AD-A064 011 CORPS OF ENGINEERS BALTIMORE MD BALTIMORE DISTRICT F/G 13/2
NATIONAL DAM INSPECTION PROGRAM. PARKER POND DAM (NDI MD00085),--ETC(U)
AUG 78

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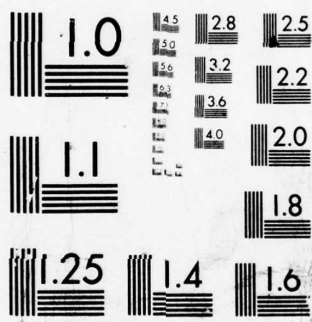

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

LEVEL II

WICOMICO RIVER BASIN

BEAVERDAM CREEK, WICOMICO COUNTY

MARYLAND

PARKER POND

NDI NO. MD 00085

PHASE 1 INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

409111

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

Prepared By: Maryland Water Resources Administration
AUGUST 1978

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LEVEL II

(1)

WICOMICO RIVER BASIN

BEAVERDAM CREEK, WICOMICO COUNTY

MARYLAND

PARKER POND DAM

NDI NO. MD00085

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

(6) National Dam Inspection Program.
Parker Pond Dam (NDI MDØØØ85),
Wicomico River Basin, Beaver Dam Creek,
Wicomico County, Maryland.
Phase I Inspection Report.

(12) 55p.

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

Prepared By: Maryland Water Resources Administration

(11) August 1978

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PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam:	Parker Pond Dam
State Located:	Maryland
County Located:	Wicomico
Stream:	Beaver Dam Creek
Date of Inspection:	14 July 1978
Inspection By:	State of Maryland Department of Natural Resources Water Resources Administration

The Phase I review of Parker Pond Dam revealed the structure to be in good condition and relatively stable under normal operation. The dam structure is low, averaging less than 8 feet in height, and slope stability problems were not detected and are not anticipated. No seepage areas were observed during the field inspection.

Due to the unavailability of original hydrologic and hydraulic design computations, a preliminary analysis was performed based on data generated for the design of a downstream structure known as Beaglin Park Drive Dam located 1.5 miles below Parker Pond, the Salisbury By-Pass crossing of Parker Pond, and local gage records. The results of the analysis considering criteria for a dam in the low hazard category indicated the spillway system to be inadequate. Due to the overtopping potential and possible deleterious effects upon Beaglin Park Drive Dam, additional analysis was performed and revealed that Beaglin Park Drive impoundment is capable of receiving surcharge inflow in the event of failure of Parker Pond Dam.

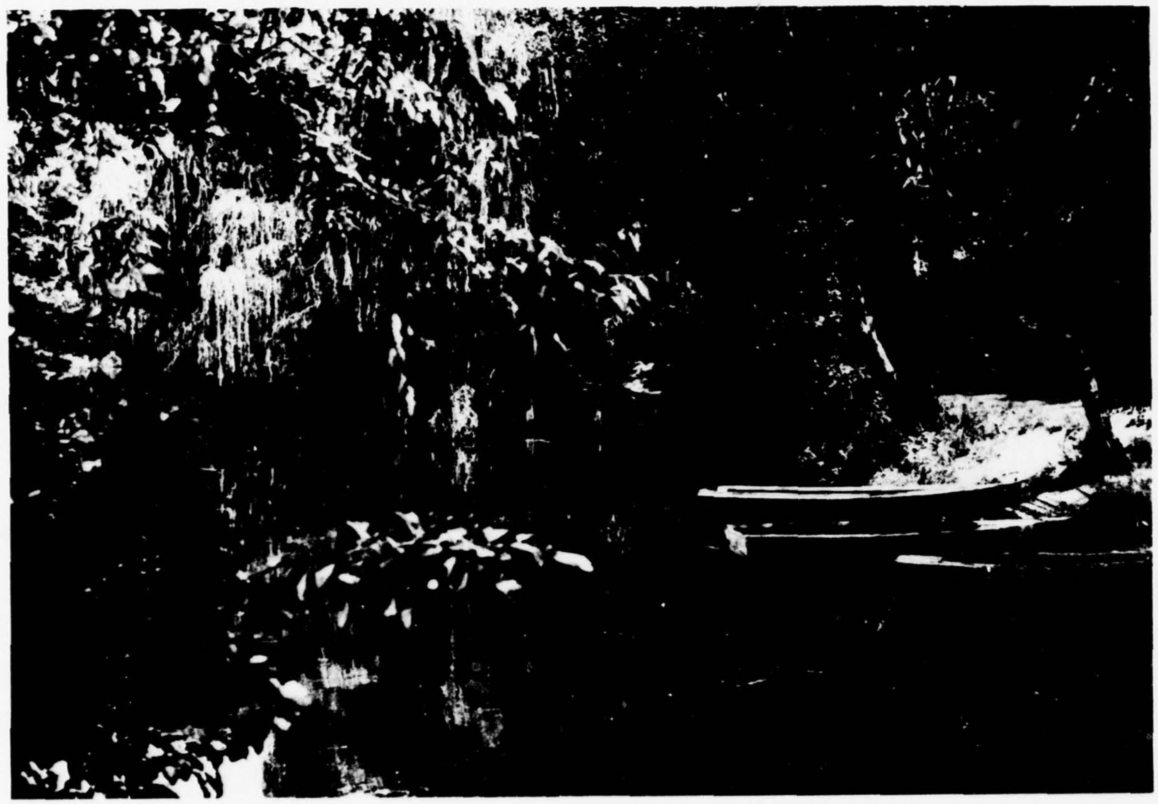
Based upon visual observation, the existing level of maintenance is satisfactory, but operation and maintenance procedures should be documented in writing.

APPROVED BY:

Jeffrey O. Smith
Chief, Dam Safety Division
Maryland Water Resources
Administration

G. K. Withers
Colonel, Corps of Engineers
District Engineer

DATE: 23 Sep 78



Parker Pond Dam
MD 00085

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

PARKER POND DAM MD00085

ABSTRACT

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority. The inspection was authorized by the Dam Inspection Act, Public Law 92-367, and was performed in accordance with the Maryland F. Y. 78 priority list.

b. ~~Purpose of Inspection.~~ The Phase I Inspection is an evaluation of existing engineering data and a visual inspection of the dam and appurtenances in an effort to determine if it constitutes a hazard to human life or property.

ABSTRACT

1.2 Description of Project

a. Description of Dam. Parker Pond is an earth embankment structure approximately 350 feet in length with two controlled spillways. The primary spillway is located at the original stream channel near the center of the dam and the other is located on the right (west) side of the dam. The right spillway is a reinforced concrete box structure designed to accept hydroelectric turbines to supply electricity to an adjacent dwelling. The principle spillway at the center of the dam is reinforced concrete with timber beam support for the roadway bridge over the spillway.

b. Location. The dam is located on Beaverdam Creek approximately 1.5 miles upstream from Beaglin Park Dam (Schumaker Pond) within the Wicomico River Drainage Basin.

c. Size Classification. Small: 13 feet high, 245 acre feet.

d. Hazard Classification. The potential for minimal property loss and no anticipated loss of life in the event of a dam failure places the dam in a low hazard category. The downstream channel is described in Section 3.1, e. and f.

e. Ownership. The structure is owned and operated by Wise H. Hinman. The road surface of Schumaker Road is owned and maintained by Wicomico County.

f. Purpose of Dam. The primary purposes of the dam are limited recreation and hydroelectric generation of electricity for the owner.

g. Design and Construction History. Parker Pond was constructed approximately 200 years ago with soil excavated in an area adjacent to the east side of the dam. The original purpose of the dam was to provide water power and grist and sawmill activities. In the late 1700's the pond was known as Robbin's Mill Lot owned by James B. Robbins. Prior to this the pond may have been referred to as Mungums' Mill Etc.

Through the years, title to the dam and milling operations changed hands several times and under the ownership of Mr. Schelshorn, milling activities ceased in 1906. The present owner, Mr. Wise H. Hinman, acquired the dam and mill in 1943. The gristmill at the principal spillway was demolished in 1956 when an automobile left the road and collided with it. The spillway remained intact, but the left downstream wingwall was damaged and is now shored with a timber beam. The former sawmill spillway at the right abutment of the dam was destroyed in 1956, apparently due to localized internal erosion. Mr. Hinman replaced the spillway with a reinforced concrete box structure and a hydroelectric turbine system for producing his own electricity.

h. Normal Operation Procedures. The water level in the impoundment is controlled by a series of manually operated wood and steel sluice gates at the primary and right spillways. Normal operation attempts to provide a specific pool level by raising or lowering the gates at the primary spillway with discharge flowing through open gates or over closed gates. During production of hydroelectric energy the gates on the right spillway are opened. The flow is generally regulated to a steady release rate.

1.3 Pertinent Data.

a. Drainage Area. 9.29 mi^2 = 5947 acres

b. Discharge at Damsite. Unknown flow rate; highest water surface at gage height 2.30; normal pool gage height 1.10.

c. Elevation (feet above mean sea level).

Top of dam - 28.30
Spillway crest - 25.87 (Gates closed)
Sediment pool - 21.47 (Gates open)
Normal tailwater - 17.73
Streambed at centerline of dam - 15.5

d. Reservoir.

Length of maximum pool - 1.02 miles
Length of Recreation pool - .98 miles
Length of flood control pool - 1.00 miles

e. Storage (acre-feet).

Sediment pool - 30 acre-feet at elevation 21.47
Recreation pool - 130 acre-feet at elevation 25.87
Top of dam - 245 acre-feet at elevation 28.30

f. Reservoir Surface (Acres).

Top of dam - 55 acres
Recreational pool - 41.5 acres
Sediment pool - 15 acres

g. Dam.

Type - earth (and some stone)
Length - 350 feet
Height - 12.8 feet from top of dam to streambed

h. Spillway.

Type: The primary spillway is a steel reinforced concrete overflow structure controlled by three steel gates on the upstream face. A timber beam bridge approximately 17 feet in length spans the spillway.

The right spillway is a steel reinforced concrete box structure controlled by 3 wood gates on the upstream side and one large steel gate on the downstream side. Within this flume are two turbines for hydroelectric generation.

Length of Weir:

Right spillway - 7.5 feet total, upstream face
Primary spillway - 7.5 feet total, upstream face

Crest Elevation:

Right spillway - 26.39 (Gate Closed)
22.94 (Gate Open)
Primary spillway - 25.87 (Gate Closed)
21.47 (Gate Open)

Gates: The primary spillway has three gates, two of which are controlled manually and the other opened by a screw apparatus which can be driven by a portable electric motor.

The right spillway has 3 gates on its upstream and 1 gate on its downstream side, all controlled by hand. A chain fall is attached to the downstream gate. Emergency drawdown may be effected by operation of the sluice gates.

SECTION 2 - ENGINEERING DATA

2.1 Design: Availability of Information. Parker Pond Dam was erected approximately 200 years ago and original design information is unavailable. Stone and earth was apparently excavated from the area adjacent to the east side of the embankment. The hydroelectric spillway, rebuilt after loss of the original spillway, at the right abutment, was constructed without the benefit of engineering analysis or plans. Mr. Hinman, builder of the replacement spillway and dam owner claims to have laid riprap in the dam core in the area of the spillway.

2.2 Construction: Availability of Information. No drawings or construction records are available.

2.3 Operation: Availability of Information. No detailed operational data is available. Stage information was recorded for a period of time for Wicomico County but the data is no longer current. Operation of the spillway gates is subject to the discretion of the owner. Use of the right spillway is more frequent during the winter months due to greater hydroelectric need. Operation procedures and records are not documented and are unavailable for review.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General. The field inspection was accomplished 14 July 1978. Prior to this several interviews were conducted with the owner, Mr. Wise H. Hinman, to establish an accurate history of Parker Pond.

b. Dam.

(1) There appears no cracking, sloughing or other indication of appreciable movement in the embankment.

(2) Minor erosion exists on the downstream slope at the right bridge abutment.

(3) Woody vegetation including a few large trees were observed on the downstream slope of the dam.

(4) The vertical and horizontal alignment are good with no evidence of settlement.

(5) All junctions of the embankment and abutment, spillways and dam appear to be stable. A staff gage with .02 ft. intervals is located on the right wingwall of the intake channel to the principal spillway. A Water Resources Administration topographic survey bench mark is located on the top right side of the upstream headwall of this same spillway and was used to establish a traverse survey around the pool as well as a roadway profile.

(6) No areas of seepage were detected.

c. Appurtenant Structures.

(1) The right spillway is constructed of steel reinforced concrete, (see photo of photograph during reconstruction). The approach channel consists of 60^{o} wooden wingwalls and 3 wooden, hand operated gates on the upstream face separated by 2 square nose piers. The downstream gate of this spillway is 5.5 feet high by 4 feet wide steel plate operated by a chain fall. This spillway terminates in housing for twin horizontal turbines for hydroelectric generation, discharging into a wide pool. The road surface was paved shortly after the washout in the fall of 1956.

(2) The primary spillway approach channel consists of 45^{o} timber wingwalls. This spillway has 3 steel gates on its upstream face, 2 of which are operated by hand and 1 which is driven by automobile differential. In addition, the gates can be

topped with 8" x 3/4" x 2.5' plywood extensions. The spillway is concrete and may not be reinforced with steel. Some honeycombing of the abutments is present. Visible bracing consists of large creosoted timber beams, some of which form the deck of the road. The road surface is owned and maintained by Wicomico County, excluding the timber decking. Discharge from the primary spillway is into a wide pool separate from the discharge pool of the right spillway. The left downstream concrete wingwall, approximately 8 feet in height, contains a horizontal crack along its midsection. The top of the wall has deflected toward the discharge channel approximately 1 to 2 inches and is braced by heavy timber.

d. Reservoir Area. New home construction on the east side of Parker Pond is slightly defoliating the heavily wooded area between the pond and the new Salisbury by-pass. The slope on this side of the pond is relatively steep compared to the flatter slopes of the west side. The west side is also wooded with corn fields beyond. These slopes are also stable.

The upper end of the reservoir, just below the twin bridges of the Salisbury by-pass is shallow with thick stands of aquatic vegetation.

e. Downstream Channel. Two downstream channels exist, one each at the primary spillway and right spillway. These channels are deep and stable, wind through thick woods, and converge about 500 feet downstream (reference APPENDIX B, Vicinity Map).

f. Danger Reach. In the event of dam failure only a heavily wooded area between Parker Pond and Schumaker Pond would be inundated.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedure As explained in Section 1.2 (h) and 2.3, the operation of the dam is mainly at the discretion of the owner. Sufficient pool level for hydroelectric generation and limited recreation dictates the dam's operation. The owners presently attempt to maintain a constant pool level at the spillway crest elevation with the gates closed. During periods of heavy rainfall, the owner opens the gates to prevent high pool lev s.

4.2 Maintenance of Dam and Operating Facilities No established written procedures for maintenance of the dam and its operating facilities exist . The present owner has accomplished remedial construction by replacing the right spillway and performing general repairs to the principal spillway. Mr. Hinman appears to produce adequate maintenance for the dam and spillways on an as-needed basis.

4.3 Warning System No formal warning system exists for Parker Pond Dam.

4.4 Evaluation The owner's attention toward controlling pool levels during rainfall and personal financial investment, even though the dam serves as a public right of way, exhibit a responsible attitude toward the operation and maintenance of Parker Pond Dam.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data. There is no known design data for Parker Pond. Pertinent design data was developed (1975) for the replacement structure for Schumaker Dam (Beaglin Park Drive Dam - MD 00204) located approximately 1.5 miles downstream, and for the Salisbury By-pass crossing (1976) of Parker Pond. These data and local gauge records were utilized to establish an estimate for the Spillway Design Flood (SDF) for Parker Pond. The Vicinity Map in APPENDIX B can be used to locate the Beaverdam Creek watershed and the above mentioned structures. The design data and gauge records are summarized in APPENDIX D, Analysis.

b. Experience Data. The highest water surface recalled by the present owner was at staff gauge height 2.30 equivalent to elevation 27.07. The discharge rate corresponding to this elevation is unknown since the specific operation of the six gates could not be recalled. The date also could not be recalled. The gauge was apparently installed by the USGS for a special study of the basin yield for the period April, 1950 through March, 1952. Gauge heights at Parker and Schumaker Ponds are published for that time period in USGS Water Supply Paper 1472. In 1956, the former sawmill spillway at the right abutment (presently the headrace for the hydro-electric generating facility) was destroyed. The alleged cause was internal erosion and not overtopping. No regular record keeping by the owner relative to gauge heights or gate operations exists. No reference to Parker Pond ever being overtopped was gleaned from the project's historical records.

c. Visual Observations. On the date of the inspection, no conditions were observed which would indicate that the spillways of Parker Pond could not operate satisfactorily in the event of a flood. It should be noted that the owner operates the spillways based upon his need for electric energy and in the interest of preventing the dam from overtopping.

d. Overtopping Potential and Evaluation. The dam has a maximum height of approximately 13 feet with the corresponding storage of approximately 245 acre-feet. The dimensions indicate a size classification of "small," and the hazard classification is "low" based upon the observed downstream conditions. The recommended Spillway Design Flood (SDF) for a dam with the above classification is the 50 to 100-year frequency flood event. The magnitude of the SDF selected is based on the economic consequences of failure - the dam replacement cost, and the temporary loss of a County roadway. Additionally, the minimum flood to be considered for a dam in the low hazard category is the 100-year flood event as mandated by State Regulations.

Accordingly, the SDF for this dam is judged to be the 100-year flood event.

Based upon gauge records and other design data (APPENDIX D) for related structures, the 100-year frequency flood event for Parker Pond is calculated to be 660 cfs (71 CSM) with a resulting inflow volume of 2166 (4.37 watershed inches) acre-feet. The maximum spillway capacity of 363 cfs represents 55 percent of the SDF. The approximate routing indicates that 975 acre-feet of incremental storage would be necessary to pass the SDF without overtopping. The spillway is considered inadequate because only 215 acre-feet of incremental flood storage is available. The 25-year frequency flood event is calculated to be 469 cfs with a resulting inflow volume of 1506 acre-feet (3.04 watershed inches). The maximum spillway capacity of 363 cfs represents 78 percent of the 25-year frequency flood event. Approximate routings indicate that the dam also can not pass the 25-year frequency flood event without overtopping.

Because no loss of life or serious economic consequences are envisioned due to the failure of Parker Pond, the spillway is not considered seriously inadequate. However, the possibility of a "domino effect" on the downstream dam and resulting consequences beyond the scope of this review prompted an analysis to determine the effect of Schumaker Pond in the event of Parker Pond Dam failure. The results indicate that Beaglin Park Drive Dam will not overtop even if it is at its design high water (4000 cfs, 200 CSM) and an unrouted (channel) failure hydrograph from Parker Pond is routed (reservoir) through it by approximate methods.

e. Spillway Adequacy. Based upon the recommended guidelines, the spillway cannot pass the 100-year frequency flood event without overtopping. Therefore, the spillway is considered inadequate. However, an unplanned overflow area (See Plan View, APPENDIX B) near the left abutment probably would pass safely the SDF. No damages are expected should this dead-end roadway convey overflows from Parker Pond. No specific studies to answer this question were accomplished. Additionally, changed hydraulic conditions as evidenced by construction of the dual bridges (Salisbury By-pass) over the upper end of Parker Pond should result in a reduced SDF peak because of the temporary storage provided by the highway. Consequently, additional hydraulic studies, if performed, may result in a revised statement of spillway adequacy or a scheme for reducing the overtopping potential. Should the owners and/or County decide to not perform such an analysis, they must be aware of the spillway inadequacy as assessed at this time. The Water Resources Administration is currently performing flood insurance studies in the Beaverdam Creek Watershed for the U. S. Department of Housing and Urban Development. Data generated for this program should be sufficient to assess the overtopping potential at Parker Pond in detail.

SECTION 6 - STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. No visible signs of appreciable movement or distress were detected in the earthen embankment or the concrete spillways. The majority of the dam is relatively low (less than 10 feet in height) and slope stability problems under normal or high flow conditions are not anticipated. Although the embankment in the vicinity of the right spillway eroded and failed in 1956, no evidence of seepage or internal erosion was observed during the inspection. Based upon visual observation the embankment is considered to be structurally and hydraulically stable. As mentioned in Section 3.1.b. woody vegetation covers portions of the downstream face of the dam. Although the trees are old and root systems could be extensive and deep, no evidence of seepage or piping problems attributable to vegetation were observed.

According to the owner, the cracked and deflected downstream wingwall of the left side of the principal spillway resulted from the impact of a vehicle which crashed into the mill house partially supported by the wingwall. The upper portion of the wall was braced with heavy timber to prevent further movement, and the wall appears stable. The bridge over the spillway appears adequate and the owner maintains a 5 ton limit.

b. Design and Construction Data. Design and computations analyzing the structural and hydraulic stability of the dam configuration are unavailable, and quite likely, may never have been performed.

c. Operating Procedures. Detailed operating procedures were unavailable for review and factors which might affect stability could therefore not be assessed.

d. Post Construction Changes. Since the original construction of this dam took place more than 200 years ago, modifications and changes were probably performed. Visual observation indicates that the primary spillway was probably rebuilt prior to 1930 and the owners indicate that the spillway at the right side of the dam was rebuilt in 1956. These modifications should not affect the stability of the dam.

e. Seismic Stability. The Parker Pond Dam is located in Seismic Zone 1 and static stability of the dam is considered adequate based on visual observation. Based upon the recommended guidelines, the dam presents no hazard from earthquake activity.

SECTION 7 - ASSESSMENT, REMEDIAL MEASURES AND RECOMMENDATIONS

7.1 Dam Assessment Assessment of Parker Pond Dam was based upon field review and hydrologic and hydraulic data generated for the design of a downstream structure known as Beaglin Park Drive Dam, the design of the Salisbury By-pass crossing over Parker Pond, and local gauge data. Based upon visual inspection, the earthen embankment, concrete spillways, and bridge over the primary spillway appear in good condition and stable under normal operation. Preliminary analyses indicate the spillway system to be inadequate for the 100-year storm event, but the downstream Schumaker Pond should be capable of receiving surcharge inflow in the event of Parker Pond Dam failure. As no loss of life or measureable property damage is anticipated in the event of dam failure, the inadequacy of the spillway is judged not to require immediate remedial measures.

7.2 Remedial Measures and Recommendations The findings of this Phase I investigation indicate the following:

a. Structure and Appurtenances. The dam structure and appurtences are considered to be stable under normal operating conditions. Due to the past failure of the spillway at the right abutment, apparently through internal erosion, the dam should be inspected routinely to detect development of seepage zones and/or loss of embankment material.

b. Operation and Maintenance Procedures. It is recommended that operation and maintenance procedures be documented in writing.

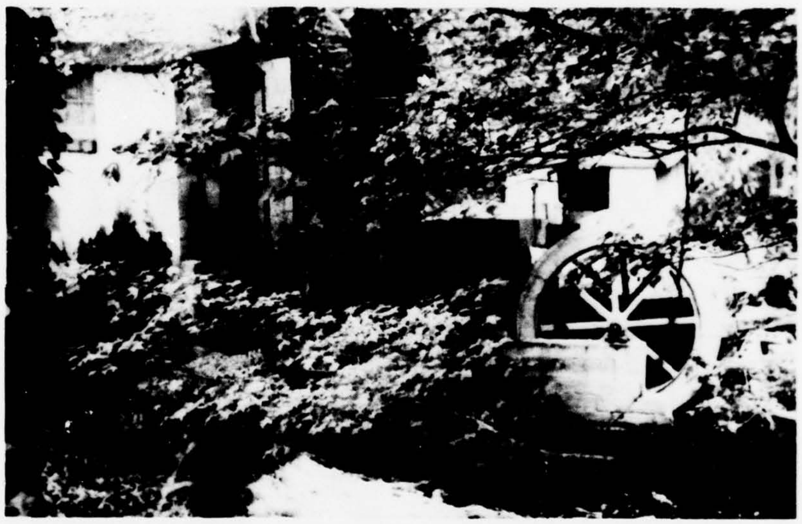
APPENDIX A - PHOTOGRAPHS

Top of dam
east view

Downstream slope
east view

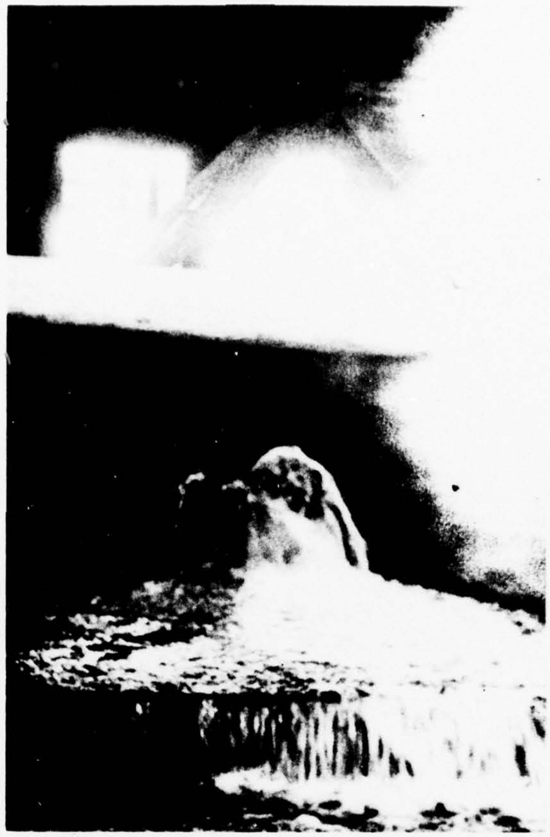
Parker Pond MD 00085

(Photo reproduction) construction of
west (hydroelectric) spillway 1956



Downstream view of west (hydroelectric)
spillway

Downstream between spillway channels
Parker Pond MD00085



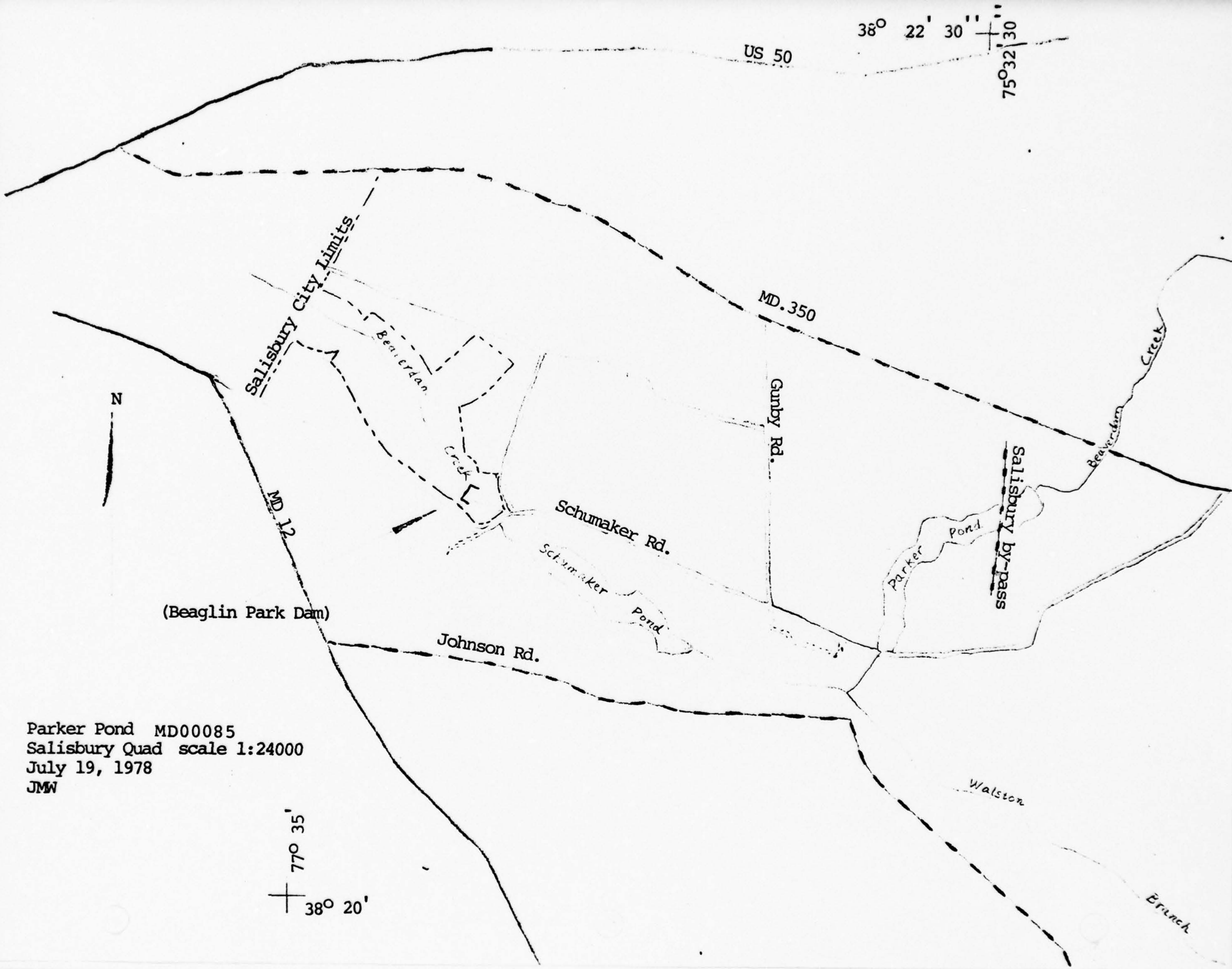
East spillway

East spillway
upstream face

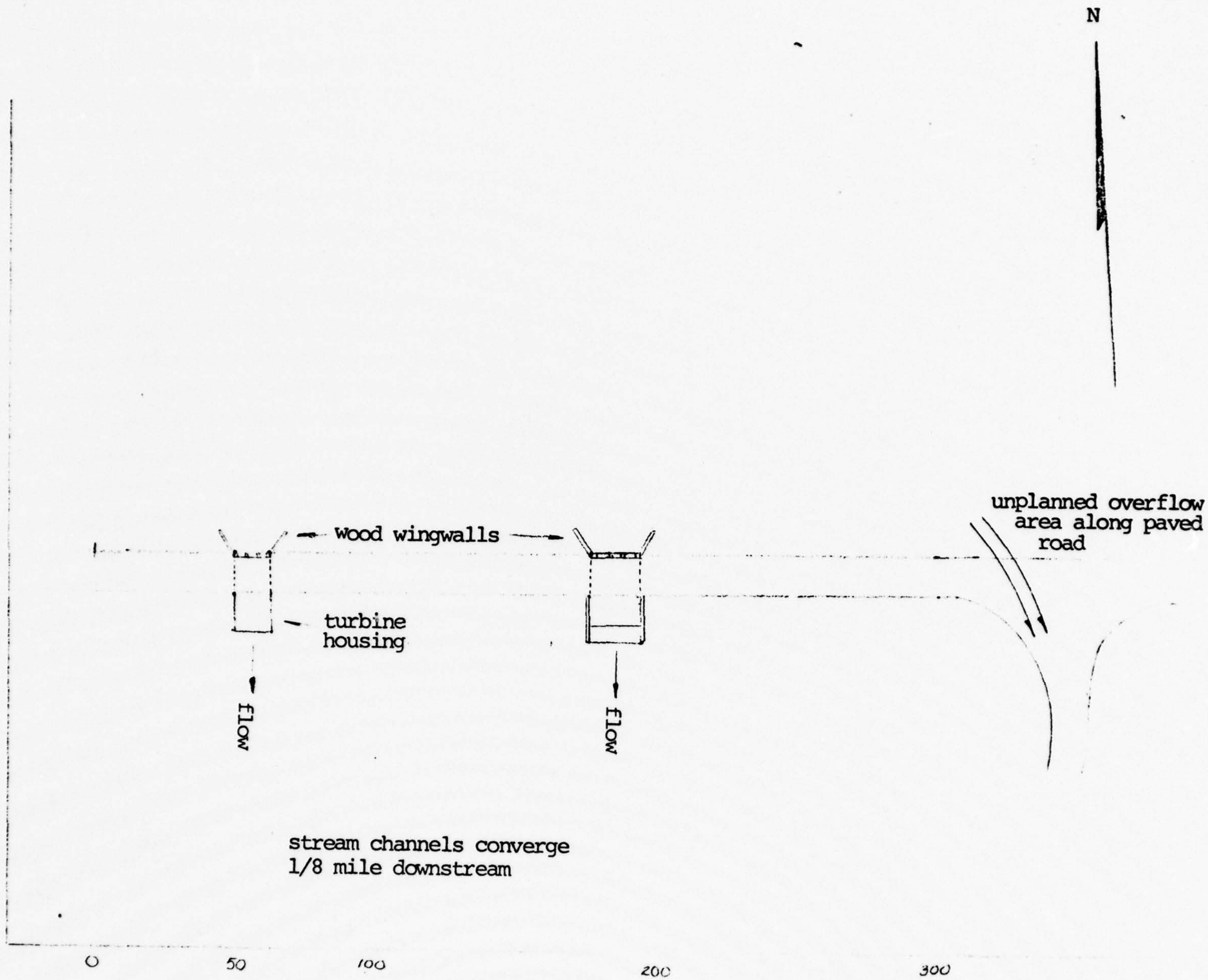
Parker Pond
MD 00085

APPENDIX B

VICINITY MAP, PLAN & SECTION VIEW

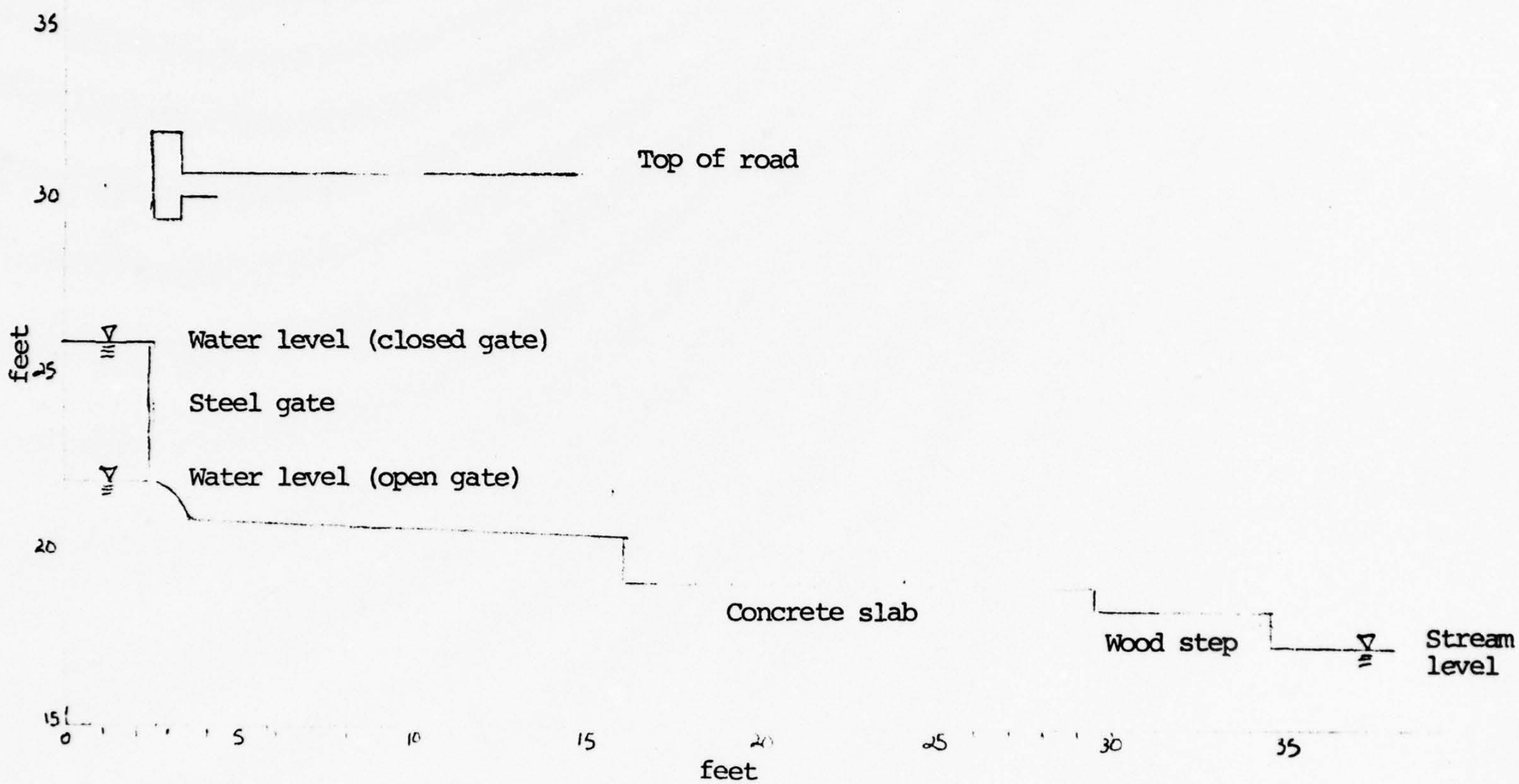


38° 22' 30''
75°32' 30''
US 50
Salisbury City Limits
MD.350
Beaverdam
N
Gunby Rd.
Creek
Salisbury by-pass
Beaverdam
Creek
MD 12
Schumaker Rd.
Schumaker
Pond
Parker
Pond
(Beaglin Park Dam)
Johnson Rd.
Walston
Branch
Parker Pond MD00085
Salisbury Quad scale 1:24000
July 19, 1978
JMW
77° 35'
38° 20'



Top view Parker Pond 00085

scale 1"=50'



East spillway cross section
Parker Pond
MD 00085

APPENDIX C - CHECK LISTS

Check List
Visual Inspection
Phase 1

Name Dam Parker Pond Dam County Wicomico State Maryland ID # MD 00085

Type of Dam earth Hazard Category I

Date(s) Inspection 14 July '78 Weather cloudy Temperature 70°F

Pool Elevation at Time of Inspection 25.9 M.S.L. Tailwater at Time of Inspection 17.8 M.S.L.

Inspection Personnel:

J.Smith	J. Wagner	
T.Moynahan		
D.Moore		

J.Smith Recorder

Incl 3

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	NONE	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	NONE	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Minor erosion, downstream slope at right bridge abutment	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	22' top width, good alignment, no evidence of settlement	
RIPRAP FAILURES	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Stable	
ANY NOTICEABLE SEEPAGE	NONE	
STAFF GAGE AND RECORDER	Staff at the right wall of the intake channel (wingwall), east spillway	
DRAINS	NONE	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE		
STRUCTURE TO ABUTMENT/EMBANKMENT. JUNCTIONS		
DRAINS		
WATER PASSAGES		
FOUNDATION		

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBERSVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES		
STRUCTURAL CRACKING		
VERTICAL AND HORIZONTAL ALIGNMENT		
MONOLITH JOINTS		
CONSTRUCTION JOINTS		

STAFF GAGE OF RECORDER:

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT		
INTAKE STRUCTURE		
OUTLET STRUCTURE		
OUTLET CHANNEL		
EMERGENCY GATE		

[illegible]GATED SPILLWAY WEST SIDE

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE [illegible] SILL	not observable	
APPROACH CHANNEL	60^{d} timber wingwall	
DISCHARGE CHANNEL	wide pool	
BRIDGE AND PIERS	reinforced concrete deck took photo of photograph during reconstruction	paved after washout during fall '56
GATES & OPERATION EQUIPMENT	# 3 gates hand controlled	3 wooden gates upstream 5.5' wide x 4' high metal gate chainfall downstream

GATED SPILLWAY EAST SIDE

SUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
NCRETE SILL	O.K. no known cracks unobservable today pictures taken 2wks. prior 24 june'78	
PPROACH CHANNEL	45° timber wingwall	
DISCHARGE CHANNEL	wide pool; no underscour.	
BRIDGE AND PIERS	creosoted timber beams (deck) county maintained road surface abutments-honeycombing, no exposed steel may not be any steel reinforcing beams are butted to form road subsurface	upstream headwall east side cracked & removeable above road surface only 17.6' from out to out headwalls
CATES AND OPERATION EQUIPMENT	3 gates separated by two square piers two gates (left & right) wood operated by hand	steel gate (center) operated by car differential all gates topped with 8"x3/4" plywood extention

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	W.R.A. topographic survey BM on east spillway upstream headwall used for traverse around pool & roadway cross section	
OBSERVATION WELLS	NONE	
WEIRS	NONE	
PIEZOMETERS	NONE	
OTHER STAFF GAGE	2/100 inch intervals	attached to right wingwall of approach channel

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	East side steep and heavily wooded - new home construction, called Colony East West side flatter, wooded with corn fields beyond	
SEDIMENTATION	Upper end, just below the Salisbury By-pass twin bridges is shallow and wide with lots of aquatic vegetation.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Wide wooded floodplain 2 stable wooded stream channels converge 500' downstream	
SLOPES		
APPROXIMATE NO. OF HOMES AND POPULATION	NONE	

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

PARKER POND
MD 00085

DRAINAGE AREA CHARACTERISTICS: ______

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 25.9 (130 acre feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ______

ELEVATION MAXIMUM DESIGN POOL: ______

ELEVATION TOP DAM: 28.3

CREST:

a. Elevation 28.3
b. Type earth dam with paved road surface
c. Width 22 ft. max.
d. Length 350 ft.
e. Location Spillover ______
f. Number and Type of Gates 6 gates 3 steel 3 wood

OUTLET WORKS:

a. Type controlled
b. Location center of old streambed & left end of dam
c. Entrance inverts 26.39
d. Exit inverts 16.1
e. Emergency draindown facilities open all 6 gates

HYDROMETEOROLOGICAL GAGES:
a. Type staff gage
b. Location upstream wingwall of principal spillway
c. Records USGS report & owner

MAXIMUM NON-DAMAGING DISCHARGE: ______

ITEM	REMARKS
SPILLWAY PLAN	No written plans exist.
SECTIONS	Dam Safety Division has created cross section and profile for main spillway
DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS	

ITEM	REMARKS
MONITORING SYSTEMS	
MODIFICATIONS	
HIGH POOL RECORDS	1950 - 1952 USGS study - Water Supply Paper 1472
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	In 1956 an automobile left the road way and totally destroyed the old mill house and part of the spillway wingwall (downstream side) The mill Was Removed. Also in 1956 the right side of the dam washed out due to internal erosion. The spillway was replaced with a concrete flume containing hydroelectric equipment. (two twin turbines)
MAINTENANCE OPERATION RECORDS	

ITEM	REMARKS
DESIGN REPORTS	
GEOLOGY REPORTS	
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	
POST-CONSTRUCTION SURVEYS OF DAM	WRA HUD Flood Insurance Study
BORROW SOURCES.	

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CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM ________________

ID # ________________

ITEM	REMARKS
AS-BUILT DRAWINGS	
REGIONAL VICINITY MAP	
CONSTRUCTION HISTORY	
TYPICAL SECTIONS OF DAM	
OUTLETS - PLAN	
- DETAILS	
-CONSTRAINTS	
-DISCHARGE RATINGS	
RAINFALL/RESERVOIR RECORDS	

APPENDIX D - ANALYSIS

Elev, FT above MSL	Area, in²	Area, Acres	Area, Avg.	Δ Vol, Ac-FT	Cum. Vol, Ac-FT
18 invert		0.			
26	732	42.01	—	135[1]	135
28	949	54.41	48.21	96	231
30	1044	59.92	57.16	114	345
32	1126	64.62	62.27	124	469
34	1195	68.58	66.60	133	602

[1] Based on 0.4 A d = 0.4 x 42 Ac x 8 FT = 135 Ac FT

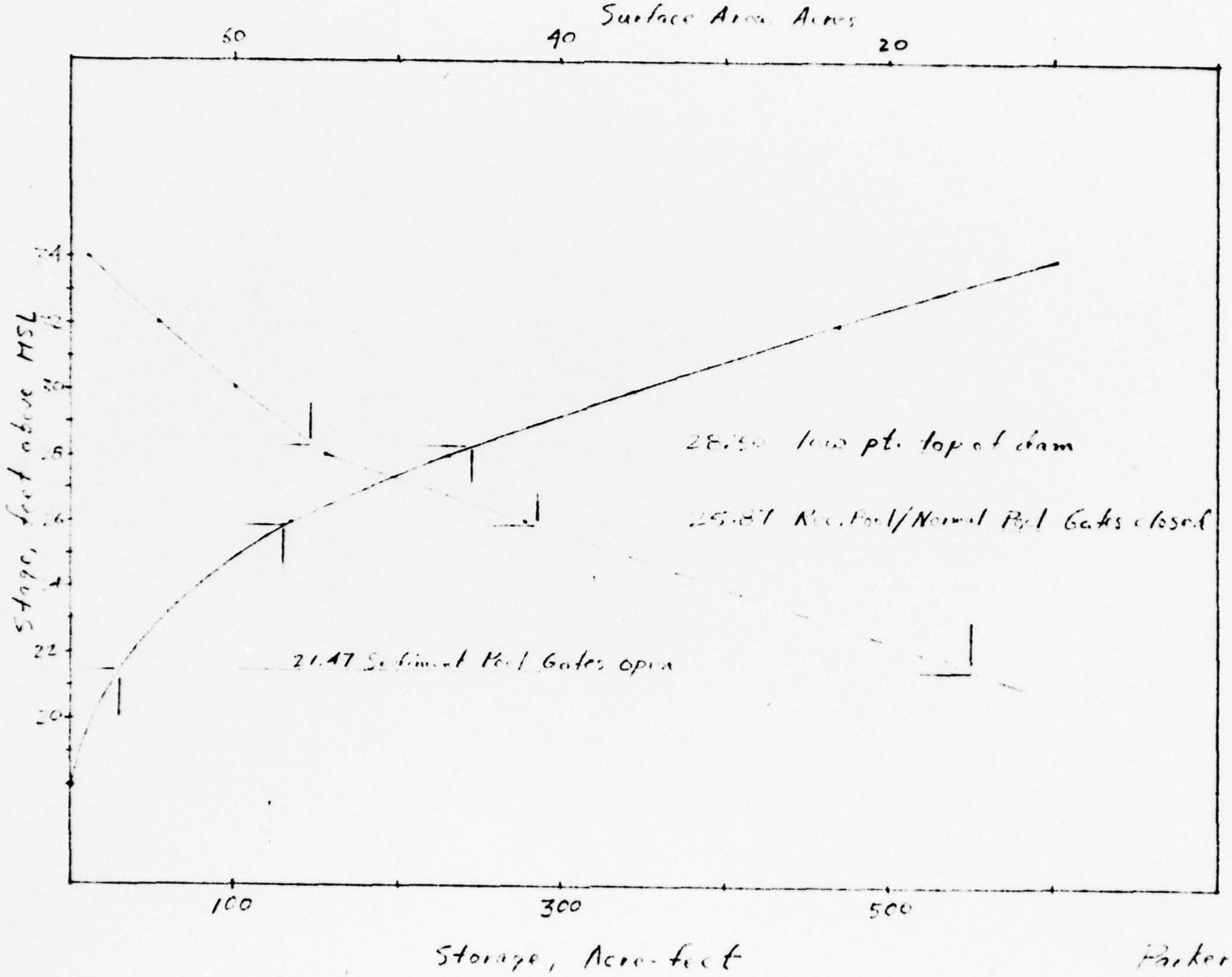
Parker Pond

Stage - Storage - Area Comps

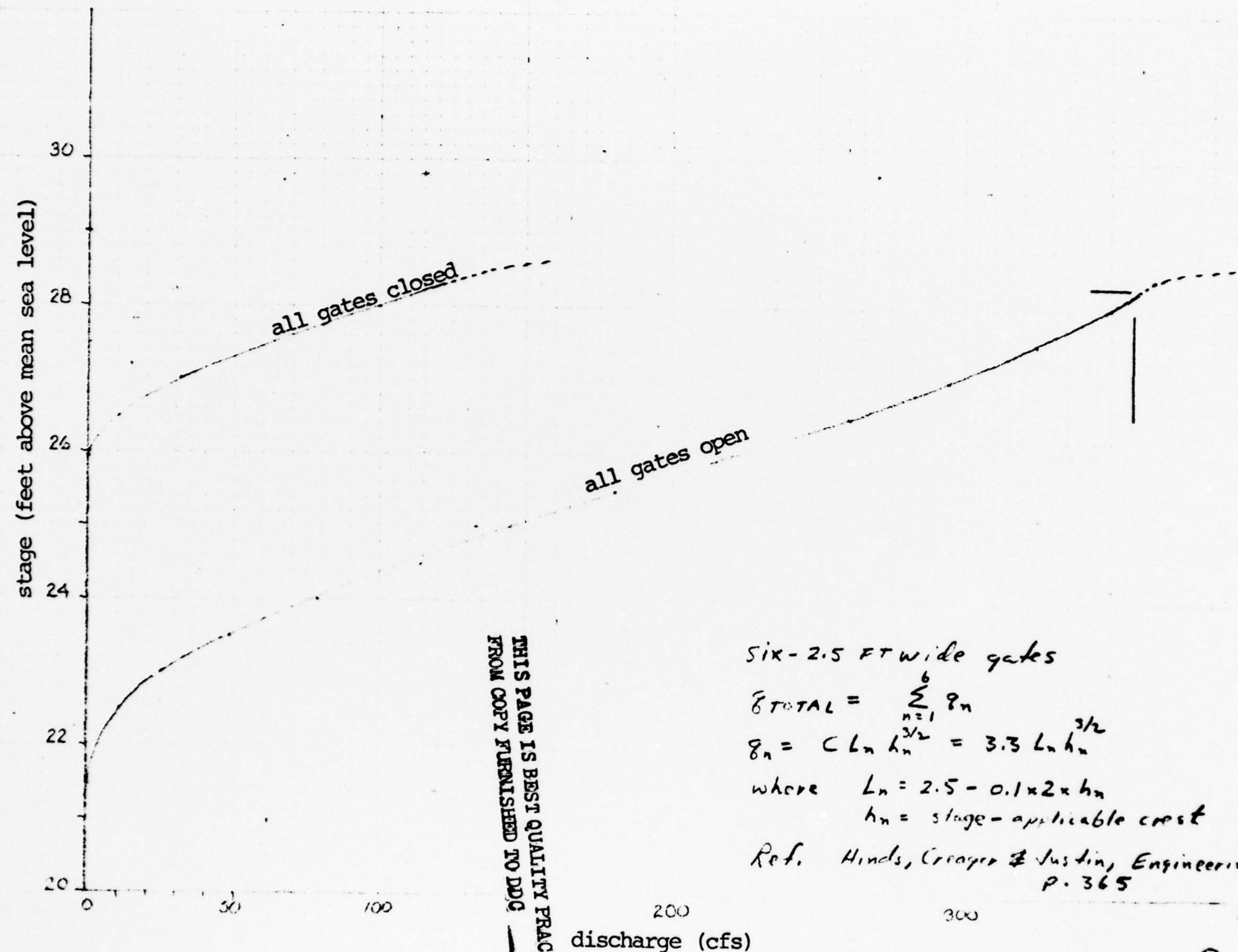
based on field run topo

for HUD-FIP

plotted 1" = 50 FT



Parker Pond
Stage-Storage-Area Curves



Six - 2.5 FT wide gates

$q_{TOTAL} = \sum_{n=1}^{6} q_n$

$q_n = C L_n h_n^{3/2} = 3.3 L_n h_n^{3/2}$

where $L_n = 2.5 - 0.1 \times 2 \times h_n$

h_n = stage - applicable crest

Ref. Hinds, Creager & Justin, Engineering for Dams p. 365

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PARKER POND
00085

Parker Pond

D.A. = 9.55 in² @ 1:62500 scale = 5947 Acres = 9.29 mi²

SDF for Parker Pond : Small, low hazard → Use 100 yr.

Using local gage records, sheets 6-10, with Log Pearson Type III Distribution to establish Q_{100} @ Parker Pond

Stream	Gage No	Q_{100}	D.A.	CSM	$(9.29/D.A.)^{0.7}$	
Nassawango	4855	1207	44.9	27	0.33 x 1207 = 400 cfs	= 43 CSM
Chicamacomico	4900	738	15.0	50	0.71 x 738 = 528	= 57
Beaverdam	4865	1109	19.5	57	0.59 x 1109 = 660	= 71

looking at 25 & 50 yr. values for Gage 4865 :

Q_{50} :		950	19.5	49	0.59 x 950 = 560	= 60
Q_{25} :		795	19.5	41	0.59 x 795 = 469	= 50

Comparing Gage records with regression eqn. from Maryland Geological Survey Report 16 : A = 9.29 mi², $S = 6 \text{ FT/mi} = \frac{60-26}{5.68}$

G = 0.76 geographic factor

$$P_{50} = 46\,(9.29)^{.915} \times 6^{.377} \times (.76)^{.909} \pm 36.7\% = 541 \pm 198 \quad \text{range } 343-739 \text{ cfs}$$

∴ Use gage records from # 4865 — 541 ≈ 560

to establish frequency line @ Parker Pond

Use Q_{25} = 469 cfs

Q_{50} = 560 cfs

Q_{100} = 660 cfs = SDF = 71 CSM

Statistics for Camelin Park Drive Dam (MD 00204)

D.A. = 19.5 mi²

S.A. = 48.6 Ac

Top of Dam elev. 26.0

SDF = 4000 cfs = 200 CSM

low stage spillway, L = 45 FT @ elev. 19.2

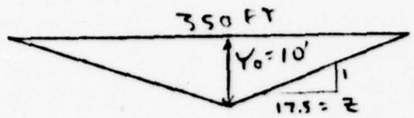
high stage spillway, L = 70 FT @ elev. 20.5

Stage	Disch., cfs	Storage, Ac-FT
19.2	0	0
20.5	-	80
24.0	4000	443
25.5	6000	675
26.0	-	-

ref. - Newton & Cripe for TVA, 1973 published in ASCE Evaluation of Dam Safety, 1976, p. 437

Assume no tailwater

Dam Height = 28.3 − 18 say 10 FT, length = 350 FT



Assumed Breach geometry

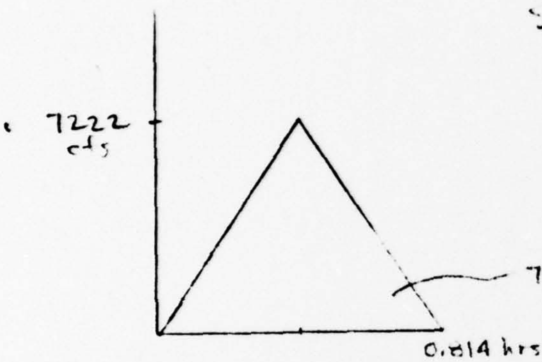
$$Q_{max} = 0.23 \times Z \times \sqrt{g} \times Y_0^{5/2}$$

$$\underline{Q_{max}} = 0.23 \times 17.5 \times 32.2^{1/2} \times 10^{5/2} = 7222 \text{ cfs}$$

Storage @ elev. 28.3 = 245 Acre-feet $= V_b$

$Y = 0.64\, Y_0 = 0.64 \times 10 = 6.4$ FT

$\underline{S_i} = 2.4\, V_b / Q_{max} = 2.4 \times 245 / 7222 = 0.814$ hrs.



Assumed failure hydrograph

$7222 \frac{ft^3}{sec} \times \frac{0.814 \text{ hr}}{2} \times 3600 \frac{sec}{hr} \times \frac{1 \text{ Ac-ft}}{43560 \text{ ft}^3} = 243 \approx 245$ OK

Use 4000 cfs as cap. of Beaglin Park Drive Dam

$P = 4000/7222 = 0.55 \rightarrow 1 - P = 0.45 = \frac{\text{Req'd Stor.}}{\text{Inflow Vol.}}$

Req'd Storage = 0.45 × 245 = 110 Acre-ft.

Incremental Storage Avail. to elev. 25.5 (½ ft below overtopping elev)
= 675 − 443 = 232 Acre-Ft

∴ Beaglin Park will not overtop when it is at its B.H.W. and superimpose on top an [illegible] failure hydrograph from Parker Pond.

F L O O D   F L O W   F R E Q U E N C I E S

L O G - P E A R S O N   T Y P E   I I I   M E T H O D

THE FOLLOWING FLOOD FREQUENCIES ARE COMPUTED USING THE PROCEDURE DESCRIBED IN A UNIFORM TECHNIQUE FOR DETERMINING FLOOD FLOW FREQUENCIES , BULLETIN NO. 15 OF THE WATER RESOURCES COUNCIL, HYDROLOGY COMMITTEE, WASHINGTON, D.C., 1967. NO ATTEMPT WAS MADE TO IDENTIFY AND DELETE OR MODIFY OUTLIERS IN THE DATA. I.E., ALL MAXIMUM ANNUAL DISCHARGES ARE INCLUDED IN THE COMPUTATIONS.

THE PROCEDURE FOR DETERMINING THE SUFFICIENCY OF THE LENGTH OF RECORD IS DESCRIBED IN NEH-4, CHAPTER 18, PAGE 11.

THE PROGRAM AND DATA WILL BE READILY AVAILABLE TO ANYONE WISHING TO TRY MODIFICATIONS OR OTHER METHODS. A PLOTTING POSITION SUBROUTINE IS AVAILABLE ALSO.

THIS LISTING IS CURRENT TO WATER YEAR 1976 AND WILL BE UPDATED AS SOON AS THE 1977 WATER RESOURCES DATA IS RECEIVED.

RBD
Water Resources Administration
Hydrologic Services Section

4855(326) NASSAWANGO CREEK NR SNOW HILL, MD. 1951-7* 4855
D.A. = 44.9 LAT 38-13-45 LONG 75-23-20

CHRONOLOGICAL LISTING OF ANNUAL MAXIMUM DISCHARGES

258.	486.	988.	430.	920.	348.	542.	761.
597.	361.	693.	669.	615.	597.	121.	200.
452.	434.	430.	431.	347.	1320.	760.	365.
615.	416.						

	SKEWNESS COEFFICIENT	MEAN	STANDARD DEVIATION
ARITHMETIC	1.14	545.08	258.32
LOGARITHMIC	-0.6694	2.6882	0.2179

Q1.01	Q2	Q5	Q10	Q25	Q50	Q100	Q200
115.	517.	750.	883.	1029.	1124.	1207.	1282.

LENGTH OF RECORD *** TEN PERCENT LEVEL OF SIGNIFICANCE

19 YEARS OF RECORD ARE NEEDED.
26 YEARS OF RECORD ARE AVAILABLE.

** R E M A R K S **

RECORDS GOOD.

4900 CHICAMACOMICO RIVER NR SALEM, MD. 1952-* 4900

D.A. = 15. LAT 38-30-45 LONG 75-52-51

HRONOLOGICAL LISTING OF ANNUAL MAXIMUM DISCHARGES

325.	152.	104.	314.	78.	260.	285.	202.
419.	470.	157.	230.	176.	182.	128.	518.
226.	169.	218.	210.	300.	542.	168.	478.
166.							

	SKEWNESS COEFFICIENT	MEAN	STANDARD DEVIATION
ARITHMETIC	0.92	259.20	131.88
LOGARITHMIC	0.0197	2.3617	0.2175

Q1.01	Q2	Q5	Q10	Q25	Q50	Q100	Q200
72.	230.	331.	437.	553.	644.	738.	837.

LENGTH OF RECORD *** TEN PERCENT LEVEL OF SIGNIFICANCE

23 YEARS OF RECORD ARE NEEDED.
25 YEARS OF RECORD ARE AVAILABLE.

** R E M A R K S **

RECORDS FAIR. OCCASIONAL REGULATION BY BIG MILL POND.

4865(327) BEAVERDAM CREEK NR SALISBURY, MD. 1930-32 1939-75 4865
D.A = 19.5 LAT 38-21-05 LONG 75-34-11

* DISCONTINUED GAGE *

CHRONOLOGICAL LISTING OF ANNUAL MAXIMUM DISCHARGES

75.	37.	115.	283.	234.	111.	392.	86.
260.	115.	252.	59.	1480.	217.	95.	143.
207.	653.	502.	338.	209.	300.	337.	733.
214.	337.	487.	239.	631.	317.	135.	296.
175.	303.	365.	212.	469.	417.	254.	339.

	SKEWNESS COEFFICIENT	MEAN	STANDARD DEVIATION
ARITHMETIC	2.87	310.96	249.71
LOGARITHMIC	-0.2602	2.3869	0.3127

Q1.01	Q2	Q5	Q10	Q25	Q50	Q100	Q200
39.	253.	450.	597.	795.	950.	1109.	1271.

LENGTH OF RECORD *** TEN PERCENT LEVEL OF SIGNIFICANCE

32 YEARS OF RECORD ARE NEEDED.
40 YEARS OF RECORD ARE AVAILABLE.

* * R E M A R K S * *

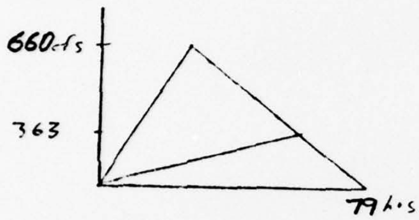
RECORDS GOOD.RECORDS REPRESENT TOTAL FLOW AND INCLUDE FLOW OVER SPILLWAY,THROUGH SPILLWAY VALVE,OVER OR THROUGH FLOODGATE, AND LEAKAGE UNDE DAM.OCCASIONAL REGULATION AT LOW AND MEDIUM FLOW CAUSED BY MILL ABOVE STATI

100-yr Hydrograph - Approx. Routing

Norfolk & Sassafras sands - Group B Soils Use RCN=70
100 yr. rainfall = 7.9 in. → Runoff, Q = 4.37 inches
} Ref. USDA-SCS EFM, Chap 2

Volume = $\frac{4.37 \text{ in}}{12 \text{ in/FT}}$ x 5947 Ac = 2166 Ac-Ft

Peak = 660 cfs , time base = $\frac{2 \times 2166 \text{ Ac-FT}}{660 \text{ cfs}} \times 12.1 \frac{\text{cfs-hrs}}{\text{Ac-FT}}$ = 79 hrs.



Vol. check: $660 \frac{FT^3}{sec} \times \frac{79}{2}$ hrs × 3600 $\frac{sec}{hr} \times \frac{1 \text{ Ac}}{43560 FT^2}$

= 2154 Ac-FT ≈ 2166 ok

% of 100 yr. passing = $\frac{363 \text{ cfs}}{660 \text{ cfs}}$ = 55 %

∴ 1 - .55 = 0.45 = $\frac{\text{Req'd Storage}}{\text{Hydrograph Vol.}}$

Pool Vol., gates open = 30 Ac-FT
Max. Pool Vol. = 245 Ac-FT
> 215 Ac-FT incremental flood Vol. available

2166 Ac-FT x 0.45 = 975 Ac-FT = Req'd Storage >> 215

∴ Dam will bypass using estimated 100 yr flood event as SDF.

25-yr Hydrograph - Approx. Routing

25 yr rainfall = 6.3 in. → Runoff = 3.04 inches

Vol. = 3.04/12 × 5947 = 1506 Ac-FT

25 yr. peak = 469 cfs , time base = $\frac{2 \times 1506}{469}$ × 12.1 = 77.7 hrs

% of 25 yr passing = 363/469 = 77.4% 1 - .774 = 0.226

1506 x .226 = 340 > 215 Ac-FT incremental storage

∴ Dam will by-pass using est. 25 year flood event

Note: above calculations assume all gates open and lowered pool which is <u>not</u> conservative

APPENDIX E - GEOLOGY REPORT

Geology Report
Parker Pond Dam
Wicomico County, Maryland

Parker Pond Dam is located on the Eastern Shore approximately 2 miles southeast of Salisbury within the major geologic region of the Atlantic Coastal Plain. The dam site and impoundment area are underlain by recent alluvial deposits and unconsolidated sediments of the Quarternary System, Pleistocene Series, known as the Beaverdam sand. This formation is composed of white to buff, fine to medium quartz sand with a little silt and gravel. Insitu, this material is relatively dense, not subject to long term settlement and should continue to provide competent support for the dam embankment.

The potential for leakage through the foundation materials exists considering that the Beaverdam sand is an extensive aquifer exhibiting moderate to high well yeilds. The quantity of leakage is dependent upon the permeability of the formation which varies according to density and fines content. Based upon the absence of seepage downstream, the formation in the vicinity of the dam may be of relatively low permeability and/or the pond floor has been rendered impervious by siltation.

REFERENCES

1. Rasmussen, W. C., Slaughter, T. H., and Hulme, A. E., 1955. The Water Resources of Somerset, Wicomico, and Worcester Counties, Bulletin 16, State of Maryland, Board of Natural Resources, Department of Geology, Mines, and Water Resources Baltimore; Maryland.

2. Boggess, D. H., and Heidel, S. G., 1968, Water Resources of the Salisbury Area, Maryland, Report of Investigations No. 3, Maryland Geological Survey.

3. Hansen, H. J. III, 1966. Pleistocene Stratigraphy of the Salisbury Area, Maryland and Its Relationship to the Lower Eastern Shore: A Subsurface Approach, Report of Investigations No. 2, Maryland Geological Survey.