

043

SLATERSVILLE RESERVOIR UPPER DAM

SLATERSVILLE RESERVOIR UPPER DAM, NORTH SMITHFIELD (043)

Slatersville Reservoir Upper Dam (**Figure 1**) has been classified by DEM as having a **High Hazard** potential. The following report summarizes GZA's evaluation of the dam's potential impact area due to failure of the dam.

1.00 SUMMARY OF SITE AND POTENTIAL DOWNSTREAM IMPACT AREA

In addition to compiling background information, including the U.S. Army Corps of Engineers Phase I Inspection Report (USACE, 1979), and GIS mapping data, GZA performed field reconnaissance of the dam and its associated downstream area (**Figure 2, 3 and 4**). GZA representatives David M. Leone and Damiana Diaz-Reck visited the site and the downstream river valley on May 12, 2009. A field checklist from the reconnaissance is provided in **Attachment I** and selected photographs are provided in **Attachment II**.

1.10 Site Description

Slatersville Reservoir Upper Dam is located on the Branch River in the Town of North Smithfield, Providence County, Rhode Island (See Locus Map, **Figure 1**). The following state and federal identification numbers are associated with the dam:

- DEM ID Number 043
- NID ID Number RI02501

The dam is an approximately 256 ft long and 27 ft high. The dam consists of a 170 ft long masonry arched overflow spillway between two stone face abutments. At the downstream toe of the left abutment there is an old canal that is filled in most of its length. The dam has an 85 square mile watershed. Pertinent engineering data, as obtained from USACE Phase I Inspection Report, is provided in **Table 1**.

The dam was reportedly constructed to provide industrial water storage for John W. Slater's milling operation. At present the reservoir is reportedly utilized for recreation, but it should be noted that information from Rhode Island GIS shows a number of water supply intake points along Slatersville Road near the left side of the Reservoir.

TABLE 1. Pertinent Engineering Data

<u>Dam</u>	
Type	Stone Masonry
Length	± 256 ft
Height	± 27 ft
Drainage Area	± 85 square miles
<u>Elevation (NGVD)</u>	
Normal Pool	± 251.5 ft
Spillway	± 251.5 ft
Top of Dam	± 259.5 ft
<u>Storage (Acre-feet)</u>	
Normal Pool	± 1,970
Top of Dam	± 3,640
<u>Primary Spillway</u>	
Type	Arched Stone Masonry Weir
Weir Length	± 170 ft

1.20 Downstream Description

Slatersville Reservoirs Middle and Lower are located immediately downstream of the dam. The river below the lower dam is in a generally deep valley with little storage available. About 400 ft downstream of the Lower Dam, a historical mill complex is located well above the left overbank and an industrial development is located lower along the right overbank.

1.21 Downstream Dams

Slatersville Reservoir Middle Dam (046) is an approximately 26 ft high composite masonry and earth run-of-river dam with a spillway length of approximately 160 feet, located about 4,300 ft downstream of Slatersville Reservoir Upper Dam. It has a reported maximum spillway capacity of 5,670 cfs, as obtained from the USACE Phase I dam inspection report.

Slatersville Reservoir Lower Dam (047) is an approximately 18 ft high, 315 ft long earthen dam located about 4,900 ft downstream of Slatersville Reservoir Upper Dam. It has a reported maximum spillway capacity discharge of 8,550 cfs, as obtained from the RI DEM dam information database.

Forestdale Pond Dam (048) is an approximately 19.5 ft high, 108 ft long masonry dam located about 1 mile downstream of Slatersville Reservoir Upper Dam. It has a reported maximum spillway capacity discharge of 5,200 cfs, as obtained from its USACE Phase I dam inspection report.

1.22 Downstream Bridges

The Providence Pike (Rt 5) crossing consist of masonry twin arch culverts about 14 ft high and 40 ft wide, situated about 1,000 ft downstream of Slatersville Reservoir Middle Dam.

The North Smithfield Expressway (Rt 146) crossing is situated 1.4 mi downstream of Slatersville Reservoir Middle Dam.

1.23 Downstream Development

The land use along the floodplain of the Branch River is primarily commercial and residential, with moderate population density. There are two schools located on the right and left overbanks of the Branch River about one mile downstream of the dam.

2.00 DAM HAZARD POTENTIAL ASSESSMENT

To further evaluate the extent of flooding due to a potential dam failure, GZA performed a limited hydraulic investigation of the hypothetical dam break flood. The analysis was performed with the National Weather Service (NWS) Simplified Dam Break (SMPDBK) model, which estimates the peak dam break flood outflow, peak water surface elevations, and the timing of the flood wave as it travels downstream, given breach characteristics specific to the dam and the geometry of the downstream channel and overbank. SMPDBK output summaries are provided in **Attachment III**.

Please note that the approximate extent of hypothetical dam break flooding generated with SMPDBK is not generally applicable for emergency planning or other hydraulic design purposes. Detailed hydraulic modeling using state-of-the-practice unsteady flow models such as the NWS DAMBRK, FLDWAV, or U.S. Army Corps of Engineers unsteady flow version of HEC-RAS computer programs, which is not in the scope of this study, should be performed when generating inundation maps for Emergency Action Plans or for use in spillway design / inflow design flood (IDF) studies.

2.10 Potential Dam Failure Mechanisms and Breach Description

As specified by the DEM, the simplified hypothetical dam failure analysis assumed starting pool elevations in the impoundment coincident with the top of dam elevation and average stream flow conditions prevailing (i.e., assumed about 2 cfs per square mile of drainage area). Dam breach parameters such as time of breach formation, breach shape, and the average width of the breach were selected according to these conditions and based upon the type of materials used in constructing the dam, in accordance with the recommended range of values published in the Federal Energy Regulatory Committee (FERC) guidelines and based on engineering judgment. For Slatersville Upper Reservoir Dam, primarily a stone-masonry gravity spillway structure, a time to failure of 0.1 hrs and a rectangular breach

shape (vertical side walls) was utilized. Such a masonry dam is assumed to fail due to excessive mass movement or cracking under fair weather circumstances.

SMPDBK also cannot adequately simulate the submergence effects upon the dam breach opening due to downstream tailwater conditions. To represent the tailwater condition presented by the Slatersville Reservoir Middle Dam, which would submerge the breach opening at the Upper Reservoir and limit the hydraulic head that drives the dam failure, the final breach elevation was assumed to be 232.5 ft, the estimated normal pool elevation for the Slatersville Reservoir Middle Dam (046). The average breach width was assumed to equal to the full height of the dam, about 27 ft.

Failure of the Slatersville Reservoir Upper Dam is expected to lead to the “domino” failure of Slatersville Reservoir Middle and Lower Dams and of Forestdale Pond Dam, for which separate SMPDBK models were prepared.

A base flow of 10,700 cfs at Slatersville Reservoir Middle Dam was used to represent the peak flow from the Slatersville Reservoir Upper Dam failure upstream. For Slatersville Reservoir Middle Dam, primarily an earth embankment structure, a time to failure of 0.5 hrs and a trapezoidal breach shape (0.5 H : 1.0 V) was utilized. Such an earthen embankment is assumed to fail piping under fair weather circumstances. The average breach width was assumed to equal to three times the height of the dam, about 78 ft.

A base flow of 12,450 cfs at Slatersville Reservoir Lower Dam was used to represent the peak flow from the Slatersville Reservoir Upper and Middle Dams failure upstream. For Slatersville Reservoir Lower Dam, primarily an earth embankment structure, a time to failure of 0.5 hrs and a trapezoidal breach shape (0.5 H : 1.0 V) was utilized. Such an earthen embankment is assumed to fail piping under fair weather circumstances. The average breach width was assumed to equal to three times the height of the dam, about 54 ft.

A base flow of 9,275 cfs at Forestdale Pond Dam was used to represent the peak flow from the Slatersville Reservoir Upper, Middle and Lower Dams failure upstream. For Forestdale Pond Dam, primarily a stone-masonry gravity spillway structure, a time to failure of 0.1 hrs and a rectangular breach shape (vertical side walls) was utilized. Such a masonry dam is assumed to fail due to excessive mass movement or cracking under fair weather circumstances. The average breach width was assumed to equal the height of the dam, or about 19.5 ft.

2.20 Estimated Peak Outflow from Dam Break

The peak outflow from the hypothetical dam break was estimated using the breach outflow approximation equation developed by the National Weather Service as part of their SMPDBK computer model (see Attachment III), using the breach parameters described above and top-of-dam pool reservoir characteristics.

The estimated peak dam breach outflow at Slatersville Upper Reservoir Dam of approximately 11,770 cfs is approximately 25 percent greater than the published FEMA 500-yr 9,500 cfs flood estimate for Branch River at the inlet of Slatersville Reservoir. However, the peak breach outflow as a result of the domino failure at Slatersville Middle Reservoir Dam is 17,530 cfs. is approximately 85 percent greater than the published FEMA 500-yr 9,500 cfs flood estimate for Branch River at the inlet of Slatersville Reservoir.

2.30 Estimated Approximate Flood Impact Area

Several riverine cross sections, developed by GZA from USGS 7.5 minute quadrangle maps and RIGIS mapping data, were input into the SMPDBK model to preliminarily estimate approximate peak water surface elevations. The results of the analysis are provided as the approximate inundation area depicted in **Figure 2, 3 and 4**.

2.31 Downstream Extent of Flooding

The stream channel downstream of Slatersville Upper Reservoir Dam has moderate to mild slopes. Typical Manning's "n" roughness coefficients used in the analysis were 0.04 for the channel areas, and 0.08 for the overbank areas. These values are consistent with the range of values used in the FEMA Flood Insurance studies for similar small streams throughout Rhode Island. The hypothetical dam failure flood wave is expected to dissipate at the confluence of the Branch River with the Blackstone River, which is the downstream extent of the model. The peak outflow due to hypothetical "domino" dam failure at the confluence of the Branch River and the Blackstone River is about 4,600 cfs, which is lower than the published FEMA 10-yr 7,600 cfs flood estimate for the Blackstone River at the confluence with the Branch River.

2.32 Potential Effects of Dam Break

Results of the analysis indicate a peak flood depth at the immediate toe of the dam of about 12 ft. The resulting dam break flood wave is anticipated to be larger than the published FEMA 500-year flood estimate for the Branch River and lead to widespread flooding along it. The dam break flood wave is anticipated to inundate many structures and is likely to result in the loss of life, in GZA's opinion.

The flood wave from a hypothetical dam failure at Slatersville Upper Reservoir Dam is also expected to cause the overtopping failure of Slatersville Reservoir Middle and Lower Dams and Forestdale Pond Dam. The dam break flood wave is likely to cause scour damage at the culvert at North Smithfield Expressway (Rt 146). Failure of the dam would likely lead to the overtopping and destruction of Great Rd. The resulting dam break flood wave is anticipated to be larger than the 500 year flood and lead to widespread flooding along the Branch River.

FIGURES


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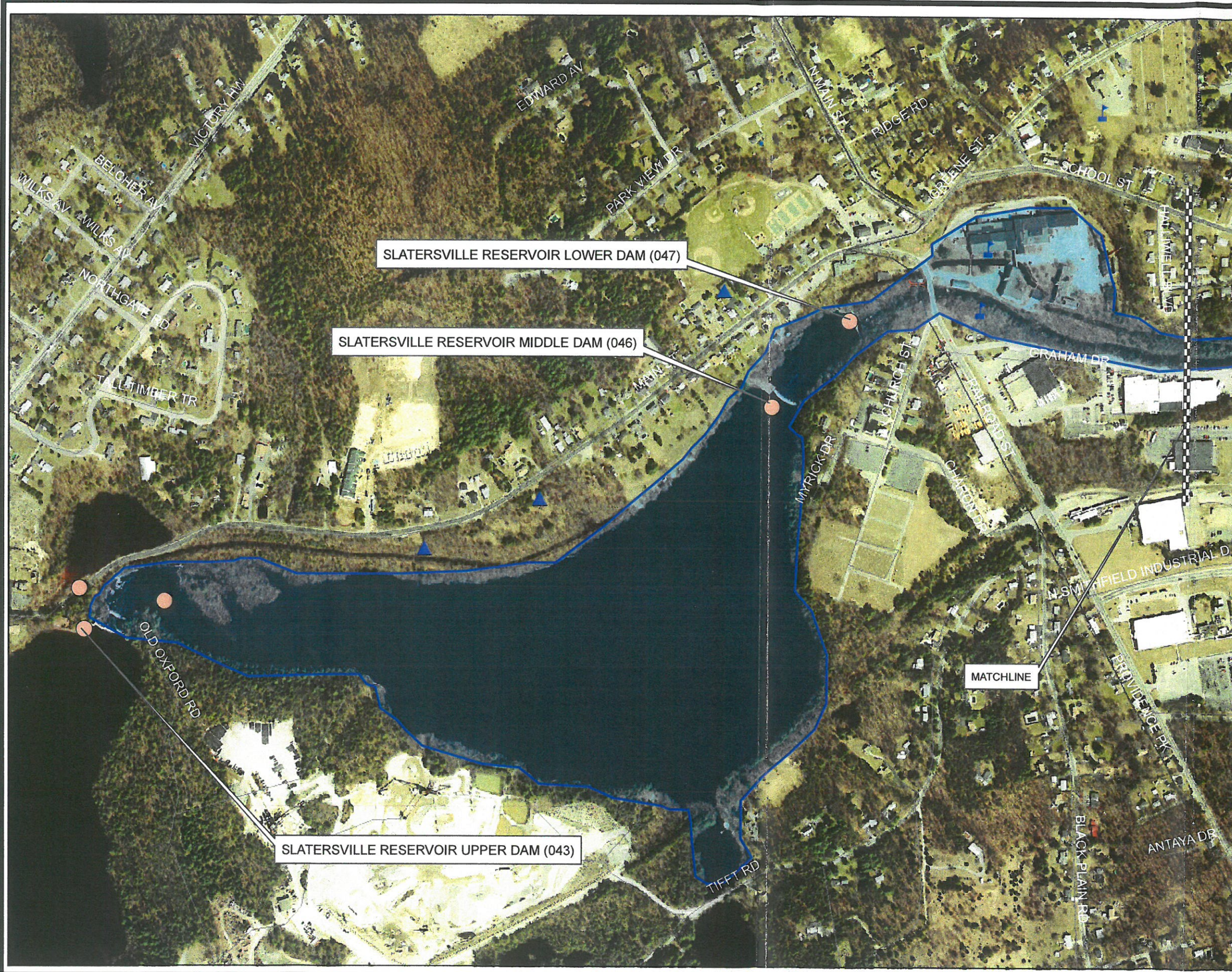


SOURCE : SCANNED USGS TOPOGRAPHIC QUADRANGLES DISTRIBUTED BY THE RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM, RIGIS. DATA SET CREDIT: This DRG was produced through an Innovative Partnership agreement between The Land Information Technology Company, Ltd., of Aurora, CO and the USGS.

Data Supplied by : **RIGIS**



	PROJ. MGR.: DML DESIGNED BY: DDR REVIEWED BY: PHB OPERATOR: DDR	SLATERSVILLE RESERVOIR UPPER DAM (043)	JOB NO. 17085.40
	DATE: 07/02/09	SITE LOCUS	FIGURE NO. 1

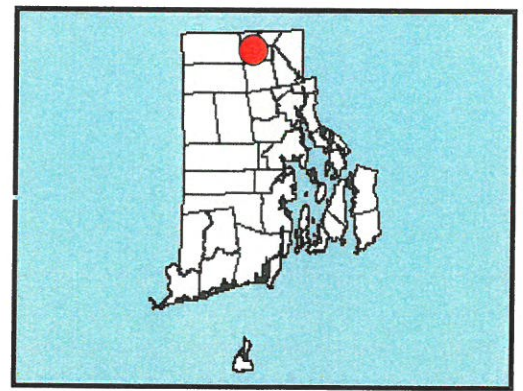


- LEGEND**
- BRIDGE
 - SCHOOLS
 - PUBLIC SAFETY BUILDINGS (FIRE, POLICE, TOWN HALLS)
 - HOSPITALS
 - APPROX. FLOOD HAZARD AREA
 - WATER SUPPLY WITHDRAWALS
 - DAMS



SOURCE

DIGITAL AERIAL OTHOPHOGRAPHY PROVIDED BY THE RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM, (RIGIS) AND THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION, (RIDOT). ORTHOPHO IMAGES WERE ORIGINALLY PRODUCED BY CHAS. H. SELLS UNDER CONTRACT TO THE (RIDOT). THE IMAGES WERE OBTAINED ON APRIL 14, 2003 AND WERE RELEASED IN NOVEMBER 2005.



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GZA GeoEnvironmental, Inc.
 One Edgewater Drive
 Norwood, MA 02062
 Phone: (781) 278-3700 Fax: (781) 278-5701



SLATERSVILLE UPPER RESERVOIR DAM (043), NORTH SMITHFIELD RHODE ISLAND

DAM FAILURE INUNDATION MAP

Proj. Mgr.: DML Designed By: DDR Reviewed By: PHB Operator: DDR	Dwg. Date: 07-07-09 Job No.: 17085.40	Figure No.: 2
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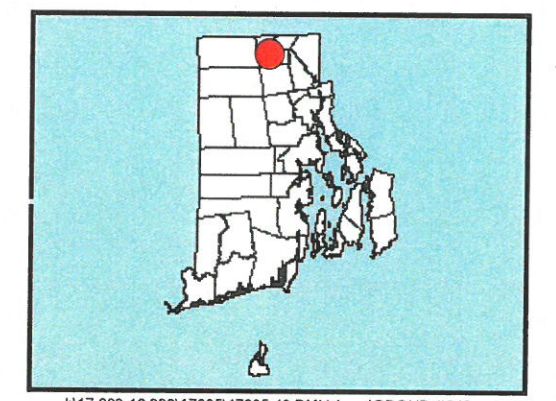
LEGEND

- BRIDGE
- SCHOOLS
- PUBLIC SAFETY BUILDINGS (FIRE, POLICE, TOWN HALLS)
- HOSPITALS
- APPROX. FLOOD HAZARD AREA
- WATER SUPPLY WITHDRAWALS
- DAMS



SOURCE

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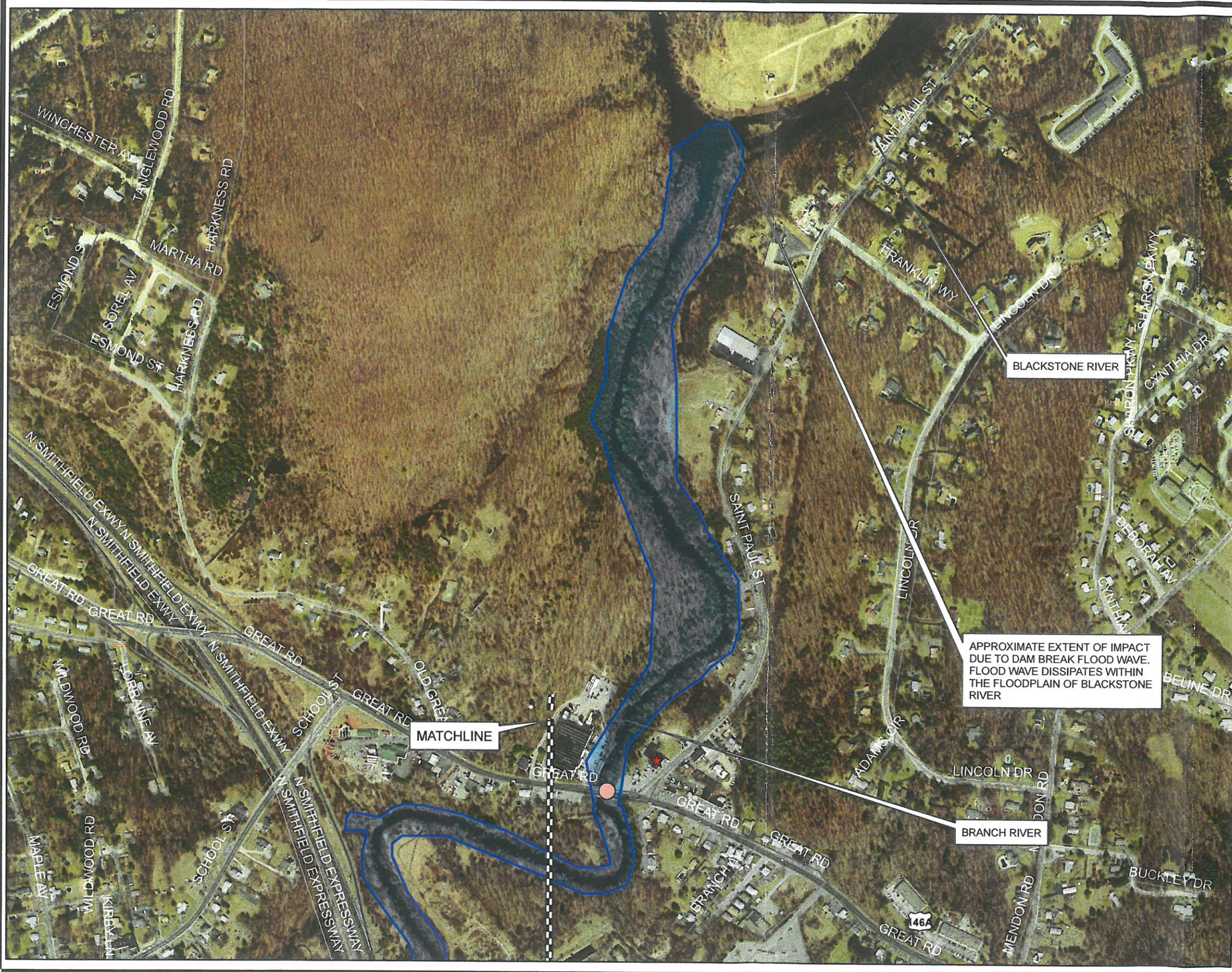
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SLATERSVILLE UPPER RESERVOIR
 DAM (043), NORTH SMITHFIELD
 RHODE ISLAND

DAM FAILURE INUNDATION MAP

Proj. Mgr.: DML Designed By: DDR Reviewed By: PHB Operator: DDR	Dwg. Date: 07-07-09 Job No.: 17085.40	Figure No.: 3
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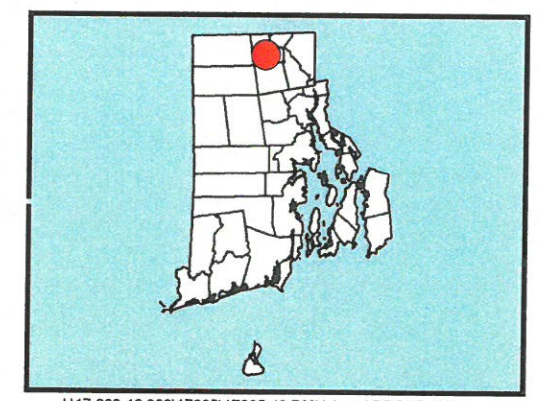


- LEGEND**
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SOURCE

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SLATERSVILLE UPPER RESERVOIR DAM (043), NORTH SMITHFIELD RHODE ISLAND

DAM FAILURE INUNDATION MAP

Proj. Mgr.: DML Designed By: DDR Reviewed By: PHB Operator: DDR	Dwg. Date: 07-07-09 Job No.: 17085.40	Figure No.: 4
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ATTACHMENT I
FIELD RECONNAISSANCE CHECKLIST

DAM HAZARD POTENTIAL FIELD CHECKLIST

Name of Dam:	Slatersville Upper Reservoir Dam		RI DEM ID NO.	43
Location:	North Smithfield Town	Branch River River or Stream		
	Slatersville Downstream Communities	Blackstone River Major Confluence		
Classification Data:	Intermediate Size		Unknown Date Built	
PHYSICAL DATA:	Stone Masonry Type of Dam	27 ft Height of Dam	256 ft Length of Dam	
	Broad Crested Stone Masonry Weir Type of Spillway	170 ft Length of Spillway	8 ft Normal Freeboard	
	Recreation Purpose of Dam	3" to 6" above spillway crest Pool at Inspection	1,970 acre-ft Normal Pool Storage Capacity	
			3,640 acre-ft Maximum Pool Storage Capacity	
Name		Title/Position	Representing	
David M. Leone		Senior Project Manager	GZA GeoEnvironmental, Inc.	
Damiana Diaz-Reck		Engineer	GZA GeoEnvironmental, Inc.	
DATE OF INSPECTION:	5/12/2009			
WEATHER:	Sunny		TEMPERATURE:	70s F

Name of Dam:

Slatersville Upper Reservoir Dam

Inspection No.:

43

Inspection Date:

12-Mar, -09

STRUCTURAL CONDITION	1	Concrete Condition	Fair condition. Some cracking on the abutments
	2	Outlet Condition	Good condition
	3	Unusual Movement	None observed.
	4	Seepage / Wet Area	None observed.
	5	Embankment Slides/Erosion	None observed.
	6	Vegetation / Pest Control	Wooded. Poorly maintained
	7	Vicinity Description	Main St on the left overbank
	8	Dam Roads & Utilities	Access through Main St.
	9	Discharge Channel	The dam discharges into Slatersville Reservoir Middle
	10	Structures (Gatehouses, etc.)	None observed.
	11	Adjacent Land Use	Residential
	12	Adjacent Population Density	Low
	13	Downstream Constrictions	Slatersville Reservoir Middle Dam
	14	Downstream Access / Use	Residential and recreational
	15	Property / Infrastructure / Utility Description & Distance	Main St 220 ft D/S on the left side
DAM & IMMEDIATE DOWNSTREAM AREA	17	Land Use Classification	Residential
	18	Population Density	Low to moderate
	19	Property / Infrastructure	Homes on the left overbank.
	21	Downstream Dams	Slatersville Reservoir Middle Dam (4,300 ft D/S)
	22	Downstream Bridges	Slatersville Reservoir Lower Dam (4,850 ft D/S) and Forestdale Pond Dam (2 mi D/S)
	23	Upstream Dams	Providence Pk and North Smithfield Expressway D/S of Slatersville Reservoir Middle Dam
	24	Channel Description (depth, Manning's n, width, overbank)	Pascoag Reservoir Upper Dam, Harrisville Pond Dam, Oakland Pond Dam
			About 20 ft wide, 5 ft deep wooded channel
ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE			

ATTACHMENT II
FIELD PHOTOGRAPHS

DAM 043 – SLATERSVILLE RESERVOIR UPPER DAM 05/12/2009

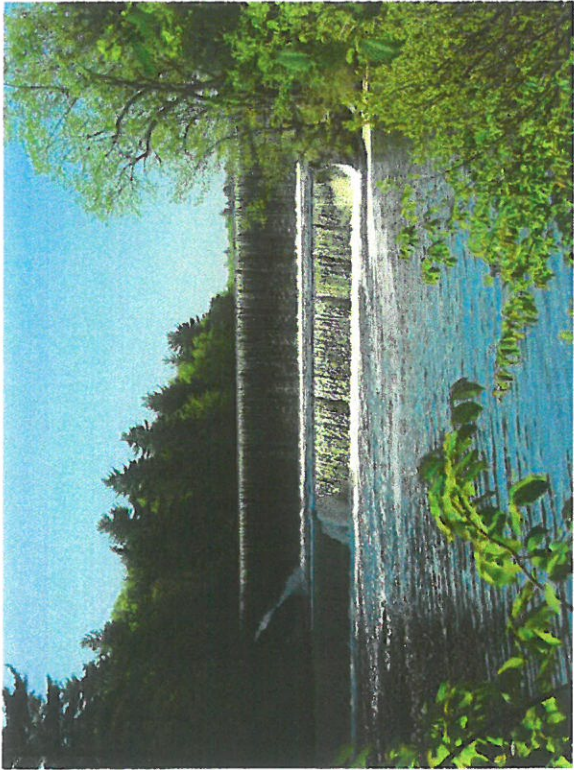


Photo 1. View of Slatersville Reservoir Upper Dam.



Photo 2. View of the spillway from the left abutment.



Photo 3. View of the left abutment. Note remains of sluice gate operators.



Photo 4. View of downstream canal on the left side.

ATTACHMENT III
SMPDBK OUTPUT SUMMARY

SIMPLIFIED DAMBREAK MODEL (SMPDBK) VERSION: 9/91
 BY D.L. FREAD, J.M. LEWIS, & J.N. WETMORE - PHONE: (301) 427-7640
 NWS HYDROLOGIC RESEARCH LAB W/OH3, 1325 EAST-WEST HIGHWAY,
 SILVER SPRING, MD 20910

SLATERSVILLE RESERVOIR UPPER DAM

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM)	EARTH	
DAM BREACH ELEVATION (HDE)		259.50 FT
FINAL BREACH ELEVATION (BME)		232.50 FT
SURFACE AREA OF RESERVOIR (SA)		150.00 ACRES
FINAL BREACH WIDTH (BW)		27.00 FT
TIME OF DAM FAILURE (TFM)		6.00 MINUTES
NON-BREACH FLOW (QO)		170.00 CFS
DISTANCE TO PRIMARY PT OF INTEREST (DISTTN)		.84 MILES
DEAD STORAGE EQUIV. MANN. N (CMS)		.50

CROSS SECTION NO. 1
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	232.5	237.0	259.5	260.0
TWIDTHS(FT) (BS)	27.0	27.0	27.0	1000.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 2
 REACH LENGTH (D) .34 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	231.0	235.0	240.0	250.0
TWIDTHS(FT) (BS)	1000.0	1100.0	1260.0	1520.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 3
 REACH LENGTH (D) .60 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	230.5	235.0	240.0	250.0
TWIDTHS(FT) (BS)	1600.0	1650.0	1700.0	2100.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 4
 REACH LENGTH (D) .84 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	230.0	235.0	240.0	250.0
TWIDTHS(FT) (BS)	400.0	410.0	425.0	510.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

AN ASTERISK (*) BESIDE A PARAMETER IMPLIES THAT A DEFAULT VALUE WAS COMPUTED

NAME OF DAM: SLATERSVILLE DAM

NAME OF RIVER: BRANCH RIVER

RVR MILE FROM DAM	MAX FLOW (CFS)	MAX ELEV (FT-MSL)	MAX DEPTH (FT)	TIME(HR)	TIME(HR)	TIME(HR)	FLOOD DEPTH(FT)
*****	*****	*****	*****	*****	*****	*****	*****
.00	11773.	244.81	12.31	.10	.03	3.05	5.00
.34	11427.	233.72	2.72	.21	.00	.00	5.00
.60	10936.	232.58	2.08	.37	.00	.00	5.00
.84	10674.	232.58	2.58	.52	.51	.91	5.00

ANALYSIS IS COMPLETE

046-B.OUT

SIMPLIFIED DAMBREAK MODEL (SMPDBK) VERSION: 9/91
BY D.L. FREAD, J.M. LEWIS, & J.N. WETMORE - PHONE: (301) 427-7640
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SILVER SPRING, MD 20910

SLATERSVILLE MIDDLE DAM
BRANCH RIVER

N SMITHFIELD, RI

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM)	EARTH	
DAM BREACH ELEVATION (HDE)		237.85 FT
FINAL BREACH ELEVATION (BME)		222.00 FT
SURFACE AREA OF RESERVOIR (SA)		140.00 ACRES
FINAL BREACH WIDTH (BW)		78.00 FT
TIME OF DAM FAILURE (TFM)		30.00 MINUTES
NON-BREACH FLOW (QO)		10700.00 CFS
DISTANCE TO PRIMARY PT OF INTEREST (DISTTN)		.10 MILES
DEAD STORAGE EQUIV. MANN. N (CMS)		.50

CROSS SECTION NO. 1				
FLOOD DEPTH (FLD)	5.00 FT			
ELEV.(FT) (HS)	222.0	237.9	240.5	250.0
TWIDTHS(FT) (BS)	78.0	310.0	350.0	500.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 2				
REACH LENGTH (D)	.05 MI			
FLOOD DEPTH (FLD)	5.00 FT			
ELEV.(FT) (HS)	221.7	235.0	240.0	250.0
TWIDTHS(FT) (BS)	200.0	250.0	350.0	500.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 3				
REACH LENGTH (D)	.10 MI			
FLOOD DEPTH (FLD)	5.00 FT			
ELEV.(FT) (HS)	221.5	240.0	245.0	250.0
TWIDTHS(FT) (BS)	200.0	250.0	350.0	500.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

AN ASTERISK (*) BESIDE A PARAMETER IMPLIES THAT A DEFAULT VALUE WAS COMPUTED

NAME OF DAM: SLATERSVILLE MIDDLE NAME OF RIVER: BRANCH RIVER

RVR MILE FROM DAM	MAX FLOW (CFS)	MAX ELEV (FT-MSL)	MAX DEPTH (FT)	TIME(HR) MAX DEPTH	TIME(HR) FLOOD	TIME(HR) DEFLOOD	FLOOD DEPTH(FT)
*****	*****	*****	*****	*****	*****	*****	*****
.00	17536.	235.43	13.43	.50	.00	.00	5.00
.05	13134.	231.05	9.35	.51	.00	.00	5.00
.10	12452.	231.05	9.55	.52	.00	.00	5.00

ANALYSIS IS COMPLETE

047-B.OUT

SIMPLIFIED DAMBREAK MODEL (SMPDBK) VERSION: 9/91
 BY D.L. FREAD, J.M. LEWIS, & J.N. WETMORE - PHONE: (301) 427-7640
 NWS HYDROLOGIC RESEARCH LAB W/OH3, 1325 EAST-WEST HIGHWAY,
 SILVER SPRING, MD 20910

SLATERSVILLE LOWER DAM with UPPER AND MIDDLE DOMINO FAILURE

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM)	EARTH	
DAM BREACH ELEVATION (HDE)		233.00 FT
FINAL BREACH ELEVATION (BME)		215.00 FT
SURFACE AREA OF RESERVOIR (SA)		40.00 ACRES
FINAL BREACH WIDTH (BW)		54.00 FT
TIME OF DAM FAILURE (TFM)		30.00 MINUTES
NON-BREACH FLOW (QO)		12450.00 CFS
DISTANCE TO PRIMARY PT OF INTEREST (DISTTN)		.95 MILES
DEAD STORAGE EQUIV. MANN. N (CMS)		.50

CROSS SECTION NO. 1
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	215.0	220.0	230.0	700.0
TWIDTHS(FT) (BS)	54.0	200.0	350.0	700.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 2
 REACH LENGTH (D) .01 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	214.8	220.0	230.0	700.0
TWIDTHS(FT) (BS)	54.0	200.0	350.0	700.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 3
 REACH LENGTH (D) .05 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	214.5	220.0	230.0	700.0
TWIDTHS(FT) (BS)	54.0	200.0	350.0	700.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 4
 REACH LENGTH (D) .10 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	214.0	217.5	230.0	240.0
TWIDTHS(FT) (BS)	.0	80.0	350.0	700.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 5
 REACH LENGTH (D) .95 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	199.0	200.0	210.0	230.0
TWIDTHS(FT) (BS)	400.0	400.0	500.0	700.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

AN ASTERISK (*) BESIDE A PARAMETER IMPLIES THAT A DEFAULT VALUE WAS COMPUTED

047-B.OUT

NAME OF DAM: SLATERSVILLE LOWER D

NAME OF RIVER: BRANCH RIVER

RVR MILE FROM DAM *****	MAX FLOW (CFS) *****	MAX ELEV (FT-MSL) *****	MAX DEPTH (FT) *****	TIME(HR) MAX DEPTH *****	TIME(HR) FLOOD *****	TIME(HR) DEFLOOD *****	FLOOD DEPTH(FT) *****
.00	15679.	228.64	13.64	.50	.00	.00	5.00
.01	12017.	226.01	11.21	.50	.00	.00	5.00
.05	10483.	226.01	11.51	.51	.00	.00	5.00
.10	10132.	226.01	12.01	.53	.00	.00	5.00
.95	9275.	204.12	5.12	.75	.00	.00	5.00

ANALYSIS IS COMPLETE

048-C.OUT

SIMPLIFIED DAMBREAK MODEL (SMPDBK) VERSION: 9/91
BY D.L. FREAD, J.M. LEWIS, & J.N. WETMORE - PHONE: (301) 427-7640
NWS HYDROLOGIC RESEARCH LAB W/OH3, 1325 EAST-WEST HIGHWAY,
SILVER SPRING, MD 20910

C1 FORESTDALE DAM
C2 BRANCH RIVER SMITHFIELD, RI
IBC ISH JNK IDAM IPLT IREC

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM) EARTH
DAM BREACH ELEVATION (HDE) 204.00 FT
FINAL BREACH ELEVATION (BME) 184.50 FT
SURFACE AREA OF RESERVOIR (SA) 20.00 ACRES
FINAL BREACH WIDTH (BW) 19.50 FT
TIME OF DAM FAILURE (TFM) 6.00 MINUTES
NON-BREACH FLOW (QO) 9275.00 CFS
DISTANCE TO PRIMARY PT OF INTEREST (DISTTN) 1.60 MILES
DEAD STORAGE EQUIV. MANN. N (CMS) .50

CROSS SECTION NO. 1
FLOOD DEPTH (FLD) 5.00 FT
ELEV.(FT) (HS) 184.5 200.0 204.5 210.0
TWIDTHS(FT) (BS) 20.0 40.0 108.5 250.0
INACTIVE TW(FT) (BSS) .0 .0 .0 .0
MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 2
REACH LENGTH (D) .01 MI
FLOOD DEPTH (FLD) 5.00 FT
ELEV.(FT) (HS) 183.0 200.0 204.5 210.0
TWIDTHS(FT) (BS) 20.0 40.0 108.5 250.0
INACTIVE TW(FT) (BSS) .0 .0 .0 .0
MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 3
REACH LENGTH (D) .37 MI
FLOOD DEPTH (FLD) 5.00 FT
ELEV.(FT) (HS) 182.0 186.0 190.0 200.0
TWIDTHS(FT) (BS) 20.0 20.0 920.0 1100.0
INACTIVE TW(FT) (BSS) .0 .0 .0 .0
MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 4
REACH LENGTH (D) .90 MI
FLOOD DEPTH (FLD) 5.00 FT
ELEV.(FT) (HS) 178.5 182.0 190.0 200.0
TWIDTHS(FT) (BS) 20.0 100.0 150.0 200.0
INACTIVE TW(FT) (BSS) .0 .0 .0 .0
MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 5
REACH LENGTH (D) 1.60 MI
FLOOD DEPTH (FLD) 5.00 FT
ELEV.(FT) (HS) 168.0 170.0 175.0 180.0
TWIDTHS(FT) (BS) 20.0 250.0 350.0 510.0
INACTIVE TW(FT) (BSS) .0 .0 .0 .0
MANNING N (CM) .040 .040 .080 .080

AN ASTERISK (*) BESIDE A PARAMETER IMPLIES THAT A DEFAULT VALUE WAS COMPUTED

048-C.OUT

NAME OF DAM: FORESTDALE DAM

NAME OF RIVER: BRANCH RIVER

RVR MILE FROM DAM *****	MAX FLOW (CFS) *****	MAX ELEV (FT-MSL) *****	MAX DEPTH (FT) *****	TIME(HR) MAX DEPTH *****	TIME(HR) FLOOD *****	TIME(HR) DEFLOOD *****	FLOOD DEPTH(FT) *****
.00	14203.	199.57	15.07	.10	.00	.00	5.00
.01	13013.	199.57	16.57	.10	.00	.00	5.00
.37	8268.	194.13	12.13	.35	.00	.00	5.00
.90	7528.	194.13	15.63	.68	.00	.00	5.00
1.60	4611.	174.44	6.44	1.04	.00	.00	5.00

ANALYSIS IS COMPLETE