of Virginia.

1.1.2 Purpose of Inspection: The purpose is to conduct a Phase I inspection according to the Recommended Guidelines for Safety Inspection of Dams. The main responsibility is to expeditiously identify those dams which may be a potential hazard to human life or property.

1.2 Description of Project

1.2.1 Description of Dam and Appurtenances: Brisentine's Dam is a 28.4 foot high[1] by 3550 foot long, off-stream, side-hill, earthfill embankment. The upstream and downstream embankment slopes are both approximately 3H:1V (Horizontal to Vertical). The crest of the dam has an average width of 16 feet. The minimum crest width is 14 feet and the minimum top of dam elevation is 542.0 feet Temporary Bench Mark[2] (T.B.M.). There is no slope protection on the embankment. There is no information available on any possible zoning of the embankment or on the existence of an internal drainage system.

The principal spillway is a 6 inch diameter corrugated metal pipe acting as a fixed crest riser. The riser is located approximately 15 feet from the upstream face of the embankment.

[1]Measured from the downstream toe of the embankment to the crest of the embankment at the maximum cross section of the dam.
[2]All elevations are referenced to a Temporary Bench Mark (T.B.M.)

The crest of the riser is at elevation 537.8 feet T.B.M. The trash rack for the principal spillway is a short length of 18 inch corrugated metal pipe placed around the upper end of the riser.

The principal spillway conduit is a 6 inch diameter corrugated metal pipe which discharges into a 15 foot long by 10 foot wide, unlined stilling basin at the embankment toe. The stilling basin discharges into a 3.5 foot wide by 3.5 foot deep channel 50 feet long. This channel merges with the unnamed tributary to Falling Creek which flows along the southern side of the reservoir.

The emergency spillway was cut through earth adjacent to the left[3] abutment. It has a trapezoidal cross section and a bottom width of 80 feet. The left and right side slopes are 4H:1V and 10H:1V, respectively. The emergency spillway discharges onto the left overbank area of the unnamed tributary to Falling Creek.

The reservoir is fed by runoff from a small drainage area to the north of the reservoir and by a diversion of water, at the western end of the reservoir, from the unnamed tributary to Falling Creek. A small pool has been formed on this tributary by installation of a low concrete weir. Water from this pool flows along a 90 foot long earth diversion channel and a 55 foot long, 15 inch diameter corrugated metal pipe into the western end of the reservoir.

There are no facilities for draining the reservoir.

1.2.2 Location: Brisentine's Dam lies just to the north of and parallels an unnamed tributary to Falling Creek, approximately 9.5 miles west of Farmville, Virginia. A Location Plan is included with this report (Appendix I).

1.2.3 Size Classification: The height of the dam is 28.4 feet; the reservoir storage capacity at the crest of the dam (elevation 542.0 feet T.B.M.) is 208 acre-feet. Therefore, the dam is in the "small" size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

[3]Facing downstream.

1.2.4 Hazard Classification: There is no development in the area immediately downstream of the dam. A two-lane, stabilized gravel road, which provides the only access to several houses, crosses the unnamed tributary to Falling Creek approximately 600 feet downstream of the dam. This road would probably be destroyed in the event of dam failure by overtopping. There are two houses located downstream of the dam along this road, but they are well above normal flood levels and probably would not be damaged in the event of a dam failure by overtopping. Although loss of human life is not highly probable, appreciable economic losses due to the destruction of the road are likely in the event of a dam failure. Brisentine's Dam is therefore considered in the "significant" hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams. The hazard classification used to categorize dams is a function of location only and has nothing to do with its stability or probability of failure.

1.2.5 Ownership: The dam is owned by Mrs. Paul P. Hicks, 1202 Lee Drive, Farmville, Virginia 23901.

1.2.6 Purpose of Dam: The dam is used for recreation by the owner.

1.2.7 Design and Construction History: The dam was designed and constructed by Mr. A. Brisentine. According to the present owner, the construction of the dam was completed in the late 1960's.

1.2.8 Normal Operational Procedures: The reservoir is normally operated at the crest of the principal spillway, elevation 537.8 feet T.B.M. No formal operating procedures are followed for this structure.

1.3 Pertinent Data

1.3.1 Drainage Area: The drainage area tributary to the dam is 0.16 square mile.

1.3.2 Discharge at Dam Site: The maximum discharge from the reservoir is unknown.

Emergency Spillway:
Pool level at top of dam . . . . . 900 c.f.s.

1.3.3 Dam and Reservoir Data: Pertinent data on the dam and reservoir are shown in the following table:

TABLE 1.1 DAM AND RESERVOIR DATA

Item	Elevation (feet)	Reservoir Capacity Area (acres)	Reservoir Capacity Acre-feet	Reservoir Capacity Watershed (inches)	Length (feet)
Top of dam (minimum)	542.0	22.1	208	24.4	3000
Emergency spillway invert	539.3	21.2	150	17.6	3000
Principal spillway crest	537.8	21.1	118	13.8	3000
Streambed at toe [4]	-	-	-	-	-

[4]Brisentine's Dam is an off-stream, side-hill embankment which lies just to the north of and parallels the stream. Therefore, there is no constant elevation for the streambed at the toe of the dam.

SECTION 2 - ENGINEERING DATA

2.1 Design: Design plans, specifications, and boring logs were not available for use in preparing this report. No stability analyses or hydrologic and hydraulic data were available for review.

2.2 Construction: Construction records, as-built plans, and inspection logs were not available for review.

2.3 Evaluation: No construction records or as-built plans were available to adequately assess the condition of the dam. All evaluations and assessments in this report were based upon field observations, discussions with the owner, and office analyses.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

3.1.1 General: The field inspection was conducted on 9 July 1980. At the time of the inspection, the pool elevation was 537.8 feet T.B.M. and the elevation of the tailwater in the stilling basin for the principal spillway was 520.5 feet T.B.M. The weather was hot and humid with temperatures in the low 90's°F. The ground surface at the embankment and abutments was generally dry. The dam and appurtenant structures at the time of the inspection were found to be in fair to poor overall condition. Deficiencies found during the inspection will require remedial treatment. The following are brief summaries of deficiencies found during the inspection. A Field Sketch of conditions found during the inspection is presented as Plate 1. The complete visual inspection check list is given in Appendix III. No record was found of any previous inspections.

Due to the length and irregular shape of this dam, the locations of all deficiencies found during the field inspection are referenced to the stationing established during the inspection for the "top of dam profile" survey. This stationing is shown on the Field Sketch, Plate 1 of this report.

3.1.2 Dam: The embankment was found to be in generally fair condition. There are no surface cracks or sloughs. Due to the lack of an adequate vegetative cover, minor erosion is occurring in scattered areas on most of the eastern half of the dam. From Station 3+00 to Station 5+00, a 1-2 foot high erosion wall (vertical scarp) has formed on the upstream embankment slope, just above the normal reservoir level. This erosion wall was probably formed by wave action. On the downstream slope, near Station 6+00, there is no vegetative cover. Erosion channels 8 inches deep and 1-2 feet apart have formed in this area. Very severe erosion has occurred near the bottom of the downstream slope from Station 7+00 to Station 8+00. There are erosion gullies up to 5 feet deep in this area; the bottom few feet of the

embankment have been washed away completely, apparently by the stream that runs along the toe.

From the right side of the emergency spillway to Station 6+00, the crest of the dam is bare soil and the upstream and downstream slopes have a thin cover of high grass. From Station 6+00 on, the vegetative cover gradually improves. From Station 20+00 to the right abutment at Station 35+50, the embankment has a cover of moderately thick to thick, high grass.

There is an area of seepage from Station 10+20 to Station 11+20, extending from the toe approximately 10-15 feet up the downstream slope. Standing water was visible, but no flowing water was observed. There was no turbidity or particulate matter in the water. There is a wet area between Station 16+50 and Station 17+00, just below the toe of the embankment and to the right of the principal spillway. The soil in this area was soft and wet, but no standing or flowing water was observed. Another area of seepage was found just above the toe of the embankment between Station 21+30 and Station 22+00. This area extends up the embankment 10-12 feet. The soil in this area was very wet and soft, and small pools of clear standing water were visible. No flowing water was observed.

Except for some minor erosion at the junction of the spillway and dam, due to a lack of adequate vegetative cover, the junctions of the embankment and abutments and spillway and dam appear to be in satisfactory condition.

3.1.3 Appurtenant Structures: The 6 inch diameter corrugated metal pipe principal spillway riser and outlet conduit appear to be in good condition. The trash rack is a short section of 18 inch diameter corrugated metal pipe placed around the upper end of the riser.

The emergency spillway is a vegetated earth, trapezoidal channel cut into the left abutment. It has a bottom width of 80 feet. The emergency spillway has only a thin cover of high grass, but otherwise appears to be in good condition.

There are no facilities for draining the reservoir. No evidence of an internal drainage system was found during the inspection.

3.1.4 Reservoir Area: The reservoir slopes are gentle to moderate and covered with a moderately thick to thick cover of high grass. There are three distinct strips of moderate erosion adjacent to the reservoir banks on the eastern half of the northern side of the reservoir. The strips of erosion vary in width from 5-7 feet to 20-30 feet. There is one house on the northern side of the reservoir.

3.1.5 Downstream Channel: An unnamed tributary to Falling Creek runs from west to east just below the toe of the embankment. Water from this stream is diverted into the reservoir at its western end. The stream is free from major obstructions. The stream has a slope of approximately 0.8 percent in the reach beside the dam. The side slopes are covered with trees. Erosion of the stream bank is occurring between Station 28+50 and Station 34+00, on the side of the stream opposite the dam.

3.1.6 Instrumentation: There is no instrumentation at the dam site.

3.2 Evaluation: In general, the dam and appurtenant structures are in fair to poor condition. The seeps and wet area should be examined at regular intervals and after periods of heavy rains for turbidity and/or increase in flow, which may indicate the potential for piping of embankment material. If turbidity or increased flows are noted, a qualified geotechnical engineering firm should be retained to perform a stability check of the dam. All areas of erosion should be regraded and recompacted, and a good grass cover should be established over the entire dam and emergency spillway. Riprap may be necessary to prevent recurrence of erosion on the upstream slope at the eastern end of the reservoir, and on the lower portion of the downstream slope where it is adjacent to the creek. The strips of erosion on the bank of the reservoir should be regraded and reseeded. A staff gage should be installed to monitor reservoir levels above normal pool.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures: Operation of the dam is an automatic function controlled by the principal spillway and the emergency spillway. Water entering the reservoir flows into the principal spillway at elevation 537.8 feet T.B.M. When the inflow is sufficient, the reservoir level rises above elevation 539.3 feet T.B.M. and discharges through the emergency spillway.

4.2 Maintenance of Dam: Maintenance of the dam is the responsibility of the owner. An inspection or maintenance schedule has not been instituted.

4.3 Maintenance of Operating Facilities: There are no operating facilities at the dam.

4.4 Warning System: At the present time, there is no warning system or emergency action plan in operation.

4.5 Evaluation: Past maintenance of the dam has been inadequate. Regular inspections should be made of the dam and appurtenant structures. A thorough check list should be compiled for use by the owner's representative as a guide for the inspections. Maintenance items should be corrected annually. A warning system and emergency action plan should be developed and put into operation.

SECTION 5 - HYDRAULIC/HYDROLOGIC DATA

5.1 Design: No design data were available for use in preparing this report.

5.2 Hydrologic Information: No rainfall, stream gage, or reservoir stage records are maintained for this dam.

5.3 Flood Experience: No records were available.

5.4 Flood Potential: The Probable Maximum Flood (PMF), 1/2 Probable Maximum Flood (1/2 PMF), and the 100-year flood were developed and routed through the reservoir by use of the HEC-1 DB computer program (Reference 9, Appendix IV) and appropriate unit hydrograph, precipitation, and storage-outflow data. Clark's T_c and R coefficients for the local drainage areas were estimated from basin characteristics. The rainfall applied to the unit hydrograph was taken from publications by the U.S. Weather Bureau and the National Oceanic and Atmospheric Administration (References 16 and 17, Appendix IV). Rainfall losses for the PMF were estimated at an initial loss of 1.0 inches and a constant loss rate of 0.05 inches per hour thereafter. Rainfall losses for the 100-year flood were estimated at an initial loss of 1.5 inches and a constant loss rate of 0.15 inches per hour thereafter.

5.5 Reservoir Regulation: Pertinent dam and reservoir data are shown in Table 1:1, Paragraph 1.3.3.

Regulation of flow from the reservoir is automatic. Normal flows are maintained by the crest of the principal spillway riser at elevation 537.8 feet T.B.M. Water also flows past the dam through the ungated emergency spillway in the event water in the reservoir rises above an elevation of 539.3 feet T.B.M.

Outlet discharge capacity was computed by hand; reservoir area was estimated from the Prospect, Virginia, 7.5 minute USGS quadrangle; and storage capacity was computed by the HEC-1 DB program. Outlet discharge capacity and storage capacity curves were computed to elevations above the crest of the dam. All flood routings were begun with the reservoir at normal pool. Flow through the principal spillway was included in the routings.

5.6 Overtopping Potential: The probable rise of the reservoir and other pertinent information on reservoir performance are shown in the following table:

TABLE 5.1 RESERVOIR PERFORMANCE

Item	Normal(a)	Hydrographs 100-year flood	1/2 PMF	PMF(b)
Peak flow, c.f.s.				
Inflow	1	568	1422	2845
Outflow	1	12	664	2059
Peak elev., ft. T.B.M.	537.8	539.5	541.6	542.8
Emergency spillway (c) (elev. 539.3 ft. T.B.M.)				
Depth of flow, ft.	-	0.2	2.3	3.5
Average velocity, f.p.s.	-	2.1	7.0	8.7
Duration of flow, hrs.	-	5.7	17.1	22.3
Non-overflow section (c) (elev. 542.0 ft. T.B.M.)				
Depth of flow, ft.	-	-	-	0.8
Average velocity, f.p.s.	-	-	-	4.1
Total duration of over-topping, hrs.	-	-	-	0.8
Tailwater elev., ft. T.B.M.	520.5	-	-	-

(a) Conditions at time of inspection.
(b) The PMF is an estimate of flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in a region.
(c) Velocity estimates were based on critical depth at control section.

5.7 Reservoir Emptying Potential: There are no facilities for draining the reservoir.

5.8 Evaluation: Brisentine's Dam is a "small" size - "significant" hazard dam requiring evaluation for a spillway design flood (SDF) in the range between the 100-year flood and the 1/2 PMF. Due to the risk involved, the 100-year flood has been selected as the SDF. The 100-year flood was routed through the reservoir and found to reach a maximum water surface elevation 2.5 feet below the minimum top of dam elevation. The spillway is capable of passing up to 60 percent of the PMF without overtopping the crest of the dam.

Conclusions pertain to present conditions and the effect of future development on the hydrology has not been considered.

SECTION 6 - DAM STABILITY

6.1 Foundation and Abutments: There is no information available on the foundation conditions. The dam is located in the Piedmont physiographic province of Virginia. The principal deposits in this province are paleozoic metamorphic and igneous rocks such as granite, gneiss, slate, etc. The topography of the area consists of rolling hills, gentle slopes, and relief less than 150 feet. No internal drainage system was found during the visual inspection. How the dam is keyed into the foundation is unknown. As noted in the visual inspection, there are seeps and wet areas on and below the downstream embankment slope.

6.2 Embankment

6.2.1 Materials: There is no information available on the nature of the embankment materials. The embankment appears to have been constructed of reddish to yellowish-brown silty clay with traces of mica and small rock fragments. The area soils are generally low-plastic silts and clays. There is no information available on any possible zoning of the embankment.

6.2.2 Stability: There are no stability calculations available. The dam is 28.4 feet high and the crest is 16 feet wide. The embankment has an estimated upstream slope of 3H:1V and a measured downstream slope of 3H:1V. The dam is not subject to a sudden drawdown because there are no facilities for draining the reservoir.

According to the guidelines presented in Design of Small Dams by the U.S. Department of the Interior, Bureau of Reclamation, for small homogeneous dams with a stable foundation, not subjected to a drawdown, and composed of low-plasticity silty clays (CL), the recommended slopes are 3H:1V upstream and 2.5H:1V downstream. The recommended crest width is 16 feet. Based on these guidelines, the embankment slopes and crest width are considered adequate.

6.2.3 Seismic Stability: Brisentine's Dam is located in Seismic Zone 2. Therefore, according to the Recommended Guidelines for Safety Inspection of Dams, the dam is considered to have no hazard from earthquakes, provided

static stability conditions are satisfactory and conventional safety margins exist.

6.3 Evaluation: There is insufficient information to adequately evaluate the stability of the dam. Based on the Bureau of Reclamation guidelines, the crest width and slopes of the embankment are adequate. However, the visual inspection revealed seeps and a wet area on and below the downstream embankment slope.

The seeps and wet area should be examined at regular intervals and after periods of heavy rains for turbidity and/or an increase in flow, which may indicate the potential for piping of embankment material. If turbidity or increased flow is noted, a qualified geotechnical engineering firm should be retained to perform a stability check of the dam.

The spillway passes the design flood with a maximum water surface elevation 2.5 feet below the minimum top of dam elevation.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment: There were no engineering data available for use in preparing this report. Deficiencies discovered during the field inspection and office analyses will require remedial treatment. The dam and appurtenant structures are generally in fair to poor condition. Maintenance of the dam is considered inadequate.

Using the Corps of Engineers' screening criteria for initial review of spillway adequacy, the 100-year flood was selected as the SDF for the "small" size - "significant" hazard classification of Brisentine's Dam. It has been determined that the spillway would pass the SDF with a maximum water surface elevation 2.5 feet below the minimum top of dam elevation. The spillway is capable of passing up to 60 percent of the PMF without overtopping the crest of the dam and is adjudged as adequate.

Due to the lack of an adequate vegetative cover, minor erosion is occurring in scattered areas on most of the eastern half of the dam. More severe erosion is also occurring in several areas. There were two areas of seepage on the downstream embankment slopes and a third area of wetness below the toe. Erosion is also occurring along much of the eastern half of the northern bank of the reservoir.

There is no warning system or emergency action plan currently in operation.

7.2 Recommended Remedial Measures: The seeps and wet area should be examined at regular intervals and after periods of heavy rains for turbidity and/or increase in flow, which may indicate the potential for piping of embankment material. If turbidity or increased flows are noted, a qualified geotechnical engineering firm should be retained to perform a stability check of the dam.

A warning system and emergency action plan should be developed and put into operation. The dam should be checked during periods of heavy rainfall until corrective measures are completed. If evidence of piping of embankment material is detected or if dam overtopping is imminent, warning should be issued to downstream inhabitants and local public officials. The emergency action plan should list steps to be taken to help prevent failure of the dam in an emergency.

Regular inspections should be made of the dam and appurtenant structures. A thorough check list should be compiled for use by the owner's representative as a guide for the inspections. Maintenance items should be completed annually.

The following repair items should be accomplished as part of the general maintenance of the dam:

1) All areas of erosion on the dam should be regraded and recompacted. Riprap may be necessary in some areas to prevent the recurrence of erosion.

2) A good grass cover should be established over the entire dam and emergency spillway.

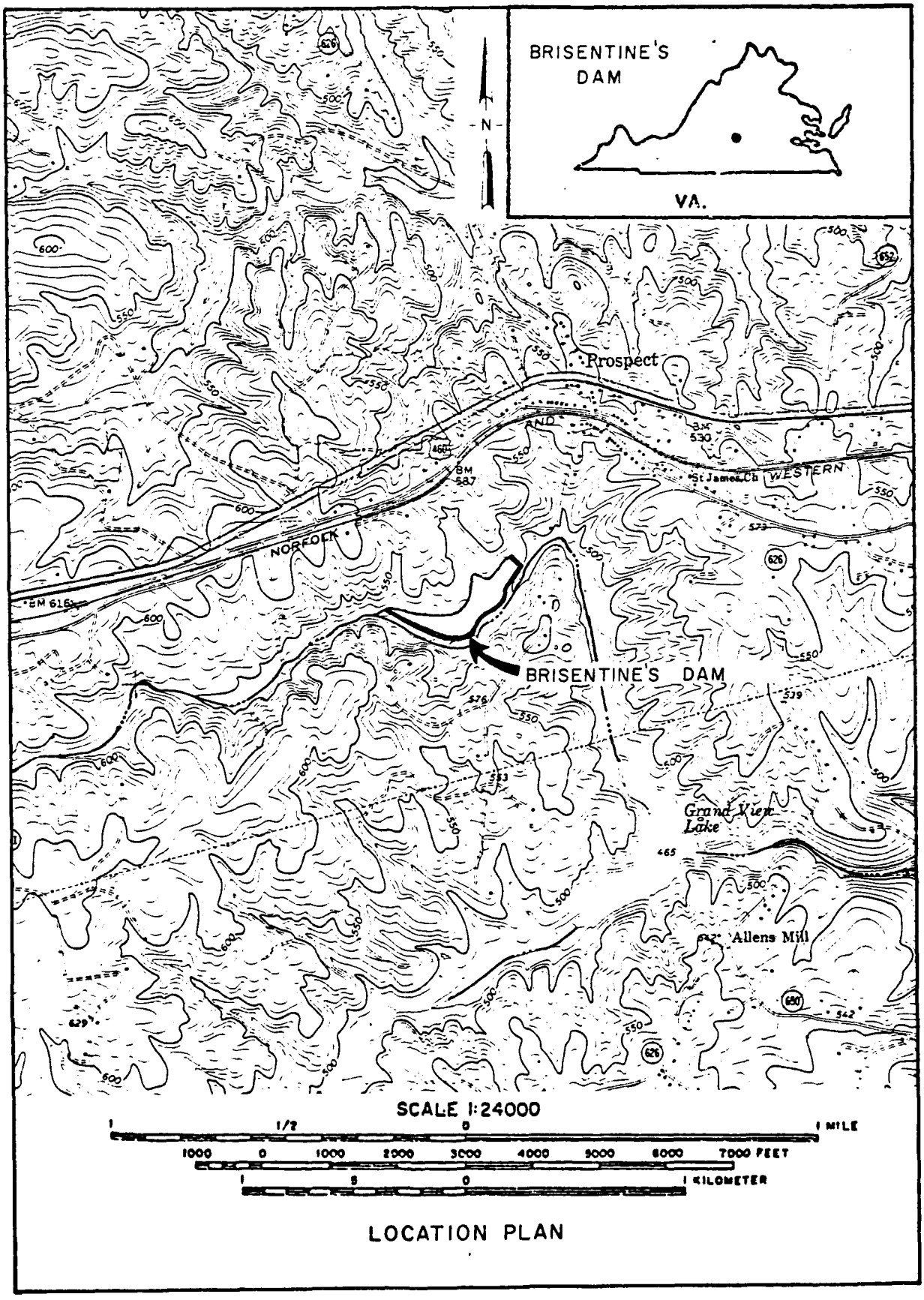
3) The strips of erosion on the eastern half of the northern bank of the reservoir should be regraded and reseeded.

4) A staff gage should be installed to monitor reservoir levels above normal pool.

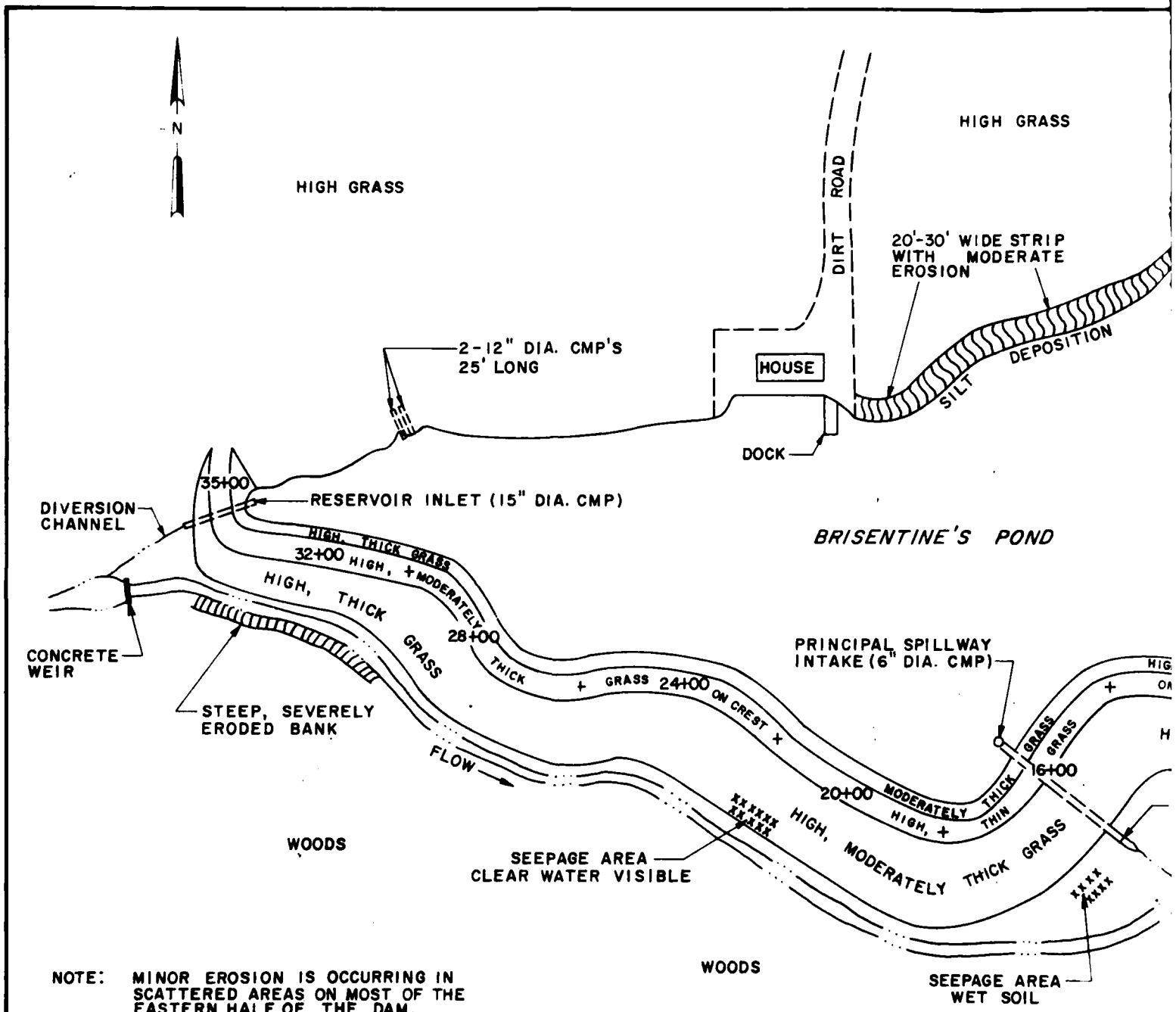
APPENDIX I

PLATES

CONTENTS



LOCATION PLAN



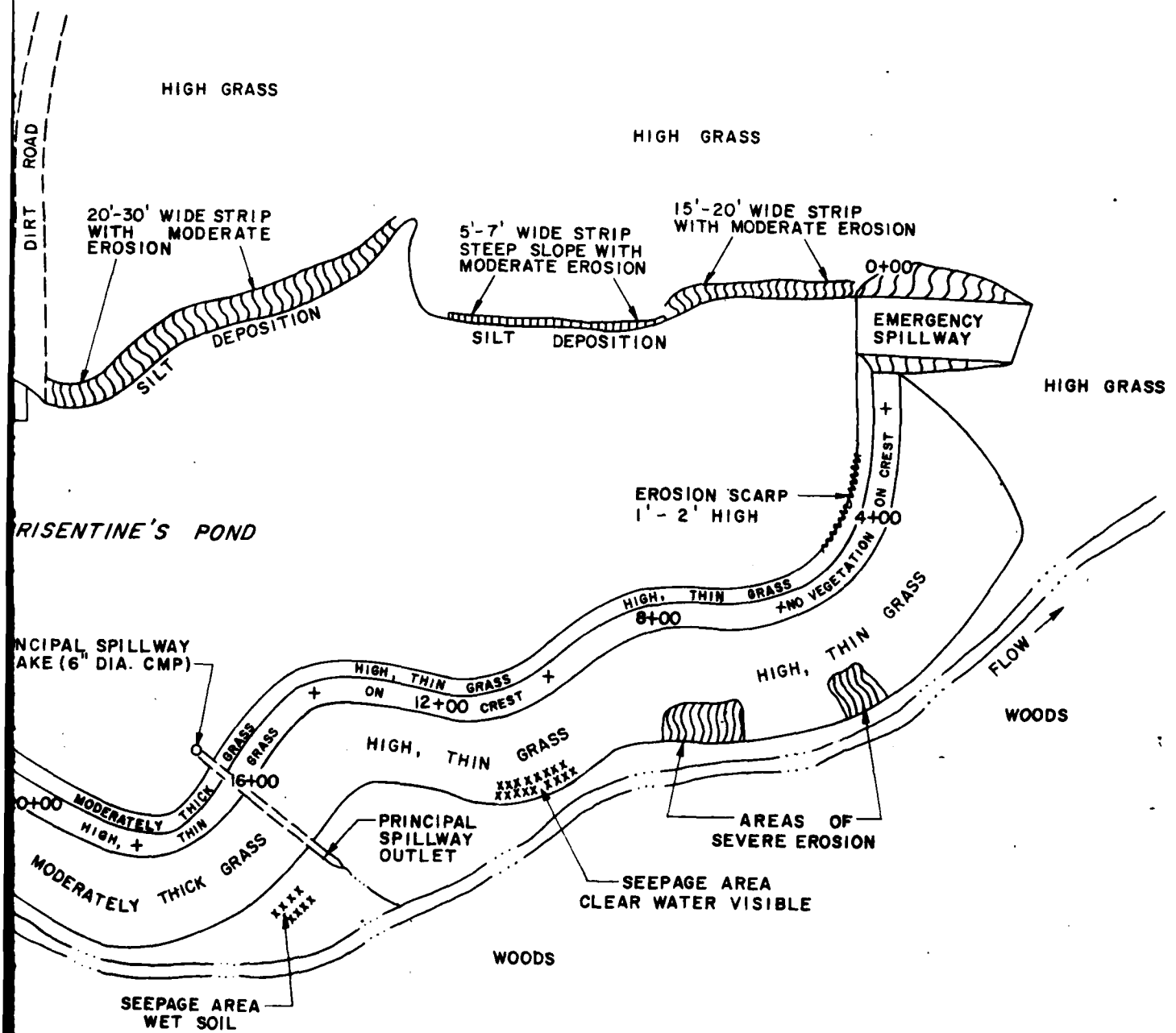
NOTE: MINOR EROSION IS OCCURRING IN SCATTERED AREAS ON MOST OF THE EASTERN HALF OF THE DAM.

FIELD SKETCH

BRISENTINE'S DAM

MICHAEL BAKER, JR., INC.
9 JULY 1980
PLATE 1

NO SCALE



FIELD SKETCH

BRISENTINE'S DAM

MICHAEL BAKER, JR., INC.
9 JULY 1980
PLATE 1

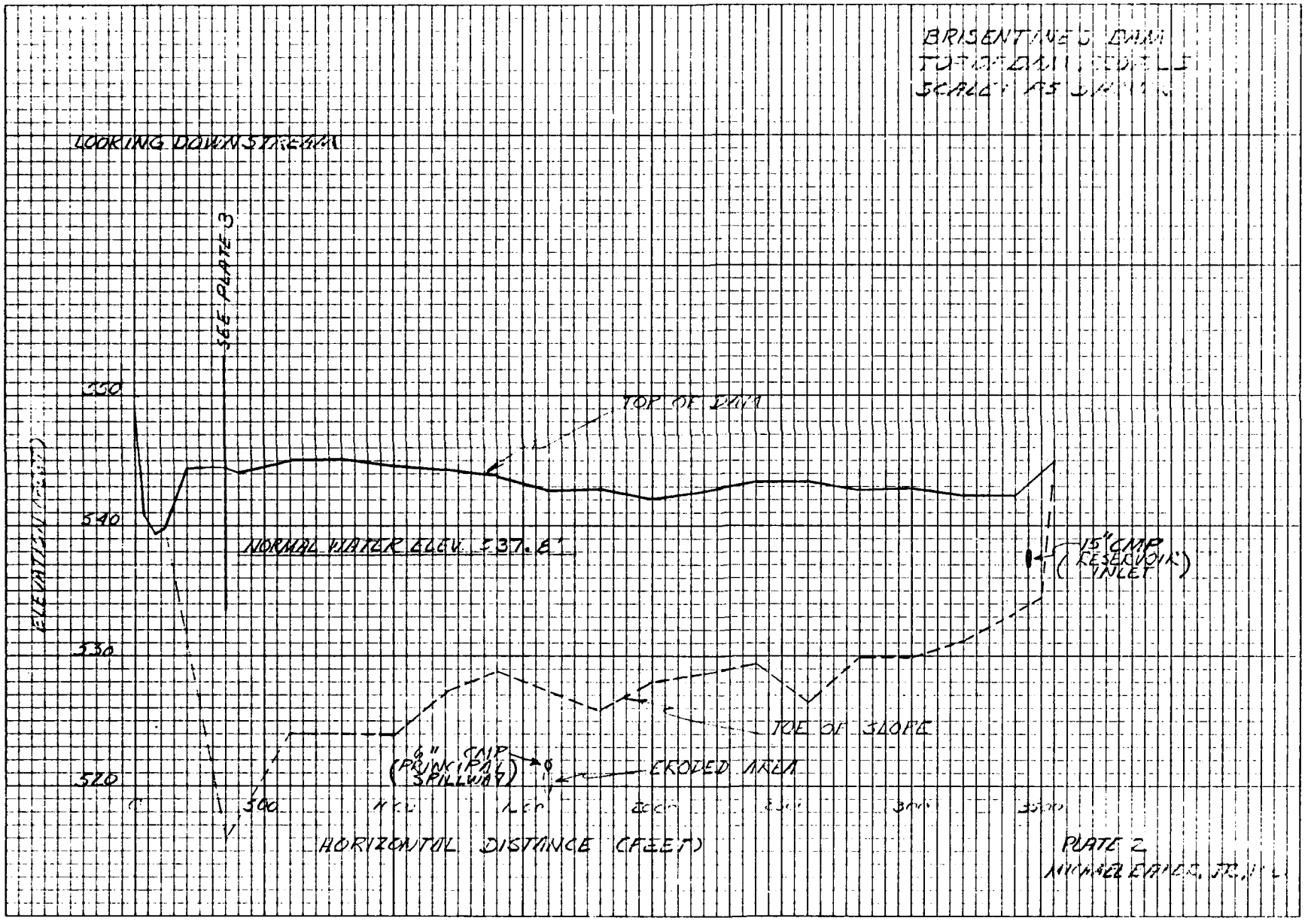

LOOKING DOWNSTREAM
SEE PLATE 3
TOP OF DAM
NORMAL WATER ELEV. 537.6'
15" CMP (RESERVOIR INLET)
6" CMP (PRINCIPAL SPILLWAY)
TOE OF SLOPE
ERODED AREA
ELEVATION (FEET)
540
530
520
500
HORIZONTAL DISTANCE (FEET)

PLATE 2

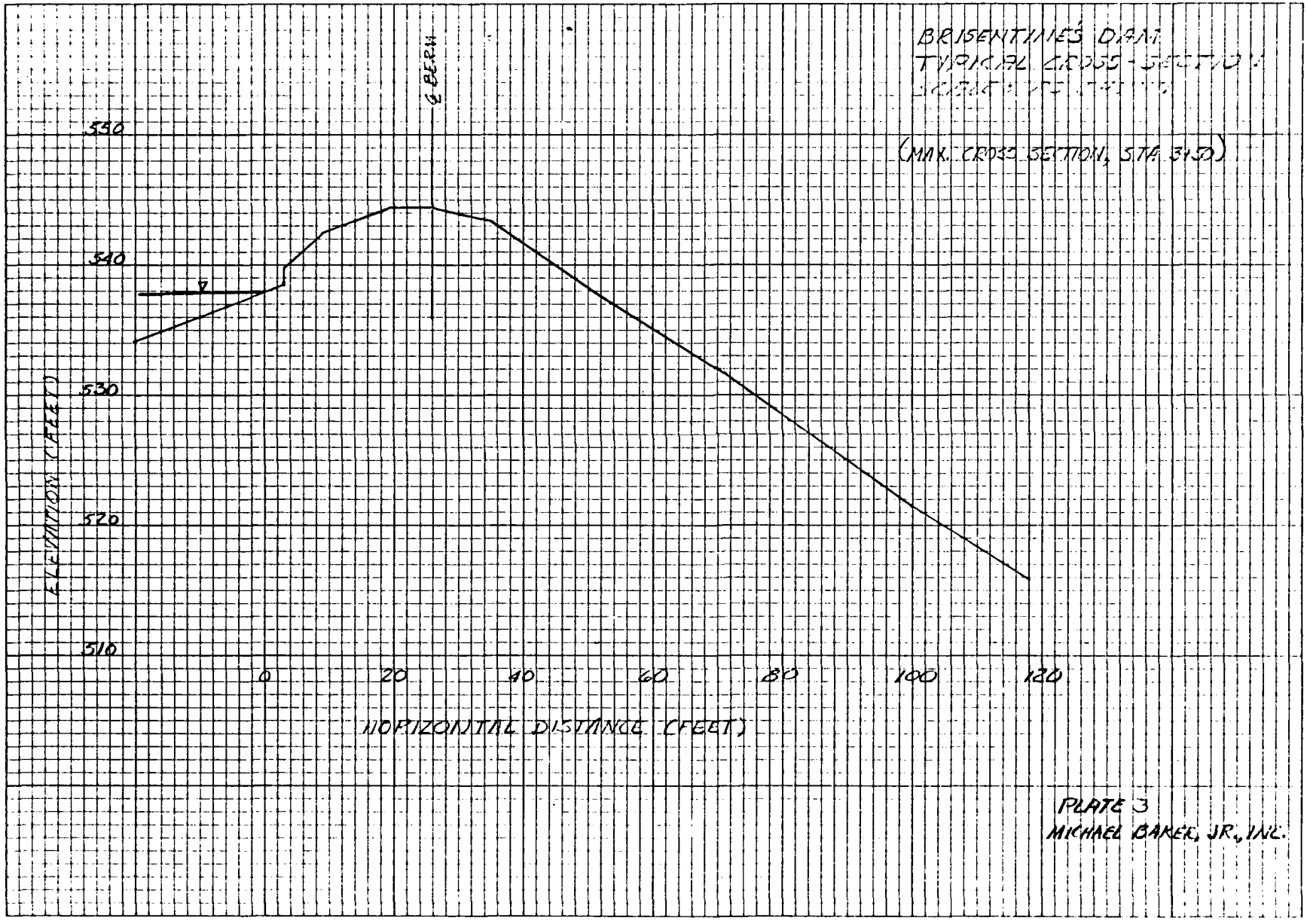


PLATE 3
MICHAEL BAKER, JR., INC.

APPENDIX II

PHOTOGRAPHS

CONTENTS

Note: Photographs were taken on 9 July 1980.

BRISENTINE'S DAM

PHOTO 1. Erosion along Northern Bank of Reservoir, Embankment in Background

PHOTO 2. Emergency Spillway

PHOTO 3. Embankment Crest from Edge of Emergency Spillway; Note Lack of Vegetation

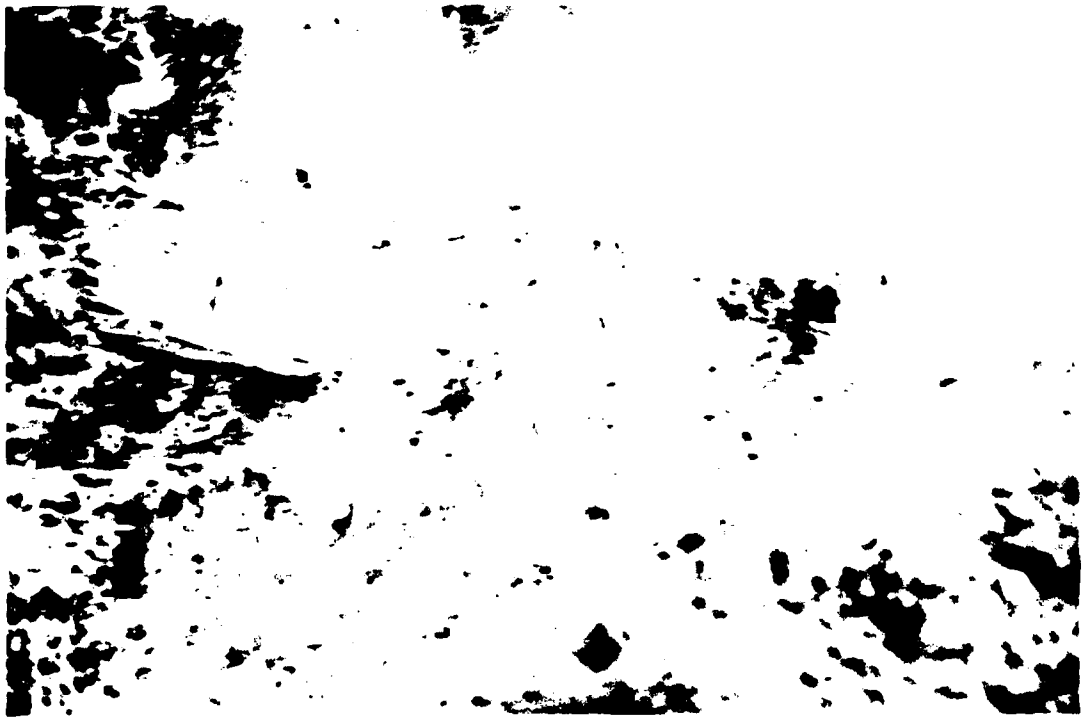


PHOTO 4. Erosion at Bottom of Downstream Slope between Station 7 + 00 and Station 8 + 00

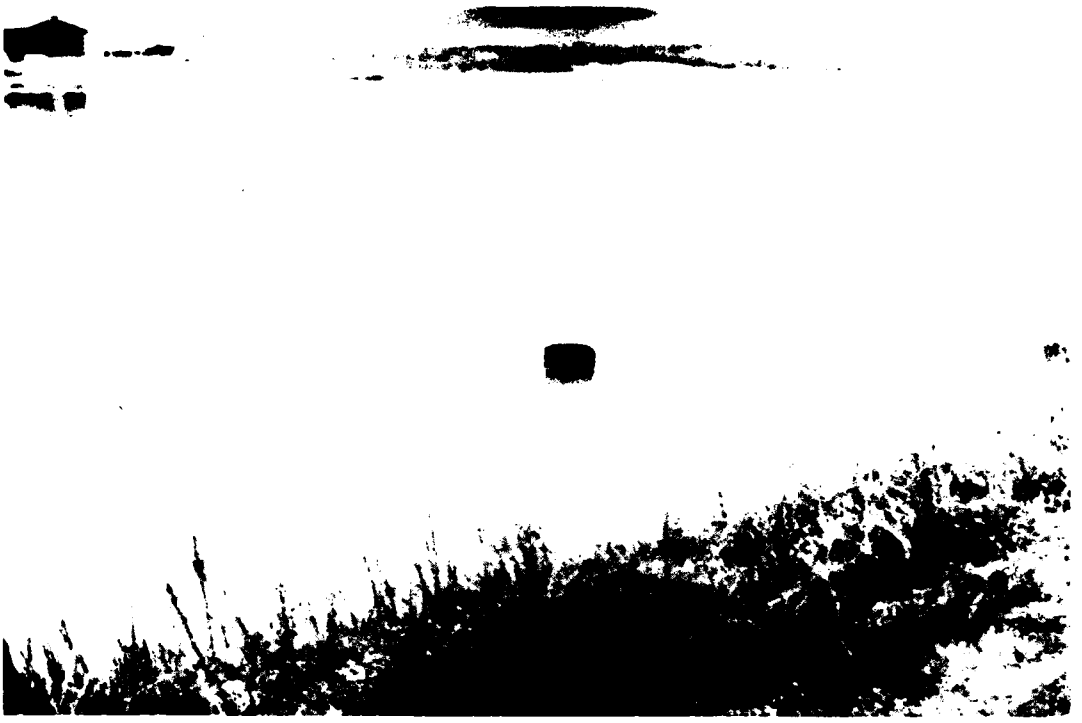


PHOTO 5. Principal Spillway Inlet

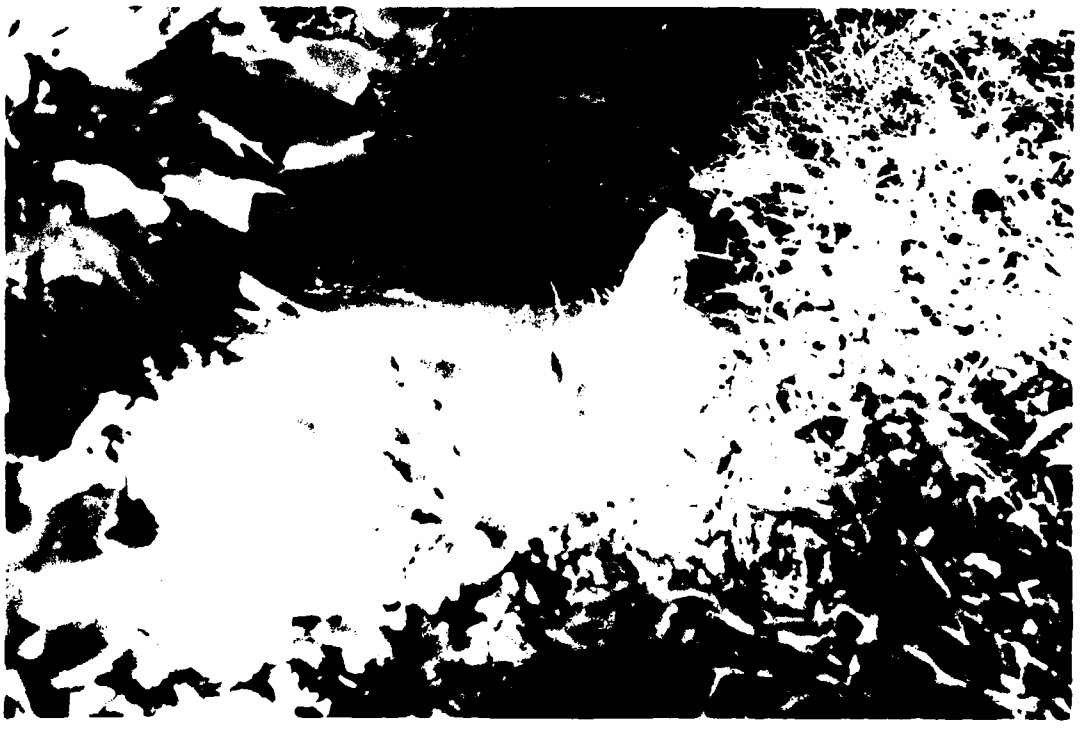


PHOTO 6. Principal Spillway Outlet

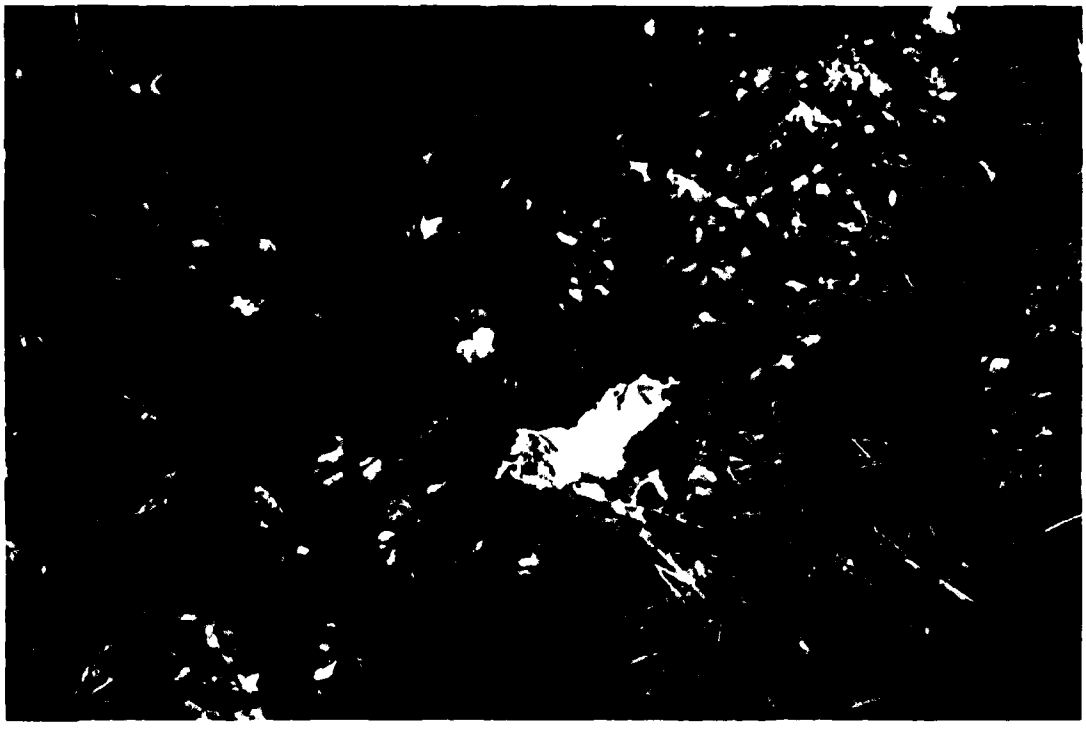


PHOTO 7. Area of Seepage between Station 21 + 30 and Station 22 + 00; Standing Water in Footprint

PHOTO 8. Reservoir Inlet

APPENDIX III

VISUAL INSPECTION CHECK LIST

Phase 1
Visual Inspection
Check List

Name of Dam Brisentine's Dam **County** Prince Edward **State** Virginia **Coordinates** Lat. 3717.7

Long. 7833.9

Date of Inspection 9 July 1980 **Weather** Sunny, humid **Temperature** 90° F.

Pool Elevation at Time of Inspection 537.8 ft.* T.B.M. **Tailwater at Time of Inspection** 520.5 ft.* T.B.M.

*Elevations were referenced to a temporary bench mark

Inspection Personnel:

Michael Baker, Jr., Inc.:

Jeffrey A. Quay
John W. Lightner
P.S. Verma

Virginia State Water Control Board:

Leon Musselwhite
Thomas Modena

Owner's Representatives:

None

P.S. Verma Recorder

Note: Due to the length and irregular shape of this dam, the locations of all deficiencies observed during the field inspection are referenced to the stationing established during the inspection for the "top of dam profile" survey. This stationing is shown on the Field Sketch, which is included in this report as Plate 1.

EMBANKMENT

Name of Dam BRISENTINE'S DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND TOE	None observed	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Due to the lack of an adequate vegetative cover, minor erosion is occurring in scattered areas on most of the eastern half of the dam. From Station 3+00 to Station 5+00, a 1-2 ft. high erosion wall has formed on the upstream embankment slope, just above the normal reservoir level. This erosion wall was probably formed by wave action. On the downstream slope, near Station 6+00, there is no vegetative cover, and moderate to severe erosion has occurred. Erosion channels 8 in. deep and 1-2 ft. apart have formed on this area. Very severe erosion has occurred near the bottom of the downstream slope from Station 7+00 to Station 8+00. There are erosion gullies up to 5 ft. deep in this area and the bottom few ft. of the embankment have been washed away completely, apparently by the stream which runs along the toe.	All areas of erosion should be regraded and recompacted, and a good grass cover should be established over the entire dam. Riprap may be necessary to prevent recurrence of erosion on the upstream slope at the eastern end of the reservoir, and on the lower portion of the downstream slope where it is adjacent to the creek.

EMBANKMENT

Name of Dam BRISENTINE'S DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	The top of dam elevation varies by approximately 3 ft. along the crest of the embankment; the lowest area is near Station 20+00. The embankment curves back and forth along the entire eastern and southern sides of the reservoir.	
RIPRAP FAILURES	There is no riprap on the dam.	Riprap may be necessary in some areas. See "SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES," above.
VEGETATION	There is a thin cover of high grass in the emergency spillway. From the right side of the emergency spillway to Station 6+00, the crest of the dam is bare soil; the upstream and downstream slopes have a thin cover of high grass. From Station 6+00 on, the vegetative cover gradually improves. From Station 20+00 to the right abutment at Station 35+50, the embankment has a cover of moderately thick to thick, high grass.	A good grass cover should be established over the entire embankment.

EMBANKMENT

Name of Dam BRISENTINE'S DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTIONS OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Except for some minor erosion at the junction of the spillway and dam, due to a lack of adequate vegetative cover, these junctions all appear to be in satisfactory condition.	
ANY NOTICEABLE SEEPAGE	There is an area of seepage from Station 10+20 to Station 11+20, extending from the toe approximately 10-15 ft. up the downstream slope. Standing water was visible, but no flowing water was observed. There is no turbidity or particulate matter in the water. There is a wet area between Station 16+50 and Station 17+00, just below the toe of the embankment and to the right of the principal spillway. The soil in this area was soft and wet, but no standing or flowing water was observed. Another area of seepage was found just above the toe of the embankment between Station 21+30 and Station 22+00. It extends up the embankment 10-12 ft. The soil in this area was very wet and soft, and small pools of clear standing water were visible. No flowing water was observed.	The seeps and wet area should be examined at regular intervals and after periods of heavy rains for turbidity and/or increase in flow, which may indicate the potential for piping of embankment material. If turbidity or increased flows are noted, a qualified geotechnical engineering firm should be retained to perform a stability check of the dam.
STAFF GAGE AND RECORDER	None	
DRAINS	No evidence of an internal drainage system for the dam was found during the inspection.	

OUTLET WORKS

Name of Dam: BRISENTINE'S DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not applicable - the outlet conduit is a 6 in. diameter C.M.P.	
INTAKE STRUCTURE	The principal spillway intake structure consists of a 6 in. diameter C.M.P. acting as a riser. The trash rack is a short section of 18 in. diameter C.M.P. placed around the upper end of the riser. The intake structure appears to be in good condition.	
OUTLET STRUCTURE	The outlet structure is a 6 in. diameter C.M.P. with a flanged end. There is no visible supporting structure. The outlet structure appears to be in good condition.	
OUTLET CHANNEL	Water emerging from the outlet conduit is discharged into a stilling basin approximately 15 ft. long and 10 ft. wide. There is no riprap in the stilling basin. The water then flows through a channel approximately 3.5 ft. wide and 3.5 ft. deep for a distance of approximately 50 ft., prior entering the stream. The outlet channel appears to be in good condition.	
EMERGENCY GATE	There is no emergency gate or other facility for draining the reservoir.	

UNGATED SPILLWAY

Name of Dam: BRISENTINE'S DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	None	
APPROACH CHANNEL	The emergency spillway is a vegetated earth trapezoidal channel cut into the left abutment. It has a bottom width of 80 ft. The approach channel is approximately 125 ft. long, with a gentle adverse slope. It has only a thin cover of high grass, but otherwise appears to be in good condition.	A good grass cover should be established.
DISCHARGE CHANNEL	The control section is approximately 20 ft. long, and is followed by a 30 ft. long discharge channel. The control section and discharge channel have only a thin cover of high grass, but otherwise appear to be in good condition.	A good grass cover should be established.
BRIDGE AND PIERS	Not Applicable	

INSTRUMENTATION

Name of Dam: BRISTENTINE'S DAM

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	No permanent markers were found.	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER		

RESERVOIR

Name of Dam: BRISENTINE'S DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	The reservoir slopes are gentle to moderate and covered with a moderately thick to thick cover of high grass. There are three distinct strips of moderate erosion next to the reservoir banks on the eastern half of the northern side of the reservoir. Total length of the erosion strips is approximately 900 ft.; the erosion strips vary in width from 5-7 ft. to 20-30 ft. There is one house on the northern bank of the reservoir.	The areas where erosion is occurring should be regraded and reseeded.
SEDIMENTATION	Silt deposition was observed near the water's edge next to the strips of erosion mentioned above. Some silt deposition is also caused by the erosion occurring on the dam crest and upstream slope.	The reservoir is fairly new, and sedimentation is not expected to interfere with the operation or use of the reservoir for some time.
INLET STRUCTURE	The reservoir is an off-stream reservoir; it is fed by run-off from a small watershed to the north of the reservoir and by a diversion of water from the stream which flows along the southern edge of the reservoir. The reservoir inlet is a 55 ft. long, 15 in. diameter C.M.P. located at the western end of the reservoir.	

DOWNSTREAM CHANNEL

Name of Dam: BRISENTINE'S DAM

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	An unnamed tributary to Falling Creek runs from west to east just below the toe of the embankment. Water from this stream is diverted into the reservoir at its western end. The stream is free from major obstructions.	
SLOPES	The stream has a slope of approximately 0.8% in the reach beside the dam. The side slopes are covered with trees. Erosion of the stream bank is occurring between Stations 28+50 and 34+00, on the side of the stream opposite the dam.	
APPROXIMATE NO. OF HOMES AND POPULATION	There are two houses approximately 600 ft. downstream of the dam. Estimated population is 8. The houses are well above normal flood elevations and probably would not be destroyed as a result of a dam failure by overtopping.	

APPENDIX IV

GENERAL REFERENCES

GENERAL REFERENCES

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