

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 2 OF 3



BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
BAINBRIDGE, TOWNSHIP OF *	261103	LINCOLN, CHARTER TOWNSHIP OF	260037
BARODA, TOWNSHIP OF*	261106	MICHIANA, VILLAGE OF	260275
BARODA, VILLAGE OF *	261105	NEW BUFFALO, CITY OF	260038
BENTON, CHARTER TOWNSHIP OF	260031	NEW BUFFALO, TOWNSHIP OF	260039
BENTON HARBOR, CITY OF	260032	NILES, CHARTER TOWNSHIP OF	260041
BERRIEN, TOWNSHIP OF	260733	NILES, CITY OF	260040
BERRIEN SPRINGS, VILLAGE OF	260330	ORONOKO, CHARTER TOWNSHIP OF	260042
BERTRAND, TOWNSHIP OF	261109	PIPESTONE, TOWNSHIP OF	261104
BRIDGMAN, CITY OF	260033	ROYALTON, TOWNSHIP OF	260043
BUCHANAN, CITY OF	260554	SHOREHAM, VILLAGE OF	260280
BUCHANAN, TOWNSHIP OF	260555	SODUS, TOWNSHIP OF	260046
CHIKAMING, TOWNSHIP OF	260258	ST. JOSEPH, CITY OF	260044
COLOMA, CHARTER TOWNSHIP OF	260034	ST. JOSEPH, CHARTER TOWNSHIP OF	260045
COLOMA, CITY OF	260556	STEVENSVILLE, VILLAGE OF	260557
EAU CLAIRE, VILLAGE OF *	260999	THREE OAKS, TOWNSHIP OF	261111
GALIEN, TOWNSHIP OF	261108	THREE OAKS, VILLAGE OF *	261110
GALIEN, VILLAGE OF *	261107	WATERVLIET, CHARTER TOWNSHIP OF	260048
GRAND BEACH, VILLAGE OF	260268	WATERVLIET, CITY OF	260047
HAGAR, TOWNSHIP OF	260035	WEESAW, TOWNSHIP OF	260049
LAKE, CHARTER TOWNSHIP OF	260036		

*No Special Flood Hazard Areas Identified

REVISED PRELIMINARY
September 2, 2022

REVISED:

TBD

FLOOD INSURANCE STUDY NUMBER

26021CV002B

Version Number 2.4.3.0



FEMA

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Exhibits

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Flood Insurance Rate Map (FIRM)

Table 23: Floodway Data

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SECOND)	WIDTH REDUCED FROM PRIOR STUDY(FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	500	70	291	0.6		617.0	617.0	617.0	0.0
B	679	8	186	2.4		617.0	617.0	617.0	0.0
C	842	49	214	0.8		618.1	618.1	618.1	0.0
D	1,666	26	277	0.6		627.1	627.1	627.1	0.0
E	2,162	180	1,129	0.2		627.1	627.1	627.1	0.0
F	2,662	105	321	0.4		627.1	627.1	627.1	0.0
G	4,162	19	48	2.5		627.6	627.6	627.6	0.0
H	5,287	17	39	2.8		629.7	629.7	629.7	0.0
I	5,811	201	300	0.3		631.8	631.8	631.9	0.1
J	6,107	49	70	1.4		631.9	631.9	632.0	0.1
K	6,733	45	242	0.2		636.8	636.8	636.9	0.1

¹Feet above confluence with Tanner Creek

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	BEDORTHA DRAIN

Table 23: Floodway Data (continued)

* Upstream elevations are shown in vertical datum NGVD29

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)*			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	450	27	136	0.9		627.1	627.1	627.1	0.0

¹Feet above confluence with Bedortha Drain

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN	BRIDGMAN CITY DRAIN
	(ALL JURISDICTIONS)	

Table 23: Floodway Data (continued)

** Downstream elevations are shown in vertical datum NAVD88

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD) **			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
B	568	106	286	0.4		628.8	628.8	628.8	0.0
C	1,812	25	40	3.0		633.0	633.0	633.0	0.0
D	1,932	13	86	0.6		638.4	638.4	638.5	0.0
E	2,626	39	58	2.7		638.8	638.8	638.8	0.0

¹Feet above confluence with Bedortha Drain

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	BRIDGMAN CITY DRAIN

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET) ³	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0	287	3,671	1.6	8	*	579.6 ²	579.6	0.0
B	600	465 ³	1,476	4.0		*	579.6 ²	579.6	0.0
C	800	126	973	6.0		*	579.6 ²	579.6	0.0
D	1,500	169	1,409	4.1		*	580.1 ²	580.1	0.0
E	1,800	200	1,851	1.5		*	580.3 ²	580.3	0.0
F	1,910	136	1,316	4.4		*	580.3 ²	580.3	0.0
G	1,990	102	749	7.8		*	580.3 ²	580.3	0.0
H	2,170	335 ³	2,650	2.2		*	582.0 ²	582.0	0.0
I	2,720	585 ³	1,950	3.0		*	582.0 ²	582.0	0.0
J	3,620	141	1,221	4.8		*	582.4 ²	582.4	0.0
K	4,220	1,437	5,302	1.1		*	582.9 ²	583.0	0.1
L	5,120	1,003	3,923	1.5		*	583.0 ²	583.1	0.1
M	5,970	1,305	5,860	1.0		*	583.2 ²	583.3	0.1
N	6,870	1,805	7,583	0.8		*	583.3 ²	583.4	0.1
O	7,850	2,476	9,074	0.7		*	583.4 ²	583.5	0.1
P	11,000	1,801	5,774	1.0		*	583.7 ²	583.7	0.0
Q	11,950	1,677	5,328	1.1		583.9	583.9	584.0	0.1
R	12,850	1,397	5,254	1.1		584.0	584.0	584.1	0.1
S	14,130	145	1,069	5.6		584.5	584.5	584.5	0.0
T	14,210	104	830	7.3		584.7	584.7	584.7	0.0
U	14,410	85	685	8.8		585.2	585.2	585.3	0.1
V	16,660	898	5,993	1.0		587.4	587.4	587.4	0.0
W	17,910	1,463	8,919	0.7		587.6	587.6	587.6	0.0
X	18,370	1,627	10,021	0.6		587.7	587.6	587.7	0.1
Y	20,490	1,057	7,550	0.8		587.8	587.8	587.8	0.0

¹Feet above confluence with Lake Michigan

²Elevation without considering backwater effects from Lake Michigan

³Width includes areas below the ordinary high water mark

* CONTROLLED BY COASTAL FLOODING -- SEE FLOOD INSURANCE RATE MAP FOR REGULATORY BASE FLOOD ELEVATION

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA	
	BERRIEN COUNTY, MICHIGAN			
	(ALL JURISDICTIONS)		GALIEN RIVER	

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	200	129	567	0.2		609.0	609.0	609.0	0.0
B	900	144	485	0.2		609.0	609.0	609.0	0.0
C	1,900	36	48	2.2		609.3	609.3	609.3	0.0
D	3,100	67	60	1.8		611.8	611.8	611.8	0.0
E	3,900	58	50	2.1		614.1	614.1	614.1	0.0
F	4,400	35	38	2.8		616.6	616.6	616.6	0.0
G	5,050	12	21	5.0		618.4	618.4	618.4	0.0
H	5,100	29	37	1.5		618.9	618.9	618.9	0.0
I	5,400	139	390	0.1		626.0	626.0	626.0	0.0
J	5,850	99	27	2.0		626.0	626.0	626.0	0.0
K	5,950	85	186	0.1		627.1	627.1	627.1	0.0
L	6,350	279	428	0.1		627.1	627.1	627.1	0.0

¹Feet above confluence with Glenlord Road Drain (South Branch)

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	GLENLORD ROAD DRAIN (NORTH BRANCH)

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	270	90	179	1.2		602.2	602.2	602.2	0.0
B	408	104	362	0.6		604.8	604.8	604.8	0.0
C	572	128	531	0.4		604.8	604.8	604.8	0.0
D	1,476	90	317	0.5		609.0	609.0	609.0	0.0
E	2,376	33	54	2.9		610.7	610.7	610.7	0.0
F	3,076	62	52	3.0		615.7	615.7	615.7	0.0
G	3,676	62	76	2.0		620.5	620.5	620.5	0.0
H	3,801	117	704	0.2		626.0	626.0	626.0	0.0
I	4,301	63	204	0.7		626.0	626.0	626.0	0.0

¹Feet above confluence with Parker/Richardson Drain

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	FLOODWAY DATA
		GLENLORD ROAD DRAIN (SOUTH BRANCH)

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,000	27	27	3.9		606.2	606.2	606.2	0.0
B	1,140	5	39	2.7		612.2	612.2	612.2	0.0
C	1,300	102	492	0.2		612.3	612.3	612.3	0.0
D	1,400	59	168	0.6		612.3	612.3	612.3	0.0
E	1,570	5	28	3.8		613.3	613.3	613.3	0.0
F	1,775	76	153	0.7		613.6	613.6	613.6	0.0
G	2,015	100	1,176	0.1		623.5	623.5	623.5	0.0
H	2,500	147	1,206	0.1		623.5	623.5	623.5	0.0
I	3,350	122	385	0.2		623.5	623.5	623.5	0.0
J	3,850	57	96	0.9		623.5	623.5	623.5	0.0
K	4,050	110	314	0.3		627.1	627.1	627.1	0.0
L	4,600	59	108	0.8		627.1	627.1	627.1	0.0
M	5,200	17	27	3.2		629.0	629.0	629.0	0.0

¹Feet above confluence with Hickory Creek

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	GOODROW DRAIN

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,000	369	204	0.7		594.2	591.3 ²	591.3	0.0
B	1,750	128	110	1.3		594.3	594.3	594.3	0.0
C	2,025	142	130	1.1		595.3	595.3	595.3	0.0
D	2,110	217	858	0.2		598.1	598.1	598.1	0.0
E	2,160	174	688	0.2		598.1	598.1	598.1	0.0
F	3,100	86	87	1.6		599.6	599.6	599.6	0.0
G	4,200	55	73	1.9		604.9	604.9	604.9	0.0
H	4,359	4	36	3.9		609.4	609.4	609.4	0.0
I	6,541	46	41	3.4		618.4	618.4	618.4	0.0
J	6,716	12	54	2.6		618.8	618.8	618.8	0.0
K	8,216	11	20	7.0		628.0	628.0	628.0	0.0
L	9,706	3	17	8.2		638.5	638.5	638.5	0.0
M	10,006	21	116	1.2		639.3	639.3	639.3	0.0
N	10,395	80	381	0.4		639.5	639.5	639.5	0.0
O	12,093	24	54	2.6		640.7	640.7	640.7	0.0

¹Feet above confluence with Paw Paw River

²Elevation taken without consideration of backwater from Paw Paw River

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	GRANGER DRAIN

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	300	3	12	4.0		624.6	624.6	624.6	0.0
B	538	2	12	4.0		627.1	627.1	627.1	0.0
C	1,745	36	26	1.7		633.6	633.6	633.6	0.0
D	1,966	3	6	7.2		633.8	633.8	633.8	0.0
E	2,268	4	14	3.1		638.2	638.2	638.2	0.0
F	2,368	17	98	0.4		639.6	639.6	639.6	0.0
G	3,418	20	63	0.7		639.6	639.6	639.6	0.0

¹Feet above confluence with Granger Drain

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	GRANGER DRAIN TRIBUTARY

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	3,430	106	509	5.3		585.4	585.4	585.4	0.0
B	3,630	200	1,170	2.3		586.3	586.3	586.3	0.0
C	4,230	163	448	6.0		586.5	586.5	586.5	0.0
D	5,180	494	2,647	1.0		588.0	588.0	588.0	0.0
E	5,880	100	560	4.8		588.0	588.0	588.0	0.0
F	6,080	204	1,555	1.7		588.8	588.8	588.8	0.0
G	7,580	524	3,136	0.9		589.0	589.0	589.0	0.0
H	9,280	131	700	3.8		589.2	589.2	589.2	0.0
I	9,704	530	3,394	0.8		590.0	590.0	590.0	0.0
J	11,304	804	3,932	0.7		590.2	590.2	590.2	0.0
K	12,004	349	1,796	1.4		590.3	590.3	590.4	0.1
L	13,504	395	1,780	1.5		591.0	591.0	591.0	0.0
M	15,704	100	432	6.0		592.7	592.7	592.7	0.0
N	15,835	48	434	6.0		593.8	593.8	593.8	0.0
O	15,940	145	615	4.2		594.3	594.3	594.3	0.0
P	16,735	497	2,847	0.9		595.3	595.3	595.3	0.0
Q	17,935	248	1,395	1.9		595.7	595.7	595.7	0.0
R	18,535	110	735	3.5		596.0	596.0	596.0	0.0
S	18,720	46	410	6.3		596.2	596.2	596.2	0.0
T	19,770	110	756	3.4		597.3	597.3	597.3	0.0
U	20,170	69	717	3.6		598.1	598.1	598.1	0.0
V	20,470	450	3,640	0.7		598.4	598.4	598.4	0.0
W	22,435	726	4,030	0.6		598.5	598.5	598.5	0.0
X	23,970	80/170 ²	890	2.9		598.7	598.7	598.7	0.0
Y	24,068	324	1,623	1.6		599.5	599.5	599.5	0.0
Z	24,943	527	2,442	0.9		599.8	599.8	599.8	0.0

¹Feet above confluence with St. Joseph River
²Left channel facing downstream / right channel facing downstream

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	HICKORY CREEK

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AA	25,593	83	539	4.0		600.0	600.0	600.0	0.0
AB	25,643	48	422	5.0		600.0	600.0	600.0	0.0
AC	26,873	410	1,932	1.1		601.0	601.0	601.0	0.0
AD	28,073	444	1,304	1.6		601.4	601.4	601.4	0.0
AE	29,073	540	1,967	1.1		602.1	602.1	602.1	0.0
AF	35,233	85	424	5.0		606.9	606.9	606.9	0.0
AG	35,333	45	435	4.9		607.2	607.2	607.2	0.0
AH	36,567	406	1,478	1.4		608.3	608.3	608.3	0.0

¹Feet above confluence with St. Joseph River

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN	HICKORY CREEK
	(ALL JURISDICTIONS)	

Table 23: Floodway Data (continued)

** Upstream elevations are shown in vertical datum NGVD29

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)**			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	2,000	80	289	3.2		*	582.2 ²	582.2	0.0
B	2,230	15	110	8.4		*	582.4 ²	582.4	0.0
C	3,650	41	244	3.8		584.4	584.4	584.5	0.1
D	3,844	55	177	5.2		584.9	584.9	584.9	0.0
E	4,225	68	291	3.2		585.5	585.5	585.5	0.0
F	4,438	63	241	3.8		586.5	586.5	586.5	0.0
G	4,521	200	771	1.2		587.3	587.3	587.3	0.0
H	4,653	288	535	1.7		587.3	587.3	587.3	0.0
I	5,353	66	339	2.7		587.6	587.6	587.6	0.0
J	5,484	111	369	2.5		588.2	588.2	588.2	0.0
K	5,578	174	441	2.1		588.2	588.2	588.2	0.0
L	5,804	225	568	1.6		588.4	588.4	588.4	0.0
M	6,353	238	719	1.3		588.6	588.6	588.6	0.0
N	6,469	226	679	1.4		589.0	589.0	589.0	0.0
O	7,703	623	2,193	0.4		589.0	589.0	589.0	0.0
P	9,003	358	867	1.1		589.1	589.1	589.1	0.0
Q	9,228	388	712	1.3		589.9	589.9	589.9	0.0
R	9,263	321	1,231	0.8		590.2	590.2	590.2	0.0
S	9,557	126	461	1.9		590.5	590.5	590.5	0.0
T	9,657	340	1,763	0.5		590.6	590.6	590.6	0.0
U	11,157	161	466	1.8		590.8	590.8	590.8	0.0
V	12,347	26	93	9.2		593.3	593.3	593.3	0.0
W	12,485	117	306	2.8		596.6	596.6	596.6	0.0
X	12,907	199	890	1.0		597.2	597.2	597.2	0.0
Y	12,967	200	967	0.9		597.4	597.4	597.4	0.0

¹Feet above confluence with Paw Paw River

²Elevation computed without considering backwater effects from Paw Paw River

* CONTROLLED BY COASTAL FLOODING -- SEE FLOOD INSURANCE RATE MAP FOR REGULATORY BASE FLOOD ELEVATION

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	OX CREEK

Table 23: Floodway Data (continued)

** Downstream elevations are shown in vertical datum NAVD88

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD) **			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Z	13,657	292	1,102	0.8		597.8	597.8	597.8	0.0

¹Feet above confluence with Paw Paw River

²Elevations computed without considering backwater effect from Paw Paw River

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	OX CREEK

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AA	13,832	237	989	0.9		597.8	597.8	597.8	0.0
AB	14,957	137	416	2.1		599.6	599.6	599.6	0.0
AC	15,967	200	710	1.2		603.7	603.7	603.7	0.0
AD	16,007	110	583	1.5		603.7	603.7	603.7	0.0
AE	17,207	83	278	3.1		604.6	604.6	604.6	0.0
AF	18,657	42	108	4.5		608.0	608.0	608.0	0.0
AG	18,803	15	65	7.5		608.3	608.3	608.3	0.0
AH	21,143	165	411	1.2		613.3	613.3	613.3	0.0

¹Feet above confluence with Paw Paw River

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	OX CREEK

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	375	151	290	2.5		599.8	599.8	599.8	0.0
B	675	249	987	0.7		600.1	600.1	600.1	0.0
C	1,325	44	179	4.1		600.3	600.3	600.3	0.0
D	1,418	15	152	4.8		601.5	601.5	601.5	0.0
E	1,868	282	1,158	0.6		602.1	602.1	602.1	0.0
F	3,628	73	166	2.8		604.7	604.7	604.7	0.0
G	4,423	233	451	1.1		606.4	606.4	606.4	0.0
H	5,098	168	266	1.6		607.0	607.0	607.0	0.0
I	6,123	198	227	1.8		609.3	609.3	609.3	0.0
J	7,173	128	137	3.0		612.0	612.0	612.0	0.0
K	8,423	248	311	1.3		616.3	616.3	616.3	0.0
L	9,248	20	32	3.4		620.0	620.0	620.0	0.0
M	9,798	13	29	3.8		624.0	624.0	624.0	0.0
N	9,913	4	27	4.1		628.0	628.0	628.0	0.0
O	10,863	16	42	2.6		628.6	628.6	628.6	0.0
P	10,973	5	27	4.1		629.0	629.0	629.0	0.0
Q	12,573	150	198	0.6		631.4	631.4	631.4	0.0

¹Feet above confluence with Hickory Creek

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	PARKER/RICHARDSON DRAIN

Table 23: Floodway Data (continued)

** Upstream elevations are shown in vertical datum NGVD29

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)**			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0.12	183	2,037	2.0		*	582.6 ²	582.6	0.0
B	0.16	350	3,037	1.4		*	582.6 ²	582.6	0.0
C	0.33	92	1,040	3.9		*	583.0 ²	583.0	0.0
D	0.40	162	1,197	3.4		*	583.2 ²	583.2	0.0
E	0.85	940	3,591	1.9		584.0	584.0	584.0	0.0
F	0.88	585	1,376	3.0		584.1	584.1	584.1	0.0
G	1.08	1,085	2,768	1.5		584.4	584.4	584.4	0.0
H	1.38	595	2,686	1.5		584.9	584.9	584.9	0.0
I	1.43	160	1,432	2.9		585.1	585.1	585.1	0.0
J	1.46	250	1,884	2.2		585.1	585.1	585.1	0.0
K	2.07	110	1,221	3.4		586.9	586.9	586.9	0.0
L	2.09	115	1,206	3.4		586.9	586.9	586.9	0.0
M	2.12	98	1,311	3.1		587.3	587.3	587.3	0.0
N	2.58	1,000	7,481	0.6		587.5	587.5	587.5	0.0
O	3.04	1,793	12,637	0.3		587.6	587.6	587.6	0.0
P	4.42	2,035	8,271	0.5		588.6	588.6	588.6	0.0
Q	6.45	2,500	11,476	0.4		589.6	589.6	589.6	0.0

¹Miles above confluence with St. Joseph River

²Elevation computed without considering backwater effect from Lake Michigan

³Left overbank / main channel

* CONTROLLED BY COASTAL FLOODING -- SEE FLOOD INSURANCE RATE MAP FOR REGULATORY BASE FLOOD ELEVATION

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	PAW PAW RIVER

Table 23: Floodway Data (continued)

** Downstream elevations are shown in vertical datum NAVD88

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)**			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
R	7.74	1,840	7,239	0.6		591.5	591.5	591.5	0.0
S	8.92	2,020	8,122	0.5		593.2	593.2	593.2	0.0
T	9.86	418/160 ³	2,548	1.6		597.1	597.1	597.1	0.0
U	9.93	131	1,016	4.0		597.5	597.5	597.5	0.0
V	10.03	1,190	7,180	0.6		598.0	598.0	598.0	0.0
W	11.26	1,865	8,330	0.5		598.6	598.6	598.6	0.0
X	11.78	1,695	7,658	0.5		599.0	599.0	599.0	0.0
Y	11.85	133	724	5.7		600.0	600.0	600.0	0.0
Z	12.09	820	3,149	1.3		601.2	601.2	601.2	0.0

¹Miles above confluence with St. Joseph River

²Elevation computed without considering backwater effect from Lake Michigan

³Left overbank / main channel

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	PAW PAW RIVER

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AA	12.11	148	1,462	2.8		601.4	601.4	601.4	0.0
AB	12.14	755	3,473	1.2		601.7	601.7	601.7	0.0
AC	13.14	872	5,148	0.8		603.0	603.0	603.0	0.0
AD	13.92	1,240	6,827	0.6		603.7	603.7	603.7	0.0
AE	14.49	1,100	6,202	0.7		604.1	604.1	604.1	0.0
AF	14.52	576	849	4.8		604.2	604.2	604.2	0.0
AG	14.69	1,690	7,320	0.6		604.6	604.6	604.6	0.0
AH ²	16.08	N/A	N/A	N/A		607.0	N/A	N/A	N/A
AI ²	16.38	N/A	N/A	N/A		607.5	N/A	N/A	N/A
AJ ²	16.70	N/A	N/A	N/A		607.7	N/A	N/A	N/A
AK ²	18.30	N/A	N/A	N/A		609.5	N/A	N/A	N/A
AL ²	18.48	N/A	N/A	N/A		610.2	N/A	N/A	N/A
AM ²	18.51	N/A	N/A	N/A		610.2	N/A	N/A	N/A
AN ²	18.53	N/A	N/A	N/A		611.2	N/A	N/A	N/A
AO ²	18.87	N/A	N/A	N/A		612.0	N/A	N/A	N/A
AP ²	19.40	N/A	N/A	N/A		612.9	N/A	N/A	N/A
AQ ²	19.46	N/A	N/A	N/A		613.7	N/A	N/A	N/A
AR ²	19.65	N/A	N/A	N/A		614.0	N/A	N/A	N/A
AS ²	19.72	N/A	N/A	N/A		614.2	N/A	N/A	N/A
AT ²	19.76	N/A	N/A	N/A		614.4	N/A	N/A	N/A
AU ²	20.00	N/A	N/A	N/A		614.5	N/A	N/A	N/A
AV ²	21.29	N/A	N/A	N/A		617.6	N/A	N/A	N/A
AW ²	22.01	N/A	N/A	N/A		618.4	N/A	N/A	N/A
AX ²	23.83	N/A	N/A	N/A		627.4	N/A	N/A	N/A
AY ²	25.51	N/A	N/A	N/A		628.8	N/A	N/A	N/A
AZ ²	25.89	N/A	N/A	N/A		629.9	N/A	N/A	N/A

¹Miles above confluence with St. Joseph River

²No floodway data computed

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	PAW PAW RIVER

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BA ²	26.57	N/A	N/A	N/A		630.3	N/A	N/A	N/A
BB ²	27.88	N/A	N/A	N/A		633.4	N/A	N/A	N/A

¹Miles above confluence with St. Joseph River

²No floodway data computed

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	PAW PAW RIVER

Table 23: Floodway Data (continued)

** Upstream elevations are shown in vertical datum NGVD29

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)**			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0.40	255	6,713	3.6		*	580.6 ³	580.6	0.0
B	0.46	255	6,629	3.6		*	580.6 ³	580.6	0.0
C	0.57	390	8,417	2.9		*	580.7 ³	580.7	0.0
D	0.62	411	6,816	3.5		*	580.7 ³	580.7	0.0
E	0.65	350	8,633	2.8		*	580.8 ³	580.8	0.0
F	0.72	315	7,645	3.1		*	580.8 ³	580.8	0.0
G	0.82	383	7,863	3.1		*	580.8 ³	580.8	0.0
H	0.87	391	6,381	3.8		*	580.8 ³	580.8	0.0
I	0.91	450	7,832	3.1		*	580.9 ³	580.9	0.0
J	1.19	382 ²	6,955	3.3		*	581.1 ³	581.1	0.0
K	1.23	462 ²	7,684	3.0		*	581.1 ³	581.1	0.0
L	1.26	490 ²	5,620	4.1		*	581.1 ³	581.1	0.0
M	1.77	800 ²	7,517	3.1		*	581.8 ³	581.8	0.0
N	2.11	709 ²	6,443	3.6		*	582.2 ³	582.2	0.0
O	2.42	718 ²	6,953	3.3		*	582.7 ³	582.7	0.0
P	2.69	823 ²	7,596	3.1		*	583.0 ³	583.0	0.0
Q	2.99	431	5,391	4.3		*	583.4 ³	583.4	0.0
R	3.04	445	5,061	4.6		*	583.4 ³	583.4	0.0
S	3.43	878	6,485	3.6		584.3	584.3	584.3	0.0
T	3.90	974	6,847	3.4		585.2	585.2	585.2	0.0
U	4.26	961	6,502	3.6		585.8	585.8	585.8	0.0

¹Miles above confluence with Lake Michigan

²Width includes floodway of both St. Joseph River and Morrison Channel excluding Radio Island

³Water surface elevations determined without consideration of Lake Michigan backwater

* CONTROLLED BY COASTAL FLOODING -- SEE FLOOD INSURANCE RATE MAP FOR REGULATORY BASE FLOOD ELEVATION

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	ST. JOSEPH RIVER

Table 23: Floodway Data (continued)

** Downstream elevations are shown in vertical datum NAVD88

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD) **			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	4.89	1,273	7,950	2.9		587.4	587.4	587.5	0.1
W	5.42	2,920	14,171	1.6		588.1	588.1	588.1	0.0
X	5.64	1,688	6,920	3.4		588.2	588.2	588.2	0.0
Y	6.00	750	6,537	3.6		588.9	588.9	588.9	0.0
Z	6.10	527	6,785	3.4		589.0	589.0	589.0	0.0

¹Miles above confluence with Lake Michigan

²Width includes floodway of both St. Joseph River and Morrison Channel excluding Radio Island

³Water surface elevations determined without consideration of Lake Michigan backwater

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	ST. JOSEPH RIVER

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AA	6.56	355	5,733	4.1	71	589.5	589.5	589.5	0.0
AB	6.70	360	5,138	4.5		589.6	589.6	589.6	0.0
AC	6.90	2,284	14,641	1.6		590.0	590.0	590.0	0.0
AD	7.21	2,043	14,874	1.6	1,527	590.2	590.2	590.2	0.0
AE	7.72	743	5,681	3.9		591.0	591.0	591.0	0.0
AF	7.93	620	5,998	3.6		591.2	591.2	591.2	0.0
AG	7.95	618	6,006	3.6		591.3	591.3	591.3	0.0
AH	8.24	397	5,335	4.0		591.7	591.7	591.7	0.0
AI	8.35	367	5,344	4.0		591.8	591.8	591.8	0.0
AJ	8.55	237	3,198	6.7		592.0	592.0	592.0	0.0
AK	8.56	535	6,052	3.5		592.8	592.8	592.8	0.0
AL	9.41	935	8,798	2.6		593.4	593.4	593.4	0.0
AM	9.80	887	6,327	3.6		593.7	593.7	593.7	0.0
AN	10.35	702	7,478	3.1		594.4	594.4	594.4	0.0
AO	10.88	997	7,685	3.0		594.9	594.9	594.9	0.0
AP	11.07	1,266	9,927	2.3		595.1	595.1	595.1	0.0
AQ	11.33	1,239	8,011	2.6		595.3	595.3	595.3	0.0
AR	11.64	1,751	10,664	2.2		595.5	595.5	595.5	0.0
AS	12.08	1,749	12,769	1.8		595.9	595.9	595.9	0.0
AT	12.57	3,710	19,651	1.2		596.2	596.2	596.2	0.0
AU	13.19	4,752	20,708	1.1		596.5	596.5	596.5	0.0
AV	13.90	2,883	15,839	1.5		596.9	596.9	596.9	0.0
AW	14.37	2,019	12,615	1.8		597.2	597.2	597.2	0.0
AX	14.88	4,589	25,638	0.9		597.6	597.6	597.6	0.0
AY	15.16	3,992	14,542	1.6		597.7	597.7	597.7	0.0
AZ	15.72	3,214	15,839	1.5		598.4	598.4	598.4	0.0

¹Miles above confluence with Lake Michigan

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	ST. JOSEPH RIVER

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BA	16.29	1,709	9,558	2.4		599.1	599.1	599.1	0.0
BB	16.53	1,886	7,581	3.0		599.4	599.4	599.4	0.0
BC	16.79	2,209	7,619	3.0		599.8	599.8	599.8	0.0
BD	17.02	1,800	11,035	2.1		600.4	600.4	600.4	0.0
BE	17.51	1,548	7,143	3.2		600.8	600.8	600.8	0.0
BF	18.09	1,343	9,272	2.5		601.8	601.8	601.8	0.0
BG	18.59	1,894	8,488	2.7		602.6	602.6	602.6	0.0
BH	18.87	2,545	11,006	2.1		603.2	603.2	603.2	0.0
BI	19.22	2,400	16,686	1.4		603.7	603.7	603.7	0.0
BJ	20.08	1,145	8,287	2.8		604.5	604.5	604.5	0.0
BK	40.88	315	3,217	6.8		644.3	644.3	644.3	0.0
BL	41.24	561	5,281	4.2		646.1	646.1	646.2	0.1
BM	41.45	258	3,996	5.5		646.4	646.4	646.5	0.1
BN	41.57	374	3,596	6.1		646.8	646.8	646.9	0.1
BO	41.68	315	4,328	5.1		647.4	647.4	647.5	0.1
BP	41.88	322	3,195	6.9		647.9	647.9	648.0	0.1
BQ	41.97	324	4,680	4.7		648.7	648.7	648.8	0.1
BR	42.07	296	3,716	5.9		648.8	648.8	648.9	0.1
BS	42.16	301	4,431	5.0		649.2	649.2	649.3	0.1
BT	42.23	331	4,831	4.6		649.3	649.3	649.4	0.1
BU	42.43	622	7,460	2.9		649.8	649.8	649.9	0.1
BV	42.64	416	6,059	3.6		649.9	649.9	649.9	0.0
BW	42.78	324	4,600	4.8		649.9	649.9	649.9	0.0
BX	42.89	320	7,163	3.1		659.8	659.8	659.8	0.0
BY	42.96	357	5,859	3.8		659.8	659.8	659.8	0.0
BZ	43.08	457	5,687	3.9		659.9	659.9	659.9	0.0

¹Miles above confluence with Lake Michigan

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	ST. JOSEPH RIVER

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,550	720	2,571	0.4		590.3	590.3	590.4	0.1
B	5,250	375	1,244	1.1		591.6	591.6	591.6	0.0
C	5,310	305	389	3.7		591.7	591.7	591.7	0.0
D	6,620	721	2,523	0.7		592.9	592.9	592.9	0.0
E	6,720	637	2,017	0.9		592.9	592.9	592.9	0.0
F	7,090	620	2,034	0.9		593.1	593.1	593.1	0.0

¹Feet above limit of detailed study (limit of detailed study is 5,300 feet downstream of Bacon Road)

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	ST. JOSEPH RIVER (LEFT OVERBANK)

Table 23: Floodway Data (continued)

* Upstream elevations are shown in vertical datum NGVD29

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)*			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tanner Creek									
A	400	28	95	3.8		585.9	585.9	585.9	0.0
B	1,350	27	101	3.6		590.6	590.6	590.3	0.0
C	2,370	29	103	3.5		594.2	594.2	594.2	0.0
D	2,750	59	178	2.0		596.7	596.7	596.7	0.0
E	3,221	22	96	3.8		597.4	597.4	597.4	0.0
F	3,543	23	78	4.6		598.2	598.2	598.2	0.0
G	4,239	135	794	0.5		607.3	607.3	607.4	0.1
H	4,389	145	399	0.9		607.3	607.3	607.4	0.1
I	4,710	32	228	1.6		607.4	607.4	607.5	0.1
J	4,818	31	277	1.9		607.4	607.4	607.5	0.1
K	5,077	86	505	0.7		610.5	610.5	610.5	0.0
L	5,221	21	264	1.9		610.5	610.5	610.5	0.0
M	5,658	56	484	0.7		617.0	617.0	617.0	0.0
William & Esseg Drain									
N	6,183	230	422	0.4		617.0	617.0	617.0	0.0
O	6,222	193	329	0.7		617.0	617.0	617.0	0.0
P	6,881	23	94	1.9		618.5	618.5	618.5	0.0
Q	6,925	23	97	1.9		618.6	618.6	618.6	0.0

¹Feet above confluence with Lake Michigan

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	TANNER CREEK, WILLIAM & ESSEG DRAIN

Table 23: Floodway Data (continued)

** Downstream elevations are shown in vertical datum NAVD88

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)**			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tanner Creek, William & Esseg Drain									
R	7,763	22	41	4.4		624.8	624.8	624.8	0.0
S	8,213	123	475	0.4		625.9	625.9	626.0	0.0
T	8,358	15	48	3.8		625.9	625.9	625.9	0.0
U	8,731	175	693	0.1		628.5	628.5	628.6	0.0
V	9,306	16	50	4.3		628.4	628.4	628.4	0.0
W	9,672	126	48	1.9		630.2	630.2	630.2	0.0

¹Feet above confluence with Lake Michigan

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	TANNER CREEK, WILLIAM & ESSEG DRAIN

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	500	19	36	6.1		584.6	584.6	584.6	0.0
B	1,150	22	46	4.8		588.9	588.9	588.9	0.0
C	1,700	22	43	5.1		592.3	592.3	592.3	0.0
D	1,825	24	56	3.9		593.3	593.3	593.3	0.0
E	2,476	25	55	4.0		596.8	596.8	596.8	0.0
F	3,076	72	53	4.2		601.9	601.9	601.9	0.0
G	3,162	70	204	1.1		604.6	604.6	604.6	0.0
H	3,488	36	60	3.2		604.9	604.9	604.9	0.0
I	3,578	10	49	4.0		605.9	605.9	605.9	0.0
J	4,229	35	47	4.1		606.5	606.5	606.5	0.0
K	4,282	15	43	4.2		606.9	606.9	606.9	0.0
L	4,608	16	38	4.5		607.7	607.7	607.7	0.0
M	4,716	5	28	6.1		610.0	610.0	610.0	0.0
N	5,562	17	36	4.4		613.2	613.2	613.2	0.0
O	5,679	7	32	5.0		613.6	613.6	613.6	0.0
P	5,925	24	50	3.2		614.4	614.4	614.4	0.0
Q	6,069	6	25	6.0		616.8	616.8	616.8	0.0
R	6,970	20	33	4.2		618.7	618.7	618.7	0.0

¹Feet above confluence with Lake Michigan

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	TRIBUTARY A

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	250	25	28	6.1		*	582.5 ²	582.5	0.0
B	1,650	16	39	4.4		588.4	588.4	588.4	0.0
C	1,745	6	25	6.8		590.8	590.8	590.8	0.0
D	2,145	153	266	0.4		591.8	591.8	591.8	0.0
E	2,445	16	24	5.0		592.4	592.4	592.4	0.0
F	2,678	7	22	5.0		593.7	593.7	593.7	0.0
G	3,678	19	29	3.8		597.5	597.5	597.5	0.0
H	4,928	21	33	3.3		602.7	602.7	602.7	0.0

¹Feet above confluence with Lake Michigan
²Elevation taken without consideration of backwater from Lake Michigan
* CONTROLLED BY COASTAL FLOODING -- SEE FLOOD INSURANCE RATE MAP FOR REGULATORY BASE FLOOD ELEVATION

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	FLOODWAY DATA
		TRIBUTARY B

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	14	4	10	5.6		591.8	591.8	591.8	0.0
B	89	54	70	0.8		592.5	592.5	592.5	0.0
C	539	16	18	3.1		595.0	595.0	595.0	0.0
D	647	3	13	4.3		600.1	600.1	600.1	0.0
E	872	23	15	3.7		603.1	603.1	603.1	0.0
F	962	64	281	0.2		615.2	615.2	615.2	0.0
G	1,437	122	1,018	0.1		615.2	615.2	615.2	0.0
H	1,937	69	368	0.2		615.2	615.2	615.2	0.0
I	2,043	78	302	0.2		615.2	615.2	615.2	0.0
J	2,518	63	187	0.3		615.2	615.2	615.2	0.0

¹Feet above confluence with Tributary B

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	TRIBUTARY C

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	150	37	95	4.2		660.2	658.8 ²	658.8	0.0
B	752	24	128	3.1		673.4	673.4	673.4	0.0
C	1,270	20	57	6.9		684.2	684.2	684.2	0.0
D	1,380	16	64	6.1		688.6	688.6	688.6	0.0
E	1,600	165	160	2.5		691.9	691.9	691.9	0.0
F	1,750	85	182	2.2		692.8	692.8	692.8	0.0
G	1,880	102	180	2.2		693.8	693.8	693.8	0.0
H	2,180	154	255	1.5		695.0	695.0	695.0	0.0
I	2,620	158	773	0.5		703.1	703.1	703.1	0.0
J	2,770	199	1,004	0.4		703.1	703.1	703.1	0.0
K	3,230	110	244	1.6		703.1	703.1	703.1	0.0
L	3,490	143	216	1.8		703.9	703.9	703.9	0.0

¹Feet above confluence with St. Joseph River

²Elevations without considering backwater effect from St. Joseph River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)

FLOODWAY DATA

WEST TRIBUTARY ST. JOSEPH RIVER

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	245	17	39	1.4		589.3	589.3	589.3	0.0
B	458	3	9	5.8		595.6	595.6	595.6	0.0
C	780	32	131	0.4		603.8	603.8	603.8	0.0
D	805	31	132	0.4		603.8	603.8	603.8	0.0
E	1,116	25	114	0.5		609.2	609.2	609.2	0.0
F	1,166	28	118	0.5		609.2	609.2	609.2	0.0
G	1,716	13	36	1.4		609.2	609.2	609.2	0.0
H	2,416	11	21	2.4		611.2	611.2	611.2	0.0

¹Feet above confluence with White Creek

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	WHITE CREEK - EAST BRANCH

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	2,819	113	325	1.9		597.5	597.5	597.5	0.0
B	3,940	12 ²	69	8.7		598.4	598.4	598.4	0.0
C	4,010	73	268	2.2		599.9	599.9	599.9	0.0
D	4,935	54	250	2.4		600.6	600.6	600.6	0.0

¹Feet above confluence with Lake Michigan
²Floodway not shown; contained in culvert

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	FLOODWAY DATA
		WHITE CREEK - WEST BRANCH

Table 23: Floodway Data (continued)

* Upstream elevations are shown in vertical datum NAVD88

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NGVD) *			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,050	250	804	1.6		589.9	588.4 ²	588.4	0.0
B	1,875	63	275	4.6		591.0	591.0	591.0	0.0
C	1,950	23	145	8.8		591.1	591.1	591.1	0.0
D	4,000	213	679	1.8		594.9	594.9	594.9	0.0
E	5,650	162	403	2.9		596.4	596.4	596.4	0.0
F	5,900	29	194	6.1		597.3	597.3	597.3	0.0
G	7,100	100	438	2.6		599.4	599.4	599.4	0.0
H	7,150	69	278	4.1		599.5	599.5	599.5	0.0
I	8,050	384	796	1.4		601.8	601.8	601.8	0.0
J	9,150	263	427	2.3		603.7	603.7	603.7	0.0
K	10,850	149	330	3.0		607.5	607.5	607.5	0.0

¹Feet above confluence with St. Joseph River

²Water surface elevations without considering St. Joseph River backwater

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	YELLOW CREEK

Table 23: Floodway Data (continued)

* Downstream elevations are shown in vertical datum NGVD29

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)*			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
L	11,850	70	354	2.4		609.5	609.5	609.5	0.0
M	11,950	17	142	6.1		609.8	609.8	609.8	0.0
N	13,500	41	191	3.6		613.5	613.5	613.5	0.0
O	14,250	177	370	1.9		615.6	615.6	615.6	0.0
P	15,149	17	120	4.8		617.2	617.2	617.2	0.0
Q	15,850	12	73	7.8		618.9	618.9	618.9	0.0
R	16,000	37	181	2.5		620.0	620.0	620.0	0.0
S	16,050	15	115	3.9		620.0	620.0	620.0	0.0
T	16,312	171	267	1.7		620.6	620.6	620.6	0.0
U	16,372	173	237	1.9		620.6	620.6	620.6	0.0
V	16,424	124	260	1.7		621.0	621.0	621.0	0.0
W	16,464	117	252	1.8		621.0	621.0	621.0	0.0
X	16,715	72	271	1.7		621.3	621.3	621.3	0.0
Y	16,800	29	164	2.7		621.3	621.3	621.3	0.0
Z	16,925	154	296	1.5		621.8	621.8	621.8	0.0

¹Feet above confluence with St. Joseph River

²Water surface elevations computed without considering St. Joseph River backwater

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	YELLOW CREEK

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY				1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AA	18,150	45	159	2.8		623.7	623.7	623.7	0.0
AB	18,200	21	106	4.3		623.7	623.7	623.7	0.0
AC	18,450	39	152	3.0		625.0	625.0	625.0	0.0
AD	18,600	19	122	3.7		625.3	625.3	625.3	0.0
AE	20,000	42	169	2.7		628.9	628.9	628.9	0.0

¹Feet above confluence with St. Joseph River

TABLE 23	FEDERAL EMERGENCY MANAGEMENT AGENCY BERRIEN COUNTY, MICHIGAN (ALL JURISDICTIONS)	FLOODWAY DATA
		YELLOW CREEK

**Table 24: Flood Hazard and Non-Encroachment Data for Selected Streams
[Not Applicable to this Flood Risk Project]**

6.4 Coastal Flood Hazard Mapping

Flood insurance zones and BFEs including the wave effects were identified on each transect based on the results from the onshore wave hazard analyses. Between transects, elevations were interpolated using topographic maps, land-use and land-cover data, and knowledge of coastal flood processes to determine the extent of flooding. Sources for topographic data are shown in Table 22.

Zone VE is subdivided into elevation zones and BFEs are provided on the FIRM.

The limit of Zone VE shown on the FIRM is defined as the farthest inland extent of any of the following criteria (determined for the 1-percent-annual-chance flood condition):

- The *primary frontal dune* is defined in 44 CFR Section 59.1 of the NFIP regulations. “The primary frontal dune represents a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes that occur immediately landward and adjacent to the beach. The primary frontal dune zone is subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune zone occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.”
- The *wave runoff Zone VE* occurs where the (eroded) ground profile is 3.0 feet or more below the 2-percent wave runoff elevation.
- The *wave overtopping splash Zone VE* is the area landward of the crest of an overtopped barrier, in cases where the potential 2-percent wave runoff exceeds the barrier crest elevation.
- The *breaking wave height Zone VE* occurs where 3-foot or greater wave heights could occur.
- The *high-velocity flow Zone VE* is landward of the overtopping splash zone (or area on a sloping beach or other shore type), where the product of depth of flow times the flow velocity squared (hv^2) is greater than or equal to 200 ft^3/sec^2 .

The SFHA boundary indicates the landward extent of the coastal SFHAs shown on the FIRM as Zones VE, AE, AO, AH, or A.

Table 25 indicates the coastal analyses used for floodplain mapping and the criteria used to determine the inland limit of the open-coast Zone VE and the SFHA boundary at each transect.

Table 25: Summary of Coastal Transect Mapping Considerations

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD88)	Zone Designation and BFE (ft NAVD88)		
1	No	VE 588	N/A	Runup	Runup
2	No	VE 588	N/A	Runup	Runup
3	No	VE 592	N/A	Wave Overtopping Splash	Wave Overtopping Splash
4	No	VE 598	N/A	Runup	Runup
5	No	VE 593	N/A	Runup	Runup
6	No	VE 588	N/A	Runup	Runup
7	No	VE 588	N/A	Runup	Runup
8	No	VE 592	N/A	Runup	Runup
9	No	VE 596	N/A	Runup	Runup
10	No	VE 593	N/A	Runup	Runup
11	No	VE 590	N/A	Runup	Runup
12	No	VE 590	N/A	Runup	Runup
13	No	VE 590	N/A	Runup	Runup
14	No	VE 589	N/A	Runup	Runup
15	No	VE 592	N/A	Runup	Runup
16	No	VE 593 AE 592	N/A	Runup	Overtopping
17	No	VE 592	N/A	Runup	Runup
18	No	VE 592	N/A	Runup	Runup
19	No	VE 591	N/A	Runup	Runup
20	Yes	VE 590	N/A	PFD	PFD
21	Yes	VE 589	N/A	PFD	PFD
22	Yes	VE 589	N/A	PFD	PFD
23	No	VE 589	N/A	Runup	Runup
24	No	VE 588	N/A	Runup	Runup
25	No	VE 588	N/A	Runup	Runup
26	No	VE 587	N/A	Runup	Runup
27	No	VE 587	N/A	Runup	Runup
28	No	VE 587	N/A	Runup	Runup
29	No	VE 596	N/A	Runup	Runup

Table 25: Summary of Coastal Transect Mapping Considerations (continued)

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD88)	Zone Designation and BFE (ft NAVD88)		
30	No	VE 587	N/A	Runup	Runup
31	No	VE 588	N/A	Runup	Runup
32	No	VE 587	N/A	Runup	Runup
33	No	VE 587	N/A	Runup	Runup
34	No	VE 593	N/A	Runup	Runup
35	No	VE 588	N/A	Runup	Runup
36	No	VE 590	N/A	Runup	Runup
37	No	VE 590	N/A	Runup	Runup
38	No	VE 588	N/A	Runup	Runup
39	No	VE 588	N/A	Runup	Runup
40	No	VE 588	N/A	Runup	Runup
41	No	VE 588	N/A	Runup	Runup
42	No	VE 587	N/A	Runup	Runup
43	No	VE 588	N/A	Runup	Runup
44	No	VE 588	N/A	Runup	Runup
45	No	VE 588	N/A	Runup	Runup
46	No	VE 588	N/A	Runup	Runup
47	Yes	VE 588	N/A	PFD	PFD
48	No	VE 595 AH 593	N/A	Runup	Overtopping
49	Yes	VE 593	N/A	PFD	PFD
50	Yes	VE 588	N/A	PFD	PFD
51	Yes	VE 594	N/A	PFD	PFD
52	No	VE 591	N/A	Runup	Runup
53	No	VE 592	N/A	Runup	Runup
54	Yes	VE 591 AO 3	N/A	PFD	Overtopping
55	No	VE 588	N/A	Runup	Runup
56	No	VE 588	N/A	Runup	Runup
57	Yes	VE 588	N/A	PFD	PFD
58	Yes	VE 588	N/A	PFD	PFD
59	No	VE 588	N/A	Runup	Runup
60	Yes	VE 587	N/A	PFD	PFD

Table 25: Summary of Coastal Transect Mapping Considerations (continued)

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD88)	Zone Designation and BFE (ft NAVD88)		
61	Yes	VE 587	N/A	PFD	PFD
62	No	VE 587	N/A	Runup	Runup
63	No	VE 587	N/A	Runup	Runup
64	No	VE 588	N/A	Runup	Runup
65	No	VE 591	N/A	Runup	Runup
66	No	VE 592	N/A	Runup	Runup
67	No	VE 593	N/A	Runup	Runup
68	No	VE 590	N/A	Runup	Runup
69	No	VE 592	N/A	Wave Overtopping Splash	Wave Overtopping Splash
70	No	VE 593	N/A	Runup	Runup
71	No	VE 594	N/A	Runup	Runup
72	No	VE 588	N/A	Wave Overtopping Splash	Overtopping
73	No	VE 590	N/A	Runup	Runup
74	No	VE 590	N/A	Runup	Runup
75	No	VE 594	N/A	Runup	Runup
76	No	VE 593	N/A	Runup	Runup
77	No	VE 593	N/A	Runup	Runup
78	No	VE 591	N/A	Runup	Runup
79	No	VE 590	N/A	Runup	Runup
80	No	VE 587	N/A	Runup	Runup
81	No	VE 591	N/A	Runup	Runup
82	No	VE 592	N/A	Runup	Runup
83	No	VE 586	N/A	Runup	Runup
84	No	VE 589	N/A	Runup	Runup
85	No	VE 591	N/A	Runup	Runup
86	No	VE 590	N/A	Wave Overtopping Splash	Wave Overtopping Splash
87	No	VE 592	N/A	Runup	Runup
88	No	VE 587	N/A	Runup	Runup
89	No	VE 589	N/A	Runup	Runup
90	No	VE 587	N/A	Runup	Runup

Table 25: Summary of Coastal Transect Mapping Considerations (continued)

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD88)	Zone Designation and BFE (ft NAVD88)		
91	Yes	VE 588	N/A	PFD	PFD
92	No	VE 588	N/A	Runup	Runup
93	No	VE 588	N/A	Runup	Runup
94	No	VE 588	N/A	Runup	Runup
95	No	VE 587	N/A	Runup	Runup
96	No	VE 587 AE 587	N/A	Runup	Runup
97	No	VE 587 AE 587	N/A	Runup	Runup
98	No	VE 587	N/A	Runup	Runup
99	No	VE 587	N/A	Runup	Runup
100	No	VE 591 AE 590	N/A	Runup	Overtopping
101	No	VE 591	N/A	Runup	Runup
102	No	VE 590	N/A	Runup	Runup
103	No	VE 588	N/A	Runup	Runup
104	No	VE 590	N/A	Runup	Runup
105	No	VE 588	N/A	Runup	Runup
106	No	VE 592	N/A	Runup	Runup
107	No	VE 590	N/A	Runup	Runup
108	No	VE 588	N/A	Runup	Runup
109	No	VE 588	N/A	Runup	Runup
110	No	VE 588	N/A	Runup	Runup
111	No	VE 588	N/A	Runup	Runup
112	No	VE 587	N/A	Runup	Runup
113	No	VE 587	N/A	Runup	Runup
114	Yes	VE 591 AH 586	N/A	PFD	Overtopping
115	No	VE 590	N/A	Runup	Runup
116	No	VE 590	N/A	Runup	Runup

A LiMWA boundary has also been added in coastal areas subject to overland wave propagation for use by local communities in safe rebuilding practices. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave.

6.5 FIRM Revisions

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 30, “Map Repositories”).

6.5.1 Letters of Map Amendment

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA. A LOMA cannot be issued for properties located on the PFD (primary frontal dune).

To obtain an application for a LOMA, visit www.fema.gov/flood-maps/change-your-flood-zone and download the form “MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill”. Visit the “Flood Map-Related Fees” section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at www.fema.gov/flood-maps/tutorials.

For more information about how to apply for a LOMA, call the FEMA Mapping and Insurance eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

6.5.2 Letters of Map Revision Based on Fill

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA’s determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting www.fema.gov/flood-maps/change-your-flood-zone for the “MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill” or by calling the FEMA Mapping and Insurance eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the “Flood Map-Related Fees” section.

A tutorial for LOMR-F is available at www.fema.gov/flood-maps/tutorials.

6.5.3 Letters of Map Revision

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit www.fema.gov/flood-maps/change-your-flood-zone and download the form “MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision”. Visit the “Flood Map-Related Fees” section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Mapping and Insurance eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Berrien County FIRM are listed in Table 26. Please note that this table only includes LOMCs that have been issued on the FIRM panels updated by this map revision. For all other areas within this county, users should be aware that revisions to the FIS Report made by prior LOMRs may not be reflected herein and users will need to continue to use the previously issued LOMRs to obtain the most current data.

Table 26: Incorporated Letters of Map Change
[Not Applicable to this Flood Risk Project]

6.5.4 Physical Map Revisions

A Physical Map Revisions (PMR) is an official republication of a community’s NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community’s chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit www.fema.gov and visit the “Flood Map Revision Processes” section.

6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community. FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard

analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit www.fema.gov to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

6.5.6 Community Map History

The current FIRM presents flooding information for the entire geographic area of Berrien County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBM) and/or Flood Boundary and Floodway Maps (FBFMs) may have been prepared for the incorporated communities and the unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 27, "Community Map History." A description of each of the column headings and the source of the date is also listed below.

- *Community Name* includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.
- *Initial Identification Date (First NFIP Map Published)* is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or "pending" (for Preliminary FIS Reports) is shown. If the community is listed in Table 27 but not identified on the map, the community is treated as if it were unmapped.
- *Initial FHBM Effective Date* is the effective date of the first FHBM. This date may be the same date as the Initial NFIP Map Date.
- *FHBM Revision Date(s)* is the date(s) that the FHBM was revised, if applicable.
- *Initial FIRM Effective Date* is the date of the first effective FIRM for the community.
- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are completed or revised, each community listed should have its FIRM dates updated accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as PMRs of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

The initial effective date for the Berrien County FIRMs in countywide format was 04/17/2006.

Table 27: Community Map History

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Bainbridge, Township of ^{1,2}	04/17/2006	N/A	N/A	04/17/2006	N/A
Baroda, Township of ²	04/17/2006	N/A	N/A	04/17/2006	TBD
Baroda, Village of ^{1,2}	04/17/2006	N/A	N/A	04/17/2006	N/A
Benton, Charter Township of	06/28/1974	06/28/1974	03/05/1976	04/03/1978	TBD 04/17/2006
Benton Harbor, City of	05/24/1974	05/24/1974	06/10/1977	05/15/1978	TBD 04/17/2006
Berrien, Township of	08/16/1988	N/A	N/A	08/16/1988	04/17/2006
Berrien Springs, Village of	08/01/1975	08/01/1975	N/A	04/30/1986	04/17/2006
Bertrand, Township of ²	04/17/2006	N/A	N/A	04/17/2006	N/A
Bridgman, City of	06/07/1974	06/07/1974	N/A	11/15/1979	TBD 04/17/2006
Buchanan, City of	10/24/1975	10/24/1975	N/A	04/16/1993	04/17/2006
Buchanan, Township of	10/08/1976	10/08/1976	N/A	03/02/1998	04/17/2006
Chikaming, Township of	06/28/1974	06/28/1974	07/16/1976	06/01/1978	TBD 04/17/2006
Coloma, Charter Township of	06/28/1974	06/28/1974	03/05/1976	02/15/1984	04/17/2006
Coloma, City of	06/03/1977	06/03/1977	N/A	01/18/1980	04/17/2006
Eau Claire, Village of ^{1,2}	04/17/2006	N/A	N/A	04/17/2006	N/A
Galien, Township of ²	04/17/2006	N/A	N/A	04/17/2006	N/A
Galien, Village of ^{1,2}	04/17/2006	N/A	N/A	04/17/2006	N/A
Grand Beach, Village of	06/28/1974	06/28/1974	N/A	02/15/1978	TBD 04/17/2006
Hagar, Township of	05/31/1974	05/31/1974	03/05/1976	12/01/1977	TBD 04/17/2006
Lake, Charter Township of	06/28/1974	06/28/1974	10/01/1976	11/01/1979	TBD 04/17/2006
Lincoln, Charter Township of	07/26/1974	07/26/1974	12/05/1975	03/01/1978	TBD 04/17/2006

¹ No Special Flood Hazard Areas Identified

² This community did not have a FIRM prior to the first countywide FIRM for Berrien County

Table 27: Community Map History (continued)

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Michiana, Village of	06/14/1974	06/14/1974	N/A	05/01/1978	TBD 04/17/2006
New Buffalo, City of	05/31/1974	05/31/1974	06/11/1976	12/04/1979	TBD 04/17/2006
New Buffalo, Township of	07/26/1974	07/26/1974	09/24/1976	12/04/1979	TBD 04/17/2006
Niles, Charter Township of	06/21/1974	06/21/1974	06/18/1976	06/03/1986	04/17/2006
Niles, City of	05/31/1974	05/31/1974	06/25/1976	07/16/1987	04/17/2006
Oronoko, Charter Township of	08/02/1974	08/02/1974	08/06/1976	06/17/1986	04/17/2006
Pipestone, Township of ²	04/17/2006	N/A	N/A	04/17/2006	N/A
Royalton, Township of	06/21/1974	06/21/1974	06/25/1976	12/01/1977	04/17/2006
Shoreham, Village of	06/21/1974	06/21/1974	06/18/1976	02/26/1982	TBD 04/17/2006
Sodus, Township of	08/02/1974	08/02/1974	06/25/1976	04/03/1978	04/17/2006
St. Joseph, Charter Township of	07/30/1976	07/30/1976	N/A	06/18/1980	TBD 04/17/2006
St. Joseph, City of	05/24/1974	05/24/1974	03/05/1976	02/01/1978	TBD 04/17/2006
Stevensville, Village of	09/26/1975	09/26/1975	N/A	04/17/2006	TBD
Three Oaks, Township of ²	04/17/2006	N/A	N/A	04/17/2006	TBD
Three Oaks, Village of ^{1,2}	04/17/2006	N/A	N/A	04/17/2006	N/A
Watervliet, Charter Township of	11/12/1976	11/12/1976	N/A	11/16/1983	04/17/2006
Watervliet, City of	05/31/1974	05/31/1974	06/11/1976	11/16/1983	04/17/2006
Weesaw, Township of ²	04/17/2006	N/A	N/A	04/17/2006	N/A

¹ No Special Flood Hazard Areas Identified

² This community did not have a FIRM prior to the first countywide FIRM for Berrien County

SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

7.1 Contracted Studies

Table 28 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

Table 28: Summary of Contracted Studies Included in this FIS Report

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
All Base (Zone A) Studies	04/17/2006	MDEQ & Fuller, Mossbarger, Scott and May Engineers, Inc. (FMSM)	EMC-2001-CO-0058	September 2004	Benton, Charter Township of; Bertrand, Township of; Buchanan, Township of; Chikaming, Township of; Coloma, Charter Township of; Galien, Township of; Hagar, Township of; Lake, Charter Township of; New Buffalo, City of; New Buffalo, Township of; Niles, Charter Township of; Oronoko, Charter Township of; Royalton, Township of; Sodus, Township of; St. Joseph, City of; St. Joseph, Charter Township of; Three Oaks, Township of; Watervliet, Charter Township of
Bedortha Drain	04/17/2006	MDEQ	EMC-2003-GR-0022	August 2004	Bridgman, City of; Lake, Charter Township of
Bridgman City Drain	04/17/2006	MDEQ	EMC-2003-GR-0022	August 2004	Bridgman, City of; Lake, Charter Township of
Dowagiac River	07/16/1987	STS Consultants, Ltd.	EMW-83-C-1169	August 1985	Niles, City of; Niles, Charter Township of
Galien River	06/1979	Williams & Works, Inc.	H-4538	May 1978	New Buffalo, City of; New Buffalo, Township of
Glenlord Road Drain (North Branch)	05/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Lincoln, Charter Township of
Glenlord Road Drain (South Branch)	05/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Lincoln, Charter Township of
Goodrow Drain	05/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Lincoln, Charter Township of

Table 28: Summary of Contracted Studies Included in this FIS Report (continued)

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Granger Drain	02/1977	Johnson & Anderson, Inc.	H-3816	October 1976	Hager, Township of
Granger Drain Tributary	02/1977	Johnson & Anderson, Inc.	H-3816	October 1976	Hager, Township of
Hickory Creek	05/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Lincoln, Charter Township of
Hickory Creek	05/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Lincoln, Charter Township of
Hickory Creek	12/1979	Williams & Works, Inc.	H-4538	August 1978	Shoreham, Village of; St. Joseph, City of; St. Joseph, Charter Township of
Lake Michigan	TBD	STARR II	HSFEHQ-09-D-0370	August 2017	Benton, Charter Township of; Benton Harbor, City of; Bridgman, City of; Chikaming, Township of; Grand Beach, Village of; Hagar, Township of; Lake, Charter Township of; Lincoln, Charter Township of; Michiana, Village of; New Buffalo, City of; New Buffalo, Township of; Shoreham, Village of; St. Joseph, City of
McCoy Creek	04/16/1993	USDA, SCS	Unknown	January 1986	Buchanan, City of
Ox Creek	11/1977	Johnson & Anderson, Inc.	H-3816	February 1977	Benton Harbor, City of
Ox Creek	06/1977	Johnson & Anderson, Inc.	H-3816	February 1977	Benton, Charter Township of
Parker / Richardson Drain	05/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Lincoln, Charter Township of
Paw Paw Lake	04/17/2006	USACE	Unknown	November 1983	Coloma, Charter Township of; Watervliet, Charter Township of
Paw Paw River	06/1977	USDA, SCS	Unknown	July 1976	Benton, Charter Township of
Paw Paw River	11/1977	USDA, SCS	Unknown	July 1976	Benton Harbor, City of

Table 28: Summary of Contracted Studies Included in this FIS Report (continued)

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Paw Paw River	08/15/1983	USDA, SCS	Unknown	July 1976	Coloma, City of; Coloma, Charter Township of
Paw Paw River	02/1977	USDA, SCS	Unknown	July 1976	Hagar, Township of;
Paw Paw River	12/1976	USDA, SCS	Unknown	July 1976	St. Joseph, City of
Paw Paw River	05/16/1983	USDA, SCS	Unknown	July 1976	Watervliet, City of; Watervliet, Charter Township of
St. Joseph River	06/1977	Johnson & Anderson, Inc.	H-3816	February 1977	Benton, Charter Township of
St. Joseph River	11/1977	Johnson & Anderson, Inc.	H-3816	February 1977	Benton Harbor, City of
St. Joseph River	07/16/1987	STS Consultants, Ltd.	EMW-83-C-1169	August 1985	Niles, City of
St. Joseph River	06/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Oronoko, Charter Township of; Sodus, Township of
St. Joseph River	02/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Royalton, Township of;
St. Joseph River	12/1976	Johnson & Anderson, Inc.	H-3816	July 1976	St. Joseph, City of; St. Joseph, Charter Township of
St. Joseph River (Left Overbank)	02/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Royalton, Township of
Tanner Creek	04/17/2006	MDEQ	EMC-2003-GR-0022	August 2004	Bridgman, City of
Tributary A	12/1977	Johnson & Anderson, Inc.	H-3816	March 1977	Chikaming, Township of
Tributary B	12/1977	Johnson & Anderson, Inc.	H-3816	March 1977	Chikaming, Township of
Tributary C	12/1977	Johnson & Anderson, Inc.	H-3816	March 1977	Chikaming, Township of
West Tributary St. Joseph River	07/16/1987	STS Consultants, Ltd.	EMW-83-C-1169	August 1985	Niles, City of
White Creek – East Branch	04/1977	Johnson & Anderson, Inc.	H-3816	April 1977	Grand Beach, Village of; New Buffalo, Township of
White Creek – West Branch	11/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Michiana, Village of

Table 28: Summary of Contracted Studies Included in this FIS Report (continued)

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
William & Esseg Drain	04/17/2006	MDEQ	EMC-2003-GR-0022	August 2004	Bridgman, City of
Yellow Creek	02/1977	Johnson & Anderson, Inc.	H-3816	December 1976	Royalton, Township of

7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and previous Flood Risk Projects are shown in Table 29. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

Table 29: Community Meetings

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Bainbridge, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, Michigan Department of Environmental Quality (MDEQ), and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Baroda, Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Baroda, Village of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Benton, Charter Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Benton Harbor, City of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Berrien, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Berrien Springs, Village of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Bertrand, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Bridgman, City of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants

Table 29: Community Meetings (continued)

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Buchanan, City of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Buchanan, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Chikaming, Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Coloma, City of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Coloma, Charter Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Eau Claire, Village of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Galien, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Galien, Village of	4/17/2006	7/28/2003	Initial CCO	Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Grand Beach, Village of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Hagar, Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants

Table 29: Community Meetings (continued)

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Lake, Charter Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Lincoln, Charter Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Michiana, Village of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
New Buffalo, City of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
New Buffalo, Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Niles, City of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Niles, Charter Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Oronoko, Charter Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Pipestone, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA

Table 29: Community Meetings (continued)

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Royalton, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Shoreham, Village of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Sodus, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
St. Joseph, City of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
St. Joseph, Charter Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Stevensville, Village of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants

Table 29: Community Meetings (continued)

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Three Oaks, Township of	TBD	9/10/2012	Project Discovery	Representatives of FEMA, MDEQ, STARR, and other local participants
		8/28/2017	Flood Risk Review	Representatives of FEMA, STARR II, and other local participants
Three Oaks, Village of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Watervliet, City of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Watervliet, Charter Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA
Weesaw, Township of	4/17/2006	7/28/2003	Initial CCO	Representatives of Berrien County, MDEQ, and FEMA
		12/6/2004	Final CCO	Representatives of Berrien County, MDEQ, and FEMA

SECTION 8.0 – ADDITIONAL INFORMATION

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see www.fema.gov.

Table 30 is a list of the locations where FIRMs for Berrien County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

Table 30: Map Repositories

Community	Address	City	State	Zip Code
Bainbridge, Township of ¹	Township Building Department 7315 Territorial Road	Watervliet	MI	49098
Baroda, Township of ¹	Township Office 9091 First Street	Baroda	MI	49101
Baroda, Village of ¹	Village Office 9051 First Street	Baroda	MI	49101
Benton, Charter Township of	Benton Township Office 1725 Territorial Road	Benton Harbor	MI	49022
Benton Harbor, City of	City Hall 200 E. Wall Street	Benton Harbor	MI	49022
Berrien, Township of	Berrien Township Office 8916 M-140	Berrien Center	MI	49102
Berrien Springs, Village of	Village Hall 112 N. Cass Street	Berrien Springs	MI	49103
Bertrand, Township of	Bertrand Township Hall 3835 Buffalo Road	Buchanan	MI	49107
Bridgman, City of	City Hall 9765 Maple Street	Bridgman	MI	49106
Buchanan, City of	City Hall 302 N. Redbud Trail	Buchanan	MI	49107
Buchanan, Township of	Township Hall 15235 Main Street	Buchanan	MI	49107
Chikaming, Township of	Chikaming Township Center 13535 Red Arrow Highway	Harbert	MI	49115
Coloma, Charter Township of	Township Hall 4919 Paw Paw Lake Road	Coloma	MI	49038
Coloma, City of	City Hall 119 N. Paw Paw Street	Coloma	MI	49038

¹ No Special Flood Hazard Areas Identified

Table 30: Map Repositories (continued)

Community	Address	City	State	Zip Code
Eau Claire, Village of ¹	Village Hall 6625 Main Street	Eau Claire	MI	49111
Galien, Township of	Township Hall 2261 Olive Branch Road	Galien	MI	49113
Galien, Village of ¹	Village Hall 121 S. Cleveland Avenue	Galien	MI	49113
Grand Beach, Village of	Village Hall 48200 Perkins Boulevard	Grand Beach	MI	49117
Hagar, Township of	Hagar Township Hall 3900 Riverside Road	Riverside	MI	49084
Lake, Charter Township of	Lake Township Hall 3220 Shawnee Road	Bridgman	MI	49106
Lincoln, Charter Township of	Lincoln Township Hall 2055 W. John Beers Road	Stevensville	MI	49127
Michiana, Village of	Village Hall 4000 Cherokee Drive	Michiana	MI	49117
New Buffalo, City of	City Hall 224 W. Buffalo Street	New Buffalo	MI	49117
New Buffalo, Township of	Township Hall 17425 Red Arrow Highway	New Buffalo	MI	49117
Niles, Charter Township of	Township Hall 320 Bell Road	Niles	MI	49120
Niles, City of	City Hall 333 N. Second Street, Ste. 301	Niles	MI	49120
Oronoko, Charter Township of	Oronoko Township Hall 4583 E. Snow Road	Berrien Springs	MI	49103
Pipestone, Township of	Pipestone Township Hall 3581 Park Road	Eau Claire	MI	49111
Royalton, Township of	Royalton Township Hall 980 Miner Road	St. Joseph	MI	49085
Shoreham, Village of	Shoreham Village Hall 2120 Brown School Road	St. Joseph	MI	49085
Sodus, Township of	Township Hall 4056 King Drive	Sodus	MI	49126
St. Joseph, Charter Township of	Township Hall 3000 Washington Avenue	St. Joseph	MI	49085
St. Joseph, City of	City Hall 700 Broad Street	St. Joseph	MI	49085
Stevensville, Village of	Village Hall 5768 St. Joseph Avenue	Stevensville	MI	49127
Three Oaks, Township of	Township Hall 6810 US Highway 12	Three Oaks	MI	49128

Table 30: Map Repositories (continued)

Community	Address	City	State	Zip Code
Three Oaks, Village of ¹	Village Hall 21 N. Elm Street	Three Oaks	MI	49128
Watervliet, Charter Township of	Township Hall 4959 M-140	Watervliet	MI	49098
Watervliet, City of	City Hall 158 W. Pleasant	Watervliet	MI	49098
Weesaw, Township of	Weesaw Township Hall 13518 State Street	New Troy	MI	49119

¹ No Special Flood Hazard Areas Identified

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM Databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 31.

Table 31 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the State NFIP Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of State and local GIS data in their state.

Table 31: Additional Information

FEMA and the NFIP	
FEMA and FEMA Engineering Library website	www.fema.gov/flood-maps/products-tools/know-your-risk/engineers-surveyors-architects
NFIP website	www.fema.gov/flood-insurance
NFHL Dataset	msc.fema.gov
FEMA Region V	Federal Regional Center 536 South Clark St., 6th Floor Chicago, IL 60605 (312) 408-5500
Other Federal Agencies	
USGS website	www.usgs.gov
Hydraulic Engineering Center website	www.hec.usace.army.mil
State Agencies and Organizations	
State NFIP Coordinator	Matt Occhipinti, Michigan NFIP Coordinator Michigan Department of Environmental Quality 350 Ottawa Avenue Grand Rapids, Michigan 49503 (616) 204-1708 occhipintim@michigan.gov
State GIS Coordinator	Eric Swanson, Information Center Director Center for Shared Solutions and Technology Partnerships Michigan Department of Information Technology Romney Building, 10th Floor 111 South Capitol Avenue Lansing, Michigan 48933 (517) 373-7910

SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES

Table 32 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.

Table 32: Bibliography and References

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article," Volume, Number, etc.</i>	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
Berrien 1996	Berrien County Planning and GIS Mapping	<i>Aerial Photography photogrammetrically compiled at a scale of 1:24000 feet</i>	Berrien County Planning and GIS Mapping	Berrien County, MI	October 1996	
Berrien 2012	Center for Shared Solutions and Technology Partnerships	<i>Michigan Geographic Framework: Berrien County</i>	Berrien County GIS	Berrien County, MI	June 2012	
CACR 2008	Center for Applied Coastal Research	<i>Cross-shore Numerical Model CSHORE for Waves, Currents, Sediment Transport and Beach Profile Evolution. Research Report No. CACR-08-01</i>	Kobayashi, N., and Farhadzadeh, A.	University of Delaware, Newark, Delaware	2008	
FEMA 10/2016	Federal Emergency Management Agency	<i>Lake Michigan Water Level and Wave Modeling: ADCIRC+SWAN Production Runs</i>	FEMA	Washington, D.C.	October 2016	
FEMA 2006	Federal Emergency Management Agency	<i>Berrien County, MI NFHL Dataset</i>	FEMA	Washington, D.C.	4/17/2006	https://hazards.fema.gov
FEMA 2006a	Federal Emergency Management Agency	<i>Flood Insurance Study, Berrien County, MI, All Jurisdictions</i>	FEMA	Washington, D.C.	4/17/2006	https://hazards.fema.gov
FEMA 2006b	Federal Emergency Management Agency	<i>Flood Insurance Rate Map, Berrien County, MI, All Jurisdictions</i>	FEMA	Washington, D.C.	4/17/2006	https://hazards.fema.gov

Table 32: Bibliography and References (continued)

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
FEMA 2014	Federal Emergency Management Agency	<i>FEMA Great Lakes Coastal Guidelines, Appendix D.3 Update</i>	FEMA	Washington, D.C.	January 2014	
FEMA 2016	Federal Emergency Management Agency	<i>Lake Michigan Water Level and Wave Modeling: Model Creation and Validation Runs</i>	FEMA	Washington, D.C.	June 2016	
FEMA 2018	Federal Emergency Management Agency	<i>Guidance for Flood Risk Analysis and Mapping: Coastal Wave Runup and Overtopping</i>	FEMA	Washington, D.C.	February 2018	https://www.FEMA.gov
JALBTCX 2013	U.S. Army Corps of Engineers (USACE), JALBTCX (Joint Airborne Lidar Bathymetry Technical Center of eXpertise)	<i>Source Floating Point Bare Earth Digital Elevation Models (DEM) with 1-meter Cell Resolution in GeoTif Format Coastal LiDAR Data and Bathymetry Data</i>	USACE Joint Airborne LiDAR Bathymetry Technical Center of Expertise	Kiln, MS	2013	https://catalog.data.gov/
NAIP 2012	United States Department of Agriculture	<i>National Agriculture Imagery Program Digital Orthophotography</i>	United States Department of Agriculture	Washington, D.C.	8/27/2012	
NHD 2013	United States Geological Survey	<i>National Hydrography Dataset - High Resolution</i>	United States Geological Survey	Washington, D.C.	1/31/2013	https://nhd.usgs.gov/
NOAA 2017	National Oceanic and Atmospheric Administration	<i>Datum Conversion Points</i>	National Oceanic and Atmospheric Administration	Washington, D.C.	August 2017	https://vdatum.noaa.gov/

Table 32: Bibliography and References (continued)

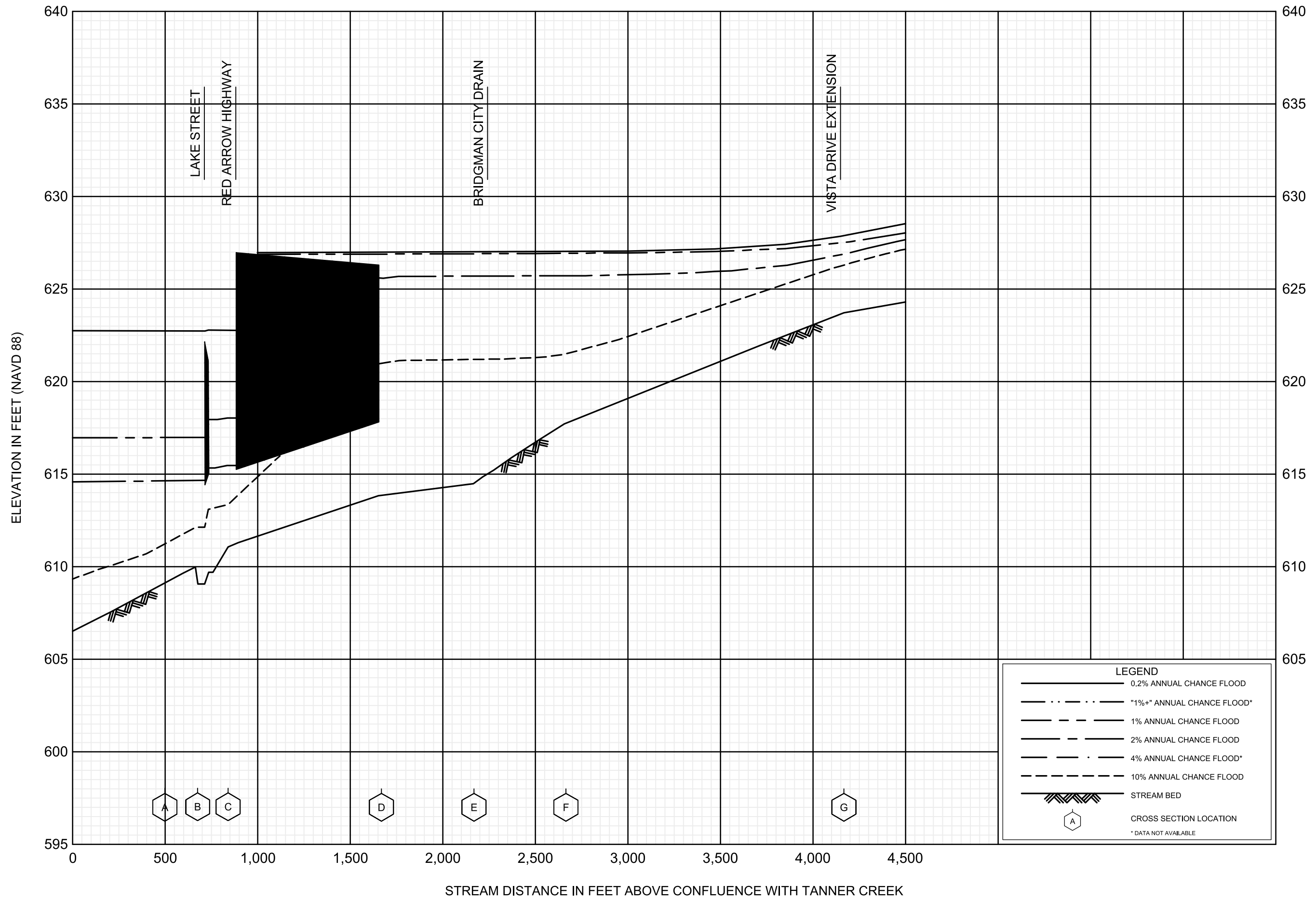
Citation in this FIS	Publisher/ Issuer	<i>Publication Title</i> , "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
STARR 2017a	Federal Emergency Management Agency	<i>Coastal Study Berrien County, MI</i>	STARR II	Berrien County, MI	August 2017	https://hazards.fema.gov
STARR 2017b	Federal Emergency Management Agency	<i>Summary Report of Coastal Engineering Analyses - Berrien County, Michigan</i>	STARR II	Washington, D.C.	August 2017	
Stockdon 2006	Coastal Engineering Vol. 53	<i>Empirical Parameterization of Setup, Swash, and Runup</i>	Stockdon		2006	
UNK1 2006	Unknown	<i>Transportation and Water lines for Berrien County</i>	Unknown		4/17/2006	
UNK2 2006	Unknown	<i>Public Land Survey System (PLSS) and Water areas for Berrien County, Michigan</i>	Unknown		4/17/2006	
USACE 1973	U.S. Army Corps of Engineers, Hydrologic Engineering Center	<i>HEC-2 Water-Surface Profile User's Manual</i>	USACE	Davis, CA	1973	
USACE 1984	U.S. Army Corps of Engineers, Hydrologic Engineering Center	<i>HEC-2 Water-Surface Profiles, Generalized Computer Program</i>	USACE	Davis, CA	April 1984	
USACE 1998	U.S. Army Corps of Engineers, Hydrologic Engineering Center	<i>HEC-HMS Hydrologic Modeling System</i>	USACE	Davis, CA	1998	

Table 32: Bibliography and References (continued)

Citation in this FIS	Publisher/ Issuer	<i>Publication Title</i> , "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE 2012	U.S. Army Corps of Engineers, ERDC/CHL	<i>Wave Runup Prediction for Flood Hazard Assessment</i>	Jeffrey Melby		October 2012	
USACE CERC 1984	U.S. Army Corps of Engineers, Coastal Engineering Research Center	<i>Shore Protection Manual</i>		Washington, D.C.	1984	
USACE ND1	U.S. Army Corps of Engineers	<i>HEC-RAS Hydraulic Modeling Software, Version Unknown</i>	USACE	Davis, CA		
USCB 2010	U.S. Census Bureau	<i>State and County Quick Facts</i>			2010	http://quickfacts.census.gov
USDA 1965	U.S. Department of Agriculture, Soil Conservation Service	<i>Technical Release No. 20, Computer Program for Project Formulation, Hydrology</i>	USDA		May 1965	
USDA 1975	U.S. Department of Agriculture, Soil Conservation Service	<i>Technical Release No. 55, Urban Hydrology for Small Watersheds</i>	USDA		January 1975	
USDA ND1	U.S. Department of Agriculture, Soil Conservation Service (NRCS)	<i>Technical Release 61 - WSP2 Water Surface Profile Computations</i>	USDA		Various Dates	
USGS 2011	United States Geological Survey	<i>National Atlas 2011</i>		Washington, D.C.	2011	

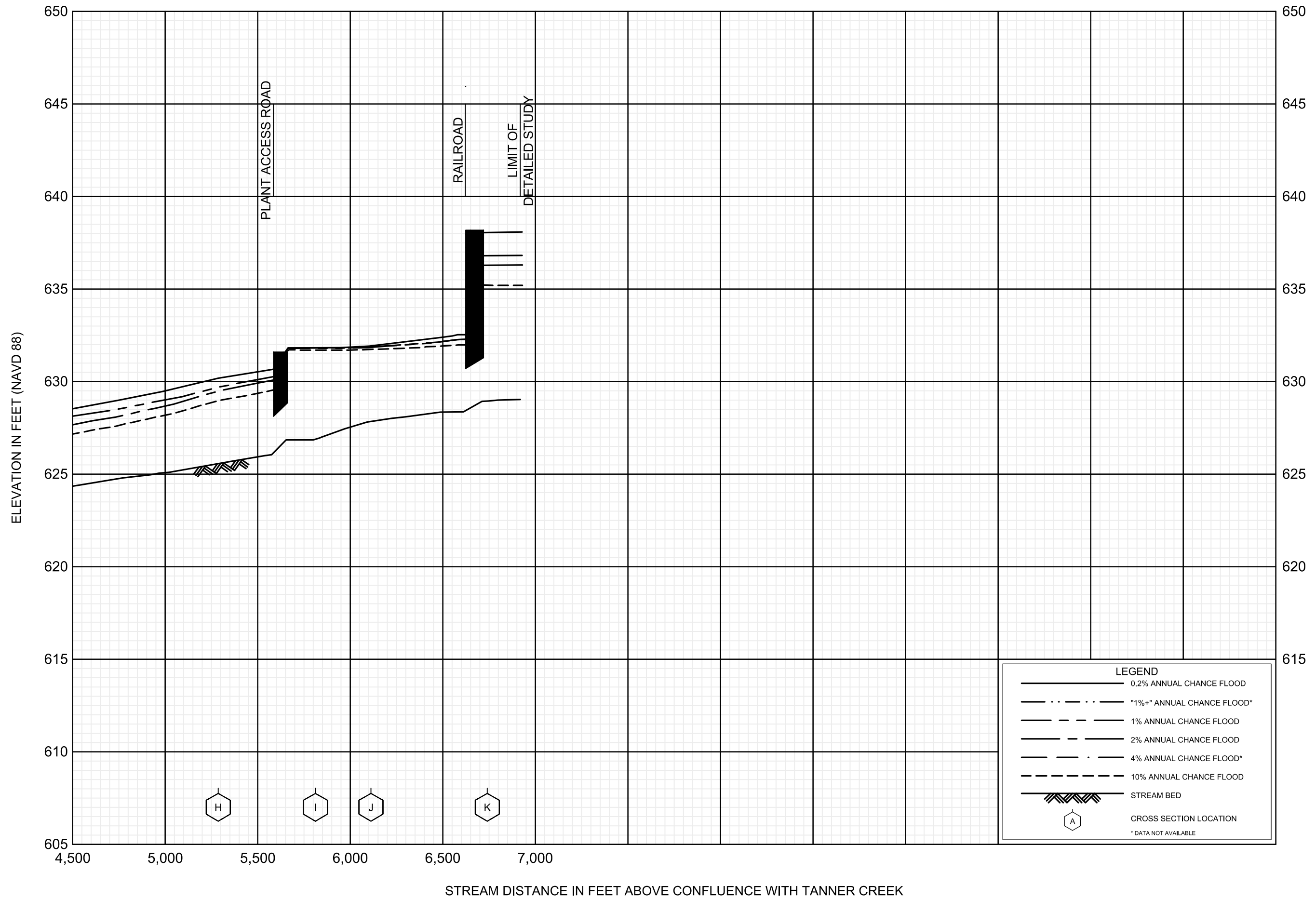
Table 32: Bibliography and References (continued)

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article," Volume, Number, etc.</i>	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USGS 2017	United States Geological Survey	<i>1/3 Arc-Second DEM Data</i>	USGS	Washington, D.C.	8/24/2017	
USWRC 1967	U.S Water Resources Council	<i>A Uniform Technique for Determining Flood Flow Frequencies, Bulletin No. 15</i>	USWRC		December 1967	
Van der Meer 2016	EuroTop	<i>Manual on Wave Overtopping of Sea Defenses and Related Structures: An Overtopping Manual Largely Based on European Research but for Worldwide Application</i>	Van der Meer		October 2016	www.overtopping-manual.com
Van Gent 2001	Journal of Waterway, Port, Coastal, and Ocean Engineering Vol. 127 (5)	<i>Wave Runup of Dikes with Shallow Foreshores</i>	Van Gent		2001	



FLOOD PROFILES
BEDORTHA DRAIN

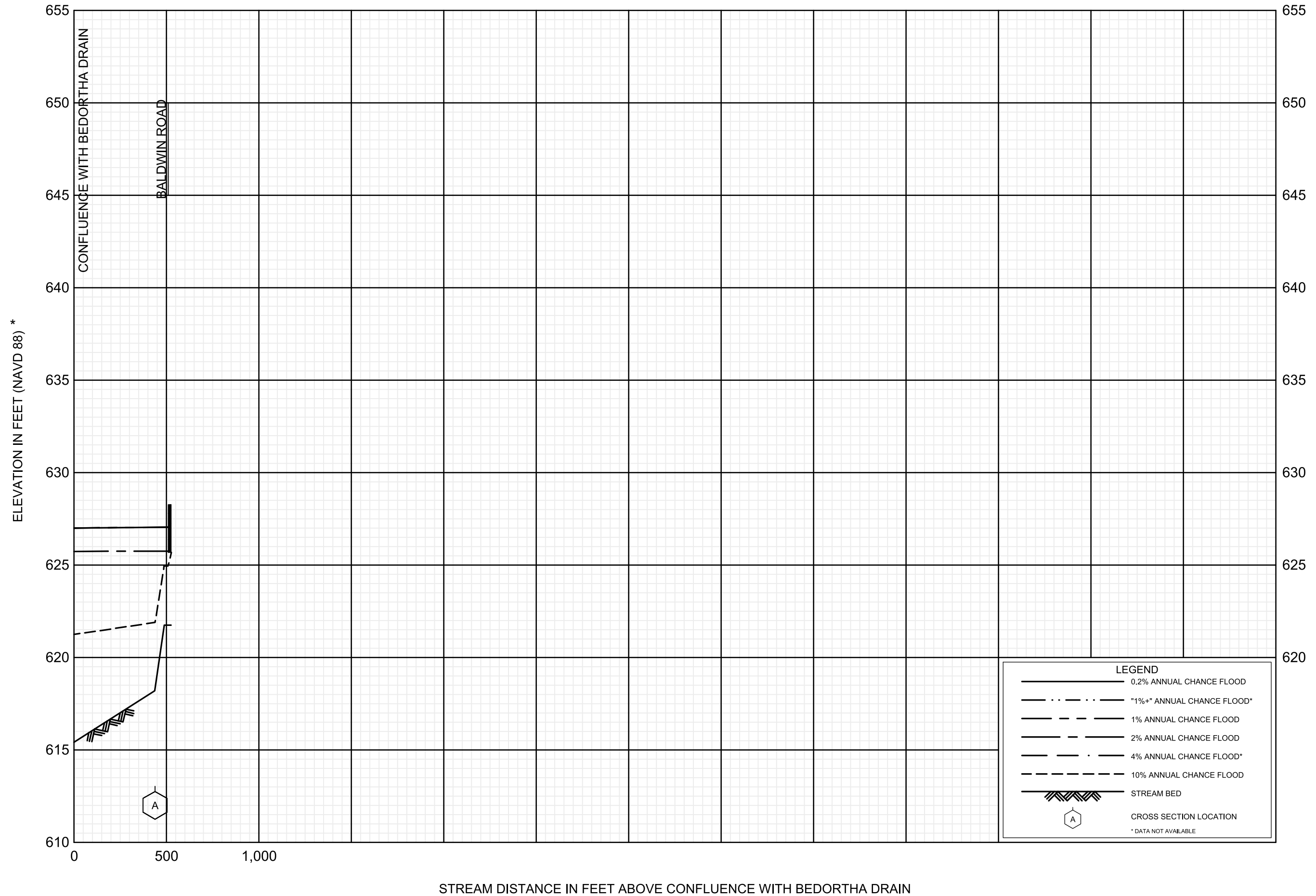
FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)



FLOOD PROFILES
BEDORTHA DRAIN

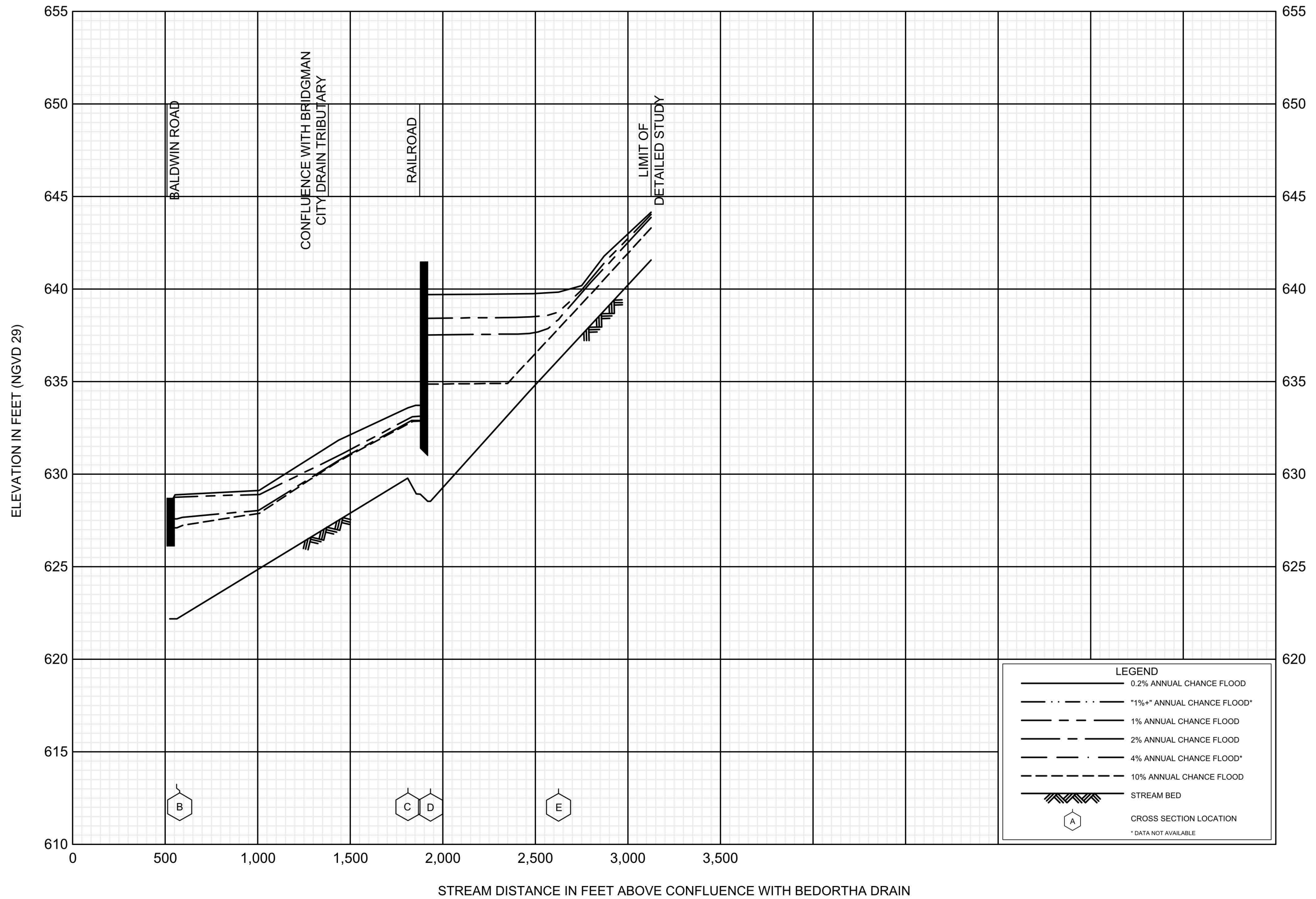
FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)

* Elevations upstream of this profile are shown in vertical datum NGVD29



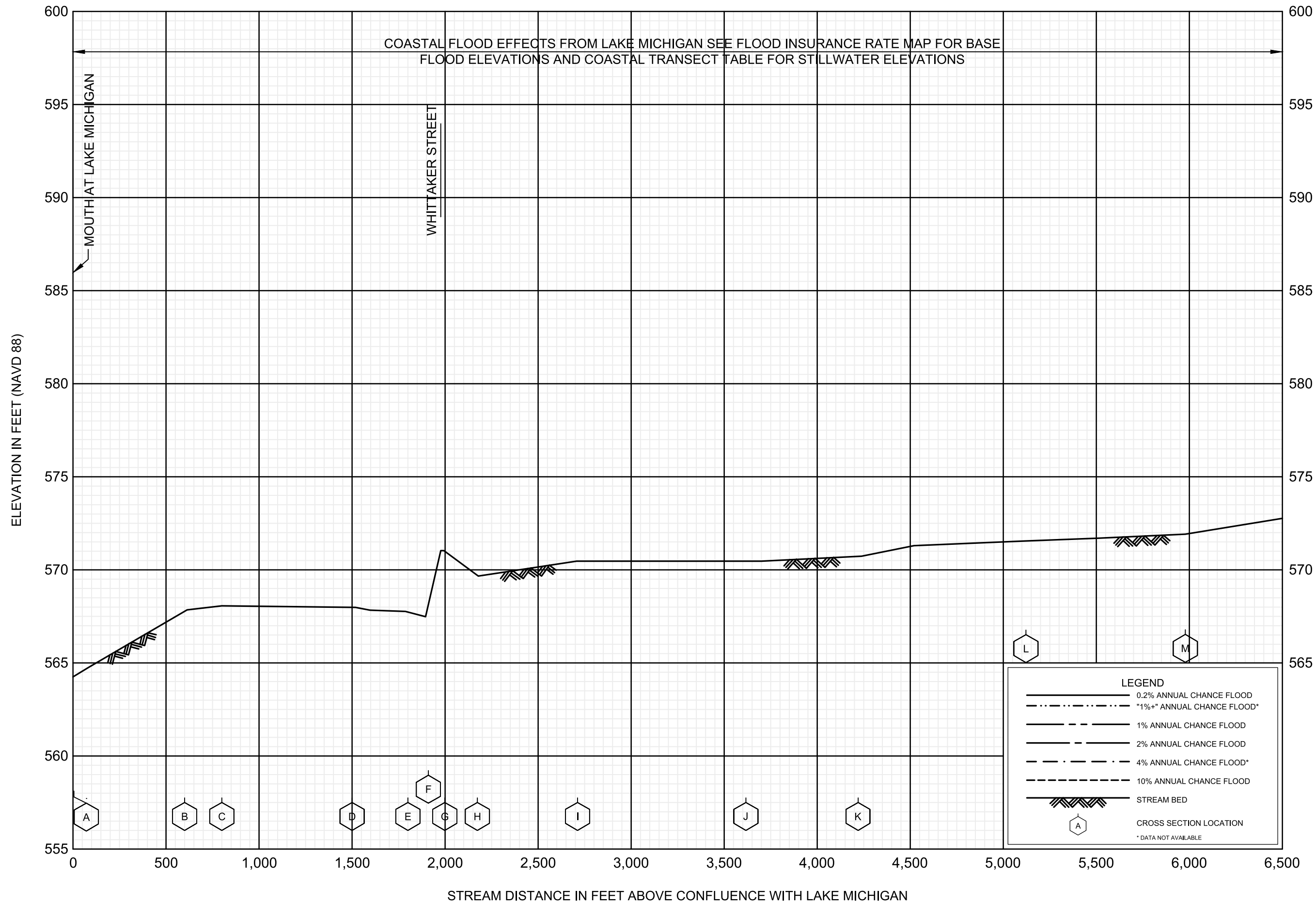
FLOOD PROFILES
BRIDGMAN CITY DRAIN

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)



FLOOD PROFILES
BRIDGMAN CITY DRAIN

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)



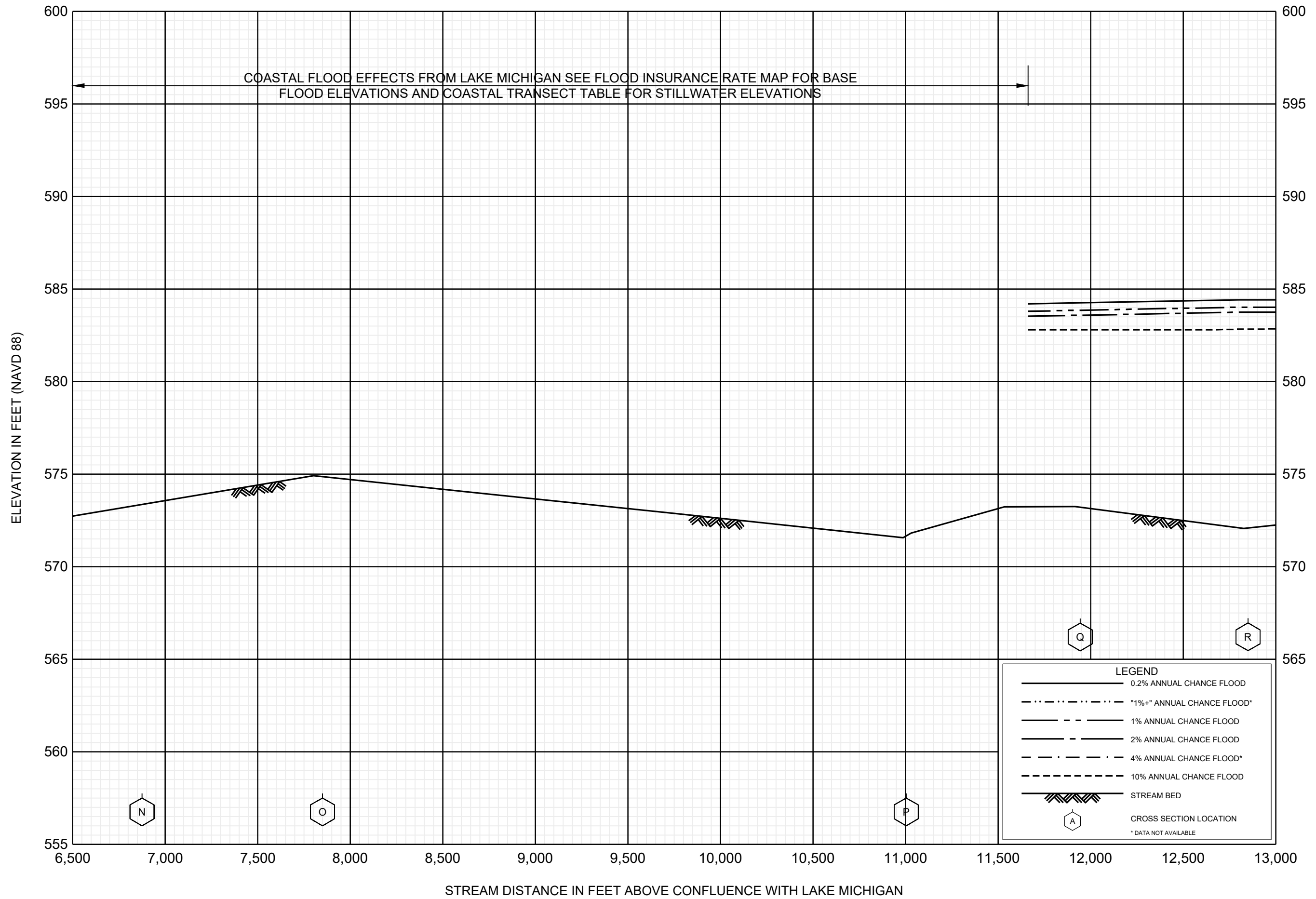
FLOOD PROFILES

GALIEN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BERRIEN COUNTY, MICHIGAN

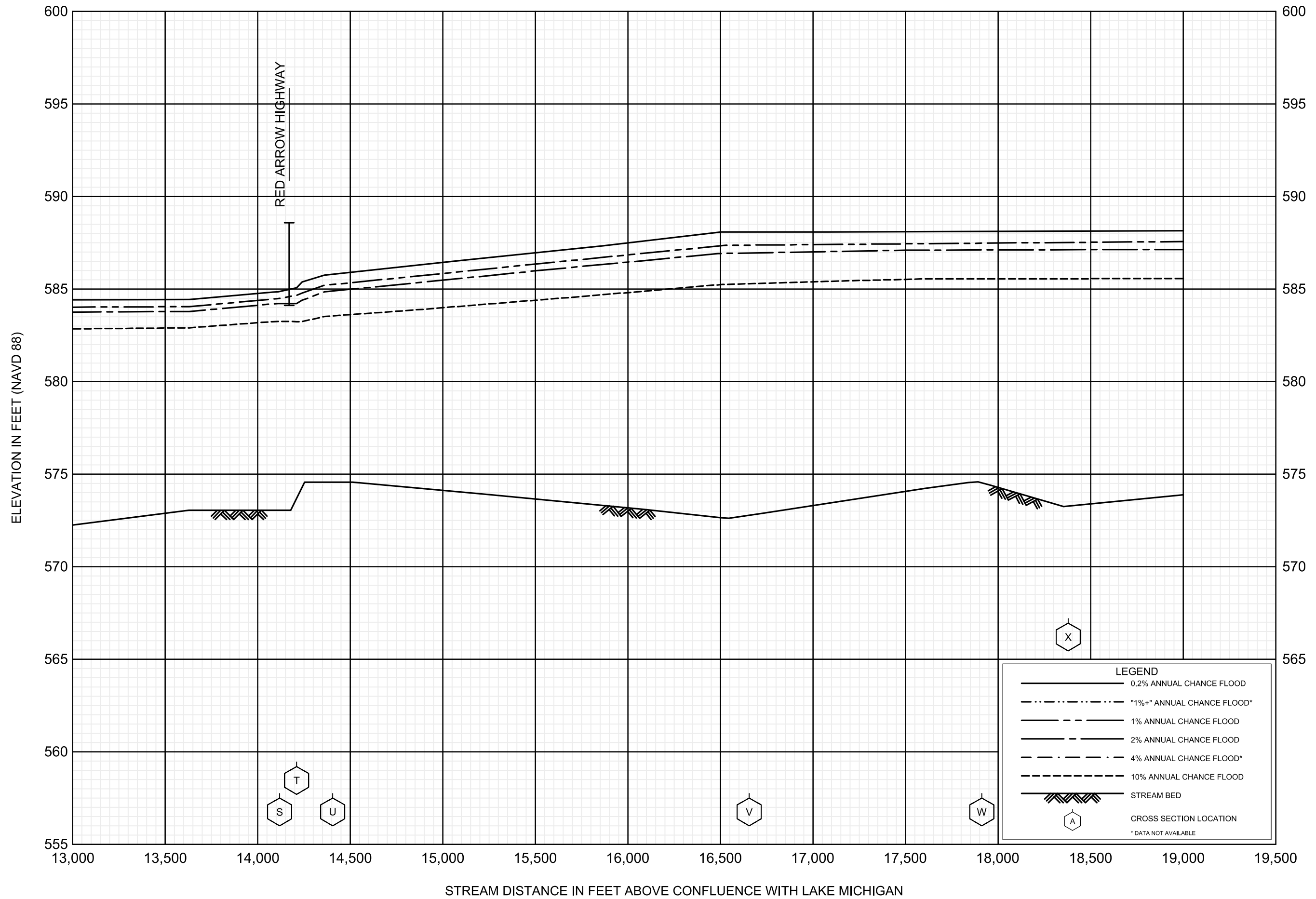
(ALL JURISDICTIONS)



FLOOD PROFILES

GALIEN RIVER

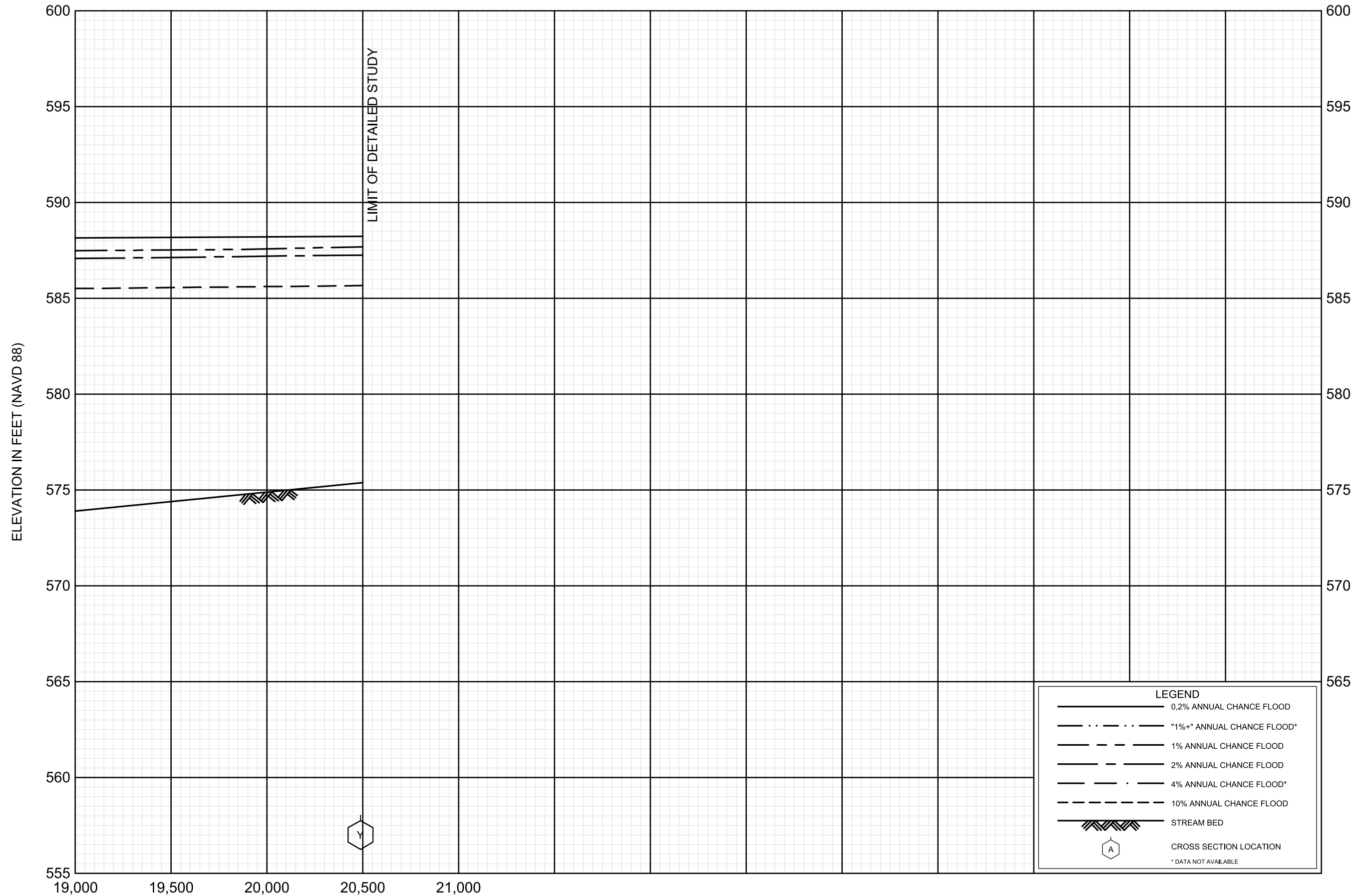
FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)



FLOOD PROFILES

GALIEN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)

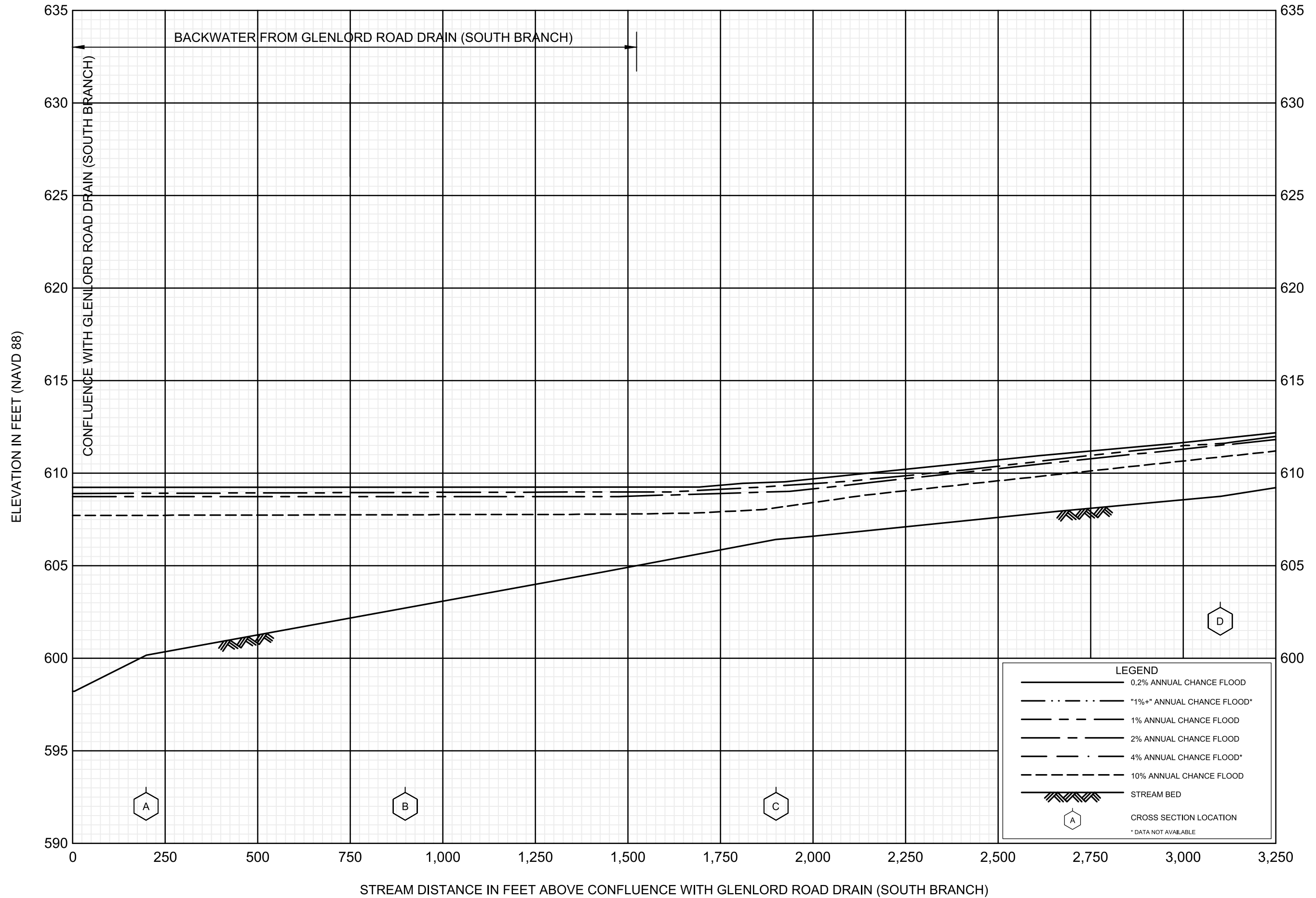


FLOOD PROFILES

GALIEN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH LAKE MICHIGAN



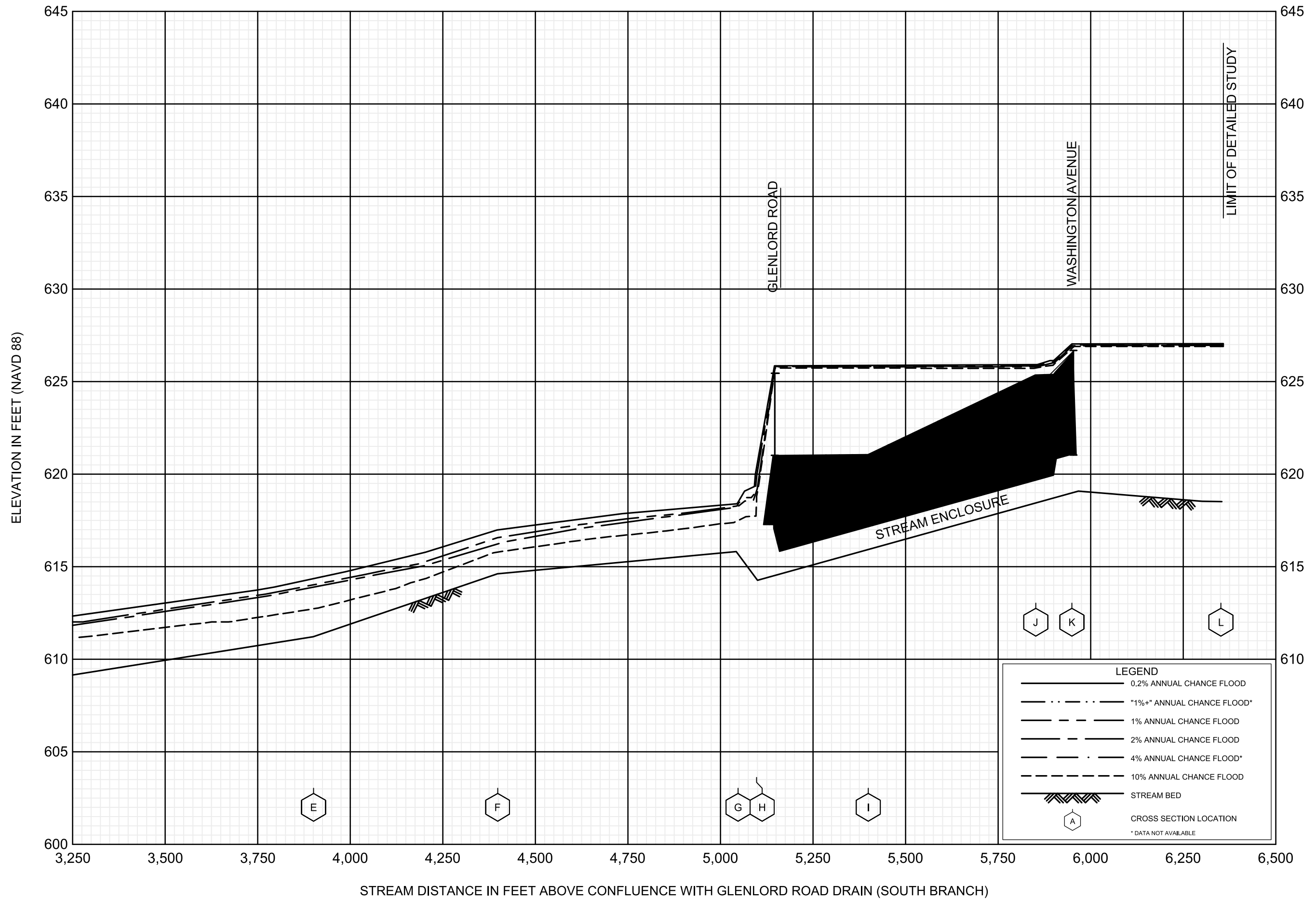
BACKWATER FROM GLENLORD ROAD DRAIN (SOUTH BRANCH)

CONFLUENCE WITH GLENLORD ROAD DRAIN (SOUTH BRANCH)

FLOOD PROFILES

GLENLORD ROAD DRAIN (NORTH BRANCH)

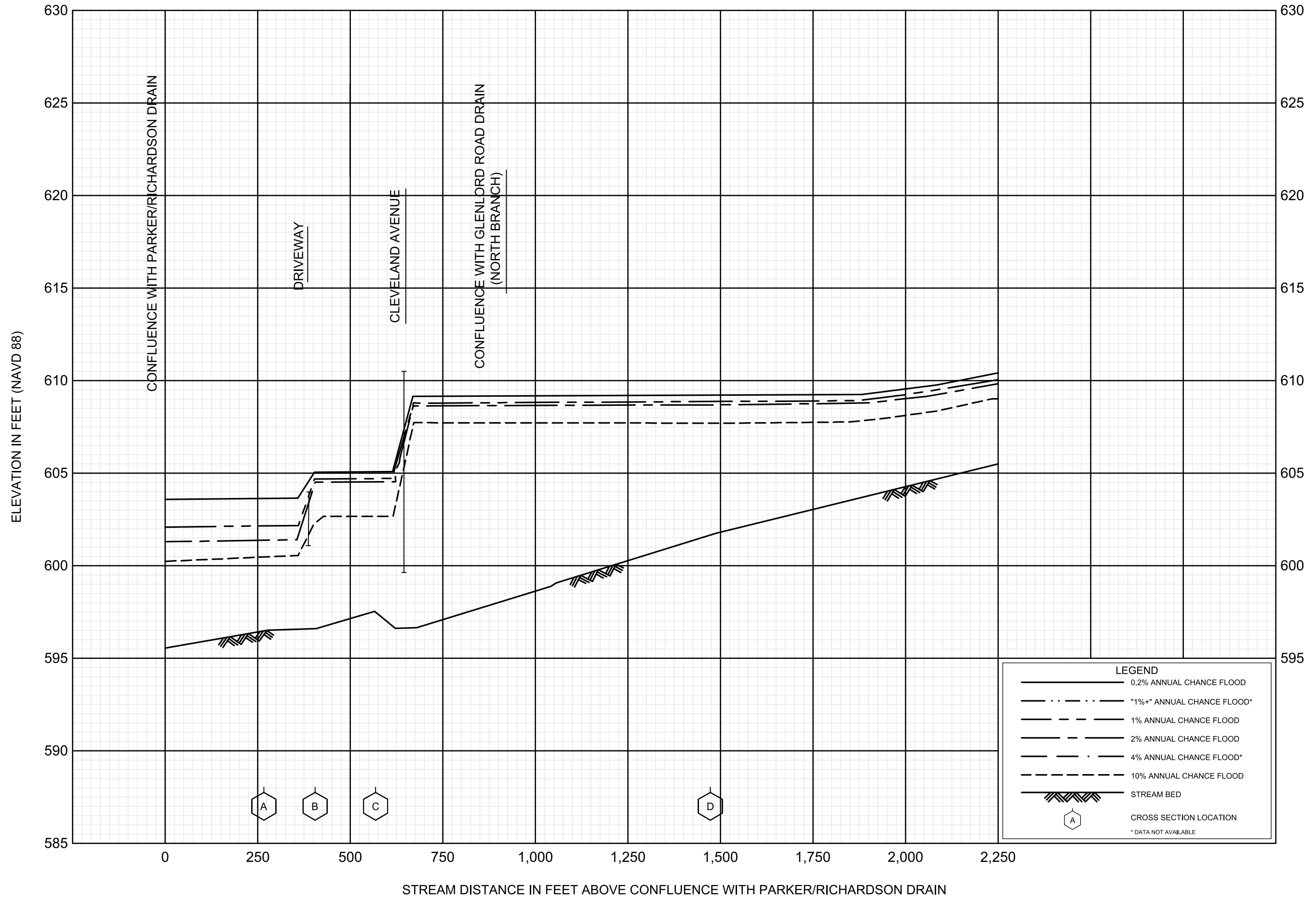
FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)



FLOOD PROFILES

GLENLORD ROAD DRAIN (NORTH BRANCH)

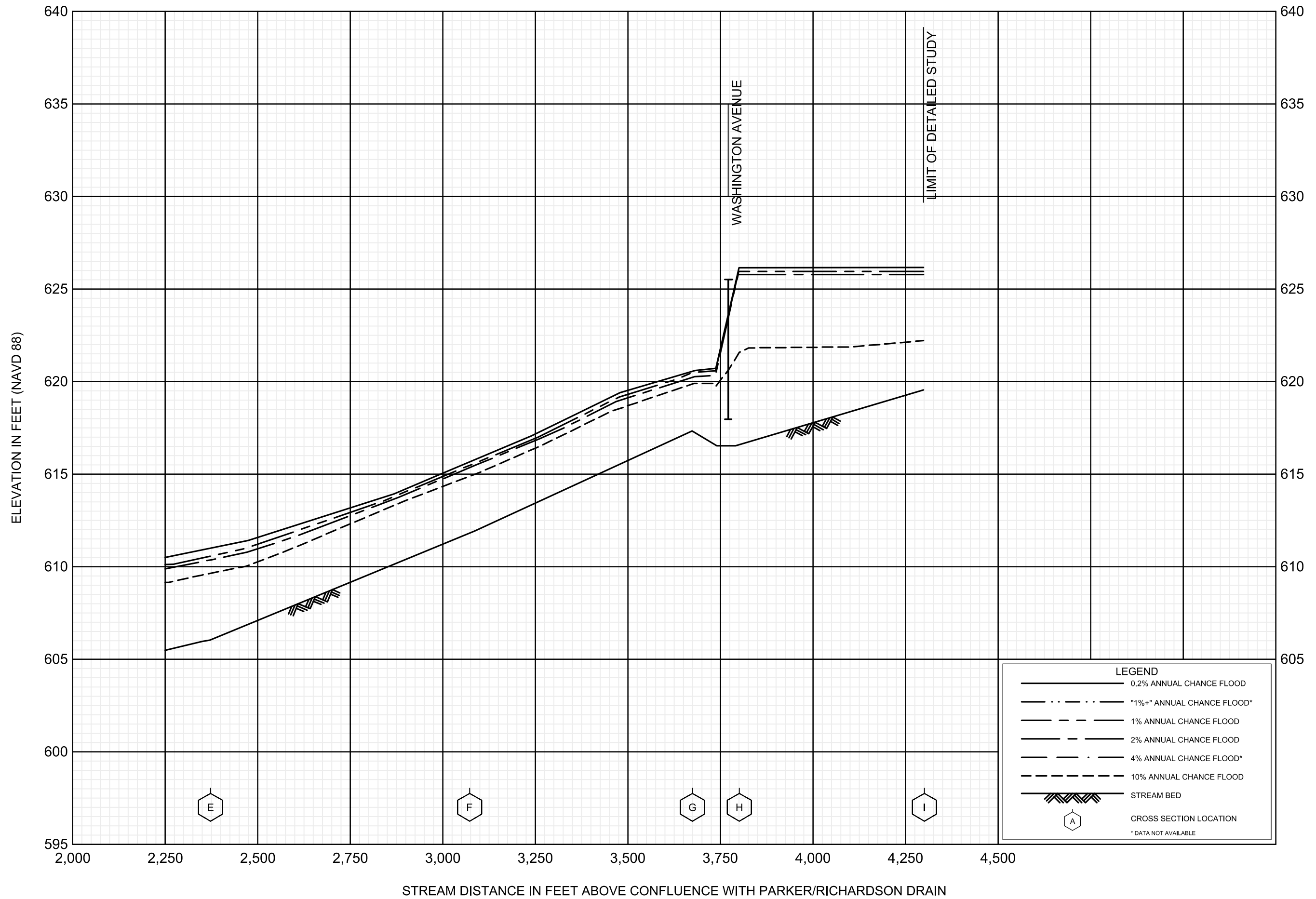
FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)



FLOOD PROFILES

GLENLORD ROAD DRAIN (SOUTH BRANCH)

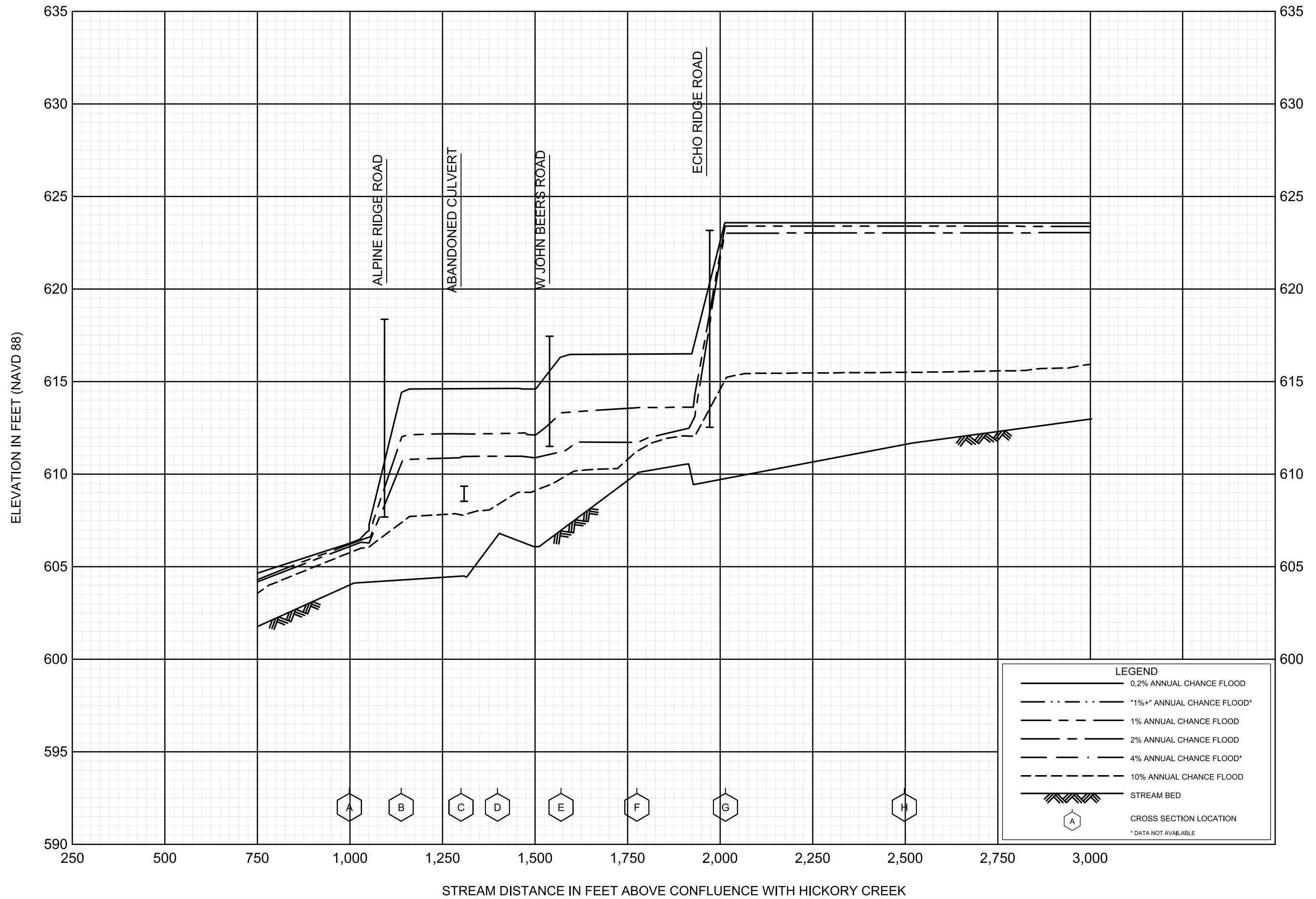
FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)



FLOOD PROFILES

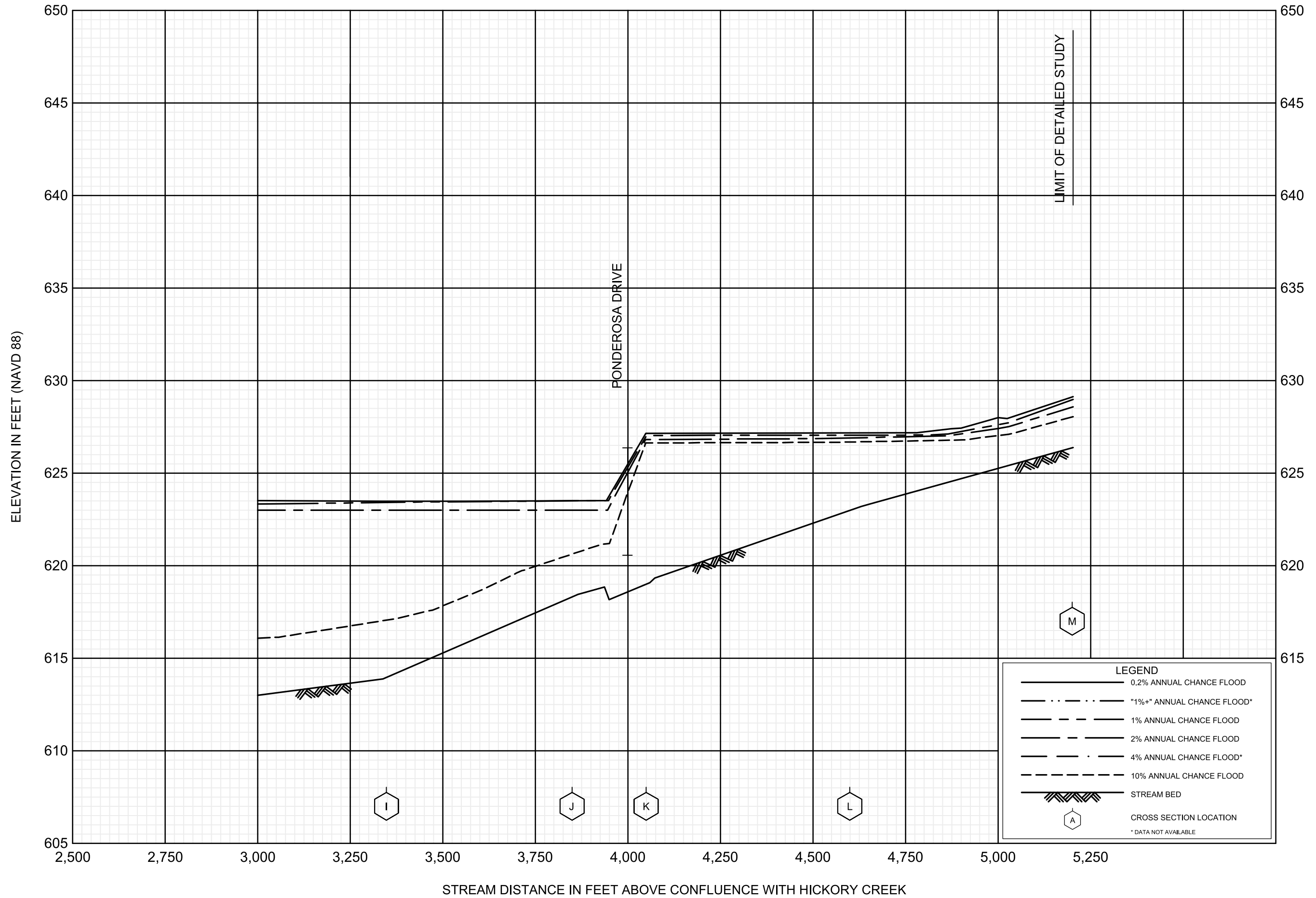
GLENLORD ROAD DRAIN (SOUTH BRANCH)

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)



FLOOD PROFILES
GOODROW DRAIN

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)



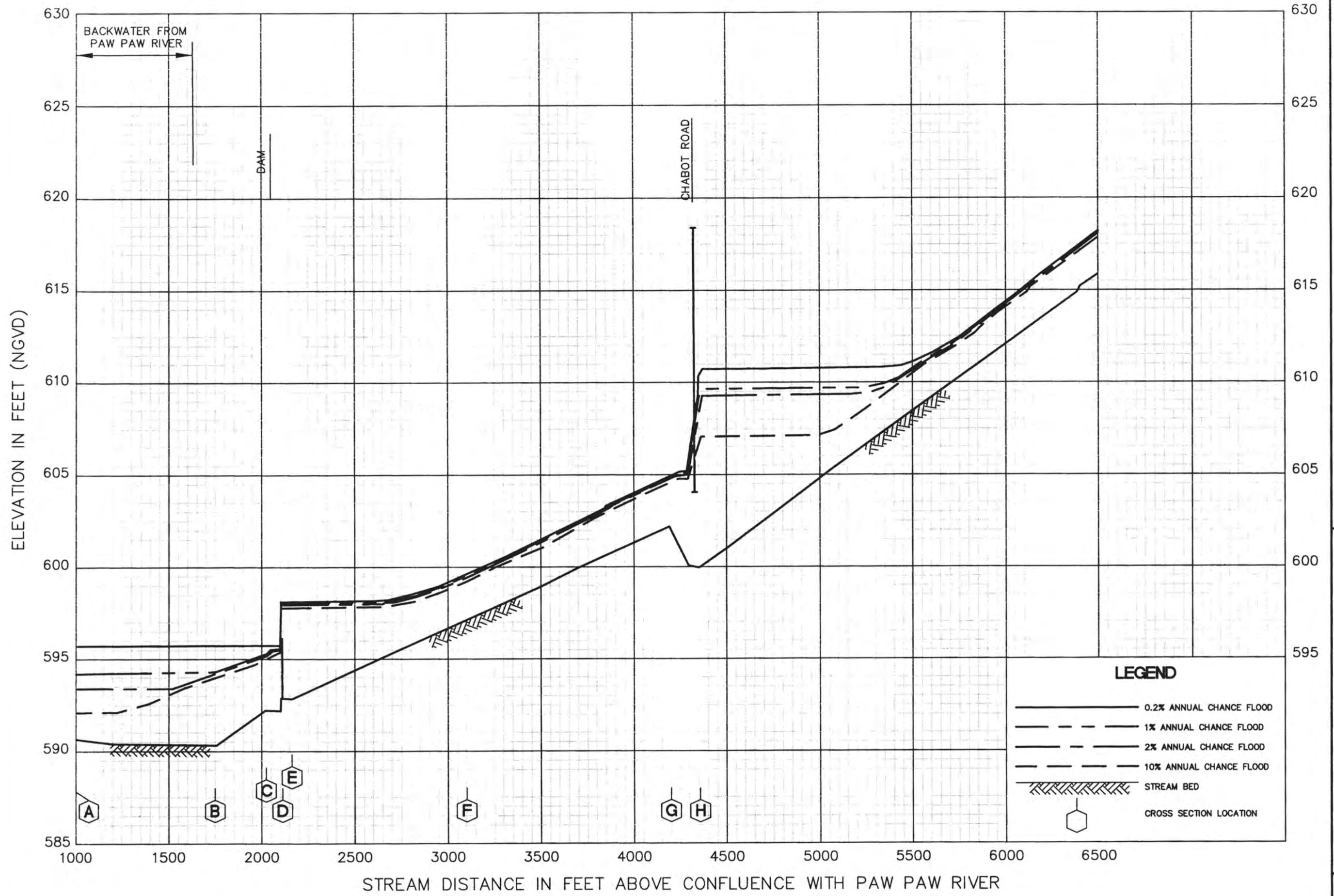
FLOOD PROFILES

GOODROW DRAIN

FEDERAL EMERGENCY MANAGEMENT AGENCY

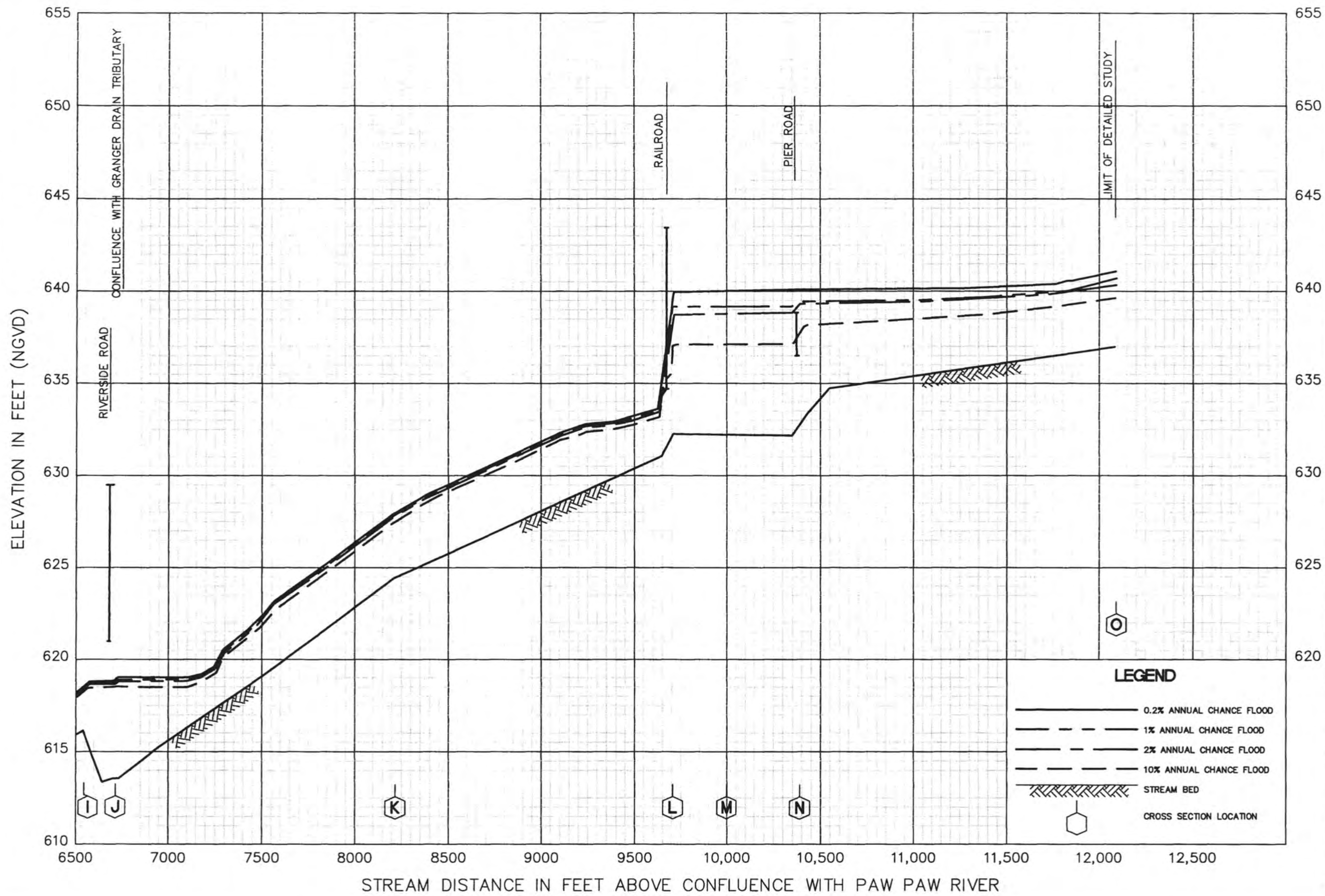
BERRIEN COUNTY, MICHIGAN

(ALL JURISDICTIONS)



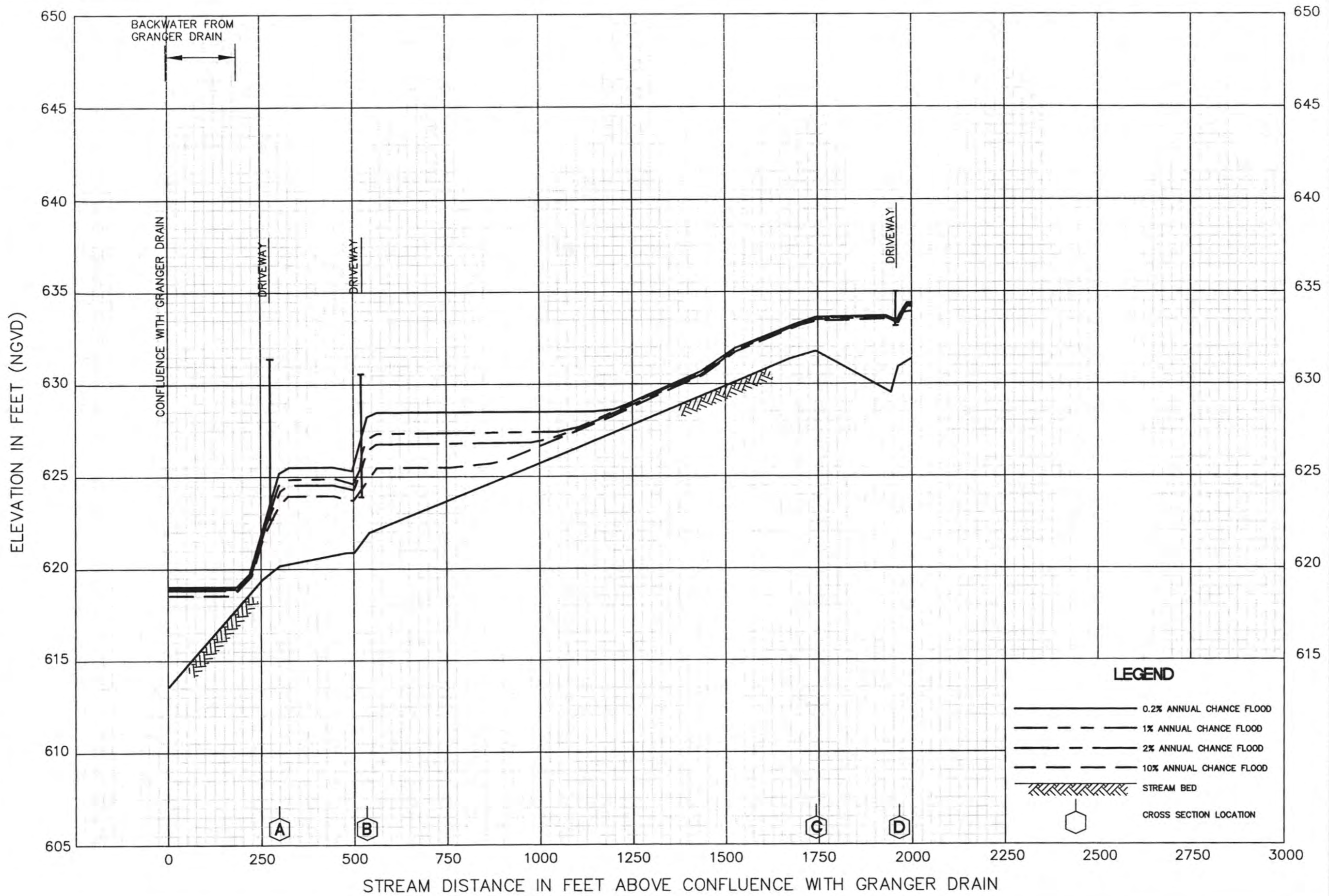
FLOOD PROFILES
GRANGER DRAIN

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)



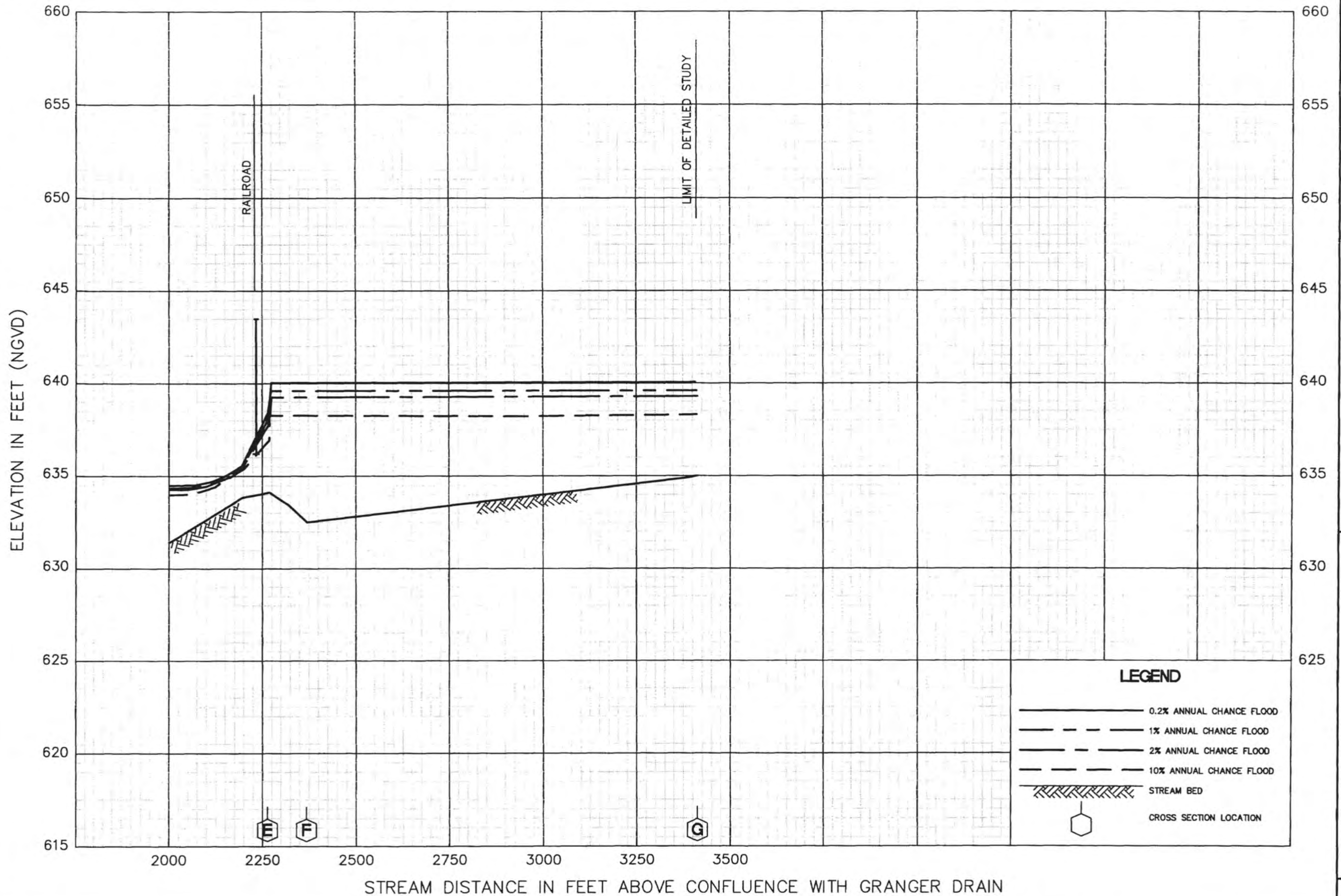
**FLOOD PROFILES
GRANGER DRAIN**

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)



FLOOD PROFILES
GRANGER DRAIN TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)



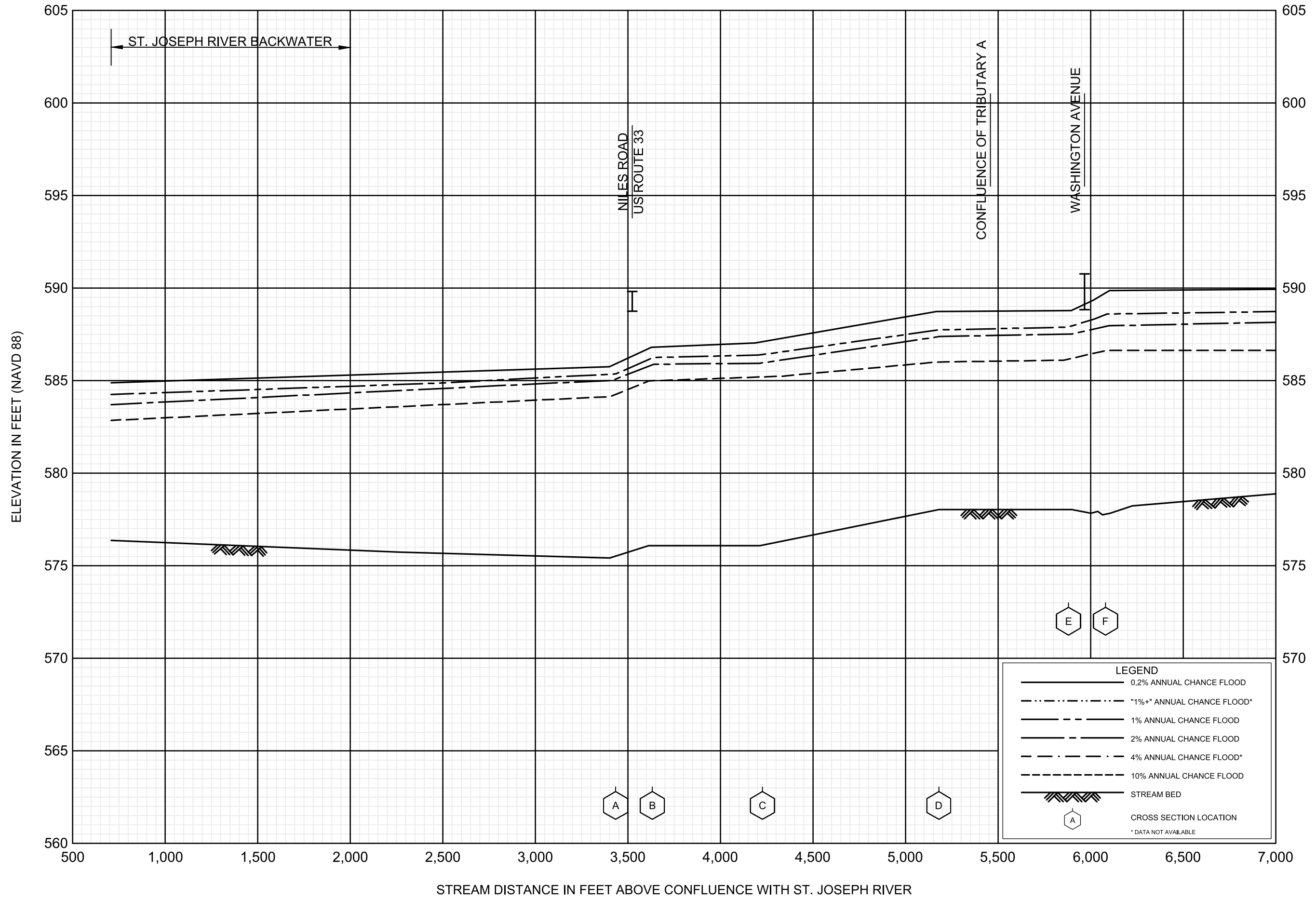
FLOOD PROFILES

GRANGER DRAIN TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

BERRIEN COUNTY, MICHIGAN

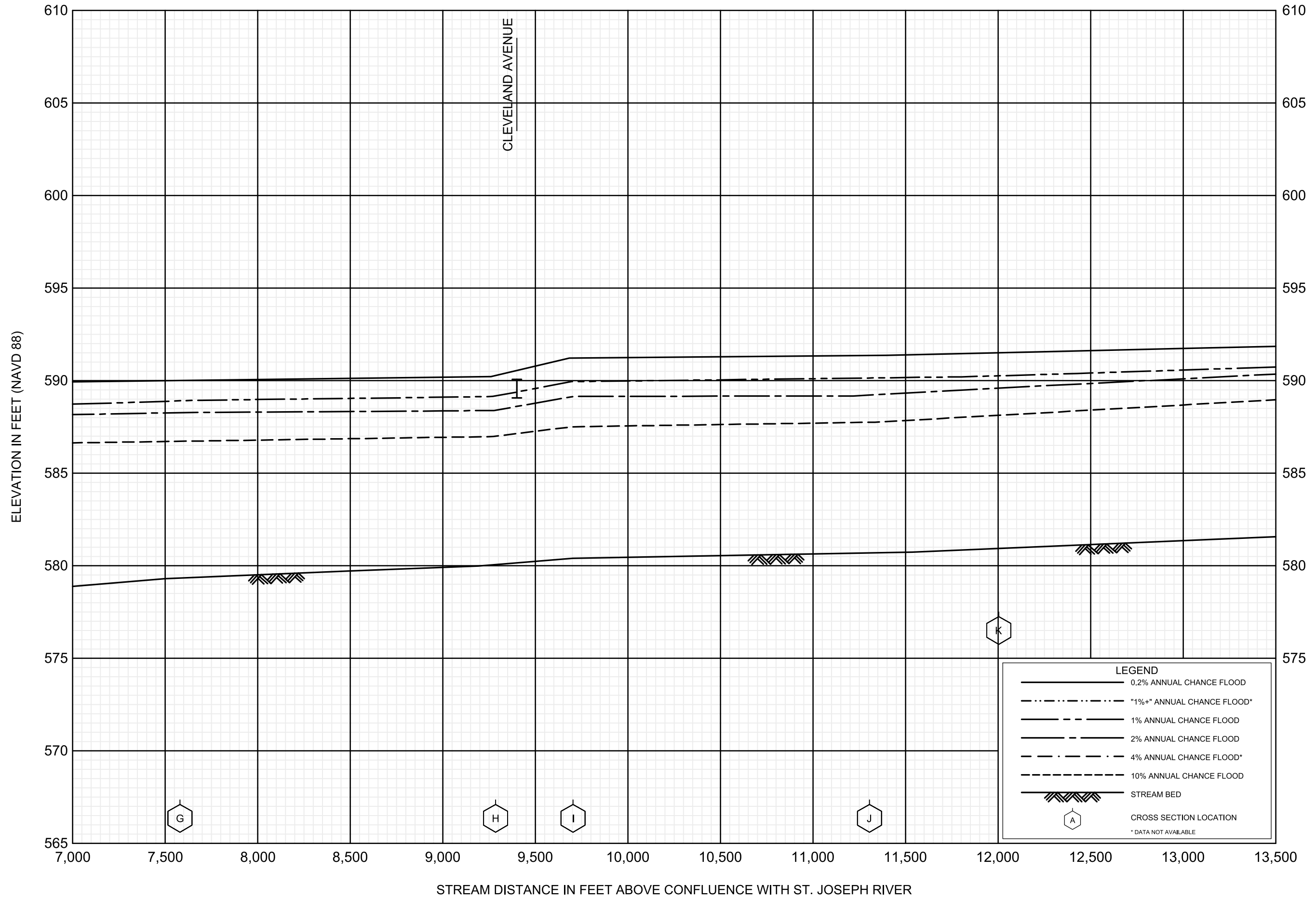
(ALL JURISDICTIONS)



FLOOD PROFILES

HICKORY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)



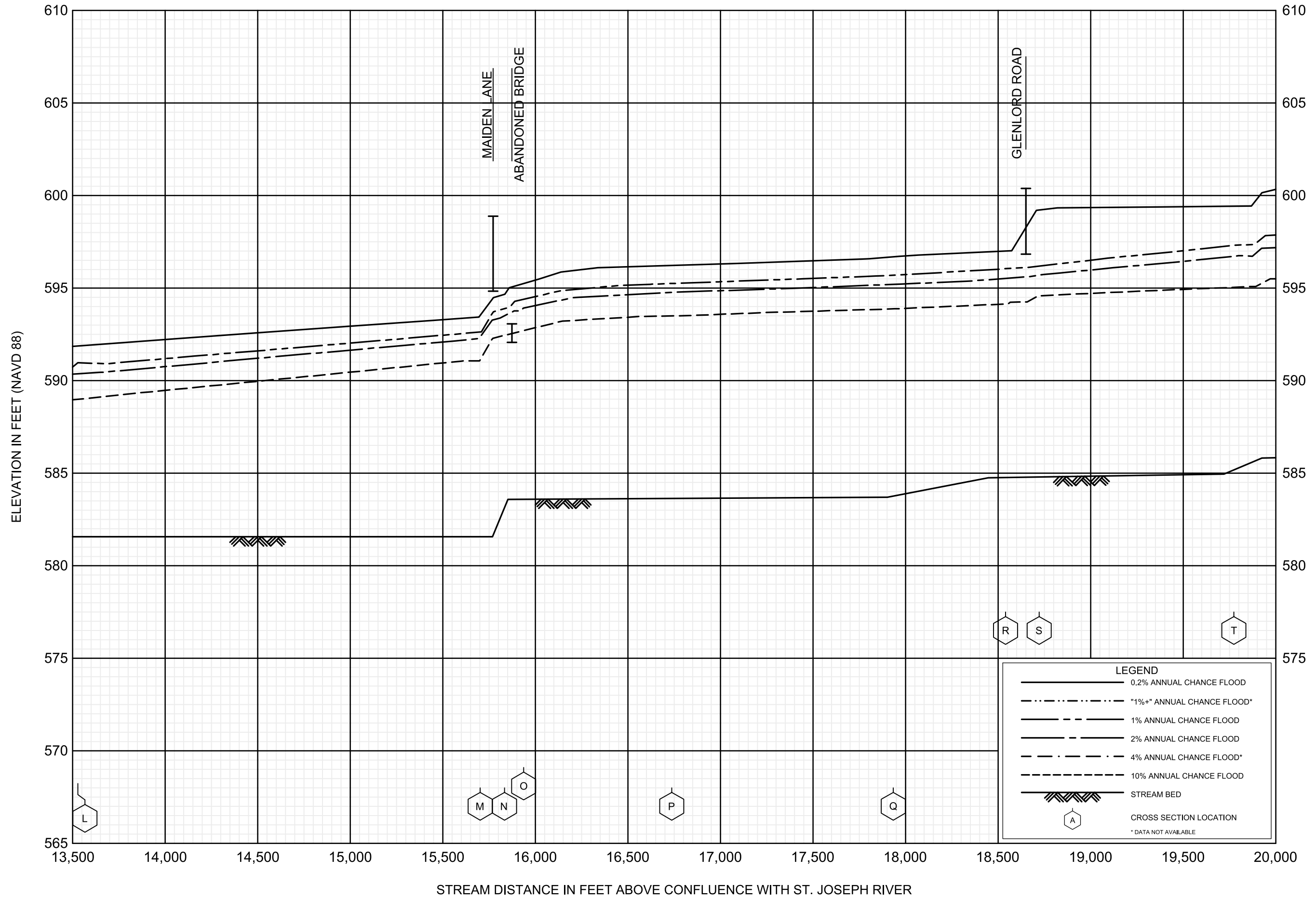
FLOOD PROFILES

HICKORY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

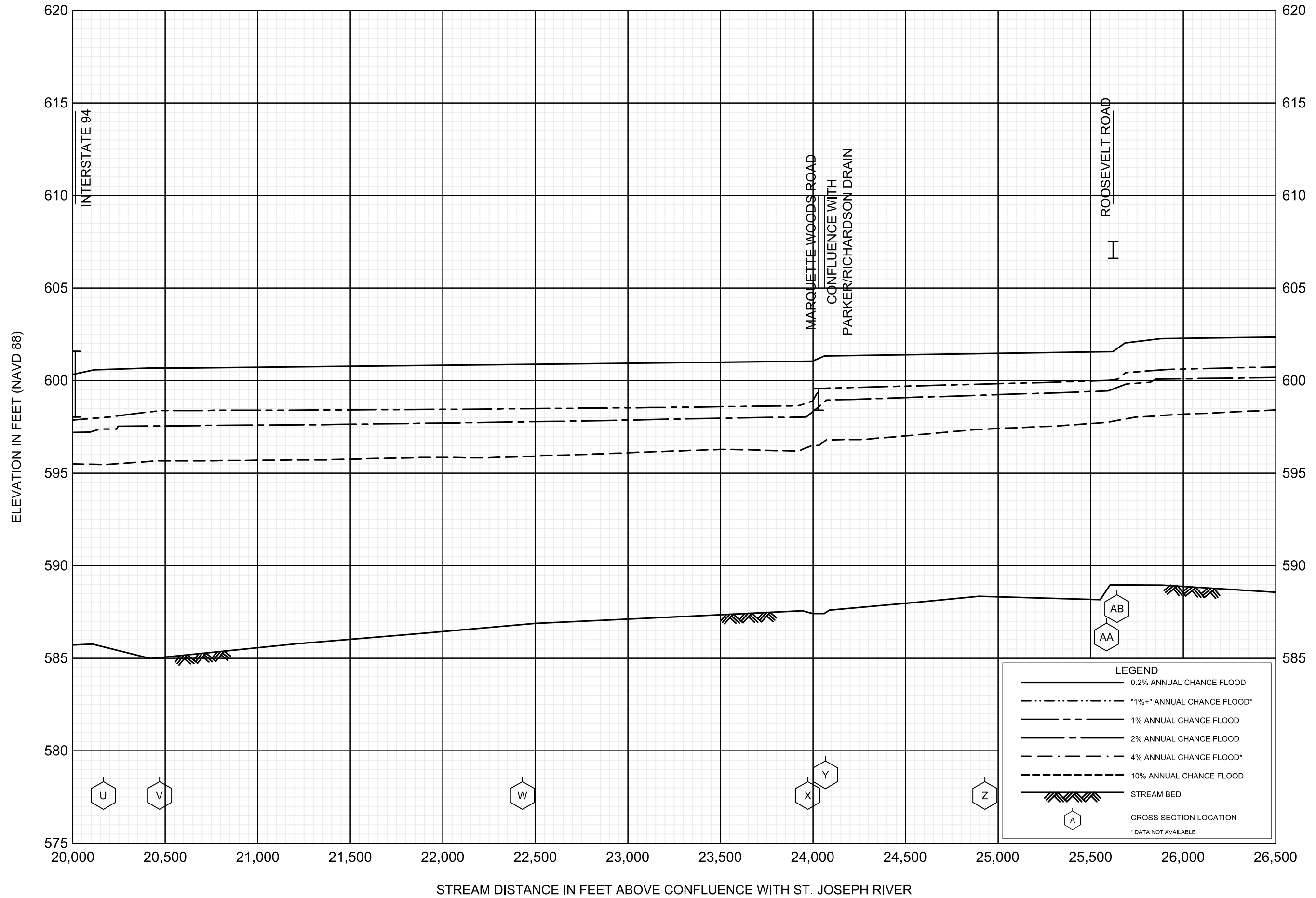
BERRIEN COUNTY, MICHIGAN

(ALL JURISDICTIONS)



FLOOD PROFILES
HICKORY CREEK

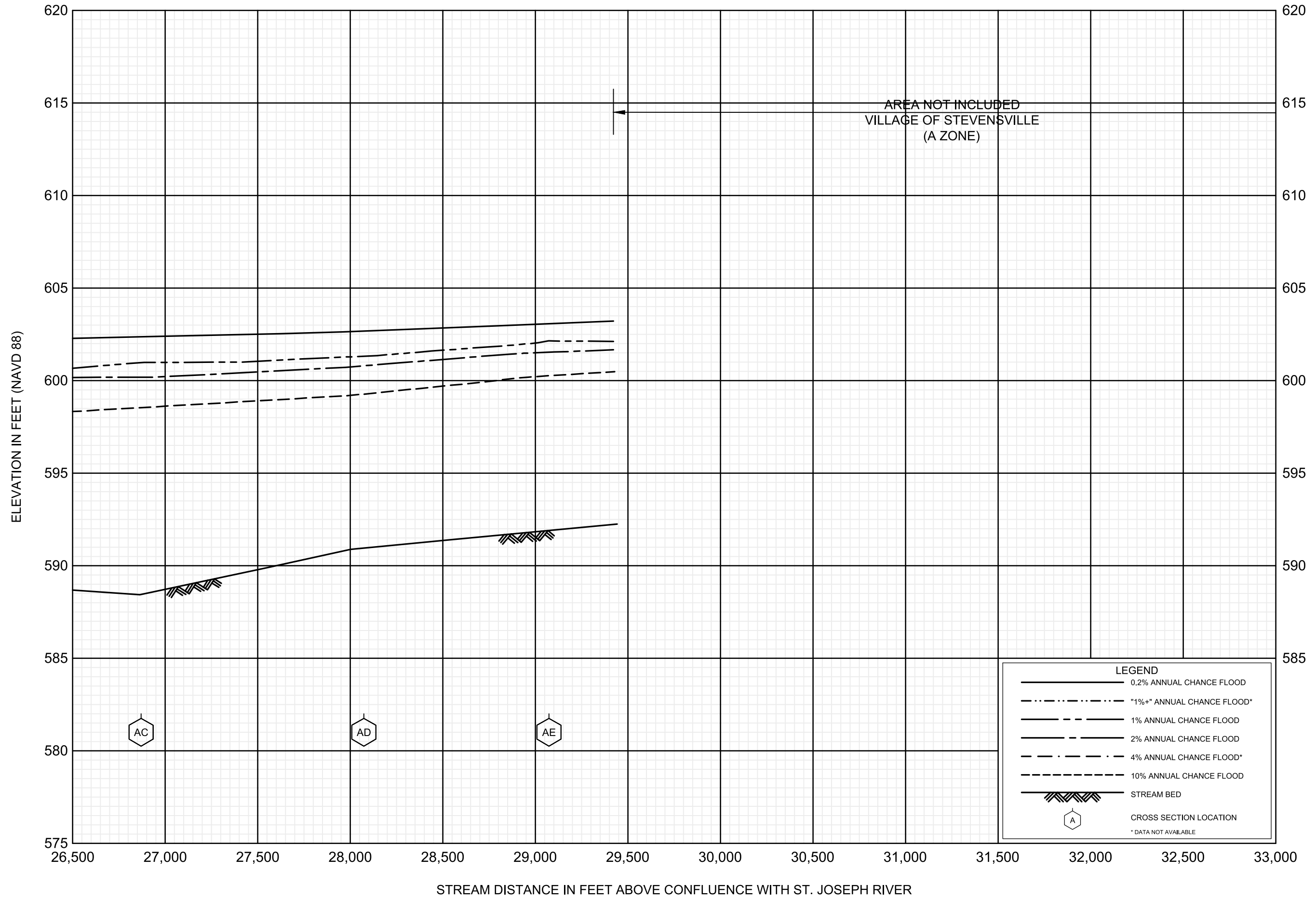
FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)



FLOOD PROFILES

HICKORY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
BERRIEN COUNTY, MICHIGAN
 (ALL JURISDICTIONS)



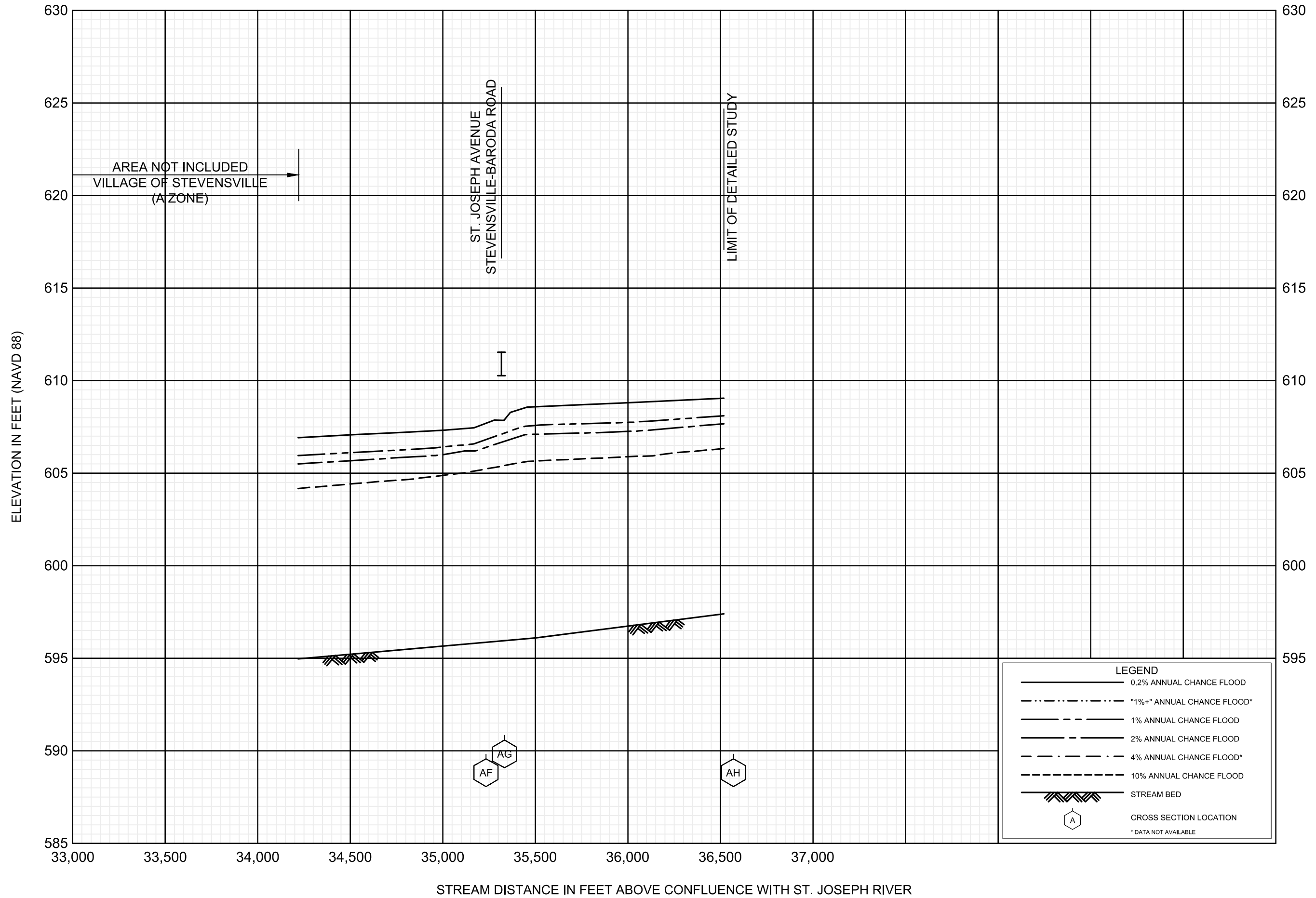
FLOOD PROFILES

HICKORY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BERRIEN COUNTY, MICHIGAN

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BERRIEN COUNTY, MICHIGAN

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