Mascoma River
New Hampshire

MASCOMA LAKE DAM
DAM - BREAK FLOOD ANALYSIS

March 1986

US Army Corps
of Engineers
New England Division

MASCOMA LAKE DAM

DAM-BREAK FLOOD

ANALYSIS

SUBMITTED TO:

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION

WALTHAM, MASSACHUSETTS

SUBMITTED BY:

VOLLMER ASSOCIATES

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CONTRACT NUMBER:

DACW 33-85-D-0006

SEPTEMBER 1985

MASCOMA LAKE DAM
DAM-BREAK FLOOD ANALYSIS

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MASCOMA LAKE DAM
DAM-BREAK FLOOD ANALYSIS

1. INTRODUCTION AND PURPOSE

This report presents the findings of a dam-break flood analysis performed for Mascoma Lake Dam. The dam is owned, operated and maintained by the New Hampshire Water Resource Board. Included in the report are a description of pertinent features of the dam, the procedure used for the analysis, the assumed dam-break conditions, and the resulting effect on downstream flooded areas. This study was not performed because of any known likelihood of a dam-break at Mascoma Lake Dam. Its purpose is to provide quantitative information for emergency planning use.

2. DAM DESCRIPTION

Identification No.:	NH 00153
Name of Dam:	Mascoma Lake Dam
Town:	Lebanon
County and State:	Grafton, NH
Stream:	Mascoma River

Mascoma Lake Dam is located in the central eastern part of the State of New Hampshire about 10 miles above the mouth of the Mascoma River, which is a tributary of the Connecticut River. The dam site is 3 miles upstream from the City of Lebanon. The dam consists of three different sections: a rock-filled timber crib, 156 feet long; a concrete abutment, containing sluice gates, 27 feet long; and two earth embankments at each end, approximately 392 feet long. The total length is approximately 575 feet.

3. PERTINENT DATA

Data is taken from "Phase I Inspection Report" for Mascoma Lake Dam dated May 1979. In 1981-82, the New Hampshire Water Resources Board made improvements to the dam consisting of removal of the gate house, replacement of the existing 4 x 4 gates with new 4 x 6 gates, removal of the existing timber pier, modifications to the spillway consisting of a new concrete crest and new flashboards and new concrete abutments. These modifications are included in this report.

a. Drainage Area

Mascoma Lake as shown on the U.S.G.S. Quadrangle Sheet (Plate 1) is located along the Mascoma River.

It has a total drainage area of 153 square miles and the watershed is highly wooded and mountainous.

b. Elevation (N.G.V.D.)

(1) Top of dam - 759.0
(2) Spillway crest - 749.0

c. Reservoir

(1) Length of recreation pool - 4.0 miles

d. Storage (Acre-Feet)

(1) Top of dam - 18,300 acre-feet
(2) Spillway crest - 6,166 acre-feet

e. Reservoir Surface (Acres)

(1) Top of dam - 1,244 acres
(2) Spillway crest - 1,128 acres

f. Dam

(1)	Type	Concrete spillway w/flashboards
(2)	Length	575 feet
(3)	Height	18 feet
(4)	Top Width	dike 10-feet; flashboard section - 5 feet
(5)	Side Slopes	
	(a) Upstream	Approximately 1 vertical to 2 horizontal
	(b) Downstream	1 vertical to 1.5 horizontal
(6)	Zoning	Not applicable
(7)	Impervious core	Not applicable
(8)	Cutoff	Concrete core wall extending some 25 feet from the concrete gate structure into the dike.

g. Spillway

(1)	Type	Spillway consists of two sections: one section consists of pin-type flashboards on a concrete crest; second consists of stop logs.
(2)	Length of weir	Stanchion section is 36 feet long divided into seven bays. Flashboard section is 125 feet. The total length is 161 feet.

(3)	Crest elevation	Sill elevation in stanchion section is 745.0. Crest elevation in flashboard section is 749.03.
(4)	Control mechanism	1-foot high flashboards in flashboards section; 6.5-foot high stop logs.
(5)	U/S Channel	Lake.

h. Regulating Outlets

(1)	Invert	742.9
(2)	Size	16 feet long and divided into four bays, each 4 feet by 6 feet.
(3)	Description	Wooden gates.
(4)	Control mechanism	Four gates - either manual or electic drill operations.

4. VALLEY DESCRIPTION

The river valley of the Mascoma River below Mascoma Lake is generally moderately sloping. The floodplains above the City of Lebanon average between 200 to 500 feet wide. Below the City of Lebanon, the floodplains average from 500 to 1,000 feet wide. The Mascoma River joins the Connecticut River approximately 10.5 miles below the dam. There are six dams along the Mascoma River downstream of Mascoma Lake Dam. Information on these dams was obtained from the Federal Emergency Management Agency-Flood Insurance Study - December 1979 for the City of Lebanon. They include the following: Grafton County Power Plant No.3 Dam, Grafton County Power Plant No. 2 Dam, American Wollen Company Dam, Cummings Tannery Dam and the Waterworks Dam. These dams are run-of-the-river dams which do not have significant surcharge storage volumes available to attenuate flood discharges. Since the dams have an insignificant effect, all the dams with the exception of Cummings Tannery Dam were excluded in the computer analysis for Mascoma Lake Dam. Cummings Tannery Dam was included in the analysis due to its proximity to the center of the City of Lebanon. The total study reach is shown on Plates 1 and 2.

5. MODEL DESCRIPTION

The Mascoma Lake Dam-Break Analysis was made using the NWS version, dated July 1984, of the "National Weather Service Dam-Break Flood Forecasting Computer Model", developed by D.L. Fread, Research Hydrologist, Office of Hydrology, National Weather Service, NOAA, Silver Spring, Maryland 20910. Input for the model consisted of: (a) storage characteristics of the reservoir, (b) selected geometry and duration of the breach development, (c) hydraulic inflows, (d) hydraulic roughness coefficients, and (e) active and inactive flow regions. Based on the input data, the model computes the dam-break outflow hydrograph and routes it downstream. The analysis provides output on the attentuation of the flood stages, and timing of the flood wave as it progresses downstream.

6. ASSUMED DAM BREAK CONDITIONS

General: The magnitude of a flood resulting from the hypothetical failure of Mascoma Lake Dam is a function of many different parameters including size of breach, initial pool level and storage, rate of breach formation, channel and overbank roughness and antecedent flow conditions. Engineering assumptions of conditions which could be reasonably expected to exist prior to a failure of Mascoma Lake Dam and which were used in the analysis are presented below:

(1) Initial Pool Level: 753.6 feet N.G.V.D., 4.6 feet above spillway crest.

(2) Reservoir Inflow: Maximum known flood at dam site March 1936 = 5,800 cfs.

(3) Breach Invert: 741.0 feet N.G.V.D.

(4) Breach Base Width: 156 feet, vertical side slopes 1V: 0.0.H.

(5) Time To Complete Formation of Breach: 0.5 hour.

(6) Downstream Channel Roughness: Manning's "n" = .040 to .130.

(7) Pre-Breach River Flows: The pre-breach river flow was assumed equal to the flood of record - March 1936 - 5800 cfs.

7. RESULTS

The resulting peak stage flood profiles are shown on plates 3, 4 and 5. Because of the scarcity of good topographic mapping in the area, profiles are shown in feet above normal summertime (July-August) low water (NLW). Users of the information can establish depth of flooding at particular properties by establishing its relative elevation with respect to the adjacent stream level. Variations in depth above NLW progressing downstream, is attributable to changes in natural stream hydraulic capacity as well as changes in peak discharge.

The peak dam break discharge from Mascoma Lake is 7,920 cfs producing a rise of approximately 9.1 feet above the NLW river depth at a point 0.01 miles downstream from the dam.

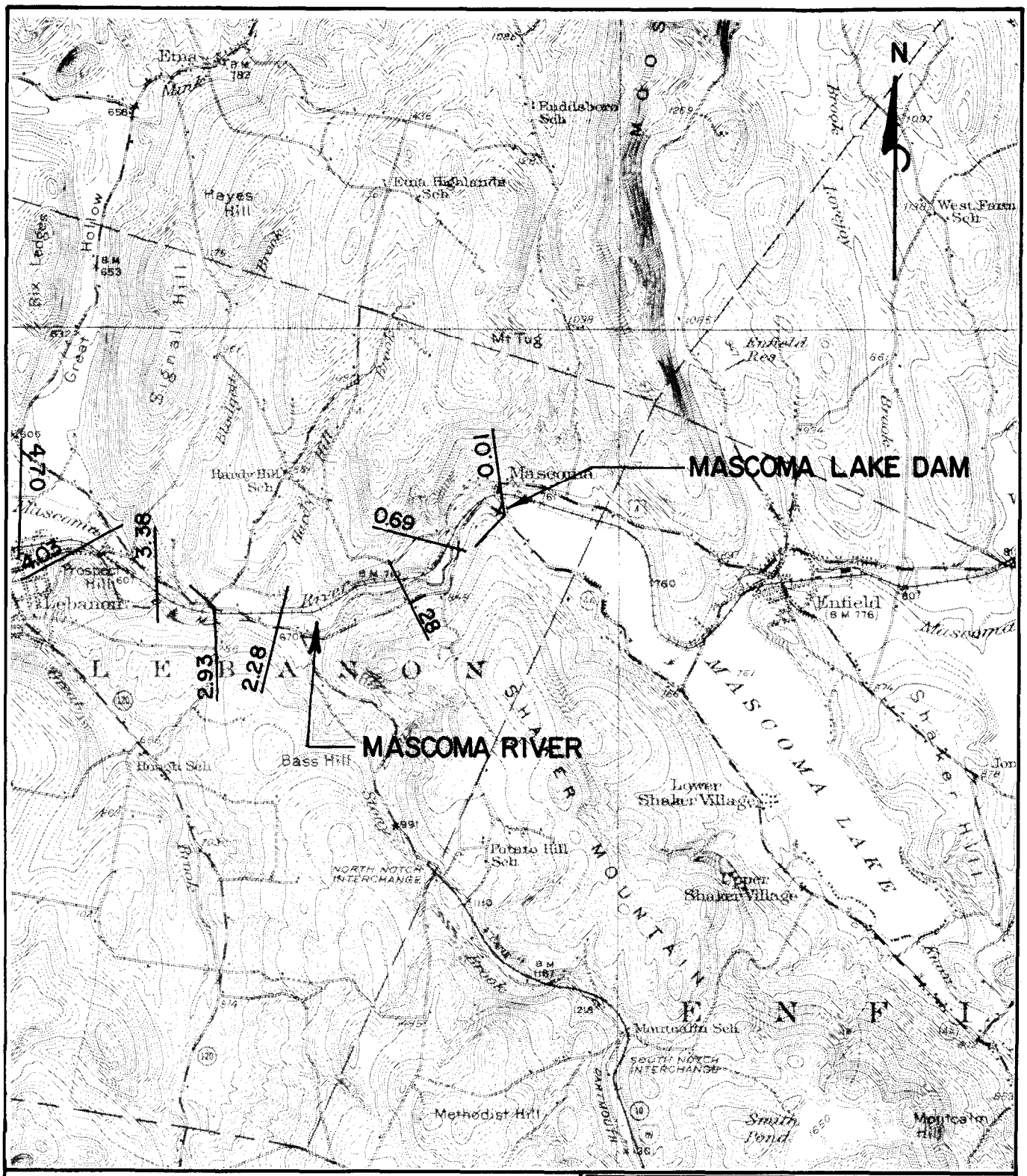
A local road crosses the Mascoma River at approximately 200 feet downstream of the dam. Analysis for Mascoma Lake Dam indicate the failure discharge is not sensitive to the size of the breach at the dam due to a high tailwater condition even through a cross-section at the road crossing was not included in the computer model.

The initial computer analysis was run using a storage routing option but results indicated tailwater to be above the starting pool level of the lake. Therefore, the analysis was changed to a dynamic option whereby the tailwater would be included in a submerged breach solution. The submerged breach solution reduced the failure discharged by approximately 1000 cfs.

At a distance of 4.03 miles below Mascoma Lake Dam, at the upstream limit of the City of Lebanon, peak discharge is 7800 cfs and the rise over NLW stage would be about 10.2 feet. At 8.55 miles downstream from the dam, the peak discharge is 7390 cfs with an associated rise of 6.8 feet over NLW stage. Peak discharge, stages and timing for three stations downstream from Mascoma Lake Dam are shown on plate 6. The stations are located .01, 4.03 and 8.55 miles downstream of the dam.

An additional analysis was performed for a breach at normal pool with an assumed pre-breach flow of 1000 cfs. This resulted in a peak failure discharge of 3770 cfs producing a rise of approximately 5.0 feet above NLW at a point 0.01 miles downstream from the dam. The dam breach under normal pool conditions is less severe than an occurrence caused by a major runoff storm event.

The input data file for the assumed dam-break conditions as summarized in Section 6 of this report is in Appendix A and Appendix B contains the output file.



MAP BASED UPON U.S.G.S.
MASCOMA, N.H.-VT. QUADRANGLE
1927

CROSS-SECTION LOCATION IN
MILES BELOW DAM

SCALE IN MILES

1 0 1

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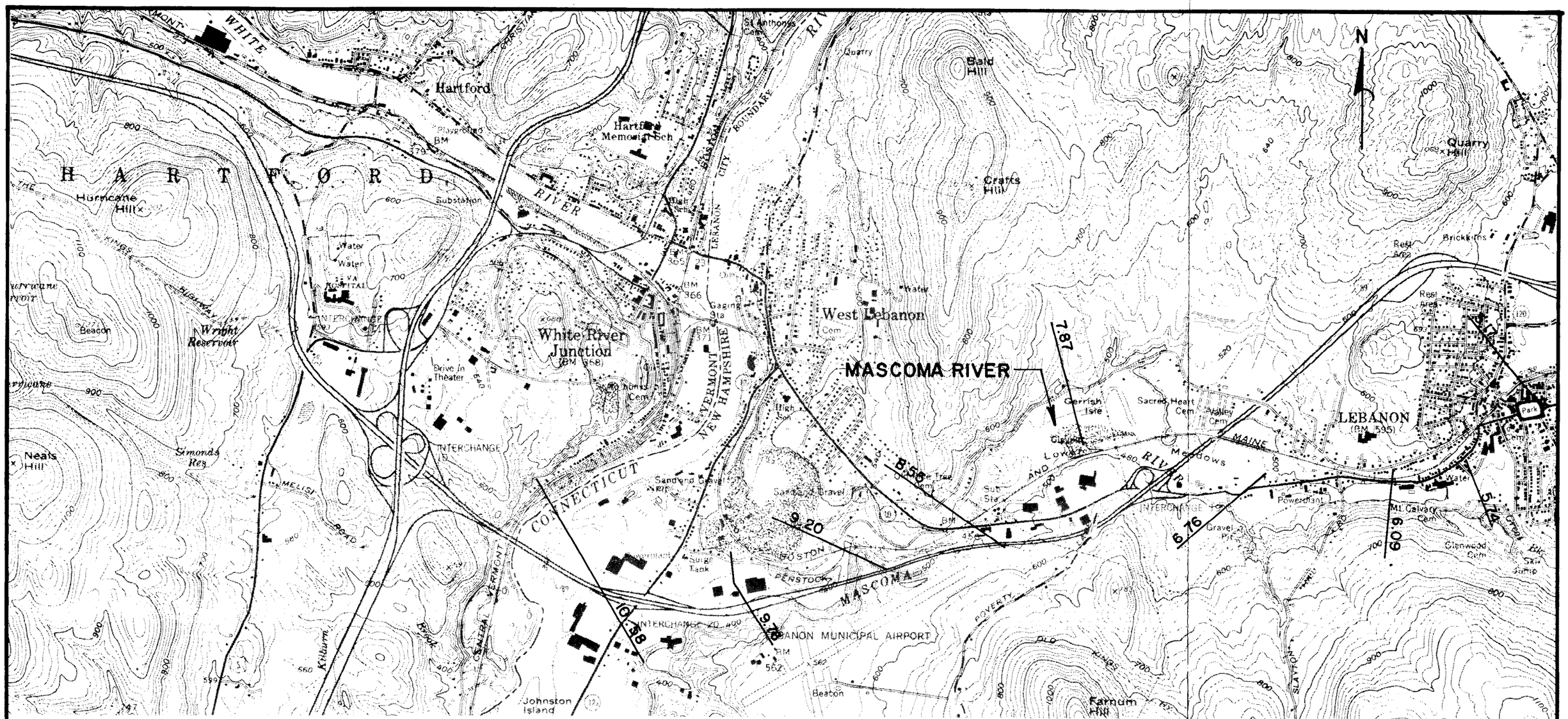
MASCOMA LAKE DAM

DAM-BREAK FLOOD ANALYSIS

INDEX MAP No. 1

PLATE 1



MAP BASED UPON U.S.G.S.
HANOVER, N.H.-VT. QUADRANGLE
1959

CROSS-SECTION LOCATION IN
MILES BELOW DAM

SCALE IN FEET

2,000 0 2,000

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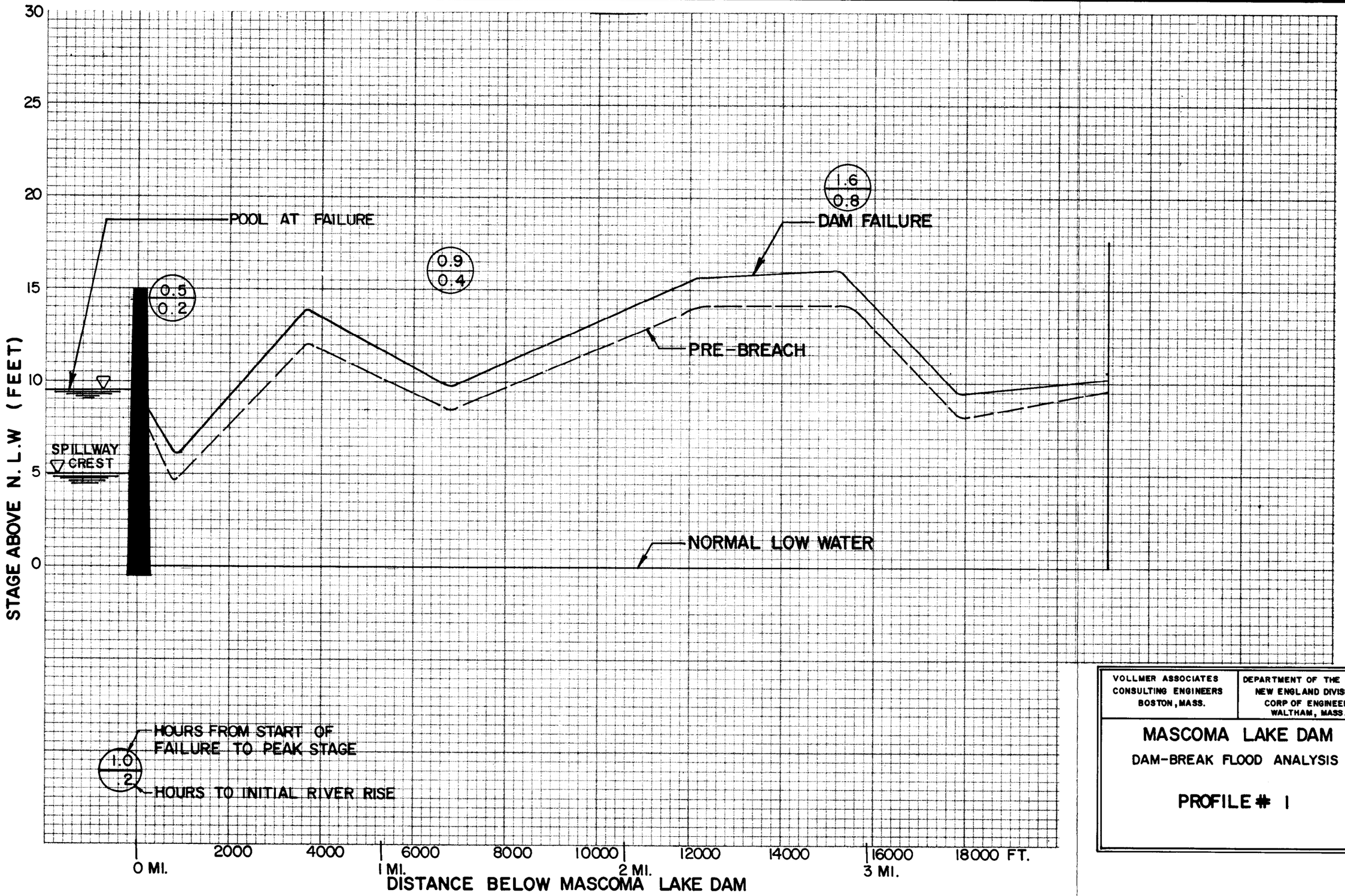
MASCOMA LAKE DAM

DAM-BREAK FLOOD ANALYSIS

INDEX MAP No. 2



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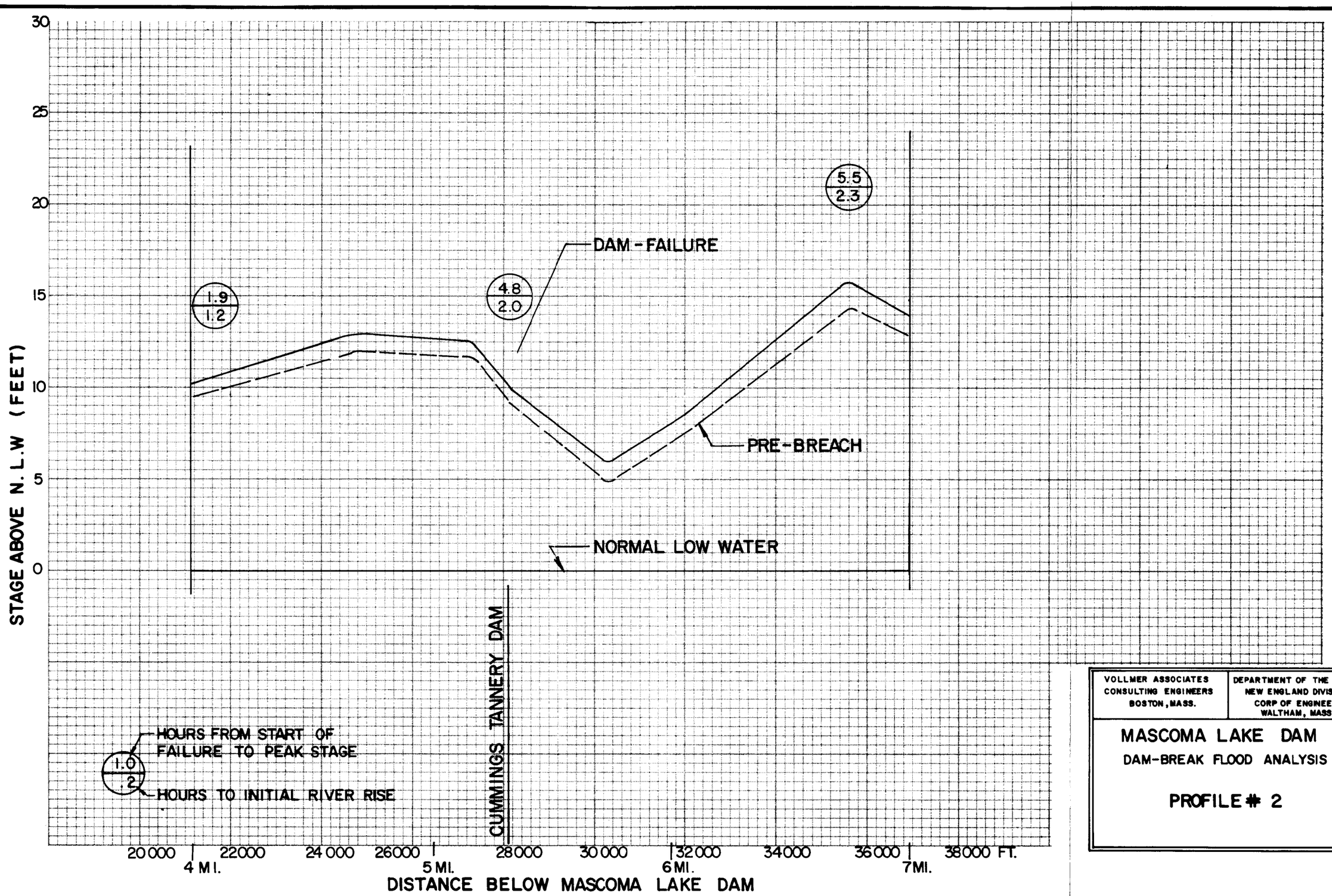
MASCOMA LAKE DAM

DAM-BREAK FLOOD ANALYSIS

PROFILE # 1



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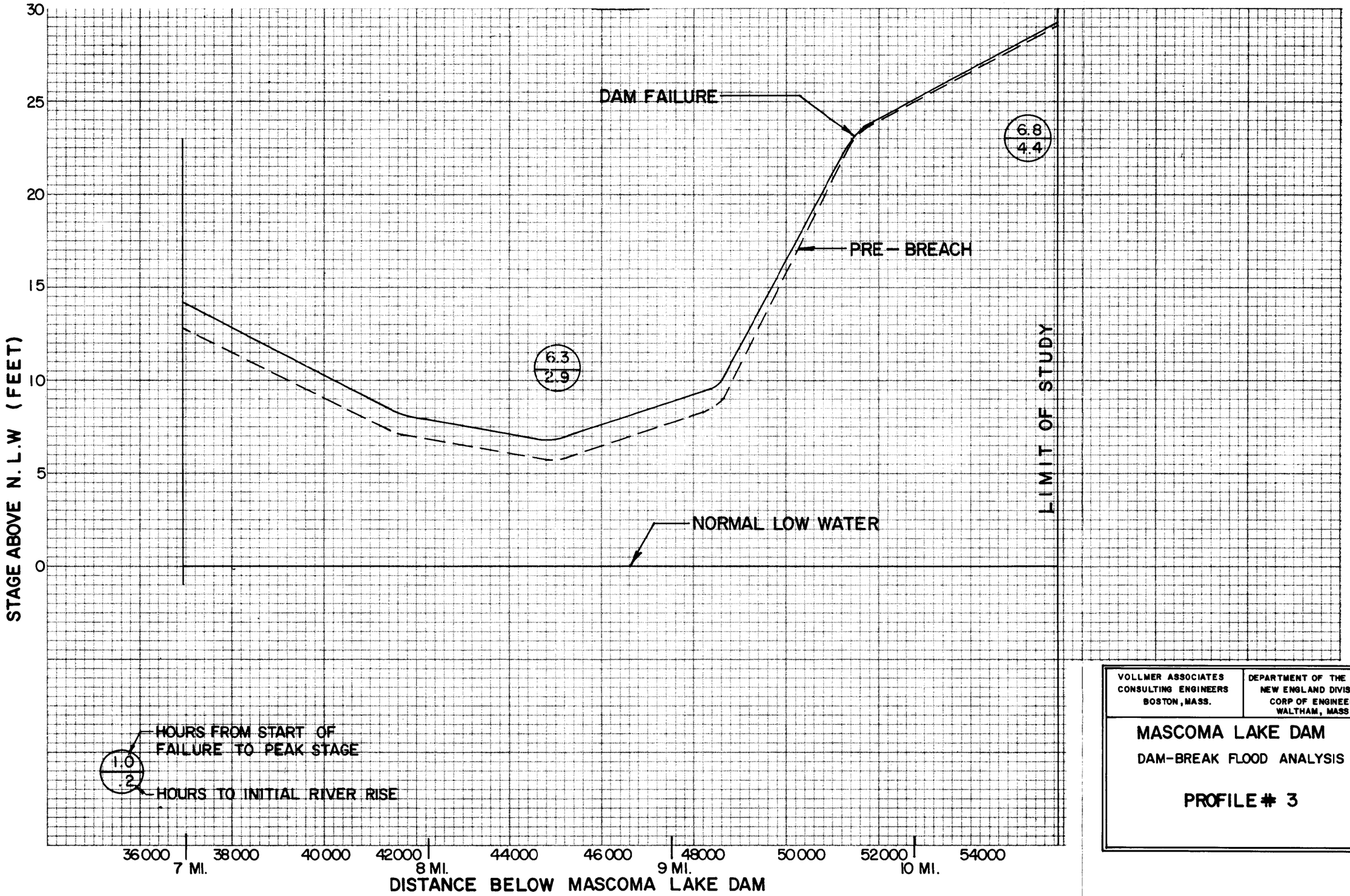
MASCOMA LAKE DAM

DAM-BREAK FLOOD ANALYSIS

PROFILE # 2



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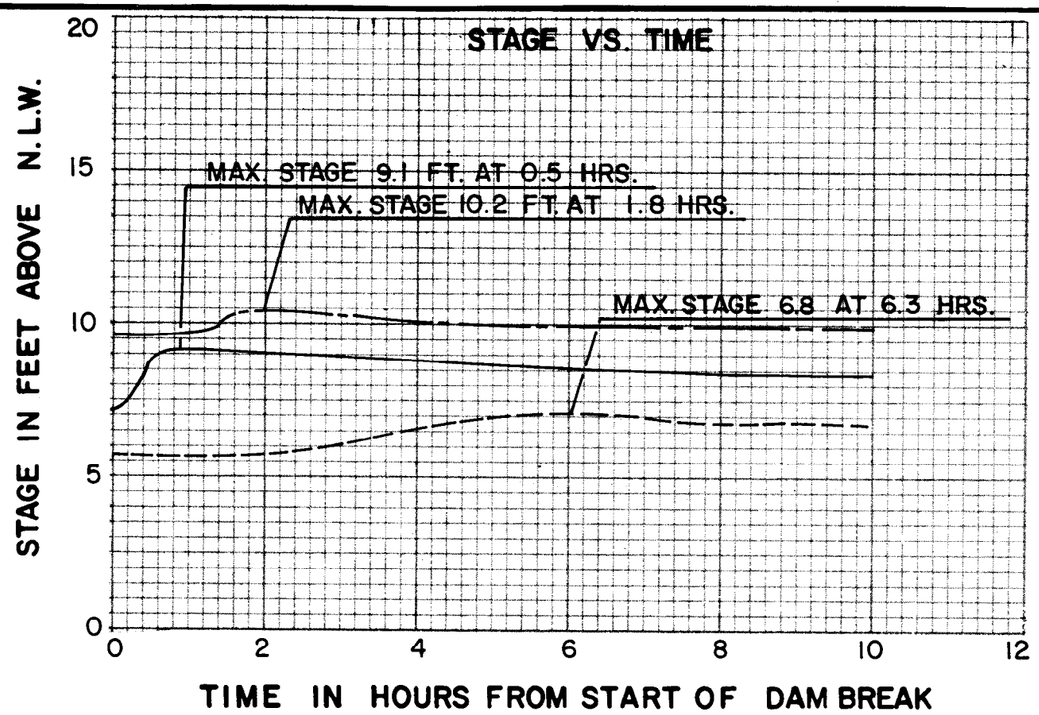
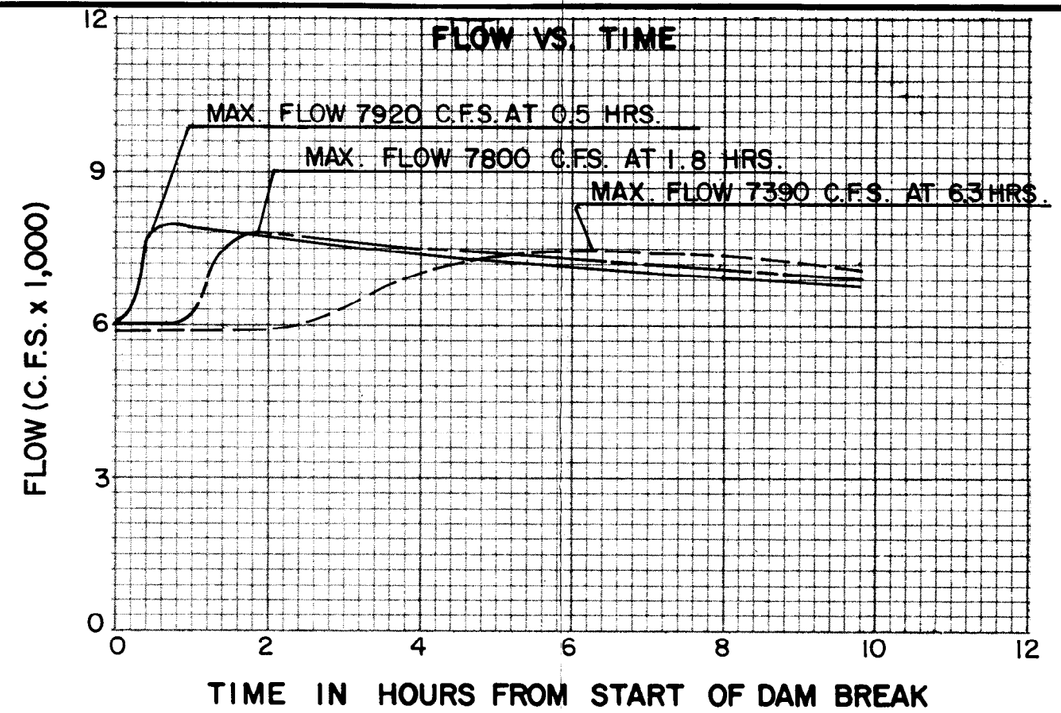
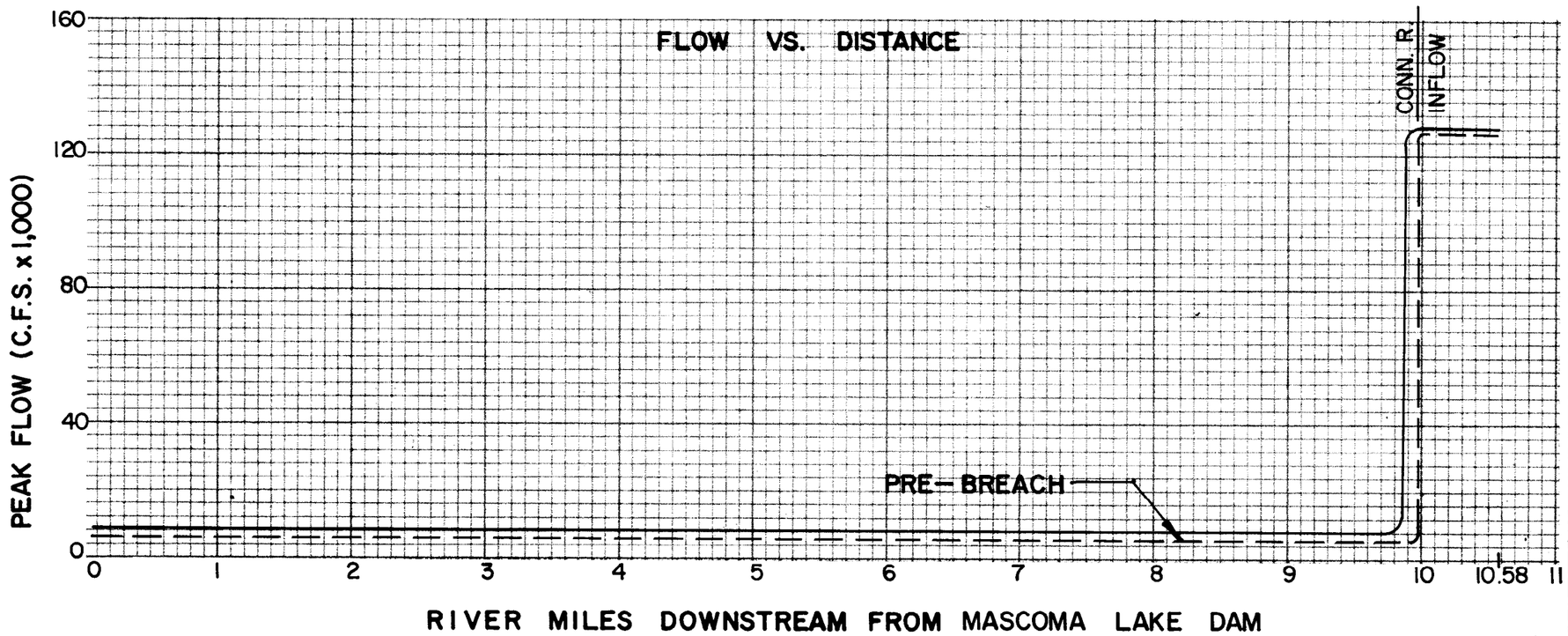
MASCOMA LAKE DAM

DAM-BREAK FLOOD ANALYSIS

PROFILE # 3







NLW DATUM (FT. N.G.V.D.)

STA. 1 R.M. 0.01 = 744.0
STA. 2 R.M. 4.03 = 577.8
STA. 3 R.M. 8.55 = 447.0

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MASCOMA LAKE DAM

DAM-BREAK FLOOD ANALYSIS

BASE FLOOD DISCHARGES STAGES & TIMING

APPENDIX A
INPUT DATA FILE

MASCOMA LAKE DAM MASCOMA RIVER VOLLMER ASSOCIATES
BOSTON, MA 02116 SEPT. 24,1985 #DB1

1	1	1	0	11	0	0	0
1							
19600	18300	13600	7600	2000	0		
760	759	755	750	745	741		
4.50	753.6	0	741	156	0.5	741	1
753.6	759	749	0	0	0	0	2700
0	380	1080	1820	2630	3440	4780	8800
0	1	2	3	4	5	6	9
1	10						
5800	5800	5800	5800	5800	5800	5800	5800
5800	5800	5800					
12	8	5	4	0	0	0	
1	5	7	9	10			
0.005							
741	745	749	751	754	756	760	780
180	180	190	237	263	325	335	1109
0.01							
741	745	749	751	754	756	760	780
0	180	190	237	263	325	335	1109
0.15							
739	743	745	748	750	755	758	770
0	165	195	265	280	430	500	1040
0.69							
714	717	730	740	750	760	770	780
0	24	135	211	341	370	449	528
1.28							
689	692	700	710	720	730	740	760
0	58	211	317	422	502	581	686
2.28							
647	650	655	660	663	665	670	680
0	32	63	135	220	365	585	1005
2.93							
620	623	640	650	660	670	680	700
0	15	100	314	528	660	792	1109
3.38							
602	605	620	630	640	650	660	680
0	53	316	449	581	740	898	1426
4.03							
575.3	578	581	584	586	591	596	600
0	80	95	290	950	970	1090	1530
4.70							
566	569	572.5	574	576	578	580	600
0	75	220	400	1455	1865	2534	3800
5.17							
564	566	569	573	575	577	580	600
0	64	86	124	180	230	600	2700
5.32							
563.5	566	569	573	575	577	580	600

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0	64	86	124	130	230	600	2700
0.040	0.055	0.070	0.085	0.100	0.110	0.120	0.130
0.040	0.055	0.070	0.085	0.100	0.110	0.120	0.130
0.050	0.065	0.080	0.090	0.105	0.115	0.120	0.130
0.050	0.070	0.090	0.100	0.110	0.120	0.120	0.130
0.050	0.070	0.090	0.100	0.110	0.120	0.120	0.130
0.055	0.075	0.090	0.100	0.110	0.120	0.120	0.130
0.055	0.075	0.090	0.100	0.110	0.120	0.120	0.130
0.055	0.075	0.090	0.100	0.110	0.120	0.120	0.130
0.065	0.075	0.090	0.100	0.110	0.120	0.120	0.130
0.065	0.075	0.090	0.100	0.110	0.120	0.120	0.130
0.065	0.075	0.090	0.100	0.110	0.120	0.120	0.130
0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
0.20	0.20	0.20					
0	0	0	0	0	0	0	0
0	0	0					
0	0	0.00	0.25	42	0	0	0
563.5	568	572.5	575	575.8	577.5		
0	5	2500	5700	7000	10000		

REACH TWO MASCOMA RIVER VOLLMER ASSOCIATES
BOSTON, MA 02116 SEPTEMBER 24,1985 #DB1

9	0	0	0	22	0	0	0
0.0	10.0						
5816	5818	5860	5988	6759	7017	7191	7253
7302	7388	7408	7410	7408	7403	7371	7357
7249	7229	7130	7110	6994	6970		
0.0	1.2	1.4	1.6	2.4	2.8	3.2	3.4
3.6	4.2	4.6	4.825	5.0	5.2	5.8	6.0
7.2	7.4	8.4	8.6	9.8	10.0		
8	7	4	4	0	0	1	
1	3	5	8				
5.74							
500	503	508	513	518	523	528	
0	170	315	510	730	905	975	
6.09							
486	489	500	510	520	530	540	
0	71	330	435	540	695	850	
6.76							
460	463	465	470	472	480	500	
0	80	98	132	142	900	1250	
7.87							
459	462	470	480	490	500	520	
0	90	450	900	1040	1180	1600	
8.55							
444	447	450	460	470	480	500	
0	95	115	180	315	450	1250	
9.20							
395	398	400	410	420	430	440	
0	50	120	360	600	625	650	
9.76							
357	360	370	380	390	400	420	
0	75	338	600	800	1000	1450	
10.58							
304	324	340	350	360	370	380	
0	650	850	2250	3650	3935	4220	
0.065	0.075	0.090	0.100	0.110	0.120	0.120	
0.055	0.075	0.090	0.100	0.110	0.120	0.120	
0.055	0.075	0.090	0.100	0.110	0.120	0.120	
0.055	0.075	0.090	0.100	0.110	0.120	0.120	
0.055	0.075	0.090	0.100	0.110	0.120	0.120	
0.075	0.085	0.090	0.100	0.110	0.120	0.120	
0.075	0.085	0.090	0.100	0.110	0.120	0.120	
0.20	0.20	0.20	0.20	0.20	0.20	0.20	
0	0	0	0	0	0	0	
0	0	0.00	0.25	42	0	0	0
7							
120000	120000	120000	120000	120000	120000	120000	120000
120000	120000	120000	120000	120000	120000	120000	120000
120000	120000	120000	120000	120000	120000		
304	344	349	351	352.7	358.5		
0	70500	109000	124000	125800	150000		

APPENDIX B
OUTPUT DATA FILE

PROGRAM DAMBRK---VERSION-07/18/84

ANALYSIS OF THE DOWNSTREAM FLOOD HYDROGRAPH

PRODUCED BY THE DAM BREAK OF

MASCOMA LAKE DAM

ON

MASCOMA RIVER

ANALYSIS BY

VOLLMER ASSOCIATES
BOSTON, MA 02116
SEPT. 24,1985 #DB1

BASED ON PROCEDURE DEVELOPED BY

DANNY L. FREAD, PH.D., RESEARCH HYDROLOGIST
HYDROLOGIC RESEARCH LABORATORY
W23, OFFICE OF HYDROLOGY
NOAA, NATIONAL WEATHER SERVICE
SILVER SPRING, MARYLAND 20910

1

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***                       ***
***  SUMMARY OF INPUT DATA  ***
***                       ***
*****************************
*****************************
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INPUT CONTROL PARAMETERS FOR MASCOMA LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF DYNAMIC ROUTING REACHES	KKN	1
TYPE OF RESERVOIR ROUTING	KUI	1
MULTIPLE DAM INDICATOR	MULDAM	1
PRINTING INSTRUCTIONS FOR INPUT SUMMARY	KDMP	0
NO. OF RESERVOIR INFLOW HYDROGRAPH POINTS	ITEH	11
INTERVAL OF CROSS-SECTION INFO PRINTED OUT WHEN JNK=9	NPRT	0
FLOOD-PLAIN MODEL PARAMETER	KFLP	0
LANDSLIDE PARAMETER	KSL	0

IDAM= 1

MASCOMA LAKE DAM RESERVOIR

TABLE OF ELEVATION VS SURFACE AREA

SURFACE AREA (ACRES) SA(K)	ELEVATION (FT) HSA(K)
1409.0	760.00
1191.0	759.00
1159.0	755.00
1241.0	750.00
999.0	745.00
1.0	741.00
.0	.00
.0	.00

DAM NUMBER 1

MASCOMA LAKE DAM RESERVOIR AND BREACH PARAMETERS

PARAMETER	UNITS	VARIABLE	VALUE
ELEVATION OF WATER SURFACE	FT	YO	753.60
SIDE SLOPE OF BREACH		Z	.00
ELEVATION OF BOTTOM OF BREACH	FT	YBMIN	741.00
WIDTH OF BASE OF BREACH	FT	BB	156.00
TIME TO MAXIMUM BREACH SIZE	HR	TFH	.50
ELEVATION OF WATER WHEN BREACHED	FT	HF	753.60
ELEVATION OF TOP OF DAM	FT	HD	759.00
ELEVATION OF UNCONTROLLED SPILLWAY CREST	FT	HSP	749.00
ELEVATION OF CENTER OF GATE OPENINGS	FT	HGT	.00
DISCHARGE COEF. FOR UNCONTROLLED SPILLWAY		CS	.00
DISCHARGE COEF. FOR GATE FLOW		CG	.00
DISCHARGE COEF. FOR UNCONTROLLED WEIR FLOW		CDO	.00
DISCHARGE THRU TURBINES	CFS	QT	2700.00

QSPILL(K, 1)	HEAD(K, 1)
0.	.0
380.	1.0
1080.	2.0
1820.	3.0
2630.	4.0
3440.	5.0
4780.	6.0
8800.	9.0

DHF(INTERVAL BETWEEN INPUT HYDROGRAPH ORDINATES) = 1.00 HRS.

TEH(TIME AT WHICH COMPUTATIONS TERMINATE) = 10.0000 HRS.

INFLOW HYDROGRAPH TO MASCOMA LAKE DAM

5800.00	5800.00	5800.00	5800.00	5800.00	5800.00	5800.00	5800.00
5800.00	5800.00	5800.00					

TIME OF INFLOW HYDROGRAPH ORDINATES

.0000	1.0000	2.0000	3.0000	4.0000	5.0000	6.0000	7.0000
8.0000	9.0000	10.0000					

1

CROSS-SECTIONAL PARAMETERS FOR MASCOMA RIVER
BELOW MASCOMA LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF CROSS-SECTIONS	NS	12
MAXIMUM NUMBER OF TOP WIDTHS	NCS	8
NUMBER OF CROSS-SECTIONAL HYDROGRAPHS TO PLOT	NTT	5
TYPE OF OUTPUT OTHER THAN HYDROGRAPH PLOTS	JNK	4
CROSS-SECTIONAL SMOOTHING PARAMETER	KSA	0
DOWNSTREAM SUPERCRITICAL OR NOT	KSUPC	0
NO. OF LATERAL INFLOW HYDROGRAPHS	LQ	0
NO. OF POINTS IN GATE CONTROL CURVE	KCG	0

NUMBER OF CROSS-SECTION WHERE HYDROGRAPH DESIRED
(MAX NUMBER OF HYDROGRAPHS = 6)

1 5 7 9 10

CROSS-SECTIONAL VARIABLES FOR MASCOMA RIVER
BELOW MASCOMA LAKE DAM

PARAMETER	UNITS	VARIABLE
LOCATION OF CROSS-SECTION	MI	XS(I)
ELEVATION (MSL) OF FLOODING AT CROSS-SECTION	FT	FSTG(I)
ELEV CORRESPONDING TO EACH TOP WIDTH	FT	HS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	FT	BS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	FT	BSS(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	ACRES	DSA(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	ACRES	SSA(K,I)
NUMBER OF CROSS-SECTION		I
NUMBER OF ELEVATION LEVEL		K

1

CROSS-SECTION NUMBER 1
****

XS(I) = .005 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	741.0	745.0	749.0	751.0	754.0	756.0	760.0	780.0
BS ...	180.0	180.0	190.0	237.0	263.0	325.0	335.0	1109.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 2
****

XS(I) = .010 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	741.0	745.0	749.0	751.0	754.0	756.0	760.0	780.0
BS ...	.0	180.0	190.0	237.0	263.0	325.0	335.0	1109.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 3
****

XS(I) = .150 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	739.0	743.0	745.0	748.0	750.0	755.0	758.0	770.0
BS ...	.0	165.0	195.0	265.0	280.0	430.0	500.0	1040.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 4
****

XS(I) = .690 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	714.0	717.0	730.0	740.0	750.0	760.0	770.0	780.0
BS ...	.0	24.0	135.0	211.0	341.0	370.0	449.0	528.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

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CROSS-SECTION NUMBER 5
****

XS(I) = 1.280 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	689.0	692.0	700.0	710.0	720.0	730.0	740.0	760.0
BS ...	.0	58.0	211.0	317.0	422.0	502.0	581.0	686.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 6
****

XS(I) = 2.280 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	647.0	650.0	655.0	660.0	663.0	665.0	670.0	680.0
BS ...	.0	32.0	63.0	135.0	220.0	365.0	585.0	1005.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 7
****

XS(I) = 2.930 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	620.0	623.0	640.0	650.0	660.0	670.0	680.0	700.0
BS ...	.0	15.0	100.0	314.0	528.0	660.0	792.0	1109.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 8
****

XS(I) = 3.380 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	602.0	605.0	620.0	630.0	640.0	650.0	660.0	680.0
BS ...	.0	53.0	316.0	449.0	581.0	740.0	898.0	1426.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

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CROSS-SECTION NUMBER 9
****

XS(I) = 4.000 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	575.3	578.0	581.0	584.0	586.0	591.0	596.0	600.0
BS ...	.0	90.0	95.0	290.0	950.0	970.0	1090.0	1530.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 10
****

XS(I) = 4.700 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	566.0	569.0	572.5	574.0	576.0	578.0	580.0	600.0
BS ...	.0	75.0	220.0	400.0	1455.0	1865.0	2534.0	3800.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 11
****

XS(I) = 5.170 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	564.0	566.0	569.0	573.0	575.0	577.0	580.0	600.0
BS ...	.0	64.0	86.0	124.0	180.0	230.0	600.0	2700.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 12
****

XS(I) = 5.330 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	563.5	564.0	569.0	573.0	575.0	577.0	580.0	600.0
BS ...	.0	64.0	86.0	124.0	180.0	230.0	600.0	2700.0
BSS ...	.0	.0	.0	.0	.0	.0	.0	.0

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MANNING N ROUGHNESS COEFFICIENTS FOR THE GIVEN REACHES
(CM(K,I),K=1,NCS) WHERE I = REACH NUMBER
****

REACH 1 ...	.040	.055	.070	.085	.100	.110	.120	.130
REACH 2 ...	.040	.055	.070	.095	.100	.110	.120	.130
REACH 3 ...	.050	.065	.080	.090	.105	.115	.120	.130
REACH 4 ...	.050	.070	.090	.100	.110	.120	.120	.130
REACH 5 ...	.050	.070	.090	.100	.110	.120	.120	.130
REACH 6 ...	.055	.075	.090	.100	.110	.120	.120	.130
REACH 7 ...	.055	.075	.090	.100	.110	.120	.120	.130
REACH 8 ...	.055	.075	.090	.100	.110	.120	.120	.130
REACH 9 ...	.065	.075	.090	.100	.110	.120	.120	.130
REACH 10 ...	.065	.075	.090	.100	.110	.120	.120	.130
REACH 11 ...	.065	.075	.090	.100	.110	.120	.120	.130

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CROSS-SECTIONAL VARIABLES FOR MASCOMA RIVER
BELOW MASCOMA LAKE DAM

PARAMETER	UNITS	VARIABLE
**********	*******	******

MINIMUM COMPUTATIONAL DISTANCE USED BETWEEN CROSS-SECTIONS — MI — DXM(I)

CONTRACTION - EXPANSION COEFFICIENTS BETWEEN CROSS-SECTIONS — FKC(I)

REACH NUMBER	DXM(I)	FKC(I)
1	.200	.000
2	.200	.000
3	.200	.000
4	.200	.000
5	.200	.000
6	.200	.000
7	.200	.000
8	.200	.000
9	.200	.000
10	.200	.000
11	.200	.000

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DOWNSTREAM FLOW PARAMETERS FOR MASCOMA RIVER
BELOW MASCOMA LAKE DAM

PARAMETER	UNITS	VARIABLE	VALUE
MAX DISCHARGE AT DOWNSTREAM EXTREMITY	CFS	QMAXD	.0
MAX LATERAL OUTFLOW PRODUCING LOSSES	CFS/FT	QLL	.000
INITIAL SIZE OF TIME STEP	HR	DTHM	.0000
INITIAL WATER SURFACE ELEVATION DOWNSTREAM	FT	YDN	.25
SLOPE OF CHANNEL DOWNSTREAM OF DAM	FT/MI	SOM	42.00
THETA WEIGHTING FACTOR		THETA	.00
CONVERGENCE CRITERION FOR STAGE	FT	EPSY	.000
TIME AT WHICH DAM STARTS TO FAIL	HR	TFI	10.00

DOWNSTREAM BOUNDARY RATING TABLE

STAGE DISCHARGE

568.00	5.00
572.50	2500.00
575.00	5700.00
575.80	7000.00
577.50	10000.00
.00	.00
.00	.00

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*******************************
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***                         ***
***  SUMMARY OF OUTPUT DATA  ***
***                         ***
*******************************
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CROSS-SECTION NO.	MILE	BOTTOM ELEVATION FEET	REACH NO.	REACH LENGTH MILES	SLOPE FT/MI	MESAGE
1	.00	741.00				
2	.01	741.00	1	.00	.00	
3	.15	739.00	2	.14	14.29	
4	.69	714.00	3	.54	46.30	
5	1.28	689.00	4	.59	42.37	
6	2.28	647.00	5	1.00	42.00	
7	2.93	620.00	6	.65	41.54	
8	3.38	602.00	7	.45	40.00	
9	4.03	575.30	8	.65	41.08	
10	4.70	566.00	9	.67	13.88	
11	5.17	564.00	10	.47	4.26	
12	5.32	563.50	11	.15	3.33	

TOTAL NUMBER OF CROSS SECTIONS (ORIGINAL+INTERPOLATED) (N) = 26 (MAXIMUM ALLOWABLE = 200

RE-NUMBERED VALUES FOR IDAM

IDAM(1) = 1

INITIAL CONDITIONS

L= 26	X(L)=	5.320	YD(L)=	575.07	K= 2	QDI(L)=	5816.0
L= 25	X(L)=	5.170	YD(L)=	580.57	K= 5	QDI(L)=	5816.0

L= 24	X(L)=	4.935	YD(L)=	581.36	K= 4	QDI(L)=	5816.0
L= 23	X(L)=	4.700	YD(L)=	581.56	K= 3	QDI(L)=	5816.0
L= 22	X(L)=	4.477	YD(L)=	581.82	K= 4	QDI(L)=	5816.0
L= 21	X(L)=	4.253	YD(L)=	583.59	K= 4	QDI(L)=	5816.0
L= 20	X(L)=	4.030	YD(L)=	587.36	K= 1	QDI(L)=	5816.0
L= 19	X(L)=	3.813	YD(L)=	592.89	K= 5	QDI(L)=	5816.0
L= 18	X(L)=	3.597	YD(L)=	605.17	K= 4	QDI(L)=	5816.0
L= 17	X(L)=	3.380	YD(L)=	613.02	K= 4	QDI(L)=	5816.0
L= 16	X(L)=	3.155	YD(L)=	624.22	K= 4	QDI(L)=	5816.0
L= 15	X(L)=	2.930	YD(L)=	637.01	K= 4	QDI(L)=	5816.0
L= 14	X(L)=	2.713	YD(L)=	648.30	K= 4	QDI(L)=	5816.0
L= 13	X(L)=	2.497	YD(L)=	656.23	K= 3	QDI(L)=	5816.0
L= 12	X(L)=	2.280	YD(L)=	664.35	K= 5	QDI(L)=	5816.0
L= 11	X(L)=	2.080	YD(L)=	671.25	K= 4	QDI(L)=	5816.0
L= 10	X(L)=	1.880	YD(L)=	677.49	K= 4	QDI(L)=	5816.0
L= 9	X(L)=	1.680	YD(L)=	684.83	K= 4	QDI(L)=	5816.0
L= 8	X(L)=	1.480	YD(L)=	692.51	K= 3	QDI(L)=	5816.0
L= 7	X(L)=	1.280	YD(L)=	700.43	K= 3	QDI(L)=	5816.0
L= 6	X(L)=	.985	YD(L)=	713.88	K= 5	QDI(L)=	5816.0
L= 5	X(L)=	.690	YD(L)=	729.05	K= 5	QDI(L)=	5816.0
L= 4	X(L)=	.420	YD(L)=	737.86	K= 4	QDI(L)=	5816.0
L= 3	X(L)=	.150	YD(L)=	747.51	K= 5	QDI(L)=	5816.0
L= 2	X(L)=	.010	YD(L)=	751.40	K= 6	QDI(L)=	5816.0
L= 1	X(L)=	.005	YD(L)=	753.60	K= 0	QDI(L)=	5816.0

LS= ITERATION COUNTER FOR SUBMERGENCE EFFECT AT TIME=0. IM= THE LOCATION OF THE DOWNSTREAM FACE OF THE DAM.

LS= 0 IM= 2 YD(IM)= 751.40 QDI(IM)= 5815.98

INITIAL CONDITIONS

I	X(I)	YD(I)	YNORM(I)
1	.00	753.60	751.40
2	.01	751.40	751.40
3	.15	747.51	747.51
4	.42	737.86	737.86
5	.69	729.05	729.05
6	.98	713.88	713.88
7	1.28	700.43	700.43
8	1.48	692.51	692.51
9	1.68	684.83	684.83
10	1.88	677.49	677.49
11	2.08	671.25	671.25
12	2.28	664.35	664.35
13	2.50	656.23	656.23
14	2.71	648.30	648.30
15	2.93	637.01	637.01
16	3.16	624.22	624.22
17	3.38	613.02	613.02
18	3.60	605.17	605.17
19	3.81	592.89	592.89
20	4.03	587.36	587.36
21	4.25	583.59	583.59
22	4.48	581.82	581.82
23	4.70	581.56	581.56
24	4.94	581.36	581.36
25	5.17	580.57	580.57
26	5.32	575.07	575.07

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TIME PARAMETERS OF OUTFLOW HYDROGRAPH IMMEDIATELY DOWNSTREAM OF DAM

PARAMETER	UNITS	VARIABLE	VALUE
TIME TO FAILURE	HR	TFH	.500
TIME TO START OF RISING LIMB OF HYDROGRAPH	HR	TFO	10.000
TIME TO PEAK	HR	TP	.000
TIME STEP SIZE	HR	DTHI	.025

PROFILE OF CRESTS AND TIMES FOR MASCOMA RIVER
BELOW MASCOMA LAKE DAM

RVR MILE FROM DAM	MAX ELEV (FT)	MAX FLOW (CFS)	TIME MAX ELEV(HR)	MAX VEL (FT/SEC)	FLOOD ELEV (FT)	TIME FLOOD ELEV(HR)
.005	753.60	7922	.000	3.14	.00	.00
.010	753.14	7922	.500	3.89	.00	.00
.150	748.93	7887	.600	4.89	.00	.00
.420	739.75	7852	.725	5.15	.00	.00
.690	730.95	7846	.800	6.54	.00	.00
.985	715.38	7845	.800	6.27	.00	.00
1.280	701.82	7842	.925	5.01	.00	.00
1.480	694.05	7838	.975	5.06	.00	.00
1.680	686.52	7834	1.075	5.05	.00	.00
1.880	679.49	7828	1.150	4.87	.00	.00
2.080	673.15	7824	1.200	4.23	.00	.00
2.280	666.16	7812	1.375	3.47	.00	.00
2.497	658.36	7803	1.475	4.53	.00	.00
2.713	650.56	7799	1.550	5.18	.00	.00
2.930	639.03	7799	1.575	8.61	.00	.00
3.155	625.71	7798	1.600	6.53	.00	.00
3.380	614.47	7797	1.650	5.70	.00	.00
3.597	606.77	7795	1.750	4.57	.00	.00
3.813	593.88	7795	1.600	8.50	.00	.00
4.030	588.03	7792	1.850	1.89	.00	.00
4.253	584.37	7768	3.425	1.79	.00	.00
4.477	582.32	7621	4.575	1.10	.00	.00
4.700	582.57	7453	4.675	.45	.00	.00
4.935	582.38	7414	4.700	.66	.00	.00
5.170	581.59	7410	4.750	1.97	.00	.00
5.320	576.03	7410	4.825	6.03	.00	.00

DISCHARGE HYDROGRAPH FOR MASCOMA RIVER ... STATION NUMBER 1
BELOW MASCOMA LAKE DAM AT MILE .00

GAGE ZERO = 741.00 MAX ELEVATION REACHED BY FLOOD WAVE = 753.60
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 12.60 AT TIME = .000 HOURS
MAX FLOW = 7923 AT TIME = .500 HOURS

HR STAGE FLOW 0 2000 4000 6000 8000 10000

.0	12.6	5816	I	I	I	*I		I	I
.2	12.6	6442	I	I	I	I *		I	I
.4	12.6	7791	I	I	I	I		*I	I
.6	12.5	7866	I	I	I	I		*I	I
.8	12.5	7828	I	I	I	I		*I	I
1.0	12.5	7794	I	I	I	I		*I	I
1.2	12.5	7760	I	I	I	I		*I	I
1.4	12.4	7727	I	I	I	I		*I	I
1.6	12.4	7695	I	I	I	I		* I	I
1.8	12.4	7664	I	I	I	I		* I	I
2.0	12.4	7633	I	I	I	I		* I	I
2.2	12.3	7602	I	I	I	I		* I	I
2.4	12.3	7572	I	I	I	I		* I	I
2.6	12.3	7543	I	I	I	I		* I	I
2.8	12.3	7514	I	I	I	I		* I	I
3.0	12.2	7486	I	I	I	I		* I	I
3.2	12.2	7458	I	I	I	I		* I	I
3.4	12.2	7430	I	I	I	I		* I	I
3.6	12.2	7403	I	I	I	I		* I	I
3.8	12.1	7377	I	I	I	I		* I	I
4.0	12.1	7351	I	I	I	I		* I	I
4.2	12.1	7325	I	I	I	I		* I	I
4.4	12.1	7301	I	I	I	I		* I	I
4.6	12.1	7276	I	I	I	I		* I	I
4.8	12.0	7252	I	I	I	I		* I	I
5.0	12.0	7228	I	I	I	I		* I	I
5.2	12.0	7205	I	I	I	I		* I	I
5.4	12.0	7182	I	I	I	I		* I	I
5.6	12.0	7159	I	I	I	I		* I	I
5.8	11.9	7137	I	I	I	I		* I	I
6.0	11.9	7115	I	I	I	I		* I	I
6.2	11.9	7094	I	I	I	I		* I	I
6.4	11.9	7073	I	I	I	I		* I	I
6.6	11.9	7052	I	I	I	I		* I	I
6.8	11.9	7032	I	I	I	I		* I	I
7.0	11.8	7012	I	I	I	I		* I	I
7.2	11.8	6992	I	I	I	I		* I	I
7.4	11.8	6973	I	I	I	I		* I	I
7.6	11.8	6954	I	I	I	I		* I	I
7.8	11.8	6935	I	I	I	I		* I	I
8.0	11.8	6917	I	I	I	I		* I	I
8.2	11.7	6899	I	I	I	I		* I	I
8.4	11.7	6881	I	I	I	I		* I	I
8.6	11.7	6864	I	I	I	I		* I	I
8.8	11.7	6847	I	I	I	I		* I	I
9.0	11.7	6830	I	I	I	I		* I	I
9.2	11.7	6813	I	I	I	I		* I	I
9.4	11.7	6797	I	I	I	I		* I	I
9.6	11.6	6781	I	I	I	I		* I	I
9.8	11.6	6765	I	I	I	I		* I	I

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DISCHARGE HYDROGRAPH FOR MASCOMA RIVER ... STATION NUMBER 7
BELOW MASCOMA LAKE DAM AT MILE 1.28

GAGE ZERO = 689.00 MAX ELEVATION REACHED BY FLOOD WAVE = 701.82
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 12.82 AT TIME = .925 HOURS
MAX FLOW = 7842 AT TIME = .900 HOURS

HR	STAGE	FLOW	0	2000	4000	6000	8000	10000
.0	11.4	5816	I	I	I	*I	I	I
.2	11.4	5816	I	I	I	*I	I	I
.4	11.7	6249	I	I	I	I*	I	I

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 .8   12.8    7825  I         I         I         I        *I         I
1.0   12.8    7835  I         I         I         I        *I         I
1.2   12.8    7805  I         I         I         I        *I         I
1.4   12.8    7771  I         I         I         I        *I         I
1.6   12.8    7738  I         I         I         I        *I         I
1.8   12.7    7706  I         I         I         I        *I         I
2.0   12.7    7674  I         I         I         I       * I         I
2.2   12.7    7643  I         I         I         I       * I         I
2.4   12.7    7612  I         I         I         I       * I         I
2.6   12.7    7582  I         I         I         I       * I         I
2.8   12.6    7553  I         I         I         I       * I         I
3.0   12.6    7524  I         I         I         I       * I         I
3.2   12.6    7495  I         I         I         I      *  I         I
3.4   12.6    7467  I         I         I         I      *  I         I
3.6   12.6    7440  I         I         I         I      *  I         I
3.8   12.5    7413  I         I         I         I      *  I         I
4.0   12.5    7386  I         I         I         I      *  I         I
4.2   12.5    7360  I         I         I         I      *  I         I
4.4   12.5    7334  I         I         I         I      *  I         I
4.6   12.5    7309  I         I         I         I      *  I         I
4.8   12.5    7285  I         I         I         I     *   I         I
5.0   12.4    7261  I         I         I         I     *   I         I
5.2   12.4    7237  I         I         I         I     *   I         I
5.4   12.4    7213  I         I         I         I     *   I         I
5.6   12.4    7190  I         I         I         I     *   I         I
5.8   12.4    7167  I         I         I         I     *   I         I
6.0   12.4    7145  I         I         I         I     *   I         I
6.2   12.3    7123  I         I         I         I     *   I         I
6.4   12.3    7102  I         I         I         I     *   I         I
6.6   12.3    7081  I         I         I         I    *    I         I
6.8   12.3    7060  I         I         I         I    *    I         I
7.0   12.3    7039  I         I         I         I    *    I         I
7.2   12.3    7019  I         I         I         I    *    I         I
7.4   12.3    7000  I         I         I         I    *    I         I
7.6   12.3    6980  I         I         I         I    *    I         I
7.8   12.2    6961  I         I         I         I    *    I         I
8.0   12.2    6943  I         I         I         I    *    I         I
8.2   12.2    6924  I         I         I         I    *    I         I
8.4   12.2    6906  I         I         I         I    *    I         I
8.6   12.2    6888  I         I         I         I   *     I         I
8.8   12.2    6871  I         I         I         I   *     I         I
9.0   12.2    6854  I         I         I         I   *     I         I
9.2   12.2    6837  I         I         I         I   *     I         I
9.4   12.1    6820  I         I         I         I   *     I         I
9.6   12.1    6804  I         I         I         I   *     I         I
9.8   12.1    6788  I         I         I         I   *     I         I
1
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DISCHARGE HYDROGRAPH FOR MASCOMA RIVER        ... STATION NUMBER  15
            BELOW MASCOMA LAKE DAM     AT MILE     2.93

GAGE ZERO =  620.00     MAX ELEVATION REACHED BY FLOOD WAVE =  639.03
                     FLOOD STAGE NOT AVAILABLE
            MAX STAGE =   19.03     AT TIME =    1.575 HOURS
            MAX FLOW =     7799    AT TIME =    1.575 HOURS

HR   STAGE     FLOW  0      2000      4000      6000      8000     10000
 .0   17.0     5816  I         I         I        *I         I         I
 .2   17.0     5816  I         I         I        *I         I         I
 .4   17.0     5816  I         I         I        *I         I         I
 .6   17.0     5837  I         I         I        *I         I         I
 .8   17.4     6163  I         I         I         I*        I         I
1.0   18.2     7007  I         I         I         I    *    I         I
```

1.2	18.8	7584	I	I	I	I	* I	I
1.4	19.0	7773	I	I	I	I	*I	I
1.6	19.0	7799	I	I	I	I	*I	I
1.8	19.0	7779	I	I	I	I	*I	I
2.0	19.0	7748	I	I	I	I	*I	I
2.2	19.0	7717	I	I	I	I	*I	I
2.4	18.9	7685	I	I	I	I	* I	I
2.6	18.9	7653	I	I	I	I	* I	I
2.8	18.9	7623	I	I	I	I	* I	I
3.0	18.8	7592	I	I	I	I	* I	I
3.2	18.8	7563	I	I	I	I	* I	I
3.4	18.8	7534	I	I	I	I	* I	I
3.6	18.8	7505	I	I	I	I	* I	I
3.8	18.7	7477	I	I	I	I	* I	I
4.0	18.7	7449	I	I	I	I	* I	I
4.2	18.7	7422	I	I	I	I	* I	I
4.4	18.7	7395	I	I	I	I	* I	I
4.6	18.6	7369	I	I	I	I	* I	I
4.8	18.6	7343	I	I	I	I	* I	I
5.0	18.6	7318	I	I	I	I	* I	I
5.2	18.6	7293	I	I	I	I	* I	I
5.4	18.5	7269	I	I	I	I	* I	I
5.6	18.5	7245	I	I	I	I	* I	I
5.8	18.5	7222	I	I	I	I	* I	I
6.0	18.5	7198	I	I	I	I	* I	I
6.2	18.4	7176	I	I	I	I	* I	I
6.4	18.4	7153	I	I	I	I	* I	I
6.6	18.4	7131	I	I	I	I	* I	I
6.8	18.4	7110	I	I	I	I	* I	I
7.0	18.4	7088	I	I	I	I	* I	I
7.2	18.3	7067	I	I	I	I	* I	I
7.4	18.3	7047	I	I	I	I	* I	I
7.6	18.3	7027	I	I	I	I	* I	I
7.8	18.3	7007	I	I	I	I	* I	I
8.0	18.3	6987	I	I	I	I	* I	I
8.2	18.2	6968	I	I	I	I	* I	I
8.4	18.2	6950	I	I	I	I	* I	I
8.6	18.2	6931	I	I	I	I	* I	I
8.8	18.2	6913	I	I	I	I	* I	I
9.0	18.2	6895	I	I	I	I	* I	I
9.2	18.1	6877	I	I	I	I	* I	I
9.4	18.1	6860	I	I	I	I	* I	I
9.6	18.1	6843	I	I	I	I	* I	I
9.8	18.1	6826	I	I	I	I	* I	I

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DISCHARGE HYDROGRAPH FOR MASCOMA RIVER ... STATION NUMBER 20
BELOW MASCOMA LAKE DAM AT MILE 4.03

GAGE ZERO = 575.30 MAX ELEVATION REACHED BY FLOOD WAVE = 588.03
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 12.73 AT TIME = 1.850 HOURS
MAX FLOW = 7793 AT TIME = 1.850 HOURS

HR	STAGE	FLOW	0	2000	4000	6000	8000	10000
.0	12.1	5816	I	I	I	*I	I	I
.2	12.1	5816	I	I	I	*I	I	I
.4	12.1	5816	I	I	I	*I	I	I
.6	12.1	5816	I	I	I	*I	I	I
.8	12.1	5835	I	I	I	*I	I	I
1.0	12.1	6104	I	I	I	I*	I	I
1.2	12.4	6851	I	I	I	I *	I	I
1.4	12.6	7481	I	I	I	I *	I	I
1.6	12.7	7736	I	I	I	I	*I	I

```
1.8   12.7    7792  I         I         I         I        *I         I
2.0   12.7    7782  I         I         I         I        *I         I
2.2   12.7    7755  I         I         I         I        *I         I
2.4   12.7    7723  I         I         I         I        *I         I
2.6   12.7    7691  I         I         I         I       * I         I
2.8   12.7    7660  I         I         I         I       * I         I
3.0   12.7    7629  I         I         I         I       * I         I
3.2   12.6    7599  I         I         I         I       * I         I
3.4   12.6    7568  I         I         I         I       * I         I
3.6   12.6    7539  I         I         I         I       * I         I
3.8   12.6    7510  I         I         I         I       * I         I
4.0   12.6    7482  I         I         I         I      *  I         I
4.2   12.6    7454  I         I         I         I      *  I         I
4.4   12.6    7427  I         I         I         I      *  I         I
4.6   12.6    7400  I         I         I         I      *  I         I
4.8   12.6    7374  I         I         I         I      *  I         I
5.0   12.5    7348  I         I         I         I      *  I         I
5.2   12.5    7322  I         I         I         I      *  I         I
5.4   12.5    7297  I         I         I         I     *   I         I
5.6   12.5    7273  I         I         I         I     *   I         I
5.8   12.5    7249  I         I         I         I     *   I         I
6.0   12.5    7226  I         I         I         I     *   I         I
6.2   12.5    7202  I         I         I         I     *   I         I
6.4   12.5    7179  I         I         I         I     *   I         I
6.6   12.5    7157  I         I         I         I     *   I         I
6.8   12.5    7135  I         I         I         I     *   I         I
7.0   12.5    7113  I         I         I         I     *   I         I
7.2   12.5    7092  I         I         I         I    *    I         I
7.4   12.5    7071  I         I         I         I    *    I         I
7.6   12.4    7050  I         I         I         I    *    I         I
7.8   12.4    7030  I         I         I         I    *    I         I
8.0   12.4    7010  I         I         I         I    *    I         I
8.2   12.4    6991  I         I         I         I    *    I         I
8.4   12.4    6972  I         I         I         I    *    I         I
8.6   12.4    6953  I         I         I         I    *    I         I
8.8   12.4    6934  I         I         I         I    *    I         I
9.0   12.4    6916  I         I         I         I    *    I         I
9.2   12.4    6898  I         I         I         I   *     I         I
9.4   12.4    6880  I         I         I         I   *     I         I
9.6   12.4    6863  I         I         I         I   *     I         I
9.8   12.4    6846  I         I         I         I   *     I         I
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DISCHARGE HYDROGRAPH FOR MASCOMA RIVER        ... STATION NUMBER  23
            BELOW MASCOMA LAKE DAM     AT MILE     4.70

GAGE ZERO =  566.00     MAX ELEVATION REACHED BY FLOOD WAVE =  582.57
                     FLOOD STAGE NOT AVAILABLE
            MAX STAGE =   16.57     AT TIME =    4.675 HOURS
            MAX FLOW =     7453    AT TIME =    3.700 HOURS

HR   STAGE     FLOW  0      2000      4000      6000      8000     10000
 .0   15.6     5816  I         I         I        *I         I         I
 .2   15.6     5816  I         I         I        *I         I         I
 .4   15.6     5816  I         I         I        *I         I         I
 .6   15.6     5816  I         I         I        *I         I         I
 .8   15.6     5816  I         I         I        *I         I         I
1.0   15.6     5824  I         I         I        *I         I         I
1.2   15.6     5970  I         I         I         *         I         I
1.4   15.6     6380  I         I         I         I *       I         I
1.6   15.8     6804  I         I         I         I   *     I         I
1.8   15.9     7067  I         I         I         I    *    I         I
2.0   16.0     7204  I         I         I         I     *   I         I
2.2   16.1     7279  I         I         I         I     *   I         I
```

2.4	16.2	7332	I	I	I	I	*	I	I
2.6	16.3	7372	I	I	I	I	*	I	I
2.8	16.4	7402	I	I	I	I	*	I	I
3.0	16.4	7424	I	I	I	I	*	I	I
3.2	16.5	7439	I	I	I	I	*	I	I
3.4	16.5	7449	I	I	I	I	*	I	I
3.6	16.5	7453	I	I	I	I	*	I	I
3.8	16.5	7452	I	I	I	I	*	I	I
4.0	16.6	7448	I	I	I	I	*	I	I
4.2	16.6	7441	I	I	I	I	*	I	I
4.4	16.6	7431	I	I	I	I	*	I	I
4.6	16.6	7419	I	I	I	I	*	I	I
4.8	16.6	7404	I	I	I	I	*	I	I
5.0	16.6	7389	I	I	I	I	*	I	I
5.2	16.6	7372	I	I	I	I	*	I	I
5.4	16.6	7354	I	I	I	I	*	I	I
5.6	16.6	7336	I	I	I	I	*	I	I
5.8	16.5	7316	I	I	I	I	*	I	I
6.0	16.5	7297	I	I	I	I	*	I	I
6.2	16.5	7276	I	I	I	I	*	I	I
6.4	16.5	7256	I	I	I	I	*	I	I
6.6	16.5	7235	I	I	I	I	*	I	I
6.8	16.5	7215	I	I	I	I	*	I	I
7.0	16.5	7194	I	I	I	I	*	I	I
7.2	16.5	7173	I	I	I	I	*	I	I
7.4	16.5	7152	I	I	I	I	*	I	I
7.6	16.4	7132	I	I	I	I	*	I	I
7.8	16.4	7112	I	I	I	I	*	I	I
8.0	16.4	7091	I	I	I	I	*	I	I
8.2	16.4	7072	I	I	I	I	*	I	I
8.4	16.4	7052	I	I	I	I	*	I	I
8.6	16.4	7032	I	I	I	I	*	I	I
8.8	16.4	7013	I	I	I	I	*	I	I
9.0	16.4	6994	I	I	I	I	*	I	I
9.2	16.4	6975	I	I	I	I	*	I	I
9.4	16.3	6957	I	I	I	I	*	I	I
9.6	16.3	6938	I	I	I	I	*	I	I
9.8	16.3	6921	I	I	I	I	*	I	I

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DATE: 09/24/85
FILE: MLDDB1.DAT

DAMBRK - Version..10/25/84

CPU Time (HH:MM:SS)....00:21:18

1

PROGRAM DAMBRK---VERSION-07/18/84

ANALYSIS OF THE DOWNSTREAM FLOOD HYDROGRAPH

PRODUCED BY THE DAM BREAK OF

REACH TWO

ON

MASCOMA RIVER

ANALYSIS BY

VOLLMER ASSOCIATES
BOSTON, MA 02116
SEPTEMBER 24,1985 #D91

BASED ON PROCEDURE DEVELOPED BY

DANNY L. FREAD, PH.D., RESEARCH HYDROLOGIST
HYDROLOGIC RESEARCH LABORATORY
W23, OFFICE OF HYDROLOGY
NOAA, NATIONAL WEATHER SERVICE
SILVER SPRING, MARYLAND 20910

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***                       ***
***  SUMMARY OF INPUT DATA  ***
***                       ***
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INPUT CONTROL PARAMETERS FOR REACH TWO

PARAMETER	VARIABLE	VALUE
NUMBER OF DYNAMIC ROUTING REACHES	KKN	9
TYPE OF RESERVOIR ROUTING	KUI	0
MULTIPLE DAM INDICATOR	MULDAM	0
PRINTING INSTRUCTIONS FOR INPUT SUMMARY	KDMP	0
NO. OF RESERVOIR INFLOW HYDROGRAPH POINTS	ITEH	22
INTERVAL OF CROSS-SECTION INFO PRINTED OUT WHEN JNK=9	NPRT	0
FLOOD-PLAIN MODEL PARAMETER	KFLP	0
LANDSLIDE PARAMETER	KSL	0

DHF(INTERVAL BETWEEN INPUT HYDROGRAPH ORDINATES) = .00 HRS.

TEH(TIME AT WHICH COMPUTATIONS TERMINATE) = 10.0000 HRS.

INFLOW HYDROGRAPH TO REACH TWO

5816.00	5818.00	5860.00	5988.00	6759.00	7017.00	7191.00	7253.00
7302.00	7388.00	7408.00	7410.00	7408.00	7403.00	7371.00	7357.00
7249.00	7229.00	7130.00	7110.00	6994.00	6970.00		

TIME OF INFLOW HYDROGRAPH ORDINATES

.0000	1.2000	1.4000	1.6000	2.4000	2.8000	3.2000	3.4000
3.6000	4.2000	4.6000	4.8250	5.0000	5.2000	5.8000	6.0000
7.2000	7.4000	8.4000	8.6000	9.8000	10.0000		

CROSS-SECTIONAL PARAMETERS FOR MASCOMA RIVER
BELOW REACH TWO

PARAMETER	VARIABLE	VALUE
NUMBER OF CROSS-SECTIONS	NS	8
MAXIMUM NUMBER OF TOP WIDTHS	NCS	7
NUMBER OF CROSS-SECTIONAL HYDROGRAPHS TO PLOT	NTT	4
TYPE OF OUTPUT OTHER THAN HYDROGRAPH PLOTS	JNK	4
CROSS-SECTIONAL SMOOTHING PARAMETER	KSA	0
DOWNSTREAM SUPERCRITICAL OR NOT	KSUPC	0
NO. OF LATERAL INFLOW HYDROGRAPHS	LQ	1
NO. OF POINTS IN GATE CONTROL CURVE	KCG	0

NUMBER OF CROSS-SECTION WHERE HYDROGRAPH DESIRED
(MAX NUMBER OF HYDROGRAPHS = 6)

1 3 5 8

CROSS-SECTIONAL VARIABLES FOR MASCOMA RIVER
BELOW REACH TWO

PARAMETER	UNITS	VARIABLE
LOCATION OF CROSS-SECTION	MI	XS(I)
ELEVATION (MSL) OF FLOODING AT CROSS-SECTION	FT	FSTG(I)
ELEV CORRESPONDING TO EACH TOP WIDTH	FT	HS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	FT	BS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	FT	BSS(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	ACRES	DSA(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	ACRES	SSA(K,I)
NUMBER OF CROSS-SECTION		I
NUMBER OF ELEVATION LEVEL		K

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CROSS-SECTION NUMBER 1

XS(I) = 5.740 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	500.0	503.0	508.0	513.0	518.0	523.0	528.0
BS ...	.0	170.0	315.0	510.0	730.0	905.0	975.0
BSS ...	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 2
****

XS(I) = 6.090 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	486.0	489.0	500.0	510.0	520.0	530.0	540.0
BS ...	.0	71.0	330.0	435.0	540.0	695.0	850.0
BSS ...	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 3
****

XS(I) = 6.760 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	460.0	463.0	465.0	470.0	472.0	480.0	500.0
BS ...	.0	80.0	98.0	132.0	142.0	900.0	1250.0
BSS ...	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 4
****

XS(I) = 7.870 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	459.0	462.0	470.0	480.0	490.0	500.0	520.0
BS ...	.0	90.0	450.0	900.0	1040.0	1180.0	1600.0
BSS ...	.0	.0	.0	.0	.0	.0	.0

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CROSS-SECTION NUMBER 5
****

XS(I) = 8.550 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	444.0	447.0	450.0	460.0	470.0	480.0	500.0
BS ...	.0	95.0	115.0	180.0	315.0	450.0	1250.0
BSS ...	.0	.0	.0	.0	.0	.0	.0

XS(I) = 9.200 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	395.0	398.0	400.0	410.0	420.0	430.0	440.0
BS ...	.0	50.0	120.0	360.0	600.0	625.0	650.0
BSS ...	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 7
****

XS(I) = 9.760 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	357.0	360.0	370.0	380.0	390.0	400.0	420.0
BS ...	.0	75.0	338.0	600.0	800.0	1000.0	1450.0
BSS ...	.0	.0	.0	.0	.0	.0	.0

CROSS-SECTION NUMBER 8
****

XS(I) = 10.580 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	304.0	324.0	340.0	350.0	360.0	370.0	380.0
BS ...	.0	650.0	850.0	2250.0	3650.0	3935.0	4220.0
BSS ...	.0	.0	.0	.0	.0	.0	.0

MANNING N ROUGHNESS COEFFICIENTS FOR THE GIVEN REACHES
(CM(K,I),K=1,NCS) WHERE I = REACH NUMBER
****

REACH 1 ...	.065	.075	.090	.100	.110	.120	.120
REACH 2 ...	.055	.075	.090	.100	.110	.120	.120
REACH 3 ...	.055	.075	.090	.100	.110	.120	.120
REACH 4 ...	.055	.075	.090	.100	.110	.120	.120
REACH 5 ...	.055	.075	.090	.100	.110	.120	.120
REACH 6 ...	.075	.085	.090	.100	.110	.120	.120
REACH 7 ...	.075	.085	.090	.100	.110	.120	.120

CROSS-SECTIONAL VARIABLES FOR MASCOMA RIVER
BELOW REACH TWO

PARAMETER	UNITS	VARIABLE
MINIMUM COMPUTATIONAL DISTANCE USED BETWEEN CROSS-SECTIONS	MI	DXM(I)
CONTRACTION - EXPANSION COEFFICIENTS BETWEEN CROSS-SECTIONS		FKC(I)

REACH NUMBER	DXM(I)	FKC(I)
1	.200	.000
2	.200	.000
3	.200	.000
4	.200	.000
5	.200	.000
6	.200	.000
7	.200	.000

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DOWNSTREAM FLOW PARAMETERS FOR MASCOMA RIVER
BELOW REACH TWO

PARAMETER	UNITS	VARIABLE	VALUE
MAX DISCHARGE AT DOWNSTREAM EXTREMITY	CFS	QMAXD	.0
MAX LATERAL OUTFLOW PRODUCING LOSSES	CFS/FT	QLL	.000
INITIAL SIZE OF TIME STEP	HR	DTHM	.0000
INITIAL WATER SURFACE ELEVATION DOWNSTREAM	FT	YDN	.25
SLOPE OF CHANNEL DOWNSTREAM OF DAM	FT/MI	SOM	42.00
THETA WEIGHTING FACTOR		THETA	.00
CONVERGENCE CRITERION FOR STAGE	FT	EPSY	.000
TIME AT WHICH DAM STARTS TO FAIL	HR	TFI	10.00

LATERAL INFLOW REACH NUMBER

LQX(I)

7

(QL(L, 1),L=1,ITEH)

120000.	120000.	120000.	120000.	120000.	120000.	120000.	120000.
120000.	120000.	120000.	120000.	120000.	120000.	120000.	120000.
120000.	120000.	120000.	120000.	120000.	120000.		

DOWNSTREAM BOUNDARY RATING TABLE

STAGE	DISCHARGE
304.00	.00
344.00	70500.00
349.00	109000.00
351.00	124000.00
352.70	125800.00
358.50	150000.00
.00	.00
.00	.00

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***                         ***
***  SUMMARY OF OUTPUT DATA ***
***                         ***
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CROSS-SECTION NO.	MILE	BOTTOM ELEVATION FEET	REACH NO.	REACH LENGTH MILES	SLOPE FT/MI	MESAGE
1	5.74	500.00				
2	6.09	486.00	1	.35	40.00	
3	6.76	460.00	2	.67	38.81	
4	7.87	459.00	3	1.11	.90	
5	8.55	444.00	4	.68	22.06	
6	9.20	395.00	5	.65	75.38	
7	9.76	357.00	6	.56	67.86	
8	10.58	304.00	7	.82	64.63	

TOTAL NUMBER OF CROSS SECTIONS (ORIGINAL+INTERPOLATED) (N) = 22 (MAXIMUM ALLOWABLE = 200

SLOPE INFORMATION FOR INPUT REACHES

REACH NO.	WATER ELEVATION FEET	HYDRAULIC DEPTH FEET	BOTTOM SLOPE FT/MI	DYNAMIC SLOPE FT/MI	TOTAL SLOPE FT/MI	CRITICAL SLOPE FT/MI	MANNING'S N
1	493.00	.75	40.00	.15	40.15	725.14	.093
1	496.00	1.50	40.00	.21	40.21	639.44	.097
1	504.00	5.86	40.00	.35	40.35	470.88	.105
1	511.50	10.23	40.00	.44	40.44	429.20	.110
1	519.00	13.89	40.00	.52	40.52	423.62	.115
1	526.50	17.44	40.00	.58	40.58	427.56	.120
1	534.00	22.10	40.00	.63	40.63	395.12	.120
2	473.00	.75	38.81	.15	38.95	648.86	.097
2	476.00	1.50	38.81	.21	39.01	639.44	.097
2	482.50	6.10	38.81	.36	39.17	464.66	.105
2	490.00	12.36	38.81	.48	39.29	402.93	.110
2	496.00	17.83	38.81	.57	39.38	389.81	.115
2	505.00	14.11	38.81	.55	39.35	458.88	.120
2	520.00	24.63	38.81	.66	39.47	381.08	.120
3	459.50	.75	.90	1.13	2.03	648.86	.087
3	462.50	1.50	.90	1.68	2.59	639.44	.097
3	467.50	4.73	.90	2.97	3.87	505.66	.105
3	475.00	9.61	.90	4.31	5.21	438.22	.110
3	481.00	16.83	.90	5.91	6.82	397.37	.115
3	490.00	16.90	.90	6.29	7.19	432.04	.120
3	510.00	29.64	.90	8.23	9.13	358.30	.120
4	451.50	.75	22.06	.20	22.25	648.86	.087
4	454.50	1.50	22.06	.28	22.33	639.44	.097
4	460.00	4.97	22.06	.44	22.50	500.78	.105
4	470.00	10.16	22.06	.59	22.65	430.11	.110
4	480.00	17.09	22.06	.74	22.80	395.37	.115
4	490.00	23.36	22.06	.86	22.91	387.88	.120
4	510.00	29.08	22.06	.92	22.98	360.57	.120
5	419.50	.75	75.38	.11	75.49	648.86	.087
5	422.50	1.50	75.38	.15	75.54	639.44	.097
5	425.00	2.99	75.38	.21	75.59	589.31	.105
5	435.00	8.48	75.38	.31	75.69	456.95	.110
5	445.00	12.95	75.38	.37	75.76	438.60	.115
5	455.00	20.29	75.38	.46	75.84	406.59	.120
5	470.00	23.78	75.38	.48	75.87	385.59	.120
6	374.00	.75	67.86	.13	67.98	805.65	.097
6	379.00	1.50	67.86	.17	68.03	706.71	.102
6	385.00	5.29	67.86	.26	68.12	487.23	.105
6	395.00	9.91	67.86	.34	68.20	438.73	.110
6	405.00	15.22	67.86	.42	68.27	410.88	.115
6	415.00	22.42	67.86	.49	68.35	393.21	.120
6	430.00	32.05	67.86	.56	68.42	349.06	.120

7	330.50	4.56	64.63	.24	64.87	441.40	.097
7	342.00	9.12	64.63	.32	64.95	387.19	.102
7	355.00	17.41	64.63	.41	65.04	327.57	.105
7	365.00	14.34	64.63	.40	65.03	383.50	.110
7	375.00	17.39	64.63	.45	65.08	393.09	.115
7	385.00	25.19	64.63	.53	65.16	378.27	.120
7	400.00	33.43	64.63	.58	65.22	344.19	.120

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INITIAL CONDITIONS

I	K	X(I)	YD(I)	QDI(I)	FRD	SOM
22	2	10.580	352.70	125816.00	.14	64.634
22	0	10.580	352.70	125816.00		
21	5	10.375	354.58	125816.00	.29	
20	6	10.170	361.66	125816.00	.45	
19	4	9.965	374.62	125816.00	.43	
18	4	9.760	383.01	5816.00	.03	
17	6	9.480	383.02	5816.00	1.00	
16	4	9.200	406.50	5816.00	.28	
15	3	8.983	419.66	5816.00	.66	
14	3	8.767	438.49	5816.00	.35	
13	4	8.550	452.64	5816.00	.54	
12	4	8.323	460.66	5816.00	.21	
11	3	8.097	464.66	5816.00	.23	
10	3	7.870	469.23	5816.00	.24	
9	4	7.648	471.87	5816.00	.14	
8	3	7.426	473.24	5816.00	.12	
7	3	7.204	474.36	5816.00	.11	
6	4	6.982	475.52	5816.00	.11	
5	4	6.760	477.48	5816.00	.14	
4	5	6.537	480.82	5816.00	.24	
3	4	6.313	487.60	5816.00	.36	
2	4	6.090	496.61	5816.00	.33	
1	4	5.740	508.39	5816.00	.29	

I	X(I)	YD(I)	YNORM(I)
1	5.74	508.39	508.39
2	6.09	496.61	496.61
3	6.31	487.60	487.60
4	6.54	480.82	480.82
5	6.76	477.48	477.48
6	6.98	475.52	475.52
7	7.20	474.36	474.36
8	7.43	473.24	473.24
9	7.65	471.87	471.87
10	7.87	469.23	469.23
11	8.10	464.66	464.66
12	8.32	460.66	460.66
13	8.55	452.64	452.64
14	8.77	438.49	438.49

15	8.98	419.68	419.68
16	9.20	406.50	406.50
17	9.48	393.02	393.02
18	9.76	383.01	383.01
19	9.97	374.62	374.62
20	10.17	361.66	361.66
21	10.38	354.58	354.58
22	10.58	352.70	352.70

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TIME PARAMETERS OF OUTFLOW HYDROGRAPH IMMEDIATELY DOWNSTREAM OF DAM

PARAMETER	UNITS	VARIABLE	VALUE
TIME TO FAILURE	HR	TFH	4.825
TIME TO START OF RISING LIMB OF HYDROGRAPH	HR	TFO	.000
TIME TO PEAK	HR	TP	4.825
TIME STEP SIZE	HR	DTHI	.241

PROFILE OF CRESTS AND TIMES FOR MASCOMA RIVER
BELOW REACH TWO

RVR MILE FROM DAM	MAX ELEV (FT)	MAX FLOW (CFS)	TIME MAX ELEV(HR)	MAX VEL (FT/SEC)	FLOOD ELEV (FT)	TIME FLOOD ELEV(HR)
5.740	509.48	7410	4.825	3.75	.00	.00
6.090	497.62	7409	4.825	4.65	.00	.00
6.313	488.81	7408	5.066	4.82	.00	.00
6.537	482.07	7403	5.066	4.07	.00	.00
6.760	479.03	7401	5.549	1.76	.00	.00
6.982	476.99	7395	5.549	2.12	.00	.00
7.204	475.58	7393	5.790	1.69	.00	.00
7.426	474.38	7390	5.790	1.88	.00	.00
7.648	472.91	7388	5.790	2.10	.00	.00
7.870	470.19	7387	6.031	3.10	.00	.00
8.097	465.78	7387	6.031	3.05	.00	.00
8.323	461.86	7386	6.031	3.18	.00	.00
8.550	458.77	7386	6.273	7.88	.00	.00
8.767	439.68	7386	6.273	5.38	.00	.00
8.983	420.46	7386	6.273	8.29	.00	.00
9.200	407.69	7386	6.273	3.93	.00	.00
9.480	383.28	7385	6.273	12.00	.00	.00
9.760	383.23	7385	6.273	.83	.00	.00
9.965	374.77	127385	6.514	3.73	.00	.00
10.170	361.89	127385	6.514	8.93	.00	.00
10.375	354.92	127384	6.755	6.05	.00	.00
10.580	353.08	127382	6.755	3.10	.00	.00

DISCHARGE HYDROGRAPH FOR MASCOMA RIVER ... STATION NUMBER 1
BELOW REACH TWO AT MILE 5.74

GAGE ZERO = 500.00 MAX ELEVATION REACHED BY FLOOD WAVE = 509.48
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 9.48 AT TIME = 4.825 HOURS
MAX FLOW = 7410 AT TIME = 4.825 HOURS

HR	STAGE	FLOW	0	2000	4000	6000	8000	10000
.0	8.4	5816	I	I	I	*I	I	I
.2	8.4	5816	I	I	I	*I	I	I
.4	8.4	5817	I	I	I	*I	I	I
.6	8.4	5817	I	I	I	*I	I	I
.8	8.4	5817	I	I	I	*I	I	I
1.0	8.4	5818	I	I	I	*I	I	I
1.2	8.4	5819	I	I	I	*I	I	I
1.4	8.4	5876	I	I	I	*I	I	I
1.6	8.5	6006	I	I	I	*	I	I
1.8	8.6	6181	I	I	I	I*	I	I
2.0	8.8	6374	I	I	I	I *	I	I
2.2	8.9	6566	I	I	I	I *	I	I
2.4	9.0	6755	I	I	I	I *	I	I
2.6	9.1	6888	I	I	I	I *	I	I
2.8	9.2	7005	I	I	I	I *	I	I
3.0	9.3	7104	I	I	I	I *	I	I
3.2	9.3	7185	I	I	I	I *	I	I
3.4	9.4	7251	I	I	I	I *	I	I
3.6	9.4	7300	I	I	I	I *	I	I
3.8	9.4	7331	I	I	I	I *	I	I
4.0	9.4	7359	I	I	I	I *	I	I
4.2	9.5	7383	I	I	I	I *	I	I
4.4	9.5	7398	I	I	I	I *	I	I
4.6	9.5	7407	I	I	I	I *	I	I
4.8	9.5	7410	I	I	I	I *	I	I
5.0	9.5	7407	I	I	I	I *	I	I
5.2	9.5	7401	I	I	I	I *	I	I
5.4	9.5	7392	I	I	I	I *	I	I
5.6	9.5	7382	I	I	I	I *	I	I
5.8	9.5	7371	I	I	I	I *	I	I
6.0	9.4	7356	I	I	I	I *	I	I
6.2	9.4	7339	I	I	I	I *	I	I
6.4	9.4	7321	I	I	I	I *	I	I
6.6	9.4	7303	I	I	I	I *	I	I
6.8	9.4	7285	I	I	I	I *	I	I
7.0	9.4	7267	I	I	I	I *	I	I
7.2	9.4	7249	I	I	I	I *	I	I
7.4	9.4	7229	I	I	I	I *	I	I
7.6	9.4	7209	I	I	I	I *	I	I
7.8	9.3	7189	I	I	I	I *	I	I
8.0	9.3	7170	I	I	I	I *	I	I
8.2	9.3	7150	I	I	I	I *	I	I
8.4	9.3	7130	I	I	I	I *	I	I
8.6	9.3	7110	I	I	I	I *	I	I
8.8	9.3	7091	I	I	I	I *	I	I
9.0	9.3	7071	I	I	I	I *	I	I
9.2	9.2	7052	I	I	I	I *	I	I
9.4	9.2	7033	I	I	I	I *	I	I
9.6	9.2	7013	I	I	I	I *	I	I
9.8	9.2	6993	I	I	I	I *	I	I

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DISCHARGE HYDROGRAPH FOR MASCOMA RIVER ... STATION NUMBER 5
BELOW REACH TWO AT MILE 6.76

GAGE ZERO = 460.00 MAX ELEVATION REACHED BY FLOOD WAVE = 479.03
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 19.03 AT TIME = 5.549 HOURS
MAX FLOW = 7402 AT TIME = 5.309 HOURS

HR	STAGE	FLOW	0	2000	4000	6000	8000	10000
.1	17.5	5816	I	I	I	*I	I	I
.3	17.5	5816	I	I	I	*I	I	I
.5	17.5	5816	I	I	I	*I	I	I
.7	17.5	5817	I	I	I	*I	I	I
.9	17.5	5817	I	I	I	*I	I	I
1.1	17.5	5817	I	I	I	*I	I	I
1.3	17.5	5821	I	I	I	*I	I	I
1.5	17.5	5838	I	I	I	*I	I	I
1.7	17.5	5885	I	I	I	*I	I	I
1.9	17.6	5996	I	I	I	*	I	I
2.1	17.7	6147	I	I	I	I*	I	I
2.3	17.8	6320	I	I	I	I *	I	I
2.5	18.0	6500	I	I	I	I *	I	I
2.7	18.2	6674	I	I	I	I *	I	I
2.9	18.3	6827	I	I	I	I *	I	I
3.1	18.5	6951	I	I	I	I *	I	I
3.3	18.6	7054	I	I	I	I *	I	I
3.5	18.7	7141	I	I	I	I *	I	I
3.7	18.8	7211	I	I	I	I *	I	I
3.9	18.8	7266	I	I	I	I *	I	I
4.1	18.9	7308	I	I	I	I *	I	I
4.3	18.9	7339	I	I	I	I *	I	I
4.5	19.0	7365	I	I	I	I *	I	I
4.7	19.0	7383	I	I	I	I *	I	I
4.9	19.0	7395	I	I	I	I *	I	I
5.1	19.0	7401	I	I	I	I *	I	I
5.3	19.0	7402	I	I	I	I *	I	I
5.5	19.0	7398	I	I	I	I *	I	I
5.7	19.0	7391	I	I	I	I *	I	I
5.9	19.0	7381	I	I	I	I *	I	I
6.1	19.0	7371	I	I	I	I *	I	I
6.3	19.0	7358	I	I	I	I *	I	I
6.5	19.0	7342	I	I	I	I *	I	I
6.7	19.0	7325	I	I	I	I *	I	I
6.9	19.0	7307	I	I	I	I *	I	I
7.1	19.0	7290	I	I	I	I *	I	I
7.3	18.9	7272	I	I	I	I *	I	I
7.5	18.9	7253	I	I	I	I *	I	I
7.7	18.9	7234	I	I	I	I *	I	I
7.9	18.9	7215	I	I	I	I *	I	I
8.1	18.9	7195	I	I	I	I *	I	I
8.3	18.9	7175	I	I	I	I *	I	I
8.5	18.8	7156	I	I	I	I *	I	I
8.7	18.8	7136	I	I	I	I *	I	I
8.9	18.8	7116	I	I	I	I *	I	I
9.1	18.8	7097	I	I	I	I *	I	I
9.3	18.8	7077	I	I	I	I *	I	I
9.5	18.7	7058	I	I	I	I *	I	I
9.7	18.7	7039	I	I	I	I *	I	I
9.9	18.7	7019	I	I	I	I *	I	I

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DISCHARGE HYDROGRAPH FOR MASCOMA RIVER ... STATION NUMBER 13
BELOW REACH TWO AT MILE 8.55

GAGE ZERO = 444.00 MAX ELEVATION REACHED BY FLOOD WAVE = 453.77
FLOOD STAGE NOT AVAILABLE

MAX STAGE = 9.77 AT TIME = 6.273 HOURS
MAX FLOW = 7386 AT TIME = 6.273 HOURS

HR	STAGE	FLOW	0	2000	4000	6000	8000	10000
.1	8.6	5816	I	I	I	*I	I	I
.3	8.6	5816	I	I	I	*I	I	I
.5	8.6	5816	I	I	I	*I	I	I
.7	8.6	5816	I	I	I	*I	I	I
.9	8.6	5816	I	I	I	*I	I	I
1.1	8.6	5816	I	I	I	*I	I	I
1.3	8.6	5816	I	I	I	*I	I	I
1.5	8.6	5817	I	I	I	*I	I	I
1.7	8.6	5819	I	I	I	*I	I	I
1.9	8.7	5828	I	I	I	*I	I	I
2.1	8.7	5850	I	I	I	*I	I	I
2.3	8.7	5892	I	I	I	*I	I	I
2.5	8.8	5960	I	I	I	*	I	I
2.7	8.8	6056	I	I	I	*	I	I
2.9	8.9	6178	I	I	I	I*	I	I
3.1	9.0	6322	I	I	I	I *	I	I
3.3	9.1	6470	I	I	I	I *	I	I
3.5	9.2	6616	I	I	I	I *	I	I
3.7	9.3	6752	I	I	I	I *	I	I
3.9	9.4	6876	I	I	I	I *	I	I
4.1	9.5	6984	I	I	I	I *	I	I
4.3	9.6	7074	I	I	I	I *	I	I
4.5	9.6	7150	I	I	I	I *	I	I
4.7	9.7	7212	I	I	I	I *	I	I
4.9	9.7	7263	I	I	I	I *	I	I
5.1	9.7	7303	I	I	I	I *	I	I
5.3	9.7	7334	I	I	I	I *	I	I
5.5	9.7	7356	I	I	I	I *	I	I
5.7	9.8	7372	I	I	I	I *	I	I
5.9	9.8	7381	I	I	I	I *	I	I
6.1	9.8	7386	I	I	I	I *	I	I
6.3	9.8	7386	I	I	I	I *	I	I
6.5	9.8	7382	I	I	I	I *	I	I
6.7	9.8	7375	I	I	I	I *	I	I
6.9	9.8	7365	I	I	I	I *	I	I
7.1	9.7	7353	I	I	I	I *	I	I
7.3	9.7	7340	I	I	I	I *	I	I
7.5	9.7	7325	I	I	I	I *	I	I
7.7	9.7	7308	I	I	I	I *	I	I
7.9	9.7	7291	I	I	I	I *	I	I
8.1	9.7	7274	I	I	I	I *	I	I
8.3	9.7	7256	I	I	I	I *	I	I
8.5	9.7	7237	I	I	I	I *	I	I
8.7	9.7	7218	I	I	I	I *	I	I
8.9	9.6	7199	I	I	I	I *	I	I
9.1	9.6	7180	I	I	I	I *	I	I
9.3	9.6	7160	I	I	I	I *	I	I
9.5	9.6	7141	I	I	I	I *	I	I
9.7	9.6	7121	I	I	I	I *	I	I
9.9	9.6	7102	I	I	I	I *	I	I

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DISCHARGE HYDROGRAPH FOR MASCOMA RIVER ... STATION NUMBER 22
BELOW REACH TWO AT MILE 10.58

GAGE ZERO = 304.00 MAX ELEVATION REACHED BY FLOOD WAVE = 353.08
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 49.08 AT TIME = 6.755 HOURS
MAX FLOW = 127382 AT TIME = 6.755 HOURS

HR	STAGE	FLOW	0	50000	100000	150000	200000	250000
.0	48.7	125816	I	I	I	* I	I	I
.2	48.7	125816	I	I	I	* I	I	I
.4	48.7	125816	I	I	I	* I	I	I
.6	48.7	125816	I	I	I	* I	I	I
.8	48.7	125816	I	I	I	* I	I	I
1.0	48.7	125816	I	I	I	* I	I	I
1.2	48.7	125816	I	I	I	* I	I	I
1.4	48.7	125816	I	I	I	* I	I	I
1.6	48.7	125816	I	I	I	* I	I	I
1.8	48.7	125817	I	I	I	* I	I	I
2.0	48.7	125819	I	I	I	* I	I	I
2.2	48.7	125825	I	I	I	* I	I	I
2.4	48.7	125839	I	I	I	* I	I	I
2.6	48.7	125869	I	I	I	* I	I	I
2.8	48.7	125919	I	I	I	* I	I	I
3.0	48.7	125993	I	I	I	* I	I	I
3.2	48.8	126089	I	I	I	* I	I	I
3.4	48.8	126208	I	I	I	* I	I	I
3.6	48.8	126343	I	I	I	* I	I	I
3.8	48.9	126484	I	I	I	* I	I	I
4.0	48.9	126623	I	I	I	* I	I	I
4.2	48.9	126754	I	I	I	* I	I	I
4.4	49.0	126873	I	I	I	* I	I	I
4.6	49.0	126979	I	I	I	* I	I	I
4.8	49.0	127069	I	I	I	* I	I	I
5.0	49.0	127143	I	I	I	* I	I	I
5.2	49.0	127206	I	I	I	* I	I	I
5.4	49.0	127256	I	I	I	* I	I	I
5.6	49.1	127297	I	I	I	* I	I	I
5.8	49.1	127329	I	I	I	* I	I	I
6.0	49.1	127351	I	I	I	* I	I	I
6.2	49.1	127367	I	I	I	* I	I	I
6.4	49.1	127377	I	I	I	* I	I	I
6.6	49.1	127381	I	I	I	* I	I	I
6.8	49.1	127382	I	I	I	* I	I	I
7.0	49.1	127378	I	I	I	* I	I	I
7.2	49.1	127371	I	I	I	* I	I	I
7.4	49.1	127362	I	I	I	* I	I	I
7.6	49.1	127350	I	I	I	* I	I	I
7.8	49.1	127337	I	I	I	* I	I	I
8.0	49.1	127322	I	I	I	* I	I	I
8.2	49.1	127306	I	I	I	* I	I	I
8.4	49.1	127289	I	I	I	* I	I	I
8.6	49.1	127272	I	I	I	* I	I	I
8.8	49.0	127253	I	I	I	* I	I	I
9.0	49.0	127235	I	I	I	* I	I	I
9.2	49.0	127216	I	I	I	* I	I	I
9.4	49.0	127197	I	I	I	* I	I	I
9.6	49.0	127178	I	I	I	* I	I	I
9.8	49.0	127158	I	I	I	* I	I	I

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DATE: 09/24/85
FILE: MLD2DB1.DAT

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